



Cisco WAN Switching Command Reference

Release 9.3.05

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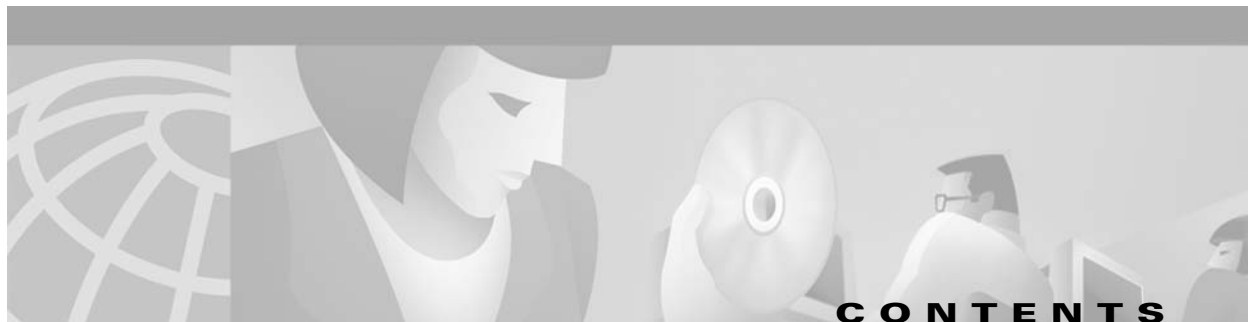
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Preface xxxix

Objectives	xxxix
Audience	xxxix
About the Cisco WAN Switch Product Name Change	xi
Organization	xi
Conventions	xli
Cisco Connection Online	xlii
Documentation CD-ROM	xliii
Related Documentation	xliii

CHAPTER 1

IGX and BPX Fundamentals 1-1

Powering Up the Control Terminal	1-2
The User Command Screen Layout	1-2
Entering a Command	1-2
About Command Categories	1-4
Aborting a Command	1-5
About Command Names	1-5
Command Shortcuts	1-7
In Case of a Mistake	1-8
Access Privileges	1-9
Help	1-9
The Numbering of Trunks, Lines, and Channels	1-10

CHAPTER 2

Basic Commands 2-1

Getting Help	2-1
Signing On	2-1
Logging Out	2-2
Clearing and Redrawing the Screen	2-2
Printing Screens	2-2
Accessing Physically Remote Nodes	2-2
List of Basic Commands	2-3
. (a period)	2-4

help or ? 2-6
 bye 2-9
 clrscrn 2-10
 prtscrn 2-11
 redscrn 2-12
 vt 2-13

CHAPTER 3

Setting Up Nodes 3-1

Naming a Node 3-1
 Configuring the Time Zone 3-2
 Removing a Trunk from the Network 3-2
 Adding an Interface Shelf 3-2
 Specifying Card Redundancy 3-3
 Card Redundancy for Virtual Trunking 3-5
 Controlling External Devices 3-6
 Command Sequences for Setting Up Nodes 3-7
 Sending A-bit Notification on ILMI/LMI Using Configurable Timer 3-8
 Definitions of Terms Related to A-bit Notification using Configurable Timer Feature in Release 9.2 3-8
 Purpose of Early A-bit Notification on ILMI/LMI Using Configurable Timer Feature 3-8
 Environment Required to use the A-bit Notification Using Configurable Timer Feature 3-9
 Configuration of A-bit Notification Feature 3-9
 Compatibility 3-9
 Overview of A-bit Notification Feature 3-9
 Function of the Early A-bit Notification on ILMI/LMI Using Configurable Timer Feature 3-10
 Using the Early A-bit Notification on ILMI/LMI Using Configurable Timer Feature 3-11
 Performance of Sending A-bit Notification Using Configurable Timer Feature 3-11
 Reliability, Availability, and Serviceability (RAS) 3-11
 Interoperability with Previous Release of Switch Software 3-11
 Summary of Commands 3-12
 addalmslot 3-14
 addcdred 3-16
 APS 1+1 Environment (Using Redundant Backcards, with Front Card Redundancy) 3-16
 addshelf 3-19
 Types of Interface Shelves Supported in Release 9.2 3-25
 UXM Feeder Support in Release 9.2 3-25

Not Supported in Release 9.2	3-25
Signalling Channel Used by MGX 8850 and SES Interface Shelves Connecting to Routing Hubs	3-25
addshelf Error Messages	3-26
addyred	3-30
Mismatch Checking Performed by addyred/delyred	3-30
cnfasm	3-32
cnfdate	3-34
cnffunc	3-36
Upgrading from Release 9.1 to Release 9.2 when IMA Trunks Exist	3-36
cnfname	3-40
cnfprt	3-42
cnfterm	3-44
cnftime	3-47
cnftmzn	3-49
delalmslot	3-51
delcdred	3-53
delshelf	3-54
delyred	3-56
dspasm	3-57
dspcd	3-59
dspcdred	3-61
dspcds	3-63
dspctrls	3-67
dsplancnf	3-69
dsplmistats	3-71
dspnds	3-73
dspnode	3-75
dsptermcnf	3-80
dsptermfunc	3-82
dspprtcnf	3-83
dspwr	3-85
dspyred	3-87
prtcared	3-89
prtyred	3-90
switchcdred	3-92

Other Notes on switchcdred **3-93**
 switchyred **3-94**
 upcd **3-97**
 window **3-99**

CHAPTER 4

Setting Up Trunks 4-1

Introduction **4-1**
 Overview of Virtual Trunking **4-3**
 Setting Up a Trunk **4-5**
 Compatibility Between Cards in Virtual Trunks **4-6**
 Virtual Trunking Support on BPX and IGX in Release 9.2 **4-6**
 Introduction to Ports and Trunks and Virtual Trunking **4-7**
 Version Interoperability **4-8**
 Virtual Trunking Configuration **4-8**
 Virtual Trunk Example **4-9**
 Connection Management **4-9**
 Cell Header Formats **4-10**
 Bit Shifting for Virtual Trunks **4-11**
 Setting up a BNI Virtual Trunk through an ATM Cloud **4-11**
 BXM and UXM Virtual Trunks Connecting through Cloud with Cisco Equipment **4-13**
 Setting Up a BXM or UXM Virtual Trunk Through an ATM Cloud **4-13**
 Routing with Virtual Trunks **4-15**
 Virtual Trunk Bandwidth **4-15**
 Virtual Trunk Connection Channels **4-15**
 Cell Transmit Address Translation **4-16**
 Cell Receive Address Lookup **4-16**
 Selection of Connection Identifier **4-16**
 Routing VPCs over Virtual Trunks **4-16**
 Configuration Requirements **4-16**
 VPC Configuration with the ATM Cloud **4-17**
 Virtual Trunk Interfaces **4-19**
 Virtual Trunk Traffic Classes **4-19**
 Virtual Trunk Cell Addressing **4-19**
 BXM/UXM Two-Stage Queueing **4-19**
 Virtual Trunking Configuration **4-20**
 Virtual Trunk Example **4-20**

Trunk and Line Redundancy	4-22
Networking	4-23
Virtual Trunk Configuration	4-23
ILMI (Integrated Local Management Interface)	4-23
Blind Addressing	4-23
VPC Failure Within the ATM Cloud	4-23
Trunk Alarms	4-23
Logical Trunk Alarms	4-23
Physical Trunk Alarms	4-23
Physical and Logical Trunk Alarm Summary	4-23
Event Logging	4-25
Error Messages	4-25
Virtual Trunking Commands	4-26
Virtual Trunks Commands Common to BXM and UXM	4-26
Virtual Trunk UXM Commands	4-27
Virtual Trunk BXM/BNI Commands	4-28
Permutations of Virtual Trunks You Can Configure Through the ATM Cloud	4-28
Ports and Trunks Feature in Release 9.2	4-29
Virtual Trunking Features Supported in Release 9.2	4-29
Impact of Other Features on Virtual Trunking in Release 9.2	4-30
BXM and UXM Card Interface Capacities	4-30
Channel Capacities	4-31
Errors and Alarm Handling	4-31
Physical Interface Specifications and Applicable Standards	4-32
Commands You Use to Configure Virtual Trunking	4-32
Commands to Configure Trunks and Ports on Same Card	4-32
Reliability, Availability, and Serviceability (RAS) Feature Support	4-32
Virtual Trunking Features Supported on BXM and UXM Cards	4-32
Virtual Trunking Limitations	4-34
Compatibility	4-35
Virtual Trunking	4-35
How Virtual Trunking Interacts with Virtual Interfaces	4-35
Virtual Trunking Function Changes	4-35
Establishing a Virtual Trunk Through an ATM Cloud	4-37
Managing Virtual Trunk Numbers	4-37

- Virtual Trunk Configuration **4-38**
 - cnftrk Command Parameters **4-38**
 - Virtual Trunking Feature must be Enabled by Cisco Technical Assistance Center **4-40**
 - Virtual Trunks cannot be Configured as Feeder Trunks **4-40**
- User Interfaces **4-40**
 - User Syntax **4-40**
 - Cisco WAN Manager **4-40**
- Reconfiguring a Trunk **4-42**
- Removing a Trunk **4-44**
- Displaying or Printing Trunk Configurations **4-44**
- Setting Up ATM Trunk and Line Redundancy **4-44**
 - Trunk Redundancy **4-45**
- APS Command Summary **4-46**
- Using Subrate Trunk Interface Control Templates **4-47**
- Summary of Commands **4-47**
- addapsln/delapsln **4-49**
 - Feature Mismatching to Verify APS (Automatic Protection Switching) Support **4-49**
- addtrk **4-51**
 - Adding a Virtual Trunk **4-51**
- addtrkred **4-54**
- cnfapsln **4-56**
- cnfcdaps **4-60**
 - Configuring the APS Standard Option (GR-253—Annex A or ITUT—Annex B) **4-60**
 - APS Environment Setup **4-61**
- cnfrsrc **4-64**
 - Configuration with cnfrsrc **4-65**
- cnftrk **4-70**
 - Subrate and Fractional Trunks **4-71**
 - Receive and Transmit Rates on Physical Trunks **4-71**
 - Receive and Transmit Rates on Virtual Trunks **4-72**
 - Physical and Virtual Trunk Configuration **4-72**
 - Configuring an IMA-Compliant Trunk **4-73**
 - Specifying a Set of Physical Lines (Comprising an IMA Group) **4-73**
 - Physical and Virtual Trunk Parameters You Can Configure with cnftrk **4-74**
 - Virtual Trunk Traffic Classes **4-75**

Adding a Single Virtual Trunk	4-75
cnftrkalm	4-90
Trunk Alarms	4-91
Logical Trunk Alarms	4-91
Physical Trunk Alarms	4-91
IMA Physical Line Alarms	4-91
cnftrkict	4-95
cpytrkict	4-97
delapsln	4-99
deltrk	4-101
deltrkred	4-103
dntrk	4-105
dspapsln	4-107
dspnw	4-109
dspphyslns	4-111
dsprkbob	4-114
dsprkcnf	4-116
dsprkict	4-123
dsprkred	4-125
dsprks	4-127
dsprkstats	4-132
Trunk Statistics	4-132
prtapsln	4-138
prtntw	4-139
prtrkict	4-141
prtrks	4-142
switchapsln	4-143
uptrk	4-146
Configuring IMA Physical Lines	4-146
Specifying an IMA Group Member	4-147
Feature Mismatching on Virtual Trunks	4-148

CHAPTER 5**Setting Up Lines 5-1**

Setting Up a Circuit Line	5-3
Setting Up an IMA Line	5-4
Calculating Transmit and Receive Rates on IMA Lines	5-6

Flow Diagrams for Line Setup **5-8**

List of Commands **5-10**

cnfcassw **5-11**

cnfln **5-14**

cnfrsrc **5-24**

dnln **5-29**

dspIncnf **5-31**

dsplns **5-36**

dspphyslns **5-38**

dsptsmap **5-40**

prtlns **5-42**

upln **5-43**

Multilevel Channels Statistics Feature Support in Release 9.2 **5-44**

CHAPTER 6

Voice Connections 6-1

Setting Up a Voice Connection **6-1**

 Configuring Voice Channel Redundancy **6-2**

 Using VAD and Configuring Voice Channel Utilization **6-2**

Summary of Commands **6-3**

addcon **6-4**

cnfchadv **6-8**

cnfchdl **6-10**

cnfchec **6-13**

cnfchfax **6-16**

cnfchgn **6-18**

cnfcond **6-20**

cnflnpass **6-23**

cnfrcvsig **6-25**

cnfvchtp **6-27**

cnfxmtsiz **6-30**

delcon **6-32**

dspchcnf **6-34**

dspchdlcnf **6-36**

dspchec **6-38**

dspcon **6-40**

dspcond **6-42**

dspcons	6-44
dspconst	6-48
dsprtcache	6-50
dspsigqual	6-52
dspsvcst	6-54
prtchcnf	6-56
prtchdlcnf	6-57
prtcons	6-58

CHAPTER 7**Data Connections 7-1**

Setting Up a Data Connection	7-2
Configuring Data Channel Redundancy	7-3
Using an Interface Control Template	7-3
Enabling DFM and Data Channel Utilization	7-3
Enabling Embedded EIA Operation on the LDP or LDM	7-3
Setting Up DDS Trunks	7-4
Configuring a Channel to Use Idle Code Suppression	7-4
Summary of Commands	7-5
addcon	7-6
cnfchdfm	7-18
cnfcheia	7-20
cnfcldir	7-22
cnfdch	7-24
How Idle Code Suppression Works	7-25
Configuring Idle Code Suppression	7-25
Interface with Cisco WAN Manager and other Network Management Systems	7-26
Inserting/Removing Cards (Idle Code Suppression Mismatch)	7-26
Y-Redundancy	7-27
Upgrading and Downgrading the Idle Code Suppression Feature	7-27
Limitations with Idle Code Suppression	7-28
cnfdchtp	7-30
cnfdclk	7-33
cnfict	7-37
cpyict	7-42
delcon	7-44
dspchcnf	7-46

dspcon 7-48
 dspcons 7-50
 dsprtcache 7-54
 dspict 7-56
 prtchcnf 7-58
 prtcons 7-59
 prtict 7-61

CHAPTER 8

Frame Relay Connections 8-1

Physical and Logical Frame Relay Ports 8-2
 Physical and Logical Ports on an FRM 8-2
 Logical Ports and Physical Lines on a UFM 8-2
 Setting Up a Frame Relay Connection 8-3
 Using Frame Relay Classes 8-4
 Using Interface Control Templates 8-5
 Configuring Channel Utilization 8-5
 Setting Channel Priorities 8-6
 Displaying Statistics 8-6
 Summary of Commands 8-6
 addcon 8-8
 Service Interworking 8-8
 Normal Connections 8-8
 Bundled Connections 8-9
 Frame Forwarding Connections 8-10
 Maximum Connections Per Port with Signaling Protocols 8-10
 addfrport 8-19
 cnfdch 8-22
 clfrportstats 8-24
 cnfchpri 8-25
 cnffrcls 8-27
 cnffrcon 8-30
 cnffrcport 8-33
 cnffrport 8-35
 Signaling Protocol Timers 8-36
 cnfict 8-48
 cnfmode 8-54

cpyict	8-57
delcon	8-59
delfrport (T1/E1)	8-61
dnfrport	8-63
dspchcnf	8-65
dspchstats	8-67
Description of Frame Relay Channel Statistics	8-68
dspcon	8-81
dspcons	8-83
Viewing Results from OAM Loopback Test	8-83
dspfrcls	8-90
dspfrport	8-92
dspfrcport	8-97
dspict	8-99
dspmode	8-102
dspmodes	8-105
dsppcs	8-107
dsportids	8-110
dsportstats	8-112
dsprtcache	8-122
prtchcnf	8-124
prtcons	8-125
prtict	8-127
upfrport	8-128

CHAPTER 9**ATM Connections 9-1**

Setting Up an ATM Connection	9-2
Managing Bandwidth	9-3
Other Commands	9-3
Summary of Commands	9-4
addcon	9-5
Network and Service Interworking	9-7
clrchstats	9-19
cnfatmcls	9-21
cnfcls	9-24
cnfcon	9-27

- cnfport **9-29**
 - Feature Mismatching to Verify LMI/ILMI Support **9-29**
 - Traffic Shaping on the UXM Card in Release 9.2 **9-29**
 - Configuring Traffic Shaping **9-30**
 - Redundancy Architecture **9-31**
 - Firmware Functionality (BXM) **9-31**
 - Performance of Traffic Shaping **9-32**
 - Errors and Alarm Handling **9-32**
- cnfportq **9-37**
 - Configuring Port Queues used by rt-VBR and nrt-VBR Connections **9-37**
- delcon **9-41**
- dnport **9-43**
- dspatmcls **9-45**
- dspchstats **9-48**
 - Functional Description **9-52**
 - Segmentation, Assembly, and Reassembly (SAR) Statistics for BXM Card **9-52**
- dspcls **9-54**
- dspcon **9-57**
- dspconcnf **9-63**
- dspcons **9-66**
- dsplmistats **9-73**
 - Functional Description of LMI Statistics for BXM Card **9-74**
- dsport **9-77**
- dsportq **9-80**
- dsportstats **9-83**
 - Statistics Supported for BPX ATM Ports (ASI or BXM Front Card) **9-84**
- dsprtcache **9-88**
- uport **9-90**

CHAPTER 10

Optimizing Traffic Routing and Bandwidth 10-1

- Specifying Channel Utilization **10-1**
- Specifying Class of Service **10-1**
- Specifying Priority Bumping **10-2**
- Managing Bandwidth **10-5**
- Summary of Commands **10-6**
- cnfbmpparm **10-7**

cnfchutl	10-12
cnfcomb	10-16
cnfcost	10-18
cnfpref	10-20
cnfrcost	10-23
dncon	10-25
dspbmpparm	10-28
dspbmpstats	10-30
dspload	10-32
dspospace	10-37
dsprtcache	10-38
dsprts	10-40
dsprkutl	10-42
prtrts	10-45
upcon	10-46

CHAPTER 11**Synchronizing Network Clocks 11-1**

Understanding Network Synchronization	11-1
Defining Clocks and Lines	11-1
Synchronizing the Network	11-3
Summary of Commands	11-4
clrclkalm	11-5
cnfclksrc	11-6
dspclksrcs	11-8
dspcurclk	11-10

CHAPTER 12**Managing Jobs 12-1**

Creating (Adding) a Job	12-1
Running a Job	12-2
Stopping a Job	12-2
Displaying Jobs	12-2
Editing a Job	12-3
Deleting a Job	12-3
Creating a Job Trigger	12-3
Summary of Commands	12-4
addjob	12-5

addjobtrig 12-8
 deljob 12-11
 deljobtrig 12-12
 dspjob 12-13
 dspjobs 12-15
 editjob 12-17
 prtjob 12-19
 prtjobs 12-20
 runjob 12-21
 stopjob 12-23

CHAPTER 13

Managing the Network 13-1

Signing On to the System 13-1
 Signing Off the System 13-1
 Changing a Password 13-2
 Set Date and Time 13-2
 Summary of Commands 13-2
 adduser 13-4
 cnfpwd 13-6
 cnffwswinit 13-7
 cnfsnmp 13-8
 cnfstatmast 13-9
 cnfsysparm 13-10
 deluser 13-15
 dsplanip 13-16
 Service-Affecting Alarms and Out-of-Band Network Management Features in Release 9.2 13-16
 dspnwip 13-18
 dsppwd 13-19
 dspsnmp 13-21
 dspsnmpstats 13-23
 dspsv3 13-25
 dsptsmap 13-31
 dspusers 13-33
 dspusertask 13-34
 dspusertasks 13-37

CHAPTER 14**Troubleshooting Commands 14-1**

- addalmslot **14-3**
- addextlp **14-5**
- addInloclp **14-7**
- addInlocrmtlp **14-9**
- addloclp **14-11**
 - Frame Relay Local Loops with Port Concentrator **14-13**
- addlocrmtlp **14-16**
- addrmtlp **14-18**
 - Remote Loopbacks and the Port Concentrator Shelf **14-20**
- clrchstas **14-23**
- clrclkalm **14-25**
- clreventq **14-26**
- clrlnalm **14-28**
- clrlnerrs **14-30**
- clrlog **14-31**
- clrmalgalm **14-33**
- clrphyslnalm **14-35**
- clrphyslnerrs **14-39**
- clrportstats **14-41**
- clrslotalms **14-43**
- clrsloterrs **14-44**
- clrtrkalm **14-45**
- clrtrkerrs **14-47**
- clrtrkstats **14-49**
- cnfbus **14-50**
- cnfleadmon **14-52**
- cnflnalm **14-54**
- cnfslotalm **14-61**
- cnftrkalm **14-63**
- dellp **14-65**
- dncd **14-67**
- dspalms **14-68**
- dspbob **14-74**
 - Displaying Signal Status for Port Concentrator Ports **14-74**

dspbusbw	14-77
dspbuses	14-80
dspclnerrs	14-82
dspeventq	14-85
dspfrcbob	14-87
dsplog	14-89
Degraded Mode Conditions	14-89
APS Alarms Displayed with dsplog Command	14-90
Logging into a Node in High-Priority Login Mode	14-94
dsplnalmcnf	14-98
dsplnerrs	14-101
dspphyslnerrs	14-103
dspphyslns	14-110
dspplr	14-113
dspslotalmcnf	14-116
dspslotalms	14-118
dspsloterrs	14-120
dspslotstatcnf	14-123
dspsv3	14-125
dsptrafficgen	14-129
dsptrkerrs	14-131
prtlnerrs	14-135
prtlog	14-136
prtlnerrs	14-137
prtlnerrs	14-138
prtrkerrs	14-139
resetcd	14-140
resetpc	14-142
switchcc	14-143
tstcon	14-145
tstconseg	14-149
tstdelay	14-151
tstpcs	14-154
tstport	14-155

CHAPTER 15**Access Device Commands on a Node 15-1**

Introduction	15-1
Summary of Commands	15-1
addad	15-3
addcon	15-5
cnfadcmtmr	15-8
cnfadcon	15-10
delad	15-14
dspads	15-16
dspcon	15-18
dspcons	15-20
resetad	15-23
restartad	15-24

CHAPTER 16**VSI Commands 16-1**

VSI Terms and Acronyms	16-2
Summary of Commands	16-5
addctrl	16-6
addshelf	16-9
Adding a VSI Controller	16-9
Feature Mismatching to Verify VSI Support	16-10
addyred	16-17
cnfqbin	16-19
Qbin Dependencies	16-22
cnfrsrc	16-24
Resource Partitioning	16-24
Partition Information Sent to Cisco WAN Manager	16-26
Partitioning	16-26
cnfrsrc Parameters, Possible Values, and Descriptions	16-27
Feature Mismatching to Verify VSI Support	16-27
cnfvsiiif	16-34
Assigning a Service Template to an Interface	16-34
cnfvsiiif Example	16-34
cnfvsiipart	16-36
delctrl	16-37

- delshelf **16-40**
 - Deleting a Controller **16-40**
- delyred **16-42**
- dspchuse **16-43**
- dspctrlrs **16-46**
- dspqbin **16-48**
 - Class of Service Buffer Descriptor Template Configuration **16-51**
- dspqbint **16-53**
- dsprsrc **16-55**
- dspst **16-60**
 - Extended Services Types Support **16-60**
 - Connection Admission Control (CAC) **16-60**
 - Supported Service Types **16-60**
 - Details of Connection (VC) Parameters Used in Service Class Templates **16-61**
- dspvsiif **16-76**
- dspvsipartcnf **16-78**
- dspvsipartinfo **16-79**
- dspvsich **16-82**
- dspyred **16-84**

CHAPTER 17

Miscellaneous Features 17-1

- High-Priority Login Feature **17-1**
 - Introduction **17-1**
 - Problem Description for Which Network Flooding Control Enhancement Provides a Solution **17-1**
 - Configuring the High-Priority Login Mode Feature **17-2**
 - Using the High-Priority Login Feature **17-2**
 - Functional Description **17-2**
 - Software Loop Prevention **17-3**
 - Duplicate Coerced Message Dumping **17-3**
 - Network Message Read Limit **17-3**
 - High-Priority Console Login **17-3**
 - ARP Table Expansion **17-4**
 - Comm Fail Tolerance **17-5**
 - LMI Failure Prevention—Manual Command **17-5**
 - cnfnodparm Screen **17-7**

dspnode Screen 17-7

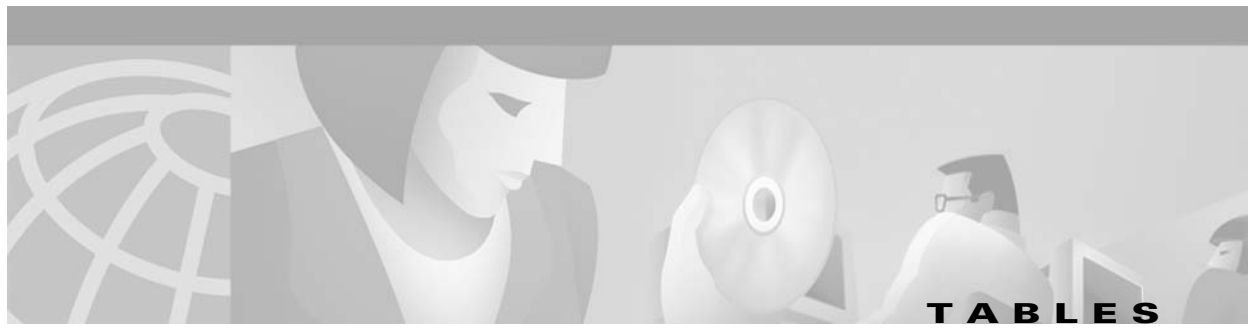
APPENDIX A

Command List A-1



<i>Figure 1-1</i>	Entering a Command	1-4
<i>Figure 3-1</i>	Y-Cable Connection	3-4
<i>Figure 3-2</i>	Y-Cables on Multiple Ports	3-5
<i>Figure 3-3</i>	Setting Up Nodes	3-7
<i>Figure 3-4</i>	Viewing the Node Configuration	3-7
<i>Figure 3-5</i>	Configuring the Node Interface for a Local Control Terminal	3-7
<i>Figure 3-6</i>	Removing a Node From the Network	3-7
<i>Figure 3-7</i>	Add an Interface Shelf to the Network	3-8
<i>Figure 4-1</i>	Typical ATM Hybrid Network Using Virtual Trunks	4-3
<i>Figure 4-2</i>	Virtual Trunks Across a Public ATM Network	4-9
<i>Figure 4-3</i>	ATM Virtual Trunk Header Types	4-10
<i>Figure 4-4</i>	Addition of Virtual Trunks Across a Public ATM Network	4-22
<i>Figure 4-5</i>	ATM Header Types	4-36
<i>Figure 5-1</i>	Setting Up Voice Lines	5-8
<i>Figure 5-2</i>	Setting Up Data Lines	5-8
<i>Figure 5-3</i>	Setting Up Frame Relay Lines	5-8
<i>Figure 5-4</i>	Setting Up ATM Lines	5-9
<i>Figure 7-1</i>	Normal Clocking on a DCE	7-33
<i>Figure 7-2</i>	Split Clocking on a DCE	7-33
<i>Figure 7-3</i>	Looped Clocking on a DCE	7-34
<i>Figure 7-4</i>	Normal Clocking on a DTE	7-34
<i>Figure 7-5</i>	Split Clocking on a DTE	7-34
<i>Figure 7-6</i>	Looped Clocking on a DTE	7-35
<i>Figure 8-1</i>	Local Addressing Example	8-12
<i>Figure 8-2</i>	Global Addressing Example	8-13
<i>Figure 8-3</i>	Signaling Protocol Timing	8-37
<i>Figure 9-1</i>	Prompt Sequence for a CBR Connection	9-8
<i>Figure 10-1</i>	Priority Bumping between Two Switches	10-3
<i>Figure 10-2</i>	Priority Bumping between Three Switches	10-4
<i>Figure 11-1</i>	Clock Provided by Vendor	11-2
<i>Figure 11-2</i>	Clock Source in Node	11-3

<i>Figure 14-1</i>	Local Loopback on a Voice Channel	14-11
<i>Figure 14-2</i>	Local Loopback on a Data Connection	14-12
<i>Figure 14-3</i>	Local Loop on Port Concentrator	14-13
<i>Figure 14-4</i>	Local Loop on FRM-2 or FRP-2	14-13
<i>Figure 14-5</i>	Remote Loopback on a Voice Channel	14-18
<i>Figure 14-6</i>	Remote Loopback on a Data Connection	14-19
<i>Figure 14-7</i>	Frame Relay Remote Loops	14-20
<i>Figure 14-8</i>	Frame Relay Remote Loops with Port Concentrator	14-20
<i>Figure 16-1</i>	Graphical View of Resource Partitioning, Automatic Routing Management and VSI	16-26
<i>Figure 17-1</i>	cnfnodeparm Screen	17-7
<i>Figure 17-2</i>	dspnode Screen	17-8



<i>Table 1-1</i>	Command Categories	1-4
<i>Table 1-2</i>	Command-Related Abbreviations	1-5
<i>Table 1-3</i>	Keys for Editing the Command Line	1-8
<i>Table 1-4</i>	Formats of System Resource Names	1-10
<i>Table 2-1</i>	List of Basic Commands	2-3
<i>Table 2-2</i>	help—Optional Parameter	2-8
<i>Table 2-3</i>	vt-Parameter	2-14
<i>Table 3-1</i>	Commands for Setting Up a Node	3-12
<i>Table 3-2</i>	addalmslot—Parameters	3-15
<i>Table 3-3</i>	addcdred—Parameters	3-18
<i>Table 3-4</i>	addshelf—Interface Shelf Parameters	3-21
<i>Table 3-5</i>	addshelf—Label Switching Parameters	3-27
<i>Table 3-6</i>	addyred—Parameters	3-31
<i>Table 3-7</i>	cnfdate—Parameters	3-35
<i>Table 3-8</i>	cnfdate—Optional Parameters	3-35
<i>Table 3-9</i>	cnffunc—Index Parameters	3-37
<i>Table 3-10</i>	cnfppt—Parameters	3-43
<i>Table 3-11</i>	cnfterrm—Parameters	3-45
<i>Table 3-12</i>	cnftime—Parameters	3-48
<i>Table 3-13</i>	cnftmzn—Parameters	3-50
<i>Table 3-14</i>	delamslot—Parameters	3-52
<i>Table 3-15</i>	delshelf—Parameters	3-55
<i>Table 3-16</i>	dspcds—Parameters	3-66
<i>Table 3-17</i>	LAN Configuration Address Fields	3-69
<i>Table 3-18</i>	dspnds—Optional Parameters	3-74
<i>Table 3-19</i>	switchyred—Example	3-94
<i>Table 3-20</i>	upcd—Parameters	3-98
<i>Table 3-21</i>	window—Parameters	3-100
<i>Table 4-1</i>	Supported Card Types in Release 9.2	4-2
<i>Table 4-2</i>	Interface Types Supported on the Same Card	4-5
<i>Table 4-3</i>	Networking Channel Capacities for Virtual Trunks	4-6

<i>Table 4-4</i>	Permutation of Virtual Trunks That Can Be Connected Through a Public Cloud	4-7
<i>Table 4-5</i>	Interface Types That Can Be Supported on a Single Card	4-8
<i>Table 4-6</i>	Bit Shifting for Virtual Trunking	4-11
<i>Table 4-7</i>	VPI Ranges	4-12
<i>Table 4-8</i>	General Guidelines on Setting cnfport Shift On/Shift Off Parameter for Virtual Trunking	4-14
<i>Table 4-9</i>	VPI Ranges	4-17
<i>Table 4-10</i>	Maximum Connection IDs (LCNs)	4-17
<i>Table 4-11</i>	Physical and Logical Trunk Alarms	4-24
<i>Table 4-12</i>	IGX Log Messaging for Activating and Adding VTs	4-25
<i>Table 4-13</i>	BPX Log Messaging for Activating and Adding VTs	4-25
<i>Table 4-14</i>	Virtual Trunk Error Messages	4-25
<i>Table 4-15</i>	Virtual Trunk Commands Common to BXM and UXM (IGX)	4-27
<i>Table 4-16</i>	Virtual Trunk UXM Commands	4-28
<i>Table 4-17</i>	Virtual Trunk Commands BXM/BNI	4-28
<i>Table 4-18</i>	Permutations of Virtual Trunks That Can Be Configured Through ATM Cloud	4-28
<i>Table 4-19</i>	Interface Types That Can Be Supported on Single Card	4-29
<i>Table 4-20</i>	BXM and UXM Interface Capacities	4-31
<i>Table 4-21</i>	Channel Capacities for BXM and UXM Cards	4-31
<i>Table 4-22</i>	VIs, Ports, and Channels Supported on BXM and UXM Cards	4-33
<i>Table 4-23</i>	Virtual Interfaces and LCNs Allowed Per Card	4-33
<i>Table 4-24</i>	Trunk Options You Can Configure with cnftrk Command	4-38
<i>Table 4-25</i>	APS Commands	4-46
<i>Table 4-26</i>	List of Trunk Commands	4-47
<i>Table 4-27</i>	addapsIn—Parameters	4-50
<i>Table 4-28</i>	addtrk—Parameters	4-52
<i>Table 4-29</i>	addtrk—Optional Parameters	4-53
<i>Table 4-30</i>	addtrkred—Parameters	4-55
<i>Table 4-31</i>	Configurable APS Parameters	4-56
<i>Table 4-32</i>	cnfcdaps—Parameters	4-62
<i>Table 4-33</i>	Maximum Connection IDs (LCNs)	4-65
<i>Table 4-34</i>	cnfrsrc—Parameters	4-66
<i>Table 4-35</i>	cnftrk—Parameters That are Configurable on Physical and Virtual Trunks	4-74
<i>Table 4-36</i>	cnftrk—Parameters	4-82
<i>Table 4-37</i>	cnftrk—Optional Parameters	4-88
<i>Table 4-38</i>	Default Statistical Reserves for Physical Trunks	4-89

<i>Table 4-39</i>	Default Statistical Reserves for Virtual Trunks	4-89
<i>Table 4-40</i>	Physical and Logical Trunk Alarms Supported on IGX and BPX	4-90
<i>Table 4-41</i>	Physical and Logical Alarms Supported on IMA Physical Lines	4-92
<i>Table 4-42</i>	cnftrkalm—Parameters	4-94
<i>Table 4-43</i>	cnftrkalm—Optional Parameters	4-94
<i>Table 4-44</i>	Configurable Signals in an Interface Control Template	4-95
<i>Table 4-45</i>	cnftrkict—Parameters	4-96
<i>Table 4-46</i>	cpytrkict—Parameters	4-98
<i>Table 4-47</i>	delapsIn Parameters	4-99
<i>Table 4-48</i>	deltrk—Parameters	4-102
<i>Table 4-49</i>	deltrk—Optional Parameters	4-102
<i>Table 4-50</i>	deltrkred—Parameters	4-104
<i>Table 4-51</i>	dntrk—Parameters	4-106
<i>Table 4-52</i>	dntrk—Optional Parameters	4-106
<i>Table 4-53</i>	dspnw—Optional Parameters	4-110
<i>Table 4-54</i>	dsphysIns—Optional Parameters	4-113
<i>Table 4-55</i>	dsptrkbob—Parameters	4-115
<i>Table 4-56</i>	dsptrkbob—Optional Parameters	4-115
<i>Table 4-57</i>	Default Statistical Reserves for Physical Trunks	4-116
<i>Table 4-58</i>	Default Statistical Reserves for Virtual Trunks	4-116
<i>Table 4-59</i>	dsptrkcnf—Parameters	4-122
<i>Table 4-60</i>	dsptrkcnf—Optional Parameters	4-122
<i>Table 4-61</i>	dsptrkred—Optional Parameters	4-126
<i>Table 4-62</i>	Additional Statistics in the dsptrkstats Display	4-132
<i>Table 4-63</i>	Trunk Statistics	4-133
<i>Table 4-64</i>	dsptrkstats—Parameters	4-137
<i>Table 4-65</i>	dsptrkstats—Optional Parameters	4-137
<i>Table 4-66</i>	prtnw—Parameters	4-139
<i>Table 4-67</i>	prtrkict—Parameters	4-141
<i>Table 4-68</i>	switchapsIn—Parameters	4-144
<i>Table 4-69</i>	uptrk—Parameters	4-150
<i>Table 4-70</i>	uptrk—Optional Parameters	4-150
<i>Table 5-1</i>	Input Line Formats	5-1
<i>Table 5-2</i>	Line Card Combinations	5-2
<i>Table 5-3</i>	Composite Port Speed	5-7

<i>Table 5-4</i>	Line Commands	5-10
<i>Table 5-5</i>	cnfcassw—Parameters	5-12
<i>Table 5-6</i>	cnfln—Voice, Frame Relay, or Data Parameters	5-19
<i>Table 5-7</i>	cnfln—ATM (ALM/A) Parameters	5-20
<i>Table 5-8</i>	cnfln—ATM (ASI) Parameters	5-21
<i>Table 5-9</i>	cnfln—ATM (UXM) Parameters	5-21
<i>Table 5-10</i>	cnfln—IMA (UXM) Parameters	5-22
<i>Table 5-11</i>	cnfrsrc—Parameters	5-26
<i>Table 5-12</i>	dnln—Parameters	5-30
<i>Table 5-13</i>	dnln—Parameters for UXM	5-30
<i>Table 5-14</i>	Possible Line Configuration Parameters	5-31
<i>Table 5-15</i>	dsplncnf—Parameters	5-35
<i>Table 5-16</i>	dspphyslns—Field Descriptions	5-39
<i>Table 5-17</i>	dsptsmap—Parameters	5-41
<i>Table 5-18</i>	upln—Parameters	5-45
<i>Table 5-19</i>	upln—Parameters for UXM	5-45
<i>Table 6-1</i>	Voice Connection Commands	6-3
<i>Table 6-2</i>	Types of CDP and CVM Operation	6-4
<i>Table 6-3</i>	Types of UVM Operation	6-5
<i>Table 6-4</i>	Types of UVM Connections	6-5
<i>Table 6-5</i>	addcon—Parameters	6-7
<i>Table 6-6</i>	addcon—Optional Parameters	6-7
<i>Table 6-7</i>	cnfchadv—Parameters	6-9
<i>Table 6-8</i>	cnfchdl—Parameters	6-11
<i>Table 6-9</i>	cnfchdl—Optional Parameters	6-12
<i>Table 6-10</i>	cnfchec—Parameters	6-15
<i>Table 6-11</i>	cnfchfax—Parameters	6-17
<i>Table 6-12</i>	cnfchgn—Parameters	6-19
<i>Table 6-13</i>	cnfcond—Parameters	6-21
<i>Table 6-14</i>	cnflnpass—Parameters	6-24
<i>Table 6-15</i>	cnfrcvsig—Parameters	6-26
<i>Table 6-16</i>	cnfrcvsig—Optional Parameters	6-26
<i>Table 6-17</i>	cnfvchtp—Parameters	6-28
<i>Table 6-18</i>	cnfvchtp—Interface Types	6-29
<i>Table 6-19</i>	cnfxmtsiz—Parameters	6-31

<i>Table 6-20</i>	cnfxmtsiz—Optional Parameters	6-31
<i>Table 6-21</i>	delcon—Parameters	6-33
<i>Table 6-22</i>	dspchcnf—Parameters	6-35
<i>Table 6-23</i>	Information in dspchdlcnf Display	6-36
<i>Table 6-24</i>	dspchdlcnf—Parameters	6-37
<i>Table 6-25</i>	Information in the dspchec Display	6-38
<i>Table 6-26</i>	dspchec—Parameters	6-39
<i>Table 6-27</i>	dspcon—Parameters	6-41
<i>Table 6-28</i>	dspcond—Parameters	6-43
<i>Table 6-29</i>	Information in the dspcons Display	6-44
<i>Table 6-30</i>	dspcons—Optional Parameters	6-47
<i>Table 6-31</i>	Types of Connection Status	6-48
<i>Table 6-32</i>	dspconst—Optional Parameters	6-49
<i>Table 6-33</i>	dsprtcache—Parameters	6-51
<i>Table 6-34</i>	dspsigqual—Parameters	6-53
<i>Table 6-35</i>	prtchcnf—Parameters	6-56
<i>Table 6-36</i>	prtchdlcnf—Parameters	6-57
<i>Table 6-37</i>	prtcons—Optional Parameters	6-58
<i>Table 7-1</i>	Data Connection Commands	7-5
<i>Table 7-2</i>	Data Connection Load Table with Normal EIA and No DFM	7-6
<i>Table 7-3</i>	Data Connection Load Table with Interleaved EIA	7-8
<i>Table 7-4</i>	Data Connection Load Table with Partially Filled Packets and No DFM	7-9
<i>Table 7-5</i>	Data Connection Load Table with Normal EIA and DFM	7-10
<i>Table 7-6</i>	Data Connection Load Table with Partially Filled Packets and DFM	7-12
<i>Table 7-7</i>	Data Connection Load Table with Partially Filled Packets and Interleaved EIA	7-12
<i>Table 7-8</i>	Sub-Rate Data Connection Load Table (HDM to HDM)	7-13
<i>Table 7-9</i>	Sub-Rate Data Connection Load Table (HDM to HDM)	7-13
<i>Table 7-10</i>	Super-Rate Data Connection Load Table (LDM to HDM)	7-14
<i>Table 7-11</i>	addcon—Parameters	7-17
<i>Table 7-12</i>	addcon—Optional Parameters	7-17
<i>Table 7-13</i>	cnfchdfm—Parameters	7-19
<i>Table 7-14</i>	cnfchdfm—Optional Parameters	7-19
<i>Table 7-15</i>	cnfcheia—Parameters	7-21
<i>Table 7-16</i>	cnfcldir—Parameters	7-23
<i>Table 7-17</i>	Active Line That is Not in Y-Redundant Pair	7-26

<i>Table 7-18</i>	Card is Configured for Y-Redundancy	7-27
<i>Table 7-19</i>	Addyred Blocked Cards	7-27
<i>Table 7-20</i>	Active Line that is Not in Y-Redundant Pair	7-27
<i>Table 7-21</i>	Card is Configured for Y-Redundancy	7-28
<i>Table 7-22</i>	cnfdch—Parameters	7-29
<i>Table 7-23</i>	cnfdchtp—Parameters	7-32
<i>Table 7-24</i>	cnfdchtp—Optional Parameters	7-32
<i>Table 7-25</i>	cnfdclk—Parameters	7-36
<i>Table 7-26</i>	Configurable Lead Names and Functions	7-37
<i>Table 7-27</i>	cnfict—Parameters	7-40
<i>Table 7-28</i>	cpyict—Parameters	7-43
<i>Table 7-29</i>	delcon—Parameters	7-45
<i>Table 7-30</i>	dspchcnf—Parameters	7-47
<i>Table 7-31</i>	dspcon—Parameters	7-49
<i>Table 7-32</i>	Fields in the dspcons Display	7-50
<i>Table 7-33</i>	dspcons—Optional Parameters	7-53
<i>Table 7-34</i>	dsprtcache—Parameters	7-55
<i>Table 7-35</i>	dspict—Parameters	7-57
<i>Table 7-36</i>	prtchcnf—Parameters	7-58
<i>Table 7-37</i>	prtcons—Optional Parameters	7-59
<i>Table 7-38</i>	prtict—Parameters	7-62
<i>Table 8-1</i>	Frame Relay Commands	8-6
<i>Table 8-2</i>	addcon—Parameters	8-16
<i>Table 8-3</i>	addcon—Optional Parameters	8-18
<i>Table 8-4</i>	Frame Relay Port Error and Warning Messages	8-19
<i>Table 8-5</i>	addrport—Parameters	8-20
<i>Table 8-6</i>	addrport—Optional Parameters	8-21
<i>Table 8-7</i>	cnfdch—Parameters	8-23
<i>Table 8-8</i>	clrfrcportstats—Parameters	8-24
<i>Table 8-9</i>	cnfchpri—Parameters	8-26
<i>Table 8-10</i>	cnffrcls—Optional Parameters	8-29
<i>Table 8-11</i>	cnffrcon—Parameters	8-31
<i>Table 8-12</i>	cnffrcon—Optional Parameters	8-32
<i>Table 8-13</i>	cnffrcport—Parameters	8-34
<i>Table 8-14</i>	T1 and E1 Data Rates	8-35

<i>Table 8-15</i>	PCS Data Rates	8-35
<i>Table 8-16</i>	Data Rates for the 1-Mbps FRI	8-38
<i>Table 8-17</i>	cnffrport—Parameters	8-42
<i>Table 8-18</i>	Configurable Lead Listing	8-48
<i>Table 8-19</i>	cnfict—Parameters	8-52
<i>Table 8-20</i>	Card Modes for Unchannelized Back Cards	8-54
<i>Table 8-21</i>	cnfmode—Parameters	8-56
<i>Table 8-22</i>	cpyict—Parameters	8-58
<i>Table 8-23</i>	delcon—Parameters	8-60
<i>Table 8-24</i>	delfrport—Warnings and Error Messages	8-61
<i>Table 8-25</i>	delfrport (T1/E1)—Parameters	8-62
<i>Table 8-26</i>	dnfrport—Parameters	8-64
<i>Table 8-27</i>	dspchcnf—Parameters	8-66
<i>Table 8-28</i>	Frame Relay Channel Statistics in IGX	8-69
<i>Table 8-29</i>	At Ingress (before FRP Firmware Release FDS/FES)	8-78
<i>Table 8-30</i>	At Ingress (FRP Firmware Release FDS/FES and later)	8-78
<i>Table 8-31</i>	At Ingress (FRP firmware Release FDV/FEV and later)	8-78
<i>Table 8-32</i>	At Egress (DE bit setting)	8-79
<i>Table 8-33</i>	At Egress (Transmit queue behavior)	8-79
<i>Table 8-34</i>	dspchstats—Parameters	8-80
<i>Table 8-35</i>	dspchstats—Optional Parameters	8-80
<i>Table 8-36</i>	dspcon—Parameters	8-82
<i>Table 8-37</i>	dspcons Output	8-83
<i>Table 8-38</i>	dspcons—Optional Parameters	8-89
<i>Table 8-39</i>	Frame Relay Port Parameters	8-92
<i>Table 8-40</i>	dspfrcport—Displayed PCS Parameters	8-97
<i>Table 8-41</i>	dspfrport—Parameters	8-98
<i>Table 8-42</i>	dspict—Parameters	8-101
<i>Table 8-43</i>	Card Modes for Unchannelized Back Cards	8-102
<i>Table 8-44</i>	dspmde—Parameters	8-104
<i>Table 8-45</i>	dsppps—Optional Parameters	8-109
<i>Table 8-46</i>	UNI Port Statistics for Frame Relay	8-112
<i>Table 8-47</i>	LMI Statistics for Frame Relay	8-112
<i>Table 8-48</i>	Frame Error Statistics	8-113
<i>Table 8-49</i>	LMI Statistics	8-116

<i>Table 8-50</i>	Miscellaneous Frame Relay Use Statistics	8-118
<i>Table 8-51</i>	CLLM (ForeSight) Statistics	8-119
<i>Table 8-52</i>	dspportstats—Parameters	8-121
<i>Table 8-53</i>	dspportstats—Optional Parameters	8-121
<i>Table 8-54</i>	dsprtcache—Parameters	8-123
<i>Table 8-55</i>	prtcons—Optional Parameters	8-125
<i>Table 8-56</i>	prtict—Parameters	8-127
<i>Table 8-57</i>	upfrport—Parameters	8-129
<i>Table 9-1</i>	ATM UNI Cards	9-1
<i>Table 9-2</i>	ATM Connection Commands	9-4
<i>Table 9-3</i>	addcon—Parameters	9-9
<i>Table 9-4</i>	addcon—Parameter Defaults and Ranges	9-12
<i>Table 9-5</i>	Minimum PCR Values with Policing Enabled	9-14
<i>Table 9-6</i>	Traffic Policing Definitions	9-15
<i>Table 9-7</i>	VBR Policing Definitions	9-16
<i>Table 9-8</i>	clrchstats—Parameters	9-20
<i>Table 9-9</i>	cnfatmcls—Parameters	9-23
<i>Table 9-10</i>	cnfatmcls—Optional Parameters	9-23
<i>Table 9-11</i>	cnfcls—Parameters	9-26
<i>Table 9-12</i>	cnfcls—Optional Parameters	9-26
<i>Table 9-13</i>	cnfcon—Parameters	9-28
<i>Table 9-14</i>	cnfcon—Optional Parameters	9-28
<i>Table 9-15</i>	cnfport—Traffic Shaping Rates	9-30
<i>Table 9-16</i>	cnfport—Parameters	9-34
<i>Table 9-17</i>	cnfportq—ASI Parameters	9-39
<i>Table 9-18</i>	cnfportq—UXM Parameters	9-39
<i>Table 9-19</i>	delcon—Parameters	9-42
<i>Table 9-20</i>	dnport—Parameters	9-44
<i>Table 9-21</i>	dspatmcls—Parameters	9-47
<i>Table 9-22</i>	dspchstats—Parameters	9-52
<i>Table 9-23</i>	dspchstats—Optional Parameters	9-52
<i>Table 9-24</i>	SAR Statistics for BXM Card	9-53
<i>Table 9-25</i>	dspcls—Parameters	9-56
<i>Table 9-26</i>	dspcon—Parameters	9-62
<i>Table 9-27</i>	dspconcnf—Parameters	9-65

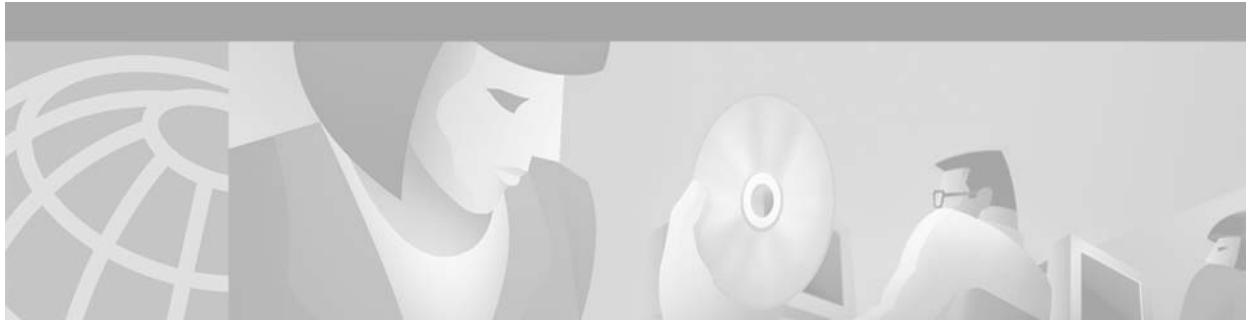
<i>Table 9-28</i>	Headings in Connection Display	9-66
<i>Table 9-29</i>	dspscons—Optional Parameters	9-71
<i>Table 9-30</i>	dsplmistats—Parameters	9-74
<i>Table 9-31</i>	dsplmistats—Optional Parameters	9-74
<i>Table 9-32</i>	LMI Statistics and Descriptions for dsplmistats (ATM) for BXM Card	9-74
<i>Table 9-33</i>	dspport—Parameters	9-79
<i>Table 9-34</i>	dspportq—Parameters	9-82
<i>Table 9-35</i>	dspportstats—Parameters	9-84
<i>Table 9-36</i>	dspportstats—Optional Parameters	9-84
<i>Table 9-37</i>	BPX Port Statistics Supported for ASI and BXM Front Cards	9-86
<i>Table 9-38</i>	dsprtcache—Parameters	9-89
<i>Table 9-39</i>	uport—Parameters	9-91
<i>Table 10-1</i>	Bandwidth Management Commands	10-6
<i>Table 10-2</i>	cnfbmpparm—Parameter Descriptions	10-9
<i>Table 10-3</i>	cnfchutl—Parameters	10-15
<i>Table 10-4</i>	cnfcmb—Parameters	10-17
<i>Table 10-5</i>	cnfcos—Parameters	10-19
<i>Table 10-6</i>	cnfpref—Parameters	10-22
<i>Table 10-7</i>	cnfpref—Optional Parameters	10-22
<i>Table 10-8</i>	Connection Status	10-25
<i>Table 10-9</i>	dncon—Parameters	10-27
<i>Table 10-10</i>	dncon—Optional Parameters	10-27
<i>Table 10-11</i>	dspbmpparm—Parameter Descriptions	10-29
<i>Table 10-12</i>	dspbmpstats—Descriptions	10-31
<i>Table 10-13</i>	dspload—Optional Parameters	10-36
<i>Table 10-14</i>	dspospace—Parameters	10-37
<i>Table 10-15</i>	dsprtcache—Parameters	10-39
<i>Table 10-16</i>	dsprts—Optional Parameters	10-41
<i>Table 10-17</i>	Trunk Utilization Parameters and Statistics	10-42
<i>Table 10-18</i>	Terminated Connection Statistics	10-43
<i>Table 10-19</i>	dsprtkutl—Parameters	10-44
<i>Table 10-20</i>	dsprtkutl—Optional Parameters	10-44
<i>Table 10-21</i>	prtrts—Optional Parameters	10-45
<i>Table 10-22</i>	upcon—Parameters	10-47
<i>Table 11-1</i>	Commands for Clock Synchronization	11-4

<i>Table 11-2</i>	clrcalkalm—Parameters	11-5
<i>Table 11-3</i>	cnfclksrc—Parameters	11-7
<i>Table 11-4</i>	cnfclksrc—Optional Parameters	11-7
<i>Table 12-1</i>	List of Job Commands	12-4
<i>Table 12-2</i>	addjob—Parameters	12-7
<i>Table 12-3</i>	addjob—Optional Parameters	12-7
<i>Table 12-4</i>	addjobtrig—Parameters	12-10
<i>Table 12-5</i>	deljob—Parameters	12-11
<i>Table 12-6</i>	deljobtrig—Parameters	12-12
<i>Table 12-7</i>	dspjob—Parameters	12-14
<i>Table 12-8</i>	editjob—Parameters	12-18
<i>Table 12-9</i>	runjob—Parameters	12-22
<i>Table 13-1</i>	Commands for Managing a Network	13-2
<i>Table 13-2</i>	adduser—Parameters	13-5
<i>Table 13-3</i>	cnfpwd—Parameters	13-6
<i>Table 13-4</i>	cnffwswinit—Parameters	13-7
<i>Table 13-5</i>	cnfsnmp—Parameters	13-8
<i>Table 13-6</i>	cnfstatmast—Parameters	13-9
<i>Table 13-7</i>	Defaults and Ranges of cnfsysparm Parameters	13-12
<i>Table 13-8</i>	cnfsysparm—Parameters	13-14
<i>Table 13-9</i>	deluser—Parameters	13-15
<i>Table 13-10</i>	dsppwd—Parameters	13-20
<i>Table 13-11</i>	Description of the Fields in the dspv3 Display	13-25
<i>Table 13-12</i>	Description of the Fields in the dspv3 Display	13-27
<i>Table 13-13</i>	Description of the Fields in the Previous dspv3 Display	13-27
<i>Table 13-14</i>	dspusertask—Parameters	13-36
<i>Table 14-1</i>	Troubleshooting Command List	14-1
<i>Table 14-2</i>	addextlp—Parameters	14-6
<i>Table 14-3</i>	addInloclp—Parameters	14-8
<i>Table 14-4</i>	addInlocrmtlp—Parameters	14-10
<i>Table 14-5</i>	addloclp—Parameters (voice)	14-14
<i>Table 14-6</i>	addloclp—Parameters (data)	14-15
<i>Table 14-7</i>	addloclp—Parameters (Frame Relay)	14-15
<i>Table 14-8</i>	addloclp—Parameters (Frame Relay connection)	14-15
<i>Table 14-9</i>	addloclp—Parameters (ATM connection)	14-15

<i>Table 14-10</i>	addloclp—Parameters (FTM connection with an Access Device attached)	14-15
<i>Table 14-11</i>	addlocrmtlp—Parameters	14-17
<i>Table 14-12</i>	addrmtlp—Parameters (voice)	14-21
<i>Table 14-13</i>	addrmtlp—Parameters (data)	14-22
<i>Table 14-14</i>	addrmtlp—Parameters (Frame Relay connections)	14-22
<i>Table 14-15</i>	addrmtlp—Parameters (ATM)	14-22
<i>Table 14-16</i>	addloclp—Parameters (FTM connection with an Access Device attached)	14-22
<i>Table 14-17</i>	clrchstats—Parameters	14-24
<i>Table 14-18</i>	clrclkalm—Parameters	14-25
<i>Table 14-19</i>	clrlnalm—Parameters	14-29
<i>Table 14-20</i>	clrphyslnalm—Parameters	14-38
<i>Table 14-21</i>	clrphyslnerrs—Parameters	14-40
<i>Table 14-22</i>	clrslotalms—Parameters	14-43
<i>Table 14-23</i>	clrsloterrs—Parameters	14-44
<i>Table 14-24</i>	clrtrkalm—Parameters	14-46
<i>Table 14-25</i>	clrtrkerrs—Parameters	14-48
<i>Table 14-26</i>	clrtrkstats—Parameters	14-49
<i>Table 14-27</i>	cnfbus—Parameters	14-51
<i>Table 14-28</i>	cnfleadmon—Parameters	14-53
<i>Table 14-29</i>	cnflnalm—Parameters	14-57
<i>Table 14-30</i>	Failure Type Parameters	14-58
<i>Table 14-31</i>	Parameters for Error Rate Options	14-60
<i>Table 14-32</i>	cnftrkalm—Parameters	14-64
<i>Table 14-33</i>	dellp—Parameters	14-66
<i>Table 14-34</i>	dnacd—Parameters	14-67
<i>Table 14-35</i>	Commands that Display Error Information	14-68
<i>Table 14-36</i>	dspbob—Parameters	14-76
<i>Table 14-37</i>	dspbob—Optional Parameters	14-76
<i>Table 14-38</i>	dspbusbw—Parameters	14-78
<i>Table 14-39</i>	dspbusbw—Optional Parameters	14-79
<i>Table 14-40</i>	dspbusbw—Screen Information	14-79
<i>Table 14-41</i>	Possible Bus Status Displays	14-80
<i>Table 14-42</i>	Bandwidth Units and Capacity	14-80
<i>Table 14-43</i>	Errors Displayed by the dspInerrs Command	14-82
<i>Table 14-44</i>	dspclnerrs—Optional Parameters	14-84

<i>Table 14-45</i>	dspfrcbob—Parameters	14-88
<i>Table 14-46</i>	APS Alarms Displayed with dsplog Command	14-90
<i>Table 14-47</i>	dsplog—Parameters	14-97
<i>Table 14-48</i>	Line Error Types	14-101
<i>Table 14-49</i>	dsplnerrs—Optional Parameters	14-102
<i>Table 14-50</i>	Description of the Errors in the dspphyslerrs Display	14-103
<i>Table 14-51</i>	dspphyslerrs—Parameters	14-109
<i>Table 14-52</i>	Description of the Errors in the dspphyslerrs Display	14-110
<i>Table 14-53</i>	dspphyslrs—Optional Parameters	14-112
<i>Table 14-54</i>	dspslotstacnf—Optional Parameters	14-117
<i>Table 14-55</i>	dspslotalms—Parameters	14-119
<i>Table 14-56</i>	Errors Displayed by the dspsloterrs Command	14-120
<i>Table 14-57</i>	dspsloterrs—Optional Parameters	14-122
<i>Table 14-58</i>	Description of the Fields in the dspsv3 Display	14-125
<i>Table 14-59</i>	Description of the Fields in the Previous dspsv3 Display	14-126
<i>Table 14-60</i>	dsptraffigen—Parameters	14-130
<i>Table 14-61</i>	Description of the Errors in the dsptkerrs Display	14-131
<i>Table 14-62</i>	dsptkerrs—Parameters	14-134
<i>Table 14-63</i>	resetcd—Parameters	14-141
<i>Table 14-64</i>	resetpc—Parameters	14-142
<i>Table 14-65</i>	Results of tstcon Execution	14-145
<i>Table 14-66</i>	Examples of tstcon Specification	14-145
<i>Table 14-67</i>	tstcon—Parameters	14-147
<i>Table 14-68</i>	tstcon—Optional Parameters	14-148
<i>Table 14-69</i>	Results of the tstconseg Display	14-149
<i>Table 14-70</i>	tstconseg—Parameters	14-150
<i>Table 14-71</i>	tstconseg—Optional Parameters	14-150
<i>Table 14-72</i>	tsdelay—Parameters	14-153
<i>Table 14-73</i>	tstfdelay—Optional Parameters	14-153
<i>Table 14-74</i>	tstpcs—Parameters	14-154
<i>Table 15-1</i>	Access Device Commands	15-1
<i>Table 15-2</i>	addad—Parameters	15-4
<i>Table 15-3</i>	addad—Optional Parameters	15-4
<i>Table 15-4</i>	addcon—Parameters	15-6
<i>Table 15-5</i>	addcon—Optional Parameters	15-7

<i>Table 15-6</i>	cnfadcmtr—Parameters	15-9
<i>Table 15-7</i>	cnfadcon—Parameters	15-12
<i>Table 15-8</i>	delad—Parameters	15-15
<i>Table 15-9</i>	dspcon—Parameters	15-19
<i>Table 15-10</i>	Information in the dspcons Display	15-20
<i>Table 15-11</i>	dspcons—Optional Parameters	15-22
<i>Table 15-12</i>	resetad—Parameters	15-23
<i>Table 15-13</i>	restartad—Parameters	15-24
<i>Table 16-1</i>	Commands for Setting up a Virtual Switch Interface (VSI) Controller	16-5
<i>Table 16-2</i>	Parameters—addctrl	16-7
<i>Table 16-3</i>	addshelf—Interface Shelf Parameters	16-12
<i>Table 16-4</i>	addshelf—MPLS Parameters	16-14
<i>Table 16-5</i>	baddyred—Parameters	16-18
<i>Table 16-6</i>	cnfqbin—Parameters	16-21
<i>Table 16-7</i>	Qbin Default Settings	16-22
<i>Table 16-8</i>	cnfqbin—Parameters	16-23
<i>Table 16-9</i>	ifci—Parameters (Virtual Switch Interface)	16-25
<i>Table 16-10</i>	Partition Criteria	16-25
<i>Table 16-11</i>	cnfrsrc Parameters, Ranges/Values, and Descriptions	16-27
<i>Table 16-12</i>	cnfrsrc—Parameters	16-31
<i>Table 16-13</i>	cnfvsipart—Parameters	16-36
<i>Table 16-14</i>	delctrl—Parameters	16-37
<i>Table 16-15</i>	delshelf—Parameters	16-41
<i>Table 16-16</i>	dspchuse—Parameters	16-44
<i>Table 16-17</i>	dspqbin Parameters	16-51
<i>Table 16-18</i>	Class of Service Buffer Parameters That Display on dspqbin Screen	16-51
<i>Table 16-19</i>	dsprsrc—Parameters	16-59
<i>Table 16-20</i>	Service Template and Associated Qbin Selection	16-61
<i>Table 16-21</i>	dspvsipartcnf—Parameters	16-78
<i>Table 16-22</i>	dspvsipartinfo—Field Description	16-79
<i>Table 16-23</i>	dspvsich—Parameters	16-83
<i>Table 17-1</i>	High-Priority Mode StrataCom User Level Commands	17-4



Preface

This manual describes the Cisco WAN switch user commands for System Software Release 9.3.0. These commands configure, monitor, and manage a network consisting of Cisco WAN switches. (For descriptions of the superuser commands, refer to the manual titled *Cisco WAN Switch Superuser Command Reference*.) Each chapter pertains to a particular aspect of using a Cisco WAN switch network. For example, Chapter 4, “Setting Up Trunks” contains the commands that apply to setting up and configuring trunks in the network (except for trunks between an MGX 8220 shelf and a BPX node). Some commands apply to more than one technology. The **addcon** command, for example, appears in many chapters. The locations of each single and multi-application command appear in Appendix A, which contains an alphabetical listing of commands with chapter page numbers.

This section discusses the objectives, audience, organization, and conventions of the *Cisco WAN Switch Command Reference* publication.

Cisco documentation and additional literature are available in a CD-ROM package, which ships with your product. The Documentation CD-ROM, a member of the Cisco Connection Family, is updated monthly. Therefore, it might be more current than printed documentation. To order additional copies of the Documentation CD-ROM, contact your local sales representative or call customer service. The CD-ROM package is available as a single package or as an annual subscription. You can also access Cisco documentation on the World Wide Web at <http://www.cisco.com>, <http://www-china.cisco.com>, or <http://www-europe.cisco.com>.

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Objectives

This publication provides descriptions for using the Cisco WAN switch user commands in the command line interface.

Audience

The Cisco WAN switch command line interface lets you control the network at the device level. Therefore, this document helps network designers and operators to set up, manage, and troubleshoot networks.

About the Cisco WAN Switch Product Name Change

The Cisco WAN Switch products have new names.

- Any switch in the BPX switch family (Cisco BPX[®] 8620 broadband switch) is now called a Cisco BPX[®] 8650 broadband switch).
- The BPX Service Node switch is now called the Cisco BPX[®] 8620 broadband switch.
- The BPX switch as a Tag switch controller is now called the Cisco BPX[®] 8650 broadband switch.
- The AXIS shelf is now called the Cisco MGX[™] 8220 edge concentrator.
- Any switch in the IGX switch family (IGX 8, IGX 16, IGX 32 wide-area switches) is now called the Cisco IGX[™] 8400 series multiband switch.
 - The IGX 8 switch is now called the Cisco IGX[™] 8410 multiband switch.
 - The IGX 16 is now called the Cisco IGX[™] 8430 multiband switch.
- Cisco StrataView Plus[®] is now called Cisco WAN Manager[®] (CWM).

Organization

The chapters and appendix in this publication are as follows:

- Preface describes this manual and the layout of the command definitions.
- Chapter 1, “IGX and BPX Fundamentals” provides fundamental information on how to communicate with a node.
- Chapter 2, “Basic Commands” describes the commands that support your use of the command line interface (for example, how to clear the screen or add a user).
- Chapter 3, “Setting Up Nodes” describes the commands that let you configure a node.
- Chapter 4, “Setting Up Trunks” describes the commands that let you set up the network trunks, interface shelves, and topology.
- Chapter 5, “Setting Up Lines” describes the commands that let you set up lines to the service ports on the node.
- Chapter 6, “Voice Connections” describes the commands that relate to voice connections
- Chapter 7, “Data Connections” describes the commands that relate to serial data connections.
- Chapter 8, “Frame Relay Connections” describes the commands for Frame Relay connections.
- Chapter 9, “ATM Connections” describes the commands that relate to ATM connections.
- Chapter 10, “Optimizing Traffic Routing and Bandwidth” describes the commands that help fine-tune the use of network resources.
- Chapter 11, “Synchronizing Network Clocks” describes the commands that let you select and monitor clocks for the network.
- Chapter 12, “Managing Jobs” describes the commands for specifying and triggering a job.
- Chapter 13, “Managing the Network” describes the commands that relate to site administration of the Cisco WAN Switching network. Tasks include password and local time specification.
- Chapter 14, “Troubleshooting Commands” describes the commands that let you check alarms or test various links in the network by using loopbacks.

- Chapter 15, “Access Device Commands on a Node” describes the commands that make an access device recognizable and configurable on a node. The chapter consists of command descriptions that are unique to access devices (such as the Cisco 3810) and descriptions of commands that are similar for other technologies.
- Chapter 16, “VSI Commands” describes the commands used to add a VSI-based controller such as the LSC (Label Switch Controller) to the BPX.
- Appendix A, “Command List” contains an alphabetical list of the commands in this manual with the chapter and page number of each.

Each chapter includes an introduction to the function of the commands and a list of the commands in that chapter. Chapters consist primarily of command descriptions. Command descriptions appear in alphabetical order. Several chapters include flow charts to illustrate how commands contribute to a larger task, such as bringing up a circuit line.

Each command description begins with the command name and a functional description. Summaries for the command and its mandatory and optional parameters follow the functional description. The summaries are in table format. The following contains a description for each part of the command summary:

Tables

Normally, the tables contain detailed information on command parameters.

Command Summary

Contains general information about a command. Information includes:

- full name
- syntax (including required parameters and optional parameters, if any)
- related commands
- attributes, such as user privilege required and whether the command can be part of a job
- example usage with screens

The syntax field indicates whether the command requires parameters or optional parameters. If required, the Parameter and Optional Parameter summaries follow the Command summary. When you enter a command at the control terminal, the system usually prompts for individual parameters. Use the Parameter and Optional Parameter summaries to determine which values to enter.

Parameters

Provides all the parameters required to execute the command (included only if noted in the syntax field of the Command Summary table).

Optional Parameters

Provides all the optional parameters that can be used when executing the command (included only if noted in the syntax field of the Command Summary table).

Conventions

This publication uses the following conventions to convey instructions and information.

Command descriptions use these conventions:

- Commands and keywords are in **boldface**.
- Arguments for which you supply values are in *italics*.
- Required command arguments are inside angle brackets (< >).
- Optional command arguments are in square brackets ([]).
- Alternative keywords are separated by vertical bars (|).

Examples use these conventions:

- Terminal sessions and information the system displays are in `screen` font.
- Information you enter is in **boldface screen** font.
- Nonprinting characters, such as passwords, are in angle brackets (< >).
- Default responses to system prompts are in square brackets ([]).



Note

Means you should *take note*. Notes contain important suggestions or references to materials not contained in the current body of text.



Caution

Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

Cisco Connection Online

Cisco Connection Online (CCO) is Cisco Systems' primary, real-time support channel. Maintenance customers and partners can self-register on CCO to obtain additional information and services.

Available 24 hours a day, 7 days a week, CCO provides a wealth of standard and value-added services to Cisco's customers and business partners. CCO services include product information, product documentation, software updates, release notes, technical tips, the Bug Navigator, configuration notes, brochures, descriptions of service offerings, and download access to public and authorized files.

CCO serves a wide variety of users through two interfaces that are updated and enhanced simultaneously: a character-based version and a multimedia version that resides on the World Wide Web (WWW). The character-based CCO supports Zmodem, Kermit, Xmodem, FTP, and Internet e-mail, and it is excellent for quick access to information over lower bandwidths. The WWW version of CCO provides richly formatted documents with photographs, figures, graphics, and video, as well as hyperlinks to related information.

You can access CCO in the following ways:

- WWW: <http://www.cisco.com>
- WWW: <http://www-europe.cisco.com>
- WWW: <http://www-china.cisco.com>
- Telnet: cco.cisco.com
- Modem: From North America, 408 526-8070; from Europe, 33 1 64 46 40 82. Use the following terminal settings: VT100 emulation; databits: 8; parity: none; stop bits: 1; and connection rates up to 28.8 kbps.

For a copy of CCO's Frequently Asked Questions (FAQ), contact cco-help@cisco.com. For additional information, contact cco-team@cisco.com.

**Note**

If you are a network administrator and need personal technical assistance with a Cisco product that is under warranty or covered by a maintenance contract, contact Cisco's Technical Assistance Center (TAC) at 800 553-2447, 408 526-7209, or tac@cisco.com. To obtain general information about Cisco Systems, Cisco products, or upgrades, contact 800 553-6387, 408 526-7208, or cs-rep@cisco.com.

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Related Documentation

<i>Cisco BPX 8600 Series Installation and Configuration</i> DOC-7810674=	Provides a general description and technical details of the BPX broadband switch.
<i>Cisco IGX 8400 Series Reference</i> DOC-7810706=	Provides a general description and technical details of the IGX multiband switch.
<i>Cisco IGX 8400 Installation and Configuration</i> DOC-7810722=	Provides installation instructions for the IGX multiband switch.
<i>Cisco WAN Switching Command Reference</i> DOC-7810703=	Provides detailed information on the general command line interface commands.
<i>Cisco WAN Switching SuperUser Command Reference</i> DOC-7810702=	Provides detailed information on the command line interface commands requiring SuperUser access authorization.
<i>Cisco MPLS Installation and Configuration</i> DOC-7810672=	Provides information on a method for forwarding packets through a network.
<i>WAN CiscoView for the IGX 8400 Switches</i> DOC-7810669=	Provides instructions for using WAN CiscoView for the IGX 8400.

<p><i>WAN CiscoView for the BPX 8600 Switches</i> DOC-7810670=</p>	<p>Provides instructions for using WAN CiscoView for the BPX 8600.</p>
<p><i>Cisco WAN Manager Installation Guide for Solaris, Release 10.1</i> DOC-7810308=</p>	<p>Provides procedures for installing Release 10.1 of the Cisco WAN Manager (CWM) network management system on Solaris systems.</p>
<p><i>Cisco WAN Manager User's Guide</i> DOC-7810658=</p>	<p>Provides procedures for using Release 10.1 of the Cisco WAN Manager (CWM) network management system.</p>
<p><i>Cisco WAN Manager Operations</i> DOC-7810309=</p>	<p>Provides procedures for operating Release 10.1 of the Cisco WAN Manager (CWM) network management system.</p>
<p><i>Cisco WAN Manager SNMP Proxy Agent Guide</i> DOC-7810786=</p>	<p>Provides information about the Cisco WAN Manager Simple Network Management Protocol (SNMP) Service Agent components and capabilities.</p>
<p><i>Cisco WAN Manager Database Interface Guide</i> DOC-7810785=</p>	<p>Provides the information to gain direct access to the Cisco WAN Manager Informix OnLine database that is used to store information about the elements within your network.</p>



IGX and BPX Fundamentals

A workstation, terminal, or a PC can function as a control terminal for an IGX or BPX node through an EIA/TIA-232 link or over an Ethernet TCP/IP LAN. All command input takes place at the terminal, and all displays appear on the terminal screen. Through displays that show status, alarm, or statistics, the terminal constantly provides a view of an individual node, a trunk, a connection, or the entire network.

The control terminal gives you the ability to control the network from any routing node. A remote access command is available for controlling the network from a node other than the node physically connected to the terminal. This command is the Virtual Terminal (**vt**) command. The **vt** command creates a communication channel for the operator to a remote node. After you access a node by using **vt**, you can begin executing commands at the accessed node. Most commands and tasks that you can execute at the local node are also executable at a remote node.

The WAN Manager Network Management Station provides network management capabilities for multi-node networks. WAN Manager also collects and displays statistics. For access, WAN Manager operates in LAN mode or telnet mode. (As of Release 8.0, you can no longer access a node through the serial port.) Refer to the *Cisco WAN Manager Operations Manual* for more information.

Powering Up the Control Terminal

After the node receives power and correctly starts up, the terminal screen appears as shown below. If the screen is blank or does not display the initial screen, check all connections to the node, and make sure the terminal and node are receiving power. If the connections are correct, press the Delete key a few times or cycle the terminal power.

```
gamma          TRM   YourID:1          IGX 8420    9.2      Aug. 15 1998  13:47 CST
```

```
Enter User ID:
```

The User Command Screen Layout

The screen has three areas. The top line of the screen (status line) displays the node name, current user name, software revision level, date, time and time zone. If the date and time have not been configured on the node, the screen states this.

The middle part of the screen shows the information returned by the executed commands. This could be, for example, configuration or statistical information.

The bottom area of the screen displays prompts for the next command or the current command parameters. As the system receives the parameters you enter, it duplicates them above the command entry line to serve as a record of the entries. The bottom area also shows the command last entered.

All command screens eventually time out. This includes dynamically updated screens such as the display for the **dspbob** command. Furthermore, if sufficient time passes, you are logged out.

Entering a Command

This section describes how to enter a command for those who are unfamiliar with Cisco WAN switch equipment. It also describes the online help for the commands.

Each user command can have one or more privilege levels. Entering a particular command is possible for a user at the same or higher privilege of the command. Each definition in this manual shows the privilege or range of privileges for the command. Most commands are not case-sensitive.

When the **Next Command** prompt is at the bottom of the screen, the system is ready for a new command. Some commands do not require parameters. These usually are commands for displaying information. Display commands often have no required parameters but have one or more optional parameters for changing the scope of displayed information. Commands that require parameters usually prompt for each parameter. To abort a command for any reason, press the Delete key. More information for altering command line entries appears in the forthcoming section called “In case of a mistake.”

The general syntax is *command* <parameter(s)> [optional parameter(s)]. When a command definition displays actual parameters, the required parameters appear within the arrow heads (<>). If the list of command parameters is too long, the command definition’s “Syntax” field just shows “parameters,” which means the parameters are available only in the parameters table for the definition. For information on the format of system resource numbering, see the section “How network trunks, lines, and channels are numbered.”

Users who are not familiar with the system can use the online help feature to become familiar with the categories of commands and get syntax information on a command. Seven categories of commands exist. The figure below lists them. To enter a command from the menu, do the following:

-
- Step 1** At the **Next Command** prompt, either press the Escape key or enter the word **help** or a question mark. A list of command categories appears as in the example below.

```
gamma          TRM   YourID:1          IGX 8420    9.2          Aug. 15 1998 13:47 CST
```

All commands fall into one (or more) of the following categories:

```
Control Terminal
Configuration
Lines
Network
Connections
Cards
Alarms and Failures
```

This Command: ?

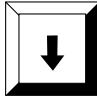
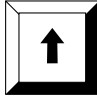
Use cursor keys to select category and then hit <RETURN> key:

- Step 2** Use the up/down arrow keys to select a command category, then press **Return**. A listing of all the commands in that category appears. (The next example is from the “line” category of commands.)
- Step 3** Use the cursor key to select the command you want to enter (**dsprks** for example), then press **Return**. The selected command appears on the screen, and the system prompts you for any additional parameters needed to complete the command.
-

Figure 1-1 Entering a Command

Commands in category "lines"

dncln	Down circuit E1 or T1 Line
dnpln	Down cacket E1 or T1 Line
dspclns	Display circuit lines
<input type="text" value="dsptrks"/>	Display trunks
prtclns	Print circuit lines
prtplns	Print packet lines
upcln	Up circuit E1 or T1 line
uppln	Up packet E1 or T1 line



SS246

A faster way to enter a command, using fewer keystrokes, is to enter the command on the command line, then press the Return key. The system prompts you for any additional parameters required to complete the command. The fastest way to enter a command, using the fewest keystrokes, requires that you know the command along with the necessary parameters. Enter the command name and all of the required parameters in the correct format, then press the Return key.

About Command Categories

The command category menu is listed when you press the Escape key. The commands are organized into seven categories. (These categories are not the categories used to organize this manual.) Table 1-1 lists and describes the command categories.

Table 1-1 Command Categories

Category	Description
Control Terminal	These commands let you configure your password, serial port and printer functions, use the help facility, establish virtual terminal connections, and create and edit jobs.
Configuration network and line timing	These commands configure voice and data channels, and display network configuration.
Lines	These commands activate and deactivate lines and display line status.
Network	These commands add and delete trunks, configure a node name, and display and print network status.
Connections	These commands add, delete, and display circuit (voice and data) and FastPacket data channel connections, configure network routing and connection characteristics (Frame Relay and ATM), and perform connection.
Cards	These commands activate, deactivate, and reset printed circuit cards, and display power supply status.
Alarms and Failures	These commands display, print, and clear alarms, errors, and network history. They also configure alarm thresholds.

Aborting a Command

You can abort any command by pressing **Delete** [on terminals without a **Delete** key, you may need to press **Shift-Backspace** or some other key(s) to perform the **Delete** function]. The **Next Command:** prompt appears at the bottom of the screen indicating that you can enter another command. The command you aborted appears in low intensity letters on the screen after the **Last Command:** prompt.

About Command Names

Most of the command names follow a descriptive verb and noun format. For example, the **addcon** command adds a connection, the **delcon** command deletes a connection, and the **dspcon** command displays information about a connection. Table 1-2 lists the command-related abbreviations.

Table 1-2 Command-Related Abbreviations

Format	Mnemonic	Descriptor
Verb	add	Add
	bye	Bye
	clr	Clear
	cnf	Configure
	cpy	Copy
	del	Delete
	dn	Down
	dsp	Display
	edit	Edit
	grp	Group
	help	Help
	prt	Print
	red	Redraw
	reset	Reset
	run	Run
stop	Stop	
switch	Switch	
tst	Test	
Noun	adv	Adaptive voice
	ait	AIT
	alm(s)	Alarms
	bob	Breakout box
	bus(es)	Bus(es)
	cd(s)	Card(s)
	ch	Channel

Table 1-2 Command-Related Abbreviations (continued)

Format	Mnemonic	Descriptor
Nouns (continued)	clk	Clock
	cln(s)	Circuit line(s)
	cls	Class
	cnf	Configuration
	con(s)	Connection(s)
	congrp	Connection group
	cond	Conditioning
	cos	Class of service (COS)
	d	Data
	date	Date
	dfm	DFM
	dial	Dial
	dl	Dial type
	eia	EIA
	errs	Errors
	extlp	External loop
	fp	FastPAD
	fr	Frame Relay
	ftc	FTC
	func	Function
	gn	Gain insertion
	grp(s)	Group(s)
	ict	Interface control template
	ip	IP
	job(s)	Job(s)
	lcn	Logical connection
	ln(s)	Line(s)
	load	Load
	loclp	Local loop
	log	Log
	mc	Multicast
	msg	Message
	name	Name
	nw	Network
	ospace	Open space
	parm(s)	Parameter(s)

Table 1-2 Command-Related Abbreviations (continued)

Format	Mnemonic	Descriptor
Nouns (continued)	port	Port
	pref	Preference
	prt	Printer
	pwr	Power
	rcv	Receiver
	red	Redundant
	rmtlp	Remote loop
	rts	Routes
	scr	Screen
	seg	Segment
	sig	Signal
	slot	Slot
	snmp	SNMP
	src(s)	Source(s)
	st	Status
	stats	Statistics
	stby	Standby
	sys	System
	term	Terminal
	tmzn	Time zone
	tp	Type
	trig	Trigger
	trk(s)	Trunk(s)
	user	User
	utl	Utilization
	xmt	Transmit
	yred	Y-cable redundancy

Command Shortcuts

When you enter a command, it displays next to the **Last Command:** prompt at the bottom of the screen. To copy the command to the new command line, press the **Ctrl** and **A** keys simultaneously. To execute the previous command, you can edit the command line and then press the Return key. You can also enter an exclamation mark (!) followed by the first letter or letters of a previous command and press the Return key. For example, to repeat the **dspscons** command:

Last Command: **dspscons**

Next Command: **!dsp**

Press the **Return** key. You can use the **Display Command History** (.) command to display the 12 most recently executed commands:

Step 1 Type . (a period) and press **Return**. A numbered list of commands displays. In the following example, the most recently executed command is numbered 1.

```
12:
11:
10:
 9:
 8:
 7:prtscrn
 6:addcon 12.1 alpha 12.1 v
 5:delcon 12.1
 4:cnfport a 1200 n 8 1 x x n
 3:cnftime 17 19 34
 2:redscrn
 1:help
```

Step 2 Type the number of the command you want to re-execute, then press the Return key. The command displays after the **Next Command:** prompt. You can press the Return key to execute the command, or you can edit the command line and then press the Return key. Whenever you end a terminal session by signing off (with the **bye** command), the command list is cleared.

In Case of a Mistake

Before you press **Return**, you can use control keys to edit a typed command. Table 1-3 lists the control key you can use to edit information on the command line. Not all terminals have the same key characters. If the exact key is not available, determine which key performs the function.

Table 1-3 Keys for Editing the Command Line

Function	Keys	Cursor Movement
Move the cursor	Ctrl-B	Moves the cursor left one word.
	Ctrl-F	Moves the cursor right one word.
	Ctrl-L	Moves the cursor right one character.
	Ctrl-G	Moves the cursor left one character.
	Arrows	Moves the cursor in the direction of the arrow.
Delete	Ctrl-W	Deletes a character.
	CHAR DEL	Deletes a character.
	Ctrl-H	Moves the cursor left one character and deletes that character.
	Ctrl-D	Deletes all characters from the cursor position to the end of the line.
	Ctrl-X	Deletes a line.
	BACKSPACE	Moves the cursor left one character and deletes that character.

Table 1-3 Keys for Editing the Command Line (continued)

Function	Keys	Cursor Movement
Insert	Ctrl-I	Toggles insert mode.
	TAB	Toggles insert mode.
	CHAR INSERT	Toggles insert mode.
	Ctrl-^	Inserts line.
Miscellaneous	*	Leaves the data in this field as it is displayed and goes to the next field.
	DELETE	Aborts command.
	Ctrl-M	Carriage return.
	RETURN	Carriage return.
	Ctrl-S	Stops the data flow from the node to the terminal screen.
	Ctrl-Q	Restarts the flow of data from the IGX.
	Ctrl-A	Copies the last command line.
	! (..)	(The exclamation mark followed by the first characters or character of a command, brings that command back to the command line.)

Access Privileges

Access to the commands is password protected. To access the commands, type your **user ID** and **user password** at the log-in prompts. Each user is assigned a privilege level by the System Manager which determines what commands you can use. There are six user privilege levels, ranging from 1 to 6. Level 1 has access to all the commands and level 6 has access to the fewest commands. A given privilege level has access to all levels below it. For example, level 3 has access to levels 3 through 6. The privilege level for each command is part of the command summary. User ID and passwords are case-sensitive.

Help

The system software provides a help function for commands. The help consists of a list of all commands and a display of command syntax. Entering “help” or “?” with no parameters displays a list of the seven command categories (see the list that follows). Entering “help” and a command name displays the command syntax. Entering “help” and a few letters of a command name lists all commands containing these characters. For example, “help fr” lists all commands containing the letters “fr.” You can then select a particular command from this list for help information.

- Control terminal
- Configuration
- Lines
- Network
- Connections
- Cards

- Alarms and failures

The Online Help feature of WAN Manager provides more detailed command information. Hypertext links allow you to navigate through command category lists, alphabetical indexes, and the command descriptions. Refer to the *Cisco WAN Manager Operations* manual for more information.

The Numbering of Trunks, Lines, and Channels

The information contained in this manual allows you to set up, configure, and maintain traffic on trunks and lines. Table 1-4 lists the format conventions for the names of trunks, lines, and channels.

Table 1-4 *Formats of System Resource Names*

Trunk, line, or channel	Description
CDP/CVM Circuit Line and NTC/NTM Trunk	The number assigned to a CDP or CVM line (CLN) or an NTC or NTM trunk (TRK) is the slot number of the BC-T1 or BC-E1 back card in the physical slot where the CLN or TRK is connected to the IGX node. In the case of redundant pairs, it is the slot associated with the primary back card.
AIT Trunk	The number assigned to the backslot of the BC-T3 or BC-E3 back card.
BPX Trunk Numbers	The number assigned to a BPX trunk (TRK) is the backslot number and port (1 - 3) of the BNI (slot.port; example, 2.1) card to which the T3 trunk cable is attached.
Voice Channel Numbers	A voice channel is specified by "SLOT.CH". Sets of voice channels are specified by "SLOT.CH-CH". The notation "SLOT" refers to the back slot number of a circuit line and "CH" refers to a channel (1-24 for T1 or 1-31 for E1). For example, "12.1" indicates channel 1 on circuit line 12, and "12.1-9" indicates channels 1-9 on circuit line 12.
Data Channel Numbers	Data channels are specified by "SLOT.PORT", where "SLOT" refers to the slot number of a data card, and "PORT" refers to a port on that data card. For example, "9.3" specifies port 3 on the data card in slot 9. The notation "9.1-4" refers to ports 1-4 on that card. The range of port numbers is from 1 to 4 for SDI and DDS data cards. An appended "a", for example; 11.1-5a, indicates the channels are configured to use the super-rate alternating channel feature.

Table 1-4 *Formats of System Resource Names (continued)*

Trunk, line, or channel	Description
Frame Relay channel numbers (local addressing)	<p>In the local addressing convention, Frame Relay channels are specified by “SLOT.PORT.DLCI”, where “SLOT” refers to the slot number of an FRP, “PORT” refers to a port on the FRP card, and “DLCI” is the local data link connection identifier. The range of port numbers is from 1 to 4. For example, the following addcon command at node alpha:</p> <p style="text-align: center;">addcon 6.1.101 beta 4.1.102 2</p> <p>The command adds a connection between alpha and beta. The user device at alpha refers to this connection using the local DLCI of 101. The user device at beta refers to this connection using the local DLCI of 102. The DLCIs have local significance only. With local addressing, the same DLCI can be used again, but not for more than one destination from the same port. For example, the following adds another connection from alpha port 6.1:</p> <p style="text-align: center;">addcon 6.1.100 gamma 6.2.102 2</p> <p>In this case, a DLCI of 100 is used at alpha. A DLCI of 102 can be used at gamma as well as at beta, because the DLCIs have only local significance.</p>
Frame Relay channel numbers (Global Addressing)	<p>In the global addressing, the format for Frame Relay channel specification is “SLOT.PORT.DLCI.” However, each FRP or FRM port (and associated user device) is identified by a unique DLCI. No two ports in the network can have the same DLCI. For example, alpha port 6.1, gamma port 6.2, and beta port 4.1 could be assigned unique DLCIs of 79, 80, and 81 when adding connections, as in the following example:</p> <p style="text-align: center;">addcon 6.1.80 gamma 6.2.79 2 (at alpha) addcon 6.1.81 beta 4.1.79 1 (at alpha) addcon 4.1.80 gamma 6.2.81 5 (at beta)</p> <p>The user device at alpha refers to the connection between alpha and gamma, using the DLCI of 80 assigned to gamma. The user device at gamma refers to this connection using the DLCI of 79 assigned to alpha. The user device at alpha refers to the connection between alpha and beta using the DLCI of 81 assigned to beta. The user device at beta refers to this connection using the DLCI of 79 assigned to alpha. The user device at beta refers to the connection between beta and gamma using the DLCI of 80 assigned to gamma. The user device at gamma refers to this connection using the DLCI of 81 assigned to beta.</p> <p>For information on adding Frame Relay connections through a FastPAD, refer to the command descriptions in the online version of the 8.2 <i>FastPAD User's Guide</i>.</p>



Basic Commands

The *user interface* commands let you access an IGX or BPX system through the control terminal. These commands provide help on how to use the commands, display the twelve most recent commands entered into the system, connect to another node, and sign you off. These commands also give you a way to clear, print, or redraw the screen. These commands are all simple to use and have no command parameters except the virtual terminal command (**vt**), in which you must specify the node name, and the help commands, in which you must enter a command character string.

Getting Help

Entering **help** or **?** displays command information. The **help** command gives you access to a general help menu or to information on a specific command. To access the general help menu, enter either **help** or **?**. Either of these commands displays the command category menu on the screen and prompts you to make a selection. Use the arrow keys to move the cursor to the correct category, then press the Return key.

For information on a specific command, enter **help** or **?** followed by a command name. For example, enter the following for information on adding a trunk:

```
help addtrk
```

Press Return to display the information. Entering **help** or **?** followed by a character string displays all those commands containing the character string. For example, for a list of all commands that contain the string “fr,” enter the following:

```
? fr
```

Signing On

Signing on to the system is a two-step process requiring you to enter both a User ID and a password. The system administrator can provide a User ID and password for the network. Only the system administrator can assign and change User IDs. Once a password is assigned, you can change your own password. For security reasons, users should periodically change their passwords. User ID and passwords are case-sensitive.

When the following prompt appears at the bottom of the initial screen, the system is ready for you to log in:

```
Enter User ID:
```

Entering a User ID and password gives access at a particular level of user privilege. (Each command has one or more levels of associated user privilege.) For information on access privileges and passwords, refer to Chapter 13, “Managing the Network”. User IDs can have up to twelve (12) characters. At the prompt, enter the User ID. The system responds with the following prompt:

Enter Password:

When you initially sign on, enter the password. (The password does not appear on the screen.) Upon receiving the correct User ID and password, the log-in is recorded by the event log, and the screen displays the following prompt:

Next Command:

The system is ready to receive commands.

Logging Out

To log out, enter **bye**. When the terminal connection is local, this returns you to the initial screen. To log out completely from a remote (virtual terminal) session, enter **bye** twice.

Clearing and Redrawing the Screen

Use the Clear Terminal Screen (**clrscrn**) to clear the screen. Use the Redraw Terminal Screen (**redscrn**) command to clear and redraw the screen. The **clrscrn** command clears any information displayed in the top portion of the screen. This information could consist of status displays on lines and connections or Help text. To clear the screen, enter **clrscrn**.

The **redscrn** command redraws the screen and updates the status lines. To make sure the status lines have been updated, enter the **redscrn** command. For example, to redraw a screen’s display with the latest statistics before printing the screen, enter **redscrn**.

Printing Screens

The Print Terminal Screen (**prtscrn**) command prints the current screen display. Verify that the node printer is correctly configured before attempting to print a screen. Upon entering the **prtscrn** command, the screen display goes to either a local or remote printer. To print all the information in a screen, enter **prtscrn**.

Accessing Physically Remote Nodes

The Make Virtual Terminal Connection (**vt**) command establishes a virtual terminal connection to a remote node. Once the connection is established, entering and executing commands takes place as if the terminal were the local terminal on the remote node. The **vt** command lets network configuration take place from a central site. The only command that cannot run remotely is the **vt** command itself.

The privilege of user commands available through a **vt** connection is the same as that of the user who logged into a node with **vt**. To establish a virtual terminal connection with a remote node, enter **vt** and the name of the node name. For example, to **vt** to node “alpha,” enter:

vt alpha

The words Virtual Terminal appear on the screen at the lower left corner to indicate that a virtual terminal connection exists. The remote node name appears at the upper left corner of the screen. To terminate the virtual terminal connection and return to your local terminal connection, enter the **bye** command.

The **bye** command has two separate functions:

- If the terminal connection is local, **bye** logs you off the system.
- If the connection is remote (a **vt** connection), the **bye** command breaks the remote connection and returns the terminal to a local connection.

To log out of the system during a remote (vt) session, enter the **bye** command twice. Note that after a default period of four minutes of inactivity, the vt session automatically ends, and the connection reverts back to being local. The timeout is configurable.

If the multiple **vt** feature has been purchased, multiple users can log into a node with the **vt** command. Cisco personnel must activate this feature.

List of Basic Commands

Table 2-1 lists the commands discussed in the previous sections. Descriptions of these commands make up the rest of this chapter.

Table 2-1 List of Basic Commands

Mnemonic	Description	Page
.	Display command history	2-4
help or ?	Help	2-6
bye	End user session	2-9
clrscrn	Clear screen	2-10
prtscrn	Print screen	2-11
redscrn	Redraw screen	2-12
vt	Make a virtual terminal connection	2-13

■ . (a period)

. (a period)

Displays the twelve (12) most recently used commands. To reuse one of these commands, enter the associated number. The command appears on the command entry line, where you can re-enter or re-execute a command. Editing in this case means backspacing through the command's arguments and typing in a new value or backspacing without typing a new value to restart the command at the cursor position.

Full Name

Display command history

Syntax

. (A period)

Related Commands

None

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

. (A period)

Description

Display the command history.

System Response

```
gamma          TRM   YourID:1          IGX 8420          9.2   Aug. 15 1998 13:47 CST
```

```
Command history
```

```
12: dspcons
11: vt beta
10: dspcons
9: addcon 6.4 alpha 6.4 (.6
8: addcon 8.1.200 alpha 9.1.300 1
7: upfrport 8.1.200
6: dntrk 14
5: uptrk addjob
4: addjob
```

```
3: dspjobs
2: addjob
1: dspjobs
```

Last Command: .

Next Command:

help or ?

Displays a help menu. This command accesses the help routine in the system software. It provides:

- A short description of the command
- An indication of whether the command can be used in a job
- The command syntax

A more extensive, menu-driven, on-line help function exists within the WAN Manager NMS. Consult the *Cisco WAN Manager Operations Guide* for a complete description of the online help.

The ways to request help on commands are:

- Entering `help` or `?` without an argument lists the command categories. Selecting one of these categories (using arrow keys and Return) displays all the commands in that category. You can select commands in this list by using arrow keys then the Return key.
- Entering a command name displays help for that particular command.
- Entering a partial command name lists all commands that contain that character string. For example, `fr` indicates all commands (such as `cnffrport`) that contain “fr.” You select a command in the list by using arrow keys to scroll to the command then press Return.

Full Name

Help command

Syntax

`?` or `help` [command name | character string]

Related Commands

None

Attributes

Privilege	Jobs	Log	Node	Lock
1–6	No	No	IGX, BPX	No

Example 1

```
help
```

Description

Display the help menu. (Without an argument, the help command shows the command categories.)

System Response

```
switchnow TN SuperUser BPX 15 9.1 Oct. 1 1997 14:14 GMT
```

All commands fall into one (or more) of the following categories:

```
Control Terminal
Configuration
Lines
Network
Connections
Cards
Alarms and Failures
Diagnostics
Debug
```

This Command: help

Use cursor keys to select category and then hit the <RETURN> key:

Example 2

help dspbxsloterrs

Description

Display the syntax and other information for Display BXM Slot Errors (**dspbxsloterrs**).

System Response

```
switchwhat TN SuperUser BPX 15 9.1 Oct. 1 1997 14:16 GMT
```

```
dspbxsloterrs - Display BXM Slot Errors
Cannot be included in Jobs.
Usage: dspbxsloterrs [slot]
```

Last Command: help dspbxsloterrs

Next Command:

Example 3

help fr

Display all commands that contain the string “fr.” (These are the Frame Relay commands.) A list of all commands containing the letters “fr” appears on screen. Scroll to a command then press **Return** to display the related help screen.

Table 2-2 *help-Optional Parameter*

Parameter	Description
command	Specifies a command.
string	Specifies a character string as a search argument.

bye

Ends a local or remote terminal connection. With a local terminal connection, the **bye** command logs out the user. If a local terminal is inactive for a (default) period of 20 minutes, the connection is automatically broken. This is the equivalent of entering the **bye** command. With a remote terminal connection (**vt**), the **bye** command returns the terminal to the local node. After a (default) period of four minutes of inactivity, a remote terminal connection is automatically returned to a local connection. This is equivalent to entering the **bye** command.

Full Name

End user session

Syntax

bye

Related Commands

vt

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	Yes	No	IGX, BPX	No

Example 1

bye

Description

End a current session from a local node. The local connection ends, and the initial sign-on prompt appears on the screen.

System Response

```
gamma          TRM   YourID:1          IGX 8420      9.2   Aug. 15 1998 13:47 CST
```

```
Enter User ID:
```

clrscrn

Clears the terminal screen.

Full Name

Clear terminal screen

Syntax

```
clrscrn
```

Related Commands

redscrn, prtscrn

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	Yes	No	IGX, BPX	No

Example 1

```
clrscrn
```

Description

Clear the screen.

System Response

```
pubsigx1      TN      SuperUser      IGX 8420      9.2      July 15 1998  22:49 GMT
```

```
Last Command: clrscrn
```

```
Next Command:
```

prtsrn

Prints the information on the screen at the time the command is entered.

Full Name

Print terminal screen

Syntax

```
prtsrn
```

Related Commands

clrscrn, redscrn

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	Yes	No	IGX, BPX	Yes

Example 1

```
prtsrn
```

Description

Send the information on the screen to the printer.

System Response

All information on the terminal screen is printed. If printing is successful, no status message appears. If the printer is unavailable, an appropriate status message appears.

redscrn

Redraws the screen. This command can be useful for communication that involves a modem. If data has become corrupted and caused erroneous characters on the terminal screen, **redscrn** clears them.

Full Name

Redraw the terminal screen

Syntax

redscrn

Related Commands

clrscrn, prtscrn

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	Yes	No	IGX, BPX	No

Example 1

redscrn

Description

Clear the terminal screen and redraw the valid screen information.

System Response

The current screen reappears without erroneous characters.

vt

Establishes a virtual terminal connection to a remote node. A virtual terminal connection has the following properties:

- On the remote node, any command except the **vt** command can be executed.
- Multiple **vt** sessions is a purchasable option. With it, more than one user can **vt** to a node.
- During a virtual terminal session, jobs can be executed at any time.

During a **vt** session, the remote node name and date flash on the local terminal screen, and “Virtual Terminal” appears in the lower left corner. The **bye** command terminates a virtual terminal session and returns the terminal to local usage. After a default timeout of four minutes of inactivity, a **vt** connection automatically reverts to a local connection. This timeout is the equivalent of using the **bye** command.

Full Name

Make a virtual connection

Syntax

```
vt <nodename>
```

Related Commands

bye

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	Yes	No	IGX, BPX	No

Example 1

```
vt sw115
```

Description

Establish a virtual terminal connection to the switch named “sw115.”

System Response

```
sw115          VT      SuperUser      BPX 15      9.1          July 15 1997 16:59 PDT
```

```
Last Command:
```

```
Next Command:
```

```
Virtual Terminal      CD
```

Table 2-3 *vt-Parameter*

Parameter	Description
node name	Specifies the name of the remote node for the virtual terminal connection. If the specified node name is not valid, the returned message states that the “Node is unknown” and prompts for the correct node name. Also, the main area of the screen names the recognized nodes in the network to help determine the correct name.



Setting Up Nodes

This chapter describes the commands that let you set up an IGX or BPX node. (You must set up each node before you build the network.) This chapter also describes how to:

- Configure a node name and time zone.
- Add and remove a network node.
- Add and remove an interface shelf in a tiered network.
- View a node's configuration.
- Specify Y-cable redundancy for cards in the node.
- Start a window session to an external device or specify an interface to an attached terminal.
- Sending A-bit Notification on ILM/LMI Using Configurable Timer

Naming a Node

Before you can add a node to the network, you need to assign a unique node name. All nodes initially have the default name **NODENAME**. The node name consists of one to eight printable characters (beginning with a letter), and cannot contain spaces. If you are naming the node after a city or place that contains more than eight characters, you will have to abbreviate the name to create a valid network node name. The name must be unique across the network. For example, to assign the node the name of **alpha**, enter:

```
cnfname alpha
```

To change a node name, do the following:

-
- Step 1** Sign on to (or establish a virtual terminal connection with) the node whose name you want to change.
 - Step 2** Change the name of the node using the **cnfname** command.

The name of the node you are connected to changes to the new name. This new name will be distributed automatically to other nodes in the network.

Configuring the Time Zone

Each node must have a *time zone*. To set the time zone for the node to Greenwich Mean Time, for example, enter:

```
cnftmzn GMT
```

Removing a Trunk from the Network

Since release 7.0, “packet lines” have been referred to as *trunks*. Use the letters “**trk**” in all commands referring to packet lines. To remove a trunk from the network, do the following.

-
- Step 1** Sign on to (or establish a virtual terminal connection with) the node.
- Step 2** Delete all packet (trunk) lines attached to the node using the **deltrk** command. For example, to delete line 5, enter: **deltrk 5**.
-

Adding an Interface Shelf

An *interface shelf* is a non-routing device that drives ATM cells to and from a BPX or IGX routing hub in a tiered network. (An interface shelf is also sometimes referred to as a *feeder shelf*.) An interface shelf can be either an IGX or MGX 8850 node configured as an interface shelf, or an MGX 8220 interface shelf.

Because tiered network capability is a purchased option, for an IGX node to serve as an interface shelf, personnel in the Technical Assistance Center (TAC) must first configure it for that purpose. Furthermore, you must use the **cnftrk** command to configure an interface shelf to use STI cell headers and BPX Addressing Mode (BAM). Before you can add an MGX 8220 shelf to a tiered network, the shelf must be an available resource in the network. (For instructions on how to bring up an MGX 8220 shelf, see the MGX 8220 documentation.)

To add an interface shelf, use **addshelf**. See Figure 3-7 for an illustration of the command sequence for setting up an interface shelf. To delete a feeder shelf, use **delsshelf**. To view conditions on a feeder trunk, use **dspnode**. (Note that **addshelf** and **addtrk** are mutually exclusive commands.)

IGX/AF is the designation of an IGX node serving as an interface shelf. Display commands such as **dspnw** and **dspnode** display these designations. The **dspnode** command identifies the hub and feeder nodes and shows the alarm status. The designation for an MGX 8220 shelf serving as an interface shelf is AXIS. The designation for an MGX 8850 serving as an interface shelf is AAL5. The designation for an SES (Service Expansion Shelf) shelf serving as an interface shelf is also AAL5.

The following procedure applies when adding any supported feeder to an IGX routing node. To configure an SES (Service Expansion Shelf) as a feeder to an IGX 8400 routing hub:

- Use **uptrk** to enable the feeder trunk on the port.
- Use **cnftrk** to configure the feeder trunk.
- Use **addshelf** to add the feeder to the database and to enable the LMI signalling channel and the IP relay.
- Use **addcon** to add connections terminating at the UXM/UXM-E feeder endpoints.

- Use **delshelf** to delete the feeder from the database and to disable the LMI signalling channel and the IP relay.

Specifying Card Redundancy

You can set up port redundancy by installing two identical front and back card sets, connecting them with a Y-cable on each paired port, then specifying redundancy with the **addyred** command. Redundancy applies to the entire card and is not port or line-specific. The commands that apply to Y-cable redundancy are:

- **addyred**
- **delyred**
- **dspyred**
- **prtyred**
- **switchyred**

During normal operation, the primary set is “active” and carrying traffic, while the secondary set is in “standby.” The primary set configuration is the configuration for both the primary and redundant set. If you reset the primary cards or the primary card set becomes inactive for another reason, the secondary card set becomes active.

IGX card sets can consist of the following:

- HDM front card and SDI back card
- LDM front card and LDI back card
- FRM front card and an FRI back card
- UFM front card and a UFI back card
- FTM front card and an FTI back card
- UVM front card and a BC-UVI-2E1EC or BC-UVI-2T1EC back card
- CVM front card and a BC-T1 or BC-E1 back card
- NTM front card and a BC-E1 or BC-T1 back card
- BTM front card and a BC-E1, AIT-T3, or AIT-E3 back card
- ALM and a BC-UAI back card
- UXM and an MMF, SMF OC-3, T3/E3, T1/E1 or IMA back card

BPX card sets may consist of the following:

- BCC front card
- BNI front card and T3, E3, or OC-3 back card
- BXM front card and MMF, SMF, or SMFLR back card
- BME front card and MMF, SMF, or SMFLR back card
- ASI front card and T3, E3, or OC-3/STM-1 back card

The following requirements apply to redundant card sets:

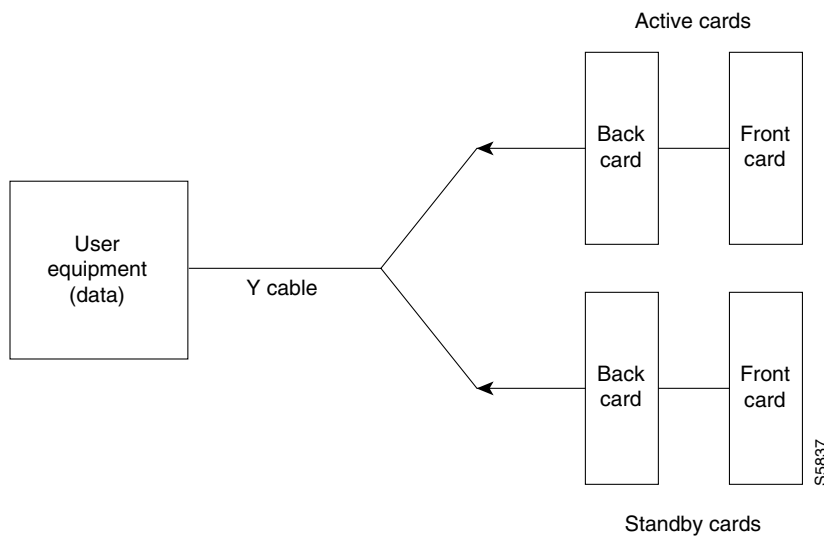
- The primary and secondary card sets must be identical.
- Secondary card sets must not be already active.
- Neither the primary nor secondary card set may already be part of a redundant card set pair.

- If an active card fails, is downed, or removed from the backplane, data automatically goes through the secondary set.
- All service cards on the IGX and BPX nodes support Y-cable redundancy. (The trunk cards also support trunk redundancy. See Chapter 4, “Setting Up Trunks” for a description.)

Figure 3-1 illustrates the typical Y-cable connection of primary and secondary card sets. The single end of a Y-cable (or base of the “Y”) goes to the user equipment. One of the two connectors at the split end goes to the primary back card, and the other connector goes to the secondary back card.

Switching to the standby card occurs only if the secondary card set is in a “Standby” or a “Standby-T” state (but not “Failed”). See the **dspecds** definition for information on these states.

Figure 3-1 Y-Cable Connection

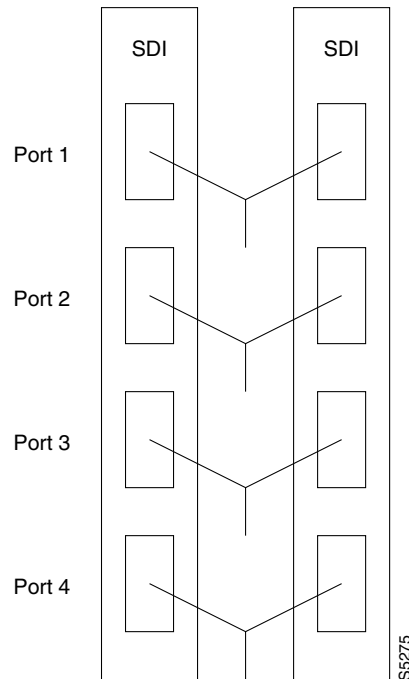


Note

Terminating connections is possible only at a primary slot and not at a secondary slot. See the **addcon** description.

On multiport card sets, each primary port is connected by a Y-cable to a secondary (redundant) port. Port 1 of the primary card set must be paired to port 1 of the secondary card set, and so on. Figure 3-2 illustrates the cabling for a multiport card set.

Figure 3-2 Y-Cables on Multiple Ports



If the secondary card set becomes active, the primary card set goes into the standby state. For the primary card set to serve as a backup, it must be a complete set and not have failed status.

You can execute **addyred** even if the primary and secondary slots are empty. If cards reside in the primary and secondary slots, the system checks for card compatibility. Two types of incompatibility can occur: back card and jumper or cable. On SDI, FRI, and FTI cards, jumpers determine whether a port is configured as DCE or DTE. On LDI cards, either a DCE or DTE adapter cable connects to the LDI port, as applicable.

If incompatibilities exist, the message “Y-Cable Conflict” appears on screen. Specific conflicts are listed in reverse video in the Y-Cable Redundancy screen. See the **dspyred** description for details. Redundancy on V.35 versions of the SDI and FRI cards requires special redundant jumpers. Always use the applicable Y-Cable Redundancy kit for a card.

Card Redundancy for Virtual Trunking

Y-Cable redundancy is supported for both the UXM and BXM trunk cards at the edge of the ATM cloud.

Controlling External Devices

If your system is configured to control an external device, such as a multiplexer, you can establish a **window** session to it from the control terminal. While in a **window** session, any characters you type at the control terminal go to the external device for processing. Any characters generated by the external device appear on the control terminal screen.

The Window to External Device (**window**) command establishes a *window* session. You can use this command only if the external device connects to the local node. You can, however, enter the **window** command during a virtual terminal session so that you have a window session with any external device in the network. To start a window session, use the Virtual Terminal (**vt**) command to access the node

cabled to the device, then invoke the **window** command. Before starting a window session, you must have configured the port and the port function with **cnfterm** and **cnftermfunc**. In addition, you must know whether the external window device is cabled to a node's Control Terminal (EIA/TIA-232) port or Aux Port (EIA/TIA-232) port. The format for the **window** command is:

window [a | c]

Enter an **a** if the external device is attached to the node's Aux Port or **c** if the device is attached to the node's Control Terminal port. The default for this parameter is Aux Port. To establish a **window** session with an external device attached to a node's Control Terminal port, enter:

window c

The system responds by redrawing the terminal screen. You can now enter commands and send data to the external device as if you were locally connected to its Control Terminal port. While in the **window** session, only commands used to control the external device are recognized. IGX/BPX commands are not recognized. You might notice a slight transfer delay in transmission, due to the IGX/BPX bundling of characters before transmitting them. Transfers are delayed until the transfer buffer is filled, or until the keyboard has been inactive for over 50 milliseconds.

To end a **window** session, enter an escape sequence. Escape sequences are one to eight characters in length and are configured with the Configure Terminal Port Function (**cnftermfunc**) command. For example, if you have specified "signoff" as the escape sequence in the Configure Terminal Port Function, enter the following to end the **window** session:

signoff

The default escape sequence is:

^^ (SHIFT 66)

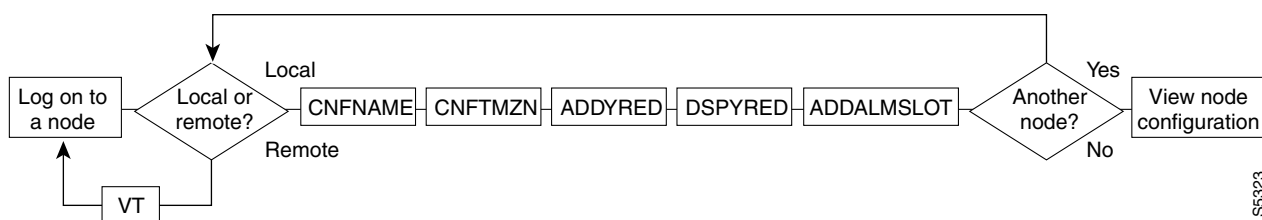
If this escape sequence does not work and you do not know the configured escape sequence, leave the keyboard idle for four minutes. After four minutes, the system terminates the window session.

Command Sequences for Setting Up Nodes

The sequences in Figure 3-3, Figure 3-4, Figure 3-5, Figure 3-6, and Figure 3-7 show the commands you execute to do the following node-related tasks:

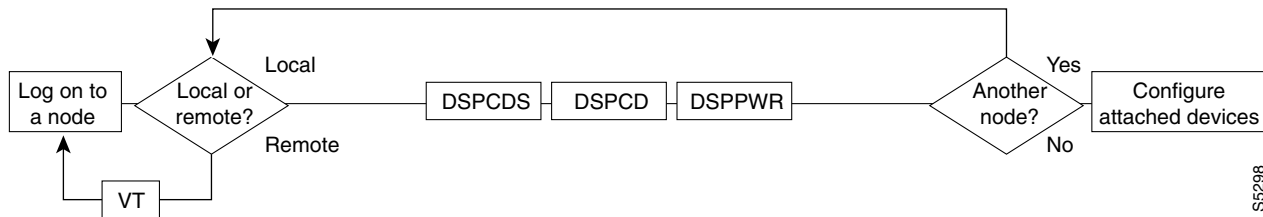
- Set up a node
- View information about the presence of the cards and system power
- Configure an interface for a control terminal that is connected to the node
- Remove a node from a network
- Add an interface shelf

Figure 3-3 Setting Up Nodes



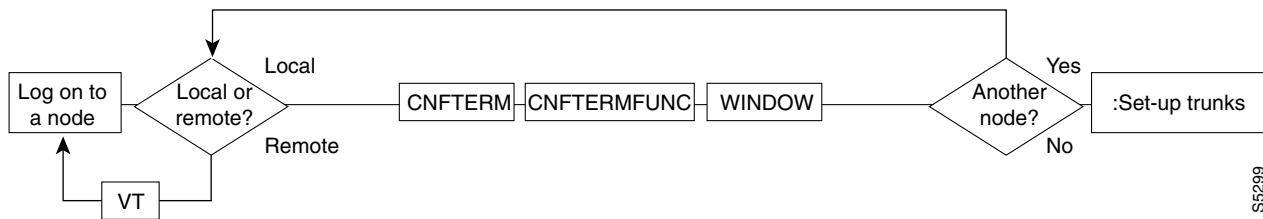
55323

Figure 3-4 Viewing the Node Configuration



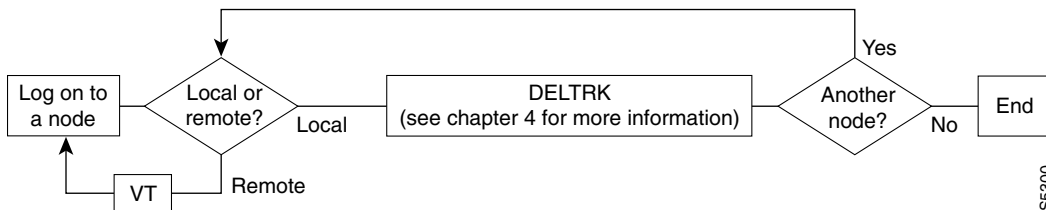
S5298

Figure 3-5 Configuring the Node Interface for a Local Control Terminal



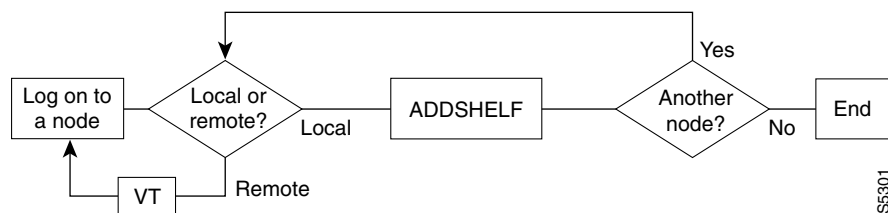
S5299

Figure 3-6 Removing a Node From the Network



S5300

Figure 3-7 Add an Interface Shelf to the Network



1035S

Sending A-bit Notification on ILMI/LMI Using Configurable Timer

The Early A-bit Notification on ILMI/LMI Using Configurable Timer feature provides a mechanism to send A-bit = 0 status change over the LMI interface or send ILMI traps over the ILMI interface after the connections are derouted a certain amount of time. You can configure this time period by setting some **cnfnodeparm** parameters. This configurable time approach provides you with the flexibility to synchronize the operation of the primary network and backup utilities, such as dialed backup over the ISDN or PSTN network. This feature is supported on both the BPX and IGX platforms.

Definitions of Terms Related to A-bit Notification using Configurable Timer Feature in Release 9.2

These brief definitions are relevant to the Early A-bit Notifications on ILMI/LMI Interface using Configurable Timer feature:

CPE

Customer premise equipment.

ILMI

Integrated Local Management Interface provides a means for configuration, status, and control information between two ATM entities.

LMI

Logical Management Interface provides a protocol to monitor the status of permanent virtual connections between two communication devices.

The Early A-bit Notification on ILMI/LMI Using Configurable Timer feature allows A-bit notifications to be sent over the LMI/ILMI interface if a connection cannot be rerouted after a user-specified time. A-bit = 0 will not be sent if the connection is rerouted successfully during that time.

Purpose of Early A-bit Notification on ILMI/LMI Using Configurable Timer Feature

The Early A-bit Notification on ILMI/LMI Using Configurable Timer feature provides the user flexibility to configure the time when the node will start sending out A-bit = 0 after a connection becomes derouted. This allows the CPE to take appropriate actions such as initiating the dialed backup process if the deroute process has not finished during a certain period of time.

The Early A-bit Notification on ILMI/LMI Using Configurable Timer feature is an enhancement to the Send A-bit on Deroute feature provided in Release 9.1.07 for the BPX. To minimize the risk in deploying this feature, and to continue to support the Send A-bit on Deroute feature, which was developed in Release 9.1.07 for BPX, the feature has the following guidelines:

- You can enable this feature by using the **cnfnodetpar** command. You can specify that A-bit Notification be sent either on deroute, or a user-configurable time after deroute. This feature can also be turned off. It is recommended that this feature be set the same on all nodes. Otherwise, the A-bit behavior can be different on different nodes.
- If this feature is turned off, switch software behaves the same as in previous releases. Existing functionality continues to function in a mixed release network (releases 8.4, 8.5, or 9.1 IGX or BPX network).
- The Early A-bit Notification on ILMI/LMI Using Configurable Timer feature is provided on both BPX and IGX platforms.
- If the **cnfnodetpar** A-bit Timer Multiplier M parameter is set to 0, then switch software behaves the same way as in Release 9.1.07 (which supported the Send A-bit on Deroute feature).

Environment Required to use the A-bit Notification Using Configurable Timer Feature

The Early A-bit Notification on ILMI/LMI Using Configurable Timer feature is supported on IGX and BPX switch software. No new hardware or firmware is required on line cards or feeder trunk cards.

Configuration of A-bit Notification Feature

You can enable the Early A-bit Notification on ILMI/LMI Using Configurable Timer feature on both IGX and BPX by using **cnfnodparms** command parameters Send A-bit Early, A-bit Timer Multiplier M, and A-bit Timer Granularity N.

Compatibility

A Release 9.2 IGX or BPX node using this feature is compatible with Release 8.4 and Release 8.5 nodes or Release 9.1 IGX and BPX nodes so that all existing connection related functions will continue to work. However, the timing in sending out the A-bit notifications at both ends of connections may behave differently, depending on how this feature is configured.

Overview of A-bit Notification Feature

The time to reroute connections varies depending on different parameters, such as the number of connections to reroute, reroute bundle size, and so on. It is important to notify the CPE if a connection is derouted and fails to transport user data after a specified time interval. However, it is desirable not to send out A-bit = 0 and then A-bit = 1 when a connection is derouted and rerouted quickly, because such notifications may trigger the CPE backup facilities, which is a costly process and may cause fluctuations in an otherwise stable system. The configurable time interval is a direct solution to these problems.

Function of the Early A-bit Notification on ILMI/LMI Using Configurable Timer Feature

The Early A-bit Notification on ILMI/LMI Using Configurable Timer feature allows you to specify the time interval after which to start sending out A-bit = 0 if a connection fails to reroute and is in the derouted state too long. To avoid having an adverse performance impact on the system, no precise timer is kept for each connection. Instead, all connections derouted during a certain time period go to the same bucket.

This time period is referred to as N, which defines the granularity of the timers, and is specified by the value of the **cnfnodparms** A-bit Timer Granularity N parameter. Another parameter is the time to wait before A-bit = 0 is sent out if the connection is in a derouted state. This parameter is called X. A connection that is derouted at a period of time between 0 and N will send out A-bit = 0 at a time between X and X + N, if the connection continues to be in a derouted state. In cases where there are many A-bit status changes to report to CPE, the last A-bit updates may be delayed much longer because A-bit updates process about 47 connections per second.

To make a compromise between performance and the granularity of timers, N can be configured to be from 3 to 255 seconds; the bigger the value of N, the better the system performance will be. The other parameter, X, is set to be M * N, where M can be configured to be from 0 to 100. The default value for N is 3 sec. Default value for M (A-bit Timer Multiplier M parameter) is 0, meaning A-bit = 0 is sent out on deroute.

It is recommended that X (value of A-bit Timer Multiplier M * the value of the A-bit Timer Granularity N) be set such that when a trunk fails, the connections are given sufficient time to reroute successfully, avoiding the need to send out A-bit = 0.

The change in the A-bit behavior is completely local to the node and is applicable to the master and slave ends of connections when the connections are derouted. When only one of the nodes connected by a connection has this feature turned on, the timing in sending the A-bit notification at one end of the connection may be drastically different from the other end. Therefore it is recommended that the Early A-bit Notification on ILMI/LMI Using Configurable Timer feature be configured the same on all nodes.

Also, because timers on nodes are not in sync, there is a slight time difference (3 seconds maximum) in sending A-bit from the two ends of a connection, even if the **cnfnodeparm** parameter settings on the nodes are the same.

**Note**

A pre-Release 9.1.07 node or Release 9.1.07 node with the Send A-bit on Deroute feature (**cnfnodeparm** Send A-bit immediately parameter) turned off behaves the same way as a Release 9.2 node with the Early A-bit Notification on ILMI/LMI Using Configurable Timer feature disabled. A Release 9.1.07 node with the **cnfnodeparm** Send A-bit immediately parameter set to yes behaves the same way as a Release 9.2 node with the Send A-bit Early parameter set to yes and the A-bit Timer Multiplier M set to 0.

If the value of X (value of A-bit Timer Multiplier M * value of A-bit Timer Granularity N) is set to be smaller than the normal time to reroute connections when a trunk fails, the time it takes to finish rerouting them may take longer. This can happen for line cards and feeder trunks, which have the LMI/ILMI protocol running on those cards, such as BXM on BPX and Frame Relay cards on IGX. Note that it takes time for those cards to process the A-bit status information for each connection coming from the controller card.

**Caution**

To follow the general Release 9.2 interoperability guideline, it is not recommended that the Early A-bit Notification on ILMI/LMI Using Configurable Timer feature be used when the standby control processor is in a locked state.

There is no impact on control processor switchover or trunk card redundancy switchover because connections are not rerouted.

Using the Early A-bit Notification on ILMI/LMI Using Configurable Timer Feature

In releases previous to Release 9.1.07, when connections are derouted, the CPE does not receive A-bit notifications. In Release 9.1.07 on BPX, the Send A-bit on Deroute feature was developed, which allowed the A-bit = 0 to be sent immediately when a connection is derouted. (This was specified by the **cnfnodeparm** parameter Send A-bit immediately parameter.) To further enhance the Send A-bit on Deroute feature in Release 9.1.07, the Early A-bit Notification on ILMI/LMI Using Configurable Timer feature has been implemented in Release 9.2 to allow the network administrator to configure the node as to when A-bit = 0 is sent out if a connection is derouted and not rerouted quickly. This feature allows you to specify when A-bit notifications will be sent at Frame Relay and ATM ports, and at feeder trunks in a tiered network architecture that supports the ILMI/LMI interface. In a tiered network, the A-bit information is used by the feeder nodes such as MGX 8220 (AXIS), which then relays the A-bit information to the CPE.

The status update messages are throttled at the rate of one message per second. Each message can be used to specify the conditioning information on a maximum of 47 connections. It may take on the order of minutes for the ILMI/LMI manager to process the A-bit status when there is a large number of connections.

Performance of Sending A-bit Notification Using Configurable Timer Feature

There are two factors in performance: system performance and reroute time. System performance is affected by the value of the time interval. In a network where connections are normally derouted and rerouted quickly before the bucket timer expires, the performance impact is very small. Only when the timer expires, then looping through all LCONs and sending update messages will take up some CPU time, which is estimated to be smaller than 1 percent.

Reroute time is not affected if LMI/ILMI is running on the controller card. When the protocol is implemented on the line cards and feeder trunk cards, some additional A-bit status communication between them and controller card may delay the reroute process.

Specifically, on the BPX, if the BXM runs LMI/ILMI, the BCC has to send A-bit updates to the card. These messages will be throttled. When this happens, the estimated time to reroute all 12K connections increases no more than 5 percent.

For the IGX, enabling the Sending A-bit Notification using Configurable Timer feature may impact performance if many connections end at Frame Relay cards. This is due to the restricted format of interface between NPM and Frame Relay cards.

Reliability, Availability, and Serviceability (RAS)

Together with the CPE equipment that has dialed backup capability, this feature increases the availability of the services between the CPEs.

Interoperability with Previous Release of Switch Software

This feature is blocked until all nodes are running Release 9.2. A Release 9.2 node with or without this feature being turned on can interwork with other 8.4 or 8.5 nodes or Release 9.1 nodes with all existing connection management functionality.

Summary of Commands

Table 3-1 shows the command name and starting page for the description of each node command.

Table 3-1 Commands for Setting Up a Node

Mnemonic	Description	Page
addalmslot	Add an alarm slot	3-14
addcdred	Add card redundancy for SONET APS 1+1 across two BXM cards	3-16
addshelf	Add a trunk between an IGX or BPX core switch shelf and an interface shelf	3-16
addyred	Add Y-cable redundancy	3-30
cnfasm	Configure ASM card	3-32
cnfdate	Configure date	3-34
cnffunc	Configure system function	3-34
cnfname	Configure node name	3-40

Table 3-1 *Commands for Setting Up a Node (continued)*

Mnemonic	Description	Page
cnfprt	Configure printing functions	3-42
cnfterm	Configure terminal port	3-44
cnftime	Configure time	3-47
cnftmzn	Configure time zone	3-49
delalmslot	Delete alarm slot	3-51
delshef	Delete a trunk between a IGX/BPX core switch shelf and interface shelf	3-54
delcdred	Delete Y-cable redundancy (disables card redundancy for SONET Automatic Protection Switching feature)	3-53
delyred	Delete Y-cable redundancy	3-57
dspasm	Display ASM card configuration	3-57
dspcd	Display card	3-59
dspcds	Display cards	3-63
dsplancnf	Display LAN configuration	3-69
dspctrlrs	Display all PNNI VSI controllers on a BPX node	
dsplmistats	Display LMI Statistics	3-71
dspnds	Display nodes	3-73
dspnode	Display summary information about interface shelves	3-75
dsptermcnf	Display terminal configuration	3-80
dsptermfunc	Display terminal port configuration	3-82
dspprtcnf	Display print configuration	3-83
dspppwr	Display power	3-85
dspcdred	Display Y-cable redundancy (displays card redundancy for SONET Automatic Protection Switching)	3-61
dspyred	Display Y-cable redundancy	3-87
prtedred	Print card redundancy (prints Y cable redundancy for SONET Automatic Protection Switching)	3-89
prtyred	Print Y-cable redundancy	3-90
upcd	Up card	3-92
window	Window to external device	3-99

addalmslot

Enables the MAJOR and MINOR alarm indicators on an Alarm Relay Card (ARC) or Alarm Relay Module (ARM) front card. It also configures the slot to provide external alarms from the Alarm Relay Interface (ARI) back card. You should use this command at each node equipped to provide external alarm indications to the customer alarm reporting system. The slot specified for the ARC or ARM may be any shelf slot, but is usually the slot farthest to the right.

Upon executing the command, the system places the alarm card set in the active state and displays the current alarm status.

Full Name

Add alarm slot

Syntax

addalmslot <slot number>

Related Commands

delalmslot, **dspalms**

Attributes

Privilege	Jobs	Log	Node	Lock
1-4	No	Yes	IGX	Yes

Example 1

```
addalmslot 16
```

Description

Enable alarm reporting from slot 16 in a node. (The system then displays alarm status.)

System Response

```
beta          TRM   YourID:1          IGX 8430    9.2      Aug. 3 1998 14:27 MST
```

```
Alarm summary (Configured alarm slots: 16)
Connections Failed:      None
Groups Failed:          None
PLN Alarms:              1 Major
CLN Alarms:              None
Cards Failed:            1
Missing Cards:           None
Remote Node Alarms:     1 Major
Remote Domain Alarms:   None
```

```
Last Command: addalmslot 16
```

```
Next Command:
```

Table 3-2 *addalmslot-Parameters*

Parameter	Description
slot number	Specifies the slot number of the alarm card set.

addcdred

The **addcdred** is an alias for the **addyred** command (thus has identical functionality) which lets you enable card and line redundancy for the cards on the IGX and BPX. It lets you add card and line redundancy for APS 1+1 across two BXM OC-3 and OC-12 cards. You also use it before enabling APS 1:1 line redundancy. It works similarly to the **addyred** command.

Use the **addcdred** command to specify the slots of the primary and secondary (standby) cards that form the redundant pair.

When configuring APS 1+1 card and line redundancy, you must execute the **addcdred** command before using **addapsln**. Refer to the *BPX 8600 Installation and Configuration Guide* for more information on setting up APS 1+1 card and line redundancy.

Redundant card sets must have the following characteristics:

- The primary and secondary card sets must be identical.
- For APS 1+1 card redundancy only, the primary and secondary card sets must reside in adjacent slots. (This restriction only applies to APS 1+1 Card and Line Redundancy.) APS 1+1 is not supported on a single-card option.
- Secondary card sets must not currently be active.
- Neither the primary nor secondary card set may already be part of a redundant set.
- Redundancy applies to the entire card and not specific trunks or lines.

In both the single and multiport card sets, if the secondary card set becomes active, the primary card set serves as its backup (assuming the primary card set is complete and not failed). You cannot use the **addcdred** command on empty card slots. If one or both of the card slots is empty, and you use the **addcdred** command, the command will fail.

If cards reside in the primary and secondary slots, the system checks for card compatibility. The following types of incompatibility can occur: back card and jumper or cable inconsistencies. Also, the **addcdred** command can fail because of firmware capabilities conflicts. For example, if one of the cards supports virtual trunking, and the other doesn't support virtual trunking, the **addcdred** command might fail. Refer to the *Cisco BPX 8600 Series Installation and Configuration* manual for more information on configuring SONET APS 1+1 card and line redundancy for BXM OC-3 and OC-12 cards.

APS 1+1 Environment (Using Redundant Backcards, with Front Card Redundancy)

The same numbered ports on adjacent BXM cards are used. A hardware, firmware, and software upgrade is required. (Firmware that supports APS 1+1 setup, and switch software Release 9.2 is required.)

The APS 1+1 feature requires two BXM front cards, an APS redundant frame assembly, and two redundant type BXM backcards. The two redundant BXM backcards are plugged into the APS redundant frame assembly. (Refer to the SONET APS Configuration chapter in the *Cisco BPX 8600 Series Installation and Configuration* guide for more information on APS hardware configuration.) The types of redundant back card and backplane sets required are:

- BPX-RDNT-LR-155-8 (8-port, long reach, SMF, SC connector)
- BPX-RDNT-LR-622 (single-port, long reach, SMF, FC connector)
- BPX-RDNT-SM-155-4 (4-port, medium reach, SMF, SC connector)
- BPX-RDNT-SM-155-8 (8-port, medium reach, SMF, SC connector)
- BPX-RDNT-SM-622 (single-port, medium reach, SMF, FC connector)
- BPX-RDNT-SM-622-2 (2-port, medium reach, SMF, FC connector)

Each of the listed model numbers includes two single back cards and one mini-backplane (providing cross-coupling of two back cards).

The single back cards and mini-backplane can be ordered as spares. Their model numbers are:

- BPX-RDNT-BP= (common backplane for all redundant APS backcards)
- BPX-LR-155-8R-BC= (for BPX-RDNT-LR-155-8)
- BPX-LR-622-R-BC= (for BPX-RDNT-LR-622)
- BPX-SMF-155-4R-BC= (for BPX-RDNT-SM-155-4)
- BPX-SMF-155-8R-BC= (for BPX-RDNT-SM-155-8)
- BPX-SMF-622-R-BC= (for BPX-RDNT-SM-622)
- BPX-SMF-622-2R-BC= (for BPX-RDNT-SM-622-2)

**Note**

Using only one front card and two back cards is not a valid configuration when adding APS capability, and APS alarm capability is reduced when the standby card is not available. You must configure card redundancy before you can configure APS redundancy.

If incompatibilities exist, the message “Y-Cable Conflict” appears on the screen. Specific conflicts are listed in reverse video on the **dspcdred** display. See the **dspcdred** description for more information.

**Note**

When SONET Automatic Protection Switching (APS) is configured, you will not be able to use the **addyred** or **delyred** commands on a card configured for APS 1:1 architecture. That is, you will not be able to execute the **addyred** command, then configure the APS 1:1 architecture. Similarly, you will not be able to configure APS 1:1, then execute the **addyred** command. You will be blocked from executing these commands at the command line interface.

In this release, to ensure that only cards with the Idle Code Suppression feature enabled on them are allowed to be a Y-redundancy pair, **addcdred** blocks cards that have different idle code suppression capability.

Full Name

Add card redundancy for SONET Automatic Protection Switching (APS) across two OC-3 or OC-12 cards.

Syntax

addcdred <primary slot> <secondary slot>

Related Commands

delcdred, dspcdred, prtcdred, switchedred

Attributes

Privilege	Jobs	Log	Node	Lock
1-4	No	Yes	BPX	Yes

Example 1

```
addcdred 2 3
```

Description

Add redundant line on port 1 for BXM OC-3 card and APS backcards in slots 2 and 3 of the BPX.

System Response

```
beta          TRM   YourID:1          BPX 8620    9.2    Aug. 15 1997 14:27 MST
```

```

      Slot Other Front  Back  Channel Configuration
Slot Type Slot  Card  Card   1    2    3    4    5    6    7    8
2   Pri   3   BXM   LM-BXM
3   Sec   2   BXM   LM-BXM

```

Last Command: addcdred 2 3

Next Command:

Table 3-3 *addcdred-Parameters*

Parameter	Description
primary slot	Specifies the slot number of the primary card set.
secondary slot	Specifies the slot number of the secondary card set.

addshelf

Adds an ATM link between an IGX/BPX core switch shelf and an interface shelf such as an MGX 8220, MGX 8850, IGX shelf, or SES (Service Expansion Shelf) in a tiered network; or an ATM link between a BXM card on a BPX node and a Label Switch Controller (LSC) such as a series 7200 or 7500 router; or an ATM link between a BXM card on a BPX node. (An MPLS controller is considered an interface shelf from the BPX's perspective.) The routing hub can be either a BPX or an IGX.

The interface shelf can be one of the following:

- An MGX 8220 shelf connected to a BPX node
- An MGX 8850 shelf connected to a BPX node
- An MPLS (Multiprotocol Label Switching) controller connected to a BPX node
- A Private Network to Network Interface (PNNI) Controller connected to a BPX node
- An IGX node connected to an IGX routing node that serves as a hub for the IGX/AF
- An SES (Service Expansion Shelf) connected to an IGX node (supported in Release 9.2.20)

The signaling protocol that applies to the trunk on an interface shelf is Annex G. (Annex G is a bidirectional protocol defined in Recommendation Q.2931, used to monitor the status of connections across an UNI interface. The Annex G protocol is used in this release to pass connection status information between an IGX/BPX core switch shelf and an attached feeder.)



Note

Because tiered network capability is a paid option, personnel in the Cisco Technical Assistance Center (TAC) must telnet to the unit and configure it as an interface shelf before you can execute **addshelf**.

Each IGX/AF, MGX 8220, MGX 8850, or SES shelf has one trunk that connects to the BPX or IGX node serving as an access hub. A BPX routing hub can support up to 16 T3 trunks to the interface shelves, which can be IGX/AF, MGX 8220, or MGX 8850 interface shelves. An IGX hub can support up to four trunks to the interface shelves, which can be IGX/AF or SES (Service Expansion Shelf) shelves.

Before it can carry traffic, you must “up” the trunk on an interface shelf (using **uptrk** on both the interface shelf and the IGX/BPX core switch shelf) and “add” it to the network (using **addshelf**). Also, a trunk must be free of major alarms before you can add it with the **addshelf** command.

In this release, the commands **addshelf** and **addctrlr** are used to add an MPLS/PNNI controller to the BPX. The command **addshelf** with option “v” is used to add a VSI shelf. This is used mainly for MPLS controllers. The command **addctrlr** is used to add a controller to a shelf that has LMI capabilities.

In this release, you can use an IGX as a feeder node to connect via a UXM IMA trunk to an IGX or BPX router node using IMATM. You use **addshelf** with the “I” option at the IGX node to add the feeder trunk connecting it to an IGX feeder node.

Full Name

Add an interface shelf (feeder) or a controller to a routing node or hub

Syntax

Interface shelf:

addshelf <slot.port> <shelf-type> [vpi] [vci]

addshelf <slot>.<primary link> <shelf type>

Tag switch controller:

addshelf <slot.port> <device-type> <control partition> <control ID>

VSI controller:

addshelf <trunk slot.port> v <ctrlr id> <part id> <control vpi> <control vci start> <redundant ctrlr warning>



Note

If you manage a tiered network through the command line interface, you can manage only Frame Relay interworking connections (ATFR) across the network. Three-segment connections for carrying serial data or voice between IGX/AFs is allowed, but you must manage them through Cisco WAN Manager.

Related Commands

delshelf, dspnode, dsptrks

Attributes

Privilege	Jobs	Log	Node	Lock
1-4	Yes	Yes	BPX switch with IGX interface shelves IGX switch with IGX shelves BPX switch with the MGX 8220 interface shelf BPX with the MGX 8850 interface shelf BPX switch for MPLS controller IGX switch for the Service Expansion Shelf (SES)	Yes

Example 1

Interface shelf: **addshelf** 11.1 a 21 200

Label switch controller: **addshelf** 4.1 vsi 1 1

Description

Interface shelf:

Add trunk 11.1 as an MGX 8220 interface shelf. After you add the shelf, the screen displays a confirmation message and the name of the shelf.

MPLS controller:

Add trunk 4.1 as an MPLS Controller interface shelf. After you add the MPLS controller, the screen displays a confirmation message and the name of the shelf.

Description for Interface Shelves

An interface shelf can be one of the following:

- An MGX 8220 connected to a BPX node.
- An MGX 8850 connected to a BPX node.
- An IGX node connected to a BPX node, which serves as a hub for the IGX/AF.
- An IGX node connected to an IGX routing node, which serves as a hub for the IGX/AF.

Table 3-4 *addshelf-Interface Shelf Parameters*

Parameter	Description
slot.port (trunk)	slot.port Specifies the slot and port number of the trunk.
shelf-type	I, A, P, V, X On a BPX node, shelf type specifies the type of interface shelf when you execute addshelf . The choices are I for IGX/AF, A for the MGX 8220, a type of adjunct processor shelf), V for VSI, or X for the MGX 8800. In the case of BNI, only two options are available: I for IGX/AF, A for the MGX 8220. On an IGX node, shelf type specifies the type of interface shelf you can add. The choices are I for IGX/AF or X for AAL5 for an SES (Service Expansion Shelf).

Table 3-4 addshelf–Interface Shelf Parameters (continued)

Parameter	Description
vpi vci	vpi,vci are optional when adding an interface shelf (feeder). Specifies the vpi and vci (Annex G vpi and vci are used). For the MGX 8220 only, the valid range for vpi is 1–1015, and the valid range for vci is 1–65535.
Control VPI Control VCI start	The (VPI.VCI) of the 15 control VCs is (control_VPI.control_VCI_start) to (control_VPI.control_VCI_start+14).The control VC used for slot n (1<= n<=15) is (control_VPI.control_VCI_start + n -1). <control_VPI> should be chosen such that: <ul style="list-style-type: none"> • If <control_VPI> = 0, <control_VCI_start> can be set to a value > 40. • If any VSI partition exists on the interface, then control_VPI < start_VPI or control_VPI > end_VPI for all partitions on that interface. An error message is displayed if the control VPI falls into the VPI range belonging to a VSI partition. • No AutoRoute connection exists on (VPI.start_VCI to VPI.start_VCI+14). If any AutoRoute connection exists on these VPI/VCI values, you are not allowed to use these VPI/VCI values. • This VPI is “reserved” for control VCs.

Example for Interface Shelves

Add an MGX 8220 at trunk 11.1 After you add the shelf, the screen displays a confirmation message and the name of the shelf. Add the MGX 8220 (may be referred to on screen as AXIS) as follows:

addshelf 11.1 a

The sample display shows a partially executed command prompting you for the interface shelf type:

System Response

```
nmsbpx23      TN      SuperUser      BPX 620      9.2      Apr. 4 1998 13:28 PST
```

```
BPX Interface Shelf Information
```

```
Trunk  Name      Type      Alarm
1.3    AXIS240  AXIS      OK
11.2   A242     AXIS      OK
```

```
This Command: addshelf 11.1
```

```
Enter Interface Shelf Type: I (IGX/AF), A (AXIS), P (APS), V (VSI), X (AAL5)
```

```
Next Command:
```

Example for Adding an MGX 8850 (AAL5) Interface Shelf to a BPX Routing Node

Add an MGX 8850 at trunk 4.1. After you add the MGX 8850 interface shelf, the screen displays a confirmation message and the name of the shelf. Add the MGX 8850 (may be referred to on-screen as AAL5) as follows:

addshelf 4.1 x

The sample display initially shows the output of a `dsprks` command, then shows how an MGX 8850 was added on trunk 4.1 as an AAL5 type of interface shelf. (AAL5 is the ATM Adaptive Layer 5 protocol, which is an ATM standard interface that is used by the routing node or routing hub to communicate to the MGX 8850 and Service Expansion Shelf feeders.) Adding an MGX 8850 interface shelf or a Service Expansion Shelf is similar to adding an MPLS controller or a PNNI controller.

In releases previous to Release 9.2.10, for BTM E1/T3 feeder interface types, `addshelf` does not prompt you for the “Interface Shelf Type.” In this release, `addshelf` will prompt you for the “Interface Shelf Type.” (This is needed to distinguish which signalling protocol is used.) Because MGX 8220, MGX 8850 and SES use the same LMI signalling protocol, you will be prompted for the “Interface Shelf Type (A) AAL5.”

System Response

```
sw288      TN      SuperUser      BPX 8620      9.2.j2      Dec. 10 1998 15:38 PST

TRK      Type      Current Line Alarm Status      Other End
4.1      OC-12      Clear - OK                          -
11.2     T3         Clear - OK                          redhook/14
11.3     T3         Clear - OK                          sw113/16
```

This Command: `addshelf 4.1`

Enter Interface Shelf Type: I (IGX), A (AXIS), P (APS), V (VSI), X (AAL5)

BPX Interface Shelf Information

```
Trunk      Name      Type      Part Id      Ctrl Id      Alarm
4.1        SIMFDRO  AAL5      -            -            OK
```

This Command: `addshelf 4.1 x`

Enter Interface Shelf Type: A (AXIS), P (APS), V (VSI), X (AAL5)

Shelf has been added

Next Command:

Example for Adding a Service Expansion Shelf (SES) to an IGX 8400

Add an SES interface shelf to an IGX 8400 (using a UXM or UXM-E interface). After you add the SES interface shelf, the screen displays a confirmation message and the name of the shelf. Add the SES (may be referred to on-screen as AAL5) as follows:

addshelf 6.1 X

Enter Interface Shelf Type: X (AAL5)



Note

You can add an SES (Service Expansion Shelf) feeder to an IGX routing node only.

System Response

```
sw288      TN      SuperUser      IGX 8420      9.2.2I      Dec. 10 1998 15:38 PST
```

```
TRK      Type      Type      Alarm
9.1      ases1     AAL5      MIN
```

This Command: addshelf 4.1

Enter Interface Shelf Type: I (IGX), A (AXIS), P (APS), V (VSI), X (AAL5)

IGX Interface Shelf Information

```
Trunk      Name      Type      Alarm
9.1      ses_fdr   AAL5      MIN
```

This Command: addshelf 4.1 x

Enter Interface Shelf Type: A (AXIS), P (APS), V (VSI), X (AAL5)

Shelf has been added
Next Command:

The sample display shows that an SES was added on trunk 9.1 as an AAL5 type of interface shelf. (AAL5 is the ATM Adaptive Layer 5 protocol, which is an ATM standard interface that is used by the routing node or routing hub to communicate with the SES shelves.) Adding an IGX interface shelf is similar to adding an MPLS (Multiprotocol Label Switching) controller as an interface shelf.

The **addshelf** command will prompt for “Interface Shelf Type.” Because the MGX 8220, MGX 8850, and the SES (Service Expansion Shelf) use the same Annex G LMI signalling protocol to communicate with an IGX routing hub, they all use the same interface shelf type of AAL5 (designated by the **addshelf** “X” option).

Types of Interface Shelves Supported in Release 9.2

Previous to Release 9.2, WAN switching software supported the ability to configure an IGX 8400 as an interface shelf to the IGX 8400 hub over a BTM E1 and T3 interface. Also, the MGX 8220 (formerly called “AXIS”) is supported as an interface shelf to the BPX. Release 9.1 introduced the ability for the MGX 8850 to serve as an interface shelf to a BPX routing hub. Release 9.2 introduced the ability for an SES (Service Expansion Shelf) to serve as an interface shelf to an IGX 8400 routing hub.

UXM Feeder Support in Release 9.2

In Release 9.2.20, the following are supported:

- You can attach SES feeders to the routing network through an IGX 8400 routing hub using UXM/UXM-E and PXM trunks using UNI and NNI format. A routing hub can support up to four feeders.
- The LMI/Annex G signalling channel is used to communicate with the SES feeder through the SAR (Segmentation Assembly and Reassembly).
- UXM Feeder support provides voice, Frame Relay, and ATM data connections from feeder node to feeder node for a 2- or 3-segment network.

Not Supported in Release 9.2

An MGX 8220 or an MGX 8850 can connect as interface shelves to a BPX routing node. An IGX interface shelf can connect to an IGX 8400 routing node over a UXM/UXM-E interface. Similarly, in Release 9.2.10, an SES can connect to an IGX routing hub over a UXM/UXM-E interface. However, you cannot do the following:

- An IGX 8400 interface shelf cannot connect to a BPX hub.
- Two-segment voice and data connections are not allowed on an SES interface shelf.
- An IGX 8400 interface shelf cannot connect to an IGX routing hub over a UXM trunk.
- An MGX 8220 interface shelf cannot connect to an IGX 8400 routing hub.

Signalling Channel Used by MGX 8850 and SES Interface Shelves Connecting to Routing Hubs

Previous to Release 9.2, the IGX 8400 interface shelf communicated with the IGX 8400 routing hub using a BTM E1 interface over the Annex G LMI with STI format. In Release 9.2, the SES interface shelf with a UXM/UXM-E interface communicates with the routing hub over an Annex G LMI interface by using AAL5 format.

**Note**

Annex G is a bidirectional protocol used to monitor the status of connections across a UNI interface. This includes the real-time notification of the addition or deletion of connection segments and the ability to pass the availability (active state) or unavailability (inactive state) of the connections crossing this interface.

An SES feeder uses the Annex G protocol to pass connection status information between itself and an IGX 8400 routing hub. Similarly, an MGX 8850 feeder uses the Annex G signalling channel to pass connection status information between itself and a BPX routing hub.

Previous to Release 9.2, IP relay was supported by encapsulating the IP data in a network message when interfacing with an IGX 8400 interface shelf. In this release, the SES interface shelf communicates with an IGX routing hub through ATM cells. Thus, IP data destined for an IGX 8400 is encapsulated in an AAL5 ATM cell format.

addshelf Error Messages

Some of the possible error messages for the **addshelf** command:

- An MGX 8850 Interface Shelf already exists on this Hub
- Trunk is already added to the Network
- Trunk is in alarm
- An Interface Shelf already exists on this trunk
- Interface Shelf VPI out of range
- Interface Shelf VCI out of range
- No memory available for Interface Shelf allocation
- Communication failure during Shelf modification
- Shelf has been added
- Shelf has been deleted
- Communication breakdown
- Interface Shelf allocation failure
- Interface Shelf already has a network connection
- Interface Shelf name is not unique
- Interface Shelf IP address is not unique
- Interface Shelf modification failure

System Response

```
pswbp3      TN      SuperUser      BPX 8600      9.1      June 6 1998 13:28 PST
```

```
BPX Interface Shelf Information
```

Trunk	Name	Type	Part Id	Ctrl Id	Alarm
4.8	SIMFDR0	AAL5	-	-	OK

```
This Command: addshelf 4.8 x
```

```
Enter Interface Shelf Type: I (IGX/AF), A (AXIS), P (APS), V (VSI), X (AAL5)
```

```
Next Command:
```

Description for Label Switching

For label switching, before it can carry traffic, you need to “up” the link to a tag switch controller (using either **uptrk** or **upport**) at the BPX node. You can then “add” the link to the network (using **addshelf**). Also, the link must be free of major alarms before you can add it with the **addshelf** command.



Note

Once you “up” a port on the BXM in either trunk or port mode by using either the **uptrk** or **upport** commands, respectively, you can only “up” the ports in the same mode.

Table 3-5 *addshelf-Label Switching Parameters*

Parameter	Description
slot.port	Specifies the BXM slot and port number of the trunk. (You can configure the port for either trunk (network) or port (service) mode.
device-type	This parameter, vsi, (for “virtual switch interface), specifies a virtual interface to an ATM-LSR (Label Switch Router) controller such as a Cisco 7200 or 7500 series router. Note that the “v” option is not applicable when configuring Automatic Routing Management PVCs. You only need to enter the “v” or “vsi” option when configuring VSI options.
control partition	Specifies the control partition. You can typically leave this field blank when you add an MPLS (formerly Tag Switch) Controller to a BPX or MGX 8800 node.
control ID	Control IDs must be in the range of 1 to 32, and you must set these identically on the VSI-MPLS Controller and in the addshelf command. A control ID of “1” is the default used by the MPLS Controller (formerly Tag Switch Controller).

Example for Multiprotocol Label Switching

Add an LSC (Label Switch Controller) link to a BPX node by entering the **addshelf** command at the desired BXM port as follows:

```
addshelf 4.1 vsi 1 1
```

System Response

```
nmsbpx23      TN      SuperUser      BPX 15      9.2      Apr. 4 1998 13:28 PST
```

```
                BPX Interface Shelf Information
```

Trunk	Name	Type	Alarm
5.1	j6c	AXIS	MIN
5.3	j5c	IGX/AF	MIN
4.1	VSI	VSI	OK

```
This Command: addshelf 4.1 v 1 1
```

```
Next Command:
```

Example for Adding a Redundant VSI Controller

```
addshelf 11.1 vsi 1 2
```

Description

Add a redundant (more than one) VSI controller (as an interface shelf to a BPX node), on slot 11 on port 1, with a control partition of 1 and control ID of 2.

System Response

```
night          TN      StrataCom      BPX 8600    9.2.00 Apr. 11 1998 14:31 GMT
```

```
                BPX Interface Shelf Information
```

Trunk	Name	Type	Part Id	Ctrl Id	Alarm
1.1	sww222	IGX/AF	-	-	UNRCH
10.3	VSI	VSI	1	1	OK

```
Warning partition already in use do you want to add redundant controller?
```

```
Last Command: addshelf 11.1 vsi 1 2
```

Example 4

```
addshelf 4.1 vsi 1 1
```


Description

Add a VSI controller to port 4.1, controlling partition 1



Note

The second “1” in the **addshelf** command is a controller ID. Controller IDs must be in the range 1-32, and must be set identically on the TSC and in the **addshelf** command. A controller ID of 1 is the default used by the TSC.

System Response

```
n4          TN      SuperUser      BPX 8620    9.2      Apr. 4 1998 16:42 PST
```

BPX Interface Shelf Information

Trunk	Name	Type	Alarm
3.1	j6c	AXIS	MIN
5.3	j5c	IGX/AF	MIN
4.1	VSI	VSI	OK

```
Last Command: addshelf 4.1 vsi 1 1
```

```
Next Command:
```

addyred

The **addyred** command performs the same function as the **addcdred** command. It enables card redundancy for cards on the IGX and BPX. Use the **addyred** command to specify the slots of the primary and secondary (standby) cards that form the redundant pair. Refer to the “Specifying Card Redundancy” section at the beginning of this chapter for a list of supported card sets.

Redundant card sets must have the following characteristics:

- The primary and secondary card sets must be identical.
- When configuring APS 1+1, the primary and secondary card sets must be in adjacent slots. (Note that this restriction applies only to the BPX chassis for APS 1+1 redundancy.)
- Secondary card sets must not currently be active.
- Neither the primary nor secondary card set may already be part of a redundant set.
- Redundancy applies to the entire card, and not specific trunks or lines.

If cards reside in the primary and secondary slots, the system checks for card compatibility. Two types of incompatibility can occur: back card and jumper or cable inconsistencies. (On SDI, FRI, and FTI cards, jumpers determine whether a port is configured as DCE or DTE. On LDI cards, either a DCE or DTE adapter cable connects to the LDI port. For descriptions of the jumper positions and cabling, see the *Cisco IGX 8400 Series Installation and Configuration* manual.)

Note that the **addyred** command prevents invalid configurations when you try to configure the SONET APS feature. When SONET Automatic Protection Switching (APS) is configured, you will not be able to use the **addyred** or **delyred** commands on a card configured for APS 1:1 architecture. That is, you will not be able to execute the **addyred** command, then configure the APS 1:1 architecture. Similarly, you will not be able to configure APS 1:1, then execute the **addyred** command. You will be blocked from executing these commands at the command line interface.

If incompatibilities exist, the message “Y-Cable Conflict” appears on the screen. Specific conflicts are listed in reverse video in the **dspyred** display. See the **dspyred** description for more information.

To ensure that only cards with the Idle Code Suppression feature enabled on them are allowed to be a Y-redundancy pair, **addyred** blocks cards that have different idle code suppression capability.

The **addyred** commands (**addyred**, **delyred**, **dspyred**, **prtyred**, **switchyred**) will perform feature mismatch checking on both the primary and secondary cards. For information on feature mismatch checking, refer to the *BPX 8600 Series Installation and Configuration*.

Mismatch Checking Performed by addyred/delyred

During **addyred**'s mismatch checking, the following verifications are done:

- A verification is done to ensure that both the primary and secondary cards support features that are activated. For example, if on the primary card, the APS feature has been configured, and on the secondary card this feature is not available, you will be blocked from using the **addyred** command.
- If the feature is not enabled, and the secondary card does not support similar feature sets, the (internal) logical database is updated to reflect this.
- Following a **delyred** command execution, the logical card's database is updated to reflect the primary card's capabilities.

Full Name

Add Y-cable redundancy

Syntax

addyred <primary slot> <secondary slot>

Related Commands

delyred, **dspyred**, **prtyred**

Attributes

Privilege	Jobs	Log	Node	Lock
1-4	No	Yes	IGX, BPX	Yes

Example 1

```
addyred 2 3
```

Description

Add Y-cable redundancy to the BXM card sets in slots 2 and 3.

System Response

```
beta          TRM  YourID:1          BPX 8620    9.2    Aug. 15 1998 14:27 MST

      Slot Other Front  Back  Channel Configuration
Slot Type Slot  Card  Card   1    2    3    4    5    6    7    8
2   Pri   3   BXM   LM-BXM
3   Sec   2   BXM   LM-BXM
```

Last Command: addyred 2 3

Next Command:

Table 3-6 *addyred-Parameters*

Parameter	Description
primary slot	Specifies the slot number of the primary card set.
secondary slot	Specifies the slot number of the secondary card set.

cnfasm

Lets you set various configurable parameters associated with the BPX Alarm and Status Monitor card in slot 15. Because this card always resides in slot 15, entering the slot number is unnecessary. In Release 9.2 and above, robust alarms are generated for the following alarm conditions:

- Power supply, temperature, fan, and DC-voltage level alarms. (Some of these conditions already generate Robust Alarms on the IGX.)
- Connection AIS alarm.

- Bus failure.
- External clock source failure.
- Multiple invalid login attempts on a user port (potential security threat).
- Excessive CPU and memory usage on switch processor card.

These alarm conditions above appear in the maintenance log or in the node command line interface commands (**dspasm**), and are not also reported as SNMP trap to the customer NMS. (Such traps are generated by the Cisco WAN Manager RTM proxy upon receiving Robust Alarms from a switch.)

In Release 9.2 and above, robust alarms are generated by the BPX when power and temperature alarm conditions are detected by the ASM card. The ASM card monitors and reports events involving:

- Power supplies
- Cabinet temperature
- Cooling fan speed
- DC-voltage level

You configure and control the reporting of these events through the **cnfasm** command, where you can enable or disable each alarm. For power supply failure/removal events, you can also specify the alarm class (that is, Major vs. Minor).

A robust alarm is generated by the following:

- The IGX platform when a DC-voltage out-of-range condition occurs.
- All switch platforms (IGX, BPX) when:
 - An Alarm Indicator Signal (AIS) condition is detected on a PVC. The alarm now has an NNI Status field that previously appeared in the Connection NNI Alarm message.
 - A bus failure or failure cleared event occurs. (In releases previous to Release 9.2, such events are reported through maintenance log messages.)
 - An external clock source failure or failure cleared event occurs.
 - The number of successive invalid login attempts on a user port exceeds the current threshold setting on the switch. You set the threshold by using the **cnfsysparm** command.)
 - The processor card CPU utilization of the IDLE process falls below a fixed threshold. The purpose of the alarm is to indicate the possible degradation of service caused by processor load reaching an abnormally high level.

Full Name

Configure ASM (Alarm and Status Monitor) card

Syntax

cnfasm

Related Commands

dspasm

Attributes

Privilege	Jobs	Log	Node	Lock
1	Yes	Yes	IGX, BPX	Yes

Example 1

```
cnfasm
```

Description

Configure parameters for the ASM card

System Response

```
D1.jea          TRM   SuperUser          BPX 8600    9.2    Aug. 30 1998 12:25 GMT

[1] Cabinet temp threshold:    50 C  [4] Polling interval (msec):    10000
[2] Power A deviation:         6 V   [5] Fan threshold (RPM):        2000
[3] Power B deviation:         6 V

                ALM
[6] ACO button                 -
[7] History button             -
[8] Cabinet temp               Y
[9] Power A volt               Y
[10] Power B volt              Y
[11] Fan 1 RPM                 Y
[12] Fan 2 RPM                 Y
[13] Fan 3 RPM                 Y

                ALM
[14] BPX card slot            -
[15] PSU A failure            Y
[16] PSU A removed            Y
[17] PSU B failure            Y
[18] PSU B removed            Y
```

This Command: cnfasm

Which parameter do you wish to change:

cnfdate

Sets the date and time for the entire network. The node broadcasts the specified date and time to every node in the network. The time displayed at each node is consistent with the time zone where the node resides. (See the **cnftmzn** description.) For the first-time configuration of the date and time in a network, **cnfdate** requires all the parameters except for *second*. The default for *second* is 0. If a date and time already exist in the network, the defaults are the existing values at the moment you enter the **cnfdate** command. Note that changes to date and time alter the time-stamps on WAN Manager statistics.

Full Name

Configure data and time

Syntax

```
cnfdate <year> <month> <day> <hour> <minute> [second]
```

Related Commands

```
cnftime, cnftmzn
```

Attributes

Privilege	Jobs	Log	Node	Lock
1	No	Yes	IGX, BPX	Yes

Example 1

```
cnfdate 1997 12 16 13 54 11
```

Description

Set the time to 1:54:11 PM, December 16, 1997. The system prompts:
“Warning: Changing time of day affects StrataView statistics time-stamps.

Continue?”

Enter “y” to continue or “n” to abort.” Upon a “y” response, the system further prompts with: “Hit RETURN to change clock, DEL to abort.”

System Response

```
alpha          TRM   YourID:1      IGX 8420    9.2    Dec. 16 1998 13:54 PST
YourID         1
Sarah         5
```

```
Last Command: cnfdate 1997 12 16 13 54 11
```

```
Warning: Changing time of day affects StrataView statistics timestamps
Continue?
```

Table 3-7 *cnfdate-Parameters*

Parameter	Description
year	Specifies the year.
month	Specifies the month. The range is 1–12.
day	Specifies the day. The range depends on the month and can be 1–31.
hour	Specifies the hours. The range is 0–23. For example, enter 6 AM as 6 and 6 PM as 18.
minute	Specifies the minute of the hour. The range is 0–59. The default is 0.

Table 3-8 *cnfdate-Optional Parameters*

Parameter	Description
second	Specifies the seconds. The range is 0–59. The default is 0.

cnffunc

Enables or disables a specified node function. Each function has an index number. By entering the command, the index parameter, and the letter “e” or “d,” the function is either enabled or disabled.

Upgrading from Release 9.1 to Release 9.2 when IMA Trunks Exist

When IMA trunks exist in a Release 9.1 network, and you are upgrading from Release 9.1 to 9.2, ensure that the following steps have been performed:

- While the network is running Release 9.1, use the **cnffunc** command option 15 to disable the **Automatic Card Reset after Burnfw for CBI cards** option. (Note that this option is enabled by default.) This step is required so that you can burn UXM firmware revision on the flash and delay execution with this new firmware revision, then later reset the card by using the **resetcd** command. After the UXM at both ends of the trunks are burned with the new firmware revision, you can reset the UXM cards at the same time so that the new ATM Forum–Compliant protocol is invoked at both ends at the same time. If this step is not followed, some nodes may not be reachable if this is an IMA trunk, and it is the only trunk connected to that remote node. Note that if an IMA trunk is not used within the 9.1 network, then you do not need to perform this step.
- Upgrade all UXM cards in the Release 9.1 network with UXM firmware model B.

You are now ready to upgrade the switch software from Release 9.1 to 9.2.

Full Name

Configure system functions

Syntax

```
cnffunc <function_index> <e/d>
```

Related Commands

none

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX, BPX	Yes

Example 1

```
cnffunc 7 e
```

Description

Enables automatic card testing after a card failure has been detected.

System Response

```
swl199          TN      StrataCom      IGX 8420      9.2      Apr. 9 1998  18:14 GMT
```

```
Index Status      Function

1      Enabled      Automatic CLN/PLN Loopback Test on Local/Remote Alarms
2      Enabled      FDP Loopback button
3      Enabled      User Command Logging
4      Enabled      Automatic Card Reset on Hardware Error
5      Enabled      TXR Model D Download
6      Enabled      Card Error Record Wraparound
7      Disabled     Card Test After Failure
8      Disabled     Download From Remote StrataView
9      Disabled     Logging of conn events in local event log
10     Disabled     Logging of conn events in SV+ event log
11     Disabled     Logging SVC Connection Events
12     Disabled     Force Download From a Specific IP address
13     Disabled     CDP WinkStart Signalling
```

```
This Command: cnffunc
```

```
Continue? y
```

```
Index Status      Function

14     Enabled      Logging of Bus Diagnostic Events in local event log
```

```
This Command: cnffunc
```

```
Enter index:
```

Table 3-9 *cnffunc-Index Parameters*

Index	Function	Description	Default
1	Automatic CLN/TRK Loopback Test on Local/Remote Alarms	A remote-end loopback is automatically set up on a failed line or trunk. Used to check the integrity of the back card alarm circuitry.	enabled
2	FDP Loopback button	For an IGX node, enables loopback button on SDP or HDM card faceplate. (Disable it to prevent accidental operation by contact.)	enabled
3	User Command Logging	All commands entered by the user is entered in the system log when enabled. When disabled, system log does not become so large but there is no audit trail of operator commands kept.	enabled

Table 3-9 cnffunc-Index Parameters (continued)

Index	Function	Description	Default
4	Automatic Card Reset on Hardware Error	The controller card (BCC, NPC, or NPM) issues a hardware reset to a card when firmware detects an error during normal operation. This allows the node to return a card to service after a firmware error.	enabled
5	TXR Model D Download	(Not used)	enabled
6	Card Error Record Wraparound	Allows the log entry for each card error to wrap for long entries. When disabled, only first ten failures are logged.	enabled
7	Card Test After Failure	Indicates card function self-tests and background test should continue to be executed after a card has been declared as failing these tests.	disabled
8	Download from Remote WAN Manager NMS	Allows a node to download software images from a WAN Manager not directly connected to the node.	disabled
9	Logging of connection events in local event log	All connection event messages are entered in the system log when enabled. When disabled, system log does not become so large but there is no audit trail of connection events kept	disabled
10	Logging of connection events in WAN Manager event log	All connection event messages are entered in the WAN Manager event log when enabled. When disabled, WAN Manager event log does not become so large but there is no audit trail of connection events kept	disabled
11	Force Download From a Specific IP address	Forces the node to only download software images from a WAN Manager with the specified IP address.	disabled
12	Logging of SVC connection events	All SVC connection event messages are entered in the local event log when enabled. When disabled, local event log does not become so large but there is no audit trail of SVC connection events kept	disabled
13	CDP WinkStart Signalling	Toggles WinkStart signaling on the CDP.	disabled

Table 3-9 *cnffunc-Index Parameters (continued)*

Index	Function	Description	Default
14	Logging of Bus Diagnostic Events in local event log	All Bus Diagnostic event messages are entered in the local event log when enabled. When disabled, local event log does not become so large but there is no audit trail of Bus Diagnostic events kept.	enabled
15	Automatic Card Reset after Burnfw for CBI Cards	While the network is running Release 9.1, use the cnffunc command option 15 to disable the Automatic Card Reset after Burnfw for CBI cards option. (By default, this option is enabled.) You need to perform this step so that you can burn the UXM firmware revision on the flash and delay execution of the new firmware revision until the card is reset with the resetcd command. After the UXM at both ends of the trunk are burned with the new firmware revision, you can reset the UXM cards at the same time so that the new ATM Forum-Compliant protocol is invoked at both ends of the trunk at the same time. It is important that you perform this step, because a node potentially may be not be reached if this is an IMA trunk, and it is the only trunk connected to that remote node. Also note that if an IMA trunk is not used within the Release 9.1 network, then you do not need to perform this step. Then upgrade all UXM cards in the Release 9.1 network with UXM firmware model B.	Enabled/ Disabled [Default: Enabled]

cnfname

Specifies the name by which a node is known within the network. It may be changed at any time. The new node name is automatically distributed to the other nodes in the network. Node names are case sensitive. For example, an upper-case “A” is not considered to be the same as a lower-case “a”. Duplicate names are not allowed in the same network. Node names may be configured from within a job sequence. If the node name is changed and the corresponding name in the job is not changed, the job will not function properly. In the following situations, the **cnfname** command cannot be executed:

- Another node is attempting to change the network topology by adding or deleting a trunk.
- Another node is notifying all nodes that it has been renamed. Another node is currently adding or deleting a channel connection in the network with the **addcon** or **delcon** commands.
- There is an unreachable node in the network.
- The name chosen is already being used for another node in the network.

Full Name

Configure node name

Syntax

cnfname <nodename>

Related Commands

cnfterm, **cnfprt**, and **window**

Attributes

Privilege	Jobs	Log	Node	Lock
1	No	Yes	IGX, BPX	Yes

Example 1

```
cnfname alpha
```

Description

The name changes to “alpha.” The network topology screen displays indicating the new name. See the **dspnw** description for more information on the network topology screen.

System Response

```
alpha          TRM   YourID:1          IGX 8410      9.2   Aug. 15 1998 12:02 PST

NodeName      Alarm Packet Line      Packet Line      Packet Line
alpha         10- 7/beta      14- 13/beta
beta         MAJOR 7- 10/alpha      9- 10/gamma      13- 14/alpha
              15- 15/gamma
gamma        MAJOR 10- 9/beta      11- 20/beta      15- 15/beta
```

```
Last Command: cnfname alpha
```

```
Next Command:
```

cnfprt

Configures the printing function. To obtain local or remote printing at a node, a printer must connect to the AUX PORT. Also, the configuration must include the correct baud rate and printer type for the port. Use the **cnfterm** and **cnftermfunc** commands to do this.

The **cnfprt** and **cnftermfunc** commands interact. If the auxiliary port on the node is configured for either an External Device Window or the Network Management Log, a “local” printing configuration automatically changes to “no printing.” Printing is not possible because the auxiliary port is being used for another purpose.

Establishing a virtual terminal connection with a node does not affect the printing location established for the node that initiates the virtual terminal connection. For example, if node *alpha* is configured so that all alpha information goes to a printer at node *beta* and if *alpha* establishes a virtual terminal connection with node *gamma*, the results of print commands entered on the *alpha* keyboard still print at *beta*. Furthermore, this occurs regardless of the printing location configured for node *gamma*.

Full Name

Configure printing functions

Syntax

```
cnfprt <mode> <remote node name>
```

Related Commands

cnfterm, **dsptermfunc**

Attributes

Privilege	Jobs	Log	Node	Lock
1–6	Yes	Yes	IGX, BPX	Yes

Example 1

```
cnfprt
```

Description

Change the configured printing.

System Response

```
alpha          TRM   YourID:1      IGX 8410      9.2   Aug. 15 1998 13:17 PST
```

```
Printing Mode
```

```
Remote Printing at beta
```

```
Local Printing
```

```
No Printing
```

```
This Command: cnfprt
```

```
Select Local (l), Remote (r), or None (n):
```

Table 3-10 *cnfprt-Parameters*

Parameter	Description
mode	Specifies the printing mode. Enter “L” for local printing, “R” for remote printing, and “n” for no printing.
remote node name	Specifies the remote node whose printer is used for print commands issued by a user who is physically logged on to this node. This option is valid only when remote printing has been selected. A remote node is one within the domain, but not the node where the command is entered.

cnfterm

Configures data transmission parameters for the control and auxiliary ports. The IGX and BPX nodes support two EIA/TIA-232 serial ports on the upper bus expansion card. The top port is called the Control Terminal port. The lower port is called the Auxiliary Port (AUX). Parameters can vary with the equipment connected to the port. The control port may connect to a control terminal, a direct-dial modem, or an external EIA/TIA-232 device. The auxiliary port may connect to either a printer or an external EIA/TIA-232 device. After you have set the data transmission parameters for a port, use the superuser command **cnftermfunc** to specify the equipment attached to the port. The configuration parameters must match the equipment physically attached to the port.

Full Name

Configure terminal port

Syntax

```
cnfterm <a/c> <baud> <parity> <num_data_bits> <num_stop_bits>
```

Related Commands**cnfterm, cnfprrt, window****Attributes**

Privilege	Jobs	Log	Node	Lock
1-6	No	Yes	IGX, BPX	Yes

Example 1**cnfterm****Description**

Configure an auxiliary control port

System Response

```
alpha          TRM  YourID:1          IGX 8430      9.2   Aug. 15 1998 11:58 PST

Control port          Auxiliary port
Baud Rate:           1200          Baud Rate:           9600
Parity:              None          Parity:              None
Number of Data Bits: 8          Number of Data Bits: 8
Number of Stop Bits: 1          Number of Stop Bits: 1
Output flow control: XON/XOFF    Output flow control: XON/XOFF
Input flow control:  XON/XOFF    Input flow control:  XON/XOFF
Use DTR signal:      Yes          DTR signal:         Yes
```

This Command: **cnfterm**

Select Control port (c) or Auxiliary port (a):

Table 3-11 cnfterm-Parameters

Parameter	Description
a/c	Specifies the port to be configured, where “a” means auxiliary port, and “c” means control port.
baud rate	Specifies the baud rate. The rates are 1200, 2400, 4800, 9600, and 19200 bps.
parity	Specifies parity checking for character transmission to and from the port. Valid parity choices are “E” for even parity, “O” for odd parity, and “N” for no parity.

Table 3-11 *cnfterrm-Parameters (continued)*

Parameter	Description
data bits	Specifies the number of bits to be sent for each transmitted character and the number of bits to be expected for each received character. A “7” indicates 7 bits for each character. An “8” indicates 8 bits for each character.
stop bits	Specifies the number of stop bits to be sent with each transmitted character and the number of stop bits to be expected with each received character. A “1” indicates one stop bit with each character; a “2” indicates two stop bits with each character.
output flow control	Specifies the output flow control. An “X” specifies XON/XOFF flow control; an “N” specifies no flow control.
input flow control	Specifies input flow control. An “X” specifies XON/XOFF flow control; an “N” specifies no flow control.
cts flow control	Configures cts flow control. An “X” specifies XON/XOFF flow control; an “N” specifies no flow control. This parameter should be turned off if working with modems on a BPX node.
use DTR	Specifies whether the node requires DTR to be asserted to allow or maintain a Login. A “Y” causes the node to require the presence of DTR before allowing a login. A “N” causes the node to ignore DTR.

cnftime

Sets the time for the entire network. The time is broadcast to all nodes in the network. The time displayed at each node is adjusted for the node's time zone. (See the **cnftmzn** command for more information.) This command can only be executed if the date for the network has already been configured using the **cnfdate** command. If hour, minute, or second is not entered, the current value is kept.

Full Name

Configure time

Syntax

```
cnftime <hour> <minute> <second>
```

Related Commands

cnfdate, **cnftmz**

Attributes

Privilege	Jobs	Log	Node	Lock
1	No	Yes	IGX, BPX	Yes

Example 1

```
cnftime 19 31 00
```

Description

Configure time to 7:31 in the evening. The system displays two warning prompts before it changes the time.

```
pubsigx1      TN      SuperUser      IGX 8430      9.2      Sep. 5 1998  19:31 GMT
```

This Command: cnftime 19 31 00

Warning: Changing time of day affects StrataView statistics timestamps
Hit RETURN to change clock, DEL to abort

Table 3-12 *cnftime-Parameters*

Parameter	Description
hour	Sets the time for the entire network. The time is broadcast to all nodes in the network. The time displayed at each node is adjusted for the node's time zone. (See the cnftmzn command for more information.) This command can only be executed if the date for the network has already been configured using the cnfdate command. If hour, minute, or second is not entered, the current value is kept.
min	Specifies the current minute. The range is 0-59.
sec	Specifies the current second. The range is 0-59.

cnftmzn

Configures the time zone for the node. Configuring the time zone for a node ensures that the node's time is correct for the local area regardless of the node at which the network date and time are set. Once configured, the time zone for the node is saved in battery-backed memory. After a power failure, a node's date and time are restored if at least one other node in the network has the current time and date.

Full Name

Configure time zone

Syntax

```
cnftmzn <timezone | g+/- hours>
```

Related Commands

cnfdate

Attributes

Privilege	Jobs	Log	Node	Lock
1	Yes	Yes	IGX, BPX	Yes

Example

```
cnftmzn pst
```

Description

Configures the time zone to Pacific Standard Time.

System Response

```
alpha          TRM   YourID:1          IGX 8420  9.2    Aug. 15 1998 13:19 PST
```

```
Last Command: cnftmzn pst
```

```
Next Command:
```

Table 3-13 *cnftmzn-Parameters*

Parameter	Description
time zone	<ul style="list-style-type: none"> • gmt (or g)—Greenwich Mean Time • cst (or c)—Central Standard Time • est (or e)—Eastern Standard Time • mst (or m)—Mountain Standard Time • pst (or p)—Pacific Standard Time • yst (or y)—Yukon Standard Time • cdt—Central Daylight Savings Time • edt—Eastern Daylight Savings Time • mdt—Mountain Daylight Savings Time • pdt—Pacific Daylight Savings Time • ydt—Yukon Daylight Savings Time
hours from Greenwich Mean Time (GMT)	Specifies the difference in hours between local time and Greenwich Mean Time. The range is from -12 to +12 hours. Instead of entering the time zone, you can enter the hours from Greenwich Mean Time. For example, instead of entering pdt for Pacific Daylight Time, you could enter g-7, which is Greenwich Mean Time minus 7 hours.

delalmslot

Disables the ARC (IPX) or ARM (IGX) alarm indicators and ARI external alarms. See the **addalmslot** description for more information on ARC/ARM alarm relays and adding alarm slots.

Upon receiving the command, the system places the alarm card set in the standby state and displays the current alarm status.

Full Name

Delete an alarm slot

Syntax

delalm <slot number>

Related Commands

addalmslot, **dspalms**

Attributes

Privilege	Jobs	Log	Node	Lock
1-4	No	Yes	IGX	Yes

Example 1

```
delalmslot 11
```

Description

Disable the alarm indicators on the ARM card set in slot 11. (The system subsequently displays alarm status.)

System Response

```
pubsigx1      TN      SuperUser      IGX 8430      9.2      July 16 1998 02:09 GMT
```

```
Alarm summary (Configured alarm slots: None)
```

```
Connections Failed:      None
Groups Failed:           None
TRK Alarms:              None
Line Alarms:             None
Cards Failed:            None
Missing Cards:           None
Remote Node Alarms:      1 Minor
Remote Domain Alarms:    None
```

```
Routing Network Alarms:  None
```

```
Cabinet Fan(s) Failed
```

```
FastPAD Node Alarms:     None
```

```
Last Command: delalmslot 11
```

```
Next Command:
```

Table 3-14 delalmslot-Parameters

Parameter	Description
slot number	Specifies the slot number of the alarm card set to activate.

delcdred

The **delcdred** command disables card redundancy for the card set in the specified primary slot number. If the secondary card slot is being used as the active slot at the time you use the **delcdred** command, the system attempts to switch back to the primary slot. The substitution takes place only if the primary slot has a complete set of cards and the cards are in a Standby or a Standby-F state (not if they are Failed). See the **dspcds** description for information on card states.

When you issue the **delcdred** command, it always completes. If the primary card is incomplete, control will still be given to the primary card.

Because YRED (Y redundancy) could be considered a misnomer for the SONET APS two-slot case, the following new commands are new in Release 9.2 to support card redundancy:

- **addcdred**—same functionality as **addyred**
- **dspcdred**—same functionality as **dspyred**
- **delcdred**—same functionality as **delyred**
- **prtyred**—same functionality as **prtyred**
- **switchcdred**—same functionality as **switchyred**

See the **addcdred** and **dspcdred** commands for more information on card and line redundancy for SONET APS (Automatic Protection Switching) 1+1.

Full Name

Delete redundant card

Syntax

delcdred <primary slot>

Related Commands

addcdred, **dspcdred**, **switchcdred**

Attributes

Privilege	Jobs	Log	Node	Lock
1-4	No	Yes	BPX	Yes

Example

```
delcdred 2
```

Description

Delete card redundancy for slot 2.

delshelf

Deletes an interface shelf from a tiered network. The identifier for an interface shelf is either the trunk number or the name of the shelf. Normally, you do not execute **delshelf** only at the BPX core switch shelf, but on the IGX/AF itself. The **delshelf** command has the single function of letting you turn off LMI if the trunk is not allowing communication. In contrast to the **deltrk** command, you can execute **delshelf** at any time if no connections terminate at the trunk.

In Release 9.2 and above, when you use **delshelf** to remove an MGX 8850 interface shelf trunk from a BPX routing hub, or an SES interface shelf (or feeder) trunk from an IGX 8400 routing node, the Annex G signalling channel and IP relay programming for the MGX 8850 or SES interface shelf is removed.

Full Name

Delete an interface shelf

Syntax

```
delshelf <trunk> | <shelf-name>
```

Related Commands

addshelf, **dspnode**

Attributes

Privilege	Jobs	Log	Node	Lock
1	Yes	Yes	IGX, BPX	Yes

Example 1

```
delshelf 4.1
```

Description

Delete shelf trunk 4.1 on a BPX.

System Response

```
nmsbpx23      TN      SuperUser      BPX 8600      9.2  Aug. 16 1998 13:26 PST
```

BPX Interface Shelf Information

Trunk	Name	Type	Alarm
1.3	AXIS240	AXIS	OK
11.2	A242	AXIS	OK

```
Last Command: delshelf A241
```

```
Shelf has been deleted
```

```
Next Command:
```

Table 3-15 delshelf-Parameters

Parameter	Description
trunk or shelf name	Specifies the slot and port number of the trunk or the name of the interface shelf.

delyred

This command disables Y-cable redundancy for the card set in the specified primary slot number. If the secondary card slot is being used as the active slot at the time you use the **delyred** command, the system attempts to switch back to the primary slot. The substitution takes place only if the primary slot has a complete set of cards and the cards are in a Standby or a Standby-F state (not if they are Failed). See the **dspcds** description for information on card states. See the **addyred** and **dspyred** commands for more information on Y-cable redundancy.

When you issue the **delyred** command, it always completes. If the primary card is incomplete, control will still be given to the primary card.

Full Name

Delete Y-cable redundancy

Syntax

delyred <primary slot>

Related Commands

addyred, dspyred, prtyred

Attributes

Privilege	Jobs	Log	Node	Lock
1-4	No	Yes	IGX, BPX	Yes

Example

```
delyred 16
```

Description

Disable Y-cable redundancy at slot 16.

dspasm

Displays BPX node alarms that, when active, produce an external alarm output (relay closure). These alarms are associated with powering and cooling the node as well as a statistics count. For example, a minor alarm is generated when a fan speed drops below 2000 rpm. Since the single ASM card is always located in slot 15, you do not need to enter a card slot for this command. To configure the ASM alarms, use **cnfasm** (a superuser command).

Full Name

Display ASM card

Syntax

```
dspasm
```

Related Commands

cnfasm

Attributes

Privilege	Jobs	Log	Node	Lock
1	No	No	BPX	Yes

Example

```
dspasm
```


Description

Display the ASM card parameters.

System Response

```
Dl.jea          TRM   SuperUser          BPX 8620    9.2    Aug. 30 1998 12:24 GMT
```

```
ASM Status:           Active          ASM Alarms
Statistics count:     7             Fan #1 RPM out of range
Statistics timeouts:  0             Fan #2 RPM out of range
Cabinet temperature: 21 C          Fan #3 RPM out of range
Power voltage A/B:    0.0 / 0.0 V
```

```
PSU  Ins  Type  Rev  SerNum  Failure
A    N    N/A   N/A   N/A     N/A
B    N    N/A   N/A   N/A     N/A
```

```
FAN   1    2    3
      0000 0000 0000 RPM
```

Last Command: dspasm

Next Command:

dspcd

Displays the status, revision, and serial number of a card. If a back card is present, its type, revision, and serial number appear. The displayed information can vary with different card types.

The **dspcd** screen indicates whether the card supports IMA compliance. If the card does not support IMA compliance, then the screen will not display any IMA support.

The **dspcd** command displays the SONET APS (Automatic Protection Switching) architecture supported on the card, slot number of redundant back card (if there is a redundant back card), and the reasons for the card's APS mismatch.

The **dspcd** screen indicates whether the front card supports the Lead State Trap for High/Low Speed Data Modules (HDM/LDM) on IGX.

The **dspcd** screen indicates the minimum Peak Cell Rate (PCR) of a connection supported by the BXM and UXM cards. In Release 9.2 and higher, the minimum PCR *without* policing is 6 cps. The minimum PCR *with* policing was, including enhanced modes, 50 cps (equivalently 19.2 kbps). This value was set to maintain a policing accuracy with 1% when policing is performed on a BXM or UXM card. Because of this limitation, it was impossible to offer and differentiate connection services on a UXM or BXM at speeds less than 19.2 kbps. In Release 9.3.0, the switch software now supports connections with policing enabled and with PCR values as low as 6 cps, with certain card limitations. If this new feature is enabled on a card, but is replaced by a card with older firmware (not supporting this feature) the **dspcd** screen parameter card status will display "Mismatch," and indicate the reason for the mismatch. A table indicating card types supported with this new feature can be found in Minimum PCR Values with Policing Enabled in Table 9-5.

If SONET APS is configured (which allows switching of SONET lines from the active line to a standby line to provide hardware line redundancy), the **dspcd** command displays the front and back card SONET APS attributes. For the front card, APS attributes are displayed if the front card supports one of the following:

- APS firmware
- APS 1+1 hardware
- APS 1:1 hardware

If the back card is a redundant back card, the slot number of the redundant back card is displayed, as well as the reasons for the card's APS mismatch.

The **dspcd** command is a single-page display. (Note that the **dsplgcd** command shows all the ports and trunks on a given slot. The second page of the **dsplgcd** command shows each port and interface type corresponding to that *slot.port*.)

In support of feature mismatch checking in Release 9.2, the **dspcd** command provides mismatch information for the specified card.

For Release 9.3.0, the Top Assembly Number, also known as the board revision number, is included in **dspcd** display. The Top Assembly Number is used to denote a 73-level part number, 800-level part number, 28-level part number, or whatever number exists in the NOVRAM.

Full Name

Display card

Syntax

```
dspcd <slot number>
```

Related Commands

dncd, **dspcds**, **resetcd**, **upcd**

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example

```
dspcd 8
```

Description

Displays the detail information (including the Top Assembly Number) for a UXM card in slot 8.

System Response

```
ips1          TN      StrataCom      IGX 8420  9.3.s0   Mar. 1 2000  19:39 GMT
```

```
Detailed Card Display for UXM in slot 8
```

```
Status:          Active                (Front Card Supports Virtual Trunks)
Revision:        BD22                  (Front Card Supports OAMLpbk & TrfcGen)
Serial Number:   284377                (Front Card Supports SIW, CGW, CellFwd)
Top Asm Number:  28216402              (Front Card Supports Hot Standby)
Backplane Installed (Front Card Supports Traffic Shaping)
Backcard Installed (Front Card Supports IMA Compliance)
  Type:          OC3                   (Front Card Supports ChanStat Level 1)
  Revision:      P03                   (Front Card Supports 8000 Channels)
  Serial Number: 486295                (Front Card Supports 8191 RCMP Entries)
  Ports:         4
  Line Mode:     MMF
```

```
Last Command: dspcd 8
```

dspcdred

Displays information for Y-cable pairings. A single slot can be specified, or all pairings are displayed when no slot is specified. Slot numbers appearing in high intensity indicate active card status. Front card, back card, and channel configuration conflicts appear in reverse video. A conflict occurs when the port interfaces are different for corresponding ports in a redundant slot pair. The output display contains the following information:

- First column (Slot) designates the slot of the displayed card.
- Second column (Slot Type) designates its status, Pri (primary) or Sec (secondary).
- Third column (Other Slot) designates the slot number of the associated Y-redundant card.
- Fourth column (Front Card) designates the type of card in the front slot.
- Fifth column (Back Card) designates the type of card in the back slot.

Remaining columns (Channel Configuration) describe the channel configurations when appropriate.

Full Name

Display redundant cards.

Syntax

```
dspcdred [slot]
```

Related Commands

addyred, delyred, prttyred

Attributes

Privilege	Jobs	Log	Node	Lock
1-4	No	No	BPX	No

Example 1

```
dspyred
```

Description

Display card redundancy for cards in slots 2 and 3.

System Response

```
beta          TRM   YourID:1          BPX 8620    9.2    Aug. 15 1997 14:27 MST

      Slot Other Front  Back  Channel Configuration
Slot Type Slot  Card   Card   1    2    3    4    5    6    7    8
2   Pri   3   BXM   LM-BXM
3   Sec   2   BXM   LM-BXM
```

```
Last Command: dspcdred 2 3
```

```
Next Command:
```

dspcds

Displays the cards in a shelf, front and back, with their type, revision, and status. For front and back card sets, the status field applies to the cards as a set. A “T” opposite a card indicates that it is running a self-test. An “F” opposite a card indicates that it has failed a test. If lines or connections have been configured for a slot, but no suitable card is present, the display will list the missing cards at the top of the screen. If a special backplane is installed or if a card was previously installed, empty slots are identified as “reserved.”

For a two-shelf node, the screen initially displays only the upper shelf with a “Continue?” prompt. Typing “y” to the prompt displays the cards in the lower shelf. The command **dspcds** followed by the letter “L” (for lower shelf) displays card status for just the lower shelf. For an IGX 8410 node, the card information appears in only the left column. The status and update messages are as follows:

- Active Card in use, no failures detected.
- Active—F Card in use, failure(s) detected.
- Active—T Card active, background test in progress.
- Active—F-T Card active, minor failures detected, background test in progress.
- Standby Card idle, no failures.
- Standby—F Card idle, failure(s) detected.
- Standby—T Card idle, background test in progress.
- Standby—F-T Card idle, failure(s) detected, background test in progress.
- Failed Card failed.
- Down Card downed by user.
- Down—F Card downed, failure(s) detected.
- Down—T Card downed, failure(s) detected, background test in progress.
- Mismatch Mismatch between front card and back card.
- Update * Configuration RAM being updated from active control card.
- Locked* Old software version is being maintained in case it is needed.
- Dnlding* Downloading new system software from the active PCC adjacent node from WAN Manager.
- Dnldr* Looking to adjacent nodes or WAN Manager for either software to load or other software needs you have not specifically requested.
- Program Occurs when new firmware is being burned on the card.

In the preceding messages, an asterisk (*) means an additional status designation for BCC, NPC, or NPM cards. An “F” flag in the card status indicates that a non-terminal failure was detected. Cards with an “F” status are activated only when necessary (for example, when no other card of that type is available). Cards with a “Failed” status are never activated.

The “reserved for” logic in Release 9.2 reserves the slot for a BXM if SONET APS (Automatic Protection Switching) has been configured on the slot.

To support the Hitless Rebuild feature in Release 9.2, after a switchover has occurred and the standby updates are about to begin, the **dspcds** command will show the standby processor card as missing temporarily. This is a result of the delay in performing the full rebuild on the standby processor, which is necessary as part of the hitless rebuild sequence.

Following any processor card switchover, the new standby will rebuild, preserving the critical databases needed for a hitless rebuild. When database updates can start, the standby will rebuild again doing a normal standby rebuild. If there is a failure on the new active card that causes it to switch back before updates can start, the card taking over will do a hitless rebuild. Under most conditions, the second switchover will not be necessary, and a full rebuild will be done on the standby processor. As this process begins, the standby card will briefly appear to be missing.

In support of the Hitless Rebuild feature, there is no change directly to the user command **dspcds**. However, after a switchover has occurred and the standby updates are about to begin, the **dspcds** command will show the standby processor card as missing temporarily. This is a result of the delay in performing the full rebuild on the standby processor, which is necessary as part of the hitless rebuild sequence.

Following any processor card switchover, the new standby will rebuild preserving the critical databases needed for a hitless rebuild. When database updates can start, the standby will rebuild again doing a normal standby rebuild. If there is a failure on the new active card that causes it to switch back before updates can start, the card taking over will do a hitless rebuild. Under most conditions, the second switchover will not be necessary, and a full rebuild will be done on the standby processor. As this process begins, the standby will briefly appear to be missing.

Full Name

Display cards

Syntax

dspcds [I]

Related Commands

dncd, **dspcd**, **resetcd**, **upcd**

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

dspcds

Description

Display status on all cards

System Response

```
IGX8430          TN      SuperUser          IGX 8430    9.2      Oct. 12 1998 18:39 PST
```

FrontCard					BackCard						
Type	Rev	Type	Rev	Status	Type	Rev	Type	Rev	Status		
1	NPM	A0205		Active-T	9	Empty	universal	backplane			
2	Empty	reserved	for NPM		10	Empty	universal	backplane			
3	FRM	ESP	FRI-T1	AC	Active	11	ALM	B0305UAI-T3	HN	Active	
4	Empty	universal	backplane		12	Empty					
5	UXM	AA09	E1-IMA	EW	Active	13	FRM	EEV	FRI-T1	AL	Standby
6	ALM	B0310UAI-T3		HN	Active	14	BTM	BFF	BTM-T3	P02	Standby
7	UXM	EX09	OC-3	AH	Standby	15	NTM	FHE	T1	AL	Standby
8	Empty	universal	backplane		16	CVM	AFF	T1	AK	Active	

Last Command: dspcds

Next Command:

Example 2

```
dspdcs l
```

Description

Display status of cards on the lower shelf of an IPX 32 node (the option “l” means “lower”).

System Response

```
beta          TRM      YourID:1          IPX 8430    9.2      Aug. 15 1998 14:37 MST
```

```
Missing Cards: 1 ATM, 1 T3
```

Front Card				Back Card				Front Card				Back Card			
Type	Rev	Type	Rev	Status	Type	Rev	Type	Rev	Status	Type	Rev	Type	Rev	Status	
17	PCC	HDB		Standby	25	SDP	BA	RS232	AK	Active-T					
18	Empty	26	SDP	BF				RS232	AK	Standby-F					
19	FRP	DFB	FRI-V35	BC	Active-F	27	Empty								
20	ATM	HM03		Empty	Failed	28	Empty								
21	Empty	29		Empty											
22	CDP	AAB		Empty	Unavail	30	Empty								
23	Empty	31		Empty											
24	Empty	reserved	for SDP		32	Empty									

Last Command: dspcds l

Next Command:

Example 3

```
dspecds
```

Description

Display status of cards on a BPX 16 node. The 2-port BME card with OC-12 interface is in slot 11.

System Response

```
sw60          TN      SuperUser      BPX 15      9.2      Feb. 5 1997 11:36 GMT
Missing Cards: 1 BCC

      FrontCard  BackCard
      Type  Rev  Type  Rev  Status      FrontCard  BackCard
      Type  Rev  Type  Rev  Status      Type  Rev  Type  Rev  Status
1  BNI-T3  CCF  T3-3  BE  Active      9  BNI-155  BDK  MMF-2  CM  Standby
2  Empty
3  ASI-T3  BJF  T3-2  AA  Standby     11 BME-622  K08  11LM-BXM P02AB Active
4  ASI-E3  BMJ  E3-2  BE  Standby     12 ASI-155  BDK  MMF-2  AB  Standby
5  BNI-E3  CMF  E3-3  EY  Standby     13 Empty
6  Empty
7  BCC    BWF  LMBCC  AC  Active      15 ASM    ACA  LMASM  AC  Active
8  Empty reserved for Card
```

Last Command: dspecds

Next Command:

Table 3-16 dspecds-Parameters

Parameter	Description
1	Directs the system to display status of the cards on just the lower shelf of an IGX 32 node.

dspctrlrs

Use the **dspctrlrs** command to display the VSI controllers, such as an PNNI SES controller, on a BPX node. The **dspctrlrs** command lists the controller ID, the partition the controller uses, the trunk/interface a controller is attached to, the controller type (always a VSI controller), the interface type (AAL5, VSI (Label Switching), or MGX 8220 (formerly called AXIS) interface shelf, and the name of the controller/entity that the controller exists on (that is, node name, equipment name).

Displays all the VSI controllers on a node, such as a BPX node. Possible VSI controllers added to a node might be a PNNI SES controller. (Note that you use **addshelf** and **delshef** to add and delete a VSI controller such as a Label Switch Controller to a BPX node.)

You can also the **dspnode** command to display the VSI controllers on a BPX node.

Full Name

Displays all VSI controllers, for example, such as PNNI SES, on a BPX node.

Syntax

```
dspctrlrs <slot.port><controller name string><partition_id><controller_id>
```


Related Commands

addctrlr, cnfctrlr, delctrlr, dspnode

Attributes

Privilege	Jobs	Log	Node	Lock
1	Yes	Yes	BPX	Yes

Example 1

dspsctrlrs

Description

Display VSI controllers on BPX node sw237.

System Response

```
sw237          TN      StrataCom      BPX 8620  9.2.a3      June 16 1999 05:04 PST
               BPX 8620 VSI controller information

Ctrl Id  Part Id      Ctrl VC          Trunk  Ctrlr Type  Intfc Type  Name
      VPI  VCIRange
      1      1          1      20 - 34      4.1   VSI         VSI         VSI
      2      1          0      40 - 54     13.2  VSI         AXIS        SIMFDR0
```

Last Command: dspsctrlrs

dsplancnf

Displays the addresses and configuration for the LAN Ethernet. The configuration fields show the type of network capability and if it is ready or unavailable. Table 3-17 describes the address fields of the **dsplancnf** command.

Table 3-17 LAN Configuration Address Fields

Field	Description
<IPAdd>	Specifies the Internet address of the node used in the TCP/IP protocol.

Table 3-17 LAN Configuration Address Fields

<IP subnet mask>	Specifies a 32-bit mask that contains information about the bit lengths of the subnet ID and host ID address fields. The format of this field uses 1s for the subnet ID field and 0s for the host ID address field as defined in the TCP/IP protocol. The default value (in decimal notation) is 255 255 255.0. This mask denotes both subnet ID and host ID fields as 8-bit fields.
<Max. LAN Transmit Unit>	BPX only: typical amount is 1500 bytes.
<TCPServicePort>	Specifies the node's service point used by the transmission control protocol (TCP).
<GatewayIPAddr>	Specifies the Internet gateway address.
Type	List of socket types (for example, TCP, UDP, and SNMP) that are open (in READY state) for communication between the node and the LAN. In the system response shown, the TCP socket is no longer used by switch software, indicated by the UNAVAIL state. The TimeHndlr (or Daytime) socket is related to TFTP. It lets an external node retrieve the day and time from the switch. The Tunneling socket is used for communication between a BPX and an INS (Intelligent Network Server).
State	State of communication socket between the node and the LAN. READY indicates that the socket is open for communication between the node and the LAN. UNAVAIL indicates that the socket is not available for communication between the node and the LAN.

Full Name

Display LAN interface configuration

Syntax

dsplancnf

Related Commands

cnflan (a superuser command)

Attributes

Privilege	Jobs	Log	Node	Lock
1-5	No	No	IGX, BPX	No

Example 1

```
dsplancnf
```

Description

Display the LAN configuration for the current node.

System Response

```
pubsbpx1      TN      SuperUser      BPX 8620      9.2      June 11 1998      13:23 GMT

Active IP Address:      204.179.31.104
IP Subnet Mask:      255.255.255.0
IP Service Port:      5120
Default Gateway IP Address:      None
Maximum LAN Transmit Unit:      1500
Ethernet Address:      00.C0.43.00.21.F0

Type      State      Type      State
LAN      READY      TUNL      READY
TCP      UNAVAIL
UDP      READY
Telnet      READY
TFTP      READY
TimeHdlr      READY
SNMP      READY

Last Command: dsplancnf

Next Command:
```

dsplmistats

Displays Annex G LMI statistics for the trunk that connects an IGX/AF interface shelf to the BPX core switch shelf. To execute this command from the access shelf itself, you must telnet to the IGX/AF. The **dsplmistats** command can provide information to help you analyze problems that may arise while you set up a tiered network.

Full Name

Display Annex G LMI statistics

Syntax

dsplmistats (parameters depend on the type of node)



Note

On an access shelf, the **dsplmistats** command takes no arguments. On an IGX node, **dsplmistats** requires a trunk number. On a BPX node, **dsplmistats** requires the slot and port number.

Related Commands

none

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX/AF, BPX	No

Example

```
dsplmistats
```

Description

Display the LMI statistics for the trunk attached to the hub.

System Response

```
batman                SuperUser          IGX/AF    9.2      Nov. 30 1998 18:04 PST

Annex G LMI Statistics for slot:1 port:1
VPI.VCI:              0.0                Lmi enabled          Lmi polling enabled
Invalid Pdu           Rx:                 0                    Status Polling Timer (T396) : 10
Invalid Pdu Len      Rx:                 0                    Status Enquiry Timer (T393) : 10
Unknown Pdu Type     Rx:                 0                    Max Status Enquiry Retry (N394): 5
Unknown IE Type      Rx:                 0                    Update Status Timer (T394) : 10
Bad Transaction      Rx:                 0                    Max Update Status Retry (N395) : 5
Status               Rx:                1384                 Spc Polling Timer : 3
Status Enq           Tx:                1384                 Spc Retry Timer : 0
Status Enq           Rx:                1384                 Spc Retry Counter : 1
Status              Tx:                1384                 Node Status Retry Timer : 0
Status Ack           Rx:                 8                    Node Status Retry Counter : 0
Update Status        Tx:                 8                    Node Status Polling Timer : 2
Update Status        Rx:                 8
Status Ack           Tx:                 8

Last Command: dsplmistats

Next Command:
```

dspnds

Displays the name, type, and alarm status of all nodes within the network of the node executing the command. The remote node alarm is provided. You can use the **vt** command to reach the remote node and obtain the alarm information.

If a node is in alarm, its name is highlighted and the alarm type (major/minor), is displayed. A major alarm will be a flashing word. A junction node is identified with “Yes” printed under the Jct column.

Full Name

Display all nodes

Syntax

```
dspnds [+n | -p | -d | domain]
```

Related Commands

```
dspnw
```

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

```
dspnds
```

Description

Display the alarm status of all nodes within the network.

System Response

```
alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 23 1998  09:42 PST

NodeName Alarm
alpha    MAJOR
beta     MAJOR
gamma    MAJOR
```

```
Last Command: dspnds
```

```
Next Command:
```

Table 3-18 *dspnds–Optional Parameters*

Parameter	Description
+n	Specifies the node number. (Assigning a node number requires superuser privilege.)

Table 3-18 *dspnds–Optional Parameters*

Parameter	Description
-p	Specifies that the display include the type of controller card in the node. The types are BCC, NPM, and so on.
-d	Specifies that the display include the type of node for each named node. The type is either “IGX” or “BPX.”

dspnode

Displays a summary of the interface shelves.

The **dspnode** command can isolate the shelf where an alarm has originated. For example, when you execute **dspalms**, the display indicates the number of shelves with alarms but does not identify the shelves. Therefore, execute **dspnode** on the IPX/BPX core switch shelf to determine which interface shelf generated the alarm.

The first example shows a screen display with **dspnode** executed on a BPX node. The second example shows a screen with **dspnode** executed on an IGX/AF. When executed on an IGX/AF, **dspnode** shows the name of the IGX/BPX core switch shelf and the trunk number. Note that to execute a command from an IGX/AF itself, you must either telnet to the shelf or use a control terminal attached to the shelf.

You can also use the **dspnode** command to display the VSI controllers on a BPX node. In this release, you can display the control_VPI and control_VCI_start of the particular controller, as shown in Example 6.

In Example 4, the **dspnode** screen shows loopbacks on feeders to a BPX node. The BPX no longer sends any status updates to the feeder yet it continues to acknowledge any feeder LMI messages received.

If the BPX cannot communicate LMI messages to its feeders, then the LMI status at the feeders must be maintained to keep the connections “active” to their external devices. If the BPX hub is flooded with network messages, then LMI/ILMI communication with its feeders may be interrupted. LMI normally runs a keep-alive between the hub and feeder. If the keep-alive fails, then the other end changes the status of all connections to “failed.” If the outage is due to a network message flood, then it is desirable to override this mechanism to keep the connection status as “active”.

Full Name

Display node

Syntax

dspnode

Related Commands

addshelf, delshelf, dsptrks

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, IGX/AF, BPX	Yes

Example 1

```
dspnode
```

Description

Display information about the interface shelves (executed on the IGX or BPX core switch shelf).

System Response

```
sw288          TN      SuperUser      BPX 8620      9.2.j2      Dec. 10 1998 15:09 GMT
```

```
                BPX 8620 Interface Shelf Information
```

Trunk	Name	Type	Part ID	Ctrl ID	Alarm
1.2	SW93AXIS	AXIS			UNRCH
1.3	SW77AXIS	AXIS			MAJ
3.1	sw92	TSC			OK
5.8	SIMFDR0	AAL5	-	-	OK

```
Last Command: dspnode
```

```
Next Command:
```

Example 2

```
dspnode
```

Description

Display information about the interface shelves (feeders) attached to IGX core switch shelf (executed on an IGX 8420). In this case, an SES (Service Expansion Shelf) communicates with the IGX routing hub over the AAL5 protocol.

■ dspnode

System Response

```
oo1          TN      SuperUser      IGX 8420      9.2.zR      Dec. 10 1998 07:23 PDT
```

```
IGX Interface Shelf Information
```

Trunk	Name	Type	Alarm
9.1	ases1	AAL5	OK

```
Last Command: dspnode
```

```
Next Command:
```

Example 3

```
dspnode
```

Description

Display information about the trunk to a BPX core switch shelf (executed on a BPX 8600).

System Response

```
BPX Interface Shelf Information
```

Trunk	Name	Type	Part Id	Ctrl Id	Alarm
1.1	sww222	IGX/AF	-	-	UNRCH
10.3	VSI	VSI	1	1	OK
11.1	VSI	VSI	1	2	OK

```
Last Command: dspnode
```

Example 4

```
dspnode
```


Description

Displays all interface shelves attached to the node. The resulting screens should show trunk 4.1 as type VSI.

System Response

```
n4          TN      SuperUser      BPX 8620    9.2      Apr. 4 1998 16:46 PST
```

```
          BPX Interface Shelf Information
```

Trunk	Name	Type	Alarm
3.1	j6c	AXIS	MIN
5.3	j5c	IPX/AF	MIN
4.1	VSI	VSI	OK
4.2	VSI	VSI	OK
4.3	VSI	VSI	OK

```
Last Command: dspnode
```

```
Next Command:
```

Example 5

```
dspnode
```

Description

Display information about the loopbacks on feeders to the BPX node.

System Response

```
sazu      TN      StrataCom    BPX 8620    9.2      pr. 18 1998 11:11 GMT
```

```
BPX Interface Shelf Information
```

Trunk	Name	Type	Alarm
10.2	sw157	IPX/AF	MAJ (L)

```
Last Command: dspnode
```

```
Next Command:
```

Major Alarm

Example 6

```
dspnode
```

Description

Display information about the BPX 8620 interface shelf with this release enhancement that shows the controller's control_VPI and control_VCI_start.

System Response

```
-----
sw237      TN      StrataCom    BPX 8620    9.2.30    June 16 1999 05:06 PST
```

```
BPX 8620 Interface Shelf Information
```

Trunk	Name	Type	Part Id	Ctrl Id	CntrlVC		Alarm
					VPI	VCIRange	
4.1	VSI	VSI	1	1	1	20 - 34	OK
13.2	SIMFDR0	AXIS	1	2	0	40 - 54	OK

```
Last Command: dspnode
```

dsptermcnf

Displays the configuration for the control port and auxiliary port at a node. It includes all the asynchronous communications parameters that are specified by the **cnfterm** command.

Full Name

Display terminal port configurations

Syntax

dsptermcnf

Related Commands

cnfterm, **cnftermfunc** (a superuser command), **dsptermfunc**

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

```
dsptermcnf
```

Description

Display the terminal port configuration data.

System Response

```
batman          TN      SuperUser      BPX 8620      9.2          Aug. 26 1997 02:55 PST
```

```
Control port          Auxiliary port

Baud Rate:           9600          Baud Rate:           9600

Parity:              None          Parity:              None
Number of Data Bits: 8      Number of Data Bits: 8
Number of Stop Bits: 1     Number of Stop Bits: 1
Output flow control: XON/XOFF  Output flow control: XON/XOFF
Input flow control: XON/XOFF  Input flow control: XON/XOFF
CTS flow control:     No          CTS flow control:     Yes
Use DTR signal:       Yes         Use DTR signal:       Yes
```

```
Last Command: dsptermcnf
```

```
Next Command:
```

dsptermfunc

Displays the port functions configured by the **cnftermfunc** command.

Full Name

Display terminal port functions

Syntax

```
dsptermfunc
```

Related Commands

cnfterm, **cnftermfunc**, **dsptermcnf**

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

```
dsptermfunc
```

Description

Display the terminal port configuration data. The highlighted or reverse video items are the currently selected options.

System Response

```
swstorm          TN      SuperUser      BPX 8620      9.2      Aug. 23 1997 09:42 PST
```

```
Control port
```

1. VT100/StrataView
2. VT100

```
Auxiliary port
```

1. Okidata 182 Printer
2. Okidata 182 Printer with LOG
3. VT100
4. Alarm Message Collector
5. External Device Window
6. Autodial Modem

```
Last Command: dsptermfunc
```

```
Next Command:
```

dspprtcnf

Displays printing configuration for the node. The three printing modes, “remote,” “local,” and “no” are listed and the currently selected mode is highlighted. If remote printing is selected, the node name where the remote printer is located also appears. If the name of the node is flashing, the node is unreachable.

The **dspprtcnf** command displays the current print configuration for the network where the command is entered.

Remote mode indicates that the log for the node prints on the printer at the listed remote node. Local mode indicates that the log for the node prints on the node’s printer. No printing mode indicates that the log for the node does not print.

Full Name

Display print configuration

Syntax

```
dspprtcnf
```

Related Commands

```
cnfprt
```

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

```
dspprtcnf
```

Description

Display the print configuration. The example does not show the highlighted field.

System Response

```
sw83          TN      SuperUser      IGX 8420      9.2          Aug. 22 1997 16:02 PST
```

```
Printing Mode
```

```
Remote Printing
Local Printing
No Printing
```

```
Last Command: dspprtcnf
```

```
Next Command:
```

dsppwr

Displays the current status of the power supply monitor, the current power supply configuration (which may consist of from one to four power supplies depending on node requirements), and the current cabinet temperature.

On the right side of the screen is displayed the internal cabinet temperature in degrees Centigrade and Fahrenheit. The temperature is displayed as a thermometer and the exact temperature appears at the top of the thermometer.

Full Name

Display power supply status

Syntax**dsppwr****Related Commands****dspcd, dspcds****Attributes**

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1**dsppwr****Description**

Display power supply status

System Response

```

sw81          TN      SuperUser      BPX 8620      9.2      May 21 1997 13:13 PST

      Power Status                                Cabinet Temperature

ASM Status: Active                                22          71

Power voltage A/B:          0 / 49 V

PSU  Ins  Type  Rev  SerNum  Failure
A    N    N/A   N/A   N/A     N/A
B    Y    240V  0C   29959  None

      Fan Status

FAN   1      2      3
      3300 3360 3240 RPM

C 60 | | 140 F
e 50 |--| 122 h
t 40 | | 104 e
g 30 | | 86  h
a 20 | | 68  i
e   | | 68  t

Last Command: dsppwr

Next Command:

```

dspyred

Displays information for Y-cable pairings. A single slot can be specified, or all pairings are displayed when no slot is specified. Slot numbers appearing in high intensity indicate active card status. Front card, back card, and channel configuration conflicts appear in reverse video. A conflict occurs when the port interfaces are different for corresponding ports in a redundant slot pair. The output display contains the following information:

- First column (Slot) designates the slot of the displayed card.
- Second column (Slot Type) designates its status, Pri (primary) or Sec (secondary).
- Third column (Other Slot) designates the slot number of the associated Y-redundant card.
- Fourth column (Front Card) designates the type of card in the front slot.
- Fifth column (Back Card) designates the type of card in the back slot.

Remaining columns (Channel Configuration) describe the channel configurations when appropriate.

Full Name

Display Y-cable redundancy

Syntax

dspyred [slot]

Related Commands

addyred, delyred, prtyred, switchyred

Attributes

Privilege	Jobs	Log	Node	Lock
1-4	No	No	IGX, BPX	No

Example 1

```
dspyred
```

Description

Display Y-redundancy for all cards

System Response

```

beta          TRM   YourID:1          IGX 8430    9.2    Aug. 15 1998 14:28 MST

      Slot Other Front  Back  Channel Configuration
Slot Type Slot  Card  Card   1    2    3    4    5    6    7    8
25  Pri  26   SDP  RS232 DCE DCE DCE DCE
26  Sec  25   SDP  RS232 DCE DCE DCE DCE

```

Last Command: dspyred

Next Command:

prtcdrd

Prints the card redundancy configuration for a BXM card with an OC-3 or OC-3 interface. This command uses the same syntax and prints the same information as the **dspyred** command. See the **dspcdrd** command for details on the format of the command output.

Full Name

Print the card redundancy for all cards.

Syntax

```
prtcdrd <start slot>
```

Related Commands

addcdred, dspcdrd, delcdred, prtcdrd, switchcdred

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	BPX	Yes

Example 1

```
prtcdrd
```

Description

Print card redundancy for all cards (no starting slot entered)

System Response

```

beta          TRM   YourID:1          BPX 8620    9.2    Aug. 15 1997 14:27 MST

      Slot Other Front  Back  Channel Configuration
Slot Type Slot  Card  Card   1    2    3    4    5    6    7    8
2   Pri   3   BXM   LM-BXM
3   Sec   2   BXM   LM-BXM

```

Last Command: prtyred 2

Next Command:

prtyred

Prints the Y-cable redundancy configuration for an SDP, LDP, CDP, FRP, FTC, NTC or AIT card on an IPX node. On an IGX node, the cards are the HDM, LDM, CVM, FRM, FTM, NTM, BTM, ALM/B, UXM, UFM, and UVM. On a BPX node, the applicable cards are the BCC, ASI, and BNI. This command uses the same syntax and prints the same information as the **dspyred** command. See the **dspyred** command for details on the format of the command output.

Full Name

Print the Y-cable redundancy

Syntax

prtyred <start slot>

Related Commands

dspyred, **addyred**, **delyred**

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	BPX	Yes

Example 1

```
prtyred
```

Description

Print Y-redundancy for all cards (no starting slot entered)

System Response

```
beta          TRM   YourID:1          IGX 8420      9.2   Aug. 15 1998 14:28 MST

      Slot Other Front  Back  Channel Configuration
Slot Type Slot  Card  Card   1    2    3    4    5    6    7    8
25  Pri  26   SDP  RS232 DCE DCE DCE DCE
26  Sec  25   SDP  RS232 DCE DCE DCE DCE
```

```
Last Command: prtyred
```

```
Next Command:
```

switchcdred

Switches active and redundant cards used for SONET APS (Automatic Protection Switching). The **switchcdred** command is the same as the **switchyred** command, and you can use it on any Y-cable redundancy card pair. You typically would use the **switchcdred** command only when you need to perform diagnostics or maintenance, and you need to remove and service the active card.

**Note**

When implementing two-card APS 1+1, it must be implemented with card redundancy. This implementation may also be referred to as “Y-redundancy,” because the new card redundancy commands used to configure APS 1+1 are based on Y-redundancy commands used in releases previous to Release 9.2.

When there is a front card failure, front card downed, or the front card fails a self-test, the card switchover should happen automatically (that is, you should not need to execute the **switchcdred** command for the card switchover to happen). An automatic switchover typically occurs when the switch software determines that the card is in a worse condition than the redundant pair (that is, a card is in a failed state due to a condition such as self-test, background test, fatal errors). If a standby card is not available, the **switchcdred** command will not be executed.

Typically, when APS and card redundancy are implemented together, the term Y-redundancy actually refers to card redundancy because there is no Y-cable connecting two back cards to one line. With SONET APS card redundancy, there is a primary and a secondary front card/back card pair. The redundant front card must be in Hot Standby state before a switchover can occur. When a front card failure is detected, the switchover should happen automatically (when card redundancy has been implemented). However, for the APS application, the active line is not switched if the line status is good. If the line has Loss of Signal (or other defects), it will be switched to the redundant line. (The line refers to the physical cable attached to the output of the back card.)

For APS 1+1, a front card can switch and become the standby card while its associated back card still has the active lines. The APS line will not switch during a card redundancy switch, unless the APS firmware detects that an APS switch is needed.

Following a **switchcdred**, or active card reset, the BXM card is sent a message from switch software to have it perform an APS switch to align itself with the last user **switchapsln** switch request. If the last user request is “clear,” full automatic APS switching is in effect with the working line in the active state by default. When there is no last user request to switch to any particular line (that is, protection line), the working line becomes active.

**Note**

In the APS 1+1 configuration, if the protection line is active and the last user request is “clear,” a **switchcdred** will cause the working line to be active if there is no line condition on the working line. When APS 1+1 comes up, it will come up on the working line if the working line is clear. When a **switchcdred** is issued, the active card also comes up on the working line if the working line is clear and there is no user request. In cases where the working line is in alarm or there is a user request to switch to the protection line, the card will first come up on the working line, then the card will detect the alarm or the user request and switch to the protection line.

Other Notes on switchcdred

**Note**

In the APS 1+1 configuration, if the last user request was a W->P switch, then **dsplog** will log a W->P switching event when a **switchcdred** is issued. On a **switchcdred**, the newly active card comes up on working line first. Then it responds to a user request to switch from working to protection by switching to the protection line and sending an event notification to that effect. The event notification can be seen in the event log by using the **dsplog** command.

**Note**

It may be necessary to perform a **switchcdred** command after performing a service switch with the **switchapsln** command so that the back card that the service switch selects has its associated front card active.

Full Name

Switch active card of a redundant pair of cards

Syntax

```
switchcdred
```

Related Commands

addcdred, delcdred, dspcdred, prtcdred

Attributes

Privilege	Jobs	Log	Node	Lock
1-3	Yes	No	BPX	Yes

Example 1

```
switchcdred
```

Description

Change the active card to be the standby card.

System Response

No display produced.

switchyred

The **switchyred** command is sometimes referred to as *soft y-red switching* (also known as the “graceful switching” feature). It lets you access the Y-redundancy switching feature already in the system.

Executing the **switchyred** command performs a graceful Y-redundancy switch in that no cards need to be reset in the process of switching from the current active card to the current standby card. Thus, all the existing channel programming on both cards remain intact, and is ready to use in the case of a fault condition (where the newly active card is found to be faulty).

The customer typically diagnoses all standby equipment for all duplicated cards. To implement similar preventative maintenance procedures, this command lets you switch active and standby cards, without resetting either card. If the customer intends to execute the switch once every two weeks, and if the standby card is faulty, in the current scheme, during reprogramming of the reset card, an outage is experienced. To do away with the outage period, the standby card should not go through a rebuild forced by the resetting of the card. With this feature, neither card is reset, and programming is continued on both cards. This type of reprogramming ensures that all channels are programmed again on the same card. It is transparent to the user, since all the channels were never deleted; they are being reprogrammed as is typical today in the case of a regular Y-redundancy switch.

The **switchyred** command operates on the following BXM cards:

- Y-redundancy trunk cards

- BXM Y-redundancy port cards
- BXM Y-redundancy feeder cards

In addition, you can use the **switchyred** command on ASI cards and BNI cards. In any case where these cards are not supported, you will be blocked from executing the command at the command line interface. The **switchyred** command initiates the Y-redundancy switch. It can also be initiated through a job. The **switchyred** command is available through the same access login as the **addyred** command.

The **switchred** command lets you switch between cards of a Y-redundancy pair, avoiding any card resets or failures. The feature is needed to allow the customer fast failure recovery in the cases where the previously standby card is found to be at fault. The feature allows for the previously active card to maintain its configuration and availability, allowing you to switch to it, either through another soft Y-redundancy switch request, or through the automated Y-red switching (which executes upon card failure).

The graceful switching command (**switchyred**) is applicable to BXM, ASI cards, and BNI cards.

This command requires Release 9.1 software and beyond. The cards in question have to be programmed to be y-redundant. The states of the cards have to be Active (for the Primary card) and Standby (for the Secondary card) OR Standby (for the Primary card) and Active (for the Secondary card).

The purpose of a graceful switch is to switch from the current active card of a Y-cable pair, to the current standby card of the pair, without deactivating, resetting, or reprogramming either of the cards.

You initiate a graceful switch by issuing a **switchyred** command at the command line interface or through an SNMP script. The input to the command is the primary card's slot number. You can obtain this information through the **dspyred** command, which lists the Primary card of a Y-redundancy pair, and the secondary card of the Y-red pair. Table 3-19 shows example usage of the **switchyred** command.

Table 3-19 switchyred-Example

Slot	Card Type	Other Slot	Front Card	Back Card
3	Pri	4	BXM	LM-BXM
4	Sec	3	BXM	LM-BXM

In the above example, a Y-red has been configured using slots 3 and 4, where slot 3 is identified as the Primary card (Pri) of the pair. Using the example shown in Table 3-19, the command line would look as follows:

Next Command: **switchyred 3**

The **switchyred** command displays errors on the screen for the slot used in the command line if the following conditions exist:

- if the card slot is not configured for Y-redundancy
- if the state of both cards is not valid

The command line issues a warning and prompts you to continue in case any channel programming is in progress. (Continuing at this stage introduces the risk of encountering continuity problems for a short period of time until all remaining channels are programmed.)

After you issue the command, the switch software starts the process of the graceful switch.

First, turn off the laser of the current active card (by sending it an Ox05 cbus message). In effect, stop running traffic on that card.

Next, activate and start running traffic on the current standby card, forcing it to be the new active card of the pair. This process also starts the channel reprogramming of the cards, and allows for the new standby card to be reprogrammed.

All the steps required to complete the graceful Y-redundancy switch are in Release 9.2 with the only possible difference being that neither card is reset.

There are no backward compatibility issues related to the **switchyred** command in Release 9.1.

The **switchyred** feature introduces the concept of deactivating a card without a failed state being present, or deactivating the card, or the need to reprogram all the channels on the card.

Function

The **switchyred** command kicks off the graceful switch process. After you issue the command, the switch software checks for and reports the following error conditions:

- If the input slot number is invalid (the valid ranges for the slot is 1–6 and 9–15).
- If the slot is empty, an error is displayed onto the screen indicating that the slot is empty.
- If the slot is not occupied by a BXM card, an error is displayed on the screen.
- If the card in the slot specified is not configured for Y-redundancy, an error specifies that the graceful switch command is executed for the y-redundancy feature. If no Y-red is configured on the card, graceful switching cannot be performed.

If the Y-redundancy pair (specified through the primary slot) contains cards in the incorrect state, a message is displayed onto the screen indicated the incorrect state of the cards. Valid states for the cards are:

- the primary card is in active state and the secondary is in standby state.
- the primary card is in standby state, and the secondary card is in active state. No other state combination is valid.

You are prompted to continue if the following is true:

- the switch software determines that channel programming is in progress for either of the cards in the Y-redundancy pair.

To choose to continue in this state implies that channels (connections) in the process of being programmed might not exist on the standby card after the graceful switching has completed, that is, the programming must be completed on both cards.

A message displays listing the cards being switched from, and the card being switched to, just before the graceful switching process begins.

After the switching process has been kicked off, the switch software does the following:

- Turns off the laser on the active card (stopping traffic).
- Puts the current active card into the standby state.
- Activates the current standby card to be the active one of the pair.

Event Logging

Event logging does not distinguish between a Y-redundancy switch due to a failure (beyond logging the indication of the failure), and a Y-redundancy switch due to the execution of the **switchyred** command.

Full Name

Switch Y-redundant cards

Syntax

```
switchcdred
```

Related Commands

```
addyred, delyred, dspyred, prtired, switchyred
```

Attributes

Privilege	Jobs	Log	Node	Lock
1-3	Yes	No	BPX	Yes

Example 1

```
switchcdred
```

Description

Change the active card to standby card.

System Response

No display produced.

upcd

Activates a card you have downed with the **dned** command. If a slot contains a complete card set, both the front and back card are upped. After a card set is upped, it is available as a node resource. When you activate a card, it comes up in either the *standby* or *active* state. The initial state depends on whether the network is ready to use the card immediately.

Full Name

Up card

Syntax

```
upcd <slot>
```

Related Commands

```
dned, dspcds
```


Attributes

Privilege	Jobs	Log	Node	Lock
1-3	Yes	No	BPX	Yes

Example 1

```
upcd 10
```

Description

Activate the card in slot 10. After you activate the NTC in slot 10, its status is “Standby.”

System Response

```
pubsipx1          VT      SuperUser          IPX 16      9.1 Oct. 30 1997 21:15 GMT

      FrontCard  BackCard
      Type  Rev  Type      Rev  Status
1  NPC    ABC
2  NPC    ABC
3  SDP    CBC  V35      AF   Standby
4  Empty
5  FRP    DFR  FRI-V35  AA   Active
6  LDP    CC03  232-4    AC   Standby
7  Empty  universal backplane
8  AIT    BBF  AIT-T3   AD   Active

      FrontCard  BackCard
      Type  Rev  Type      Rev  Status
9  Empty
10 NTC    ESC  E1        P06  Standby-F
11 Empty
12 Empty
13 CDP    ABE  T1        P06  Standby-T
14 Empty
15 NTC    EC02  Empty      Unavail
16 Empty
```

Last Command: upcd 10

Next Command:

Table 3-20 upcd-Parameters

Parameter	Description
slot	Specifies the card slot number of the card

window

Provides an interface to an external device. To establish a session with an external device, first use the **cnftermfunc** command to designate the auxiliary port to serve as the external device window. To begin the session, enter the **window** command and specify the port. The control terminal screen subsequently clears, after which characters entered at the control terminal go to the external device and vice versa.

Because the IGX and BPX nodes “bundle” characters together before transmitting them, a slight transfer delay occurs. Transfers are delayed until the transfer buffer is filled or the keyboard is inactive for over 50 milliseconds. To end the session, enter the escape sequence designated with the **cnftermfunc** command. The default for the escape sequence is ^^ (SHIFT 66).

The **window** command can be executed over a virtual terminal connection. This makes it possible to control external devices from a single point in the network. Devices such as Channel Service Units (CSUs), routers, channel banks and other devices with RS-232 console ports can be accessed remotely with this feature.

Full Name

Window to external device

Syntax

window <a/c>

Related Commands

cnfterm, **cnftermfunc**

Attributes

Privilege	Jobs	Log	Node	Lock
1-4	No	No	IGX, BPX	Yes

Example 1

```
window a
```

Description

Connect to a local router attached to the auxiliary port. The following dialogue shows the prompts and example responses.

System Response

```

Protocol [ip]:

Target IP address: 192.9.202.1

Repeat count [5]:
Datagram size [100]:

Timeout in seconds [2]:

Extended commands [n]::

Type escape sequence to abort. ^^

Sending 5, 100-byte ICMP Echoes to 192.9.202.1, timeout is 2 seconds:
.....

Success rate is 100 percent

left #

```

Table 3-21 *window-Parameters*

Parameter	Description
a	Specifies a window into external equipment attached to the node's auxiliary port. This is the default connection.
c	Specifies a window into external equipment attached to the node's control port.

■ window



Setting Up Trunks

This chapter describes the commands you use to set up and configure trunks. The contents in this chapter are as follows:

- Introduction
- A table showing the supported combinations of nodes, card sets, and line types
- Descriptions of trunk-related procedures:
 - Setting up a trunk
 - Setting up a virtual trunk
 - Configuring resources on a physical or virtual trunk
 - Reconfiguring a trunk
 - Removing a trunk
 - Displaying or printing a trunk configuration
 - Specifying trunk or line redundancy
 - Using substrate trunk interface control templates
- A list of commands in this chapter with beginning page number
- Descriptions of the trunk commands

Introduction

After you have configured the *nodes*, you must activate the *trunks*. Trunks are intra-node communication links in a network. A trunk can connect any combination of IGX or BPX nodes. Trunk characteristics are:

- Physical line type: T1 (including fractional), E1 (including fractional), Subrate, E3, T3, or OC-3 (STM1), OC-3/AIM with UXM, OC-12 with BXM
- Communication technology: Asynchronous Transfer Mode (ATM) or FastPackets.

Table 4-1 shows the communication technology for each node type, card combination, and line type.

Table 4-1 Supported Card Types in Release 9.2

Node Type	Front Card	Back Card	Line Types	Technology
IGX	NTM	BC-T1	T1, T1 Fractional	FastPacket
IGX	NTM	BC-E1	E1, E1 Fractional	FastPacket
IGX	NTM	BC-SR	Subrate	FastPacket
IGX	NTM	BC-Y1	Y1	FastPacket
IGX	UXM	BC-UAI-2OC3-SMF, BC-UAI-2STM-1-SMF BC-UAI-4OC3-SMF, BC-UAI-4STM-1-SMF BC-UAI-4OC3-MMF BC-UAI-4STM-1-MMF BC-UAI-4T1-IMA DB15, BC-UAI-4E1-IMA DB15, BC-UAI-4E1-IMA BNC BC-UAI-8T1-IMA DB15, BC-UAI-8E1-IMA DB15, BC-UAI-8E1-IMA BNC BC-UAI-3T3 BC-UAI-6T3 BC-UAI-3E3 BC-UAI-6E3	OC-3 (STS) OC-3 (STM1) OC-3 (STS) OC-3 (STM1) OC-3 (STS) OC-3 (STM1) T1 E1 E1 T1 E1 E1 T3 T3 E3 E3	ATM
IGX	UXM	BC-6T3, BC-6E3 BC-3T3, BC-3E3 BC-UAI-3T3 BC-UAI-6T3 BC-UAI-3E3 BC-UAI-6E3	T3, E3 T3, E3 T3 T3 E3 E3	ATM
IGX	ALM/B	BC-BTM-HP-T3 BC-BTM-HP-E3	T3, E3	ATM
IGX	BTM	AIT-T3, AIT-E3, AIT-E2, AIT-HSSI, BTI-E1	T3, E3, E2, E1, HSSI	ATM
BPX	BNI	LM-3T3, LM-3E3	T3, E3	ATM
BPX	BNI-155, BNI-155E	2OC3-SMF or 2OC3-MMF	OC-3 (STS)	ATM
BPX	BXM-155-8	MMF-155-8 SMF-155-8 SMFLR-155-8	OC-3 (STS)	ATM
BPX	BXM-155-4	MMF-155-4 SMF-155-4 SMFLR-155-4	OC-3 (STS)	ATM
BPX	BXM-622-2	SMF-622-2 SMFLR-622-2	OC-12 (STM4)	ATM

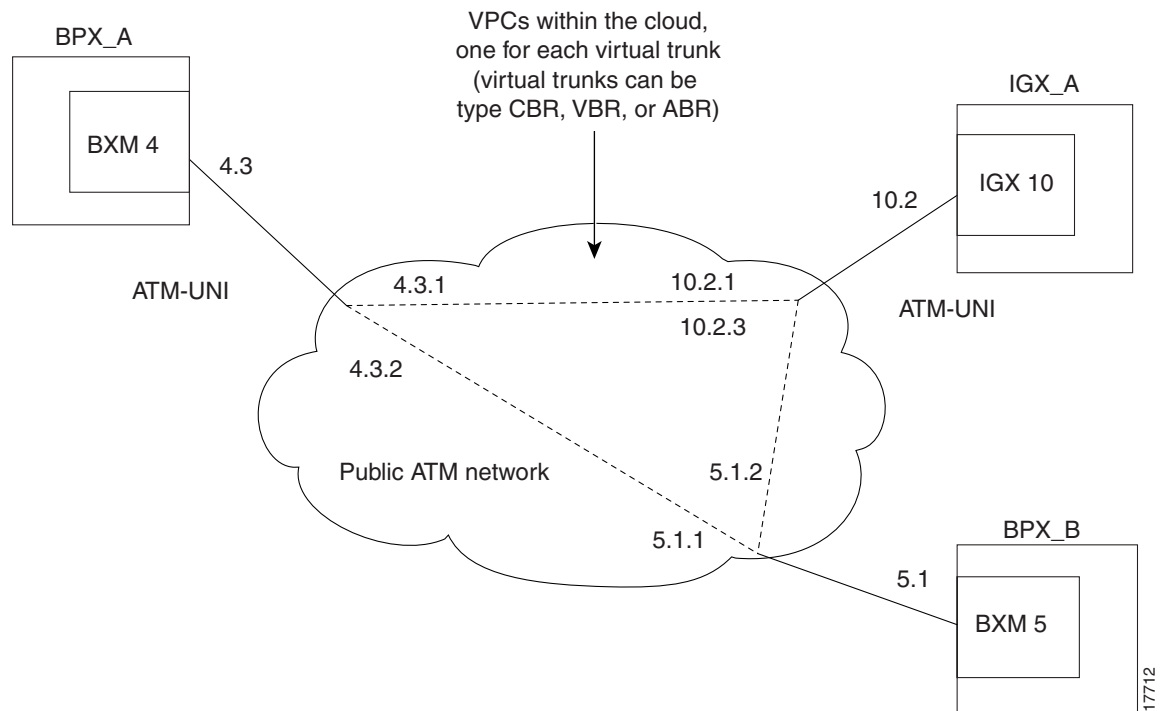
Overview of Virtual Trunking

The purpose of virtual trunks is to provide customers with a cost-effective way to use Cisco equipment while connecting to a public ATM network. This hybrid network of private trunks and public networks is expected to be a common configuration as customers begin to implement ATM in their networks and public carriers begin to offer ATM service. This hybrid network configuration provided by virtual trunking allows private virtual trunks to use the mesh capabilities of the public network in interconnecting the subnets of the private network.

You establish connectivity through a public ATM cloud by allocating virtual trunks between the nodes on the edge of the cloud. With only a single trunk port attached to a single ATM port in the cloud, a node uses the virtual trunks to connect to multiple destination nodes on the other side of the cloud. From the perspective of a Cisco node, a virtual trunk is equivalent to a VPC provided by the ATM cloud network, which provides connectivity through the cloud.

A virtual trunk is simply “a trunk defined over a public ATM service.” The trunk really does not exist as a physical line in the network. You use an additional level of reference, called a *virtual trunk number*, to differentiate the virtual trunks found within a physical port. The ATM equipment in the cloud must support Virtual Path switching and moving incoming cells based on the VPI in the cell header. Within the cloud, one virtual trunk is equivalent to one VPC. Because the VPC is switched with just the VPI value, the 16 VCI bits (from the ATM cell format) of the ATM cell header are passed transparently through to the other end. The VCI bits within the header are passed transparently through the entire cloud (see Figure 4-1). The virtual path ID (VPI) is provided by the ATM cloud administrator (for example, service provider).

Figure 4-1 Typical ATM Hybrid Network Using Virtual Trunks



17712

This release introduces support of the UXM trunk card as a physical interface to the public ATM cloud on the IGX. BXM trunk card support is introduced as a physical interface to the cloud on the BPX. The trunk connection at the cloud's access point can be an ATM UNI or ATM NNI interface. Virtual trunking is supported on the IGX and BPX platforms. With the BPX switch, virtual networks can be set up with either the BNI card or BXM card. The virtual trunks originate and terminate on BXMs to BXMs, or BXMs to UXMs (IGX switch), or BNIs to BNIs, but not BNIs to BXMs or UXMs.

Each Cisco sub-network is connected through the public ATM network with virtual trunks. The trunk interface at the Cisco nodes is either a BNI, BXM, or UXM trunk card. The BXM card's physical trunk interface to the ATM cloud is a standard ATM UNI or NNI interface at the cloud's access point. The administrator of the ATM cloud (for example, service provider) specifies whether the interface is UNI or NNI, and also provides the VPI to be used by a virtual trunk across the cloud. Specifying an NNI cell interface provides four more bits of VPI addressing space.

Virtual trunking is a purchased feature, so Cisco Customer Service must enable it on each node where you intend to use virtual trunking. Virtual trunking is supported on the ASI, BNI and BXM cards in the BPX, and on the UXM card in the IGX. Note that firmware levels on ASI, BXM, and UXM cards must be current. For more information on virtual trunking, see the chapter on BXM virtual trunks in the *<CellCommandItalic>Cisco BPX Series Installation and Configuration* and *Cisco BPX 8600 Series Reference*.

Setting Up a Trunk

Before executing the commands in this section, you must have finished setting up the nodes (see the "Setting Up Nodes" chapter.) Also, the front and back cards that support the proposed line type and communication technology must reside in the slot intended for the trunk.

In this release, the Ports and Trunks feature, which is supported on the BPX and IGX, allows you to configure port, routing trunk and feeder trunk interfaces simultaneously on a slot containing a BXM or UXM card. For example, you can up port 1 on a BXM slot as a trunk interface while also upping port 2 as a line interface. See Table 4-2 for card/interface support. For BXM and UXM cards, you do not need to upgrade the firmware.



Note

You cannot use a virtual trunk as an interface shelf (feeder) trunk; similarly, you cannot configure an interface shelf trunk to act as a virtual trunk, nor can you terminate interface shelf (feeder) connections on a virtual trunk.

Table 4-2 Interface Types Supported on the Same Card

Interface Type	BXM	UXM
Physical trunks	supported	supported
Virtual trunk	supported	supported
Interface shelf (feeder) trunks	supported	Not supported
Ports (UNI)	supported	supported

1. Use the **uptrk** command to activate the trunk.

Use the **uptrk** command to activate the port so that it can start to generate framing. It also determines whether the trunk is a physical-only trunk or a virtual trunk. The third digit you specify in the **uptrk** command (represented by *slot.port.vtrk*) indicates that the trunk is virtual. See the *Cisco BPX Series 8600 Reference* for more information on virtual trunking.

Use **uptrk** at each end of the trunk. When the trunk is upped at only one end, the node detects the trunk as being in an alarm state (see **dsprtrks**). Upping the trunk at both ends clears the alarm.

2. Use the **cnftrk** command to override the trunk's default values. You must use **cnftrk** for virtual trunks, but it is an optional command for physical trunks. For virtual trunks, you must change the VPI to a non-0 value before executing **addtrk**.

If you use **cnftrk**, you must make the same changes at both ends of the trunk. To display existing trunk parameters, use the **dsprtrkcnf** command. The configurable parameters are listed for each card type in Table 4-1. (The possible parameters are PKT for FastPackets, ATM cells, BNI if the trunk is a BNI card, or All.) Not all of these parameters apply to the BPX node.

After you configure the trunk, and add the trunk (**addtrk**), you can respecify certain parameters. For example, a period of trunk use may give you enough information to indicate that you should change parameters to optimize how the trunk is used. Refer to "Reconfiguring a Trunk" for details.

3. Use **addtrk** to add the trunk. Adding the trunk makes the trunk a usable resource, so you can add connections (**addcon**) to carry traffic. You only need to add one end of the trunk.

(To add an interface shelf to a routing node in a tiered network, use **addshelf**. See the chapter "Setting Up Trunks.")

Compatibility Between Cards in Virtual Trunks

Virtual trunking is supported on the BPX and IGX. However, because the BXM and UXM cards both use the standard UNI and NNI cell header formats across the virtual trunks (instead of the Strata-UNI cell format used on BNI virtual trunks), BNI virtual trunks are not compatible with BXM/UXM virtual trunks.

To use virtual trunking on a BXM or a UXM card, Release 9.2 software is required, and Release 9.2 BXM and UXM firmware, which is backward compatible. No hardware upgrade is required. Also, nodes running Release 9.2 software can interoperate with nodes running 9.1 or 8.5, but you cannot add UXM and BXM virtual trunks into a network of mixed software releases. This is because the networking messages are different among the software releases, specifically the virtual trunk number and the cell format on virtual trunks.

You configure the BXM and UXM cards similarly as in releases previous to Release 9.2; that is, you use similar card, line, port and connection commands for configuration.

Virtual Trunking Support on BPX and IGX in Release 9.2

Each BPX node can have a combined maximum of 64 logical (physical and virtual) trunks per node. Each IGX node can have a combined maximum of 32 logical (physical and virtual) trunks per node.

A BNI-T3 or E3 line can support up to 32 virtual trunks on one or both physical ports. A BNI-OC-3 line can support up to 11 virtual trunks.

A BXM card can support up to 31 virtual trunks. A UXM card can support up to 15 virtual trunks. Note that, like regular trunks, virtual trunks can carry high-priority traffic.

Channel Capacities. In Release 9.2, networking channels will be pre-allocated only for AutoRoute trunks. In releases previous to Release 9.2, for UXM and BXM cards, networking channels are pre-allocated when the first trunk is upped; that is, 270 channels are allocated for each trunk on that

card. For example, if the card had four trunks enabled on it, trunk 1 would have channels 0 through 270 allocated, trunk 2 would have channels 271 through 540; trunk 3 would have channels 541 through 810, and trunk 4 would have channels 811 through 960 allocated.

Network channels are no longer pre-allocated. Networking channels will be allocated for each trunk when the trunk is upped. For each trunk that is upped, 270 channels will be dynamically allocated for networking.

For legacy UXM/BXM cards, approximately 270 networking channels are allocated for each virtual trunk. For example, UXM cards will allocate 4320 channels if all 16 virtual trunks are upped on a single card. BXM cards will allocate 8640 channels if all 32 virtual trunks are upped. See Table 4-3 for networking channel capacities for virtual trunks.

Table 4-3 Networking Channel Capacities for Virtual Trunks

#VT	# Networking Channels for Legacy Cards	# Networking Channels for Enhanced Cards
1 VT	270 chans	270 chans
2 VTs	540 chans	270 chans
3 VTs	810 chans	270 chans
16 VTs	4320 chans	270 chans
32 VTs	8640 chans	270 chans

This implies that UXM legacy cards upping all 15 virtual trunks would consume 4320 gateway channels for networking, leaving none for user traffic. For this reason, you will need to limit the number of virtual trunks that you up on a legacy UXM card. You can use the **cnfport** command to control the number of trunks upped on a UXM card.

Introduction to Ports and Trunks and Virtual Trunking

The fundamental architecture of the virtual trunking feature in this release is similar to that of the BNI virtual trunk implementation in previous switch software releases. The standard UNI/NNI cell headers are used across the virtual trunks, and two-stage queueing as defined by the Virtual Interface.

This section discusses some features that interact with virtual trunking, including:

- trunks and ports on the same card
- VSI resource partitioning
- virtual ports

You up and configure virtual trunks with the existing commands. The commands have additional parameters for virtual trunk-specific items. You up a trunk with **uptrk** *<slot.port.vtrk>*. You configure the trunk VPI (VPI range 1–4095) and other parameters on the trunk with **cnftrk**, **cnftrkparm**, and **cnfrsrc** commands.

Table 4-4 lists the permutation of virtual trunks that you can interface through the public ATM cloud.

Table 4-4 Permutation of Virtual Trunks That Can Be Connected Through a Public Cloud

	BNIs (T3/E3/OC-3)	BXM (T3/E3/OC-3/ OC-12)	UXMs (T3/E3/OC-3)	UXM-AIM
BNIs (T3/E3/OC-3)	yes	no	no	no
BXMs (T3/E3/OC-3/OC-12)	no	yes	yes	yes
UXMs (T3/E3/OC-3)	no	yes	yes	yes
UXM-AIM	no	yes	yes	yes

The Ports and Trunks feature lets you configure multiple trunk lines and circuit lines on a single BXM or UXM card simultaneously. In releases previous to Release 9.2, when you upped a single port as a trunk (by using the **uptrk** command), all the remaining ports on that card are treated as trunks. Similarly, when you up a single port as a circuit line (by using the **upln** command), all the remaining ports on the card are treated as circuit-line ports.

The Ports and Trunks feature is supported on the BXM and UXM cards for the BPX and IGX platforms. A port, routing trunk, and feeder trunk interface can be supported on a given slot containing a BXM or UXM card type simultaneously. For example, a user of a BXM slot can have port 1 upped as a trunk interface while having port 2 upped as a line interface.

For example, a BXM card can have:

- port 1 upped as a physical trunk
- port 2 upped as a feeder trunk
- port 3 upped with multiple virtual trunks
- port 4 upped as a UNI interface

Table 4-5 lists the interface types which can be supported on a single card.

Table 4-5 Interface Types That Can Be Supported on a Single Card

	ASIs (T3/E3/OC-3)	BNIs (T3/E3/OC-3)	BXM (T3/E3/OC-3/ OC-12)	UXMs (T3/E3/OC-3)	UXM-AIM
MGX 8850 Feeder	no	yes	yes (except OC-12)	no	no
IGX Feeder	no	yes	no	no	no
Physical Trunks	no	yes	yes	yes	yes
Virtual Trunks	no	yes	yes	yes	yes
UNI port	yes	no	yes	yes	yes
Virtual UNI	no	no	no	no	no

Version Interoperability

Virtual trunking is not supported in a mixed network (that is, of mixed releases 8.4, 8.5, 9.1, and 9.2). You must upgrade nodes to Release 9.2 to use virtual trunking.

You can use the Ports and Trunks feature in a network of mixed releases.

To support virtual trunk networking channels and VSI on virtual trunks, you must upgrade to new firmware. Refer to 9.2 release notes for system requirements.

Virtual Trunking Configuration

You use the existing trunk commands to manage trunks (for example, **uptrk**, **cnftrk**, and **addrtrk**). The syntax to identify a logical trunk has an optional virtual trunk identifier, which you append to the slot and port information.

The ATM cloud must be configured to support virtual trunking. For an ATM cloud containing Cisco equipment (for example, BPX nodes are in the public ATM cloud), the access points are ASI or BXM ports. (These access points serve as physical interfaces to the cloud.) If the ATM cloud has access points of ASI or BXM ports, and the cloud attaches to either BXM or UXM virtual trunks, the ASI or BXM port should be configured (with **cnfport**) so that the HCF field (sometimes called the *shift/no shift* option is set correctly. The **cnfport shift (H)** option specifies that a one-byte shift on the HCF field of the cell header will occur.

For an ATM cloud containing IGXs, the access points are UXM ports. Similarly, you must configure the ports to handle the virtual trunk cells from Cisco nodes. This entails setting the physical port parameters such that they match the trunk to which they are attached. In addition, if the access point in the BPX cloud is a BNI port, you must to configure the port to not shift (*Shift N*) the VCI in the cell header.



Note

For a non-BPX and non-IGX cloud, due to ILMI signalling support, you no longer need to configure the ATM ports to block signalling traffic to the Cisco nodes.

Virtual Trunk Example

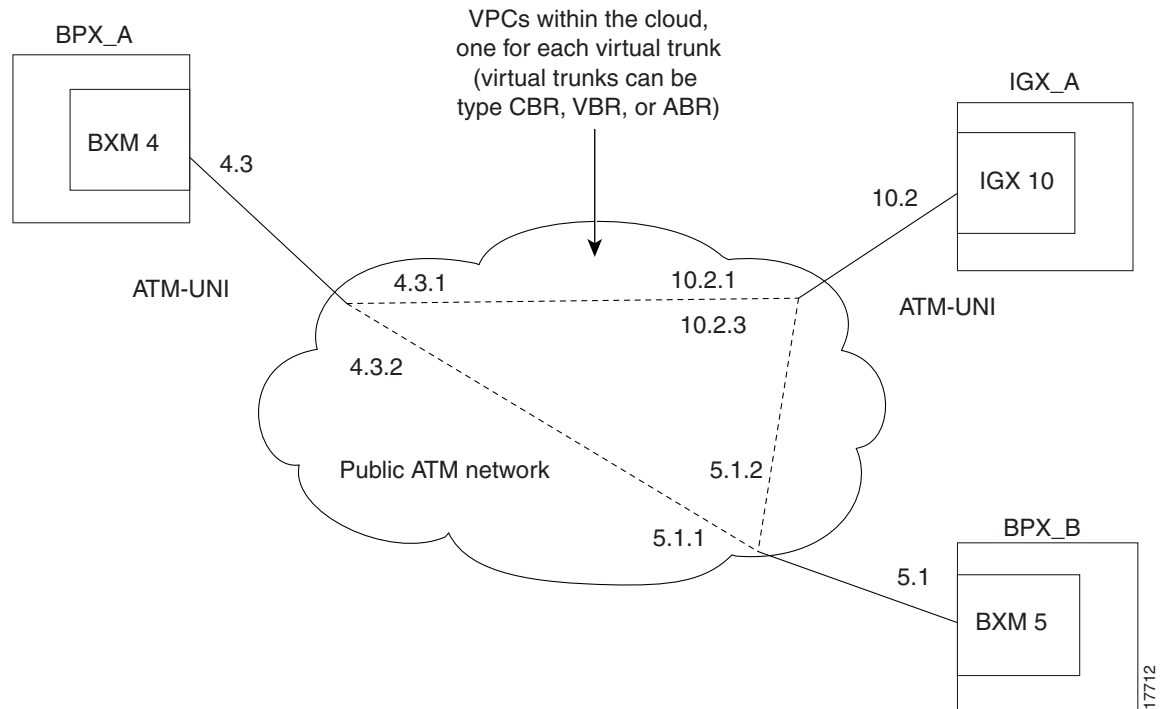
An example of a number of virtual trunks configured across a public ATM Network is shown in Figure 4-2. There are three virtual trunks shown across the network, each with its own unique VPC.

The three virtual trunks shown in the network are:

- between BPX_A 4.3.1 and IGX 10.2.1
- between BPX_A 4.3.2 and BPX_B 5.1.1
- between BPX_B 5.1.2 and IGX_A 10.2.3.

Each VPC defines a virtual trunk which you can configure for support of CBR, VBR, or ABR traffic.

Figure 4-2 Virtual Trunks Across a Public ATM Network



Connection Management

Virtual trunking allows a BPX and IGX node to provide trunks that are compatible with the standard 3.0/3.1 ATM UNI cell format interface of a public ATM network. Unlike previous trunk implementations, the ATM cells are not in a proprietary STI (StrataCom Trunk Interface) format, permitting StrataCom (STRM) trunks to connect through a public ATM network.

The cell addressing method for connections routed through a virtual trunk handles multiple type of traffic flowing through an ATM cloud. The header format of cells may match the ATM-UNI or ATM-NNI format since the port interface to the ATM cloud is a physical interface configured as either a UNI or NNI interface, as specified by the administrator of the ATM cloud.

Congestion management (resource management) cells are passed transparently through the network. Cisco features such as Advanced CoS Management and Optimized Bandwidth Management may not be supported within the public network, but the information is carried through the network. Leased lines may also exist to connect the Cisco subnetworks outside of the ATM network.

Cell Header Formats

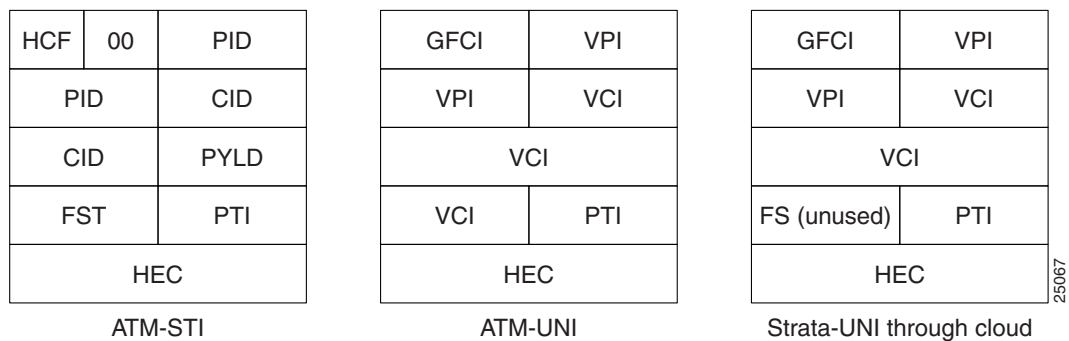
Before cells enter the cloud on a virtual trunk, the cell header is translated to a user configured VPI value for the trunk, and a software configured VCI value, which is unique for the cell.

As cells are received from the cloud by the BPX or IGX in the Cisco networks at the other end of the cloud, these VPI/VCI are mapped back to the appropriate VPI/VCI addresses by the Cisco nodes for forwarding to the next destination.

The VPI value across the virtual trunk is identical for all cells on a single virtual trunk. The VCI value in these cells determines the final destinations of the cells. On BNI cards, for virtual trunking, a modified ATM UNI cell format (Strata-UNI) stores the Optimized Bandwidth Management information, as applicable, in the header of a Strata-UNI cell format. A virtual trunk with a BNI at one end must terminate on a BNI at the other end. (BNI trunks are incompatible with BXM or UXM trunks.)

Figure 4-3 shows three different cell header types: ATM-STI, ATM-UNI, and Strata-UNI through a cloud. The ATM-NNI header (which is not shown in the figure) differs in format from the ATM-UNI only in that there is no GFCI field, and those four bits are added to the VPI bits to give a 12-bit VPI.

Figure 4-3 ATM Virtual Trunk Header Types



The ATM-STI header is used with BNI trunks between BPX nodes within a Cisco switch subnetwork. The ATM-UNI is the standard ATM Forum UNI supported by the BXM card along with standard NNI. Virtual trunks terminating on BXMs or UXMs use the standard ATM-UNI or ATM-NNI header as specified by the cloud administrator (for example, service provider). Virtual trunks terminating on BNIs use the Strata-UNI header.

Because the BNI cards use a Strata-UNI format across a virtual trunk, BNI virtual trunks are not compatible with BXM/UXM virtual trunks which use either the standard UNI or NNI cell header formats. Therefore, BXM to BXM, UXM to UXM, and BXM to UXM virtual trunks are supported while BNI to BXM or BNI to UXM virtual trunks are not supported.

Bit Shifting for Virtual Trunks

The ATM-STI header uses four of the VCI bit spaces for additional control information. Only two of the bits are used for HCF. When the cell is to be transferred across a public network, a shift of these bit spaces is performed to restore them to their normal location so they can be used across a network expecting a standard ATM cell header.

This bit shifting is shown in Table 4-6. A BNI in the Cisco subnetwork can interface to an ASI or BXM (port configured for port mode) in the cloud. The ASI or BXM in the cloud is configured for no shift in this case.

A BXM in the Cisco subnetwork can interface to an ASI UNI port, BXM UNI port, or other UNI port in the cloud. The BXM in the cloud is configured for bit shifting as shown in Table 4-6.

In this case the BXMor ASI in the cloud is configured for bit shifting as shown in Table 4-6.

Table 4-6 Bit Shifting for Virtual Trunking

Subnetwork	FW Rev	Shift		Cloud	FW Rev	Shift
BXM	--	??	>	BXM (port mode)		Yes
BNI	--		>	ASI		No
BNI	--		>	BXM (port mode)		No

Setting up a BNI Virtual Trunk through an ATM Cloud

The following example provides a general procedure on how to set up a virtual trunk through an ATM cloud using Cisco equipment (that is, a BPX or IGX cloud).

-
- Step 1** Obtain a VPC from the ATM cloud provider.
 - Step 2** Set up cables by doing the following: in the cloud network, physically connect an ASI port to each BNI port that is likely to carry virtual trunks.
 - Step 3** For each ASI port connected to a BNI virtual trunk port, use the following configuration sequence:

```
upln slot.port
```

```
upport slot.port
```

```
cnfport slot.port, and set the shift parameter to "N" for no shift.
```

The *shift/no shift* parameter specifies whether or not the VCI bits in the cell header should be shifted based on the HCF field of the Cell header on cells arriving from the backplane. It is how Cisco networks convert STI cells to standards based cell formats, and similarly how standards-based cell formats are converted back to STI cells.

- Step 4** Execute **addcon**. In the cloud network, add a virtual path ASI connection for each end of the virtual trunk that is to be routed through the cloud. An example of the syntax for this is:

```
addcon joker 5.1.1.* swstorm 6.2.10.*
```

where 5.1 and 6.2 are ASI ports that are hooked up and configured for virtual trunking. DACS connections are acceptable.

Note that the third number is the VPI, which must correspond to the virtual trunk VPI configured with **cnftrk** in step 4. For BNI virtual trunks, the usable range of VPIs is 1 to 255 (for T3/E3 trunks). For BNI OC-3 virtual trunks, the usable range of VPIs is 1 to 63.

The VPI configured for a virtual trunk must match the VPI of the VPC in the public ATM cloud. Every cell transmitted to the virtual trunk has this VPI value. Valid VPC VPIs depend on the port type as shown in Table 4-7.

Table 4-7 VPI Ranges

Port Type	Valid VPI Range
BXM/UXM (UNI)	1–255
BXM/UXM (NNI)	1–4095
BNI T3/E3	1–255
BNI OC-3	1–63

The CBR/VBR parameter must also correspond to the virtual trunk type of the virtual trunk. For T3, set PCR to 96000 and CDTV to 24000 for the connection so that the ASI does not drop cells. Cisco recommends these values based on testing.

- Step 5** Configure BNI trunks. Use **uptrk** to enable the virtual trunk on the port. Take this step if the ATM cloud provider has assigned the VPC. On BNIs that connect to the cloud's ASI ports, configure the virtual trunks, as follows:

```
uptrk slot.port.vtrk
```

If the cloud is already configured, the alarm on the virtual trunk should clear.

```
cnftrk slot.port.vtrk
```

When you use **cnftrk** to configure the virtual trunk, make sure the virtual trunk type and VPI correspond to the existing ASI Virtual Path connections (that is, make sure that the virtual trunk matches the cloud's VPC configuration, uses the correct cell format (UNI or NNI), and that HCF-based shifting is *off* (which you configure using **cnfport** on the ASI port).

- Step 6** Use **addtrk** to add the virtual trunk to the network topology.

```
addtrk slot.port.vtrk
```

The parameters *slot.port.vtrk* on a BNI card can have the following values:

- Slot can be 1–6, 9–14.
 - Port is the physical port number, which can be 1–3 for T3/E3 or 1–2 for OC-3/STM1.
 - Vtrk is the virtual trunk number, which (for BNIs) can be 1–32 for T3/E3 or 1–11 for OC-3/STM1. Note that the two ends of a virtual trunk can have different port interfaces. For example, a virtual trunk supported by a UXM-OC-3 on one end can be supported by a BXM-T3 at the other end. However, both ends of the trunk must have the same trunk bandwidth, connection channels, cell format, and traffic classes. The **addtrk** command verifies this when you add the trunk.
-

BXM and UXM Virtual Trunks Connecting through Cloud with Cisco Equipment

Consider the example where the cloud consists of some Cisco MSSBU switches such as BPXs or IGXs. In the case where a virtual trunk is routing cells over only BXM routing trunks, all 16 bits of the ATM cell header can be passed cleanly because BXMs have the capability to handle a standard ATM cell header. However, if there are BNIs in the cloud network, some bits of the VCI could be lost. There is no guarantee that connections can be made. If there are only BXM trunks in the cloud, then set the **cnfport** Shift parameter to *Shift off* on all BXM or ASI ports that connect to the cloud. However, if there are some BNIs within the cloud that connections may be routed over, then set the **cnfport** Shift parameter to *Shift on* for all ports that connect to the cloud.

Consider another example where you have a BXM routing trunk and a UXM routing trunk connecting through a public cloud. In this situation, all the trunk cards can support the standard ATM cell header, thus all 16 bits of the VCI can be passed through the cloud. In this case, each port interfacing to the cloud should have its **cnfport** parameter set to *Shift off*.

Setting Up a BXM or UXM Virtual Trunk Through an ATM Cloud

The following example describes how to set up a virtual trunk through a BPX or IGX cloud:

-
- Step 1** Obtain a VPC from the ATM cloud provider.
 - Step 2** Set up cables by doing the following: in the cloud network, physically connect an ASI port (or a BXM port) to each BXM port that is likely to carry virtual trunks.
 - Step 3** For each ASI port connected to a BXM virtual trunk port, use the following configuration sequence:

```
upln slot.port
```

```
upport slot.port
```

```
cnfport slot.port, and set the Shift parameter to "H" for shift.
```

The *shift/no shift* parameter specifies whether or not the VCI bits in the cell header should be shifted based on the HCF field of the cell header on cells arriving from the backplane. It is how Cisco networks convert STI cells to standards-based cell formats, and similarly how standards-based cell formats are converted back to STI cells. See Table 4-8 for some general guidelines on how to set the *shift* parameter when using virtual trunking through a cloud of non-Cisco equipment versus Cisco equipment using BXMs.)



Note If the network has BNI cards, or if the VPC can route over BNIs, set the **cnfport** *Shift* parameter to "H." This causes the cell, when transported over a public network, to shift these bit spaces to restore them to their normal location that they can be used across a network expecting a standard ATM cell header. If, however, the route through the cloud traverses all BXMs, for example, then configure the **cnfport** command to *no shift* (on the port's entry point into the cloud).

For UXM cards, you cannot configure the *shift* parameter—the shift setting is always *n*, or *shift off*.

Table 4-8 General Guidelines on Setting *cnfport Shift On/Shift Off* Parameter for Virtual Trunking

	Non-Cisco Cloud	Cisco BXM Cloud
BNI Virtual Trunks	Shift off	Shift off
BXM/UXM Virtual Trunks	Shift off	Shift on

Step 4 Execute **addcon**. In the cloud network, add a virtual path ASI connection for each end of the virtual trunk that is to be routed through the cloud. An example of the syntax for this is

```
addcon joker 5.1.1.* swstorm 6.2.10.*
```

where 5.1 and 6.2 are ASI ports that are hooked up and configured for virtual trunking. DACS connections are acceptable.

Note that the third number is the VPI, which must correspond to the virtual trunk VPI configured with **cnftrk** in step 4. For UXM/BXM UNI virtual trunks, the useable range of VPIs is 1 to 255. For UXM/BXM NNI virtual trunks, the useable range of VPIs is 1 to 4095.

The CBR/VBR parameter must also correspond to the virtual trunk type of the virtual trunk. For T3, set PCR to 96000 and CDTV to 24000 for the connection so that the ASI does not drop cells. Cisco recommends these values based on testing.

Step 5 Configure BXM trunks. Use **uptrk** to enable the virtual trunk on the port. Take this step if the ATM cloud provider has assigned the VPC. On BXMs that connect to the cloud's ASI ports, configure the virtual trunks, as follows:

```
uptrk slot.port.vtrk
```

If the cloud is already configured, the alarm on the virtual trunk should clear.

```
cnftrk slot.port.vtrk
```

When you use **cnftrk** to configure the virtual trunk, make sure the virtual trunk type and VPI correspond to the existing ASI Virtual Path connections (that is, make sure that the virtual trunk matches the cloud's VPC configuration, uses the correct cell format (UNI or NNI), and that HCF-based shifting is *Shift on*.)



Note Ports on UXM cards that connect to a cloud must always be set to *Shift off*. Connections between a port set to *shift on* and a port set to *shift off* are not guaranteed.

Step 6 Optionally, use **cnfrsrc** to configure the number of connection IDs (conids) and the bandwidth available on the trunk. (Refer to the **cnfrsrc** command in this chapter.)

Step 7 Use **addtrk** to add the virtual trunk to the network topology.

```
addtrk slot.port.vtrk
```

The parameters *slot.port.vtrk* on a BXM card can have the following values:

- Slot can be 1–6, 9–14.
- Port is the physical port number, which can be 1–3 for T3/E3 or 1–2 for OC-3/STM1.
- Vtrk is the virtual trunk number, which (for BXMs) can be 1–31 for T3/E3.



Note BXM cards support up to 31 virtual trunks, while UXM cards support up to 15 virtual trunks.)



Note The two ends of a virtual trunk can have different port interfaces. For example, a virtual trunk supported by a UXM-OC-3 on one end can be supported by a BXM-T3 at the other end. However, both ends of the trunk must have the same trunk bandwidth, connection channels, cell format, and traffic classes. The **addtrk** command verifies this when you add the trunk.

Consider an example where the cloud consists of all equipment that supports a standard ATM cell header (16-bit VCI). For example, there are three virtual trunks connecting through the cloud—from two BPX-BXM nodes and one IGX-UXM node. Consider that these virtual trunks are connecting to each other through a cloud with non-Cisco equipment. If the cloud has non-Cisco equipment, then Shift/No Shift cannot be configured.



Note Note that UXM cards cannot be configured for Shift off or Shift on. They always have Shift set to off.

Routing with Virtual Trunks

Virtual trunks appear in the routing topology map as trunks available for routing. The existing physical trunk characteristics, such as bandwidth and satellite/terrestrial type, apply to virtual trunks. The routing algorithm must take into account additional criteria when virtual trunks are in the routing topology:

- **Virtual Trunk Existence**—Routing has special restrictions and conid assignments for a virtual trunk. For example, VPCs may not be routed over a virtual trunk.
- **Traffic Classes**—The unique characteristics of CBR, VBR, and ABR traffic are maintained through the cloud as long as the correct type of virtual trunk is used. You configure the traffic classes allowed per virtual trunk with **cnftrk**. The routing algorithm excludes virtual trunks whose traffic class is not compatible with the candidate connection to be routed.
- **Connection Identifier (Conid) Capacity**—Each virtual trunk has a configurable number of connection channels reserved from the card. The routing algorithm checks for adequate channel availability on a virtual trunk before selecting the trunk for a route.

Virtual Trunk Bandwidth

The total bandwidth of all the virtual trunks in one port cannot exceed the maximum bandwidth of the port. The trunk loading (load units) is maintained per virtual trunk, but the cumulative loading of all virtual trunks on a port is restricted by the transmit and receive rates for the port.

Virtual Trunk Connection Channels

The total number of connection channels of all the virtual trunks in one port cannot exceed the maximum number of connection channels of the card. The number of channels available is maintained per virtual trunk.

Cell Transmit Address Translation

All cells transmitted to a virtual trunk have a translated cell address. This address consists of a VPI chosen by the user and a VCI (ConId) chosen internally by the software. The trunk firmware is configured by the software to perform this translation.

Cell Receive Address Lookup

The user-chosen VPI is the same for all cells on a virtual trunk. At the receiving end, multiple virtual trunks can send cells to one port. The port must be able to determine the correct channel for each of these cells. The VPI is unique on each trunk for all the cells, but the VCI may be the same across the trunks. Each port type has a different way of handling the incoming cell addresses. This applies to both the BXM and UXM cards.

Selection of Connection Identifier

For connections, the associated LCNs are selected from a pool of LCNs for the entire card. Each virtual trunk can use the full range of acceptable conid values. The range consists of all the 16-bit values (1-65535) excluding the node numbers and blind addresses. A port uses the VPI to differentiate connections that have the same conid.

You can change the number of channels per virtual trunk after the trunk has been added to the network. Decreasing the number of channels on an added virtual trunk will cause connection reroutes, but increasing the number of channels on an added virtual trunk will NOT cause connection reroutes.

Routing VPCs over Virtual Trunks

A VPC is not allowed to be routed over a virtual trunk. The routing algorithm excludes all virtual trunks from the routing topology. The reason for this restriction is due to how the virtual trunk is defined within the ATM cloud.

The cloud uses a VPC to represent the virtual trunk. Routing an external VPC across a virtual trunk would consist of routing one VPC over another VPC. This use of VPCs is contrary to its standard definition. A VPC should contain multiple VCCs, not another VPC. In order to avoid any non-standard configuration or use of the ATM cloud, VPCs cannot be routed over a virtual trunk through the cloud.

Configuration Requirements

The primary commands you use to configure virtual trunks are **cnftrk**, **cnfrsrc**, and **cnftrkparm**.



Note

A virtual trunk cannot be used as a feeder trunk. Feeder connections cannot be terminated on a virtual trunk.

Configuration with **cnftrk**

The main **cnftrk** parameters are transmit trunk rate, trunk VPI, Virtual Trunk Type, Connection Channels, and Valid Traffic Classes.

The VPI you configure for a virtual trunk must match the VPI of the VPC in the public ATM cloud. Every cell transmitted to the virtual trunk has this VPI value. Valid VPC VPIs depend on the port type as shown in Table 4-9.

Table 4-9 VPI Ranges

Port Type	Valid VPI Range
BXM/UXM (UNI)	1–255
BXM/UXM (NNI)	1–4095
BNI T3/E3	1–255
BNI OC-3	1–63

Configuration with cnfrsrc

You use **cnfrsrc** to configure the resource partition's conids (lcns) and bandwidth. The conid capacity indicates the number of connection channels on the trunk port that are usable by the virtual trunk.

This number cannot be greater than the total number of connection channels on the card. The maximum number of channels is additionally limited by the number of VCI bits in the UNI cell header. For a virtual trunk, the number is divided by the maximum number of virtual trunks on the port to determine the default. You configure this value with the **cnfrsrc** command on the BPX. Table 4-10 lists the number of connection IDs for virtual trunks on various cards.

Table 4-10 Maximum Connection IDs (LCNs)

Port Type	Maximum Conids	Default
BXM/UXM	1–(number of channels on the card)	256
BNI T3/E3	1–1771	256
BNI OC-3	1–15867 (3837 max/vtrk)	256

Configuration with cnfrkparm

BXM and UXM virtual trunks have all the configuration parameters for queues that physical trunks have. The integrated alarm thresholds for major alarms and the gateway efficiency factor is the same for all virtual trunks on the port.


Note

BNI virtual trunks are supported by a single queue and do not support configuration of all the Advanced CoS Management queues on a single virtual trunk.

VPC Configuration with the ATM Cloud

For the virtual trunk to successfully move data through an ATM cloud, the cloud must provide some form of connectivity between the trunk endpoints. The ATM equipment in the cloud must support virtual path switching and move incoming cells based on the VPI in the cell header.

A virtual path connection (VPC) is configured in the cloud to join two endpoints. The VPC can support either CBR, VBR, or ABR traffic. A unique VP ID per VPC is used to moved data from one endpoint to the other. The BPX nodes at the edge of the cloud send in cells that match the VPC's VPI value. As a result the cells are switched from one end to the other of the ATM public cloud.

Within the ATM cloud, one virtual trunk is equivalent to one VPC. Because the VPC is switched with just the VPI value, the 16 VCI bits (from the ATM cell format) of the ATM cell header are passed transparently through to the other end.

If the public ATM cloud consists of BPX nodes using BXM cards, the access points within the cloud are BXM ports. If the cloud consists of IGX nodes, the access points within the cloud are UXM ports.

If the link to the public cloud from the private network is using BNI cards, then access points within the cloud are ASI ports. The BNI card uses an STI header. The ASI port cards within the cloud should be configured to *not shift* the VCI when forming the STI header. The command **cnfport** allows you to configure the port's *shift* parameter to *shift off*.

More Guidelines on VPC Configuration within the ATM Cloud

If you have a cloud with all Cisco equipment using all BPX-BXM cards, or any public ATM cloud that can fully pass 16 bits in the ATM cell header (thus uses a standard ATM cell header), then there is no need to set the Shift on/Shift off parameter with **cnfport**.

In a simple example of virtual trunking, say you have BXM and UXM virtual trunks feeding into a public ATM cloud. The cloud has equipment that uses a standard ATM cell header. If the cloud is using equipment that can cleanly pass a 16-bit ATM cell header (a standard ATM cell header), you would need to configure the **cnfport** parameter to *No Shift* on both ports at either end of the cloud. In other words, you must configure the port. In this case, because the cloud uses standard NNI and UNI cell headers, the cell will pass transparently to the other end of the cloud without any problem.



Note

You would configure the Shift parameter to *Shift off* in the case where you have an ASI or BXM port entering into the cloud. For best results, the Shift parameter should be set on both ends of the cloud, at the port's entry point to the cloud.

Because BNI cards were deployed before the ATM cell header became an ATM Forum standard, the BNI cards still use a non-standard ATM cell header. So if within a public cloud there is Cisco equipment with BNIs, these non-standard cell headers use 12-bit VCIs. To work with this situation, if BXM/UXM virtual trunks are being connected, the port can be configured for *Shift on*. If BNI virtual trunks are being connected, the ports should be *Shift off*. If the virtual trunk ports are configured this way, as the cells traverse the network through BNI cards, connection continuity can be preserved. Similarly, if BXM cards are used within a cloud, then the VCI bits are preserved when a VPC connection is routing through the cloud.



Note

If a network outside of a public ATM cloud has Cisco equipment using BNIs, for a VPC connection to be routed over the BNIs, the **cnfport** Shift parameter must be configured to Shift off on all ports entering into the cloud. As long as the **cnfport** Shift parameter is set to Shift off on all ports connecting into the cloud, then all 16 bits of the VCI will be preserved, thus connection continuity can be preserved.

Consider the case where non-Cisco equipment is used within the public cloud, and a standard ATM cell header is supported. Also consider another example where the cloud has Cisco equipment with BXMs. Another case might be where the cloud has some Cisco equipment, and has some BNI cards in use. In this latter case (cloud has Cisco equipment, including BNIs), ports interfacing with this cloud must have the **cnfport** parameter set to *Shift on*. These examples are discussed in the following sections.

Virtual Trunk Interfaces

The two ends of a virtual trunk can have different types of port interfaces. For example, a virtual trunk may contain a T3 port at one end of the ATM cloud and an OC-3 port at the other end. However, both ends of the trunk must have the same bandwidth, connection channels, cell format, and traffic classes. This requirement is automatically checked when a trunk is added.

Virtual Trunk Traffic Classes

All types of traffic from a private network using Cisco nodes are supported through a public ATM cloud. The CBR, VBR, and ABR configured virtual trunks within the cloud should be configured to carry the correct type of traffic.

- CBR Trunk: ATM CBR traffic, voice/data/video streaming, and so on.
- VBR Trunk: ATM VBR traffic, Frame Relay traffic, and so on.
- ABR Trunk: ATM ABR traffic, Optimized Bandwidth Management traffic, and so on.

A CBR configured trunk is best suited to carrying delay-sensitive traffic such as voice/data, streaming video, and ATM CBR traffic, and so on.

An nrt-VBR configured trunk is best suited to carrying Frame Relay and nrt-VBR traffic, and so on.

An ABR configured trunk is best suited to carrying Optimized Bandwidth Management and ABR traffic, and so on.

Two-stage queueing at the egress of virtual trunks to the ATM cloud allows shaping of traffic before it enters the cloud. However, the traffic is still routed on a single VPC and may be affected by the traffic class of the VPC selected.

A user can configure any number of virtual trunks up to the maximum number of virtual trunks per slot (card) and the maximum number of logical trunks per node. These trunks can be any of the three trunk types: CBR, VBR, or ABR.

A user can configure any number of virtual trunks between two ports up to the maximum number of virtual trunks per slot and the maximum number of logical trunks per node. These trunks can be any of the three trunk types.

Virtual Trunk Cell Addressing

Cells transmitted to a virtual trunk use the standard UNI or NNI cell format.

The trunk card at the edge of the cloud ensures that cells destined for a cloud VPC have the correct VPI/VCI. The VPI is a 12-bit value ranging from 1–4095. The VCI is a 16-bit value ranging from 1–65535.

BXM/UXM Two-Stage Queueing

The UXM and BXM share the same queueing architecture. The egress cells are queued in two stages. First they are queued per Virtual Interface (VI), each of which supports a virtual trunk. Within each VI, the traffic is queued as per its normal OptiClass traffic type. In other words, voice, Time-Stamped, Non- Timestamped, High Priority, BDATA, BDATB, CBR, VBR, and ABR traffic are queued separately. The overall queue depth of the VI is the sum of all the queue depths for all the available queues. The user does not directly configure the VI.

The user command **cnfrkparm** is used to configure the queues within the virtual trunk.

Virtual Trunking Configuration

Connectivity is established through the public ATM cloud by allocating virtual trunks between the nodes on the edge of the cloud. With only a single trunk port attached to a single ATM port in the cloud, a node uses the virtual trunks to connect to multiple destination nodes across the network thereby providing full or partial meshing as required.

From the perspective of the Cisco node, a virtual trunk is equivalent to a VPC provided by an ATM cloud where the VPC provides the connectivity through the cloud.

Virtual Trunk Example

The following is a typical example of adding one virtual trunk across an ATM network. On one side of the cloud is a BPX with a BXM trunk card in slot 4. On the other side of the cloud is an IGX with a UXM trunk card in slot 10. A virtual trunk is added between port 3 on the BXM and port 2 on the UXM (Figure 4-4).

Perform the following:

- | | | | |
|----|-------------------------|--|---|
| 1. | Initial Setup | | Contact Customer Service to enable virtual trunking on the nodes in your network. |
| 2. | In the public ATM cloud | | Obtain the VPCs for the virtual trunks for the service provider. These are the VPCs that are configured within the ATM cloud by the service provider to support the virtual trunks. |
| 3. | At BPX_A | uptrk 4.3.1
uptrk 4.3.2 | Up virtual trunks 4.3.1 and 4.3.2 on BXM port 4.3 |
| 4. | At BPX_A | cnftrk 4.3.1 ...
cnftrk 4.3.2 ... | Configure the virtual trunks to match the cloud's VPC configuration, including VPI, header type (UNI or NNI), traffic classes, and VPC type, and so on. |
| 5. | At BPX_A | cnfrsrc 4.3.1 ...
cnfrsrc 4.3.2 ... | Configure the number of conids, bandwidth, and so on, available for the virtual trunks. |
| 6. | At BPX_B | uptrk 5.1.1
uptrk 5.1.2 | Up virtual trunks 5.1.1 and 5.1.2 on BXM port 5.1 |
| 7. | At BPX_B | cnftrk 5.1.1 ...
cnftrk 5.1.2 ... | Configure the virtual trunks to match the cloud's VPC configuration, including VPI, header type (UNI or NNI), traffic classes, and VPC type, and so on. |
| 8. | At BPX_B | cnfrsrc 5.1.1 ...
cnfrsrc 5.1.2 ... | Configure the number of conids, bandwidth, and so on, available for the virtual trunks. |
| 9. | At IGX_A | uptrk 10.2.1
uptrk 10.2.3 | Up virtual trunks 10.2.1 and 10.2.3 on IGX trunk port 10.2 |

- | | | | |
|-----|----------|---|---|
| 10. | At IGX_A | cnftrk 10.2.1 ...
cnftrk 10.2.3 ... | Configure the virtual trunks to match the cloud's VPC configuration, including VPI, header type (UNI or NNI), traffic classes, and VPC type, and so on. |
| 11. | At IGX_A | cnfrsrc 10.2.1 ...
cnfrsrc 10.2.3 ... | Configure the number of conids, bandwidth, and so on, available for the virtual trunk. |
| 12. | At BPX_A | addtrk 4.3.1
IGX_A 10.2.1
addtrk 4.3.2
BPX_B 5.1.1 | Add the virtual trunks between three nodes. Using addtrk 10.2.1 ... at IGX_A and addtrk 5.1.1 ... at BPX_B would also add the virtual trunks. |
| 13. | At BPX_B | addtrk 5.1.2
IGX_A 10.2.3 | Add the virtual trunks between the two nodes. Using addtrk 10.2.3 ... at IGX_A would also add the virtual trunks. |

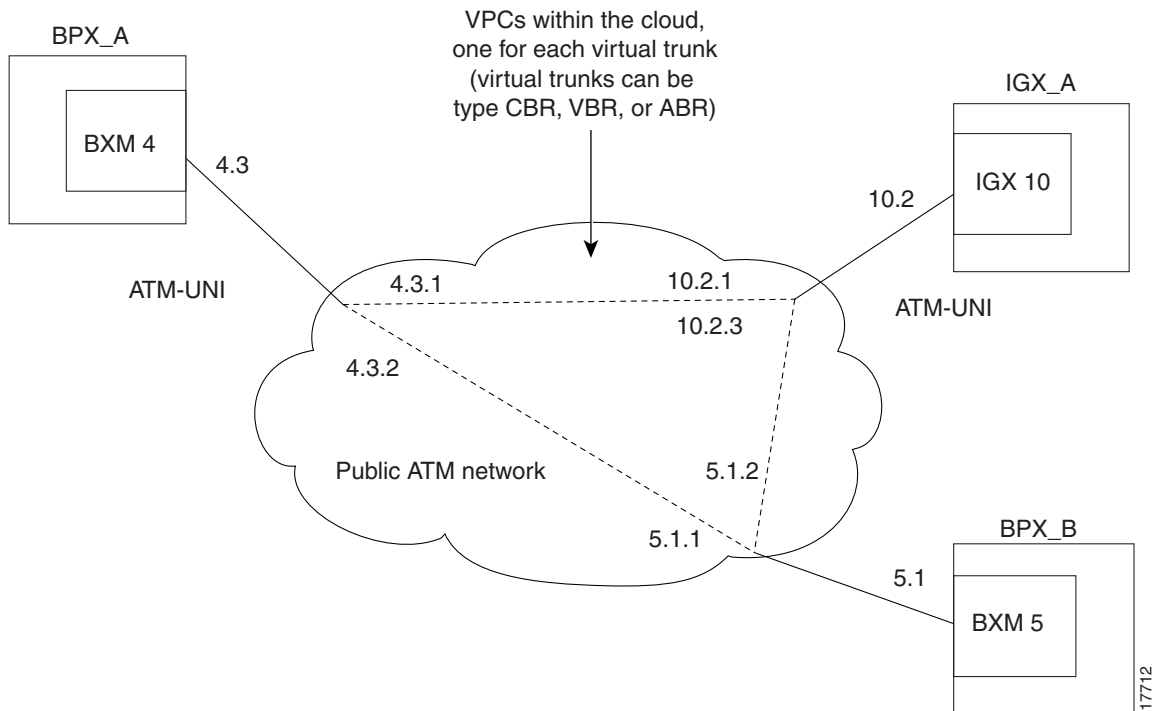
The VPI values chosen using **cnftrk** must match those used by the cloud VPC. In addition, both ends of the virtual trunk must match with respect to Transmit Rate, VPC type, traffic classes supported, and the number of connection channels supported. The **addtrk** command checks for matching values before allowing the trunk to be added to the network topology.

The network topology as seen from a **dsprks** command at BPX_A would be:

BPX_A 4.3.1-10.2.1/IGX_A

BPX_A 4.3.2-5.1.1/BPX_B

Figure 4-4 Addition of Virtual Trunks Across a Public ATM Network



Trunk and Line Redundancy

Trunk redundancy can refer to one of two features:

- SONET Automatic Protection Switching (APS)
- Y-redundancy

APS Redundancy

APS line redundancy is supported. APS line redundancy is only supported on BXM SONET trunks and is compatible with virtual trunks. The trunk port supporting virtual trunks may have APS line redundancy configured in the same way it would be configured for a physical trunk. The commands **addapsln**, **delapsln**, **switchapsln**, and **cnfapsln** are all supported on virtual trunk ports. These commands accept a trunk port parameter as <slot>.<port>. Refer to the *BPX 8600 Installation and Configuration Manual* for more information on SONET Automatic Protection Switching support.

Note that you cannot configure virtual trunks as interface shelf (feeder) trunks; similarly, you cannot configure interface shelf (feeder) trunks as virtual trunks.

Y-Redundancy

The original trunk redundancy feature is an IGX-only feature and is not supported for virtual trunks. The commands **addtrkred**, **deltrkred**, and **dsprtrkred** are rejected for virtual trunks.

Networking

Virtual Trunk Configuration

The characteristics of a virtual trunk used by connection routing are maintained throughout the network. This information—virtual trunk existence, traffic classes and connection channels—is sent to every node to allow the routing algorithm to use the trunk correctly. Routing uses only those virtual trunks that can support the traffic type of the connection.

ILMI (Integrated Local Management Interface)

For ATM clouds that do not have Cisco equipment (such as BPX or IGX nodes), previous to Release 9.2, you had to configure the ATM ports to block signalling traffic to the Cisco nodes. In this release, you no longer need to configure the ATM ports to block signalling traffic due to ILMI (Integrated Layer Management Interface) signalling support.

Blind Addressing

Each virtual trunk is assigned a blind address. In general terms, the blind address is used by a node to communicate to the node at the other end of a trunk. Specifically, the blind address is used for sending messages across a virtual trunk when a trunk is added, and for sending messages for the Trunk Communication Failure testing.

VPC Failure Within the ATM Cloud

Any VPC failure within the ATM cloud generates a virtual trunk failure in the Cisco network. This trunk failure allows applications (for example, connection routing) to avoid the problem trunk.

Upon receiving notification of a VPC failure, the trunk is placed into the “Communication Failure” state and the appropriate trunk alarms are generated. The trunk returns to the “Clear” state after the VPC clears and the trunk communication failure test passes.

Trunk Alarms

Logical Trunk Alarms

Statistical alarming is provided on cell drops from each of the Advanced CoS Management (formerly called OptiClass) queues. These alarms are maintained separately for virtual trunks on the same port.

Physical Trunk Alarms

A virtual trunk also has trunk port alarms, which are shared with all the other virtual trunks on the port. These alarms are cleared and set together for all the virtual trunks sharing the same port.

Physical and Logical Trunk Alarm Summary

A listing of physical and logical trunk alarms is provide in Table 4-11.

Table 4-11 Physical and Logical Trunk Alarms

Alarm Type	Physical					Logical	Statistical	Integrated
	T1	E1	T3	E3	SONET			
LOS	X	X	X	X	X		X	X
OOF	X	X	X	X	X		X	X
AIS	X	X	X	X	X		X	X
YEL	X	X	X	X	X			X
PLCP OOF			X					X
LOC				X	X			X
LOP					X			X
PATH AIS					X			X
PATH YEL					X			X
PATH TRC					X			X
SEC TRC					X			X
ROOF	X	X						X
FER	X	X						X
AIS16	X	X					X	X
IMA	X	X						X
NTS Cells Dropped						X	X	
TS Cells Dropped						X	X	
Voice Cells Dropped						X	X	
BDATA Cells Dropped						X	X	
BDATB Cells Dropped						X	X	
HP Cells Dropped						X	X	
CBR Cells Dropped						X	X	
VBR Cells Dropped						X	X	
ABR Cells Dropped						X	X	

Event Logging

All trunk log events display the virtual trunk number. These messages were implemented on the BPX platform previous to Release 9.2, but are new on the IGX in Release 9.2. The following example shows the log messaging for activating and adding virtual trunk 1.2.1.

All trunk log events will display the virtual trunk number. The examples in Table 4-12 and Table 4-13 show the log messaging for activating and adding a virtual trunk 1.2.1.

Table 4-12 IGX Log Messaging for Activating and Adding VTs

Class	Description
Info	NodeB at other end of TRK 1.2.1
Clear	TRK 1.2 OK
Major	TRK 1.2 Loss of Sig (RED)
Clear	TRK 1.2.1 Activated

Table 4-13 BPX Log Messaging for Activating and Adding VTs

Class	Description
Info	NodeB at other end of TRK 1.2.1
Clear	TRK 1.2.1 OK
Major	TRK 1.2.1 Loss of Sig (RED)
Clear	TRK 1.2.1 Activated

Error Messages

In Release 9.2, there are new error messages to manage the virtual trunks, some of which are listed in Table 4-14 below.

Table 4-14 Virtual Trunk Error Messages

Message	Description
“Port does not support virtual trunking”	Port is not configured for virtual trunks
“Port configured for virtual trunking”	Port is not configured for a physical trunk
“Invalid virtual trunk number”	Virtual trunk number is invalid
“Maximum trunks per node has been reached”	Trunk limit per node has been reached
“Invalid virtual trunk VPI”	Virtual trunk VPI is invalid
“Invalid virtual trunk traffic class”	Virtual trunk traffic class is invalid
“Invalid virtual trunk VPC type”	Virtual trunk VPC type is invalid
“Invalid virtual trunk conid capacity”	Virtual trunk conid capacity is invalid

Table 4-14 Virtual Trunk Error Messages (continued)

Message	Description
“Port does not support virtual trunking”	Port is not configured for virtual trunks
“Mismatched virtual trunk configuration”	Ends of virtual trunk have different configuration
“Maximum trunks for card has been reached”	The trunk card is out of VIs

Virtual Trunking Commands

The following command descriptions are summaries specific to virtual trunk usage on the BPX, using the BXM cards. For information about the BPX, refer to the BPX 8600 Series documents. For information about the UXM, refer to the IGX 8400 Series documents. Also, refer to the Cisco WAN Manager documents for application information using a graphical user interface for implementing command functions.

- Three main commands are used for configuring virtual trunks. These are **cnftrk**, **cnftrkparm**, and **cnfrsrc** which configure all port and trunk attributes of a trunk. When a physical port attribute change is made, the user is notified that all trunks on the port are affected.
- Virtual trunks support APS redundancy on BXM OC-3 and OC-12 ports. The commands **addapsln**, **delapsln**, **switchapsln**, and **cnfapsln** are the main commands. For more information, refer to the section on APS Redundancy in this manual. The prior Y-redundancy is not supported by virtual trunks, nor the related commands **addtrkred**, **deltrkred**, and **dsptrkred**.



Note

Since a virtual trunk is defined within a trunk port, its physical characteristics are derived from the port. All the virtual trunks within a port have the same port attributes.

If a physical trunk is specified on a physical port that supports multiple virtual trunks, the command is applied to all virtual trunks on the physical port. **If a virtual trunk is specified for a command that configures information related to the physical port, then the physical port information is configured for all virtual trunks.**

With Release 9.2, the BPX statistics organization is modified to separate logical and physical trunk statistics. This method also is used on the UXM card on the IGX 8400 series switches.

Virtual Trunks Commands Common to BXM and UXM

The following commands are available on both the IGX and the BPX and have the same results. Refer to the IGX 8xxx Series documentation for information the IGX and UXM.

The entries in Table 4-15 that are marked with a [*] are configured on a logical trunk basis, but automatically affect all trunks on the port when a physical option is changed. For example, if the line framing is changed on a virtual trunk, all virtual trunks on the port are automatically updated to have the modified framing.

Table 4-15 Virtual Trunk Commands Common to BXM and UXM (IGX)

Command	Description
addrk	adds a trunk to the network
ckrtrkerrs	clears the trunk errors for a logical trunk
clrtrkstats	clears the summary trunk statistics for a logical trunk
clrphyslnerrs	clears trunk errors for a physical line
cnflnalm	configures the statistical alarm thresholds for trunks and ports (affects all trunks on node)
cnftrk	configures a logical trunk [*]
cnftrkparm	configures the trunk parameters of a logical trunk [*]
cnftrkstats	configures the interval statistics collection for a logical trunk
cnfphyslnstats	configures the interval statistics for a physical line
deltrk	deletes a trunk from the network
dntrk	downs a trunk
dsplogtrk	displays the logical trunk information
dspphyslnstatcnf	displays the statistics configuration for a physical line
dspphyslnstathist	displays the statistics collection result for a physical line
dsprtrkcnf	displays the trunk configuration
dsprtrkcons	displays the number of connections routed over a trunk
dsprtrkerrs	displays the trunk errors for a logical trunk
dsprtrks	displays the upped/added trunks
dsprtrkstatcnf	displays the configured statistics collection for a trunk
dsprtrksthist	displays the statistics collection results for a trunk
dsprtrkstats	displays the summary trunk statistics for a trunk
dsprtrkutl	displays the utilization/traffic for a logical trunk
prtphyslnerrs	print the trunk errors for a physical line
prttrkerrs	prints the trunk errors for a logical trunk
prttrks	prints the active logical trunks
uptrk	ups a trunk

Virtual Trunk UXM Commands

The commands listed in Table 4-16 are IGX-specific, or behave differently than their BPX counterparts. Refer to the IGX 8400 Series documentation for further information about UXM virtual trunk commands.

Table 4-16 Virtual Trunk UXM Commands

Command	Description
clrtrkalm	clears the statistical alarms for a logical trunk (affects logical trunk alarms only)
clrphyslnalm	clears statistical alarms for a physical trunk (IGX only)
dspphysln	displays physical line status (IGX only)
clrtrkstats	clear trunk stats (IGX only)

Virtual Trunk BXM/BNI Commands

The commands listed in Table 4-17 are BPX-specific.

Table 4-17 Virtual Trunk Commands BXM/BNI

Command	Description
clrtrkalm	clears the statistical alarms for a logical trunk [*]; (clears logical and physical trunk alarms)
cnfrsrc	configure cell rate and number of conids (BXM only)

Permutations of Virtual Trunks You Can Configure Through the ATM Cloud

Table 4-18 lists the permutations of virtual trunks that you can set up to pass through the ATM cloud. For example, you can set up a virtual trunk between a BXM card with a T3, E3, OC-3, or OC-12 interface and a UXM card with a T3, E3, or OC-3 interface.

Table 4-18 Permutations of Virtual Trunks That Can Be Configured Through ATM Cloud

	BNI Card (T3/E3/OC-3)	BXM Cards (T3/E3/OC-3/ OC-12)	UXM Cards (T3/E3/OC-3)	UXM-AIM Card
BNI (T3/E3/OC-3)	yes	no	no	no
BXM (T3/E3/OC-3/OC-12)	no	yes	yes	yes
UXMs (T3/E3/OC-3)	no	yes	yes	yes
UXM-AIM	no	yes	yes	yes

Ports and Trunks Feature in Release 9.2

The Ports and Trunks feature lets you configure multiple trunk lines and circuit lines on a single BXM or UXM card simultaneously. In previous releases, when a single port is upped as a trunk (by using **uptrk** command), all the remaining ports on that card are treated as trunks. Similarly, in releases previous to Release 9.2, when a single port is upped as a circuit line (by using the **upln** command), all the remaining ports on the card are treated as circuit-line ports.

The way virtual trunk numbers are displayed is new for IGX trunks. IMA trunk ports are referenced by the first physical line of the trunk port after **uptrk** has been executed. For example, you can execute *uptrk 1.5-8.9*, then you can up a second trunk on the same trunk port with *uptrk 1.5.11*.

In support of the Ports and Trunks feature, a single BXM card can support physical trunks, virtual trunks, feeder trunks and UNI interfaces simultaneously; a UXM card can support physical trunks, virtual trunks and UNI interfaces simultaneously. For example, a BXM card can have:

- port 1 upped as a physical trunk
- port 2 upped as a feeder trunk
- port 3 upped with multiple virtual trunks
- port 4 upped as a UNI interface

Table 4-19 lists the interface types that can be supported on a single card:

Table 4-19 Interface Types That Can Be Supported on Single Card

	ASIs (T3/E3/OC-3)	BNIs (T3/E3/OC-3)	BXM (T3/E3/OC-3/OC-12)	UXMs (T3/E3/OC-3)	UXM-AIM
SES Feeder	no	yes	yes (except OC-12)	no	no
IPX Feeder ¹	no	yes	no	no	no
Physical Trunks	no	yes	yes	yes	yes
Virtual Trunks	no	yes	yes	yes	yes
UNI Port	yes	no	yes	yes	yes
Virtual UNIs	no	no	no	no	no

1. Note that an IPX node running Release 9.1, 8.5, and 8.4 can interoperate with nodes running Release 9.2; however, an IPX node cannot support Release 9.2 switch software.

Virtual Trunking Features Supported in Release 9.2

These virtual trunking features are supported in Release 9.2:

- Cell format for BXM/UXM virtual trunks. Standard UNI and NNI cell headers are used, as opposed to the Strata-UNI format used on BNI virtual trunks. This implies that BNI virtual trunks are not compatible with BXM or UXM virtual trunks. A VPI range of 1–4095 is supported.
- Cell Queueing. A virtual trunk is supported by a Virtual Interface (VI) on the BXM and UXM cards. Each virtual interface is a collection of traffic-based queues. Thirty-one (31) multiclass virtual trunks are supported per BXM and 15 per UXM (all types) using virtual interfaces. You can define virtual trunks on a port-by-port basis.
- Support for current trunk statistics

- Traffic shaping on physical and virtual trunks is supported. This feature operates in a similar manner as UNI traffic shaping. (See the **cnfport** command in Chapter 9, “ATM Connections” chapter for information on configuring traffic shaping.)
- Support for current trunk and line configuration and debug options.
- Support for ILMI (Integrated Local Management Interface) between a virtual trunk and a foreign switch. Integrated Local Management Interface is a bidirectional protocol for exchanging configuration, status, and control information between two ATM Interface Management Entities (IMEs).
- BXM virtual trunks can work over another BPX network acting as the ATM cloud. The **tstcon** command, test delay, and Optimized Bandwidth Management must operate over virtual trunks in this configuration.
- Virtual trunks are accessible to VSI controllers. You cannot partition the virtual trunk. The trunk is entirely owned by either a VSI controller or Automatic Routing Management (formerly called AutoRoute).
- F4/F5 OAM flows supported are as follows:
 - AIS/RDI OAM Flows:
 - F5 (VCC) flows are supported for end to end connections through a virtual trunk
 - F4 (VPC) VPC is not supported through virtual trunks
 - F4 flows are not supported between the ATM cloud network and virtual trunk
 - OAM (test delay) Loopback:
 - F5 (VCC) flows are supported for end to end connections through a virtual trunk
 - F4 (VPC)VPC is not supported through virtual trunks

Impact of Other Features on Virtual Trunking in Release 9.2

LMI/ILMI on the BXM Firmware—ILMI monitoring on virtual trunks is supported for the new card types. LMI and ILMI were implemented in the BCC switch software previous to Release 9.2. Because switch software must process multiple LMI/ILMI requests from all the configured ports in the BPX node, this is a severe drain on the available processor bandwidth on the BCC. For this reason, the LMI/ILMI functionality has moved from the switch software in Release 9.1 to the BXM card firmware in Release 9.2.

Hitless Rebuild feature—The hitless trunk reconfiguration feature introduces new flexibility in the options that you can configure on active trunks. This will affect some of the new and existing virtual trunk options.

BXM and UXM Card Interface Capacities

BXM and BXM Enhanced cards can support up to a maximum of 31 interfaces per card. The UXM and UXM Enhanced cards can support up to a maximum of 15 interfaces per card.

For each interface upped on a card’s physical trunk, feeder trunk, virtual trunk, or UNI interface, a single virtual interface is used. This implies that on BXM cards any combination of 31 interfaces can be supported, and for UXM any combination of 15 interfaces can be supported. See Table 4-20 for information on BXM and UXM interface capacities.

Table 4-20 *BXM and UXM Interface Capacities*

	BXM (T3/E3/OC-3/OC-12)	UXM (T3/E3/OC-3/AIM)	BXM (T3/E3/OC-3/OC-12)	BXM (T3/E3/OC-3/OC-12)
SES Feeder	4 feeder ports	N/A	4 feeder ports	0 feeder ports
IGX Feeder	N/A	N/A	no	no
Physical Trunks	4 physical trunks	1 physical trunks	4 physical trunk	0 physical trunks
Virtual Trunks	10 Virtual Trunks on 1 port	5 Virtual Trunks on 1 port	0 Virtual Trunk	10 Virtual Trunks on 1 port
UNI port	3 UNI ports	1 UNI ports	4 UNI port	0 UNI ports
Total VIs used	21 VIs	7 VIs	12 VIs	10 VIs
Total Ports used	12 ports	4 ports	12 ports	1 port

Channel Capacities

For legacy UXM/BXM cards, approximately 270 networking channels are required for each virtual trunk. For example, UXM cards allocate 4320 channels if all 16 virtual trunks are upped on a single card. BXM cards allocate 8640 channels if all 32 virtual trunks are upped. Table 4-21 lists channel capacities for BXM and UXM cards.

Table 4-21 *Channel Capacities for BXM and UXM Cards*

Number of Virtual Trunks	# Networking Channels for Legacy (Non-Enhanced) Cards	Number of Networking channels for Enhanced Cards
1 virtual trunk	270 chans	270 chans
2 virtual trunks	540 chans	270 chans
3 virtual trunks	810 chans	270 chans
16 virtual trunks	4320 chans	270 chans
32 virtual trunks	8640 chans	270 chans

This implies that for UXM legacy cards, upping all 15 virtual trunks would consume 4320 gateway channels for networking, leaving none for user traffic. For this reason, the number of virtual trunks upped on a legacy UXM card is limited. Use the `cnfrkport` command to control the number of trunks upped on a UXM card.

Errors and Alarm Handling

Errors and alarms function the same as in releases previous to Release 9.2. The Trunks and Ports feature continues to support:

- slot errors and alarming
- trunk/line errors and alarming
- statistical line alarms
- integrated line alarms
- connection conditioning

Physical Interface Specifications and Applicable Standards

For virtual trunking, the trunk cell format will be either standard UNI or NNI.

The current ATM and physical layer standards are the same as in Release 9.1.

Commands You Use to Configure Virtual Trunking

The following commands let you configure virtual trunking on a BXM, a BPX, and a UXM on an IGX node:

- **uptrk** slot.port[.vtrk]
- **dntrk** slot.port[.vtrk]
- **addtrk** slot.port[.vtrk]
- **deltrk** slot.port[.vtrk]
- **dsprkstats** slot.port[.vtrk]
- **dsprkerrs** slot.port[.vtrk]
- **dsplug** entries display the virtual trunk (*vtrk*) number
- **cnftrk** slot.port[.vtrk]
- **cnftrkparm** slot.port[.vtrk]

Commands to Configure Trunks and Ports on Same Card

Following are the commands you use to configure trunks, lines, ports, and connections on BXM and UXM cards:

- Card Commands: **upcd, dncd**
- Circuit Line Commands: **upln, dnln, cnfln, cnfrsrc**
- Trunk Commands: **uptrk, dntrk, cnftrk, cnfrsrc, cnftrkparm**
- Port Commands: **upport, dnport, cnfport, cnfportq**
- Connection Commands: **addcon, delcon, cnfcon**

Reliability, Availability, and Serviceability (RAS) Feature Support

- **Availability.** Networking channels are allocated dynamically. This can provide more user channels. Card redundancy/hot standby is supported for RAS features.
- **Serviceability.** The Ports and Trunks feature lets you configure both service provider and trunk interfaces from the same card.

Virtual Trunking Features Supported on BXM and UXM Cards

The BXM and UXM cards come with several combinations of number of virtual interfaces, number of ports, and number of channels. See Table 4-22 and Table 4-23.

Table 4-22 VIs, Ports, and Channels Supported on BXM and UXM Cards

	Number of VIs	Max LCNs	Default LCNs
BXM	31	32000	16320
UXM	15	8000	8000

Table 4-23 Virtual Interfaces and LCNs Allowed Per Card

	Number of VIs	Max LCNs	Default LCNs
BXM	31	65535	16320
UXM	15	8000	8000

- The maximum number of virtual trunks per card equals the number of virtual interfaces.
- The maximum number of logical (physical and virtual) trunks per node allowed are
 - 64 logical (physical and virtual) trunks per BPX node
 - 32 logical (physical and virtual) trunks per IGX node
- The total connection channels (LCNs) per card are shared by all the trunks (physical and virtual) on the card. The number of channels used by all the virtual trunks on a port cannot exceed the total number of LCNs on the card. The number of LCNs on a given trunk is further limited by the port group to which it belongs.
- The number of port groups limits the number of LCNs that you can use on a port. For example, consider an 8-port BXM card with two (2) port groups and a total of 16320 channels. Each port group can access a pool of 8160 channels. Each port can access only the channels in its port group, so each port is limited to a maximum of 8160 channels. Refer to the description of the BXM card and firmware in the *BPX 8600 Series Reference* and *BPX 8600 Series Configuration* guides for a more detailed description of port groups.
- The total bandwidth per port is shared by all the virtual trunks on the port. The sum of bandwidth of all the virtual trunks on a port cannot exceed the bandwidth of the port. Following are several maximum supported bandwidth per physical line type:
 - T3 (PLCP mode)96000 cells/second
 - T3 (HEC /Direct mapping mode)104000 cells/second
 - E380000 cells/second
 - OC-3353208 cells/second
 - OC-121412830 cells/second
 - IMA(No. of physical lines)* (T1 or E1) cells/second
- Queue depth per port is shared by all the logical (physical and virtual) trunks on the card. The queues are dynamic, which allows oversubscription of the available queue space. This means that the sum of all the configured queue depths can be larger than the available queue space on the card.
- The two ends of a virtual trunk can have different port interfaces. For example, a virtual trunk supported by a UXM-OC-3 on one end can be supported by a BXM-T3 at the other end.
- BNI virtual trunks are incompatible with UXM and BXM virtual trunks. UXM and BXM virtual trunks are compatible with each other. The incompatibility arises from the cell header formats used by the different cards.

- On the BXM and UXM, virtual trunks support ATM-UNI or ATM-NNI cell format. This is in contrast to physical trunks on these cards, which only support NNI. For a virtual trunk to be added, both ends must use the same cell format.
- Virtual trunking is a chargeable feature. Cisco Customer Service must enable this feature per node by using the **cnfswfunc** command. The **cnfswfunc** command has a privilege level of Service and higher.
- Advanced CoS Management (FairShare and Advanced CoS Management combined) is supported for virtual trunking on the BXM and UXM virtual trunks. Multiple traffic classes are queued and serviced separately.
- APS Line redundancy is supported for virtual trunks.
- Cisco VPCs (Virtual Path Connections) cannot be routed over virtual trunks.
- You cannot configure a virtual trunk as a feeder trunk.
- Following are the VPI limitations for virtual trunks:
 - 1–255 for UXM/BXM UNI virtual trunks
 - 1–4095 for UXM/BXM NNI virtual trunks
- ILMI signalling has been moved to the BXM firmware. The current implementation is in switch software, and is used on physical ports that support virtual trunks. BNI virtual trunks continue to use the current scheme (that is, ILMI signalling is performed by the switch software), but for BXM cards, ILMI signalling will be performed by the BXM firmware. UXM virtual trunks use the same scheme as the BNI, in other words, the protocol will be run by switch software.
- The ATM-UNI supported on the Cisco trunk and ATM cloud is Version 3.0 or later.

Virtual Trunking Limitations

The following lists some items not supported in Release 9.2, or limitations in Release 9.2, related to virtual trunking:

- Pass-through connections.
- VSI VPC partitioning.
- Multiple virtual trunks per virtual interface.
- Support of virtual UNIs.
- The maximum number of virtual trunks supported on a UXM is 15.
- The maximum number of virtual trunks supported on a BXM is 31.
- The Peak Interval Timer for port statistics has been increased from 10 seconds to 1 minute.
- Reporting of BXM/UXM virtual interface statistics for RX CLP0 and CLP1 discards only counts user-based traffic. That is, networking traffic is not included in these counts.
- You need to upgrade BXM firmware to support virtual trunking. If virtual trunking is not required, you do not need to upgrade firmware.
- To support this release, you will need to upgrade the UXM firmware.
- F4/F5 OAM flows are NOT supported between the BXM/UXM virtual trunk and the cloud's VPC connection.

Compatibility

The BXM and UXM virtual trunking feature requires Release 9.2 switch software, and new BXM and UXM firmware. The new firmware revisions are backward compatible and support the current physical trunking. The Release 9.2 software is also compatible with the current (Release 9.1) BXM firmware. Release 9.2 software is *not* compatible with Release 9.1 UXM firmware. A UXM firmware upgrade is required for networks running Release 9.2.

Node by node upgrades in Release 9.2 allows interoperability between Release 9.2 software and Release 9.1 or Release 8.5 software. In a network of hybrid releases, you cannot add UXM and BXM virtual trunks. The restriction is enforced because of changes to networking messages, which involve the virtual trunk number and the cell format on virtual trunks.

Virtual Trunking

The virtual trunking feature lets you define multiple trunks within a single trunk port interface. In previous releases, trunking has been associated with the physical existence of a trunk card and port. The virtual trunking capability already exists for the BPX BNI trunk card. In Release 9.2, the virtual trunking capability is now supported on the BXM and UXM trunk cards.

Virtual trunking allows you to define an additional level of trunking within the port resources. This “many-to-one” virtual trunk to port relationship produces a “fanout” trunk capability.

Each Cisco sub-network is connected through the public ATM network with virtual trunks. The trunk interface at the Cisco nodes is either a BNI, BXM or UXM trunk card. Congestion management (RM) cells are passed transparently through the network. Cisco features such as Advanced COS Management (formerly called FairShare Advanced CoS Management) and Optimized Bandwidth Management (formerly called Optimized Bandwidth Management) may not be supported within the public network, but the information is carried through the network. Leased lines may also exist to connect the Cisco subnetworks outside of the ATM network.

How Virtual Trunking Interacts with Virtual Interfaces

The BXM and UXM trunks are the first to use more than one virtual interface per physical port. Each virtual interface aggregates a group of traffic-type based queues. On a physical trunk, only one virtual interface is used. On a physical port supporting multiple virtual trunks, a virtual interface is used to support each virtual trunk. The virtual interfaces are scaled and managed in the same way queues are, regarding their bandwidth, maximum depth, and drop thresholds. This is sometimes referred to as *two-stage queueing* for these virtual trunks.

Virtual Trunking Function Changes

Resource management, networking and connection management are the largest areas affected by this project. A virtual trunk requires special handling, even though it behaves very similarly to a physical trunk. Cells routed on a virtual trunk require special address management as they enter and exit the cloud.

Some functional areas of virtual trunking have changed in Release 9.2:

Resource Management—To ease managing virtual trunks, the software now handles physical and virtual trunk configuration similarly. Virtual trunk configuration of a port-level characteristic affects all the virtual trunks on the port. The port characteristics of a trunk consist of the configuration associated with the trunk port. The logical trunk characteristics of a trunk consist of those items not tied directly to the port.

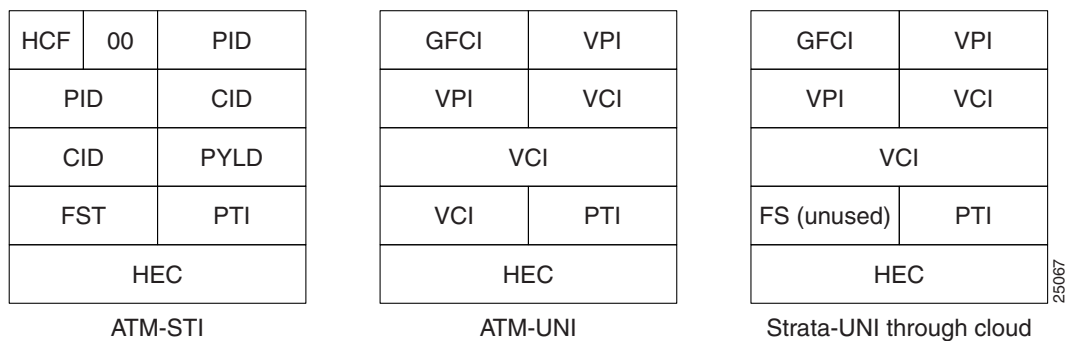
The logical trunks in a node are either virtual or physical trunks. The current trunk commands to up/down, configure, or add/delete a trunk apply to all logical trunks. Trunk statistics are kept for logical trunks.

The logical trunk configuration is stored in the existing logical trunk database. This change allows the number of trunks supported per switch to grow independently of the number of slots and ports per switch.

The way you manage logical trunks is different in Release 9.2. In general, managing virtual interfaces is hidden from the user. Internally, the depth and the bandwidth of the virtual interface are configured based on the aggregate queue depth and bandwidth of all the queues within the virtual interface.

Connection Management—The cell addressing scheme for connections routed through a virtual trunk handles multiple types of traffic flowing through an ATM cloud. The header format of cells may match the ATM-UNI or ATM-NNI format since the port interface to the cloud is a UNI or NNI port. On BNIs, the cell format is modified to store the Optimized Bandwidth Management information in the header. The incompatible cell headers makes BNI to BXM or UXM virtual trunks technically difficult. The solution of adopting the Strata-UNI cell format for all of our virtual trunks has a few distinct disadvantages, including limiting the number of conns which can be routed, inability to guarantee Optimized Bandwidth Management over the trunks, and propagation of a non-standard cell format. Because of all these issues, BNI to BXM or UXM virtual trunks are not supported.

Figure 4-5 ATM Header Types



Before cells enter the cloud on a virtual trunk, the cell header is translated to a user-configured VPI value for the trunk, and a software configured VCI value that is unique for the cell. As cells are received at the other end of the cloud, this VPI/VCI is mapped back to a correct cell header by the Cisco equipment. The VPI value is identical for all cells on a single virtual trunk, so the VCI contains the unique information needed to determine the final destination of the cell.

NNI virtual trunks have four additional VPI bits in place of the GFC bits in the UNI header. Otherwise, this cell format is the same as the ATM-UNI format.

Connection routing uses existing trunk characteristics in the route selection algorithm. Both virtual and physical trunks appear as logical trunks in the routing topology. Supported traffic classes may be configured on virtual or physical trunks. VPC connections can *not* be routed over virtual trunks.

The trunks and ports feature modifies the way channel allocation is done. Virtual trunk channel allocation will be included in the design from the Trunks and Ports project.

Networking—Virtual trunks appear in the network topology just like physical trunks. Network communication (blind messaging and node-to-node communication) through these trunks is modified to support the cell addressing scheme through the cloud. Information about virtual trunks is stored in each node's Node Information Block (NIB) database.

User Interface—The parsing and display of virtual trunk numbers is new for IGX trunks. IMA trunk ports are referenced by the first physical line of the trunk port after `uptrk` has been done. For example, a user may `uptrk 1.5-8.9`. A second trunk on the same trunk port may be upped with `uptrk 1.5.11`.

External Interfaces—A virtual trunk description consists of a virtual trunk number appended to a physical port description. The user interface and event logging of trunks support this extra number. The current Cisco WAN Manager messages handle virtual trunks, but require modification to support virtual trunks consisting of multiple physical lines (IMA VTs). IMA VTs are only a concern on the IGX. The BPX uses the same modified interface as the IGX.

Common Control—The trunk configuration database is modified to include the mapping between logical trunks and VI numbers and vice versa. These new database fields are supported in the standby updates and BRAM recovery.

SNMP—The configurable trunk options for *ATM trunk header type(NNI/UNI)* and *Traffic Shaping* are introduced by this project. The corresponding MIB tables are updated for these values.

Establishing a Virtual Trunk Through an ATM Cloud

You establish connectivity through an ATM cloud by allocating virtual trunks between the nodes on the edge of the cloud. With only a single trunk port attached to a single ATM port in the cloud, a node uses the virtual trunks to connect to multiple destination nodes on the other side of the cloud.

A virtual trunk from the Cisco perspective is equivalent to a VPC provided by an ATM cloud. The VPC provides the connectivity through the cloud. To correctly set up a virtual trunk, the following steps are required.

-
- Step 1** Secure a VPC from the ATM cloud provider.
 - Step 2** Use `uptrk` to enable the virtual trunk on the port.
 - Step 3** Use `cnftrk` to configure the virtual trunk to match the cloud's VPC configuration.
 - Step 4** Use `cnftrk` to configure the trunk to use the correct cell format (UNI or NNI). UNI is the default.
 - Step 5** Use `cnfport` to configure the trunk to use no HCF based shifting (BXM only).
 - Step 6** Use `cnfrsrc` (optional) to configure the number of conids and the bandwidth available on the trunk.
 - Step 7** Use `addtrk` to add the virtual trunk to the network topology.
-

Managing Virtual Trunk Numbers

A simple description of a virtual trunk is a “trunk defined over a public ATM service.” The trunk does not exist as a physical line in the network. You must use an additional level of reference, called a **virtual trunk number**, to differentiate the virtual trunks found within a port.

For the BXM, you can define a maximum of **31** virtual trunks within one port. Valid virtual trunk numbers are 1-31 per port. The number of virtual trunks available is limited by the number of virtual interfaces available on the card. Each logical trunk (physical or virtual) consumes one virtual interface.

The same restrictions apply to the UXM. The maximum virtual trunks on the UXM is **15**.

The following user syntax describes a virtual trunk:

- UXM/BXM:slot.port.vtrunk
- slot = slot number (1–32)
 - port = port number (1–16)
 - vtrunk = virtual trunk number (1–31) (1–15 on UXM)

Virtual Trunk Configuration

Because a virtual trunk is defined within a trunk port, its physical characteristics are derived from the port. All the virtual trunks within a port have the same port attributes.

You configure all port and trunk attributes of a trunk with **cnftrk**, **cnftrkparm** or **cnfrsrc**. When a physical port attribute change is made, you are notified that all the trunks on the port are affected.

cnftrk Command Parameters

Below are the trunk options you can configure with **cnftrk**. You can specify all physical options on virtual trunks. If you change a physical option on a virtual trunk, the change is propagated to all virtual trunks on the trunk port.

X in indicates the parameter is configurable.

X* in the virtual trunk columns indicates that the parameter is a physical parameter, and changing the value for one virtual trunk on the port automatically causes all virtual trunks on the port to be updated with the same value. See Table 4-24.

Table 4-24 Trunk Options You Can Configure with **cnftrk** Command

Descriptions	BXM		UXM	
	Physical	Virtual	Physical	Virtual
Transmit Trunk Rate	X	X	X	X
Receive Trunk Rate	X	X	X	X
Pass Sync	X	X*	X	X*
Loop Clock	X	X*	X	X*
Statistical Reserve	X	X	X	X
Header Type	X	X*	X	X*
Trunk VPI		X	X	X
Routing Cost	X	X	X	X
Virtual Trunk Type		X		X
Idle Code	X	X*	X	X*
Restrict PCC traffic	X	X	X	X
Link Type	X	X*	X	X*
Line Framing	X	X*	X	X*
Line Coding			X	X*
Line Cable type			X	X*
Line cable length	X	X*	X	X*

Table 4-24 Trunk Options You Can Configure with *cnftrk* Command (continued)

Descriptions	BXM		UXM	
	Physical	Virtual	Physical	Virtual
HCS Masking	X	X*	X	X*
Payload Scramble	X	X*	X	X*
Connection Channels	X	X	X	X
Gateway Channels			X	X
Valid Traffic classes	X	X	X	X
Frame Scramble	X	X*	X	X*
Deroute Delay Time	X	X	X	X
VC (Traffic) Shaping	X	X	X	X
Protocol by the Card	X		X	

Transmit Trunk Rate—This parameter indicates the trunk load for a BXM. You configure this value by using *cnfrsrc* on BXMs.

Virtual Trunk Type—The VPC type indicates the configuration of the VPC provided by the ATM cloud. Valid VPC types are CBR, VBR, and ABR.

Traffic classes—The traffic classes parameter indicates the types of traffic a trunk can support. By default, a trunk supports all traffic classes, that is, any type of traffic can be routed on any type of VPC. However, to prevent unpredictable results, a more appropriate configuration would be to configure traffic classes best supported by the VPC type:

VPC Type Recommended Traffic Classes

CBR All Traffic classes

VBR ATM VBR, Bdata, Bdatb (Optimized Bandwidth Management), ABR

ABR ATM ABR, Bdatb (Optimized Bandwidth Management)

High priority traffic can be routed over any of the VPC types.

Protocol by the Card—If set to “yes,” specifies that LMI is running on the (BXM/UXM) card instead of processor card. If set to “no,” LMI is running on the processor card.

VPC VPI—The VPI configured for a virtual trunk matches the VPI for the VPC in the cloud. Every cell transmitted to this trunk has this VPI value. Valid VPC VPIs depend on the port type.

Port Type Valid VPI Range

BXM/UXM (UNI) 1-255

BXM/UXM (NNI) 1-4095

BNI T3/E31-255

BNI OC-31-63

Conid Capacity—The conid capacity indicates the number of connection channels on the trunk port that can be used by the virtual trunk. This number cannot be greater than the total number of connection channels on the card. The maximum number of channels is additionally limited by the number of VCI bits in the UNI cell header. For a virtual trunk, this number is divided by the maximum number of virtual trunks on the port to get the default. You configure this value by using *cnfrsrc* on BPXs.

Port Type Max Conids

```
BXM/UXM1-(#channels on card)
BNI T3/E31-1771
BNI OC-31-15867 (3837 max/VTRK)
```

Header Type—You can change the cell header from NNI (virtual trunk) to UNI (physical trunk). UNI is the default for virtual trunks, but it may be necessary to configure this parameter to NNI to match the header type of the VPC provided by the cloud. This is a new configurable parameter for physical and virtual trunks.

VC Traffic Shaping—You can change the traffic shaping over the trunk. Different algorithm run by firmware/hardware.

Virtual Trunking Feature must be Enabled by Cisco Technical Assistance Center

The virtual trunking feature is a chargeable feature, which means that it must be enabled on a per node basis with the **cnfswfunc** command by Cisco TAC personnel. Virtual trunking must be enabled on a node before you can up a virtual trunk on a port in the node.

Virtual Trunks cannot be Configured as Feeder Trunks

A virtual trunk cannot be used as a feeder trunk. Feeder connections cannot be terminated on a virtual trunk. If you try to add a virtual trunk as a feeder trunk, or try to terminate a feeder connection on a virtual trunk, you will be prevented from doing so at the command line interface.

User Interfaces

User Syntax

All trunk commands that allow a trunk description accept a virtual trunk number. You add physical trunks in the same way as in releases previous to 9.2. For virtual trunks, the virtual trunk number is added to the end of the trunk description.

```
UXM/BXM:slot.port--- slot.port.vtrunk
```

Cisco WAN Manager

In Release 9.1, the Cisco WAN Manager user interface displays virtual trunks on IGXs. The trunk description passed to Cisco WAN Manager contains the new virtual trunk number. The topology display on Cisco WAN Manager shows the <slot>.<port>.<vtrunk>. Both the topology and robust messages used to maintain network status and displays are modified. This is new for IGX nodes only in this release.

Virtual trunk parameters can be configured or queried through an SNMP manager. This capability already exists on the BPX, but is new to the IGX in Release 9.2.

Virtual trunk information is passed to Cisco WAN Manager using the existing mechanism for physical trunks—no virtual trunk number is sent.

The interface to Cisco WAN Manager has an improved scheme for multiplexed virtual trunks. The messages that communicate trunk and physical line information to Cisco WAN Manager include a *primary physical line number*, which is used to “glue” the physical lines and the logical trunks. For example, suppose the trunks 5.2-4.9 and 5.2.11 are upped on a UXM/IMA card set. Switch software internally assigns each physical line (5.2, 5.3 and 5.4) a unique physical line number. In this example,

assume our physical lines are numbered 8, 9, and 10, respectively. The primary physical line number is the unique identifier for the first physical line of the aggregated trunk port—in this case 8. The Physical line messages for 5.2, 5.3, and 5.4 include the primary physical line 8. The messages for 5.2.9 and 5.2.11 also include the primary physical line 8. Cisco WAN Manager uses this identifier to associate physical lines to an aggregate multiplexed pipe (trunk port), and to associate trunks with a trunk port.

The Compliant IMA (Inverse Multiplexing over ATM) feature requires a bitmap of physical lines to be added to the messages. The bitmap is required because the physical lines forming the trunk port may be non-consecutive. Previously, the first port and the number of physical lines were included. Note that the information provided by the physical line bitmap and the primary physical line number is in some ways redundant. The bitmap enhances the primary physical line scheme by giving instant information about all physical lines associated with a logical trunk.

Reconfiguring a Trunk

This section describes how to change trunk parameters after you have added the trunk. After you have added a trunk, you can reconfigure some parameters without first deleting the trunk (with **deltrk**). This means that you can reconfigure the following list of trunk and line parameters when the port is in use (active). The **cnftrk** display highlights all configurable parameters, and dims parameters that are not configurable. The parameters that you can change *without* first deleting the trunk are:

- Restrict Control Card traffic (“PCC restrict”)
- Pass sync
- Loop clock
- Statistical reserve
- Bursty data peak speed
- Bursty data peak average frame
- Idle Code (reconfigurable for trunk and line)
- User traffic
- Maximum PVC Channels
- Trunk Partitions PNNI SVC/SPVC and PVC
- DS0 Map (IGX only, as of Release 9.2)
- Cable type/length
- Virtual trunk type
- Link type
- HCS Masking
- Payload Scrambling
- Frame Scrambling
- Gateway Channels
- Retained Links
- IMA link auto disabled
- IMA window size
- IMA max transition counts

- IMA link reenable time
- Traffic classes
- Recv Impedance
- Gateway Efficiency
- Cost of Trunk
- Deroute Delay Time
- Line T1 signalling (Line reconfiguration allowed)
- Line caching (Line reconfiguration allowed)
- Line CAS Switching (Line)
- Line Cnf slot.line (Line)
- Line Cnfg (Line)
- Line pct fast modem (Line)
- Trunk Receive Rate—On IGX, configurable after a trunk has been added.
- Trunk Transmit Rate—On BPX platforms, configurable after a trunk has been added.

Before making changes to any other trunk parameters, you must first delete the trunk (**deltrk**).

To display the current trunk parameters, use **dsptrkcnf**. If you can make all the needed parameter changes without deleting the trunk, execute **cnftrk**. Use **cnftrk** at both ends of the trunk.

To change parameters that require you to first delete the trunk, do the following:

-
- Step 1** Delete the trunk by executing **deltrk** at one end of the trunk.
 - Step 2** Execute **cnftrk** at both ends of the trunk to reconfigure parameters.
 - Step 3** Execute **addtrk** at only one end of the trunk to add the trunk.

Switch software triggers a reroute of connections only if a change to a parameter results in too few resources to support the current load of connections.

If you attempt to change one of these parameters, the other endpoint will be updated by switch software. It is not necessary to change both endpoints' parameters.

Before Release 9.2, changes made to the following three parameters caused a reroute on the trunk. For example, any increase to Statistical reserve would cause a reroute of all connections on the trunk. In this release, any changes you make to the following parameters will cause reroutes to PVCs on the trunk only if resources are no longer available to support the current connection load:

- Statistical reserve
- Trunk Partitions SVC/PVC
- Maximum PVC Channels



Note

Note that MPLS (Tag switching) partitions will not be affected by trunk/line reconfiguration, as tag switching partitions cannot be increased beyond the available number of resources.

For a trunk between a node running Release 9.2 and node running an earlier release (such as 9.1 or 8.5), you will be prompted that you can change a parameter only if both ends allow such a change.

Removing a Trunk

To remove a trunk:

-
- Step 1** Use the **deltrk** command to delete the trunk. If both nodes are reachable, perform this command at one end of the trunk only. Otherwise, you must perform this command at both ends. Connections using the deleted trunk that cannot be rerouted are automatically deleted.
- Step 2** Use the **dntrk** command to down the trunk. Execute **dntrk** at both ends of the trunk.
-

Displaying or Printing Trunk Configurations

You can display the network trunk configuration on the screen or print it on the printer in a one-step process by using any one of the following commands.

- **dsptrks**—Displays the current trunk configuration and alarm status at a node.
- **prtrks**—Prints the current trunk configuration and alarm status at a node.
- **dspnw**—Displays all trunks for each node in a domain.
- **prtnw**—Prints all trunks for each node in a domain.

Setting Up ATM Trunk and Line Redundancy

Trunk redundancy can refer to one of two features:

- The original *ATM trunk redundancy* feature supported on the IPX/IGX platform previous to Release 9.2
- *APS line redundancy*, supported in Release 9.2

ATM trunk redundancy is the T3 and E3 trunk redundancy supported by the AIT, ALM/B, and BTM cards. Redundancy can exist between either an AIT card and BNI (BPX) card, an ALM/B and BNI card, or a BTM and a BNI card. Trunk redundancy cannot exist between IPX and IGX nodes. Also, virtual trunking and trunk redundancy are incompatible. Trunk redundancy uses the standard trunk cables rather than a Y-cable. (For all service card sets other than trunk cards, you manage redundancy by using the Y-cable redundancy commands **addyred**, **delyred**, **prtyred**, and **dspyred**).

The original ATM trunk redundancy feature is an IPX/IGX feature only and is not supported for virtual trunks. The **addrkred**, **deltrkred**, and **dsptrkred** will be rejected for virtual trunks.

APS line redundancy is available only on BXM SONET trunks and is compatible with virtual trunks. In other words, you can configure APS line redundancy on a trunk port that supports virtual trunks in the same way you configure a physical trunk. The commands **addapsln**, **delapsln**, **switchapsln**, and **cnfapsln** are all supported on virtual trunk ports. (These APS line redundancy commands are described in this chapter.)

Trunk redundancy depends on the applicable commands, the trunk card in the adjacent slot, and the standard trunk cable. You can execute trunk redundancy commands only on the IGX node. The BPX node does not require information regarding this feature. Use the following commands to manage the original trunk redundancy feature (which was supported in previous releases and is still supported in this release) on IGX platforms:

- **addtrkred**—Sets up redundancy for a pair of AIT, BTM, or ALM/B cards.
- **deltrkred**—Deletes redundancy for a current redundant pair.
- **dsptkred**—Displays all redundant ATM trunk pairs.

Trunk Redundancy

Trunk redundancy can refer to one of two features: APS line redundancy or the original ATM trunk redundancy feature supported in releases previous to Release 9.2 on the IGX/IPX platforms. APS line redundancy is available only on BXM SONET trunks and is compatible with virtual trunks. In other words, you can configure the trunk port supporting virtual trunks with APS line redundancy the same way you would configure a physical trunk. There are new APS line redundancy commands—**addapsln**, **delapsln**, **switchapsln**, and **cnfapsln**—which you can use on virtual trunk ports. The syntax for these commands is unchanged from Release 9.1; that is, they accept a trunk port parameter as *slot.port*. Refer to “APS Command Summary” and to the **addapsln**, **delapsln**, **cnfapsln**, and **cnfcdaps** commands in this chapter for information on how to configure the APS line redundancy feature.

The original trunk redundancy feature is an IGX-only feature and is not supported for virtual trunks. The commands **addtrkred**, **deltrkred**, and **dsptkred** are rejected for virtual trunks.

APS Command Summary

A number of commands have been added and modified to support APS. These are listed in Table 4-25, and defined in more detail in the following pages. This is a list of the APS switch events that the BXM can return to switch software. They can be switched successfully or failed (that is, the switch cannot be done).

Table 4-25 APS Commands

Command	Description
Commands to Manage APS	
cnfcdaps slot	sets APS options on the card
addapsln slot1.port1 slot2.port2 protocol	adds APS
delapsln slot.port	deletes APS
dspapsln	displays status of APS line pairs
switchapsln slot.port	controls the APS user switching interface
cnfapsln slot.port	configures the APS parameters on a line a
New Commands for Card Redundancy for APS 1+1	
addcdred	adds redundancy across two cards (operates like addyred command)
dpscdred	displays redundant cards (operates like dspsyred command)
delcdred	deletes redundancy configuration for cards (operates like delyred command)
prtcdred	prints active and redundant cards (operates like prtyred command)
switchcdred	switches active and redundant cards (operates like switchyred command)
Commands Modified for use with APS	
cnfbkcd	modified to APS options
dspalms	added row for “APS Alarms” which lists Minor and Major APS alarms
dspcd	displays front and back card APS attributes. For the front card, displays that card supports APS 1+1 and APS 1:1. For the back card, displays if back card is a redundant back card, and if so, the slot number of the redundant back card. Also, displays APS mismatch conditions
dspsv3	modified to display APS alarms pending
dsplog	displays APS alarms. Refer to “dsplog” section on page 14-89 for more information about this command.
addyred	modified to prevent invalid configurations when combined with APS
delyred	modified to prevent invalid configurations when combined with APS

Using Subrate Trunk Interface Control Templates

Subrate trunks use an Interface Control Template that specifies the configuration of an output control lead. The template defines which output lead is to be configured and whether the lead is asserted, inhibited, or follows a specified input source. You can configure a template for a subrate trunk individually or copy a template of another subrate trunk.

You manage subrate trunk interface control templates by using the following commands:

- **cnftrkict**—Configures an interface control template for a subrate trunk.
- **cpytrkict**—Copies the template from one subrate trunk and applies it to another trunk.
- **dsptrkict**—Displays the interface control template for a specified line.
- **prtrkict**—Prints the interface control template for a specified line.

Summary of Commands

Table 4-26 shows the full name and starting page for the description of each trunk command.

Table 4-26 List of Trunk Commands

Mnemonic	Description	Page
addapsln	Add SONET APS line redundancy to a BXM OC-3 or OC-12 card	4-49
addtrk	Add trunk	4-51
addtrkred	Add trunk redundancy	4-54
cnfapsln	Configure APS parameters on a working line of APS redundant pair	4-56
cnfcdaps	Configure various APS line parameters	4-56
cnfrsrc	Configure resources	4-56
cnftrk	Configure trunk	4-70
cnftrkalm	Configure trunk alarm	4-90
cnftrkict	Configure trunk interface control template	4-95
cpytrkict	Copy trunk interface control template	4-97
delapsln	Delete SONET APS line from a BXM OC-3 or OC-12 card	4-47
deltrk	Delete trunk	4-101
deltrkred	Delete trunk redundancy	4-103
dntrk	Down trunk	4-105
dspapsln	Display currently configured APS lines and their status	4-107
dspnw	Display network	4-109
dspphyslns	Display lines in an IMA trunk	4-111
dspphyslnstathist	Display statistics gathered for lines in an IMA trunk	4-114
dsptrkbob	Display trunk breakout box	4-114
dsptrkcnf	Display trunk configuration	4-116

Table 4-26 List of Trunk Commands (continued)

Mnemonic	Description	Page
dsptrkict	Display trunk interface control template	4-123
dsptrkred	Display trunk redundancy	4-125
dsptrks	Display trunks	4-127
dsptrkstats	Display trunk statistics	4-132
prtntw	Print network	4-138
prttrkict	Print trunk interface control template	4-141
prttrks	Print trunks	4-142
printapsln	Print the APS line redundancy switching interface	4-143
switchapsln	Control the APS line redundancy switching interface	4-143
uptrk	Up trunk	4-146

addapsln/delapsln

The **addapsln** and **delapsln** command lets you add SONET APS (Automatic Protection Switching) for BXM OC-3 or OC-12 lines.

SONET APS is a standard that describes the switching of SONET lines from the active line to a standby line to provide hardware line redundancy. The SONET APS feature applies only to BXM OC-3 and OC-12 cards in this release.

You must specify the desired APS protocol when adding a new APS line pair. The **delapsln** command deletes APS for the lines.

For background information on how SONET APS for BXM cards works, refer to “APS Command Summary” section in this chapter.

When the **addapsln** command executes, the switch software does the following:

- Verifies that the slot.port arguments support APS
- Verifies that the appropriate back card is installed
- Verifies that the protection port is not already active
- If card redundancy is already configured for the two-slot case (APS 1+1), verifies that the primary card is the same type as the working line card.

Before the **addapsln** command has been executed, there is no working or protection line. The **addapsln** command defines which line is the working line and which line is the protection line. (For APS 1+1 Annex B, the active line is called the “primary section,” and the standby line is called the “secondary section,” which provides protection for the primary section.)

Feature Mismatching to Verify APS (Automatic Protection Switching) Support

In this release, the **addapsln** command, in addition to other configuration commands, will perform mismatch verification on the BXM and UXM cards. For example, the **addapsln** command will verify whether the cards both have APS support configured. Refer to “High-Priority Login Feature” section on page 17-1 for more information on Feature Mismatching, refer to the *BPX 8600 Series Installation and Configuration Manual*.

Whenever you activate a feature by configuring it with CLI commands, switch software performs a verification to ensure that the hardware and firmware support the feature. For example, if you are attempting to add APS on a specific line (by using **addapsln**), and the BXM card does not support this feature, a warning message is displayed and the addition is not completed.

The Feature Mismatching capability will not mismatch cards unless the actual feature has been enabled on the card. This allows for a graceful card migration from an older release.

Full Name

Add a SONET APS (Automatic Protection Switching) line

Syntax

```
addapsln <slot.port1> < slot.port2> <protocol>
```

You must enter the slot.port pair and the protocol option. If you do not enter the protocol option, a menu listing the options is displayed.

Table 4-27 addapsln—Parameters

Parameter	Description
slot.port1	The desired working line number
slot.port2	The desired protection line number
protocol	1: 1+1 2: 1:1 3: 1+1 Annex B 4: 1+1, ignore K1K2 bytes

Related Commands

delapsln, cnfapsln, cnfcdaps, dspapsln, dsplog, dspalms

Attributes

Privilege	Jobs	Log	Node	Lock
1	No	Yes	BPX	Yes

Example 1

```
addapsln 2.1 3.1 1
```

Description

Add an APS redundant pair, with Working line on slot2, port 1; Protection line on slot 3, port 1; with “1” specifying APS 1+1 protocol.

System Description

```

alexas TRM genre BPX 8620 9.2 Sep. 9 1998
16:08 PDT

Last User Actv Current Line Current APS
Work/Protect Protocol Line Alarm Stat Alarm StatCard
Switch Req
2.1 3.1 1+1 WORK OK APS OK Clear

Command: addapsln 2.1 3.1 1

```

addtrk

Adds a trunk between nodes. You must add a trunk to the network before it can carry traffic. You only need to execute **addtrk** at one of the nodes terminating the trunk. Before you add a trunk to the network, you must have activated (or “upped”) the trunk at both ends by using **uptrk**.

A trunk must be free of major alarms before you can add it. If you use **addtrk** to join two networks that were previously separate, the local node verifies that all node names and node numbers in both networks are unique before it adds the trunk.

You cannot add a trunk while any of the following conditions are true:

- Another node is attempting to change the network topology by adding or deleting a trunk.
- Another node is notifying all nodes that it has been renamed.
- Another node is currently adding or deleting a connection in the network with the **addcon** or **delcon** command.
- An unreachable node exists in the network.
- Connections are rerouting.
- The node names or the node numbers across the two networks are not unique. Use the command and optional parameter **dspnds +n** to see the node numbers.

When using the **addtrk** command, exercise caution when adding a new node to a network or one network to another network. With these particular operations, the user IDs and passwords may be replaced by those in the other network. Consult Customer Service before performing these operations.

Adding a Virtual Trunk

You can add a trunk as a physical trunk or a virtual trunk. A virtual trunk is a way to connect Cisco nodes through a public ATM cloud. For this release, you can define virtual trunks on BNI, BXM and UXM cards. Note that even though nodes running Release 9.2 can interoperate with 9.1 or 8.5 nodes, if you are running a network with mixed releases, you cannot add UXM and BXM virtual trunks because the networking messages are incompatible due to the virtual trunk number and different cell format on virtual trunks. (BNI cards use STI cell format, and BXM and UXM cards use NNI cell format.)

To designate a trunk as a virtual trunk, you use a virtual trunk number, which is used to differentiate the virtual trunks within a physical port. (Refer to the *BPX 8600 Series Reference* for more information on virtual trunking.)

For the BXM card, you can define a maximum of 32 virtual trunks within one port. Valid virtual trunk numbers are 1-31 per port. The number of virtual trunks available is limited by the number of virtual interfaces (VIs) available on the card. Each logical trunk (physical or virtual) consumes one VI.

For the UXM card, you can define a maximum of 16 virtual trunks within one port. Valid virtual trunk numbers are 1–15.

The addtrk command will be blocked for virtual trunks configured for VSI.

Full Name

Add trunk to the network

Syntax

addtrk <slot.port>[.vtrk]

Related Commands

deltrk, **dsptrks**, **uptrk**

Attributes

Privilege	Jobs	Log	Node	Lock
1	Yes	Yes	IGX, BPX	Yes

Example 1

addtrk 7

Description

Add trunk between node beta slot 7 and node alpha slot 10.

System Response

```

beta          TRM   YourID:1          IPX 8430    9.2    Aug. 3 1998 15:04 MST

PLN  Type      Current Line Alarm Status          Other End
 7   E1/32     Clear - Line OK                    alpha.10
 9   T1/24     Clear - Line OK                    gamma.10
13   T1/24     Clear - Line OK                    alpha.14
15   T1/24     Clear - Line OK                    gamma.15
20   T3/3      Major - AIT Missing                -

```

Last Command: addtrk 7

Next Command:

Table 4-28 *addtrk-Parameters*

Parameter	Description
slot.port	Specifies the slot and port number of the trunk to add.

Table 4-29 *addtrk-Optional Parameters*

Parameter	Description
vtrk	<p>Specifies the virtual trunk number. Virtual trunking is supported on a BNI or BXM card on a BPX node, or a UXM card on an IGX node.</p> <p>The maximum number of virtual trunks per physical port you can add on a BNI card is 32. The maximum on a T3 or E3 line is 32. The maximum on an OC-3/STM1 line is 11.</p> <p>The maximum number of virtual trunks per port you can add on a BXM card is 32 virtual trunks. The maximum number of virtual trunks per port you can add on a UXM card is 16.</p>

addtrkred

Configures trunk redundancy on an ATM trunk. The **addtrkred** command specifies a backup trunk to the primary trunk. Applicable line types are T3 and E3. The redundancy scheme requires two sets of ATM trunk cards and two standard T3 or E3 cables (not Y-cables). Note the following characteristics of trunk redundancy:

- Applicable card sets are the AIT, BTM, and ALM/B connected to a BNI card set on a BPX node. (Trunk redundancy between an AIT, BTM, and ALM/B is not allowed.)

- Execute **addtrkred** on an IPX or IGX but not on the BPX side.
- Primary and backup card sets must be in adjacent slots.
- After a primary trunk failure clears, the traffic automatically returns to the primary card set.
- Trunk redundancy is not compatible with virtual trunking.

Full Name

Add trunk redundancy

Syntax

addtrkred <primary trunk> <secondary trunk>

Related Commands

deltrkred, **dsptrkred**

Attributes

Privilege	Jobs	Log	Node	Lock
1-4	No	Yes	IGX	Yes

Example 1

addtrkred 4 5

Description

Add bandwidth redundancy for the primary ATM trunk in slot 4 with backup from the ATM trunk in slot 5.

System Response

```
beta          TRM   YourID:1      IGX 8420     9.2   Aug. 3 1998  15:15 MST
```

```
ATM Line Backup ATM Line
  4             5
```

```
Last Command: addtrkred 4 5
```

```
Next Command:
```

Table 4-30 *addtrkred-Parameters*

Parameter	Description
primary trunk	Specifies the slot number of the primary trunk card set.
secondary trunk	Specifies the slot number of the secondary trunk card set as backup.

cnfapsln

SONET APS Line Redundancy in this release implements industry standards. Switching is performed by hardware with better performance than the ATM Trunk Redundancy feature introduced in release 8.4. (The ATM trunk redundancy feature is supported on the IGX platform only.) This release supports both. The IGX platform supports ATM trunk redundancy, and the BPX supports SONET APS line redundancy. APS line redundancy provides a standards-based solution to line redundancy.

The **cnfapsln** command lets you configure various APS line parameters. Below is a list of the configurable APS parameters:

- **Signal Fail Bit Error Rate (SFBER)**—Signal Fail Bit Error Rate threshold which, will cause an APS switch.
- **Signal Detect Bit Error Rate (SDBER)**—Signal Detect Bit Error Rate threshold for line degradation, which will cause an APS switch.
- **Revertive/Non-Revertive**—Revert to working line after WTR interval expires. You must enter the number 0 or 1. This only applies to automatic switches. Revertive switching does not take place as a result of user-initiated switching.
- **Wait to Restore (WTR)**—Wait to restore interval. After a switch from a working to a protection line, this is the interval in minutes to wait before attempting to switch back to the working line. This is not applicable if the revertive mode option is set to N (non-revertive).

- **Direction (Unidirectional/Bidirectional)**—Direction of switching. Unidirectional is switching in only one direction. With Bidirectional, after one side switches, the other end will switch also.

**Note**

For the Annex A protocol, you cannot set both the Bidirectional and Nonrevertive options—they are invalid combinations. For the Annex B protocol option, the default is Bidirectional and Nonrevertive.

Table 4-31 lists configurable APS parameters, descriptions, and possible ranges and options.

Table 4-31 Configurable APS Parameters

Parameter	Description	Range/Options
slot.port	Slot and port of the line you want to configure	–
SFBER (Signal Fail Bit Error Rate)	Signal Fail Bit Error Rate threshold at which point an APS switch occurs	Default is 3 range is 3–12
SDBER (Signal Detect Bit Error Rate)	Signal Detect Bit Error Rate for line degradation	Default 5 range is 5–12
Revertive mode	Revert to Working line after Wait to Restore interval expires. You must enter the number 0 or 1. This only applies to automatic switches. Revertive switching does not take place as a result of user-initiated switching. For Annex A, the default is non-revertive. For Annex B, the default is non-revertive. For Annex B, you are not allowed to change to unidirectional or revertive mode.	Default = 1 range is 0–1 0 = revertive 1 = non-revertive
WTR (Wait to Restore)	Wait to restore interval. After a switch from a Working to a Protection line, this is the interval in minutes to wait before attempting to switch back to the Working line. This is not applicable if the Revertive Mode option is set to N (non-revertive)	Default is 5, range is 1–12 minutes
Direction	Direction of switching. Unidirectional is switching in only one direction. With Bidirectional, after one side switches, then the other side also switches. For Annex A, the default is unidirectional. For Annex B, default is bidirectional. For Annex B, you are not allowed to change to unidirectional or revertive mode.	Default is 0 (unidirectional) Range is 0–1, where 0 is unidirectional and 1 is bidirectional.

Full Name

Configure various SONET APS line parameters

Syntax

cnfapsln <slot.port> <SFBER> <SDBER> <Revertive_mode> <WTR> <Direction>

where:

slot.ports = slot.port of working line of APS pair to be configured

SFBER = Signal Fail Bit Error Rate for line degradation. You must enter a number between 3 and 12. Default is 3.

SDBER = Signal Detect Bit Error Rate for line degradation. You must enter a number between 5 and 12. Default is 5.

Revertive/Non = Revert to working line after WTR interval. You must enter 0 (revertive) or 1 (non-revertive).

WTR = Wait to Restore timer [1–12 minutes]

You must enter a number between 1 and 12.

Direction = Direction of switching. Unidirectional is switching in only one direction. With bidirectional, after one side switches, then the other side also switches. You must enter 0 for Unidirectional, 1 for Bidirectional. (For Annex B, you are not allowed to change to Unidirectional or revertive mode.)

Related Commands

addapsln, delapsln, cnfapsln, cnfcdaps, dspapsln, dsplog, dspalms, switchapsln

Attributes

Privilege	Jobs	Log	Node	Lock
1–4	No	Yes	BPX	Yes

Example 1

cnfapsln 1.1

Description

Configures various APS line parameters (described in Table 4-31).

System Response

```
alexas TRM genre BPX 8620 9.2 Sep. 9 1998
16:15 PDT
```

```
APS Configuration parameters for Working, Protection lines 1.1, 1.2
```

```
APS Protocol: 1+1
Signal Fail BER threshold (10 to the -n): 3
Signal Detect BER threshold (10 to the -n): 5
Revertive Switching: Yes
Wait to Restore Timer: 5 minutes
Uni/Bi Directional Switching: Unidirectional
```

```
Command: cnfapsln 1.1
```

Example 2**cnfapsln 1.1****Description**

Configures various APS line parameters (described in Table 4-31).

System Response

```
colossus TN StrataCom BPX 8600 9.2 Sep. 9 1998 16:08 PDT
```

```
APS Configuration parameters for Working, Protection lines 1.1, 1.2
```

```
APS Protocol: 1+1
Signal Fail BER threshold (10 to the -n): 3
Signal Detect BER threshold (10 to the -n): 5
Revertive Switching: Yes
Wait to Restore Timer: 5 minutes
Uni/Bi Directional Switching: Unidirectional
```

```
Command: cnfapsln 1.1
```

Example 3**cnfapsln 6.3****Description**

Configures various APS line parameters (described in Table 4-31) for APS 1:1 line redundancy

System Response

```
colossus      TN      StrataCom    BPX 8600    9.2    Sep. 9 1998 16:08 PDT

APS Configuration parameters for Working, Protection lines 6.3, 6.4

APS Protocol:                               1+1

Channels Halved for APS operation:           Yes
APS Standard for Card:                       GR-253

Signal Fail BER Threshold (10 to the -n):    3
Signal Detect BER Threshold (10 to the -n):  5
Uni/Bi Directional Switching:               Bidirectional
Revertive Switching:                        Yes
Wait to Restore Timer:                      5 minute(s)

Command: cnfapsln 6.3
```

cnfcdaps

Use the **cnfcdaps** command to set the APS 1:1 “channels halved” option and the APS standard option on the card. When you execute the command, the switch software performs the following syntax checking:

- verifies that the slot is a BXM OC-3 or OC-12 card
- verifies that the BXM card version supports APS
- verifies that the card does not already have **cnfcdaps** enabled
- issues a warning if any trunks or lines are upped on the card, and if so, issues a warning and prompts you to continue with the **cnfcdaps** command.
- issues a warning if you attempt to change the APS standard to GR-253 while an Annex B–configured trunk/line is on the card.



Caution

The **cnfcdaps** command is a service-level command, which is not accessible to privilege levels 1 through 6, or to SuperUser level users. You must have service-level privileges to access this command. As improper use of this command could cause card mismatch, thus affecting traffic, use it with caution.



Note

You must have Service level privileges to use the **cnfcdaps** command.

Executing the **cnfcdaps** command will automatically perform a **resetcd** (reset card) command.

Configuring the APS Standard Option (GR-253—Annex A or ITUT—Annex B)

Following are some things to be aware of when configuring either Annex A (GR-253) or Annex B (ITUT) options:

- You use the same commands to configure the Annex A (GR-253) protocol as you do to configure the Annex B protocol (ITUT).
- If you are configuring the Annex B (ITUT) protocol, there is no difference in the way the APS commands work from the way they work when configuring the Annex A option.
- You cannot configure Annex B in unidirectional mode. (Annex B is bidirectional only.) Also, you cannot configure Annex B in revertive mode. (Annex B is non-revertive.)
- If you specify the ITUT protocol by using the **cnfcdaps 0** option, the Annex B protocol will be configured and used as the APS standard. Annex B always uses APS 1+1, bidirectional, and non-revertive.
- When configuring APS with **cnfapsln**, you may be prevented from making some changes (if you have specified the ITUT (Annex B) option by using the **cnfcdaps** command.
- You cannot use the Annex B protocol while in GR-253 (Annex A) mode.

GR-253 (Annex A) Configuration. When you configure GR-253 (Annex A) with the **cnfcdaps 1** option (the default), the working and protection lines are identified as “Work/Pro.”

When Annex A (GR-253) is configured with the **cnfcdaps 1** option (GR-253 is the default), either the working line or the protection line can be active. If the working line has an alarm activated on it, APS switches back to the protection line, thus making the protection line the “active” line. If there is an alarm on that line, and the alarm has been cleared on the working line, it reverts the working line back to the active line. The protection line serves as a backup line to the “active” line, or “working” line.

ITUT (Annex B) Configuration. When Annex B is configured as the APS standard (with the **cnfcdaps 0** option), the lines are identified as “Work1/Work2.” (These are shown on the **dspapsln** screen as “Work1” and “Work2.”) The “Work1” line corresponds to the working line used in Annex A (GR-253), and the “Work2” line corresponds to the protection line used in GR-253 (Annex A). (Work1 and Work2 lines are also sometimes referred to as “primary” and “secondary” lines, and as “working section 1” and “working section 2.”) The GR-253 (Annex A) terminology (that is, “working” and “protection” lines) refers to lines on all other screen displays (except for **dspapsln** screen) for ITUT (Annex B) lines.

If the Work1 line has an alarm activated on it, APS switches to Work2. While the alarm is still on the Work1 line, and APS has already switched, the “Work1” line is still the primary line, and “Work2” is still considered the secondary line. If the alarm clears on “Work1,” no switch occurs. Instead, the “Work2” line becomes the primary line, and the “Work1” line becomes the secondary line.



Note

When using the Annex B protocol (ITUT), which you configure with the **cnfcdaps 0** option, some configuration changes may not be allowed that would be allowed when using Annex A (GR-253) protocol.

You cannot use Annex B protocol standard when in GR-253 mode. Annex B can be configured by specifying the ITUT option of **cnfcdaps 0**.

APS Environment Setup

This section provides a brief functional description of APS support for the BPX platform. The following configurations of APS are supported in this release:

- APS 1:1, front and back card, using existing hardware

To use the APS 1:1 feature, no new hardware is required. A single front card with a regular single back card will support APS 1:1. Two adjacent lines on the same card are used. A firmware upgrade that supports APS 1:1, Release 9.2 switch software, and Cisco WAN Manager Release 9.2 is required.

For APS 1:1 using existing hardware, you must use the **cnfcdaps** command to reduce the maximum number of connections on the BXM card, which will in turn decrease the number of channels on the card by half. If lines or trunks are upped already on this card, a warning will be issued and the request denied, because changing the number of channels on the fly will cause a card mismatch condition.

- APS 1:1, using new hardware

Two adjacent lines on the same card are used. (You do not need to use the **cnfcdaps** command to change the number of maximum connections on the card.) A BXM-Enhanced card, a BXM-E daughter card, BXM firmware revision that supports APS in Release 9.2 (refer to 9.2 release notes), Release 9.2 BPX system software, and Cisco WAN Manager 9.2 software.

- APS 1+1, two front and back cards, new hardware, combined with front card redundancy

You should first use the **dspecd** command to check if the BXM card supports the APS option.

Installing SONET APS is service-affecting. For APS 1:1 using existing hardware, you can use the **cnfcdaps** command only when all lines and trunks have been downed. For the other options (for example, APS 1:1 with front and back card and new hardware; APS 1+1 with two front and back cards, new hardware, combined with front card redundancy), logical lines, trunks and connections can remain intact, but you must install new firmware and hardware.

For the two-card option, you must install a special dual slot backplane. In addition, when existing BXMs are replaced with BXM APS hardware, the new card must match or exceed the old card's number of channels to avoid a Mismatch condition. Refer to "APS Command Summary" section on page 4-46 for more information.

Executing the **cnfcdaps** command will automatically perform a **resetcd** (reset card).

Full Name

Configure BXM OC-3 or OC-12 card with SONET APS line redundancy options

Syntax

```
cnfcdaps <slot> <Y/N> < 0/1>
```

where:

slot = Desired APS slot number

N/Y = Disable/enable the channels halved option on the card (Default is disabled, or *N*.)

0/10 = ITUT (Annex B), 1 = GR-253 (Default is 1—GR-253, or Annex A)

Table 4-32 cnfcdaps—Parameters

Parameter	Description
slot	Specifies the desired BXM APS slot number.
Y/N	Disable/enable the channels option on the card.
10/1	0 = ITUT, 1 = GR253

Related Commands

addapsln, delapsln, cnfapsln, cnfcdaps, dspapsln, dsplog, dspalms

Attributes

Privilege	Jobs	Log	Node	Lock
1	No	Yes	BPX	Yes

System Response

```
sw117          TN      StrataCom      BPX 8620  9.2.q3      Mar. 24 1999 21:54 GMT
```

```
APS Card Configuration parameters for card 2
```

```
Channels Halved for APS operation:      Yes
APS Standard for Card:                  GR-253
```

```
This Command: cnfcdaps 2 n
```

```
Enter channels halved option (Y or N);
```

```
Enter APS protocol standard to be used on card (0=ITUT, 1=GR-253):
```

```
MAJOR ALARM
```

cnfrsrc

Use the **cnfrsrc** command to partition resources for Automatic Routing Management PVCs, VSI-Multiprotocol Label Switching (MPLS), or PNNI SVCs/SPVCs. (If you want to configure resources for a VSI-MPLS controller or PNNI SVCs, refer to **cnfrsrc** in the “VSI Commands” chapter for more information specific to configuring VSI options.)

This command was introduced in Release 9.1 to support physical trunks. It has been extended to support virtual trunks. After VSI has been enabled, the virtual trunk becomes a “dedicated” VSI virtual trunk. Note that if the trunk has already been added or if the VPI value has not been configured, you will not be able to configure the VPI value. (Switch software will block you from doing so.)

**Note**

Note that VSI-MPLS is not supported in Release 9.2; VSI will be supported in a post-9.2 release. If you upgrade to Release 9.2, the VSI commands will not be blocked at the CLI level, but they will not function.

In this release, you can configure a virtual trunk to be dedicated to VSI or to Automatic Routing Management. You cannot configure a virtual trunk for both VSI and Automatic Routing Management. You configure all port and trunk attributes with **cnftrk**, **cnftrkparm**, or **cnfrsrc**.

**Note**

When you change a physical port attribute, you will be notified that all the logical (physical and virtual) trunks on the port are affected.

**Note**

Note that when using **cnfrsrc** to configure partition resources for Automatic Routing Management PVCs, and you are prompted whether you want to configure VSI options, enter “n” for No. You will not be prompted to enter any VSI options.

Configurable resources (using **cnfrsrc**) are:

- Template number—relevant only when configuring VSI options
- Maximum PVC LCNs
- Maximum PVC Bandwidth
- Configure Partition (Y/N)—Enter “n” for No to configure Automatic Routing Management PVCs. Enter “y” for yes to configure VSI options (in post-9.2 release).
- Partition ID
- Enable Partition (Enable/Disable)
- Minimum VSI LCNs
- Maximum VSI LCNs
- Start VSI VPI—**Warning message will tell you to use the cnftrk command**
- End VSI VPI—**Warning message will tell you that the end vsi vpi is equal to the start vsi vpi for virtual trunks**
- Minimum VSI Bandwidth
- Maximum VSI Bandwidth

The resources that you can currently configure are the number of connection IDs (conids) and the trunk bandwidth. In this release, you use the **cnfrsrc** command to configure the cell rate and number of connections on a BXM card only. (You cannot use the **cnfrsrc** command on the IGX.)

Configuration with cnfrsrc

The **cnfrsrc** command is used to configure conids (lcns) and bandwidth. The conid capacity indicates the number of connection channels on the trunk port which are usable by the virtual trunk.

This number cannot be greater than the total number of connection channels on the card. The maximum number of channels is additionally limited by the number of VCI bits in the UNI cell header. For a virtual trunk, the number is divided by the maximum number of virtual trunks on the port to determine the default. This value is configured by the **cnfrsrc** command on the BPX. Table 4-33 lists the number of connection IDs for virtual trunks on various cards.

Table 4-33 Maximum Connection IDs (LCNs)

Port Type	Maximum Conids	Default
BXM/UXM	1-(number of channels on the card)	256
BNI T3/E3	1-1771	256
BNI OC-3	1-15867 (3837 max/vtrk	256

Full Name

Configure partition resources

Syntax

```
cnfrsrc <slot>.<port> <maxpvclicns> <maxpvcbw> <partition> <e/d> <minvsilcns> <maxvsilcns>
<vsistartypi> <vsiendypi><vsiminbw> <vsimaxbw>
```

Related Commands

dsprsrc

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	BPX (BXM cards only)	No

Example 1

```
cnfrsrc 11.2 256 96000 y 1 e 0 0 1 1 0 0
```

Description

Configure resource partitions on card slot 11, port 2, to use Automatic Routing Management PVCs.

System Response

```

sw98          TN      SuperUser      BPX 8600      9.2.0r      Apr. 4 1998  16:40 PST

Port/Trunk : 11.2
Maximum PVC LCNS:          256      Maximum PVC Bandwidth:96000
Min Lcn(1) : 0 Min Lcn(2) : 0
Partition 1
Partition State :          Enabled
Minimum VSI LCNS:          0
Maximum VSI LCNS:          0
Start VSI VPI:             1
End VSI VPI :              1
Minimum VSI Bandwidth :    0          Maximum VSI Bandwidth :      0

Last Command: cnfrsrc 4.1 256 26000 1 e 512 7048 2 15 26000 100000

Next Command:

```

Table 4-34 cnfrsrc—Parameters

Parameter	Description
slot.port	Specifies the BXM card slot and port number.
Maximum PVC LCNS	<p>The maximum number of LCNs allocated for Automatic Routing Management PVCs for this port. The range is 1 to 256; 256 is the default. For trunks, there are additional LCNs allocated for Automatic Routing Management that are not configurable.</p> <p>You can use the dspecd <slot> command to display the maximum number of LCNs you can configure using the cnfrsrc command for the given port. For trunks, configurable LCNs represent the LCNs remaining after the BCC has subtracted the networking LCNs needed. A trunk has 270 networking LCNs, or channels.</p> <p>For a port card, a larger number is shown, as compared with a trunk card. This is because a trunk uses 270 networking LCNs, as compared with a port card, which uses no networking LCNs.</p> <p>Setting this field to 0 would disable Automatic Routing Management PVCs on the specified port.</p> <p>Note that you must specify a value greater than 0 for the Maximum PVC LCNS, Maximum PVC Bandwidth, and Maximum VSI LCNS parameters. Otherwise, you will not be able to create any Automatic Routing Management PVC connections on a BXM card. Also, if these parameters do not have values greater than 0, you will be unable to change the connection channel amount when you configure the BXM trunk using cnfrtk.</p>

Table 4-34 cnfrsrc—Parameters (continued)

Parameter	Description
Maximum PVC Bandwidth	<p>Specifies the maximum bandwidth of the port allocated for Automatic Routing Management use. The range is 0 to 352207; 0 is the default. You can configure the Maximum PVC Bandwidth value for ports, but not for trunks.</p> <p>Note that you must specify a value greater than 0 for the Maximum PVC LCNs, Maximum PVC Bandwidth, and Maximum VSI LCNs parameters. Otherwise, you will not be able to create any Automatic Routing Management PVCs on the BXM card.</p>
Configure Partition	<p>Answer yes or no to begin configuring resources for the partition. If you enter “n” for no, you will not be prompted to configure any VSI options. If you are configuring Automatic Routing Management PVCs, enter “n” for no.</p> <p>If you want to configure VSI options, enter “y” for yes, and you will be prompted to enter the rest of the cnfrsrc parameters, which are related to configuring VSI (such as a VSI MPLS controller or a PNNI controller). Refer to the cnfrsrc command in “VSI Commands” chapter for more information on VSI-related options.</p>
Partition ID	<p>Specifies the ID number of the partition; 1 is the default. Always use 1 in Release 9.1 and Release 9.2.10. (The range of 0 to 255.)</p>
Enable Partition	<p>Answer yes or no to enable your configured partition.</p>
Minimum VSI LCNs	<p>The minimum number of LCNs guaranteed for this partition. The range is 1 to 256; 0 is the default. The VSI controller guarantees at least this many connection endpoints in the partition, provided there are sufficient free LCNs in the common pool to satisfy the request at the time the partition is added. When a new partition is added or the value is increased, it may be that existing connections have depleted the common pool so that there are not enough free LCNs to satisfy the request. The BXM gives priority to the request when LCNs are freed. The net effect is that the partition may not receive all the guaranteed LCNs (min LCNs) until other LCNs are returned to the common pool.</p> <p>You can increase this value dynamically when there are enough unallocated LCNs in the port group to satisfy the increase.</p> <p>You may not decrease the value dynamically. All partitions in the same port group must be deleted first and reconfigured in order to reduce this value.</p> <p>To avoid this deficit condition, which could occur with maximum LCN usage by a partition or partitions, it is recommended that all partitions be configured ahead of time before adding connections. Also, it is recommended that all partitions be configured before adding a VSI controller using the addshelf command.</p>

Table 4-34 cnfrsrc—Parameters (continued)

Parameter	Description
Maximum VSI LCNs	<p>The total number of LCNs the partition is allowed for setting up connections. The min LCNs is included in this calculation. If max LCNs equals min LCNs, then the max LCNs are guaranteed for this partition.</p> <p>Otherwise, (max - min) LCNs are allocated from the common pool on a FIFO basis.</p> <p>If the common pool is exhausted, new connection setup requests will be rejected for the partition, even though the maximum LCNs has not been reached.</p> <p>You may increase this value dynamically when there are enough unallocated LCNs in the port group to satisfy the increase.</p> <p>You may not decrease the value dynamically. All partitions in the same port group must be deleted first and reconfigured in order to reduce this value.</p> <p>Different types of BXM cards support different maximum values. If you enter a value greater than the allowed maximum, a message is displayed with the allowable maximum value.</p> <p>Note that you must specify a value greater than 0 for the Maximum VSI LCNs, Maximum PVC Channels, and Maximum PVC Bandwidth parameters. Otherwise, you will not be able to add any connections on a BXM card.</p>
Start VSI VPI	<p>By default the TSC (for example, the 7200 or 7500 series router) will use either a starting VSI VPI of 1 or 2 for tag switching, whichever is available. If both are available, a starting VSI VPI of 1 is used. The VPI range should be 2-15 on a BPX 8620 VSI. The VSI range for tag switching on the BPX 8620 is configured as a VSI partition, usually VSI partition number 1. VSI VPI 1 is reserved for Automatic Routing Management PVCs. (This restriction applies only to trunks, not to ports. For a port, you can use any VPI value.) For a port UNI, the VPI range is 1 to 255. For a port NNI, the range is 1 to 4095. For trunks that do not have Automatic Routing Management configured, the VPI ranges are the same as for ports.</p> <p>The VSI partition for tag switching should start at VPI 2. If VPI 2 is not to be used, you can use the tag switching VPI interface configuration on the TSC to override the defaults.</p> <p>For trunks with Automatic Routing Management configured, the range is 2 to 4095. Always set to 2 for trunks.</p>
End VSI VPI	<p>Two VPIs are sufficient for Release 9.1, although it may be advisable to reserve a larger range of VPIs for later expansion, for example, VPIs 2-15.</p> <p>The range is the <Start VSI VPI > value to 4095.</p>

Table 4-34 cnfrsrc—Parameters (continued)

Parameter	Description
Minimum VSI Bandwidth	The minimum port bandwidth that can be used by this partition in cells/second. The range is 0 to <Maximum Line Rate>. For example, the OC-3 line rate is 352207. 0 is the default.
Maximum VSI Bandwidth	The maximum port bandwidth that can be used by this partition. This value is used for VSI QBin bandwidth scaling. The range is 0 to <Maximum Line Rate>. For example, the OC-3 line rate is 352207. 0 is the default.

cnftrk

Configures trunk parameters. A trunk has a default configuration after you activate (or “up”) the trunk with the **uptrk** command. Beyond this default configuration, **cnftrk** lets you configure trunk parameters. Typically, you use **uptrk** to first up the trunk, then use **cnftrk** to configure trunk parameters, then use **addtrk** to add it to the network. You must execute **cnftrk** at both ends of a trunk. (You also use **cnftrk** to configure an interface shelf.)

The section “**cnftrk**–Parameters” in this description shows required **cnftrk** parameters. The section titled “**cnftrk**–Optional Parameters” shows virtual trunk parameters. You can reconfigure some parameters after adding a trunk with **addtrk**. See the section “Reconfiguring a Trunk.”

In the display for **cnftrk**, the current value for each parameter appears on screen. At the command line prompt for each parameter, the current or default value appears in parentheses and stays the same if you press Return without entering anything. Configurable parameters depend on the trunk type. For example, an NTM card and a BNI support different parameters. If a displayed parameter is not available for the current interface, its name displays at half-intensity, and the value field contains dashes. (Note that Clock Rate is a required parameter for only HSSI. The Clock Rate range is 4 Mbps–50.84 Mbps. The actual clock limits depend on the front card.)



Note

If you specify **cnftrk** in a job, prompts appear for line format and line options when you create or edit the job with **addjob** or **editjob**, respectively.

As of Release 9.1, you can configure cost-based routing from either end of the trunk. You can change the cost before or after the trunk has been added to the network. You can also change the cost after connections have been routed over the trunk. Any cost change is updated network-wide. Every node in the network stores the cost of every trunk in the network.

In this release, the **cnftrk** command configures a logical trunk (physical or virtual), so when you change a physical parameter, all trunks on the port (both physical and virtual) are affected. For example, if you change the line framing on a virtual trunk, all virtual trunks on the port are automatically updated to have the modified line framing.

You can use **cnftrk** to configure the Transmit Trunk Rate for all BPX cards, except for the BXM card. For BXM cards, you must use the **cnfrsrc** command to configure the Transmit Trunk Rate (trunk load). For IGX cards, you can configure the Transmit Trunk Rate after a trunk has been added.

You can use the **cnftrk** command to assign a VPI value. You will not be able to configure the VPI value if the virtual trunk is already configured for VSI. Also note that if the VSI feature is enabled, and you execute **cnftrk** to decrease the transmit rate, you must confirm whether the Qbin configuration is set up correctly by using the **cnfqbin** command to change the value. The reason for this is that when the transmit rate is decreased, the Qbin depth will be automatically recalculated.

In this release, **cnftrk** supports the rt-VBR and nrt-VBR traffic classes (instead of just the VBR traffic class). Similarly, the virtual trunk type can be rt-VBR or nrt-VBR.

You can configure the ILMI protocol running on a trunk interface to run on the BCC instead of the BXM.

Subrate and Fractional Trunks

For FastPacket trunks, which the NTC and NTM front cards support, you can configure the Subrate interface and Subrate data rate fields only if the back card is a BC-SR. The interface types for a subrate trunk are V.11, X.21, V.35, and EIA/TIA-449. Set the data rate to match the subrate facility within the range 64 Kbps–1.920 Mbps.

The DS0 map is used to define fractional E1 and T1 trunks. It consists of a repeating set of specifications in the form <x[-y[a]]>, where “x” and the optional “y” are DS0 numbers 0–23, and the optional “a” indicates *alternating*. The value of “y” must be greater than the value of “x.” The values of both “x” and “y” cannot be less than 0 or greater than the maximum number of DS-0s for the line type. In the DS0 map for unframed E1, use 0–31. For framed E1, use 1–31. For 30 DS-0 E1, use 1–15, 17–31.

Receive and Transmit Rates on Physical Trunks

The parameters RCV Trunk Rate and Transmit Trunk Rate apply to physical ATM trunks on an IGX node. On a BPX node, only Transmit Trunk Rate is available. These parameters let you configure lower rates than the maximum line rate for the trunk type. If you adjust a rate, you need to do this at both ends of the trunk. For example, if RCV Trunk Rate on an IGX is 40,000 packets per second (pps), Transmit Trunk Rate on the far end must be 20,000 cells per second (cps). The typical relationship between pps and cps is two FastPackets for each cell.

For ATM trunks terminating on a BTM (IGX), make sure the receive rate is below the maximum of the T3 or E3 line rate. For these cards, the rate should be no more than 40,000 packets per second. Increments for RCV Trunk Rate and Transmit Trunk Rate can be as small as 1 cell or packet per second. (Note that the node may round up or round down the value you enter.)

The default value for Transmit Trunk Rate is the maximum rate for the back card type. You can reduce this rate to any number of cells per second that is less than or equal to the physical port rate. If E3 or T2 is selected, the bandwidth is reduced from the T3 rate.



Note

You can configure the Transmit Trunk Rate parameter, which indicates the trunk load, by using the **cnfrsrc** command on BXM cards. On both IGX and BPX nodes, the trunk load displays in cps (cells per second), and the value is displayed in brackets on the first line of the **cnftrk** display.

On the **cnftrk** screen, the Transmit Rate and Transmit Load are always displayed in cps (cells per second). (The Transmit Load displays in brackets above the Transmit Rate field, for example, TRK 13.1.1 Config T3 [2867 cps].) Because switch software performs an internal conversion from

DS0s to cells for the receive rate, this receive rate dictates the transmit load at the other end of the trunk, and vice versa. Because the Transmit Load (in cps) may not fit into the full DS0, the resulting number that appears in the Transmit Load field (for example, [2867 cps], could be truncated. For example, if you were to change the Transmit Rate on a routing trunk from 96000 to 104268, **cnftrk** will prompt you to enter a Transmit Rate of 0-104268, and will accept 104268, but it may assign a value of 104150 instead of 104268. The Transmit Load would be the same, for example, 104150 cps, regardless of whether the user configured the Transmit Rate as 104268 or 104269 or 104270.

The following shows how the transmit rate is calculated internally by switch software:

1 DS0 = 64000 bits/sec

or

DS0 = 8 bits x 8000 samples/sec = 64000 bits/sec

1 cell long unit = 424 bits/sec

therefore:

Number of cells per second (cps) = DS0 * 8000 / 53 bytes per ATM cell

Following is some further explanation of how the Transmit Trunk Rate is calculated internally by switch software:

For any user-provided Transmit Trunk Rate value in T1 cells per second (cps).

Rcv Trunk Rate = T1 x 53 / 8000 (in DS0)

(This is the actual value used for everything and dictates the Transmit Trunk Load value at the other end of the trunk.)

The conversion occurs again at the other end:

T2 = R1 * 8000 / 53 (in cps)

The Transmit Load number displayed in brackets is the same, that is, 104150 cells per second, whether the user has given the Transmit Rate as 104268 or 104269 or 104270.

Receive and Transmit Rates on Virtual Trunks

The implementation of XMT Trunk Rate on a virtual trunk differs from the implementation on a physical trunk. On a physical trunk, XMT Trunk Rate limits the rate at which the back card physically generates cells. For a virtual trunk, XMT Trunk Rate does not limit the rate at which the back card generates cells: the line rate stays at the maximum for the line type. However, XMT Trunk Rate is the maximum transmission rate allowed on a virtual trunk.

The provider of the virtual trunk service assigns the value for XMT Trunk Rate. You must have this provider-assigned value for XMT Trunk Rate and enter it when you use **cnftrk**.

The total bandwidth of all the virtual trunks in one port cannot exceed the maximum bandwidth of the port. The trunk loading (load units) is maintained per virtual trunk, but the cumulative loading of all virtual trunks on a port is restricted by the transmit and receive rates for the port.

Physical and Virtual Trunk Configuration

Physical and virtual trunk configuration is similar. When you configure a port-level characteristic of a virtual trunk, all the virtual trunks on the port are modified with that characteristic. When the port characteristics of a trunk are modified, all characteristics related to that trunk port are updated.

Virtual trunks appear in the routing topology map as available trunks for routing. The existing physical trunk characteristics, such as bandwidth and satellite/terrestrial type, apply to virtual trunks. The routing algorithm must take into account special restrictions and conid assignments for a virtual trunk. For example, VPCs cannot be routed over a virtual trunk. Also, each virtual trunk has a configurable number of connection channels reserved from the card. The routing algorithm checks for adequate channel availability on a virtual trunk before selecting the trunk for the route.

The connection channel management scheme for the UXM and BXM cards is the same as in the previous release. The conids are selected on a per logical trunk basis. The associated LCNs are selected from a pool of LCNs for the entire card. Each virtual trunk can use the full range of acceptable conid values. The range consists of all the 16-bit values (1-65535), excluding the node numbers and blind addresses. A port uses the VPI to differentiate connections that have the same conid.

The number of channels per virtual trunk can be changed after the trunk has been added to the network. Decreasing the number of channels on an added virtual trunk causes connection reroutes where increasing the number of channels on an added virtual trunk will not cause connection reroutes.

Configuring an IMA-Compliant Trunk

The `cnftrk` command has a parameter that lets you add or delete physical lines of an existing IMA group (IMA Group member parameter). You will be prompted to enter the physical lines using the same format as described in the “Configuring IMA Physical Lines” section on 4-146. When you add or delete a physical link, the following are enforced:

- You cannot delete primary links.
- The total number of physical links in the group must be greater than or equal to the number of retained links. You will be prompted to decrease the number of retained links, if necessary.
- The bandwidth of the deleted physical link will be subtracted from the trunk’s Trunk Transmit Rate only. The trunk’s Trunk Receive Rate is unaffected. If the Trunk Receive Rate needs to be dropped down, you will be prompted to do this first in a separate operation. You will be warned that connection reroutes may occur.

Note that the above functional characteristics only apply to the UXM Firmware Model M, which supports the ATM Forum IMA-Compliant protocol. If a card has UXM Firmware Model A, which supports the Cisco Proprietary protocol, the IMA trunk functions as it did in Release 9.1. For example, you will not be able to add or delete physical links of an existing IMA group.

Primary Link—In an IMA group, you must select one of the physical links to be a primary link. This primary link number is used to refer to this IMA group or trunk. You can use `cnftrk` to add additional links to the group or delete existing links.

When deleting existing links from an IMA group, you cannot delete the primary link. You must first deactivate the trunk using `deltrk`, then use `dntrk` to remove the primary link.

Refer to 9.2 release notes for up-to-date feature support and system requirements.

Specifying a Set of Physical Lines (Comprising an IMA Group)

In Release 9.1, it was a requirement that the IMA group had to consist of consecutive physical lines. In this release, you can define an IMA trunk consisting of non-consecutive physical lines. In addition, you can change the group member by deleting a physical line from an existing IMA trunk.

Use the following syntax to specify an IMA group on a UXM trunk:

- `uptrk slot.group_member.vtrk`

where:

slot is the slot number

group_member is a set of physical lines composing an IMA group. You can specify the member in an expression consisting of the primary link followed by a, or – and additional physical links.

vtrk is the optional virtual trunk number. If at least one virtual trunk already exists on this port, you only have to specify the primary link as the *group_member*.

For example, 9.1–4 defines trunk 9.1 to consist of four physical links, that is, 1, 2, 3 and 4, where physical link 1 is the primary link. (This example is compatible with Release 9.1.)

For example, 9.1–3,5 defines trunk 9.1 to consist of four physical links, that is, 1, 2, 3 and 5 where physical link 1 is the primary link.

For example, 9.5–7,2–3 defines trunk 9.5 to consist of five physical links, that is, 2, 3, 5, 6 and 7 where physical link 5 is the primary link.

9.8,2,4,6 defines trunk 9.8 to consist of all even number of physical links where physical link 8 is the primary link.

Physical and Virtual Trunk Parameters You Can Configure with cnftrk

Table 4-35 below shows the trunk parameters that you can configure with **cnftrk**. You can specify all physical options on virtual trunks. If you change a physical option on a virtual trunk, the change is propagated to all virtual trunks on the trunk port. An X indicates that the parameter is configurable. An X* in the Virtual column indicates that the parameter is a physical parameter, and changing the value for one virtual trunk on the port will automatically cause all virtual trunks on the port to be updated with the same value.

Table 4-35 cnftrk—Parameters That are Configurable on Physical and Virtual Trunks

Descriptions	BXM		UXM	
	Physical	Virtual	Physical	Virtual
Transmit Trunk Rate (configurable using cnfrsrc)	X	X	X	X
Receive Trunk Rate	X	X	X	X
Pass Sync	X	X*	X	X*
Loop Clock	X	X*	X	X*
Statistical Reserve	X	X	X	X
Header Type NNI	X	X*	X	X*
Trunk VPI		X	X	X
Routing Cost	X	X	X	X
Virtual Trunk Type		X		X
Idle Code	X	X*	X	X*
Restrict PCC traffic	X	X	X	X
Link Type	X	X*	X	X*
Line Framing	X	X*	X	X*
Line Coding			X	X*
Line Cable type			X	X*

Table 4-35 *cnftrk—Parameters That are Configurable on Physical and Virtual Trunks (continued)*

Descriptions	BXM		UXM	
	Physical	Virtual	Physical	Virtual
Line cable length	X	X*	X	X*
HCS Masking	X	X*	X	X*
Payload Scramble	X	X*	X	X*
Connection Channels	X	X	X	X
Gateway Channels			X	X
Valid Traffic classes	X	X	X	X
Frame Scramble	X	X*	X	X*
Deroute Delay Time	X	X	X	X
VC (Traffic) Shaping	X	X	X	X
Protocol by the Card	X	X	X	X
IMA Differential Delay			X	X
IMA Clock Mode			X	X
IMA Group member			X	X
Retained links			X	X

Virtual Trunk Traffic Classes

All types of Cisco traffic are supported through an ATM cloud. Every trunk is defaulted to carry every type of traffic. The CBR, VBR (rt-VBR and nrt-VBR), and ABR virtual trunks within the cloud should be configured to carry the correct type of traffic. The CBR trunk is suited to carry all types of traffic. The VBR trunk is best suited to carry IGX Frame Relay and BPX VBR traffic, as well as Optimized Bandwidth Management (formerly called ForeSight) and ABR traffic. The ABR trunk is best suited to carry Optimized Bandwidth Management and ABR traffic. You can change the type of traffic each trunk carries. However, to avoid unpredictable results, it is best to stick to the recommended traffic types for a given VPC type.

Two-stage queueing at the egress of virtual trunks allows shaping of traffic before it enters the cloud. However, the traffic is still routed on a single VPC and may be affected by the traffic class of the VPC selected.

You can configure any number of virtual trunks between two ports up to the maximum number of virtual trunks per slot and the maximum number of logical trunks per node. These trunks can be any number of three trunk types.

The unique characteristics of CBR, VBR (rt-VBR and nrt-VBR), and ABR traffic are maintained through the cloud as long as the correct type of virtual trunk is used. The traffic classes allowed per virtual trunk are configured with **cnftrk**. The routing algorithm excludes virtual trunks whose traffic class is not compatible with the candidate connection to be routed.

Adding a Single Virtual Trunk

The following example describes a typical scenario of adding one virtual trunk across an ATM network. One side of the cloud is a BPX with a BXM trunk in slot 4. On the other side of the cloud is an IGX with a UXM trunk card in slot 10. A virtual trunk is added between port 3 on the BXM and port 2 of the UXM.

Use the same steps that follow to add a virtual trunk on top of IMA ports on the IGX platform.

Once you up a virtual trunk, and the IMA port has been allocated during the **uptrk** command, then you up additional virtual trunks using ONLY the primary IMA port, for example, 10.2.2, 10.2.3, and so on.



Note

You must configure a VPC within the cloud first.



Note

You must configure a VPC within the cloud first.

1. On BPX_A, up virtual trunk #1 on BXM trunk port 4.3.1.
uptrk 4.3.1
2. On BPX_A, configure the VPI, VPC type, traffic classes, number of connection channels, and header type.
cnftrk 4.3.1
3. On IGX_A, up the virtual trunk #1 on the UXM trunk port 10.
uptrk 10.2.1
4. On IGX_A, configure the VPI, VPC type, traffic classes, number of connection channels, and header type.
cnftrk 10.2.1
5. On BPX_A, add a virtual trunk between the two nodes. (Executing **addtrk 10.2.1** at IGX_A would also add a virtual trunk between the two nodes.)
addtrk 4.3.1

The VPI values you chose during **cnftrk** must match those used by the cloud VPC. Also, both ends of the virtual trunk must match on Transmit Rate, VPC type, traffic classes supported, and number of connection channels supported. The **addtrk** command checks for matching values before allowing the trunk to be added to the network topology.

The network topology from BPX_A's perspective after you add the trunk will be:

```
BPX_A    4.3.1-10.2.1/IGX_A
```

This release supports virtual trunking on both the BPX and IGX. IMA trunk ports are referenced by the first physical line of the trunk port after **uptrk** has been executed. For example, you can *uptrk 1.5–8.9*. You can then up a second trunk (which, in this case, is a virtual trunk on slot.port 1.5) on the same trunk port using *uptrk 1.5.11*.

Full Name

Configure trunk

Syntax

```
cnftrk <slot.port>[.vtrk] <options for E1 | T1 | E3 | T3 | OC-3 | OC-12 | E2 | HSSI | SR >
```

Related Commands

```
addtrk, dsptrkcnf
```

Attributes

Privilege	Jobs	Log	Node	Lock
1	Yes	Yes	IGX, BPX	Yes

Example 1

```
cnftrk 11
```

Description

Configure trunk 11. The trunk in slot 11 is an ATM T3 trunk on an ALM/B. (If you want to verify the card is the trunk version of the ALM, use either **dspscd** or **dspscds** and check the front card “Rev.” The Rev column contains a B for the first character for an ALM/B.)

System Response

```
IGX8420          TN      SuperUser      IGX 8420    9.2    Sep. 5 1998  16:38 PST

PLN 11 Config      T3/576 [192000pps]  ALM slot: 11
Clock Rate:        --                Idle code:          7F hex
Transmit Trunk Rate: 96000 cps          Restrict PCC traffic: No
Rcv Trunk Rate:    192000 pps      Link type:          Terrestrial
Subrate interface: --                Line framing:       --
Subrate data rate: --                coding:             --
Line DS-0 map:     --                CRC:                --
Pass sync:         Yes              recv impedance:    --
Loop clock:        No                cable type:
Statistical Reserve: 992 pps          length:             0-225 ft.
Header Type:       STI                HCS Masking:       Yes
Gateway Type:      BAM                Payload Scramble:   No
VPI Address:       0                  End supp BData:    Yes
VCI Address:       0                  End supp FST:      Yes
Deroute delay time: 0 seconds
```

```
Last Command: cnftrk 11
```

```
Next Command:
```

Example 2

```
cnftrk 1.1
```

Description

Configure trunk 1.1. This trunk is an ATM T3 trunk on a BPX node.

System Response

```

batman          TN      SuperUser      BPX 8620      9.1          Date/Time Not Set

TRK  1.1 Config      T3      [96000 cps]  BNI-T3 slot: 1
                                     Restrict CC traffic: No
Transmit Rate:      96000                                     Link type:      Terrestrial
Subrate interface:  --                                     Line framing:   --
Subrate data rate:  --                                     coding:        --
Line DS-0 map:      --                                     CRC:           --
Pass sync:          Yes                                     recv impedance: --
Loop clock:         No                                     cable type:    --
Statistical Reserve: 992 cps                                     length:        0-225 ft.
Idle code:          7F hex                                     HCS Masking:   Yes
Connection Channels: 1771                                     Payload Scramble: No
Valid Traffic Classes:
  V, TS, NTS, FR, FST, CBR, rt-VBR, nrt-VBR, ABR  Cell Header Type: --
                                     Virtual Trunk Type: --
SVC Channels:       0                                     Virtual Trunk VPI: --
SVC Bandwidth:      0 cps                                     Virtual Trunk Service: --

This Command: cnftrk 1.1

Transmit Rate [T2=14490, E3=80000, T3=96000, OC-3 = 353208](96000):

```

Example 3**cnftrk 13.1.1****Description**

Configure trunk 13.1.1 (a virtual trunk on an ATM T3).

System Response

```

sw97          TN      SuperUser      BPX 8620      9.2          July 30 1998 11:45 GMT

TRK 13.1.1 Config T3          [2867 cps]   BNI-T3 slot: 13
Restrict CC traffic: No
Transmit Rate:          3000          Link type:    Terrestrial
Subrate interface:     --          Line framing: --
Subrate data rate:     --          coding:      --
Line DS-0 map:         --          CRC:         --
Pass sync:             No          recv impedance: --
Loop clock:            No          cable type:
Statistical Reserve:   992 cps          length:      0-225 ft.
Idle code:             7F hex        HCS Masking: Yes
Connection Channels:   55          Payload Scramble: No
Valid Traffic Classes: V,TS,NTS,FR,FST,CBR,rt-VBR,nrt-VBR,ABR
Frame Scramble:       --
Virtual Trunk Type:   CBR
Virtual Trunk VPI:    0
Virtual Trunk Service: 4

Last Command: cnftrk 13.1.1 3000 N N 992 7F 55 V,TS,NTS,FR,FST,CBR,rt-VBR,nrt-VBR,ABR N
TERRESTRIAL 0 Y N CBR 0

Next Command:

```

Example 4**cnftrk 6.3****Description**

Configure trunk 6.3 (an OC-3 trunk on a UXM).

System Response

```

sw228          TN      SuperUser      IGX 8420      9.2.0r      Aug. 27 1998 17:42 PST

TRK 6.3 Config      OC-3      [353056cps] UXM slot: 6
Transmit Trunk Rate: 353207 cps      Frame Scramble:      Yes
Rcv Trunk Rate:     353207 cps      Cell Framing:       STS-3C
Pass sync:         Yes
Loop clock:        No
Statistical Reserve: 1000 cps
Idle code:         7F hex
Restrict PCC traffic: No
Link type:         Terrestrial
Routing cost:      10
HCS Masking:       Yes
Payload Scramble:  Yes
Connection Channels: 256
Gateway Channels:  256
Valid Traffic Classes:
                   V, TS, NTS, FR, FST, CBR, rt-VBR, nrt-VBR, ABR

Last Command: cnftrk 6.3

Next Command:

```

Example 5**cnftrk 8.1****Description**

Configure trunk 8.1 (a T3 trunk on a UXM).

System Response

```

sw228          TN      SuperUser      IGX 16       9.1.w2      Aug. 27 1997 17:42 PST

TRK 8.1 Config      T3        [96000cps] UXM slot: 8
Transmit Trunk Rate: 96000 cps
Rcv Trunk Rate:     96000 cps      Line Framing:       PLCP
Pass sync:         Yes           Cable Length        0-255 ft.
Loop clock:        No
Statistical Reserve: 1000 cps
Idle code:         7F hex
Restrict PCC traffic: No
Link type:         Terrestrial
Routing cost:      10
HCS Masking:       Yes
Payload Scramble:  Yes
Connection Channels: 256
Gateway Channels:  256
Valid Traffic Classes:
                   V, TS, NTS, FR, FST, CBR, rt-VBR, nrt-VBR, ABR

Last Command: cnftrk 8.1

Next Command:

```


Example 6**cnftrk 10.1****Description**

Configure trunk 10.1 (an E3 trunk on a UXM).

System Response

```

sw228          TN      SuperUser      IGX 8420      9.2      Aug. 27 1998 17:42 PST

TRK  10.1 Config      E3      [80000cps] UXM slot: 10
Transmit Trunk Rate:  80000 cps
Rcv Trunk Rate:      80000 cps      Line Framing:      HEC
Pass sync:          Yes      Cable Length      0-255 ft.
Loop clock:        No
Statistical Reserve: 1000 cps
Idle code:         7F hex
Restrict PCC traffic: No
Link type:         Terrestrial
Routing cost:      10
HCS Masking:      Yes
Payload Scramble:  Yes
Connection Channels: 256
Gateway Channels:  256
Valid Traffic Classes:
                   V, TS, NTS, FR, FST, CBR, rt-VBR, nrt-VBR, ABR

Last Command:  cnftrk 10.1

Next Command:

```

Example 7**cnftrk 5.2****Description**

Configure an IMA trunk 5.2 (an E1 trunk on a UXM), which consists of non-consecutive physical lines 1, 3, 5, and 7.

System Response

```

sw224          TN      SuperUser      IGX 8420      9.2      Aug. 27 1998      17:50 GMT

TRK 5.2-8 Config      E1/203 [30641 cps] UXM slot: 5
Line DS-0 map:        1-15,17-31
Retained links:       7
IMA Group member:     1,3,5,7      Valid Traffic Classes:
Transmit Trunk Rate:  30641 cps      V,TS,NTS,FR,FST,CBR,rt-VBR,nrt-VBR,ABR
Rcv Trunk Rate:       28075 cps      IMA Protocol Option: Disabled
Pass sync:            Yes          IMA Max. Diff. Dly: 200 msec
Loop clock:           No          IMA Clock Mode: CTC
Statistical Reserve:  600 cps      Deroute delay time: 0 seconds
Idle code:            54 hex
Restrict PCC traffic: No
Link type:            Terrestrial
Routing cost:         10
Line coding:          HDB3
HCS Masking:          Yes
Payload Scramble:     Yes
Connection Channels:  256
Gateway Channels:     256

This Command: cnftrk 5.2

```

**Note**

The ATM Forum–compliant ATM Inverse Multiplexing standard does not support the IMA link autodisable option. Previous to Release 9.2, the IMA link auto disable parameter displayed for IMA links, but it does not display in Release 9.2.

The IMA group member and IMA Differential delay parameters are configurable. The IMA Clock Mode parameter is fixed at CTC and is not configurable.

Also, note that you can configure IMA trunk parameters on virtual trunks that are on top of IMA ports.

Example 8**cnftrk 10.1****Description**

Configure trunk 10.1 (a T1 trunk on a UXM).

System Response

```

sb-reef          TN      SuperUser      IGX 8420      9.2      Aug. 27 1998      17:46 PDT

TRK 10.1-5 Config      T1/115 [17358 cps] UXM slot: 10
IMA group member      1,3,5,7
Transmit Trunk Rate:  17358 cps      Connection Channels:  256
Rcv Trunk Rate:      17358 cps      Gateway Channels:     256
Pass sync:           Yes      Valid Traffic Classes:
Loop clock:          No      V, TS, NTS, FR, FST, CBR, rt-VBR, nrt-VBR, ABR
Statistical Reserve: 600 cps      Retained links:      5
Idle code:           7F hex      IMA Protocol Option: Disabled
Restrict PCC traffic: No      IMA Max. Diff. Dly:  200 msec.
Link type:           Terrestrial      IMA Clock Mode:     CTC
Line framing:        ESF
Line coding:         B8ZS
Line cable type:     ABAM
Line cable length:   0-131 ft.
HCS Masking:        Yes
Payload Scramble:    No

Last Command: cnftrk 10.1

```

**Note**

The ATM Forum-compliant ATM Inverse Multiplexing standard does not support the IMA link auto-disable option. Previous to Release 9.2, the IMA link auto disable parameter displayed for IMA links, but it does not display in this release.

If the IMA link auto disable option is disabled, the Window size, Max transition counts, and Link reenable time parameters will not display. In this release, because the ATM Forum-compliant ATM Inverse Multiplexing standard does not support the IMA link auto disable option, these parameters do not display.

Refer to Table 4-36 and Table 4-37 for a list of **cnftrk** parameters, and **cnftrk** optional parameters.

Table 4-36 *cnftrk—Parameters*

Trunk Option	Type	Description	Possible Entries	Default
slot.port	All	The number of the trunk to configure.	Any valid slot and port. For cards with one port, use slot.	N/A
Trunk Identification (display only—not configurable)	All	Displays trunk number, trunk type and bandwidth supplied; and the card type and slot number of the unit supporting the trunk.	T3, E3, T1, E1, E2, fractional T1, fractional E1 subrate, ATM, NTC, NTM, OC-3, STM1, OC-12, STM4.	none
Clock Rate	ATM	This clock rate is for only HSSI.	4 Mbps–50.84Mbps	

Table 4-36 cnftrk—Parameters (continued)


Trunk Option	Type	Description	Possible Entries	Default
Transmit Trunk Rate (display only—not configurable)	ATM	<p>This indicates the trunk load, and is configurable by using cnfrsrc command for BXM cards (BPX platform). This parameter appears on the cnftrk screen for display purposes only.</p> <p>On IGX, Transmit Trunk Rate is configurable after a trunk has been added.</p> <p> Note The trunk load, which displays in brackets at the end of the first line on the cnftrk display, may vary from the Transmit Trunk Rate value. This is due to the way that cells are converted to DS0s, and vice versa, and the way the Rcv Trunk Rate determines the Transmit load at the other end of the trunk. The Transmit Trunk Rate in cells per second (cps) may not fit in the full DS0 thus the resulting value may be truncated. The result is that the values displayed in Trunk load field and Transmit Trunk Rate fields may display different values.</p>		
Rcv TRK Rate	ATM	<p>CELLBUS or MUXBUS bandwidth in packets per second (pps) to allocate to a BTM, ALM/B. On a BPX, Rcv TRK Rate is not used.</p> <p>On IGX, Rcv Trunk Rate is configurable after a trunk has been added.</p>	<p>ALM/B T3: 1K–192K pps</p> <p>BTM (IGX): 0–80K pps</p> <p>BTM-E1: 0–10538 pps for CGW, unframed E1 or 0–10208 pps for CGW, for framed E1</p>	1000 pps
Subrate interface	PKT	Subrate physical interface type	X.21 V.35	X.21
Subrate data rate	PKT	Subrate data rate in Kbps. Allows you to specify, in Kpbs, the clock rate for the selected subrate interface. Acceptable values are any multiple of 64 Kpbs up to a maximum of 1920 Kpbs.	64 Kbps, 128 Kbps, 256 Kbps, 384 Kbps, 1.024Mbps, 1.536 Mbps, and 1.920Mbps	1920 Kbps
DS0 map	PKT	Specifies the DS0s to use for a fractional T1 or E1 bundle. Optional “a” = “use alternating channels” (for example, 20–30a means 20, 22, 24, and so on.)	x - y[a]	0-31 (E1) 0-23 (T1)
Pass sync	All	Enables the trunk to pass a clock for network synchronization.	Yes No	Yes for standard, no for virtual trunks
Loop Clock	All	Loop receive clock back to transmit.	Yes No	No

Table 4-36 cnfrtk—Parameters (continued)

Trunk Option	Type	Description	Possible Entries	Default
Statistical Reserve	All	<p>This trunk bandwidth is reserved for non-standard traffic, such as internode controller messages or user traffic diverted because of a failure.</p> <p>With Release 9.3.0 switch software, the default values for statistical reserves are increased to accommodate sufficient bandwidth for control traffic. The statistical reserve can be changed. However, if you modify the reserves below the recommended statistical reserve, a warning message is displayed. For example, if the statistical reserve is changed below recommended values for “upped” trunks, the warning message that follows is displayed:</p> <pre>WARNING: Changing stats reserve < {1000 300 } may cause a drop in CC traffic</pre>	0–10666	The recommended stats reserve for T3/E3/OC3/OC12 is 1000 cps and 300 cps for T1/E1 virtual trunks. See also Table 4-38 and Table 4-39 for values.
Header Type	ATM	Selects the ATM cell header type: UNI, NNI, or STI. UNI is the default for virtual trunks but you may need to configure this parameter to NNI to match the header type of the VPC provided by the ATM cloud. In this release, this parameter is configurable for physical and virtual trunks. See the <i>Cisco WAN Switching System Overview</i> for a description.	UNI NNI STI	STI
Gateway Type	ATM	Defines the type of addressing mode for this trunk. See <i>Cisco WAN Switching System Overview</i> for a description.	BPX-BPX (BAM) Cloud (CAM) Simple (SAM)	BAM
VPI Address	ATM	Virtual path address in ATM cell. The VPI configured for a virtual trunk must match the VPI for the VPC in the cloud. Valid VPC VPIs depend on the port type. Must be non-0 for a virtual trunk.	BXM/UXM (UNI)—1-255 BXM/UXM (NNI)—1-4095 BNI T3/E3—1-255 BNI OC-3—1-63	0
VCI Address	ATM	Virtual circuit address in ATM cell.	0–65,535	0
Idle code	All	HEX code either in the payload space of an ATM <i>idle cell</i> or on an <i>idle FastPacket trunk</i> (<i>idle packets</i> do not exist)	0–FF (hex)	54 (E1) 7F (T1, ATM)
SVC Channels	ATM	The number of channels reserved for SVCs.	T3: 0–1771 E3: 0–1771 OC-3: 0–16199	0
SVC Bandwidth	ATM	The bandwidth reserved for SVCs.	T3: 96000 cps E3: 80000 cps OC-3: 353208 cps	0

Table 4-36 cnfrk—Parameters (continued)

Trunk Option	Type	Description	Possible Entries	Default
Restrict CC traffic (requires superuser privilege)	All	Restrict node controller messages from a trunk. Restricting CC traffic can cause serious problems. Contact the TAC through Cisco Customer Engineering before you change it.	Y N	No
Link type	All	Terrestrial or Satellite link.Link Type applies to configuring a route so it can “avoid satellite.”	T S	T
Routing Cost	ATM	The administrative cost of a trunk for when cost-based routing is configured.	1–50	10 (upon trunk activation)
Line framing	PKT	T1 line framing	D4 ESF	D4
Line coding	PKT	E1 line coding T1 line coding	HDB3 AMI ZCS B8ZS AMI	HDB3 ZCS
Line CRC	PKT	E1 CRC-4	Yes No	No
Recv impedance	PKT	E1 receive impedance.	1 = 75W unbalanced 2 = 75W balanced 3 = 120W balanced	1
Cable type and cable length	PKT ATM	Length and type of cable used for trunk. Designates the software configurable line build-out to match the cable length from the IGX node to the DSX cross-connect. For BPX, the choices are 0–225 feet and over 225 feet. Cable type is not selectable for BPX. Not applicable to MMF or SMF.	1 = 0–220' MAT 2 = 220–440' MAT 3 = 440–655' MAT 4 = 0 -133' ABAM 5 = 133–266' ABAM 6 = 266–399' ABAM 7 = 399–533' ABAM 8 = 533–655' ABAM 0= 0–225 1= greater than 255	4 0
HCS Masking	ATM	Mask the ATM cell header checksum to disable error checking. HCS Masking applies to E3, OC-3, and OC-12 only.	Yes No	Yes
Payload Scramble	ATM BNI	Scramble the cell payload.	Yes No	Yes for BNI-E3 No for all others
End supp BData	PKT ATM	Indicates whether the far end of a trunk supports bursty, Frame Relay data.	Yes No	No
End supp FST	PKT ATM	Indicates whether the far end of the trunk supports Optimized Bandwidth Management for Frame Relay.	Yes No	No
Gateway Efficiency	ATM	How many packets to stuff into an ATM cell. Does not apply to BNI.	1 2 3	2

Table 4-36 *cnftrk*—Parameters (continued)

Trunk Option	Type	Description	Possible Entries	Default
IMA Differential Delay		<p>The possible value ranges between 0 to 200 milliseconds. Differential delay of 200 msec is the default.</p> <p>Because all physical links share the same line configuration, any changes made to this parameter and IMA Clock Mode parameter will be applied to all physical links of the specified IMA group.</p> <p>This parameter is configurable on virtual trunks that are on top of IMA ports.</p>	0-200 msec	0-200 msec
IMA Clock Mode		<p>Two clock mode options are available: Common Transmit Clock Source (CTC mode), and Independent Transmit Clock Source (ITC mode). CTC mode is the default.</p> <p>This parameter is configurable on virtual trunks that are on top of IMA ports.</p>		CTC mode
IMA Group member		<p>Lets you add or delete physical lines of an existing IMA group. You are prompted to enter the physical lines using the following format, for example:</p> <p>IMA Group member: 1,3,5,7 or IMA Group member: where 1,3,5,7 are physical lines that comprise the IMA group.</p> <p>You can configure this parameter on virtual trunks that are on top of IMA ports.</p> <p><i>IMA Group member</i> is a set of physical lines comprising an IMA group. You can specify the group member as an expression consisting of the primary link followed by a “,” (comma), or a hyphen (-), and additional physical links. You then use the following syntax to up a trunk when you specify an IMA group on a UXM trunk:</p> <p>uptrk slot.group_member.vtrk</p>	primary link (slot.port)	No default
Retained links		Total number of physical links in the group must be greater than or equal to the number of retained links.		

Table 4-36 *cnftrk*—Parameters (continued)

Trunk Option	Type	Description	Possible Entries	Default
IMA Protocol Option		Lets you enable/disable the IMA Protocol on trunks that have only <i>one</i> physical line.	Enabled/Disabled	Default: IMA protocol disabled on these types of trunks
Deroute Delay Time	All	<p>Indicates how long in seconds the network will wait before rerouting connections on a failed trunk. This helps when statistical errors are occurring or when a trunk momentarily moves into a failure state then returns to normal operation. This feature is relevant when rerouting the connections is more of a disruption than the errors caused by the intermittent trunk.</p> <p>Causes each node not to recognize the trunk as failed until this timer expires at the nodes used by the trunk. This indirectly affects the time that A-bit notifications are sent out because the connection deroute is also delayed.</p> <p>Regarding the A-bit Notifications feature in Release 9.1.07, this parameter specifies the maximum number of connections that can be derouted at the same time when the connection management (CM) state machine runs.</p>	0-600	0

Table 4-37 cnftrk—Optional Parameters

Virtual Trunk Parameter	Type	Description	Possible Entries	Default
Connection Channels	BNI	<p>The maximum number of connection channels per trunk. All virtual trunks on the port share this total. The number of connections added to the port cannot exceed the number of connection channels configured for the port.</p> <p>Number of connection channels, or LCNs, on the trunk port that are usable by the virtual trunk. This number cannot be greater than the total number of connection channels on the card. The maximum number of channels is additionally limited by the number of VCI bits in the UNI cell header. For a virtual trunk, divide this number by the maximum number of virtual trunks on the port to get the default.</p>	<p>BNI-T3/E3: max 1771</p> <p>BNI-OC-3: max 15867 (3837 maximum/virtual trunk)</p> <p>BXM/UXM: 1–(<i>number of channels allowable on card</i>)</p>	<p>BNI-T3/E3: 1771</p> <p>BNI-OC-3: 15867</p> <p>For Virtual Trunks: BNI-T3/E3: 55 BNI-OC-3: 1442</p>
Valid Traffic Classes	BNI, BXM	<p>The valid types of traffic for a virtual trunk. The recommended traffic classes for each virtual trunk type:</p> <p>On a CBR trunk: ATM CBR, NTS, TS, voice. All traffic classes are recommended on a CBR trunk.</p> <p>On a VBR trunk: ATM VBR, bursty data A, bursty data, bursty data B (Optimized Bandwidth Management), ABR</p> <p>On an ABR trunk: ATM ABR and bursty data B (Optimized Bandwidth Management).</p>	<p>V—voice</p> <p>TS—timestamped</p> <p>NTS—non-timestamped</p> <p>FR—Frame Relay</p> <p>FST—Optimized Bandwidth Management (formerly ForeSight)</p> <p>CBR—constant bit rate</p> <p>VBR—variable bit rate</p> <p>ABR—available bit rate</p>	
Virtual Trunk Type	BNI	This choice usually comes from the carrier that provides the ATM cloud. This is the VPC type provided by the ATM cloud.	CBR, VBR, ABR	CBR
Virtual Trunk VPI	BNI	<p>Virtual trunks must be configured to have a greater-than-0 VPI before connections are added by addcon. This value usually comes from the carrier that provides the ATM cloud.</p> <p>VPI configured for a virtual trunk matches VPI for VPC in the ATM cloud. Every cell transmitted to this trunk has this VPI value. Valid VPC VPIs depend on the port type.</p>	<p>1–255 for BXM/UXM (UNI)</p> <p>1–4095 for BXM/UXM (NNI)</p> <p>1–255 for BNI T3/E3</p> <p>1–63 for BNI OC-3 (STM1)</p>	

Table 4-38 Default Statistical Reserves for Physical Trunks

	BNI	BXM	UXM	BTM	ALM	NTM
IMA-T1/E1	N/A	N/A	5000cps > T2, E2 1000 cps < T2, E2	N/A	N/A	N/A
T1/E1	N/A	N/A	1000 cps	N/A	N/A	1000 cps
T3/E3	5000 cps	5000 cps	5000 cps	5000 cps	5000 cps	N/A
OC3	5000 cps	5000 cps	5000 cps	N/A	N/A	N/A
OC12	N/A	5000 cps	N/A	N/A	N/A	N/A

T2 = 14490 cps (96 DS0s)

E2 = 19900 cps

N/A = not available

Table 4-39 Default Statistical Reserves for Virtual Trunks

	BNI	BXM	UXM
T1/E1	N/A	N/A	300 cps
T3/E3	1000 cps	1000 cps	1000 cps
OC3	1000 cps	1000 cps	1000 cps
OC12	N/A	1000 cps	N/A

N/A = not available

cnftrkalm

Use **cnftrkalm** to configure whether or not alarms on a trunk cause system alarms and reporting (on IGX only). When a trunk is upped and added to the network, alarm reporting is enabled, but **cnftrkalm** lets you disable alarms on upped trunks. Disabling alarms can be useful when a trunk is connected to a node but not yet in service or when a trunk has occasional bursts of errors but still functions.

A virtual trunk also has trunk port alarms that are shared with all the other virtual trunks on the port. These alarms are cleared and set together for all the virtual trunks sharing the same port.

Statistical alarming is provided on cell drops from each of the Advanced CoS Management queues. These alarms are maintained separately for virtual trunks on the same port.

On an IGX node, enabled alarms cause an output from the ARC or ARM card or an indication to Cisco WAN Manager.

Table 4-40 below shows a table of physical and logical trunk alarms, with the alarm type, the physical interface type, and whether the alarm is a logical, statistical, or integrated alarm.

Table 4-40 Physical and Logical Trunk Alarms Supported on IGX and BPX

Alarm Type	Physical					Logical	Statistical	Integrated
	T1	E1	T3	E3	SONET			
LOS	X	X	X	X	X		X	X
OOF	X	X	X	X	X		X	X
AIS	X	X	X	X	X		X	X
YEL	X	X	X	X	X			X
PLCP OOF			X					X
LOC				X	X			X
LOP					X			X
PATH AIS					X			X
PATH YEL					X			X
PATH TRC					X			X
SEC TRC					X			X
ROOF	X	X						X
FER	X	X						X
AIS16	X	X					X	X
IMA	X	X						X
NTS Cells Dropped						X	X	
TS Cells Dropped						X	X	
Voice Cells Dropped						X	X	
Bdata Cells Dropped						X	X	
BdatB Cells Dropped						X	X	
HP Cells Dropped						X	X	
CBR Cells dropped						X	X	
VBR Cells dropped						X	X	
ABR Cells dropped						X	X	

Trunk Alarms

Logical trunk alarms, physical trunk alarms, and IMA physical line alarms are briefly described below.

Logical Trunk Alarms

Statistical alarming is provided on cell drops from each of the Advanced CoS Management queues. These alarms are maintained separately for virtual trunks on the same port.

Physical Trunk Alarms

A virtual trunk also has trunk port alarms that are shared with all the other virtual trunks on the port. These alarms are cleared and set together for all the virtual trunks sharing the same port.

IMA Physical Line Alarms

IMA physical line alarms are a special case. Each IMA trunk port has a configurable number of retained links. If the number of non-alarmed lines is less than the number of retained links, the logical trunks on the IMA trunk port are placed into major alarm.

For example, suppose there are IMA virtual trunks 4.5-8.2 and 4.5-8.7. Further, the number of retained links on 4.5-8 has been configured to 2. If 4.5 and 4.6 go into LOS, physical line alarms are generated for these 2 physical lines. The logical trunks 4.5-8.2 and 4.5-8.7 do not go into alarm because the two retained links are still healthy. In this situation, the bandwidth on the logical trunks is adjusted downwards to prevent cell drops, and the connections on those trunks are re-routed. If a third line goes into alarm, the logical trunks are then failed. See Table 4-41 for a list of physical and trunk alarms that are supported on IMA lines.

Table 4-41 Physical and Logical Alarms Supported on IMA Physical Lines

Alarm Type	Physical					Logical	Statistical	Integrated
	T1	E1	T3	E3	SONET			
LOS	X	X	X	X	X		X	X
OOF	X	X	X	X	X		X	X
AIS	X	X	X	X	X		X	X
YEL	X	X	X	X	X			X
PLCP OOF			X					X
LOC				X	X			X
LOP					X			X
PATH AIS					X			X
PATH YEL					X			X
PATH TRC					X			X
SEC TRC					X			X
ROOF	X	X						X
FER	X	X						X
AIS16	X	X					X	X
IMA	X	X						X
NTS Cells Dropped						X	X	

Table 4-41 Physical and Logical Alarms Supported on IMA Physical Lines (continued)

Alarm Type	Physical					Logical	Statistical	Integrated
	T1	E1	T3	E3	SONET			
TS Cells Dropped						X	X	
Voice Cells Dropped						X	X	
BDATA Cells Dropped						X	X	
BDATB Cells Dropped						X	X	
HP Cells Dropped						X	X	
CBR Cells Dropped						X	X	
VBR Cells Dropped						X	X	
ABR Cells Dropped						X	X	

■ cnftrkalm

Full Name

Configure trunk alarms

Syntax

cnftrkalm <slot,port>[.vtrk] <e | d>

Related Commands

dspalms, dsptrks

Attributes

Privilege	Jobs	Log	Node	Lock
1-5	Yes	Yes	IGX, BPX	Yes

Example 1

cnftrkalm 7 d

Description

Disable trunk alarms on trunk 7.

System Response

```
beta          TRM   YourID:1          IGX 8430    9.2    Aug. 3 1998 15:21 MST

PLN  Type      Current Line Alarm Status      Other End
 7   E1/32     Clear - Line OK                alpha.10
 9   T1/24     Clear - Line OK                gamma.10
13   T1/24     Clear - Line OK                alpha.14
15   T1/24     Clear - Line OK                gamma.15
20   T3/3      Major - AIT Missing             -
```

Last Command: cnftrkalm 7 d

Next Command:

Table 4-42 *cnftrkalm—Parameters*

Parameter	Description
slot.port	Specifies the trunk number.
e	Enables the alarm.
d	Disables the alarm.

Table 4-43 *cnftrkalm—Optional Parameters*

Parameter	Description
vtrk	Specifies the virtual trunk number.

cnftrkict

Configures the output lines of an interface control template for a subrate trunk. Table 4-44 shows the configurable signals.

Table 4-44 *Configurable Signals in an Interface Control Template*

Interface Type	Output Signal	Inputs
X.21	C, I	
V.35	RTS, DTR	CTS, DSR
MIL-188	IS, LL, RL, RS, SF, SS, TR	DM, CS

Full Name

Configure trunk interface control template

Syntax

```
cnftrkict <line> <output> <source>
```

Related Commands

dsptrkict, prttrkict

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	Yes	Yes	IGX	Yes

Example 1

```
cnftrkict 9 c on
```

Description

Configure output lead “c” as “on” in the interface control template for subrate trunk 9.

System Response

```
beta          TRM   YourID:1          IPX 8430      9.2      Aug. 3 1998 15:15 MST
```

```
Packet Line:9
Interface:X.21DTE
```

```
Interface Control Template for Trunk Line
```

```
Lead Output Value Lead0 Output Value
C /DTR ON
```

```
Last Command: cnftrkict 9 c on
```

```
Next Command:
```

Table 4-45 *cnftrkict-Parameters*

Parameter	Description
line	Specifies the trunk for the interface control template.
output	Specifies the output lead to be configured. Configurable output leads vary depending on the type of data interface used (X.21 or V.35).
source	Specifies how the specified output lead is to be configured. The options are as follows: <ul style="list-style-type: none"> • On, which means the output lead is asserted. • Off, which means the output lead is inhibited. • l (lower case L) Output follows a local input lead. • Input, which specifies the name of the local input lead that the output lead follows. Input leads vary according to the type of data interface supported (X.21 or V.35).

cpytrkict

Copies the interface control template of one trunk to another trunk. Once copied, the control information can be edited with the **cnftrkict** command. See the **cnftrkict** description for more information on configuring the trunk interface control templates.

Full Name

Copy trunk interface control template

Syntax

cpytrkict <source_trunk> <destination_trunk>

Related Commands

cnftrkict, **dsptrkict**

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1

cpytrkict 9 11

Description

Copy the interface control template for trunk 9 to trunk 11.

System Response

```
beta          TRM   YourID:1          IPX 8430    9.2    Aug. 3 1998 15:15 MST
```

```
Packet Line:      9
Interface:        X.21  DTE
```

```
Interface Control Template for Trunk Line
```

```
Lead  Output Value  Lead  Output Value
      C/DTR         ON
```

```
Last Command: cpytrkict 9 11
```

```
Enter destination line number:
```

Table 4-46 *cpytrkict-Parameters*

Parameter	Description
source trunk	Specifies the trunk number of the interface control template information to be copied.
destination trunk	Specifies the trunk number to which the interface control template information is copied.

delapsln

The **delapsln** command deletes SONET Automatic Protection Switching (APS) for the lines. You must enter the working slot.port pair. When you execute the **delapsln** command, the **dspapsln** display appears, showing you that the line you deleted is gone. (The **delapsln** display will be empty, or show only the remaining APS lines.)

SONET APS is a standard that describes the switching of SONET lines from the active line to a standby line to provide hardware line redundancy. The SONET APS feature applies only to BXM OC-3 and OC-12 cards in this release.

For background information on how SONET APS for BXM cards works, refer to “APS Command Summary” in this chapter.

When you execute the **delapsln** command, the switch software does verify that the slot.port arguments support APS.

Full Name

Delete a SONET APS (Automatic Protection Switching) line

Syntax

```
delapsln <slot.port1> < slot.port2> <protocol>
```

where:

slot.port1 = Desired working line number.

Table 4-47 *delapsln Parameters*

Parameter	Description
slot.port1	The desired working line number.

Related Commands

addapsln, cnfapsln, cnfcdaps, dspapsln, dsplog, dspalms

Attributes

Privilege	Jobs	Log	Node	Lock
1	No	Yes	BPX	Yes

Example 1

```
delapsln 2.1
```

Description

Deletes a SONET APS line from a BXM OC-3 or OC-12 card.

System Response

```
sw117      TRM   genre      BPX 8620      9.2.c1      June 1 1999      16:25 PDT
Work/Protect      Actv   Active Line      Standby Line      Current APS      Last User
(Work 1/Work 2)  Line   Alarm Status      Alarm Status      Alarm Status      Switch Req
```

```
Command: delapsln 2.2
```

deltrk

Deletes a trunk. Because deleting a trunk removes the communication path between two nodes, using **deltrk** may split a network into two separate networks. If executing **deltrk** splits the network, then the connections that are using the deleted trunk are also deleted.

If both nodes on the trunk are reachable, you only need to execute **deltrk** on one node. If you delete a trunk on a node while the node at the other end is unreachable, the unreachable node does not detect that the trunk to the other node has been deleted, so be sure to delete the trunk at both nodes in this case.

After you delete a trunk, it still carries framing signals but no traffic. Also, the trunk can generate alarms for counting. To remove a trunk completely, use **dntrk** after executing the **deltrk** command.

In the following situations, the node does not allow **deltrk** to execute:

- Another node is attempting to change the network topology by adding or deleting a trunk.
- Another node is notifying all other nodes that it has a new node name.
- Another node is adding or deleting a channel connection in the network with the **addcon** or **delcon** command.

In Release 9.1.07, when the A-bit Notifications on LMI/ILMI Interface feature is enabled (using **cnfnodeparm**), after deleting the trunk, the master node will deroute all the connections on the trunk. The slave end will receive the A7 (CMUP_DEROUTE) message before the reroute message from the master node. For information on the A-bit Notifications feature, see “Summary of Commands” on page 47.

Regarding the A-bit Notifications feature, each pass in the Connection Management routing state machine involves two activities: deroute and then followed by routing connections. However, connections can be derouted without going through the reroute state machine (for example, **deltrk**). There are several ways to kick off the routing state machine resulting in slightly different deroute and reroute behavior. See the **deltrk**, **dncd**, and **cnfcmparm** (superuser) commands.

Full Name

Delete trunk from a network

Syntax

```
deltrk <slot,port>[.vtrk]
```

Related Commands

addtrk, **dntrk**, **dspnw**, **dsptrks**, **uptrk**

Attributes

Privilege	Jobs	Log	Node	Lock
1	Yes	Yes	IGX, BPX	Yes

Example 1

```
deltrk 7
```

Description

Delete trunk 7 from the network.

System Response

```

beta          TRM   YourID:1          IGX 8430      9.2    Aug. 15 1998 15:02 MST

PLN  Type      Current Line Alarm Status          Other End
 7   E1/32     Clear - Line OK                    -
 9   T1/24     Clear - Line OK                    gamma.10
13   T1/24     Clear - Line OK                    alpha.14
15   T1/24     Clear - Line OK                    gamma.15
20   T3/3      AIT - AIT Missing                  -

```

Last Command: deltrk 7

Next Command:

Table 4-48 deltrk-Parameters

Parameter	Description
slot.port	Specifies the physical trunk number.

Table 4-49 deltrk-Optional Parameters

Parameter	Description
vtrk	Specifies the virtual trunk portion of the trunk identifier.

deltrkred

Removes redundancy from a UXM, ALM/B, BTM, or AIT trunk. After you execute **deltrkred**, you can remove the backup card without causing an alarm.

The trunk redundancy feature (not the Automatic Protection Switching redundancy feature) is supported on the IPX and IGX platforms. This is different from the Automatic Protection Switching redundancy feature, supported in this release. APS is supported only on BXM SONET trunks, and can be used with virtual trunks. That is, the trunk port supporting virtual trunks can have APS line redundancy configured in the same way it would be configured for a physical trunk. The APS commands **addapsln**, **delapsln**, **switchapsln**, and **cnfapsln** are all supported on virtual trunk ports.

Note that the trunk redundancy feature is not supported for virtual trunks. The **addtrkred**, **deltrkred**, and **dsptrkred** commands will be rejected for virtual trunks.

Note that Y-cable redundancy is supported for both the UXM and BXM trunk cards at the edge of the ATM cloud.

■ deltrkred

Full Name

Delete ATM trunk redundancy

Syntax

deltrkred <backup ATM trunk number>

Related Commands

addtrkred, **dsptrkred**

Attributes

Privilege	Jobs	Log	Node	Lock
1-4	No	Yes	IGX	Yes

Example 1

deltrkred 5

Description

Remove ATM trunk redundancy for the card set in slot 5.

System Response

```
beta          TRM   YourID:1          IGX 8430    9.2    Aug. 15 1998 15:15 MST
```

```
ATM LineBackup ATM Line
```

```
58
```

```
Last Command: deltrkred 5
```

```
Next Command:
```

Table 4-50 *deltrkred-Parameters*

Parameter	Description
Backup trunk number	Specifies of the ATM card set assigned as the backup.

dntrk

Downs a trunk, after which it no longer carries framing or statistics. Before you can down a trunk with **dntrk**, you must remove it must from the network with **deltrk** (or **delshelf** in a tiered network).

Full Name

Down trunk

Syntax

dntrk <slot.port>[.vtrk]



Note

No space exists between the port number and the “.” for the virtual trunk specification.

Related Commands

addtrk, **deltrk**, **uptrk**, **dsptrks**

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	Yes	Yes	IGX, BPX	Yes

Example 1

```
dntrk 9
```

Description

Deactivate trunk 9.

System Response

```

beta          TRM   YourID:1          IPX 8430      9.2      Aug. 3 1998 10:53 MST

From Type    Current Line Alarm Status      Other End
13  T1/24     Clear - Line OK                alpha.14
15  T1/24     Clear - Line OK                gamma.15
20  T3/3      Major - AIT Missing            -

```

Last Command: dntrk 9

Next Command:

Table 4-51 dntrk-Parameters

Parameter	Description
slot.port	Specifies the physical trunk.

Table 4-52 dntrk-Optional Parameters

Parameter	Description
vtrk	Specifies a virtual trunk number (applies to BNI only). T3/E3 range is 1–32. OC-3 range is 1–11.

dspapsln

The **dspapsln** command displays the currently configured APS lines and their status.

Full Name

Display currently configured APS lines and their status

Syntax

dspapsln

Related Commands

addapsln, delapsln, cnfapsln, dspapsln, dsplog, dspalms

Attributes

Privilege	Jobs	Log	Node	Lock
1	No	No	BPX	No

Example 1

```
dspapsln
```

Description

Display all the currently configured APS lines and their status.

System Response

```
alexas      TRM      genre      BPX 8600      9.2      May 11 1999      16:25 PDT

Work/Protect  Actv  Active Line  Standby Line  Current APS  Last User
              Line  Alarm Status Alarm Status  Alarm Status Switch Req

2.1  3.1      PROT  OK           OK           Loss of Sig (RED)  Clear
5.1  5.2      WORK  OK           LOS          LOS              Lockout
6.3  6.4      NONE  Deactivated  APS Deactivated
10.1 11.1     PROT  OK           OK           Standard Mismatch Clear

Command: dspapsln
```

Example 2

```
dspapsln
```

System Description

Display currently configured APS lines and their status.

System Response

```
sw117      TRM      genre      BPX 8620      9.2.c1      June 1 1999      16:25 PDT

Work/Protect  Actv  Active Line  Standby Line  Current APS  Last User
              Line  Alarm Status Alarm Status  Alarm Status Switch Req
(Work 1/Work 2)

2.2  3.2      WORK  Loss of Sig (RED)  Remote (YEL)  Remote (YEL)  Clear

Command: dspapsln
```

dspnw

Displays the network topology in tabular form. Alarms appear in a column, and added trunks (by **addtrk**) appear to the right to the node name. Each trunk entry shows the local back card slot number and the node name and back card slot number on the other end of the line. Note the following conventions:

- ~ indicates that the trunk is a satellite line.
- Flashing entry indicates a failed line.
- Blinking node name indicates a node executing downloader software.

If the network has more nodes and trunk connections than are currently on the screen, a “Continue?” prompt appears. Press the Return key to display other parameters, or enter “n” to exit the command.

Full Name

Display network

Syntax

dspnw [+b | -b] [+z | -z]

Related Commands

dspnds, **prrnw**

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

dspnw

Description

Display the network topology in tabular form.

System Response

```

sw91          TN      SuperUser      IGX 8410      9.2   Nov. 13 1998 16:06 GMT

NodeName      Alarm          Trunk          Trunk
sw92          UNRCH
  8-7/sw91
sw200         UNRCH
  14-14/sw201      15-15/sw201      16-16/sw201
sw201         UNRCH
  14-14/sw200      15-15/sw200      16-16/sw200
  12.1-4.5/sw26
sw12          MAJOR
  3.1.2-4.7/sw26      3.1.3-6.3/sw91
sw91          MAJOR
  7-8/sw92          6.3-3.1.3/sw12      6.4-3.1.4/sw68
sw68          Minor
  3.1.4-6.4/sw91

```

This Command: dspnw

Continue?

The display shows a network containing the nodes sw92, sw200, sw201, sw12, sw91, and sw68. The word “Major” to the right of “sw12” and “sw91” (see Alarm column) indicates the existence of alarm conditions such as loss of signal.

On node “sw92”, trunk 8 connects to trunk 7 on node “sw91”. Similarly, on node “sw200”, trunk 14 connects to trunk 14 on node “sw201”. If the two trunk numbers are separated by a tilde (~) in place of a dash (-), this indicates a satellite. Table 4-53 illustrates a map of this network.

Table 4-53 dspnw–Optional Parameters

Parameter	Description
+b	Display only the lines that support bursty data.
-b	Display only the lines that do not support bursty data.
+z	Display only the lines that use ZCS encoding.
-z	Display only the lines that do not use ZCS encoding.

dspphyslns

Displays a summary of line alarm status for the ATM port specified. These include the cell count in the transmit and receive directions, and error counts associated with the port. The display indicates the date and time that the statistics were cleared and the statistics collection time since they were last cleared. Cells transmitted indicates the amount of data transmitted out the port to the user device. Cells received indicates the amount of data received from the user device at the port. Corrupted statistics result from channel/port loopbacks or port tests. A yes in this field indicates that such a loopback or port test has occurred since the statistics were last cleared.

Note that IMA physical line alarms are maintained differently from other types of logical (physical and virtual) trunks. Each IMA trunk has a configurable number of retained links. If the number of non-alarmed lines is less than the number of retained links, the logical (physical and virtual) trunks on

the IMA trunk are placed into major alarm. For example, if a line has IMA virtual trunks 4.5–8.2 and 4.5–8.7, the number of retained links on 4.5–8 has been configured to 2. If 4.5 and 4.6 go into LOS (loss of signal), physical line alarms are generated for these two physical lines. The logical trunks 4.5–8.7 do not go into alarm because the two retained links are still healthy. In this situation, the bandwidth on the logical trunks is adjusted downward to prevent cell drops, and the connections on those trunks are re-routed. If a third line goes into alarm, the logical trunks are then failed.

Full Name

Display the status of the UXM trunk and its physical line (or lines if IMA)

Syntax

dspphyslms [slot]

Related Commands

dspphyslmsstathist

Attributes

Privilege	Jobs	Log	Node	Lock
1–6	No	No	IGX	No

Example 1

dspphyslms

Description

Display the physical line of all the UXM cards on the node.

System Response

```

sw228          TN      SuperUser      IGX 8420      9.2      Aug. 27 1998 17:52 PST

PHYSLN  Type  Current Line Alarm Status      TRK
6.2     OC-3   Major - Loss of Sig (RED)      6.2
6.3     OC-3   Clear - OK                      6.3
11.3    E1/30   Clear - OK                      11.3
11.4    E1/30   Major - Loss of Sig (RED)      11.4-6
11.5    E1/30   Major - Loss of Sig (RED)      11.4-6
11.6    E1/30   Major - Loss of Sig (RED)      11.4-6

```

Last Command: dspphyslns

Example 2**dspphyslns 11****Description**

Display the physical lines of the UXM card in slot 11.

System Response

```

sw228          TN      SuperUser      IGX 8420      9.2      Aug. 27 1998 17:53 PST

PHYSLN  Type  Current Line Alarm Status      TRK
11.1    T1/24   Clear - OK                      11.1x4
11.3    T1/24   Clear - OK                      11.1x4
11.5    T1/24   Clear - OK)                     11.1x4
11.7    T1/24   Clear - OK                      11.1x4

```

Last Command: dspphyslns 11

Table 4-54 dsphyslns–Optional Parameters

Parameter	Description
slot	Specifies the slot number.

dsprkbob

Displays the state of all inputs from subrate line equipment to an IPX or IGX node and the state of all outputs from the node to the subrate line equipment. Display updates can occur at an optional, user-specified interval. Otherwise, the display remains on-screen until Delete is pressed or the display times out. The default interval for updating the display is every 5 seconds. If a trunk is disabled, its number appears in dim, reverse video. See **cnftrkict** for configuration details.

Full Name

Display trunk breakout box

Syntax

dsprkbob <line> [interval]

Related Commands

cnftrkict, **dsprkict**

Attributes

Privilege	Jobs	Log	Node	Lock
1–6	No	No	IGX	Yes

Example 1

dsprkbob 9

Description

Display the breakout for subrate trunk 9.

System Response

```
beta          TRM   YourID:1          IGX 8430    9.2    Sep. 15 1998 15:15 MST
```

```
Packet Line:9
```

```
Interfaces:  X.21    DTE
```

```
Inputs from Line Equipment
```

```
Outputs to Line Equipment
```

Lead	Pin	State	Lead	Pin	State	Lead	Pin	State	Lead	Pin	State
RxD	4/11	Idle	TxD	2/9	Active						
I/DSR	5/12	On				C/DTR	3/10	On			
S/RxC	6/13	Active									

```
Last Command: dsprkbob 9
```

```
Hit DEL key to quit:
```

Table 4-55 dsprkbob-Parameters

Parameter	Description
trunk	Specifies the substrate trunk.

Table 4-56 dsprkbob-Optional Parameters

Parameter	Description
interval	The number of seconds between updates of the breakout box display. The range is 1–60.

dsprkcnf

Displays trunk configuration. The parameter values that **dsprkcnf** displays have been set with **cnftrk** or are default values.

With Release 9.3.0 switch software, the default values for statistical reserves are increased to accommodate sufficient bandwidth for control traffic. The statistical reserve can be changed. However, if you modify the reserve below recommended values, a warning message is displayed. For example, if the statistical reserve is modified below 1000 cps for “upped” T1/E1/T3/OC3/OC12 physical trunks and 300 for T1/E1 virtual trunks, the warning message that follows is displayed:

```
“WARNING: Changing stats reserve < {1000 | 300 } may cause a drop in CC traffic”
```

Table 4-57 Default Statistical Reserves for Physical Trunks

	BNI	BXM	UXM	BTM	ALM	NTM
IMA-T1/E1	N/A	N/A	5000cps > T2, E2 1000 cps < T2, E2	N/A	N/A	N/A
T1/E1	N/A	N/A	1000 cps	N/A	N/A	1000 cps
T3/E3	5000 cps	5000 cps	5000 cps	5000 cps	5000 cps	N/A
OC3	5000 cps	5000 cps	5000 cps	N/A	N/A	N/A
OC12	N/A	5000 cps	N/A	N/A	N/A	N/A

T2 = 14490 cps (96 DS0s)

E2 = 19900 cps

N/A = not available

Table 4-58 Default Statistical Reserves for Virtual Trunks

	BNI	BXM	UXM
T1/E1	N/A	N/A	300 cps
T3/E3	1000 cps	1000 cps	1000 cps
OC3	1000 cps	1000 cps	1000 cps
OC12	N/A	1000 cps	N/A

N/A = not available

As of Release 9.1, **dsptrkcnf** displays the cost of a trunk if cost-based routing is configured. You configure the administrative cost of a trunk with **cnftrk**.

Full Name

Display trunk configuration

Syntax

dsptrkcnf <slot.port>[.vtrk]

Related Commands

cnftrk

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

dsptrkcnf 6.8

Description

Display the configuration for trunk 6.8

System Response

```
sw203          TN      StrataCom      BPX 8620      9.2      Sep. 25 1998 07:35 GMT

TRK 6.8 Config  OC-3      [353207cps]  BXM slot:    6
Transmit Rate:      353208      Line framing: STS-3C
Subrate data rate:  --              coding:      --
Line DS-0 map:      --              CRC:        --
Statistical Reserve: 1000 cps      recv impedance: --
Idle code:          7F hex      cable type:  --
Max Channels/Port:  256              length:     --
Connection Channels: 256              Pass sync:   Yes
Traffic:  V,TS,NTS,FR,FST,CBR,VBR,ABR  Loop clock:  No
SVC Vpi Min:       0              HCS Masking: Yes
SVC Channels:      0              Payload Scramble: Yes
SVC Bandwidth:     0 cps          Frame Scramble: Yes
Restrict CC traffic: No          Cell Header Type: --
Link type:         Terrestrial    Virtual Trunk Type: --
Routing Cost:      10              Virtual Trunk VPI: --
Deroute delay time: 0 seconds

Last Command: dsptrkcnf 6.8

Next Command:
```

Example 2**dsprkcnf 6****Description**

Display the configuration for trunk 6. Trunk 6 is an AIT trunk on an IPX node.

System Response

```

sw91          TN      SuperUser      IGX 8410      9.2          Sep. 22 1998 16:09 GMT

PLN 6 Configuration  T3/3  [1000 pps]  AIT slot: 6
Clock Rate:         --
Transmit Trunk Rate: 96000 cps
Rcv Trunk Rate:     1000 pps
Subrate interface:  --
Subrate data rate:  --
Line DS-0 map:      --
Pass sync:          Yes
Loop clock:         No      pps
Statistical Reserve: 992
Header Type:        STI
Gateway Type:       BAM
VPI Address:        0
VCI Address:        0
Routing Cost:       0

Idle code:          7F hex
Restrict PCC traffic: No
Link type:          Terrestrial
Line framing:       --
coding:             --
CRC:                --
recv impedance:    --
cable type:         --
length:             0-225 ft.
HCS Masking:        Yes
Payload Scramble:   No
End supp BData:     Yes
End supp FST:       Yes

Last Command: dsprkcnf 6

Next Command:

```

Example 3**dsprkcnf 11****Description**

Display the configuration for the E3 trunk in slot 11 (an ALM/B trunk).

System Response

```

IGX16          TN      SuperUser      IGX 16      9.1 Sep. 23 1997 02:08 GMT

PLN 11 Config      E3/480 [160000pps]    ALM slot: 11
Clock Rate:        --                                Idle code:          7F hex
Transmit Trunk Rate: 80000 cps                          Restrict PCC traffic: No
Rcv Trunk Rate:    160000 pps                        Link type:          Terrestrial
Subrate interface: --                                Line framing:       --
Subrate data rate: --                                coding:             --
Line DS-0 map:     --                                CRC:                --
Pass sync:         Yes                               recv impedance:    --
Loop clock:        No                               cable type:         length: 0-225 ft.
Statistical Reserve: 992 pps                        HCS Masking:       Yes
Header Type:       STI                              Payload Scramble:   No
Gateway Type:      BAM                              End supp BData:    Yes
VPI Address:       0                               End supp FST:      Yes
VCI Address:       0
Routing Cost:      10

Last Command: dsptrkcnf 11

Next Command:

```

Example 4**dsprkcnf 13.3.1****Description**

Display the configuration for virtual trunk 13.3.1. The trunk is on a BNI-T3 card set in a BPX node.

System Response

```

sw97          TN      SuperUser      BPX 8620    9.2          June 22 1998 07:34 GMT

TRK 13.3.1 Config T3          [2867 cps]    BNI-T3 slot: 13
Restrict CC traffic: No
Transmit Rate:      3000                                Link type:          Terrestrial
Subrate interface: --                                Line framing:       --
Subrate data rate: --                                coding:             --
Line DS-0 map:     --                                CRC:                --
Pass sync:         No                               recv impedance:    --
Loop clock:        No                               cable type:         length: 0-225 ft.
Statistical Reserve: 992 cps                        HCS Masking:       Yes
Idle code:         7F hex                            Payload Scramble:   No
Connection Channels: 55                            Frame Scramble:     --
Valid Traffic Classes: V, TS, NTS, FR, FST, CBR, VBR, ABR
Virtual Trunk Type: CBR
Virtual Trunk VPI: 1
Virtual Trunk Service: 3

Last Command: dsprkcnf 13.3.1

```

Example 5**dsprkcnf 4.1**

Description

Display the configuration for BXM 4.1 trunk.

System Response

```

b2                TRM    StrataCom    BPX 8620  9.2.3N    Dec. 14 1999 04:43
GMT

TRK 4.1 Config    E3      [80000 cps]    BXM slot:    4
Transmit Rate:    80000                                VPC Conns disabled:  No
Protocol By The Card: No <=====??                Line framing:    --
VC Shaping:       No                                coding:          --
Hdr Type NNI:     Yes                               recv impedance:  --
Statistical Reserve: 1000 cps                       cable type:     --
Idle code:        7F hex                            length:         0-225ft.
Connection Channels: 256                            Pass sync:      No
Traffic:V,TS,NTS,FR,FST,CBR,NRT-VBR,ABR            Loop clock:     No
SVC Vpi Min:      0                                HCS Masking:    Yes
SVC Channels:     0                                Payload Scramble: Yes
SVC Bandwidth:    0 cps                            Frame Scramble:  --
Restrict CC traffic: No                            Virtual Trunk Type: --
Link type:        Terrestrial                       Virtual Trunk VPI: --
Routing Cost:     10                                Deroute delay time: 0

```

Example 5**dsprkcnf 6.3****Description**

Display the configuration for trunk 6.3. The trunk is on a UXM-OC-3 card set in an IGX node.

System Response

```

sw228            TN     SuperUser    IGX 8420  9.2     Aug. 27 1998 17:42 PST

TRK 6.3 Config    OC-3    [353056cps]    UXM slot:    6
Transmit Trunk Rate: 353207 cps                    Frame Scramble:    Yes
Rcv Trunk Rate:     353207 cps                    Cell Framing:      STS-3C
Pass sync:          Yes
Loop clock:         No
Statistical Reserve: 1000 cps
Idle code:          7F hex
Restrict PCC traffic: No
Link type:          Terrestrial
HCS Masking:        Yes
Payload Scramble:   Yes
Connection Channels: 256
Gateway Channels:   256
Valid Traffic Classes:
                    V,TS,NTS,FR,FST,CBR,VBR,ABR
Routing Cost:       10                            Deroute delay time: 0 seconds

Last Command: dsprkcnf 6.3

Next Command:

```

Example 6**dsptrkcnf 5.2****Description**

Display the configuration for trunk 5.2. The trunk is on a UXM-E1 card set in an IGX node.

System Response

```
sw224          TN      SuperUser      IGX 8420      9.2      Aug. 27 1998 17:50 GMT

TRK 5.2-8 Config      E1/203 [30641 cps]  UXM slot: 5
Line DS-0 map:        1-15,17-31      Valid Traffic Classes:
Transmit Trunk Rate: 30641 cps          V,TS,NTS,FR,FST,CBR,VBR,ABR
Rcv Trunk Rate:      28075 cps          Retained links:      7
Pass sync:           Yes              IMA link auto disable:Disable
Loop clock:          No
Statistical Reserve: 600 cps
Idle code:           54 hex
Restrict PCC traffic: No
Link type:           Terrestrial
Line coding:         HDB3
HCS Masking:         Yes
Payload Scramble:    Yes
Connection Channels: 256
Gateway Channels:    256
Routing Cost:        10                Deroute delay time:  0 seconds

This Command: dsptrkcnf 5.2
```

Example 7**dsptrkcnf 10.1****Description**

Display the configuration for trunk 10.1. The trunk is on a UXM-T1 card set in an IGX node.

System Response

```

sb-reef          TN      SuperUser      IGX 8420      9.2      Aug. 27 1998 17:46 PDT

TRK 10.1-5 Config      T1/115 [17358 cps] UXM slot: 10
Transmit Trunk Rate: 17358 cps      Connection Channels: 256
Rcv Trunk Rate:      17358 cps      Gateway Channels: 256
Pass sync:          Yes      Valid Traffic Classes:
Loop clock:        No      V, TS, NTS, FR, FST, CBR, VBR, ABR
Statistical Reserve: 600 cps      Retained links: 5
Idle code:        7F hex      IMA link auto disable: Enable
Restrict PCC traffic: No      Window size: 30 (x10 secs)
Link type:        Terrestrial      Max transition cnts: 10
Line framing:     ESF      Link reenable time: 6 (x10 mins)
Line coding:     B8ZS
Line cable type: ABAM
Line cable length: 0-131 ft.
HCS Masking:     Yes
Payload Scramble: No
Routing Cost:    10      Deroute delay time: 0 seconds

Last Command: dsprkcnf 10.1

```

Table 4-59 dsprkcnf-Parameters

Parameter	Description
slot.port	Specifies the physical slot and port number of the trunk.

Table 4-60 dsprkcnf-Optional Parameters

Parameter	Description
vtrk	Specifies the virtual trunk number. The maximum value on a node is 32. The maximum on a T3 or E3 line is 32. The maximum for user traffic on an OC-3/STM1 trunk is 11. (See also the section called “Compatibility Between Cards in Virtual Trunks” at the front of this chapter.)

dsprkict

Displays interface control information for the substrate trunks. The displayed information includes:

- Specified line.
- Associated leads and their status (that is, on or of.f)
- Whether output follows a local input.
- Name of the local or remote input lead that the output lead follows.

To see a list of configurable outputs, and information on how to configure an output, see the **cnftrkict** command. Disabled trunks have their trunk number displayed in dim, reverse video on the screen.

Full Name

Display trunk interface control templates

Syntax

`dsptrkict <line>`

Related Commands

`cnftrkict`, `prttrkict`

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	No	No	IGX	No

Example 1

`dsptrkict 9`

Description

Display subrate for the trunk 9 interface control template.

System Response

```
beta          TRM   YourID:1          IGX 8430    9.2  Aug. 15 1998 15:15 MST
```

```
Trunk:      9
Interface:  X.21  DTE
```

```
Interface Control Template for Trunk Line
```

```
Lead   Output Value   Lead   Output Value
C/DTR  ON
```

```
Last Command: dsptrkict 9
```

```
Next Command:
```

dsprkred

Displays the backup and primary cards for a trunk.

Full Name

Display ATM trunk redundancy

Syntax

dsprkred [trunk]

Related Commands

addtrkred, deltrkred

Attributes

Privilege	Jobs	Log	Node	Lock
1-4	No	No	IGX, BPX	No

Example 1

```
dsprkred
```

Description

Display all ATM trunks with redundancy.

System Response

```

beta          TRM   YourID:1          IGX 8430    9.2    Aug. 15 1998 15:15 MST

ATM Line  Backup ATM Line
4         5
7         8

```

Last Command: dsptrkred

Next Command:

Table 4-61 *dsptrkred*—Optional Parameters

Parameter	Description
ATM trunk number	Specifies the slot number of the primary or backup ATM card set to display. Without this optional entry, the screen displays all primary and backup ATM trunks.

dsptrks

Displays basic trunk information for all trunks on a node. This command applies to both physical only and virtual trunks. The displayed information consists of:

- Trunk number, including the virtual trunk number, if applicable
- Line type (E1, T3, or OC-3, for example)
- Alarm status

In addition, for trunks that have been added to the network with the **addtrk** command, the information includes the node name and trunk number at the other end. Trunks that have a “-” in the Other End column have been upped with **uptrk** but not yet added on both ends with **addtrk**. For disabled trunks, the trunk numbers appear in reverse video on the screen.

For UXM trunks with ATM Forum IMA-compliant trunks, a trunk is displayed in **dsptrks** as:

```
<slot>.<primary_port>x<num ports>
```

For example, an IMA trunk would display in the TRK column in the **dsptrks** screen as the following:

```
5.1x4
```

In this case, 5.1x4 indicates an ATM Forum-compliant IMA trunk 5.4, which consists of four physical lines. To see all physical lines belonging to this IMA trunk, you can enter the **dspphyslms** command.

In Release 9.2.20, **dsptrks** displays all interface shelves attached to a BPX or an IGX routing hub that use the AAL5 protocol.

Note that in this release, for IMA trunks, you can configure non-consecutive physical lines. In Release 9.1, an IMA trunk required that consecutive physical lines be configured on the same card. In this release, non-consecutive physical lines are supported.

For VSI “dedicated” virtual trunks, **dsptrks** will indicate this.

Full Name

Display trunks

Syntax

dsptrks

Related Commands

addtrk, deltrk, dntrk, uptrk

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

dsptrks

Description

Display information on the trunk configuration and alarm status for the trunks at a node. The trunk numbers with three places represent virtual trunks.

System Response

```
sw288          TN    SuperUser      BPX 8620      9.2    Dec. 10 1998 15:39 GMT

TRK   Type      Current Line Alarm Status      Other End
 4.1  OC-12      Clear - OK                      SIMFDR (AAL5)
11.2  T3         Clear - OK                      redhook/14
11.3  T3         Clear - OK                      sw113/16
```

Last Command: dsptrks

Next Command:

Example 2**dsptrks****Description**

Display information on the trunk configuration and alarm status for the trunks at a node. The trunk numbers with three places (*slot.port.vrtk*) represent virtual trunks; for example—trunk 13, port 3, virtual trunk 12. Also, on trunk 4, slot 8, is a simulated interface shelf “SIMFDR0”, with interface shelf type of AAL5.

System Response

```
sw288          TN      SuperUser      BPX 8620      9.2      Dec. 10 1998 23:03 GMT

TRK           Type    Current Line Alarm Status      Other End
2.1           T3      Clear - OK                       pswbpx1/1.2
4.8           T3      Clear - OK                       SIMFDR0 (AAL5)
13.3.12      OC-3    Clear - OK                       rita/4.2.10
```

Last Command: dsptrks

Next Command:

Example 3**dsptrks****Description**

Display information on the trunk configuration and alarm status for the trunks at a node. The trunk numbers with three places (*slot.port.vrtk*) represent virtual trunks. An ATM Forum-compliant trunk is configured on slot 11, which has a primary port of 1 and 4 physical lines.

■ dsptrks

System Response

```

sw53          TN      SuperUser      BPX 8620      9.2      Sep. 24 1998 23:03 GMT

TRK      Type      Current Line Alarm Status      Other End
2.1      T3          Clear - OK                      pswbpx1/1.2
4.8      T3          Clear - OK                      SIMFDR0 (AAL5)
11.1x4   T1/92         Clear - OK                      alc/3.5x4
15.1     OC-3         Clear - OK                      alc/3.5x4

```

Last Command: dsptrks

Next Command:

Example 4**dsptrks****Description**

Display information on the trunk configuration and alarm status for the trunks at an IGX node showing IMA compliant links on slot 11.

System Response

```

oo1          TN      SuperUser      IGX 8430      9.2.zR      Dec. 10 1998 23:03 GMT

TRK      Type      Current Line Alarm Status      Other End
6.1      OC-3         Clear - OK                      oo1p(AAL5)
8.5      T3          Clear - OK                      n4b/4.5
8.6      E3/530     Clear - OK                      alc/15
10       T3/240       Clear - OK                      alc/3.5x4
11.1x4   T1/92         Clear - OK                      alc/3.5x4
15.1     OC-3         Clear - OK                      n1a/11.3
15.2     OC-3         Clear - OK                      n2b/5.3

```

Last Command: dsptrks

Next Command:

Example 5**dsptrks**

Description

Display information on the feeders attached to an IGX 8400 routing hub. (The SES feeder uses the AAL5 protocol to communicate with the routing network.) Feeder names appear in the Other End field on the **dsptrks** screen on an IGX routing hub.

System Response

```
oo1          TN      SuperUser      IGX 8430      9.2.zR      Dec. 10 1998 23:03 GMT

TRK         Type    Current Line Alarm Status      Other End
13          E1      Clear - OK                      igx1/12
14.1       OC-3    Clear - OK                      ases1 (AAL5)
```

Last Command: dsptrks

Next Command:

Example 6

dsptrks

Description

Display trunks including virtual trunks. A VSI trunk is on trunk 2.1.1; **dsptrks** indicates this with “VSI trunk.”

System Response

```
TRK         Type    Current Line Alarm Status      Other End
1.1         E3      Clear - OK                      sw58/1.1
1.2         E3      Clear - OK                      sw183 (AXIS)
2.1.1      OC-3    Clear - OK                      VSI trunk
```

Example 7

dsptrks

Description

The **dsptrks** screen shows VSI trunks 4.1, 4.2 and 4.3, with the “Other End” of 4.1 reading “VSI (VSI)”. A typical dsptrks screen example showing some VSI trunks configured follows:

System Response

```
n4          TN      SuperUser      BPX 15      9.2        Apr. 4 1998 16:45 PST

TRK   Type      Current Line Alarm Status      Other End
2.1   OC-3       Clear - OK                       j4a/2.1
3.1   E3         Clear - OK                       j6c (AXIS)
5.1   E3         Clear - OK                       j6a/5.2
5.2   E3         Clear - OK                       j3b/3
5.3   E3         Clear - OK                       j5c (IPX/AF)
6.1   T3         Clear - OK                       j4a/4.1
6.2   T3         Clear - OK                       j3b/4
4.1   OC-3       Clear - OK                       VSI (VSI)
4.2   OC-3       Clear - OK                       VSI (VSI)
4.3   OC-3       Clear - OK                       VSI (VSI)
```

Last Command: dsprks

dsprkstats

Displays the trunk port status, ATM cell loss counts, cell payload errors, and cell header errors for the specified trunk. Table 4-62 lists the other statistics. If you include the optional *clear* parameter, executing **dsprkstats** clears the statistics.

Logical trunk statistics refer to counts on trunks that are visible as routing entities. This includes physical and virtual trunks (all logical trunks). Logical trunk statistics are displayed on the **dsprkstats**, **dsprksthist**, and screens. These commands accept only logical trunk numbers and display only logical trunk statistics. Virtual interface (VI) statistics and queue statistics are both subsets of the logical trunk statistics.

Table 4-62 Additional Statistics in the dsprkstats Display

Statistics	Description
Cells dropped due to BFrame parity err.	A parity error was detected in one or more of the P bits in the BFrame header or in the BIP-16 parity check for the header causing the cell to be dropped.
Cell header mismatch error count.	A count of cells received by a BNI in this slot.port with an incorrect header address for that card.
First mismatch cell header VPI/VCI.	This displays the VPI/VCI address of the first header mismatch to be received by the card in this slot.port.
BFrame cell data payload error.	A separate BIP-16 parity check is used for the payload data. This number represents the number of errors detected by this parity check. This does not necessarily cause a cell to be dropped.
BFrame cell loss due to admin access.	Internal to the BNI card is an administrative processor. This statistic is a count of the cells that were lost in an internal administrative shuffle.

Trunk Statistics

Statistics are collected on trunks at several different levels.

- **Physical line** statistics apply to each physical port. In the case of IMA trunks, the physical line statistics are tallied separately for each T1 port.

On both the BPX and the IGX, physical line stats are displayed on the **dspphyslnstats**, **dspphyslnstathist**, and **dspphyslnerrs** screens. These commands accept only physical line numbers (that is, slot.port). These commands are new to the BPX in this release.

- **Logical trunk** statistics refer to counts on trunks that are visible to users as routing entities. This includes physical trunks and virtual trunks.

Logical trunk stats are displayed on the **dsprkstats**, **dsprkstahist**, and **dsprkerrs** screens. These commands accept only logical trunk numbers and display only logical trunk statistics.

- **VI statistics** are a subset of the logical trunk statistics.
- **Queue statistics** are a subset of the logical trunk statistics.
- **Channel statistics** are not polled by software on trunks. However, they are available if the debug command **dspchstats** is used.

A listing of trunk statistics including statistics type, card type, and line type, as applicable, is provided in Table 4-63.

Table 4-63 Trunk Statistics

Statistic	Stat Type	Card Type	Line Type
Total Cells Received	Logical	UXM/BXM	All
Total Cells Transmitted	Logical	UXM/BXM	All
LOS transitions	Physical	UXM/BXM	All
LOF transitions	Physical	UXM/BXM	All
Line AIS transitions	Physical	UXM/BXM	T3/E3/Sonet
Line RDI (Yellow) transitions	Physical	UXM/BXM	T3/E3/Sonet
Uncorrectable HCS errors	Physical	UXM	T3/E3/Sonet
Correctable HCS errors	Physical	UXM	T3/E3/Sonet
HCS errors	Physical	BXM	T3/E3/Sonet
Line Code Violations, ES, and SES	Physical	BXM	T3/E3
Line Parity(P-bit]) errors, ES, and SES	Physical	BXM	T3
Path Parity(C-bit) errors, ES, and SES	Physical	BXM	T3
Far End Block Errors	Physical	BXM	T3
Framing Errors and SES	Physical	BXM	T3/E3
Unavailable Seconds	Physical	BXM	T3/E3
PLCP LOF and SES	Physical	BXM	T3
PLCP YEL	Physical	BXM	T3

Table 4-63 Trunk Statistics (continued)

Statistic	Stat Type	Card Type	Line Type
PLCP BIP-8, ES, SES	Physical	BXM	T3
PLCP FEBE, ES, SES	Physical	BXM	T3
PLCP FOE, ES, SES	Physical	BXM	T3
PLCP UAS	Physical	BXM	T3
LOC errors	Physical	UXM/BXM	E3/Sonet
LOP errors	Physical	UXM/BXM	Sonet
Path AIS errors	Physical	UXM/BXM	Sonet
Path RDI errors	Physical	UXM/BXM	Sonet
Section BIP-8 counts, ES, and SES	Physical	UXM/BXM	Sonet
Line BIP-24 counts, ES, and SES	Physical	UXM/BXM	Sonet
Line FEBE counts, ES, and SES	Physical	UXM/BXM	Sonet
Section SEFS	Physical	UXM/BXM	Sonet
Line UAS and FarEnd UAS	Physical	UXM/BXM	Sonet
Clock Loss Transitions	Physical	UXM	T1/E1
Frame Loss Transitions	Physical	UXM	T1/E1
Multiframe Loss	Physical	UXM	T1/E1
CRC errors	Physical	UXM	T1/E1
BPV	Physical	UXM	T1
Frame bit errors	Physical	UXM	E1
Unknown VPI/VCI count	Physical	UXM/BXM	All
Errored LPC cell count	Physical	UXM	All
Non-zero GFC cell count	Physical	UXM/BXM	
Max Differential Delay	Physical	UXM	T1/E1
Uncorrectable HEC errors	Physical	UXM	All
Cell Hunt count	Physical	UXM	T1/E1
Bandwidth Changed count	Physical	UXM	T1/E1
Receive CLP=0 cell count	Logical	UXM/BXM	All
Receive CLP=1 cell count	Logical	UXM/BXM	All
Receive CLP=0 cell discard	Logical	UXM/BXM	All
Receive CLP=1 cell discard	Logical	UXM/BXM	All
Transmit CLP=0 cell count	Logical	UXM/BXM	All
Transmit CLP=1 cell count	Logical	UXM/BXM	All
Receive OAM cell count	Logical	UXM/BXM	All
Transmit OAM cell count	Logical	UXM/BXM	All

Table 4-63 Trunk Statistics (continued)

Statistic	Stat Type	Card Type	Line Type
Receive RM cell count	Logical	UXM/BXM	All
Transmit RM cell count	Logical	UXM/BXM	All
For Each Traffic Type: (V,TS,NTS,ABR,rt-VBR, nrt-VBR,CBR, BdatB, BdatA,HP)			
Cells served	Logical	UXM/BXM	All
Maximum Qbin depth	Logical	UXM/BXM	All
Cells discarded count	Logical	UXM/BXM	All

Full Name

Display trunks statistics

Syntax

dsptrkstats <slot.port> [clear]

Related Commands

cnftrkstats, **dsptrkerrs**

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	BPX, IGX (UXM)	Yes

Example 1

dsptrkstats 1.1

Description

Display cell statistics for ATM trunk 1.1.

System Response

```

sw53          TN      SuperUser      BPX 8620      9.2          Sep. 24 1998 23:07 GMT

Trunk 1.1      Status: Clear - OK          Cleared: 04/24/96 17:31:16
Type
Cells dropped due to BFrame parity err      0
Cell header mismatch error count           0
BFrame cell data payload error             0
BFrame cell loss due to disabled chan      0
BFrame cell count (TX)                     8316      non-hipri cells -    52
BFrame cell count (RX)                     12452

First mismatch cell masked VPI/VCI         0
First mismatch cell full VPI/VCI          0

```

Last Command: dsprkstats 1.1

Next Command:

Example 2**dsprkstats 11.1****Description**

Display cell statistics for ATM trunk 11.1 on a UXM card.

System Response

```

sw199          TN      SuperUser      IGX 8620      9.2      Aug. 27 1998 19:26 PDT

Trunk 11.1-2  Status: Clear - OK                               Snapshot
Collection Time: 0 day(s) 00:49:40                            Clrd: 08/27/97 18:36:05
Type                                                       Count
QBIN: NTS Cells Tx to line                                0
QBIN: Tx NTS Cells Received                              0
QBIN: Tx NTS Cells Discarded                             0
QBIN: Hi-Pri Cells Tx to line                            2561
QBIN: Tx Hi-Pri Cells Received                           2561
QBIN: Tx Hi-Pri Cells Discarded                          0
QBIN: rt-VBR Cells Tx to line                            0
QBIN: Tx rt-VBR Cells Received                           0
QBIN: Tx rt-VBR Cells Discarded                          0
QBIN: TimeStamped Cells Tx to ln                         0
QBIN: Tx TS Cells Received                               0
QBIN: Tx TS Cells Discarded                              0
QBIN: BData A Cells Tx to line                           0
QBIN: Tx BData A Cells Received                          0
QBIN: Tx BData A Cells Discarded                         0
QBIN: BData B Cells Tx to line                           0
QBIN: Tx BData B Cells Received                          0
QBIN: Tx BData B Cells Discarded                         0
QBIN: Tx CBR Cells Served                                0
QBIN: Tx CBR Cells Received                              0
QBIN: Tx CBR Cells Discarded                             0
QBIN: Tx nrt-VBR Cells Served                            0
QBIN: Tx nrt-VBR Cells Received                          0
QBIN: Tx nrt-VBR Cells Discarded                         0
QBIN: Tx ABR Cells Served                                0
QBIN: Tx ABR Cells Received                              0
QBIN: Tx ABR Cells Discarded                             0
VI: Cells received                                       655
VI: Cells transmitted                                    653
VI: Cells received w/CLP=1                               0
VI: Cells transmitted w/CLP=1                            0
VI: Cells received w/CLP=0                               655
VI: Cells transmitted w/CLP=0                            653
VI: Cells discarded w/CLP=1                              0
VI: Cells discarded w/CLP=0                              0
VI: OAM cells received                                   0
VI: OAM cells transmitted                                0
VI: RM cells received                                    0
VI: RM cells transmitted                                  0
CGW: Packets Rx From Network                             0
CGW: Cells Tx to Line                                    0
CGW: NIW Frms Relayed to Line                            0
CGW: SIW Frms Relayed to Line                            0
CGW: Aborted Frames Tx to Line                           0
CGW: Dscd Pkts                                          0
CGW: 0-Length Frms Rx from Network                       0
CGW: Bd CRC16 Frms Rx from Network                       0
CGW: Bd Length Frms Rx from Network                     0
CGW: OAM RTD Cells Tx                                    0
CGW: Packets Tx to Network                               0
CGW: Cells Rx from Line                                   0
CGW: NIW Frms Relayed from Line                           0
CGW: SIW Frms Relayed from Line                           0
CGW: Aborted Frms Rx From Line                           0
CGW: Dscd Cells                                         0

```

```

CGW: 0-Lngth Frms Rx from Line          0
CGW: Bd CRC32 Frms Rx from Line         0
CGW: Bd Lngth Frms Rx from Line         0
CGW: OAM RTD Cells Rx                   0
CGW: OAM Invalid OAM Cells Rx           0
CF: Egress Packet Sequence Errs         0
CF: Egress Bad HEC from cellbus         0
CF: Egress Packets from cellbus         0
CF: Egress Cells Tx to Line             0
CF: Ingress Packets to cellbus          0
CF: Ingress Cells from Line             0
IE: Egress Packets to Extract Buf       0
IE: Egress Cells injected                0
IE: Egress Packets Extract Buf full     0
IE: Ingress Cells to Extract Buf        0
IE: Ingress Packets injected            0
IE: Ingress Cells Extract Buf full      0

```

Last Command: dsptrkstats 11.1

Next Command:

Table 4-64 dsptrkstats-Parameters

Parameter	Description
slot.port	Specifies the physical part of the logical trunk number.

Table 4-65 dsptrkstats-Optional Parameters

Parameter	Description
clear	Directs the system to clear the statistics counters.

prtapsln

The **prtapsln** command prints the **dspapsln** screen, that is, the currently configured APS lines and their status.

Full Name

Prints **dspapsln** screen (currently configured APS lines and their status)

Syntax

```
printapsln
```

Related Commands

addapsln, delapsln, cnfapsln, cnfcdaps, dspapsln, dsplog, dspalms

Attributes

Privilege	Jobs	Log	Node	Lock
1	No	No	BPX	No

Example

```
prtnw
```

System Response

No display produced.

prtnw

Prints the network topology table. Alarms print in a column, and added trunks (by **addtrk**) appear to the right to the node name. Each trunk entry shows the local back card slot number and the node name and back card slot number on the other end of the line. Note the following conventions:

- ~ indicates the trunk is a satellite line.
- Flashing entry indicates a failed line.
- Blinking node indicates a node is executing downloader software.

Parameters set Zero Coded Suppression (ZCS) display characteristics. ZCS writes a 1 over the least significant bit of any byte that contains 0s. The purpose is to ensure a minimum occurrence of 1s so that the receiving node can extract timing information. The **prtnw** command uses the same syntax and prints the same information as the **dspnw** command.

Full Name

Print network

Syntax

```
prtnw [+b | -b] [+z | -z]
```

Related Commands

dspnw

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	Yes	No	IGX, BPX	Yes

Example 1

```
prtnw
```

Description

Print the network topology.

System Response

(No screen display appears—just a printout.)

Table 4-66 prtnw-Parameters

Parameter	Description
+b	Display only the lines that support bursty data.
-b	Display only the lines that do not support bursty data.
+z	Display only the lines that use ZCS encoding.
-z	Display only the lines that do not use ZCS encoding.

prtrkict

Prints the interface control template of a subrate trunk. For a list of configurable outputs and configuration steps, see the **cnftrkict** description. The printed information includes:

- Specified line
- Associated leads and their status
- Whether output follows a local input
- Name of the local or remote input lead that the output lead follows

Full Name

Print trunk interface control template

Syntax

```
prtrkict <line>
```

Related Commands

dsprkict

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	Yes	No	IGX	Yes

Example 1

```
prtrkict
```

Description

Print network topology.

System Response

No screen display—just a printout.

Table 4-67 *prtrkict-Parameters*

Parameter	Description
line	Specifies the trunk interface control template.

prtrks

Prints the trunk configuration for the node. This command uses the same syntax and prints the same information as the **dsprks** command. Configuration information for trunks includes the trunk number and the type of line (T3, E3, and so on). For trunks that have been added to the network with the **addtrk** command, the configuration information also includes the node name and trunk number at the other end of the line.

Note the following printout characteristics:

- Those trunks that show a “–” in the “Other End” column, have been *upped* with the **uptrk** command but not yet *added* with the **addtrk** command.
- The Other End column shows the node name and slot number of the other end of the trunk.
- Names of disabled trunk appear as light text in the printout.

Full Name

Print trunks

Syntax

```
prtrks
```

Related Commands

```
dsprks
```

Attributes

Privilege	Jobs	Log	Node	Lock
1–6	Yes	No	IGX, BPX	Yes

Example 1

```
prtrks
```

Description

Print trunk configuration for the node.

System Response

No screen display appears—just a printout.

switchapsln

The **switchapsln** command lets you control the APS switching interface. You use the **switchapsln** command, along with other APS commands such as **addapsln**, **delapsln**, **dspapsln**, **switchapsln**, and **cnfapsln** to configure and control a SONET APS (Automatic Protection Switching) line for a BXM OC-3 or OC-12 card. SONET APS is a standard that describes the switching of SONET lines from the active line to a standby line to provide hardware line redundancy.

Several options are available that determine the type of switch operation:

- *Clear*—clear user switch request. This option clears the last user switch request and sets the switching state machine to fully automatic hardware control.
- *Forced Switch (Working to Protection or Protection to Working)*—the forced switch forces hardware to switch to the standby line even if it is in alarm.
- *Manual Switch (Working to Protection or Protection to Working)*—the manual switch is lower priority than a forced switch and will cause only a switch if certain conditions are met.

**Note**

It is recommended that you not use the *Manual Switch* option with Annex B configured when the BPX is connected to a third-party vendor's switch.

- *Lockout*—prevents switching from the working line to the protection line from taking place. A lockout request is cleared by a subsequent Clear request.
- *Service*—the service switch for the two-slot solution only. This request causes all lines to be forcibly switched to one back card so that the other card of the pair can be removed for service.

Be sure that the associated front card is active for the back card that is to remain in the rack. You may have to perform a **switchcdred** so that the back card to which the service switch switches has its associated front card active.

**Note**

When Annex B is configured, **switchapsln** options will not be blocked at the command line interface.

Full Name

Controls APS switching interface.

Syntax

```
switchapsln <slot.port> <switchoption> [S]
```

Related Commands

cnfcdaps, addapsln, delapsln, dspapsln, switchapsln, cnfapsln

Attributes

Privilege	Jobs	Log	Node	Lock
1	Yes	Yes	BPX	Yes

Example 1

```
switchapsln 2.1 1 S
```

Description

Controls the APS switching interface to configure and control SONET APS line switching from an active line to a standby line. Upon executing **switchapsln**, the **dspapsln** screen appears.

System Response

```
alexas TRM genre BPX 8600 9.2 Sep. 9 1998 16:25 PDT
Work/Protect Protocol Active Current Line Current APS last User
Line Alarm Status Alarm Status Switch Request
2.1 3.1 1+1 PROT OK APS OK Forced W->P
Command: switchapsln 2.1 3
```

Table 4-68 *switchapsln* – Parameters

Parameter	Description
slot.port	The working APS line to be switched.
	Switch Options

Table 4-68 *switchapsln*—Parameters (continued)

Parameter	Description
	1. Clear <i>Clear</i> clears the last user request, returns state back to working line, resets to all defaults, and sets BXM to fully automatic line control.
	2. Lockout <i>Lockout of Protection</i> —Prevents specified APS pair from being switched to protection line. If protection line is already active, switch is made back to the working line. (For Annex B, the Working line is termed the “primary line,” and the Protection line is termed the “secondary line.”)
	3. Forced switch (working to protection line) <i>Forced Working to Protection Line Switch</i> —If working line is active, switch is made to protection line unless the protection line is locked out or in the SF condition or Forced Switch is already in effect. Forces hardware to switch to the protection line even if it is in alarm.
	4. Forced switch (protection to working line) <i>Forced Protection to Working Line Switch</i> —If Protection is active, switch is made to Working unless a request of equal or higher priority is in effect. P-->W switch applies only in the 1+1 architecture. If protection line is active, switch is made to working line unless a request of equal or higher priority is in effect.
	5. Manual switch (working to protection line) <i>Manual Switch (Working to Protection Line)</i> —Switch from working to protection line unless a request of equal or higher priority is in effect. Will not switch if other line is in alarm. Not applicable to APS 1+1, Annex B.
	6. Manual switch (Protection to working line) <i>Manual Switch (Protection to Working line)</i> Not applicable to APS 1+1, Annex B.
S	If you enter S as an additional parameter, a service switch is performed for all ports on the card such that all lines are forcibly switched to one back card so that the other back card of the pair can be removed for service. Be sure that the associated front card is active for the back card that is to remain in the rack. You may have to perform a switchdred command so that the back card that the service switch changes to has its associated front card active.

uptrk

Activates (or ups) a trunk and, if you include the optional *vrk* parameter for applicable cards, activates the trunk as a virtual trunk. You also use **uptrk** to enable a feeder trunk on a port.

After you have upped the trunk but not yet added it, the trunk carries line signalling but does not yet carry live traffic. Before you add the trunk with **addtrk**, the node can monitor the trunk for reliability. Once a trunk has shown reliability and is ready to go into service, add the trunk to the network. If you need to take an active trunk out of service, use **dntrk**. The **dntrk** command causes the node to reroute any existing traffic if sufficient bandwidth is available.

The Ports and Trunks feature lets you configure multiple trunk lines and circuit lines on a single BXM or UXM card simultaneously. In previous releases, when a single port is upped as a trunk (by using the **uptrk** command), all the remaining ports on that card are treated as a trunk. Similarly, when you up a single port as a circuit line (by using the **upln** command), all the remaining ports on the card are treated as circuit line ports. This feature allows the BXM and UXM trunks to be trunk line cards as well as circuit line cards, and to allow trunks and circuit lines to coexist on these cards.

For example, assuming that a four-port BXM card is plugged into slot 11, you could do the following:

1. **uptrk** 11.1
2. **upln** 11.2
3. **upln** 11.3
4. **uptrk** 11.4

That is, you could up a trunk at port 1 on slot 11, up a line at port 2 of slot 11, up a line at port 3 of card slot 11, and also up a trunk at port 4 of card slot 11.

You can now mix physical and virtual trunk specifications. For example, after you up a trunk as a standard trunk, you can then add it as a virtual trunk when you execute **addtrunk**. Furthermore, if you want to change trunk types between standard and virtual, you must first down the trunk with **dntrk**, then up it as the new trunk type.

You cannot up a trunk if the required card is not available. Furthermore, if a trunk is executing a self-test, a “card in test” message may appear on-screen. If this message appears, re-enter **uptrk**.

If, after upping a BXM trunk, you get a message telling you to use **cnfrsrc** to configure PVCs, make sure that when configuring resource partitions with **cnfrsrc**, you specify values greater than 0 for the Maximum PVC Channels, Maximum PVC Bandwidth, and Maximum VSI LCNs. Otherwise, you will be unable to create any PVCs on a BXM card. Also, you will not be able to change the Connection Channels amount with **cnftrk** if you do not first use **cnfrsrc** to configure PVCs.

In this release, to support the Multilevel Channels Statistics feature, you will be prompted when you attempt to up the line with **upln** or up the trunk with **uptrk**, warning you to initialize the channel statistics level before activating the card. This warning only applies when upping the first trunk or first line on the card:

```
“Channel Statistic Level must be initialized prior to card activation”
```

Configuring IMA Physical Lines

Release 9.1 supported a Cisco proprietary IMA (Inverse Multiplexing ATM) protocol on UXM trunks, which was able to interoperate only with Cisco products, for example, MGX-8220 IMATM. Release 9.2 supports the ATM Forum-compliant IMA protocol, which allows UXM trunks to interoperate with other vendor equipment. IMA provides inverse multiplexing of ATM cells across multiple physical lines. The ATM Forum-compliant IMA protocol is supported only on UXM trunks.

The IMA protocol feature requires you to upgrade the UXM firmware to Model B. When you load Model B firmware onto a UXM card, all IMA trunks invoked on that card automatically perform ATM Forum-compliant IMA protocol. You do not need to use any switch software commands to enable the IMA protocol. Note that switch software Release 9.2 is not set up to work with UXM Release 9.1 firmware, so it is advised that you *not* downgrade to Model A firmware, as the software will not work. (The UXM firmware code space is not large enough to hold both versions of the protocol in a single firmware image.)

Note also that the ATM Forum–compliant IMA feature is not compatible with the Cisco proprietary IMA protocol supported in Release 9.1 (which uses UXM firmware Model A). Both ends of the UXM IMA trunk requires UXM firmware Model B. If the UXM trunk is connected to another device, that device must support the ATM Forum–compliant IMA protocol.

**Note**

Refer to 9.2 release notes for up-to-date feature support and system requirements.

Note that this release supports a subset of the ATM Forum compliant IMA protocol. These functions supported in Release 9.2 are:

- You can add and delete physical links while the IMA group is active.
- You can up an IMA group with a minimum number of retained links.
- New configurable link (**cnftrk**) parameters:
 - IMA Max. Differential Delay
 - IMA Protocol Option
 - IMA Clock Mode (this parameter is fixed and not configurable)
- Additional IMA group and individual physical link state and statistics can be collected.
- Allows non-consecutive physical links on the same card to be in the same IMA group. This is specific to the UXM card and is not specified as part of the ATM Forum–compliant IMA standard.

Release 9.2 supports virtual trunking on both the BPX and IGX. IMA trunk ports are referenced by the first physical line of the trunk port after **uptrk** has been executed. For example, you can *uptrk 1.5–8.9*. You can then up a second trunk (which, in this case, is a virtual trunk on slot.port 1.5) on the same trunk port using *uptrk 1.5.11*.

This release supports using a UXM IMA trunk to connect an IGX feeder node to a routing node, either an IGX or a BPX using IMATM. UXM IMA provides redundancy in case one of the physical lines on an IMA trunk should fail. This reduces the chance of a single point of failure when a single feeder trunk is out of service. Also, you may configure the services on a feeder node rather than on a router node; this indirectly allows the network to scale better with respect to the limit of 223 network nodes.

Specifying an IMA Group Member

In this release, you can define an IMA trunk consisting of non-consecutive physical lines. In addition, you can change the group member by deleting a physical line from an existing IMA trunk.

Use the following syntax to specify an IMA group on a UXM trunk:

- **uptrk** *slot.group_member.vtrk*

where:

slot is the slot number

group_member is a set of physical lines composing an IMA group. You can specify the member in an expression consisting of the primary link followed by a, or – and additional physical links.

vtrk is the optional virtual trunk number. If at least one virtual trunk already exists on this port, you only have to specify the primary link as the *group_member*. In the case of adding a UXM IMA feeder trunk from an IGX routing node to an IGX feeder node, you will not know whether the trunk is a regular trunk or feeder trunk. There is no virtual trunk for the feeder.

For example, 9.1–4 defines trunk 9.1 to consist of four physical links, that is, 1, 2, 3 and 4, where physical link 1 is the primary link. (This example is compatible with Release 9.1.)

For example, 9.1–3,5 defines trunk 9.1 to consist of four physical links, that is, 1, 2, 3 and 5 where physical link 1 is the primary link.

For example, 9.5–7,2–3 defines trunk 9.5 to consist of five physical links, that is, 2, 3, 5, 6 and 7 where physical link 5 is the primary link.

Similarly, 9.8,2,4,6 defines trunk 9.8 to consist of all even number of physical links where physical link 8 is the primary link.

cnftrk is used to specify the primary link on the IMA trunk.

Primary Link—In an IMA group, you must select one of the physical links to be a primary link. This primary link number is used to refer to this IMA group or trunk. You can use **cnftrk** to add additional links to the group or delete existing links. When deleting existing links from an IMA group, you cannot delete the primary link. You must deactivate the trunk using **deltrk** followed by **dntrk** to remove the primary link. The **cnftrk** will be blocked after the trunk has been added as a feeder trunk.

Feature Mismatching on Virtual Trunks

The **uptrk** command, in addition to other configuration commands, will perform mismatch verification on the BXM and UXM cards. For example, the **uptrk** command will verify whether the card has virtual trunk support. Refer to “High-Priority Login Feature” section on page 17-1. For more information about Feature Mismatching, refer to the *BPX 8600 Series Installation and Configuration Manual*.

The Feature Mismatching capability will not mismatch cards unless the actual feature has been enabled on the card. This allows for a graceful card migration from an older release.

Full Name

Up trunk

Syntax

```
uptrk <slot.port>[.vtrk]
uptrk <slot.group_member.[<vtrk]> for IMA
uptrk <slot>.<group-member(s)>
```

Related Commands

addtrk, **dntrk**, **cnfrsrc**

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	Yes	Yes	IGX, BPX	Yes

Example 1

```
uptrk 21
```

Description

Activate (up) trunk 21—a single-port card, in this case, so only the slot is necessary.

Example 2

uptrk 6.1.1

Description

Activate (up) trunk 6.1.1—in this case, a virtual trunk, as indicated by the third digit.

Example 3

uptrk 4.1

uptrk 4.2

uptrk 4.3

Description

On the BXM in slot 4, bring up the ports 4.1, 4.2, and 4.3.

**Note**

The previous example enables ports 4.1, 4.2, and 4.3 in trunk mode with the **uptrk** command, they could also all be upped in port mode using the **upport** command. This is because label switching and the VSI make no distinction between a port and a trunk.

System Response

```
n4          TN      SuperUser      BPX 15      9.2      Apr. 4 1998  16:39 PST

TRK      Type      Current Line Alarm Status      Other End
2.1      OC-3      Clear - OK                        j4a/2.1
3.1      E3        Clear - OK                        j6c (AXIS)
5.1      E3        Clear - OK                        j6a/5.2
5.2      E3        Clear - OK                        j3b/3
5.3      E3        Clear - OK                        j5c (IPX/AF)
6.1      T3        Clear - OK                        j4a/4.1
6.2      T3        Clear - OK                        j3b/4
4.1      OC-3      Clear - OK                        VSI (VSI)
```

Last Command: uptrk 4.1

Next Command:

Table 4-69 uptrk—Parameters

Parameter	Description
slot.port	Specifies the slot and port of the trunk to activate. If the card has only one port, the <i>port</i> parameter is not necessary. An NTM card, for example, has one port.
slot.group_member	Specifies the slot and a set of physical lines composing an IMA group on an IMA trunk to activate. You can specify the group_member in an expression consisting of the primary link followed by a, or – and additional physical links. (When specifying an IMA group, you must select one of the physical links to be a <i>primary link</i> . This primary link number is used to refer to this IMA group or trunk. You can use cntrk to add additional links to the group of delete existing links. When deleting existing links from an IMA group, you cannot delete the primary link. You must deactivate the trunk using deltrk , followed by dntnk to remove the primary link.

Table 4-70 uptrk—Optional Parameters

Parameter	Description
vtrk	Specifies the virtual trunk number. The maximum on a node is 32. The maximum on a T3 or E3 line is 32. The maximum for user traffic on an OC-3/STM1 trunk is 11 (so more than one OC-3/STM1 may be necessary). See also the section called “Compatibility Between Cards in Virtual Trunks” at the front of this chapter. When specifying an IMA group, if at least one virtual trunk already exists on this port, then you only have to specify the primary link as the group_member.



Setting Up Lines

A circuit line is the physical line that carries data, voice, Frame Relay, or ATM traffic between an IGX or BPX node and customer premises equipment (CPE). Each piece of customer premises equipment is attached to a node through a circuit line. After a *card* has been “upped” with the **upcd** command, a *circuit line* on that card can be “upped” and configured.

This chapter:

- Describes input circuit line formats
- Summarizes circuit line card combinations
- Explains how to set up lines
- Describes each command



Note

Line commands are the same as circuit line commands. However, the **cnfcln** command is no longer used; use **cnfln** instead. The switch software prompts for the parameters appropriate for the card type it detects.

Table 5-1 shows input line formats. Table 5-2 shows the permissible card combinations for CPE-to-IGX lines.

Table 5-1 Input Line Formats

Type	Country	Electrical Signal Format	Ones Density Enforcement	Multiplexing
J1	Japan	Coded Mark Inversion (CMI)		31 channels @ 64 kbps each
E1	Others	Alternate Mark Inversion (AMI)	High density bipolar 3 (HDB3)	31 channels @ 64 kbps each 1 E1 line on CDP/CVM, FRP/FRM 8 E1 lines on UFM
T1	USA Canada ASIA	Alternate Mark Inversion (AMI)	Bipolar Zero Substitution (B8ZS)	24 channels @ 64kbps each 1 T1 line on CDP/CVM, FRP/FRM 8 T1 lines on UFM

Table 5-1 Input Line Formats (continued)

E3	Europe and others	Physical Layer Convergence Protocol per AT&T publication; ITU I-361 with HEC for E3	HDB3	ITU-T G.804, G.832
T3	USA Canada	Physical Layer Convergence Protocol per AT&T publication TA-TSY-00772 and 000773 for T3	B3ZS+	M13 mode

Table 5-2 Line Card Combinations

Service	Node Type	Front Card	Back Card
ATM	IGX	UXM	BC-UAI BC-UAI BC-UAI-1T1 BC-UAI-1E1 BC-UAI-1OC3
ATM	IGX	ALM/A	BC-UAI-1T3 BC-UAI-1E3
Frame Relay	IGX	UFM-4C, UFM-8C	UFI-8T1-DB15, UFI-8E1-DB15, UFI-8E1-BNC
Frame Relay	IGX	FRP-6, FRP-31/FRM-6, FRM-31	FRI-T1, FRI-E1
Frame Relay	IGX	UFM-C	UFI-8T1-DB15 UFI-8E1-DB15 or UFI-8E1-BNC
High-Speed Data	IGX	SDP/HDM	SDI/RS-232 SDI/RS-422
High-Speed Data	IGX	SDP/HDM	SDI/RS-232 SDI/RS-422
Voice	IGX	UVM	BC-UVI-2T1EC BC-UVI-2E1EC BC-UVI-2J1EC
Voice	IGX	CDP/CVM	BC-T1 BC-E1 BC-J1

Setting Up a Circuit Line

Frame Relay, data, and voice connections require an active line. Use the commands in the following steps to establish a line. The card must be in either the active or standby state before you enter these commands.

-
- Step 1** Use **upln** to activate a circuit line in a slot that contains the appropriate circuit line card set.
- Step 2** Use the **upport** command to activate ports at both ends of the line.
- Step 3** Use **cnfln** to configure the circuit line.

The **upln** and **cnfln** commands establish the general parameters for the line but do not establish specific Frame Relay, data, or voice parameters. Refer to applicable chapters for details on a particular service. For example, Data Connections describes specific commands for data connections, and Frame Relay Connections describes specific commands for Frame Relay connections.

Setting Up an IMA Line

Inverse Multiplexing over ATM (IMA) allows you to group physical T1 or E1 lines to form a logical line, also known as an IMA line. By bundling smaller lines together to form an IMA line, you enlarge the traffic bandwidth on your network without upgrading to a higher speed service, such as T3/E3. Therefore, you're

the access lines you already have instead of replacing them. The IMA line feature is compliant with ATM Forum Standard version 1.0, allowing UXM IMA trunks to interoperate with other vendor equipment.

IMA line characteristics are as follows:

- Supports up to eight T1/E1 lines.
- Connects to any CPE that is ATM Forum IMA Standard Version 1.0 compliant.
- An IMA line and a non-IMA line can coexist in the same card.
- Physical links can be added or deleted while the IMA group is active. Exceptions are:
 - A physical line cannot be deleted from a group if the resulting numbers of physical lines in the IMA group is less than the minimum retained links specified.
 - The primary link (the first physical line in the IMA group) can not be deleted dynamically.
- Ability to configure the differential delay for the IMA line.
- All physical ports of an IMA line use the same line configuration.
- The IMA line supports Common Transmit Clock (CTC) mode; meaning, all lines in the IMA group use the same clock mode.
- Full support for individual physical line alarms and statistics.
- Ability to configure the minimum retained links in the IMA group; for example, if 8 T1 lines compose an IMA line, you specify how many active T1 lines in the group can fail before the IMA line fails.

To configure an IMA line:

1. Use the **upln** command to create an IMA group, specifying a range of ports for the IMA Line. The syntax for the command is:

```
upln <slot>.<group-members>
```

Where *group-members* are the physical lines composing an IMA group; for example:

upln 10.1,3,6,8 adds the primary link 10.1 and the non-consecutive physical lines 10.3, 10.6, and 10.8. When you use other commands, such as **dnln** or **cnfln**, this IMA group is known by the primary link, 10.1.

upln 10.5-7,2-3 adds the primary link 10.5 and the physical lines 10.5, 10.6, 10.7, 10.2, and 10.3. When you use other commands, such as **dnln** or **cnfln**, this IMA group is known by the primary link, 10.5.

2. Use the **upport** command to activate ports at both ends of the line. The **upport** command uses the primary link designation.
3. Use the **cnfln** command to configure the minimum number of retained links and the differential delay.

To modify an IMA line:

1. Use the **cnfln** command to add lines to or delete lines from an IMA group, using the parameter IMA Group Members. You cannot change or delete a primary link from the IMA group. Should you wish to delete the primary link, you first must use the **dnport** command, then deactivate the line using the **dnln** command.
2. Use the **cnfln** command to change the minimum number of retained links, and the differential delay.
3. Use the **dnln** command to deactivate the line. A downed line is inactive, so no traffic is passed and no statistics are generated. You must remove all connections on a line (**delcon** or **delcongrp**) before you down the line with **dnln**.

To view IMA line information:

1. Use the **dsplog** command following an **upln** command to confirm that the IMA line is activated and operating; for example, following the **upln** 10.1 command, the **dsplog** command shows:

```
Clear LN 10.1 OK
Clear LN 10.1 Activated
Clear PHYSLN 10.1 OK
Clear PHYSLN 10.1 Activated
```

Following a **dnln** 10.1 command, the **dsplog** command shows:

```
Clear LN 10.1 Deactivated
Clear PHYSLN 10.1 Deactivated
```

Following an Inverse Mux Failure for an IMA group with three lines in the group, the **dsplog** command shows:

```
Major LN 10.2(3) Inverse Mux Failure
Major PHYSLN 10.4 Inverse Mux Failure
Major PHYSLN 10.3 Inverse Mux Failure
Major PHYSLN 10.2 Inverse Mux Failure
```

2. Use the **dsplns** command to show the number of lines in the IMA group, and the alarm status for the IMA line; for example:

```
dsplns 3.1
System Response: 3.1 (4) OK
```

IMA line failure is indicated by the error message Inverse Mux Failure. An Inverse Mux Failure can be triggered by:

- Physical line failure at the physical layer, such as a Loss of Signal.
- Number of physical lines are not the same at the local and remote end.
- Insufficient number of retained links in an IMA group.
- IMA protocol failure due to exceeding the maximum differential delay.

- Incompatible IMA protocol versions. To verify compatibility, check to see if the UXM firmware at both ends supports ATM 1.0 (unless CPE; in which case, verify what ATM version is running on the CPE).
3. Use the **dsplncf** command to display the IMA group members that compose the IMA line.
 4. Use the **dspport** command to identify that the port is in an IMA Port Group and the IMA line speed. In the example below, the port group is 2.5 and the line speed is 13433 cps.

```
sw225 TN      StrataCom      IGX 16      9.3.00      Jun 19 1999 13:39 PST

Port:         7.2          [ACTIVE ]
IMA Port Group: 2-5
Interface:    E1-IMA              CAC Override:  Enabled
Type:         UNI              %Util Use:    Disabled
Speed:        13433 (cps)
SIG Queue Depth: 640

Protocol:     NONE

Last Command: dspport 7.2
```

5. Use the **dsports** command (or **dsplns** command) to display the primary link of the IMA group; for example:

```
sw225 TN      StrataCom      IGX 16      9.3.00      Jun 19 1999 13:39 PST

Port configuration for ATM 8

Port  Chan      Speed      Interface      State      Protocol      Type
1     1           4528 (cps)  E1-IMA        ACTIVE     NONE          UNI
2     2           4528 (cps)  E1-IMA        INACTIVE   NONE          UNI
3     3           4528 (cps)  E1-IMA        INACTIVE   NONE          UNI
4     4           4528 (cps)  E1-IMA        INACTIVE   NONE          UNI
5(3) 5-8      54000 (cps) E1-IMA        ACTIVE     NONE(IMA)    UNI
```

To configure and view IMA statistics:

1. Use the **cnfphyslnstats** command (Super User privilege) to configure parameters for collecting circuit line statistics, including IMA-specific statistics. Refer to the *Cisco WAN Switching SuperUser Command Reference* for information about the **cnfphyslnstats** command.
2. Use the **dspphyslnstacnf** command (Super User privilege) to view the parameters configured for collecting circuit line statistics, including IMA-specific statistics. Refer to the *Cisco WAN Switching SuperUser Command Reference* for information about the **dspphyslnstats** being collected.
3. Use the **dspphyslnstathist** command (Super User privilege) to display the actual statistics information for one type of physical line statistic on an active IMA line on a UXM card. Refer to the *Cisco WAN Switching SuperUser Command Reference* for information about the **dspphyslnstathist**.

Calculating Transmit and Receive Rates on IMA Lines

The port rate of an IMA line is the sum of all physical lines less the IMA protocol overhead. The overhead is calculated as:

- 1-4 lines = 1 DSO

- 5-8 lines = 2 DSO

When an IMA group is reconfigured, the IMA line bandwidth is readjusted automatically because of the change in the total number of links.

Please refer to Table 5-3 for composite port speeds.

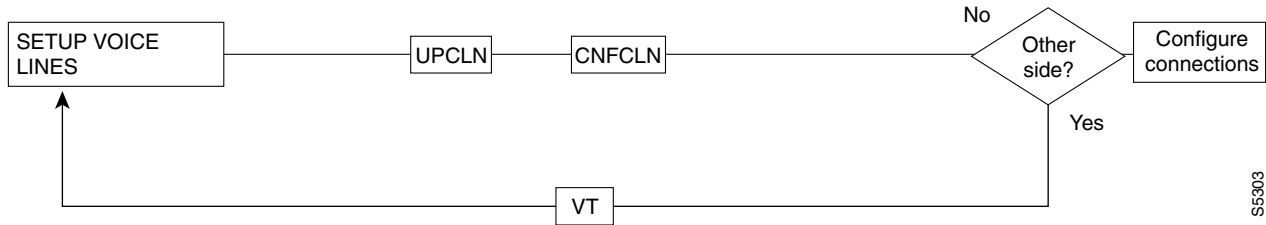
Table 5-3 Composite Port Speed

Interface	Port Speed (DSO)	Port Speed (CPS)	Description
8xT1	$(24*8-2) = T1/190$	28697	LN.1-8
7xT1	$(24*7-2)=T1/166$	25056	LN.1-7
6xT1	$(24*6-2) = T1/142$	21433	LN.1-6
5xT1	$(24*5-2)=T1/166$	17811	LN.1-5
4xT1	$(24*4-1) = T1/95$	14339	LN.1-4
3xT1	$(24*3-1)=T1/71$	10716	LN.1-3
2xT1	$(24*2-1) = T1/47$	7094	LN.1-2
1xT1	$(24*1-1)=T1/23$	3471	LN.1
T1	24 DSOs T1/24	3622	Non-IMA
8xE1	$(30*8-2) = E1/238$	35924	LN.1-8
7xE1	$(30*7-2) = E1/208$	31396	LN.1-7
6xE1	$(30*6-2) = E1/178$	26867	LN.1-6
5xE1	$(30*5-2) = E1/148$	22339	LN.1-5
4xE1	$(30*4-1) = E1/119$	17962	LN.1-4
3xE1	$(30*3-1) = E1/89$	13433	LN.1-3
2xE1	$(30*2-1) = E1/59$	8905	LN.1-2
1xE1	$(30*1-1) = E1/29$	4377	LN.1
E1	39 DSOs E1/30	4528	Non-IMA

Flow Diagrams for Line Setup

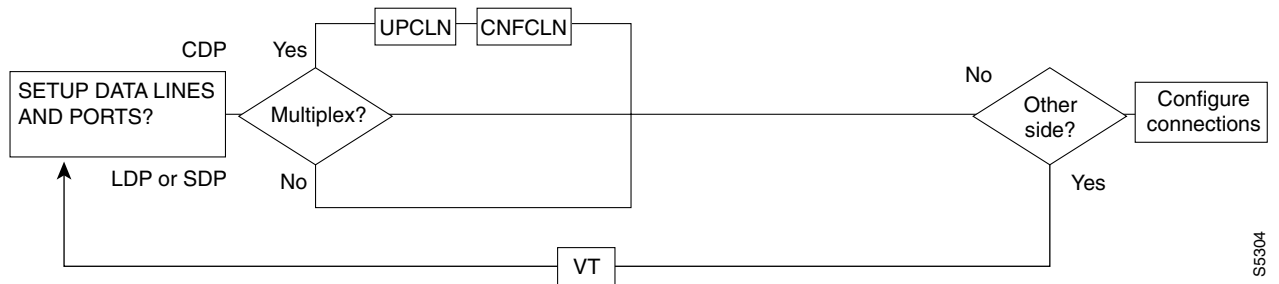
Figure 5-1, Figure 5-2, Figure 5-3, and Figure 5-4 show the command sequence for setting up lines for voice, serial data, Frame Relay, and ATM, respectively. A yes/no decision branch for “Other Side?” and the **vt** command in the sequence indicates command sequences on local and far nodes. Multiplex refers to channelized streams.

Figure 5-1 Setting Up Voice Lines



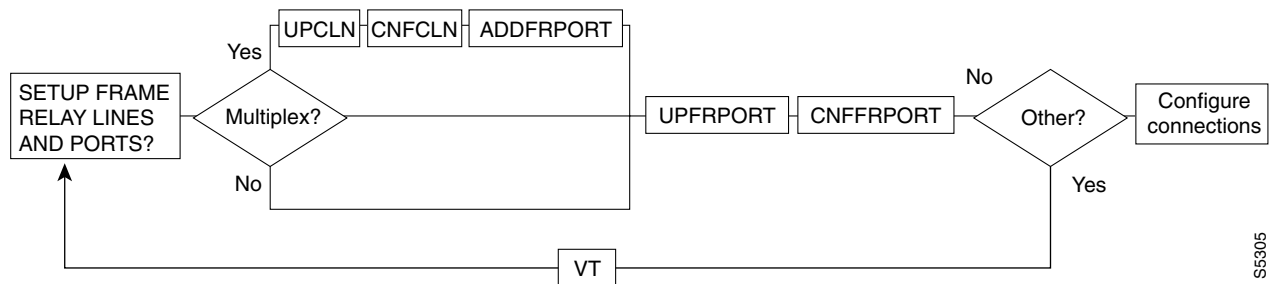
S5303

Figure 5-2 Setting Up Data Lines



S5304

Figure 5-3 Setting Up Frame Relay Lines



S5305

Figure 5-4 Setting Up ATM Lines

List of Commands

Table 5-4 shows the full command name and starting page for each line command description.

Table 5-4 Line Commands

Mnemonic	Description	Page
cnfcassw	Configure CAS switching	5-11
cnfln	Configure line (same as cnfcln)	5-14
cnfphylstats	Configure physical line statistics*	5-4
cnfport	Configure a port	9-29
cnfrsrc	Configure resources	5-24
dnln	Down line (same as dncln)	5-29
dspphylstatcnf	Display physical line statistics configuration*	5-4
dspphylstathist	Displays the physical line statistics history*	5-4
dsplncnf	Display line configuration (same as dspclncnf)	5-31
dsplns	Display lines (same as dspclns)	5-36
dspport	Displays information about a specific port.	9-77
dsptsmap	Display time slot map	5-40
prtlns	Print circuit lines (same as prtclns)	5-42
upln	Up line (same as upcln)	5-43

* Denotes SuperUser command. For detailed information about a SuperUser command, refer to the Cisco WAN Switching SuperUser Command Reference.

cnfcassw

Configures a UVM to convert channel associated signaling (CAS) and dual-tone multi-frequency (DTMF) tones to common channel signaling (CCS) call control messages. This conversion is necessary for voice networks in which a Voice Network Switch (VNS) uses SVCs to route calls from a CAS-based PBX through a WAN. Model B or later firmware on the UVM is necessary.

Before you can execute **cnfcassw**, note the following:

- The line to which you apply **cnfcassw** must be up.
- If any connections exist on the line, you cannot change the **cnfcassw** parameters. However, you can execute the command to see the current parameters in the **cnfcassw** display.
- You cannot configure a line for both CAS-switching and pass-through.
- With CAS-switching on a UVM that has Y-cable redundancy, the call state of each connection is lost in the event of a switch-over.

Full Name

Configure CAS switching

Syntax

```
cnfcassw <line> <mode> <CCS type> <CAS type> <conn type> <country code>
<interdigit timeout> <tone level> <DTMF duration> <idle pattern> <parameters 6-18>
```


**Note**

For the initial implementation of CAS switching, you should specify only port 1 for the *line* parameter (where *line* has the format *slot.port*) and select “PBX-end” for *mode*.

Related Commands

dspln, dsplncnf

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	No	Yes	IGX	Yes

Example 1

cnfcassw 5.1

Description

Configure port 1 of the UVM in slot 5 to support CAS switching.

System Response

```
sw175          TN      SuperUser      IGX 8420      9.2 Sep. 17 1998 06:11 PST
```

```
Line 5.1 CAS Switching Parameters
```

```
=> CASSW mode      [OFF]                      Parm 11      [00] (H)
   CCS Type        [ 1] (D)      Parm 12      [00] (H)
   CAS Type        [ 1] (D)      Parm 13      [00] (H)
   Conn Type       [a32 ]      Parm 14      [00] (H)
   Country code    [00] (H)      Parm 15      [00] (H)
   Interdigit TO   [05] (H)      Parm 16      [00] (H)
   Tone level      [00] (H)      Parm 17      [00] (H)
   DTMF duration   [0C] (H)      Parm 18      [00] (H)
   Idle pattern    [54] (H)
   Parm 6          [00] (H)
   Parm 7          [00] (H)
   Parm 8          [00] (H)
   Parm 9          [00] (H)
   Parm 10         [00] (H)
```

```
This Command: cnfcassw 5.1
```

```
Enter mode: Pbx/Server/Off (o):
```

Table 5-5 *cnfcassw—Parameters*

Parameter	Description	Default
line	Specifies the line in the format <i>slot.port</i> . The line must be up before you can execute <i>cnfcassw</i> .	
mode	Possible entries are “p” for PBX-end, “s” for server-end, or “o” for off. The applications are as follows: <ul style="list-style-type: none"> • PBX-end applies to a UVM connected to a PBX. Specify PBX-end mode if you plan to add the signaling channel (using addcon) at the UVM connected to the PBX (rather than the CVM or UVM connected to the VNS). • Server-end applies to a UVM connected to the VNS. Specify Server if you plan to add the signaling channel (using addcon) at the UVM connected to the VNS (rather than the PBX). • Off means the UVM is not in CAS-switching mode. 	off
CCS type	The range of entries 1–4. A 1 selects Q.SIG.	1
CAS type	The range is 1–32. A 1 specifies AB signaling for 2-wire E&M line.	1
connection type	Specifies the type of voice connection. Valid entries are a32 and a24.	a32
country code	The range is 0–0xFF. For example, 0 is the U.S. country code.	0
interdigit timeout	The range is 0–0xFF, where each hexadecimal value you enter is a multiplier of 50 millisecond increments.	05, which results in 250 ms.
tone level	Specifies the dB level of the DTMF below 0 dBm. The range is 0–0xFF.	00 for 0 dB
DTMF duration	Specifies the DTMF on/off duration. The range is 0–0xFF, and the value you enter is multiplied by 5 millisecond increments.	0C, which results in 60 ms on then 60 ms off.
idle pattern	Specifies the data pattern for the data channel. The range is 0–0xFF.	7F for T1, 54 for E1 line
parms 6–19	Parameters 6-18 are reserved for future use.	00

cnfln

Configures a line to be compatible with the device to which it connects. The **cnfln** command applies to voice, data, Frame Relay, and ATM, and IMA lines. See Table 5-3 for a list of the front and matching back cards. Because of the variety of line types and characteristics, the parameters section of this description has three tables to describe the parameters. The system automatically presents the correct options on the command line for each line type. If a parameter is not applicable to a card type, the system displays the parameter in half-tone or the value field of that parameter with dashed lines. Table 5-5 describes the parameters for voice, data, and Frame Relay parameters. Table 5-6 describes the

parameters for the ATM Line Module (ALM/A). Table 5-7 describes the parameters for the ASI line card (BPX node). Table 5-8 describes the ATM parameters for the UXM card (IGX node). describes the IMA parameters for the UXM card (IGX node).

For an ALM/A, the **cnfln** command lets you configure the receive rate and header type and enable payload scrambling. For more details on the features and configurable parameters of the ALM/A, refer to the *Cisco IGX 8400 Series Reference* and the *Cisco IGX 8400 Series Installation* manuals. Note that, although the **cnfln** display shows the transmit rate, you cannot configure it because the ALM/A transmit rate is always the maximum line rate.

For an IMA line, you can add or delete links in an IMA group, or specify the number of retained links for an IMA configuration. By default, the number of retained links is the same as the number of lines grouped together when the IMA group is created; for example:

```
upln 3.1-4
```

Results in 4 lines in an IMA group with 4 retained links. If one link fails, the IMA line fails. Using the **cnfln** command, you can change the parameter “**Retained Links**” to a lesser number, for example, 3. Therefore, if one of the lines failed, the IMA line could remain active.

For more information about commands related to IMA lines, refer to List of Commands, page 5-10.

**Note**

The **cnfln** command is the same as **cnfcln**.

Full Name

Configure line

Syntax

```
cnfln <line> <parameters>
```

Syntax for IMA

```
cnfln <slot>.<primary link>
```

Related Commands

dspln, dsplncnf, dsptsmap, dnln, upport, dspport, dsports

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IPX, IGX, BPX	Yes

Example 1

```
cnfln 14
```

Description

Configure voice line 14.

System Response

```

alpha          TRM   YourID:1          IGX 8420      9.2   Aug. 23 1998 09:55 PST

CLN 14 Configuration  T1/24          CDP slot: 13
Loop clock:          --

Line framing:        --
coding:              --
CRC:                 --
recv impedance:     --
E1 signalling:      --
encoding:            --
T1 signalling:      --
cable type:         --
length:              --
56KBS Bit Pos:      --
pct fast modem:     --

Last Command: cnfcln 14

Next Command:

```

Example 2**cnfcln 7 n 2****Description**

Configure a Frame Relay T1 line for the following options: no loop clock and a receive impedance of 75 ohms.

System Response

```

alpha          TRM   YourID:1          IPX 16       9.2   Aug. 23 1997 09:55 PST

CLN 14 Configuration  T1/24 FRPslot: 13
Loop clock:          --

Line framing: ESF
coding:              ZCS
CRC:                 --
recv impedance:     --
E1 signalling:      --
encoding:            --
T1 signalling:      --
cable type:         ABAM
length:              0-133 ft.
56KBS Bit Pos:      --
pct fast modem:     --

Last Command: cnfcln 7 n 2

Next Command:

```

Example 3**cnfln 4.2 7F 0 N****Description**

Configure ASI port 4.2 with an idle code 7F and without payload scrambling.

System Response

```

ca19          VT      SuperUser      BPX 8620      9.2      Aug. 23 1998 19:11 GMT

LN  4.2 Configuration T3      [96000 cps]  ASI-T3 slot:4
Loop clock:          --          Idle code:          7F hex

Line framing:        --
coding:              --
CRC:                 --
recv impedance:     --
E1 signalling:      --
encoding:            --          cable type:
T1 signalling:      --          length:              0-450 ft.
                                HCS Masking:              Yes
                                Payload Scramble:          No

56KBS Bit Pos:      --
pct fast modem:     --

```

Last Command: cnfln 4.2 7F 0 N

Next Command:

Example 4**cnfln 12****Description**

Configure the ALM/A in slot 12.

System Response

```

reach          TN      SuperUser      IGX 8420      9.2      July 22 1998 12:39 PDT

LN 12 Config   T3/3      [452 cps]     ALM slot: 12
Transmit Line Rate: 96000 cps
Receive Line Rate: 452 cps
Header Type:   VCC
Payload Scramble Yes

```

Last Command: cnfln 12 452 vcc y

Next Command:

Example 5

cnfln 10.1 N D4 ZCS AB 4 20 _

Description

Configure line 1 on the UVM in slot 10 with no loop clock, D4 framing, Zero Code Suppression coding, AB T1 signalling, and 20 percent expected channel utilization by a high speed modem.

System Response

```

sw176          TN      SuperUser      IGX 8420      9.2      Sep. 15 1998 13:37 PST

LN 10.1 Config T1/24          UVM slot: 10
Loop clock:     No

Line framing:   D4          cnfg:          External
coding:        ZCS          slot.line:    --
CRC:           --          CAS-switching: PBX-end
recv impedance: --          SVC-Caching   : On
E1/J1 signalling: --
encoding:      u-law
T1 signalling: AB
cable type:    ABAM
length:        0-133 ft.
56KBS Bit Pos: msb
pct fast modem: 20

```

This Command: cnfln 10.1 N D4 ZCS AB 4 20 _

Turn on SVC-Caching (Y):

This release has added a prompt to configure a UVM line for SVC Caching. It is also supported on CVM lines on the IPX. The SVC Caching feature speeds up call setup for most VNS controlled calls by avoiding some of the call setup/tear-down operations when a call originates or terminates.

Refer to the *VNS Installation and Configuration Manual* for more information on SVC Caching.

Example 6

```
cnfln 5.1 1-15,17-31 1-8 6 200 N 54 Y Y N
```

Description

Configure the number of retained links from the default (8 for this configuration) to 6.

```
sw225          TN      StrataCom      IGX 8420  9.3.13   Feb. 2 2000  10:14 GMT

LN   5.1(8) Config  E1/238          UXM slot:10
Line DS-0 map:      1-15,17-31
IMA Group Member(s): 1-8
Retained links:     6
IMA Protocol Option: Enabled
IMA Max. Diff. Dly: 200 msec.
IMA Clock Mode:     CTC
Loop clock:         No
Line coding:        HDB3
Line CRC:           Yes
Line recv impedance: 75 ohm
Idle code:          54 hex
HCS Masking:        Yes
Payload Scramble:   Yes
VC Shaping:         No
```

This Command: cnfln 5.1 1-15,17-31 1-8 6 200 N 54 Y Y N

Next Command:

Table 5-6 cnfln—Voice, Frame Relay, or Data Parameters

Parameter	Description	Default
slot or slot.line	Specifies the line. If the back card has one line connector and cable, enter the slot number. If the card has more than one physical line, include a line number. If the card is a UVM, however, enter just the slot number.	
loop clock	Enables the transmit and receive control leads to use the same clock. Format for the parameter is Y or N	N
line framing	Configures T1 line framing to be D4 or ESF. Note that UFM-C series is ESF only.	D4 (ESF on UFM/FRM)
line coding	Configures T1 and E1 coding:	
	T1:ZCS B8ZS AMI	ZCS B8ZS for FRM
	E1:HDB3 ZCS	HDB3

Table 5-6 *cnfln—Voice, Frame Relay, or Data Parameters (continued)*

Parameter	Description	Default
line CRC on	Enables CRC-4 detection for E1 lines. Use either Y or N.	N
E1 recv impedance	A parameter, in the range 1–7. 1 is 75 ohm impedance, unbalanced 2 is 75 ohm impedance, unbalanced 3 is 20 ohm impedance, balanced 4 is 0–133 ft impedance, ABAM cable 5 is 133–266 ft impedance, ABAM cable 6 is 266–399 ft impedance, ABAM cable 7 is 399–533 ft, ABAM cable	1
signaling	E1: Common channel signaling (CCS) or ABCD signaling bits with channel associated signaling (CAS)	CAS
	T1: ABCD or ABAB (with ESF line framing) or AB (with D4 line framing); CCS is available in timeslot 24 if applicable PBXs need it.	AB
encoding	A-law micro-law	depends on the back card
cable type/length	A parameter, in the range 1–8. 1 = voice circuit: 0–220 ft MAT cable, Frame Relay circuit: CSU Network Interface 2 = voice circuit: 220-440 ft MAT cable, Frame Relay circuit: 0–133 ft ABAM cable 3 = voice circuit: 440-655 ft MAT cable, Frame Relay circuit: 133–266 ft ABAM cable 4 = voice circuit: 0-133 ft ABAM cable, Frame Relay circuit: 266–399 ft ABAM cable 5 = voice circuit: 133-266 ft ABAM cable, Frame Relay circuit: 399–533 ft ABAM cable 6 = voice circuit: 266-399 ft ABAM cable, Frame Relay circuit: 533–655 ft ABAM cable 7 = voice circuit: 399-533 ft, Frame Relay circuit: not used 8 = voice circuit: 533-655 ft, Frame Relay circuit: not used	4
56kbs bit stuffing	most significant byte (msb) least significant byte (lsb)	msb
pct fast modem	Expected ADPCM fast connections (range 0-100). High speed modems preclude the use of ADPCM. Consequently, channel load requirements increase over that required for a voice channel. The pct fast modem parameters specify the expected channel utilization (%) by a high-speed modem.	20

Table 5-7 *cnfln—ATM (ALM/A) Parameters*

Parameter	Description
line	Identifies the line. The line is the slot number of the ALM/A.
receive rate	Specifies the receive rate for the line. The range for a T3 line is 150 cells per second (cps) through 96000 cps. For an E3 line, the range is 150 cps–96000 cps.
header type	The header type is either VCC or VPC. The default is VCC. Refer to the IGX-related documentation for an explanation of the header type on the ALM/A.
payload scramble	Enables or disables payload scramble. The default is No.

Table 5-8 *cnfln*—ATM (ASI) Parameters

Parameter	Description			
line number	Specifies the ASI line to configure.			
line options	Specifies the ATM line options:			
	Parameter	Description	Options	Default
	Loop clock	Enable loop clocking.	Yes/No	No
	Idle Code	Hex data placed in unused payload of cells.	0 - FF (hex)	7F
	Cable Type/Length	Length and type of cable used for trunk.	1 = 0 - 225 2 = >225	1
	HCS Masking	Masking of cell header checksum to disable error checking.	Yes No	Yes
	Payload Scramble	Whether or not to scramble (randomize) the cell payload data. Note: for E3, this must always be set to Yes.	Yes No	No

Table 5-9 *cnfln*—ATM (UXM) Parameters

Parameter	Description			
slot.line	Specifies which line on which slot to configure			
line options	Specifies the ATM line options:			
	Parameter	Description	Options	Default
	Loop clock	Enable loop clocking	Yes/No	No
	Idle Code	Hex data placed in unused payload of cells.	0 - FF (hex)	7F
	HCS Masking	Masking of cell header checksum to disable error checking.	Yes No	Yes
	Payload Scramble	Whether or not to scramble (randomize) the cell payload data. Note: for E3, this must always be set to Yes.	Yes No	Yes
	Frame Scramble	Whether or not to scramble (randomize) the frame data. Note: for E3, this must always be set to Yes.	Yes No	No
	Cell Framing	Choose the cell framing format. Select either STS-3C (SONET) or STM-1 (SDH).	STS-3C STM-1 PLCP HEC	STS-3C for OC-3 PLCP for T3 HEC for E3

Table 5-10 cnfln—IMA (UXM) Parameters

Parameter	Description
slot.line	Specifies which line on which slot to configure.
Line DSO-Map	Line DSO mapping.
IMA Group Members	Displays the line numbers of the individual links composing the IMA group.
Retained Links	The minimum number of links in the IMA group that must be active in order for the IMA line to operate. If the number of links fails and falls below the retained link number specified, the IMA line fails.
IMA Protocol Option	Specify one of the following: Enable—to enable the IMA protocol on a line Disable—to disable the IMA protocol on a line Note: Changing the protocol option on an active line results in port failure. The user should always change this option at the CPE side or the other end of the physical line to ensure the protocol is running. <ul style="list-style-type: none"> • At the CPE end, decrease the port speed to be below T1/E1 rate less protocol overhead. An IGX switch will inform the user of the proper port speed value. • At the node (line side), change port speed. • At the CPE end, disable IMA protocol. • At the node (line side), use the cnfln command to disable IMA protocol.
IMA Max Diff. Dly	Specify a value in the range: 0–200 msec. The default is 200 msec.
IMA Clock Mode:	The clock speed mode is CTC.
Loop Clock	Enables the transmit and receive control leads to use the same clock. Specify Yes or No. The default is No.
Line Coding	Configures T1 and E1 coding. Valid options are: T1—ZCS, B8ZS, AMI The T1 default is ZCS (for FRSM, B8Zs) E1—HDB3, ZCS The E1 default is HDB3
Line CRC	Enables CRC-4 detection for E1 lines. Use either Y or N. The default is N.
Line recv impedance	For E1, a parameter in the range 1–7. 1 is 75 ohm impedance, unbalanced 2 is 75 ohm impedance, unbalanced 3 is 20 ohm impedance, balanced 4 is 0–133 ft impedance, ABAM cable 5 is 133–266 ft impedance, ABAM cable 6 is 266–399 ft impedance, ABAM cable 7 is 399–533 ft, ABAM cable

Table 5-10 cnfln—IMA (UXM) Parameters (continued)

Parameter	Description
Idle Code	Hex data placed in unused payload of cells, in the range 0 - FF (hex). the default is 7F.
HCS Masking	Masking of cell header checksum to disable error checking. Specify either Yes or No. The default is Yes.
Payload Scramble	Whether or not to scramble (randomize) the cell payload data. Specify either Yes or No. The default is No. Note: for E3, this must always be set to Yes.
VC Shaping	Specify one of the following: Yes—Allows traffic to pass through VC queues and QBins before leaving the card for traffic flow control. No—Traffic does not pass through VC queues; only QBins.

cnfrsrc

Use the **cnfrsrc** command to partition resources (ports and trunks) for Automatic Routing Management PVCs, VSI-MPLS (Multiprotocol Label Switching), or PNNI SVCs. (If you want to configure resources for a VSI-MPLS controller or PNNI SVCs, refer to **cnfrsrc** in the “VSI Commands” chapter for more information specific to configuring VSI options.)



Note

Note that VSI-MPLS is supported in this release. Up to two controllers of the same type can be attached to a node and assigned the same partition to provide controller redundancy on that partition. A different set of controllers can be attached to the node and be assigned a different partition to provide controller redundancy on this second partition.

You can configure a virtual trunk to be dedicated to VSI or to Automatic Routing Management. You cannot configure a virtual trunk for both VSI and Automatic Routing Management.

This command was introduced in Release 9.1 to support physical trunks. It has been extended to support virtual trunks. After VSI has been enabled, the virtual trunk becomes a “dedicated” VSI virtual trunk. Note that if the trunk has already been added or if the VPI value has not been configured, you will not be able to configure the VPI value. (Switch software will block you from doing so.)

Configurable resources (using **cnfrsrc**) are:

- Template number—only relevant when configuring VSI options
- Maximum PVC LCNs
- Maximum PVC Bandwidth
- Configure Partition (Y/N)—Enter “n” for No to configure Automatic Routing Management PVCs. Enter “y” for yes to configure VSI options.
- Partition ID
- Enable Partition (Enable/Disable)
- Minimum VSI LCNs

- Maximum VSI LCNs
- Start VSI VPI - **Warning message will tell you to use the cnfrtrk command**
- End VSI VPI - **Warning message will tell you that the end vsi vpi is equal to the start vsi vpi for virtual trunks**
- Minimum VSI Bandwidth
- Maximum VSI Bandwidth

The resources that you can currently configure are the number of connection IDs (conids) and the trunk bandwidth. You use the **cnfrsrc** command to configure the cell rate and number of connections on a BXM card only. (You cannot use the **cnfrsrc** command on the IGX.)

You configure all port and trunk attributes with **cnfrtrk**, **cnfrtrkparm**, or **cnfrsrc**. Note that when you change a physical port attribute, you will be notified that all the logical (physical and virtual) trunks on the port are affected.

**Note**

Note that when using **cnfrsrc** to configure partition resources for Automatic Routing Management PVCs, and you are prompted whether you want to configure VSI options, enter “n” for No. You will not be prompted to enter any VSI options.

Full Name

Configure resource

Syntax

```
cnfrsrc <slot>.<port> <maxpvclens> <maxpvcbw> <partition> <e/d> <minvsilens> <maxvsilens>
<vsistartvpi> <vsiendvpi><vsiminbw> <vsimaxbw>
```

Related Commands

dsprsrc

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	BPX (BXM cards only)	No

Example 1

```
cnfrsrc 11.2 256 96000 y 1 e 0 0 1 1 0 0
```

Description

Configure resource partitions on card slot 11, port 2, to use Automatic Routing Management PVCs.

System Response

```

sw98          TN      SuperUser      BPX 8600      9.2.0r      Apr. 4 1998  16:40 PST

Port/Trunk : 11.2
Maximum PVC LCNS:          256      Maximum PVC Bandwidth:96000
Min Lcn(1) : 0 Min Lcn(2) : 0
Partition 1
Partition State :          Enabled
Minimum VSI LCNS:          0
Maximum VSI LCNS:          0
Start VSI VPI:             1
End VSI VPI :              1
Minimum VSI Bandwidth :    0      Maximum VSI Bandwidth :      0

Last Command: cnfrsrc 4.1 256 26000 1 e 512 7048 2 15 26000 100000

Next Command:

```

Table 5-11 cnfrsrc—Parameters

Parameter	Description
slot.port	Specifies the BXM card slot and port number.
Maximum PVC LCNS	<p>The maximum number of LCNs allocated for Automatic Routing Management PVCs for this port. The range is 1 to 256; 256 is the default. For trunks, there are additional LCNs allocated for Automatic Routing Management that are not configurable.</p> <p>You can use the dspecd <slot> command to display the maximum number of LCNs you can configure using the cnfrsrc command for the given port. For trunks, configurable LCNs represent the LCNs remaining after the BCC has subtracted the networking LCNs needed. A trunk has 270 networking LCNs, or channels.</p> <p>For a port card, a larger number is shown, as compared with a trunk card. This is because a trunk uses 270 networking LCNs, as compared with a port card, which uses no networking LCNs.</p> <p>Setting this field to “0” would disable Automatic Routing Management PVCs on the specified port.</p> <p>Note that you must specify a value greater than 0 for the Maximum PVC LCNS, Maximum PVC Bandwidth, and Maximum VSI LCNS parameters. Otherwise, you will not be able to create any Automatic Routing Management PVC connections on a BXM card. Also, if these parameters do not have values greater than 0, you will be unable to change the connection channel amount when you configure the BXM trunk using cnftrk.</p>

Table 5-11 *cnfrsrc—Parameters (continued)*

Parameter	Description
Maximum PVC Bandwidth	<p>Specifies the maximum bandwidth of the port allocated for Automatic Routing Management use. The range is 0 to 352207; 0 is the default. You can configure the Maximum PVC Bandwidth value for ports, but not for trunks.</p> <p>Note that you must specify a value greater than 0 for the Maximum PVC LCNs, Maximum PVC Bandwidth, and Maximum VSILCNs parameter. Otherwise, you will not be able to create any Automatic Routing Management PVCs on the BXM card.</p>
Configure Partition	<p>Answer yes or no to begin configuring resources for the partition. If you enter “n” for No, you will not be prompted to configure any VSI options. If you are configuring Automatic Routing Management PVCs, enter “n” for No.</p> <p>If you want to configure VSI options, enter “y” for yes, and you will be prompted to enter the rest of the cnfrsrc parameters, which are related to configuring VSI (such as a VSI MPLS controller or a PNNI controller). Refer to the cnfrsrc command in “VSI Commands” chapter for more information on VSI-related options.</p>
Partition ID	Specifies the ID number of the partition; 1 is the default. Always use 1 in Release 9.1. In this release, you can use 2. (The range of 0 to 255.)
Enable Partition	Answer yes or no to enable your configured partition.
Minimum VSI LCNs	<p>The minimum number of LCNs guaranteed for this partition. The range is 1 to 256; 0 is the default. The VSI controller guarantees at least this many connection endpoints in the partition, provided there are sufficient free LCNs in the common pool to satisfy the request at the time the partition is added. When a new partition is added or the value is increased, it may be that existing connections have depleted the common pool so that there are not enough free LCNs to satisfy the request. The BXM gives priority to the request when LCNs are freed. The net effect is that the partition may not receive all the guaranteed LCNs (min LCNs) until other LCNs are returned to the common pool.</p> <p>You can increase this value dynamically when there are enough unallocated LCNs in the port group to satisfy the increase.</p> <p>You may not decrease the value dynamically. All partitions in the same port group must be deleted first and reconfigured in order to reduce this value.</p> <p>To avoid this deficit condition, which could occur with maximum LCN usage by a partition or partitions, it is recommended that all partitions be configured ahead of time before adding connections. Also, it is recommended that all partitions be configured before adding a VSI controller using the addshelf command.</p>

Table 5-11 cnfrsrc—Parameters (continued)

Parameter	Description
Maximum VSI LCNs	<p>The total number of LCNs the partition is allowed for setting up connections. The min LCNs is included in this calculation. If max LCNs equals min LCNs, then the max LCNs are guaranteed for this partition.</p> <p>Otherwise, (max - min) LCNs are allocated from the common pool on a FIFO basis.</p> <p>If the common pool is exhausted, new connection setup requests will be rejected for the partition, even though the maximum LCNs has not been reached.</p> <p>You may increase this value dynamically when there are enough unallocated LCNs in the port group to satisfy the increase.</p> <p>You may not decrease the value dynamically. All partitions in the same port group must be deleted first and reconfigured in order to reduce this value.</p> <p>Different types of BXM cards support different maximum values. If you enter a value greater than the allowed maximum, a message is displayed with the allowable maximum value.</p> <p>Note that you must specify a value greater than 0 for the Maximum VSI LCNs, Maximum PVC Channels, and Maximum PVC Bandwidth parameters. Otherwise, you will not be able to add any connections on a BXM card.</p>
Start VSI VPI	<p>By default the TSC (for example, the 7200 or 7500 series router) will use either a starting VSI VPI of 1 or 2 for tag switching, whichever is available. If both are available, a starting VSI VPI of 1 is used. The VPI range should be 2-15 on a BPX 8620 VSI. The VSI range for tag switching on the BPX 8620 is configured as a VSI partition, usually VSI partition number 1. VSI VPI 1 is reserved for Automatic Routing Management PVCs. (This restriction applies only to trunks, not to ports. For a port, you can use any VPI value.) For a port UNI, the VPI range is 1 to 255. For a port NNI, the range is 1 to 4095. For trunks that do not have Automatic Routing Management configured, the VPI ranges are the same as for ports.</p> <p>The VSI partition for tag switching should start at VPI 2. If VPI 2 is not to be used, you can use the tag switching VPI interface configuration on the TSC to override the defaults.</p> <p>For trunks with Automatic Routing Management configured, the range is 2 to 4095. Always set to 2 for trunks.</p>
End VSI VPI	<p>Two VPIs are sufficient for Release 9.1, although it may be advisable to reserve a larger range of VPIs for later expansion, for example, VPIs 2-15.</p> <p>The range is the <Start VSI VPI > value to 4095.</p>

Table 5-11 cnfrsrc—Parameters (continued)

Parameter	Description
Minimum VSI Bandwidth	The minimum port bandwidth that can be used by this partition in cells/second. The range is 0 to <Maximum Line Rate>. For example, the OC-3 line rate is 352207; 0 is the default.
Maximum VSI Bandwidth	The maximum port bandwidth that can be used by this partition. This value is used for VSI QBins bandwidth scaling. The range is 0 to <Maximum Line Rate>. For example, the OC-3 line rate is 352207; 0 is the default.

dnln

Deactivates (“downs”) a line. After **dnln** executes, the line no longer generates framing, and no statistics are gathered. Before you deactivate a line, use **delcon** to remove all connections on the line and use **dnport** to deactivate the port associated with the line.

The **dnln** command is used to deactivate an IMA line, too (IGX only). As with the other lines, you must remove all connections on the IMA line (**delcon** or **delcongrp**), then deactivate the port using the **dnport** command. You then can deactivate the line with **dnln**.

For more information about IMA lines, refer to Setting Up an IMA Line, page 5-4.



Note

The command is the same as the **dncln** command.

Full Name

Down line

Syntax

dnln <line number>

Related Commands

upcln, **dsplns**, **dsptsmap**

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	Yes	Yes	IPX, IGX, BPX	Yes

Example 1

```
dnln 5.1
```

Description

Deactivate line 5.1 (the primary link for an IMA line). After this command executes, the system displays the status of the line using the same information as **dsplns** displays.

System Response

```
sw225          TRM   StrataCom      IGX 8420  9.3.a6   Mar. 10 2000 05:54
GMT
```

```
Line          Type   Current Line Alarm Status
 8.1          T1/24 Clear - OK
 9            E1/30 Clear - OK
```

Last Command: dnln 5.1

Table 5-12 dnln-Parameters

Parameter	Description
line number	Specifies the line. If the back card has one line, enter the slot number. If the card has more than one line, include a line number.

Example 2

dnln 3.12

Description 2

Deactivate line 12 on slot 3.

Table 5-13 dnln-Parameters for UXM

Parameter	Description
slot.line number	Specifies the slot and line to down on the UXM.

dsplncnf

Displays the configuration of a line. Table 5-14 shows all possible parameters in the display. The fields that actually contain data depend on the type of line.

Table 5-14 Possible Line Configuration Parameters

Screen Item	Description	Options
LN configuration	Line type and the number of channels.	T1 E1
Loop clock	Specifies whether the receive clock is looped back to the transmit clock.	Y N
Line framing	Identifies the type of line framing used by the circuit line.	DS4 for T1 ESF for T1 PLCP for T3/E3 HEC for T3/E3 STS-SC for OC-3 STM-1 for OC-3
Line coding	Identifies the line coding used by the circuit line.	E1:HDB3, AMI T1:ZCS, B8ZS, AMI
CRC	Specifies the CRC checking on E1 lines.	Y N
recv impedance	Nominal impedance for the receive line.	75 ohms balanced or unbalanced 120 ohms balanced
E1 signaling	Identifies the signaling type used for E1.	CCS or ABCD with CAS
encoding	Specifies the voice encoding scheme	micro-law A-law
T1 signaling	Identifies the signaling type used for T1	ABCD or ABAB (with ESF line framing) or AB (with D4 line framing); CCS is available in timeslot 24 if applicable PBXs need it.
56 kbps Bit Pos:	Position in word for bit stuffing on 56 Kbps data channels.	MSB or LSB
Pct fast modem		
Cable type	Specifies the T1 or E1 cable type (used for equalization)	MAT ABAM
Cable length	Specifies the T1 or E1 cable length in feet to the CSU or digital cross-connect.	0–220220–440440–655 0–133133–262262–393 393–524524–655 T3/E3 = 0–255 ft. greater than 255 ft.

Table 5-14 Possible Line Configuration Parameters (continued)

Screen Item	Description	Options
Cnfg	Applies to the UVM: cnfg shows the mode of an individual UVM port. The <i>slot.line</i> identifies the line.	External, Passing, Blocked, or Inserting See the UVM documentation in the <i>Cisco IGX 8400 Series Reference</i> for a description of these modes.
Transmit Line Rate	Applies to ATM line cards: the display shows the transmit line rate (the direction is away from the node).	The value is always the maximum for the line and is in cells per second (cps): 96000 cps for T3, 80000 cps for E3, or 353208 cps for OC-3.
Receive Line Rate	Applies to ATM line cards: the display shows the user-configured receive line rate (the direction is towards the node).	The value is in cells per second (cps). The range is 150–9600 cps for T3, 150–80000 cps for E3, or 353208 cps for OC-3.
Header Type	Applies to ATM cards: the display shows the user-specified header type.	The header type is VCC or VPC.
Payload Scramble	Applies to ATM cards: the display shows whether payload scramble is on.	The display shows Yes or No.

Full Name

Display line configuration

Syntax

dsplncnf <line number>

Related Commands

cnfln (obsolete name: **cnfcln**)

Attributes

Privilege	Jobs	Log	Node	Lock
1–6	No	No	IPX, IGX, BPX	o

Example 1

dsplncnf 5.1

Description

Displays the configuration for an IMA line in slot 5. The **dsplncnf** shows the same screen as **cnfln** without prompting for configuration.

System Response

```

sw225          TRM   StrataCom   IGX 8420   9.3.a6   Mar. 10 2000 05:55
GMT

LN   5.1(4) Config   E1/119           UXM slot:5
Line DS-0 map:      1-15,17-31
IMA Group Member(s): 1-4
Retained links:    4
IMA Protocol Option: Enabled
IMA Max. Diff. Dly: 200 msec.
IMA Clock Mode:    CTC
Loop clock:        No
Line coding:       HDB3
Line CRC:          Yes
Line rcv impedance: 75 ohm
Idle code:         54 hex
HCS Masking:      Yes
Payload Scramble:  Yes
VC Shaping:       No

Last Command: dspIncnf 5.1

```

Example 2**dspIncnf 5.1****Description**

Displays configuration for line 1 of the UVM in slot 5. The “cnfg” field shows “External,” so all DS0s terminate on line 1. Also, CAS switching is off, and SVC caching is on.

System Response

```

sw175          TN    SuperUser   IGX 8420   9.2 Sep. 17 1998 23:28 PST

LN   5.1 Config   E1/30           UVM slot: 5
Loop clock:      No

Line framing:    On           cnfg:           External
coding:         HDB3         slot.line:     --
CRC:            No          CAS-Switching: Off
rcv impedance: 75 ohm + gnd  SVC-Caching   : On

E1/J1 signalling: CAS
encoding:       A-LAW
T1 signalling:  --
cable type:    --
length:        --
56KBS Bit Pos: msb
pct fast modem: 20

Last Command: dspIncnf 5.1

Next Command:

```

Example 3**dsplncnf 13****Description**

Display the configuration of the line card in slot 13. The card in slot 13 is an ALM/A.

System Response

```
sw142          TN      SuperUser      IGX 16      9.1 July 31 1997 12:01 PDT

LN 13 Config   T3/1   [150 cps]   ALM slot: 13
Transmit Line Rate: 96000 cps
Receive Line Rate: 150 cps
Header Type:    VCC
Payload Scramble: No
```

```
Last Command: dsplncnf 13
```

```
Next Command:
```

Example 4**dsplncnf 12.1****Description**

Display the line configuration for 12.1. The card in slot 12 is an ASI in a BPX node.

System Response

```

ca20          LAN   SuperUser      BPX 8620    9.2   Aug. 23 1998 10:35 PST

LN 12.1 Configuration T3      [96000 cps]  ASI-T3 slot:12
Loop clock:      --                Idle code:      7F hex

Line framing:    --
coding:          --
CRC:             --
recv impedance: --
E1 signalling:  --
encoding:        --
T1 signalling:  --                cable type:
                                length:      0-450 ft.
HCS Masking:     Yes
Payload Scramble: No

56KBS Bit Pos:  --
pct fast modem: --

Last Command: dsplncnf 12.1

Next Command:

```

Example 5

dsplncnf 7.1

Description

Displays configuration for line 1 of the UXM OC-3 card set in slot 7.

System Response

```

sw224        TN   SuperUser      IGX 16     9.0.n2   Aug. 27 1997 16:09 GMT

LN 7.1 Config  OC-3                UXM slot: 7
Loop clock:    No
Idle code:     7F hex
HCS Masking:   Yes
Payload Scramble: Yes
Frame Scramble: Yes
Cell Framing:  STS-3C

Last Command: dsplncnf 7.1

```

Table 5-15 dsplncnf—Parameters

Parameter	Description
line number	Identifies the line in the format <i>slot</i> or <i>slot.line</i> . If the back card has one line connector and cable, enter the slot number. If the card has more than one physical line, such as a UXM, enter a slot and line number. In the case of a UVM, however, enter just the slot number.

dsplns

Displays basic configuration and status information for all the lines on the node. The information includes the line number, the type of line, and the line alarm status. The line type shows whether the line is J1, T3, E3, T1, E1, or OC-3 and shows the number of configured DS0s. This command also shows the primary line in an IMA line configuration, and whether the line alarm status. Line alarm status categories include:

- Clear—Line OK Alarm Information Signal
- Loss of Signal Remote Out of Frame
- Out of Frame Remote Out of Packet Frame
- Minor—Bad clock source Loss of Multiframe

Full Name

Display lines



Note

The **dsplns** command is the same as the **dsplns** command.

Syntax

dsplns

Related Commands

dncln, **dsptrks**, **upcln**

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IPX, IGX, BPX	No

Example 1

dsplns

Description

Display circuit lines on the node.

System Response

```
sw109          VT      SuperUser      IGX 8420      9.2 Aug. 20 1998 18:40 PST

Line Type      Current Line Alarm Status
3   T1/24      Clear - OK
5.1 E1/30      Clear - OK
5.2 E1/30      Clear - OK
5.3 E1/30      Clear - OK
5.7 E1/30      Clear - OK
5.8 E1/30      Clear - OK
7.1 T1/24      Clear - OK
11  E1/30      Clear - OK
```

Last Command: dsplns

Example 2

dsplns

Description

Displays the lines within an IMA configuration. Line 5.1 designates the primary line (the line first added to the configuration) and (8) designates that eight lines are grouped together to form this IMA line. The overall IMA group alarm status is shown in **dsplns** display. The **dspphyslms** command shows the alarm status on each of the 8 physical lines within the IMA group.

System Response

```
sw225          TN      StrataCom      IGX 8420 9.3.13      Feb. 2 2000 10:15 GMT

Line      Type      Current Line Alarm Status
5.1(8)    E1/238    Clear - OK
```

Last Command: dsplns

dspphyslns

Use the **dspphyslns** command to display the physical lines associated with an IMA line.

Full Name

Display physical lines

Syntax

dspphyslns [<slot> | T | L] [T | L]

Related Commands

upcln, dsplns, cnfln

Attributes

Privilege	Jobs	Log	Node	Lock
Any user	No	No	IGX	No

Example

```
dspphyslns 8
```

Description

Display the physical lines on node 8.

System Response

```
sw225          TN      StrataCom      IGX 8420  9.3.13   Feb. 2 2000  10:11 GMT

PHYSLN        Type    Current Line Alarm Status          Trk/Line
5.1           E1/30  Clear - OK                               5.1(8)-L
5.2           E1/30  Clear - OK                               5.1(8)-L
5.3           E1/30  Clear - OK                               5.1(8)-L
5.4           E1/30  Clear - OK                               5.1(8)-L
5.5           E1/30  Clear - OK                               5.1(8)-L
5.6           E1/30  Clear - OK                               5.1(8)-L
5.7           E1/30  Clear - OK                               5.1(8)-L
5.8           E1/30  Clear - OK                               5.1(8)-L
```

Last Command: dspphyslns 8

Table 5-16 dspphyslns–Field Descriptions

Parameter	Description
PHYSLN	The physical line number.
Type	Physical line type.
Current Line Alarm Status	The alarm status is one of the following values: <ul style="list-style-type: none"> • Clear—OK (Alarm Information Signal) • LOS (Loss of Signal) • Out of Frame (Remote Out of Packet Frames) • Minor—Bad clock source (Loss of Multiframe)
Trk/Line	Shows the primary line or trunk number. The primary line or trunk is the first line or trunk added to an IMA configuration using the upln or uptrk command.

dsptsmap

Use the **dsptsmap** command to display the channel to timeslot mapping usage information on a UVM card on an IGX node or a CDP/CVM card on an IPX node. The **dsptsmap** command is for use with the SVC caching feature, which speeds up call setup for most VNS controlled calls. The SVC caching feature avoids some of the call setup/tear-down operations associated with **addcon** and **delcon** as a call originates or terminates. The SVC caching feature reduces the connect time for many switch calls over a busy network.

To use the **dsptsmap** command, the line must have SVC caching enabled on it. You can find out if a channel is disabled by using the **dsptsmap** command.

The **cnfln** command is used to configure the SVC caching parameter setting.

The **dspscons** command is used to view disabled connections provided the SVC has not been deleted.

The **dsplncnf** command will show the value (On/Off) of the SVC caching mode feature.

Refer to the *VNS Installation and Configuration Manual* for more information on SVC caching.

Full Name

Display the channel to timeslot mapping usage for a UVM on an IGX node



Note

The **dsplcns** command is the same as the **dsplns** command.

Syntax

```
dsptsmap <line_number>[update_interval]
```

Related Commands

cnfuiparm, **cnfln**, **cnfupcln**, **dncln**, **dsptrks**, **dspln**, **dsplncnf**

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IPX, IGX	No

Example

dsptsmap 7.2

Description

Display channel to timeslot mapping for a specified line.

Table 5-17 dsptsmap—Parameters

Parameter	Description
line_number	<i>slot.line</i> for UVM or line for CVM/CDP
interval_number	Interval in seconds between screen updates. The default value is controlled by “Screen Update Time” in the cnfuiparm command.

Example

dsptsmap 9 1

Description

Enabled channels are shown on the screen underlined and in reverse video. Disabled (cached) channels are shown with the channel number underlined and in reverse video, while the timeslot is shown in normal video. Channels that have no connection are shown in normal video for both channel number and timeslot.

For example:

- Channel 1 does not have a connection.
- Channel 2 is an enabled connection carrying traffic.
- Channel 3 is a disabled connection.

Specify the *line_number* parameter in *slot.line* format for UVM, and *line* format for CDP/CVM.

Use the optional *update_interval* parameter to control how often the screen gets updated. If you do not enter any value through the CLI, the value of the Screen Update Time parameter set using in the **cnfuiparm** command is used.

System Response

```
swl76          TRM   StrataCom      IGX 16      9.1.0      Sep. 5 1997 11:00 PST
```

```
Line 7.2 Channel to Timeslot Map
```

Chan	TS	Chan	TS	Chan	TS	Chan	TS
1	1	9	14	17	17		
2	2	10	12	18	5		
3	22	11	18	19	19		
4	5	12	10	20	20		
5	11	13	13	21	21		
6	6	14	9	22	3		
7	7	15	15	23	23		
8	8	16	9	24	24		

```
This Command: dsptsmap 7.2
```

```
Hit DEL key to quit:
```

prtlns

Prints the current line configuration and line alarm status for a node. This command uses the same syntax, and prints the same information as is displayed using the **dsplns** command. See the **dsplns** command for syntax and output information.

Full Name

Print line configuration

Syntax

```
prtlns
```

Related Commands

```
dsplns
```

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	Yes	No	IGX, BPX	Yes

Example

```
prtlns
```

Description

This command uses the same syntax and prints the same information as is displayed using the **dsplns** command. See the **dsplns** command for syntax and output information.

upln

Activates (ups) a line. Use the **upln** command to make the line available for configuring and to start statistics gathering.

You must execute **upln** at both ends of the line. Executing **upln** at only one end of the line eventually causes an alarm. Configure the line's signal characteristics for the data you intend for the line using the **cnfln** command. Once both ends of the line are active, you must activate ports at both ends of the line by executing the **upport** command. Once completed, add connections with the **addcon** command.

A line consists of a cable for transmitting data and the interface circuitry for the line. The cable can be a coaxial wire, fiber optic, or a twisted pair. See Table 5-1 for information on card combinations.

The Ports and Trunks feature lets you configure multiple trunk lines and circuit line cards on a single BXM or UXM card simultaneously. In previous releases, when a single port is upped as a trunk (by using the **uptrk** command), all the remaining ports on that card are treated as a trunk. Similarly, when you upped a single port as a circuit line (by using the **upln** command), all the remaining ports on the card are treated as circuit line ports.

For example, assuming that a four-port BXM card is plugged into slot 11, you could do the following:

1. **uptrk** 11.1
2. **upln** 11.2
3. **upln** 11.3
4. **uptrk** 11.4

That is, you could up a trunk at port 1 on slot 11, up a line at port 2 of slot 11, up a line at port 3 of card slot 11, and also up a trunk at port 4 of card slot 11.

The BXM or UXM card can be a trunk card and a line (port) card at the same time. For example, a BXM slot can up port 1 as a trunk interface while upping port 2 as a line interface.

In release 9.3, you can configure an IMA line for ports as well as trunks. Use the **upln** command to create an IMA group. The command syntax is:

```
upln <slot>.<group-member>
```

Where *group-member* specifies a range of physical lines that compose an IMA line. The first connection in the string becomes the primary link (how the IMA group is recognized in other screens), such as **dsport**, **dsports**, and **cnfln**.

upln 10.1,3,6,8 adds the primary link 10.1 and the non-consecutive physical lines 10.3, 10.6, and 10.8. When you use other commands, such as **dnln** or **cnfln**, this IMA group is known by the primary link, 10.1.

upln 10.5-7,2-3 adds the primary link 10.5 and the physical lines 10.5, 10.6, 10.7, 10.2, and 10.3. When you use other commands, such as **dnln** or **cnfln**, this IMA group is known by the primary link, 10.5.

Please refer to Setting Up an IMA Line, page 5-4 for further information about using this feature, as well as composite port speeds.

Multilevel Channels Statistics Feature Support in Release 9.2

To support the Multilevel Channels Statistics feature, you will be prompted when you attempt to up the line with **upln** or up the trunk with **uptrk**, warning you that you must initialize the channel statistics level before the card will be activated. The following warning applies only when upping the first trunk or first line on the card.

Channel Statistic Level must be initialized prior to card activation



Note

If, after upping a BXM line, you get a message telling you to use **cnfrsrc** to configure PVCs, make sure that when configuring resource partitions with **cnfrsrc**, you specify values greater than 0 for the Maximum PVC Channels, Maximum PVC Bandwidth, and Maximum VSI LCNs. Otherwise, you will be unable to create any AutoRoute PVCs on a BXM card. You also will not be able to change the Connection Channels amount with **cnftrk** if these parameters' values are not set to values greater than 0.



Note

The **upln** command is the same as **upcln**.

Full Name

Up line

Syntax

upln <line number>

Related Commands

cnfcln, **dsplns**, **dspln**, **dncln**

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IPX, IGX, BPX	Yes

Example 1

upln 5.1-4

Description

Activate and “bundle” lines 1 through 4 on slot 5 into an IMA line. After this command executes, the system displays the status of the line using the same information as **dsplns** displays.

System Response

```
sw225          TRM   StrataCom   IGX 8420   9.3.a6   Mar. 10 2000 05:53
GMT
```

```
Line          Type   Current Line Alarm Status
5.1(4)       E1/119 Clear - OK
8.1          T1/24 Clear - OK
9            E1/30 Clear - OK
```

Last Command: upln 5.1-4

Table 5-18 upln—Parameters

Parameter	Description
line number	Identifies the line number in the form <i>slot</i> for a single-line card or <i>slot.port</i> for a card with more than one line.

Example 2

upln 3.2

Description

Upping a line on a UXM. Activate line 2 on slot 3. After this command executes, the system displays the status of the line using the same information as **dsplns** displays.

Table 5-19 upln—Parameters for UXM

Parameter	Description
slot.line number	Specifies the slot and line to up on the UXM. There can be no more than sixty four (64) lines per node. The upln command will be rejected if all sixty four lines have already been upped.



Voice Connections

The voice commands apply to setting up and configuring, and statistical reporting for voice connections (including FAX). In addition to the command descriptions, this chapter describes how to add a voice connection, configure card redundancy, and optimize the use of voice activity detection (VAD). A list of the commands that let you modify most characteristics of voice and data connections also appears at the front of the chapter. Use this list as a guideline for building voice service.

Voice connections exist as ports on circuit lines that are supported by a Channelized Voice Module (CVM) or Universal Voice Module (UVM) in an IGX node. The back card for the CDP or CVM is either a BC-T1, BC-E1, or BC-J1. For the UVM, the back card is either a BC-UVI-2T1EC, a BC-UVI-2J1EC, or BC-UVI-2E1EC.

Setting Up a Voice Connection

The following steps describe how to set up a voice connection.

Step 1 Configure the voice channel at each end of the connection. The associated commands are:

- **upln** Use **upln** to activate the line.
- **cnfcassw** If the UVM must convert CAS/DTMF to CCS signaling for a Voice Network Switch (VNS), use **cnfcassw** to configure the UVM for CAS switching. For CAS switching, the minimum UVM firmware level is B. Note that CAS switching is incompatible with passthrough. Before you use **addcon** to add signaling channels (to *slot.port.24* or *slot.port.16* for T1 or E1, respectively), specify “PBX-end” mode with **cnfcassw**.
- **cnflnpass** For a UVM intended to carry voice traffic with low delay code-excited linear predictive coding (LDCELP) or conjugative algebraic code-excited linear predictive coding (CACELP) per G.729, use **cnflnpass** to configure the UVM lines for the *passthrough* feature. Refer to the *Cisco IGX Reference* for a description of passthrough. Before you can execute **cnflnpass**, you must activate (**upln**) and configure (**cnfln**) the lines. Note that passthrough is incompatible with CAS-switching.
- **cnfchadv** Configures the channel for adaptive voice (ADV). This command enables or disables adaptive voice compression for one or more voice channels. The feature must be configured at both ends of the channel.

- **cnfchdl** Configures a channel's dial-type. The options are inband, pulse, and user-configured.
- **cnfchec** Configure the echo canceller for the channel. The command enables or disables the echo canceller for a range of voice channel, sets the echo return loss to high or low and enables/disables the tone disabler, convergence, and non-linear processing.
- **cnfchgn** Configures the amount of gain inserted in a voice channel.
- **cnfcond** Configures a conditioning template for the channel.
- **cnfrcvsig** Configures receive signaling for the channel.
- **cnfxmtsiz** Configures transmit signaling for the channel.
- **cnfvchtp** Configures a voice interface type for the channel.
- **cnfchutl** Configures channel utilization (see "Optimizing Traffic Routing and Bandwidth" chapter).
- **addyred** Enables voice channel redundancy.
- **dsplncnf** Use **dsplncnf** to make sure you have correctly configured the line.

Step 2 Add the connections with the **addcon** command. You must complete the appropriate steps at each end by using the commands in the preceding list before you add connections.

Configuring Voice Channel Redundancy

You can configure voice cards for redundancy by installing two identical card sets in adjacent slots and connecting them to the CPE through a Y-cable. Configure redundancy by using **addyred**. Note that a switch to a standby UVM that has active CAS-switching causes the loss of all call states.

Using VAD and Configuring Voice Channel Utilization

The bandwidth savings you gain by using VAD are less than optimal if you do not set the utilization of the voice channels to a reasonable value. To configure the utilization, use the **cnfchutl** command.

Summary of Commands

Table 6-1 shows the command name and starting page for the description of each command.

Table 6-1 Voice Connection Commands

Command	Full Name	Page
addcon	Add connection	6-4
cnfchadv	Configure channel adaptive voice	6-8
cnfchdl	Configure channel dial type	6-10
cnfchec	Configure channel echo canceller	6-13
cnfchfax	Configure fax modem detection for channels (UVM)	6-16
cnfchgn	Configure channel gain insertion	6-18
cnfcond	Configure conditioning template	6-20
cnfdch	Configure data connection to have idle code suppression enabled/disabled	6-23
cnflnpass	Configure line pass	6-23
cnfrcvsig	Configure receive signaling	6-25
cnfvchtp	Configure voice channel interface type	6-27
cnfxmtsiz	Configure transmit signaling	6-30
delcon	Delete connection	6-32
dspchcnf	Display channel configuration	6-34
dspchdlcnf	Display channel dial type configuration	6-36
dspchec	Display channel echo canceller	6-38
dspcon	Display connection	6-40
dspcond	Display conditioning template	6-42
dspcons	Display connections	6-44
dspconst	Display connection state	6-48
dspsigqual	Display signal qualifiers	6-50
dspsvct	Display voice SVC statistics	6-54
prtchcnf	Print channel configuration	6-56
prtchdlcnf	Print dial type configuration	6-57
prtcons	Print connections	6-58

addcon

Establishes the channel connections between nodes in the network. You can add voice connections to any slot that has a CDP, UVM, or CVM. Before you add a connection, determine its compression type.

If you plan for a port on a UVM to carry more than 16 channels with LDCELP or the G.729 version of CACELP, you must have a second, connected UVM and configure the resultant pair of UVMs for passthrough operation. If you attempt to add more than 16 LDCELP or G.729 channels, the system reports any excess connections as being failed connections after **addcon** execution finishes.

Furthermore, if you execute **dspcon**, the status display for the excess connections shows “ConnRJ” (connection rejected). Refer to the **cnflnpass** description in this chapter and the UVM description in the *Cisco IGX Reference* for a description of passthrough.

After you have established passthrough for a pair of UVM card sets, the system does not allow duplication of channel numbers when you add connections. For example, if you add 7.1.1-16, the node does not allow you to add 8.1.1-8 if you have linked the UVMs by using **cnflnpass**. Instead, you would add 8.1.17-24.

A UVM with Model B or higher firmware supports CAS switching. Before you can add connections in a network with CAS switching, you must configure the UVM for this feature with the **cnfcassw** command. Note that, for CAS switching, you use **addcon** to add the signaling channels at the near and far end in the format *slot.port.24* on a T1 line and *slot.port.16* on an E1 line. Also, the connection *type* for these signaling channels is “t.” If you specify D-channel compression, the connection type is “td.” See the description of **cnfcassw** in the “Setting Up Lines” chapter or, for a more detailed description, the manual titled *Cisco VNS (Voice Network Switching) Installation and Operation*.

When adding a range of channels, you do not have to specify the full channel set at the near-end. You may specify only the first channel in the set. For example, to connect channels 13.1-10 at alpha to channels 12.5-14 at beta, you could enter “**addcon** 13.1-10 beta 12.5.” In this example, channel 13.1 is connected to channel 12.5, and channel 13.2 is connected to channel 12.6, and so on.

Connections are added with a default *class of service* (COS). The value of COS is the number of seconds that the node waits before it reroutes the connection after a failure. The COS applies to various types of connections other than voice and therefore is described elsewhere (see the **cnfcos** description in the “Optimizing Traffic Routing and Bandwidth” chapter).

Table 6-2 and Table 6-3 describe what you enter for the *type* parameter for each rate and compression variable.

Table 6-2 Types of CDP and CVM Operation

Rate	VAD	No VAD	Comment
64 Kbps	v	p	None.
32 Kbps	c32	a32	None.
32 Kbps for FAX	c32d	a32d	Specifies 32 Kbps specially optimized for FAX; c32d incorporates Voice Activity Detection (VAD).
24 Kbps ADPCM	c24	a24	None.
16 Kbps no ZCS	c16z	a16z	For non-ZCS only.
16 Kbps	c16	a16	ZCS is permissible; c16 and a16 use non-standard compression algorithms.

Table 6-3 Types of UVM Operation

Rate	VAD	No VAD	Comment
64 Kbps	v	p, t	Pass-through does not accept t-type connections.
32 Kbps	c32	a32	None.
24 Kbps ADPCM	c24	a24	None.

Table 6-3 Types of UVM Operation (continued)

Rate	VAD	No VAD	Comment
16 Kbps no ZCS	116V	116	For non-ZCS only.
8 Kbps	g729r8v g729ar8v	g7298 g729ar8	The UVM supports two forms of CACELP. Both versions can support VAD (or no VAD). The “a” indicates G.729A. The other version is G.729.

Table 6-4 Types of UVM Connections

Connection	Description
p	A p-connection carries 64 Kbps PCM voice and supports A-law or micro-law encoding and conversion, gain adjustment, and signaling.
t	A t-connection carries 64 Kbps clear channel data traffic.
td	A td-connection carries compressed, 16 Kbps signaling between an IGX node and VNS unit.
v	A v-connection is the same as “p” (above) but with VAD.
a32 a24	Specifies ADPCM only. You can specify 32 Kbps or 24 Kbps.
c32 c24	Specifies both ADPCM and VAD. You can specify 32 Kbps or 24 Kbps.
116	LDCELP compression of voice to 16 Kbps.
116v	LDCELP compression of voice to 16 Kbps with VAD.
g729r8	CACELP voice compression at 8 Kbps according to G.729. This type also supports automatic FAX and modem upgrade.
g729r8v	CACELP voice compression at 8 Kbps with VAD according to G.729.
g729ar8	CACELP voice compression at 8 Kbps according to G.729A.
g729ar8v	CACELP voice compression at 8 Kbps with VAD according to G.729A.

The difference between a PCM (p) connection and a transparent (t) or transparent D-compression (td) connection is that the D4 frame signaling bits are identified and processed as signaling information with PCM connections. PCM connections permit gain adjustment to be applied to the connection. Transparent connections treat all bits, including signaling bits, as data bits and disables any gain adjustment conversion that you may have specified.

The *number* in the type field indicates the ADPCM rates in Kbps. The “z” suffix indicates that 00 code level is used. Type a16 or c16 uses only 01, 10, and 11 binary codes to avoid long strings of zeros. Type a16z and c16z connections use the 00 code and are automatically configured to avoid ZCS lines (*Z).

Full Name

Add connection

Syntax

```
addcon <local channel> <remote node> <remote channel> <type> [avoid]
```

Related Commands

delcon, dncon, dspcon, dspcons, cnfcos

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1

addcon 7.2 beta 8.2 v

Description

Add a “v” type voice connection. This command connects channel 7.2 on node alpha to channel 8.2 on node beta. A prompt appears asking you to confirm the proposed connections.

Connection type is “v,” Class of Service (COS) is “2,” compression is VAD, and ownership is local. For an explanation of COS, see the **cnfcos** description in the “Optimizing Traffic Routing and Bandwidth” chapter. Because you are entering the **addcon** command at node alpha, the node alpha is the owner of the connection.

System Response

```
alpha          TRM    YourID:1      IPX 16    9.1    Aug. 16 1997 09:37 PST

Local          Remote    Remote
Channel        NodeName  Channel      State  Type    Compression  Avoid COS
7.2            beta     8.2          Ok     v       VAD          L      2
```

Last Command: addcon 7.2 beta 8.2 v

Next Command:

Table 6-5 *addcon—Parameters*

Parameter	Description
local channel	<p>Specifies the local channel or set of channels to add. Right-angle brackets indicate a range of channels. Channel specification on a UVM has one more parameter than the specification on a CDP or CVM, as follows:</p> <p>For a CDP or CVM, the format for channel specification is <i>slot.chan[-chan]</i>.</p> <p>For a UVM, the format for channel specification is <i>slot.line.chan[-chan]</i>. Refer to the <i>Cisco IGX Reference</i> for a description of the UVM's lines. Note that, if you are using CAS switching with Model B firmware, <i>line</i> must be 1.</p>
node	<p>Specifies the name of the node at the other end of the connection. For a DAX connection (where channels on a node are connected to channels on the same node), use the local node name.</p>
remote channel	<p>Specifies the remote channel or set of channels to connect. Brackets indicate that a range of channels can be specified. Channel specification on a UVM has one more parameter than the specification on a CDP or CVM. For a CDP or CVM, the format for channel specification is <i>slot.chan[-chan]</i>. For UVM, the format for channel specification is <i>slot.line.chan[-chan]</i>.</p> <p>Access devices such as the Cisco 3800 use the following format for the remote channel specification: <i><slot.port></i> <i><access_device_connection_ID></i></p> <p>where <i>slot</i> is the slot number of the FTC or FTM card, <i>port</i> is the port number, and <i>access_device_connection_ID</i> is in the range 1–252.</p>
type	<p>Specifies the voice connection type. Refer to Table 6-1 or Table 6-2 for voice connection types and compression.</p> <p>For connections to an access device such as the Cisco 3810, <i>type</i> can be one of the following: 24 Kbps or 32 Kbps ADPCM, LDCELP, or CACELP.</p>

Table 6-6 *addcon—Optional Parameters*

Parameter	Description
avoid	<p>Specifies the type of trunk for the connection to avoid. The default is no avoidance. The choices are:</p> <ul style="list-style-type: none"> • savoid satellite trunks. • tavoid terrestrial trunks. • zavoid trunks using zero code suppression techniques that modify any bit position to prevent long strings of zeros.

cnfchadv

Enables the adaptive voice (ADV) feature for individual channels. ADV must also be enabled at each node that terminates the connection. The channel-specific **cnfchadv** has no effect at nodes that do not support ADV enabled.

If the ADV feature is enabled for a channel with a “c” or “v” connections, VAD is automatically disabled on that channel when trunk bandwidth is available and enabled when trunk bandwidth is needed. If the Adaptive Voice feature is not enabled for a channel with a “c” or “v” connections, VAD is always turned on for that channel. In order for a voice (“c” or “v”) connection to use ADV, both ends must have ADV enabled with the **cnfchadv** command.

Full Name

Configure channel adaptive voice

Syntax

```
cnfchadv <channel(s)> <y/n>
```

Related Commands

dspchcnf

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1

```
cnfchadv 14.1 e
```

Description

Enable Adaptive Voice for channel 14.1.

System Response

```
alpha          TRM   YourID:1          IPX 8420    9.2    Aug. 16 1998 09:43 PST

                %   Adaptive Gain (dB)   Dial
Channels Util Voice   In  Out   Type  Interface Type      A  B  C  D  Crit.
14.1-24    40  Enabled  0   -   Inband Unconfig  ?  ?  -  -   a
```

Last Command: cnfchadv 14.1 e

Next Command:

Table 6-7 *cnfchadv-Parameters*

Parameter	Description
channel	Specifies the channel or range of channels over which you specify Adaptive Voice.
e	Enables ADV (default).
d	Disables ADV.

cnfchdl

Configures the dial type for a channel or set of channels. The dial type may be inband, pulse, or user-configured. The user-configured option allows non-default timing values to be used. The parameters associated with the **cnfchdl** command are timing constants used to ensure that signaling pulses are not distorted in time by transmission through the network.

- Dial type determines the signaling message timing for a connection. Dial type is ignored for DS0 data connections.
- When you add an inband or pulse dial type to a channel, the channel configuration screen appears, showing the designated dial types for each channel.
- When you add a user-configured dial type, a more detailed screen appears, showing the dial type as well as the signaling delay, minimum wink, interdigit times, and playout delay.

If you select inband, the node assumes that the A and B bits are not used for loop-disconnect dialing. Therefore, any change in signaling bit status goes in a packet to the far end of the connection.

If you select pulse, the transmitting node waits (normally 72 ms) after an A or B bit transition for another transition to arrive. If a transition arrives, the new transition goes into the same signaling packet that is sent to the far end of the connection. This step increases the delay of the signaling transition across the network but decreases the amount of trunk bandwidth used for signaling.

If the default timings are not correct for the network, you must configure the options. The dialing type should be set correctly. If a connection-designated pulse is used for inband signaling, a greater than necessary delay across the network results. If a connection-designated inband is used for pulse signaling, the relative timing of signaling transitions may be lost and so distort the pulses.

Full Name

Configure dial type for channels

Syntax

```
cnfchdl <channel(s)> <dial_type> [<sig_delay> <min_wink> <int_dig_time>
<playout delay>]
```

Related Commands

dspchcnf, dspchdlnf

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1**cnfchdl 14.1 p****Description**

Configure the dial type of channel 14.1 to pulse.

System Response

```
alpha          TRM   YourID:1          IGX 8420    9.2   Aug. 16 1998 09:46 PST

Channels      %   Adaptive Gain (dB)   Dial
14.1          40  Enabled   0   -   Pulse   Unconfig
14.2-24      40  Enabled   0   -   Inband  Unconfig

OnHk          Cond
A   B   C   D   Crit.
?   ?   -   -   a
?   ?   -   -   a
```

Last Command: cnfchdl 14.1 p

Next Command:

Table 6-8 *cnfchdl—Parameters*

Parameter	Description
channel	Specifies the channel or range of channels over which to configure dial type.
dial type	Specifies the dial type to assign. The three possible dial types are: i = inband p = pulse u = user-configured Inband is the default dial type. If you designate “u” for a user-configured dial type, you are prompted, as applicable, from among the following: sig delay, min wink, interdigit time, and playout delay.

Table 6-9 *cnfchdl—Optional Parameters*

Parameter	Description
signaling delay	Specifies the signaling delay for the user-configured dial type. The range is 12–96 ms. Your entry is rounded to the closest multiple of 1.5 ms.
minimum wink	Specifies the minimum wink to assign to the user-configured dial type. The range is 3–765 ms. Your entry is rounded down to the nearest multiple of 3 ms. This parameter does not apply to CDP, UVM, or CVM channels.
interdigit time	Specifies the interdigit time for the user-configured dial type. The range is 3–765 ms. Your entry is rounded down to the nearest multiple of 3 ms. This parameter does not apply to CDP, UVM, or CVM channels.
playout delay	Specifies the signaling delay assign to the user-configured dial type. The range is 12–96 ms. Your entry is rounded to the closest multiple of 1.5 ms.

cnfchec

Configures the echo canceller and other channel parameters associated with a voice channel. (You cannot configure CAS and data channels using **cnfchec**.) The CDP/CVM and UVM have slightly different parameters. Unavailable parameters appear on the screen as a dashed line, so no prompts for these unavailable options appear.

Full Name

Configure channel echo canceller

Syntax

For CDP/CVM:

```
cnfchec <chan> <ec> <erl> <td> <convergence> <nlp>
```

For UVM:

```
cnfchec <chan> <ec> <td> <nlp> <bkgd_filter>
```

Related Commands

dspchec

Attributes

Privilege	Jobs	Log	Node	Lock
1	No	No	IGX	Yes

Example 1**cnfchec 7.1 e h e e e****Description**

Enable and configure the Echo Canceller in channel 7.1 with high echo loss tone disabled, convergence enabled, and non-linear processing enabled. In this example, the card is either a CDP or CVM because the channel is specified with *slot.channel* rather than *slot.line.channel*.

System Response

```
pubsigx1      TN      cisco      IGX 8420  9.2   July 27 1998 06:06 PDT

Channels      Echo      Echo Return  Tone      Conver-  Non-Linear Voice
              Cancel   Loss (.1 dBs) Disabler  gence    Processing Tmpl't
7.1           Enabled  High  60      Enabled  Enabled  Enabled  USA
7.2-31       Disabled High  60      Enabled  Enabled  Enabled  USA
```

Last Command: cnfchec 7.1 e h e e e

Next Command:

Example 2

cnfchec 13.1.1 e

Description

Enable the echo canceller in channel 13.1.1. In this example, the card is a UVM because the channel is specified with *slot.line.channel*. Note the available parameters differ slightly from a CDP/CVM.

System Response

```
sw176          TN      Cisco      IGX 8420      9.1 Aug. 4 1997 13:29 PST

                Echo      Echo Return  Tone      Conver-  Non-Linear  Voice  Bkgrnd
Channels        Cancel  Loss(.1 dBs) Disabler  gence    Processing Tmplt  Filter
13.1.1-24      Disabled -           Enabled   -        Enabled    -     Enabled
13.2.1-24      Disabled -           Enabled   -        Enabled    -     Enabled
```

This Command: cnfchec 13.1.1

Enable or Disable Echo Cancel (e/d)? [d]:

Table 6-10 cnfchec—Parameters

Parameter	Description
channel	Specifies the channel or range of channels. For a CDP or CVM, “channel” has the format <i>slot.channel(s)</i> . For a UVM, “channel” has the format <i>slot.line.channels(s)</i> .
echo canceller	Enable or disable the echo canceller. An “e” enables. A “d” disables.
echo return loss	Sets the echo return loss as high/low). An “h” specifies high. An “l” specifies low.
tone disabler	Enables or disables the tone disabler. An “e” enables. A “d” disables.
convergence	Enables or disables convergence. An “e” enables. A “d” disables. Except for test purposes, the normal state for convergence is enabled.
nonlinear processing	Enables or disables nonlinear processing. An “e” enables. A “d” disables.
bkgd_filter	Enables or disables the background filter.

cnfchfax

Configures a channel on a UVM for either *FAX detection* or *FAX relay*. If you enable FAX detection, the UVM suspends voice compression when it detects a FAX or modem tone on the channel. For the duration of the FAX, transmission takes place at 64 Kbps.

FAX relay is a mechanism for compression the FAX transmission rate across a network to 9.6 Kbps.

To view the current configuration, use the **dspchcnf** command.

Full Name

Configure FAX modem detection for channels

Syntax

```
cnfchfax <slot.line> <channel(s)> <e/d>
```

Related Command

dspchcnf

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	Yes	Yes	IGX	Yes

Example 1**cnfchfax 7.1.1****Description**

Configure channels 1-24 on line 1 of the UVM in slot 7 to have FAX modem detection.

System Response

```
sw109          VT    Cisco      IGX 8420      9.2    Aug. 20 1998 19:10 PST

                %    Adaptive          Gain (dB)    Dial    Interface          OnHk    Cond
Channels Util Voice      Fax      In  Out    Type    Type          A  B  C  D Crit
7.1.1-24  40  Enabled Disabled  0    0    Inband  2W E&M      0  X  -  -  a
7.2.1-24  40  Enabled Disabled  0    0    Inband  Unconfig   ?  ?  -  -  a
```

Last Command: cnfchfax 7.1.1

Next Command:

Table 6-11 cnfchfax—Parameters

Parameter	Description
slot.line	Specifies the line of the UVM.
channel(s)	Specifies the DS0 or range of DS0s.
e/d	Enable or disable FAX detection.

cnfchgn

Configures the amount of gain inserted by the IGX node for a given circuit line channel or range of channels. Gain can be configured between +6 dB and -8 dB. The input gain is inserted at the receive side of a voice card and is therefore applied before the signal is packetized by the card. The output gain is inserted at the transmit side of a voice card and is applied after the signal has been depacketized by the card. Gain is meaningless for channels that carry data.

Full Name

Configure gain insertion for channels

Syntax

```
cnfchgn <channel(s)> <input_gain> <output_gain>
```

Related Commands

```
dspchcnf
```

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	Yes	Yes	IGX	Yes

Example 1**cnfchgn 14.1 -4 2****Description**

Configure input gain of -4 dB and an output gain of $+2$ dB for channel 1 of circuit line 1.

System Response

```
alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 16 1998 09:52 PST

          %   Adaptive Gain (dB)   Dial
Channels Util Voice   In  Out      Type   Interface Type   A   B   C   D   Crit.
14.1      40   Enabled -4   -2 User   Unconfig ? ? - -   a
14.2-24   40   Enabled 0    -2 Inband Unconfig ? ? - -   a
```

Last Command: cnfchgn 14.1 -4 2

Next Command:

Table 6-12 cnfchgn-Parameters

Parameter	Description
channel	Specifies the channel or range of channels.
input_gain	Specifies the gain, in decibels, to assign to the channel. The range is -8 dB $+$ 6 dB.
output_gain	Specifies the gain, in decibels, to assign to the channel. The range is -8 dB $+$ 6 dB.

cnfcond

Creates a conditioning template that specifies the bit patterns to be transmitted for each of the T1 and E1 timeslots and their A, B, C, and D signaling bits while the channel is in the failed state. Its purpose is to prevent the signaling bits from returning to the idle (on-hook) bit pattern during a channel failure and to force a known bit pattern (usually busy). If a connection fails and the template has been specified as the conditioning template for the failed connection, the data parameter in the template is transmitted in the channels timeslot, and the A, B, C, and D bits are processed according to the specified parameters.

A two-character sequence in the ID parameter field identifies the template. The Data Pattern field displays the pattern transmitted in the channels timeslot. The Signaling Pattern field displays the pattern transmitted in the channel's A, B, C, and D signaling bit positions. Each of the A, B, C, and D signaling bits are specified independently and may be held high or low or toggled to the on-hook condition for a short time then off-hook (the name of this latter action is a *wink*). You can control the timing of the bit-toggling by specifying the duration of winks in increments of 50 ms.

A typical failure response is for the node to:

1. Transmit idle characters in the channel's timeslot
2. Signal off-hook for a period of 2 seconds
3. Return permanently to the on-hook condition

Full Name

Configure conditioning template

Syntax

```
cnfcond <id> <data> <A bit> <B bit> <C bit> <D bit>
```

Related Commands

cnfvchtp, dspchcnf, dspcond

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1

```
cnfcond lm 01010100 0(40)/1 1 1 1
```

Description

Configure the conditioning template.

System Response

```
alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 16 1998 09:59 PST
```

```
Conditioning criterion lm:
```

```
Data Pattern
01010100 - E1/T1
```

```
Signalling Pattern
A          0(40)/1
B          1
C          1
D          1
```

```
Last Command: cnfcond lm 01010100 0(40)/1 1 1 1
```

```
Next Command:
```

Table 6-13 *cnfcond—Parameters*

Parameter	Description
id	Specifies the identifier of conditioning template. The identifier may be any two character combination of lowercase letters (a–z) and numeric digits (0–9).

Table 6-13 *cnfcond—Parameters (continued)*

Parameter	Description
data	Specifies an eight-bit binary string to use instead of the voice in the event the channel fails.
A bit B bit C bit D bit	<p>Specifies the signaling sequence to be transmitted for these bits in the event of a channel failure. You can independently set each of these parameters. Each element in the sequence is expressed as a 1 or 0 (to indicate the logic state of the line) followed by a number in parenthesis to indicate the duration that the state remains on the channel. The duration number is expressed in 50 ms intervals. If you do not enter a duration value, the state remains the same indefinitely.</p> <p>For example, if is set to 1(40); upon a channel failure, the B bit remains in the 1 state for 2 seconds (40 x 50 ms=2 seconds).</p> <p>For another example, <C> set to 0 would cause the C bit to be held permanently at 0 during a failed channel condition because no duration value is present.</p> <p>Note that you can specify a sequence of states by entering several states separated by slash symbols. The maximum number of states in a sequence is 5. For example, you could set <A> to 1(40)/0(20)/1 to vary the duration of the 0 and 1 states.</p>

cnflnpass

Configures a pair of ports so that unprocessed channels go from a *primary* UVM to a *secondary* UVM. The **cnflnpass** command primarily applies to channels that use LDCELP or G.729 CACELP (although passthrough is possible on any type of connection except t-type or td-type). For a description of *pass-through*, refer to the UVM description in the *Cisco IGX Reference*.

To return ports to the non-passing configuration, execute **cnflnpass** with a 0 as the second argument.

Full Name

Configure line pass-through

Syntax

To configure pass-through, enter:

```
cnflnpass <primary line> <secondary line>
```

To remove pass-through from the primary and secondary lines, enter:

```
cnflnpass <primary line> 0
```

Related Commands

dsplncnf

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	Yes	Yes	IGX	Yes

Example 1**cnflnpass 13.1 12.1****Description**

Configure line 13.1 to pass any unsupported channels to line 12.1.

System Response

Upon successful execution of the command, the screen displays the slot and line of the passing channel on the right. The screen also shows other characteristics of the line.

```
sw176          TN          IGX 8420    9.2    Aug. 26 1998 00:18 GMT

LN 13.1
E1/30          UVM slot: 13
Loop clock:    No

Line framing:   On          cnfg:          Passing
coding:        HDB3          slot.line:    12.1
CRC:           No
recv impedance: 75 ohm + gnd
E1/J1 signalling: CAS
encoding:      A-LAW
T1 signalling: --
cable type:    --
length:        --
56KBS Bit Pos: msb
pct fast modem: 20
```

Last Command: cnflnpass 13.1 12.1

Next Command:

Note that, when you remove pass-through by entering a 0 for the secondary line, the screen also still line characteristics but with dashed lines in the column for the secondary (or passing) line.

Table 6-14 *cnflnpass—Parameters*

Parameter	Description
primary line	Specifies the channels that the primary card supports. The format is <i>slot.port</i> .
secondary line	Specifies the channels that the secondary card supports. The format is <i>slot.port</i> .

cnfrcvsig

Configures the receive signaling bits for a voice channel. Channel signaling bit options are t (transparent), 0, 1, or I (invert). If signaling is set to “not used” (-) by **cnfchtp**, the following condition is maintained: A=1, B=1, C=0, D=1.

Full Name

Configure receive signaling

Syntax

cnfrcvsig <channel(s)> <[A/]Conv> <[B/]Conv> <[C/]Conv> <[D/]Conv>

Related Commands

cnfxmtsig, **dspsigqual**

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1

cnfrcvsig 8.1 A/T B/0 C/I D/I

Description

Configure channel 8.1 signaling to transparent for the A bit, inhibited for the B bit, inverted for the C and D bits.

System Response

```
beta          TRM   YourID:1          IGX 8420    9.2    Aug. 23 1998 11:36 MST
```

```

                                Signalling Qualifiers
From 8.1    TXAbit  TXBbit  TXCbit  TXDbit  RXAbit  RXBbit  RXCbit  RXDbit
8.1        T      T      T      T      T      0      I      I
8.2-31    T      T      T      T      T      T      T      T

```

```
Last Command: cnfrcvsig 8.1 A/T B/0 C/I D/I
```

```
Next Command:
```


Table 6-15 cnfrcvsig—Parameters

Parameter	Description
channel	Specifies the channel or range of channels to receive signaling.

Table 6-16 cnfrcvsig—Optional Parameters

Parameter	Description
A/	Specifies the conversion applied to the A bit. <Conv> can be one of: 1:bit is asserted. 0:bit is inhibited. T:bit is passed transparently. I:bit is inverted.
B/	Specifies the conversion applied to the B bit.
C/	Specifies the conversion applied to the C bit.
D/	Specifies the conversion applies to the D bit.

cnfvchtp

Configures an interface signaling type for a voice channel. Most standard signaling types are maintained by the node, but a custom template may be built by the user. If you enter the **cnfvchtp** command without a specific interface number, the system will present you with a list of valid interface types and their associated onhook and conditioning information.

To assign an interface type (and its associated onhook and conditioning information) to the channel or set of channels, enter the number of the desired interface type. As mentioned previously, type “1” requires user configuration. Interface type is ignored for “d” type connections.

Full Name

Configure interface type for voice channels

Syntax

```
cnfvchtp <channel(s)> <type> [<A> <B> <C> <D> <cond_code>]
```

Related Commands

cnfchgn, cnfchdl, dspchcnf

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1**cnfvchtp 7.1.1****Description**

Configure the interface type for channel 7.1.1-24.

System Response

```
sw109          VT    cisco    IGX 8420    9.2  Aug. 20 1998  18:54 PST

CDP Models All                None          All
UVM Models All                None          All
      Sample Delay Bkgnd          Echo Suppression V.25 Xmit
From 7.1.1.1 VAD Non-VAD Noise HPF Float Function Loss Detect Delay
7.1.1-24 A8 01 67 ON ON ON ON ON 64K 5
7.2.1-24 A8 01 67 ON ON ON ON ON 64K 5
```

This Command: cnfvchparam 7.1.1

Sample delay for VAD connections:

Example 2**cnfvchtp 15.5-8 1 X X - - b****Description**

Configure a user configurable interface type for channel 15.1 to 15.8. The channel configuration screen shows that channels 5-8 of circuit line 15 now has a user-configured interface type with an A-bit on-hook value of X, a B-bit on-hook value of X, an C-bit on-hook value of not used, D-bit on-hook value of not used, and conditioning template b.

Table 6-17 cnfvchtp—Parameters

Parameter	Description
channel	Specifies the channel or range of channels for the interface type configuration. For a CVM or CDP, the format is <i>slot.channel[-channel]</i> . For a UVM, the format for channel is <i>slot.line.channel[-channel]</i> .

Table 6-17 cnfvchtp—Parameters (continued)

Parameter	Description
interface type	<p>Specifies the number of the interface type to assign to the channel or range of channels. These types are listed in Table 6-18. The On-hook column has A bits on the left and B bits on the right. The conditioning column has different types of conditioning specified. If you designate interface type number 1 to indicate a user-configured interface type, the system prompts for: on-hook A, on-hook B, on-hook C (if applicable), on-hook D (if applicable), conditioning A, conditioning B, conditioning C (if applicable), conditioning D (if applicable), and conditioning template information.</p> <p>When the IPX or IGX receives A, B, C, and D bits corresponding to the on-hook values, that channel is known to be on-hook. If the A, B, C, and D bits do not correspond to the onhook values, that channel is known be off-hook</p>
onhook A	Abit value for the on-hook state of a channel or set of channels.
onhook B	Bbit value for the on-hook state of a channel or set of channels.
onhook C	Cbit value for the on-hook state of a channel or set of channels.
onhook D	<p>Dbit value for the on-hook state of a channel or set of channels. Possible values are:</p> <p>1 + high 0 = low X= don't care ? = don't know - = not used</p>
conditioning template	One of many predefined or user-defined conditioning templates in the range of 00000000 to 11111111. (See dspond and cnfcond commands.) Each interface type, except for option 1, has a predetermined conditioning template associated with it. These represent the A, B, C, D bit values as well as the substitute PCM voice sample sent to the attached equipment in case the voice connection fails for any reason.

Table 6-18 cnfvchtp—Interface Types

Interface Number	Interface Type	Onhook	Conditioning
1	User Config		
2	Unconfig	? ? - -	a
3	No Sig	? ? ? ?	a
4	Force Sig	? ? - -	a
5	2W E&M	0 X - -	a
6	4W E&M	0 X - -	a
7	FXO	11 - -	b
8	FXS G/S	01 - -	c

Table 6-18 cnfvchtp—Interface Types (continued)

Interface Number	Interface Type	Onhook	Conditioning
9	FXS L/S	0 X - -	d
10	DPO	0 X - -	a
11	DPT	0 X - -	a
12	RPO	0 X - -	a
13	RPT	0 X - -	a
14	SDPO	0 X - -	a
15	DX	0 X - -	a
16	ETO	? ? - -	e
17	PLAR	? ? - -	d
18	PLR	0 X - -	a
19	RD	? ? - -	a
20	R1 (SOCOTEL)	0 - - -	e
21	SSDC5A	1 1 0 1	f
22	R2 (backward)	1 1 - -	e
23	R2 (forward)	1 0 - -	d

cnfxmstsig

Allows the node to pass A, B, C, and D channel signaling bits through unchanged, or to invert, or hold them at a given value for a CDP or CVM line. It affects signaling bits in the transmit direction (to the PBX or channel bank) in an E1 system. The command configures the transmit signaling. Channel signaling bit options are T (transparent), 0, 1, or I (invert). If signaling is set to “not used” (-) by **cnfvchtp**, the following is maintained: A=1, B=1, C=0, D=1.

Full Name

Configure transmit signaling

Syntax

```
cnfxmstsig <channel(s)> <[A/]Conv> <[B/]Conv> <[C/]Conv> <[D/]Conv>
```

Related Commands

cnfrevsig, dspsigqual

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1

cnfxmtsiz 8.1 a/I b/0 c/1 d/t

Description

Configure the transmit signaling for channel 8.1 to inverted for the A bit, inhibited for the B bit, asserted for the C bit and transparent for the D bit.

System Response

```
beta          TRM   YourID:1          IGX 8420    9.2    Aug. 23 1998 11:38 MST
```

```

                                Signalling Qualifiers
From 8.1    TXAbit  TXBbit  TXCbit  TXDbit  RXAbit  RXBbit  RXCbit  RXDbit
8.1        1        0        1        T        T        0        I        I
8.2-31    T        T        T        T        T        T        T        T

```

Last Command: cnfxmtsiz 8.1 a/I b/0 c/1 d/t

Next Command:

Table 6-19 cnfxmtsiz—Parameters

Parameter	Description
channel	Specifies the channel or range of channels to receive signaling.

Table 6-20 cnfxmtsiz—Optional Parameters

Parameter	Description
A/	Specifies the conversion applied to the A bit. <Conv> can be one of: 1 = bit is asserted. 0 = bit is inhibited. T = bit is passed transparently. I = bit is inverted.
B/	Specifies the conversion applied to the B bit.
C/	Specifies the conversion applied to the C bit.
D/	Specifies the conversion applies to the D bit.

delcon

Removes one or more voice connections from a network. You can delete connections at either end of the connection.

Do not delete a connection when the node at the other end of the connection is unreachable. The unreachable node does not recognize the deletion.

Also, you must not delete a connection to an unreachable node then connect that deleted channel to another node.

Full Name

Delete connection

Syntax

delcon <channel(s)>

Related Commands

addcon, dspcon, dspcons

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	Yes	Yes	IGX	Yes

Example 1**delcon 14.1****Description**

Delete connection 14.1. The proposed deletions are highlighted, and a prompt requests confirmation of the deletion. Enter a “y” to delete the highlighted connections or an “n” to keep the highlighted connections. The example shows the screen after deletion of 14.1.

System Response

```
alpha          TRM   YourID:1      IGX 8420     9.2   Aug. 16 1998 09:35 PST

Local          Remote      Remote
Channel        NodeName   Channel     State  Type    Compression  Code Avoid COS O
5.1            beta       25.1        Ok    256    7/8          0   L
9.1.100       gamma     8.1.200    Ok    fr     0           0   L
9.2.400       beta     19.2.302   Ok    fr     0           0   L
```

Last Command: delcon 14.1

Next Command:

Table 6-21 delcon—Parameters

Parameter	Description
channel(s)	Specifies a channel or range of channels to delete. The format for channel on a CDP or CVM is <i>slot.channel</i> The format for channel on a UVM is <i>slot.line.channel</i> . For a range of channels, separate the first and last channel with a dash (-).

dspchcnf

Displays configuration details for voice, data, or Frame Relay channels. When you specify a voice channel with **dspchcnf**, the display shows:

- Percent of channel utilization
- Adaptive voice enable status
- Fax enable status
- Gain in both directions (in decibels)

- Dial Type
- Interface type (such as 2w E&M)
- Onhook and conditioning specifications

For the contents of the display when you apply **dspchcnf** to a serial data channel or Frame Relay channel, refer to the chapters in this manual that describe those traffic types.

Full Name

Display channel configuration

Syntax

dspchcnf <start_channel>

Related Commands

cnfchadv, cnfchdfm, cnfchdl, cnfcheia, cnfchgn, cnfchtp, cnfchutl

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX	No

Example 1

dpchcnf 7.1.1

Description

Display the channel configuration of line 7.1.1-24. The card in slot 7 is a UVM.

System Response

```
sw109          VT    cisco      IGX 8420      9.2  Sept. 20 1998 18:59 PST

                % Adaptive          Gain (dB) Dial  Interface      OnHk  Cond
Channels Util Voice      Fax  In  Out  Type  Type          A  B  C  D Crit
7.1.1-24  40  Enabled Disabled  0   0  Inband 2W E&M      0  X  -  -  a
7.2.1-24  40  Enabled Disabled  0   0  Inband Unconfig  ?  ?  -  -  a
```

Last Command: dspchcnf 7.1.1

Next Command:

Example 2**dspchcnf 9.1.3-8****Description**

Display configuration values for all channels on Frame Relay port 9.1 (which also shows if a data channel is configured for idle code suppression).

```
sw176          TRM   StrataCom      IGX 16    9.2.a2    Apr. 3 1998  17:32 PST
               Maximum EIA    %      DFM Pattern    DFM   Idle Code    PreAge
From 9.1.3    Update Rate    Util   Length        Status  Suppr       (usec)
9.1.3-8      -              -      -              -      Enabled     0
```

Last Command: dspchcnf 9.1.3

Table 6-22 dspchcnf-Parameters

Parameter	Description
start channel	Specifies the channel to begin the display. The format for a CDP or CVM is <i>slot.channel</i> . The format for a UVM is <i>slot.line.channel</i> . The format for an IMA-compliant line is <i>slot.line.start_channel—end_channel</i> .

dspchdlcnf

Displays dial type configurations for all channels on a circuit line, as shown in Table 6-23.

Table 6-23 Information in dspchdlcnf Display

Channel Type	Dial Type	Description
All	Dial Type	Inband, pulse, or user-configured.
User-configured	signaling delay	The signaling delay on a channel. The range is 12 ms–96 ms.
	minimum wink	The minimum wink on the channel. The range is 3 ms–765 ms. (Minimum wink does not apply to a CDP or CVM channel.)
	interdigit time	The interdigit times on a channel. The range is 3 ms–765 ms. (Interdigit time does not apply to a CDP or CVM channel.)
	playout delay	The playout delay on a channel. The range is 12 ms–96 ms.

■ dspchdlnf

Full Name

Display channel dial type configurations

Syntax

dspchdlnf <start_channel>

Related Commands

cnfchdl

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX	No

Example 1

dspchdlnf 14.1

Description

Display the dial type configuration for all channels beginning with 14.1.

System Response

```
alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 16 1998 09:45 PST
```

```
Channels  Type   Sig Delay   Min Wink  IntDigit Time  Payout Delay
14.1-24  Inband    12      141      300      -
```

```
Last Command: dspchdlnf 14.1
```

```
Next Command:
```

Table 6-24 *dspchdlcnf—Parameters*

Parameter	Description
start channel	Specifies the channel at which the display begins. For a CDP or CVM, the format is <i>slot.channel</i> . For a UVM, the format is <i>slot.line.channel</i> .

dspchec

Displays the integrated echo canceller (IEC) parameters for one or more voice channel(s). The **dspchec** command does not apply to CAS or data channels. The specified channels must be on a CDP, CVM, or UVM. Table 6-25 lists the displayed parameters and possible values.

Table 6-25 *Information in the dspchec Display*

Category	Possible Value
Echo cancellation	Enabled or Disabled
Echo Return Loss (.1 dBs)	High/low (loss is in units are 0.1 dBs)
Tone Disabler	Enabled or Disabled
Convergence	Enabled or Disabled
Nonlinear Processing	Enabled or Disabled
Voice Template	USA, other

Full Name

Display channel echo canceller configuration

Syntax

dspchec <channel(s)>

Related Commands

cnfchec

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX	No

Example 1

dspchec 7.1

Description

Display the echo canceller configuration for channel 7.1.

System Response

```
pubsipx1      TN      cisco      IGX 8420    9.2      July 27 1998    06:10 PDT

Channels      Echo      Echo Return  Tone      Conver-  Non-Linear  Voice
              Cancel   Loss (.1 dBs)  Disabler  gence    Processing  Tmpl't
7.1           Enabled  High  60      Enabled  Enabled    Enabled    USA
7.2-31       Disabled High  60      Enabled  Enabled    Enabled    USA
```

Last Command: dspchec 7.1

Next Command:

Table 6-26 *dspchec—Parameters*

Parameter	Description
channels	Specifies the channel or channels to display. For a CVM or CDP, the format is <i>slot.channel(s)</i> . For a UVM, the format is <i>slot.line.channel(s)</i> .

dspcon

Displays connection information for a specified channel. The information displayed includes:

- The channel numbers for both the local and remote ends of the connection.
- The node names at both ends of the connection.
- The routing restriction.
- The class of service (COS) of the connection (see **cnfcos** description for details).
- The connection route listing the end nodes and any intermediate nodes.
- The preferred route for the connection (if configured).
- If cost-based routing is configured, displays maximum and current costs for a connection route.
- The status of the cards associated with the connection.
- Any Y-cable conflicts.

- The type of the compression, if applicable (VAD, ADPCM, LDCELP, CACELP for voice; repetitive pattern suppression (RPS) applies to data connections).

The status that may be displayed includes:

ok	Connection good
failed	Connection failed

Full Name

Display connection

Syntax

`dspcon <channel>`

Related Commands

`addcon`, `cnfrtcost`, `cnfpref`

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	Yes	Yes	IGX	No

Example 1**dspcon 6.1****Description**

Display connection information for 6.1.

System Response

```

sw196          VT    cisco    IGX 8420    9.2    Oct. 19 1998    13:35 PDT
Conn:  6.1          sw83          7.13          c16
                                           Status: OK

Owner: LOCAL  Restriction: NONE  COS: 2  Compression: ADPCM

Path:  sw196    14-- 6.1sw86    1.1-- 11sw83
Pref:  sw196    14-- 6.1sw86    1.1-- 11sw83

sw196    Line  6: OK          ONHK  sw83    Line  7: OK

Last Command: dspcon 6.1

Next Command:

```

Table 6-27 dspcon—Parameters

Parameter	Description
channel	Specifies the channel for the connection details display. The command displays connection information for one channel at a time. The format for <i>channel</i> on a CDP or CVM is <i>slot.channel</i> . The format for a channel on a UVM is <i>slot.line.channel</i> .

dspcond

Displays the signaling bit patterns from the specified template. Refer to the description of the **cnfcond** command for the purpose of the conditioning template.

Full Name

Display conditioning criteria

Syntax

dspcond <identifier>

Related Commands

cnfchtp, cnfcond

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX	No

Example 1

dspcond a

Description

Display the conditioning template identified as “a.”

System Response

```
alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 16 1998    09:56 PST
```

```
Conditioning criterion a:
```

```
Data Pattern
01010100 - E1
01111111 - T1
```

```
Signalling Pattern
A          0(40)/1
B          1
C          1
D          1
```

```
Last Command: dspcond a
```

```
Next Command:
```

Table 6-28 dspcond—Parameters

Parameter	Description
identifier	Specifies the identifier of the template.

dspcons

Displays a summary of the connections on an IGX node. Table 6-29 shows the fields displayed in the **dspcons** screens.

The **dspcons** screen in Example 3 shows whether the Idle Code Suppression feature is enabled or disabled. The Idle Code Suppression feature provides a way to stop Fast Packet generation on an Nx64 super-rate PVC connection when the connected PBX has terminated a video call. Traffic on the data network will therefore be reduced. Bursty data will be able to use this unused bandwidth.

On the **dspcons** screen, data connections show the letters ICS under the Compress field if the connection has idle code suppression enabled or not. This feature is supported only on IGX platforms in Release 9.2. It is supported only on the UVM and CDP/CVM cards. The UVM model E and CVM/CDP model B revision E firmware are required to use the Idle Code Suppression feature in Release 9.2.

Table 6-29 Information in the dspcons Display

Fields	Description
Local Channel	The connection's channel at this node.
Remote Node Name	The name of the node at the other end of the connection.
Remote Channel	The connection's channel at the remote node.
State	The state of the connection(s) as follows: <ul style="list-style-type: none"> • OK = Routed • Down = Downed • OK Downed = Waiting for onhook to occur to allow courtesy down to take place for connection(s) that have been courtesy downed using the dncon command. • Failed = Unrouted, but trying
Type	The type of connection (v = voice, d = data, fr = Frame Relay, atfr = ATM to Frame Relay interworking, atfst = ATM to Frame Relay interworking with ForeSight, -fail = failed connections; data rate in Kbps for data).
Compression	The type of compression applied to the connection. The types of voice compression appear earlier in the chapter. The compression that applies to data connections is the purchased option called repetitive pattern suppression (RPS).
COS	The Class Of Service.
Loopback	A connection with a local loopback is indicated by a right parenthesis symbol between the Local Channel and Remote NodeName columns. A Frame Relay connection with a port loopback is indicated by a right bracket symbol between the Local Channel and Remote NodeName columns. A connection with a remote loopback is indicated by a right parenthesis symbol before the channel number in the Remote Channel column.
Local/Remote Abit	A bit status on the local and remote nodes if -abit option selected. Note that -abit is incompatible with -v, -d, and +d.

Full Name

Display connections

Syntax

```
dspcons [start_channel] [nodename] [state] [type]
[-g | +d | -v | -d | -f | -abit | -fabit | -atfr | -siw | -fail | -down]]
```

Related Commands

addcon, cnfchadv, chfchdfm

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX	No

Example 1

```
dspcons
```

Description

Display a summary of all connections.

System Response

```
pubsipx1      TN      cisco      IPX 16      9.1      July 24 1997 23:04 PDT

Local         Remote   Remote
Channel       NodeName Channel   State  Type    Compress Code COS
5.1.100      pubsipx3 5.1.200   Ok     fr      0         0
```

Last Command: dspcons

Next Command:

Example 2

```
dspcons -abit
```

Description

Display connections and Abit status.

System Response

```
sw53          VT    cisco      BPX 8420     9.2    July 25 1998 11:52 GMT

Local         Remote   Remote      Local        Remote
Channel       NodeName Channel      State        Abit        Abit
4.1.2.1      sw53    4.3.2.1     Ok           OK          OK
4.1.2.2      sw53    4.3.2.2     Ok           OK          OK
4.1.2.3      sw53    4.3.2.3     Ok           OK          OK
4.1.2.4      sw53    4.3.2.4     Ok           OK          OK
4.1.2.5      sw53    4.3.2.5     Ok           OK          OK
4.1.2.6      sw53    4.3.2.6     Ok           OK          OK
4.1.2.7      sw53    4.3.2.7     Ok           OK          OK
4.1.2.8      sw53    4.3.2.8     Ok           OK          OK
4.1.2.9      sw53    4.3.2.9     Ok           OK          OK
4.1.2.10     sw53    4.3.2.10    Ok           OK          OK
4.1.2.11     sw53    4.3.2.11    Ok           OK          OK
4.1.2.12     sw53    4.3.2.12    Ok           OK          OK
```

This Command: dspcons -abit

Continue?

Example 3**dspcons****Description**

Display connections (shows if ICS is enabled on a channel)

System Response

```
sw176        TRM    StrataCom    IGX 8420     9.2.a2     Apr. 3 1998 17:36 PST

Local         Remote   Remote      State  Type        Compress  Code  COS
Channel       NodeName Channel      State  Type        Compress  Code  COS
9.1.2-3      sw176   9.1.2-3     Ok     2x64        7/8
9.1.4        sw176   9.1.4       Ok     1x64        ICS       7/8
9.1.6        sw176   9.1.6       Ok     g729r8      LDCELP
9.1.7        sw176   9.1.7       Ok     1x64        7/8
9.1.9        sw176   9.1.9       Ok     c32         VAD/ADPCM
9.1.10-13    sw176   9.1.10-13   Ok     4x64        ICS       7/8
```

d

Last Command: dspcons

Table 6-30 *dspcons*—Optional Parameters

Parameter	Description
start channel	Specifies the channel to begin the display. The start channel on a CDP or CVM is specified as <i>slot.channel</i> . The start channel on a UVM is <i>slot.line.channel</i> .
node name	Specifies that only connections to this remote node from the local node be displayed. If no “nodename” is designated, connections from the local node to all other nodes are displayed.
connection type	Specifies that only connections of a certain type be displayed. If you do not add at least one argument to specify a particular connection type, all connections appear. When you enter the connection type on the command line, precede it with a hyphen (-). In some cases, you can add more than one connection type (with a space between), but not all compound arguments are compatible, so you may not always see the expected combination of types. The connection types are: -v displays only voice connections. -d displays only data connections. -f displays only Frame Relay connections. -abit shows Abit (nni) status. -fabit shows connections with failed Abit (nni) status. -fail shows only failed connections -siw shows service interworking connections. -atfr shows only network interworking connections.
+d	Causes the display to show the user-configured descriptor for the connection instead of the compression and ownership fields.

dspconst

Displays the status of the circuit line(s) and continues to display the status until you press the Delete key. While the display is on the screen, the status is automatically updated. The update frequency is one second for each circuit line being displayed. (For example, if only one line is displayed, the update frequency is once per second, if three circuit lines are displayed, the update frequency is once per three seconds.) Table 6-31 shows the connection type. The **cnfchtp** command must be correctly configured.

Table 6-31 *Types of Connection Status*

Symbol	Description
+	offhook
-	onhook
m	slow modem
M	fast modem
F	FAX
blank	channel not connected

Full Name

Display connection state for line connections

Syntax

dspconst [circuit line]

Related Commands

cnfchtp

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX	No

Example 1**dsprtcache****Description**

Display the condition state for the voice channels on the node.

System Response

```
alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 16 1998  09:55 PST

Connection status display

+ offhook, - onhook, m slow modem, M fast modem, F FAX
              1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 3 3
CLN   1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1

14      +
```

This Command: dsprtcache

Hit DEL key to quit:

Table 6-32 dsprtcache—Optional Parameters

Parameter	Description
circuit line	Specifies the number of the line for the channel state display. If you do not specify a line, all upped circuit lines (up to a maximum of eight at once) are displayed.

dsprtcache

This command displays the cache of all cost-based routing connections. The optional *index* parameter lets you specify a cache entry index. The optional *c* parameter clears the cache. The information displayed includes:

Full Name

Display cost-based route cache

Syntax

dsprtcache [index] [c]

[index] specifies the cache entry index

[c] specifies to clear the entire cache or a single entry

Related Commands

dsprcon, cnfrtcost, cnfpref

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, PX	No

Example 1**dsprtcache****Description**

Display route cache contents, and let you monitor and manually clear the cache.

System Response

```
pissaro TN StrataCom BPX 8620 9.2 Jun. 18 1998 11:11 GMT
Route Cache (Summary)
Index Use Cost Delay Restrict Load VPC Hops Remote Node
0 Yes 1 Yes No None VBR No 2 lautrec
1 Yes 6 Yes No *s BDB No 3 vangogh
2 Yes 9 Yes No None BDA No 3 matisse
3 Yes 3 Yes No *t BDB No 3 rousseau
4 Yes 1 Yes No None CBR No3 seurat<- current
5 No 0 No No None --- No0 ---
6 No 0 No No None --- No0 ---
7 No 0 No No None---No0 ---
8 No 0 No No None---No0 ---
9 No 0 No No None---No0 ---
10 No 0 No No None---No0 ---
11 No 0 No No None---No0 ---
```

Last Command: dsprtcache

Next Command:

Table 6-33 dsprtcache-Parameters

Parameter	Description
index	Specifies a particular route entry within the cache. When used with the c parameter, the route is either displayed or cleared from the cache.
c	Clears the cache, or if you also enter the index parameter, clears the route cache specified by the index number.

dspsigqual

Displays the configuration for the A, B, C, and D bit signaling qualifiers for all channels. The only parameter is the starting channel. You set the values for these signaling bits with the **cnfrcvsig** and **cnfxmtsiz** commands. Note that these signaling bit states are different from the states during circuit alarm (signaling conditioning).

During normal operation of the voice circuit, the A, B, C, and D signaling bits may be held at a fixed value (0 or 1), inverted (I), or passed through transparently (T). For the direction of the signals, the transmit direction is towards the PBX or channel bank. Receive is from the external equipment.

Full Name

Display signaling qualifiers

Syntax

dspsigqual <start channel>

Related Commands

cnfxmtsig, **cnfrcvsig**

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX	No

Example 1

dspsigqual 8.1

Description

Display the channel signaling bit qualifiers for channel 8.1.

System Response

```
beta          TRM   YourID:1          IPX 8420    9.2    Aug. 23 1998 11:39 MST
```

```

                                Signalling Qualifiers
From 8.1    TXAbit  TXBbit  TXCbit  TXDbit  RXAbit  RXBbit  RXCbit  RXDbit
8.1         1       0       1       T       T       0       I       I
8.2-31     T       T       T       T       T       T       T       T

```

```
Last Command: dspsigqual 8.1
```

```
Next Command:
```

Table 6-34 dspsigqual—Parameters

Parameter	Description
start channel	Specifies the starting channel. On a CDP or CVM, the format is <i>slot.channel</i> . On a UVM, the format is <i>slot.line.channel</i> .

dspvcst

Displays the voice SVC statistics.

Full Name

Display voice SVC statistics

Syntax

```
dspvcst
```

Related Commands

None

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX	No

Example 1

```
dspvcst
```

Description

Display the voice SVC statistics for the current node.

System Response

```
sw91          TN    cisco    IGX 8410     9.2        Aug. 29 1998 14:11 GMT
```

```
Number of Active SVC           :          0
Number of SVC Requests         :          0
Number of Failed Requests      :          0
Last Reason for request failure :          0
Number of Completed SVC Routes :          0
Number of Failed SVC Routes    :          0
Number of Deleted SVC(s)      :          0
Number of Failed SVC           :          0
Max Secs To Perform SVC Route  :        0.000
Avg Secs To Perform SVC Route  :        0.000
```

```
Last Command: dspcvst
```

```
Next Command:
```

prtchcnf

Prints the configuration details for voice channels or data channels. This command uses the same syntax, and prints the same information as is displayed using the **dspchcnf** command. See the **dspchcnf** command for syntax and output information.

Full Name

Print channel configurations

Syntax

```
prtchcnf [start_channel]
```

Related Commands

dspchcnf

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	Yes	No	IP IGX	Yes

Example 1

```
prtchcnf 14.1
```

Description

Print the configuration values of circuit line 14.1.

System Response

None available because this command produces hardcopy.

Table 6-35 prtchcnf-Parameters

Parameter	Description
start channel	Specifies the starting channel for the print output. On a CDP or CVM, the format is <i>slot.channel</i> . On a UVM, the format is <i>slot.line.channel</i> .

prtchdlcnf

Prints the dial type configurations for channels on a circuit line.

Full Name

Print dial type configuration for channels

Syntax

```
prtchdlcnf <start_channel>
```

Related Commands

cnfchdl, dspchcnf

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	Yes	No	IGX	Yes

Example 1

```
prtchcnf 14.1
```

Description

Print the dial type configuration for all channels beginning with 14.1.

System Response

None available as this command produces hardcopy.

Table 6-36 prtchdlcnf-Parameters

Parameter	Description
start channel	Specifies the starting channel for the print output. On a CDP or CVM, the format is <i>slot.channel</i> . On a UVM, the format is <i>slot.line.channel</i> .

prtcons

Prints a summary of connections terminated at the IGX node.

Full Name

Print connections

Syntax

```
prtcons [start_channel] [nodename] [type]
```

Related Commands

dspcons

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	Yes	No	IGX	Yes

Example 1

```
prtcons
```

Description

Print a summary of all connections.

System Response

None available as this command produces hardcopy.

Table 6-37 *prtcons*–Optional Parameters

Parameter	Description
start channel	Specifies the starting channel. On a CDP or CVM, the format is <i>slot.channel</i> . On a UVM, the format is <i>slot.line.channel</i> .
node name	Specifies that only connections to this remote node from the local node be displayed. If no “nodename” is designated, connections from the local node to all other nodes are displayed.
connection type	Specifies that only connections of the specified type appear. If you do not include a connection-type argument, all connections appear. Connection types require a hyphen (-). Valid connection type entries are: -v = Displays only voice connections. -d = Display only data connections. -f = Displays Frame Relay connections. -nni = Displays Frame Relay network to network connections for failed connections only.



Data Connections

Data commands apply to setting up, configuring, and statistical reporting on data connections. For descriptions of the data commands on a FastPAD, refer to the *FastPAD User's Guide*. Examples of the tasks described in the chapter are:

- Setting up a circuit line and a data connection
- Configuring data channel redundancy
- Using interface control templates
- Enabling DFM and data channel utilization
- Enabling Embedded EIA operation
- Setting up DDS trunks
- Configuring idle code suppression on a per-connection basis

Setting Up a Data Connection

To set up a data connection:

Step 1 If necessary, configure the data channel at each end of the connection. Default configuration parameters exist, so using the following commands are optional. The designation of a data channel has the format *slot.port*. For example, 6.3 is port 3 on the card in slot 6. The items that need configuring depend on the type of data connection. The configuration commands and their associated parameters are as follows.

- **cnfdclk** Specifies the clocking for the data channel.
- **cnfmdir** Sets the control leads for bidirectional pins 11 and 23 on an EIA/TIA-232 data channel. The default is *input*.
- **tstport** Use sixth lead feature to provide test port loopback.
- **addyred** Enables optional card redundancy. This step requires extra hardware.

- **cnfict** Configures an interface control template that determines output lead behavior for data channels. Output leads can be either configured as steady state (on or off) or programmed to follow an input lead. Five types of templates exist for channels in active, conditioned, looped, near, and far states.
- **cpyict** Copies interface control template information from one channel to another. This step is optional.

Step 2 Add the connection with the **addcon** command. The above configuration must have been completed at each end before the connection can be added.

Configuring Data Channel Redundancy

You can configure redundant data channels by installing two identical card sets in adjacent slots and connecting the cards to the customer's line through a Y-cable.

- Use the **addyred** command to establish the redundant connection between the two card sets.
- Use the **delyred** command to remove redundancy from a redundant pair.
- Use the **dspyred** command to display Y-cable configurations.
- Use the **prtyred** command to print Y-cable configurations.

Using an Interface Control Template

Data channels have an associated default interface control template for each of the active (normal), conditioned, looped, near and far states. The templates define how the control leads at the data interface are to be configured (asserted, inhibited, follow a local source or follow a remote source). The interface control template can be changed by using the **cnfict** command. Each template and each control lead must be configured individually. The **cpyict** (copy interface control panel) can be used to apply (copy) the settings of a template for one data channel to those of a template for another data channel.

Enabling DFM and Data Channel Utilization

DFM (Data Frame Multiplexing) is a feature on the IGX nodes in which repetitive data patterns (such as IDLE codes) are suppressed at the source and regenerated at the remote node. This feature has the effect of approximately doubling the bandwidth of the data channel.



Note

DFM operates on connections with maximum rate of 128 Kbps.

The command for changing the DFM enable-status for individual data channels is **cnfchdfm**. Before you execute this command, make sure the DFM feature has been activated on each applicable node by Customer Service. You can check the DFM configuration for a channel by using the **dsphcnf** command. When the DFM feature is first activated at a node, it has the following default values:

- Percent of channel utilization is 100 percent
- Pattern length is 8 bits
- DFM status is enabled

Enabling Embedded EIA Operation on the LDP or LDM

The EIA feature encodes the status of the CTS or RTS lead as the eighth bit in each data byte. The byte subsequently is processed in accordance with the DFM algorithm, which remains unchanged.

Any DCE and DTE combination at each end is valid. A typical configuration might have the LDP at one end of a connection as DCE (normal clocking) and an LDM at the other end as DTE (looped clocking). RTS is transmitted in encoded form from the remote end to the local end, and CTS is transmitted in the other direction. Other EIA leads use the non-interleaved format.

The EIA feature is allowed for all legal baud rates 19.2 kbps and below and is activated by typing encoding type 7/8E followed by an *Z when adding a connection using the **addcon** command. Different channels on the same card may be set up with or without the feature, but all ports on the card must be configured at or below 19.2 Kbps for EIA to be active. Note that you do not have to enter *Z after 7/8E on the command line because the system automatically enters it.

Setting Up DDS Trunks

DDS Trunks normally operate at 56 Kbps. The IGX nodes can provide a direct interface to a DDS line and provide limited distance access to Data Service Units (DSUs) by using the DDS format over private lines. The LDI4/DDS back card and LDP (Model B) or LDM front card support DDS. Each LDI/DDS supports four DDS trunks in DSU or OCU modes.

- Use the **cnfdchtp** command to configure the DDS port. Specify OCU or DSU for the port type.
- Add the connection using the **addcon** command. When prompted for the rate, enter 2.4 Kbps, 4.8 Kbps, 9.6 Kbps, 19.2 Kbps, or 56 Kbps.

Configuring a Channel to Use Idle Code Suppression

In Release 9.2, the UVM and CVM cards on the IGX support Idle Code Suppression (ICS) for video calls. You can configure the idle code suppression (ICS) feature on an Nx64 super-rate PVC connection (which uses multiple channels) to stop FastPacket generation when the connected PBX has terminated a video call. No video traffic will be generated when a video call has terminated. Use the **chfdch** and **dspchcnf** commands to enable or disable idle code suppression for the UVM and CDP/CVM cards, and to display the configuration for the cards. All back card types supported by UVM/CVM/CDP support the idle code suppression feature.



Note

The UXM/CVM firmware needs to be upgraded for this feature. The CVM model B revision E and above support this feature. The UVM's Model E and above supports this feature. The **dspcd** screen displays "Front card supports idle code suppression."

The UVM/CVM card firmware detects the idle (on-hook) state of a video call, which uses an nx64K data connection, and suppresses packet transmission during this idle connection. The UVM or CVM at the far end of the connection plays out the idle code during this time. You use the switch software **cnfdch** and **dspchcnf** commands to enable/disable and display this feature on a per connection basis. The primary benefit of the ICS feature is the trunk bandwidth savings during the on-hook state of an nx64 connection. This extra bandwidth can be used by other connections.

Summary of Commands

Table 7-1 shows the full name and starting page of each description.

Table 7-1 Data Connection Commands

Mnemonic	Description	Page
addcon	Add connection	7-6
cnfchdfm	Configure Data Frame Multiplexing (DFM)	7-18
cnfcheia	Configure EIA	7-20
cnfkdir	Configure control lead direction	7-22
cnfdchtp	Configure data channel interface type	7-24
cnfdch	Configure data connection to have ICS (Idle Code Suppression)	7-24
cnfdclk	Configure data clock	7-33
cnfict	Configure interface control template	7-37
cpyict	Copy interface control template	7-42
delcon	Delete connection	7-44
dspchcnf	Display channel configuration	7-46
dspcon	Display connection	7-48
dspcons	Display connections	7-50
dspict	Display interface control template	7-56
prtchcnf	Print channel configuration	7-58
prtcons	Print connections	7-59
prtict	Print interface control template	7-61

addcon

Establishes data channel connections between nodes in a network. After you add a connection using the **addcon** command, the node automatically routes the connection. The node where you execute **addcon** is the “owner” of the added connections. The concept of ownership is important because you must enter information about automatic rerouting and preferred routing at the node that owns the connection. See the **cnfpref** and **cnfcos** commands for more information on automatic rerouting. Before the node adds the connection, the proposed connection appears on the screen with a prompt for you to confirm the addition.

When applied to data connections, the **addcon** command adds a synchronous data connection to the network. You can add synchronous data connections to any node slot equipped with either an LDM or HDM in an IGX node. Before you add a connection, determine the desired data rate. To find the data rates that individual cards support, refer to the card descriptions in the *Cisco IGX 8400 Series Reference* manual or the *Cisco IGX Reference* manual.

When connecting sets of data channels, you do not have to specify the full channel set for the local end of the connection. You have to designate only the first channel in the range. For example, to add connects 27.1-4 at local node alpha to channels 9.1-4 at beta, you can enter

```
addcon 27.1-4 beta 9.1
```

If Y-cable redundancy has been specified, you can add data connections at only primary card slots (not at the secondary card slots). See the **addyred** description for more information. Standard Data Rates tables follow, listing data rates. The following notations appear with some data rates:

- * Must be used with 8/8 or 8/8I coding.
- /n Specifies a partially filled packet type: the /n allows partial packets to be sent and so avoid the delay incurred by waiting to build a full packet.
- f Entered after the data rate, an *f* specifies fast EIA (interleaved EIA) for the connection.
- t Indicates “transparent” (CDP or CVM substrate DS0A): if you include the t-option, the IGX node does not check for supervisory or control information.

Table 7-2 Data Connection Load Table with Normal EIA and No DFM

Bit Rate (kbps)	7/8 Coding		8/8 Coding	
	Pkt/Sec	Bits/Pkt	Pkt/Sec	Bits/Pkt
1.2	43	28	38	32
1.8	65	28	57	32
2.4	35	70	30	80
3.2	46	70	40	80
3.6	52	70	45	80
4.8	35	140	30	160
6.4	46	140	40	160
7.2	52	140	45	160
8	58	140	50	160
9.6	69	140	60	160
12	86	140	75	160
12.8	92	140	80	160
14.4	103	140	90	160
16	115	140	100	160
16.8	120	140	105	160

Table 7-2 Data Connection Load Table with Normal EIA and No DFM (continued)

Bit Rate (kbps)	7/8 Coding		8/8 Coding	
	Pkt/Sec	Bits/Pkt	Pkt/Sec	Bits/Pkt
19.2	138	140	120	160
24	172	140	150	160
28.8	206	140	180	160
32	229	140	200	160
38.4	275	140	240	160
48	343	140	300	160
56	381	147	334	160
57.6	392	147	360	160
54	436	147	381	168
72	490	147	429	168
76.8	523	147	458	168
84	572	147	500	168
96	654	147	572	168
112	762	147	667	168
115.2	784	147	686	168
128	871	147	762	168
144	980	147	858	168
168	1143	147	1000	168
192	1307	147	1143	168
224	1524	147	1334	168
230.4	1568	147	1372	168
256	1742	147	1524	168
288	1960	147	1715	168
336	2286	147	2000	168
384	2613	147	2286	168
448	3048	147	2667	168
512	3483	147	3048	168
672	4572	147	4000	168
768	5225	147	4572	168
772	5252	147	4596	168
896	6096	147	5334	168
1024	6966	147	6096	168
1152	7837	147	6858	168

Table 7-2 Data Connection Load Table with Normal EIA and No DFM (continued)

Bit Rate (kbps)	7/8 Coding		8/8 Coding	
	Pkt/Sec	Bits/Pkt	Pkt/Sec	Bits/Pkt
1344			8000	168

Unshaded connections generate time-stamped data packets. Shaded connections generate non-time-stamped data packets.

Table 7-3 Data Connection Load Table with Interleaved EIA

Bit Rate (kbps)	7/8 Coding		8/8 Coding	
	Pkt/Sec	Bits/Pkt	Pkt/Sec	Bits/Pkt
1.2f	35	35	30	40
1.8f	52	35	45	40
2.4f	35	70	30	80
3.2f	46	70	40	80
3.6f	52	70	45	80
4.8f	69	70	60	80
6.4f	92	70	80	80
7.2f	103	70	90	80
8f	115	70	100	80
9.6f	138	70	120	80
12f	172	70	150	80
12.8f	183	70	160	80
14.4f	206	70	180	80
16f	229	70	200	80
16.8f	240	70	210	80
19.2f	275	70	240	80
24f	343	70	300	80
28.8f	412	70	360	80
32f	458	70	400	80
38.4f	549	70	480	80
48f	686	70	600	80
56f	800	70	700	80
57.6f	823	70	720	80
54f	915	70	800	80
72f	1029	70	900	80
76.8f	1098	70	960	80
84f	1200	70	1050	80
96f	1372	70	1200	80

Table 7-3 Data Connection Load Table with Interleaved EIA (continued)

Bit Rate (kbps)	7/8 Coding		8/8 Coding	
	Pkt/Sec	Bits/Pkt	Pkt/Sec	Bits/Pkt
112f	1600	70	1400	80
115.2f	1646	70	1440	80
128f	1829	70	1600	80
144f	2058	70	1800	80
168f	2400	70	2100	80
192f	2743	70	2400	80
224f	3200	70	2800	80
230.4f	3292	70	2880	80
256f	3658	70	3200	80
288f	4115	70	3600	80
336f	4800	70	4200	80
384f	5486	70	4800	80
448f	6400	70	5600	80
512f	7315	70	6400	80
1.2f	35	35	30	40
1.8f	52	35	45	40
2.4f	35	70	30	80
3.2f	46	70	40	80
3.6f	52	70	45	80
4.8f	69	70	60	80
6.4f	92	70	80	80

Connections above the line generate time-stamped data packets. Shaded connections generate non-time-stamped data packets. DFM is not available on interleaved EIA connections.

Table 7-4 Data Connection Load Table with Partially Filled Packets and No DFM

Bit Rate (kbps)	7/8 Coding		8/8 Coding	
	Pkt/Sec	Bits/Pkt	Pkt/Sec	Bits/Pkt
2.4/4	86	28	75	32
3.2/4	115	28	100	32
Bit Rate (kbps)	7/8 Coding		8/8 Coding	
	Pkt/Sec	Bits/Pkt	Pkt/Sec	Bits/Pkt
3.6/4	129	28	113	32
4.8/10	69	70	60	80
4.8/4	172	28	150	32

Table 7-4 Data Connection Load Table with Partially Filled Packets and No DFM (continued)

6.4/10	92	70	80	80
6.4/4	229	28	200	32
7.2/10	103	70	90	80
7.2/4	258	28	225	32
8/10	115	70	100	80
9.6/10	138	70	120	80
12/10	172	70	150	80
12.8/10	183	70	160	80
14.4/10	206	70	180	80

All of the above connections generate time-stamped data packets.

Table 7-5 Data Connection Load Table with Normal EIA and DFM

Bit Rate (kbps)	7/8 Coding		8/8 Coding	
	Pkt/Sec	Bits/Pkt	Pkt/Sec	Bits/Pkt
1.2	58	21	24	3
1.8	86	21	24	3
2.4	39	63	72	9
3.2	51	63	72	9
3.6	58	63	72	9
4.8	37	133	152	19
6.4	49	133	152	19
7.2	55	133	152	19
8	61	133	152	19
9.6	73	133	152	19
12	91	133	152	19
12.8	97	133	152	19
14.4	109	133	152	19
16	121	133	152	19
16.8	127	133	152	19
19.2	145	133	152	19
24	181	133	152	19
28.8	217	133	152	19
32	241	133	152	19
38.4	289	133	152	19
48	361	133	152	19
56	422	133	152	19

Table 7-5 Data Connection Load Table with Normal EIA and DFM (continued)

Bit Rate (kbps)	7/8 Coding		8/8 Coding	
	Pkt/Sec	Bits/Pkt	Pkt/Sec	Bits/Pkt
57.6	434	133	152	19
64	482	133	152	19
72	542	133	152	19
76.8	578	133	152	19
84	632	133	152	19
96	722	133	152	19
112	843	133	152	19
115.2	867	133	152	19
128	963	133	152	19

All of the above connections generate time-stamped data packets.

Table 7-6 Data Connection Load Table with Partially Filled Packets and DFM

Bit Rate (kbps)	7/8 Coding		8/8 Coding	
	Pkt/Sec	Bits/Pkt	Pkt/Sec	Bits/Pkt
2.4/4	115	21	100	24
3.2/4	153	21	134	24
3.6/4	172	21	150	24
4.8/10	77	63	67	72
4.8/4	229	21	200	24
6.4/10	102	63	89	72
6.4/4	305	21	267	24
7.2/10	115	63	100	72
7.2/4	343	21	300	24
8/10	127	63	112	72
9.6/10	153	63	134	72
12/10	191	63	167	72
12.8/10	204	63	178	72
14.4/10	229	63	200	72

All of the above connections generate time-stamped data packets.

Table 7-7 Data Connection Load Table with Partially Filled Packets and Interleaved EIA

Bit Rate (kbps)	7/8 Coding		8/8 Coding	
	Pkt/Sec	Bits/Pkt	Pkt/Sec	Bits/Pkt
1.2f/2	86	14	75	16
1.8f/2	129	14	113	16
2.4f/5	69	35	60	40
2.4f/2	172	14	150	16
3.2f/5	92	35	80	40
3.2f/2	229	14	200	16
3.6f/5	103	35	90	40
3.6f/2	258	14	225	16
4.8f/5	138	35	120	40
6.4f/5	183	35	160	40
7.2f/5	206	35	180	40

All of the above connections generate time-stamped data packets. DFM is not available on interleaved EIA connections.

Table 7-8 Sub-Rate Data Connection Load Table (HDM to HDM)

Bit Rate (kbps)	7/8 Coding		8/8 Coding	
	Pkt/Sec	Bits/Pkt	Pkt/Sec	Bits/Pkt
2.4t			35	80
4.8t			35	160
9.6t			70	160
56t			381	168
t			381	168

All sub-rate data connections use 8/8 coding. Unshaded connections generate time-stamped data packets. Shaded connections generate non-time-stamped data packets. DFM is not available on sub-rate connections. Interleaved EIA is not available on sub-rate connections.

Table 7-9 Sub-Rate Data Connection Load Table (HDM to HDM)

Bit Rate (kbps)	7/8 Coding		8/8 Coding	
	Pkt/Sec	Bits/Pkt	Pkt/Sec	Bits/Pkt
2.4/4t			88	32
4.8/10t			70	80
4.8/4t			175	32
9.6/10t			140	80

All sub-rate data connections use 8/8 coding. All of the above connections generate time-stamped data packets. DFM is not available on sub-rate connections. Interleaved EIA is not available on sub-rate connections.

Table 7-10 Super-Rate Data Connection Load Table (LDM to HDM)

Bit Rate (kbps)	7/8 Coding		8/8 Coding	
	Pkt/Sec	Bits/Pkt	Pkt/Sec	Bits/Pkt
1x56	381	147	334	168
2x56	762	147	667	168
3x56	1143	147	1000	168
4x56	1524	147	1334	168
5x56	1905	147	1667	168
6x56	2286	147	2000	168
7x56	2667	147	2334	168
8x56	3048	147	2667	168
1x64	436	147	381	168
2x64	871	147	871	168
3x64	1307	147	1307	168
4x64	1742	147	1143	168
5x64	2177	147	1524	168
6x64	2613	147	1905	168
7x64	3048	147	2286	168
8x64	2483	147	2667	168

All of the above connections generate non-time-stamped data packets. DFM is not available on interleaved EIA connections.

In fast EIA signalling mode, an interleaved byte of EIA signalling information is associated with every byte of data in a packet. This format is appropriate for applications where EIA lead transitions must closely synchronize with user data. Fast EIA can apply to data rates up to 512 Kbps.

When FastPackets are built using the 7/8 coding format, each octet in the FastPacket payload consists of seven user data bits followed by a 1. This “bit-stuffing” allows these FastPackets to be safely carried on trunks which enforce ones density requirements by ensuring that each octet contain at least one 1 (such as IGX trunks configured for ZCS or AMI encoding). The user data may have any format and may contain any pattern, including all 0s. The single 1 inserted in the final bit position of each octet ensures that no more than seven consecutive 0s occur in a FastPacket. The 7/8 coding format is the safest mode to use when the data protocol is unknown and certain trunks in the network use ZCS or AMI.

When FastPackets are built using the 8/8 coding format, each octet in the FastPacket payload consists of eight user data bits. The 8/8 coding format is more efficient than the 7/8 format. However, the ones density requirement on trunks must be met by one of the following:

- Ensuring that the end-user equipment data protocol can never send more than seven consecutive 0s.
- Ensuring that the connection can never be carried on a trunk which uses ZCS ones density enforcement.

The vast majority of trunks today use intelligent ones density enforcement schemes, such as B8ZS, HDB3, B3ZS, or CMI. All such trunks can safely carry 8/8 data connections with no risk of data corruption. Data connections can be configured to NOT use ZCS trunks by specifying the optional “*Z” routing restriction.

When FastPackets are built using the 8/8I coding format, each octet in the FastPacket payload consists of eight inverted user data bits, i.e., each 0 is changed to a 1 and each 1 is changed to a 0. The bits are re-inverted at the far end of the connection. For such connections, the ones' density requirement on trunks must be met by one of the following:

- Ensuring that the end-user equipment data protocol can never send more than seven consecutive 1s.
- Ensuring that connection can never be carried on a trunk that uses ZCS ones density enforcement.

As with the 8/8 coding format, 8/8I connections can be safely carried on the vast majority of trunks today. However, the 8/8I format is primarily intended to provide the efficiency of 8/8 coding for any data which is HDLC or SDLC-based. HDLC/SDLC can never send more than six consecutive 1s, which, when inverted, automatically meets the ones density requirements of every possible trunk format.

If the data protocol requires an acknowledgment and is delay-sensitive, avoid routing the connection over a satellite line (*s for avoid). If 8/8 or 8/8I coding is the selected format, avoid trunks with zero code suppression (*z for avoid) because the zero code suppression could corrupt the last bit in the byte.

Full Name

Add a connection

Syntax

addcon <local channel> <remote node> <remote channel> <type> <coding> [avoid]

Related Commands

delcon, dncon, dspcon, dspcons, upon

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	No	IGX	Yes

Example 1**addcon 6.1 pubsigx2 11.1 56****Description**

Add a low speed data connection of 56 Kbps at 6.1. The connections are highlighted on the screen. A prompt appears asking you to confirm these connections. Respond “y” for yes to add the connection. The connections screen then appears showing that data channel 11.1 on node pubsigx2 is connected to channel 6.1 on node pubsigx1. The 56 under the type category indicates that the data rate for the channel is 56 Kbps.

System Response

```
pubsigx1      TN      SuperUser      IGX 8420      9.2      July 25 1998  06:23 PDT

From          Remote      Remote
6.1           NodeName   Channel
6.1           pubsigx2   11.1          State  Type      Compress  Code COS
              7/8 0
```

Last Command: addcon 6.1 pubsigx2 11.1 56

Next Command:

Example 2**addcon 5.1 beta 6.1-4 4x64****Description**

For a CDP super-rate connection, add a 256 Kbps (4x64) connection from an SDP at node alpha to the CDP at node beta. Data rates come from the Standard Data Rate Connections in the preceding pages. The elements on the command line consist of the following:

addcon *slot.port remote nodename slot.start channel at far-end channel rate*

Example 3**addcon 5.4-7 beta 6.1-4 4x64****Description**

For CDP to CDP or CVM to CVM, add a 256 Kbps (4x64) data connection from a CDP (or CVM) at node alpha to the CDP (or CVM) at node beta. The syntax for this example requires that the start and end channel are entered for both ends of the connection and that the *data rate* is specified to be the same at both ends. The channel *numbers* can be different on each end if they are contiguous.

```
addcon      slot.start channel -end channel      remote nodename
            slot.start channel -end channel      rate
```

Table 7-11 addcon-Parameters

Parameter	Description
local channel	Specifies the local channel or set of channels in the format slot.port [-port]. (The brackets indicate you can specify a range of channels.)
remote node	Specifies the name of the node at the other end of the connection. For a DACS-type connection (where a channel on a node connects to a channel on the same node), use the local node name for <i>remote node</i> .
remote channel	Specifies the remote channel or set of channels in the format slot.port [-port]. (The brackets indicate you can specify a range of channels.)
type	Specifies the data connection bit rate, EIA control lead mode, and in some cases, the number of data bytes in a data packet. Refer to the Standard Data Connection rates for allowable bit rates.
coding	Specifies the data coding format for data transmissions. Valid formats are: <ul style="list-style-type: none"> • 7/87 = bits of user data plus a 1 inserted in the final bit position of each data byte in a data packet. This is the default coding. • 7/8e = used with LDP or LDM application. • 8/88 = bits of user data for each data byte in a data packet. • 8/8I8 = bits of user data for each data byte in a packet. The data is inverted

Table 7-12 addcon-Optional Parameters

Parameter	Description
avoid	Specifies the type of trunk for the connection to avoid. The default is no avoidance. The choices are: <ul style="list-style-type: none"> • savoid satellite trunks. • tavoid terrestrial trunks. • zavoid trunks using zero code suppression techniques that modify any bit position to prevent long strings of 0s.

cnfchdfm

Enables or disables Data Frame Multiplexing (DFM) for individual channels and sets the DFM parameters for the channels. The default state when the DFM feature is activated on a card is enabled. Because DFM is a purchased option, the Cisco Technical Assistance Center (TAC) must activate on the applicable nodes before you use the **cnfchdfm** command.

The DFM feature must be both *installed* and *enabled*. The DFM feature must be installed through software control at each node terminating the connection. If DFM is not installed for a pertinent node in the network, the **cnfchdfm** command has no effect at that node. Furthermore, you must use **cnfchdfm** at both ends of the connection to enable DFM.

Full Name

Configure channel DFM

Syntax**cnfchdfm** <channel(s)> <7 | 8 | 16> [e | d]**Related Commands****dspchcnf****Attributes**

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1**cnfchdfm 5.1 8****Description**

Set the DFM pattern length to 8 bits for data channel 5.1.

System Response

```
alpha          TRM   YourID:1          IGX 8420   9.2   Aug. 15 1998  16:21 PST

      Maximum EIA    %      DFM Pattern      DFM
Channels  Update Rate  Util   Length      Status
5.1      15      100    8             Enabled
5.2-4    2       100    8             Enabled
```

Last Command: cnfchdfm 5.1 8

Next Command:

Table 7-13 cnfchdfm-Parameters

Parameter	Description
channel	Specifies the channel or range of channels.
7/8/16	Specifies the pattern length in bits for the DFM algorithm. The default is 8 bits

Table 7-14 cnfchdfm-Optional Parameters

Parameter	Description
e/d	Enables or disables DFM. The default is "e." Note that DFM works at rates no higher than 128 Kbps.

cnfcheia

Sets the sampling rate for the updating EIA control leads. You can set this rate from 0 (no sampling) to packet-generation rate for the EIA leads associated with the channel.

At 20 updates/second, the control leads are polled for changes every 50 msec. Therefore, changes occurring more rapidly than that may not be detected. If there is no change in EIA lead status, no packet is sent. A minimum of one update per second is sent if the maximum update rate chosen is from 1 to 20. If the connection is configured in such a way that an implied isochronous clock is detected, the update rate is always 20 per second in the same direction as that of the clock signal. For 1.544 Mbps data connections, this defaults to 0. This does not affect EIA sampling rates of fast EIA or embedded EIA leads.

Full Name

Configure EIA update rate for channels

Syntax

```
cnfcheia <channel(s)> <update_rate>
```

Related Commands

dspchcnf

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1**cnfcheia 5.1 15****Description**

Set the EIA update rate to 15 sec. for data channel 5.1.

System Response

```

alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 15 1998 16:20 PST

                Maximum EIA    %    DFM Pattern    DFM
Channels        Update Rate    Util    Length    Status
5.1              15      100     8        Enabled

```

Last Command: cnfcheia 5.1 15

Next Command:

Table 7-15 cnfcheia-Parameters

Parameter	Description
channel	Specifies the channel or range of channels over which to configure the EIA update rate.
update rate	Specifies the maximum EIA update rate in updates per second.

cnfdir

Sets the control lead direction for pins 11 and 23 on the EIA/TIA-232 data channels of an SDP or HDM card set. This allows the control leads to carry “backward” channels. Pins 11 and 23 on an EIA/TIA-232 interface are bidirectional. The signals on these pins can have various names, such as SI, SF, CH, CI, and QM. To display control lead information about pins 11 and 23, use the **dsprob** command. Use the **cnfict** command to configure the behavior of all output leads.

Full Name

Configure control lead direction

Syntax

```
cnfclmdir <channel> <lead> <direction>
```

Related Commands

cnfict, dspbob, dspict

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1

```
cnfclmdir 3.1 11 input
```

Description

Configure lead number 11 of channel 3.1 to be an input. The screen example shows the display after the system has accepted the input as valid.

System Response

```
pubsigx1      TN      SuperUser      IGX 8420      9.2      Aug. 14 1998 00:30 GMT
```

```
Port:          3.1
Interface:     V35   DCE
Clocking:      Normal
```

Inputs from User Equipment				Outputs to User Equipment			
Lead	Pin	Lead	Pin	Lead	Pin	Lead	Pin
RTS	C			CTS	D		
DTR	H			DSR	E		
TxD	P/S			DCD	F		
TT	U/W			RI	J		
				TM	K		
				RxD	R/T		
				RxC	V/X		
				TxC	Y/a		

```
Last Command: cnfclmdir 3.1 11 input
```

```
Next Command:
```

Table 7-16 *cnfldir-Parameters*

Parameter	Description
channel	Specifies the EIA/TIA-232 data channel whose control lead direction to configure.
pin number	Specifies the pin number of the control lead. The valid pin numbers are 11 and 23.
direction	Specifies the direction of the control lead signal. Valid control lead directions are Input = The control lead acts as an input to the IGX node. This is the default. Output = The control lead acts as an output from the IGX node.

cnfdch

The **cnfdch** command lets you configure a super-rate data connection that has idle code suppression (ICS) enabled or disabled, before you add a connection. The ICS information in the **cnfdch** screen is identical to that of **dspchcnf**.

The idle code suppression feature provides a way to stop FastPacket generation on an Nx64 super-rate PVC connection when the connected PBX has terminated a video call and there are no video calls in progress. Traffic on the data network is therefore reduced. Bursty data can then use this unused bandwidth.

The idle code suppression feature enables the UVM and CVM to detect the on-hook condition of video conferencing calls. During the on-hook phase, FastPacket generation ceases, resulting in more trunk bandwidth becoming available. All connections that use ForeSight can use this bandwidth, resulting in higher information rate.

The **cnfdch** command is blocked if one or more specified channels is carrying a voice connection (including t-type).

If some of the specified channels do not yet have any connection attached, those channels will be initialized to a data type channel.

The **cnfdch** command prompts you to enable or disable idle code suppression with the following prompt:

```
Enable or Disable Idle Code Suppression (e/d)?[d]:
```

The **cnfdch** command is a level 2 access command, which lets you configure a super-rate data connection that has idle code suppression (ICS) enabled or disabled.

The **cnfdchl** command lets you configure a channel before you add a connection. The configuration remains the same when connections are removed and added again. This configuration will be removed when the associated line is deactivated.

The Idle Code Suppression feature supported in Release 9.2 provides a way to stop FastPacket generation on an Nx64 super-rate PVC connection when the connected PBX has terminated a video call. No video traffic will be generated when a video call has terminated.

Because there are multiple channels involved in an Nx64 data connection, the idle code suppression configuration of the first channel in the Nx64 channel will be used for the entire connection bandwidth.

The **cnfdch** command is available for level 2 users and above; that is, you must have at least privilege level 2 or above to use this command. Use the **cnfdch** command to configure a channel before you add a connection. The configuration will stay the same even if connections are removed and added again.

Because there are multiple channels involved in an Nx64 data connection, the idle code suppression configuration of the first channel in the Nx64 bundle will be used for the entire connection.

Configuration must be done for each endpoint of a connection. When the state of an ICS connection changes, no network message is sent to the other end. You can choose to configure the other end if ICS is supported on the other end also. To maximize the benefit of the idle code suppression feature, you should enable ICS on both endpoints of the connection.

To interwork with HDM/LDM/SDP/LDP cards, idle code suppression on UVM/CVM/CDP channel will be turned off for any super-rate connection that also terminates on HDM/LDM/SDP/LDP.

All super-rate data connections will have their ICS state set to “disabled” state unless they have been specifically configured with the **cnfdch** command to be enabled, or through Cisco WAN Manager (or another SNMP manager application).

How Idle Code Suppression Works

When a video call terminates, the PBX generates the appropriate line idle code (for example, 0x7f for mu-law). Per ITU H.221 video coding scheme, no byte will be repeated on one DS0 for more than 80 times. In the case of BONDING protocol, the maximum is 256 (32 msec). The firmware can distinguish a video call and an idle channel carrying idle code. Idle code suppression is not programmable. Any byte that repeats for more than 32 msec in all DS0s in a super-rate connection will be suppressed.

Switch software determines idle code suppression capability on a card based on firmware model and revision number (for example, it considers that the CVM card supports idle code suppression starting with model B revision E firmware).

The idle code suppression feature for the UVM and CVM cards on the IGX detects the idle (on-hook) state of a video call, which uses an Nx64K data connection, and suppresses packet transmission during this idle condition. The UVM or CVM at the far end plays out the idle code during this time. You disable or enable and display the status of idle code suppression on a per-connection basis through the switch software CLI **cnfdch** and **dspchcnf** commands.

The UVM and CVM card firmware identifies an on-hook or idle condition by detecting repetition of idle codes. These codes can be present in the regular video traffic also (that is, in H.221 or BONDING frames). The code must repeat a certain number of times before it can be concluded that the call is on-hook. It is not necessary to look for specific idle codes. Any byte-code repeating beyond the threshold (about 32 ms) indicates idle channels. The firmware monitors byte repetition on each Nx64 connection for which this feature is enabled. On detecting repetition beyond the specified threshold, FastPacket generation for such a connection would cease. This results in the remote side of the connection to under-run. In this condition, it would transmit the previously transmitted byte on each DS0 for the connection. The UVM/CVM continues to monitor DS0s for the connection to detect a change in data received. Any change would indicate an off-hook condition, after which FastPacket transmission would resume.

The idle code suppression feature consists of IGX switch software Release 9.2, and requires UVM model E firmware and CVM/CDP model B revision E firmware. The new UVM/CVM/CDP firmware ensures that idle code suppression can interoperate with UVM/CVM/CDP cards that do not have idle code suppression capability. Such a configuration means that FastPacket generation stops in one direction while the other end continues to generate FastPackets. This behaves exactly the same as enabling idle code suppression on one side but not on the other side.

All back card types supported by UVM/CVM/CDP support idle code suppression.

Configuring Idle Code Suppression

The standard configuration involves UVM/CVM/CDP cards on both ends of the video connections. An Nx64 super-rate PVC is set up between the two cards. Each video codec is connected through a PBX, which is attached to the UVM/CVM/CDP cards.

The idle code suppression feature is available on IGX. When idle code suppression is disabled on a connection (the default), switch software behaves the same as in releases previous to Release 9.2.

UVM/CVM/CDP cards that support idle code suppression can interwork with HDM/LDM/SDP/LDP cards. If the UVM/CVM/CDP channels are configured with idle code suppression enabled, the actual channel will not have idle code suppression enabled if the other end of the connection is not a UVM/CVM/CDP (that is, HDM/LDM/SDP/LDP).

All connection limitations that exist in Release 9.1 remain the same. A t-type connection is not supported. On a VNS controlled network, t-type SVCs are used for video calls. VNS does not support Nx64 super-rate connections.

The idle code suppression feature provides a way to stop FastPacket generation on an Nx64 super-rate PVC connection when the connected PBX has terminated a video call. No video traffic will be generated when a video call has terminated. Current UVM/CVM/CDP implementation restricts N to between 1 and 8. This feature is intended to work with video codecs that implement H.221 or BONDING protocol only.

The basic idea is that when a video call terminates, the PBX will generate the appropriate line idle code (for example, 0x7f for mu-law). Per the ITU H.221 video coding scheme, no byte will be repeated on one DS0 for more than 80 times. In the case of BONDING protocol, the maximum is 256 (32 msec). The firmware can distinguish a video call and an idle channel carrying idle code. It is important to understand that the idle code is not programmable. It is a more general approach where any byte that repeats for more than 32 msec in all DS0s in a super-rate connection will be suppressed.

Switch software's job is mainly one of providing interfaces for configuring of channels by enabling/disabling idle code suppression for super-rate data connections. In turn, switch software informs the UVM/CVM/CDP card if idle code suppression should be used on each of the super-rate connections.

No new hardware is needed. All back card types supported by UVM/CVM/CDP support the idle code suppression feature.

Interface with Cisco WAN Manager and other Network Management Systems

The SNMP agent interface on the IGX provides the following operations: Get/Set of MIB information of the desired state of idle code suppression (enabled/disabled).

If a request fails, a General Error is returned to Cisco WAN Manager. An error string is logged in the switch software error table. Cisco WAN Manager can then optionally obtain the error string from switch software. Examples of error messages are "Card in slot does not support Idle Code Suppression" and "E1 CAS and Voice Channels - Not Configured".

Inserting/Removing Cards (Idle Code Suppression Mismatch)

Given an active non-Y-redundant UVM/CVM/CDP card without ICS support, upgrades to a card with ICS are allowed. However, you cannot downgrade a card with ICS capability to a card that does not support ICS (see Table 7-17).

Given a pair of cards in a Y-redundancy configuration, whether any of them is active or not, they must have the same ICS capability (see Table 7-18).

Table 7-17 Active Line That is Not in Y-Redundant Pair

ICS Support		Comment
Old Card	New Card	
NO	NO	OK - same card
NO	YES	OK
YES	NO	mismatch
YES	YES	OK - same card

Table 7-18 Card is Configured for Y-Redundancy

ICS Support		Comment
Old Card	New Card	
NO	NO	OK
NO	YES	OK but ICS is not available until both cards support ICS
YES	NO	Mismatch if both cards support ICS before
YES	YES	OK

Y-Redundancy

To ensure that cards with the same ICS capability be allowed to be a Y-redundancy pair, **addyred** blocks cards that have different idle code suppression capability.

Table 7-19 Addyred Blocked Cards

ICS Support		Comment
Primary Card	Secondary Card	
NO	NO	OK
NO	YES	addyred blocked
YES	NO	addyred blocked
YES	YES	OK

Upgrading and Downgrading the Idle Code Suppression Feature

Given an active non-Y-redundant UVM/CVM/CDP card without idle code suppression support, an upgrade to a card with ICS support is allowed. Downgrading a card with ICS capability to a card without ICS capability is not allowed.

Upgrading the ICS feature to a Y-redundancy pair that does not support the ICS feature is not allowed. The Y-redundancy pair must be deleted first to upgrade the feature. After both cards complete the ICS upgrade, the cards can be added as a Y-redundancy pair.

Table 7-20 Active Line that is Not in Y-Redundant Pair

ICS Support		Comment
Old Card	New Card	
NO	NO	OK - same card
NO	YES	mismatch
YES	NO	mismatch
YES	YES	OK - same card

Table 7-21 Card is Configured for Y-Redundancy

ICS Support		Comment
Old Card	New Card	
NO	NO	OK
NO	YES	OK but ICS is not available until both cards support ICS
YES	NO	Mismatch if both cards support ICS before
YES	YES	OK

Limitations with Idle Code Suppression

T-type connections are not supported. On a VNS controlled network, t-type SVCs are used for video calls. VNS does not support Nx64 super-rate connections.

This feature is intended to work with video codecs that implement H.222 or BONDING protocol only.

Full Name

Configures a voice connection to have idle code suppression enabled/disabled

Syntax

```
cnfdch <channel><ch_ics_state>
```

Related Commands

dspchcnf, dspcons

Attributes

Privilege	Jobs	Log	Node	Lock
2-6	Yes	No	IGX	No

Example 1

cnfdch 9.1.3–5

Description

Display configuration values for channels 9.1.3 through 9.1.5.

```
sw176          TRM   StrataCom      IGX 8420      9.2.0r      Apr. 3 1998  17:28 PST
               Maximum EIA      %      DFM Pattern      DFM      Idle Code      PreAge
From 9.1.3     Update Rate      Util      Length      Status      Suppr      (usec)
9.1.3-5       -                -                -                -                Disabled      0
```

This Command: cnfdch 9.1.3-5

Table 7-22 cnfdch—Parameters

Parameter	Description
<i>channel</i>	<i>slot.line.channel</i> for UVM or <i>line.channel</i> for CVM/CDP. A channel range is allowed.
<i>ch_ics_state</i>	Channel idle code suppression state: d for disabled; e for enabled.

Full Name

Configures a voice connection to have idle code suppression enabled/disabled

Syntax

cnfdch <*channel*><*ch_ics_state*>

Related Commands

cnfdch 9.1.3–5

cnfdchtp

Configures a CDP, CVM, or LDP or LDM DDS port interface type to OCU or DSU. When configuring DDS operations, this command returns an error if executed on a slot with an EIA/TIA-232 back card. It forces a back card slot from EIA/TIA-232 mode to DDS mode if a back card is not installed and there are no connections. Any Y-cable association is deleted in this case. The clocking tracks the DDS port interface type. OCU type interfaces are configured as looped, and DSU type interfaces are configured as normal. The default interface is DSU.

When configuring CDP, CVM, LDP, or LDM operation, this command configures DCE types as normal clocking and DTE types as looped clocking. The default type is DCE. For T1 lines, DS0A on T1 unassigned signalling is configurable. When a connection is not present, voice channels are converted to data channels.

Full Name

Configure data channel interface type

Syntax

```
cnfdchtp <channel> <interface type> [unassigned signaling]
```

Related Commands

none

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1

```
cnfdchtp 31.1 oc
```

Description

Configure DDS channel 31.1 as OCU.

System Response

```

beta          TRM   YourID:1          IGX 8430    9.2    Aug. 15 1998 17:30 MST

Data Channel: 31.1
Interface:    DDS-4   OCU Config
Clocking:    Looped

```

Interface Control Template for Connection while ACTIVE

Lead	Output Value	Lead	Output Value
DSR	ON	CTS	ON
DCD	ON		

Last Command: cnfdchtp 31.1 oc

Next Command:

Example 2**cnfdchtp 22.1 dce****Description**

Configure channel 22.1 as DCE with T1 unassigned signalling.

System Response

```

beta          TRM   YourID:1          IGX 32     9.2    Aug. 15 1998 17:30 MST

Data Channel: 22.1
Interface:MissingDDS0A DCE Configuration
Clocking:Normal

```

Interface Control Template for Connection while ACTIVE

Lead	Output Value	Lead	Output Value
DSR	ON	CTS	ON
DCD	ON		

Last Command: cnfdchtp 22.1 dce t

Next Command:

Table 7-23 *cnfdchtp—Parameters*

Parameter	Description
channel	Specifies the channel to configure in the format <slot>. <port>.
interface type	Specifies the interface type to configure. An LDP or LDM DDS port can be configured as DSU or OCU (enter ds or oc). A CDP or CVM port can be configured as DCE or DTE (enter dce or dte).

Table 7-24 *cnfdchtp—Optional Parameters*

Parameter	Description
channel	Specifies the channel to configure in the format slot. port
unassigned signalling	Specifies an optional parameter for T1 lines to indicate DS0A or T1 unassigned signalling. Enter d for DS0A or t for T1.

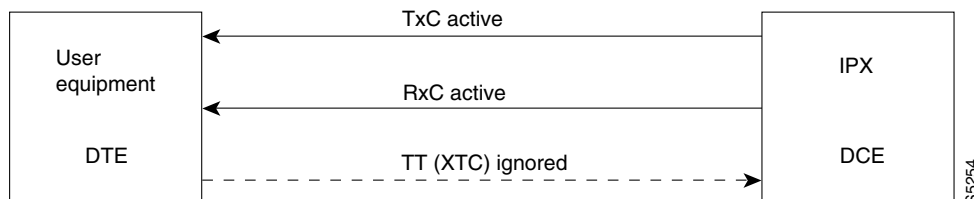
cnfdclk

Configures the clocking for a data channel. In general, the clock configuration may be normal, split, or looped for an SDP or HDM (fewer options for an LDP or LDM). The clock configuration of each channel of a connection determines how the clock will be propagated through the network, and how external equipment should be synchronized.

If clocking is not set correctly, there may be no synchronization, and the connection will operate in a pliesiochronous mode. Each data port can be configured independently to act as either DCE or DTE by adjusting the jumper (SDI card) or changing the adapter cable (LDI card) on the data interface card. The effect of the clocking type designated depends on whether each data port is configured as DTE or DCE. The following data clocking configurations are possible with the **cnfdclk** command:

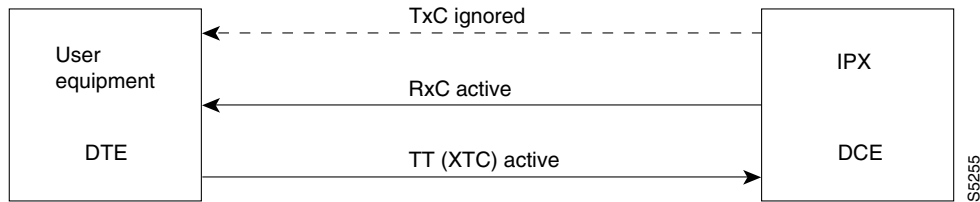
DCE-Configured Data Port: Normal Clocking

When the data port is configured as DCE, selecting a clocking type of n (for normal) results in clocking as illustrated below. The IGX node, acting as DCE, provides both the transmit and receive data clocks to the user equipment.

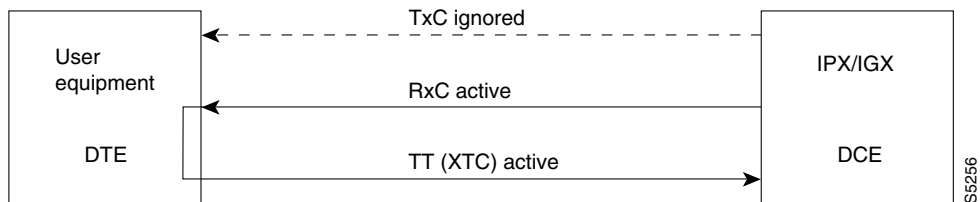
Figure 7-1 *Normal Clocking on a DCE*

DCE-Configured Data Port: Split Clocking

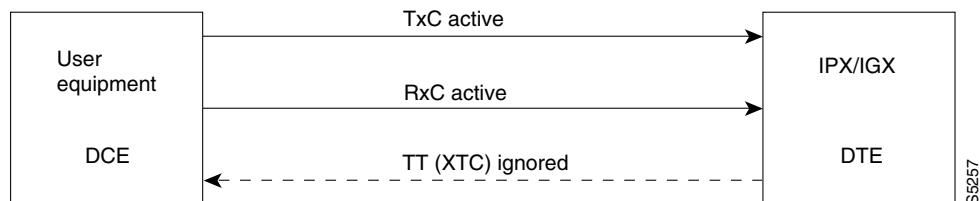
When the data port is configured as DCE, selecting a clocking type of s (for split) results in clocking as illustrated below. In split clocking, TT may be generated independently of RxC. The maximum data rate for split clocking is 112 Kbps.

Figure 7-2 Split Clocking on a DCE**DCE-Configured Data Port: Looped Clocking**

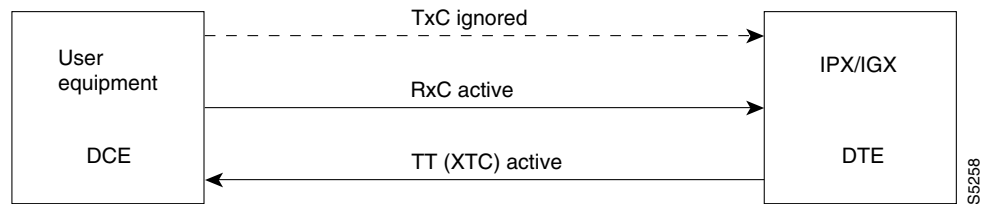
When the data port is configured as DCE, selecting a clocking type of l (for looped) results in clocking as illustrated below. The Terminal Timing signal, called TT or XTC, is simply RxC looped back from the user equipment. In this configuration, it is important that the two clocks (RxC and TT) be frequency locked. This clocking configuration is supported for all data rates.

Figure 7-3 Looped Clocking on a DCE**DTE-Configured Data Port: Normal Clocking**

When the data port is configured as DTE, selecting a clocking type of n (for normal) results in clocking as illustrated below. The IGX, acting as DTE, receives both the transmit and receive data clocks from the user equipment. When the user equipment is not referenced to the network clock, the maximum data rate for this configuration is 112 Kbps. The two clocks must be frequency-locked for proper operation.

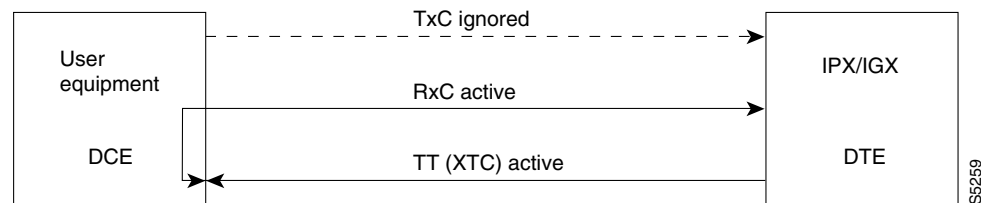
Figure 7-4 Normal Clocking on a DTE**DTE-Configured Data Port: Split Clocking**

When the data port is configured as DTE, selecting a clocking type of s (for split) results in the clocking as illustrated below. When the user equipment is not referenced to the network clock, the maximum data rate for this configuration is 112 Kbps. The two clocks must be frequency-locked for proper operation.

Figure 7-5 Split Clocking on a DTE**DTE Configured Data Port: Looped Clocking**

If you specify clocking type of 1 (looped) when the data port is in DTE mode, the result is the clocking arrangement shown in Figure 7-6. The RxC clock signal is the TT(XTC) signal looped back to the IGX node by the user equipment. The network supports this clocking configuration for all data rates. The restrictions to the data clocking schemes are

- Except for special cases, isochronous clocking is limited to data rates of 112 Kbps or less. For higher data rates, all clocks must be frequency-locked to the network.
- For any port there must be only one isochronous clock in a direction. Any situation where user equipment provides two clock signals that are not locked is subject to slippage.
- Slippage may also occur in any situation where there are opposing user clocks for a single direction of data.

Figure 7-6 Looped Clocking on a DTE**Full Name**

Configure data channel clocking type

Syntax

```
cnfdclk <channel> <normal/split/looped>
```

Related Commands

none

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1

cnfdclk 5.1 n

Description

Configure the clocking for channel 5.1 to normal.

System Response

```
alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 23 1998 10:41 PST
```

```
Data Channel:    5.1
Interface:       V35   DCE
Clocking:        Normal
```

Interface Control Template for Connection while ACTIVE

```
Lead   Output Value   Lead   Output Value
RI(J)  OFF                DSR (E) ON
CTS(D) ON            TN (K)  OFF
DCD(F) ON
```

Last Command: cnfdclk 5.1 n

Next Command:

Table 7-25 cnfdclk-Parameters

Parameter	Description
channel	Specifies the channel to configure in the format <slot>. <port>.
normal/split/looped	Specifies the clocking type to assign to the channel. Valid clocking types are: <ul style="list-style-type: none"> • n for Normal • s for Split • l for Looped

cnfict

Sets the interface control template signals. The signals that can be set using **cnfict** depend on the type of back card used and whether the hardware is configured for DCE or DTE. On an IGX node, the applicable front cards are the LDM, HDM, FRM, CVM (for data), and FTM (for data). Each data channel has a default interface control template for its active, conditioned, and looped near and far states. The **cnfict** command is used to change a control template. Each interface control lead in each template is individually configured.

When Y-cable redundancy is in effect, the control template configuration for the data channels terminating at the primary slot is also applied to the data channels of the secondary slot. Any configuration information for the secondary slot is ignored. Table 7-26 shows the configurable leads and the equivalence between EIA/TIA-232C, EIA/TIA-232D, EIA/TIA-449, V.35, and X.21 interfaces. The leads are configurable for each type of data interface supported by the IGX node. The entries under the IGX Name column indicate the abbreviations to use when specifying input or output leads on the command line. A node treats leads impartially for non-interleaved connections. Any signal received on an EIA pin at one end may be transmitted to any pin at the other end, up to the maximum of 12 EIA leads on any interface type. For interleaved EIA connections, refer to the Fast EIA column. The column shows which leads are carried in the interleaved bytes of the data packets. All remaining leads are carried in standard control lead packets.

Table 7-26 Configurable Lead Names and Functions

Configurable Leads								
Source	IGX Name	EIA/TIA-232C	EIA/TIA-232D	EIA/TIA-449	V.35	X.21	Fast EIA	Function
DTE	RTS	CA	CA	RS	C		F4	Request to Send
DCE	CTS	CB	CB	CS	D		F4	Clear to Send
DCE	DSR	CC	CC	DM	E		F3	Data Set Ready
DCE	DCD	CF	CF	RR	F		F7	Data Carrier Detect (RLSD)
DCE	QM	QM	QM					Equalizer Mode
DTE	pin 11	11	11					Sometimes used for Data
DCE	SDCD	SCF	SCF					Secondary Data Carrier Detect
DCE	SCTS	SCB	SCB					Secondary Clear to Send
DTE	STxD	SBA	SBA				F5	Secondary Transmit Data
DTE	NS			NS			F7	New Sync
DCE	SRxD	SBB	SBB				F5	Secondary Receive Data
DCE	DCR	DCR						Divided Receiver Clock
DTE	RL		RL	RL			F6	Remote Loopback
DTE	SRTS	SCA	SCA					Secondary Request to Send
DTE	DTR	CD	CD	TR	H		F3	Data Terminal Ready
DCE	SQ	CG	CG	SQ				Signal Quality Detect
DCE	RI	CE	CE	IC	J**			Ring Indicator
DTE	SF	CH	CH	SF				Signal Rate Select (to DCE)

Table 7-26 Configurable Lead Names and Functions (continued)

Configurable Leads								
Source	IGX Name	EIA/TIA-232C	EIA/TIA-232D	EIA/TIA-449	V.35	X.21	Fast EIA	Function
DCE	SI	CI	CI	SI				Signaling Rate Select. (to DTE)
DTE	BSY	BSY		IS			F1	Busy (In Service)
DCE	SB		TST	SB			F1	Test Indicator
DTE	LL			LL			F2	Local Loopback
DCE	TM			TM	K ¹		F6	Test Mode
DTE	SS			SS				Select Standby
DTE	C					C		Control
DCE	I					I		Indicator

1. Applicable to SDP cards only.

Note that pins 11 and 23 on an EIA/TIA-232 port are bidirectional, and their default direction is input. See the **cnfctdir** command for information on changing the direction of these pins. The **cpyict** command can be used to copy an interface control template from one data channel to another. You can then edit it by using the **cnfict** command. The **dspbob** command displays the state of leads at specified intervals.

Full Name

Configure interface control templates

Syntax

```
cnfict <port> <template> <output> <source>
```

Related Commands

addextlp, **dspict**, **tstport**

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1

```
cnfict 31.1 c SB on
```

Description

Configure the conditioned interface control template for channel 31.1 to SB on (DDS).

System Response

```
beta          TRM   YourID:1          IGX 8420    9.2    Aug. 15 1998 17:30 MST

Data Channel:    31.1
Interface:      DDS-4   OCU Config
Clocking:       Looped
```

Interface Control Template for Connection while CONDITIONED

Lead	Output Value	Lead	Output Value
SB	ON	RI	OFF
DSR	OFF	CTS	ON
DCD	OFF		

Last Command: cnfict 31.1 c sb on

Next Command:

Example 2

cnfict 25.1 a CTS on

Description

Configure the active interface control template for channel 25.1 to CTS on (EIA/TIA-232).

System Response

```
beta          TRM   YourID:1          IGX 8430    9.2    Aug. 15 1998 17:36 MST

Data Channel:    25.1
Interface:      EIA/TIA-232  DCE
Clocking:       Normal
```

Interface Control Template for Connection while ACTIVE

Lead	Output Value	Lead	Output Value
RI	OFF	DSR	ON
CTS	ON	SRxD	ON
DCR	OFF	DCD	ON
SCTS	ON	SDCD	ON
SQ	ON		

Last Command: cnfict 25.1 a cts on

Next Command:

Example 3**cnfict 5.1 active CTS on****Description**

Configure the active interface control template for channel 5.1 to CTS on (V.35).

System Response

```
alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 23 1998 10:29 PST
```

```
Data Channel:    5.1
Interface:       V35   DCE
Clocking:        Normal
```

Interface Control Template for Connection while ACTIVE

```
Lead   Output Value          Lead   Output Value
RI (J) OFF                DSR (E) ON
CTS (D) ON                 TM (K) OFF
DCD (F) ON
```

Last Command: cnfict 5.1 a cts on

Next Command:

Table 7-27 *cnfict—Parameters*

Parameter	Description		
port	Specifies the data channel or Frame Relay port whose interface control template is to be configured. Entered as <slot.port>. On an IGX node, the applicable cards are the LDM, HDM, FRM, CVM, and FTM.		
template	Specifies which interface control template to configure for the channel and has the format <a/c/l/n/f>. Valid entries are listed below. The only valid template for a Frame Relay port, X.21 or V.35, is the ACTIVE template. Also, all the output leads have steady state values and do not follow local or remote inputs		
	Entry	Template	Description
	a	Active	The active control template is in effect while the data channel is active (normal operation) i.e., when the connection is routed and not failed.

Table 7-27 *cnfict*—Parameters (continued)

Parameter	Description		
	Entry	Template	Description
	c	Conditioned	The conditioned control template is in effect when conditioning is applied to the data channel. The conditioned template is used when the network detects that it cannot maintain the connection because of card failures or lack of bandwidth (the connection failed).
	l	Looped	The looped template is in effect when the data channel is being looped back in either direction. The looped template is used when addloclp or addrmtlp has been used to loop the connection within the network.
	n	Near loopback	The near template is in effect when running a tstport n command or an addextlp n command on a port. The port is configured such that the external near modem is placed in a loopback.
	f	Far loopback	The far template is in effect when running a tstport f command or an addextlp f command on a port. The port is configured such that the external far-end modem is placed in a loopback.
output	Specifies the output lead. Refer to the Configurable Lead information in the command description for abbreviations. Configurable output leads vary with the type of data interface (EIA/TIA-232, V.35, X.21, or EIA/TIA -449).		
source	Specifies how the lead is to be configured and has the format <on off local remote> <input> [delay]. Valid source choices follow:		
	Source Options		
	on	The output lead is asserted.	
	off	The output lead is inhibited.	
	l	Local. Indicates that the output follows a local lead.	
	r	Remote. Indicates that the output follows a remote lead.	
	input	Specifies the name of the local or remote input lead that the output lead follows.	
	delay	Specifies the time in milliseconds that separates the off to on lead transitions. Delay is valid <i>only</i> when the output lead is CTS and the input lead is local RTS. On to Off lead transitions are not subject to this delay.	

cpyict

Copies all control template information associated with a given channel: the active template information, the conditioned template information, and the looped template information for near and far ends. Once copied, the control template information may be edited with the **cnfict** command. See the **cnfict** command for more information on interface control templates.

On an IGX node, the applicable front cards are the LDM, HDM, FRM, CVM (for data), and FTM (for data).

Full Name

Copy interface control templates

Syntax

```
cpyict <source_port> <destination_port>
```

Related Commands

cnfict, **dspict**

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1

```
cpyict 25.1 25.2
```

Description

Copy the interface control template for data channel 25.1 to channel 25.2.

System Response

```
beta          TRM   YourID:1          IGX 8430    9.2   Aug. 15 1998 17:40 MST
```

```
Data Channel:      25.2
Interface:         EIA/TIA 232   DCE
Clocking:          Normal
```

Interface Control Template for Connection while ACTIVE

Lead	Output Value	Lead	Output Value
RI	OFF	DSR	ON
CTS	ON	SRxD	ON
DCR	OFF	DCD	ON
SCTS	ON	SDCD	ON
SQ	ON		

Last Command: cpyict 25.1 25.2

Next Command:

Table 7-28 *cpyict—Parameters*

Parameter	Description
source channel	Specifies the data channel or Frame Relay port whose interface control template information to copy.
designating channel	Specifies the data channel or Frame Relay port that will receive the copied control template information.

delcon

Removes connections from the network. After entry of the channel or range of channels to delete, a prompt requests confirmation of the selection. Connections can be deleted from the node at either end of the connection. Do not delete a connection when the node at the other end of the connection is unreachable. The unreachable node does not recognize the deletion. It is especially important not to delete a connection to an unreachable node and then connect that channel to another node.

Full Name

Delete connections

Syntax

delcon <channel(s)>

Related Commands

addcon, dspcon, dspcons

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1**delcon 3.1****Description**

Delete connection 3.1.

System Response

```
pubsigx1      TN      SuperUser      IGX 8410      9.2      Aug. 14 1998 00:53 GMT

Local          Remote      Remote
Channel        NodeName   Channel      State  Type      Compress  Code COS
3.1            pubsigx1   3.2          Ok     64         7/8
3.2            pubsigx1   3.1          Ok     64         7/8
5.1.101        pubsigx1   5.1.102     Ok     fr
5.1.102        pubsigx1   5.1.101     Ok     fr
5.1.111        pubsigx1   9.1.1       Ok     atfr
5.1.203        pubsigx1   5.1.204     Ok     fst
5.1.204        pubsigx1   5.1.203     Ok     fst
5.1.222        pubsigx1   8.5.2       Ok     atfst
5.1.223        pubsigx1   8.5.3       Ok     atfst
8.5.1          pubsigx1   5.1.111     Ok     atfr
8.5.2          pubsigx1   5.1.222     Ok     atfst
8.5.3          pubsigx1   5.1.223     Ok     atfst
13.1           pubsigx1   13.2        Failed p
```

This Command: delcon 3.1

Delete these connections (y/n)?

Table 7-29 delcon—Parameters

Parameter	Description
channel	Specifies the data channel or channels to delete. The format is <i>slot.port</i> .

dspchcnf

Displays configuration details for data channels. This command provides information for voice, Frame Relay, ATM, and data channels. For data connections on the specified card and starting with the specified channel, the **dspchcnf** command displays the following information:

- Maximum EIA update rate
- Percentage of channel utilization
- DFM pattern length

- DFM status.(enabled or disabled)
- Idle code suppression (enabled or disabled)
- PreAge (in microseconds)

The data cards that support this command are the HDM, LDM, UVM, and CVM/CVP cards on the IGX node.

Full Name

Display channel configurations

Syntax

dspchcnf <start_channel>

Related Commands

cnfdch, cnfchadv, cnfchdfm, cnfchdl, cnfcheia, cnfchgn, cnfchtp, cnfchutl, cnffrcon

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX	No

Example 1

dspchcnf 3.1

Description

Display the configuration values for data channels starting at 3.1.

System Response

```
pubsigx1      TN      SuperUser      IGX 8410      9.2 Jan. 9 1998 00:04 GMT

              Maximum EIA      %      DFM Pattern      DFM
Channels      Update Rate      Util      Length      Status
3.1-4         2          100      8          Enabled
```

Last Command: dspchcnf 3.1

Next Command:

Example 2**dspchcnf 9.1.3****Description**

Display the configuration values for data channels starting at channel 9.1.3.

System Response

```
sw176          TRM      StrataCom      IGX 8420      9.2.a2      Apr. 3 1998 17:32 PST

              Maximum EIA      %      DFM Pattern      DFM      Idle Code      PreAge
From 9.1.3    Update Rate      Util      Length      Status      Suppr      (usec)
9.1.3-8       -          -          -          -          Enabled      0
```

Last Command: dspchcnf 9.1.3

Table 7-30 *dspchcnf-Parameters*

Parameter	Description
start channel	Specifies the starting channel using the format <i>slot.port</i>

dspcon

Displays connection information for a specified channel. The information displayed includes:

- The channel numbers for both the local and remote ends of the connection.
- The node names at both ends of the connection.
- The routing restriction.
- The class of service (COS) of the connection. See the chapter “Optimizing Traffic Routing and Bandwidth” for more information about COS.
- The connection route listing the end nodes and any intermediate nodes.
- The preferred route for the connection (if configured).
- If cost-based AutoRoute is configured, displays maximum and current costs for a connection route.
- The status of the cards associated with the connection.
- Any Y-cable conflicts.
- The compression status (VAD on or off, ADPCM on or off, DFM on or off, Frame Relay compression on or off).
- The connection descriptor (if configured).

The status that may be displayed includes:

```
OK           Connection OK
FAILED      Connection failed
```

Full Name

Display connection

Syntax

```
dspcon <channel>
```

Related Commands

cnfchec, cnfrtcost

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX	No

Example 1

```
dspcon 13.1
```

Description

Display information for data channel 13.1. This connection is FAILED and off hook.

System Response

```
pubsigx1      TN      SuperUser      IGX 8420      9.2      Aug. 14 1998 00:20 GMT
Conn: 13.1      pubsigx1      13.2      p
Desc: bogus      Status:Failed
```

```
Path: Route information not applicable for local connections
```

```
pubsigx1 Line 13: Failed      OFFHK pubsigx1 Line 13: Failed      OFFHK
```

```
Last Command: dspcon 13.1
```

```
Next Command:
```

Table 7-31 dspcon-Parameters

Parameter	Description
channel	Specifies the channel. The command displays connection information for one channel at a time. The format for channel specification is <i>slot.channel</i> .

dspcons

Displays a summary of the connections on an IGX node. Status that you can display includes:

```
OK      Connection OK
FAILED  Connection failed
```

Table 7-32 describes the fields in the **dspcons** screens.

Table 7-32 Fields in the dspcons Display

Fields	Description
Local Channel	The connection's channel at this node.
Remote Node Name	The name of the node at the other end of the connection.

Table 7-32 Fields in the dspcons Display (continued)

Fields	Description
Remote Channel	The connection's channel at the remote node.
State	The state of the connection(s) as follows: OK = Routed Down = Downed OK Downed = Waiting for onhook to occur to allow courtesy down to take place for connection(s) that have been courtesy downed using the dncon command. Failed = unrouted, but trying
Type	The type of connection (v = voice, d = data, fr = Frame Relay, atr = ATM to Frame Relay interworking, atfst = ATM to Frame Relay interworking with ForeSight, -fail = failed connections; data rate in Kbps for data)
Route Avoid	The type of lines to avoid when routing (satellite lines, terrestrial lines, lines with zero code suppression).
Compression	The type of compression applied to the connection (PCM, PCM and VAD, ADPCM, VAD and ADPCM for voice connections), (DFM or ICS for data connections).
COS	Class Of Service.
Loopback	A connection with a local loopback is indicated by a right parenthesis symbol between the Local Channel and Remote NodeName columns. A Frame Relay connection with a port loopback is indicated by a right bracket symbol between the Local Channel and Remote NodeName columns. A connection with a remote loopback is indicated by a right parenthesis symbol before the channel number in the Remote Channel column.

Full Name

Display connections

Syntax

dspcons [start_channel] [nodename] [connection type]

Related Commands

addcon, cnfchadv, chfchdfm

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX	No

Example 1

```

dspcons

```

Description

Display a summary of all connections.

System Response

```

alphaTRMYourID:1 IGX 8410 Rev:9.2 Aug. 16 1998 09:42 PST

Local      Remote      Remote
Channel    NodeName    Channel    State  Type    Compression  Code Avoid COS O
5.1beta25.10k2567/80L
9.1gamma8.10kv0L
9.2beta19.20kv0L
14.1gamma15.10kvVAD2L

```

```

Last Command: dspcons

```

```

Next Command:

```

Example 2

```

dspcons

```

Description

Display the connection with descriptors.

System Response

```
pubsigx1      TN      SuperUser      IGX 8410      9.2      July 25 1998 06:40 PDT

Local         Remote      Remote
Channel       NodeName   Channel
5.1.100      pubsigx3   5.1.200      Ok      fr
6.1          pubsigx2   11.1         Ok      56
```

Last Command: dspcons +d

Next Command:

Example 5**dspcons****Description**

Display a summary of all connections.

System Response

```
sw176         TRM      StrataCom      IGX 16      9.2.a2      Apr. 3 1998 17:36 PST

Local         Remote      Remote
Channel       NodeName   Channel
9.1.2-3      sw176     9.1.2-3      Ok      2x64      7/8
9.1.4        sw176     9.1.4        Ok      1x64      ICS      7/8
9.1.6        sw176     9.1.6        Ok      g729r8    LDCELP
9.1.7        sw176     9.1.7        Ok      1x64      7/8
9.1.9        sw176     9.1.9        Ok      c32      VAD/ADPCM
9.1.10-13    sw176     9.1.10-13    Ok      4x64      ICS      7/8
```

Table 7-33 *dspcons*—Optional Parameters

Parameter	Description
start channel	Specifies the channel to begin the display. The start channel is specified as follows: slot.channel slot.port.dlci slot.vpi.vci
node name	Specifies that only connections to this remote node from the local node be displayed. If no nodename is designated, connections from the local node to all other nodes are displayed.
connection type	Specifies that only connections of this type be displayed. If no connection type is designated, all connections appear. When you enter the connection type on the command line, precede it with a hyphen (-). Valid connection types to display are: -v = Displays only voice connections. -d = Display only data connections. -f = Displays Frame Relay connections. -abit = Shows A-bit (nni) status. -fabit = Shows connections with failed A-bit (nni) status. -fail = Shows only failed connections.

dsprtcache

This command displays the cache of all cost-based routing connections. The optional *index* parameter lets you specify a cache entry index. The optional *c* parameter clears the cache.

Full Name

Display cost-based route cache

Syntax

dsprtcache [index] [c]

[index] specifies the cache entry index

[c] specifies to clear the entire cache or a single entry

Related Commands

dspcon, cnfrtcost, cnfpref

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

```
dsprtcache
```

Description

Display route cache contents, and let you monitor and manually clear the cache.

System Response

```

pissaro      TN      StrataCom      BPX 15      9.1      Jun. 18 1997 11:11 GMT
Route Cache (Summary)
Index  Use  Cost  Delay  Restrict  Load  VPC  Hops  RemoteNode
0      Yes  1     Yes   No        None  VBR  No    2      lautrec
1      Yes  6     Yes   No        *s    BDB  No    3      vangogh
2      Yes  9     Yes   No        None  BDA  No    3      matisse
3      Yes  3     Yes   No        *t    BDB  No    3      rousseau
4      Yes  1     Yes   No        None  CBR  No    3      seurat  <-
current
5      No   0     No    No        None  ---  No    0      ---
6      No   0     No    No        None  ---  No    0      ---
7      No   0     No    No        None  ---  No    0      ---
8      No   0     No    No        None  ---  No    0      ---
9      No   0     No    No        None  ---  No    0      ---
10     No   0     No    No        None  ---  No    0      ---
11     No   0     No    No        None  ---  No    0      ---

Last Command: dsprtcache

Next Command:

```

Table 7-34 *dsprtcache—Parameters*

Parameter	Description
index	Specifies a particular route entry within the cache. When used with the c parameter, the route is either displayed or cleared from the cache.
c	Clears the cache, or if you also enter the index parameter, clears the route cache specified by the index number.

dspict

Displays interface control template information for data channels and Frame Relay ports. Displayed information includes:

- The specified channel.
- The type of template: a, c, l, n, or f.
- The associated output leads and their status:
 - ON.
 - OFF.
 - Following a local input.
 - Following a remote input.

For Frame Relay ports, the entire port configuration screen is displayed (see **dsprport** command). The input being followed, where applicable, is specified. Any RTS to CTS delay is also shown.

Full Name

Display interface control template

Syntax

```
dspict <port> <template>
```

Related Commands

```
cnfict, cpyict
```

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	No	No	IGX	No

Example 1

```
dspict 25.1
```

Description

Display the active interface control template for 25.1.

System Response

```
beta          TRM   YourID:1          IGX 8430    9.2    Aug. 15 1998 17:33 MST

Data Channel:    25.1
Interface:      EIA/TIA 232   DCE
Clocking:      Normal
```

Interface Control Template for Connection while ACTIVE

Lead	Output Value	Lead	Output Value
RI	OFF	DSR	ON
CTS	ON	SRxD	ON
DCR	OFF	DCD	ON
SCTS	ON	SDCD	ON
SQ	ON		

```
Last Command: dspict 25.1
```

```
Next Command:
```

Table 7-35 dspict—Parameters

Parameter	Description
channel	Specifies the channel. The format of the channel specification is <i>slot.port</i> .
template	Specifies which control template to display for the channel. There are three templates available for data channels and one available (a only) for Frame Relay ports. You also specify which end of the circuit. a = Active control template (normal operation). The only choice for a Frame Relay port. c = Conditioned control template (when connection fails). l = Looped control template (with local or remote loopback). n = Near. f = Far.

prtchcnf

Prints the configuration details for voice channels or data channels. This command uses the same syntax, and prints the same information as the **dspchcnf** command. See the **dspchcnf** description for syntax and output information.

Full Name

Print channel configurations

Syntax

```
prtchcnf <start_channel>
```

Related Commands

dspchcnf

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	Yes	No	IGX	Yes

Example 1

```
prtchcnf 14.1
```

Description

Print the configuration values of circuit line 14.1.

System Response

None available as this command produces hardcopy.

Table 7-36 prtchcnf-Parameters

Parameter	Description
start channel	Specifies the channel at which the printout begins. The format is <i>slot.channel</i> .

prtcons

Prints a summary of connections terminated at the IGX node.

Full Name

Print connections

Syntax

prtcons [start_channel] [nodename] [type]

Related Commands

dspcons

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	Yes	No	IGX	Yes

Example 1

prtcons

Description

Print a summary of all connections.

System Response

None available as this command produces hardcopy.

Table 7-37 prtcons—Optional Parameters

Parameter	Description
start channel	Specifies the channel to begin the display. The start channel is specified as follows: slot.channel
node name	Specifies that only connections to this remote node from the local node be displayed. If no <i>nodename</i> is designated, connections from the local node to all other nodes are displayed.
connection type	Specifies that only connections of this type be displayed. If no <i>connection type</i> is designated, all connections display. When you enter the connection type on the command line, it must be preceded with a hyphen (-). Valid connection types to display are -v = Displays only voice connections. -d = Display only data connections. -f = Displays Frame Relay connections. -nni = Displays Frame Relay network to network connections for failed connections only. -fail = Displays only failed connections.

prtict

Prints the configuration details for voice channels or data channels. This command uses the same syntax, and prints the same information as is displayed using the **dspchcnf** command. See the **dspchcnf** command for syntax and output information.

Full Name

Print interface control template

Syntax

prtict <port> <template>

Related Commands

cnfict, **cpyict**

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	Yes	No	IGX	Yes

Example 1

prtict 25.1

Description

Print the active interface control template for 25.1.

System Response

None as this command produces hardcopy.

Table 7-38 prtict—Parameters

Parameter	Description
channel	Specifies the channel containing the data card. The start channel has the format <i>slot.port</i> .
template	<p>Specifies which control template to display for the channel. Three templates are available for data channels. One template (option “a”) is available for Frame Relay ports. You can also specify the near or far end of the connection.</p> <p>a = Active control template (normal operation). The only choice for a Frame Relay port.</p> <p>c = Conditioned control template (when connection fails).</p> <p>l = Looped control template (with local or remote loopback).</p> <p>n = Near.</p> <p>f = Far.</p>



Frame Relay Connections

The Frame Relay commands let you add, configure, delete, and specify statistical reporting for Frame Relay connections. In addition to describing the commands, this chapter tells you how to:

- Set up a Frame Relay connection
- Use Frame Relay classes
- Use interface control templates
- Configure channel utilization
- Set channel priorities
- Display statistics

The Frame Relay commands in this chapter operate on an FRM or UFM card set in an IGX node. For the Frame Relay commands that operate on an FRSM in an MGX 8220 shelf, refer to the *Cisco MGX 8220 Command Reference*. For the Frame Relay commands that operate on the FastPADs and supporting service cards, refer to the FastPAD manuals.

For a greater number of low-speed connections, the Port Concentrator Shelf (PCS) is available. The PCS is an external device that requires an FRM-2/FRI-2 card set in an IGX node. The system recognizes an FRM-2 or FRC-2 and accepts commands for the PCS.



Note

A connection is the same as a PVC (permanent virtual circuit).

Physical and Logical Frame Relay Ports

This section describes the command-related issues for physical and logical Frame Relay ports.

In the IPX and IGX nodes, the Frame Relay-only cards are the FRP, FRM and UFM card sets. (The FTM supports Frame Relay, voice, and serial data but is not described in this manual.) In the FRP and FRM, both physical and logical ports can exist. The UFM has *logical* ports and *physical* lines.

Physical and Logical Ports on an FRM

In the FRP and FRM card sets, a *logical* port is a convention that applies to a T1 or E1 back card. In contrast, the ports on an X.21 or V.35 back card are physical. The reason that T1 and E1 ports on an FRP or FRM card set are logical is that these ports use one, bidirectional connector. To support the range of possible PVCs, the traffic passes through a demultiplexer on a T1 or E1 FRI. Therefore, although

only one connector exists on the card, the Frame Relay commands accept port numbers 1–24 (T1) or 1–31 (E1). When a Frame Relay command takes the parameter *slot.port*, the port in this case is logical, and the node tracks it accordingly.

**Note**

Keep in mind the distinction between a logical *port* and a logical *channel*: a logical channel is one or more DS0s.

Logical Ports and Physical Lines on a UFM

On the UFI back cards, the presence of multiple physical lines adds a parameter to the connection identifier. When you identify a UFM-C channel, use the format *slot.port line.DS0_range*. Due to the architecture of the software, *port* is a logical specification, and *line* is a physical specification. The range of logical ports is 1–250. The number of physical lines (hardware connectors) on the UFI-8T1 and UFI-8E1 is 8 (regardless of whether the front card is a UFM-4C or UFM-8C). The range of DS0s is 1–24 for T1 and 1–31 for E1.

For interfaces attached to a UFM-U front card, the range of ports is 1–12 for the UFI-12V.35 or UFI-12X.21 and 1–4 for the UFI-4HSSI.

Setting Up a Frame Relay Connection

Frame Relay connections can exist between the following cards:

- FRP, FRM, or UFM to any FRP, FRM or UFM.
- UFM to an ASI in a BPX or an ALM/A in an IGX: These paths use service interworking (SIW) to terminate a connection that is Frame Relay at one end and ATM at the other end.
- FRP, FRM, or UFM and an FRSM (in an MGX 8220 shelf): this path uses network interworking (NIW) to carry Frame Relay data encapsulated in ATM cells between an IPX or IGX node and an FRSM.
- FRP, FRM, or UFM to a FastPAD port.

An IPX or IGX node provides a Permanent Virtual Circuit (PVC) Frame Relay Service for interconnecting user devices (routers, bridges, and packet switches). The PVCs are internally created on the node and rely on FastPacket switching. The user device connects to the Frame Relay back card in the node. The back card provides the adaptation layer function to convert between the Frame Relay format and the FastPacket format.

In addition to the interface cards just listed, Frame Relay connections require a trunk card. Trunk cards can be an NTC or AIT in an IPX node or an NTM, BTM, or ALM/B in an IGX node. Because Frame Relay is a purchased option, Cisco must enable it on each applicable WAN Switching node.

A variety of external user devices can operate with an IGX node. The configuration on these devices must be appropriate for the type of interface on the back card.

The following command sequence brings up a Frame Relay port and adds a Frame Relay connection.

Step 1 Activate a Frame Relay port with the **upfrport** command.

Step 2 Use **cnffrport** to specify the Frame Relay parameters for the Frame Relay service.

An optional command may be applicable to a Port Concentrator Shelf (PCS): you can use **cnffreport** to configure the concentrated link between the PCS and Frame Relay cards.

Step 3 Use the **dspcls** command to view the existing Frame Relay classes. Decide on a class if a suitable class exists, otherwise create a suitable class using the **cnffrcls** command. Use the class number in the **addcon** command.

Step 4 Use the **vt** command to access the node at the remote end of the proposed Frame Relay connection, then use the **upfrport** and **cnffrport** commands as in steps 1 and 2.

Step 5 Use the **addcon** command on the local node to add the Frame Relay connection.

Using Frame Relay Classes

For each Frame Relay connection you add, you must specify a *Frame Relay class*. A Frame Relay class is a set of parameters that specify the bandwidth and congestion-prevention characteristics for a connection. Cisco provides ten (10) predefined classes, but you can modify any of the 10 Frame Relay classes with **cnffrcls**. To see the parameters in all connection classes, execute **dspfrcls**. A Frame Relay class is relevant only at the time you add a connection with **addcon**. Once the connection exists, the system uses the parameters but does not keep track of the class number.

Apart from using the **cnffrcls** command, you can change one or more Frame Relay parameters with the **addcon** command. When you add a Frame Relay connection with **addcon**, a prompt appears requesting a Frame Relay class. At this prompt you can do one of the following:

- Enter the number of a predefined class. The range is 1–10.
- Enter the number of a class modified with the **cnffrcls** command. The range is 1–10.
- Override one or more parameters in a connection class by typing the class number—*without pressing the Return key*—then continue the line by typing either a new value or an asterisk (*) for each parameter. Separate each item with a space and no comma.

If you are overriding class parameters, but want to keep the existing value of the parameter, use the asterisk to cause the connection to use the existing value of the parameter in that class. Most parameters are bidirectional and have the format *parameter/parameter*. If you want to keep a value for both directions, enter a single *. If you want to change a value for only one direction, enter the parameter in the form **/new_parameter* or *new_parameter/**. When you type individual parameters, you need to enter characters only up to the last changed item. Before the last item, you must enter new values or * as a placeholder.

The parameters in the list that follows make up a Frame Relay class. Collectively, the name of these parameters is *frp_bw*. For most parameters, you can specify the value for each direction of the connection, so most parameter names appear in the format *parameter/parameter*. ForeSight (FST) is the exception because ForeSight automatically applies to both directions.

- **MIR/MIR** is defined as fr_MIR_Tx /fr_MIR_Rx, where fr_MIR is the minimum information rate for the connection. The range for MIR is 2.4 Kbps–2048 Kbps.
- **CIR/CIR** is defined as fr_CIR_Tx and fr_CIR_Rx, where fr_CIR is defined as the committed information rate guaranteed to the user.

The full range of values for Frame Relay cards is 0–2048 Kbps. Note that a CIR of 0 is not a standard setting. The standard range is 2.4 Kbps–2048 Kbps. CIR = 0 is a valid parameter only if the connection terminates at both ends on either a UFM, FRM or FRP. Before you can specify CIR

= 0 with either **addcon** or **cnffrcs**, you must enable IDE-to-DE mapping with the **cnfrport** command. If you do not first enable IDE-to-DE mapping, the range for CIR is 2.4 Kbps–2048 Kbps. Additionally, the CIR = 0 specification is necessary at only one end of the connection.

The Port Concentrator Shelf does not support CIR = 0. On the FRP-2 and FRM-2 cards sets, the range for CIR is 2.4 Kbps–2048 Kbps.

- **VC_Q/VC_Q** is defined as fr_vc_q_Tx/fr_vc_q_Rx, where fr_vc_q Tx is the transmit VC maximum queue depth. Specify the VC_Q in bytes within the range 1–65535.

OR

Bc/Bc is defined as $\text{fr_Bc_Tx} / \text{fr_Bc_Rx}$. If you have selected Frame Relay Forum standard parameters (through the **cnfsysparm** command), the Committed Burst (Bc) parameter is used instead of **vc_q**. Bc is defined as the amount of data the network can accept over a variable time interval **Tc** for committed delivery on a specific PVC. Specify Bc in bytes in the range 1–65535. Bc has meaning for only FST connections. The relationship between Bc and **VC_Q** is

$$\text{Bc} = \text{VC_Q} / ((1 - (\text{CIR}/\text{port speed}))$$

- **PIR/PIR** is defined as $\text{fr_PIR_Tx} / \text{fr_PIR_Rx}$, where **fr_PIR_Tx** is the peak transmit rate for the PVC. The PIR range is 2.4–2048 Kbps. You can also specify the value 0 to cause PIR to default to the port speed. Thus, you can modify PIR, leave it the same, or set it to the port speed.

OR

Be/Be is defined as $\text{fr_Be_Tx} / \text{fr_Be_Rx}$. If you have selected Frame Relay Forum standard parameters (through the **cnfsysparm** command), the PVC uses Excess Burst (Be) instead of PIR. Be is the *amount* of transmit/receive data above the number of bytes set by Bc if enough extra bandwidth is available. Specify Be in bytes within the range 1–65535. Delivery of Be-data is not guaranteed. Be has meaning to only ForeSight. The relationship between Be and PIR is

$$\text{Be} = \text{Bc} * ((\text{PIR}/\text{CIR}) - 1)$$

- **Cmax/Cmax** is defined as $\text{fr_cmax_Tx} / \text{fr_cmax_Rx}$, where Cmax is the maximum credits the connection can accrue. Cmax has the range 1–255 packets per second (pps).
- **ECNQ_thresh/ECNQ_thresh** are the transmit and receive threshold settings for the explicit congestion notification control queues. The range for ECNQ_thresh is 1–65535 bytes.
- **QIR/QIR** is defined as $\text{fr_QIR_Tx} / \text{fr_QIR_Rx}$ where **fr_QIR** is the quiescent information rate for the connection, which is the initial transmit rate after a period of inactivity on the channel. If you do not specify the quiescent receive rate **fr_QIR_Rx**, the system sets it to the transmit value. The values are specified in Kbps and must be in the range **MIR**–**PIR**. In addition, you can specify the value 0 to default to the **MIR**. QIR has meaning for only ForeSight connections.
- **FST** enables or disables ForeSight for a connection. Valid entries are “y” (use ForeSight) or “n” (do not use ForeSight). If the ForeSight status changes, the network reroutes the connection.
- **%util/%util** are the percentage transmit and receive utilization settings for the Frame Relay class. This value is specified as a percentage in the range 0%–100%.

Using Interface Control Templates

X.21 ports use a *fixed, active* control template. In contrast, although V.35 and V.28 ports use an active control template, you can set the signals that are active to on or off. These ports cannot use *looped, conditioned, near, or far*.

Configuring Channel Utilization

You can use the **cnfchutil** command to enter the expected channel utilization of a Frame Relay circuit into the system. This command helps the system allocate the proper bandwidth to the circuit.

Setting Channel Priorities

A Frame Relay connection has either low or high priority. The default is low priority. You can use **cnfchpri** to assign a high priority to a circuit or to re-assign a high priority circuit to low priority.

Displaying Statistics

Nodes collect statistics for Frame Relay traffic, channel use, and Explicit Congestion Notification. Use **dspchstats** to display these statistics. Use **clrchststats** to clear the statistics and start collecting new statistics. To display Frame Relay use and error statistics, use **dspportstats**.

Summary of Commands

Table 8-1 lists the full name and starting page of the description for each Frame Relay command

Table 8-1 Frame Relay Commands

Mnemonic	Name	Page
addcon	Add connection	8-8
addfrport	Add Frame Relay port	8-19
clrfreportstats	Clear Port Concentrator link statistics	8-22
cnfchpri	Configure channel priority	8-25
cnffrccls	Configure Frame Relay class	8-27
cnffrcon	Configure Frame Relay connection	8-30
cnffrreport	Configure Frame Relay port on a Port Concentrator Shelf	8-33
cnffrport	Configure Frame Relay port	8-35
cnfict	Configure interface control template	8-48
cnfmode	Configure mode	8-54
cpyict	Copy interface control template	8-57
delcon	Delete connection	8-59
delfrport	Delete Frame Relay port	8-61
dnrfrport	Down Frame Relay port	8-63
dspchcnf	Display channel configuration	8-65
dspchstats	Display channel statistics	8-67
dspcon	Display connection	8-81
dspcons	Display connections	8-83
dspfrccls	Display Frame Relay class	8-90
dspfrrport	Display Frame Relay port	8-92
dspict	Display interface control template	8-99
dspmode	Display mode	8-102

Table 8-1 Frame Relay Commands (continued)

Mnemonic	Name	Page
dspmodes	Display modes	8-105
dsppcs	Display Port Concentrator Shelf	8-107
dspportids	Display port IDs	8-110
dspportstats	Display port statistics	8-112
prtchcnf	Print channel configuration	8-122
prtcons	Print connections	8-125
prtict	Print interface control template	8-127
upfrport	Up Frame Relay port	8-128

addcon

Adds a Frame Relay connection to the network. After you add a connection, the system automatically routes the connection. The node on which you execute **addcon** is the *owner* of the connection. The concept of ownership is important because you must specify automatic rerouting and preferred routing information at the node that owns the connection. See the **cnfpref** and **cnfcos** descriptions for information on automatic rerouting. Before it actually adds the connection, the system displays the parameters you have specified and prompts you to confirm them.



Note

For cards with Y-cable redundancy specified, you can add connections to only primary cards.

Each Frame Relay connection (and associated user device) has a local identification in the form of a unique DLCI. The total range for DLCIs is 1–1023. Typically, DLCIs 16–1007 are available for local and remote channels. According to ANSI standards, DLCIs 1–15 and 1008–1022 are reserved. DLCI 1023 is reserved for LMI signaling.

Only a UFM could come close to using all DLCIs. The maximum number of connections on a UFM is 1000. The maximum number of Frame Relay connections on an FRC or FRM is 252.

If a user device can automatically determine the network configuration by using the LMI, you do not need to specify the DLCIs in the network to the device. If a device cannot interrogate the network to determine the DLCIs in the network, you must specify the network DLCIs to the user device.

As the following sections describe, you can generally differentiate Frame Relay connections as *normal*, *bundled*, *grouped*, and *frame forwarding*. In particular, a Frame Relay connection can also terminate at a Frame Relay endpoint or an ATM endpoint if the endpoints have firmware to support this arrangement. A connection that terminates at Frame Relay and ATM endpoints uses service interworking (SIW).

Service Interworking

Frame Relay connections that terminate at ATM endpoints require service interworking (SIW) support. At the Frame Relay end, service interworking is one of the optional parameters. The line cards on which you can add service interworking connections are the UFM on an IGX node, ASI on a BPX node, and FRSM in an MGX 8220 shelf. The Frame Relay endpoint has an identifier in the format *slot.port.DLCI*. For SIW connections, the ATM endpoint identifier has the format *slot.port.vpi.VCI*.

**Note**

You cannot group or bundle SIW connections with non-SIW connections.

Normal Connections

A *normal* connection is a single PVC. A Frame Relay PVC can terminate at either a Frame Relay endpoint or an ATM endpoint.

Bundled Connections

Connection bundling creates a full mesh of connections between two groups of Frame Relay ports by executing **addcon** command only once. When you add a bundle between two groups of ports, you create a connection between each port of one group of ports and each port of the other group of ports. Each group of Frame Relay ports can include up to four ports. Consequently, the maximum number of connections in a bundle is 16 (resulting from a full mesh of connections between two groups of four ports each). Note that a Port Concentrator Shelf does not support bundling. Characteristics of connection bundling are:

- The number of ports used at each end of the bundle does not have to be the same.
- All of the ports used in a group must be on the same card.
- Only the FRP Model D and the FRM Model D support connection bundles. The UFM does not support connection bundling.
- All of the ports used for a bundle must be contiguous. For example, a bundle on a card may not consist of only ports 1, 3, and 4.
- The syntax for specifying a group of ports for a connection bundle is *slot.port[xport]*.

When you create a connection bundle with **addcon**, you do not explicitly specify the required DLCI at each endpoint of each connection. Instead, the DLCIs are automatically assigned using global addressing with the Port IDs, which have been previously assigned to the ports. Consequently, you must first assign a Port ID (other than 0) to every port to which you plan to assign a connection bundle. Use **cnffrport** to assign a Port ID or **dspport** to see an existing Port ID.

For example, the command

```
addcon 6.1x3 alpha 7.2x3 1
```

defines a single connection bundle between a local group of 3 ports (ports 1, 2, and 3 on card 6) and a remote group of 2 ports (ports 2 and 3 on card 7). The resulting connection bundle consists of the following six connections:

```
local node slot 6.port 1 to node alpha slot 7.port 2
local node slot 6.port 1 to node alpha slot 7.port 3
local node slot 6.port 2 to node alpha slot 7.port 2
local node slot 6.port 2 to node alpha slot 7.port 3
local node slot 6.port 3 to node alpha slot 7.port 2
local node slot 6.port 3 to node alpha slot 7.port 3
```

Each connection in the bundle is assigned the parameters of the same Frame Relay class (class 1, in the example above). Notice that no DLCIs were specified for the six connections. The DLCIs are automatically assigned using the Port IDs of the ports.

As an example, assume that the following Port IDs had been previously assigned for the five ports.

port 6.1 Port ID = 22

port 6.1 Port ID = 534

port 6.3 Port ID = 487

port 7.2 Port ID = 92

port 7.3 Port ID = 796

As a result of the **addcon** command, the six connections that you create are automatically assigned DLCIs using global addressing as follows.

6.1.92 – 7.2.22

6.1.796 – 7.3.22

6.2.92 – 7.2.534

6.2.796 – 7.3.534

6.3.92 – 7.2.487

6.3.796 – 7.3.487

The **dspecons** display shows the entire bundle as a single item. Therefore, you cannot see the automatically assigned DLCIs on the **dspecons** screen. (The automatically assigned DLCIs in the preceding list appear in italics.) To see the DLCIs, use **dspecon**, as in the following example:

```
dspecon 6.1x3 alpha 7.2x3
```

The preceding shows one screen for the whole bundle then an additional screen for each connection in the bundle. The assigned DLCIs appear in these individual connection display screens.

Frame Forwarding Connections

A non-Frame Relay data connection (such as HDLC or SDLC) that is routed through Frame Relay cards can bypass a router or take advantage of DFM at higher data rates. The format *slot.port.** identifies a frame forwarding connection. An example is:

```
addcon 11.2.* alpha 12.3.* 2
```

The “*” indicates to the node that a DLCI is meaningless.

Maximum Connections Per Port with Signaling Protocols

For any Frame Relay card set that has a maximum frame length of 4510 bytes, the use and type of signaling protocol you may have (optionally) specified with the **cnffrport** command results in a limit on the possible number of connections per physical or logical port. The maximum number of connections per port for each protocol is as follows:

- For Annex A: 899
- For Annex D: 899
- For StrataLMI: 562

The **addcon** command does not prevent you from adding more than the maximum number connections on a port. If the number of connections is exceeded, the particular LMI does not work on the port, the full status messages that result are discarded, and LMI timeouts occur on the port. A port failure results and subsequently leads to A-bit failures in segments of the connection path.

Full Name

Add connection

Syntax

```
addcon <local_channel> <remote_node> <remote_channel> [con_type] <frame_relay_class |
[individual parameters]> [route_avoid]
```

**Note**

If you request help for **addcon** at the command line prompt, the Help line shows *type* as a parameter. However, when you are *using addcon* for a Frame Relay connection, the *type* shown in the help display is actually the *Frame Relay class* shown on the preceding syntax line and described in the preceding section titled “Using Frame Relay Classes.” As stated, you can optionally override any or all of the bandwidth parameters and ForeSight-enable in the Frame Relay class by typing the parameters that appear as *frp_bw* and *avoid* in the Help display. See the forthcoming “Optional Parameters” table.

Note also that you do not enter the *coding* parameter shown on the Help line.

Related Commands

delcon, dncon, dspcon, dspcons, uponcon

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	Yes	Yes	IGX, (and BPX for service internetworking)	Yes

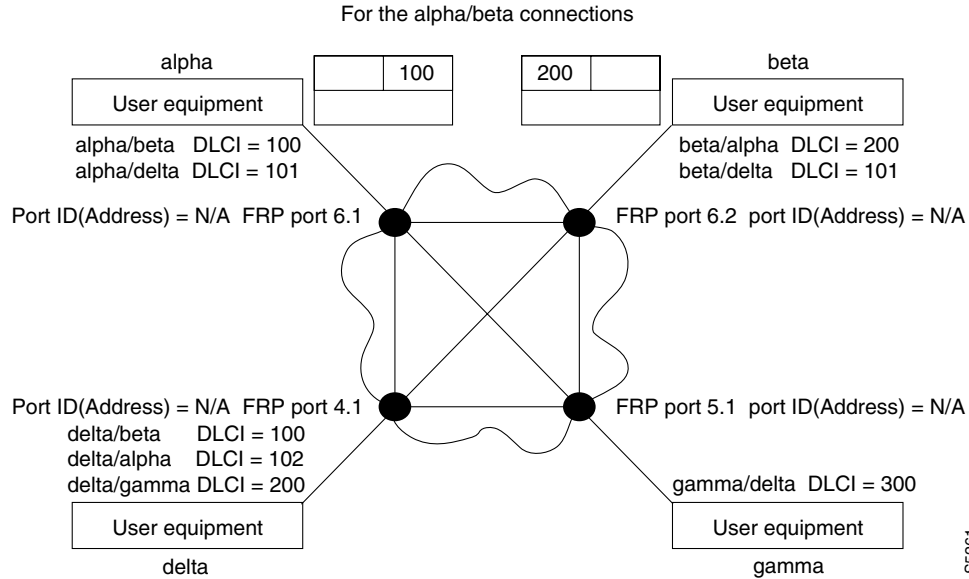
Example 1 (local addressing)

```
addcon 6.1.100 beta 6.2.200 3
addcon 6.1 101 delta 4.1.102 2
addcon 4.1.100 beta 6.2.101 4
addcon 4.1.200 gamma 5.1.300 1
```

Description

Execute the preceding commands at node Alpha to configure the following network shown in Figure 8-1.

Figure 8-1 Local Addressing Example



Example 2a

addcon 9.1.200 gamma 8.1.300 1

Description

Add a connection between the user-device at alpha port 9.1 and the user-device at gamma port 8.1. The user-device at alpha refers to the connection using local DLCI 200. The user-device at gamma refers to this connection using local DLCI 300. The DLCIs have only local significance, so a DLCI must apply to only one connection.

System Response

```
alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 23 1998 10:12 PST

Local          Remote   Remote
Channel        NodeName Channel   State    Type    Compression  Code   Avoid  COS  O
5.1            beta     25.1     Ok       256    7/8         0     0     0   L
9.1.100        gamma   8.1.200  Ok       fr      0           0     0     0   L
9.1.200        gamma   8.1.300  Ok       fr      0           0     0     0   L
9.2.400        beta    19.2.302 Ok       fr      0           0     0     0   L
14.1           gamma   15.1     Ok       v       0           0     0     0   L
```

Last Command: addcon 9.1.200 gamma 8.1.300 1

Next Command:

Example 2b

```
addcon 9.1.100 beta 6.2.300 2
```

Description

Add another connection at local port 9.1. A DLCI of 100 is used at the local node. A DLCI of 300 can be used at both beta gamma because the DLCIs have only local significance.

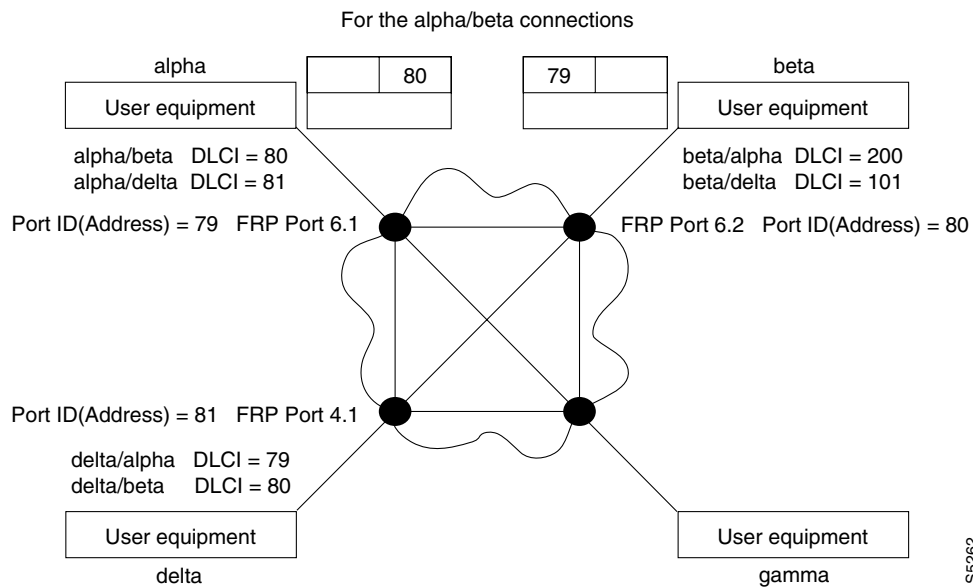
Example 3 (global addressing)

```
addcon 6.1.80 beta 9.2.79 2
addcon 6.1.81 gamma 4.1.79 1
addcon 4.1.80 beta 6.2.81 5
```

Description

The network to configure in this example is as in Figure 8-2.

Figure 8-2 Global Addressing Example



Example 4 (bundle connections)**addcon 8.1x3 alpha 19.2x4 1****Description**

Add a bundle of connections between Frame Relay ports 8.1-3 on node gamma and 19.2-4 on node alpha. For this bundle, the network routes traffic between gamma port 8.2 and alpha port 19.2.

System Response

```
pubsigx3      VT      SuperUser      IGX 8410      9.2 Aug. 3 1998 19:41 GMT

Local         Remote      Remote
Channel       NodeName   Channel
  8.1x3       alpha      19.2x4   Ok      fr
State Type      Compress Code COS
```

```
This Command: addcon 8.1x3 alpha 19.2x4 1
```

```
Add these connections (y/n)?
```

Example 5 (frame forwarding)**addcon 8.2.* alpha 19.2.* 1****Description**

Add a frame forwarding connection between the local node's port 8.2 and 19.2 on node alpha.

■ addcon

System Response

Locals Channel	Remote NodeName	Remote Channel	State	Type	Compression	Code	Route Avoid	COS	O
6.1	beta	25.2	Ok	256		7/8		0	R
8.1.200	alpha	9.1.100	Ok	fr				0	R
8.2.300	beta	19.1.101	Ok	fr				0	R
15.1	alpha	14.1	Ok	v				0	R

This Command: addcon 8.2.* alpha 19.2.* 1

Add these connections (y/n)?

Example 6 (modifying bandwidth)

addcon 8.3.101 beta 19.3.201 7 * * * * 30/30 * * Y 80/80

Description

Parameters specified by Frame Relay class 7 for this connection are modified by substituting 30 for Cmax in both directions, enabling ForeSight, and reducing percent utilization from 100 percent to 80 percent.

System Response

```
gamma          TRM    YourID:1      IGX 8410     9.2   Aug. 23 1998 12:10 CST

Local          Remote      Remote
Channel        NodeName    Channel      State  Type   Compression  Code  Route
6.1            beta        25.2         Ok     256   7/8          0    R
8.1.200        alpha       9.1.100     Ok     fr    0            0    R
8.2.300        beta        19.1.101    Ok     fr    0            0    R
15.1           alpha       14.1         Ok     v     0            0    R
```

Last Command: dspcons

Next Command: addcon 8.3.101 beta 19.3.201 7 * * * * 30/30 * * Y 80/80

Table 8-2 addcon—Parameters

Parameter	Description
local channel	<p>Specifies the local channel to connect in the format:</p> <p><i>slot.port.DLCI x port .*</i></p> <p>On an FRP or FRM, the range for <i>port</i> is 1–24 or 1–31. On a UFM-C, the range for <i>port</i> is 1–250. (For connections on a UFM-C, <i>line</i> is not necessary because of the port-to-line mapping through addfrport). For a UFM-U, the range for <i>port</i> is 1–12 for V.35 or X.21 and 1–4 for HSSI. The range for <i>DLCI</i> is 16–1007.</p>
node	Specifies the name of the remote node at the other end of the connection.
remote channel	<p>Specifies the connection at the far end. For Frame Relay termination points, use:</p> <p><i>slot.port.DLCI x port .*</i></p> <p>If the far end is an ATM termination (as in interworking), use:</p> <p><i>slot.port.vpi.vci</i></p> <p>where <i>vpi</i> has a range of 0–255, and <i>vci</i> has a range of 1–4095. One exception to these ranges is the ALM/A, which has a VCI range of 0–255. Another exception is an interface shelf (which uses Annex G signaling) in a tiered network, as follows:</p> <ul style="list-style-type: none"> For an MGX 8220 shelf, the VPI range is 1–1015, and the VCI range is 1–65535. For an MGX 8850 shelf, when adding a connection with a UNI interface to a BPX routing node, the VPI range is 1–4095. The VCI range is 1–65535. <p>For an MGX 8850 shelf, when adding a connection with an NNI interface to a BPX routing node, the VPI range is 1–4095. The VCI range is 1–65535.</p> <ul style="list-style-type: none"> For an IPX/AF or IGX/AF shelf, the range for both VPI and VCI is 1–255. <p>Access devices such as the Cisco 3800 use the following format for the remote channel specification: <i><slot.port></i> <i><access_device_connection_ID></i></p> <p>where <i>slot</i> is the slot number of the FTC or FTM card, <i>port</i> is the port number, and <i>access_device_connection_ID</i> is in the range 1–252.</p>

Table 8-2 *addcon—Parameters (continued)*

Parameter	Description
Frame Relay class	Specifies a Frame Relay class. Entering a Frame Relay class is a shortcut for specifying bandwidth parameters. You must enter a Frame Relay class, but then you can modify any of the bandwidth parameters specified by the class. To do so, do not press Return after you type the class number but continue typing either a value for the parameter or a * to keep the current value. The system does not display the parameters, but the description of the frp_bw parameters in the “Optional Parameters” table that follows shows the order and ranges of the parameters you can specify. For more details on the parameters and the Frame Relay classes, refer to “Using Frame Relay Classes” earlier in this chapter.

Table 8-3 addcon—Optional Parameters

Parameter	Description
con_type	Specifies the type of ATM-to-Frame Relay service interworking. (If the connection is Frame Relay-to-Frame Relay, the network selects any necessary interworking.) The possible <i>con_type</i> entries are <i>atft</i> and <i>atfx</i> . To specify service interworking in transparent mode, type atft . To specify service interworking in translation mode, type atfx . In translation mode, a standard set of encapsulation protocols are translated. If system software does not recognize an encapsulation protocol for an <i>atfx</i> connection, it generates one of two Frame Relay endpoint statistics: <i>rcvFramesDscdUnknownProtocol</i> or <i>xmtFramesDscdUnknownProtocol</i> .
frp_bw	<p>Optionally specifies individual bandwidth parameters. The parameter name “frp_bw” is the label for the bandwidth parameters described here. The slash (/) between the repeated parameter name shows that you can specify a value for each direction. (FST is the exception.) Two parameters can be either the (default) Cisco versions or the Frame Relay Forum standard parameters. To switch between Cisco and Frame Relay Forum, use the cnfsysparm command. Note that all parameters you select with cnfsysparm are network-wide and not confined to the current connection addition. The switchable parameters are as follows:</p> <p>Cisco Parameters Standard Parameters</p> <p>PIR (peak information rate)Be (excess burst)</p> <p>VC_Q (VC queue depth)Bc (committed burst)</p> <p>When you are using the Cisco parameter set, the names and order of specification are as follows:</p> <p>MIR/MIR, CIR/CIR, VC_Q/VC_Q, PIR/PIR, Cmax/Cmax ECNQ_thresh/ECNQ_thresh, QIR/QIR, FST, %utl/%utl</p> <p>When you are using the parameters with the two Frame Relay Forum versions, the names and order of specification are as follows:</p> <p>MIR/MIR, CIR/CIR, Bc/Bc, Be/Be, Cmax/Cmax, ECNQ_thresh/ECNQ_thresh, QIR/QIR, FST, %utl/%utl</p> <p>For the definition of each parameter and important information on setting CIR=0, refer to the section titled “Using Frame Relay Classes” earlier in this chapter.</p>
avoid	<p>Specifies the type of trunk or route to avoid for the connection. The default is no avoidance. To specify an <i>avoid</i> value, type it after the Frame Relay class or—if you override the Frame Relay class—after the <i>frp_bw</i> values. Be sure to include the asterisk (*). The <i>avoid</i> parameters are:</p> <p>*s = Avoid satellite trunks.</p> <p>*t = Avoid terrestrial trunks.</p> <p>*z = Avoid trunks using zero-code suppression techniques that modify any bit position to prevent long strings of zeros.</p>

addfrport

Activates a logical Frame Relay port on a channelized FRP, FRM, or UFM card set. Only T1 or E1 lines carry channelized Frame Relay traffic, so the **addfrport** command does not apply to a Port Concentrator Shelf or front cards with a V.35, X.21, or HSSI interface.

The **addfrport** command adds a logical Frame Relay port by using the slot number of the FRM and the DS0/timeslots that make up the logical port. On a UFM, the logical ports span the whole range of physical lines: you associate the logical ports to the lines as needed, then include the DS0s as the last field of the argument. Table 8-4 lists the error and warning messages for **addfrport**.

Table 8-4 Frame Relay Port Error and Warning Messages

Messages	Reason for Message
Slot is out of range	Line number not correct for T1/E1. You cannot add slots 0-31, that is, you cannot have a port at E1 speed. The maximum you can get is 31 slots (1984) using CCS (Common Channel Signalling) since slot 0 is used for FAS, etc.
Line must first be upped	Line is down.
Invalid channel range	Channel is out of the range 1–24 or 1–31 (16 is a reserved channel for E1).
Channel is busy	Channel is already assigned to a logical port.
You cannot use signaling channel 16" (E1)	CAS channel 16 included in logical port (E1). CCS permits the use of channel 16 but not in all countries.
Invalid rate	Entered rate is not 56 Kbps or 64 Kbps.
This rate is available for single channel only	Entered rate is 56 Kbps, but multiple channels specified.

Full Name

Add Frame Relay port T1/E1

Syntax

For FRP or FRM card sets: **addfrport** <slot.port> [DS0 channel] [56 | 64]

For UFM-C card sets: **addfrport** <slot.port> <line.DS0_channel>

Related Commands

upln (upcln is the obsolete name), **delfrport**, **cnffrport**, **cnffrport**, **dspfport**

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1

```
addfrport 21.9 -15
```

Description

Add a single Frame Relay port that occupies DS0s (timeslots) in the range 9–15. For a T1 line, this channel rate is 7 x 64 Kbps = 448 Kbps, as the screen example shows. The card is an FRP.

System Response

```
gamma          TRM   YourID:1          IGX 8410    9.2    Aug. 15 1998 17:28 CST
```

```
Port configuration for FRP 21
```

From	Chan	Speed	Interface	State
1	9-15	448	FRI	T1 INACTIVE

```
Last Command: addfrport 21.9-15
```

```
Next Command:
```

Table 8-5 *addfrport—Parameters*

Parameter	Description
slot.port (FRP or FRM series)	Specifies the FRI T1 or E1 line number and the logical port number. For a UFM-U, specifies the physical slot and port. For an example of a T1 or E1: 8.12 is physical slot 8 and timeslot (or <i>channel</i>) 12.
slot.port line.DS0 channel (for UFM-C series)	For the UFM card sets, this parameter specifies the slot and logical port, the physical line (the connector), and one or more contiguous DS0s. The range of logical ports is 1–250. The range of lines is 1–4 for the UFM-4C and 1–8 for the UFM-8C. Note the space between the port and line.

Table 8-6 *addfrport—Optional Parameters*

Parameter	Description
– chan	Specifies that multiple DS0/timeslots should form one logical port. A “–” separates the starting and ending DS0s/timeslots). Timeslots must be contiguous. An example is addfrport 8.1–5. The system uses the lowest DS0/timeslot number as the logical port number and shows this in related displays.
rate	Specifies the rate of a single, logical port. By default, a single logical port (or channel) is 64 Kbps. A single DS0 (timeslot) may be 56 Kbps or 64 Kbps. If you do not enter a rate, the default is 64 Kbps.

cnfdch

The **cnfdch** command lets you configure a super-rate data connection that has idle code suppression (ICS) enabled or disabled. All super-rate data connections will have the Idle Code Suppression (ICS) state set to disabled unless it has been specifically configured with the new **cnfdch** command or through SNMP. The **cnfdch** screen is identical to that of **dspchcnf**.

The Idle Code Suppression feature supported in this release provides a way to stop FastPacket generation on an Nx64 super-rate PVC connection when the connected PBX has terminated a video call. No video traffic will be generated when a video call has terminated.

Configuration is done for each of channel of an endpoint. Upon changes in the state of Idle Code Suppression of a connection, no network message will be sent to the other end. You can choose to configure the other end if ICS is supported there also. To maximize the benefit of this feature, you should enable ICS on both sides of a connection.

The **cnfdch** command prompts you to enable or disable idle code suppression with the following prompt:

```
Enable or Disable Idle Code Suppression (e/d)?[d]:
```

The **cnfdch** command is available for level 2 users and above; that is, you must have at least privilege level 2 or above to use this command. Use it to configure a channel before you add a connection. If some of the specified channels do not yet have any connection attached, those channels will be initialized to a data type channel.

The configuration will stay the same even if connections are removed and added again.

The **cnfdch** command will be blocked at the CLI if one or more of the specified channels is carrying a voice connection (including t-type).

The switch software provides an interface to configure channels to enable or disable idle code suppression for super-rate data connections. In turn, the switch software tells the UVM/CVM/CDP card if idle code suppression should be used on each of the super-rate connections.

Because there are multiple channels involved in an Nx64 data connection, the idle code suppression configuration of the first channel in the Nx64 channel will be used for the entire connection. The configuration of the other channels in the bundle will be ignored in channel programming or on the **dspscon** screen.

To interwork with HDM/LDM/SDP/LDP cards, idle code suppression on a UVM/CVM/CDP channel will be turned off for any super-rate connection that also terminates on HDM/LDM/SDP/LDP.

Full Name

Configures data connection to have ICS enabled/disabled

Related Commands

prtchcnf

Attributes

Privilege	Jobs	Log	Node	Lock
2-6	No	No	IGX	No

Example 1

dspchcnf 31.1.8

Description

Display configuration values for channel 9.1.3-5

System Response

```
sw176          TRM   StrataCom      IGX 16   9.2.a2   Apr. 3 1998  17:28 PST
               Maximum EIA   %      DFM Pattern   DFM   Idle Code   PreAge
From 9.1.3   Update Rate   Util   Length      Status   Suppr      (usec)
9.1.3-5      -             -      -            -       Disabled    0
```

This Command: cnfdch 9.1.3-5

Syntax

dspchcnf [parameters]

Table 8-7 cnfdch—Parameters

Parameter	Description
<i>channel(s)</i>	<i>slot.line.chan</i> for UVM or <i>line.chan</i> for CVM/CDP. You can enter a range of channels.
<i>ch_ics_state</i>	Channel idle code suppression state: d for disabled; e for enabled.

clrfrcportstats

Clears port statistics for FRM-2 or FRP-2 physical ports connected to a Port Concentrator Shelf. To see the statistics that you clear with **clrfrcportstats**, execute **dspfrcportstats**. The controller card collects statistics from the FRM-2 or FRP-2 once per minute. Because **clrfrcportstats** clears statistics on the controller card, it may not clear statistics generated within the last minute.

Full Name

Clear FRC/FRM port statistics

Syntax

```
clrfrcportstats <slot.port | *>
```

Related Commands

dspfrcportstats

Attributes

Privilege	Jobs	Log	Node	Lock
1–5	Yes	Yes	IGX	No

Table 8-8 *clrfrcportstats—Parameters*

Parameter	Description
slot,port *	Slot and port of the physical port. The range for <i>port</i> is 1–4. An asterisk (*) specifies all FRC-2/FRM-2 physical ports.

cnfchpri

Sets the channel priority for a Frame Relay connection. The Channel Priority feature permits some Frame Relay connections to receive a higher priority within a port queue than other Frame Relay traffic on a per-connection basis. The default priority is low. You can configure Frame Relay LMI ports to communicate the priority to a router. You must change the priority on both ends of a connection.



Note

Note that data of high-priority (hi-pri) connections is sent to the CPE (customer premises equipment) ahead of data from low priority (low-pri) connections. Note that this parameter has nothing to do with how the connection is routed through the network, but affects only how data is sent to the CPE.

Full Name

Configure Frame Relay channel priority

Syntax

```
cnfchpri <connection> <priority>
```

Related Commands

```
dspchcnf
```

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1

```
cnfchpri 9.1.100 h
```

Description

Configure a high priority for Frame Relay connection 9.1.100.

System Response

```
alpha          TRM   YourID:1          IGX 8410    9.2    Aug. 15 1998 16:00 PST

Conn: 9.1.100   gamma      8.1.200    fr
      MIR      CIR      VC Q Depth    PIR      Cmax    ECN QThresh    QIR      FST
      9.6/9.6   9.6/9.6    5/5        256/256   10/10   65535/65535  9.6/9.6   n
% Util: 100/100
Owner: LOCAL   Restriction: NONE  COS: 0          Status: OK
Group: NONE    Priority: H        TestRTD: 0 msec

Path:   alpha  14--13beta  15--15gamma
Pref:   Not Configured

alpha 9.1.100          gamma 8.1.200
FRP:   OK              FRP:   OK
FRI:   OK              FRI:   OK
```

```
Last Command: cnfchpri 9.1.100 h
```

```
Next Command:
```

Table 8-9 cnfchpri—Parameters

Parameter	Description
channels	Specifies the channel or range of channels. The format is <i>slot.port.DLCI</i> .
h l	The priority: h = high; l = low.

cnffrcls

Configures a system-wide Frame Relay connection class. Refer to the “Using Frame Relay Classes” section at the beginning of this chapter for a definition of a Frame Relay class. The following are characteristics of this command:

- You should configure network-wide classes only when all nodes are reachable.
- Beware of conflicting values with existing, joined networks.
- Changing a class does not affect any existing connections. An altered Frame Relay class affects only connections that are added using the changed class.

Full Name

Configure Frame Relay class

Syntax

```
cnffrcls <class_num> [<BW params>] [<description>]
```

Related Commands

addcon, dspfrcls

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	Yes	Yes	IGX	Yes

Example 1

```
cnffrcls 1 *
```

Description

Configure Frame Relay class #1 to operate with ForeSight. The list of * parameters leaves those parameters unchanged, and “y” enables ForeSight. Because the utilization and description parameters have not been entered, any existing values for these parameters remain in effect.

System Response

```

alpha          TRM    YourID:1      IGX 8410    9.2    Aug. 15 1998 16:05 PST

                Frame Relay Connection Classes

#   MIR      CIR    VC Q Depth    PIR      Cmax    ECN QThresh    QIR    FST
.6/9.6  9.6/9.6  65535/65535   128/128  10/10   65535/65535  9.6/9.6  y
% Util: 100/100 Description: "Default 9.6"
2 19.2/19.2 19.2/19.2 65535/65535   */*      10/10   65535/65535 19.2/19.2 n
% Util: 100/100 Description: "Default 19.2"
3 16/16     16/16     65535/65535   */*      10/10   65535/65535 16/16     n
% Util: 100/100 Description: "Default 16"
4 32/32     32/32     65535/65535   */*      10/10   65535/65535 32/32     n
% Util: 100/100 Description: "Default 32"
5 56/56     56/56     65535/65535   */*      10/10   65535/65535 56/56     n
% Util: 100/100 Description: "Default 56"

Last Command: cnffrcls 1 * * * * * y

Continue (y): y

```

System Response (continued)

```

alpha          TRM    YourID:1      IGX 8410    9.2    Aug. 15 1998 16:03 PST

                Frame Relay Connection Classes

#   MIR      CIR    VC Q Depth    PIR      Cmax    ECN QThresh    QIR    FST
6 64/64     64/64     65535/65535   */*      10/10   65535/65535 64/64     n
% Util: 100/100 Description: "Default 64"
7 128/128   128/128   65535/65535   */*      10/10   65535/65535 128/128   n
% Util: 100/100 Description: "Default 128"
8 192/192   192/192   65535/65535   */*      10/10   65535/65535 192/192   n
% Util: 100/100 Description: "Default 192"
9 256/256   256/256   65535/65535   */*      10/10   65535/65535 256/256   n
% Util: 100/100 Description: "Default 256"
10 512/512  512/512  65535/65535   */*      10/10   65535/65535 512/512   n
% Util: 100/100 Description: "Default 512"

Last Command: cnffrcls 1 * * * * * y

Next Command:

```

Table 8-10 cnffrcls—Optional Parameters

Parameter	Description
frp_bw	<p>Optionally specifies individual bandwidth parameters. The parameter name “frp_bw” is the label for the bandwidth parameters described here. The slash (/) between the repeated parameter name shows that you can specify a value for each direction. (FST is the exception.) Two parameters can be either the (default) Cisco versions or the Frame Relay Forum standard parameters. To switch between Cisco and Frame Relay Forum, use the cnfsysparm command. Note that all parameters you select with cnfsysparm are network-wide and not confined to the current connection addition. The switchable parameters are as follows:</p> <p>Cisco Parameters Standard Parameters</p> <p>PIR (peak information rate)Be (excess burst)</p> <p>VC_Q (VC queue depth)Bc (committed burst)</p> <p>When you are using the Cisco parameter set, the names and order of specification are as follows:</p> <p>MIR/MIR, CIR/CIR, VC_Q/VC_Q, PIR/PIR, Cmax/Cmax ECNQ_thresh/ECNQ_thresh, QIR/QIR, FST, %utl/%utl</p> <p>When you are using the parameters with the two Frame Relay Forum versions, the names and order of specification are as follows:</p> <p>MIR/MIR, CIR/CIR, Bc/Bc, Be/Be, Cmax/Cmax, ECNQ_thresh/ECNQ_thresh, QIR/QIR, FST, %utl/%utl</p> <p>For the definition of each parameter and important information on setting CIR=0, refer to the section titled “Using Frame Relay Classes” earlier in this chapter.</p>
description	Any text string up to 25 characters terminated by a <RET>. This is used to provide the user with a descriptive identifier for the class.

cnffrcon

Configures bandwidth parameters or enables ForeSight for an individual Frame Relay connection. Because you normally specify bandwidth parameters through the Frame Relay class or by the option of overriding bandwidth parameters through specific arguments for **addcon**, using **cnffrcon** tends to be used for instances where you need to customize a single connection’s bandwidth parameters.

Be sure the MIR you specify is appropriate. If the MIR is too high, bandwidth is wasted. If it is too low, the connection may drop data. The statistics reports are the best source of information to help you determine the appropriate MIR.

The PIR usually is set to the port speed. You can specify a lower PIR if other constraints on the data generation rate exist. Be sure the PIR you specify is appropriate. If it is too low, frames are dropped. If it is too high, bandwidth may be wasted unless the network has ForeSight.

The Cmax, VC Q, and ECN Q values should be changed only by knowledgeable users and when tuning data is available to support the determination of appropriate values. These values affect system buffering resources, so any change from the defaults requires caution. Refer to the *Cisco WAN Switching System Overview* for more details on connection parameters.

If the connection type has ForeSight (FST = y), the result of the last test round-trip delay command (Test RTD) is displayed. Note that this is not the current RTD but the result of the last, user-specified test. High or low connection priority is displayed for both standard Frame Relay connections and ForeSight connections.

The node checks the bandwidth parameters to promote efficient use of network bandwidth. The following messages reflect the checks on bandwidth usage.

Error	Min cannot exceed peak.
Warning	Min exceeds this port's speed.
Warning	Sum of mins exceeds port's speed.
Warning	Peak exceeds this port's speed.

Warning messages are informational and do not indicate that the command is failing to execute. Error messages indicate the command is not executing.

When you specify the frp_bw parameters, enter all changes (or unchanged values indicated by an asterisk) on the line. You must specify either a change or a place-holder (*) up to at least the last changed value (after which place-holders are unnecessary). Decide on any changes before starting this command. The parameters section of this command description lists frp_bw parameters. The section "Using Frame Relay Classes" at the beginning of this chapter describes the parameters.

Full Name

Configure Frame Relay connection

Syntax

```
cnffrcon <channel> [bandwidth_parameters]
```

Related Commands

addcon, dspcon

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1

```
cnffrcon 8.1.200
```

Description

Configure Frame Relay connection 8.1.200.

System Response

```

gamma          TRM   YourID:1          IGX 8410    9.2    Aug. 15 1998 17:28 CST

Conn: 8.1.200   alpha    9.1.100   fr
      MIR      CIR      VC Q Depth  PIR      Cmax    ECN QThresh  QIR      FST
      9.6/9.6   9.6/9.6   5/5      256/256   10/10   65535/65535 9.6/9.6   n
% Util: 100/100
Owner: REMOTE  Restriction: NONE  COS: 0                      Status: OK
Group: NONE   Priority: L   TestRTD: 0 msec

Path:   gamma  15--15beta  13--14alpha
Pref:   Not Configured

gamma 8.1.200          alpha 9.1.100
FRP:   OK             FRP:   OK
FRI:   OK             FRI:   OK

```

Last Command: cnffrcon 8.1.200

Next Command:

Table 8-11 cnffrcon—Parameters

Parameter	Description
channel	Specifies the channel to configure connection parameters. The command configures connection information for one channel at a time. You cannot specify a set of channels. The channel has the following format: slot.port.DLCI

Table 8-12 cnffrcon—Optional Parameters

Parameter	Description
bandwidth_parameters	Specifies the bandwidth parameters in the following format: MIR/MIR, CIR/CIR, VC_Q/VC_Q, PIR/PIR, Cmax/Cmax ECNQ_thresh/ECNQ_thresh, QIR/QIR, FST, %utl/%utl See “Using Frame Relay Classes” in this chapter for information on the bandwidth parameters. A slash indicates you can specify a value for each direction. FST is either ForeSight enable (y) or disable (n). A “*” is a place-holder for a parameter you do not change.

cnffrcport

Configures the port speed and percent of utilization on the concentrated link of a Port Concentrator Shelf (PCS). This is not a standard command. Primarily, you would use **cnffrcport** to adjust the rate on the concentrated link due to some unusual system configuration.

Because this command applies to the FRC interface (the concentrated link) rather than the user port for the CPE, the port number and the range of speeds is the same as that of the FRP or FRM card. Thus, the port numbers are 1–4 with rates varying from 56 Kbps through 2 Mbps. During port configuration, a prompt for each parameter appears. To keep the current value of the parameter, press the Return key without typing anything.

Full Name

Configure Frame Relay port

Syntax

```
cnffrcport <slot.port> <percent utilization>
```

Related Commands

upfrport, dnfrport, dspfrport, dspcd

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	Yes	Yes	IGX	Yes

Example 1

```
cnffrcport 6.1 512 88
```

Description

Reconfigure PCS port 6.1 to have a speed of 512 Kbps and a concentrated link utilization of 88 percent. (Note that executing **dspcd** for this slot would show a port count of 44, which indicates that the card set supports a PCS. The Configured Clock of 512 Kbps by itself does not indicate a PCS because a standard FRP-2 or FRM-2 also supports this rate.

System Response

```

minnow          TN      SuperUser      IGX 8410      9.2          Aug. 30 1998 10:16 PST

Physical Port: 6.1          [INACTIVE]
Interface:  FRI-X21 DCE          Configured Clock:  512 Kbps
Clocking:   Normal          Measured Rx Clock: 0 Kbps
                                     Min Flags / Frames      1

Port ID          1022
Port Queue Depth 65535      OAM Pkt Threshold 3 pkts
ECN Queue Threshold 65535      T391 Link Intg Timer 10 sec
DE Threshold     100 %      N391 Full Status Poll 6 cyl
Signalling Protocol None          EFCI Mapping Enabled No
Asynchronous Status No          CLLM Enabled/Tx Timer No/ 0 msec
T392 Polling Verif Timer 15          IDE to DE Mapping Yes
N392 Error Threshold 3          Interface Control Template
N393 Monitored Events Count 4          Lead I
Communicate Priority No          State ON
Upper/Lower RNR Thresh 75%/ 25%      Concentrated Link Util 88%

Last Command: cnffrcport 6.1 512 88

Next Command:

```

Table 8-13 cnffrcport—Parameters

Parameter	Description
slot.port	Specifies the card slot and port number. Because the port number is that of the concentrated link rather than the user port number, the range is 1–4 (not 1–44).
speed	Specifies the port clock speed for a 2.0 Mbps FRP-2 or FRM-2. The display shows the <i>configured</i> speed as Configured Clock and the <i>actual</i> speed as Measured Rx Clock. The available speeds are: 1 port (selected speeds, 56–2048 Kbps) 2 ports (selected speeds, 56–1024 Kbps) 3 ports (selected speeds, 56–672 Kbps) 4 ports (selected speeds, 56–512 Kbps)
utilization	Specifies the percent of utilization of the concentrated link.

cnffrport

Configures the parameters of a Frame Relay port. The **cnffrport** command applies to the UFM/UFI, FRP/FRI, FRM/FRI, and FRM-2/FRP-2. (Note that a less commonly used command also exists for the concentrated link between the PCS and FRM-2 or FRP-2: **cnffrcport**.)

During port configuration, a prompt for each parameter appears. To keep the current value of the parameter, press the Return key without typing any characters. When a parameter is not configurable for an application, the parameter appears shaded or with dashed lines. You can mix the data rate for each of the ports if the total for all ports does not exceed the maximum composite data rate that the card set supports. Table 8-14 shows the supported data rates for individual T1 and E1 lines.

Table 8-14 T1 and E1 Data Rates

Data Rates at 56 Kbps Increments				Data Rates at 64 Kbps Increments			
56	112	168	224	64	128	192	256
280	336	392	448	320	384	448	512
504	560	616	672	576	640	704	768
728	784	840	896	832	896	960	1024
952	1008	1064	1120	1088	1152	1216	1280
1176	1232	1288	1344	1344	1408	1472	1536
1400	1456	1512	1568	1600	1664	1728	1792
1624	1680	1736	1792	1856	1920	1984	2048

Table 8-15 shows the available data rates on a single, PCS user-port. For the FRP-2 and FRM-2 cards, the maximum composite data rate over the 44 logical user-ports is 1.792 Mbps.

Table 8-15 PCS Data Rates

Data Rates in Kbps							
9.6	14.4	16	19.2	32	38.4	48	56
64	112	128	168	192	224	256	280
320	336	384					

For a PCS, some additional rules for assigning data rates to the 44 ports apply:

- No single user-port should have a speed greater than 384 Kbps.
- The total for each group of 11 ports should not exceed 448Kbps. The software allows higher rates, but the system may drop data if user-equipment passes data above the aggregate total of 448 Kbps.
- The port numbers for the 11-port groups are 1–11, 12–22, 23–33, and 34–44.

Signaling Protocol Timers

This section introduces the implementation of two signaling timers and related parameters you can specify through the **cnffrport** command.

Periodically, devices use *signaling* to request the status of other, connected devices or networks. The signaling can be a simple confirmation of the other device's existence or more detailed information, such as the DLCIs, bandwidth, and state of all PVCs. The signaling described here occurs between:

- The user-equipment and a Frame Relay port across the user-to-network interface (UNI)
- Frame Relay ports in the network across the network-to-network interface (NNI)

Periodically, Frame Relay ports within the network transmit a Status Enquiry and wait for a Status response. These exchanges occur across the UNI and the NNI. At the UNI, the user-equipment periodically sends a series of Status Enquiries and awaits a Status response for each enquiry. At the NNI of any network, a Frame Relay port can generate Status Enquiries and, at alternate times, receive Status Enquiries. In this way, the signaling between networks mirror each other. (Figure 8-3 shows the three possible exchanges.) The timers for Status Enquiry and Status Response and other, related parameters are the:

- *Link integrity timer*—the time period between each Status Enquiry that either the user-equipment or a Frame Relay port in the network generates
- *Polling verification timer*—a time period in which a Frame Relay port waits for a Status Response to a Status Enquiry that the port generated
- *Error threshold*—the number of missing or erroneous events that triggers a Port Communication Failure
- *Monitored events count*—the number of events in a polling cycle
- *Full status polling cycle*—a polling cycle in which the port that has sent the Status Enquiry waits for detailed status information

In the preceding list, an *event* is either a Status Enquiry or a Status Response. The meaning of the event depends on whether the link integrity timer or the polling verification timer is waiting for the event. The link integrity timer waits for *Status Responses*. The polling verification timer waits for *Status Enquiries*.

Most Status Enquiries contain only a sequence number. After sending these simple Status Enquiries, the polling device checks for the sequence number. Periodically, a *full status polling cycle* takes place, in which the polling device waits for all applicable information, such as the status of all connections that cross the NNI. For signaling across the UNI, the Frame Relay Forum has recommended a full status polling cycle at every sixth polling cycle. The Frame Relay Forum has not recommended a frequency for the NNI. The **cnffrport** command lets you select a frequency in the range of once every 1–10 polling cycles.

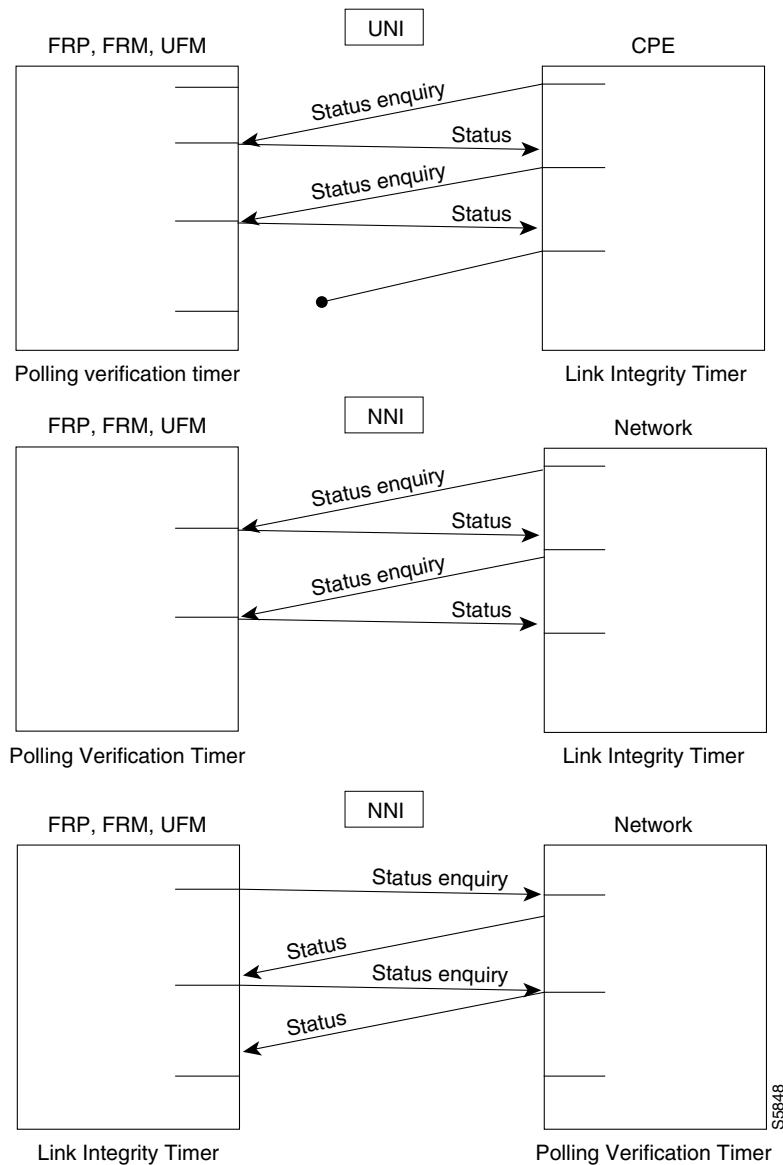
The Frame Relay port or user-device counts a user-specified number of errors out of a user-specified number of attempts before it signals a Port Communication Failure. These parameters are the *error threshold* and the *monitored events count*, respectively. The defaults for these parameters are 3 and 4, respectively. To use the defaults in an example: if 3 out of 4 events are either missing or erroneous within the specified time period, the port signals a Port Communication Failure (a minor alarm).

An event has a user-specified amount of time to arrive. The allowed time period for the arrival of a valid event is the number of seconds you assign to a timer. If an enquiry or response is missing or bad within the timer value, the event is failed. Again, using all default values in an example: if the polling verification timer is 15 seconds and no Status Enquiry arrives within that time, the port records a missing Status Enquiry. If no Status Enquiry arrives during the next two 15-second periods, the port

signals a Port Communication Failure. In the UNI example in the figure, the third Status Enquiry does not arrive. Note that each time a Status Enquiry arrives, the polling verification timer restarts counting at 0 seconds rather than waiting until the specified number of seconds has elapsed.

Whether the port is on a UNI or NNI, the polling verification timer setting must be longer than the link integrity timer. (Refer to the forthcoming **cnffrport** parameters table for values.) You cannot set the link integrity timer for the user-equipment with **cnffrport**. Usually, the link integrity timer on user-equipment is 10 seconds, which you can verify by executing **dspportstats** and counting the number of seconds between statistical updates. On the NNI, you can set both timers (they use either Annex A or Annex D).

Figure 8-3 Signaling Protocol Timing



The 1 Mbps FRI

The data rates available with the 1 Mbps FRI are shown in Table 8-16.

Table 8-16 Data Rates for the 1-Mbps FRI

Port Data Rates in Kbps for 1Mbps FRI			
1024	512	256	128
896	448	224	112
768	384	192	64
672	336	168	56

The rules for assigning data rates to the four ports when using the 1 Mbps FRI are:

- If you assign a data rate of 672 Kbps or higher on any port, you cannot use any other port.
- If you assign a data rate of between 384 Kbps and 512 Kbps to any port, you can specify a second port with an available data rate of 512 Kbps or less.
- If you assign a data rate of 336 Kbps to any port, you can specify two other ports for any available data rates of 336 Kbps or less.
- If the data rate of any port does not exceed 256 Kbps, you can specify all four ports with any available data rates of 256 Kbps or less.

Full Name

Configure Frame Relay port

Syntax (T1/E1 ports on UFM-C)

```
cnffrport <slot.port> <line.DS0_range> <port queue depth> <ecn queue threshold>
<de threshold> <signaling protocol> [protocol parameters]
```

Syntax (Unchannelized ports on UFM-U)

```
cnffrport <slot.port> <port type> <port queue depth> <ecn queue threshold>
<de threshold> <signaling protocol> [protocol parameters]
```

Syntax (T1/E1 ports on FRM or FRP)

```
cnffrport <slot.port> <port queue depth> <ecn queue threshold> <de threshold>
<signaling protocol> [protocol parameters]
```

Syntax (All other ports—for an FRM or FRP)

```
cnffrport <slot.port> <speed> <port queue depth> <clocking> <de_threshold>
<min-flags-bet-frames> <ECN q_threshold> <port ID> <signaling protocol y/n>
[protocol parameters]
```

Related Commands

addfrport, upfrport, dnfrport, dspfrport

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1

```
cnffrport 3.1 48000 48000 100 n N Y 1
```

Description

Change Frame Relay port 3.1 to have queue depths of 48000. The interface in this example is a T1.

System Response

```
pubsigx1      TN      SuperUser      IGX 32      9.2      Sep. 10 1997 16:25 GMT

Port:         3.1          [ACTIVE ]
Interface:    FRI-T1          Configured Clock:    64 Kbps
Clocking:     None          Measured Rx Clock:  None
Min Flags / Frames          1
Channel Range              1
Port ID                    -
Port Queue Depth           48000      OAM Pkt Threshold   3 pkts
ECN Queue Threshold        48000      T391 Link Intg Timer 10 sec
DE Threshold                100 %      N391 Full Status Poll 6 cyl
Signalling Protocol        None        EFCI Mapping Enabled No
Asynchronous Status       No         CLLM Enabled/Tx Timer No/ 0 msec
T392 Polling Verif Timer   15        IDE to DE Mapping    Yes
N392 Error Threshold       3         Channel Speed        64
N393 Monitored Events Count 4
Communicate Priority        No
Upper/Lower RNR Thresh    75%/ 25%

Last Command: cnffrport 3.1 48000 48000 100 n N Y 1

Next Command:
```

Example 2

```
cnffrport 5.1 256 n 12000 10000 100 a N N 15 3 4 3 y y 100 Y 1
```

Description

Change queue depths for port 8.1. An explanation of the screen appears after the screen example.

System Response

```
padma      VT      SuperUser      IGX 8410      9.2      Sep. 10 1998 16:39 GMT

Port:      5.1      [ACTIVE ]
Interface: FRI-V35 DCE      Configured Clock: 256 Kbps
Clocking:  Normal      Measured Rx Clock: 256 Kbps
Min Flags / Frames      1

Port ID      0
Port Queue Depth      12000      OAM Pkt Threshold      3 pkts
ECN Queue Threshold      10000      T391 Link Intg Timer      10 sec
DE Threshold      100 %      N391 Full Status Poll      6 cyl
Signalling Protocol Annex A UNI      EFCI Mapping Enabled      Yes
Asynchronous Status      No      CLLM Enabled/Tx Timer      Yes/100 msec
T392 Polling Verif Timer      15      IDE to DE Mapping      Yes
N392 Error Threshold      3      Interface Control Template
N393 Monitored Events Count      4      Lead CTS DSR DCD
Communicate Priority      No      State ON ON ON
Upper/Lower RNR Thresh 75%/ 25%
```

Last Command: cnffrport 5.1 256 NORMAL 0 12000 10000 100 a N N 15 3 4 3 y y 100 Y 1

Next Command:

The screen in Example 2 shows the following:

- Port Speed (configured, measured) 256 Kbps 256 Kbps The screen displays both the configured clock speed and the measured clock speed—256 Kbps for both in this case.
- Clocking (type) Normal Of the two clocking types, the interface uses normal clocking.
- Port ID 0 The optional Port ID has not been specified.
- Port Queue Depth 12000 Depth of port queue is set at 12000 bytes.
- ECN Queue Depth 10000 Port queue must reach 10000 bytes before FECN and BECN bits are set.
- DE Threshold 100 Port buffer must be 100 percent full before DE frames are dropped.
- Signaling Protocol Annex A The selected protocol for the UNI.

- Asynchronous Status N No asynchronous messages to user-device; wait for polling from user-device.
- Polling Verify Timer 15 15 seconds heartbeat period.
- Error Threshold 3 3 failures trigger port communication failure.
- Monitored Events Count 4 4 events are monitored.
- Communicate Priority N Do not communicate port priority to user-device.
- Upper RNR Threshold 75 75 percent of buffer capacity triggers receiver not ready condition.
- Lower RNR Threshold 25 25 percent of buffer capacity clears a receiver not ready condition.
- Minimum Flags/Frame 1 One flag exists for each FR data frame.

Example 3

cnffrport 13.1

Description

Configure the parameters for the newly upped V.35 port at 13.1. In this case, the only change is the port type: the interface becomes a DTE in this example.

System Response

```
sw180          TN      SuperUser      IGX 16      9.2 July 30 1997 00:09 GMT
Port:          13.1      [ACTIVE ]
Interface:     V35      DCE
Clocking:     Normal
Configured Clock: 256 Kbps
Measured Rx Clock: 0 Kbps
```

```
Port ID                0      Min Flags / Frames      1
Port Queue Depth      65535  OAM Pkt Threshold      3 pkts
ECN Queue Threshold   65535  T391 Link Intg Timer    10 sec
DE Threshold          100 %  N391 Full Status Poll   6 cyl
Signalling Protocol    None    EFCI Mapping Enabled    No
Asynchronous Status   No      CLLM Enabled/Tx Timer   No/ 0 msec
T392 Polling Verif Timer 15      IDE to DE Mapping       Yes
N392 Error Threshold   3      Interface Control Template
N393 Monitored Events Count 4      Lead CTS DSR DCD
Communicate Priority   No      State ON ON ON
Upper/Lower RNR Thresh 75%/ 25%
```

```
Last Command: cnffrport 13.1 DTE 256 NORMAL 0 65535 65535 100 n N N Y
```

```
Next Command:
```



Note

Table 8-17 describes both mandatory and optional parameters because some parameters are mandatory for T1/E1 lines and optional for other line types.

Table 8-17 cnffrport—Parameters

Parameter	Description
slot.port	Specifies the logical port on the FRP, FRM, or UFM-U in the format <i>slot.port</i> . For a T1/E1 line on an FRM or FRP, port is a logical number. For a UFM-C, the range for port is 1–250. (See the description of <i>slot.port line</i> in the <i>Cisco IGX 8400 Series Reference</i> manual.) For a Port Concentrator Shelf, <i>port</i> is to the logical port in the range 1–44.
port type (for a UFM-U) For <i>port type</i> on a PCS, see next box.	Specifies whether a port on a UFM-U is DCE or DTE. The prompt appears if the system detects a UFM-U. The default is DCE. For an FRM or FRP, “port Type” is display-only because jumper blocks on the back cards set the mode. When you use cnffrport in a job, the “Enter mode (line or port)” prompt follows <i>slot.port</i> . Note that this <i>mode</i> is the interface type of the Frame Relay port rather than the mode of the UFM-U. Valid entries are HSSI, V35, X21, PORT (PORT is generically unchannelized), or LINE (LINE indicates T1 or E1). If the front card is a UFM-U, a subsequent prompt asks you to specify DCE or DTE.
port type (for a PCS) (For port type on a UFM-U, see preceding box.)	<i>Port type</i> for a PCS tells switch software whether the port is V.35, V.11 or V.28. <i>Port type</i> for a PCS does not actually configure the port: to configure the port, you must install the appropriate card in the PCS. See the <i>port type</i> description for the UFM-U for information on cnffrport in a job.
interface type	Specifies an interface type for a Port Concentrator Shelf (PCS). This parameter appears if switch software detects a PCS. It applies to the user interface display only and not the PCS itself because system software does not detect the interface type within the PCS. To change the user-interface type, you must change a card in the PCS.
slot.port line	Specifies the UFM-C slot, port, and line number, where <i>port</i> can be 1–250, and <i>line</i> can be 1–8. Note that the maximum number of T1/E1 lines per node is 32. This maximum could be, for example, spread over 4 UFM-8C card sets that utilize all 8 lines on each back card.
speed	Specifies a port clock speed in Kbps for a 2.0 Mbps UFM, FRP, or FRM. The <i>configured</i> speed appears under the Configured Clock heading. The <i>actual</i> clock rate appears under the Measured Rx Clock heading. Note that this option does not apply to T1/E1 lines because these line types use 64 or 56 Kbps timeslots. The range of speeds according to the number of active ports is as follows: <ul style="list-style-type: none"> • 1 port (selected speeds, 56–2048 Kbps) • 2 ports (selected speeds, 56–1024 Kbps) • 3 ports (selected speeds, 56–672 Kbps) • 4 ports (selected speeds, 56–512 Kbps) Refer to the table at the beginning of this command description for the available clock rates for all port combinations.

Table 8-17 cnffrport—Parameters (continued)

Parameter	Description
clocking	<p>Specifies the port's clock type for HSSI, V.35, and X.21 lines. <i>Clocking</i> does not apply to T1, E1, or Port Concentrator lines. The clock is either <i>normal</i> or <i>looped</i>.</p> <p>Four combinations of clocking are available for the V.35 ports. Two combinations of clocking are available for HSSI and X.21. Note that the clock and data direction in DCE mode is the opposite of the direction for DTE mode. The possibilities are:</p> <ul style="list-style-type: none"> • FRP, FRM, or UFM-U port is DCE with normal clocking (HSSI, V.35, X.21). • FRP, FRM, or UFM-U port is DCE with looped clocking (V.35 only). • FRP, FRM, or UFM-U port is DTE with normal clocking (HSSI, V.35, X.21). • FRP, FRM, or UFM-U port is DTE with looped clocking (V.35 only). <p>For a description of looped and normal clocking, refer to the <i>Cisco IGX 8400 Series Reference</i> manual, or the <i>Cisco WAN Switching System Overview</i>.</p>
port ID	Specifies the DLCI associated with the port (0–1024) {0}. A node uses this number when you add bundled connections. Otherwise, port ID can be used as a network destination number in global addressing. The <i>port ID</i> does not apply to T1, E1, or PCS ports.
port queue depth	Specifies the maximum bytes in the transmission queue at the UFM, FRP, or FRM port. The range is 0–65535 bytes. The default is 65535 bytes.
ecn queue threshold	Specifies the threshold at which the system begins to generate explicit congestion notification (BECN and FECN bits) for the port. The range is 0–65535 bytes. The default is 65535 bytes.
de threshold	Specifies the port queue depth above which the system discards frames with a set Discard Eligibility (DE) bit. The range is 0–100 percent. The default is 100 percent. A threshold of 100 percent disables DE for the port because a queue cannot contain more than 100 percent of its capacity.

Table 8-17 cnffrport—Parameters (continued)

Parameter	Description
signaling protocol	<p>Specifies the LMI operation mode. The first time you execute cnffrport on a port, the command line interface displays the following options for this parameter: “none, Strata LMI, a (for Annex A), and d (for Annex D).” If you enter “a” or “d,” the subsequent prompt asks if the interface is NNI.</p> <p>For the <i>initial</i> port specification and <i>subsequent</i> port specifications for a particular port, you can also use a single digit from the LMI definition list that follows. The total industry standard range is 0–255, but Cisco WAN Switching nodes recognize only the following (the default is internally recognized as LMI=2):</p> <p>LMI = 0 LMI is disabled at this port.</p> <p>LMI = 1 Cisco LMI and the asynchronous update process is enabled at this port. Greenwich Mean Time is also enabled.</p> <p>LMI = 2 LMI is disabled at this port.</p> <p>LMI = 3 Cisco LMI is enabled at this port, but asynchronous update process is disabled.</p> <p>LMI = 4 The port configuration is UNI using CCITT Q.933 Annex A parameters.</p> <p>LMI = 5 The port configuration is UNI using ANSI T1.617 Annex D parameters.</p> <p>LMI = 6 The port configuration is NNI using CCITT Q.933 Annex A parameters.</p> <p>LMI = 7 The port configuration is NNI using ANSI T1.617 Annex D parameters.</p> <p>For any Frame Relay card set that has a maximum frame length of 4510 bytes, the use and type of a signaling protocol results in a limit on the possible number of connections per port (the port here is either physical or logical). The maximum number of connections per port for each protocol is as follows:</p> <p>For Annex A: 899</p> <p>For Annex D: 899</p> <p>For Strata LMI: 562</p> <p>Neither addcon nor cnffrport prevents you from adding more than the maximum number of connections on a port. (You might, for example, use cnffrport to specify an LMI when too many connections for that particular LMI already exist.) If the number of connections is exceeded for a particular LMI, the LMI does not work on the port, the full status messages that result are discarded, and LMI timeouts occur on the port. A port failure results and also subsequently leads to A-bit failures in other segments of the connection path.</p>
asynchronous status	<p>Specifies whether the node should send unsolicited LMI update messages when they appear or wait for the user-device to poll. Enter y (yes) or n (no).</p>

Table 8-17 cnffrport—Parameters (continued)

Parameter	Description
polling verify timer	Specifies a Link Integrity Verification Timer heartbeat (keep-alive) period. The range is 5–30. The default is 15. Set the timer to 5 secs. more than the setting in the user equipment.
error threshold	Specifies the number of failures in the monitored events that cause the keep-alive process to report an alarm. The theoretical range is 0–255. The valid range is 1–10. A threshold of 0 reverts to 1. A threshold greater than 10 reverts to 10.
monitored events count	Specifies the number of monitored events for the keep-alive process. It has a theoretical range of 0–255 and a valid range of 1–10. A port communication-fail condition is cleared after this number of successful polling cycles. A value of 0 reverts to 1, and a value more than 10 reverts to 10.
communicate priority	Specifies whether the system should communicate the SNA priority of the connections to the user-device on the port. Enter y (yes) or n (no). (SNA priority is either H or L.)
upper/lower RNR threshold	Specifies the <i>receiver not ready</i> (RNR) thresholds. The upper threshold is the number of receiver not ready indications from the user equipment before an alarm is generated for this port. The lower RNR threshold is the number of indications from the user equipment before an alarm is cleared. The range is 1–255. The default for the upper RNR threshold is 75. The default for the lower RNR threshold is 25.
Enable EFCI to BECN mapping	Directs the system to map the ForeSight congestion bit (which is set in the FastPackets by a trunk card) to the FECN and BECN bits on the affected PVC.
ForeSight over port	Specifies whether the system should use CLLM over the port.
min. flags/frame	Specifies the minimum number of flags between frames when the direction of transmission is from the node to the user-equipment. Any value greater than 0 is valid on the UFM, FRP or FRM. The default is 1. On a Port Concentrator Shelf, the range is 1–16.

Table 8-17 cnffrport—Parameters (continued)

Parameter	Description
OAM FastPacket threshold	<p>Specifies how many OAM FastPackets must arrive from a remote NNI port before the local port generates “A-bit = 0” in the signaling protocol message to the locally attached device. The range for this parameter is 0–15 packets. The default is 3 packets. A 0 disables this function. The <i>OAM FastPacket threshold</i> setting applies to UNI and NNI ports. The following two paragraphs provide a more detailed explanation of the A-bit and <i>OAM FastPacket threshold</i> usage.</p> <p>On any Frame Relay port (UNI or NNI) that is using a signaling protocol (Cisco LMI, Annex A, or Annex D), the FRP or FRM provides a Status message to the attached equipment in response to a Status Enquiry message or as an Asynchronous Update. These Status messages contain details about every PVC configured on the port. In particular, the PVC Active bit (the A-bit) represents whether a PVC is active (A-bit=1) or out of service (A-bit = 0). If the other end of the connection PVC on a UNI port, the only conditions that can cause the local Frame Relay card to send an A-bit=0 are:</p> <ul style="list-style-type: none"> • The PVC is down (intentionally taken out of service) • The PVC has failed for any reason (such as a hardware failure, trunk failure with no ability to reroute, and so on) <p>If the other end of the PVC terminates on an NNI port, one additional condition can cause the local UFM, FRP, or FRM to send an A-bit=0 to the local device: if the remote NNI port on the card receives an A-bit=0 from the remote network over the remote NNI, then the local card can propagate an A-bit=0 out the local port. The mechanism by which the remote card notifies the local card of the A-bit=0 coming from the remote network is OAM FastPackets. The local node sends one OAM FastPacket every 5 seconds for as long as the A-bit coming from the remote network is 0.</p>
link integrity timer (T391)	<p>Specifies the interval after which the system sends Status Enquiry messages across the NNI port. The range for the interval is 5–30 seconds. The default is 6 seconds. Both networks do not need to have the same T391 value.</p> <p>On a Frame Relay NNI port, the Link Integrity Timer (T391) specifies how often the UFM, FRP, or FRM generates a Status Enquiry message to the attached network using the selected NNI signaling protocol (Annex A or Annex D). The card should receive a Status message for every Status Enquiry message it transmits. If the Frame Relay card receives either no responses or invalid responses, a Port Communication Failure results (and causes a minor alarm). Using the default values for N392 Error Threshold and N393 Monitored Events Count in an example: an error occurs when no response (or a bad response) arrives for 3 out of the last 4 Status Enquiry messages. (The default for N392 Error Threshold is 3. For N393 Monitored Events Count, the default is 4.)</p>

Table 8-17 *cnffrport*—Parameters (continued)

Parameter	Description
N392 error threshold	Specifies the number of bad or undelivered responses to Status Enquiry messages that can occur before the system records a Port Communication Failure. The range is 1–10. The default is 3. See the description of the <i>link integrity timer</i> parameter for example usage.
N393 monitored events count	Specifies the number of Status Enquiry messages in a period wherein the system waits for responses to the enquiries. The range is 1–10. The default is 4. See the description of the <i>link integrity timer</i> parameter for example usage.
full status polling cycle (N391)	Specifies the interval at which the system sends the Full Status Report request for all PVCs across the NNI port. The range is 1–255 polling cycles. The default is 10 cycles. The Full Status reports the status of <i>all</i> the connections across the NNI.
card type	Specifies the card type when you enter the cnffrport command in a job. This parameter is not available except when you specify cnffrport in a job by using the addjob command. During the job specification, you enter the <i>card type</i> just after the <i>slot.port</i> during the command specification phase of addjob . Valid <i>card types</i> are “V.35,” “X.21,” “port,” and “line,” where “line” indicates a T1 or E1 line.
CLLM status Tx Timer	Specifies an interval for the system to send ForeSight congestion messages across the NNI. The range is 40 ms–350 ms. The default is 100 ms. Both networks must be Cisco WAN Switching networks.
IDE to DE mapping	Specifies whether the destination system should map the internal DE bit (IDE) status in the FastPacket or ATM cell to the Frame Relay DE bit at the destination. Enter y (yes) or n (no). If you specify the non-standard case of CIR=0 with either addcon or cnffrcs , you must first enable <i>IDE to DE mapping</i> . Refer to the section titled “Using Frame Relay Classes” for important information on setting CIR=0.
interface control template	Specifies the control leads available on the V.35 and X.21 physical Frame Relay ports and the meaning for each lead.
channel range	Specifies the DS0s for the T1 or E1 logical port. The value can be 1 or a contiguous combination in the range 1–24 for T1 or 1–31 for E1. For example, 7–12 indicates 6 DS0s for the port, starting with DS0 7. Before you use this command, specify the valid channel range with the addfrport command.
channel speed	Specifies the bandwidth available to a logical port. The speed is 64 Kbps times the number of DS0s you specify with the <i>channel range</i> parameter.

cnfict

Configures the interface control template signals. Each interface control lead must be individually configured. (Each data channel has a default interface control template for its active, conditioned, and looped-near and far states.) The signals available to **cnfict** depend on the type of back card and whether

the port mode is DCE or DTE. On an IPX node, the applicable front cards are the SDP, LDP, FRP, CDP (for data), and FTC (for data). On an IGX node, the applicable front cards are the LDM, HDM, FRM, UFM, CVM (for data), and FTM (for data).

**Note**

The **cnfict** command is not valid for V.11 and X.21 interfaces. For FRP V.35 and Port Concentrator V.35 and V.28 interfaces, only the active template is usable, and you can configure the leads to on or off.

When Y-cable redundancy is in effect, the control template configuration for the data channels terminating at the primary slot also applies to the data channels of the secondary slot. Any configuration information you attempt to apply to the secondary slot is ignored. Table 8-18 lists which leads are configurable for each type of data interface supported by the IGX node. The entries under the IGX Name column indicate the abbreviations to use when you specify input or output leads on the command line.

Table 8-18 Configurable Lead Listing

Source	IGX Name	EIA/TIA-232C	EIA/TIA-232D	EIA/TI-449	V.35	X.21	Fast EIA	CCITT (ITU-T) Equivalent	Function
DTE	RTS	CA	CA	RS	C		F4	105	Request to Send
DCE	CTS	CB	CB	CS	D		F4	106	Clear to Send
DCE	DSR	CC	CC	DM	E		F3	107	Data Set Ready
DCE	DCD	CF	CF	RR	F		F7	109	Data Carrier Detect (RLSD)
DCE	QM	QM	QM						Equalizer Mode
DTE	pin 11	11	11						Sometimes used for Data
DCE	SDCD	SCF	SCF					122	Secondary Data Carrier Detect
DCE	SCTS	SCB	SCB					121	Secondary Clear to Send
DTE	STxD	SBA	SBA				F5	118	Secondary Transmit Data
DTE	NS			NS			F7		New Sync
DCE	SRxD	SBB	SBB				F5	119	Secondary Receive Data
DCE	DCR	DCR							Divided Receiver Clock
DTE	RL		RL	RL			F6		Remote Loopback
DTE	SRTS	SCA	SCA					120	Secondary Request to Send
DTE	DTR	CD	CD	TR	H		F3	108.2	Data Terminal Ready
DCE	SQ	CG	CG	SQ				110	Signal Quality Detect
DCE	RI	CE	CE	IC	J**			125	Ring Indicator
DTE	SF	CH	CH	SF				111	Signal Rate Select (to DCE)
DCE	SI	CI	CI	SI				112	Signal Rate Select (to DTE)
DTE	BSY	BSY		IS			F1		Busy (In Service)
DCE	SB		TST	SB			F1		Test Indicator
DTE	LL			LL			F2		Local Loopback
DCE	TM			TM	K**		F6		Test Mode

Table 8-18 Configurable Lead Listing (continued)

Source	IGX Name	EIA/TIA-232C	EIA/TIA-232D	EIA/TI-449	V.35	X.21	Fast EIA	CCITT (ITU-T) Equivalent	Function
DTE	SS			SS					Select Standby
DTE	C					C			Control
DCE	I					I			Indicator

Asterisks (**) indicate the listing is applicable to only an SDP or HDM card. Pins 11 and 23 on an RS-232 port are bidirectional, and their default direction is input. See the **cnfdir** command for information on changing the direction of these pins. The **cpyict** command can be used to copy an interface control template from one data channel to another. The template can then be edited using the **cnfict** command. The **dspbob** command displays the state of leads at specified intervals.

The preceding table shows the equivalence between RS-232C, RS-232D, RS-449, V.35, and X.21 interfaces. An IGX treats leads impartially for non-interleaved connections. Any signal arriving on an EIA pin at one end may be transmitted to any pin at the other end. An imposed maximum of 12 EIA leads applies to any interface type. For interleaved EIA connections, the Fast EIA column shows which leads are carried in the interleaved bytes in the data packets. All remaining leads are carried in traditional control lead packets.

Full Name

Configure interface control template

Syntax

```
cnfict <port> <template> <output> <source>
```

Related Commands

addextlp, **dspict**, **tstport**

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1**cnfict 25.1 a cts on****Description**

Configure the active interface control template for channel 25.1 to CTS-on. CTS-on means that when the port is active, the CTS lead is asserted.

System Response

```
beta          TRM   YourID:1          IGX 8430    9.2    Aug. 15 1998 17:36 MST
```

```
Data Channel:      25.1
Interface:         RS232  DCE
Clocking:         Normal
```

```
Interface Control Template for Connection while ACTIVE
```

Lead	Output Value	Lead	Output Value
RI	OFF	DSR	ON
CTS	ON	SRxD	ON
DCR	OFF	DCD	ON
SCTS	ON	SDCD	ON
SQ	ON		

```
Last Command: cnfict 25.1 a cts on
```

```
Next Command:
```

Example 2**cnfict 9.1 a rts on****Description**

Configure the active interface control template to have RTS-on. This means that when the port is active, the RTS lead is asserted.

System Response

```

alpha          TRM   YourID:1          IGX 8430    9.2    Aug. 23 1998 10:23 PST

Port:          9.1          [ACTIVE ]
Interface:     FRI-V35 DTE          Configured Clock: 256 Kbps
Clocking:      Normal          Measured Rx Clock: 0 Kbps
Port ID        7
Port Queue Depth 65535          OAM Pkt Threshold 3 pkts
ECN Queue Threshold 65535          T391 Link Intg Timer 6 sec
DE Threshold    100 %          N391 Full Status Poll 10 cyl
Signalling Protocol None          ForeSight (CLLM) No
Asynchronous Status No          CLLM Status Tx Timer 0 msec
T392 Polling Verif Timer 15          Interface Control Template
N392 Error Threshold 3          Lead State
N393 Monitored Events Count 4          RTS ON
Communicate Priority No          DTR ON
Upper/Lower RNR Thresh 75%/ 25%
Min Flags / Frames 1

Last Command: cnfict 9.1 a rts on

Next Command:

```

Example 3**cnfict 31.1 n dsr on****Description**

Configure the near interface control template for 31.1, to DSR on (DDS trunk).

System Response

```

beta          TRM   YourID:1          IGX 8430    9.2    Aug. 15 1998 17:38 MST

Data Channel:  31.1
Interface:     DDS-4   OCU Config
Clocking:      Looped

          Interface Control Template for Connection while NEAR EXT LOOPED

Lead   Output Value          Lead   Output Value
DSR    ON                    CTS    ON
DCD    ON

Last Command: cnfict 31.1 near dsr on

Next Command:

```

Table 8-19 *cnfict*—Parameters

Parameter	Description		
port	Specifies the data channel or Frame Relay port whose interface control template you want to configure. Specify the port in the format <i>slot.port</i> .		
template	Specifies which interface control template to configure for the channel and has the format: <i>a/c/l/n/f</i> . Valid entries are:		
	Entry	Template	Description
	a	Active	The active control template is in effect while the data channel is active (normal operation).
	c	Conditioned	The conditioned control template is in effect when conditioning is applied to the data channel. The conditioned template is used when the network detects that it cannot maintain the connection because of card failures or lack of bandwidth. (The connection is failed.)
	l	Looped	The looped template is in effect when the data channel is being looped back in either direction. The looped template is used when the addloclp command or the addrmtlp command has been used to loop the connection within the network.
	n	Near loopback	The near loopback template is in effect when running a tstport n command or an addextlp n command on a port. The port is configured such that the external near modem is placed in a loopback.
	f	Far loopback	The far loopback template is in effect when running a tstport f command or an addextlp f command on a port. The port is configured such that the external far-end modem is placed in a loopback.
Active	The only valid template for a Frame Relay port, X.21 or V.35 is the active template. Also, all the output leads have steady state values and do not follow local or remote inputs.		
output	Specifies the output lead to configure. Valid abbreviations for output leads are listed in the previous parameter (template). Configurable output leads vary depending on the type of data interface: RS-232, V.35, X.21, or RS-449.		

Table 8-19 *cnfict—Parameters (continued)*

Parameter	Description
source	Specifies how the lead is to be configured and has the format: on off local remote input delay Delay is an optional parameter. The following lists the valid source choices:
on	The output lead is asserted.
off	The output lead is inhibited.
l	Local indicates that the output follows a local lead.
r	Remote indicates that the output follows a remote lead.
input	The name of the local or remote input lead that the output lead follows.
delay	The time in milliseconds that separates the off to on lead transitions. Delay is valid <i>only</i> when the output lead is CTS and the input lead is local RTS. On to Off lead transitions are not subject to this delay.

cnfmode

Selects a *mode* of the card for a UFM-U back card. The mode of a card is combination of maximum port speeds and for specific port numbers. Table 8-20 lists the maximum port speeds and active ports for each mode. The **cnfmode** command lets you select 1 of 27 modes for either a UFI-12V.35 back card or a UFI-12X.21 back card. For a UFI-4HSSI back card, three modes are available. Note that you specify the actual speed of an individual port by using **cnffrport**. The IGX documentation describes the application of the modes and the sequence of execution of these commands.



Note

The **cnfmode** and **cnfufmumode** commands are the same command.

Table 8-20 *Card Modes for Unchannelized Back Cards*

Mode	V.35 and X.21 Ports												HSSI Ports			
	Group A				Group B				Group C				A		B	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
1	3	3	3	3	3	3	3	3	3	3	3	3	8	8	8	8
2	8	-	8	-	8	-	8	-	8	-	8	-	16	-	16	-
3	10	-	-	-	10	-	-	-	10	-	-	-	16	-	-	-
4	8	-	8	-	3	3	3	3	3	3	3	3				
5	10	-	-	-	3	3	3	3	3	3	3	3				
6	8	-	8	-	8	-	8	-	3	3	3	3				
7	10	-	-	-	8	-	8	-	3	3	3	3				

Table 8-20 Card Modes for Unchannelized Back Cards (continued)

V.35 and X.21 Ports													HSSI Ports			
Mode	Group A				Group B				Group C				A		B	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
8	10	-	-	-	10	-	-	-	3	3	3	3				
9	10	-	-	-	8	-	8	-	8	-	8	-				
10	10	-	-	-	10	-	-	-	8	-	8	-				
11	3	3	3	3	8	-	8	-	3	3	3	3				
12	3	3	3	3	3	3	3	3	8	-	8	-				
13	3	3	3	3	10	-	-	-	3	3	3	3				
14	3	3	3	3	3	3	3	3	10	-	-	-				
15	8	-	8	-	3	3	3	3	8	-	8	-				
16	3	3	3	3	8	-	8	-	8	-	8	-				
17	8	-	8	-	10	-	-	-	3	3	3	3				
18	8	-	8	-	3	3	3	3	10	-	-	-				
19	3	3	3	3	8	-	8	-	10	-	-	-				
20	3	3	3	3	10	-	-	-	8	-	8	-				
21	10	-	-	-	3	3	3	3	8	-	8	-				
22	10	-	-	-	3	3	3	3	10	-	-	-				
23	3	3	3	3	10	-	-	-	10	-	-	-				
24	8	-	8	-	10	-	-	-	8	-	8	-				
25	8	-	8	-	8	-	8	-	10	-	-	-				
26	10	-	-	-	8	-	8	-	10	-	-	-				
27	8	-	8	-	10	-	-	-	10	-	-	-				

Full Name

Configure mode

Syntax**cnfmode** <port> <mode>**Related Commands****cnffrport**, **dspmode**, **dspmodes**

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Node	Yes	IGX	Yes

Example 1

```
cnfmode 13 4
```

Description

Configure the UFM-U card set in slot 13 to have mode 4. Note that the display shows which ports are active for each mode number but does not show the current mode of the UFM-U. To see the current mode of the UFM-U, use **dspmode**.

System Response

```
w180          TN      SuperUser      IGX 16      9.2 July 30 1997 01:25 GMT
```

```
UFMU MODES AND PORT AVAILABILITY BITMAP
```

```
Mode[ 1]:111111111111  Mode[ 2]:101010101010  Mode[ 3]:100010001000
Mode[ 4]:101011111111  Mode[ 5]:100011111111  Mode[ 6]:101010101111
Mode[ 7]:100010101111  Mode[ 8]:100010001111  Mode[ 9]:100010101010
Mode[10]:100010001010  Mode[11]:111110101111  Mode[12]:111111111010
Mode[13]:111110001111  Mode[14]:111111111000  Mode[15]:101011111010
Mode[16]:111110101010  Mode[17]:101010001111  Mode[18]:101011111000
Mode[19]:111110101000  Mode[20]:111110001010  Mode[21]:100011111010
Mode[22]:100011111000  Mode[23]:111110001000  Mode[24]:101010001010
Mode[25]:101010101000  Mode[26]:100010101000  Mode[27]:101010001000
```

```
This Command: cnfmode 13
```

```
Enter The New UFMU Mode [1]: 4
```

Table 8-21 *cnfmode—Parameters*

Parameter	Description
slot	Specifies the slot of the UFM-U card.
mode	Specifies the mode of the UFM-U card set. The range for V.35 and X.21 ports is 1–27. The range for HSSI ports is 1–3. You may have to delete connections and down one or more ports before you execute cnfmode . To determine if you must delete connection or for a detailed description of the modes of a UFM-U, see the <i>Cisco IGX 8400 Series Reference</i> .

cpyict

Copies all control template information associated with a given channel: the active template information, the conditioned template information, and the looped template information near, far. Once copied, you can edit the control template information with the **cnfict** command. See the **cnfict** command for more information on interface control templates.

Full Name

Copy SDP/LDP/FRP interface control template

Syntax

```
cpyict <source_port> <destination_port>
```

Related Commands

cnfict, **dspict**

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1

```
cpyict 25.1 25.2
```

Description

Copy the interface control template on channel 25.1 to channel 25.2.

System Response

```
beta          TRM   YourID:1          IGX 8430    9.2    Aug. 15 1998 17:40 MST
```

```
Data Channel:      25.2
Interface:         RS232   DCE
Clocking:          Normal
```

Interface Control Template for Connection while ACTIVE

Lead	Output Value	Lead	Output Value
RI	OFF	DSR	ON
CTS	ON	SRxD	ON
DCR	OFF	DCD	ON
SCTS	ON	SDCD	ON
SQ	ON		

```
Last Command: cpyict 25.1 25.2
```

```
Next Command:
```

Example 2**cpyict 25.1 25.2****Description**

Copy the Frame Relay interface control template on port 25.1 to 25.2.

System Response

```
beta          TRM   YourID:1          IGX 8430    9.2    Aug. 15 1998 17:40 MST
```

```
Data Channel:    25.2
Interface:       RS232   DCE
Clocking:        Normal
```

Interface Control Template for Connection while ACTIVE

Lead	Output Value	Lead	Output Value
RI	OFF	DSR	ON
CTS	ON	SRxD	ON
DCR	OFF	DCD	ON
SCTS	ON	SDCD	ON
SQ	ON		

Last Command: cpyict 25.1 25.2

Next Command:

Table 8-22 cpyict—Parameters

Parameter	Description
source channel	Specifies the data channel or Frame Relay port.
destination channel	Specifies the data channel or Frame Relay port you want to receive the copied control template information.

delcon

Removes connections from the network. A prompt appears for confirming the deletion. Connections can be deleted from the node at either end of the connection. Do not delete a connection when the node at the other end of the connection is unreachable. The unreachable node will not recognize the deletion. It is especially important not to delete a connection to an unreachable node and then connect that channel to another node. Channel connections are added to the network with the **addcon** command.

Full Name

Delete connections

Syntax

```
delcon <channel(s)>
```

Related Commands

```
addcon, dspcon, dspcons
```

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1

```
delcon 25.1
```

Description

Delete connection 25.1. The connections to delete are highlighted. A prompt asks you to confirm the deletion. Respond with “y” for yes. Connection 25.1 is deleted.

System Response

```
beta          TRM   YourID:1          IGX 8430   9.2   Aug. 15 1998 15:43 MST

Local        Remote      Remote
Channel      NodeName   Channel   State  Type   Compression  Code Avoid COS O
19.1.101    gamma      8.2.300   Ok    fr           0 L
19.2.302    alpha      9.2.400   Ok    fr           0 R
25.2        gamma      6.1       Ok    256         7/8         0 L
```

```
Last Command:
```

```
Next Command: delcon 25.1
```

Table 8-23 delcon—Parameters

Parameter	Description
channel	<p>Specifies the channel or set of channels in the following format: slot.port.DLCI.</p> <p>On an FRP or FRM, the range for <i>port</i> is 1–24 or 1–31. On a UFM-C, the range for <i>port</i> is 1–250. (For connections on a UFM-C, <i>line</i> is not necessary because of the port-to-line mapping through addfrport). For a UFM-U, the range for <i>port</i> is 1–12 for V.35 or X.21 and 1–4 for HSSI (unless Y-cable redundancy exists on the HSSI, in which case <i>port</i> can be only “1”). The range for <i>DLCI</i> is typically 16–1007.</p>

delfrport (T1/E1)

The information in this description applies to only Frame Relay ports using a T1 or E1 line. The **delfrport** command deletes logical ports on FRP, FRM, or UFM-C cards and “unassigns” associated DS0/timeslots. The deleted DS0/timeslots are available for you to assign to new logical ports (with the **addfrport** command). The port display (normally visible through **dspfrport** command) appears regardless of whether the port has been successfully deleted. The screen displays the defined port numbers for the specified line. Table 8-24 lists the error and warning messages for this command.

Table 8-24 delfrport—Warnings and Error Messages

Messages	Reason for Message
“Slot is out of range”	Line number is not correct for FRP T1/E1.
“Port does not exist”	Logical port number does not exist.
“You must first down the port”	Logical port is up.
“You must first down the port”	Specified port is not first DS0/timeslot of logical port.

Full Name

Delete Frame Relay port

Syntax

For FRM or FRP: **delfrport** <slot.port>

For UFM: **delfrport** <slot.port> <line.ds0_range>

Related Commands

addfrport, **dspfrport**, **dnfrport**

Attributes

Privilege	Jobs	Log	Node	Lock
1	Yes	Yes	IGX	Yes

Example 1

delfrport 8.1

Description

Delete Frame Relay port 8.1.

System Response

```
alpha TRM   YourID:1           IGX 8420   9.2   Aug. 15 1998 17:28 CST
```

```
Port configuration for FRP 8
```

From	Chan	Speed	Interface	State
1	9-15	448	FRI T1	ACTIVE
20	20-24	320	FRI T1	ACTIVE

```
Last Command: delfrport 8.1
```

```
Next Command:
```

Table 8-25 delfrport (T1/E1)—Parameters

Parameter	Description
slot	Specifies the physical FRP or FRM T1 or E1 line. The range of logical port numbers is 1–24 for T1 lines and 1–31 for E1 lines.
port	Specifies the logical port number of the port to delete.

dnfrport

Deactivates (downs) the specified Frame Relay port. Before deactivating a port, you must delete all connections on the port (see **delcon** description).

Full Name

Down Frame Relay port

SyntaxFor UFM-U, FRM, or FRP: **dnfrport** <slot.port>For UFM-C: **dnfrport** <slot.port> <line.ds0_range>**Related Commands****cnffrport, dspfrport, upfrport****Attributes**

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1**delfrport 3.1****Description**

Down Frame Relay port 3.1.

System Response

```
pubsigx1      TN      SuperUser      IGX 32      9.2      Aug. 14 1997 03:49 GMT

Port:         3.1          [INACTIVE]
Interface:    FRI-T1          Configured Clock:    64 Kbps
Clocking:     None          Measured Rx Clock:  None
Min Flags / Frames      1
Port ID          -          Channel Range        1
Port Queue Depth      65535      OAM Pkt Threshold    3 pkts
ECN Queue Threshold  65535      T391 Link Intg Timer 10 sec
DE Threshold         100 %      N391 Full Status Poll 6 cyl
Signalling Protocol   None          EFCI Mapping Enabled No
Asynchronous Status   No          CLLM Enabled/Tx Timer No/ 0 msec
T392 Polling Verif Timer 15          IDE to DE Mapping     Yes
N392 Error Threshold  3          Channel Speed        64
N393 Monitored Events Count 4
Communicate Priority   No
Upper/Lower RNR Thresh 75%/ 25%

Last Command: dnfrport 3.1

Next Command:
```

Table 8-26 dnfrport—Parameters

Parameter	Description
slot	Specifies the slot number of the Frame Relay card with the port to down.
port	Specifies the port number to deactivate on the card specified by <i>slot</i> . On an FRP or FRM, the range is 1–24 or 1–31. On a UFM-C, the range is 1–250. On a UFM-U with a V.35 or X.21 interface, the range is 1–12. On a UFM-U with a HSSI interface, the range is 1–4.
line	The physical line on UFM-C card sets (not used for UFM-U cards).

dspchcnf

Displays configuration details for voice, data, or Frame Relay channels.

Voice channels display: Utilization, Adaptive Voice, Gain, Dial Type, Interface Type, and On-hook and Conditioning specifications.

Data channels display: Maximum EIA Update Rate, Percentage Utilization, DFM Pattern Length, and DFM Status.

Frame Relay channels display: Minimum Information Rate, VC Queue Buffer Size or Bc, Peak Information Rate or Be, Maximum Credits, ECN Queue Buffer Size, Quiescent Information Rate, ForeSight enabled or not, and Percentage Utilization.

If the channel specified is a voice channel, the display includes configuration details for all channels on the specified circuit line starting with the specified channel. If the channel specified is a data channel, the display includes configuration details for all channels on the specified data card (CDP, SDP, or LDP) starting with the specified channel. If the channel specified is a Frame Relay channel, the display includes configuration details for all channels on the specified FRP port starting with the specified channel. If you specify a Frame Relay port only with no DLCI, the display includes configuration details for all channels on the Frame Relay port specified. The display also indicates either Cisco parameters or standard Frame Relay parameters where appropriate.

Full Name

Display channel configuration

Syntax

```
dspchcnf <start_channel>
```

Related Commands

cnfchadv, cnfchdfm, cnfchdl, cnfcheia, cnfchgn, cnfchpri, cnfchutl, cnffrcon

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX	No

Example 1**dspchcnf 9.1****Description**

Display configuration values for all channels on Frame Relay port 9.1.

```
alpha          TRM   YourID:1          IGX 8430    9.2    Aug. 15 1998 15:56 PST
                Frame Relay Channel Configuration  Port: 9.1

Channel  MIR   CIR  VC Q Depth   PIR  Cmax  ECN QThresh  QIR  FST  % Util
9.1.100  9.6   9.6          5    256   10   65535   9.6   n    100
```

Last Command: dspchcnf 9.1

Next Command:

Table 8-27 dspchcnf—Parameters

Parameter	Description
channel	Specifies the channel at which the display begins. The format is <i>slot.port.DLCI</i> . The DLCI parameter is optional.

dspchstats

Displays traffic statistics and the statistics collection period for the specified channel. The display shows when the statistics were last cleared and the time that has elapsed during the current collection period. The statistical parameters include:

- Number of frames transmitted
- Average frame size in bytes
- Average frame rate in frames per second

- Number of packets transmitted
- Average packet rate in packets per second
- Percent of the channel in use

For each parameter, the values appear in the following categories:

- From the port (received from the attached device into the node)
- To the network (transmitted from the node into the network)
- Discarded (received from the attached device but not transmitted to the network)
- From the network (received from the network into the node)
- To the port (transmitted from the node to the attached device)
- Discarded (received from the network but not transmitted to the attached device)

The **dspchstats** command also displays ECN (Explicit Congestion Notification) statistics.

- **FECN:** Lists number of frames sent to the receiving end router with the FECN (Forward Explicit Congestion Notification) bit set and the ratio of these frames to the total number of frames sent. This is a measure of Frame Relay congestion and the extent to which the receiving router has been informed of frames received that encountered congestion.
- **BECN:** Lists number of frames sent to the transmitting end router with the BECN (Backward Explicit Congestion Notification) bit set and the ratio of these frames to the total number of frames sent. This is a measure of Frame Relay congestion and the extent to which the transmitting router has been informed of frames received that encountered congestion.
- **Min-Pk. bytes rcvd:** Lists number of bytes received at the receiving end router during the greatest minute-peak of bytes received.
- **Minutes congested:** Lists number of congested minutes of received data since the command started.

Description of Frame Relay Channel Statistics

The following 35 statistics are available for each Frame Relay PVC channel. Note that the statistic field name listed may be slightly different from the field name on the **dspchstats** screen.

- 1)Frames Received
- 2)Receive Frames Discarded
- 3)Frames Transmitted
- 4)Transmit Frames Discarded
- 5)Packets Received
- 6)Receive Packets Discarded
- 7)Packets Transmitted
- 10)Bytes Received
- 11)Receive Bytes Discarded
- 12)Bytes Transmitted
- 13)Transmit Bytes Discarded
- 17)Seconds In Service
- 18)Frames Transmitted with FECN
- 19)Frames Transmitted with BECN
- 21)Minutes Congested
- 22)DE Frames Received
- 23)DE Frames Transmitted
- 24)DE Frames Dropped
- 25)DE Bytes Received
- 26)Frames Received in Excess of CIR
- 27)Bytes Received in Excess of CIR
- 28)Frames Transmitted in Excess of CIR
- 29)Bytes Transmitted in Excess of CIR
- 32)Rx Frames Discarded - Deroute/Down
- 33)Rx Bytes Discarded - Deroute/Down
- 34)Rx Frames Discarded - VC Q Overflow
- 35)Rx Bytes Discarded - VC Q Overflow
- 36)Tx Frames Discarded - Q Overflow
- 37)Tx Bytes Discarded - Q Overflow
- 38)Tx Frames Discarded - Ingress CRC
- 39)Tx Bytes Discarded - Ingress CRC
- 40)Tx Frames Discarded - Trunk Discard
- 41)Tx Bytes Discarded - Trunk Discard
- 42)Tx Frames During Ingress LMI Fail
- 43)Tx Bytes During Ingress LMI Fail

Table 8-28 Frame Relay Channel Statistics in IGX

Statistic	Description
Frames Received (Ingress)	This statistic provides a count of the number of frames received from the attached equipment. This statistic is incremented even when the received frame is invalid or discarded for any reason. (See possible reasons below.)
Receive Frames Discarded (Ingress)	<p>This statistic provides a count of the number of frames received from the attached equipment that were discarded before being sent into the network or aborted after some portion had been already sent into the network. Possible reasons for discard are:</p> <ul style="list-style-type: none"> • Invalid CRC—that is, the CRC calculated by the IGX does not match the CRC provided by the attached equipment in the last two octets of the frame. (Frames received with an invalid CRC are also included in the port Receive Frame CRCs Errors statistic.) • Invalid Frame Length—that is, the length of the received frame, including the header and frame check sequence (FCS, or CRC) octets, is either too short (less than five octets) or too long (more than 4510 octets). (Frames received with an invalid frame length are also included in the port Illegal Length Receive Frames statistic.) • Invalid Alignment—that is, the length of the received frame is not an integral number of octets. (Frames received with an invalid alignment are also included in the port Receive Frame Alignment Errors statistic.) <p>Frame received with DE = 1 and the PVC's ingress queue is filled at least to the DE threshold and the global DE feature is enabled (using the cnfsysparm command). Frames discarded for this reason are specifically counted in the PVC DE Frames Dropped statistic (below).</p> <ul style="list-style-type: none"> • PVC failed (due to endpoint hardware failure/absence or inability to find a route through the network) or downed (intentionally out of service due to operator action). Frames discarded for this reason are specifically counted in the PVC Rx Frames Discarded - Deroute/Down statistic (below). • PVC ingress queue full. The queue may fill (and overflow) due to sustained transmission above the PVC's MIR or as a result of MUXBUS oversubscription. Frames discarded for this reason are specifically counted in the PVC Rx Frames Discarded - VC Q Overflow statistic (below). <p>This statistic is a subset of the PVC Frames Received statistic.)</p>

Table 8-28 Frame Relay Channel Statistics in IGX (continued)

Statistic	Description
Frames Transmitted (Egress)	This statistic provides a count of the number of frames transmitted to the attached equipment.
Transmit Frames Discarded	<p>This statistic provides a count of the number of frames that were not able to be transmitted to the attached equipment. Possible reasons for discard are:</p> <p>Port transmit queue overflow - that is, the frame traversed the network successfully but encountered a full egress port queue. Frames discarded for this reason are specifically counted in the PVC Tx Frames Discarded - Q Overflow statistic (below) and the port Tx Frames Discarded - Queue Overflow statistic (above).</p> <p>Incomplete frame at egress (that is, no end-of-frame (EOF) packet received) for any reason. The most common cause is a CRC error detected at ingress; that is, the beginning of the frame traversed the network successfully but the end of the frame was never sent because a CRC error was detected at the end of the frame at ingress. Frames discarded due to a missing EOF packet (because of ingress CRC error or EOF packets dropped in a trunk) are specifically counted in the PVC Tx Frames Discarded - Ingress CRC statistic (below). Ingress CRC errors are also counted in the ingress port Receive Frame CRC Errors statistic (above).</p> <p>Incorrect frame length, that is, the expected frame length (recorded in the end-of-frame packet) is different than the total payload of all the packets that arrive. Such a frame length error could be caused by:</p> <ul style="list-style-type: none"> • one or more packets being missing due to discard(s) on a trunk, or • a transmission bit error on the frame length field in the end-of-frame packet. Frames discarded for this reason are counted in the PVC Tx Frames Discarded - Trunk Discard statistic (below). <p>Invalid frame length, that is, the frame is longer than 4510 octets long. This could occur if the end-of-frame packet from one frame and the start-of-frame packet of the next frame are both missing due to discards on a trunk, resulting in a concatenated frame. Frames discarded for this reason are counted in the PVC Tx Frames Discarded - Trunk Discard statistic (below).</p> <p>Frame CRC error; that is, the calculated CRC at the destination does not match the original frame's CRC (contained within the received packets). This situation can occur as a result of transmission bit errors on payload bits on one or more packets of the frame. Frames discarded for this reason are specifically counted in the PVC Tx Frames Discarded - Trunk Discard statistic (below).</p>

Table 8-28 Frame Relay Channel Statistics in IGX (continued)

Statistic	Description
Packets Received	This statistic provides a count of the number of packets received across the network. These are the packets that are used to re-create all the frames which are counted in the PVC Frames Transmitted and Transmit Frames Discarded statistics (above).
Receive Packets Discarded	This statistic provides a count of the number of packets received across the network but whose payload was ultimately discarded because they contained portions of the frames which are discarded and counted in the Transmit Frames Discarded statistic (above).
Packets Transmitted	This statistic provides a count of the number of packets submitted to the network. These packets are all the packets that were generated from the non-errored received frames (Frames Received minus Receive Frames Discarded) as well as some of the packets from the errored-received frames (Receive Frames Discarded). Some packets from errored receive frames may be submitted to the network because the IGX does not wait to receive the entire frame before starting to packetize the frame and send it through the network. Consequently, if an error is detected at the end of the frame (for example, CRC error, alignment error, length error), the frame is aborted only after some packets may have been sent.
Bytes Received	This statistic provides a count of the number of octets in the frames counted in the Frames Received statistic (above). The octets counted include the Frame Relay header octets as well as the frame check sequence (FCS, or CRC) octets.
Receive Bytes Discarded	This statistic provides a count of the number of octets in the frames counted in the Receive Frames Discarded statistic (above). The octets counted include the Frame Relay header octets as well as the frame check sequence (FCS, or CRC) octets.
Bytes Transmitted	This statistic provides a count of the number of octets in the frames counted in the Frames Transmitted statistic (above). The octets counted include the Frame Relay header octets as well as the frame check sequence (FCS, or CRC) octets.
Transmit Bytes Discarded	This statistic provides a count of the number of octets in the frames counted in the Transmit Frames Discarded statistic (above). The octets counted include the Frame Relay header octets as well as the frame check sequence (FCS, or CRC) octets.

Table 8-28 Frame Relay Channel Statistics in IGX (continued)

Statistic	Description
Seconds in Service	<p>This statistic provides a count of the number of seconds during which the PVC was in service. The PVC is considered in service any time the PVC is not failed (due to endpoint hardware failure/absence or inability to find a route through the network) or downed (intentionally out of service due to operator action).</p>
Frames Transmitted with FECN	<p>This statistic provides a count of the number of frames transmitted to the attached equipment with the Forward Explicit Congestion Notification (FECN) bit set, regardless of where in the network the congestion was experienced.</p> <p>This statistic is a subset of the PVC Frames Transmitted statistic.</p> <p>This statistic is also a subset of the port Frames Transmitted with FECN statistic.</p>
Frames Transmitted with BECN	<p>This statistic provides a count of the number of frames transmitted to the attached equipment with the Backward Explicit Congestion Notification (BECN) bit set, regardless of where in the network the congestion was experienced.</p> <p>This statistic is a subset of the PVC Frames Transmitted statistic.</p> <p>This statistic is also a subset of the port Frames Transmitted with BECN statistic.</p>
Minutes Congested	<p>This statistic provides a count of the number of minutes during which 50 percent or more of the frames transmitted to the attached equipment have the Forward Explicit Congestion Notification (FECN) bit set.</p> <p>The threshold (default: 50 percent) which defines congestion is configurable (by a SuperUser) using the cnffstparm command.</p>
DE Frames Received	<p>This statistic provides a count of the number of frames received from the attached equipment with the Discard Eligible (DE) bit already set.</p> <p>This statistic is a subset of the PVC Frames Received statistic</p>
DE Frames Transmitted	<p>This statistic provides a count of the number of frames transmitted to the attached equipment with the Discard Eligible (DE) bit set, regardless of why or where the DE bit was set.</p> <p>If IDE-to-DE mapping is enabled on the port, this statistic includes those frames that have their DE bit set by the IDE-to-DE mapping function.</p> <p>This statistic is a subset of the PVC Frames Transmitted statistic.</p>

Table 8-28 Frame Relay Channel Statistics in IGX (continued)

Statistic	Description
DE Frames Dropped	<p>This statistic provides a count of the number of frames received from the attached device which were discarded because the frame's DE bit is set and the PVC's ingress buffer has reached the DE threshold. The DE threshold is configured as part of the port configuration (cnfport command).</p> <p>This statistic is a subset of the PVC Frames Received statistic.</p> <p>This statistic is a subset of the PVC Receive Frames Discarded statistic.</p> <p>This statistic is a subset of the PVC DE Frames Received statistic.</p>
DE Bytes Received	<p>This statistic provides a count of the number of octets in the frames counted in the DE Frames Received statistic (above). The octets counted include the Frame Relay header octets as well as the frame check sequence (FCS, or CRC) octets.</p> <p>This statistic is a subset of the PVC Bytes Received statistic.</p>
Frames Received in Excess of CIR	<p>This statistic provides a count of the number of frames received from the attached equipment which exceed the configured Committed Information Rate (CIR) for the PVC. Whether a frame is considered in excess of CIR depends on whether the DE feature is enabled (using the cnfsysparm command).</p> <ul style="list-style-type: none"> • If the DE feature is enabled, only frames with DE=0 are counted against Bc. Thus, this statistic only counts those frames which exceeded Bc and had DE=0. (If a frame is received with DE=1, only the DE Frames Received statistic is incremented and the frame is not counted against Bc.) • If the DE feature is not enabled, all frames are counted against Bc. If the frame exceeds Bc, it is included in this statistic. <p>This statistic is a subset of the PVC Frames Received statistic</p>
Bytes Received in Excess of CIR	<p>This statistic provides a count of the number of octets in the frames counted in the Frames Received in Excess of CIR statistic (above). The octets counted include the Frame Relay header octets as well as the frame check sequence (FCS, or CRC) octets.</p> <p>This statistic is a subset of the PVC Bytes Received statistic.</p>

Table 8-28 Frame Relay Channel Statistics in IGX (continued)

Statistic	Description
Frames Transmitted in Excess of CIR	<p>This statistic provides a count of the number of frames transmitted to the attached equipment which:</p> <ul style="list-style-type: none"> • were determined at ingress to exceed the configured Committed Information Rate (CIR) for the PVC, or • were received at ingress with DE=1 and the DE feature is enabled, or • were received at ingress when the VC_Q exceeded the configured DE threshold and the DE feature is enabled. <p>All of these conditions have in common that the packets carrying these frames all have CLP=1. It is actually the status of the CLP bits in the arriving packets that is monitored at egress.</p> <p>This statistic is a subset of the PVC Frames Transmitted statistic.</p>
Bytes Transmitted in Excess of CIR	<p>This statistic provides a count of the number of octets in the frames counted in the Frames Transmitted in Excess of CIR statistic (above). The octets counted include the Frame Relay header octets as well as the frame check sequence (FCS, or CRC) octets.</p> <p>This statistic is a subset of the PVC Bytes Transmitted statistic.</p>
Rx Frames Discarded—Deroute/Down	<p>This statistic provides a count of the number of frames received from the attached equipment which are discarded because the PVC is routed (due to endpoint hardware failure/absence or inability to find a route through the network) or òdownedó (intentionally out of service due to operator action).</p> <p>This statistic is a subset of the PVC Frames Received statistic.</p>
Rx Bytes Discarded—Deroute/Down	<p>This statistic provides a count of the number of octets in the frames counted in the Rx Frames Discarded - Deroute/Down statistic (above). The octets counted include the Frame Relay header octets as well as the frame check sequence (FCS, or CRC) octets.</p> <p>This statistic is a subset of the PVC Bytes Received statistic.</p> <p>This statistic is also a subset of the PVC Receive Bytes Discarded statistic.</p>
Rx Frames Discarded—VC Q Overflow	<p>This statistic provides a count of the number of frames received from the attached equipment which are discarded because the PVC ingress buffer (VC Q) is full.</p> <p>This statistic is a subset of the PVC Frames Received statistic.</p>

Table 8-28 Frame Relay Channel Statistics in IGX (continued)

Statistic	Description
Rx Bytes Discarded—VC Q Overflow	<p>This statistic provides a count of the number of octets in the frames counted in the Rx Frames Discarded - VC Q Overflow statistic (above). The octets counted include the Frame Relay header octets as well as the frame check sequence (FCS, or CRC) octets.</p> <p>This statistic is a subset of the PVC Bytes Received statistic.</p> <p>This statistic is also a subset of the PVC Receive Bytes Discarded statistic.</p>
Tx Frames Discarded—Q Overflow	<p>This statistic provides a count of the number of frames which were not able to be transmitted to the attached equipment because the port's egress buffer is full. The port's egress buffer may fill (and overflow) due to oversubscription.</p> <p>This statistic is a subset of the PVC Transmit Frames Discarded statistic.</p> <p>This statistic is a subset of the port Tx Frames Discarded - Q Overflow statistic.</p>
Tx Bytes Discarded—Q Overflow	<p>This statistic provides a count of the number of octets in the frames counted in the Tx Frames Discarded - Q Overflow statistic (above). The octets counted include the Frame Relay header octets as well as the frame check sequence (FCS, or CRC) octets.</p> <p>This statistic is a subset of the PVC Transmit Bytes Discarded statistic.</p> <p>This statistic is a subset of the port Tx Bytes Discarded - Q Overflow statistic.</p>

Table 8-28 Frame Relay Channel Statistics in IGX (continued)

Statistic	Description
Tx Frames Discarded—Ingress CRC	<p>This statistic provides a count of the number of frames which were not able to be transmitted to the attached equipment because the frame is incomplete. Specifically, this statistic is incremented any time an end-of-frame (EOF) packet is missing. In other words:</p> <ul style="list-style-type: none"> • a start-of-frame packet is followed by another start-of-frame packet, or start-of-frame packet is followed by an encapsulated-frame packet, or • a middle-of-frame packet is followed by a start-of-frame packet, or • middle-of-frame packet is followed by an encapsulated-frame packet <p>The most likely cause of any of these conditions is a CRC error detected at ingress causing the end of the frame (including at least the end-of-frame packet and maybe one or more middle-of-frame packets) to not be sent.</p> <p>A less likely cause for the missing EOF packet is that the packet was dropped due to a transmission bit error in the packet header that is detected by a trunk along the PVC's path. Such conditions are included in this statistic.</p> <p>This statistic is a subset of the PVC Transmit Frames Discarded statistic.</p>
Tx Bytes Discarded—Ingress CRC	<p>This statistic provides a count of the number of octets in the frames counted in the Tx Bytes Discarded - Ingress CRC statistic (above). The octets counted include the Frame Relay header octets as well as any octets which arrived successfully.</p> <p>This statistic is a subset of the PVC Transmit Bytes Discarded statistic.</p>

Table 8-28 Frame Relay Channel Statistics in IGX (continued)

Statistic	Description
Tx Frames Discarded—Trunk Discard	<p>This statistic provides a count of the number of frames that were not able to transmitted to the attached equipment because the frame:</p> <ul style="list-style-type: none"> has an incorrect length, that is, the expected frame length (recorded in the end-of-frame packet) is different than the total payload of all the packets which arrive. Such a frame length error could be caused by: <ul style="list-style-type: none"> • one or more packets being missing due to discard(s) on a trunk, or • a transmission bit error on the frame length field in the end-of-frame packet. • has an invalid length, that is, the frame is longer than 4510 octets long. This could occur if the end-of-frame packet from one frame and the start-of-frame packet of the next frame are both missing due to discards on a trunk, resulting in a concatenated frame. <p>In any of the cases above, a packet could be discarded on a network trunk either due to extreme trunk congestion or a detected transmission bit error on the packet header.</p> <p>This statistic is a subset of the PVC Transmit Frames Discarded statistic.</p>
Tx Bytes Discarded—Trunk Discard	<p>This statistic provides a count of the number of octets in the frames counted in the Tx Bytes Discarded - Trunk Discard statistic (above). The octets counted include the Frame Relay header octets as well as the frame check sequence (FCS, or CRC) octets.</p> <p>This statistic is a subset of the PVC Transmit Bytes Discarded statistic.</p>
Tx Frames During Ingress LMI Failure	<p>This statistic provides a count of the number of frames that were transmitted to the attached equipment while the signaling protocol on the local port was failed (that is, when the port was in a Port Communication Failure state).</p> <p>This statistic is a subset of the PVC Frames Transmitted statistic</p>
Tx Bytes During Ingress LMI Failure	<p>This statistic provides a count of the number of octets in the frames counted in the Tx Frames During Ingress LMI Failure statistic (above). The octets counted include the Frame Relay header octets as well as the frame check sequence (FCS, or CRC) octets.</p>

Table 8-29 At Ingress (before FRP Firmware Release FDS/FES)

DE Feature Enabled	DE = 1	> CIR	VC_Q > DE Threshold	Action
No	Don't care	No	Don't care	Send
No	Don't care	Yes	Don't care	Set CLP=E1 in all packets
Yes	No	No	No	Send
Yes	No	No	Yes	Set CLP=E1 in all packets
Yes	No	Yes	No	Set CLP=E1 in all packets
Yes	No	Yes	Yes	Set CLP=E1 in all packets Set IDE=1 in last packet
Yes	Yes	Don't care	No	Set CLP=E1 in all packets
Yes	Yes	Don't care	Yes	Discard frame

Table 8-30 At Ingress (FRP Firmware Release FDS/FES and later)

DE Feature Enabled	DE=1	> CIR	VC_Q > DE Thresh	Action
No	Don't care	No	Don't care	Send
No	Don't care	Yes	Don't care	Set CLP=1 in all packets
Don't care	No	No	No	Send
Don't care	No	No	Yes	Set CLP=1 in all packets
Don't care	No	Yes	No	Set CLP=1 in all packets
Don't care	No	Yes	Yes	Set CLP=1 in all packets Set IDE=1 in last packet
Yes	Yes	Don't care	No	Set CLP=1 in all packets
Yes	Ye'	Don't care	Yes	Discard frame

Table 8-31 At Ingress (FRP firmware Release FDV/FEV and later)

DE Feature Enabled	DE=1	> CIR	Action
No	Don't care	No	Send
No	Don't care	Yes	Set CLP=1 in all packets
Don't care	No	No	Send
Don't care	No	Yes	Set CLP=1 in all packets Set IDE=1 in last packet
Yes	Yes	Don't care	Set CLP=1 in all packets

Table 8-32 At Egress (DE bit setting)

IDE = 1	IDE = 1	IDE to DE Mapping Enabled	Action
Yes	Don't care	Don't care	DE=1 (No change to DE bit) --> Tx_Q
No	No	Don't care	DE=1 (No change to DE bit) --> Tx_Q
No	Yes	No	DE=1 (No change to DE bit) --> Tx_Q
No	Yes	Yes	DE=1 (Change DE bit) --> Tx_Q

Table 8-33 At Egress (Transmit queue behavior)

DE Feature Enabled	DE=1	Tx_Q > DE Threshold	Action
No	Don't care	Don't care	If space available, put frame into Tx_Q
Yes	No	Don't care	If space available, put frame into Tx_Q
Yes	Yes	No	If space available, put frame into Tx_Q
Yes	Yes	Yes	Discard frame

Full Name

Display Frame Relay channel statistics

Syntax

dspchstats <channel> [interval]

Related Commands

clrchstats, cnfchstats

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX	No

Example 1

dspchstats 5.1.100

Description

Display the channel statistics for connection 5.1.100.

The system response shows the following statistics categories:

- From the port (something coming into a port, typically from an external device/box)

- To the network (something going out of the switch; typically trunks)
- Discarded (received from the attached device but not transmitted to the network)
- From the network (received in; typically, into the trunk)
- To the port (transmitted out of the port, to an external device or cloud)
- Discarded (received from the network but not transmitted to the attached device)

System Response

```
pubsigx1      TN      SuperUser      IGX 8420      9.2      Aug. 7 1998  04:04 PDT

Channel Statistics: 5.1.100      Cleared: July 25 1997 06:07
MIR: 9.6 kbps      Collection Time: 12 day(s) 21:48:41      Corrupted: YES
      Frames      Avg Size Avg      Util      Packets      Avg
      (bytes)      (fps)      (%)
From Port:      0      0      0      0
To Network:      0      0      0      0      58732      0
Discarded:      0      0      0      0
From Network:      1      5      0      0      1      0
To Port:      0      0      0      0
Discarded:      1      5      0      0      1      0
      ECN Stats: Avg Rx VC Q:      0      ForeSight RTD      --
Min-Pk bytes rcvd:      0      FECN Frames:      0      FECN Ratio (%)      0
Minutes Congested:      0      BECN Frames:      0      BECN Ratio (%)      0
Frames rcvd in excess of CIR:      0      Bytes rcvd in excess of CIR:      0
Frames xmtd in excess of CIR:      0      Bytes xmtd in excess of CIR:      0
```

This Command: dspchstats 5.1.100

Hit DEL key to quit:

Table 8-34 *dspchstats—Parameters*

Parameter	Description
channel	Specifies the channel. The command displays connection information for one channel at a time, so you cannot specify a range of channels. The format for channel is <i>slot.port</i> .

Table 8-35 *dspchstats—Optional Parameters*

Parameter	Description
interval	Specifies the refresh interval for displaying data. The range is 1–60 seconds. The default is 10 seconds. If you do not specify a value for the refresh interval, the screen refresh defaults to 10. If the Rx Q depth and the Tx Q depth fields remain “0”, make sure that a value other than “0” is specified for the <i>interval</i> parameter.

dspcon

Displays connection information for a channel. The information displayed includes:

- The channel number at both the local and remote ends of the connection
- The node name at both ends of the connection
- The type or data rate of the connection
- The routing restriction
- The class of service (COS) of the connection
- The connection route, which lists the end nodes and any intermediate nodes
- The preferred route for the connection (if configured)
- If cost-based AutoRoute is configured, displays maximum and current costs for a connection route.
- The status of the cards associated with the connection
- Any Y-cable conflicts (LDI, CDP for example)
- The compression status (VAD on or off, ADPCM on or off, DFM on or off, Frame Relay compression on or off)
- The connection bandwidth parameter values for Frame Relay
- The circuit round trip delay (RTD) if ForeSight is enabled

A failure that affects the connection flashes on the screen. For Frame Relay NNI ports, the NNI value indicates the A-bit value was received over the NNI from the remote network. The possible status messages are:

- OK Connection OK.
- FAILED Connection failed.
- MISSING DLCI was deleted in other network at NNI. A previous status report indicated a valid DLCI was present but an updated report did not.
- UNUSED Indicates the UNI port does not support reporting of NNI A-bit status.

Full Name

Display connections

Syntax

dspcon <slot.port.DLCI>

Related Commands

addcon, cnfcos, cnfpref, cnfrtcost, dspcons

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX	No

Example 1

```
dspcon 19.1.101
```

Description

Display connection information for Frame Relay channel 19.1.101 (cost based routing is configured).

System Response

```
beta          TRM   YourID:1          IGX 8430    9.2    Aug. 15 1998 15:42 MST

Conn: 19.1.101  gamma    8.2.300    fr
      MIR      CIR      VC Q Depth    PIR      Cmax    ECN QThresh    QIR      FST
      9.6/9.6   9.6/9.6   65535/65535   256/256   10/10   65535/65535   9.6/9.6   n
% Util: 100/100
Owner: LOCAL          Restriction: NONE  COS: 0                      Status: OK
TestRTD: 0 msec      Trunk Cell Routing Restrict: Y  Max Cost: 100  Route Cost: 36

Path:   beta    15--15gamma
Pref:   Not Configured
```

```
beta 19.1.101          gamma 8.2.300
FRP:  OK              FRP:  OK
FRI:  OK              FRI:  OK
```

```
Last Command: dspcon 19.1.101
```

```
Next Command:
```

Table 8-36 dspcon—Parameters

Parameter	Description
channel	Specifies the channel in the format <i>slot.port.DLCI</i> . The dspcon command displays information for one connection at a time.

dspcons

Displays information about the connections on an IGX node. The following table lists all possible information headings that appear in the display. The actual headings that appear depend on the choice of selected optional parameters—including no parameters. Entering the command with no parameters displays all connections. The screen examples in this description reflect various parameter options, including no parameters.

Viewing Results from OAM Loopback Test

The OAM Loopback Test will consider a PVC to be failed if ten consecutive loopback cells do not return. When a failure occurs, this information will be stored in switch software. The test will continue to run even when connections are in a failed state. You can view the results of the test by using the **dspcons -oam** command.

You can view a display of connections that have failed the OAM Loopback Test by using the **dspcons** command. The **dspcons** command with no optional parameters will show all connections, and those that have failed the OAM Loopback Test *but are otherwise OK* will show a state of OAM. Other states will supersede OAM. You can use the **dspcons -oam** command to view all connections that have failed the OAM Loopback Test. When an OAM Loopback failure occurs, the state field shows OAM-F.

Table 8-37 *dspcons* Output

Fields	Description														
Local Channel	The connection's channel at this node.														
Remote Node Name	The name of the node at the other end of the connection.														
Remote Channel	The connection's channel at the remote node.														
State	The possible connections states are as follows:														
	<table border="1"> <thead> <tr> <th>State</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>OK</td> <td>Routed, A-bit = 1.</td> </tr> <tr> <td>Down</td> <td>Downed.</td> </tr> <tr> <td>Failed</td> <td>unrouted, but trying; A-bit = 0.</td> </tr> <tr> <td>Unused</td> <td>The UNI port does not support reporting of NNI A-bit status.</td> </tr> <tr> <td>OAM</td> <td>Connections that have failed the OAM Loopback test, but are otherwise OK.</td> </tr> <tr> <td>OAM-F</td> <td>Indicates OAM Loopback failure</td> </tr> </tbody> </table>	State	Description	OK	Routed, A-bit = 1.	Down	Downed.	Failed	unrouted, but trying; A-bit = 0.	Unused	The UNI port does not support reporting of NNI A-bit status.	OAM	Connections that have failed the OAM Loopback test, but are otherwise OK.	OAM-F	Indicates OAM Loopback failure
State	Description														
OK	Routed, A-bit = 1.														
Down	Downed.														
Failed	unrouted, but trying; A-bit = 0.														
Unused	The UNI port does not support reporting of NNI A-bit status.														
OAM	Connections that have failed the OAM Loopback test, but are otherwise OK.														
OAM-F	Indicates OAM Loopback failure														
Type	The type of connection. For example, this can be Frame Relay, Frame Relay with interworking, voice, data, and so on.														
Only __	If one parameter pre-empts another, this heading appears with the accepted parameter type. To name two examples: if the parameter is -d for data or -fail for failed connections only, this heading becomes either "Only d" or "Only fail," respectively.														
Code	The encoding used for data connections (7/8 = data byte is 7 bits of user data plus a "1" in the last bit position, 8/8 = data byte is 8 bits of user data, 8/8I = data byte is 8 bits of inverted user data).														
Route Avoid	The type of lines to avoid when routing (satellite lines, terrestrial lines, lines with zero code suppression).														
Compression	The type of compression applied to the connection (PCM, PCM and VAD, ADPCM, VAD and ADPCM for voice connections), (DFM for data connections).														
COS	The Class Of Service.														

Table 8-37 *dspcons* Output (continued)

Fields	Description
A-bit	A-bit status at both ends of the connection.
Loopback	This is not a heading but rather the standard loopback symbols indicating the presence of a test loop. See the “Troubleshooting” chapter for an explanation of these symbols.

Full Name

Display connections

Syntax

dspcons [*start_channel*] [*nodename*] [-f] [-v] [-d] [-atfr] [-abit] [-fabit] [-fail] [-down]

where

<i>start_channel</i>	is the starting channel to display
<i>nodename</i>	specifies that connections for only the named node appear in the display
-f	equals display Frame Relay connection only
-v	equals display only voice connections
-d	equals display only data connections and do so in Kbps
-atfr	equals Frame Relay to ATM interworking connections (also displays atfr with ForeSight)
-abit	equals show status of the A-bit
-fabit	equals show only connections with failed A-bits
-fail	equals show only failed connections
-down	equals show only downed connections

**Note**

Some parameters may supersede other parameters.

Related Commands

addcon, cnfchadv, chfchdfm

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX	No

Example 1

```

dspcons

```

Description

Displays all connections

System Response

```

sw83          VT      SuperUser      IGX 8430      9.2          Aug. 14 1998 12:58 PST

```

From	Remote	Remote	State	Type	Compress	Code	COS
3.1.27	NodeName	Channel					
3.1.27	sw86	13.1.1.27	Ok	atfst			0
3.1.28	sw86	13.1.1.28	Ok	atfst			0
3.1.29	sw86	13.1.1.29	Ok	atfst			0
3.1.30	sw86	13.1.1.30	Ok	atfst			0
3.1.31	sw86	13.1.1.31	Ok	atfst			0
3.1.32	sw86	13.1.1.32	Ok	atfst			0
3.1.33	sw86	13.1.1.33	Ok	atfst			0
3.1.34	sw86	13.1.1.34	Ok	atfst			0
3.1.35	sw86	13.1.1.35	Ok	atfst			0
3.1.36	sw86	13.1.1.36	Ok	atfst			0
3.1.37	sw86	13.1.1.37	Ok	atfst			0
3.1.38	sw86	13.1.1.38	Ok	atfst			0
3.1.39	sw86	13.1.1.39	Ok	atfst			0

```

This Command: dspcons

```

```

Continue?

```

Example 2**dspcons 19.1****Description**

Display connections starting with 19.1. This example shows frame and data connections.

System Response

```
beta          TRM    YourID:1          IGX 8430    9.2    Aug. 15 1998 15:37 MST

Local        Remote    Remote
Channel      NodeName  Channel  State  Type    Compression  Code Avoid COS O
19.1.101    gamma    8.2.300  Ok    fr
19.2.302    alpha    9.2.400  Ok    fr
25.1        alpha    5.1      Ok    256    7/8        0 L
25.2        gamma    6.1      Ok    256    7/8        0 L
```

Last Command: dspcons 19.1

Next Command:

Example 3**dspscons -f****Description**

Display Frame Relay connections only.

System Response

```
beta          TRM    YourID:1          IGX 8430    9.2    Aug. 15 1998 15:38 MST

Local        Remote    Remote    Only
Channel      NodeName  Channel  State  f    Compression  Code Avoid COS O
19.1.101    gamma    8.2.300  Ok    fr
19.2.302    alpha    9.2.400  Ok    fr
```

Last Command: dspscons -f

Next Command:

Example 4**dspcons -abit****Description**

Display connections and show the status of the A-bit on the local and remote nodes.

System Response

```
sw83          VT      SuperUser      IGX 8410      9.2          Aug. 14 1998 13:02 PST
```

Local Channel	Remote NodeName	Remote Channel	State	Local Abit	Remote Abit
3.1.1	sw86	13.1.1.1	Ok	OK	OK
3.1.2	sw86	13.1.1.2	Ok	OK	OK
3.1.3	sw86	13.1.1.3	Ok	OK	OK
3.1.4	sw86	13.1.1.4	Ok	OK	OK
3.1.5	sw86	13.1.1.5	Ok	OK	OK
3.1.6	sw86	13.1.1.6	Ok	OK	OK
3.1.7	sw86	13.1.1.7	Ok	OK	OK
3.1.8	sw86	13.1.1.8	Ok	OK	OK
3.1.9	sw86	13.1.1.9	Ok	OK	OK
3.1.10	sw86	13.1.1.10	Ok	OK	OK
3.1.11	sw86	13.1.1.11	Ok	OK	OK
3.1.12	sw86	13.1.1.12	Ok	OK	OK
3.1.13	sw86	13.1.1.13	Ok	OK	OK

```
This Command: dspcons -abit
```

```
Continue?
```

Example 5**dspcons****Description**

Display connections.

System Response

```

sw99TN      StrataCom  BPX 8620  9.2.10      Aug. 27 1998 08:59 GMT

Local      Remote      Remote      Route
Channel    NodeName    ChannelState Type        Avoid    COS    O
-----
3.2.6.16sw1410.1.6.16Ok  vbr          0    L
3.2.6.17sw1410.1.6.17Ok  vbr          0    L
3.2.6.18sw1410.1.6.18Ok  vbr          0    L
3.2.6.19sw1410.1.6.19Ok  vbr          0    L
3.2.6.20sw1410.1.6.20Ok  vbr          0    L
3.2.6.21sw1410.1.6.21Ok  vbr          0    L
3.2.6.22sw1410.1.6.22Ok  vbr          0    L
3.2.6.16sw15716.1.6Failed atfr0        L
3.2.6.17sw15716.1.7Failed atfr          0    L
3.2.8.18sw15716.1.8OAM-F atfr          0    L
3.2.8.19sw15716.1.9OAM-F atfr    0    L

```

Last Command: dspcons

Example 6**dspcons -oam**

Description

Display connections that have failed the OAM Loopback Test.

System Response

```
sw99TNStrataComBPX 159.2.10Aug. 27 1998 08:59 GMT

Local          Remote          RemoteRoute
Channel        NodeName        ChannelState   Type AvoidCOS  O
-----
3.2.6.16sw15716.1.6OAM-Fatfr0L
3.2.6.17sw15716.1.7OAM-Fatfr0L
3.2.8.18sw15716.1.8OAM-Fatfr0L
3.2.8.19sw15716.1.9OAM-Fatfr0L

Last Command: dspcons -oam

Next Command:
```

Table 8-38 dspcons—Optional Parameters

Parameter	Description
start channel	Specifies the channel to begin the display. Specify <i>start channel</i> in one of the following formats: <i>slot.port.DLCI</i> (Frame Relay channel) <i>remote node.group_name</i> (Frame Relay group connection) If you do not specify a starting channel, the display begins at the first connection.
node name	Specifies that only connections to this remote node from the local node be displayed. If no <i>nodename</i> is designated, connections from the local node to all other nodes are displayed.
(connection types)	Specifies that only connections of a certain type be displayed. If you do not add at least one argument to specify a particular connection type, all connections appear. When you enter the connection type on the command line, precede it with a hyphen (-). In some cases, you can add more than one connection type (with a space between), but not all compound arguments are compatible, so you may not always see the expected combination of types. The connection types are: -v displays only voice connections. -d displays only data connections. -f displays only Frame Relay connections. -abit shows A-bit (nni) status. -fabit shows connections with failed A-bit (nni) status. -fail shows only failed connections. -siw shows service interworking connections. -atfr shows only network interworking connections.

dspfrcls

Displays the configuration of a Frame Relay class. Network-wide classes are available to provide a shortcut for adding Frame Relay connections. Refer to the section titled “Using Frame Relay Classes” at the beginning of this chapter for a definition of a Frame Relay class.

The */* in the PIR (Peak Information Rate) column means that if a connection is added using this Frame Relay class, the PIR for this connection will be equal to that of the port speed on which the connection was added. For example, if the port speed for port 6.1 = 64 kbps, and if a connection 6.1.100 is adding using the Frame Relay class, it will have a value of 64 kbps for the PIR parameter.

Full Name

Display Frame Relay classes

Syntax

```
dspfrcls
```

Related Commands

addcon, cnffrcls

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	No	No	IGX	No

Example 1**dspfrcls****Description**

Display the Frame Relay class configurations.

The screen display is the same as that for the **cnffrcls** command.

System Response

```
sw83          TN      SuperUser      IGX 8420      9.2      Aug. 23 1998 13:43 GMT
```

```
Frame Relay Connection Classes
```

```
#      MIR      CIR      VC Q Depth      PIR      Cmax      ECN QThresh
1  9.6/9.6  9.6/9.6  65535/65535      */*      10/10      65535/65535
   QIR:  9.6/9.6  FST: n % Util: 100/100 Description: "Default 9.6"
2 19.2/19.2 19.2/19.2 65535/65535      */*      10/10      65535/65535
   QIR: 19.2/19.2 FST: n % Util: 100/100 Description: "Default 19.2"
3  16/16     16/16     65535/65535      */*      10/10      65535/65535
   QIR:  16/16     FST: n % Util: 100/100 Description: "Default 16"
4  32/32     32/32     65535/65535      */*      10/10      65535/65535
   QIR:  32/32     FST: n % Util: 100/100 Description: "Default 32"
5  56/56     56/56     65535/65535      */*      10/10      65535/65535
   QIR:  56/56     FST: n % Util: 100/100 Description: "Default 56"
```

```
This Command: dspfrcls
```

```
Continue?
```

dspfrport

Displays information on Frame Relay cards and physical and logical ports. The applicable card sets are the FRP, FRM, and UFM. The content of the information display depends on the arguments you include with the command. The information can be:

- The status of all Frame Relay ports in a node
- General information on all ports on a selected FRP, FRM, or UFM card
- Configuration information on a single Frame Relay port

The following are examples of the **dspfrport** command syntax:

- dspfrport** Display the states of all Frame Relay ports in the node.
- dspfrport 8** Display the port states for FRP in slot 8.
- dspfrport 8.1** Display the configuration for port 1 of the FRP in slot 8.
- dspfrport 6.44** Display the configuration for logical port 44 of the FRP-2 in slot 6.

Table 8-39 lists the possible displayed port parameters for a single port. For a more detailed description of these parameters, refer to the **cnffrport** command.

Table 8-39 Frame Relay Port Parameters

Parameters	Parameters
Port number	Polling Verification Timer
DLCI number	Error Threshold
State: Active or inactive	Monitored Events Count
Interface Type: V.35 or X.21, DCE or DTE	Priority Communicated
Configured clock speed in Kbps	The lead states in the Interface Control Template
Measured clock speed in Kbps	Receiver Not Ready Thresholds
The port VC queue depth in bytes	Flags per frame
The VC queue ECN threshold in bytes	OAM FastPacket Threshold (for NNI ports)
The DE threshold	Link Integrity Timer (for NNI ports FRP rev. F/H or above)
The Signaling Protocol	Full Status Polling cycle (for NNI ports)
Asynchronous Status	

Full Name

Display Frame Relay port

Syntax

dspfrport [slot | slot.port]

Related Commands

cnffrport, **upfrport**, **dnfrport**

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	No	No	IGX	No

Example 1

```
dspfrport
```

Description

Display the port status of the Frame Relay ports in the node.

System Response

```
alpha          TRM   YourID:1      IGX 8420     9.2   Aug. 15 1997 15:48 PST
```

```
FRP Port States
Port  ID   State
9.1   0     ACTIVE
9.2   0     ACTIVE
9.3   0     INACTIVE
9.4   0     INACTIVE
```

```
Last Command: dspfrport
```

```
Next Command:
```

Example 2**dspfrport 5****Description**

Display the status of the ports on the FRP in slot 5.

System Response

```
pubsipx1      TN    SuperUser    IGX 8420     9.2   Sep. 7 1997 02:11 PDT
```

```
Port configuration for FRP 5
```

Port	ID	Speed	Interface	State	Protocol	Port Type
1	0	256	FRI-V35 (DCE)	ACTIVE	None	FR
2	0	256	FRI-V35 (DCE)	INACTIVE	None	FR
3	0	256	FRI-V35 (DCE)	INACTIVE	None	FR
4	0	256	FRI-V35 (DCE)	INACTIVE	None	FR

```
Last Command: dspfrport 5
```

```
Next Command:
```

Example 3**dspfrport 5.1****Description**

Display port status for logical Frame Relay port 5.1. In the example, note the range of channels.

System Response

```

sw109          VT      SuperUser      IGX 16      9.2  Aug. 21 1997 18:14 GMT

Port:          5.1          [ACTIVE ]
Interface:     E1B          Configured Clock: 960 Kbps
Clocking:      None        Measured Rx Clock: None

Port ID                -          Min Flags / Frames          1
Port Queue Depth      32000      OAM Pkt Threshold          3 pkts
ECN Queue Threshold   65535     T391 Link Intg Timer       10 sec
DE Threshold          100 %     N391 Full Status Poll      6 cyl
Signalling Protocol   None       EFCI Mapping Enabled       No
Asynchronous Status   No        CLLM Enabled/Tx Timer      No/ 0 msec
T392 Polling Verif Timer 15       IDE to DE Mapping          Yes
N392 Error Threshold  3        Channel Speed              64
N393 Monitored Events Count 4        Line Number                 1
Communicate Priority   No        Channel Range              1-15
Upper/Lower RNR Thresh 75%/ 25%

Last Command: dspfrport 5.1

Next Command:

```

Example 4**dspfrport 5****Description**

Display port status for all the Port Concentrator ports at slot 5.

System Response

```
tecate          LAN    SuperUser      IGX 8420    9.2    Aug. 6 1997  09:59 PST
```

```
Port configuration for FRP 5
```

Port	ID	Speed	Interface	State	Protocol
1	0	64	V.35 (DCE)	ACTIVE	None
2	0	64	V.35 (DCE)	ACTIVE	None
3	0	38.4	V.11 (DTE)	ACTIVE	None
4	0	38.4	V.11 (DCE)	ACTIVE	None
5	0	38.4	V.11 (DCE)	ACTIVE	None
6	0	38.4	V.11 (DTE)	ACTIVE	None
7	0	19.2	V.11 (DCE)	ACTIVE	None
8	0	19.2	V.28 (DCE)	ACTIVE	None
9	0	19.2	V.28 (DTE)	ACTIVE	None
10	0	38.4	V.28 (DCE)	INACTIVE	None
11	0	38.4	V.28 (DCE)	INACTIVE	None
12	0	38.4	V.28 (DCE)	INACTIVE	None

```
Last Command: dspfrport 5
```

```
Continue?
```

Example 5**dspfrport 6.44****Description**

Display port configuration for Frame Relay port 6.44 (a Port Concentrator port).

System Response

```
singha          TN    SuperUser      IPX 32    9.2    July 7 1997  13:38 GMT
```

```
Port:          6.44          [FAILED]
Interface:     V.11    DCE          Configured Clock:  38.4 Kbps
Clocking:      Normal          Startup Rx Clock:  0 Kbps
Min Flags / Frames          1

Port ID          0
Port Queue Depth          65535    OAM Pkt Threshold          3 pkts
ECN Queue Threshold          65535    T391 Link Intg Timer          10 sec
DE Threshold          100 %    N391 Full Status Poll          6 cyl
Signalling Protocol          None    EFCI Mapping Enabled          No
Asynchronous Status          No    CLLM Enabled/Tx Timer          No/ 0 msec
T392 Polling Verif Timer          15    IDE to DE Mapping          Yes
N392 Error Threshold          3    Interface Control Template
N393 Monitored Events Count          4    Lead          I
Communicate Priority          No    State          ON
Upper/Lower RNR Thresh          75%/ 25%
```

```
Last Command: dspfrport 6.44
```

```
Next Command:
```

dspfrport

Displays physical port configuration for FRM-2 or FRP-2 ports connected to a Port Concentrator. The following is a list of possible displayed parameters for a port.


Note

The screen displayed with this command includes fields for standard Frame Relay ports on the FRM card. Only the fields in the following table have meaning for a Port Concentrator.

Table 8-40 dspfrport—Displayed PCS Parameters

Field	Meaning
Interface	Always <i>FRI-X.21 DCE</i> for PCS ports.
Clocking	Always <i>Normal</i> for PCS ports.
Port Type	Specifies port type, always FR (Frame Relay) for PCS ports.
Port ID	Specifies the DLCI for the port, always 1022 for PCS ports.
Port Queue Depth	Specifies the maximum bytes queued for transmission from the FRM-2 or FRP-2 port. The range is 0–65535; 65535 is the default.
DE Threshold	Specifies the port depth queue above which frames with the Discard Eligibility bit set will be discarded. Valid entries are 0–100 percent, with a default of 100 percent. 100 percent effectively disables DE for the port.
Signaling Protocol	For Frame Relay ports, specifies LMI operation mode. For PCS ports, this is set to <i>None</i> .
Measured Rx Clock	The actual speed of received data as clocked by the FRM-2 or FRP-2. Under normal operation, this should always display the fixed concentrated link speed of 512 Kbps. Clock speed is measured by the FRM-2 or FRP-2 once per minute.
Concentrated Link Util	Current utilization percentage of the concentrated link. Utilization is defined as the percentage of the fixed link speed (512K) used for data. Since the maximum allowable aggregate for each link's 11 ports is 448 Kbps, 88 percent is the maximum value for this field.
Min Flags / Frames	Specifies the minimum number of flags per frame. All values greater than zero are valid; the default is 1.
OAM Pkt Threshold	Specifies the OAM FastPackets used within the local node to transmit the NNI status from the remote network. The range of values is 0–15 packets. The default is 3. A 0 disables this function.

Full Name

Display FRC-2/FRM-2 port configuration

Syntax

dspfrport <slot.port> <interval>

Related Commands**dspfrport, dspbob****Attributes**

Privilege	Jobs	Log	Node	Lock
1-2	No	No	IPX, IGX	No

Example 1**dspfrport 3.1****Description**

Display the configuration of port 3.1.

System Response

```

tecate          LAN   SuperUser      IGX 8420   9.2   Aug. 6 1998  10:25 PST
Physical Port:      3.1           [ACTIVE]
Interface:  FRI-X.21 DCE                Configured Clock:  512 Kbps
Clocking:   Normal                       Measured Rx Clock: 512 Kbps
Port Type   FR                               Min Flags / Frames 1
Port ID     1022
Port Queue Depth 65535      OAM Pkt Threshold   3 pkts
ECN Queue Threshold 65535    T391 Link Intg Timer 6 sec
DE Threshold 100 %      N391 Full Status Poll 10 cyl
Signalling Protocol None      ForeSight (CLLM)     No
Asynchronous Status No      CLLM Status Tx Timer 0 msec
T392 Polling Verif Timer 15    IDE to DE Mapping    Yes
N392 Error Threshold 3      Interface Control Template
N393 Monitored Events Count 4      Lead I
Communicate Priority No      State ON
Upper/Lower RNR Thresh 75%/ 25% Concentrated Link Util 88%

```

Last Command: dspfrport 3.1

Next Command:

Table 8-41 dspfrport-Parameters

Parameter	Description
slot.port	Specifies the physical slot and port of the Frame Relay card set. The range is 1-4.
interval	Specifies the screen update interval in seconds. The default is five seconds.

dspict

Displays interface control template information for data channels and Frame Relay ports. The information includes:

- The specified channel.
- The type of template: a, c, l, n, or f.
- The associated output leads and their status:

- ON.
- OFF.
- Following a local input.
- Following a remote input.

For Frame Relay ports, the entire port configuration screen is displayed (see **dspfrport** command). The input being followed is specified, when applicable. Any RTS to CTS delay is also shown.

Full Name

Display interface control template

Syntax

```
dspict <port> <template>
```

Related Commands

cnfict, **cpyict**

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	No	No	IPX, IGX	No

Example 1

```
dspict 25.1 a
```

Description

Display the active interface control template for channel 25.1.

System Response

```
beta          TRM   YourID:1          IPX 32    9.2    Aug. 15 1997 17:33 MST
```

```
Data Channel:    25.1
Interface:       RS232  DCE
Clocking:        Normal
```

```
Interface Control Template for Connection while ACTIVE
```

Lead	Output Value	Lead	Output Value
RI	OFF	DSR	ON
CTS	ON	SRxD	ON
DCR	OFF	DCD	ON
SCTS	ON	SDCD	ON
SQ	ON		

```
Last Command: dspict 25.1 a
```

```
Next Command:
```

Example 2**dspict 9.1 a****Description**

Display the Frame Relay data channel 9.1 interface control template.

System Response

```
alpha          TRM   YourID:1          IGX 8420  9.2    Aug. 23 1997 10:26 PST
```

```
Port:          9.1          [ACTIVE ]
Interface:     FRI-V35 DTE          Configured Clock: 256 Kbps
Clocking:      Normal          Measured Rx Clock: 0 Kbps
Port ID                7
Port Queue Depth      65535          OAM Pkt Threshold      3 pkts
ECN Queue Threshold   65535          T391 Link Intg Timer    6 sec
DE Threshold          100 %          N391 Full Status Poll   10 cyl
Signalling Protocol   None          ForeSight (CLLM)        No
Asynchronous Status   No          CLLM Status Tx Timer    0 msec
T392 Polling Verif Timer 15          Interface Control Template
N392 Error Threshold   3          Lead                    State
N393 Monitored Events Count 4          RTS                      ON
Communicate Priority    No          DTR                      ON
Upper/Lower RNR Thresh 75%/ 25%
Min Flags / Frames     1
```

```
Last Command: dspict 9.1 a
```

```
Next Command:
```

Table 8-42 *dspict*—Parameters

Parameter	Description
port	Specifies the physical slot and port of the Frame Relay card set.
template	Specifies the template. Choices are a, c, n, l, and f.

dspmode

Displays the *mode* of the card. The mode applies only to a UFM-U back card. The UFM-U back cards are the UFI-12V.35, UFI-12X.21, and UFI-4HSSI. A card mode is a combination of maximum port speeds and for specific port numbers. Table 8-43 lists the maximum port speeds and active ports for each mode. For a description of the UFM-U modes, see the UFM-U description in the *Cisco IGX 8400 Series Reference*.

Table 8-43 Card Modes for Unchannelized Back Cards

Mode	V.35 and X.21 Ports												HSSI Ports				
	Group A				Group B				Group C				1	2	3	4	
	1	2	3	4	5	6	7	8	9	10	11	12					
1	3	3	3	3	3	3	3	3	3	3	3	3	3	8	8	8	8
2	8	-	8	-	8	-	8	-	8	-	8	-	8	16	-	16	-
3	10	-	-	-	10	-	-	-	10	-	-	-	10	16	-	-	-
4	8	-	8	-	3	3	3	3	3	3	3	3	3				
5	10	-	-	-	3	3	3	3	3	3	3	3	3				
6	8	-	8	-	8	-	8	-	3	3	3	3	3				
7	10	-	-	-	8	-	8	-	3	3	3	3	3				
8	10	-	-	-	10	-	-	-	3	3	3	3	3				
9	10	-	-	-	8	-	8	-	8	-	8	-	8				
10	10	-	-	-	10	-	-	-	8	-	8	-	8				
11	3	3	3	3	8	-	8	-	3	3	3	3	3				
12	3	3	3	3	3	3	3	3	8	-	8	-	8				
13	3	3	3	3	10	-	-	-	3	3	3	3	3				
14	3	3	3	3	3	3	3	3	10	-	-	-	10				
15	8	-	8	-	3	3	3	3	8	-	8	-	8				
16	3	3	3	3	8	-	8	-	8	-	8	-	8				
17	8	-	8	-	10	-	-	-	3	3	3	3	3				
18	8	-	8	-	3	3	3	3	10	-	-	-	10				
19	3	3	3	3	8	-	8	-	10	-	-	-	10				
20	3	3	3	3	10	-	-	-	8	-	8	-	8				
21	10	-	-	-	3	3	3	3	8	-	8	-	8				

Table 8-43 Card Modes for Unchannelized Back Cards (continued)

	V.35 and X.21 Ports												HSSI Ports			
	Group A				Group B				Group C							
Mode	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
22	10	-	-	-	3	3	3	3	10	-	-	-				
23	3	3	3	3	10	-	-	-	10	-	-	-				
24	8	-	8	-	10	-	-	-	8	-	8	-				
25	8	-	8	-	8	-	8	-	10	-	-	-				
26	10	-	-	-	8	-	8	-	10	-	-	-				
27	8	-	8	-	10	-	-	-	10	-	-	-				

Full Name

Display mode

Syntax`dspmode <slot>`**Related Commands**`cnffrport, cnfmode, dspmodes`**Attributes**

Privilege	Jobs	Log	Node	Lock
1-6	No	Yes	IGX	Yes

Example 1`dspmode 13`**Description**

Display the mode of the UFM-U in slot 13.

System Response

```
sw180          TN      SuperUser      IGX 16      9.2 July 30 1997 01:39 GMT
```

UFMU Card Mode Configuration

Slot Number	Configured Mode	Available Ports	Currently Activated Ports
13	1	[111111111111]	[100000000000]

Last Command: dspmode 13

Next Command:

Table 8-44 dspmode-Parameters

Parameter	Description
slot	Specifies the slot of the UFM-U card.

dspmodes

Displays the ports that are active with each *mode* of an unchannelized UFM. The mode applies only to a UFM-U back card. The UFM-U back cards are the UFI-12V.35, UFI-12X.21, and UFI-4HSSI. A card mode is a combination of maximum port speeds and specific port numbers. Refer to the description of **dspmode** for the table that lists the maximum port speeds and active ports for each mode. For a description of the UFM-U modes, see the UFM-U description in the *Cisco IGX 8400 Series Reference*.

The dspmodes command takes no parameters. Also, note that only the first three modes apply to a UFI-4HSSI.

Full Name

Display mode

Syntax

dspmode

Related Commands

cnffrport, cnfmode, dspmode

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	Yes	IPX, IGX	Yes

Example 1

```
dsppmodes
```

Description

Display the possible modes.

System Response

```
sw180          TN      SuperUser      IGX 16      9.2 July 30 1997 01:39 GMT
```

```
                UFMU Card Mode Configuration
```

Slot Number	Configured Mode	Available Ports	Currently Activated Ports
13	1	[111111111111]	[100000000000]

```
Last Command: dsppmode 13
```

```
Next Command:
```

dsppcs

Displays status and level information for either a specific Port Concentrator Shelf or all Port Concentrators attached to the node. When the command has a specific slot number for an argument, information appears for each concentrated link. The information for each concentrated link is as follows (see also Example 1):

- Status, where OK means the FRM-2 or FRP-2 is communicating with the PCS, and “Failed” means the FRM-2 or FRP-2 is not communicating with the PCS on the concentrated link.
 - No Test means no test (**tsppcs** command) has occurred since last reset.
 - Passed means the last PCS test (**tsppcs** command) detected no errors in the PCS hardware.
 - Failed means the last PCS test (**tsppcs** command) detected errors in the PCS hardware.

- Testing means a test (**tstpcs** command) is in progress.
- FW Revision is the firmware revision of the PCS module.
- Boot PROM Date is the boot firmware date of PCS module.
- Boot PROM Revision is the boot firmware revision of PCS module.

When the command executes without a specified slot, a general status statement and the firmware revision for each port appear (see Example 2).

Full Name

Display port concentrator shelf

Syntax

dspport [slot]

Related Commands

cnffrport, dspfrport, dspfrcbob, dspportstats

Attributes

Privilege	Jobs	Log	Node	Lock
1-3	No	No	IPX, IGX	No

Example 1**dsppcs 6****Description**

Display PCS information for port 6.

System Response

```
singha      TN      SuperUser      IPX 32      9.2      July 7 1997  14:04 GMT
```

```
Detailed Port Concentrator Display For FRP in slot 6
```

```
Link Number:      1      Link Number:      3
Status:           Failed   Status:           OK
Test Status:      No Test  Test Status:      Passed
FW Revision:      P3      FW Revision:      P3
Boot PROM Date:   11/9/95  Boot PROM Date:   11/9/95
Boot PROM Revision: P3    Boot PROM Revision: P3
```

```
Link Number:      2      Link Number:      4
Status:           Failed   Status:           OK
Test Status:      No Test  Test Status:      Passed
FW Revision:      P3      FW Revision:      P3
Boot PROM Date:   11/9/95  Boot PROM Date:   11/9/95
Boot PROM Revision: P3    Boot PROM Revision: P3
```

```
Last Command: dsppcs 6
```

```
Next Command:
```


Example 2**dsppcs****Description**

Display information for all Port Concentrator Shelves.

System Response

```
singha          TN      SuperUser      IPX 32      9.2      July 7 1997  14:02 GMT
```

```
Port Concentrator Status
```

```
Slot.Port      Status      FW Revision
6.1            Failed
6.2            Failed
6.3            OK          P3
6.4            OK          P3
```

```
Last Command: dsppcs
```

```
Next Command:
```

Table 8-45 dsppcs—Optional Parameters

Parameter	Description
slot	Specifies slot associated with the ports you want to display.

dspportids

Displays *port IDs*. The port ID is a user-specified identifier for a particular Frame Relay port where several virtual circuits share the same physical interface. The port ID can be any numeric value in the range 1–1024. The command for specifying a port ID is **cnffrport**. Note that a Port Concentrator does not use port IDs.

Full Name

Display port IDs

Syntax**dspport IDs**

Related Commands**cnffrport****Attributes**

Privilege	Jobs	Log	Node	Lock
1-2	No	No	IPX, IGX	No

Example 1**dspportids****Description**

Display the port IDs throughout the network.

System Response

```
alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 15 1997 15:55 PST
```

```
Frame Relay Port IDs
```

```
ID   Node
7    alpha |
9    alpha |
```

```
Last Command: dspportids
```

```
Next Command:
```

dspportstats

Displays a summary of port statistics for a Frame Relay port. Statistics include the data byte count in the transmit and receive directions and error counts associated with the port. The display indicates the date and time the statistics were cleared and the amount of time since the node last cleared the statistics. *Bytes transmitted* indicates the amount of data transmitted from the port to the user device. *Bytes received* indicates the amount of data received at the port from the user device.

Corrupted statistics result from channel/port loopbacks or port tests. A “yes” in this field indicates that loopback or port tests have occurred since the statistics were last cleared. The statistics for User-to-Network Interface (UNI) ports (connections to user devices) are displayed with one screen. Table 8-46 lists usage statistics displayed in screen 1.

The **dspportstats** command also displays the following statistics.

Table 8-46 UNI Port Statistics for Frame Relay

Frame Errors	LMI Statistics	Miscellaneous Statistics
Invalid CRC	Status Enquiries Received	Average TX Port Q
Invalid Alignment	Status Transmitted	FECN Frames
Invalid Frame Length	Update Transmit	FECN Ratio (%)

Table 8-46 UNI Port Statistics for Frame Relay (continued)

Frame Errors	LMI Statistics	Miscellaneous Statistics
Invalid Frame Format	Invalid Requests	BECN Frames
Unknown DLCIs	Sequence # Mismatches	BECN Ratio (%)
Last Unknown DLCI	Timeouts	Resource Overflow
	Signaling Protocol	DE Frames Dropped (Egress)

Network to Network (NNI) ports require two screens to display all the parameters. The first screen is the same as described previously for UNI ports—you display the second screen by responding with a “y” for yes to the Continue? prompt. The second screen compares receive LMI statistics with transmit LMI statistics. The LMI receive statistics are repeated from the middle column of the first screen and displayed again so you can compare them. Table 8-47 lists the usage statistics in screen 2.

Table 8-47 LMI Statistics for Frame Relay

LMI Receive Protocol Stats	LMI Transmit Protocol Statistics
Status Enquiries Received	Status Inquiries Transmitted
Status Enquiries Transmitted	Status Received
Asynchronous Status Transmitted	Asynchronous Status Received
Sequence # Mismatches	Sequence # Mismatches
Timeouts	Timeouts
Invalid Frames	
Signaling Protocol	

The command displays frame error, LMI, and miscellaneous statistics, as shown in Table 8-48.

Table 8-48 Frame Error Statistics

Statistics	Description
CRC Errors	<p>Based on a CRC CCITT 16-bit frame check sequence, which is a cyclic redundancy check. If the frame received at a port has an incorrect CRC, it is flagged as a CRC error, and the frame is discarded.</p> <p>Receive Frame CRC Errors (Ingress). Provides a count of the number of frames received from the attached equipment in which the CRC calculated by the IGX does not match the CRC provided by the attached equipment in the last two octets of the frame.</p> <p>Any frame received with an incorrect CRC is discard by the network.</p> <p>However, the IGX does not wait to receive the entire frame before starting to packetize the frame and send it through the network. As long as the frame header format is valid (see Invalid Format Receive Frames statistic) and the DLCI field in the frame header is recognized (see Receive Frames Undefined DLCI Count statistic below), packets containing the beginning of the frame are created—one start-of-frame (SOF) packet and subsequent middle-of-frame (MOF) packets—and sent as soon as possible.</p> <p>If the frame is short and if there are other packets already waiting to be sent, the detection of the CRC error will cause all the packets of the frame to be discarded. However, if the frame is long and there is no congestion in the ingress VC queue, some packets are sent through the network before the CRC error is detected. As soon as the CRC error is detected, any portion of the frame that has not yet been sent is discarded. In particular, no end of frame (EOF) packet is ever sent. At the far end, when an SOF packet arrives that does not immediately follow an EOF packet, the incomplete frame is discard and counted in the PVC statistic of Transmit Frames Discarded. If the CRC is incorrect because of a bit error in the DLCI field in the frame header, then the error will also be recorded as a Receive Frame with Undefined DLCI unless the errored DLCI is also configured on the port. This statistic is a subset of the Frames Received statistic.</p>

Table 8-48 Frame Error Statistics (continued)

Statistics	Description
Alignment error	<p data-bbox="654 315 1144 346">Frame was not an integral number of bytes.</p> <p data-bbox="654 357 1385 514">Receive Frame Alignment Errors (Ingress). This statistic provides a count of the number of frames received from the attached equipment in which the total frame length is not an integral number of octets. Any frame received with an incorrect alignment is discarded by the network.</p> <p data-bbox="654 525 1385 787">However, the IGX does not wait to receive the entire frame before starting to packetize the frame and send it to the network. As long as the frame header format is valid (See Invalid Format Receive Frames statistic), and the DLCI field in the frame header is recognized (see Receive Frames Undefined DLCI Count statistic), packets containing the beginning of the frame are created—one start-of-frame (SOF) packet and subsequent middle-of-frame (MOF) packets—and sent as soon as possible.</p> <p data-bbox="654 798 1385 1060">If the frame is short or if there are other packets already waiting to be sent, the detection of the alignment error will cause all the packets of the frame to be discarded. However, if the frame is long and there is no congestion in the ingress VC queue, some packets are sent through the network before the alignment error is detected. As soon as the alignment error is detected, any portion of the frame that has not yet been sent is discarded. In particular, no end-of-frame (EOF) packet is ever sent.</p> <p data-bbox="654 1071 1385 1222">When the next frame arrives, a new SOF packet is sent, etc. At the far end, when an SOF packet arrives that does not immediately follow an EOF packet, the incomplete frame is discarded and counted in the PVC statistic of Transmit Frames Discarded. This statistic is a subset of the Frames Received statistic.</p>

Table 8-48 Frame Error Statistics (continued)

Statistics	Description
Frame length errors	<p>Frames < 5 bytes or >4096 bytes.</p> <p>Illegal Length Receive Frames (Ingress). Provides a count of the number of frames received from the attached equipment in which the total frame length is either too short or too long. To be accepted, a frame must be at least five octets, but no more than 4510 octets long, including the header and frame check sequence (FCS, or CRC) octets. Any frame received with an invalid length is discard by the network. A frame that is too short is immediately detected and discarded. For a frame that is too long, the IGX does not wait to receive the entire frame before starting to packetize the frame and send it through the network.</p> <p>As long as the frame header format is valid (see Invalid Format Receives Frames statistic), and the DLCI field in the frame header is recognized (see Receive Frames Undefined DLCI Count statistic below), packets containing the beginning of the frame are created—one start of frame (SOF) packet, and sent as soon as possible. Since the frame is very long, it is very likely that some packets are sent through the network before the length error is detected. As soon as the length error is detected, any portion of the frame that has not yet been sent is discarded. In particular, no end-frame (EOF) packet is ever sent. When the next frame arrives, a new SOF packet arrives that does not immediately follow an EOF packet, the incomplete frame is discarded and counted in the PVC statistic of Transmit Frames Discarded. This statistic is a subset of the Frames Received statistic.</p>
Frame format errors	<p>Occurs when either of the least significant bits in the first two bytes of the Frame Relay header are set incorrectly. These two bytes are the frame's address field. The first byte's least significant bit is defined to be a zero, meaning that there is a second byte to the address. The second byte's least significant bit is defined to be a one, meaning this is the last byte of the address because it's a two byte address field.</p> <p>Invalid Format Receive Frames (Ingress). Provides a count of the number of frames received from the attached equipment in which the Extended Address (EA) bits (the least significant bit in each of the two Frame Relay header octets) is incorrect. The IGXIGX must see a r0s as the least significant bit of the first octet and a r1s as the least significant bit of the second octet. Any frame received with incorrect EA bits is discarded immediately. This statistic is a subset of the Frames Received statistic.</p>

Table 8-48 Frame Error Statistics (continued)

Statistics	Description
Unknown DLCIs	<p>Occurs when a frame arrives at a Frame Relay port and the DLCI has not been mapped and the frame is discarded.</p> <p>Received Frames Undefined DLCI Count (Ingress). Provides a count of the number of frames received with a DLCI for which no PVC is provisioned on this port. This count includes any signalling protocol frames received while no signaling protocol is enabled or the wrong signalling protocol is enabled (such as by enabling the Strata LMI signaling protocol while the attached equipment is generating Annex A or Annex D signaling protocol frames, or vice versa). Any frame received with an undefined DLCI is discarded immediately. This statistic is a subset of the Frames Received statistic.</p>
Last unknown DLCI	Displayed so that the user can see the unknown DLCI.

Table 8-49 LMI Statistics

Statistics	Description
Status inquiries transmitted/received	<p>Provides a count of the number of status enquiry frames received from the attached equipment as part of the selected signaling protocol. This statistic is valid for any UIN signaling protocol chosen (Strata LMI, ANSI Annex D, or CCITT Annex A). This statistic is a subset of the Frames Received statistic.</p> <p>LMI UNI Status Enquiries (Ingress). Provides a count of the number of status enquiry frames received from the attached equipment as part of the selected signaling protocol. This statistic is valid for any UNI signaling protocol chosen (Strata LMI, ANSI Annex D, or CCITT Annex A). This statistic is also valid for any NNI signaling protocol chosen (ANSI Annex D, or CCITT Annex A). This statistic is a subset of the Frames Received statistic.</p> <p>LMI NNI Status Enquiries (Egress). Provides a count of the number of status enquiry frames transmitted to the attached equipment as part of the selected signaling protocol. This statistic is valid for any NNI signaling protocol chosen (ANSI Annex D or CCITT Annex A). This statistic is a subset of the Frames Transmitted statistic.</p>
Status transmit/received	<p>The number of Status messages sent to the user device.</p> <p>LMI UNI Status Transmit Count (Egress). Provides a count of the number of status frames transmitted to the attached equipment as part of the selected signaling protocol. This statistic is valid for any UNI signalling protocol. This statistic is valid for any UNI signaling protocol chosen (Strata LMI, ANSI Annex D, or CCITT Annex A). This statistic is a subset of the Frames Transmitted statistic.</p>

Table 8-49 LMI Statistics (continued)

Statistics	Description
Async status Xmit	<p>The number of asynchronous status messages sent to the user device.</p> <p>Provides a count of the number of asynchronous status update frames transmitted to the attached equipment as part of the selected signaling protocol. This statistic is valid for any UNI signaling protocol chosen (StrataLMI, ANSI Annex D, or CCITT Annex A). This statistic is also valid for any NNI signaling protocol chosen (ANSI Annex D, or CCITT Annex A). If enabled as part of the port configuration (cnfport command), an asynchronous status update frame is generated any time a PVC is failed or downed and again any time a PVC is repaired or upped. This statistic is a subset of the Frames Transmitted statistic.</p>
Invalid requests	<p>The number of invalid requests received from the user device.</p> <p>LMI Invalid Status Enquiries (Ingress). Provides a count of the number of status enquiry frames with an invalid format received from the attached equipment as part of the selected signaling protocol. This statistic is valid for any UNI signaling protocol chosen (Strata LMI, ANSI Annex D, or CCITT Annex A). This statistic is also valid for any NNI signaling protocol chosen (ANSI Annex D, or CCITT Annex A). This statistic is a subset of the Frames Received statistic.</p>
Timeouts	<p>The number of LMI protocol timeouts.</p> <p>LMI UNI Link Timeout Errors. Provides a count of the number of times that the rT392 Polling Verification Timers times out without a Status Enquiry frame having been received. This statistic is valid for any UNI signaling protocol chosen (Strata LMI, ANSI Annex D, or CCITT Annex A). The rT392 Polling Verification Timers is configured as part of the port configuration (cnfport command).</p>
Sequence number mismatches	<p>The number of LMI protocol sequence number mismatches.</p> <p>LMI UNI Keepalive Sequence Errors. Provides a count of the number of times that there was a discontinuity in the (normally consecutive) sequence numbers contained the Status Enquiry frames received from the attached equipment. This statistic is valid for any UNI signalling protocol chosen (Strata LMI, ANSI Annex D, or CCITT Annex A).</p>
Signaling protocol	<p>The protocol selected for this Frame Relay port interface: Cisco LMI, Annex A UNI, Annex D UNI, Annex A NNI, or Annex D NNI.</p>

Table 8-50 Miscellaneous Frame Relay Use Statistics

Miscellaneous Statistics	
Statistics	Description
Average queue depth	<p>The average fill of the VC queue at the input of the FRP or FRM.</p> <p>Transmit Frames Discarded—Queue Overflow (Egress). Provides a count of the number of frames that were discarded because the port's transmit queue (egres queue) was full. The size of the port's transmit queue is configured as part of the port configuration (cnfport) command.</p> <p>Transmit Bytes Discarded—Queue Overflow (Egress). Provides a count of the number of octets in the Transmit Frames Discarded—Queue Overflow statistic. The octets counted include the Frame Relay header octets as well as the frame check sequence (FCS, or CRC) octets.</p>
BECN frames	<p>Number Explicit Congestion Notification frames transmitted to the receiving router.</p> <p>Number of Explicit Congestion Notification frames transmitted to the transmitting router.</p> <p>Percentage of BECN frames sent to the total number of frames sent.</p> <p>Frames Transmitted with BECN (Egress). Provides a count of the number of frames transmitted to the attached equipment with the Backward Explicit Congestion Notification (BECN) bit set, regardless of where in the network the congestion was observed.</p>
FECN frames	<p>The percentage of FECN frames sent to the total number of frames sent.</p> <p>Frames Transmitted with FECN (Egress). Provides a count of the number of frames transmitted to the attached equipment with the Forward Explicit Congestion Notification (FECN) bit set, regardless of the where in the network the congestion was experienced.</p> <p>This statistic is a subset of the Frames Transmitted statistic.</p>
Rsrc overflow	Resource overflow indicates the number of times the port shut down due to receive frame buffer overflow or receive queue entries.
DE Frames Dropped (Egress)	<p>The total number of frames with Discard Eligibility that were discarded.</p> <p>Provides a count of the number of frames to be transmitted to the attached device that were discarded because the frame's DE bit is set and the port's egress buffer has reached the DE threshold. The DE threshold is configured as part of the port configuration (cnfport command). This statistic is a subset of the corresponding PVCs Transmit Frames Discarded statistic.</p>

Table 8-51 CLLM (ForeSight) Statistics

Statistics	Description
CLLM Frames Received	Provides a count of the number of Consolidated Link Layer Management (CLLM) frames received from the attached equipment. CLLM frames are used to exchange PVC congestion information over an NNI port to allow the ForeSight algorithm to regulate the flow of traffic on each PVC based on congestion in the local network as well as congestion in the attached network. This is not intended to be a full implementation of the CLLM suite. The CLLM mechanism is enabled as part of the port configuration (cnfport command). This statistic is a subset of the Frames Received statistic.
CLLM Bytes Received (Ingress)	Provides a count of the number of octets in the frames counted in the CLLM Frames Received statistic. The octets counted include the Frame Relay header octets as well as the frame check sequence (FCS, or CRC) octets. This statistic is a subset of the Bytes Received statistic.
CLLM Frames Transmitted (Egress)	Provides a count of the number of Consolidated Link Layer Management (CLLM) frames transmitted to the attached equipment. CLLM frames are used to exchange PVC congestion information over an NNI port to allow the ForeSight algorithm to regulate the flow of traffic on each PVC based on congestion in the local network as well as congestion in the attached network. This is not intended to be a full implementation of the CLLM suite. The CLLM mechanism is enabled as part of the port configuration (cnfport command). This statistic is a subset of the Frames Transmitted statistic.
CLLM Bytes Transmitted (Egress)	Provides a count of the number of Consolidated Link Layer Management (CLLM) frames transmitted to the attached equipment. CLLM frames are used to exchange PVC congestion information over an NNI port to allow the ForeSight algorithm to regulate the flow of traffic on each PVC based on congestion in an attached network. This is not intended to be a full implementation of the CLLM suite. The CLLM mechanism is enabled as part of the port configuration (cnfport command). This statistic is a subset of the Frames Transmitted statistic.
CLLM Failures	Provides a count of the number of times that no CLLM frame was received within one second (not configurable), or % a CLLM frame was received with any invalid internal format. An invalid CLLM frame that is discarded is included in the statistic of Frames Received.

Full Name

Display Frame Relay port statistics

Syntax**dspportstats** <slot.port> [interval]

Related Commands**clrportstats****Attributes**

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IPX, IGX	Yes

Example 1**dsportstats 4.1****Description**

Display the port statistics for Frame Relay port 4.1.

System Response

```
alpha32      LAN    SuperUser      IPX 32    9.2    Aug. 21 1997 12:44 PST
```

```
Port Statistics for 4.1      Cleared: Aug. 21 1997 09:45      Snapshot
Port Speed: 256 kbps      Collection Time: 0 day(s) 02:56:48      Corrupted: NO
```

	Bytes	Average (kbps)	Util (%)	Frames	
From Port:	0	0	0	0	
To Port:	0	0	0	0	
Frame Errors		LMI Receive Protocol Stats	Misc Statistics		
Invalid CRC	0	Status Enq Rcvd	0	Avg Tx Port Q	0
Invalid Alignment	0	Status Xmit	0	FECN Frames	0
Invalid Frm Length	0	Asynch Xmit	0	Ratio (%)	0
Invalid Frm Format	0	Seq # Mismatches	0	BECN Frames	0
Unknown DLCIs	0	Timeouts	0	Ratio (%)	0
Last Unknown DLCI	0	Invalid Req	0	Rsrc Overflow	0
		Sig Protocol: None		DE Frms Dropd	0

```
Last Command: dsportstats 4.1
```

```
Continue to next page? (y/n)
```

Enter “y” to see subsequent screens.

```
alpha32          LAN   SuperUser      IPX 32    9.2      Aug. 21 1997 12:49 PST

Port Statistics for 4.1          Cleared: Aug. 21 1997 09:45
Port Speed: 256 kbps          Collection Time: 0 day(s) 03:03:42          Corrupted: NO

          Bytes          Average (kbps)          Util (%)          Frames
From Port:          0          0          0          0
To Port:          0          0          0          0
LMI Receive Protocol Stats LMI Transmit Protocol Stats CLLM (ForeSight) Stats
Status Enq Rcvd          0 Status Enq Xmit          --          Frames Rcvd          --
Status Xmt          0 Status Rcd          --          Bytes Rcvd          --
Asynch Xmit          0 Asynch Rcvd          --          Frames Xmt          --
Seq # Mismatches          0 Seq # Mismatches          --          Bytes Xmt          --
Timeouts          0 Timeouts          --          CLLM Failures          --
Invalid Frames          0

Sig Protocol: None

This Command: dsportstats 4.1

Hit DEL key to quit:
```

Table 8-52 dsportstats—Parameters

Parameter	Description
slot	Specifies the Frame Relay card set slot.
port	Specifies the port on the back card. The range is 1–4 for the FRI-V.35 or FRI-X.21 back cards. For channelized ports, the range is 1–24 or 1–31 for a FRI-T1 or FRI-E1, respectively, and 1-250 for a UFI back card.

Table 8-53 dsportstats—Optional Parameters

Parameter	Description
interval	Specifies the refresh interval time for data. The range is 1–60 seconds. The default interval is 1 second.

dsprtcache

This command displays the cache of all cost-based routing connections. The optional “index” parameter lets you specify a cache entry index. The optional c parameter clears the cache.

Full Name

Display cost-based route cache

Syntax

dsprtcache [index] [c]

[index] specifies the cache entry index

[c] specifies to clear the entire cache or a single entry

Related Commands

dspon, cnfrcost, cnfpref

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IPX, IGX, BPX	No

Example 1

dsprtcache

Description

Display route cache contents, and let you monitor and manually clear the cache.

System Response

```

pissaro      TN      StrataCom      BPX 15      9.1      Jun. 18 1997 11:11 GMT
Route Cache (Summary)
Index  Use   No.   Cost   Delay   Restrict   Load   VPC   Hops   RemoteNode
0      Yes   1     Yes    No      None       VBR    No    2      lautrec
1      Yes   6     Yes    No      *s         BDB    No    3      vangogh
2      Yes   9     Yes    No      None       BDA    No    3      matisse
3      Yes   3     Yes    No      *t         BDB    No    3      rousseau
4      Yes   1     Yes    No      None       CBR    No    3      seurat
      <- current
5      No    0     No     No      None       ---    No    0      ---
6      No    0     No     No      None       ---    No    0      ---
7      No    0     No     No      None       ---    No    0      ---
8      No    0     No     No      None       ---    No    0      ---
9      No    0     No     No      None       ---    No    0      ---
10     No    0     No     No      None       ---    No    0      ---
11     No    0     No     No      None       ---    No    0      ---

Last Command: dsprtcache

Next Command:

```

Table 8-54 *dsprtcache—Parameters*

Parameter	Description
index	Specifies a particular route entry within the cache. When used with the c parameter, the route is either displayed or cleared from the cache.
c	Clears the cache, or if you also enter the index parameter, clears the route cache specified by the index number.

prtchcnf

Prints the configuration details for voice channels or data channels. This command uses the same syntax, and prints the same information as is displayed using the **dspchcnf** command. See the **dspchcnf** command for syntax and output information.

Full Name

Print channel configurations

Syntax

prtchcnf [start_channel] (see **dspchcnf** description)

Related Commands

dspschcnf

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	Yes	Yes	IPX, IGX	Yes

prtcons

Prints a summary of connections terminated at the IPX or IGX node. This command uses the same syntax and prints the same information as is displayed using the **dspscons** command. See the **dspscons** command for syntax and output information.

Full Name

Print connection

Syntax

prtcons [start_channel] [nodename] [type] [+d]

Related Commands

dspscons

Attributes

Privilege	Jobs	Log	Node	Lock
1–6	Yes	No	IPX, IGX	Yes

Table 8-55 prtcons—Optional Parameters

Parameter	Description
start channel	Specifies the channel to begin the display. Specify <i>start channel</i> in one of the following formats: <i>slot.port.DLCI</i> (Frame Relay channel) <i>remote node.group_name</i> (Frame Relay group connection) If no starting channel is specified, the display begins with the first connected channel.
node name	Specifies that only connections to the remote node from the local node are displayed. If no <i>nodename</i> is designated, connections from the local node to all other nodes are displayed.
-v	Voice only.
-d	Data only.
-f	Frame relay only.
-atfr	Interworking connections.

Table 8-55 prtcons—Optional Parameters (continued)

Parameter	Description
-g	Grouped connections.
+d	Connection descriptor.
-abit	A-bit status.
-fabit	A-bit errors.
-fail	Failed connections.
-down	Downed connections.
type	Types listed in Syntax section. The state that may be displayed for Frame Relay and NNI connection types includes: OK: Connection OK, A-bit = 1. FAILED: Connection failed, A-bit = 0. MISSING: DLCI was deleted in other network NNI. A previous status report indicated a valid DLCI present but an updated report did not. UNUSED: The UNI port does not support reporting of NNI A-bit status.

prtict

Prints a data channel's interface control template. The **prtict** command uses the same syntax and prints the same information as **dspict**. See the **dspict** description for output information.

Full Name

Print interface control template

Syntax

```
prtict <port> <template>
```

Related Commands

dspict

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	Yes	No	IPX, IGX	Yes

Table 8-56 *prtict*—Parameters

Parameter	Description
port	Specifies the physical slot and port of the Frame Relay card set.
template	Specifies the template. Choices are a, c, n, l, and f.

upfrport

Activates a port on a Frame Relay card. The applicable cards are all versions of the FRP, FRM, and UFM series of cards. If the port has not been configured through the **cnffrport** command, a set of default configuration values apply.

With a Port Concentrator Shelf (PCS), *upping* the first port causes the FRP-2 or FRM-2 to begin communicating with the four PCS modules and to download code to them if necessary.

Full Name

Up Frame Relay port

Syntax

For UFM-U, FRM, or FRP: **upfrport** <slot.port>

For UFM-C: **upfrport** <slot.port> <line>

Related Commands

dnfrport, cnffrport

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	Yes	Yes	IPX, IGX	Yes

Example 1

```
upfrport 9.2
```

Description

Activate port 2 on the FRP in slot 9.

System Response

```

alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 15 1997 15:51 PST

Port:          9.2          [ACTIVE ]
Interface:     FRI-V35 DTE          Configured Clock: 256 Kbps
Clocking:      Normal          Measured Rx Clock: 0 Kbps
Port ID       0
Port Queue Depth 65535      OAM Pkt Threshold 3 pkts
ECN Queue Threshold 65535      T391 Link Intg Timer 6 sec
DE Threshold   100 %      N391 Full Status Poll 10 cyl
Signalling Protocol None      ForeSight (CLLM) No
Asynchronous Status No      CLLM Status Tx Timer 0 msec
T392 Polling Verif Timer 15      Interface Control Template
N392 Error Threshold 3      Lead State
N393 Monitored Events Count 4      RTS ON
Communicate Priority No      DTR ON
Upper/Lower RNR Thresh 75%/ 25%
Min Flags / Frames 1

```

Last Command: upfrport 9.2

Next Command:

Table 8-57 upfrport—Parameters

Parameter	Description
slot	Specifies slot number of the card containing the port.
port	Specifies the port. The ranges are: 1–250 on a UFM-C 1–12 on UFM-U with a UFI-12V.35 or UFI-12X.21 1–4 on UFM-U with a UFI-4HSSI 1–4 on an FRP or FRM 1–44 on an FRP-2 or FRM-2.
line	Applies to UFM-C only. The line is the physical connector. The range is 1–8 for T1 or E1.



ATM Connections

This chapter describes the ATM commands that let you activate and configure ATM connections as well as statistical reporting for these connections at an ATM UNI in a BPX or IGX node. You can add ATM connections to an ASI or BXM in a BPX node, or to an ALM/A or UXM in an IGX node. Table 9-1 lists the ATM UNI card combinations for BPX and IGX nodes. For details on ATM commands and other support on an MGX 8220 shelf, refer to the MGX 8220 documentation. For details on ATM commands on an MGX 8550 shelf, refer to the MGX 8550 documentation.

Table 9-1 ATM UNI Cards

Front Card	Back Card
ALM/A	BC-UAI-1T3 or BC-UAI-1E3
ASI-T3	LM-2T3 (Two ports)
ASI-E3	LM-2E3 (Two ports)
ASI-155	MMF-2-BC, SMF-2-BC, or SMF LR-2-BC
UXM	UAI-4OC3MMF, UAI-4OC3SMF, UAI-2OC3SMF, UAI-8T1-IMA DB15, UAI-8E1-IMA DB15, UAI-8E1-IMA BNC
BXM-T3-8 or BXM-T3-12	BPX-T3/E3-8/12 (a universal back card for BXM-T3 or E3)
BXM-E3-8 or BXM-E3-12	BPX-T3/E3-8/12 (a universal back card for BXM-T3 or E3)
BXM-155-4	MMF-155-4, SMF-155-4, or SMFLR-155-4
BXM-155-8	MMF-155-8, SMF-155-8, or SMFLR-155-8
BXM-622	SMF-622 or SMFLR-622
BXM-622-2	SMF-622-2 or SMFLR-622-2

Setting Up an ATM Connection

To set up an ATM connection, perform the following steps:

- Step 1** Activate a line with the **upln** command. Activating a line makes it available so you can configure it. Also, it starts statistics collection. Subsequently, you can begin to add connections with **addcon**. You can verify that the line has been activated by using the **dsplns** command. (See the chapter titled “Setting Up Lines” for descriptions of **upln** and **dsplns**.)
- Step 2** Activate the ATM port with the **upport X.X** command, where X.X is the slot and port of the ATM card set.

- Step 3** Use the **cnfport** command to establish the characteristics for the ATM port.
- Step 4** If a suitable class is already configured, note its number and use this class when adding the ATM connection with the **addcon** command. (The **dspcls** command displays the parameters for each connection class. The **cnfcls** command allows you to modify an individual class.)
- Step 5** Use the **vt** command to log in to the node at the remote end of the proposed ATM connection.
- Step 6** At the remote node, use the **upln**, **upport**, and **cnfport** commands, as listed in steps 1 and 2, to activate and configure the remote port.
- Step 7** Use the **addcon** command at one end of the connection to activate the ATM connection.
-

Managing Bandwidth

There are several commands that assist you in managing bandwidth to achieve satisfactory traffic patterns.

- **cnfpref** Use the configure preference command to specify preferred routing for intra-domain connections. You can use this command to assist in balancing the load on the network's trunks.
- **dsprts, prtrts** Use the display and print routes commands in conjunction with the **cnfpref** command to display the current connection routing information.
- **upcon, dncon** Use the up and down connection commands to temporarily down connections, thus releasing bandwidth for other services. Frequently, to provide more bandwidth for data, Frame Relay, or ATM traffic, you can down some voice connections.

Other Commands

The following commands are useful in establishing connections.

- **delcon** Deletes a connection from an ATM line.
- **dspscons** Displays the connections on a specified ATM line.
- **dsplnutl** Displays the line utilization for an ATM line.

Summary of Commands

Table 9-2 shows the name of each ATM connection command and the page the command description starts on.

Table 9-2 ATM Connection Commands

Mnemonic	Description	Page
addcon	Add connection	9-3
clrchstats	Clear channel statistics	9-16
cnfabrparm	Configure ABR parameters (applies to BXM)	* See below
cnfatmcls	Configure ATM class	9-18
cnfcdparm	Configure channel statistic level on UXM/BXM cards	*See below.
cnfcls	Configure class	9-20
cnfcon	Configure connection	9-23
cnfport	Configure port	9-25
cnfportq	Configure port queue	9-33
delcon	Delete connection	9-36
dnport	Down port	9-37
dspatmcls	Display ATM class	9-38
dspchstats	Display channel statistics	9-40
dspcls	Display class	9-47
dspcon	Display connection	9-49
dspconcnf	Display connection configuration	9-55
dspcons	Display connections	9-58
dsplmistats	Display LMI statistics	9-65
dspport	Display port	9-69
dspportq	Display port queue	9-71
dspportstats	Display port statistics	9-73
upport	Up port	9-78

*Refer to the Cisco WAN Switching SuperUser Command Reference.

addcon

Establishes an ATM connection between the current node and one or more nodes in the network. You can add ATM connections at a UNI port on either an ASI or a BXM in a BPX node, or an ALM/A or a UXM in an IGX node. When used with the syntax in this chapter, **addcon** adds either a standard ATM connection or an ATM-Frame Relay interworking connection. You can also use **addcon** to add a virtual path connection (or VP tunnelling DAX connection) between a line port on an IGX-UXM as the VP side, and the line port at the ATM cloud entry point as the VCC side. For a description of the **addcon** command as it applies to Frame Relay connections, voice connections, or serial data connections, refer to the chapter in this manual that describes the applicable traffic type. For descriptions of the ATM commands that operate on an MGX 8220 shelf, see the MGX 8220 documentation. For descriptions of the ATM commands that operate on an MGX 8850 shelf, see the MGX 8850 documentation.

Note that in this release, on BXM and UXM cards, you can configure port and trunk (routing and feeder trunk) interfaces on the same card slot. For example, you can have port 1 on a BXM slot upped as a trunk interface while having port 2 on the same card slot upped as a line interface. For more information on the Port and Trunks feature, refer to the “Setting Up Trunks” chapter.

In Release 9.2.10, you can add VP tunnelling DAX connections. This type of connection has a VP connection as one end of the connection, and the other end as a VC connection. This VP tunnelling DAX connection can be between different port interfaces on the same UXM card, or on different UXM cards. See Example 2.

In Release 9.2.20, you can add both rt-VBR and nrt-VBR connections. The parameter prompts are the same for both rt-VBR and nrt-VBR, except for Trunk Cell Routing Restrict, which displays for all ATM connections except real-time VBR connections. (This is because rt-VBR connections should only be routed over ATM trunks such as BXM, UXM, and ASI trunks; rt-VBR connections should not be routed over FastPacket trunks such as BTM or ALM/B trunks.)

**Note**

In Release 9.2.20, the rt-VBR class of service is supported on the IGX UXM and BPX BXM, ASI, and BNI cards only. It is not supported for BTM or ALM-A/B connection endpoints. The rt-VBR class of service is not supported on FastPacket trunks, nor is it supported on MGX 8850 or MGX 8220 (AXIS) interface shelves.

Note that for segment connections, all 2- and 3-segment connections must be the same, that is, all rt-VBR or all nrt-VBR. The CLI will not block you from adding any combination of rt-VBR or nrt-VBR segment connections.

The CLI will block you from adding rt-VBR connections in a network of nodes running releases previous to Release 9.2. All nodes in the network must be first upgraded to Release 9.2.10. In a mixed network of Release 9.1 and 9.2.20, or Release 9.2.10 and 9.2.20, the rt-VBR class of service is not supported—in this scenario, all VBR connections will function as nrt-VBR connections. To support rt-VBR, all nodes in the network must be running switch software 9.2.20. See the *Cisco WAN Switching 9.2 Release Notes* for more information.

In Release 9.2.0, the switch software supports a minimum Peak Cell Rate (PCR) of 6 cps *without* policing enabled on both the BXM and UXM. In Release 9.3.0, the switch software supports a minimum PCR of 6 cps *with* policing enabled (with certain card limitations). Use the **dspcd** command to determine if this feature is supported on a given slot. Use the **addcon** command to set the minimum PCR values. If these values are less than the minimum values supported on a given card, the command line interface will not allow you to set them until you have disabled policing. (A prompt will let you know about this limitation, and allow you to disable policing.) Note the following when adding a card:

1. If this new feature is enabled on a card, but is replaced by a card with older firmware (not supporting this feature) the **dspcd** screen parameter “card status” will display “Mismatch,” and indicate the reason for the mismatch.
2. If two cards are loaded with new firmware supporting this feature and configured for Y-redundancy, and one replaced with a card with old firmware, the result is a “mismatch.”

For ABRSTD, a policing prompt is now added for VSVD=OFF connections.

Please refer to Table 9-5 for a list of cards that are supported by this feature and their performance specifications.

The **addcon** command for ATM adds any one of the following types of ATM connections:

- Constant Bit Rate (CBR)
- Variable Bit Rate (VBR)—rt-VBR and nrt-VBR

- Frame Relay-to-ATM interworking connection (ATFR)
- Frame Relay-to-ATM interworking with ForeSight (ATFST) connection
- Available Bit Rate according to ATM Forum standards (ABRSTD)
- Available Bit Rate with ForeSight (ABRFST)
- Frame Relay to ATM transparent Service Interworking (ATFT)
- Frame Relay to ATM transparent Service Interworking (ATFTFST)
- Frame Relay to ATM translational Service Interworking (ATFX)
- Frame Relay to ATM translational Service Interworking (ATFXFST)
- Unspecified Bit Rate (UBR)

Detailed connection sequences can be found in the <CellCommandItalic>Cisco BPX Series Installation and Configuration. This description has the following information:

- A table that names each type of policing
- A table showing each connection parameter, possible values, and defaults
- A table with a brief definition of each connection parameter
- Example screens from the command line interface

For detailed descriptions of the connection types, traffic classes, policing, and ATM-related topics, refer to the *Cisco BPX 8600 Series Installation and Configuration* guide or the ATM Forum specifications.

The node on which **addcon** executes is the “owner” of the connection. Connection ownership is important because automatic rerouting and preferred routing information is entered on the node that owns the connection. See the **cnfpref** and **cnfcos** descriptions for details on automatic rerouting.

The parameter prompts depend on the connection type. The figures on this and the following pages are flow diagrams showing the sequence of possible parameter prompts according to the connection type. The flow diagrams begin at the point after you have entered the remote node name and VPI and VCI (which are common parameters). The subsequent tables define the parameters and list the defaults and ranges for each parameter.

A form of notation appears for some parameters that may need explanation. The notation is either (0), (1), or (0+1). This refers to the state of the Cell Loss Priority (CLP) bit. The usage of the CLP bit is in the traffic policing schemes. (0+1) means cells with CLP=0 or 1. (0) means cells with CLP=0. (1) means cells with CLP=1. The CLP bit is used in different contexts. For example, CDVT (0+1) refers to Cell Delay Variation Tolerance (CDVT) for cells with CLP=0 or 1.

Before a connection is added, the proposed connection appears on the screen prompting you to confirm. After **addcon** executes, the system software automatically routes the connection.

Instead of entering a class of service, the user can instead enter a class number to select a pre-configured template, for example, class 4 for NTR-VBR, and class 3 for RT-VBR. The class of service templates can be modified as required using the **cnfcls/cnfatmcls** command and displayed using the **dspcls/dspatmcls** command.



Note

An IGX switch running NPM-64/4M BRAM, now has increased VC Bandwidth Parameter entries. This provides support for more connections with different bandwidths. When adding or modifying a connection, the input bandwidth parameters are checked against the existing VC Bandwidth Parameters array. If there is a match against an existing parameter in the array, then that particular parameter entry will be used for the connection issued. If

there is no match, a new VC Bandwidth Parameter is assigned to the connection. The maximum number of VC Bandwidth Parameters for the NPM-64/4M BRAM was 700. With Release 9.3.0 switch software and higher, the maximum number is 1999.

**Note**

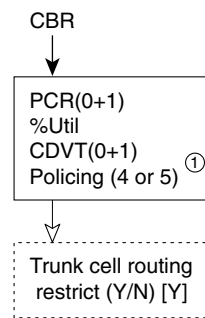
For a new node running 9.2.20 or later, the rt-VBR connection class number is 3. An upgraded node will retain existing connection classes. Therefore, it won't have the rt-VBR connection class 3. However, the user can configure the connection classes to whatever service and parameters they want using the **cnfcls/cnfatmcls** command.

Network and Service Interworking

Frame Relay to ATM Interworking enables Frame Relay traffic to be connected across high-speed ATM trunks using ATM standard Network and Service Interworking.

Two types of Frame Relay to ATM interworking are supported, Network Interworking and Service Interworking. The Network Interworking function is performed by the BTM card on the IGX switch. The FRSM card on the MGX 8220 supports both Network and Service Interworking.

Figure 9-1 Prompt Sequence for a CBR Connection



- ① For policing prompt:
4 = PCR policing only
5 = policing off

Note: BW allocation = (PCR)x(%Util)

10224

Table 9-3 addcon—Parameters


Parameter/Prompt	Description
local channel	<p>Specifies the local slot, port, virtual path identifier (vpi), and virtual connection identifier (vci) for the connection. The format is <i>slot.port.vpi.vci</i>.</p> <p>The VPI range for a UNI connection is 1–255. The VPI range for an NNI connection is 1–4095.</p> <p>When adding an MGX 8850 interface shelf with a UNI interface to a BPX routing node, the VPI range is 1–255. The VCI range is 1–65535.</p> <p>When adding an MGX 8850 interface shelf with an NNI interface to a BPX routing node, the VPI range is 1–255. The VCI range is 1–65535.</p> <p>When adding an SES (Service Expansion Shelf) to an IGX 8400 routing node, for VCC addressing, the VPI range is 1–255. The VCI range is 1–65535.</p> <p>For VPC addressing, when adding an SES interface shelf to an IGX 8400 routing hub with a UNI interface, the VPI range is 1–255. The VCI range is 1–65535.</p> <p>For VPC addressing, when adding an SES shelf to an IGX 8400 routing with an NNI interface, the VPI range is 1–4095. The VCI range is 1–65535.</p> <p> Note When adding an SES to an IGX 8400 routing node, the VPI/VCI configured on the IGX 8400 routing hub should match the VPI/VCI configured on the SES interface shelf endpoint address.</p> <p>When adding a VP tunnelling DAX connection to an IGX-UXM card, either end of the connection can be the VPI or VCI side. This connection type can be any of the ATM connection types supported by UXM virtual trunks, for example, ABR, CBR, UBR, and VBR.</p> <p>The VCI range is 1–65535. The vci can be an asterisk (*) to indicate the connection is a <i>virtual path connection</i> (so the vci has no meaning within the network).</p>
remote node name	Specifies the name of the node at the other (or remote) end of the connection.
remote channel	<p>Specifies the remote node's slot, port, vpi, and vci for this connection. The format is <i>slot.port.vpi.vci</i>. The vpi and vci ranges are:</p> <p>The vpi range for a UNI connection is 1–255. The vpi range for an NNI connection is 1–4095.</p> <p>The range for a vci is 1–65535. The vci can be an asterisk (*) to indicate the connection is a <i>virtual path</i> (the vci does not provide a distinction within the network).</p>

Table 9-3 addcon—Parameters (continued)


Parameter/Prompt	Description
connection class/ traffic type	<p>Specifies one of the following traffic types—VBR (rt-VBR or nrt-VBR), UBR, CBR, ATFST, ATFR, ABRSTD, ABRFST, ATFT, ATFX, ATFTFST, or ATFXFST; or connection classes—for example, for rt-VBR, connection class 3 for a new node running Release 9.2.20.</p> <p>The subsequent displayed parameters depend on the connection type you choose. To see the parameters associated with each connection type, refer to the appropriate flow diagrams in the refer to the <CellCommandItalic>Cisco BPX Series Installation and Configuration.</p> <p>The option for choosing a class <i>number</i> is also available. The class is a <i>template</i> for a connection type. The class serves as an alternative to specifying each parameter for a connection type. To specify a connection class, enter a digit in the range 1–10. To see the parameter values for a class, use the dspcls commands. To customize any class template, use cnfcls.</p> <p>For a new node running 9.2.20 or later, the rt-VBR connection class number is 3. An upgraded node will retain existing connection classes. Therefore, it won't have the rt-VBR connection class 3. However, you can configure the connection classes to whatever service and parameters you want by using the cnfcls/cnfatmcls command.</p> <p> Note For VP tunnelling DAX connections, a VP tunnelling connection type is represented by CBRVP, ABRSTVP, ABRFSTVP, etc. (The letters “VP” are appended to the connection class or connection type, to indicate that it is a VP tunnelling connection.) This connection type must be the same as the VCC connection type provisioned within the public ATM cloud.</p>
PCR	Peak Cell Rate: the cell rate that the source cannot exceed.
%Util	Specifies the percentage of bandwidth utilization.
MCR	Minimum Cell Rate: the committed, minimum cell rate for a connection in a network.
CDVT	Cell Delay Variation Tolerance: controls time scale over which the PCR is policed.
FBTC (AAL5 Frame-based Traffic Control)	<p>To enable the possibility of discarding the whole frame, not just one non-compliant cell. This is used to set the Early Packet Discard bit at every node along a connection.</p> <p>With the ASI, FBTC means packet discard on both policing and queueing. With the BXM, FBTC means packet discard on queueing only.</p>
VSVD	Virtual Source Virtual Destination.
Flow Control External Segments	Enables Cisco WAN switches to perform flow control on external segments (on the CPE, for example) in addition to the Cisco WAN Switching segments.
SCR	Sustainable Cell Rate: the long-term limit on the rate that a connection can sustain.

Table 9-3 addcon—Parameters (continued)

Parameter/Prompt	Description
MBS	Maximum Burst Size: the maximum number of cells that can burst at the PCR and still be compliant. MBS is used to determine the Burst Tolerance (BT), which controls the time period over which the SCR is policed.
Policing	(see Table 9-5) With the ASI, FBTC means packet discard on both policing and queueing. With the BXM, FBTC means packet discard on queueing only.
VC QDepth	The depth of the queue VC QDepth.
CLP Hi	Cell Loss Priority Hi threshold (% of VC QDepth). When the high threshold is exceeded, the node discards cells with CLP=1 until the number of cells in the queue drops below the level specified by CLP Lo/EPD.
CLP Lo/EPD	Cell Loss Priority Low threshold (% of VC QDepth)/Early Packet Discard. When the number of cells in the queue drops below the level specified by CLP Lo/EPD, the node stops discarding cells with CLP=1. If the card is a BXM and AAL5 FBTC=yes, the percent of VC QMax equals the value of EPD. Frame-based Traffic Control (FBTC) is FGCR for AAL5. The BXM does not support Frame-based Policing. For an ASI card, the percent of VC QMax is CLP Lo regardless of the FBTC setting.
EFCI	Explicit Forward Congestion Indication threshold (% of VC QDepth).
ICR	Initial Cell Rate: the rate at which a source initially transmits after an idle period.
IBR	Initial Burst Size: the maximum burst size a source can initially transmit after an idle period. IBR applies to only BXM cards.
ADTF (ATM Forum TM 4.0 term)	The Allowed-Cell-Rate Decrease Factor. Time permitted between sending RM-cells before the rate is decreased to ICR. (In previous software releases, ADTF was ICR TO—Initial Cell Rate Time Out.)
Trm (ATM Forum TM 4.0 term)	An upper bound on the time between forward RM-cells for an active source: an RM cell must be sent at least every <i>Trm</i> milliseconds. (In previous software releases, Trm was Min. Adjust.)
RIF (ATM Forum TM 4.0 term)	Rate Increase Factor: controls the amount by which the cell transmission rate may increase upon receipt of an RM cell. (In previous software releases, RIF was Rate Up.)
RDF (ATM Forum TM 4.0 term)	Rate Decrease Factor: controls the amount decrease in cell transmission rate when an RM cell arrives. (In previous software releases, RDF was Rate Down.)
Nrm (ATM Forum TM 4.0 term)	Nrm. Maximum number of cells a source may send for each forward RM cell: an RM cell must be sent for every <i>Nrm</i> -1 data cells.
FRTT (ATM Forum TM 4.0 term)	Fixed Round Trip Time: the sum of the fixed and propagation delays from the source to a destination and back.

Table 9-3 *addcon—Parameters (continued)*

Parameter/Prompt	Description
TBE (ATM Forum TM 4.0 term)	Transient Buffer Exposure The negotiated number of cells that the network would like to limit the source to sending during start-up periods, before the first RM-cell returns.
PCR	Peak cell rate: the cell rate which the source may never exceed.

Table 9-4 *addcon—Parameter Defaults and Ranges*

Parameter with (Default Settings)	UXM and BXM T1/E1, T3/E3, OC-3, and OC-12 Range	ASI Range
PCR(0+1)[50/50]	50–max. T1/E1 cells/sec. 50–max. T3/E3 cells/sec. 50–max. OC-3 cells/sec 50–max. OC-12 cells/sec	T3: MCR–96000 E3: MCR–80000 OC-3 (STM1): 0–353200 Limited to MCR–5333 cells/sec for ATFR connections.
%Util [100/100] for UBR [1/1]	0–100%	1–100%
MCR [50/50]	cells/sec 6–max. of T3/E3/OC-3/OC-12	T3: 0–96000 cells/sec E3: 0–80000 cells/sec
AAL5 Frame-Based Traffic Control: for rt/nrt-VBR [disable] for ABR/UBR [enable] for Path connection [disable]	enable/disable With the BXM card, FBTC means packet discard on both policing and queueing.	enable/disable With the ASI card, FBTC means packet discard on both policing and queueing.
CDVT(0+1): for CBR [10000/10000], others [250000/250000]	0–5,000,000 microseconds.	T3/E3 1–250,000 usecs. OC-3/STM1: 0–10000 usecs.
ForeSight [disable]	0 = disable 1 = enable	0 = disable 1 = enable
VSVD [disable]	enable/disable	enable/disable
Flow Control External Segment [disable]	enable/disable	enable/disable
Default Extended Parameters [enable]	enable/disable	enable/disable
CLP Setting [enable]	enable/disable	enable/disable

Table 9-4 addcon—Parameter Defaults and Ranges (continued)

Parameter with (Default Settings)	UXM and BXM T1/E1, T3/E3, OC-3, and OC-12 Range	ASI Range
SCR [50/50]	c50–max. T1/E1 cells/sec. 50–max. T3/E3 cells/sec. 50–max. OC-3 cells/sec 50–max. OC-12 cells/sec	T3: MCR–96000:T3 E3: MCR–80000: E3 OC-3/STM1: 0–353200 Limited to MCR–5333 cells/sec for ATFR connections.
MBS [1000/1000]	1-5,000,000 cells	T3/E3: 1–24000 cells OC-3 (STM1): 10–1000 cells
Policing [3] For CBR: [4]	1 = VBR.1 2 = VBR.2 3 = VBR.3 4 = PCR policing only 5 = off	1 = VBR.1 2 = VBR.2 3 = VBR.3 4 = PCR policing only 5 = off
ICR: max [MCR, PCR/10]	MCR - PCR cells/sec	MCR - PCR cells/sec
ADTF [1000]	62–8000 msec.	1000–255000 msec.
Trm [100]	ABRSTD: 1–100 msec. ABRFST: 3–255 msec.	20–250 msec.
VC QDepth [16000/16000] For ATFR/ATFST [1366/1366]	0–61440 cells	Applies to T3/E3 only ABR: 1–64000 cells ATFR: 1–1366 cells
CLP Hi [80/80]	1–100%	1–100%
CLP Lo/EPD [35/35]	1–100%	1–100%
EFCI [30/30] For ATFR/ATFST [100/100]	1–100%	1–100%
RIF: For ForeSight: = max [PCR/128, 10] For ABRSTD [128]	If ForeSight, then in absolute (0–PCR) If ABR, then 2 ⁿ (1–32768)	If ForeSight, then in absolute (0–PCR) If ABR, then 2 ⁿ (1–32768)

Table 9-4 *addcon—Parameter Defaults and Ranges (continued)*

Parameter with (Default Settings)	UXM and BXM T1/E1, T3/E3, OC-3, and OC-12 Range	ASI Range
RDF: For ForeSight [93]	IF ForeSight, then % (0%–100%)	IF ForeSight, then % (0%–100%)
For ABRSTD [16]	If ABR, then 2 ⁿ (1–32768)	If ABR, then 2 ⁿ (1–32768)
Nrm[32]–BXM only	2–256 cells	not applicable
FRTT[0]–BXM only	0–16700 msec	not applicable
TBE[1,048,320]–BXM only	0–1,048,320 cells (different maximum range from TM spec. but limited by firmware for CRM (4095 only) where CRM=TBE/Nrm)	not applicable
IBS [0/0]	0–24000 cells	T3/E3 ABR: 0–24000 cells ATFR: 1–107 cells OC-3: 0–999 cells
Trunk Cell Routing Restriction (y/n) [y]	yes or no For rt-VBR connections, this prompt will not display. (This is because rt-VBR connections should only be routed over ATM trunks such as BXM, UXM, and ASI, not over FastPacket trunks such as BTM or ALM/A-B.) Trunk Cell Routing Restriction will display for all other connections.	yes or no For rt-VBR connections, this prompt will not display. (This is because rt-VBR connections should only be routed over ATM trunks such as BXM, UXM, and ASI, not over FastPacket trunks such as BTM or ALM/A-B.) Trunk Cell Routing Restriction will display for all other connections.

Table 9-5 *Minimum PCR Values with Policing Enabled*

Card Name	Card Types	Minimum PCR Values with Policing
IGX-UXM	T1/E1	6 cps
IGX-UXM	IMA	6 cps
IGX-IUX	T3/E3	12 cps
IGX-UXM	OC3/STM-1	50 cps
BPX-BXM	T3/E3	12 cps

Table 9-5 Minimum PCR Values with Policing Enabled (continued)

BPX-BXM	OC3/STM-1	50 cps
BPX-BXM	OC12/STM-4	50 cps

Note: The policing accuracy is always within 1%. The maximum PCR policing values are the same as the line rate.

Table 9-6 Traffic Policing Definitions

Connection Type	ATM Forum TM Spec. 4.0 Conformance Definition	PCR Flow (1st Leaky Bucket)	CLP Tagging (for PCR Flow)	SCR Flow (2nd Leaky Bucket)	CLP Tagging (for SCR Flow)
CBR	CBR.1 when policing set to 4 (PCR policing only)	CLP(0+1)	no	off	n/a
CBR	when policing set to 5 (off)	off	n/a	off	n/a
UBR	UBR.1 when CLP setting = no	CLP(0+1)	no	off	n/a
UBR	UBR.2 when CLP setting = yes	CLP(0+1)	no	CLP(0)	yes
rt/nrt-VBR, ABR, ATFR, ATFST	VBR.1 when policing set to 1	CLP(0+1)	no	CLP(0+1)	no
rt/nrt-VBR, ABR, ATFR, ATFST	VBR.2 when policing set to 2	CLP(0+1)	no	CLP(0)	no
rt/nrt-VBR, ABR, ATFR, ATFST	VBR.3 when policing set to 3	CLP(0+1)	no	CLP(0)	yes
rt/nrt-VBR, ABR, ATFR, ATFST	when policing set to 4	CLP(0+1)	no	off	n/a
rt/nrt-VBR, ABR, ATFR, ATFST	when policing set to 5 (off)	off	n/a	off	n/a



Note For UBR.2, SCR = 0



Note CLP = Cell Lost Priority
 CLP(0) means cells that have CLP = 0
 CLP(1) means cells that have CLP = 1
 CLP(0+1) means both types of cells: CLP = 0 & CLP = 1
 CLP(0) has higher priority than CLP(1)
 CLP tagging means to change CLP = 0 to CLP = 1, where CLP = 1 cells have lower priority

Table 9-7 VBR Policing Definitions

Connection Type	ATM Forum TM Spec. 4.0 Conformance Definition	PCR Flow (1st Leaky Bucket)	CLP Tagging (for PCR Flow)	SCR Flow (2nd Leaky Bucket)	CLP Tagging (for SCR Flow)
rt/nrt-VBR, ABR, ATFR, ATFST, ATFT, ATFTST, ATFX, ATFXFST	VBR.1 when policing set to 1	CLP(0+1)	no	CLP(0+1)	no
rt/nrt-VBR, ABR, ATFR, ATFST, ATFT, ATFTST, ATFX, ATFXFST	VBR.2 when policing set to 2	CLP(0+1)	no	CLP(0)	no
rt/nrt-VBR, ABR, ATFR, ATFST, ATFT, ATFTST, ATFX, ATFXFST	VBR.3 when policing set to 3	CLP(0+1)	no	CLP(0)	yes
rt/nrt-VBR, ABR, ATFR, ATFST, ATFT, ATFTST, ATFX, ATFXFST	when policing set to 4	CLP(0+1)	no	off	n/a
rt/nrt-VBR, ABR, ATFR, ATFS, ATFT, ATFTST, ATFX, ATFXFST	when policing set to 5 for off	off	n/a	off	n/a

Full Name

Add a connection

addcon *parameters* (see preceding tables)

Related Commands

delcon, **dspecons**

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX, BPX	Yes

Example 1

```
addcon 9.1.100.100 pubsbpx2 9.1.102.102
```

Description

Add a standard ABR connection with VSVD and no Default Extended Parameters (which then require user input for SCR, MBS, and so on).

System Response

```
pubsbpx1      TN      SuperUser      BPX 15      9.2 Oct. 27 1997 05:22 GMT

From          Remote      Remote
9.1.100.100  NodeName   Channel
9.1.100.100  pubsbpx2  9.1.102.102   Ok   abrstd
9.1.102.102  pubsbpx2  9.1.100.100   Ok   abrstd

State Type      Route
Avoid COS O
```

```
This Command: addcon 9.1.100.100 pubsbpx2 9.1.102.102 abr * * * * e * d * * 1
* * * * * * * * *
```

```
Add these connections (y/n)?
```

Example 2

```
addcon 5.2.10.* pubsigx1p 5.1.1.100 CBR ...
```

Description

Add a virtual path connection (VPC) to virtual circuit connection (VCC) between ports 1 and 2. (This is called a VP tunnelling connection.)

System Response

```
pubsigx1      TN      SuperUser      IGX 8400      9.2      Oct. 27 1998 05:22 GMT

From          Remote          Remote          State  Type          Route
NodeName      Channel
5.2.10.*      pubsigx2        5.1.1.100      Ok     abrstvp       Avoid COS 0
5.1.1.100     pubsigx2        5.2.10.*       s Ok   abrstvp
```

```
This Command: addcon 5.2.10.* pubsigx1p 5.1.1.100 CBR ...
```

```
Add these connections (y/n)?
```

clrchstats

Clears the gathered statistics for either a specific channel or all channels. When you enter a specific channel number, the current channel statistics display appears, asking if you want to clear the display. If you enter "*" (all channels) for the channel specification, the display prompts you to confirm whether you want to clear all channel statistics. This is sometimes referred to as a summary statistics command.

The Multilevel Channel Statistics lets you configure and display additional levels of statistics beyond level 1 statistics (for example, levels 2 and 3), as supported by the multilevel channels statistics feature. You use the **cnfcdparm** command to configure the channels statistics level on the BXM or UXM cards. For example, if you configure slot 5 to support level 3 channel statistics, all connections on that particular card are set to provide level 3 statistics. Switch software collects, displays, and propagates to Cisco WAN Manager the various statistics types. The channel statistic type vary in number and type based on the level of support provided by the BXM and UXM cards. You use the **dspechstats** and **clrchstats** to display and clear the statistics.

Full Name

Clear channel statistics

Syntax

```
clrchstats <channel | *>
```

Related Commands

```
dspchstats
```

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX, BPX	Yes

Example 1

```
clrchstats 3.1.1
```

Description

Clear channel statistics for 3.1.1.

System Response

```
sw83          TN      SuperUser      IGX 8420      9.2          Aug. 23 1997 19:24 PST

Channel Statistics: 3.1.1          Cleared: Aug. 17 1997 08:10
MIR: 3.8 kbps          Collection Time: 6 day(s) 10:04:58          Corrupted: NO
          Frames  Avg Size Avg  Util          Packets  Avg
          (bytes) (fps) (%)          (pps)
From Port:          1516586          198      2  35
To Network:          1516215          198      2  35          16678365          30
Discarded:          371          198      0  0
From Network:          1518665          197      2  35          16705146          30
To Port:          1518629          198      2  35
Discarded:          36          120      0  0          238          0
          ECN Stats: Avg Rx VC Q:          0  ForeSight RTD  40
Min-Pk bytes rcvd:          52470  FECN Frames:          0  FECN Ratio (%)  0
Minutes Congested:          0  BECN Frames:          16  BECN Ratio (%)  0
Frames rcvd in excess of CIR:          0  Bytes rcvd in excess of CIR:          0
Frames xmtd in excess of CIR:          0  Bytes xmtd in excess of CIR:          0

This Command: clrchstats 3.1.1

OK to clear (y/n)?
```

Table 9-8 clrchstats—Parameters

Parameter	Description
channel	Specifies the channel whose statistics are cleared.
*	Specifies all channel statistics.

cnfatmcls

The **cnfatmcls** command allows the ten Cisco-supplied class templates for ATM connection configuration to be modified. (The **addcon** command can take a class as an input.)

When you enter the number of the class to configure, the display shows the current value of each parameter in the class. For each item in the class, a prompt appears for changing or keeping the current value.

In Release 9.2.20, you can use **cnfatmcls** and **cnfcls** to configure the rt-VBR ATM connection class. You can use **dspatmcls** and **dspcls** to display the connection parameters for the rt-VBR and nrt-VBR connection classes.

The rt-VBR connections are configured per class 3 service parameters, and nrt-VBR connections are configured per class 2 service parameters. You can change these class parameters by using the **cnfcls/cnfatmcls** command, or you can enter the parameters individually for each connection by specifying yes to the extended parameters prompt of the **addcon** command.



Note

For a new node running software Release 9.2.20 or later, the rt-VBR connection class number is 3. An upgraded node will retain existing connection classes. Therefore, it won't have the rt-VBR connection class 3. However, the user can configure the connection classes to whatever service and parameters they want using the **cnfcls/cnfatmcls** command. For nrt-VBR connections in a new node, running 9.2.20, a number of connection classes are pre-configured, including 2, 4, 5, and 6.

Full Name

Configure class

Syntax

cnfatmcls <class number> [*optional parameters*]

Related Commands

addcon, **cnfatmcls**, **dspatmcls**, **cnfcls**, **dspcls**

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	Yes	Yes	IGX, BPX	Yes

Example 1

```
cnfatmcls 10
```

Description

Configure ATM connection class 10. The command line interface (CLI) displays the current settings and requests the class type (see System Response 1). After you enter a class type, the CLI prompts you to specify each parameter for the selected class type (ABRSTD as System Response 2 shows).

System Response 1

```

sw60          TN      SuperUser      BPX 8620      9.2 Date/Time Not Set

                ATM Connection Classes
Class: 10
  PCR(0+1)    % Util      CDVT(0+1)    Policing      Type: CBR
4000/4000    100/100      10000/10000  4
Description: "Default CBR 4000"

```

This Command: cnfatmcls 10

Enter class type (rt-VBR, nrt-VBR, UBR, CBR, ATFST, ATFR, ABRSTD, ABRFST, ATFT, ATFX, ATFTFST, ATFXFST):

System Response 2

```

sw60          TN      SuperUser      BPX 8620      9.2 Date/Time Not Set

                ATM Connection Classes
Class: 10
  PCR(0+1)    % Util      MCR          CDVT(0+1)    Type: ABRSTD
4000/4000    100/100    4000/4000    10000/10000  AAL5 FBTC
n
Description: "Default CBR 4000"

```

This Command: cnfatmcls 10 abrstd * * * * *

Do you want this change (y/n)?

Example 2**cnfatmcls 3****Description**

Configure ATM connection class 3 for rt-VBR class type connection parameters. The command line interface (CLI) displays the current settings and requests the class type.

System Response 3

```

sw60          TN      SuperUser      BPX 8620      9.2 Date/Time Not Set

                        ATM Connection Classes

Class: 3
  PCR(0+1)      % Util      CDVT(0+1)      AAL5 FBTC      SCR
2000/2000      100/100      10000/10000      n              2000/2000

  MBS          Policing
1000/1000      3

      Description: "Default rt-VBR 2000"

```

This Command: cnfatmcls 3

Enter class type (rt-VBR, nrt-VBR, UBR, CBR, ATFST, ATFR, ABRSTD, ABRFST, ATFT, ATFX, ATFTFST, ATFXFST):

Table 9-9 *cnfatmcls-Parameters*

Parameter	Description
class	Specifies the class to configure. The class numbers are 1–10.

Table 9-10 *cnfatmcls-Optional Parameters*

Parameter	Description
optional parameters	Individual parameters are specific to the type of connection (rt-VBR, nrt-VBR, CBR, UBR, ATFST, ATFR, ABRSTD, ABRFST, ATFT, ATFX, ATFTFST, ATFXFST). Each is prompted one at a time. Refer to the dspcls command to see the parameters in each of the classes.

cnfcls

The **cnfcls** command allows the ten Cisco-supplied class templates for connection configuration to be modified. (The **addcon** command can take a class as an input.)

When you enter the number of the class to configure, the display shows the current value of each parameter in the class. For each item in the class, a prompt appears for changing or keeping the current value.

In Release 9.2.20, you can use **cnfatmcls** and **cnfcls** to configure the rt-VBR ATM connection class. You can use **dspatmcls** and **dspcls** to display the connection parameters for the rt-VBR and nrt-VBR connection classes.

The rt-VBR connections are configured per class 3 service parameters, and nrt-VBR connections are configured per class 2 service parameters. These class parameters can be changed using the **cnfcls/cnfatmcls** command, or the parameters can be entered individually for each connection by specifying yes to the extended parameters prompt of the **addcon** command.

**Note**

For a new node running software Release 9.2.20 or later, the rt-VBR connection class number is 3. An upgraded node will retain existing connection classes. Therefore, it won't have the rt-VBR connection class 3. However, the user can configure the connection classes to whatever service and parameters they want using the **cnfcls/cnfatmcls** command. For nrt-VBR connections in a new node, running 9.2.20, a number of connection classes are pre-configured, including 2, 4, 5, and 6.

Full Name

Configure class

Syntax

cnfcls <class number> [*optional parameters*]

Related Commands

addcon, dspcls, cnfatmcls, dspatmcls

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	Yes	Yes	IGX, BPX	Yes

Example 1

cnfcls 10

Description

Configure connection class 10. The command line interface (CLI) displays the current settings and requests the class type (see System Response 1). After you enter a class type, the CLI prompts you to specify each parameter for the selected class type (ABRSTD as System Response 2 shows).

System Response 1

```

sw60          TN      SuperUser      BPX 8620      9.2 Date/Time Not Set

                          ATM Connection Classes
Class: 10
  PCR(0+1)      % Util      CDVT(0+1)      Policing      Type: CBR
4000/4000      100/100      10000/10000      4
Description: "Default CBR 4000"

```

This Command: cnfcls 10

Enter class type (VBR, CBR, UBR, ABRSTD, ABRFST, ATFR):

System Response 2

```

sw60          TN      SuperUser      BPX 8620      9.2 Date/Time Not Set

                          ATM Connection Classes
Class: 10
  PCR(0+1)      % Util      MCR              CDVT(0+1)      Type: ABRSTD
4000/4000      100/100      4000/4000        10000/10000    AAL5 FBTC
n
Description: "Default CBR 4000"

```

This Command: cnfcls 10 abrstd * * * * *

Do you want this change (y/n)?

An example of a **cnfcls/cnfatmcls** command and response is shown in the following example:

System Response 3

```
pubsbpx1      TN      silves:1      BPX 8620  9.2.2G      July 16 1999 10:42 PDT

                        ATM Connection Classes
Class: 2                        Type: nrt-VBR
  PCR(0+1)      % Util      CDVT(0+1)      AAL5 FBTC      SCR
1000/1000      100/100      10000/10000      n              1000/1000

  MBS          Policing
1000/1000      3

Description: "Default nrt-VBR 1000 "
```

This Command: `cnfcls atm 2`

Enter class type (rt-VBR, nrt-VBR, CBR, UBR, ABRSTD, ABRFST, ATFR, ATFST, ATFT, ATFTFST, ATFX, ATFXFST):

Table 9-11 *cnfcls-Parameters*

Parameter	Description
class	Specifies the class to configure. The class numbers are 1–10.

Table 9-12 *cnfcls-Optional Parameters*

Parameter	Description
optional parameters	Individual parameters are specific to the type of connection (CBR, rt-VBR, nrt-VBR, ABR, ATFR). Each is prompted one at a time. Refer to the <code>dspcls</code> command to see the parameters in each of the classes.

cnfcon

Configures the ATM bandwidth parameters for a specified connection. The initial cell rate (ICR) normally is set to the port speed. It may be lower if other constraints exist on the data-generation rate. If ICR is too low, cells are dropped. If it is too high, bandwidth may be wasted unless ForeSight is used. Statistical reports are the best source of information for deciding what to adjust.

If the connection type includes ForeSight (abr enabled), the results of the last test round-trip delay command (`tstdelay`) appear. Note that this is not the current RTD but the result of the last test that ran. Connection priority—high or low—is displayed for standard Frame Relay connections and ForeSight connections. Several checks are done on the parameters that specify bandwidth to assist users in efficient use of network bandwidth. The following messages describe the performance evaluation:

- Error Min cannot exceed peak.
- Warning Min exceeds this port's speed.
- Warning Sum of mins exceeds port's speed.
- Warning Peak exceeds this port's speed.

Warning messages are informational only, so the related operation continues. If an error message appears, the operation does not continue.

Full Name

Configure connection

Syntax

cnfcon <slot.port.vpi.vci> [bandwidth parameters]

Related Commands

addcon, dspcon

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX, BPX	Yes

Example 1

cnfcon 12.1.1.6

Description

Configure ASI port 12.1.1.6.

System Response

```

a20          LAN   SuperUser      BPX 15    9.2      Aug. 29 1997 11:43 PST

Conn: 12.1.1.6          ca19          4.1.1.6          ABR
Description:

      SCR          IBS          MBS          ABR          MCR          PCR          ICR
      100/100      10/10      10/10        y           10/10      96000/96000  10/10

ICR TO  Rate Up  Rate Dn  Rate FastDn  Max Adjust  VC Qdepth  EFCI  % Util
   10     100    100      100          100        64000/64000  100/100  100/100

CLP  CLP Hi  CLP Lo
  y   100/100  90/90

```

This Command: `cnfcon 12.1.1.6`

MBS (10) must exceed IBS (10)
Enter the MBS [10/10]:

Table 9-13 *cnfcon—Parameters*

Parameter	Description
channel	Specifies the connection to configure. This command configures one connection at a time. The channel specification has the following format: slot.port.vpi.vci

Table 9-14 *cnfcon—Optional Parameters*

Parameter	Description
bandwidth parameters	Refer to the addcon command in this chapter for descriptions and connection types.

cnfport

Configures the parameters of an ATM port on an ASI or BXM card on the BPX or a UXM card on the IGX. Press Return to keep the current value of a parameter. See the parameter table for important information.

Previous to Release 9.2, on the BXM card, only ABR VSVD connections are subject to VC scheduling policies on the egress and that is only when the FCES (external segment) option is enabled. With the introduction of traffic shaping, you can choose whether to perform VC scheduling on CBR, VBR, and UBR traffic streams.

In this release, the Ports and Trunks feature lets you configure multiple trunk lines and circuit lines on a single BXM or UXM card simultaneously. In previous releases, when you upped a single port as a trunk (by using the **uptrk** command), all the remaining ports on that card were treated as a trunk.

Similarly, when you up a single port as a circuit line (by using the **upln** command), all the remaining ports on the card are treated as circuit line ports. This feature allows BXM and UXM cards to be trunk line cards as well as circuit line cards at the same time. This allows trunks as well as circuit lines to coexist on these interface cards.

Feature Mismatching to Verify LMI/ILMI Support

The **cnfport** commands, in addition to other configuration commands, perform mismatch verification on the BXM and UXM cards. For example, the **cnfport** command will verify whether the cards both have LMI/ILMI configured.

The command **cnfport** will prevent disabling ILMI protocol on a port interface if a VSI ILMI session is active on a VSI partition of the port interface. Configure ILMI protocol running on a port interface to run on the BCC instead of the BXM.

Refer to “Feature Mismatching” in the *BPX 8600 Series Installation and Configuration*. The Feature Mismatching capability will not mismatch cards unless the actual feature has been enabled on the card. This allows for a graceful card migration from an older release.

Traffic Shaping on the UXM Card in Release 9.2

Traffic shaping lets you choose whether to have VC scheduling performed to your CBR, VBR, and UBR traffic streams. You can configure the traffic shaping (which involves weighted fair queuing) option on each BXM interface. A **cnfport** parameter will prompt you to enable/disable traffic shaping. (The default is for traffic shaping to be disabled.)

Traffic shaping is performed on a per-port basis. When traffic shaping is enabled, all traffic exiting the port is subject to the VC scheduling based on the appropriate service parameters you provision. When a particular port is configured to perform traffic shaping, all ATM cells, regardless of class of service, pass through the VC queues before leaving the card. Where a port is not configured for traffic shaping, the CBR, VBR, and UBR PVCs circumvent the VC queues and are scheduled by the QBin.

No connections should exist on the port before changing the port traffic shaping parameter. If there are existing connections when the port traffic shaping parameter is toggled, then these connections will not be updated unless the card is reset, connections are rerouted, a **switchcc** occurs, or you modify the connection parameters. Also, traffic shaping is not enabled on a VSVC endpoint if an external segment has been enabled.

Redundant cards must both support traffic shaping, or neither support traffic shaping. In the non-redundant case, traffic shaping is configurable regardless of whether the BXM card in the target slot supports traffic shaping. If the card does not support traffic shaping, then a BXM card that does support traffic shaping can be inserted later and the traffic shaping configuration will take effect. System software will not perform mismatch checking on the traffic shaping capabilities of the BXM.

The traffic shaping rate parameters are in Table 9-15. The MCR is the minimum cell rate for the connection. This is the lowest rate that the connection will be scheduled from the VC queue into the QBin. The PCR is the peak cell rate, or the highest rate at which the connection will be scheduled from the VC queue into the QBin.

Table 9-15 *cnfport* – Traffic Shaping Rates

Service Type	MCR	PCR
CBR	PCR	PCR
VBR	SCR ¹ %Util	PCR
UBR	0	PCR
ABR	MCR %Util	PCR

1. Indicates that the system software issues a warning that traffic shaping is not supported on that specific BXM.

Note that traffic shaping does not generate any alarms. There is no mismatch checking for BXMs that support traffic shaping, so if you insert a BXM card with firmware that does not support it, then the traffic shaping functionality will not exist.

Also, cells can be momentarily received out of order when you reconfigure connections between traffic shaping and non-traffic shaping. This is a limitation of the hardware for which there is no workaround.

Configuring Traffic Shaping

Traffic shaping involves passing ATM traffic through the ATM interface at a VC queue, scheduled rate. Currently, in the BXM-only ABR VSVD connections are subject to VC scheduling policies. With the introduction of traffic shaping, the customer will have the option to perform VC scheduling to his/her CBR, VBR, and UBR traffic streams. Traffic shaping is performed by the BXM hardware.

Traffic shaping will be performed on a per-port basis. When enabled, all traffic exiting the port will be subject to the VC scheduling based on the appropriate service parameters provisioned by the user. Note that all ATM cells, regardless of class of service, pass through the VC queues before leaving the card.

No connections should exist on the port before you change the port traffic shaping parameter. If there are existing connections when you toggle the port traffic shaping parameter, then these connections will not be updated unless you reset the card (by using the **resetcd** command), connections are rerouted, a **switchcc** occurs, or you modify the connection parameters. Also, it should be noted that traffic shaping is not enabled on a VSVD endpoint if external segment has been enabled.

Redundancy Architecture

Software requires that redundant cards either both support the feature or neither supports the feature. In the non-redundant case, the feature is configurable regardless of whether the BXM card in the target slot supports traffic shaping. If the card does not support the feature, then a BXM card that does support traffic shaping can be inserted later and the traffic shaping configuration will take effect. Switch software will not perform mismatch checking on the traffic-shaping capabilities of the BXM.

Cisco WAN Manager in Release 9.2 has no changes to support traffic shaping. Switch software functionality is limited to enabling the traffic shaping option (involving weighted fair queuing) on a per-BXM interface case. The **cnfport** command has a new parameter, which will prompt you to enable or disable traffic shaping. The parameter default is to disable the feature.

Refer to the WAN Switch Software Release 9.2 release notes for additional information on traffic shaping. No connections should be on the port before changing the port traffic shaping parameter. If there are existing connections when the port traffic shaping parameter is toggled, then these connections will not be updated unless the card is reset, connections are rerouted, a **switchcc** occurs, or you modify

the connection parameters*. Also, it should be noted that traffic shaping is not enabled on a VSVD endpoint if an external segment has been enabled. In this case, the scheduling policies are based upon the ATMF 4.0 ABR rules.

The MCR is the minimum cell rate for the connection. This is the lowest rate that the connection will be scheduled from the VC queue into the Qbin. The PCR is the peak cell rate, or the highest rate at which the connection will be scheduled from the VC queue into the Qbin.

Firmware Functionality (BXM)

The BXM firmware supports a new Commbus parameter to enable/disable traffic shaping. When you add a connection, the BXM firmware checks its database to see if traffic shaping is enabled for the port that the connection is to be mapped to. If traffic shaping is enabled, the BXM firmware sets up the ASIC hardware to perform the weighted fair queuing. In the background, the BXM firmware runs a rate-based algorithm.

Existing functionality, such as VC queuing, is used by the traffic shaping feature.

In this release, the BXM firmware supports a new CommBus (CBUS) parameter to enable/disable traffic shaping. When a connection is added, the BXM firmware checks its database to see if traffic shaping is enabled for the port that the connection is to be mapped to. If traffic shaping is enabled, the BXM firmware sets up the ASIC hardware to perform the weighted fair queuing. In the background, the BXM firmware runs a rate-based algorithm similar to what is done today for ERS (explicit rate stamping). The only other interface change includes an egress SCR parameter in the channel (0x52) message.

The algorithm executed by the firmware involves the BXM firmware polling the cell arrival and transmit counters of the Qbins approximately every 15 msec. During this time, the firmware determines the congestion ratio:

$$- rc = rp * out/in$$

where rp is the previous value of rc , “out” is the number of cells leaving the Qbin, and “in” is the number of cells arriving into the QBIN. Note that if the ratio of out/in is less than 1, then the Qbin is experiencing congestion. The BXM firmware takes the resulting “rc” and divides this value into the sum of all of the PCRs for the Qbin and uses this result as the congestion factor to be programmed into the hardware (SABRE).

Performance of Traffic Shaping

The weighted-fair queuing (WFQ) algorithm for traffic shaping runs the same algorithm as the explicit rate stamping (ERS). Today, this processing consumes 12 percent. Because the algorithm runs once (even if both ERS and WFQ are enabled), traffic shaping will not increase the worst-case demand for BXM processor time.

Errors and Alarm Handling

No alarms will be generated regarding the Traffic Shaping feature. As previously mentioned, there is no mismatch checking for BXMs that do not support the feature, so if you insert a BXM with firmware that does not support the feature, then the traffic shaping functionality will not be supported on that card.

It should be noted that cells can be momentarily received out of order when connections are reconfigured between traffic shaping and non-traffic shaping. This is a limitation of the hardware for which there is no work-around.

Full Name

Configure port

Syntax`cnfport <port> [<params>]`**Related Commands**`upport, dnport, dspport, dsports`**Attributes**

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX, BPX	Yes

Example 1`cnfport 12.1 N N N H N N`**Description**

Configure port 12.1 to have a UNI cell header format; not to be an MGX 8220 shelf; not to have a Metro Cell Header format; shift on HCF; use no protocol; and not to apply %util.

System Response

```

batman          TN      SuperUser      BPX 15      9.2      Date/Time Not Set

Port:           12.1
Interface:      T3-2
Type:           UNI          %Util Use:    Disabled
Speed:          96000
Shift:          SHIFT ON HCF (Normal Operation)
VBR Queue Depth: 1000

Protocol:      NONE

```

```
Last Command: cnfport 12.1 N N N H N N
```

```
Next Command:
```

Example 2**cnfport 5.1 N N N N****Description**

Configure port, when used with an IMA line, displays the IMA Port Group. It does not prompt for any new IMA configuration.

System Response

```
sw225          TRM   StrataCom      IGX 8420  9.3.a6   Mar. 10 2000 05:56
GMT
```

```
Port:          5.1      [ACTIVE ]
IMA Port Grp:  1-4
Interface:     E1-IMA          CAC Override:  Enabled
Type:          UNI           %Util Use:    Disabled
Speed:         17962 (cps)
SIG Queue Depth: 640
```

```
Protocol:      NONE
```

```
This Command: cnfport 5.1
```

```
NNI Cell Header Format? [N]:
Protocol [N]:
Apply Percent Utilization? [N]:
CAC Override Disable? [N]:
```

Table 9-16 cnfport—Parameters

Parameter	Description
slot.port	Specifies the ASI, BXM, or UXM card slot and port number.
nni/uni	Specifies whether the cell header format is NNI or UNI. UNI is the default.
axis	Specifies MGX 8220 queue depth for each slot.
metro data cell header	Specifies whether the metro data cell header type is used.

Table 9-16 *cnfport—Parameters (continued)*


Parameter	Description
shift h n	<p>Specifies whether a one-byte shift on the HCF field of the cell header occurs. The choice of H (shift) or N (no shift) depends on whether the ATM cloud includes non-Cisco WAN Switching nodes and whether virtual trunking is in operation:</p> <ul style="list-style-type: none"> You typically select H (the default, or <i>shift on</i>) if the cloud includes non-Cisco WAN Switching nodes or if only a physical trunk is configured for the ASI port. You typically select N (<i>shift off</i>) if virtual trunks are configured <i>and</i> the ATM cloud consists of Cisco WAN Switching nodes only. <p>For BPX or IGX ports performing virtual trunking within an ATM cloud to external Cisco equipment, ports should be configured to <i>shift on</i> (that is, Shift H) for BNI cards; BXM ports should typically be configured to Shift off (Shift N).</p> <p> Note For UXM cards, you cannot configure the <i>Shift</i> parameter—the Shift setting is always <i>N</i>, or <i>shift off</i>.</p> <p>For example, if the public ATM cloud consists of BPX nodes, the access points to the cloud might be ASI ATM-UNI ports. Because the cells transmitted to the ASI trunk interface are coming from a Cisco device, for example, a BNI card, the 16 VCI bits have already been left shifted by four (4) bits and contain 12 bits of VCI information and four (4) bits of ForeSight information. Therefore, the ASI cards at either end of the cloud should be configured to not shift (that is, Shift off). In this case, you would configure Shift N on the ASI port.</p> <p>If the ATM cloud consists of non-Cisco nodes, then the 12 VCI + 4 bits ForeSight bits in the cells coming from the BNI card in the BPX are then passed through untouched as 16 VCI bits. Because it is a non-Cisco network, the ForeSight bits are ignored.</p> <p>Make sure that you set the HCF field correctly for your network configuration before you add connections. For example, if you are acting as a service provider, and one of your customers wants to configure virtual trunking through the network, if your ports have been previously configured with the incorrect HCF shift field setting, you may need to go back and delete all the connections from each port, configure the port, and add the connections again.</p> <p>Below shows some guidelines on how to set the Shift parameter when using BNI virtual trunking through a cloud of Cisco equipment using BXMs, and a cloud using ASIs and BNIs. Also shown is how to set the Shift parameter when using either BXM or UXM virtual trunking through a cloud of Cisco equipment (BXM cards), and a cloud of ASIs and BNIs.</p>

Table 9-16 *cnfport*—Parameters (continued)

Parameter	Description			
		Non-Cisco Cloud	Cisco BXM Cloud	Cisco ASI/BNI Cloud
	BNI VT	X	No shift	No shift
	BXM/UXM VT	X	No shift	Shift
	Refer to the section “Compatibility Between Cards in Virtual Trunks” section on page 4-5 for more information on virtual trunking and how to set the HCF Shift field.			
protocol	<p>Specifies the use of either an LMI protocol, an ILMI protocol, or no specified protocol. No specified protocol is the default. Values for protocol are one of the following:</p> <p>N—(NONE)</p> <p>L—(LMI)</p> <p>I—(ILMI)</p> <p>Note: An IMA configuration will display the same protocol values as shown above.</p>			
%util	<p>Enables/disables percent utilization. This parameter supports ATM VBR/ABR fairness for ASI terminated connections and applies to only VBR and ABR connections. To change the %util status of a port, no connections can be currently terminating on the port. Therefore, if connections terminate on the port, they must be deleted before cnfport execution then re-added after execution of cnfport.</p> <p>When this feature is disabled, the port queue bandwidth is calculated using the sum of the MCRs or PCRs for the connections terminating on the port. This is identical to the port queue bandwidth calculation prior to the implementation of the %util feature.</p> <p>The port queue bandwidth with %util feature <i>disabled</i> is:</p> <ul style="list-style-type: none"> • For ABR connections Port Queue BW = sum (MCR) • For VBR connections Port Queue BW = sum (PCR) • For CBR connections Port Queue BW = sum (PCR) <p>When the %util feature is enabled, the port queue bandwidth is calculated for ABR and VBR connections as follows: for ABR connections, the port queue bandwidth is the sum of a percentage of the MCRs for the connections terminating on the port; for VBR connections, the port queue bandwidth is the sum of a percentage of the PCRs for connections terminating on the port. The feature is not applied to CBR connections.</p> <p>In summary, the port queue bandwidth with feature %util <i>enabled</i> is:</p> <ul style="list-style-type: none"> • For ABR connections Port Queue BW = sum (MCR * %util) • For VBR connections Port Queue BW = sum (PCR * %util) • For CBR connections Port Queue BW = sum (PCR) 			

cnfportq

Configures queue parameters for a port on an ASI or BXM card on the BPX or a UXM card on the IGX. Pressing the Return key keeps the current value for the parameter.

In Release 9.2.20, the VBR class of service type can be either rt-VBR or nrt-VBR, depending on the way the corresponding port (service) queues (both ingress and egress) are configured. For the nrt-VBR class of service type in this release, the corresponding service queues are larger than in previous releases to provide more efficient bandwidth sharing with other non-real time service types. The service queues for both rt-VBR and nrt-VBR service types can be configured on a node-by-node basis.

You can use **cnfportq** to configure Qbin values separately for rt-VBR and nrt-VBR connection types on ports. (To configure the qbin values for rt-VBR and nrt-VBR classes of service on trunks, use **cnftrkparm**.) The rt-VBR and nrt-VBR connections use different queues on a port: these are the rt-VBR and nrt-VBR queues, respectively. (See Example 3 for a **cnfportq** screen showing the configuration parameters available for a port queue.)

For information on configuring trunk queues used by rt-VBR and nrt-VBR connections, see the **cnftrkparm** command.

Configuring Port Queues used by rt-VBR and nrt-VBR Connections

The rt-VBR and nrt-VBR connections use different queues on a port, these are the rt-VBR and nrt-VBR queues, respectively. You can configure these separately, using the **cnfportq** command.

See Example 2 for a sample **cnfportq** screen showing configuration parameters available for a port queue.

Full Name

Configure port queue parameters

Syntax

```
cnfportq <port> [<params>]
```

Related Commands

upport, **dnport**, **dspportq**

Attributes

Privilege	Jobs	Log	Node	Lock
2	Yes	Yes	IGX, BPX	Yes

Example 1

```
cnfportq 4.2 200 80 60 80 1000 80 60 80 9800 80 60 80
```

Description

Configure port 4.2 to the parameters indicated.

System Response

```

ca19          VT      SuperUser      BPX 8620    9.2      June 23 1999 19:11 GMT

      ASI-T3

Port:         4.2      [ACTIVE]
Interface:    T3-2
Type:         UNI
Speed:        96000 (cps)
SVC Queue Pool Size:          0
CBR Queue Depth:              200      rt-VBR Queue Depth:          1000
CBR Queue CLP High Threshold: 80%     rt-VBR Queue CLP High Threshold: 80%
CBR Queue CLP Low Threshold:  60%     rt-VBR Queue CLP Low Threshold  60%
CBR Queue EFCI Threshold:     80%     rt-VBR Queue EFCI Threshold    80%
nrt-VBR Queue Depth:          1000     UBR/ABR Queue Depth:         9800
nrt-VBR Queue CLP High Threshold: 80%  UBR/ABR Queue CLP High Threshold: 80%
nrt-VBR Queue CLP Low Threshold: 60%  UBR/ABR Queue CLP Low Threshold: 60%
nrt-VBR Queue EFCI Threshold: 80%     UBR/ABR Queue EFCI Threshold: 80%

Last Command: cnfportq 4.2 N N N 200 80 60 80 1000 80 60 80 9800 80 60 80

Next Command:

```

Example 2**cnfportq 2.2****Description**

Configure the port queue parameters on port 2.2.

System Response

```
pubsbpx1      TN      silves:1      BPX 8620  9.2.2G   July 16 1999 10:47 PDT

Port:         2.2      [ACTIVE ]
Interface:    LM-BXM
Type:         UNI
Speed:        353208 (cps)

SVC Queue Pool Size:      0
CBR Queue Depth:          600      rt-VBR Queue Depth:      0
CBR Queue CLP High Threshold: 80%      rt-VBR Queue CLP High Threshold: 80%
CBR Queue CLP Low Threshold: 60%      rt-VBR Queue CLP Low/EPD Threshold: 60%
CBR Queue EFCI Threshold: 60%      rt-VBR Queue EFCI Threshold: 80%
nrt-VBR Queue Depth:      5000      UBR/ABR Queue Depth:    20000
nrt-VBR Queue CLP High Threshold: 80%      UBR/ABR Queue CLP High Threshold: 80%
nrt-VBR Queue CLP Low Threshold: 60%      UBR/ABR Queue CLP Low/EPD Threshold: 60%
nrt-VBR Queue EFCI Threshold: 60%      UBR/ABR Queue EFCI Threshold: 20%
```

This Command: cnfportq 2.2

Table 9-17 *cnfportq—ASI Parameters*

Parameter	Description
slot.port	Specifies the ASI card slot and port number.
nmi/uni	Specifies whether the cell header format is NNI or UNI. UNI is the default.
cbr queue parms	Specifies the CBR queue parameters of depth, cbr-hi, cbr-lo, and efc. The ranges are 0 to 24000 for depth and 0 to 100% for all others.
nrt-vbr queue parms	Specifies the nrt-VBR queue parameters of depth, vbr-hi, vbr-low, and efc. The ranges are 0 to 24000 for depth and 0 to 100% for all others.
rt-vbr queue parms	Specifies the rt-VBR queue parameters of depth, vbr-hi, vbr-low, and efc. The ranges are 0 to 24000 for depth and 0 to 100% for all others.
ubr/abr queue parms	Specifies the ABR queue parameters of depth, abr-hi, abr-low, and efc. The ranges are 0 to 24000 for depth and 0 to 100% for all others.

Table 9-18 *cnfportq—UXM Parameters*

Parameter	Description
slot.port	Specifies the UXM card slot and port number.
nmi/uni	Specifies whether the cell header format is NNI or UNI. UNI is the default.
cbr queue parms	Specifies the CBR queue parameters of depth, cbr-hi, cbr-lo, and efc. The ranges are 0 to 97250 for depth and 0 to 100% for all others.
nrt-vbr queue parms	Specifies the nrt-VBR queue parameters of depth, vbr-hi, vbr-low, and efc. The ranges are 0 to 97250 for depth and 0 to 100% for all others.

Table 9-18 *cnfportq—UXM Parameters (continued)*

Parameter	Description
rt-vbr queue parms	Specifies the rt-VBR queue parameters of depth, vbr-hi, vbr-low, and efc. The ranges are 0 to 97250 for depth and 0 to 100% for all others.
ubr/abr queue parms	Specifies the ABR queue parameters of depth, abr-hi, abr-low, and efc. The ranges are 0 to 97250 for depth and 0 to 100% for all others. UBR traffic shares this queue with the ABR traffic.

**Note**

The total queue size of the UXM card is 97250 cells.

delcon

Removes connections from the network. The same command with differing syntax may be used to delete voice connections, data connections, Frame Relay connections, or ATM connections. The syntax in this section deletes an ATM connection. You can verify connection deletions by using the **dspscons** command.

In Release 9.2.20, you can use **delcon** to delete data or FRP connections that are terminated on UXM/UXM-E cards for IGX 8400 interface shelves, and terminated on routing network feeder trunks for IGX 8400 routing nodes.

Full Name

Delete connections

Syntax

delcon <channel(s)>

Related Commands

addcon, **dspscon**, **dspscons**

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX, BPX	Yes

Example 1

delcon 4.1.1.4

Description

Delete connection 4.1.1.4. The connections to delete are highlighted, and a prompt appears asking you to confirm the deletion. Respond with “y”, for yes, and connection 4.1.1.4 is deleted.

System Response

```

ca19          VT      SuperUser      BPX 15      9.2      Aug. 23 1997 20:36 GMT

Local          Remote      Remote
Channel        NodeName    Channel
4.1.1.4        ca20        12.1.1.4    Ok      CBR          0 R
4.1.1.5        ca20        12.1.1.5    Ok      VBR          0 R
4.1.1.6        ca20        12.1.1.6    Ok      ABR          0 R
4.1.1.7        ca20        12.1.1.7    Ok      VBR          0 R
4.2.1.1        ca20        12.2.1.1    Ok      CBR          0 L
4.2.1.2        ca20        12.2.1.2    Ok      VBR          0 L
4.2.1.3        ca20        12.2.1.3    Ok      ABR          0 L

```

Last Command: delcon 4.1.1.4

Delete connections? (y)

Next Command:

Table 9-19 delcon—Parameters

Parameter	Description
channel	Specifies the channel or set of channels for deleting connections. <channel> is specified in the following format: slot.port.vpi.vci

dnport

Deactivates (or “downs”) the specified ATM port. Before downing a port, you must remove all connections from the port.

Full Name

Down port

Syntax

dnport <port>

Related Commands

cnfport, dspport, upport

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX, BPX	Yes

Example 1

dnport 4.2

Description

Down port 4.2.

System Response

```
ca19          VT      SuperUser      BPX 15      9.2      Aug. 23 1997 19:49 GMT

ASI Port States
Port  State
4.1  ACTIVE
4.2  INACTIVE
```

Last Command: dspports

Next Command: dnport 4.2

Table 9-20 dnport—Parameters

Parameter	Description
port	Specifies the slot number and port number in the format <i>slot.port</i> .

dspatmcls

Displays the current parameters for an ATM connection class template. The number of classes is ten. The parameters and the values for each varies with the type of connection (CBR, VBR, ABR, and ATRF).

In Release 9.2.20, both the **dspatmcls** and **dspcls** commands display

Full Name

Display ATM connection class

Syntax

dspatmcls <class number>

Related Commands

addcon, cnfatmcls, dspcls, cnfcls, dspcon, dspcons

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	No	No	IGX, BPX	No

Example 1

dspatmcls 1

Description

Display the parameters for configuration class 1.

System Response

```

night                TN      SuperUser      BPX 8620      9.2      July 28 1997 13:22 GMT

                        ATM Connection Classes
Class: 1
Type: VBR

UPC      SCR      IBS      MBS      ABR      PCR      ABR PCR
y        500/500    10/10    1000/1000  -        500/500    -/-

      ICR      ICR TO Rate Up Rate Dn Rate FastDn Max Adjust      CDVT[in cells]
      -/-      -        -        -        -        -        -        64000/64000

      EFCI     % Util FGCRA      MFS      CLP CLP Hi CLP Lo BCM
100/100 100/100 n/n      -/-      y 100/100 100/100 n/n

      Description: "Default VBR 500"

Last Command: dspatmcls 1

Next Command:

```

Example 2

dspatmcls 1

Description

Display the parameters for configuration class 1.

System Response

```
night          TN      SuperUser      BPX 8620      9.2      July 28 1997 13:22 GMT
```

```
                ATM Connection Classes
```

```
Class: 3
PCR(0+1)      %Util      CDVT(0+1)      AAL5 FBTC      Type: rt-VBR
2000/2000    100/100    10000/10000    n              SCR
                                           2000/2000

MBS          Policing
1000/1000    3
```

```
Description: "Default rt-VBR 2000"
```

```
Class: 4
PCR(0+1)      %Util      CDVT(0+1)      AAL5 FBTC      Type: rt-VBR
8000/8000    100/100    10000/10000    n              SCR
                                           8000/8000

MBS          Policing
1000/1000    3
```

```
Description: "Default nrt-VBR 8000"
```

```
Last Command: dspatmcls 1
```

```
Next Command:
```

Table 9-21 *dspatmcls—Parameters*

Parameter	Description
class number	Specifies the class whose current parameters you want to see. Values are 1–10.

dspchstats

Displays statistics for a channel. You can specify an optional parameter *interval*, and the statistics display will be refreshed by the number of seconds you specify. (You can press the Delete key to stop the screen refresh.) If you do not specify the *interval* parameter, the screen refresh interval defaults to 10 seconds.

In this release, the multilevel channels statistics feature provides additional levels of channel statistics configuration for the BXM/UXM cards. You can use the **cnfcdparm** command to configure the channel statistic level on the BXM and UXM cards. For more information see the **cnfcdparm** command description in the *Cisco WAN Switching SuperUser Command Reference*.

The system responses that follow display the following statistics categories:

- From the port (something coming into a port, typically from an external device/box)
- To the network (something going out of the switch; typically trunks)
- Discarded (received from the attached device but not transmitted to the network)
- From the network (received in; typically, into the trunk)
- To the port (transmitted out of the port, to an external device or cloud)
- Discarded (received from the network but not transmitted to the attached device)

Full Name

Display channel statistics

Syntax

```
dspchstats <channel> [interval]
```

Related Commands

clrchstats

Attributes

Privilege	Jobs	Log	Node	Lock
5	No	No	IGX, BPX	No

Example 1

```
dspchstats 4.1.50.1
```

Description

Display the channel statistics for connection 4.1.50.1.

System Response

```

night          TN      SuperUser      BPX 15      9.2      July 17 1997 02:46 GMT

Channel Statistics for 4.1.50.1      Cleared: July 13 1997 02:53      (|)
MCR: 0 cps      Collection Time: 0 day(s) 18:10:22      Corrupted: NO
  Traffic      Cells      CLP      Avg CPS      %util      Discards:      Cells
From Port      :      14710      0      0      0      VcQ > CLP:      0
To Network      :      14710      ---      0      0      VcQ Full :      0
From Network:      14710      ---      0      0      Qbin Full:      0
To Port      :      14710      14710      0      0      Qbin> CLP:      0
                                                Failed :      14710
                                                RsrcOVL :      0
VC Q      :      0      Tx OAM :      29608      NonCompliant:      0
Rx EFCI      :      0      Rx AIS :      14710
Tx EFCI      :      0      Rx FERF:      0      ForeSight      Cells
                                                Rx BCM :      0      Adj Up :      0
                                                Tx BCM :      0      Adj Dn :      0
AAL-5 Frames:      0      Adj Fdn:      0

```

This Command: dspchstats 4.1.50.1

Hit DEL key to quit:

Example 2**dspchstats 13.1.100 10****Description**

Display statistics for connection 13.1.100 with a 10-second interval between screen updates. The card in slot 13 is an ALM/A.

System Response

```

sw142          TN      SuperUser      IGX 16      9.2      July 31 1997 14:38 PDT

Channel Statistics: 13.1.100      Cleared: July 31 1997 11:50      (/)
MCR: 150 cps      Collection Time: 0 day(s) 00:00:00      Corrupted: NO
  Cells      Avg      Util
              (cps)      (%)
From Port:      0      0      0
To Network:      0      0      0
Discarded:      0      0      0
From Network:      0      0      0
To Port:      0      0      0
Discarded:      0      0      0

```

This Command: dspchstats 13.1.100

Hit DEL key to quit:

Example 3**dspchstats 9.2.1.100****Description**

Display statistics for connection 9.2.1.100. The card in slot 9 is a UXM.

System Response

```
sw199          TN      SuperUser      IGX 16      9.0.s6      Aug. 28 1997 09:25 PDT

Channel Statistics: 9.2.1.100                               Snapshot
Collection Time: 0 day(s) 13:28:47                          Clrd: 08/27/97 19:47:24
Type                                                       Count
Cells Received from Port                                   0
Cells Transmitted to Network                             0
Cells Received from Network                               0
Cells Transmitted to Port                                 0
EOF Cells Received from Port                              0
Cells Received with CLP=1                                 0
Cells Received with CLP=0                                 0
Non-Compliant Cells Received                             0
Average Rx VcQ Depth in Cells                            0
Average Tx VcQ Depth in Cells                            0
Cells Transmitted with EFCI=1                             0
Cells Transmitted with EFCI=0                             0
Ingress Vsvd Allowed Cell Rate                           0
Egress Vsvd Allowed Cell Rate                             0
OAM state (0:OK,1:FERF,2:AIS)                             0
Good Pdu's Received by the Sar                            0
Good Pdu's Transmitted by the Sar                         0
Rx pdu's discarded by the Sar                             0
Tx pdu's discarded by the Sar                             0
Invalid CRC32 pdu rx by the sar                           0
Invalid Length pdu rx by the sar                          0
Shrt-Lgth Fail detected by the sar                        0
Lng-Lgth Fail detected by the sar                          0

Last Command: dspchstats 9.2.1.100
```

Example 4**dspchstats 2.1.1.1 1****Description**

Display statistics for connection 2.1.1.1 (with a VPI of 1, and VCI of 1), and an interval of 1.

System Response

```

sw57          TRM   StrataCom      BPX 8620      9.2.zR      Date/Time Not Set

Channel Statistics for 2.1.1.1      Cleared: Date/Time Not Set      (\) Snapshot
MCR: 96000/96000 cps      Collection Time: 0 day(s) 00:01:45      Corrupted: NO
  Traffic      Cells      CLP      Avg CPS      %util      Chan Stat Addr: 30EBB36C
From Port   :      0      ---      0      0
To Network  :      0      ---      0      0
From Network:      0      ---      0      0
To Port     :      0      ---      0      0

NonCmplnt Dscd:      0 Rx Q Depth      :      0 Tx Q Depth      :      0
Rx Vsvd ACR  :      0 Tx Vsvd ACR  :      0 Bkwd SECB      :      0
Bkwd Lost Cell:      0 Bkwd Msin Cell:      0 Bkwd BIPV      :      0
Fwd SECB     :      0 Fwd Lost Cell :      0 Fwd Msin Cell :      0
Fwd BIPV     :      0

Last Command: dspchstats 2.1.1.1 1

Next Command:

                                CD                                Minor Alarm

```

Example 5**dspchstats 10.1.205.101****Description**

Display statistics for connection 10.1.205.101 (with a VPI of 205 and VCI of 101).

System Response

```

m2a          TN      StrataCom      IGX 8420      9.2.zR      May 14 1998 14:19 GMT

Channel Statistics: 10.1.205.101
Collection Time: 0 day(s) 23:02:58
Type          Count      Traffic      Rate (cps)
Cells Received from Port      82978      From port      0
Cells Transmitted to Network  82978      To network     0
Cells Received from Network   82978      From network   0
Cells Transmitted to Port     82978      To port        0
EOF Cells Received from Port      0
Cells Received with CLP=1        0
Cells Received with CLP=0      82978
Non-Compliant Cells Received    0
Average Rx VcQ Depth in Cells  0
Average Tx VcQ Depth in Cells  0
Cells Transmitted with EFCI=1    0
Cells Transmitted with EFCI=0  82978

This Command: dspchstats 10.1.205.101

```

Table 9-22 *dspchstats—Parameters*

Parameter	Description
channel	Specifies the channel for statistics display, with format of <i>slot.port.vpi.vci</i> .

Table 9-23 *dspchstats—Optional Parameters*

Parameter	Description
interval	Specifies the interval (in seconds) between updates of the statistics display. If you specify an interval, you can either press Delete to terminate the command or wait until the command times out. The default is 10 seconds. If the Rx Q depth and the Tx Q depth fields remain “0”, make sure that a value other than “0” is specified for the interval parameter.

Functional Description

The table provides some statistics information regarding the BXM SAR. The switch software collects miscellaneous statistics regarding the Monarch SAR (Segmentation, Assembly, and Reassembly).

Segmentation, Assembly, and Reassembly (SAR) Statistics for BXM Card

Table 9-24 provides some statistics information for SAR on the BXM card. Note that the object name typically maps to the screen field name on the **dspchstats** screen.

Table 9-24 SAR Statistics for BXM Card

Object ID	Object Name	Range/Values	Default	Description
01	Message Tag	Byte 0-3 : Tag ID Byte 4-7 : IP Address	0	Identifier and source IP address sent with CommBus message. Both will be copied into the response, if any is to be sent.
02	Ingress Unknown AAL5 Discards	0 - 2 ³² -1	N/A	Number of unknown AAL5 PDUs discarded in the ingress.
03	Egress Unknown AAL5 Discards	0 - 2 ³² -1	N/A	Number of unknown AAL5 PDUs discarded in the egress.
04	Ingress Frame Ready FIFO Overruns	0 - 2 ³² -1	N/A	Number of ingress frame-ready FIFO overruns.
05	Egress Frame Ready FIFO Overruns	0 - 2 ³² -1	N/A	Number of egress frame-ready FIFO overruns.
06	Ingress Frame Ready FIFO Fulls	0 - 2 ³² -1	N/A	Number of ingress frame-ready FIFO fulls.
07	Egress Frame Ready FIFO Fulls	0 - 2 ³² -1	N/A	Number of egress frame-ready FIFO fulls.
08	Ingress Frame Ready FIFO Half-Fulls	0 - 2 ³² -1	N/A	Number of ingress frame-ready half-fulls.
09	Egress Frame Ready FIFO Half-Fulls	0 - 2 ³² -1	N/A	Number of egress frame-ready half-fulls.
0A	Inverse ARP Requests Rcv	0 - 2 ³² -1	N/A	Number of inverse ARP requests received.
0B	Inverse ARP Replies Rcv	0 - 2 ³² -1	N/A	Number of inverse ARP replies received.
0C	Bad /errored ARP packets rcv	0 - 2 ³² -1	N/A	Number of invalid or unknown type ARP packets received.
0D	Inverse ARP Requests Xmt	0 - 2 ³² -1	N/A	Number of inverse ARP requests transmitted.
0E	Inverse ARP Replies Xmt	0 - 2 ³² -1	N/A	Number of inverse ARP replies transmitted.
0F	Errored ARP packet Xmt	0 - 2 ³² -1	N/A	Number of invalid or unknown type ARP packets transmitted.
10	Bad LLC/NSAP PDUs Rcv	0 - 2 ³² -1	N/A	Number of illegal LLC/NSAP packets received.

dspcls

Displays the current parameters for a connection class template. The number of classes is ten. The parameters and the values for each varies with the type of connection (CBR, rt-VBR, nrt-VBR, ABR, and ATFR). (Note that connection parameters for the rt-VBR and nrt-VBR connection classes display separately.)

Full Name

Display connection class

Syntax

```
dspcls <class number>
```

Related Commands

addcon, cnfcls, dspcon, dspcons

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	No	No	IGX, BPX	No

Example 1

```
dspcls 1
```

Description

Display the parameters for configuration class 1.

System Response

```
night          TN      SuperUser      BPX 8620      9.2      July 28 1997 13:22 GMT
```

```
                ATM Connection Classes
```

```
Class: 3
PCR(0+1)      %Util      CDVT(0+1)      AAL5 FBTC      Type: rt-VBR
2000/2000    100/100    10000/10000    n              SCR
                                                    2000/2000

MBS          Policing
1000/1000    3
```

```
Description: "Default rt-VBR 2000"
```

```
Class: 4
PCR(0+1)      %Util      CDVT(0+1)      AAL5 FBTC      Type: rt-VBR
8000/8000    100/100    10000/10000    n              SCR
                                                    8000/8000

MBS          Policing
1000/1000    3
```

```
Description: "Default nrt-VBR 8000"
```

```
Last Command: dspatmcls 1
```

```
Next Command:
```

Example 2**dspcls 1****Description**

Display the parameters for configuration class 1.

System Response

```

night          TN      SuperUser      BPX 15      9.2      July 28 1998 13:22 GMT

                        ATM Connection Classes
Class: 1
Type: VBR

UPC      SCR      IBS      MBS      ABR      PCR      ABR PCR
y        500/500    10/10    1000/1000  -      500/500    -/-

      ICR      ICR TO Rate Up Rate Dn Rate FastDn Max Adjust      CDVT[in cells]
      -/-      -      -      -      -      -      -      64000/64000

      EFCI      % Util FGCRA      MFS      CLP CLP Hi CLP Lo BCM
100/100 100/100 n/n      -/-      y 100/100 100/100 n/n

      Description: "Default VBR 500"

Last Command: dspcls 1

Next Command:

```

Table 9-25 *dspcls—Parameters*

Parameter	Description
class number	Specifies the class whose current parameters you want to see. Values are 1–10.

dspcon

Displays connection information for a specified channel. The information displayed includes:

- The channel numbers for both the local and remote ends of the connection.
- The node names at both ends of the connection.
- The type or data rate of the connection.
- The routing restriction.
- Trunk cell routing restriction.
- The Class of Service (COS) of the connection.
- The connection route, listing the end nodes and any intermediate nodes.
- If cost-based AutoRoute is configured, displays maximum and current costs for a connection route.
- The preferred route for the connection (if configured).
- The status of the cards associated with the connection.
- Any Y-cable conflicts.
- The compression status.
- The connection bandwidth parameter values.

- The connection/type descriptor (if configured). (If the connection is a VP tunnelling DAX connection, the type is displayed as cbrvp, abrsvp, abrfsvp, etc.)
- The circuit round-trip delay (if ForeSight is enabled).

Any failures that affect the connection flash on the screen. For Frame Relay NNI ports, the NNI value indicates the A-bit value received across the NNI from the remote network. The status that may be displayed includes:

OK	Connection OK
FAILED	Connection failed
MISSING	VPI.VCI was deleted in other network at NNI. A previous status report indicated a valid VPI.VCI was present but an updated report did not.
UNUSED	Indicates the UNI port does not support reporting of NNI A-bit status

In release 9.2 switch software for an IGX 8400 routing hub, **dspcon** does the following:

- **dspcon**—Shows the new connection segment. Because the connection type is based on the master end of the connection (either voice, data, Frame Relay or ATM connections), the **dspcon** command displays that and shows the feeder trunk endpoint as the slave end and the incoming A-bit status.
- **dspcon**—Indicates connection failures at feeder endpoints.

In Release 9.2.20, rt-VBR and nrt-VBR connection service types display separately.

Full Name

Display connections

Syntax

```
dspcon <channel>
```

Related Commands

addcon, cnfcon, cnfpref, cnfrtcost

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

```
dspcon 12.1.1.5
```

Description

Display connection information for channel 12.1.1.5 (a VBR connection).

System Response

```

ca20          LAN   SuperUser      BPX 15   9.2      Aug. 29 1997 10:44 PST

Conn: 12.1.1.5          ca19          4.1.1.5          VBR   Status: Down
      SCR              MBS              PCR              ABR PCR          UPC FST CLP  % util
      1000/1000        10/10          500/500          --/--          y  n  y  100/100
Owner: LOCAL  Restriction: NONE  COS: 0
Group: NONE   TestRTD: 16705 msec

```

```

Path:   Downed by user
Pref:   Not Configured

```

```

ca20          ASI-T3      : OK          ca19          ASI-T3      : OK
              Line 12.1 : OK          Line 4.1     : OK

```

```
Last Command: dspcon 12.1.1.5
```

```
Next Command:
```

Example 2**dspcon 12.1.1.4****Description**

Display connection information for channel 12.1.1.4 (CBR).

System Response

```
ca20          LAN    StrataCom      BPX 15    9.2      Aug. 29 1997 10:42 PST

Conn: 12.1.1.4      ca19      4.1.1.4      CBR      Status: Down
      PCR          CDVT          MCR          ABR PCR      UPC FST CLP % util
      100/100      10/10      --/--      --/--      y  n  y 100/100
Owner: LOCAL  Restriction: NONE  COS: 0
Group: NONE  TestRTD: 0 msec  Trunk Cell Routing Restrict: Y  Max Cost: 100  Route Cost:
36

Path:   Downed by user
Pref:   Not Configured
```

```
ca20          ASI-T3      : OK          ca19      ASI-T3      : OK
          Line 12.1 : OK          Line 4.1 : OK
```

Last Command: dspcon 12.1.1.4

Next Command:

Example 3**dspcon 12.1.1.100****Description**

Display connection information for channel 12.1.1.100 (an ABR connection.)

System Response

```
ca20          LAN    SuperUser      BPX 15    9.2      Aug. 29 1997 10:31 PST
```

```
Conn: 12.1.1.100      ca20
      SCR             MBS             MCR             ABR PCR       UPC FST CLP  % util
20000/20000          50/50          20000/20000    96000/96000   Y  Y  Y  100/100
      ForeSight RTD: 0 msec
```

```
Path:  Route information not applicable for local connections
```

```
ca20          ASI-T3      : OK          ca20          ASI-T3      : OK
              Line 12.1 : OK          ca20          Line 12.2 : OK
```

```
Last Command: dspcon 12.1.1.100
```

```
Next Command:
```

Example 4**dspcon 4.1.2.1****Description**

Display connection information for channel 4.1.2.1 (an ATFST connection.)

System Response

```
sw53          TN      SuperUser      BPX 8620      9.2      July 26 1997 13:40 GMT

Conn:  4.1.2.1          sw53          4.3.2.1          atfst      Status: OK
      SCR          MBS          MCR          ABR PCR          UPC FST CLP % util
      25/25          1000/1000          25/25          25/25          Y  Y  Y 100/100
ForeSightRTD: 0 msec
```

Path: Route information not applicable for local connections

```
sw53          BNI-T3      : OK          sw53          BNI-T3      : OK
          Line 4.1 : OK          Line 4.3 : OK
          OAM Cell RX: Clear          NNI          : OK
          NNI          : OK
```

Last Command: dspcon 4.1.2.1

Next Command:

Example 5**dspcon 12.1.1.*****Description**

Display connection information for channel 12.1.1.* (a CBR VP tunnelling DAX connection.)

System Response

```

sw224          TRM          IGX 8420  9.2.a5          Mar. 5 1999  11:10 PST
Conn:  12.2.1.*          sw224          12.1.1.100          cbrvp          Status:OK
      PCR(0+1)    % Util    CDVT(0+1)    Policing
      1000/1000  100/100  10000/10000  4/4
Pri: L  Test-RTD: 0 msec
Path:   Route information not applicable for local connections

sw224    UXM:   OK          sw224    UXM:   OK
        Line 12.2 : OK          Line 12.1 : OK
        OAM Cell RX: Clear          NNI:   OK
        NNI:   OK

This Command: dspcon 12.2.1.*

```

Table 9-26 dspcon—Parameters

Parameter	Description
channel	Specifies the channel for which to display connection details. The command displays connection information for one channel at a time. You cannot specify a set of channels. Channel is specified in the following format: slot.port.vpi.vci

dspconcnf

Displays the following information for a connection's configuration:

- The channel numbers for both the local and remote ends of the connection.
- The node names at both ends of the connection.
- The preferred route for the connection (if configured).
- The bandwidth parameter values for ATM connections.
- VC queue depth.

- The connection type (if configured).
- Other values (see example screen).

The rt-VBR and nrt-VBR connection service types will display separately.

Full Name

Display connection configuration

Syntax

```
dspconcnf <channel>
```

Related Commands

addcon, dspcon, dspcons, delcon

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	BPX	No

Example 1

```
dspconcnf 3.1.1.1
```

Description

Display the configuration for 3.1.1.1.

System Response

```
sw60          TN      SuperUser      BPX 8620      9.2 Date/Time Not Set
Conn: 3.1.1.1          sw60          3.1.1.1          abrstd
Description:
      PCR(0+1)      % Util      MCR          CDVT(0+1)      AAL5 FBTC
96000/96000      100/100 96000/96000      10000/10000      n
```

Last Command: dspconcnf 3.1.1.1

Next Command:

Example 2**dsponcnf 2.1.1.101****Description**

Display the configuration for 2.1.1.101.

System Response

```
sw60          TN      SuperUser      BPX 8620      9.2 Date/Time Not Set

Conn:  3.1.1.1          sw60          3.1.1.1          rt-vbr
Description:

  PCR(0+1)  % Util      CDVT(0+1)          AAL5 FBTC          SCR
  -----  -
50/50      100/100    250000/250000    n                    50/50

MBS        Policing
-----
500/500      3

Trunk Cell Routing Restrict:  Y
```

Last Command: dsponcnf 3.1.1.1

Next Command:

Table 9-27 dsponcnf—Parameters

Parameter	Description
channel	Specifies the channel for which to display connection configuration. The command displays connection information for one channel at a time. You cannot specify a set of channels. Channel is specified in the following format: slot.port.vpi.vci

dsponcnf

Displays information about the connections on an IGX or BPX node. (For information about **dsponcnf** for an MGX 8220 card, refer to the *MGX 8220 Command Reference*.)

Table 9-28 lists all possible information headings that appear in the display. The actual headings that appear depend on the choice of selected optional parameters—including no parameters. The screen examples reflect various optional parameters.

**Note**

This description contains all parameters that are displayed even though some parameters are meaningless on a BPX.

You can also use **dspcons** to display those connections that have failed the OAM loopback test.

In Release 9.2.20, **dspcons** will display the rt-VBR and nrt-VBR service types separately.

As you configure VP tunnelling connections on a node, you can display all the VP tunnelling connections on a particular node by using the **dspcons -tun** command. VP tunnelling connections are indicated by a connection type of “cbrvp”, for example, in the Type column of the **dspcons** screen. For more information on VP tunnelling on UXM cards, see the *IGX Installation and Configuration* manual.

Table 9-28 Headings in Connection Display

Fields	Description
Local Channel	The connection's channel at this node.
Remote Node Name	The name of the node at the other end of the connection.
Remote Channel	The connection's channel at the remote node.
State	The state of the connection(s) are as follows. OK–routed Down–downed Failed–unrouted, but trying
Type	The type of connection (nrt-vbr, cbr, abr, atfr, or atfst).
Route Avoid	The type of lines to avoid when routing (satellite lines, terrestrial lines, lines with zero code suppression).
COS	The Class Of Service.
Owner	The end of the connection in control of re-routing.
ABRSTD=OFF	The policing value for the connection.

Full Name

Display connections

Syntax

dspcons [*start_channel*] [*nodename*] [-f] [-v] [-d] [-atfr] [-abit] [-fabit] [-fail] [-down]

where

<i>start_channel</i>	The starting channel to display.
<i>nodename</i>	specifies that connections for only the named node appear in the display.
-f	specifies that the display show Frame Relay connections only.
-v	specifies that the display show only voice connections.

- d specifies that the display show only data connections (in Kbps).
- atfr specifies that the display show Frame Relay to ATM interworking connections (as well as atfr with ForeSight).
- abit specifies that the display show status of the A-bit.
- fabit specifies that the display show only connections with failed A-bits.
- down specifies that the display show only downed connections.

**Note**

Some parameters may cause other parameters not to appear. Therefore, if you specify all parameters, some do not appear.

Related Commands

addcon, delcon

Attributes

Privilege	Jobs	Log	Node	Lock
1–6	No	No	IGX, BPX	No

Example 1**dspcons 4.1.1.4****Description**

Displays all connections starting with 4.1.1.4.

System Response

```
ca19          VT      SuperUser      BPX 15      9.2      Aug. 23 1997 19:44 GMT

Local        Remote      Remote
Channel      NodeName   Channel
4.1.1.4     ca20       12.1.1.4      Ok      CBR        0 R
4.1.1.5     ca20       12.1.1.5      Ok      rt-VBR     0 R
4.1.1.6     ca20       12.1.1.6      Ok      ABR        0 R
4.1.1.7     ca20       12.1.1.7      Ok      nrt-VBR    0 R
```

Last Command: dspcons

Next Command:

Example 2**dspcons -abit****Description**

Display the Abit status for all connections starting with 1.1.3.66.

System Response

```
sw81          TN      SuperUser      BPX 15      9.2          Aug. 14 1997 10:32 PST

Local         Remote      Remote
Channel       NodeName   Channel
1.1.3.66     sw81       1.1.3.66   Ok          OK          OK
1.1.3.67     sw81       1.1.3.67   Ok          OK          OK
1.1.3.68     sw81       1.1.3.68   Ok          OK          OK
1.1.3.69     sw81       1.1.3.69   Ok          OK          OK
1.1.3.70     sw81       1.1.3.70   Ok          OK          OK
1.1.3.71     sw81       1.1.3.71   Ok          OK          OK
1.1.3.72     sw81       1.1.3.72   Ok          OK          OK
1.1.3.73     sw81       1.1.3.73   Ok          OK          OK
1.1.3.74     sw81       1.1.3.74   Ok          OK          OK
1.1.3.75     sw81       1.1.3.75   Ok          OK          OK
1.1.3.76     sw81       1.1.3.76   Ok          OK          OK
1.1.3.77     sw81       1.1.3.77   Ok          OK          OK
1.1.3.78     sw81       1.1.3.78   Ok          OK          OK
```

This Command: dspcons -abit

Continue?

Example 3**dspcons****Description**

Display connections

System Response

```
sw99      TN      StrataCom      BPX 8620      9.2.10      Aug. 27 1998 08:59 GMT

Local      Remote      Remote      State      Type      Route
Channel    NodeName    Channel     State      Type      Avoid    COS    O
-----
3.2.6.16   sw14        10.1.6.16   Ok         rt-vbr    -----  0      L
3.2.6.17   sw14        10.1.6.17   Ok         rt-vbr    -----  0      L
3.2.6.18   sw14        10.1.6.18   Ok         rt-vbr    -----  0      L
3.2.6.19   sw14        10.1.6.19   Ok         rt-vbr    -----  0      L
3.2.6.20   sw4         10.1.6.20   Ok         rt-vbr    -----  0      L
3.2.6.21   sw14        10.1.6.21   Ok         nrt-vbr   -----  0      L
3.2.6.22   sw14        10.1.6.22   Ok         atfr      -----  0      L
3.2.6.16   sw157       16.1.6      Failed    atfr      -----  0      L
3.2.6.17   sw157       16.1.7      Failed    atfr      -----  0      L
3.2.8.18   sw157       16.1.8      OAM-F     atfr      -----  0      L
3.2.8.19   sw157       16.1.9      OAM-F     atfr      -----  0      L
```

Last Command: dspcons

Example 4**dspcons -oam****Description**

Display connections that have failed the OAM loopback test.

System Response

```
sw99TN      StrataCom      BPX 8620      9.2.10      Aug. 27 1998 08:59 GMT
```

```
Local          Remote          RemoteRoute
Channel        NodeName        ChannelState    Type AvoidCOS  O
-----
3.2.6.16sw15716.1.6OAM-Fatfr0L
3.2.6.17sw15716.1.7OAM-Fatfr0L
3.2.8.18sw15716.1.8OAM-Fatfr0L
3.2.8.19sw15716.1.9OAM-Fatfr0L
```

```
Last Command: dspcons -oam
```

```
Next Command:
```

Table 9-29 dspcons—Optional Parameters

Parameter	Description
start channel	Specifies the beginning channel to display. The <i>start channel</i> format is: <i>slot.port.vpi.vci</i> If no starting channel is specified, the display begins with the first connected channel.
node name	Specifies that connections to a specific remote node are displayed.
-atfr	Frame Relay to ATM interworking connections
-abit	A-bit status
-fabit	Connections with A-bit errors
-fail	Failed connections
-down	Downed connections

Example 5**dspscons -tun****Description**

Display only VP tunnelling connections on that node.

System Response

```

sw224          TRM   StrataCom      IGX 8420  9.2.a5   Mar. 5 1999  11:10 PST

Local          Remote      Remote
Channel        NodeName   Channel    State  Type      Compress   Code COS
12.1.1.100    sw224     12.2.1.*   Ok     cbrvp
12.2.1.*      sw224     12.1.1.100 Ok     cbr

```

Last Command: dspscons

dsplmistats

Displays LMI statistics for a specified channel.

Full Name

Display LMI/ILMI statistics

Syntax**dsplmistats** <port> [clear]**Note**

On an access shelf, the **dsplmistats** command takes no arguments. On an IPX or IGX node, **dsplmistats** requires a trunk number. On a BPX node, **dsplmistats** requires the slot and port number.

Related Commands

none

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

dsplmistats 1.1

Description

Display LMI statistics for channel 1.1.1.1.

System Response

```
sw81          TN      SuperUser      BPX 15      9.2      Aug. 29 1997 14:44 PST
```

```

Annex G LMI Statistics for slot:1 port:1
VPI.VCI:      0.0      Lmi enabled      Lmi polling enabled
Invalid Pdu    Rx:      0      Status Polling Timer (T396) : 10
Invalid Pdu Len Rx:      0      Status Enquiry Timer (T393) : 10
Unknown Pdu Type Rx:      0      Max Status Enquiry Retry (N394): 5
Unknown IE Type Rx:      0      Update Status Timer (T394) : 10
Bad Transaction Rx:      0      Max Update Status Retry (N395) : 5
Status        Rx:      77715      Spc Polling Timer : 3
Status Enq    Tx:      77711      Spc Retry Timer : 0
Status Enq    Rx:      77897      Spc Retry Counter : 1
Status        Tx:      77897      Node Status Retry Timer : 0
Status Ack    Rx:      1505      Node Status Retry Counter : 0
Update Status Tx:      1507      Node Status Polling Timer : 7
Update Status Rx:      2042
Status Ack    Tx:      2042

```

Last Command: dsplmistats 1.1

Next Command:

Table 9-30 dsplmistats—Parameters

Parameter	Description
port	Channel is specified in the format <i>slot.port</i> .

Table 9-31 dsplmistats—Optional Parameters

Parameter	Description
clear	On a BPX node only, the optional clear argument clears the current statistics after dsplmistats executes.

Functional Description of LMI Statistics for BXM Card

An internal firmware command provides the capability for the controller card to fetch ILMI/LMI statistics on ILMI/LMI sessions on the BXM card. The BXM must be firmware-capable. Refer to LMI Statistics and Descriptions for dsplmistats (ATM) for BXM Card

Table 9-32 LMI Statistics and Descriptions for dsplmistats (ATM) for BXM Card

Object ID	Object Name	Range/Values	Default	Description
01	Message Tag	Byte 0-3 : Tag ID Byte 4-7 : IP Address	0	Identifier and source IP address sent with CommBus message. Both will be copied into the response, if any is to be sent.
02	Port Number	1 - 12	R	Identifies the target port. If multiple port numbers are sent during the operation, then each port number object terminates the configuration for the string of objects for the previous port number.
03	Virtual Port #	1 - 255	R	Identifies the target virtual port.
04	Status Sync	0 - Clear 1 - Get Status	R	Sync up ingress status information to bcc
05	Session Status	0 - Okay 1 - Failed	0	Indicates whether or not the ILMI/LMI session on this logical interface is failed.
06	BPX/Feeder IP Address	0 - 2 ³² -1	0	Valid for feeder connections. Indicates the IP address of the Feeder
07	BPX/Feeder Name	Byte 0..8 : String	N/A	Valid for feeder connections. Indicates the name of the Feeder
08	BPX/Feeder Serial Number	Byte 0..8 : String	N/A	Valid for feeder connections. Indicates the serial number of the Feeder
09	BPX/Feeder Alarm Status	0 : Clear 1 : Minor 2 : Major	N/A	Valid for feeder connections. Indicates the alarm status of the Feeder
0A	BPX/Feeder Line Rate	0 - 2 ³² -1	N/A	Valid for feeder connections. Indicates the line receive rate of the Feeder
0B	BPX/Feeder LAN IP Address	0 - 2 ³² -1	0	Valid for feeder connections. Indicates the LAN IP address of the feeder
0C-0F	RESERVED			
10	ILMI Number of Get Req Rx'd	0 - 2 ³² -1	N/A	ILMI number of Get Requests received.
11	ILMI No. of Get Next Req Rx'd	0 - 2 ³² -1	N/A	ILMI number of Get Next Requests received.
12	ILMI No. of Get Next Req Tx'd	0 - 2 ³² -1	N/A	ILMI number of Get Next Requests transmitted.
13	ILMI No. of Set Req Rx'd	0 - 2 ³² -1	N/A	ILMI number of Set Requests received.
14	ILMI No. of Traps Rx'd	0 - 2 ³² -1	N/A	ILMI number of traps received.

Table 9-32 LMI Statistics and Descriptions for dsplmistats (ATM) for BXM Card (continued)

Object ID	Object Name	Range/Values	Default	Description
15	ILMI No. of Get Resp. Rx'd	0 - 2 ³² -1	N/A	ILMI number of Get Responses received.
16	ILMI No. of Get Req. Tx'd	0 - 2 ³² -1	N/A	ILMI number of Get Requests transmitted.
17	ILMI No. of Get Resp. Tx'd	0 - 2 ³² -1	N/A	ILMI number of Get Responses transmitted.
18	ILMI No. of Traps Tx'd	0 - 2 ³² -1	N/A	ILMI number of traps transmitted.
19	ILMI Unknown PDUs Rx'd	0 - 2 ³² -1	N/A	ILMI number of unknown PDUs received.
1A-1F	RESERVED			
20	LMI No. of Status Tx'd	0 - 2 ³² -1	N/A	LMI number of Status transmitted.
21	LMI No. Update Status Tx'd	0 - 2 ³² -1	N/A	LMI number of Update Status transmitted.
22	LMI No. of Status Ack. Tx'd	0 - 2 ³² -1	N/A	LMI number of StatusAck. transmitted.
23	LMI No. of Status Enq. Rx'd	0 - 2 ³² -1	N/A	LMI number of Status Enquiries received.
24	LMI No. of Status Enq. Tx'd	0 - 2 ³² -1	N/A	LMI number of Status Enquiries transmitted.
25	LMI No. of Status Rx'd	0 - 2 ³² -1	N/A	LMI number of Status received.
26	LMI No. Update Status Rx'd	0 - 2 ³² -1	N/A	LMI number of Update Status received.
27	LMI No. of Status Ack. Rx'd	0 - 2 ³² -1	N/A	LMI number of StatusAck. received.
28	LMI No. of Invalid PDU Rx'd	0 - 2 ³² -1	N/A	LMI number of invalid PDUs received.
29	LMI No. of Invalid PDU Len. Rx'd	0 - 2 ³² -1	N/A	LMI number of invalid PDU lengths received.
2A	LMI No. Unknown PDUs Rx'd	0 - 2 ³² -1	N/A	LMI number of unknown PDUs received.
2B	LMI No. of Invalid IEs Rx'd	0 - 2 ³² -1	N/A	LMI number of Information Elements received.
2C	LMI No. of Invalid T.ID Rx'd	0 - 2 ³² -1	N/A	LMI number of invalid Transaction IDs received.

dspport

Displays detailed status on a single specified ATM port. The more specific the port address in the command, the more detail is provided. A full description of these parameters is provided in the **cnfport** command.

Full Name

Display port

Syntax

dspport <slot.port>

Related Commands

cnfport, upport, dnport

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	No	No	IGX, BPX	No

Example 1

dspport 4.1

Description

Display the status of ASI port 4.1.

System Response

```
swstorm      TN      SuperUser      BPX 15      9.2      July 26 1997 17:57 GMT
```

```
Port:        4.1      [ACTIVE ]  
Interface:   T3-2  
Type:       UNI  
Speed:      96000 (cps)  
VBR Queue Depth: 10800  
  
Protocol:   NONE
```

```
Last Command: dspport 4.1
```

```
Next Command:
```

Example 2**dspport 7.2****Description**

Display the status of the primary link on port 2, slot 7, of an IMA line.

System Response

```
sw225 TN      StrataCom      IGX 16      9.3.00      Jun 19 1999 13:39 PST

Port:         7.2      [ACTIVE ]
IMA Port Group:2-5
Interface:    E1-IMA
Type:         UNI      CAC Override: Enabled
Speed:        13433 (cps) %Util Use: Disabled
SIG Queue Depth: 640

Protocol:     NONE

Last Command: dspport 7.2
```

Table 9-33 dspport—Parameters

Parameter	Description
slot.port	Specifies the slot number and port to display.

dspportq

Displays the port queue configuration for an ASI or BXM card on a BPX or a UXM card on an IGX. After you enter this command with the required slot and port number parameter, the display shows the detailed port queue configuration information shown in the example figure.

Full Name

Display port queue configuration.

Syntax

```
dspportq <slot.port>
```

Related Commands

cnfportq

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	No	No	IGX, BPX	No

Example 1**dspportq 4.2****Description**

Display the port queue configuration for 4.2.

System Response

```

ca19          VT      SuperUser      BPX 8620   9.2   June 23 1999 19:11 GMT

      ASI-T3

Port:          4.2      [ACTIVE]
Interface:     T3-2
Type:          UNI
Speed:         96000 (cps)
SVC Queue Pool Size:          0
CBR Queue Depth:              200      rt-VBR Queue Depth:          1000
CBR Queue CLP High Threshold:  80%     rt-VBR Queue CLP High Threshold:  80%
CBR Queue CLP Low Threshold:   60%     rt-VBR Queue CLP Low Threshold   60%
CBR Queue EFCI Threshold:      80%     rt-VBR Queue EFCI Threshold      80%
nrt-VBR Queue Depth:          1000     UBR/ABR Queue Depth:          9800
nrt-VBR Queue CLP High Threshold: 80%   UBR/ABR Queue CLP High Threshold: 80%
nrt-VBR Queue CLP Low Threshold: 60%   UBR/ABR Queue CLP Low Threshold: 60%
nrt-VBR Queue EFCI Threshold:  80%     UBR/ABR Queue EFCI Threshold:   80%

Last Command: cnfportq 4.2

Next Command:

```

Example 2**dspportq 2.1****Description**

Display the port queue configuration for 2.1

System Response

```

swstorm          TN      SuperUser          BPX 8620    9.2    June 26 1998 18:01 GMT

ASI-T3

Port:            2.1      [ACTIVE ]
Interface:       T3-2
Type:            UNI
Speed:           96000 (cps)
SVC Queue Pool Size:      0
CBR Queue Depth:      200      rt-VBR Queue Depth:      1000
CBR Queue CLP High Threshold: 80%      rt-VBR Queue CLP Hi-Threshold: 80%
CBR Queue CLP Low Threshold: 60%      rt-VBR Queue CLP Low Threshold: 60%
CBR Queue EFCI Threshold: 80%      rt-VBR Queue EFCI Threshold: 80%
rt-VBR Queue Depth:      10800      UBR/ABR Queue Depth:      9800
rt-VBR Queue CLP High Threshold: 80%      UBR/ABR Queue CLP High Threshold: 80%
rt-VBR Queue CLP Low Threshold: 60%      UBR/ABR Queue CLP Low Threshold: 60%
rt-VBR Queue EFCI Threshold: 80%      UBR/ABR Queue EFCI Threshold: 80%

Last Command: dspportq 2.1

Next Command:

```

Table 9-34 *dspportq—Parameters*

Parameter	Description
slot or slot.port	Specifies either the slot number or the slot and port number.

dspportstats

Displays a summary of port statistics for the ATM port specified. These include the cell count in the transmit and receive directions, and error counts associated with the port. The display indicates the date and time that the statistics were cleared and the statistics collection time since they were last cleared. Cells transmitted indicates the amount of data transmitted out the port to the user device. Cells received indicates the amount of data received from the user device at the port. Corrupted statistics result from channel/port loopbacks or port tests. A “yes” in this field indicates that such loopback or port tests have occurred since the statistics were last cleared.

Full Name

Display port statistics

Syntax

```
dspportstats <port> [interval]
```

Related Commands

clrportstats

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IPX, IGX	No

Example 1**dsportstats 11.1****Description**

Display the statistics for ASI port 11.1.

System Response

```
PABPX001      VT      StrataCom      BPX 15      8.5.04      Feb. 27 1998
16:38 G+01

Port Statistics for 11.1      Cleared: Feb. 19 1998 18:26
Port Speed: 80000 cps      Collection Time: 5 day(s) 09:54:37      Corrupted: NO

          Cells          CLP          (EFCI)
Rx Port:  41735369          0          0
Tx Port:  55704628          0          0

Unknown Addr  :    144592  Cell Buf Ovfl  :          0  Nonzero GFC Ct:
0
Rcv Ais Count :          0  Rcv Ferf Count:    343  Rx BCM Cells  :
0
Tx Pyld Err Ct:          0  Tx H Err Dscd  :          0  Lst Un Vpi/Vci:    0.16
```

This Command: dsportstats 11.1

Hit DEL key to quit:

Table 9-35 dsportstats—Parameters

Parameter	Description
slot.port	Specifies the ATM card set and port number.

Table 9-36 *dspportstats—Optional Parameters*

Parameter	Description
interval	<p>Specifies the refresh interval time for data. It can be specified between 1 and 60 seconds. The default interval is 1 seconds.</p> <p>Note that you must specify a value other than 0 for the “interval” parameter. Otherwise, the screen displayed for a UXM and BMX card will be just a snapshot—it will not be updated periodically. If the Rx Q depth and the Tx Q depth on the BXM and UXM cards remain “0”, specify a value for the interval parameter other than 0.</p>

Statistics Supported for BPX ATM Ports (ASI or BXM Front Card)

The following 45 statistics are available for each BPX ATM port, with an ASI or BXM front card type, and T3, E3, or OC-3 back card type. (Note that the statistics names listed below are what displays in Cisco WAN Manager; the field name that appears on the **dspportstats** screen may vary slightly from the Cisco WAN Manager parameter/field name.)

- 1) Cell Buffer Overflow
- 2) Cells Rx w/CLP discarded
- 3) Cells Rx w/CLP=0
- 4) Cells Rx w/CLP=0 discarded
- 5) Cells Tx w/CLP=0
- 6) Egress OAM Cell Count
- 7) Egress RM Cell Count
- 8) Get Request Rx
- 9) Get Request Tx
- 10) Get Response Rx
- 11) Get Response Tx
- 12) GetNext Request Rx
- 13) GetNext Request Tx
- 14) Ingress RM Cell Count
- 15) Invalid LMI IE Rx
- 16) Invalid LMI Rx
- 17) Invalid LMI length Rx
- 18) Invalid Transaction IDs
- 19) Non-zero GFC Count
- 20) Number of BCM Cell Rx
- 21) Number of Cells Rx
- 22) Number of Cells Rx w/CLP set
- 23) Number of Cells Rx w/EFCI set

- 24) Number of Cells Tx
- 25) Number of Cells Tx w/CLP set
- 26) Number of Cells Tx w/EFCI set
- 27) OAM Cells Rx Count
- 28) Rx AIS Cell
- 29) Rx FERF Cell
- 30) SetRequest Rx
- 31) Status Ack Rx
- 32) Status Ack Tx
- 33) Status Enq Rx
- 34) Status Enq Tx
- 35) Status Rx
- 36) Status Tx
- 37) Trap Rx
- 38) Trap Tx
- 39) Tx Header Err Discard
- 40) Tx Payload Err Due to BIP-16 Err
- 41) Unknown LMI Rx
- 42) Unknown LMI Tx
- 43) Unknown VPI/VCI
- 44) Update Status Rx
- 45) Update Status Tx

Table 9-37 BPX Port Statistics Supported for ASI and BXM Front Cards

Statistics Name in Cisco WAN Manager	Statistics ID
Cell Buffer Overflow	1
Cells Rx w/CLP discarded	42
Cells Rx w/CLP=0	40
Cells Rx w/CLP=0 discarded	41
Cells Tx w/CLP=0	43
Egress OAM Cell Count	44
Egress RM Cell Count	46
Get Request Rx	17
Get Request Tx	23
Get Response Rx	22
Get Response Tx	24
GetNext Request Rx	18
GetNext Request Tx	19

Table 9-37 BPX Port Statistics Supported for ASI and BXM Front Cards (continued)

Statistics Name in Cisco WAN Manager	Statistics ID
Ingress RM Cell Count	45
Invalid LMI IE Rx	38
Invalid LMI Rx	35
Invalid LMI length Rx	36
Invalid Transaction IDs	39
Non-zero GFC Count	2
Number of BCM Cell Rx	10
Number of Cells Rx	7
Number of Cells Rx w/CLP set	8
Number of Cells Rx w/EFCI set	9
Number of Cells Tx	11
Number of Cells Tx w/CLP set	14
Number of Cells Tx w/EFCI set	15
OAM Cells Rx Count	12
Rx AIS Cell	5
Rx FERF Cell	6
SetRequest Rx	20
Status Ack Rx	34
Status Ack Tx	29
Status Enq Rx	30
Status Enq Tx	31
Status Rx	32
Status Tx	27
Trap Rx	21
Trap Tx	25
Tx Header Err Discard	16
Tx Payload Err Due to BIP-16 Err	13
41) Unknown LMI Rx	37
Unknown LMI Tx	26
Unknown VPI/VCI	0
Update Status Rx	33
Update Status Tx	28

dsprtcache

This command displays the cache of all cost-based routing connections. The optional *index* parameter lets you specify a cache entry index. The optional *c* parameter clears the cache.

Full Name

Display cost-based route cache

Syntax

dsprtcache [*index*] [*c*]

[*index*] specifies the cache entry index

[*c*] specifies to clear the entire cache or a single entry

Related Commands

dsprcon, **cnfrtcost**, **cnfpref**

Attributes

Privilege	Jobs	Log	Node	Lock
1–6	No	No	IGX, BPX	No

Example 1**dsprtcache****Description**

Display route cache contents, and let you monitor and manually clear the cache.

System Response

```

pissaro      TN      StrataCom      BPX 15      9.1      Jun. 18 1997 11:11 GMT
Route Cache (Summary)
Index  Use   No.   Cost  Delay  Restrict  Load  VPC   Hops  RemoteNode
0      Yes   1     Yes   No     None      VBR   No    2     lautrec
1      Yes   6     Yes   No     *s        BDB   No    3     vangogh
2      Yes   9     Yes   No     None      BDA   No    3     matisse
3      Yes   3     Yes   No     *t        BDB   No    3     rousseau
4      Yes   1     Yes   No     None      CBR   No    3     seurat <- current
5      No    0     No    No     None      ---   No    0     ---
6      No    0     No    No     None      ---   No    0     ---
7      No    0     No    No     None      ---   No    0     ---
8      No    0     No    No     None      ---   No    0     ---
9      No    0     No    No     None      ---   No    0     ---
10     No    0     No    No     None      ---   No    0     ---
11     No    0     No    No     None      ---   No    0     ---

```

Last Command: dsprtcache

Next Command:

Table 9-38 dsprtcache—Parameters

Parameter	Description
index	Specifies a particular route entry within the cache. When used with the c parameter, the route is either displayed or cleared from the cache.
c	Clears the cache, or if you also enter the index parameter, clears the route cache specified by the index number.

upport

Activates a single port on an ASI or BXM card on a BPX or a UXM card on an IGX. If the port has not been configured, the default configuration values are used to configure the port.

Full Name

Up port

Syntax

upport <slot.port>

Related Commands

dnport, cnfport, upln

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX, BPX	Yes

Example 1

upport 4.2

Description

Activate port 2 on the ASI in slot 4.

System Response

```

ca19          VT      SuperUser      BPX 15      9.2      Aug. 23 1997 19:17 GMT

Port:         4.2      [ACTIVE ]
Interface:    T3-2
Type:         UNI
Speed:        96000 (cps)

CBR Queue Depth:          200
CBR Queue CLP High Threshold: 80%
CBR Queue CLP Low Threshold: 60%
CBR Queue EFCI Threshold: 80%
VBR Queue Depth:          1000
VBR Queue CLP High Threshold: 80%
VBR Queue CLP Low Threshold: 60%
VBR Queue EFCI Threshold: 80%
ABR Queue Depth:          9800
ABR Queue CLP High Threshold: 80%
ABR Queue CLP Low Threshold: 60%
ABR Queue EFCI Threshold: 80%

```

Last Command: upport 4.2

Example 2

upport 5.1

Description

Activate port 1, in slot 5, the primary link for the IMA.

System Response

```

sw225          TN      StrataCom      IGX 8420  9.3.13    Feb. 2 2000  10:15 GMT

Port:          5.1      [ACTIVE  ] Secondary Y Redundancy (Configuration not used)
IMA Port Grp:  1-8
Interface:     E1-IMA          CAC Override:    Enabled
Type:          UNI           %Util Use:      Disabled
Speed:         35924 (cps)
SIG Queue Depth: 640

Protocol:      NONE

Last Command:  upport 5.1

```

Table 9-39 upport—Parameters

Parameter	Description
slot.port	Specifies the slot number of the card and the port to activate.



Optimizing Traffic Routing and Bandwidth

To achieve peak network performance, the routing of traffic and the use of available bandwidth is configurable. The information used in configuring traffic routing and bandwidth is gathered from historical network trends. The tasks required to optimize the network are specifying channel utilization, specifying the class of service (including the use of the priority bumping feature), and managing bandwidth. These tasks are discussed in the paragraphs that follow.

Specifying Channel Utilization

Use the **cnfchutl** command to specify the expected utilization of Frame Relay, data, or voice channel as a percentage of the channel's total capacity. The specified value can be in the range of 0% to 100%; 100% is the default for data and Frame Relay channels. The default for voice channels is 40%. To display the utilization of a particular trunk, use the **dsptrkutl** command. This command displays a details on the packets transmitted over the trunk. The user can specify the rate in seconds at which the screen is updated. Use the **dspload** command to display the load for a specified trunk at a node.

Specifying Class of Service

Use the **cnfcos** command to specify a class of service (COS) for a Frame Relay, data, or voice channel connection. The class of service is the delay in seconds before the network reroutes a connection in the event of a trunk failure. The range is 0–15. By spreading out the COS numbers to vary the rerouting delay, one class of channels has a chance to reroute before the another class starts to reroute.

Specifying Priority Bumping

Priority bumping allows both BPX and IGX to switch connections that are classified as more important (via COS value) to bump existing connections that are less important when network resources become scarce. While the existing AutoRoute feature is capable of automatically redirecting all failed connections onto other paths, use the priority bumping command **cnfbmpparm** command to activate the priority bumping feature in order to retain important connections when network resources are diminished to a point when all connections cannot be sustained. Network resources are reclaimed for the more important connections by bumping (or derouting) the less important connections. Priority bumping is triggered by insufficient resources (such as bandwidth), resulting from a number of events, including changes to the network via the **addcon**, **upcon**, **cnfcon**, **cnfpref**, **cnftrk**, **deltrk**, as well as a trunk line/card failure, and node failure. The most typical event is a trunk failure.

In priority bumping, connections are defined by their Class of Service (COS) value. Connections tagged with the lowest COS, zero, are the most important to maintain. Connections tagged with the highest COS, 15, have the lowest priority. Connections that have a COS value in between 0 and 15 are progressively less important as they ascend upward.

The COS values are categorized into a set of 8 bands. These bands can be configured to meet the specific needs of each network. However, when priority bumping is enabled, the default settings are as follows:

Band	0	1	2	3	4	5	6	7
COS	0/1	2/3	4/5	6/7	8/9	10/11	12/13	14/15

**Note**

Configuring priority bumping requires a thorough knowledge of AutoRouting capabilities (also known as Automatic Routing Management) available bandwidth, and COS values.

For an example of how this feature works, refer to Figure 10-1. If a trunk is established between switches A and B with a bandwidth of 1000 load units, it can support connection 1 (Conn. 1) with a bandwidth of 800. However, if we add a second connection (Conn. 2) with a bandwidth of 500, the trunk can no longer support both connections.

Conn. 1 (800) + Conn. 2 (500) = total bandwidth of 1300

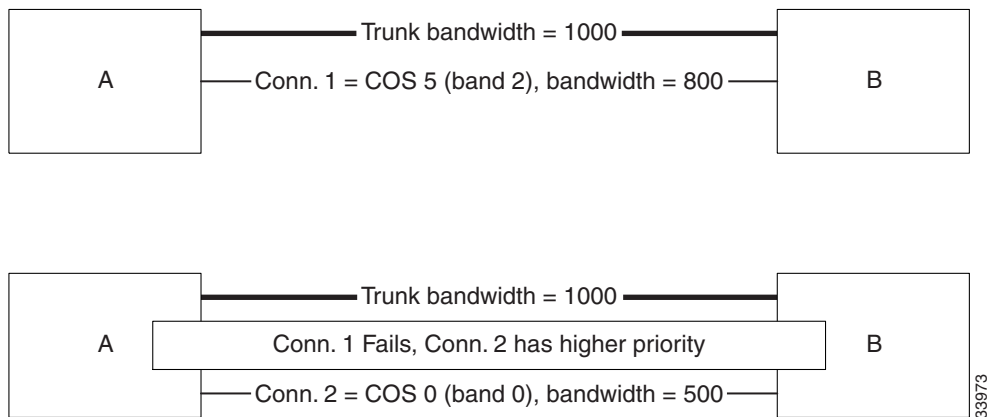
When priority bumping is enabled the least important connection is bumped.

Conn. 1 has COS of 5

Conn. 2 has a COS of 0

The lower COS connection has the higher priority. Conn. 1 with a COS of 5 is failed in order for Conn. 2 traffic (with a COS of 0) to flow without interruption.

Figure 10-1 Priority Bumping between Two Switches



Another example with three switches is illustrated in Figure 10-2. Three trunks are established:

Trunk	Bandwidth
AB	1000
AC	500
BC	600

Two connections are established:

Connection	Between Switches	COS	Band	Bandwidth
1	AB	10	5	400
2	BC	14	7	300

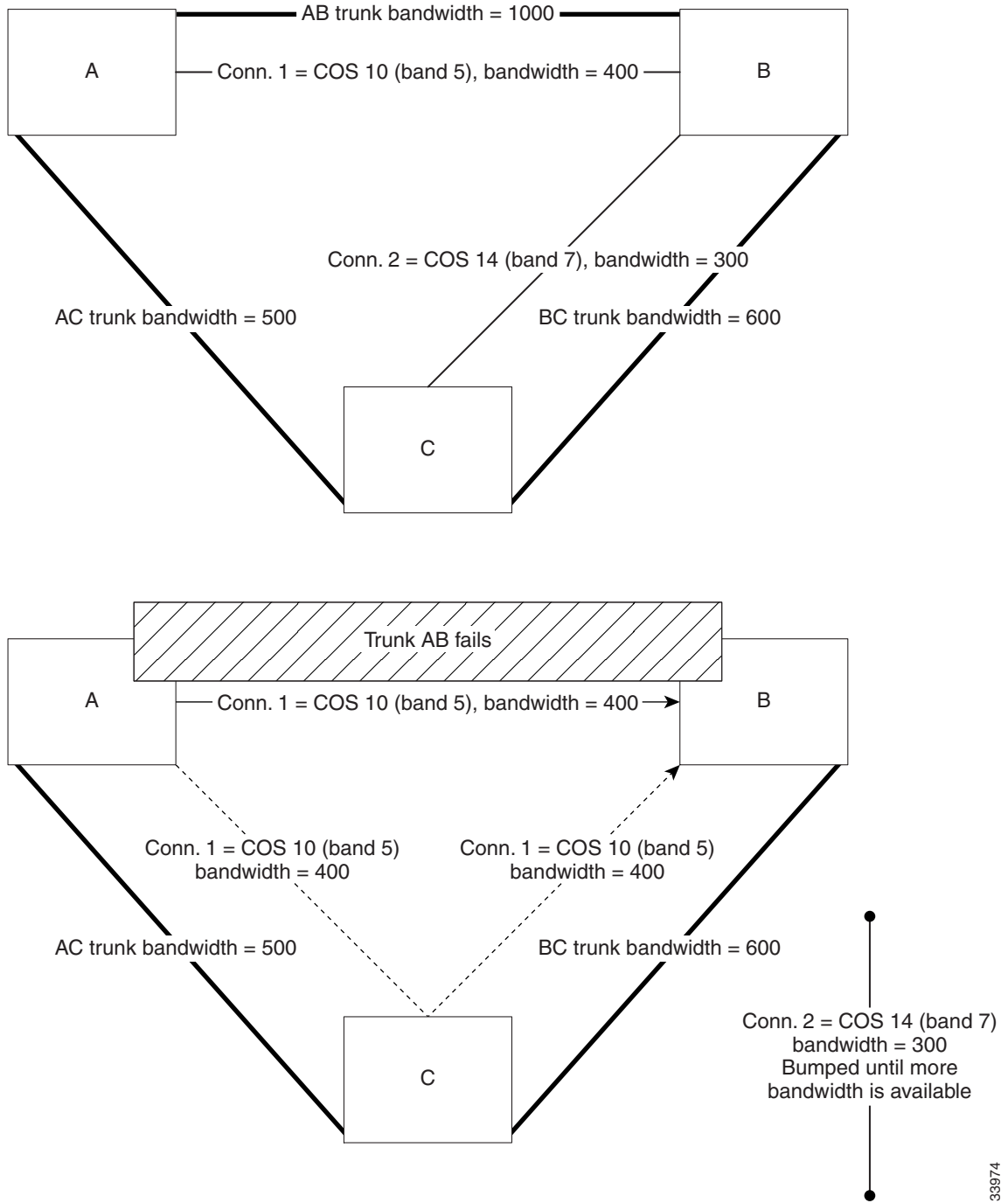
All traffic on the connections is uninterrupted, but if Trunk AB fails, Trunk BC, with a bandwidth of 600, cannot handle the total bandwidth of both connections (700). Conn. 1 is in Band 5; Conn. 2 is in Band 7. The lower the band, the higher the priority. Conn. 2 is bumped to accommodate Conn. 1 with the higher priority.

**Note**

For more information about the “bumping” or rerouting process, please refer to an update on this topic at:

http://www.cisco.com/univercd/cc/td/doc/product/wanbu/bpx8600/9_3_0/rnotes/9305.htm

Figure 10-2 Priority Bumping between Three Switches



33974

Managing Bandwidth

There are a number of commands that assist in managing bandwidth to achieve satisfactory traffic patterns.

upcon, dncon, cnfcon The up and down connection commands can be used to temporarily down connections of a specified COS, thus releasing bandwidth for other services. Often it is possible to down some voice connections to provide more bandwidth for data and Frame Relay connections.

Use the **cnfcon** command to change the bandwidth used by a connection.

cnfpref The configure preference command can be used to instruct a connection to route over a preferred path. This command can be used to assist in balancing the load on the network's trunks.

dsprts, prtrts The display and print routes commands can be used in conjunction with the **cnfpref** command to display the current connection routing information.

Summary of Commands

Table 10-1 Shows the full command name and starting page for each description.

Table 10-1 Bandwidth Management Commands

Command	Description	Page
cnfbmpparm	Configure priority bumping	10-7
cnfchutl	Configure channel utilization	10-12
cnfcomb	Configure combined timeout parameters	10-16
cnfcon	Configure a connection	9-27
cnfcos	Configure class of service	10-18
cnfpref	Configure preferences	10-20
cnfrcost	Configure cost based routing	10-23
dncon	Down connections	10-25
dspbmpparm	Display priority bumping parameters	10-28
dbmpstats	Display priority bumping operational statistics	10-30
dspload	Display load	10-28
dspospace	Display open space for routes	10-37
dsprts	Display routes	10-38
dsprkutl	Display trunk utilization	10-42
prtrts	Print routes	10-45
upcon	Up connections	10-46

cnfbmparm

Priority bumping requires a number of configuration parameters which are saved in the BRAM and sent to the Standby Processor card. The parameters consist of a feature activation flag, a bundle size, and a set of seven COS bands (0-7), implicitly defining eight COS bands. Unlike AutoRoute capabilities, which include a number of different operational flavors, priority bumping is strictly a COS-based (or, more accurately, band-based) algorithm. Each band is defined by the low-end COS value within the band. Band 0 (implicitly defined) is the most important one, whereas Band 7 is the least important. Each connection within a band is equally important, despite the fact that it might be tagged with a different COS. Note that Band 0 is not bumpable.

A minimum of two bands are required to be defined for the priority bumping feature to work. A network with only one band is equivalent to having the priority bumping feature disabled.

The entire network must be upgraded to 9.3.0 in order for the priority bumping feature to be operational.

Use the following steps to setup priority bumping:

1. For a BPX switch, a license must be purchased for each BPX node on the network using the **cnfswfunc 6 e** command (see Example 10-1). The Cisco System Engineer enters the password to purchase priority bumping license. The license is granted immediately with the correct password.

Example 10-1 Purchase priority bumping on a BPX using the cnfswfunc command, option 6

Purchasing PB license on a BPX

```
bpx1          TN      StrataCom      BPX 8620  9.3.0K      Jan. 26 2000 14:16 PST
```

```
Index Status   Function
1      Enabled   Configuration Save/Restore
2      Enabled   ForeSight
3      Enabled   Multiple VTs (6 sessions enabled)
4      Enabled   Virtual Trunks
5      Enabled   ABR standard with VSVD
6      Enabled   Priority Bumping
```

Last Command: cnfswfunc 6 e

2. From either an IGX switch or a BPX switch, enable priority bumping from any node on the network using the **cnfbmparm**. Parameter changes made at one node are propagated to the rest of the network, then updated both to the BRAM and Standby Processor card.

The default configuration when priority bumping is enabled is shown below.

Band	0	1	2	3	4	5	6	7
COS	0/1	2/3	4/5	6/7	8/9	10/11	12/13	14/15

3. To test priority bumping (optional) you can create an environment to “stress” bandwidth resources and see how the feature works. For example:
 - a. Delete a trunk.
 - b. Physically remove a cable to a connection.
 - c. Add connections to create limited bandwidth resources on a trunk.

You then can use the **dspscons** command to view connection routing.

4. To display the COS-based loads, use the **dspload** command. Information about the COS-based loads within each band helps you determine where to add connections in a priority bumping environment. In Example 10-2, the loads are displayed for a trunk. The total capacity is shown at the bottom of the display, and the load for each Band is displayed at the top. Any connection that is added to a band could bump and utilize bandwidth resources for the band that follows it; for example, adding a connection to Band 5 can bump connections in Band 6 and Band 7, allowing connections in Band 5 to utilize the bandwidth from those bands.

Example 10-2 COS-based loads

```
igxaf1          TN      StrataCom          IGX 8420  9.3 the.0F    Jan. 10 2000 15:33 PST

Configured Trunk Loading:  TRK  igxaf1 16.4--10.1 bpx2
Band:  CoS                Xmt-c   Rcv-c
B1   : 1- 1                191     191   Conid In Use+Avail 256
B2   : 2- 2                288     288
B3   : 3- 3                1036    1036  VPC conids: 0/256
B4   : 4- 4                216     216
B5   : 5- 5                216     216   Trunk type is Terrestrial
B6   : 6-13                900     900   Trunk supports cell routing
B7   :14-15                300     300   Trunk does not use ZCS
Total In Use                3147    3147  Trunk end supports all gateway types
Reserved                    400     400   Gateway conns: 28/200
Available                   75      75   Traffic: V TS NTS FR FST CBR NRT-VBR ABR
Total Capacity              3622    3622          RT-VBR
Lcn/GwLcn bmap, oe: 7F/5F,7F/00
```

Limitations

1. Priority bumping does not support a situation when VPC CONIDs (or any resources other than bandwidth and LCN) are in short supply.
2. Priority bumping can only be activated when all nodes are upgraded to Release 9.3.0 switch software, or higher.
3. In a 9.3 network, there can be some nodes (BPX only) that do not purchase the priority bumping feature. Consequently, they are not capable of participating in the priority bumping operations. These nodes are not chosen during route selection unless the trunks leading to or from the nodes have sufficient network resources.
4. The maximum number of low priority connections that can be bumped in each attempt to route a high priority connection is 1023.
5. The maximum number of connections that can be bundled in a routing attempt is 50.

Full Name

Configure priority bumping.

Syntax

```
cnfbmpparm [1 [<enable>|<disable>]
            [2 <bundle>
            [3 <b1> <b2> [<b3> [<b4> [<b5> [<b6> [<b7>]]]]]]]] ]
```

Attributes

Privilege	Jobs	Log	Node	Card Type and Memory Requirement	Lock
1-2	No	No	IGX or BPX	NPM-32 NPM-64 BCC-64.	Yes

Related Commands

dspsbmpparm, dspsbpmstats

Table 10-2 cnfbmpparm–Parameter Descriptions

Parameter	Values	Description
Priority Bumping Enabled	ON or OFF Default OFF	This flag specifies whether the priority bumping feature is activated on the node.
Priority Bumping Bundle	1 .. 50 Default 10	The number of connections that can be selected in a priority bumping routing request.
Bumping Band 1	1 .. 15 Default 2	The lowest value in the second most important COS band. Connections with a COS value below <i>Bumping Band 1</i> are implicitly grouped as the most important band, Band 0. Connections in Band 0 can bump those in other bands, but cannot be bumped. Connections in Band 1 can bump those in bands 2-7, and can only be bumped by those in Band 0.
Bumping Band 2	1 .. 15 Default 4	The lowest value in the third most important COS band. Connections in this band can bump those in bands 3-7, and can be bumped by those in bands 0-1. <i>Bumping Band 2</i> cannot be less than <i>Bumping Band 1</i> . If they are equal, the band definition ends.
Bumping Band 3	1 .. 15 Default 6	The lowest value in the fourth most important COS band. Connections in this band can bump those in bands 4-7, and can be bumped by those in bands 0-2. <i>Bumping Band 3</i> cannot be less than <i>Bumping Band 2</i> . If they are equal, the band definition ends.

Table 10-2 cnfbmpparm–Parameter Descriptions (continued)

Parameter	Values	Description
Bumping Band 4	1 .. 15 Default 8	The lowest value in the fifth most important COS band. Connections in this band can bump those in bands 5-7, and can be bumped by those in bands 0-3. <i>Bumping Band 4 cannot be less than Bumping Band 3. If they are equal, the band definition ends.</i>
Bumping Band 5	1 .. 15 Default 10	The lowest value in the sixth most important COS band. Connections in this band can bump those in bands 6-7, and can be bumped by those in bands 0-4. <i>Bumping Band 5 cannot be less than Bumping Band 4. If they are equal, the band definition ends.</i>
Bumping Band 6	1 .. 15 Default 12	The lowest value in the seventh most important COS band. Connections in this band can only bump those in Band 7, and can be bumped by those in bands 0-5. <i>Bumping Band 6 cannot be less than Bumping Band 5. If they are equal, the band definition ends.</i>
Bumping Band 7	1 .. 15 Default 14	The lowest value in the least important COS band. Connections in this band cannot bump, but can be bumped by those in bands 0-6. <i>Bumping Band 7 cannot be less than Bumping Band 6.</i>

Example 10-3 Default Setup, Eight COS Bands

The default configuration is priority bumping disabled. However, when the feature is simply enabled (without changing the other banding parameters), the network would operate with eight COS bands.

Band	0	1	2	3	4	5	6	7
COS	0/1	2/3	4/5	6/7	8/9	10/11	12/13	14/15

Example 10-4 Refined Granularity of COS Banding

A sample *PB_Band* configuration of 1, 2, 3, 4, 5, 11 and 13 provides a better granularity of COS banding at the more important end of the spectrum

Band	0	1	2	3	4	5	6	7
COS	0	1	2	3	4	5-10	11/12	13-15

Another sample *PB_Band* configuration of 3, 5, 8, 12, 13, 14 and 15 provides a better granularity of COS banding at the less important end of the spectrum.

Band	0	1	2	3	4	5	6	7
COS	0-2	3/4	5-7	8-11	12	13	14	15

Example 10-5 Reduced COS Banding, Better Operational Performance

A sample *PB_Band* configuration of 1, 2, 8, 9, 9, 9 and 9 provides a reduced COS banding, thus allowing better routing performance (with fewer iterations through the bands)

Band	0	1	2	3	4
COS	0	1	2-7	8	9-15

The following screen illustrates how the bands in Example 10-5 are configured, then displayed.

```
bpx1          TN      StrataCom      BPX 8620  9.3.0K      Jan. 26 2000 14:28 PST

1 Priority Bumping Enabled          [ YES]
2 Priority Bumping Bundle           [ 10] (D)
3 Priority Bumping Bands:
  Bumping Band 1                   [  1] (D)
  Bumping Band 2                   [  2] (D)
  Bumping Band 3                   [  8] (D)
  Bumping Band 4                   [  9] (D)
  Bumping Band 5                   [  9] (D)
  Bumping Band 6                   [  9] (D)
  Bumping Band 7                   [  9] (D)
```

Last Command: cnfbmpparm 3 1 2 8 9 9

```
bpx1          TN      StrataCom      BPX 8620  9.3.0K      Jan. 26 2000 14:28 PST

1 Priority Bumping Enabled          [ YES]
2 Priority Bumping Bundle           [ 10] (D)
3 Priority Bumping Bands:
  Bumping Band 1                   [  1] (D)
  Bumping Band 2                   [  2] (D)
  Bumping Band 3                   [  8] (D)
  Bumping Band 4                   [  9] (D)
  Bumping Band 5                   [  9] (D)
  Bumping Band 6                   [  9] (D)
  Bumping Band 7                   [  9] (D)
```

```
Priority Bumping Active on this node [ YES]
Number of Priority Bumping Bands     [  4] (D)
```

Last Command: dspbmpparm

Example 10-6 Minimum COS Banding

Another sample *PB_Band* configuration of 1, 1, 1, 1, 1, 1 and 1 provides a minimum COS banding of only two bands)

Band	0	1
COS	0	1-15

cnfchutl

Informs the system software of the expected utilization rate of connections with traffic-dependent compression algorithms (voice connections with VAD, data connections with DFM, Frame Relay connections). The software load model then takes the user-specified rate of the connection and modifies it by using the percent of utilization you specify with **cnfchutl**. The resulting rate is used in calculations for loading trunks. The load model uses these figures instead of calculated estimates from real traffic patterns.

For the full benefits of the compression algorithms to be used, the default utilizations should be modified after traffic studies have been performed. Traffic studies of Frame Relay connections should be used to determine optimum utilization settings. When calculating loads in a network, the load allocated to a connection is:

channel utilization x full load for the connection type

For example, with a channel utilization of 50% and a full load of 480 packets per second, the load allocated to a connection is:

$0.50 \times 480 \text{ pps} = 240 \text{ pps}$

For voice connections with VAD turned off, the bandwidth allocated is always the maximum bandwidth for the connection type. In other words, the utilization, although configurable, is ignored for a voice channel without VAD and a data channel without DFM.

If you use **cnfchutl** to increase the utilization of a connection, the system verifies that the additional bandwidth is available on the connection's current route. If the bandwidth is not available, the system attempts to reroute the connection. If no other route is found, the connection is failed.

If you use **cnfchutl** to decrease the utilization of a connection, the system makes the bandwidth available to other connections that require a route. The screen displayed by the **cnfchutl** command depends upon whether a data channel, voice channel, or Frame Relay channel is specified.

Full Name

Configure channel utilization

Syntax

cnfchutl <channel(s)> <%_util>

Related Commands

dspchcnf

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

■ cnfchutl

Example 1

cnfchutl 5.1 40

Description

Set utilization on data channel 5.1 at 40%.

System Response

```

alpha          TRM   YourID:1      IGX 8420     9.2   Aug. 23 1998 10:45 PST

                Maximum EIA   %      DFM Pattern   DFM
Channels  Update Rate  Util   Length        Status
5.1              15      40      8             Enabled
5.2-4           2       100    8             Enabled

```

Last Command: cnfchutl 5.1 40

Next Command:

Example 2

```
cnfchutl 14.1 55
```

Description

Set utilization on voice channel 14.1 at 55%.

System Response

```
alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 16 1998 10:10 PST

Channels Util % Adaptive Gain (dB) Dial
14.1      55 Enabled -4 - User Interface Type A B C D Crit.
14.2-24  40 Enabled 0 - Inband Unconfig ? ? - - a
```

```
Last Command: cnfchutl 14.1 55
```

```
Next Command:
```

Example 3

```
cnfchutl 8.1.100 60
```

Description

Set utilization on Frame Relay channel 8.1.100 at 60%.

System Response

```
alpha          TRM   YourID:1       IGX 8420      9.2   Aug. 23 1998 10:45 PST
```

```
Frame Relay Channel Configuration Port: 8.1
```

```
FromMinimumPeakAvgFrameCmaxVC QECN Q% Util
8.1.1009.6*7010655356553560
8.1.3019.6*70106553565535100
```

```
Last Command: cnfchutl 8.1.100 60
```

```
Next Command:
```

Table 10-3 *cnfchutl*—Parameters

Parameter	Description
channel	Specifies the channel for configuring utilization. The channel can be in voice, data, Frame Relay. The format for <i>channel</i> depends on the technology, as follows: <ul style="list-style-type: none"> Voice connection: <i>slot.channel</i> Data connection: <i>slot.port</i> Frame relay connection: <i>slot.port.DLCI</i> Access device connection: <i>slot.port.device_ID</i>
percent utilization	Specifies the percentage of utilization of the channel. The is range 0–100. The default value for data or Frame Relay is 100%. The default value for voice is 40%.

cnfcmb

Configures a time the node waits for a second packet to become available for placing in an ATM cell. You can use the **cnfcmb** command to control the time that the node waits for individual traffic types. When you enter a value for a parameter, switch software multiplies the value by 125 microseconds to derive the timeout.

Full Name

Configure combine timeout parameters

Syntax

```
cnfcmf <parameter number> <value>
```

Related Commands

```
dspchcnf
```

Attributes

Privilege	Jobs	Log	Node	Lock
service	Yes	No	IGX	Yes

Example 1

```
cnfcmf 1 1
```

```
Description
```

Change the timeout for voice packets from the default of 2 * 125 microseconds to 1 * 125 microseconds.

System Response

```
pubsigx1      TN      SuperUser      IGX 32      9.2      Sep. 17 1998 23:38 PDT

                System-Wide Combine Timeout Parameters

1 Packet Combining Timeout for Voice (125 usec *).....      2
2 Packet Combining Timeout for Time Stamped Traffic (125 usec *).....      2
3 Packet Combining Timeout for High Priority Traffic (125 usec *).....      0
4 Packet Combining Timeout for Non Time Stamped Traffic (125 usec *)...      2
5 Packet Combining Timeout for Bursty Data 1 Traffic (125 usec *).....      255
6 Packet Combining Timeout for Bursty Data 2 Traffic (125 usec *).....      255
```

```
This Command: cnfcmf
```

```
Which parameter do you wish to change: 1 1
```

Table 10-4 cnfcmf—Parameters

Parameter	Description	Default
1	Timeout for Voice (multiplied by 125 microseconds)	2
2	Timeout for Time Stamped Traffic (multiplied by 125 microseconds).	2
3	Timeout for High Priority Traffic (multiplied by 125 microseconds)	0
4	Timeout for Non Time Stamped Traffic (multiplied by 125 microseconds)	2

Table 10-4 cnfcmb—Parameters (continued)

Parameter	Description	Default
5	Timeout for Bursty Data 1 Traffic (multiplied by 125 microseconds)	255
6	Timeout for Bursty Data 2 Traffic (multiplied by 125 microseconds)	255

cnfcos

Determines the priority for rerouting a connection. You determine the priority by specifying a delay before the network reroutes one or more failed connections. The COS applies to:

- A single connection
- A range of connections
- A connection group

When connections have failed (typically due to a trunk failure), the network reroutes them according to priorities that are set primarily by the class of service (COS). The value of COS is the number of seconds the network waits before it begins to reroute the connection, so the COS determines the rerouting order for connections owned by a node. The range of possible COS values is 0–15.

The number of connections in a network has an effect on the increment between COS values you should use. For larger numbers of connections, you should allow more time to reroute the connections in a class. To facilitate the greater time required to reroute larger numbers of connections, use a larger increment between COS values. In a larger network, for example, you could specify COS values that are 3 seconds apart (such as 0, 3, 6, 9, 12, and so on, for example). For a network with less traffic, assign COS values in increments of 1 or 2. This strategy ensures that all connections of a given COS reroute before the connections with the next COS start to reroute.

Full Name

Configure class of service for connections

Syntax

```
cnfcos <group | channel(s)> <cos>
```

Related Commands

dspcons

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	Yes	Yes	IGX	Yes

Example 1

```
cnfcos 5.1 0
```

Description

Set the COS for channel 5.1 to 0.

System Response

```
alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 16 1998 10:12 PST

Local          Remote          Remote
Channel        NodeName        Channel        State  Type        Compression    Code Avoid COS O
5.1            beta            25.1           Ok     256
9.1.100        gamma           8.1.200        Ok     fr
9.2.400        beta            19.2.302       Ok     fr
14.1           gamma           15.1           Ok     v
                                0 L
                                0 L
                                0 L
                                0 L
```

Last Command: cnfcos 5.1 0

Next Command:

Table 10-5 *cnfcos—Parameters*

Parameter	Description
channels	Specifies the voice, data, Frame Relay, or Fast PAD voice/data channel(s), where <i>channel</i> is one of the following: <ul style="list-style-type: none"> Voice connections: <i>slot.channel</i> Serial data connections: <i>slot.port</i> Frame Relay connections: <i>slot.port.DLCI</i>
cos	Specifies the class of service number to assign to the channel, range of channels, or connection group. The range is 0–15 seconds, so the rerouting priority is inversely proportional to the COS (a low COS values means a high routing priority).

cnfpref

Specifies the preferred route for a connection or range of connections. Enter **cnfpref** only at a node that is an end point of the connection. This command applies only to connections that exist *within* a domain. Do not attempt to execute **cnfpref** on connections that exist between domains.

The preferred route for a connection is used when possible. If the preferred route is different from the existing route, the connection automatically moves to the preferred route whenever network conditions allow (for example, when trunks are out of alarm and sufficient bandwidth exists).

Full Name

Configure preferred route for connections

Syntax

```
cnfpref <channel(s) | *> <route> < + | -> [d]
```

Related Commands

dsprts

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX, BPX	Yes

Example 1

```
cnfpref 14.1 13/beta 15/gamma d
```

Description

Select the preferred route for channel 14.1 to be through beta trunk 13 to beta then to gamma trunk 15. For gamma, the “d” in the command specifies that the route is *directed*.

System Response

```
alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 16 1998 10:22 PST

From 14.1          Route
14.1
Pref: (D)  alpha  14--13beta  15--15gamma
           alpha  14--13beta  15--15gamma
```

```
Last Command: cnfpref 14.1 13/beta 15/gamma d
```

```
Next Command:
```

Example 2

```
cnfpref 6.4 -
```


Description

Remove the preferred route for channel 6.4.

Example 3

```
cnfpref * +
```

Description

Designate the current routing of all locally owned connections to be the preferred routing. Using a “-” instead of a “+” in the command would remove the preferred routing designation of all locally owned connections.

System Response

```
alpha          TRM   YourID:1      IGX 8420     9.2   Aug. 23 1998 10:48 PST
```

```
Chan/Grp  Route
5.1
```

```
alpha 10-- 7beta
```

```
Pref: alpha 10-- 7beta
```

```
9.1.100
```

```
alpha 14--13beta 15--15gamma
```

```
Pref: alpha 14--13beta 15--15gamma
```

```
9.1.200
```

```
alpha 10-- 7beta 15--15gamma
```

```
Pref: alpha 10-- 7beta 15--15gamma
```

```
9.2.400
```

```
alpha 10-- 7beta
```

```
Pref: alpha 10-- 7beta
```

```
Last Command: cnfpref * +
```

```
Next Command:
```

Table 10-6 *cnfrcost—Parameters*

Parameter	Description
channels	<p>Specifies the channel or range of channels for preferred route configuration. The channel specifier has one of the following formats</p> <ul style="list-style-type: none"> Voice connection: <i>slot.channel</i> Data connection: <i>slot.port</i> Frame Relay connection: <i>slot.port.DLCI</i> <p>A "*" specifies all locally owned connections and applies only to the "+" and "-".</p>
route	<p>Designates the preferred route for the connection(s) to take through the network. The route is designated by one or more "trunk/node name" pairs. At a given node <i>alpha</i>, for example, entering a route of "12/delta 6/epsilon", would route the connection from alpha to delta via delta's trunk 12. The connection would then go from delta to epsilon via epsilon's trunk 6. A "+" causes the connection's current route to become the preferred route. A "-" removes the connection's preferred route designation.</p>

Table 10-7 *cnfrcost—Optional Parameters*

Parameter	Description
d	Specifies directed routing. If the preferred route is not available, the connection is failed.

cnfrcost

Configures the cost cap for a connection when cost-based routing is configured.

A maximum allowable cost value (cost cap) is used during route determination to prevent selection of a route which exceeds an acceptable cost. For routing based on delay, the cost cap is the acceptable end-to-end delay for the connection type. This cap is configured network-wide per delay-sensitive connection type.

For routing based on trunk cost, the cost cap is the acceptable end-to-end cost. This cap is configured per connection. The default cost cap is 100, which is derived from the maximum hops per route (10) and default cost per trunk (10). The cost cap can be changed at any time. If the cost cap is decreased below the current route cost, the connection is not automatically rerouted. A manual reroute is required to route the connection to fit under the new cost cap. This gives the user more control over the connection reroute outage.



Note `cnfrcost` is only valid at the node where the connection was added.

Full Name

Display connection loading

Syntax

cnfrcost <connection> <max cost>

<connection> indicates the connection endpoint (that is, slot.port.vpi.vci)

<max cost> indicates the maximum allowable route cost

Valid values = 1 - 500

Related Commands

dspon, cnfpref, dsprtcache

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX, BPX	Yes

Example

cnfrcost 9.2.5.100 40 1

After configuring the cost cap for a connection, you can check to see the configured value with the **dspon** command, as is shown in the System Response example. This is the **dspon** response for 9.2.5.100 with the additional fields of Max Cost (40) and Route Cost (1). For a route optimized on trunk delay, the cost labels are updated to indicate delay: Max Cost becomes Max Delay and Route Cost becomes Route Delay.

Description

Select route cost for channel 9.2.5.100.

System Response

```

sw203          TN      StrataCom      BPX 8620      9.1.a4      Sep. 24 1998 18:18 GMT

Conn:  9.2.5.100      sw242      14.2.5.100      cbr      Status:OK
      PCR(0+1)      % util      CDVT(0+1)      Policing
          50/50      100/100      10000/10000      4/4
Owner: LOCAL Restriction: NONE COS: 0
TestRTD: 0 msec Trunk Cell Routing Restrict: Y Max Cost: 40 Route Cost: 1

Path:  sw203      3.1.1-- 2.1.1sw242
Pref:  Not Configured

```

```

sw203          ASI-T3      : OK          sw242      ASI-OC-3      : OK
          Line 9.2 : OK          Line 14.2 : OK
          OAM Cell RX: Clear      NNI          : OK
          NNI          : OK

```

```
Last Command: dspcon 9.2.5.100
```

```
Next Command:
```

dncon

Deactivates (downs) a connection, bundle of connections, a connection group or all connection in a COS or COS range. The **dncon** command temporarily removes one or more connections from the network. This command is useful for temporarily removing voice connections when additional bandwidth is necessary for other types of connections.

Connections can be downed immediately or with courtesy. Even with immediate downing, a prompt appears that requests confirmation. With courtesy downing, the system waits until the connection is onhook before downing the connection. Courtesy downing is possible only if the onhook status has been configured with the **cnfvchtp** command. The **upcon** command reactivates the voice connections. The up/down status of the voice connections appears in the “State” column of the **dspscons** screen. Table 10-8 shows each item in the State column.

Table 10-8 Connection Status

State	Description
“OK” (routed)	Connection is activated and able to carry traffic.
“Down”	Connection has been added to the network database but is not activated and is not able to carry traffic.
“OK(Dn)”	Waiting for onhook to occur to allow courtesy down to take place for connection(s) that have been courtesy downed using the dncon command.
“Failed”	Unrouted, but trying to reroute.

Full Name

Down connection

Syntax

```
dncon {<group | local_chan(s)> | COS <cos_range>} {i | c}
```

Related Commands

upcon

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	Yes	Yes	IGX	Yes

Example 1

```
dncon 14.1 c
```

Description

Down connection 14.1 with courtesy.

Example 2

```
dncon 14.1 i
```

Description

Down connection 14.1 immediately.

Example 3

```
dncon cos 4–8 c
```

Description

Courtesy down on-hook connections network-wide with COS 4 through 8. This command marks all connections that may be courtesy downed at one time and does not monitor new connections or those that later fit the COS.

Example 4

```
dncon 3.1.100 i
```

Description

Immediately down connection 3.1.100.

System Response

```
pubsigx1      TN      SuperUser      IGX 32      9.2      Aug. 26 1998 16:51 GMT

Local         Remote      Remote
Channel       NodeName    Channel
3.1.100       pubsigx1    3.2.200       Ok      fr
3.2.200       pubsigx1    3.1.100       Ok      fr
```

```
This Command: dncon 3.1.100 i
```

```
Down these connections (y/n)?
```

Example 5

```
dncon cos 4-8 i
```

Description

Immediately down all connections network-wide with COS 4 through 8. This command executes once, so if individual connections are subsequently upped or new connections added in this COS range, they remain up.

Table 10-9 dncon—Parameters

Parameter	Description
channels or group	Specifies a group, a channel, or a range of channels to down.
cos range	Specifies the COS or COS range. The range is 0–15.

Table 10-10 dncon—Optional Parameters

Parameter	Description
i/c	Specifies immediate downing (i) of the specified connections or courtesy downing (c) of the specified connections.

dspbmpparm

Displays the priority bumping parameters.

Full Name

Display priority bumping parameters

Syntax

`dspsbmpparm`

Example 10-7 Use `dspsbmpparm` to view the priority bumping parameters. Note that priority bumping for the whole network is shown at the top of the display, and then at the bottom for a specific node

```
igxr2          TN      StrataCom      IGX 8420  9.3.0K      Jan. 26 2000 15:19 PDT

1 Priority Bumping Enabled          [ YES]
2 Priority Bumping Bundle          [ 10] (D)
3 Priority Bumping Bands:
  Bumping Band 1                   [  2] (D)
  Bumping Band 2                   [  4] (D)
  Bumping Band 3                   [  6] (D)
  Bumping Band 4                   [  8] (D)
  Bumping Band 5                   [ 10] (D)
  Bumping Band 6                   [ 12] (D)
  Bumping Band 7                   [ 14] (D)

Priority Bumping Active on this node [ YES]
Number of Priority Bumping Bands    [  7] (D)
```

Last Command: `dspsbmpparm`

```
bpx1          TN      StrataCom      BPX 8620  9.3.0K      Jan. 26 2000 14:20 PST

1 Priority Bumping Enabled          [ YES]
2 Priority Bumping Bundle          [ 10] (D)
3 Priority Bumping Bands:
  Bumping Band 1                   [  2] (D)
  Bumping Band 2                   [  4] (D)
  Bumping Band 3                   [  6] (D)
  Bumping Band 4                   [  8] (D)
  Bumping Band 5                   [ 10] (D)
  Bumping Band 6                   [ 12] (D)
  Bumping Band 7                   [ 14] (D)

Priority Bumping Active on this node [ NO]
Number of Priority Bumping Bands    [  0] (D)
```

Last Command: `dspsbmpparm`

Related Command

`cnfbmpparm`

Table 10-11 dspbmparm—Parameter Descriptions

Parameter	Values	Description
Priority Bumping Enabled	ON or OFF Default OFF	This flag specifies whether the priority bumping feature is activated on the node.
Priority Bumping Bundle	1 .. 50 Default 10	The number of connections that can be selected in a priority bumping routing request when PB is enabled.
Bumping Band 1	1 .. 15 Default 2	The lowest value in the second most important COS band. Connections with a COS value below <i>Bumping Band 1</i> are implicitly grouped as the most important band, Band0. Connections in Band 0 can bump those in other bands, but cannot be bumped. Connections in Band 1 can bump those in bands 2-7, and can only be bumped by those in Band 0.
Bumping Band 2	1 .. 15 Default 4	The lowest value in the third most important COS band. Connections in this band can bump those in bands 3-7, and can be bumped by those in bands 0-1. <i>Bumping Band 2</i> cannot be less than <i>Bumping Band 1</i> .
Bumping Band 3	1 .. 15 Default 6	The lowest value in the fourth most important COS band. Connections in this band can bump those in bands 4-7, and can be bumped by those in bands 0-2. <i>Bumping Band 3</i> cannot be less than <i>Bumping Band 2</i> .
Bumping Band 4	1 .. 15 Default 8	The lowest value in the fifth most important COS band. Connections in this band can bump those in bands 5-7, and can be bumped by those in bands 0-3. <i>Bumping Band 4</i> cannot be less than <i>Bumping Band 3</i> .
Bumping Band 5	1 .. 15 Default 10	The lowest value in the sixth most important COS band. Connections in this band can bump those in bands 6-7, and can be bumped by those in bands 0-4. <i>Bumping Band 5</i> cannot be less than <i>Bumping Band 4</i> .
Bumping Band 6	1 .. 15 Default 12	The lowest value in the seventh most important COS band. Connections in this band can only bump those in Band7, and can be bumped by those in bands 0-5. <i>Bumping Band 6</i> cannot be less than <i>Bumping Band 5</i> .
Bumping Band 7	1 .. 15 Default 14	The lowest value in the least important COS band. Connections in this band cannot bump, but can be bumped by those in bands 1-6. <i>Bumping Band 7</i> cannot be less than <i>Bumping Band 6</i> .
Priority Bumping Active on this node?	YES or NO Default = NO	Indicates whether priority bumping is enabled or disabled on a particular node.
Number of Priority Bumping Bands	0 through 7	Indicates the number of priority bands enabled. If priority bumping is not enabled, this value is 0.

dspbmpstats

Displays priority bumping operational statistics for the priority bumping feature.

Full Name

Display priority bumping statistics.

Syntax

```
dspbmpstats
```

Related Commands

dspbmpparm, cnfbmpparm, dsprrst, rrtinf

Attributes

Privilege	Jobs	Log	Node	Lock
?	Yes	Yes	IGX/BPX	?

Example 1

Description

dspbmpstats command from a BPX

Example 10-8 *dspbmpstats*

```
sw67          TN      StrataCom      BPX 8620  9.3.0L   Jan. 28 2000 18:57 PST

PB Routing Statistic

Latest bumping band          -      Latest bumped band          -
Hwm bumping band            -      Lwm bumped band            -

Latest # bumping conns/req    0      Latest # bumped conns/req    0
Hwm # bumping conns/req      0      Hwm # bumped conns/req      0

Accum # bumping conns        0      Accum # bumped Lcons         0
Avg # bumping conns/req      0.00  Accum # bumped VLcons        0
```

Last Command: dspbmpstats

Table 10-12 dspbmpstats—Descriptions

Statistics Object	Description
Latest bumping band	The band value of the latest reroute connection which originates from this node.
Latest bumped band	The band value of the latest connection which is bumped from this node. The bumped connection can be mastered or slaved on this node. It can even be simply traversing this node. The bumping connection also can be mastered on, slaved on, or simply which originates from this node.
Hwm bumping band	The high water mark, since the last resetting of statistics, of the band value of any reroute connection which traverses this node
Lwm bumped band	The low water mark, since the last resetting of statistics, of the band value of any connection which has been bumped from this node.
Latest # bumping conns/req	The number of reroute candidate connections in the most recent reroute request. If there are many similar connections to be routed to the same destination, this value usually represents the bundle size of the Priority Bumping reroute request.
Latest # bumped conns/req	The number of connections selected to be bumped from this node in the most recent reroute request.
Hwm # bumping conns/req	The high water mark, since the last resetting of statistics, of the number of reroute candidate connections in any reroute request.
Hwm # bumped conns/req	The high water mark, since the last resetting of statistics, of the number of connections selected to be bumped from this node in any reroute request.
Accum # bumping conns	The total number, since the last resetting of statistics, of successfully routed connections.
Accum # bumped Lcons	The total number, since the last resetting of statistics, of master or slave connections bumped from this node.
Avg # bumping conns/req	The average number, since the last resetting of statistics, of successfully routed connections in a reroute request.
Accum # bumped VLcons	The total number, since the last resetting of statistics, of via connections bumped from this node.

dspload

Displays both the used and available bandwidth (both in the transmit and receive directions) for each trunk at the specified node. The “transmit” direction is *from* the node specified and *to* the node at the other end of the trunk. In the screen display, the numbers of disabled trunks appear in dim, reverse video on the screen.

The **dspload** display reflects the static load model stored by the node and used to determine the bandwidth available for new connections and reroutes. The display does not represent changes due to the dynamic utilization of the trunks. Some types of connections, such as voice connections using adaptive voice and data connections using Data Frame Multiplexing (DFM), suppress packets. In contrast, Frame Relay connections may generate additional packets when bandwidth permits.

When this command is executed at a local node in structured networks, the information displayed is for any node on the intra-domain lines belonging to the same domain. The node uses the terminating and through routed connections' calculated load to calculate the trunk load. The connection type (v, c, a, or d) or baud rate (9.6 Kbps, 56 56 Kbps, and so on) and other factors determine its basic load. The calculated trunk load is also modified by the **cnfchutl** command for connections that use VAD, DFM, or Frame Relay.

A certain amount of bandwidth is reserved for each trunk (using **cnftrk**). The reserved bandwidth is available only for high priority packets (for example, PCC traffic). The node cannot route connections using this reserved bandwidth. The following loading, in packets per second, is calculated for each trunk in each direction:

$$\text{total trunk capacity} = \text{current load} + \text{open space} + \text{statistical reserve}$$

If the **dspload** arguments include a trunk number, detailed information for each of the packet types on that line appears. See Example 2. Additional categories of information for Frame Relay loads on the trunk include Cmax In Use, Cmax Available, and Cmax Capacity.

As shown in Example 3, the **dspload** screen displays the bandwidth used by rt-VBR and nrt-VBR connections on a trunk.

And in Example 4, the **dspload** screen used with the **-cos** parameter displays the load categorized by bands. This is applicable and meaningful only when the Priority Bumping option is enabled.

Full Name

Display connection loading

Syntax

dspload [nodename] [line number] [-cos]

Related Commands

dsprkutl, **cnfcmparm**

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

dspload

Description

Display the load for all trunks that terminate on the current node.

■ dspload

System Response

```
alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 16 1998 11:54 PST

Trunk loads for node 'alpha'

          Units      Used      Available  Reserved  Cmax In Use Cmax In Use
PLN      Xmt   Rcv   Xmt   Rcv   Xmt   Rcv   Xmt   Rcv   XmtA RcvA  XmtB RcvB
10      Pkts Pkts  1760 1744  8304 8320   600  600    0    0    0    0
14      Pkts Pkts   504  504  6896 6896   600  600   20   20    0    0
```

Last Command: dspload

Next Command:

Example 2

dspload 10

Description

Display the load for the trunk in slot 10 of the current node.

System Response

```
sw151          TN     SuperUser          IGX 16     9.2     Aug. 26 1998 17:05 GMT

Configured Trunk Loading:  TRK sw151 10--10 sw150

          Load Type      Xmt-p Rcv-p          lcl
          NTS            2016 2016      Conid In Use    11
          TS             432  432      Conid Available 1760
          Voice          208  208      Total Capacity  1771
          BData A        0     0
          BData B        0     0      Line type is Terrestrial
          CBR            0     0      Line supports BData Load
          rt-VBR         0     0      Line does not use ZCS
          nrt-VBR        50    50
          ABR            0     0      Traffic class:
          Total In Use   2656 2656      V TS NTS FR FST CBR nrt-VBR ABR rt-VBR
          Reserved      992   992
          Available     76352 76352
          Total Capacity 80000 80000
```

Last Command: dspload 10

Next Command:

Example 3

dspload 1.1

Description

Displays the load for trunk 1 in slot 1 of the current node based on load type (CBR, ABR, etc.). The trunk queue delay is also displayed if routing with delay is enabled.

System Response

```
sw203          TN      SuperUser      BPX 8620      9.2          Sep. 24 1998 17:05 GMT

Configured Trunk Loading:  TRK sw203 1.1-- 1.1 sw242

      Load Type      Xmt-c  Rcv-c          lcl
      NTS             0      0      Conid In Use   1068
      TS              0      0      Conid Available 703
      Voice           0      0      Total Capacity 1771
      BData A         0      0
      BData B         0      0      Trunk cost: 26
      CBR             23100  23100      Trunk V Qdelay: 2.5 msec
      rt-VBR          14300  14300      Trunk NTS Qdelay: 31.9 msec
      nrt-VBR         14300  14300      Trunk end doesn't support complex gateway
      ABR             18901  18901      Trunk is Terrestrial
      Total In Use    56301  56301      Trunk does not use ZCS
      Reserved        1000   1000      Trunk end doesn't support complex gateway
      Available       38699  38690      Traffic class: V TS NTS FR FST CBR nrt-VBR ABR
      Total Capacity  96000  96000      rt-VBR
```

Last Command: dspload 1.1

Next Command:

Example 4

```
dspload 1.1 -cos
```

Description

Displays the “cos based” load for trunk 1 in slot 1 of the current node. The -cos option displays the load categorized by bands. This is applicable and meaningful only when the Priority Bumping option is enabled.

System Response

```

sw67          TRM   StrataCom      BPX 8620  9.3.a7   Mar. 2 2000
13:52 GMT

Configured Trunk Loading: TRK sw67 1.1--13.1 sw66
Band:  CoS          Xmt-c   Rcv-c
B0   : 0- 1          50      50   Conid In Use+Avail:      1+
1770= 1771
B1   : 2- 3          0       0   VPC conids:             0/256
B2   : 4- 5          0       0
B3   : 6- 7          0       0   Trunk is Terrestrial
B4   : 8- 9          0       0   Trunk supports cell routing
B5   :10-11         0       0   Trunk does not use ZCS
B6   :12-13         0       0   Trunk end doesn't support complex
gateway
B7   :14-15         0       0   Traffic: V TS NTS FR FST CBR
NRT-VBR ABR
Total In Use      50      50      RT-VBR
Reserved          5000   5000   Lcn/GwLcn bmap, oe: 00/00,00/00
Available         90950  90950
Total Capacity    96000  96000

Last Command: dspload 1.1 -cos

```

Table 10-13 dspload—Optional Parameters

Parameter	Description
nodename	Specifies the local node.
line number	Specifies the physical line whose loading information is displayed.
-cos	Displays loading based on all cos band values.

dspspace

Displays the open space for a connection route.

Full Name

Display open space for a route

Syntax

dspspace <connection | group>

Related Commands

none

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX	No

Example 1

```
dspospace 4.1.1
```

Description

Display the open space for the ATM Frame Relay connection 4.1.1. The line interface card is a UFM-8C.

System Response

```
sw110          TN      SuperUser          IGX 16      9.2 Jan. 22 1998 19:11 GMT
Open Space for 4.1.1                                     Snapshot
```

Domain

```
Local:  sw110          8--10.3sw86      6.2-- 6.1sw81
        ms_cur_pkts: 524272      ms_cur_cells: 12576
        sm_cur_pkts: 4368       sm_cur_cells: 11296
```

Last Command: dspospace 4.1.1

Next Command:

Table 10-14 dspospace—Parameters

Parameter	Description
connection	Specifies the connection.

dsprtcache

This command displays the cache of all cost-based routing connections. The optional 'index' parameter lets you specify a cache entry index. The optional 'c' parameter clears the cache. The information displayed includes:

Full Name

Display cost-based route cache

Syntax

```
dsprtcache [index] [c]
```

[index] specifies the cache entry index

[c] specifies to clear the entire cache or a single entry

Related Commands

dsprcon, cnfrtcost, cnfpref

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

dsprtcache

Description

Display route cache contents, and let you monitor and manually clear the cache.

System Response

```

pissaroTN StrataCom BPX 8620 9.2Jun. 18 1998 11:11 GMT
Route Cache (Summary)
Index Use # Cost Delay RestrictLoadVPCHopsRemoteNode
0 Yes 1 Yes No NoneVBRNo2lautrec
1 Yes6 Yes No *sBDB No3 vangogh
2 Yes 9 Yes No NoneBDA No3 matisse
3 Yes 3 Yes No *tBDB No3 rousseau
4 Yes 1 Yes No NoneCBR No3 seurat<- current
5 No 0 No No None--- No0 ---
6 No 0 No No None---No0 ---
7 No 0 No NoNone---No0 ---
8 No 0 No NoNone---No0 ---
9 No 0 No NoNone---No0 ---
10 No 0 No No None---No0 ---
11 No 0 No NoNone---No0 ---

```

Last Command: dsprtcache

Next Command:

Table 10-15 dsprtcache—Parameters

Parameter	Description
index	Specifies a particular route entry within the cache. When used with the c parameter, the route is either displayed or cleared from the cache.
c	Clears the cache, or if you also enter the index parameter, clears the route cache specified by the index number.

dsprts

Displays the routes used by all connections at a node. The display shows the trunk numbers and names of all nodes in the path.

The command **dsprts** displays the current cost for all connection routes. A derouted connection shows no current cost. A connection route optimized with trunk delay shows the current total delay. A highlighted connection on the display has exceeded the maximum route cost.

Full Name

Display connection routing

Syntax

```
dsprts [start group | chan] [nodename]
```

Related Commands

cnfpref

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

```
dsprts
```

Description

Display the connection routes.

System Response

```

sw203          TN      SuperUser      BPX 8620      9.2      Sep. 24 1998 17:47 GMT

Conn  Route
9.1.1.*          (Cost = 5)
          sw203      1.1-- 1.1sw242
Pref:  Not Configured
9.2.5.100        (Cost = 1)
          sw203      3.1.1-- 2.1.1sw242
Pref:  Not Configured
9.2.5.101        (Cost = 1)
          sw203      3.1.1-- 2.1.1sw242
Pref:  Not Configured
9.2.5.102        (Cost = 5)
          sw203      1.1-- 1.1sw242
Pref:  Not Configured

```

This Command: dsprts

Continue?

Table 10-16 dsprts—Optional Parameters

Parameter	Description
start group or channel	Specifies the starting group or channel with which to begin the display. Channel displays are in numeric order. If no starting channel is specified, the display begins with the first connected channel. Start channel is specified in one of the following formats: Voice connection: <i>slot.channel</i> Data connection: <i>slot.port</i> Frame relay connection: <i>slot.port.DLCI</i> Frame relay connection group: <i>remote node.groupname</i> Access device connection: <i>slot.port.device_ID</i>
node name	Specifies that connections from only the local node to the current node are displayed. If no <i>nodename</i> is entered, connections from the local node to all other nodes are displayed.

dsptrkutl

Displays dynamic utilization information for a specified trunk. The trunk must be upped and added to use this command. Table 10-17 lists the trunk utilization and terminated connection parameters included in the display. The parameter values are updated according to the specified or default interval and the screen remains displayed until the DEL key is depressed. Disabled trunks have their trunk number displayed in dim, reverse video on the screen.

If you notice that data traffic has slowed or stopped due to the very high trunk utilization due to network traffic, it may be because a node is receiving excessive volumes of network traffic (CC) traffic. In this case, the node may start dropping messages, which will result in communication breaks with other nodes as well as possible communication failures on some of its trunks.

You can detect the excessive traffic by displaying various statistics such as network statistics (**nwstats**), SAR statistics (**srstats**), and check utilization of the node's trunks by using the **dsptrkutl** command. In the event of excessive traffic, these command displays will show values that are increasing at a high rate. (See the **cnfnodparm** parameters Enable Degraded Mode, Auto Switch on Degrade, and Max Degraded Aborts for descriptions of how to set parameters so that if a node has exhausted its internal resources due to excessive messaging (among other possible causes), which leads the node to abort, the node will either switch to the standby CC if available, or it will enter degraded mode (if the **cnfnodparm** Enable Degraded Mode parameter is enabled).

Table 10-17 Trunk Utilization Parameters and Statistics

Trunk Utilization Parameters and Statistics	Description
Elapsed Time (seconds)	Elapsed time in seconds since the command was started
Total Packets Transmitted	Number of packets transmitted during the elapsed time.
Overall Packet Rate	Number of packets transmitted per second during the (pkts/sec)elapsed time.
Overall utilization	Bandwidth used, expressed as a percentage of the available bandwidth during the elapsed time. This is: $100 \times (\text{"Total packets transmitted"} / (\text{"Elapsed Time"} \times \text{bandwidth (in packets per second)}))$.
Peak Interval Utilization	Bandwidth used, expressed as a percentage of the available bandwidth during the peak interval. This is: $100 \times (\text{"Total packets transmitted"} / (\text{"Peak Interval"} \times \text{bandwidth (in packets per second)}))$.
Last Interval (seconds)	Elapsed time, in seconds, for the last screen update interval.
Interval packets generated	Number of packets transmitted during the last interval.
Interval packet rate (pkts/sec)	Number of packets transmitted per second during the last interval.
Interval utilization	The used bandwidth expressed as a percentage of the available bandwidth during the last interval. The derivation of interval utilization is as follows: $100 \times (\text{"Interval packets transmitted"} / (\text{"Last Interval"} \times \text{bandwidth (in packets per second)}))$.
Total Connections	Total number of connections routed over the trunk.
Terminated/Via	Terminated: Number of connections routed over the trunk that terminate at this node. Via: Number of connections routed over the trunk that do not terminate at this node.

Table 10-18 Terminated Connection Statistics

Terminated Connection Statistics	Description
Voice terminated	Number of voice connections terminated at this node that are routed over this trunk.
Data terminated	Number of data connections terminated at this node that are routed over this trunk.
Frame relay terminated	Number of Frame Relay connections terminated at this node that are routed over this trunk.
Num voice offhook	Number of voice connections off-hook that are terminated at this node and routed over this trunk.
Connection Type	Voice connection types: c, a, v, p or t.
Connection Num	Number of terminated voice connections of each type: c, a, v, p and t.
Modem On	Number of terminated connections with modem detected.
Modem V.25	Number of terminated connections with V.25 modem detected.
VAD Enabled	Number of terminated connections with VAD enabled.

Full Name

Display trunk utilization

Syntax

dsprkutl <trunk number> [interval]

Related Commands

dspload, dspchhist, dsprkhist

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	Yes

Example 1

dsprkutl 5.3

Description

Display trunk utilization for port 3 of the BNI in slot 5. The node is a BPX.

System Response

```
bootzilla          TN      SuperUser          BPX 8620  9.2          Aug. 27 1998 15:21 GMT
```

```
TRK  5.3 Utilization Display
```

```
Elapsed time (seconds)          160.1          Terminated Connection Statistics
Total cells transmitted         30             Voice terminated          0
Overall cell rate (cells/sec)   0              Data terminated          0
Overall utilization              0%            ATM and FR terminated    1584
Peak interval utilization       1%            Num voice OffHook        0
Last interval (seconds)        5.1
Interval cells generated        0
Interval cell rate (cells/sec)  0
Interval utilization            0%
Terminated Connections          1584
Via Connections and Groups      0

Connection  Modem Modem VAD
Type  Num  On  V.25  Enabled
c     0   0   0     0
a     0   0   0     -
v     0   0   0     0
p/t   0   0   0     -
```

```
This Command: dsptrkutl 5.3
```

```
Hit DEL key to quit:
```

Table 10-19 dsptrkutl—Parameters

Parameter	Description
trunk number	Specifies the number of the trunk in the format <i>slot.trunk</i> . If the card has only one trunk, you can enter just the slot.

Table 10-20 dsptrkutl—Optional Parameters

Parameter	Description
interval	Specifies the number of seconds between screen updates. The range is 1–60. The default is 5.

prtrts

Prints the connection routes for channels on the IGX node. It uses the same syntax and prints the same information as the **dsprts** command. See the **dsprts** description for output information.

Full Name

Print connection routes

Syntax

```
prtrts [start_channel] [dest_nodename]
```

Related Commands

dsprts

Attributes

Privilege	Jobs	Log	Node	Lock
1–6	Yes	No	IGX	Yes

Example 1

prtrts

Description

Print connection routes.

System Response

None available as command produces hardcopy.

Table 10-21 prtrts—Optional Parameters

Parameter	Description
start channel	Specifies the channel with which to print. Channels are printed in numeric order. If no starting channel is specified, the display begins with the first connected channel. Start channel is specified in one of the following formats: slot.channelvoice connection. slot.portdata connection. slot.port.DLCIFrame Relay connection. remote node.groupnameFrame Relay connection group.
destination node name	Specifies the printing of connection routes from only the local node to the current node. Without a specified node name, the printout shows connections from the local node to all other nodes.

upcon

Ups (activates) a connection, bundle of connections, group of connections, or all connections with a COS or COS range. When a connection is upped, the system tries to route. If the connection cannot immediately be routed, the connection is failed and generates a major alarm. The State display column in an **upcon** or **dsicons** screen has the following meaning:

- “OK” (routed).
- “Down” (downed).

- “OK(Dn)” (waiting for onhook to occur to allow courtesy down to take place for connection(s) that have been courtesy downed using the **dncon** command.
- “Failed” (not routed, but trying).

Full Name

Up a connection

Syntax

```
upcon {<group | local_chan(s)> | COS <cos_range>}
```

Related Commands

dncon, dspcon, dspcons

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1

```
upcon 5.1
```

Description

Activate connections 5.1.

System Response

```

alpha          TRM   YourID:1      IGX 8420    9.2    Aug. 23 1998 11:33 PST

Local          Remote      Remote
Channel        NodeName    Channel     State  Type    Compression  Code Avoid COS O
5.1            beta        )25.1      Ok    256                    7/8    0  L
9.1.100        gamma      8.1.200    Ok    fr                               0  L
9.1.200        gamma      8.1.300    Ok    fr                               0  L
9.2.400        beta        19.2.302   Ok    fr(Grp)                       0  L
14.1           )gamma     15.1       Ok    v                               0  L

```

Last Command: upcon 5.1

Next Command:

Example 2

```

upcon 9.1-4
Activate a range of connections 9.1-4

```

Example 3

```

upcon alpha
Activate a Frame Relay group connection

```

Example 4

```

upcon 9
Activate all downed connections with a COS of 9

```

Example 5

```

upcon cos 9-12
Activate all downed connections with a COS of 9-12

```

Table 10-22 upcon—Parameters

Parameter	Description
group or channel(s)	Specifies a group, a channel, or a range of channels to activate.
COS /cos range	Specifies the COS or COS range. The range is 0–15.



Synchronizing Network Clocks

This chapter describes how to synchronize a network and the commands related to synchronization.

Understanding Network Synchronization

Available clock sources are defined within the network as primary (p), secondary (s), or tertiary (t). This hierarchy is based on clock source stability. Each trunk that can pass clock synchronization is defined. Each network node's clock is based on the most stable clock source. If multiple, equal clock sources are available, each node chooses the closest one (measured in number of hops).

Clock sources can be changed by you or automatically by a node. If there are no primary, secondary, or tertiary clock sources defined or working in a network, then the internal oscillator of one node is automatically selected as the active network clock source.

Whenever a clock source changes—because of a line repair or an operator's command, for example—the node ensures that the clock path remains hierarchical. Also, whenever a subnetwork is merged with another subnetwork, each node in the new network verifies that it has the nearest, most stable clock that is available.

A continuous clock test compares the frequency of the node clock source to a reference on the control card. If it detects a clock source outside preset frequency limits, the controller declares the source defective and selects another source.

Defining Clocks and Lines

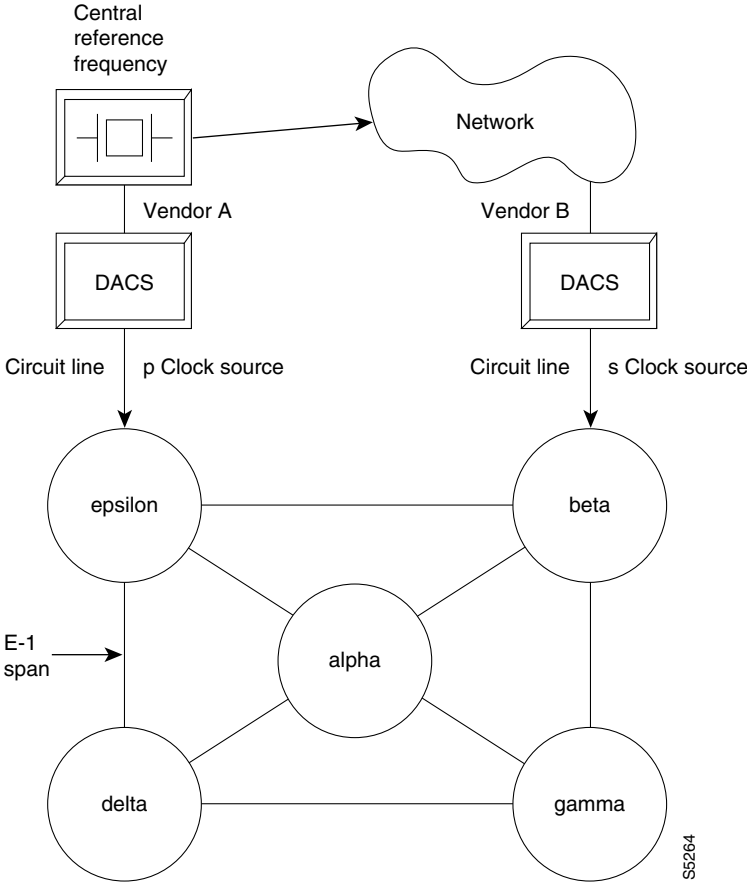
Ordinarily, a network's clock sources and line characteristics are configured as part of the node installation process. Thereafter, clock sources are redefined when a network is reconfigured or a line status is changed.

Clock sources are manually defined as primary, secondary, or tertiary. The definition depends on the stability of the clock source. Considerations for assessing and defining clock sources include:

- Stratum level of each clock source
- Reliability of each clock source (Figure 11-1 illustrates clock source reliability)
- Network configuration (topology, backbone, ring, star, mesh, and so on)
- Availability of multiple clock sources in a plesiochronous network (see Figure 11-2)

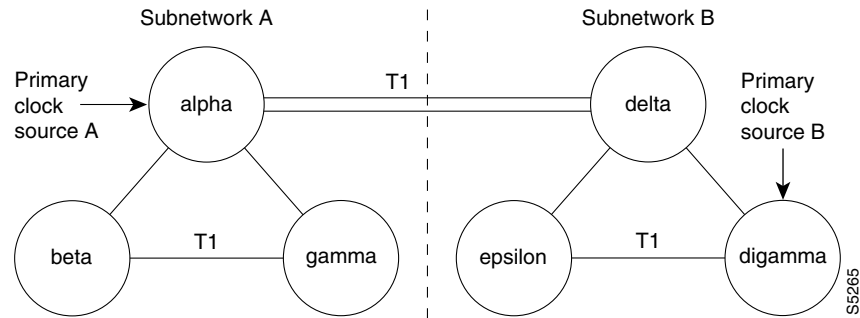
A plesiochronous network is a network in which there are two or more independent, active clock sources. For example, a network in which multiple vendors provide multiple lines that require clock mastership can be a plesiochronous network. Figure 11-1 depicts clock source reliability.

Figure 11-1 Clock Provided by Vendor



In this example of a network, vendor A provides the most reliable clock source.

Figure 11-2 Clock Source in Node



If the packet lines in the T1 span between nodes alpha and delta are defined to pass clock synchronization, then node delta could attempt to synchronize with primary clock source A as well as with primary clock source B, because the distance in hops (instead of miles or kilometers) is the same: one.

If the packet lines in the T1 span from node alpha to node delta are defined not to pass clock synchronization, then a plesiochronous network would result.

Refer to Figure 11-2. One trunk parameter is the ability to pass a clock. A line passes a clock if the clock information transmitted from one end arrives as the identical clock at the other end. Normal T1 or E1 lines pass clock. Lines that do not normally pass clock include:

- Satellite lines
- Lines that pass through a DACS (Digital Access Cross-connect Switch)
- Subrate lines

A long-distance line that passes through another provider's network may or may not pass clock. The default ability for an IGX trunk is to pass clock. The following applies to clocks and lines:

- Defining a trunk as a *clock source* is incompatible with defining it as passing clock.
- In an IGX/BPX network, a *clock source* functions as a source for the entire network.
- A trunk should be defined as a clock source only if a DACS-type device connects to the trunk.

Synchronizing the Network

Network synchronization includes specification of primary, secondary, and tertiary clock sources. The latter two sources serve as backups in case of clock failures. The `cnfclksrc` command specifies the source of a clock and can remove a previously specified clock source. Multiple primary sources, multiple secondary sources, and multiple tertiary sources are allowed.

The designation of the clock source depends on the stratum (or stability) of the clock source. Each node in the network synchronizes to the nearest (fewest number of hops) primary clock source. If no primary source is available, the nearest secondary clock source is used, and so on. If no other source is available, the network synchronizes to the internal oscillator of one of the nodes in the network. The following commands manage the network clocks.

- `cnfclksrc` Specifies a primary, secondary, or tertiary clock source in a network.
- `dspclksrcs` Displays all the currently defined clock sources.

- **dspcurelk** Displays the current clock source that the network is currently using.
- **clrelkalm** Clears an alarm associated with a clock source. The cause of an alarm usually clock source that fails or is outside of the frequency limits. You must clear a clock alarm before the corresponding clock source is usable.

Summary of Commands

Table 11-1 shows the name and starting page for the description of synchronization commands.

Table 11-1 *Commands for Clock Synchronization*

Command	Description	Page
clrelkalm	Clear clock alarm	11-5
cnfclksrc	Configure clock source	11-6
dspclksrcs	Display clock source	11-8
dspcurelk	Display current clock	11-10

clrckalm

Clears the alarm status of a clock source after a problem is cleared. (The alarm can be a “Bad Clock Source” or “Bad Clock Path.”) Before the node can use the original clock source, you must clear the alarm with **clrckalm**. The system displays no messages after execution.

Full Name

Clear clock alarm

Syntax

clrckalm <line type> <line number>

Related Commands

cnfclksrc, **dspclksrcs**, **dspclns**, **dspcureclk**, **dsptrks**

Attributes

Privilege	Jobs	Log	Node	Lock
1–5	No	Yes	IGX, BPX	Yes

Example 1

```
clrckalm c 12
```

Description

Clear a clock alarm on circuit line 12.

Example 2

```
clrckalm p 12
```

Description

Clear clock alarm on trunk 12.

Table 11-2 *clrckalm*—Parameters

Parameter	Description
c/p	Specifies the type of line. A “c” indicates a circuit line. A “p” indicates a trunk.
line number	Specifies the number of the circuit line or trunk.

cnfclksrc

Specifies a network-wide clock source. The clocking scheme ensures that all nodes in the network automatically synchronize to the nearest, most stable clock available. After you specify a clock source, the location and type of the network clock source goes out to all nodes in the network. This synchronization remains in effect despite line failures, power outages, controller card switchovers, line repairs, and the joining of subnetworks and all other network topology changes. Each node in the network maintains a list of the available clock sources for the network.

A clock *source* can be either circuit line (C), a trunk (P), or an external source (E). The clock *type* can be primary (P), secondary (S), or tertiary (T). To remove a clock source, enter its type as “r” at the end of the **cnfclksrc** command line.

Designation of the clock type depends on the stratum (or stability) of the clock source. In a large network, for example, you could designate all stratum 2 clocks as “primary,” all stratum 3 clocks as “secondary,” and all stratum 4 clocks as “tertiary.” The network regards all primary clocks as equal in the network clocking hierarchy, regards all secondary clocks as equal, and regards all tertiary clocks as equal. Each node synchronizes to the highest stratum clock source that is available. If multiple, equal clock sources are available, the node synchronizes to the source that is physically the closest. If none of the sources is available, the network synchronizes to the internal oscillator of one of the nodes in the network. When you are planning clock sources, consider the following:

- The **dspclksrcs** command displays all clock sources in a network. The **dspcurclk** command displays the clock source that a specific node is currently using and the path between the source and the local node.
- To avoid unnecessary clock disruptions, configure all primary clock sources for the network first.
- A line must be *upped* and not in an alarm before you can configure it as a network clock source.
- Before you define a trunk as a clock source, use **cnftrk** to specify that the trunk does not pass synchronization.

Full Name

Configure network clock source

Syntax

```
cnfclksrc <line type> <line number> <source type> [freq]
```

Related Commands

dspclksrcs, **dspcurclk**

Attributes

Privilege	Jobs	Log	Node	Lock
1	No	Yes	IGX, BPX	Yes

Example 1

```
cnfclksrc c 15 p
```

Description

Configure circuit line 15 as a primary clock. The network clock sources screen shows that circuit line 15 has been configured as a primary clock source for the network.

System Response

```
bootzilla      TRM   YourID:1          IGX 8420   9.2   Aug. 15 1998 15:31 MST
```

Network Clock Sources

```
Primary
bootzilla CLN  15
```

```
Secondary
None
```

```
Tertiary
None
```

```
Last Command: cnfclksrc c 15 p
```

```
Next Command:
```

Table 11-3 cnfclksrc—Parameters

Parameter	Description
line type	Specifies whether the clock source is a trunk (p), circuit line (c), or external (e).
line number	For a network clock source of either a circuit (c) or trunk (p), this specifies the back slot location of the source. For external clock sources (e), enter either front card slot 1 or 2 as long as either slot has a card. This external source designation applies to IGX, and BPX nodes.
source type	Specifies where the clock fits in the hierarchy: p = primary; s = secondary; and t = tertiary. To remove the clock source configuration for the current type and line, enter an "r."

Table 11-4 cnfclksrc—Optional Parameters

Parameter	Description
freq	Specifies the frequency of the clock source. An entry is necessary only if the <i>line type</i> is an external line. The supported frequencies are 1.544 MHz and 2.048 MHz. Enter a "1" for 1.544 MHz or a "2" for 2.048 MHz.

dspclksrcs

Displays all clock sources for the network. The display for unreachable or failed clock sources flashes on and off.

Full Name

Display network clock sources

Syntax

dspclksrcs

Related Commands

cnfclksrc, **dspeurclk**

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

dspclksrcs

Description

Display the network clock sources.

System Response

```
bootzilla      TRM   YourID: Numba 1   IGX 8430   9.2   Aug. 15 1998 15:32 MST
```

```
Network Clock Sources
```

```
Primary  
bootzilla CLN  15
```

```
Secondary  
None
```

```
Tertiary  
None
```

```
Last Command: dspclksrcs
```

```
Next Command:
```

dspcurclk

Displays the current clock source. The display for **dspcurclk** contains the following information:

- Source Node: The node in the network where the clock source originates.
- Source Line: the type of line used as the clock source and its back slot number (for example, “CLN 15”, TRK 22, “EXTERNAL 2”, or “INTERNAL”).
- Clock Type: the clock type configured for the source clock (primary, secondary, or tertiary). If the source clock for the node is an internal oscillator, no clock type is given.
- Clock Frequency: the received clock frequency as measured by the local NPC/BCC.
- Path to Source: the path from the current node to the node of the originating clock source. This includes all intermediate nodes and trunks.

Full Name

Display current clock sources

Syntax

```
dspcurclk
```

Related Commands

```
cnfclksrc, dspclksrcs
```

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

```
dspcurclk
```

Description

Display the current clock source.

System Response

```
bootzilla          TRM   YourID:1          IGX 8430    9.2    Aug. 15 1998 15:33 MST
```

Current Clock Source

```
Source Node:      gamma
Source Line:      Internal
Clock Type:
Clock Frequency:  1544015
```

```
Path to Source:
  bootzilla 9--10gamma
```

```
Last Command: dspcurclk
```

```
Next Command:
```

■ dspcurclk



Managing Jobs

A *job* is a user-specified string of commands. A job can automatically execute on a prearranged schedule or upon an event trigger. This chapter describes the commands that let you:

- Create a job
- Run a job
- Stop a job
- Display one or more jobs
- Edit a job
- Delete a job
- Create a job trigger

The system assigns a number to a new job. This *job number* identifies the job and is a required parameter for most job control commands. When you create a new job, the current privilege level is automatically saved as the privilege level of the job. Only commands that are available at your privilege level can be in your job specification. For example, a user whose highest privilege level is 3 cannot include the **addtrk** command in a job because **addtrk** requires a level 1 privilege. This privilege requirement also applies to other job functions, such as running, editing, or stopping a job.

Not all Cisco WAN Switching commands can execute as a part of a job. For this reason, the Attributes section of each command description in this manual states whether the command can function in a job.

Creating (Adding) a Job

Consider the following before creating a job:

- The **addjob** command creates a new job. When you use **addjob**, the system prompts for optional and required arguments. Unlike other commands, the **addjob** command begins with optional parameters. A job can run when you execute the **runjob** command or at a time and date you specify with **addjob**. Note that the system increments the job number, but you can assign a job description to indicate the function of the job. The following list describes the **addjob** parameters:
 - Description (optional): this can contain up to 16 characters and include spaces.
 - Execution time (optional): if you specify an execution time, the first (unprompted) parameter to enter is four digits indicating the year. The system subsequently prompts for the month, day, hour, minute, and (optional) second of the start time for the job.

- Interval (optional): the Interval prompt appears only if you have specified an execution time. The first interval prompts you for units: *days*, *hours*, and *minutes*. The system then prompts you for the number of units.
- Command (required): without a command specified, the **addjob** command terminates, so this is how you exit **addjob**. After each command and its parameters, the system prompts you for an action to take if a failure occurs (see the **addjob** description for details).
- Because commands in a job do not immediately execute, the system does not check the validity of the commands and parameters to the same degree as it does for standard command entry. For example, if you enter **dncd** for a card slot that is out of range, the system flags the error, but it does not flag a card that is missing from a valid card slot.

Running a Job

The following steps aid in running a job:

- Use the **runjob** command to run a job manually. Specify the job number to run.
- While a job is running, “executing” flashes in the upper-left area of the screen.
- The **runjob** command runs a job regardless of the assigned execution time. The **runjob** command does not change the specified execution time.
- The **runjob** command itself can be in a job. Therefore, running one job can cause another job to start. The limitation to this is that a job cannot cause itself to run. For example, Job 1 cannot contain the command “runjob 1.” Also, Job 1 cannot have the command “runjob 2” if Job 2 contains the command “runjob 1.”
- After **runjob** executes, the screen displays the results for each command in the job.

Stopping a Job

The following steps aid in stopping a job:

- Use the **stopjob** command to stop a running job. The template for the current job appears on the screen along with the prompt, “Stop this and all currently executing jobs (y/n)?”
- The **stopjob** command works only on a job that is running. Because stopping a job can leave a task partially completed, use **stopjob** with caution.

Displaying Jobs

For displaying one or all jobs:

- Use the **dspjob** command to display the status of a job. This command displays the template for the specified job and includes the results of the last run for each command in the job.
- To display details of all current jobs, use the **dspjobs** command.

Editing a Job

The following information applies to editing a job. Before using an edited job, test it to ensure that it works.

- Use the **editjob** command to edit job parameters.
- When you enter the **editjob** command, the template of the specified job appears. The system prompts you to keep or change each item in the template. To change an item, type over the existing information, then press Return. (You can use any of the Control keys to edit existing information.) To keep the same parameter specification, press Return at the prompt.
- To insert a new command between existing commands in a job, press the ^ key while holding down the Control key. A new line opens above the command that is currently highlighted. Enter the new command at the “Enter Cmd” prompt.
- To delete a command from a job, two methods are available. One way is to backspace over the command when it appears on the command line, then press Return. The other way is to press the “x”-key while holding down the Control key.
- When commands are added to or deleted from a job, the system rennumbers the remaining commands.

Deleting a Job

Use the **deljob** command to delete a job. You cannot delete a job that is running. If necessary, stop the job with the **stopjob** command before deleting it.

Creating a Job Trigger

The following information applies to creating a job trigger:

- Use the **addjobtrig** command to configure a job to run if a line failure or repair-alarm occurs. (A “repair-alarm” occurs when a line or trunk is back up, and a message is sent to the event log.)
- The template on the screen prompts for a line type: “p” for packet line or trunk, “c” for circuit line, or “d” for a T3 (DS3) line. (Do not use the “d” option, as it represents the MT3 card, which is obsolete.)
- The template on the screen prompts for the slot number of the line on which an alarm triggers the job.
- The prompt requests you to specify whether the trigger should occur on the failure (“f”) or repair (“r”) of a line. Typically, you write a job that would run whenever a line fails, so you create its trigger with the “f”. Then you would write another job (to reverse the effects of the first job) that would run when the line repairs. This trigger would occur on the “r”, or repair of the line.

Summary of Commands

Table 12-1 shows the full command name and starting page for the description of each command.

Table 12-1 List of Job Commands

Command	Description	Page
addjob	Add a job	12-5
addjobtrig	Add a job trigger	12-8
deljob	Delete a job	12-11
deljobtrig	Delete job trigger	12-12
dspjob	Display a job	12-13
dspjobs	Display jobs	12-15
editjob	Edit a job	12-17
prtjob	Print a job	12-17
prtjobs	Print jobs	12-20
runjob	Run a job	12-21
stopjob	Stop a job	12-23

addjob

This command creates a new job. When you create a new job with **addjob**, your privilege level becomes the privilege level of the job itself. When adding commands to the job, you cannot add a command that requires a privilege higher than your privilege level. Furthermore, you must have a privilege level at least as high as the job to run the job (with **runjob**, for example).

The system does not check the commands' validity with respect to the current state of the network or for relationships to other commands in the job. To ensure that it works as expected, try running the job with **runjob**.

Full Name

Add a job

Syntax

addjob [description] [execution time, execution interval] <commands>

Related Commands

deljob, **dspjob**, **dspjobs**, **editjob**, **prtjob**, **runjob**, **stopjob**

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	Yes	IGX, BPX	Yes

Example 1

```
addjob
```

Description

The system response is a series of prompts requesting details of the job. The system requests a job description (or name), an execution time for the job, a unit for the interval at which the job is to run (hours, for example), the number of units in the interval, the commands to execute, and what to do with the result.

```
alpha          TRM   YourID:1          IGX 8420      9.2   Aug. 16 1998 14:15 PST

                               Job 1   test
Last Execution Results: None           Status: Idle
Next Execution Time: 08/17/97 20:20:30 Interval: 1 days

1: prtlog
  - Failure Reaction: Repeat 2 Times and Abort      Exec. Results: None
```

Last Command: addjob

Next Command:

In this example, a new job is being created. The job number is “1.” The job description (or name) is “test.” The job is scheduled to run on August 17, at 2:20:30 PM and every day thereafter at the same time. The command in the job is **prtlog**. If this command fails when the job runs, it tries twice again and aborts if unsuccessful.

The “Enter Cmd” prompt at the bottom of the screen indicates you can enter the next command for the job. To exit **addjob**, press Return without entering a command.

Table 12-2 addjob—Parameters

Parameter	Description
command	<p>Specifies the syntax for a command to include in the job. The number of commands that can be included in a job is limited only by available memory.</p> <p>Not all commands can be included in a job. A job cannot contain commands that are above your privilege level. For example, if you have privilege level 3, your job cannot include the addtrk command because this command requires privilege level 1.</p>
failure reaction	<p>Specifies the desired reaction to the failure of a command in the job. Each command in the job must have a failure reaction. The failure reaction is specified in the following format <c a rc ra> <number of repetitions>. In this format:</p> <p>c specifies that the job continues running.</p> <p>a specifies that the job must abort.</p> <p>rc specifies that the command should retry for the specified number of times and continue running the job even if the command fails during the retries.</p> <p>ra specifies that the command should retry for the specified number of times and abort the job if the command always fails during the retries.</p>

Table 12-3 addjob—Optional Parameters

Parameter	Description
job description	A user-specified description of the job. This description can be up to 16 characters, including spaces.
execution time	<p>Specifies the date and time to run the job. Without an execution time, the job can begin running only by the runjob command.</p> <p>Execution time is specified in the following format. (The <i>seconds</i> parameter is optional.)</p> <p>year (four digits) month (two digits) day hour (0–23) minute [seconds]</p>
execution interval	<p>Specifies an interval between job repetitions. The three possible execution intervals are:</p> <p>d (days) h (hours) m (minutes)</p> <p>The interval range is 1 minute to 45 days. If you do not specify an execution interval, the job runs once at execution time. If you specify an execution interval (d, h, or m), you must also specify the number of units in the interval.</p>

addjobtrig

Configures a job to run if a failure or repair occurs on a trunk (narrowband or broadband), a line (voice, data, Frame Relay, ATM, narrowband, broadband), or a T3 (DS3). You can also use **addjobtrig** to allocate or release bandwidth from other connections. This bandwidth decision depends on whether the EIA lead status is “up” or “down.” For example, a job can be triggered to run if the RTS lead of an HDM/LDM port changes state. If the FRM you are using is an FRM-T1 or E1, it qualifies as a line and can be used as a job trigger.

A line failure is any alarm condition that takes the trunk or line out of service. Such a condition is always a major alarm. However, not all major alarms cause the trunk or line to be considered failed. Those that are considered failed are the ones that appear on the **dsptrks** or **dsplns** screens with a color associated with it, such as “Major - Local All Ones” or “Major - Remove Packet Out of Frame (Yel)”. Specifically excluded are all the statistical alarms, some of which may be major.

A line repair is the opposite of a line failure. A repair of a line occurs when the alarms on the line are removed.

In this release, the lead type on HDM/LDM is based on the configuration from **cnfleadmon**. The display now show Front Card Supports Lead State Trap.

Full Name

Add a job trigger

Syntax

```
addjobtrig <job_number> <line_type> <line_specifier> <fail/repair>
```

Related Commands

addjob, **dspjob**, **dspjobs**

Attributes

Privilege	Jobs	Log	Node	Lock
1-5	No	No	IGX, BPX	Yes

Examples

```

addjobtrig      1 p 14 f      trigger job 1 when TRK 14 fails
addjobtrig      3 c 15 r      trigger job 3 when CLN 15 repairs
addjobtrig      2 p 14 r      trigger job 2 when TRK 14 repairs
addjobtrig      3 d 27 E f    trigger job 3 when DS3 27 E (East) fails

```

```

alpha          TRM   YourID:1          IGX 8420   9.2   Aug. 16 1998 14:22 PST

Job  Description      Next Execution      Status      Interval      Access Group
1    test              08/17/97 11:00:00   Idle        1 days        Group 1
      Trigger 1 - CLN 14          REPAIR

```

Last Command: addjobtrig 1 c 14 r

Next Command:

Example 2

```
addjobtrig 1 c 14 r
```

Description

Trigger job 1 whenever a repair of line 14 occurs.

Table 12-4 *addjobtrig—Parameters*

Parameter	Description
job number	Specifies the number of the job to trigger.
line type	Specifies the type of line. A “p” indicates any type of trunk (TRK). A “c” indicates any type of circuit line. (A “d” indicates a DS3 line. Do not specify the “d” option, as this represents a now-obsolete card—the MT3.)
line specifier	Specifies the slot number for trunks and lines. Use the standard nomenclature to designate trunks and lines. For example, depending on the card type (single-line or multi-line), specify either <i><slot.port></i> , or just <i><slot></i> .
fail/repair	Specifies whether the trigger occurs on the failure or repair of a line.
fail/repair	If the card is an SDP, LDP, HDM, or LDM, the fail and repair triggers occur only on the transitions of RTS (regardless of whether the port is DCE or DTE). If you select fail, the trigger is the transition of RTS from on to off. If you select “repair,” the trigger is the transition of RTS from off to on. To enable triggering on leads other than RTS, use the cnfict command.

deljob

Deletes a job. To delete a job, you must have a privilege level at least as high as the job itself. A job that is currently running cannot be deleted. If necessary, use **stopjob** to stop the job so that you can delete it.

Full Name

Delete a job

Syntax

deljob <job_number>

Related Commands

addjob, dspjob, dspjobs

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	Yes	IGX, BPX	Yes

Example 1

deljob 4

Description

Delete job 4.

```
pubsigx1      TN      SuperUser      IGX 32      9.2      Sep. 3 1998 19:54 GMT
```

```
Job 4
```

```
Last Execution Results: None
```

```
Status: Locked
```

```
Next Execution Time:
```

```
Interval:
```

```
1: prtlog
```

```
- Failure Reaction: Abort
```

```
Exec. Results: None
```

```
2: dncd 6
```

```
- Failure Reaction: Repeat 12 Times and Abort
```

```
Exec. Results: None
```

```
3: dncd 6
```

```
- Failure Reaction: Repeat 12 Times and Continue
```

```
Exec. Results: None
```

```
This Command: deljob 4
```

```
Delete this job (y/n)?
```

Table 12-5 deljob—Parameters

Parameter	Description
job number	Specifies the number of the job.

deljobtrig

Deletes a job trigger. The **deljobtrig** command deletes one trigger at a time. If you delete a job by using the **deljob** command, all associated job triggers are deleted.

Full Name

Delete a job trigger

Syntax

```
deljobtrig <job_number> <trig_num>
```

Related Commands

addjobtrig, dspjobs

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	Yes	IGX, BPX	Yes

Example 1

```
deljobtrig 1 1
```

Description

Delete job trigger 1 for job 1.

```
pubsigx1      TN      SuperUser      IGX 32      9.2      Sep. 3 1998 18:19 GMT

Job  Description      Next Execution      Status      Interval      Access Group
1    test1              Trigger 1 - PLN      2              FAILURE      Idle          SuperUser
2                                Idle          SuperUser
3    test3              09/02/97 11:11:11  Idle          1 days       SuperUser
4                                Idle          SuperUser
5                                Idle          SuperUser
6                                Idle          SuperUser
```

This Command: deljobtrig 1

Enter trigger number:

Table 12-6 deljobtrig—Parameters

Parameter	Description
job number	Specifies the number of the job.
trigger number	Specifies the number of the trigger to delete.

dspjob

The **dspjob** command displays the following information about a job.

- Job number and description
- Next execution date and time
- Status
- The time interval between successive executions of the job
- The results of the last execution of the job

This command requires at least the same privilege level as the person who created the job.

Full Name

Display jobs

Syntax

```
dspjob <job_number>
```

Related Commands

addjob, deljob, dspjob

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

■ dspjob

Example 1**dspjob 2****Description**

Display job number 2.

System Response

```
alpha          TRM   YourID:1          IGX 8420      9.2   Aug. 16 1998 14:17 PST

                               Job 1   test
Last Execution Results: None          Status: Idle
Next Execution Time: 08/17/97 20:20:30 Interval: 1 days

1: prtlog
  - Failure Reaction: Repeat 2 Times and Abort      Exec. Results: None
```

Last Command: dspjob 1

Next Command:

Table 12-7 *dspjob—Parameters*

Parameter	Description
job number	Specifies the the number of the job to display.

dspjobs

Displays the following information on each job:

- Job number
- Job description
- Next execution date and time
- Execution interval between jobs
- Access Group: The privilege level required to run or display the job

To see details of an individual job, use the **dspjob** command.

Full Name

Display jobs

Syntax

```
dspjobs
```

Related Commands

addjob, deljob, dspjob

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

```
dspjobs
```

Description

Display a summary of all jobs stored at the node.

System Response

```
alpha          TRM   YourID:1      IGX 8420    9.2    Aug. 16 1998 14:16 PST

Job  Description      Next Execution      Status      Interval      Access Group
1    test              08/17/97 20:20:30  Idle        1 days        Group 1
```

Last Command: dspjobs

Next Command:

editjob

Allows you to change any of the following items in a job:

- The job description
- Execution time
- Execution interval
- Individual commands in the job
- Failure reactions for each command

After you enter the **editjob** command, the system displays the template for the job. With **editjob**, you can edit, delete, or add a command. Each item in the template is successively displayed on the command line so that you can confirm or change the item.

You cannot change the privilege level of a job.

The following is a list of actions you can take with **editjob**:

- To change an item in the job template, enter or type over the existing information on the command line and press the Return key.
- Use any of the control keys to change information on the command line. To keep the same value of an item, press the Return key at the prompt.
- To add a new command between existing commands in a job, hold down the Control key while you press the ^ key. A new line appears above the command that is highlighted. Enter the new command after the “Enter Cmd:” prompt and press Return.
- To add a new command to the end of a job, press the Return key after the last command in the job template.
- To delete a command from a job, either backspace over the command when it appears on the command line and press the Return key, or hold down the Control key while you press the “x”-key.
- To end the editing session, press the Return key when prompted for a new command or press the Del key.

When commands are added to or deleted from a job, the system re-numbers the commands. To test an edited job, run it with the **runjob** command.

Full Name

Edit a job

Syntax

```
editjob <job_number>
```

Related Commands

addjob, deljob, dspjob, dspjobs, runjob

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	Yes	IGX, BPX	Yes

Example 1**editjob 1****Description**

Edit job 1. The template for job 1 appears on the screen. The system displays the existing job description, which you can change or keep. To keep it, press Return. The system then displays the execution time. To change it to August 17, 1998 at 11:00:, for example, enter:

```
1998 8 17 11 00
```

If no other items need changing, press the Return key.

System Response

```
alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 16 1998 14:19 PST

Job 1 prtlog
Last Execution Results: None          Status: Editing
Next Execution Time: 08/17/97 11:00:00 Interval: 1 days

1: prtlog
  - Failure Reaction: Repeat 2 Times and Abort      Exec. Results: None
2:
```

```
Last Command: editjob 1
```

```
Next Command:
```

Table 12-8 editjob—Parameters

Parameter	Description
job number	Specifies the number of the job to edit.

prtjob

Prints the following information about a specific job:

- Job number
- Job description
- Next execution date and time
- Status
- Interval. The time interval between successive executions of the job
- Execution. The results of the last execution of the job

To print a job, you must have at least the same (or higher) privilege level as the person who wrote the job). See the **addjob** description for more information. The **prtjob** command uses the same syntax and prints the same information the **dspjob** command.

Full Name

Print job

Syntax

```
prtjob <job_number>
```

Related Commands

dspjob

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	Yes	No	IGX, BPX	Yes

prtjobs

Prints the following information about all existing jobs:

- Job number
- Job description
- Next execution date and time
- Status
- Execution interval between jobs
- Access Group: The privilege level required to run or display the job

For a printout on a single job, use the **prtjob** command. This command uses the same syntax, and prints the same information as is displayed using the **dspjobs** command. See the **dspjobs** command for syntax and output information.

Full Name

Print jobs

Syntax

prtjobs

Related Commands

dspjobs

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	Yes	IGX, BPX	Yes

runjob

Runs a job. The **runjob** command runs a job regardless of its execution time. The **runjob** command does not change a Job's assigned execution time.

When you enter **runjob**, the system displays the job template and prompts, "Run this job (y/n)?" Enter "y" to start the job. Enter "n" to exit **runjob**.

After you enter y, four seconds pass before a job begins running. Press any key briefly to suspend a job. Four seconds of no keyboard activity must pass before the jobs resume. While a job is running, the system highlights the current command and updates command results.

You can include the **runjob** command in a job. Therefore, running one job can cause another job to run. The only limitation is that a job cannot cause itself to run. For example, Job 1 cannot include the command "runjob 1." Also, Job 1 cannot include the command "runjob 2" if Job 2 contains the command "runjob 1."

Full Name

Run a job

Syntax

```
runjob <job_number>
```

Related Commands

addjob, dspjobs, editjob, stopjob

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	Yes	Yes	IGX, BPX	Yes

Example 1

```
runjob 1
```

Description

Run job 1

System Response

```

alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 16 1998 14:23 PST

                               Job 1   test
Last Execution Results: None          Status: Idle
Next Execution Time: 03/17/96 11:00:00 Interval: 1 days

1: prtlog
  - Failure Reaction: Repeat 2 Times and Abort      Exec. Results: None

```

This Command: runjob 1

Run this job (y/n)?

Table 12-9 runjob—Parameters

Parameter	Description
job number	Specifies the number of the job to run.

stopjob

Stops all running and all waiting jobs. When you enter the **stopjob** command, the system prompts, “Stop all running and waiting jobs (y/n)?” Enter a “y” to stop running jobs and prevent all waiting jobs from beginning. Enter an “n” to exit **stopjob**. Because the **stopjob** command can leave a task partially executed, use **stopjob** with caution. You must have at least the same or higher privilege level of the creator of the jobs you want to stop.

Full Name

Stop job

Syntax

stopjob

Related Commands

runjob

Attributes

Privilege	Jobs	Log	Node	Lock
1–6	No	No	IGX, BPX	No

Example 1

stopjob

Description

Stop all jobs currently running or queued to run on the node. Confirm by entering: y.

System Response

```
alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 16 1998 14:24 PST

                               Job 1   test
Last Execution Results: None      Status: Idle
Next Execution Time: 03/17/96 11:00:00  Interval: 1 days

1: prtlog
  - Failure Reaction: Repeat 2 Times and Abort      Exec. Results: None
```

This Command: stopjob

Stop all running and waiting jobs (y/n)?



Managing the Network

This chapter tells you how to use network administration commands. Examples of the tasks these commands perform are creating a password, setting the network date and time, and adding a user.

Signing On to the System

Signing on to a node is a two-step process that requires you to enter a User ID and a password. The system or network administrator can provide a User ID and password to you. The User ID can be up to 12 characters. To protect the security of the system, you should change your password regularly. Only your system administrator can change the User ID. To sign on to a node:

-
- Step 1** Enter your user ID at the system prompt “Enter User ID.”
 - Step 2** Enter your password at the “Enter Password” prompt. For initial sign-on, enter the password that the system administrator provides. You can change the password with the **cnfpwd** command.
- After you sign on, the system is ready and so prompts you for the next command.
-

Signing Off the System

When you have completed a session and want to sign off, use the **bye** command. This command returns the display to the initial system sign-on prompt. If you enter the **bye** command when you have a virtual terminal connection to another node, the **bye** command ends the virtual terminal session and returns to the local session. To end the local session and thus sign-off the system, again enter the **bye** command.

Changing a Password

To change the password given to you by your System Administrator, or to change your present password to a different one, perform the following. To ensure the security of your system, your password should be changed on a regular basis. See the System Administrator for the recommended frequency of change.

-
- Step 1** Enter the **cnfpwd** command. The system prompts for your current password.
 - Step 2** Enter your current password. The system prompts for a new password.

- Step 3** Enter a new password. Passwords must have 6–15 characters. The system prompts you to confirm the new password by typing it again.
-

Set Date and Time

Date and time are network-wide parameters. You can set the time zone for each node. The **cnfdate** command lets you set both time and date. The **cnftime** command lets you set the time for the entire network.

Summary of Commands

Table 13-1 shows the full name and starting page for the description of each network management command.

Table 13-1 *Commands for Managing a Network*

Command	Description	Page
adduser	Add user(s)	13-4
cnfpwd	Configure password	13-6
cnffwswinit	Configure Cisco WAN Manager node IP address firmware/software initiator	13-7
cnfsnmp	Configure SNMP parameters	13-8
cnfstatmast	Configure statistics master SV+ address	13-9
cnfsysparm	Configure system parameters	13-10
deluser	Delete user	13-15
dsplanip	Display LAN IP address of all nodes in network	13-16
dspnwip	Display network IP interface	13-18
dsppwd	Display password	13-19
dspsnmp	Display SNMP parameters	13-21
dspsnmpstats	Display SNMP statistics	13-23
dspsv3	Display WAN Manager Layer 3 Link Control Blocks	13-25
dspusers	Display users	13-25
dspusertask	Display user task	13-34
dspusertasks	Display all user tasks	13-37

adduser

Adds a user to the network. The first time the new user ID is used for logon, a prompt appears asking the user to change from the default password to a new password which they enter using the **cnfpwd** command. Users with privilege levels 1 through 5 may add users with lower privilege levels. Since privilege level 6 has no user levels below it, level 6 cannot add any users.

Full Name

Add a user

Syntax

```
adduser <user_id> <privilege_level>
```

Related Commands

cnfpwd, deluser, dspusers

Attributes

Privilege	Jobs	Log	Node	Lock
1–5	No	Yes	IGX, BPX	Yes

Example 1

```
adduser sarah 5
```

Description

Add a user sarah with privilege level 5.

System Response

```

alpha          TRM   YourID:1      IGX 8410    9.2    Aug. 16 1998 13:48 PST

YourID        1
Sarah         5

```

Last Command: adduser Sarah 5

Next Command:

Table 13-2 *adduser—Parameters*

Parameter	Description
userid	Specifies the name of the user to add.
privilege level	Specifies the privilege level to grant to the added user. The range of levels is 1–6, where 1 is the highest level and 6 is the lowest.

cnfpwd

Changes the password associated with a User ID. To change a password, you must log into the node with the User ID whose password you want to change. Passwords are case-sensitive.

In a structured network, each domain requires you to have a password. In each domain, your password and associated privilege level can be the same as or different from those in the other domains. For each domain, you can change the password at any node within the domain, including a junction node.

Full Name

Configure password

Syntax

cnfpwd <old password> <new password>

Related Commands

dsppwd, **adduser**, **deluser**, **dspusers**

Attributes

Privilege	Jobs	Log	Node	Lock
1–6	No	Yes	IGX, BPX	Yes

Example 1

```
cnfpwd
```

Description

Change your password.

Table 13-3 *cnfpwd—Parameters*

Parameter	Description
old password	Specifies the old password.
new password	Specifies the new password. Passwords must have 6–15 characters. Only letters, numbers, “_”, and “-” are allowed in a password. Spaces are not allowed.

cnffwswinit

Use the **cnffwswinit** command to inform the IGX/BPX the IP address of the machine used to initiate a firmware or software download. This is used as a sort of a safety measure, to prevent downloads from being started anywhere in the network. You must have access to a node, and use the **cnffwswinit** command to set the IP address before a download will be accepted from that address.

Full Name

Configure firmware and software downloader’s WAN Manager IP address

Syntax

```
cnffwswinit <IP address of download initiator>
```

Related Commands

dsppwd, adduser, deluser, dspusers

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	Yes	IGX, BPX	Yes

Example

```
cnffwswinit 172.29.52.17
```

Description

Configures the IP address of the machine running WAN Manager from which the firmware and software download will be initiated to other nodes. If you do not provide the IP address for the WAN Manager node from which to initiate the firmware/software download, you will be prompted to enter it.

Table 13-4 *cnffwswinit-Parameters*

Parameter	Description
IP address	Specifies IP address of machine running WAN Manager from which the firmware and software download will be initiated to other nodes in the network.

cnfsnmp

Configures the SNMP GET and SET community strings.

Full Name

Configure SNMP parameters

Syntax

```
cnfsnmp <GET community string> <SET community string>
```

Related Commands

dspsnmp, dspsnmpstats

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	Yes	IGX, BPX	Yes

Example 1

```
cnfsnmp
```

Description

Configure the SNMP GET and SET community string parameters.

Table 13-5 *cnfsnmp—Parameters*

Parameter	Description
get community string	Specifies the GET community string.
set community string	Specifies the SET community string.

cnfstatmast

Configures an IP address for the Statistics Master process in WAN Manager. The **cnfstatmast** command defines the IP address for routing the messages to and from the Statistics Master in WAN Manager.

The Statistics Master process requests and receives network statistics by using TFTP Get and Put messages. These TFTP messages pass between the node and the Statistics Master over IP Relay. See the **cnfnwip** description for details on setting a node address.

Full Name

Configure statistics master SV+ address

Syntax

```
cnfstatmast <IP Address>
```

Related Commands

cnfnwip, **dspnwip**

Attributes

Privilege	Jobs	Log	Node	Lock
1	Yes	Yes	IGX, BPX	Yes

Example 1

```
cnfstatmast 199.35.96.217
```

Description

Configure 199.35.96.217 as the IP address for the Statistics Master.

Table 13-6 *cnfstatmast—Parameters*

Parameter	Description
ip address	Specifies the IP address for the Statistics Master. IP addresses have 32-bits. The format of an IP address is x.x.x.x, where x is a value in the range 1–255.

cnfsysparm

Configures various system (or network) parameters. Network-wide parameters are configurable only when all nodes in the network are reachable. The parameters you specify with this command apply throughout the network regardless of which node you execute the command from. Take special note of the consequences of how you resolve conflicting values when networks are joined.

You can select each parameter by its index number. The paragraphs that follow describe each parameter by index number. Table 13-6 lists the defaults and ranges for each parameter.



Note

Using **cnfsysparm** requires caution because network rerouting or loss of data may result from changes in system parameters. If necessary, consult with the TAC before you use **cnfsysparm**.

The following paragraphs describe the user-configurable system parameters by index number.

- 1: *Maximum Time-Stamped Packet Age* is the maximum age a time-stamped packet can have before the switch discards it. If networks are joined and the *Maximum Time-Stamped Packet Age* in the networks differ from each other, the lower value becomes the maximum.
- 2: *Fail Connections On Communication Break* Determines whether connections are conditioned if the node at the other end of the connection becomes unreachable. If networks with different settings are joined, the resolution is to *enable* this parameter for the new network.
- 3–7: *Maximum Network Delay* for various types of compressed voice and high-speed data connections using SDP/LDP on an IPX node or LDM/HDM on an IGX node. When the total queueing delay on a route exceeds this value, connection traffic cannot use the route. The units of measure are milliseconds. When networks with different values are joined, the lower value becomes the *Maximum Network Delay*.
- 8–12: *Maximum Network Delay* for compressed voice and high-speed data connections. When the total queueing delay on a route exceeds the specified number of milliseconds, a connection traffic cannot use the route. When networks with different values are joined, the higher value becomes the *Maximum Network Delay*. Applicable cards are the UVM, CDP, or CVM.



Note

In Release 9.1, when cost-based routing is configured, the delay cost cap is the maximum allowable end-to-end delay for the connection type. Use parameters 3 through 12 to configure this delay network-wide for all delay-sensitive connections.

- 13: *Enable Discard Eligibility (DE)* bit for Frame Relay connections. Frames received with DE set have been sent on connections where the PIR has been exceeded and are eligible to be discarded. Enabling DE automatically enables CLP. CLP is disabled when Discard Eligibility is turned off except on the bursty data B queue when ForeSight is enabled.

- 14: *Use Frame Relay Standard Parameters Bc and Be* allows you to substitute the Frame Relay Forum standard Bc for VC Q depth and Be for PIR when you configure Frame Relay ports and connections. (The affected commands are **cnffrport**, **addcon** for Frame Relay, and **cnfcon**.) Screen displays for Frame Relay ports and connections reflect the choice for this parameter. Note that if you change this parameter, a network-wide reset to the default values takes place for all Frame Relay classes, and the terminal displays a warning that the reset occurred.
- Obsolete: 15–20: *Maximum Local Delay for Interdomain UVM, CDP, or CVM to UVM, CDP, or CVM connections* is similar to parameters 8–12 described above. These parameters specify the maximum delay at the local domain in a structured network. These delays can be set only on a domain-by-domain basis (not end-to-end).
- 21: *FastPAD Jitter Buffer Size* is the size of the buffer for neutralizing jitter in connections that terminate on a FastPAD. The units of measurement are milliseconds.
- 22: *Number of Consecutive Invalid Login Attempts to Cause Major Alarm* specifies the number of failed login attempts that causes a major alarm. The default of 0 means that failed login attempts do not cause an alarm. If the threshold is set to 0, the Too Many Invalid Login Attempts service-affecting alarm is disabled and no alarm will be generated.
- 23: *Enable Connection Deroute Delay* is an enable that causes the network to wait a period of time before rerouting connections because of an error on a trunk. With *Enable Connection Deroute Delay* enabled, the network does not immediately reroute connections when statistical errors are occurring or when a trunk momentarily moves into a failure state then returns to normal operation. This feature is relevant when rerouting the connections is more of a disruption than the errors caused by the intermittent trunk.
- 24: *Frame Relay VCs Polling Rate* is the period between the start of polling cycles for both ATM and Frame Relay virtual connections. The possible values are 5, 10, and 15 seconds. As the number of connections in a network grows, greater intervals between cycles may be appropriate. The suggested intervals for the numbers of connections are:
 - 5 minute polling for up to 4000 connections
 - 10 minute polling for up to 8000 connections
 - 15 minute polling beyond 8000 connections.
- 25: *Port Polling Rate* is the time between the start of polling cycles for interval statistics. The possible values are 5, 10, and 15 minutes. (To specify the particular statistics, use the statistics manager in WAN Manager.) As the number of connections in a network grows, greater intervals between cycles may be appropriate. The suggested intervals for the numbers of connections are:
 - 5 minutes for up to 300 connections
 - 10 minutes for up to 500 connections
 - 15 minutes for more than 500 connections.

Table 13-7 Defaults and Ranges of cnfsysparm Parameters

System Parameters			
Index	System-Wide Parameter	Default	Range
1	Max Time Stamped Packet Age (in milliseconds).	40	1–60
2	Fail Connections On Communication Break.	No	y or n
3	Max Network Delay for “v” connections (in milliseconds).	14	1–255
4	Max Network Delay for “c” connections (in milliseconds).	27	1–64
5	Max Network Delay for “d” connections (in milliseconds).	14	1–255
6	Max Network Delay for “a” connections (in milliseconds).	27	1–255
7	Max Network Delay for High-Speed Data connections (in milliseconds).	40	1–255
8	Max Network Delay for CDP or CVM to CDP or CVM “v” connections (in milliseconds).	64	1–255
9	Max Network Delay for CDP or CVM to CDP or CVM “c” connections (in milliseconds).	64	1–64
10	Max Network Delay for CDP or CVM to CDP or CVM “t & p” connections (in milliseconds).	64	1–255
11	Max Network Delay for CDP or CVM to CDP or CVM “a” connections (in milliseconds).	64	1–255
12	Max Network Delay for CDP or CVM to CDP or CVM High-Speed Data connections (in milliseconds).	64	1–255
13	Enable Discard Eligibility (DE).	No	y or n
14	Use Frame Relay standard parameters Bc and Be.	No	y or n
15	Obsolete: Max Local Delay for Interdom CDP to CDP “v” connections.	27	1–255
16	Obsolete: Max Local Delay for Interdom CDP to CDP “c” connections.	27	1–64
17	Obsolete: Max Local Delay for Interdom CDP to CDP “t & p” connections.	27	1–255
18	Obsolete: Max Local Delay for Interdom CDP to CDP “a” connections.	27	1–255
19	Obsolete: Max Local Delay for Interdom CDP to CDP High-Speed Data connections.	27	1–255
20	Obsolete: Max Local Delay for Interdom High-Speed Data connections (in milliseconds).	28	1–255
21	FastPAD Dejitter Buffer Depth (in milliseconds).	15	0–255
22	Number of Consecutive Invalid Login Attempts to Cause Major Alarm.	0	3–9
23	Enable Connection Deroute Delay.	Yes	y or n
24	Frame Relay VCs Polling Rate is the number of minutes between polling cycles for both ATM and Frame Relay virtual connections in the network.	5	5, 10, or 15
25	Port Polling Rate is the number of minutes between polling cycles for interval statistics gathered for all ports in the network.	5	5, 10, or 15

Full Name

Configure system parameters

Syntax

cnfsysparm <index> <value>

Related Commands

none

Attributes

Privilege	Jobs	Log	Node	Lock
1	Yes	Yes	IGX, BPX	Yes

Example 1

```
cnfsysparm
```

Description

Configure system-wide parameters. In response to the prompt “Continue” at the bottom of the display enter a “y”, or press Return to display the second screen, or enter “n” to not display the next screen. If you enter an “n,” the prompt line requests an index number.

System Response

```
sw171          VT   SuperUser      IGX 8420      9.2 Oct. 14 1998 17:37 GMT

                System-Wide Parameters

1  Max Time Stamped Packet Age (msec) ..... 32
2  Fail Connections On Communication Break ..... No
3  Max Network Delay for 'v' connections (msec)..... 14
4  Max Network Delay for 'c' connections (msec)..... 27
5  Max Network Delay for 't' & 'p' connections (msec)..... 14
6  Max Network Delay for 'a' connections (msec)..... 27
7  Max Network Delay for High Speed Data connections (msec)..... 32
8  Max Network Delay for CDP-CDP 'v' connections (msec)..... 32
9  Max Network Delay for CDP-CDP 'c' connections (msec)..... 32
10 Max Network Delay for CDP-CDP 't' & 'p' connections (msec)..... 32
11 Max Network Delay for CDP-CDP 'a' connections (msec)..... 32

This Command: cnfsysparm

Continue? n
```

System Response

In response to the “Continue” prompt at the bottom of the display, enter an “n,” then enter a “1” to enter the maximum allowable age for a time-stamped packet.

```
sw171          VT      SuperUser      IGX 8420      9.2 Oct. 14 1998 17:37 GMT

                System-Wide Parameters

1  Max Time Stamped Packet Age (msec) ..... 40
2  Fail Connections On Communication Break ..... No
3  Max Network Delay for 'v' connections (msec)..... 14
4  Max Network Delay for 'c' connections (msec)..... 27
5  Max Network Delay for 't' & 'p' connections (msec)..... 14
6  Max Network Delay for 'a' connections (msec)..... 27
7  Max Network Delay for High Speed Data connections (msec)..... 32
8  Max Network Delay for CDP-CDP 'v' connections (msec)..... 32
9  Max Network Delay for CDP-CDP 'c' connections (msec)..... 32
10 Max Network Delay for CDP-CDP 't' & 'p' connections (msec)..... 32
11 Max Network Delay for CDP-CDP 'a' connections (msec)..... 32
```

This Command: cnfsysparm 1

Enter new value (in Decimal):

Enter the number of the parameter you wish to change, along with the value. For example, to change the Maximum Time-Stamped Packet Age (1) from 40 milliseconds to 42 milliseconds, enter:

1 42



Note

If you change item 15, the following prompt appears on the screen:

```
Changing this parameter will reset Frame Relay classes to their defaults.
Continue (y/n)?
```

Changing parameter 15 requires a change in the Frame Relay classes. Since Frame Relay classes are not associated with a specific port (or port speed 0), no translation can be made. The values for Bc and Be, or VC Q depth and PIR are reset to their default values.

Table 13-8 cnfsysparm—Parameters

Parameter	Description
index	Specifies a numerical value that refers to the specific parameter to be changed. Index numbers and descriptions of the system-wide parameters are in the table that precedes the command summary.
value	Specifies a numerical value that applies to the selected parameter. See Table 13-6.

deluser

Deletes a user from the network. A user can delete users at any lower privilege level.

Full Name

Delete a user

Syntax

```
deluser <user_id>
```

Related Commands

adduser, dspusers

Attributes

Privilege	Jobs	Log	Node	Lock
1–5	No	Yes	IGX, BPX	Yes

Example 1

```
deluser john
```

Description

Delete user “john.”

```
alpha          TRM   YourID:1      IGX 8410     9.2   Aug. 16 1998 13:52 PST
YourID        1
Sarah         5
```

\

Last Command: deluser John

Next Command:

Table 13-9 deluser—Parameters

Parameter	Description
userid	Specifies the name of the user to delete from the network.

dsplanip

The **dsplanip** command is similar to the **dspnwip** command. It displays the LAN IP address and subnet mask of the local node, and also displays the LAN IP address of all other nodes in the network, including feeder nodes. (Feeder nodes are displayed with a blank node name, and they appear immediately beneath the hub node to which they are attached.)

The **dsplanip** command displays the LAN IP address of all nodes reachable from a given node in the network.

The **dsplanip** command is new in Release 9.2 in support of the Out-of-Band network management feature which enables management traffic to be sent over IP to the switches' LAN Ethernet interface, thereby reducing the load on trunk bandwidth and node processor times.

Service-Affecting Alarms and Out-of-Band Network Management Features in Release 9.2

The service-affecting alarms feature enhances reporting of switch alarm conditions to Cisco WAN Manager, and to a customer network management system (NMS) through the Cisco WAN Manager RTM Proxy. New Robust Alarm messages are generated from existing switch events that could affect service.

The Out-of-Band network management feature in Release 9.2 enables management traffic to be sent over IP to switches' LAN Ethernet interface to Cisco WAN Manager, thereby reducing the load on trunk bandwidth and node processor times. For WAN Manager to be able to manage a switch out of band, the following things must be done:

- To support out-of-band management feature and service-affecting alarms, SV+ must be running Release 9.2 or higher.
- The LAN IP address of the switch must be configured.
- LAN Ethernet access must be provided from the Cisco WAN Manager workstation to the switches' LAN port.
- You may only use the "lanip" option for Cisco WAN Manager, which enables out-of-band management, if all switch nodes in the network are running switch software Release 9.2 or higher.
- For an MGX 8220 (AXIS) interface shelf to be able to send LAN IP address changes to a routing node, it must be running MGX 8220 release 4.0.20 or higher.

To change the LAN IP address of a routing node you use the **cnflan** user command. The Out-of-Band Network Management software in Release 9.2 detects a change to the LAN IP address on a routing or feeder node and forwards an update message to Cisco WAN Manager.



Note

The service-affecting alarms and out-of-band network management features in Release 9.2 can interoperate in mixed networks containing one or more nodes running switch software Release 9.1 or 8.5.

Full Name

Display LAN IP address of local node, and all nodes in the network

Syntax**dsplanip****Related Commands****dspphyslns, dsptrks****Attributes**

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX	No

Example 1**dsplanip****Description**

Display the LAN IP address of local node, and all other reachable nodes in network.

System Response

```

sw248      TN      StrataCom      BPX 15 9.2.0      May 4 1998 18:28 GMT

Active LAN IP Address:      172.29.9.155
Active LAN IP Subnet Mask:  255.255.255.0

NodeName      LAN IP Address
sw252         172.29.9.159
              172.29.9.175
sw263         172.29.9.167
              172.29.9.163
sw8           172.29.9.124
sw248         172.29.9.155
              172.29.9.134
              172.29.9.173

Last Command: dsplanip

```

dspnwip

Displays the IP address for each node in the network. The IP address is used to route TFTP messages transferring bulk statistics between the node and the WAN Manager Statistics Master.

■ dsppwd**Full Name**

Display network IP interface

Syntax

dsppwip

Related Commands

cnfwip

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

dsppwip

Description

Display network IP addresses.

```
axiom1      TN      bootzilla      IGX 32      9.2      Sep. 5 1998 18:18 GMT
```

```
Active Network IP Address:      169.134.90.106
Active Network IP Subnet Mask:  255.255.255.0
```

```
NodeName   IP Address
axiom1     169.134.90.111
           169.134.90.105
           169.134.90.101
axiom2     169.134.90.102
axiom3     169.134.90.103
axiom1     169.134.90.106
```

Last Command: dsppwip

Next Command:

dsppwd

Displays the password of the current user or any user at any lower privilege level.

Full Name

Display password

Syntax

```
dsppwd <user_id>
```

Related Commands

```
adduser, cnfpwd, deluser, dspusers
```

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

```
dsppwd yourid
```

Description

Display the password for user YourID.

System Response

```
alpha          TRM   YourID:1      IGX 8410     9.2   Aug. 16 1998 13:56 PST
```

```
The password for YourID is liftoff
```

```
This Command: dsppwd YourID
```

```
This screen will self-destruct in ten seconds
```

```
Next Command: dsppwd YourID
```

Table 13-10 dsppwd—Parameters

Parameter	Description
userid	Specifies the user whose password is displayed.

dspsnmp

Display the following SNMP parameters for the current node:

- Get Community String
- Set Community String
- Trap Community String
- SNMP Set Request Queue Size
- SNMP Queued Request Timeout, in seconds
- SNMP Trap Event Queue Size

Full Name

Display SNMP parameters

Syntax

```
dspsnmp
```

Related Commands

```
cnfsnmp, dspsnmpstats
```

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

```
dspsnmp
```

Description

Display the SNMP parameters for the current node.

System Response

```
sw91          TN    SuperUser      IPX 8    9.2      Aug. 29 1998 13:45 GMT

Get Community String:          NOACCESS
Set Community String:          NOACCESS
Trap Community String:         NOACCESS

SNMP Set Request Queue Size:   110
SNMP Queued Request Timeout (secs): 30
SNMP Trap Event Queue Size:    100
```

```
Last Command: dspsnmp
```

```
Next Command:
```

dspsnmpstats

Displays the following SNMP statistics for the node:

- SVC Requests Received, the number of SVC requests received.
- SVC Current Queue Length, the number of outstanding SVC requests in the queue.
- SVC Maximum Queue Length, the high watermark of the number of outstanding SVC requests in the queue.
- SVC Requests Timed Out, the number of SVC requests that have timed out.
- Current Trap Managers, the number of managers (up to 10) that are currently registered, their IP addresses and UDP ports.

- Traps Transmitted, the number of traps transmitted.
- TRAP Current Queue Length, the number of outstanding traps in the queue.
- TRAP Maximum Queue Length, the high watermark of the number of outstanding traps in the queue.
- TRAP Queue Events Discarded, the number of traps discarded due to queue overflow.
- Overflow Traps Transmitted, the number of overflow traps transmitted due to queue overflow.

Full Name

Display SNMP parameters

Syntax

dspsnmpstats

Related Commands

cnfsnmp, dspsnmp

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

dspsnmpstats

Description

Display SNMP statistics for the current node.

System Response

```

sw91          TN      SuperUser      IPX 8      9.2      Aug. 29 1998 13:21 GMT

SVC Requests Received:      256      Traps Transmitted:      256

SVC Current Queue Length:   0          TRAP Current Queue Length:   0
SVC Maximum Queue Length:  0          TRAP Maximum Queue Length:  0
SVC Requests Timed Out:    0          TRAP Queue Events Discarded: 196864
                                Overflow Traps Transmitted: 100925440

Current Trap Managers:      0/10      Snmp_Trap_Db Ptr:      30DDCD02

```

Last Command: dspsnmpstats

Next Command:

dspsv3

Displays the Cisco WAN Manager L3 (Layer 3) Link Control Blocks.

The **dspsv3** command displays the LCBs (Link Control Blocks) used by a switch to communicate with one or more SV+ workstations. The display shows whether the out-of-band (lanip) option is being used. Previous to Release 9.2, the **dspsv3** screen indicated whether or not NWIP was being used. In Release 9.2, the dspsv3 screen distinguishes between the three modes supported in Release 9.2:

- nwip_off
- nwip_on
- lanip

This command supports the Out-of-Band network management feature, which enables management traffic to be sent over IP to switches' LAN Ethernet interface, thereby reducing the load on trunk bandwidth and node processor times.

The **dspsv3** command displays counts of pending SONET APS (Automatic Protection Switching) alarms.

Full Name

Display Cisco WAN Manager L3 (Layer 3s) Link Control Blocks

Syntax

```

dspsv3
or
dspsv3 <LCB number>

```

Table 13-11 Description of the Fields in the dspsv3 Display

Field	Explanation
Serial Admin	Serial link admin window
LAN Admin	LAN Admin window
LCB	Link Control Block number (0 is the gateway link)
Node	SV+ gateway node number (0 is local IO)
IP	IP address (* indicates nwip is enabled)

Related Commands

dsplanip

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	BPX	No

Example 1

dspsv3

Description

Display Cisco WAN Manager L3 Link Control Blocks.

System Response

```
nsaigx2      TN      StrataCom    IGX 8420    9.2    June 8 1998 06:11 GMT
Number of Active SV3 Links: 2      Serial Admin: None    LAN Admin: None
LCB:  0 Node:  0 IP:*172.16.64.20
LCB:  1 Node:  3 IP:*172.16.64.20

>Last Command: dspsv3
```

Example 2

dspsv3

System Response

```
sw248      TN      StrataCom      BPX 15 9.2.0      May 4 1998 18:05 GMT

Number of Active SV3 Links: 2      Serial Admin: None      LAN Admin: None
LCB:      0 Node: 128 IP:N172.29.9.29
LCB:      1 Node: 128 IP:L172.29.9.53
LCB:      2 Node: 128 IP: 172.29.9.115

Last Command: dspsv3
```

In Example 2, the summary display shows three Link 1 LCBs, which connect to three different SV+ workstations. The “N” next to the first IP address indicates the `nwip_on` option. The “L” next to the second address indicates the `lanip` option. The absence of a symbol on the third line indicates the `nwip_off` option.

Example 3

```
dspsv3
```

System Response

```
sw248      TN      StrataCom      BPX 15 9.1.a5      May 4 1998 18:11 GMT

LCB: 1 Alloc: 1 sv3_lcb_ptr: 31514034
IP Address: 172.29.9.53 (lanip)
Response Timer: 0
Idle Timer: 393
Retry Count: 120
Current Protocol State: SV3_TRANSFER
No. of Buffers in the data_q: 0
No. of Buffers in the xmit_q: 0
No. of Buffers in the nflow_q: 0
Comm Break Alarm: Update: 0, Pending: 0
Comm Break Alarm Bitmaps: Update: 314741FC, Pending: 3147449C

Last Command: dspsv3 1
```

In Example 3, the detailed display below shows the state on an individual link control block. The display indicates the use of the `lanip` option.

Table 13-12 Description of the Fields in the dspsv3 Display

Field	Explanation
Serial Admin	Serial link admin window
LAN Admin	LAN Admin window
LCB	Link Control Block number (0 is the gateway link)

Table 13-12 Description of the Fields in the dspsv3 Display (continued)

Field	Explanation
Node	SV+ gateway node number (0 is local IO)
IP	IP address (* indicates nwip is enabled)

Example 1

```
dspsv3 0
```

Description

Display Cisco WAN Manager L3 Link Control Blocks.

Table 13-13 Description of the Fields in the Previous dspsv3 Display

Field	Explanation
LCB	LCB number
Alloc	LCB allocated (1) or no (0)
sv3_lcb_ptr	Address of LCB in memory
IP Address	SV+ IP Address
Response Timer	SV+ Link Response Timer
Idle Timer	Display SV+ Link Idle Timer
Retry Count	SV+ Link Retry Count
Current Protocol State	Link state (idle, reset, transfer, poll)
No. of buffers in the data_q	Messages in the data queue
No. of buffers in the xmit_q	Messages in the transmit queue
No. of buffers in the nflow_q	Messages in the non-flow-controlled queue
Subscribed applications	Applications to which SV+ has subscribed
Update object(s)	Robust object types that have updated status
Pending	Robust object types that have been updated to SV+, and are waiting for an acknowledgment from SV+.

System Response

```
nsaix2      TN      StrataCom    IGX 8420    9.2      June 8 1998 06:11 GMT
```

```
LCB: 0 Alloc: 1 sv3_lcb_ptr: 3120248C
IP Address: 172.29.9.60
Response Timer: 0
Idle Timer: 600
Retry Count: 120
Current Protocol State: SV3_TRANSFER
No. of Buffers in the data_q: 0
No. of Buffers in the xmit_q: 0
No. of Buffers in the nflow_q: 0
```

```
This Command: dspsv3 0
```

```
Continue?
```

```
LCB: 0 Alloc: 1 sv3_lcb_ptr: 3120248C
Subscribed Applications: Topology MaintLog
                        312024C0
```

	Update	Pending			
Revision:	0	0			
Stats Rebuild:	0	0			
Subscription:	0	0	APS Alarm:	0 31202EB6	0 31202EDB
Feeder Obj:	0 312029D2	0 312029D4	Feeder Alarm:	0 31202ED8	0 31202EDA
Port Obj:	0 312029C6	0 312029CC	Port Alarm:	0 31202ECC	0 31202ED2
Conn Obj:	0 312024D0	0 31202741	Conn Alarm:	0 312029D6	0 31202C47
Cline Obj:	0 312029B2	0 312029B7	Cline Alarm:	0 31202EB8	0 31202EBD
Trunk Obj:	0 312029BC	0 312029C1	Trunk Alarm:	0 31202EC2	0 31202EC7

```
Last Command: dspsv3 0
```

```
Continue?
```

```
LCB: 0 Alloc: 1 sv3_lcb_ptr: 3120248C
Robust Database Updates data:
db_update_flags:      30D6E16C db_pending_flags:      30D6E355
flag_offset_table:   30D6E56C
  1:0   2:0   3:0   4:0   5:0   6:0   7:0   8:1   9:16 10:1A
11:59 12:0 13:D6 14:D7 15:0 16:DC 17:FC 18:0 19:13B 20:0
21:17B 22:17D 23:0 24:0 25:17F 26:0 27:180 28:0 29:181 30:183
31:0 32:0 33:0 34:185 35:0 36:0 37:186 38:0 39:0 40:0
41:0 42:0 43:0 44:0 45:0 46:187 47:0 48:0 49:0 50:0
51:18C 52:0 53:0 54:0 55:0 56:0 57:0 58:0 59:0 60:0
61:0 62:0 63:0 64:0 65:0 66:18D 67:0 68:0 69:0 70:0
71:0 72:0 73:18E 74:0 75:0 76:0 77:0 78:0 79:0 80:0
81:0 82:0 83:0 84:0 85:0 86:0 87:0 88:0 89:0 90:0
91:0 92:18F 93:18F 94:190 95:1A5 96:1A9 97:0 98:0 99:1E8 100:0
101:0 102:0 103:0 104:0
```

```
Last Command: dspsv3 0
```

LCB	- LCB number
Alloc	- LCB allocated (1) or not (0)
sv3_lcb_ptr	- address of LCB in memory
IP Address	- SV+ IP Address
Response Timer	- SV+ Link Response Timer

```

Idle Timer                - Display SV+ Link Idle Timer
Retry Count               - SV+ Link Retry Count
Current Protocol State    - Link state (idle, reset, transfer, poll)
No. of Buffers in the data_q - Messages in the data queue
No. of Buffers in the xmit_q - Messages in the transmit queue
No. of Buffers in the nflow_q- Messages in the non-flow-controlled queue

Subscribed Applications    - Applications to which SV+ has subscribed

Update                    - Robust object types that have updated object(s)
                           status.
Pending                   - Robust object types that have been updated to
                           SV+, and are waiting for an acknowledge from
                           SV+.

Robust database update bitmap addresses.

```

dsptsmap

Displays the following SNMP statistics for the node:

- SVC Requests Received, the number of SVC requests received.
- SVC Current Queue Length, the number of outstanding SVC requests in the queue.
- SVC Maximum Queue Length, the high watermark of the number of outstanding SVC requests in the queue.
- SVC Requests Timed Out, the number of SVC requests that have timed out.
- Current Trap Managers, the number of managers (up to 10) that are currently registered, their IP addresses and UDP ports.
- Traps Transmitted, the number of traps transmitted.
- TRAP Current Queue Length, the number of outstanding traps in the queue.
- TRAP Maximum Queue Length, the high watermark of the number of outstanding traps in the queue.
- TRAP Queue Events Discarded, the number of traps discarded due to queue overflow.
- Overflow Traps Transmitted, the number of overflow traps transmitted due to queue overflow.

Full Name

Display SNMP parameters

Syntax

```
dspsnmpstats
```

Related Commands

```
cnfsnmp, dspsnmp
```

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

```
dspsnmpstats
```

Description

Display SNMP statistics for the current node.

System Response

```
sw91          TN    SuperUser      IPX 8      9.2      Aug. 29 1998 13:21 GMT
SVC Requests Received:      256      Traps Transmitted:      256
SVC Current Queue Length:    0          TRAP Current Queue Length:    0
SVC Maximum Queue Length:    0          TRAP Maximum Queue Length:    0
SVC Requests Timed Out:      0          TRAP Queue Events Discarded: 196864
                                Overflow Traps Transmitted: 100925440
Current Trap Managers:      0/10      Snmp_Trap_Db Ptr:      30DDCD02
```

```
Last Command: dspsnmpstats
```

```
Next Command:
```

dspusers

Displays users. The privilege levels in the display are restricted to those of the current user and any privileges below the current user.

Full Name

Display users

Syntax

```
dspusers
```

Related Commands

adduser, deluser, dspusers

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

dspusers

Description

Display the users on a network.

dspusertask

Displays information about the current user-task. The displayed information varies with the user task. For example, information about a vt session slightly differs from a telnet session. The command takes a user task number as an argument. If the user task number is unknown, enter the command without a number to see a list of possible user tasks and the current user task. The types of user tasks are as follows:

- User, which can be the control terminal user, auxiliary port user, or StrataView
- A telnet session
- A virtual terminal session (vt)
- An SNMP agent
- A job

Full Name

Display user task

Syntax

dspusertask [user task number]

Related Commands

adduser, cnfpwd, deluser, dspusers, dsppwd

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1**dspusertask****Description**

Display user task information—without specifying a task in this case. This example shows a case in which the user has started a vt session on a node. See also step 2 of this example.

System Response

```
sw78          VT      SuperUser      BPX 15      9.2      Jan. 31 1998 15:52 PST

#  TASK PURPOSE      USER ID      #  TASK PURPOSE      USER ID
--  --  -----      --  --  -----
1  USR1 control port none      13 VT-5 VT          none
2  USR2 auxilry port none      14 VT-6 VT          none
3  USR3 lan port (SV) none      15 SNMP agent       n/a
4  TN-1 lan (telnet) none      16 JOBS runs jobs   n/a
5  TN-2 lan (telnet) none
6  TN-3 lan (telnet) none
7  TN-4 lan (telnet) none
8  TN-5 lan (telnet) none
9  VT-1 VT: sw81      SuperUser    < You
10 VT-2 VT          none
11 VT-3 VT          none
12 VT-4 VT          none
```

This Command: dspusertask

Please Enter User Number:9

Example 2

9

Description

This example shows the screen after the you enter a 9 at the prompt in the *previous* screen, a case in which you already started a vt session on a node. Note that the display shows the status as a vt slave, and the node on which the vt session originated is sw81.

```
sw78          VT      SuperUser      BPX 15      9.2      Jan. 31 1998 15:53 PST
```

```
Task: VT-1
Logged in as: SuperUser
VT master: no
VT slave: yes      Master node is: sw81
VT pending: no
```

```
Public lock: no
Private lock: none
```

```
No command is currently running.
Previous command: dspusertask 9
```

```
Last Command: dspusertask 9
```

```
Next Command:
```

Table 13-14 dspusertask—Parameters

Parameter	Description
user task number	Specifies the number of the user task whose information is displayed.

dspusertasks

Displays general information about all current user tasks. The types of user tasks are as follows:

- User, which can be the control terminal user, auxiliary port user, or Cisco WAN Manager
- A telnet session
- A virtual terminal session (vt)
- An SNMP agent
- A job

Full Name

Display user tasks

Syntax

dspusertasks

Related Commands

adduser, cnfpwd, deluser, dspusers, dsppwd, dspusertask

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

dspusertasks

Description

Display user task information.

System Response

```
sw151          TN      SuperUser      IGX 8420      9.2      Aug. 14 1998 18:02 GMT

#  TASK  PURPOSE      USER ID      #  TASK  PURPOSE      USER ID
--  ---  -
1  USR1  control port  SuperUser    13 VT-5  VT           none
2  USR2  auxilry port  none         14 VT-6  VT           none
3  USR3  lan port (SV) none         15 SNMP  agent        n/a
4  TN-1  lan (telnet)  none         16 JOBS  runs jobs    n/a
5  TN-2  lan (telnet)  SuperUser    < You
6  TN-3  lan (telnet)  none
7  TN-4  lan (telnet)  none
8  TN-5  lan (telnet)  none
9  VT-1  VT           none
10 VT-2  VT           none
11 VT-3  VT           none
12 VT-4  VT           none
```

Last Command: dspusertasks

Next Command:



Troubleshooting Commands

Table 14-1 lists the troubleshooting commands.

Table 14-1 Troubleshooting Command List

Command	Full Name	Page
addalmslot	Add alarm slot	14-3
addextlp	Add external loopback	14-4
addloclp	Add local loopback	14-9
addlocrmtlp	Add local-remote loopback	14-14
addrmtlp	Add remote loopback	14-16
clrchstats	Clear channel statistics	14-21
clrcalkm	Clear clock alarm	14-22
clrclnalm	Clear circuit line alarm	14-26
clrclnerrs	Clear circuit line errors	14-26
clreventq	Clear the events queues	14-23
clrlnalm	Clear line alarm	14-26
clrlnerrs	Clear line errors	14-26
clrlog	Clear log	14-27
clrmsgalm	Clear message alarm	14-28
clrphyslnalm	Clear physical line alarms	14-29
clrphyslnerrs	Clear physical line errors	14-33
clrportstats	Clear port statistics	14-34
clrslotalms	Clear slot alarms	14-36
clrsloterrs	Clear slot errors	14-36
clrtrkalm	Clear trunk alarm	14-37
clrtrkerrs	Clear trunk errors	14-39
clrtrkstats	Clear trunk statistics	14-40
cnfbus	Configure bus	14-41
cnfleadm	Monitor IGX LDM/HDM data port control leads	14-43
cnflnalm	Configure line alarm	14-47

Table 14-1 Troubleshooting Command List (continued)

Command	Full Name	Page
cnfslotalm	Configure slot alarm	14-52
cnftrkalm	Configure trunk alarm	14-53
dellp	Delete loopback	14-55
dncd	Down card	14-57
dspalms	Display alarms	14-58
dspbob	Display Breakout Box	14-64
dspbusbw	Display cell bus allocated bandwidth	14-67
dspbuses	Display Buses	14-69
dspclnerrs	Display circuit line errors	14-71
dspeventq	Display the event queue names and the data in each.	14-23
dspfrcbob	Display FRC-2/FRM-2 breakout box	14-75
dsplog	Display event log	14-77
dsplnalmcnf	Display line alarm configuration	14-87
dsplnerrs	Display line errors	14-89
dsppwr	Display power	14-100
dpslotalms	Display slot alarms	14-104
dpsloterrs	Display slot errors	14-105
dpslotstatcnf	Display slot statistics configuration	14-108
dpsv3	Display Cisco WAN Manager L3 (layer 3) Link Control Blocks	14-109
dsptrafficgen	Display whether Traffic Generation feature for card slot is enabled	14-109
dsptrkerrs	Display individual or all trunk errors	14-115
prtclnerrs	Print circuit line errors	14-118
prtlerrs	Print line errors	14-120
prtlog	Print log	14-119
prtrkerrs	Print trunk errors	14-121
resetcd	Reset card	14-122
resetpc	Reset Port Concentrator	14-124
switchcc	Switch controller card	14-125
tstcon	Test connection	14-126
tstconseg	Test connection segment	14-129
tstdelay	Test delay	14-132
tstpcs	Test Port Concentrator Shelf	14-134
tstport	Test port	14-135
tstubus	Test cell bus	14-135

addalmslot

Enables the MAJOR and MINOR alarm indicators on an Alarm Relay Card (ARC) or Alarm Relay Module (ARM). It also configures the slot to support external alarms from the Alarm Relay Interface (ARI) back card. You can use this command at any node that can provide external alarm indications to an alarm reporting system. The ARC or ARM can reside in any front slot but usually resides in the right-most slot.

Full Name

Add alarm slot

Syntax

```
addalmslot <slot number>
```

Related Commands

delalmslot, dspalms

Attributes

Privilege	Jobs	Log	Node	Lock
1-4	No	Yes	IGX	Yes

Example 1

```
addalmslot 16
```

Description

Enable alarm reporting from slot 16 in a node.

System Response

```
beta          TRM   YourID:1          IGX 8430      9.2          Aug.  3 1998 14:27 MST
```

```
Alarm summary (Configured alarm slots: 16)
```

```
Connections Failed:      None
Groups Failed:          None
PLN Alarms:             1 Major
CLN Alarms:             None
Cards Failed:           1
Missing Cards:          None
Remote Node Alarms:     1 Major
```

```
Last Command: addalmslot 16
```

```
Next Command:
```

addextlp

Places an external device in loopback mode. The **addextlp** command applies to existing connections on an SDP, HDM, LDP, or LDM. A near loopback causes the NEAR EIA template to be applied. A far loopback causes the FAR EIA template to be applied to the data port. The loopback remains in place until removed by the **dellp** command.

The **dspscons** command shows which connections are in loopback mode. Specifying an “n” after the channel indicates a near loopback, and an “f” indicates a far loopback. Because **addextlp** takes the specified connections out of service, use it only when a service disruption is tolerable.

Full Name

Add External Loop to Connection

Syntax

```
addextlp <channel> < n | f >
```

Related Commands

dellp, **dspscons**

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1

```
addextlp 5.1 n
```

Description

Place the device connected to channel 5.1 in near loopback.

System Response

```
alpha          TRM  YourID:1          IGX 8420    9.2    Aug. 16 1998 12:53 PST

Local          Remote          Remote
Channel        NodeName        Channel        State  Type        Compression    Code Avoid COS O
N5.1           beta            25.1           Ok    256          7/8            0  L
9.1.100        gamma           8.1.200        Ok    fr           0              0  L
9.2.400        beta            19.2.302       Ok    fr           0              0  L
14.1           gamma           15.1           Ok    v            0              0  L
```

```
Last Command: addextlp 5.1 n
```

```
Next Command:
```

Table 14-2 addextlp—Parameters

Parameter	Description
channel	Specifies the channel to loopback in the format <i>slot.port</i> .
n /f	Specifies whether the loopback is near or far. An “n” specifies near; an “f” specifies far. For a non-DDS port, the near or far modem is placed in loopback, if it supports this function. For a DDS port, the external DDS device is placed in CSU loopback. Local channels must be configured as OCU in order to place them in external loopback.

addlnloclp

Establishes a local-remote loopback on a trunk or port card in a BPX. Applicable cards are the ASI, BNI, BME, and BXM.

While a line loop is present, software suspends the card self-test and the line diagnostic test that normally run when a line goes into alarm. Suspending these tests prevents background test loops from interfering with the user-specified loop.

Line loops are set for a line on the local node, so you cannot specify a remote node, and no network messaging is supported for setting a line loop of any type on a remote node.

Line loop status is displayed on the **dsplns** screen for an ASI, BME, or a BXM in port mode and the **dsptrks** screen for a BNI, BME, or a BXM in trunk mode. Line loop status is not displayed for connections (**dspecons**) affected by a line loop. Instead, a warning is printed if the line has connection traffic travelling on it, and an event is logged when a line loop is set or cleared. A line loop on a trunk generates Comm Fail, causing connections to fail and be rerouted.

For both of the **dsplns** and **dsptrks** screens, the “[” character appears before the back card type in the “Type” column to indicate that the line local loopback is active.

The line loop state is not saved in BRAM or on a rebuild but is preserved on a switchover. After a rebuild, a line’s loop state is cleared.

Exercise caution when you set up loops on a BNI, BME, or BXM trunk because looping an added BNI/BXM/BME trunk causes Comm Failure and connection rerouting. BNI/BXM/BME **addlnloclp** is not supported because of a lack of useful purpose, and Cisco recommends that you use **addlnloclp** only when the trunk is upped but not added. On the other hand, the system does not prevent you from looping an added BNI/BXM/BME trunk port.

Full Name

Add local loopback to line

Syntax

```
addlnloclp <slot.port>
```

Related Commands

dellnlp, **dsptrks**, **dsplns**, **addlnloclp**

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	BPX	Yes

Example 1**addInlocp 9.1****Description**

The **dsplns** display appears with the connection highlighted and a prompt for confirmation.

System Response

```
pubsbsp1      TN      SuperUser      BPX 8620      8.4 Feb. 28 1998 01:25 GMT

Line   Type   Current Line Alarm Status
3.1    OC-3   Clear - OK
3.2    OC-3   Clear - OK
3.3    OC-3   Clear - OK
3.4    OC-3   Clear - OK
3.5    OC-3   Clear - OK
3.8    OC-3   Clear - OK
5.1    T3     Clear - OK
5.2    T3     Clear - OK
9.1    [OC-3  Clear - OK
```

Last Command: addInlocp 9.1

Warning - Looping will interrupt data flow on the line
Next Command:

Table 14-3 addInlocp—Parameters

Parameter	Description
slot.port	Specifies the port.

addInlocrmtlp

Establishes a local-remote loopback on a trunk or port card in a BPX. Applicable cards are the ASI, BNI, and BXM/BME.

While a line loop is present, software suspends the card self-test and the line diagnostic test that normally run when a line goes into alarm. Suspending these tests prevents background test loops from interfering with the user-specified loop.

Line loops are set for a line on the local node, so you cannot specify a remote node, and no network messaging is supported for setting a line loop of any type on a remote node.

Line loop status is displayed on the **dsplns** screen for an ASI or a BXM/BME in port mode and the **dsptrks** screen for a BNI or a BXM/BME in trunk mode. Line loop status is not displayed for connections (**dspecons**) affected by a line loop. Instead, a warning is printed if the line has connection traffic travelling on it, and an event is logged when a line loop is set or cleared. A line loop on a trunk generates Comm Fail, causing connections to fail and be rerouted.

For both of the **dsplns** and **dsptrks** screens, the “[” character appears before the back card type in the “Type” column to indicate that the line local-remote loopback is active.

The line loop state is not saved in BRAM or on a rebuild but is preserved on a switchover. After a rebuild, a line’s loop state is cleared.

Exercise caution when you set up loops on a BNI or BXM/BME trunk because looping an added BNI/BXM/BME trunk causes Comm Failure and connection rerouting. BNI/BXM/BME **addlnocrmtlp** is not supported because of a lack of useful purpose, and Cisco recommends that you use **addlnloclp** only when the trunk is upped but not added. On the other hand, the system does not prevent you from looping an added BNI/BXM/BME trunk port.

In this release, you can use the **addloclp** and **addlocrmtlp** commands to enable a two-segment connection at the hub node port endpoint in a network of IGX hubs and MGX 8800 interface shelves. The **addloclp** and **addlocrmtlp** commands are blocked at the interface shelf trunk endpoint. The **addrmtlp** command is not supported at either endpoint of the connection. You can use the **dellp** command to remove the local (or local remote) loopbacks that have been added; however, you cannot use the **dellp** command at the trunk endpoint of the connection—it will be blocked. Loops of any kind are not supported for the middle segment of a three-segment connection.

Full Name

Add local-remote loopback to line

Syntax

```
addlnocrmtlp <slot.port>
```

Related Commands

dsptrks, **dsplns**, **dellnlp**, **addlnloclp**

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	Yes	Yes	BPX	Yes

Example 1

```
addlnocrmtlp 10.1
```

Description

The **dsptrks** screen appears with the loopback highlighted by the “[” character.

System Response

```
pubsbpx1      TN      SuperUser      BPX 8620      8.4 Feb. 28 1998 01:27 GMT

TRK      Type      Current Line Alarm Status      Other End
1.1      T3      Clear - OK      pubsaxi1 (AXIS)
1.3      T3      Clear - OK      pubsipx1/8
4.1      OC-3      Clear - OK      -
10.1     [OC-3      Clear - OK      -
```

Last Command: addlnlocrmtlp 10.1

Next Command:

Table 14-4 *addlnlocrmtlp—Parameters*

Parameter	Description
slot.port	The port on the local node.

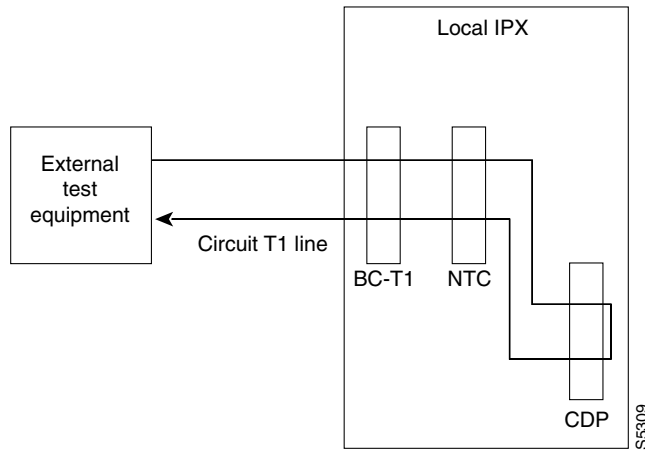
addloclp

The **addloclp** command places the following types of channels in local loopback mode:

- Voice
- Data
- Frame Relay port
- Frame Relay connection
- ATM connection
- Access device port

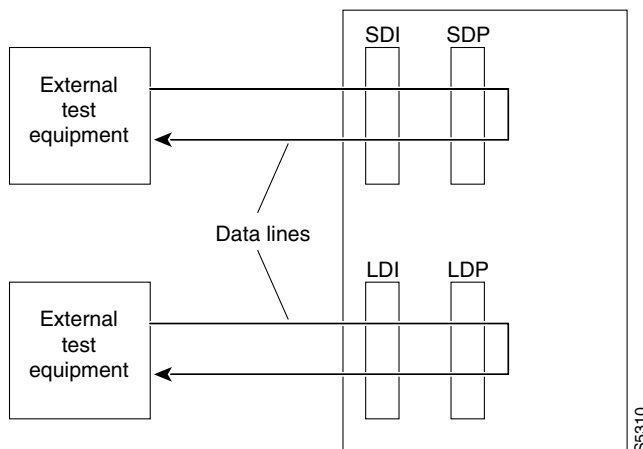
For voice connections, **addloclp** creates a signal path from a channel or group of channels on an incoming line then back out to the line. External test equipment can test the integrity of the path at the T1 DS0 level. Figure 14-1 shows a local loopback on a voice channel.

Figure 14-1 Local Loopback on a Voice Channel



For data connections, **addloclp** creates a signal path from the incoming data port or set of ports back to these same port(s) through the local CDP/CVM, SDP/HDM, or LDP/LDM. External test equipment can then test the integrity of the path. Figure 14-2 illustrates a local loopback on a data connection.

Figure 14-2 Local Loopback on a Data Connection



A local loopback can simultaneously exist at both ends of a connection. However, a local loopback and a remote loopback cannot co-exist on a connection. (See the **addrmtlp** description for more information.)

Before executing a loopback, the IGX node performs signal and code conditioning to remove the connection from service. The loopback remains in place until removed by the **dellp** command. Only existing connections can be looped back. Use the **dspecons** command to see which connections are looped back. A flashing right parenthesis “)” or left parenthesis “(” is used in the connections display to indicate a loopback. The direction and location of the parenthesis depends on whether the loopback is local or remote and which end of the connection was used to establish the loopback. A local loopback initiated from the local end of the connection looks like this in the connections display:

Local Channel	Remote Node	Remote Channel
12.1	alpha	15.1

A local loopback initiated from the remote end of the connection looks like this:

Local Channel	Remote Node	Remote Channel
12.1	alpha	15.1

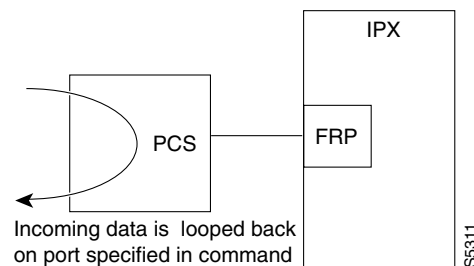
In Frame Relay connection loopback mode (DLCI included in command), all packets from the far-end of the connection are dropped. The far-end system software is informed of the loopback. In port loopback mode (port specified without a DLCI), all packets for this port are dropped and each opposite end is informed of the loopback mode. Use the format *slot.port* in port mode to loop just the port. The data is looped directly in the FRI back card, so no data reaches the muxbus or cellbus. Use the format *slot.port.DLCI* in connection (channel) mode to loop a specific channel. Note that this can affect up to 252 connections (channels) in port loopback mode.

Because the **addloclp** command causes the connection(s) to be removed from service, you should use loopbacks only when a service disruption can be tolerated. You establish remote loopbacks with the **addrmtlp** command. You remove local and remote loopbacks with the **dellp** command. You can also initiate loopbacks for data channels by pressing a button on the front of the associated data card.

Frame Relay Local Loops with Port Concentrator

When a Frame Relay port or connection is located on a Port Concentrator instead of directly on an FRP or FRM card, the data test path is different. When just the *<port>* parameter is used, incoming data is looped back out on the Port Concentrator port, as shown in Figure 14-3.

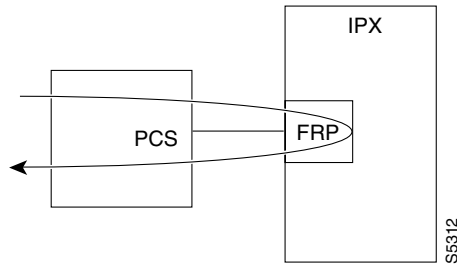
Figure 14-3 Local Loop on Port Concentrator



This loop disrupts all Frame Relay connections on the port that is under test.

When you specify a connection with *<port.dlci>* parameters, the connection is looped back at the FRM-2 or FRP-2 interface with the IGX card bus, as shown in Figure 14-4.

Figure 14-4 Local Loop on FRM-2 or FRP-2



As shown, this test verifies the operation of all components from the Port Concentrator to the IGX interface with the FRP-2 or FRM-2 card.

This test interrupts *only* the specified connection on the Port Concentrator port.

In this release, the **addloclp** and **addlocrmtlp** commands support the two-segment connection at the hub node port endpoint in a network of IGX hubs and SES interface shelves. The **addloclp** and **addlocrmtlp** commands are blocked at the interface shelf trunk endpoint. The **addrmtlp** command is not supported at either endpoint of the connection. You can use the **dellp** command to remove the local (or local remote) loopbacks that have been added; however, you cannot use the **dellp** command at the trunk endpoint of the connection—it will be blocked. Loops of any kind are not supported for the middle segment of a three-segment connection.

Full Name

Add local loopback to connections on a port

Syntax

addloclp *channel*

Related Commands

addrmtlp, **dellp**, **dspcons**, **dspfport**

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX, BPX	Yes

Example 1

addloclp 14.1

Description

The connections screen appears with connection 14.1 highlighted. The system prompts you to confirm the loopback. To confirm it, enter y.

System Response

```

Next Command:
alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 23 1998 11:03 PST

Local          Remote          Remote          State  Type    Compression  Code Avoid COS O
Channel        NodeName        Channel
5.1            beta            )25.1           Ok     256
9.1.100        gamma           8.1.200         Ok     fr
9.1.200        gamma           8.1.300         Ok     fr
9.2.400        beta            19.2.302        Ok     fr(Grp)
14.1          )gamma          15.1            Ok     v

```

Last Command: addloclp 14.1

Next Command:

Table 14-5 *addloclp—Parameters (voice)*

Parameter	Description
slot	Specifies the slot number of the card containing the port to loop at the local node.
channel (s)	Specifies the channel or set of channels to loop at the local node.
port	Where applicable for the connection type, specifies the port.

Table 14-6 *addloclp—Parameters (data)*

Parameter	Description
slot	Specifies the slot number of the card containing the port to loop at the local node.
port	Specifies the local port to loop at the local node.

Table 14-7 *addloclp—Parameters (Frame Relay)*

Parameter	Description
slot	Specifies the slot number of the FRP card containing the port to be looped at the local node.
port	Specifies the local port to loop at the local node.

Table 14-8 addloclp—Parameters (Frame Relay connection)

Parameter	Description
slot	Specifies the slot number of the FRP card containing the port to loop at the local node.
port	Specifies the local port to loop at the local node.
DLCI	Specifies the Data Link Connection Identifier (DLCI) number of the channel to loop at the local node.

Table 14-9 addloclp—Parameters (ATM connection)

Parameter	Description
slot	Specifies the slot number of the ATM card containing the port to loop at the local node.
port	Specifies the local port to loop at the local node.
VPI/VCI	The VPI range is 0–7, and the VCI range is 1–255. An asterisk (*) indicates a virtual path.

Table 14-10 addloclp—Parameters (FTM connection with an Access Device attached)

Parameter	Description
slot	Specifies the slot number of the ATM card containing the port to loop at the local node.
port	Specifies the local port to loop at the local node.
Access Device ID	The Access Device ID range is 1–255. Omit to loopback all access devices on the local port.
Connection ID	The Connection ID range is 1–252. Omit to loopback all connections on the local port.

addlocrmtlp

Adds support of a local-remote loopback for testing multi-segment connections in a tiered network. The effect is to instruct the remote node to set up a remote loopback. You must execute the **addlocrmtlp** command before using **tstcon** and **tstdelay** for multisegment connections. For interface shelves, you can execute **addlocrmtlp** on either the interface shelf (after telnetting to it). After testing is complete, remove the local-remote loop by executing **dellp**. A parenthesis on the screen shows the loop's endpoint.

In this release, the **addloclp** and **addlocrmtlp** commands support a two-segment connection at the hub node port endpoint in a network of IGX hubs and SES interface shelves. The **addloclp** and **addlocrmtlp** commands are blocked at the interface shelf trunk endpoint. The **addrmtlp** command is not supported at either endpoint of the connection. You can use the **dellp** command to remove the local (or local remote) loopbacks that have been added; however, you cannot use the **dellp** command at the trunk endpoint of the connection—it will be blocked. Loops of any kind are not supported for the middle segment of a three-segment connection.

Full Name

Add local-remote loopback in a tiered network

Syntax

```
addlocrmtlp <channel(s)>
```

Related Commands

tstcon, tstdelay, dellp, dspcons, dspfrport

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	Yes	Yes	IGX, BPX	Yes

Example 1**addlocrmtlp 5.1.3.100****Description**

The connections screen appears with the connection highlighted and prompts you to confirm.

System Response

```
pubsbsp1      TN      SuperUser      BPX      9.2      July 13 1998 14:41 PDT

Local
Channel      Remote      Remote
5.1.3.100 (  NodeName   Channel
                pubsbsp3    7.1.2.49

State Type      Compress Code COS
Ok   aftr

```

```
This Command: addlocrmtlp 5.1.3.100
```

```
Loopback these connections (y/n)?
```

Table 14-11 addlocrmtlp—Parameters

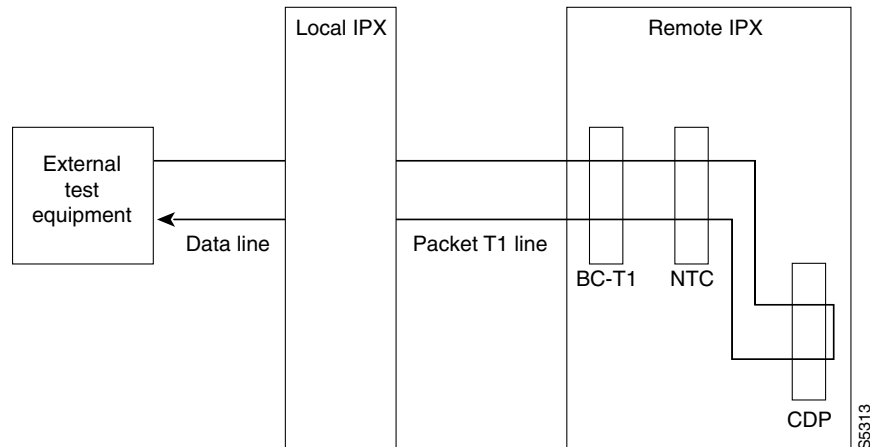
Parameter	Description
channels(s)	The connection endpoint on the local node.

addrmtlp

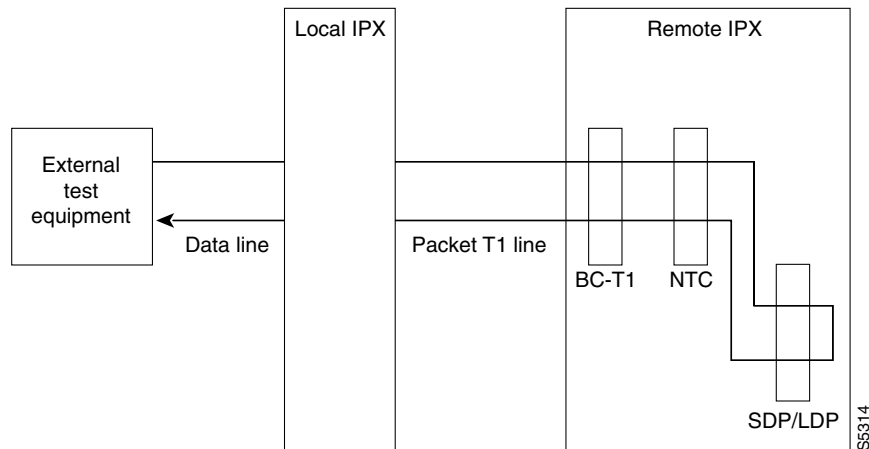
The **addrmtlp** command places the following types of channels in remote loopback mode:

- Voice
- Data
- Frame Relay port
- Frame Relay connection
- ATM connection

For voice connections, **addrmtlp** loops the information stream from the designated channel or group of channels on an incoming circuit line across the network and loops it back to the circuit line by way of the remote CDP or CVM. External test equipment can then test the integrity of the path at the T1 DS0 level. Figure 14-5 illustrates a remote loopback on a voice channel.

Figure 14-5 Remote Loopback on a Voice Channel

For data connections, **addrmtlp** transfers the information stream from the designated channels through the network and loops it back to the data port(s) through a remote SDP, HDM, LDM, or LDP. External test equipment can then test the integrity of the path. The following illustrates a data connection remote loopback.

Figure 14-6 Remote Loopback on a Data Connection

Prior to executing the loopback, the IPX or IGX node applies signaling template bit patterns to the A, B, C, and D signaling bits at the remote end to remove the connection from service. The loopback remains in place until removed by the **dellp** command. Only existing connections (those that have been entered with the **add-on** command) can be looped back. You cannot establish a remote loopback on a connection that is already looped back, either locally or remotely. (See the **addloclp** command for more information on local loopbacks.)

Use the **dspecons** command to see which connections are looped back. A flashing left parenthesis “(” or right parenthesis “)” is used in the connections display to indicate a loopback. The direction and location of the parenthesis depends on whether the loopback is local or remote and which end of the connection was used to establish the loopback. A remote loopback initiated from the local end of the connection looks like this:

Local Channel	Remote Channel	Remote Node
3.2	alpha	12.1

A remote loopback initiated from the remote end of the connection looks like this:

Local Channel	Remote Node	Remote Channel
3.2	alpha	12.1

For remote loopback of Frame Relay connections, note that in remote loopback mode, if the transmit minimum bandwidth exceeds the receive minimum bandwidth, then loopback data may be dropped. For this reason, the connection speeds will be checked and the user will receive the following message if there is a problem:

```
Warning-Receiver's BW < Originator's BW-Data may be dropped
```

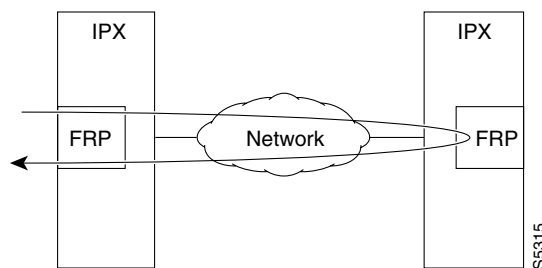
Because the **addrmtlp** command causes the connection to be removed from service, loopbacks should be used only when a service disruption can be tolerated. Local loopbacks are established with the **addloclp** command. Both local and remote loopbacks are removed by the **dellp** command. Loopbacks for data channels can also be initiated by pressing a push-button on the front of the associated data card.

Remote Loopbacks and the Port Concentrator Shelf

For Frame Relay remote loops, DLCI MUST be specified; entering only port number only generates an error message.

Unlike local loopbacks, remote loopbacks are not supported for Frame Relay *ports*; connections must be specified. Data incoming on the Frame Relay port is looped at the remote end FRM-2 or FRP-2 card, as shown in Figure 14-7.

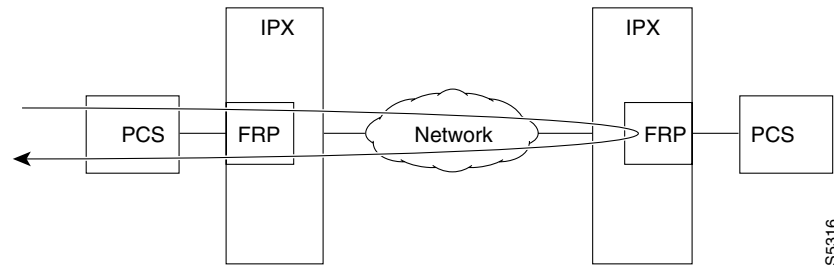
Figure 14-7 Frame Relay Remote Loops



As shown, this test verifies the operation of IPX/IGX network components up to the interface with the remote-end FRM-2 or FRP-2. This test interrupts data traffic for *only* the connection specified by DLCI.

If a port concentrator is attached to the FRM-2 or FRP-2, the only difference in the loop is that the port specified to loop data is on the Port Concentrator, as shown in Figure 14-8.

Figure 14-8 Frame Relay Remote Loops with Port Concentrator



The **addloclp** and **addlocrmtlp** commands support the two-segment connection at the hub node port endpoint in a network of IGX hubs and SES interface shelves. The **addloclp** and **addlocrmtlp** commands are blocked at the interface shelf trunk endpoint. The **addrmtlp** command is not supported at either endpoint of the connection. You can use the **dellp** command to remove the local (or local remote) loopbacks that have been added; however, you cannot use the **dellp** command at the trunk endpoint of the connection—it will be blocked. Loops of any kind are not supported for the middle segment of a three-segment connection.

Full Name

Add remote loopback to connections

Syntax

addrmtlp (see parameter tables)

Related Commands

addloclp, **dellp**, **dspcons**

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	Yes	Yes	IGX, BPX	Yes

Example 1

```
addrmtlp 5.1
```

Description

The connections screen appears with connection 5.1 highlighted. The system prompts to confirm the loopback. To confirm it, enter y. A flashing parenthesis “)” appears in the “Remote Channel” column of the connection to indicate that the connection is looped back.

System Response

```

alpha          TRM   YourID:1      IGX 8420     9.2   Aug. 16 1998 12:57 PST

Local          Remote      Remote
Channel        NodeName    Channel     State  Type    Compression  Code Avoid COS O
5.1            beta        )25.1      Ok     256    7/8          0   L
9.1.100        gamma       8.1.200    Ok     fr     0            0   L
9.2.400        beta        19.2.302   Ok     fr     0            0   L
14.1           gamma       15.1       Ok     v      0            0   L

```

Last Command: addrmtlp 5.1

Next Command:

Table 14-12 addrmtlp—Parameters (voice)

Parameter	Description
slot	Specifies the slot number of the card containing the port to loop at the local node.
channel (s)	Specifies the channel or set of channels to loop at the local node.
port	Where applicable for the connection type, specifies the port.

Table 14-13 addrmtlp—Parameters (data)

Parameter	Description
slot	Specifies the slot number of the card containing the port to loop at the local node.
port	Specifies the local port to loop at the local node.

Table 14-14 addrmtlp—Parameters (Frame Relay connections)

Parameter	Description
slot	Specifies the slot number of the FRP card containing the port to loop at the local node.
port	Specifies the local port to loop at the local node.
DLCI	Specifies the Data Link Connection Identifier (DLCI) number of the channel to loop at the local node.

Table 14-15 addrrmtlp—Parameters (ATM)

Parameter	Description
slot	Specifies the slot number of the card containing the port to loop at the local node.
channel (s)	Specifies the channel or set of channels to loop at the local node.
port	Where applicable for the connection type, specifies the port.
vpi.vci	Specifies VPI/VCI.

Table 14-16 addloclp—Parameters (FTM connection with an Access Device attached)

Parameter	Description
slot	Specifies the slot number of the FTM card containing the port to loop at the local node.
port	Specifies the local port to loop at the local node.
Access Device ID	The Access Device ID range is 1–255.
Connection ID	The Connection ID range is 1–252.

clrchstats

Clears the channel utilization statistics for either all Frame Relay channels or a specified Frame Relay channel. Statistics generated within the last one minute are not cleared.

Full Name

Clear channel statistics

Syntax

```
clrchstats <channel | *>
```

Related Commands

dspchstats

Attributes

Privilege	Jobs	Log	Node	Lock
1–5	Yes	Yes	IGX	Yes

Example 1

```
clrchstats 9.2.400
```

Description

Clear the statistics of channel 9.2.400.

System Response

```
alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 16 1998 13:24 PST

Channel Statistics for 9.2.400    Cleared: Aug. 16 1998 13:23
MIR: 9.6 kbps                    Collection Time: 0 day(s) 00:02:42    Corrupted: NO
                                Frames   Avg Size Avg   Util           Packets   Avg
                                (bytes) (fps) (%)           (pps)
From Port:                      0         0   0   0
To Network:                     0         0   0   0           0         0
Discarded:                      0         0   0   0
From Network:                   0         0   0   0           0         0
To Port:                        0         0   0   0
Discarded:                      0         0   0   0           0         0

                                ECN Stats: Avg Rx VC Q:           0   ForeSight RTD   --
Min-Pk bytes rcvd:             0   FECN Frames:           0   FECN Ratio (%)   0
Minutes Congested:             0   BECN Frames:           0   BECN Ratio (%)   0

This Command: clrchstats 9.2.400

OK to clear (y/n)?
```

Table 14-17 clrchstats—Parameters

Parameter	Description
channel	Specifies the Frame Relay channel in the format <i>slot.port.DLCI</i> . An "*" specifies all channels.

clrcalm

Clears the alarm condition attached to a clock source, either circuit line or trunk. The clock test runs continuously in a node, comparing the frequency of the node's clock source to a reference on the NPC/BCC/CC/control card. If a clock source is found to be outside preset frequency limits, it is declared defective and another clock source is selected. In order for the node to return to the original clock source, the alarm must be cleared using the **clrcalm** command. The alarm may be either a "Bad Clock Source" or "Bad Clock Path" alarm.

Full Name

Clear clock alarm

Syntax

```
clrcalm <line type> <line number>
```

Related Commands

cnfelksrc, dspelksrcs, dspclns, dspcurclk, dsptrks

Attributes

Privilege	Jobs	Log	Node	Lock
1–5	No	Yes	IGX	Yes

Example 1

```
clrckalm c 12
```

Description

Clear a clock alarm on circuit line 12

Example 2

```
clrckalm p 12
```

Description

Clear a clock alarm on packet line 12

Table 14-18 clrckalm—Parameters

Parameter	Description
c/p	Specifies the type of line. A “c” is entered for a circuit line, and a “p” is entered for a trunk.
line number	Specifies the number of the circuit or trunk.

clreventq

Clears high-water marks for fail handler event queues.

Full Name

Clear event queues from the fail handler

Syntax

```
clreventq
```

Related Commands

dspeventq

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	Yes	IGX, BPX	Yes

Example 1

```
clreventq
```

Description

Clear the fail handler event queue.

System Response

```
sw151          TN      SuperUser      IGX 16    9.2      Sep. 12 1998 19:18 GMT

  QUEUE                LENGTH                THROTLING
NUM NAMES              MAX    HIGH CURRENT    POINT
1  Fail_Xid                26      1      7000
2  Fail_Q                  25      0
3  Mt_Sv_Q[0]             300     9      270
4  sv_mt_bufq              9       0
```

```
This Command: clreventq
```

```
OK to clear HIGH counts(y/n)?
```

clrlalm

Clears the alarms associated with a circuit line. Since the statistical alarms associated with a circuit line have associated integration times, they can keep a major or minor alarm active for some time after the cause has been rectified. This command allows these alarms to be cleared, allowing any new alarms to be quickly identified. The **clrlalm** command can only clear alarms caused by the collection of statistical data. Alarms caused by a network failure cannot be cleared. For example, an alarm caused by a collection of bipolar errors can be cleared, but an alarm caused by a card failure cannot.

Full Name

Clear circuit line alarm

Syntax

```
clearnalm <line_number> <fail_type>
```

Related Commands

dsplns, dsplnerrs

Attributes

Privilege	Jobs	Log	Node	Lock
1-5	No	Yes	IGX	Yes

Example 1**`clrnalm 14 2`****Description**

Clear the minor alarm caused by frame slips on circuit line 14.

System Response

```
alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 16 1998 13:10 PST
```

Line Alarm Configuration

Minor				Major		
Violation	Rate	Alarm Time	Clear	Rate	Alarm Time	Clear
1) Bpv	10E-7	10 min	3 min	10E-3	10 sec	10 sec
2) Fs	.01%	10 min	3 min	.1%	10 sec	10 sec
3) Oof	.0001%	10 min	3 min	.01%	10 sec	10 sec
4) Vpd	2%	5 min	3 min	5%	60 sec	10 sec
5) Tsdp	.01%	5 min	3 min	.1%	60 sec	10 sec
6) Ntsdp	.01%	5 min	3 min	.1%	60 sec	10 sec
7) Pkterr	.01%	10 min	3 min	.1%	125 sec	10 sec
8) Los	.0001%	10 min	3 min	.01%	10 sec	10 sec

```
This Command: clrnalm 14 2
```

```
Continue?
```

Table 14-19 `clrnalm`—Parameters

Parameter	Description
line number	Specifies the number of the line.
failure type	Specifies the type of alarm to clear.

clrnerrs

Clears the errors associated with a circuit line. Since the statistical alarms associated with a circuit line have associated integration times, they can keep a major or minor alarm active for some time after the cause has been rectified. This command allows these alarms to be cleared, allowing any new alarms to be quickly identified. The **clrnerrs** command can clear only those alarms that the collection of statistical data has caused. You cannot clear alarms caused by a network failure cannot be cleared by **clrnerrs**.

Full Name

Clear line errors

Syntax

```
clrlnerrs [<line_number>]
```

Related Commands

dsplnerrs, prtlnerrs

Attributes

Privilege	Jobs	Log	Node	Lock
1-5	Yes	Yes	IGX	Yes

Example 1

```
clrlnerrs
```

Description

Clear line error counts. In response to the prompt, enter “y” to reset all line error counts to “0.”

System Response

```
alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 16 1998 13:12 PST

Total Errors

From Code   Frame   Out of   Loss of   Frame   CRC   Out of
CLN  Errors  Slips   Frames  Signal  BitErrs Errors  MFrames AIS-16
14   0       0       0       -       0     -     -     -

Last Command: clrlnerrs

Next Command:
```

clrlog

Clears the event log. When the log is cleared, one entry remains, “Info Log Cleared”. Before the event log is cleared, a prompts asks you to confirm. See the **dsplog** command for more information on the event log.

Full Name

Clear event log

Syntax

```
clrlog
```

Related Commands**dsplog****Attributes**

Privilege	Jobs	Log	Node	Lock
1-5	Yes	Yes	IGX	Yes

Example 1**clrlog****Description**

Clear the event log. When the log is cleared, one entry remains, "Info Log Cleared." Enter "y" to confirm.

System Response

```
sw151          TN      SuperUser      IGX 16      9.2      Sep. 12 1998 19:19 GMT

Most recent log entries (most recent at top)
Class  Description                                     Date      Time
Info   User SuperUser logged out (Local)              09/12/96 18:18:57
Major  LN 5.6 Loss of Sig (RED)                        09/12/96 18:12:22
Info   User SuperUser logged out (Local)              09/12/96 18:11:17
Info   Clock switch to oscillator of SCC               09/12/96 18:10:46
Clear  LN 5.6 OK                                       09/12/96 18:05:11
Minor  LN 5.6 Out of Multi-Frames                      09/12/96 18:03:27
Info   Clock switch to LINE 5.6                        09/12/96 18:03:12
Clear  LN 5.6 OK                                       09/12/96 18:02:42
Info   Clock switch to oscillator of SCC               09/12/96 17:59:24
Major  LN 5.6 Loss of Sig (RED)                        09/12/96 17:59:24
Info   Clock switch to LINE 5.6                        09/12/96 17:59:20
Clear  LN 5.6 OK                                       09/12/96 17:59:20
Major  LN 5.6 Loss of Sig (RED)                        09/12/96 17:58:51

This Command: clrlog

OK to clear (y/n)?
```

clrmsgalm

Clears the minor alarm due to an alarm message received at an alarm collection port.

Full Name

Clear message alarm

Syntax`clrmsgalm`**Related Commands**`dspalms, dsplog`**Attributes**

Privilege	Jobs	Log	Node	Lock
1-5	No	Yes	IGX, BPX	Yes

Example 1`clrmsgalm`**Description**

Clear a minor alarm due to an alarm message.

System Response

```
alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 23 1998 10:59 PST
```

```
Last Command: clrmsgalm
```

```
No message alarm set
Next Command:
```

clrphyslnalm

Clears the specified statistical alarm associated with a physical line on a UXM card. The physical line statistical alarms include LOS, LOF, AIS, YEL, LOP, Path AIS, and Path YEL. You can display these alarms using the `dspphysln` command. These alarms are shown as the physical line status, at the top of

the display, when you run the **dspphysln** command. Alarms caused by a network failure cannot be cleared. For example, an alarm caused by a collection of bipolar errors can be cleared, but an alarm caused by a card failure cannot.

Full Name

Clear physical line alarm

Syntax

clrphyslnalm <line_number> <fail_type>

Related Commands

dspphyslns, **dspphyslnerrs**

Attributes

Privilege	Jobs	Log	Node	Lock
1-5	No	Yes	IGX	Yes

Example 1

clrphyslnalm 10.1

Description

Clear an alarm on physical line 10.1.

System Response

```
sw199          TN      StrataCom      IGX 16      9.1.w9      Apr. 9 1998  18:10 GMT
```

Line Alarm Configuration

Minor				Major		
Violation	Rate	Alarm Time	Clear	Rate	Alarm Time	Clear
1) Bpv	10E-7	10 min	3 min	10E-3	30 sec	10 sec
2) Fs	.01%	10 min	3 min	.1%	30 sec	10 sec
3) Oof	.0001%	10 min	3 min	.01%	30 sec	10 sec
4) Los	.0001%	10 min	3 min	.01%	30 sec	10 sec
5) Fer	.01%	10 min	3 min	.1%	200 sec	10 sec
6) CRC	.01%	10 min	3 min	.1%	200 sec	10 sec
7) Oom	.001%	10 min	3 min	.1%	30 sec	10 sec
8) Ais16	.0001%	10 min	3 min	.01%	30 sec	10 sec

```
This Command: clrphyslnalm 10.1
```

```
Continue?
```

```
sw199          TN      StrataCom      IGX 16      9.1.w9      Apr. 9 1998  18:11 GMT
```

Line Alarm Configuration

Minor				Major		
Violation	Rate	Alarm Time	Clear	Rate	Alarm Time	Clear
9) Pkoof	.01%	10 min	3 min	.1%	200 sec	10 sec
10) Pkterr	.01%	10 min	3 min	.1%	125 sec	10 sec
11) Badclk	.1%	10 min	3 min	1%	50 sec	10 sec
12) Vpd	2%	5 min	3 min	5%	60 sec	10 sec
13) Tsdp	.01%	5 min	3 min	.1%	60 sec	10 sec
14) Ntsdp	.01%	5 min	3 min	.1%	60 sec	10 sec
15) Pccpd	.001%	5 min	3 min	.1%	60 sec	10 sec
16) Bdapd	.001%	5 min	3 min	.1%	60 sec	10 sec

```
This Command: clrphyslnalm 10.1
```

```
Continue?
```

```
sw199          TN      StrataCom      IGX 16      9.1.w9      Apr. 9 1998  18:11 GMT
```

Line Alarm Configuration

Minor				Major		
Violation	Rate	Alarm Time	Clear	Rate	Alarm Time	Clear
17) Bdbpd	.001%	5 min	3 min	.1%	60 sec	10 sec
18) Lcv	10E-5	10 min	3 min	10E-3	30 sec	10 sec
19) Pcvl	10E-7	10 min	3 min	10E-3	30 sec	10 sec
20) Pcvp	10E-7	10 min	3 min	10E-3	30 sec	10 sec
21) Bcv	10E-7	10 min	3 min	10E-3	30 sec	10 sec
22) Rxvpd	1%	5 min	3 min	4%	60 sec	10 sec
23) Rxtspd	.01%	5 min	3 min	.1%	60 sec	10 sec
24) Rxbdapd	.001%	5 min	3 min	.1%	60 sec	10 sec

This Command: clrphyslnalm 10.1

Continue?

```
sw199          TN      StrataCom      IGX 16      9.1.w9      Apr. 9 1998  18:11 GMT
```

Line Alarm Configuration

Minor				Major		
Violation	Rate	Alarm Time	Clear	Rate	Alarm Time	Clear
25) Rxbdbpd	.001%	5 min	3 min	.1%	60 sec	10 sec
26) Rxntspd	.01%	5 min	3 min	.1%	60 sec	10 sec
27) Rxhppd	.001%	5 min	3 min	.1%	60 sec	10 sec
28) Atmhcc	.1%	10 min	3 min	1%	120 sec	10 sec
29) FSyncErr	.01%	10 min	3 min	.1%	200 sec	10 sec
30) Rxspdm	.01%	4 min	2 min	.001%	30 sec	5 sec
31) CGWpktds	.01%	5 min	3 min	1%	60 sec	10 sec
32) CGWcellld	.01%	5 min	3 min	1%	60 sec	10 sec

This Command: clrphyslnalm 10.1

Continue?

```
sw199          TN      StrataCom      IGX 16      9.1.w9      Apr. 9 1998  18:12 GMT
```

Line Alarm Configuration

Minor				Major		
Violation	Rate	Alarm Time	Clear	Rate	Alarm Time	Clear
33) Txntscds	.001%	5 min	3 min	.1%	60 sec	10 sec
34) Txhpcdsc	.001%	5 min	3 min	.1%	60 sec	10 sec
35) Txvcdscd	.1%	5 min	3 min	.0001%	60 sec	10 sec
36) Ttxtscdsc	.01%	5 min	3 min	.1%	60 sec	10 sec
37) Txbdacds	.001%	5 min	3 min	.1%	60 sec	10 sec
38) Txbdacds	.001%	5 min	3 min	.1%	60 sec	10 sec
39) Txcbrcds	.001%	5 min	3 min	.1%	60 sec	10 sec
40) Txabrcds	.001%	5 min	3 min	.1%	60 sec	10 sec

This Command: clrphyslnalm 10.1

```
Continue?
sw199          TN      StrataCom      IGX 16      9.1.w9      Apr. 9 1998  18:12 GMT
```

Line Alarm Configuration

Minor				Major		
Violation	Rate	Alarm Time	Clear	Rate	Alarm Time	Clear
41) Txvbrcds	.001%	5 min	3 min	.1%	60 sec	10 sec
42) TxGwFPds	.01%	5 min	3 min	1%	60 sec	10 sec
43) RxGwCLds	.01%	5 min	3 min	1%	60 sec	10 sec

This Command: `clrphyslnalm 10.1`

Enter Type:

Table 14-20 *clrphyslnalm*—Parameters

Parameter	Description
line number	Specifies the number of the physical line. The format is either <i>slot</i> (for a single-trunk card) or <i>slot.port</i> .
failure type	Specifies the type of alarm to clear. If not specified, the system prompts with <code>Enter Type:</code> .

clrphyslnerrs

Clears the errors associated with a UXM physical line. Since the statistical alarms associated with a circuit line have associated integration times, they can keep a major or minor alarm active for some time after the cause has been rectified. This command allows these alarms to be cleared, allowing any new alarms to be quickly identified. The **clrphyslnerrs** command can clear only those alarms that the collection of statistical data has caused. Alarms caused by a network failure cannot be cleared by **clrphyslnerrs**.

Full Name

Clear UXM physical line errors

Syntax

```
clrphyslnerrs [<line_number>]
```

Related Commands

dspphyslnerrs, **prtpphyslnerrs**

Attributes

Privilege	Jobs	Log	Node	Lock
1-5	Yes	Yes	IGX	Yes

Example 1**clrphyslnerrs 11.3****Description**

Clear UXM physical line error counts from line on port 3 of slot 11. In response to the prompt, enter “y” to reset all circuit line error counts to “0.”

System Response

```
sw199          TN      StrataCom      IGX 16      9.1.w9      Apr. 9 1998  18:10 GMT

                Line Alarm Configuration

                Minor                                Major

Violation      Rate      Alarm Time  Clear      Rate      Alarm Time  Clear
1) Bpv          10E-7    10 min     3 min     10E-3    30 sec     10 sec
2) Fs           .01%     10 min     3 min     .1%      30 sec     10 sec
3) Oof          .0001%   10 min     3 min     .01%     30 sec     10 sec
4) Los          .0001%   10 min     3 min     .01%     30 sec     10 sec
5) Fer          .01%     10 min     3 min     .1%      200 sec    10 sec
6) CRC          .01%     10 min     3 min     .1%      200 sec    10 sec
7) Oom          .001%    10 min     3 min     .1%      30 sec     10 sec
8) Ais16        .0001%   10 min     3 min     .01%     30 sec     10 sec
```

This Command: `clrphyslnalm 10.1`

Table 14-21 *clrphyslnerrs*—Parameters

Parameter	Description
<i>line number</i>	Specifies the physical line. The format is either <i>slot</i> (for a single-trunk card) or <i>slot.port</i> .

clrportstats

Clears the statistics for any port on an FRP. This includes the data byte count in the transmit and receive directions and error counts associated with the port. Statistical accumulation then resumes for that port.

Statistics collecting takes place once per minute, so **clrportstats** may not clear statistics that are less than one minute old.

Full Name

Clear port statistics

Syntax

clrportstats <port | *>

Related Commands

dspportstats

Attributes

Privilege	Jobs	Log	Node	Lock
1-5	Yes	Yes	IGX	Yes

Example 1

clrportstats 9.1

Description

Clear the port statistics for port 1 on an FRP card in slot 9. Type “y” to confirm.

System Response

```
alpha          TRM   YourID:1          IGX 8420    9.2   Aug. 23 1998 10:57 PST

Port Statistics for 9.1          Cleared: Aug. 11 1998 15:32
Port Speed: 256 kbps           Collection Time: 11 day(s) 19:22:09      Corrupted: YES

          Bytes      Average (kbps)    Util (%)      Frames
From Port:          0          0          0          0
To Port:            0          0          0          0
Frame Errors          LMI Receive Protocol Stats  Misc Statistics
Invalid CRC          0  Status Enq Rcvd          0  Avg Tx Port Q          0
Invalid Alignment    0  Status Xmit          0  FECN Frames          0
Invalid Frm Length    0  Asynch Xmit          0  Ratio (%)          0
Invalid Frm Format     0  Seq # Mismatches      0  BECN Frames          0
Unknown DLCIs         0  Timeouts              0  Ratio (%)          0
Last Unknown DLCI     0  Invalid Req           0  Rsrc Overflow        0
                          Sig Protocol: None      DE Frms Dropd        0

This Command: clrportstats 9.1

OK to clear port statistics (y/n)?
```

clrslotalms

Clears the alarm messages associated with the alarms displayed for the Display Slot Alarms command. Alarm messages are cleared for the specified slot only. These counters should be cleared before beginning any monitoring session. This command prompts the user with an “OK to Clear?” message before actually clearing the counters. Use **dspslotalms** to observe the slot alarms. Refer to the **dspslotalms** command for a description of the counters cleared by the **clrslotalms** command.

Full Name

Clear slot alarms

Syntax

clrslotalms parameters

Related Commands

dspslotalms

Attributes

Privilege	Jobs	Log	Node	Lock
1-5	Yes	Yes	BPX	Yes

Example 1

clrslotalms 3

Description

Clear alarm on slot 3.

Table 14-22 clrslotalms—Parameters

Parameter	Description
slot number	Specifies shelf slot in the BPX node.

clrsloterrs

Clears the counters for the error counts displayed for the Display Slot Errors command. Counters are cleared for the specified slot only. These counters should be cleared before beginning any monitoring session. This command prompts the user with an “OK to Clear?” message before actually clearing the counters. Use **dspsloterrs** to observe the **slot errors**. Refer to the **dspsloterrs** command for a description of the counters cleared by the **clrsloterrs** command.

Full Name

Clear slot errors

Syntax`clrsloterrs <slot number | *>`**Related Commands**`dspsloterrs`**Attributes**

Privilege	Jobs	Log	Node	Lock
1–5	Yes	Yes	IGX, BPX	Yes

Example 1`clrsloterrs 3`**Description**

Clear the slot errors in slot 3.

Table 14-23 clrsloterrs—Parameters

Parameter	Description
slot number	Specifies the shelf slot in the node.

clrtrkalm

Clears statistical alarms associated with either a physical or virtual trunk. Note that if a virtual trunk is specified for a command that configures information related to the physical port, then the physical port information is configured for all virtual trunks. This means that using **clrtrkalm** clears parameters on a logical trunk basis, but any changes automatically affect all trunks on the port when you change a physical option. Any changes you make to a virtual trunk on a port affect all virtual trunks on that port.

Since the statistical alarms associated with a trunk have associated integration times, they can keep a major or minor alarm active for some time after the cause has been rectified. The **clrtrkalm** allows these alarms to be cleared, allowing any new alarms to be quickly identified.

The **clrtrkalm** command can only clear alarms caused by the collection of statistical data. Alarms caused by a network failure cannot be cleared. For example, an alarm caused by a collection of bipolar errors can be cleared, but an alarm caused by a card failure cannot.

Note that a virtual trunk also has trunk port alarms that are shared with all the other virtual trunks on that port. You clear and set these alarms together for all the virtual trunks sharing the same port.

Alarms for the BXM and UXM card types are cleared and displayed differently.

Full Name

Clear trunk alarm

Syntax**cltrkalm** <trunk number> <failure type>**Related Commands****dsptrks**, **dsptrkerrs****Attributes**

Privilege	Jobs	Log	Node	Lock
1-5	No	Yes	IGX, BPX	Yes

Example 1**cltrkalm****Description**

Statistical trunk alarms are cleared.

System Response

```
sw199          TN      StrataCom      IGX 16      9.1.w9      Apr.  9 1998  18:10 GMT
```

Line Alarm Configuration

Minor				Major		
Violation	Rate	Alarm Time	Clear	Rate	Alarm Time	Clear
1) Bpv	10E-7	10 min	3 min	10E-3	30 sec	10 sec
2) Fs	.01%	10 min	3 min	.1%	30 sec	10 sec
3) Oof	.0001%	10 min	3 min	.01%	30 sec	10 sec
4) Los	.0001%	10 min	3 min	.01%	30 sec	10 sec
5) Fer	.01%	10 min	3 min	.1%	200 sec	10 sec
6) CRC	.01%	10 min	3 min	.1%	200 sec	10 sec
7) Oom	.001%	10 min	3 min	.1%	30 sec	10 sec
8) Ais16	.0001%	10 min	3 min	.01%	30 sec	10 sec

This Command: **cltrkalm 10.1****Example 2****cltrkalm 7 4**

Description

Clear the minor alarm type 4 caused by dropped voice packets on trunk 7. Respond to the “Continue?” prompt with “y” (for yes) to clear and display the remaining alarms.

System Response

```
beta          TRM   YourID:1          IGX 8430    9.2    Aug. 15 1998 15:15 MST

PLN  Type      Current Line Alarm Status          Other End
 7   E1/32     Clear - Line OK                    alpha.10
 9   T1/24     Clear - Line OK                    gamma.10
13   T1/24     Clear - Line OK                    alpha.14
15   T1/24     Clear - Line OK                    gamma.15
20   T3/3      Clear - ATM Missing                -

Last Command: clrtrkalm 7 4

Next Command:
```

Table 14-24 *clrtrkalm*—Parameters

Parameter	Description
<i>trunk number</i>	Specifies the trunk. Note that for virtual trunks, no virtual trunk parameter is required—just <i>slot.port</i> . The format is either <i>slot</i> (for a single-trunk card) or <i>slot.port</i> .
<i>failure type</i>	Specifies the type of alarm to clear.

clrtrkerrs

Clears the statistical error counters at the node for the specified physical or virtual trunk. You should do this before you begin any monitoring session and periodically thereafter to determine exactly when a trunk problem begins. Use **dsptkerrs** to observe errors without clearing counters.

Full Name

Clear trunk errors

Syntax

```
clrtrkerrs <trunk_number | *>
```

Related Commands

dsptkerrs, **prtrkerrs**

Attributes

Privilege	Jobs	Log	Node	Lock
1-5	Yes	Yes	IGX, BPX	Yes

Example 1

```
clrtkerrs *
```

Description

Clear all trunk errors.

System Response

```
pubsbpx1      TN      SuperUser      BPX 8620      9.2      Sep. 12 1998 19:37 PST
```

```
Total Errors
```

TRK	Code	Rx Cell	Out of	Loss of	Frame	HCS	Tx Cell	Cell	Cell
	Errors	Dropped	Frames	Signal	BitErrs	Errors	Dropped	Errors	Oofs
1.1	0	0	0	0	0	-	0	0	-
1.2	0	0	0	0	0	-	0	0	-

```
This Command: clrtkerrs *
```

```
Clears errors on all trunks. Continue (y/n)?
```

Table 14-25 clrtkerrs—Parameters

Parameter	Description
trunk number	Specifies the trunk counter to clear.

cltrkstats

Clears the node counters used for the Display Trunk Statistics. Counters are cleared for a physical or virtual trunk. You should clear these counters before beginning any monitoring session. This is similar to the **clrtkerrs** command for errors. This command prompts you with an “OK to Clear?” message before actually clearing the counters. Use **dsprkstats** to observe the trunk statistics. See the **dsprkstats** command for a description of the counters cleared by the **cltrkstats** command.

Full Name

Clear trunk statistics

Syntax

clrtrkstats <trunk number>

Related Commands

dsprkstats

Attributes

Privilege	Jobs	Log	Node	Lock
1-5	Yes	Yes	IGX, BPX	Yes

Example 1

clrtrkstats

Description

Clear the statistics on trunk 3.

Table 14-26 *clrtrkstats—Parameters*

Parameter	Description
trunk number	Specifies the trunk. Note that, for virtual trunks, no virtual trunk parameter is required—just slot.port. The format is either slot (for a single-trunk card) or slot.port.

cnfbus

Selects the active System Bus. It should only be necessary to use this command when a problem is suspected with the currently active System Bus. As a safeguard against bus failure, each node is equipped with redundant System Buses, Bus A and Bus B. Either bus can be configured as the active bus and the remaining bus is reserved as standby. Use the **dspbuses** command to display the current bus configuration when configuring the buses with the **cnfbus** command.

Full Name

Configure active bus

Syntax

cnfbus <a/b/t/l>

Related Commands

dspbuses

Attributes

Privilege	Jobs	Log	Node	Lock
1-3	Yes	Yes	IGX	

Example 1

cnfbus t

Description

Configure the system bus to toggle.

System Response

```
pubsigx1      TN      SuperUser      IGX 32      9.2      Sep. 12 1998 19:42 GMT
```

```
Bus Info
```

```
Bus Bandwidth usage in Fastpackets/second (Snapshot)
```

```
Allocated = 20000      ( 2%)
```

```
Available = 1148000   (98%)
```

```
-----
Bus A: Standby - OK
Bus B: Active - OK
```

```
Last Command: cnfbus t
```

```
Next Command:
```

Table 14-27 cnfbus—Parameters

Parameter	Description
a	Select Bus A as the active bus.
b	Select Bus B as the active bus.
t	Toggles between buses. It changes the standby bus to the active bus and the active bus to the standby bus.
l	Toggles between buses and lanes. It changes the standby bus to the active bus and the standby lane to the active lane and the active bus to the standby bus and the active lane to the standby lane.

cnfleadmon

Monitors the IGX node's LDM/HDM ports for failures. You can set each of the twelve control lead types to be monitored by firmware on the LDM/HDM card. The monitor reports only lead state changes; no event is reported if the lead remains up from one poll to the next.

You can also set the interval value that determines how frequently the firmware will check the card's serial port leads. To turn off the feature, set the interval value to zero.

Full Name

Monitor LDM/HDM data port leads

Syntax

```
cnfleadmon <index> <interval>
```

Related Commands

dsplogcd, dspcd, addjobtrig

Attributes

Privilege	Jobs	Log	Node	Lock
2	Yes	Yes	IGX	

Example 1

```
cnfleadmon 4 5
```

Description

Tells the LDM/HDM card firmware to monitor data port lead number 4, every 5 seconds.

System Response

```

swws1          TRM   StrataCom      IGX 8420  9.2.m8   Date/Time Not Set
               LDM           | HDM/SDI-RS232 | HDM/SDI-RS449 | HDM/SDI-V35
               DCE   DTE   | DCE   DTE   | DCE   DTE   | DCE   DTE
1               |           | TST/25 | IS/28 | SB/36 |           |
2               |           | LL/18  | RI/22 | LL/10 | IC/15 |           |
3 | DTR/20 | DSR/6 | DTR/20 | DSR/6 | TR/12&30 | DM/11&29 | DTR/H | DSR/E
==> 4 | RTS/4  | CTS/5 | RTS/4  | CTS/5 | RS/7&25 | CS/9&27 | RTS/C | CTS/D
5               |           | STxD/14 | SRxD/16 |           |           |           |
6 | RL/21  |           | RL/21  |           | RL/14  | TM/18  |           | TM/K
7               | DCD/8   |           | DCD/8   | NS/34  | RR/13&31 |           | DCD/F
8               |           | SRTS/19 | SCTS/13 |           |           |           |
9               |           | SDCD/12 |           |           |           |           |
10              |           | SF/23   | SI/23   | SF/16  | SI/2   |           |
11              |           |           |           |           | SQ/33  |           |
12              |           | ***/11  | QM/11   | SS/32  |           |           |
Sampling interval for HDM or LDM control lead shown above..... 5 seconds

```

This Command: cnfleadmon

Enter index of data port control lead to be monitored (1-12) : 4

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```

swws1          TRM   StrataCom      IGX 8420  9.2.m8   Date/Time Not Set
               LDM           | HDM/SDI-RS232 | HDM/SDI-RS449 | HDM/SDI-V35
               DCE   DTE   | DCE   DTE   | DCE   DTE   | DCE   DTE
1               |           | TST/25 | IS/28 | SB/36 |           |
2               |           | LL/18  | RI/22 | LL/10 | IC/15 |           |
3 | DTR/20 | DSR/6 | DTR/20 | DSR/6 | TR/12&30 | DM/11&29 | DTR/H | DSR/E
==> 4 | RTS/4  | CTS/5 | RTS/4  | CTS/5 | RS/7&25 | CS/9&27 | RTS/C | CTS/D
5               |           | STxD/14 | SRxD/16 |           |           |           |
6 | RL/21  |           | RL/21  |           | RL/14  | TM/18  |           | TM/K
7               | DCD/8   |           | DCD/8   | NS/34  | RR/13&31 |           | DCD/F
8               |           | SRTS/19 | SCTS/13 |           |           |           |
9               |           | SDCD/12 |           |           |           |           |
10              |           | SF/23   | SI/23   | SF/16  | SI/2   |           |
11              |           |           |           |           | SQ/33  |           |
12              |           | ***/11  | QM/11   | SS/32  |           |           |
Sampling interval for HDM or LDM control lead shown above..... 5 seconds

```

This Command: cnfleadmon 4

Enter sampling interval for selected control lead (0, 5-255): 5

MAJO

Table 14-28 cnfleadmon—Parameters

Parameter	Description
index	Index number of the serial data port leads. Values 1 through 12. When you enter a different lead index number, an arrow moves to highlight the current monitoring data on that lead.
interval	The timer value in seconds. This determines how frequently the firmware on the LDM/HDM card will check the specified lead. Values 5 through 255 seconds. Default = 0 Enter 0 to turn off the feature.

cnflnalm

Sets the trunk and line alarm values for failures that are statistical in nature. Statistical alarms are declared by the switch software when a cards supporting these trunks or lines report too many errors. The switch declares an alarm if the detected error rate equals the **cnflnalm** parameter *error rate* for the period of time designated by the *alarm time* parameter. Error rates that exceed the specified error rate cause an alarm in a proportionately shorter period of time. An alarm is cleared when the error rate remains below the rate specified by *error rate* for a period of time designated by the *clear time*.

You can configure the thresholds for alarms caused by the collection of statistics but not for the alarms caused by a network failure. For example, you can configure the threshold for an alarm caused by a collection of bipolar errors, but you cannot configure an alarm caused by a card failure.

Six parameters exist for each *failure type*—three for minor alarms and three for major alarms. When configuring any item for a minor or major alarm, you must enter a value. You can enter a new value or enter the current value.

Table 14-29 describes the parameters for **cnflnalm**. For each *failure type*, the *alarm classes*, the possible *error rate* options, and default *alarm times* and *clear times* are listed in Table 14-30. Table 14-31 describes the *error rate* options listed in Table 14-30.

Full Name

Configure line alarms

Syntax

```
cnflnalm <fail_type> <alarm_class> <rate> <alarm_time> <clear_time>
```

Related Commands

clrcnalm, cltrrkalm, dspcnerrrs, dsplnalmcnf, dsptrkerrrs

Attributes

Privilege	Jobs	Log	Node	Lock
1-3	No	Yes	IGX	Yes

Example 1

```
cnflnalm
```

Description

Display current alarm types.

System Response

```
sw224          TN      SuperUser      IGX 16      9.0.n2      Aug. 27 1998 16:16 GMT
```

Line Alarm Types

1) Bpv	13) Tsdp	25) Rxbdbpd	37) Txbdacdscd
2) Fs	14) Ntsdp	26) Rxntspd	38) Txbdbcdscd
3) Oof	15) Pccpd	27) Rxhppd	39) Txcbrcdscd
4) Los	16) Bdapd	28) Atmhec	40) Txabrcdscd
5) Fer	17) Bdbpd	29) FSyncErr	41) Txvbrcdscd
6) CRC	18) Lcv	30) Rxspdm	42) TxGwFPdscd
7) Oom	19) Pcvl	31) CGWpktcdscd	43) RxGwCLdscd
8) Ais16	20) Pcvp	32) CGWcellcdscd	
9) Pkoof	21) Bcv	33) Txntscdscd	
10) Pkterr	22) Rxvpd	34) Txhpcdscd	
11) Badclk	23) Rxtspd	35) Txvcdscd	
12) Vpd	24) Rxbdapd	36) Txtscdscd	

```
Last Command: cnflnal
```

```
Next Command:
```

Example 2

```
cnflnal 27 1 4 4 3
```

Description

Set Alarm Type 27, the Minor alarm time threshold, to 4 minutes. In this example, the **cnflnal** command is followed by the alarm type (27), the alarm minor or major (1 for minor, 2 for major), the current rate (which is the default of 0.001%, (which is a 4), the new value for Alarm Time of 4 minutes (which is a “4” entry), and the existing Alarm Clear time of “3.”

System Response

```
pubsigx1      TN      SuperUser      IGX 32      9.2      Aug. 20 1998 17:19 GMT
```

```
Line Alarm Configuration
```

		Minor			Major		
Violation	Rate	Alarm Time	Clear	Rate	Alarm Time	Clear	
25) Rxbdapd	.001%	5 min	3 min	.1%	60 sec	10 sec	
26) Rxbdbpd	.001%	5 min	3 min	.1%	60 sec	10 sec	
27) Rxhppd	.001%	4 min	3 min	.1%	60 sec	10 sec	
28) Atmhec	.1%	10 min	3 min	1%	120 sec	10 sec	
29) FSyncErr	.01%	10 min	3 min	.1%	200 sec	10 sec	
30) Rxspdm	.01%	4 min	2 min	.001%	30 sec	5 sec	

```
Last Command: cnflnalm 27 1 4 4 3
```

```
Next Command
```

Table 14-29 cnflnalm—Parameters

Parameter	Description
Failure type	<p>Specifies the failure type. The list that follows gives the number for each failure type. (Items with an asterisk pertain to ATM only.)</p> <ol style="list-style-type: none"> 1. Bpv—Bipolar violations 2. Fs —Frame slip 3. oof—Out of frame 4. Vpd -Voice packets dropped (TX) 5. Tspd—Time-stamped packets dropped (TX) 6. Ntspd—Non-time-stamped packets dropped 7. Pkterr—Packet error 8. Los—Loss of signal 9. Fer—Frame error 10. CRC—Cyclic Redundancy Check 11. Pkoof—Packet out of frame 12. Oom—Out of multiframe 13. Ais16—Alarm information signal—E1/E3 Only 14. Bdapd—Bursty data A packets dropped 15. Bdbpd—Bursty data B packets dropped 16. Badclk—Bad clock 17. Pccpd—PCC packets dropped 18. * Lcv—Line code violations 19. * Pcv1—P-bit parity code violations 20. * Pcvp—C-bit parity code violations 21. * Bcv—PLCP BIP-8 code violations 22. * Rxvpd—Receive voice packets dropped 23. * Rxtspd—Receive time stamped packets dropped 24. * Rxntspd—Receive non-time-stamped packets dropped 25. * Rxbdapd—Receive bursty data A packets dropped 26. * Rxbdbpd—Receive bursty data B packets dropped 27. * Rxhppd—Receive high priority packets dropped 28. * Atmhec—Cell header HEC errors 29. * Plcpoof—PLCP out of frame 30. * 30—Rxspdm: Receive spacer packets dropped
alarm class	<p>Specifies the class of alarm to be configured for the specified alarm type. Valid alarm classes are:</p> <ul style="list-style-type: none"> • Minor alarm • Major alarm

Table 14-29 cnflnalm—Parameters (continued)

Parameter	Description
rates	Specifies the error rate at which the error must occur before an alarm is declared. The choices for error rates vary depending on the <i>failure type</i> and the <i>alarm class</i> . The choices are called out as Error Rate Options. The default error rates are indicated. With the exception of a Vpd (voice packets dropped) failure, you enter the number corresponding to the error rate. For Vpd (voice packets dropped) failures, you enter a percentage for the dropped packet rate in the range 1%–10%. See Table 14-30 for failure type and Table 14-31 for error rate options.
alarm time	Specifies the time that a condition must exceed a threshold before an alarm is declared. For minor alarms, the alarm time has a range of 3–10 minutes. For major alarms, the alarm time has a range of 10–250 seconds.
clear time	Specifies the time that the condition must exceed the selected threshold before the alarm is cleared. For minor alarms, the clear time has a range of 3–10 minutes. For major alarms, the clear time has a range of 10–250 seconds.

Table 14-30 Failure Type Parameters

Failure Type	Alarm Class	Error Rate Options *	Alarm Time	Clear Time
1-Bpv	1–minor	Option B Default = 4	10 Minutes	3 Minutes
	2–major	Default = 2	10 Seconds	10 Seconds
2-Fs	1–minor	Option A Default = 3	10 Minutes	3 Minutes
	2–major	Default = 2	10 Seconds	10 Seconds
3-Oof	1–minor	1: 1% 2: 0.1% 3: 0.01% 4: 0.001% 5: 0.0001% (Def.)	10 Minutes	3 Minutes
	2–major	1: 1% 2: 0.1% 3: 0.01% (Def.) 4: 0.001%	10 Seconds	10 Seconds
4- Vpd	1–minor	Any dropped packet rate from 1% to 10%	5 Minutes	3 Minutes
	2–major		60 Seconds	10 Seconds
5- Tspd	1–minor	Option A Default = 3	5 Minutes	3 Minutes
	2–major	Default = 2	60 Seconds	10 Seconds
6-Ntspd	1–minor	Option A Default = 3	5 Minutes	3 Minutes
	2–major	Default = 2	60 Seconds	10 Seconds
7- Pkterr	1–minor	Any error count from 1–10,000	10 Minutes	3 Minutes
	2–major		125 Seconds	10 Seconds

Table 14-30 Failure Type Parameters (continued)

Failure Type	Alarm Class	Error Rate Options *	Alarm Time	Clear Time
8-Los	1-minor 2-major	Option A Default = 5 Default = 3	10 Minutes 10 Seconds	3 Minutes 10 Seconds
9- Fer	1-minor 2-major	Option A Default = 3 Default = 2	10 Minutes 200 Seconds	3 Minutes 10 Seconds
10- CRC	1-minor 2-major	Option A Default = 3 Default = 2	10 Minutes 200 Seconds	3 Minutes 10 Seconds
11-Pkoof	1-minor 2-major	Option A Default = 3 Default = 2	10 Minutes 200 Seconds	3 Minutes 10 Seconds
12- Oom	1-minor 2-major	Option A Default = 4 Default = 2	10 Minutes 10 Seconds	3 Minutes 10 Seconds
13- Ais16	1-minor 2-major	Option A Default = 5 Default = 3	10 Minutes 10 Seconds	3 Minutes 10 Seconds
14-Bdapd	1-minor 2-major	Option A Default = 4 Default = 2	5 Minutes 60 Seconds	3 Minutes 10 Seconds
15- Bdbpd	1-minor 2-major	Option A Default = 4 Default = 2	5 Minutes 60 Seconds	3 Minutes 10 Seconds
16-Badclk	1-minor 2-major	Option A Default = 2 Default = 1	10 Minutes 50 Seconds	3 Minutes 10 Seconds
17-Pccpd	1-minor 2-major	Option A Default = 4 Default = 2	5 Minutes 60 Seconds	3 Minutes 10 Seconds
18-Lcv	1-minor 2-major	Option B Default = 3 Default = 1	10 Minutes 10 Seconds	3 Minutes 10 Seconds
19-Pcv1	1-minor 2-major	Option B Default = 3 Default = 1	10 Minutes 10 Seconds	3 Minutes 10 Seconds
20-Pcvp	1-minor 2-major	Option B Default = 3 Default = 1	10 Minutes 10 Seconds	3 Minutes 10 Seconds
21-Bcv	1-minor 2-major	Option B Default = 3 Default = 1	10 Minutes 10 Seconds	3 Minutes 10 Seconds

Table 14-30 Failure Type Parameters (continued)

Failure Type	Alarm Class	Error Rate Options *	Alarm Time	Clear Time
22-Rxvpd	1-minor	1-10% Default = 1%	5 Minutes	3 Minutes
	2-major	1-10% Default = 4%	60 Seconds	10 Seconds
23-Rxtspd	1-minor	Option A Default = 3	5 Minutes	3 Minutes
	2-major	Default = 2	60 Seconds	10 Seconds
24-Rxbdapd	1-minor	Option A Default = 3	5 Minutes	3 Minutes
	2-major	Default = 2	60 Seconds	10 Seconds
25-Rxbdbpd	1-minor	Option A Default = 4	5 Minutes	3 Minutes
	2-major	Default = 2	60 Seconds	10 Seconds
26-Rxntspd	1-minor	Option A Default = 4	5 Minutes	3 Minutes
	2-major	Default = 2	60 Seconds	10 Seconds
27-Rxhppd	1-minor	Option A Default = 4	5 Minutes	3 Minutes
	2-major	Default = 2	60 Seconds	10 Seconds
28-Atmhec	1-minor	Option A Default = 4	10 Minute	3 Minutes
	2-major	Default = 2	120 Seconds	10 Seconds
29-Plcpoof	1-minor	Option A Default = 4	10 Minutes	3 Minutes
	2-major	Default = 2	200 Seconds	10 Seconds
30-Rxspdm	1-minor	Option A Default = 4	4 Minutes	2 Minutes
	2-major	Default = 2	10 Seconds	5 Seconds

Table 14-31 Parameters for Error Rate Options

Error Rate Options				
Option	Alarm Class	Error Rate		
A	1 - minor	1 - 1%	2 -.1%	3 -.01%
	2 - major	4 -.001%	5 -.0001%	
B	1 - minor	1 - 10E-4	2 - 10E-5	3 - 10E-6
	2 - major	4 - 10E-7	5 - 10E-8	
		1 - 10E-2	2 - 10E-3	3 - 10E-4
		4 - 10E-5	5 - 10E-6	

cnfslotalm

Configures the alarm parameters for the various card types. Upon command entry, the system displays a screen with a choice of eight card-alarm types. It then displays “Enter Type” and waits for a number in the range 1–12. Upon entry of the alarm type, the system displays the error rates of the selected type.

Full Name

Configure slot alarm parameters

Syntax

```
cnfslotalm <fail_type> <alarm_class> <rate> <alarm_time> <clear_time>
```

Related Commands

dspslotalms

Attributes

Privilege	Jobs	Log	Node	Lock
1	Yes	Yes	BPX	Yes

Example 1

```
cnfslotalm 10
```

Description

Configure the alarm parameters.

System Response

```
pubsbpx1      TN      SuperUser      BPX 8620      9.2 Sep. 12 1998 19:43 PST
```

```
Slot Alarm Types
```

- | | |
|-------------------------|---------------------|
| 1) Standby PRBS Errors | 11) Poll Clk Errors |
| 2) Rx Invalid Port Errs | 12) CK 192 Errors |
| 3) PollA Parity Errors | |
| 4) PollB Parity Errors | |
| 5) Bad Grant Errors | |
| 6) Tx Bip 16 Errors | |
| 7) Rx Bip 16 Errors | |
| 8) Bframe parity Errors | |
| 9) SIU phase Errors | |
| 10) Rx FIFO Sync Errors | |

```
This Command: cnfslotalm
```

```
Enter Type:
```

The screen display after selecting alarm type 10:

```
pubsbpx1      TN      SuperUser      BPX 8620      9.2      Sep. 12 1998 19:47 PST
```

```
Slot Alarm Configuration
```

	Minor			Major		
Violation	Rate	Alarm Time	Clear	Rate	Alarm Time	Clear
1) SPRBS	.1%	10 min	3 min	1%	100 sec	100 sec
2) InvP	.1%	10 min	3 min	1%	100 sec	100 sec
3) PollA	.1%	10 min	3 min	1%	100 sec	100 sec
4) PollB	.1%	10 min	3 min	1%	100 sec	100 sec
5) BGE	.1%	10 min	3 min	1%	100 sec	100 sec
6) TBip	.1%	10 min	3 min	1%	100 sec	100 sec
7) RBip	.1%	10 min	3 min	1%	100 sec	100 sec
8) Bfrm	.1%	10 min	3 min	1%	100 sec	100 sec
9) SIU	.1%	10 min	3 min	1%	100 sec	100 sec
10) RFifo	.1%	10 min	3 min	1%	100 sec	100 sec

```
Last Command: cnfslotalm 10
```

```
Next Command:
```

cnftrkalm

Configures trunk alarm reporting. When trunks are upped and added to the network, alarm reporting automatically is enabled. The **cnftrkalm** command lets you disable alarms on a trunk. Disabling alarms may be useful, for example, for trunks that are connected to the node but not yet in service or if the node

is experiencing occasional bursts of errors but is still operational. (When the alarms are enabled, they cause an alarm output from the DTI Group Alarm Connector (if present) and an alarm indication on the Cisco WAN Manager terminal.)

Full Name

Configure trunk alarms

Syntax

cnftrkalm <trunk number> <e | d>

Related Commands

dspalms, **dsptrks**

Attributes

Privilege	Jobs	Log	Node	Lock
1-5	Yes	Yes	IGX, BPX	Yes

Example 1

cnftrkalm 14 d

Description

Disable trunk alarms on trunk 14, which has a major alarm. After using this command to disable the alarms, the only indication that the alarms have been disabled is to observe the **dspalms** screen while a trunk alarm exists. The **dspalms** screen displays the word “disabled” after “PLN Alarms.” Therefore, when you disable trunk alarms, be sure to note this action so you remember to enable alarms after the cause of the trunk failure has been corrected.

System Response

```

alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 16 1998 13:04 PST

From Type      Current Line Alarm Status      Other End
14   T1/24      Major - Tx NTS Packets Dropped  beta.13

```

```
Last Command: cnftrkalm 14 d
```

```
Next Command:
```

Example 2

```
cnftrkalm 14 e
```

Description

Enable the alarms after they have been disabled.

Table 14-32 cnftrkalm—Parameters

Parameter	Description
e d	Enable or disable trunk alarms.

dellp

Deletes an external, local, remote, or local-remote (tiered nets) loopback from the designated channel, set of channels, or port. After the loopback is deleted, any conditioning applied during the loopback process is removed and service is restored.

- Add local loopbacks with the **addloclp** command.
- Add remote loopbacks by using the **addrmtlp** command.
- Add external loopbacks by using the **addextlp** command.

A local loop can be deleted only from the node that added it. However, a remote loop can be deleted from the node at either end of the connection.

Add local-remote loopbacks by using the **addlocrmtlp** command. Note that with local-remote loopbacks, execution of **dellp** is mandatory after testing is complete, otherwise continuity errors will follow.

In this release, the **addloclp** and **addlocrmtlp** commands support the two-segment connection at the hub node port endpoint in a network of IGX routing hubs and SES interface shelves. The **addloclp** and **addlocrmtlp** commands are blocked at the interface shelf trunk endpoint. The **addrmtlp** command is not supported at either endpoint of the connection. You can use the **dellp** command to remove the local (or local remote) loopbacks that have been added; however, you cannot use the **dellp** command at the trunk endpoint of the connection—it will be blocked. Loops of any kind are not supported for the middle segment of a three-segment connection.

Full Name

Delete loopback from connections or a port

Syntax

```
dellp <channel(s)>
```

Related Commands

addextlp, addloclp, addlocrmtlp, addrmtlp

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	Yes	Yes	IGX, BPX	Yes

Example 1

```
dellp 5.1.121
```

Description

Delete the loopback on channel 5.1.121. The connections screen appears with connection 5.1.121 highlighted. (The highlighting is not visible in the screen example, but the loop symbols indicates loopback.) The display prompts you to confirm deletion of the loopback. To confirm, enter “y.”

System Response

```
pubsipx1      TN      SuperUser      IGX 8420      9.1.00      May 29 1998 19:16 PDT

Local         Remote      Remote
Channel       NodeName   Channel       State  Type      Compress  Code COS
5.1.121      )pubsipx1  8.33.133     Ok    atfr
5.1.122      pubsipx1   8.34.134     Ok    atfr
5.2.111      pubsipx1   8.45.155     Ok    atfr
5.2.112      pubsipx1   8.45.156     Ok    atfr
8.33.133     pubsipx1   (5.1.121     Ok    atfr
8.34.134     pubsipx1   5.1.122     Ok    atfr
8.45.155     pubsipx1   5.2.111     Ok    atfr
8.45.156     pubsipx1   5.2.112     Ok    atfr
```

This Command: dellp 5.1.121

Delete these loopbacks (y/n)?

Table 14-33 dellp—Parameters

Parameter	Description
channels	Specifies the channel or set of channels whose loopback is to be deleted. The format for <i>channel</i> depends on the type of connection, as follows: Voice connection: <i>slot.channel</i> Data connection: <i>slot.port</i> Frame Relay connection: <i>slot.port.DLCI</i> ATM connections: <i>slot.port.vpi.vci</i> Access device: <i>slot.port.connection_ID</i>

dncd

Downs (or deactivates) a card. When you down a card, it is no longer available as a node resource. You should down a card before you remove it from a card cage. Before it actually downs an active card, the node determines if a standby card is available. If no standby card is present, the node gives you an opportunity to abort the command. If a standby card of the same type is available and you execute **dncd**, the standby card is activated. If no standby card is available and you execute the command, a major alarm results. To activate a downed card, use the **upcd** command.



Note

If you remove a card from a card cage without first executing **dncd**, no warning appears.

You cannot down a control card (NPC, NPM, or BCC). Use **switchcc** for control cards.

If the A-bit Notifications on LMI/ILMI Interface feature is enabled (with **cnfnodeparm**), after downing the trunk, the master node will deroute the connections or condition the connections due to path fail. (For information on the A-bit Notifications on LMI/ILMI Interface feature in Release 9.1.07, refer to “Summary of Commands” on page 46.)

Full Name

Down card

Syntax

dncd <slot number>

Related Commands

dspcds, **resetcd**, **upcd**

Attributes

Privilege	Jobs	Log	Node	Lock
1–3	Yes	Yes	IGX, BPX	Yes

Example 1

dncd 9

Description

Down card 9.

Table 14-34 dncd—Parameters

Parameter	Description
slot number	Specifies the slot number of the card to be downed.

dspalms

Displays major and minor alarms throughout the network and more specific alarms at the local node. The **dspalms** command displays the following information:

- The number of failed connections on the node.
- The number of sources failed.
- The number of major and minor circuit line alarms on the node.
- The number of major and minor trunk alarms on the node.
- The number of failed cards on the node.
- The number of missing cards on the node.
- The number of alarms on other nodes in the network.

- The number of APS lines in alarm.
- When the Cisco WAN Manager terminal is at a junction (physically, or **vt**), the number of junction node alarms is displayed.
- The number of unreachable nodes in the network.
- The power supply and power monitor failures on the node.
- Bus failures (either “Failed” or “Needs Diagnostics”).
- FR/ATM Port Communication Failed (OAM Packet Threshold exceeded).
- FR/ATM NNI A-bit Alarms (connections with A-bits=0).
- Slot alarms on IGX due to insufficient bus bandwidth allocation on a slot containing a UXM card.
- Any alarm on the ASM card if the node is a BPX.

Trunk alarms are differentiated between those trunks that are disabled and trunks that are not disabled. For more details on each type of alarm, use the “display” command associated with each failed item. Table 14-35 shows the display commands that show error information.

Table 14-35 Commands that Display Error Information

Command	Description
dspcds	Displays cards in the node, with F for failures.
dspclns	Displays circuit lines.
dspcons	Displays connections.
dsplog	Displays events affecting the node.
dspnds	Displays unreachable nodes within a network.
dspnw	Displays the network topology and includes alarm status of each node in the network.
dsptrks	Displays trunks.
dspppwr	Displays power supply status and internal temperature.

The **dspalms** command displays the number of APS lines that are in alarm. The **dspalms** command’s display is similar to the **dsplog** command.



Note

Statistical alarms are not cleared on an APS switch. This is done to maintain to provide consistency with the way card redundancy works (sometimes referred to as “YRED”). Statistical alarms are not cleared on a YRED switch.

Full Name

Display current node alarms

Syntax

dspalms

Related Commands

dspcds, dspclns, dspcons, dsplog, dspnw, dsptrks, dspppwr

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1**dspalms****Description**

See a summary of all alarms affecting the node.

System Response

```
sw181          TN      SuperUser      BPX 8620      9.2 Oct. 2 1998 12:26 GMT
```

```
Alarm summary (Configured alarm slots: None)
```

```
Connections Failed:  None
Groups Failed:      None
TRK Alarms:         None
Line Alarms:        None
Cards Failed:       None
Slots Alarmed:      None
Missing Cards:      1
Remote Node Alarms: 2 Minors
APS Alarms:         1 Minor
```

```
Interface Shelf Alarms: None
ASM Alarms:           None
```

```
Last Command: dspalms
```

```
Next Command:
```

Example 2**dspalms****Description**

The current alarms on a BPX.

System Response

```
sw53          TN      SuperUser      BPX 8620      9.2      July 21 1998 15:18 GMT
```

```
Alarm summary (Configured alarm slots: None)
```

```
Connections Failed:      100
Groups Failed:           None
TRK Alarms:              None
Line Alarms:             None
Cards Failed:            None
Slots Alarmed:           None
Missing Cards:           None
Remote Node Alarms:     1 Unreachable, 5 Majors, 5 Minors
APS Alarms:              1 Minor
```

```
Interface Shelf Alarms: 2 Unreachables, 2 Minors
ASM Alarms:              None
```

```
Last Command: dspalms
```

```
Next Command:
```

```
SW
```

```
MAJOR ALARM
```

Example 3**dspalms****Description**

The current alarms on a BPX.

System Response

```
sw118          TN      StrataCom      BPX 8620      9.2      Date/Time Not Set
```

```
Alarm summary (Configured alarm slots: None)
```

```
Connections Failed:      None
TRK Alarms:              None
Line Alarms:             None
Cards Failed:            None
Slots Alarmed:           1 Major
Missing Cards:           1
Remote Node Alarms:      1 Minor
APS Alarms:              1 Minor
```

```
Interface Shelf Alarms: None
ASM Alarms:              None
```

```
Last Command: dspalms
```

Example 4**dspalms****Description**

Display APS alarms

System Response

```
alex@TRM> dspalms
alex@TRM> genre
BPX 8620
9.2
Sep. 9 1998 16:35 PDT
```

```
Alarm summary (Configured alarm slots: None)
Connections Failed:           None
TRK Alarms:                   None
Line Alarms:                  None
Cards Failed:                 None
Slots Alarmed:                1 Major
Missing Cards:                1
Remote Node Alarms:          1 Minor
APS Alarms:                   1 Minor

Interface Shelf Alarms:      None
ASM Alarms:                  None
```

```
Last Command: dspalms
```

dspbob

Shows the current state of all inputs from user equipment to the node the state of all outputs from the node to the user equipment. The display is real-time and updated at a user-specified interval. The display refreshes at the designated interval until the Delete key is pressed or until it times out. See the **cnfict** description for information on configuring data interfaces. When used with Frame Relay T1/E1 applications, **dspbob** displays the message “This FRP does not support V.35 ports.”

Displaying Signal Status for Port Concentrator Ports

If an FRM-2 or FRP-2 card connects to a Port Concentrator Shelf (PCS), up to 44 ports can be specified with the *port* parameter. In this case, **dspbob** displays the signal status for ports on the PCS. The PCS relays any changes in signal states to the FRM-2 or FRP-2, so a slight delay occurs when signals are updated.

When used for PCS ports, **dspbob** has an optional parameter of measuring port clock speed. Selection of this parameter temporarily interrupts all traffic on the logical port. The events that take place upon input of this parameter are:

1. The port is disabled.
2. Two invalid frames are timed as they go out the port.

- The port is reactivated.

Full Name

Display breakout box

Syntax

dspbob <port> [interval] [(measure clock speed) y | n]

Related Commands

cnfict, **dspon**, **dspict**

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	Yes

Example 1

dspbob 5.1

Description

See the breakout box display for channel 5.1.

System Response

```
alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 23 1998 11:29 PST

Port:          5.1
Interface:     V35   DCE
Clocking:      Normal      (255999 Baud)

          Inputs from User Equipment          Outputs to User Equipment
Lead Pin State  Lead Pin State  Lead Pin State  Lead Pin State
RTS  C   Off    DTR  H   Off    CTS  D   On
DTR  H   Off    DSR  E   On
TxD  P/S Idle  DCD  F   Off
TT   U/W Unused  RI   J   Off
                                TM   K   Off
                                RxD  R/T Idle
                                RxC  V/X Active
                                TxC  Y/a Active
```

This Command: dspbob 5.1

Hit DEL key to quit:

Example 2**dspbob 9.1****Description**

See the breakout box display for Frame Relay connections.

System Response

```
alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 23 1998 11:29 PST

Port:          9.1
Interface:     FRI-V35   DTE
Clocking:      Normal

          Inputs from User Equipment          Outputs to User Equipment
Lead Pin State  Lead Pin State  Lead Pin State  Lead Pin State
CTS  D   Off      DSR  E   Off      DTR  H   On
DCD  F   Off      LT   L   Off      (RLB) N Off
(TM) n   Off
```

This Command: dspbob 9.1

Hit DEL key to quit:

Table 14-36 dspbob—Parameters

Parameter	Description
slot	Specifies the slot number of the card containing the port whose input and output pins are to be displayed.
port	Specifies the data port or Frame Relay port whose input and output pins are to be displayed.

Table 14-37 dspbob—Optional Parameters

Parameter	Description
interval	Specifies the time in seconds, between updates of the breakout box display. The range is from 1 to 60 seconds. If no interval is specified, the display is updated at five second intervals. Do not use an interval of “1” second in a busy network.
measure clock speed	For Port Concentrator Shelf (PCS) only, directs the system to measure the clock speed. If a Port Concentrator port is selected, the last measured clock speed is displayed on the Clocking line. When Measure Clock Speed is entered as an optional parameter, the clock is measured first, and the results are displayed. Clock speed measurement for PCS ports is described in the <i>Cisco WAN Switching System Overview</i> information for the PCS.

dspbusbw

Displays the amount of bandwidth allocated on the cell bus on an IGX node. By default, the system will allocate enough bus bandwidth for one OC-3 when the first line is upped using the **upln** command. If there is not enough allocated cell bus bandwidth, the line will not be upped. Cell bus bandwidth must be allocated before adding connections on the UXM card.

Full Name

Display cell bus bandwidth allocated for UXM card

Syntax

```
dspbusbw <slot> [u]
```

Related Commands

cnfbusbw

Attributes

Privilege	Jobs	Log	Node	Lock
1–6	No	No	IGX (with UXM)	Yes

Example

```
dspbusbw 6
```

Description

Display the amount of bandwidth allocated on the cell bus on the UXM card in slot 6 of the IGX node.

System Response

```

Get updated bandwidth info from card (Y/N)? n

sw199          TN      StrataCom      IGX 16      9.1.w9      Apr. 9 1998  17:52 GMT

1\NBus Bandwidth Usage for UXM card in slot 6      Last Updated on 04/07/98 12:03:0
0
          FPkts/sec      Cells/sec      UBUs
Minimum Req'd Bandwidth:          0          0          0
Average Used Bandwidth:          0          0          0
Peak    Used Bandwidth:          0          0          0
Maximum Port Bandwidth:          -          10866      3

Allocated    Bandwidth:          8
          (Cell Only):          -          32000
          (Cell+Fpkt):          16000      24000
          (Fpkts / 2 + Cells)  <=          32000

Reserved    Bandwidth:          -          4000      1

Last Command: dspbusbw 6

Next Command: dspbusbw 6

Get updated bandwidth info from card (Y/N)? y

sw199          TN      StrataCom      IGX 16      9.1.w9      Apr. 9 1998  17:53 GMT

1\NBus Bandwidth Usage for UXM card in slot 6      Last Updated on 04/09/98 17:53:2
2
          FPkts/sec      Cells/sec      UBUs
Minimum Req'd Bandwidth:          0          0          0
Average Used Bandwidth:          0          0          0
Peak    Used Bandwidth:          0          0          0
Maximum Port Bandwidth:          -          10866      3

Allocated    Bandwidth:          8
          (Cell Only):          -          32000
          (Cell+Fpkt):          16000      24000
          (Fpkts / 2 + Cells)  <=          32000

Reserved    Bandwidth:          -          4000      1

Last Command: dspbusbw 6

```

Table 14-38 dspbusbw-Parameters

Parameter	Description
slot	Specifies the slot number of the card containing the universal bus bandwidth information to display.

Table 14-39 dspbusbw—Optional Parameters

Parameter	Description
u	Specifies that the card should update the information with the latest information calculated in firmware. If not provided, the system will prompt you.

Table 14-40 dspbusbw—Screen Information

Display	Description
Minimum Required Bandwidth	Minimum bandwidth in FastPackets per second and cells per second required for all connections currently configured on this card. This is calculated by UXM firmware as connections are added.
Maximum Port Bandwidth	Total bandwidth of all active trunks/ports on this card in FastPackets per second, cells per second, and UBUs.
Average Bandwidth and Peak Used Bandwidth	Statistics counters maintained by UXM firmware. These statistic counters display FastPackets per second, cells per second, and UBUs. Use this information when calculating the amount of bus bandwidth to be allocated. These counters will be cleared when the UXM card is reset.
Last Updated time	Shows the time when the counters were last updated. This will be the current time if you answered yes to the <code>Get updated bandwidth info from card (Y/N)?</code> prompt or entered the command with the <code>u</code> parameter.
Allocated Bandwidth	The bandwidth allocated for this card using the <code>cnfbusbw</code> command. Refer to the <i>Cisco WAN Switching SuperUser Commands</i> manual for more information. Allocated bandwidth is specified in FastPackets per second, cells per second and converted to UBU units by the system.

dspbuses

Displays the status of the System Buses on an IPX or IGX node. As a safeguard against bus failure, each node is equipped with redundant System Buses: Bus A and Bus B. Either bus can be configured as the active bus with the other bus as standby. The `cnfbus` command is used to switch the active bus. Each System Bus contains the following buses: Control Bus, Time Division Multiplex (TDM) bus, clock bus and power bus. In addition to showing which System Bus is active and which is standby, the `dspbuses` command also shows which sub-bus needs diagnostics or has failed. Bus status is displayed at the bottom of the screen. Table 14-41 shows the possible status displays and their meaning.

Table 14-41 Possible Bus Status Displays

Status	Description
OK	Bus operation satisfactory
Failed TDM	A failed TDM Bus
Failed CNTL	A failed Control Bus
Needs Diagnostics TDM	The TDM bus needs diagnostics
Needs Diagnostics CNTL	The Control Bus needs diagnostics

The remaining MUXBUS or CELLBUS bandwidth available to assign to cards and circuits is displayed. This is primarily used when configuring the AIT card on the IPX node or BTM card on the IGX node. The user can assign MUXBUS or CELLBUS bandwidth for the IPX or IGX node, respectively. Available bandwidth falls into two categories, namely, *dedicated* and *pooled*. Dedicated bandwidth is reserved by the system for specific purposes, such as Statistical Reserve for PCC traffic. Pooled bandwidth can be assigned to any use but primarily is used for an ATM trunk.

MUXBUS or CELLBUS bandwidth is assigned in quantities of “switches,” “slices,” and “circuits” and the available bandwidth is displayed in three rows accordingly. A single DS0 circuit occupies 333 packets per second (pps) of MUXBUS or CELLBUS bandwidth, a “slice” of bandwidth is equivalent to three DS0 circuits for a total of 1000 pps. And a switch is eight slices for a total of 8000 packets/second of bus bandwidth. In a newly installed node with no cards and no circuits installed, the total bus bandwidth that is available to be assigned is listed in the right column of Table 14-42, which is the sum of the dedicated and pooled bandwidth. As cards and circuits are added to the node, the available bandwidth decreases accordingly.

Table 14-42 Bandwidth Units and Capacity

Unit of BW	Quantity	MUXBUS/CELLBUS Capacity
switch	8 slices or 8000 pps	20
slice	3 DS0's or 1000 pps	160
DS0	333 pps	480

Full Name

Display status of buses

Syntax

dspbuses

Related Commands

cnfbus

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX (non-UXM)	No

Example 1

```
dsfbuses
```

Description

Display status and bandwidth available. The status of Bus A and Bus B is displayed. In this example, both buses are OK and B is the active Control bus (normal operation is for bus A to be the active bus).

System Response

```
alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 16 1998 13:34 PST

                          Bus Info

Available MUXBUS bandwidth (snapshot)

Dedicated  Pooled  Units
-----  -----  -----
0           13      8000 pkts/sec
5           104     1000 pkts/sec
22          312     ds0 circuits

Bus Status
-----
Bus A: Standby - OK
Bus B: Active - OK

Last Command: dsfbuses

Next Command:
```

dsplnerrs

Displays the accumulated error count since the last time errors were reset. Table 14-43 lists the types of circuit line errors. The **clrcnerrs** command clears the error counters for circuit lines.

**Note**

The **dsplnerrs** and **dsplnerrs** commands are the same.

Table 14-43 Errors Displayed by the dspcnerrs Command

Type	Explanation
Bipolar errors	Number of times that two consecutive pulses had the same polarity (applies to AMI coding only).
Frame slips	Number of times a frame was discarded to re-establish synchronization.
Out of frames	Number of times a loss-of-frame synchronism was detected on this circuit line.
Loss of signal	Number of times the signal level at the circuit line input went below the minimum acceptable level.
Frame bit errors	Number of times the frame bit failed to alternate (frame error).
CRC errors	Number of times the generated CRC character did not match the received CRC character (applies only if CRC checking is enabled).
Out of MFrames	Number of times a multiframe synch error was detected (E1 lines only).
AIS - 16	Number of times the Alarm Information Signal (Blue signal) was received.

Full Name

Display circuit line errors

Syntax

dspcnerrs [slot | slot.line]

Related Commands

clrcnerrs, **prtcnerrs**

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX	No

Example 1

```
dspcnerrs
```

Description

Display a summary of all circuit line errors.

System Response

```
sw151          TN      SuperUser      IGX 16      9.2          June 20 1998 12:45 GMT
```

```
Total Errors
```

CLN	Code Errors	Frame Slips	Out of Frames	Loss of Signal	Frame BitErrs	CRC Errors	Out of MFrames	AIS-16
9	0	-	0	0	-	0	-	-
5.1	0	-	0	0	-	0	-	-
12	0	0	0	0	-	0	-	-
5.2	0	-	0	0	-	0	-	-

```
Last Command: dspclnerrs
```

```
Next Command:
```

Example 2**dspclnerrs 5.1****Description**

Display the circuit line errors for line 5.1 on the UFM card in slot 5.

System Response

```

sw151          TN      SuperUser      IGX 16      9.2      June 20 1998 12:38 GMT

Circuit Line 5.1 Status:Major - Out of Frm (RED)      Clrd: 06/20/96 12:08:38
Type          Count ETS   Status      Type          Count ETS   Status
Bipolar Err   0      0           Loss of Sig (RED)  0      -
Frame Slips   -      -           AIS (BLU)         0      -
Out of Frms   0      0           Out of Frms (RED)  2      -
Loss of Sig   0      0           Frm Err Rate(RED) -      -
Frame BitErrs -      -           AIS-16 (RED)      -      -
CRC Err       0      0           Rmt Oof (YEL)     0      -
AIS-16        -      -           Out of MFms (RED) -      -
Out of MFms   -      -           Rmt Oom (YEL)     -      -
Local CGA (RED) -      -
Remote CGA (YEL) -      -

```

Last Command: dspclnerrs 5.1

Next Command:

SW

MAJOR ALAR

Table 14-44 dspclnerrs—Optional Parameters

Parameter	Description
slot or slot.line	For most circuit lines, the slot number is the line number. To use this optional parameter on a UFM, enter one of the line numbers. With no optional parameter specification, a summary screen for all line errors appears.

dspeventq

Display information about any configured event queues from the *fail event handler*.

Full Name

Display event queue

Syntax

```
dspeventq
```

Related Commands

```
clreventq
```

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

```
dspeventq
```

Description

Display the contents of the fail event handler on the current node.

System Response

```
swstorm          TN      SuperUser      BPX 8620      9.2      Aug. 24 1998 11:00 GMT

  QUEUE                LENGTH                THROTLING
NUM NAMES            MAX    HIGH CURRENT      POINT
 1 Fail_Xid                4      1      14000
 2 Fail_Q                  4      0
```

```
Last Command: dspeventq
```

```
Next Command:
```

dspfrcbob

Displays the current state of the signals on the FRM-2 or FRP-2 physical port. The display is real-time and updated according to the *interval* parameter. The display refreshes at a user-specified interval until either the Delete key is pressed or until a timeout occurs.

This command does not show inputs from the user equipment. It shows inputs from the Port Concentrator module to the FRI-2.

For the Inputs from the User Equipment, the display shows the signals as either On, Off, Active, or Inactive. For the Outputs to User Equipment, the display shows the signals as either On, Off, Active, or Inactive. X.21 State Names and Leads for DTC and DCE interfaces are also displayed as ON or OFF.

Full Name

Display FRC/FRM breakout box

Syntax

dspfrcbob <slot.pot> <interval>

Related Commands

dspbob, **dspfrcport**

Attributes

Privilege	Jobs	Log	Node	Lock
1-3	No	No	IGX	Yes

Example 1

dspfrcbob 5.2

Description

Display the signals states for port 2 in slot 5.

System Response

```
bootzilla LAN SuperUser IGX 8430 9.2 Aug. 4 1998 15:09 GMT

Physical Port: 5.2
Interface: FTI-X21 DCE
Clocking: Normal (512224 bps)

      Inputs from User Equipment          Outputs to User Equipment
Lead Pin State Lead Pin State Lead Pin State
C 3/10 On I 5/12 On
T 2/9 Active R 4/11 Active

      X.21 State Name DTE Lead T C DCE Lead R I
      1 Ready 1 OFF 1 OFF
      13 S Send Data D ON 1 OFF
      13 R Receive Data 1 OFF D ON
      13 Data Transfer D ON D ON
```

This Command: dspfrcbob 6.2 1

Hit DEL key to quit:

Table 14-45 dspfrcbob—Parameters

Parameter	Description
slot.pot	Specifies the slot and port of an FRM-2/FRC-2 physical port. Port range is 1–4.
interval	Specifies the screen update interval in seconds. The default is five seconds.

dsplog

Displays the event log for a node. Events affecting the node are displayed in chronological order with the most recent events at the top of the log. The display includes a description of the event, the date and time of the event, and the alarm class of the event. A Continue? prompt is displayed if more than one screen is required to display all the log entries. Events generating alarms are marked Major or Minor, and events clearing alarms are marked Clear.

When you enter parameters with the **dsplog** command, they may all be used and entered in any order (except the <i> parameter, which cannot be used with <p>).

In this release, **dsplog** entries show the virtual trunk number of a trunk, for example, *slot.port.vtrk*.

For UXM cards with ATM Forum IMA compliant trunks, a trunk is displayed in **dsptrks** as:

```
<slot>.<primary_port>x<num ports>
```

For example, an IMA trunk would display in the TRK column in the **dsptrks** display as the following:

```
5.1x4
```

In this case, 5.1x4 indicates an ATM Forum–compliant IMA trunk 5.4 which consists of four physical lines. To see all physical lines belonging to this IMA trunk, you can enter the **dspphyslns** command.

Note that in this release, for IMA trunks, you can configure nonconsecutive physical lines. In Release 9.1, an IMA trunk required that consecutive physical lines be configured on the same card. In this release, nonconsecutive physical lines are supported.

Note also that to support ATM Forum compliant IMA trunks, the UXM card must have Model B firmware. (Model A firmware supports Cisco proprietary IMA protocol trunks, but not the ATM Forum–compliant trunks.)

The **dsplog** displays an SES interface shelf (feeder) when it is added or removed from an IGX 8400 routing hub.

A message displays when you execute the **dsplog** command that tells you when a Hitless Rebuild of the node occurred. See Example 2, which shows even log entries indicating that a hitless rebuild has occurred.

When a hitless rebuild occurs, event log entries indicating the occurrence of the rebuild will be logged. You view these event log entries using **dsplog**.

Whenever the polling type changes, this event is logged in the event log (displayed using **dsplog** command) on the switch.

Degraded Mode Conditions

Related to degraded mode conditions, which may occur when a node has exhausted its internal resources due to excessive messaging (among other possible causes) which leads the node to abort, the node will either switch to the standby CC if it is available, or else it will go into the degraded mode, assuming that this mode has been enabled. A node indicates that it is in degraded mode by: displaying degraded on the console screen; remote nodes generating degraded mode alarms; remote nodes showing the degraded mode as unreachable/degraded (UNDeg). The abort that put the node into degraded mode is logged in the switch software log, which you can display using the **dsplog** command.

After a node enters the degraded mode, communication is halted with the rest of the network. All the network nodes immediately transition to communication break with the node in degraded mode.

The communication break generates a Minor Alarm for the network nodes. Each node inserts a special communication break message into the local event log (**dsplog**). For a locally attached Cisco WAN Manager, the message is also inserted into the Cisco WAN Manager event log. This message indicates the communication break was caused by a degraded mode at the remote node.

In addition to the log entries, a Communication Break Robust Alarm trap is generated to Cisco WAN Manager. This trap contains a new alarm type (code 997), which indicates the communication break was caused by a degraded mode at the remote node.

After a node exits the degraded mode, communication resumes with the rest of the network. All the network nodes clear communication break with the node.

The clearing of the communication break clears the Minor Alarm for the network nodes. Communication break clear messages are inserted into the local and Cisco WAN Manager event logs. A Communication break Robust Alarm trap is generated with the clear alarm type (code 998). The log messages and the robust trap for the communication break clear do not indicate that the communication break was caused by the node being in a degraded mode.

APS Alarms Displayed with dsplog Command

The **dsplog** command displays SONET APS (Automatic Protection Switching) events and alarms.

APS alarms are also propagated to Cisco WAN Manager (called StrataView Plus in previous releases). Table 14-46 lists the APS alarms displayed with the **dsplog** command. (APS events are indicated in the table by “Info” class type. Note that events can be displayed with the **dsplog** command, but are not displayed by the **dspapsln** command.)

Table 14-46 APS Alarms Displayed with dsplog Command

Class	dsplog Text	Description
Minor	APS standard mismatch	In a two-card APS 1+1 configuration, one card is programmed for GR-253 and the other card is programmed for ITUT.
Minor	APS redundant protection back card missing	Not supported
Minor	APS redundant working back card missing	Not supported
Minor	APS 1+1 Protection hardware Front Card missing	Not supported

Table 14-46 APS Alarms Displayed with dsplog Command (continued)

Class	dsplog Text	Description
Minor	APS 1+1 Working Hardware Front card missing	Not supported
Minor	APS 1/2 channels parameter mismatch front card	Not supported
Minor	APS Firmware missing Protection card	Not supported
Minor	APS Firmware missing Working Card	Not supported
Minor	APS Firmware missing Working card	Not supported
Minor	APS card missing	Indicates that either a BXM front card or back card supporting this APS line is detected as missing by a BXM.
Minor	APS front card missing	Not supported
Minor	APS working back card missing	Not supported
Minor	APS card mismatch	Not supported
Clear	APS OK	APS line is up with no alarms
Clear	APS deactivated	APS line is down
Minor	APS lines looped	APS line is looped
Minor	APS remote signal failure	A remote signal indicates that there is a problem with the far end signaling information in the K1K2 bytes.
Minor	APS Channel Mismatch	Can happen only in bidirectional mode and indicates that there is a problem with the underlying APS channel protocol. The receive K2 channel number does not equal the transmit K1 channel number.
Minor	APS Protection Switch byte failure	Protection switch byte failure or PSB. In bidirectional mode, indicates that there is an invalid K1 byte. The receive K1 request does not match the reverse request and is less than the transmit K1 request. In all modes, a PSB alarm indicates that K1/K2 protocol is not stable.
Minor	APS far end protection failure	Far end protection failure indicates that the far end's protection line is failing. When there is signal failure on the protection channel, the remote end sees Far End Protection Fail.
Minor	APS architecture mismatch ¹	Architecture mismatch means that the APS configuration on one end of the line does not match the APS configuration at the other side of the line. Specifically, GR-253 at one end and ITUT at the other or 1+1 at one end and 1:1 at the other.

Table 14-46 APS Alarms Displayed with dsplog Command (continued)

Class	dsplog Text	Description
Info	APS Init/Clear/Revert	A BXM APS event indicating that the BXM APS has been initialized or a clear switch has occurred or a revert switch has occurred.
Info	Cannot perform a Clear/Revert switch	A BXM APS event indicating that the BXM APS was unable to perform a clear/revert switch.
Info	APS manual switch	A BXM APS event indicating that the BXM APS has performed a user requested manual switch.
Info	Cannot perform a manual switch	A BXM APS event indicating that the BXM APS was unable to perform a user requested manual switch.
Info	APS signal degrade LoPri switch	A BXM APS event indicating that the BXM APS performed a switch due to a low-priority signal degrade condition. An automatically initiated switch due to a “soft failure” condition resulting from the line BER exceeding a preselected threshold (cnfapsln).
Info	Cannot perform a signal degrade LoPri switch	A BXM APS event indicating that the BXM APS was unable to perform a switch due to a low-priority signal degrade condition.
Info	APS signal degrade HiPri switch	A BXM APS event indicating that the BXM APS performed a switch due to a high-priority signal degrade condition. An automatically initiated switch due to a “soft failure” condition resulting from the line BER exceeding a preselected threshold (cnfapsln).
Info	Cannot perform a signal degrade HiPri switch	A BXM APS event indicating that the BXM APS was unable to perform a switch due to a high-priority signal degrade condition.
Info	APS signal failure LoPri switch	A BXM APS event indicating that the BXM APS performed a switch due to a low-priority signal failure condition. An automatically initiated switch due to a signal failure condition on the incoming OC-N line including loss of signal, loss of frame, AIS-L defects, and a line BER exceeding 10-3.

Table 14-46 APS Alarms Displayed with dsplog Command (continued)

Class	dsplog Text	Description
Info	Cannot perform a signal failure LoPri switch	A BXM APS event indicating that the BXM APS was unable to perform a switch due to a low-priority signal failure condition.
Info	APS signal failure HiPri switch	A BXM APS event indicating that the BXM APS performed a switch due to a high-priority signal failure condition. An automatically initiated switch due to a signal failure condition on the incoming OC-N line including loss of signal, loss of frame, AIS-L defects, and a line BER exceeding 10 ⁻³ .
Info	Cannot perform a signal failure HiPri switch	A BXM APS event indicating that the BXM APS was unable to perform a switch due to a high-priority signal failure condition.
Info	APS forced switch	A BXM APS event indicating that the BXM APS has performed a user requested forced switch.
Info	Cannot perform a forced switch.	A BXM APS event indicating that the BXM APS was unable to perform a user requested forced switch.
Info	APS lockout switch	A BXM APS event indicating that the BXM APS has performed a user requested switch that prevents switching from working line to protection line from taking place.
Info	Cannot perform a lockout switch	A BXM APS event indicating that the BXM APS was unable to perform a user requested lockout of protection switch.
Info	WTR switch	A BXM APS event indicating that the BXM APS performed a switch due to a Wait to Restore time-out. A state request switch due to the revertive switch back to the working line because the wait-to-restore timer has expired.
Info	Cannot perform a WTR switch.	A BXM APS event indicating that the BXM APS was unable to perform a switch due to a WTR condition.
Info	Exercise switch	Not supported.
Info	Cannot perform an Exercise switch.	Not supported.

Table 14-46 APS Alarms Displayed with dsplog Command (continued)

Class	dsplog Text	Description
Info	Reverse switch	A BXM APS event indicating that the BXM APS performed a switch due to a reverse request. A state request switch due to the other end of an APS bidirectional line performing an APS switch.
Info	Cannot perform a Reverse switch.	A BXM APS event indicating that the BXM APS was unable to perform a switch due to a reverse switch request.
Info	No Revert switch	A BXM APS event indicating that the BXM APS performed a switch due to a Do Not Revert. A state request due to the external user request being cleared (such as a forced switch) while using non-revertive switching.
Info	Cannot perform a No Revert switch.	A BXM APS event indicating that the BXM APS was unable to perform a switch due to a Do Not Revert switch request.
Minor	Standby Line Section Trace	APS standby line alarm
Minor	Standby line path trace	APS standby line alarm
Minor	Standby line path yellow alarm	APS standby line alarm
Minor	Standby line path AIS	APS standby line alarm
Minor	Standby line loss of pointer	APS standby line alarm
Minor	Standby line loss of cell	APS standby line alarm
Minor	Standby line pclp yellow alarm	APS standby line alarm
Minor	Standby line plcp out of frame alarm	APS standby line alarm
Minor	Standby line yellow alarm	APS standby line alarm
Minor	Standby line alarm indication signal (AIS)	APS standby line alarm
Minor	Standby line out of frame alarm (LOF)	APS standby line alarm
Minor	Standby line loss of signal alarm (LOS)	APS standby line alarm

1. Architecture mismatch indicates that one side supports APS 1+1, and the other end of line is configured for 1:1, or the directional or revertive parameter does not match. Firmware cannot bring the two ends into compliance on the fly—the user must correct the configuration error.

There is no APS power supply alarm.

Logging into a Node in High-Priority Login Mode

Example 4 shows a **dsplog** screen where notification is given when high-priority mode is in use by the High Priority! string on the screen. The local event log indicates when the high-priority mode is entered and exited. (For information on the high-priority login feature and when you typically would use it, see “High-Priority Login Feature” section on page 17-1.) The following strings are logged:

- Info User StrataCom logged in (Local High Priority)
- Info User StrataCom logged out (Local High Priority)

When in local high-priority mode, using the `vt` command to execute commands on another node provides a high-priority virtual terminal session. If you log into a control port at high priority, and then use the `vt` command to remotely log into another node with high priority VT, then both nodes will be servicing you at a high priority. The local node will service you at the control port high priority, while the remote node serves you at a priority just below the network handler. When using the high-priority `vt` command, the screen shows High Priority VT and the local event log shows the following strings.

- Info User StrataCom logged in (Virtual Terminal High Pri)
- InfoUser StrataCom logged out (Virtual Terminal High Pri)

Similar to the console screen, the Cisco WAN Manager and maintenance log show only the normal VT strings (listed previously).

Syntax

```
dsplog <r> <p> <t> <i>
```

Related Commands

dspabortlog, dspswlog, clogs, dspphyslms, dsptrks

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

```
dsplog r
```

System Description

Displays the log in reverse order, oldest entries first.

System Response

```

sw215          TRM   Cisco          BPX 8620  9.3.r7   Mar. 16 2000 08:49 PST

Least recent log entries (most recent at bottom)
Class  Description                                     Date      Time
Info   Log Cleared                                     Date/Time Not Set
Info   BCC 8 Restarted due to a Primary Revision Change Date/Time Not Set
Info   CC 8 Starting rebuild due to Primary Revision Change Date/Time Not Set
Info   Full Rebuild Occurred                           Date/Time Not Set
Info   Invalid Login Attempt via Control Port (Local)   Date/Time Not Set
Info   BCC 8 downloading Flash with Revision 9.3.r7    Date/Time Not Set
Info   ASM Inserted                                     Date/Time Not Set
Info   ASM 15 Activated                                 Date/Time Not Set
Info   Polling type changed to 2                         Date/Time Not Set
Clear  LMASM 15 Inserted - Activated                   Date/Time Not Set
Minor  Fan #1 RPM out of range                           Date/Time Not Set
Minor  Fan #2 RPM out of range                           Date/Time Not Set
Minor  Fan #3 RPM out of range                           Date/Time Not Set

This Command: dsplog r

```


Example 2**dsplog p****System Description**

Displays the log in pages. Use “n” for next, “p” for previous, and “q” to quit out of the log.

System Response

```
sw215          TRM   Cisco          BPX 8620  9.3.r7   Mar. 16 2000 08:50 PST

Snapshot of log entries (most recent at top)
Class  Description                                     Date      Time
Info   AXIS shelf on TRK 2.1: Added                    03/16/00 08:48:07
Info   BCC 8 downloaded Flash with Revision 9.3.r7    03/16/00 08:47:58
Clear  TRK 2.1 OK                                     03/16/00 08:47:51
Clear  TRK 2.1 Activated                             03/16/00 08:47:51
Info   BNI-T3 2 Activated                              03/16/00 08:47:51
Info   BCC 8 downloading Flash with Revision 9.3.r7  03/16/00 08:47:25
Info   Port 3.1 Activated                             03/16/00 08:47:25
Info   BCC 8 Restarted due to a Primary Revision Change 03/16/00 08:47:21
Clear  LN 3.1 OK                                     03/16/00 08:47:21
Clear  LN 3.1 Activated                             03/16/00 08:47:21
Info   ASI-T3 3 Activated                              03/16/00 08:47:21
Clear  Fan #3 RPM out of range                       03/16/00 08:46:58
Clear  Fan #2 RPM out of range                       03/16/00 08:46:58

This Command: dsplog p
Continue direction - Next/Previous/Quit? (n/p/q)
```

Example 3**dsplog t 2000 3 16 8 46 58****System Description**

Displays the log by timestamp.

System Response

```
sw215          TRM   Cisco          BPX 8620  9.3.r7   Mar. 16 2000 08:52 PST

Snapshot of log entries (most recent at top)
Class  Description                                     Date      Time
Clear  Fan #3 RPM out of range                       03/16/00 08:46:58
Clear  Fan #2 RPM out of range                       03/16/00 08:46:58
Clear  Fan #1 RPM out of range                       03/16/00 08:46:58
Info   T3-2 3 Inserted                                 03/16/00 08:46:55
Info   ASI-T3 3 Inserted                              03/16/00 08:46:55
Info   MMF-2 14 Inserted                              03/16/00 08:46:53
Info   BNI-155 14 Inserted                           03/16/00 08:46:53
Info   Time changed from: Date/Time Not Set          03/16/00 08:46:52
Info   SMF-2 6 Inserted                               Date/Time Not Set
Info   BNI-155 6 Inserted                             Date/Time Not Set
Info   Name change from NODENAME to sw215           Date/Time Not Set
Info   LM-BXM 11 Inserted                            Date/Time Not Set
Info   BXM 11 Inserted                               Date/Time Not Set

This Command: dsplog t 2000 3 16 8 46 58
```

Example 4

```

dsplog i

```

System Description

For service level privilege and above. Displays log entries, software error entries, and aborts.

System Response

```

sw215          TRM    Cisco          BPX 8620  9.3.r7    Mar. 16 2000 09:00 PST

Most recent log entries (most recent at top)
Class  Description                                     Date      Time
Info   BCC 8 Restarted due to a Software Abort         03/16/00 08:59:38
Info   Abort 9000000 Data:00000001 PC:30200A30/USR1 9.3.r7 03/16/00 08:59:19
Info   User Cisco logged in (Local)                       03/16/00 08:59:03
Info   Hitless Rebuild Occurred                           03/16/00 08:59:01
Info   CC 8 Starting rebuild due to Software Abort        03/16/00 08:59:00
Info   User Cisco logged in (Local)                       03/16/00 08:59:02
Info   User Service logged out (Local)                   03/16/00 08:58:51
Info   User Service logged in (Local)                    03/16/00 08:58:34
Info   User SuperUser logged out (Local)                 03/16/00 08:58:29
Info   User SuperUser logged in (Local)                  03/16/00 08:57:22
Info   Invalid Login Attempt via Control Port (Local)    03/16/00 08:57:03
Info   User Cisco logged out (Local)                    03/16/00 08:56:57
Info   Error 1015 Data:DEADBEEF PC:302B74A6/USR1 9.3.r7 03/16/00 08:56:53

Last Command: dsplog i

```

Table 14-47 dsplog-Parameters

Parameter	Description
<r>	Reverses the entry order in the log. Normally, the log displays the most recent entries at the top (newest to oldest. When you use the <r> parameter, entries are displayed oldest to newest.
<p>	Allows you to page through the log. Use “n” to go to the next page, “p” to go to the previous page, and “q” to quit the log.
<t>	Searches the log for an exact or closest timestamp. The syntax is: [pli] [r] [t yyyy mm dd hh mm ss] For example: 2000 3 16 8 46 58 For fields that you don’t search, insert a zero. For example: 2000 3 16 0 0 0
<i>	<i>This parameter is available only for service level privilege and above.</i> Displays all log entries, software error entries (dspswlog), and aborts (dspabortlog). Software error and abort entries are integrated by timestamp. This parameter can be used with either the <r> or <t> parameter. Refer to the <i>Cisco WAN SuperUser Command Reference</i> for more information about the dspswlog and dspabortlog commands.

dsplnalmcnf

Displays alarm configuration by alarm type. Each alarm type includes:

- The minor alarm threshold
- The minor alarm time
- The minor alarm clear time
- The major alarm threshold
- The major alarm time
- The major alarm clear time

The alarm threshold, alarm time, and alarm are set in the **cnflnal** command. See the **cnflnal** command for descriptions of these parameters.

Full Name

Display line alarm configuration

Syntax

```
dsplnalmcnf
```

Related Commands

cnflnal, **dspcnerrs**, **dsptrkerrs**

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX	No

Example 1

```
dsplnalmcnf
```

Description

View the line alarm threshold configured for a node.

System Responses

```
alpha          TRM    YourID:1          IGX 8420    9.2    Aug. 23 1998 10:51 PST
```

Line Alarm Configuration

Minor				Major		
Violation	Rate	Alarm Time	Clear	Rate	Alarm Time	Clear
1) Bpv	10E-7	10 min	3 min	10E-3	10 sec	10 sec
2) Fs	.01%	10 min	3 min	.1%	10 sec	10 sec
3) Oof	.0001%	10 min	3 min	.01%	10 sec	10 sec
4) Vpd	2%	5 min	3 min	5%	60 sec	10 sec
5) Tsdp	.01%	5 min	3 min	.1%	60 sec	10 sec
6) Ntsdp	.01%	5 min	3 min	.1%	60 sec	10 sec
7) Pkterr	.01%	10 min	3 min	.1%	125 sec	10 sec
8) Los	.0001%	10 min	3 min	.01%	10 sec	10 sec

```
This Command: dsplnalmcnf
```

```
Continue?
```

```
-----
```

```
alpha          TRM    YourID:1          IGX 8420    9.2    Aug. 23 1998 10:51 PST
```

Line Alarm Configuration

Minor				Major		
Violation	Rate	Alarm Time	Clear	Rate	Alarm Time	Clear
9) Fer	.01%	10 min	3 min	.1%	200 sec	10 sec
10) CRC	.01%	10 min	3 min	.1%	200 sec	10 sec
11) Pkoof	.01%	10 min	3 min	.1%	200 sec	10 sec
12) Oom	.001%	10 min	3 min	.1%	10 sec	10 sec
13) Ais16	.0001%	10 min	3 min	.01%	10 sec	10 sec
14) Bdapd	.001%	5 min	3 min	.1%	60 sec	10 sec
15) Bdbpd	.001%	5 min	3 min	.1%	60 sec	10 sec
16) Badclk	.1%	10 min	3 min	1%	50 sec	10 sec

```
This Command: dsplnalmcnf
```

```
Continue?
```

```
alpha          TRM    YourID:1          IGX 8420    9.2    Aug. 23 1998 10:52 PST
```

Line Alarm Configuration

Minor				Major		
Violation	Rate	Alarm Time	Clear	Rate	Alarm Time	Clear
17) Pccpd	.001%	5 min	3 min	.1%	60 sec	10 sec
18) Lcv	10E-6	10 min	3 min	10E-2	10 sec	10 sec
19) Pcvl	10E-6	10 min	3 min	10E-2	10 sec	10 sec

```

20) Pcvp      10E-6  10 min   3 min      10E-2  10 sec   10 sec
21) Bcv      10E-6  10 min   3 min      10E-2  10 sec   10 sec
22) Rxvpd     1%    5 min   3 min      4%    60 sec   10 sec
23) Rxtspd   .01%   5 min   3 min      .1%   60 sec   10 sec
24) Rxntspd  .01%   5 min   3 min      .1%   60 sec   10 sec

```

This Command: dsplnalmcnf

Continue?

```
alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 23 1998 10:52 PST
```

Line Alarm Configuration

Violation	Rate	Minor		Major		
		Alarm Time	Clear	Rate	Alarm Time	Clear
25) Rxbdapd	.001%	5 min	3 min	.1%	60 sec	10 sec
26) Rxbdapd	.001%	5 min	3 min	.1%	60 sec	10 sec
27) Rxhppd	.001%	4 min	3 min	.1%	60 sec	10 sec
28) Atmhec	.1%	10 min	3 min	1%	120 sec	10 sec
29) Plcpoof	.01%	10 min	3 min	.1%	200 sec	10 sec
30) Rxspdm	.01%	4 min	2 min	.001%	10 sec	5 sec

Last Command: dsplnalmcnf

Next Command:

dsplnerrs

Displays the accumulated error count since the last time errors were reset. Table 14-48 lists the error types displayed. The **clrnerrs** command clears the error counters for circuit lines by resetting all error counts to 0.

Table 14-48 Line Error Types

Type	Explanation
Bipolar errors	Number of times two consecutive pulses have the same polarity (occurs only when the line uses AMI coding).
Frame slips	Number of times a frame is discarded to re-establish synchronization.
Out of frames	Number of times a loss-of-frame synchronism is detected on this line.
Loss of signal	Number of times the signal level at the circuit line input went below the minimum acceptable level.
Frame bit errors	Number of times the frame bit failed to alternate (frame error).

Table 14-48 Line Error Types (continued)

Type	Explanation
CRC errors	Number of times the generated CRC character did not match the received CRC character (applies only if CRC checking is enabled).
Out of MFrames	Number of times a multiframe synch error was detected (E1 lines only).
AIS - 16	Number of times the Alarm Information Signal (Blue signal) was received.

Full Name

Display line errors

Syntax

dsplnerrs [line_number]

Related Commands

clrlnerrs, **prtlnerrs**

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX	No

Example 1

dsplnerrs

Description

Display the circuit line errors for all lines.

Table 14-49 dsplnerrs—Optional Parameters

Parameter	Description
line number	Specifies the circuit for the error count display. Otherwise, a summary screen for all lines appears.

dspphyslerrs

Displays the accumulated line error counts, by failure type, for the specified trunk(s). If no trunk number is entered, a one-line summary of errors for all trunks at the local node is displayed. If a specific trunk number is entered with the command, a detailed analysis, including error threshold (ETH), is

displayed. Disabled trunks have their trunk number displayed in dim, reverse video on the screen. The **clrphyslnerrs** command resets all error counts to 0. Table 14-50 contains a brief description of each error.

In this release, on both the BPX and IGX, physical line statistics are displayed on the **dspphyslnstats**, **dspphyslnstathist**, and **dspphyslnerrs** screens. These commands accept only physical line numbers (that is, slot.port).

Table 14-50 Description of the Errors in the dspphyslnerrs Display

Line Type	Error	Explanation
All except ATM	Bipolar errors	Number of times two consecutive pulses have the same polarity (AMI coding only).
	Frame slips	Number of times a frame is discarded to re-establish synchronization.
	Out of frames	Number of times a loss-of-frame synchronism is detected on this circuit line.
	Loss of signal	Number of times the signal level at the circuit line input went below the minimum acceptable level.
	Frame bit errors	Number of times the frame bit failed to alternate (frame error).
	CRC errors	Number of times the generated CRC character did not match the received CRC character (applies only if CRC checking is enabled).
	Out of MFrames	Number of times a multiframe synch error was detected (E1 lines only).
	AIS - 16	Number of times the Alarm Information Signal (Blue signal) was received.
	Only ATM	Out of Frames
Loss of sync (XX)		Number of times a loss of-DS3 frame alignment lasting more than XX seconds was detected.
Packet Error		Number of CRC errors for a packet address.
Line Code Errors		Number of B3ZS code errors detected.
P-bit Parity Errors		Number of parity errors for the DS3 parity bit (P-bit) sequence.
C-bit Parity Errors		Number of parity errors for the DS3 control bit (C-bit) sequence.
Comm Fails		Number of BCC failed to communicate to the other node.
Loss of signal		Number of times the signal level at the trunk line input went below the minimum acceptable level.
Only ATM		AIS (BLU)

Table 14-50 Description of the Errors in the dspphyslnerrs Display (continued)

Line Type	Error	Explanation
	Out of MFrames	Number of times a loss-of-frame synchronism in the DS3 multiframe alignment was detected.
	Remote Oof	Number of times the DS3 remote alarm (indicating remote end was out of frame alignment) was received.

Full Name

Display physical line errors

Syntax

dspphyslnerrs [slot | slot.port]
 or
dspphyslnerrs <slot.port> (for virtual physical lines)

Related Commands

clrphyslnerrs, prtphyslnerrs

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX	No

Example 1**dspphyslerrs****Description**

Display a summary of all physical line errors at the local IGX node.

System Response

```
sw228          TN      SuperUser      IGX 16      9.1.w2      Aug. 27 1998 17:56 PST
```

```
Total Errors
```

	Code	Out of	Loss of	Frame	HCS
PHYSLN	Errors	Frames	Signal	BitErrs	Errors
6.2	0	0	0	0	0
6.3	0	0	0	0	0
8.1	0	0	0	0	0
10.1	0	0	0	0	0
11.3	-	0	0	0	0
11.4	-	0	0	0	0
11.5	-	0	0	0	0
11.6	-	0	0	0	0

```
Last Command: dspphyslerrs
```

Example 2**dspphyslerrs 11.3****Description**

Display a detailed description of the errors for physical line 11.3 (an OC-3 trunk).

System Response

```
sw228          TN      SuperUser      IGX 16      9.1.w2      Aug. 27 1998 17:59 PST

PHYSLN 11.3      Status:Clear - OK

Type              Count ETS   Status      Type              Count ETS   Status
Out of Frms      0      0           Loss of Sig (RED) 0      -
Loss of Sig      0      0           AIS (BLU)         0      -
Frame BitErrs    0      0           Out of Frms (RED) 0      -
CRC Err          0      0           Frm Err Rate(RED) 0      -
                                   AIS-16 (RED)      0      -
                                   Rmt Oof (YEL)     0      -
                                   Loss of Cell      1      -

Clrd: 08/27/97 13:33:15
```

Last Command: dspphyslerrs 11.3

Example 3**dspphyslnerrs 8.1****Description**

Display a detailed description of the errors for physical line 8.1 (an E3/T3 trunk).

System Response

```
sw228          TN      SuperUser      IGX 16      9.1.w2      Aug. 27 1998 17:57 PST

PHYSLN  8.1          Status:Major - Loss of Sig (RED)
                                           Clrd: 08/27/97 11:04:30
Type          Count ETS   Status      Type          Count ETS   Status
Bipolar Err   0      0          Loss of Sig (RED)  5      -
Out of Frms   0      0          AIS          (BLU)         0      -
Loss of Sig   0      0          Out of Frms (RED)  0      -
Frame BitErrs 0      0          Remote      (YEL)         0      -
CRC Err       0      0          Loss of Cell                                0      -
P-bit Parity Errs 0      0          Loss of Pointer  0      -
C-bit Parity Errs 0      0          PLCP Out of Frame 0      -
```

Last Command: dspphyslnerrs 8.1

Example 4**dspphyslerrs 11.3****Description**

Display a detailed description of the errors for physical line 11.3 (an E1 trunk).

System Response

```
sw228          TN      SuperUser      IGX 16      9.1.w2      Aug. 27 1998 17:59 PST
```

```
PHYSLN 11.3      Status:Clear - OK
```

```
Clrd: 08/27/97 13:33:15
```

Type	Count	ETS	Status	Type	Count	ETS	Status
Out of Frms	0	0		Loss of Sig (RED)	0		-
Loss of Sig	0	0		AIS (BLU)	0		-
Frame BitErrs	0	0		Out of Frms (RED)	0		-
CRC Err	0	0		Frm Err Rate(RED)	0		-
				AIS-16 (RED)	0		-
				Rmt Oof (YEL)	0		-
				Loss of Cell	1		-

```
Last Command: dphyslerrs 11.3
```

Example 5**dspphyslnerrs 10.1****Description**

Display a detailed description of the errors for physical line 10.1 (a T1 trunk).

System Response

```

sb-reef          TN      SuperUser      IGX 16      9.1.12      Aug. 27 1998 18:03 PDT

PHYSLN 10.1      Status:Clear - OK

Type              Count ETS   Status      Type              Count ETS   Status
Bipolar Err      0      0          Status      Loss of Sig (RED) 0      -
Out of Frms      0      0          AIS          (BLU)            0      -
Loss of Sig      0      0          Out of Frms (RED) 0      -
Frame BitErrs   0      0          Rmt Oof      (YEL)            0      -
CRC Err          0      0          Loss of Cell  0      -

                                Clrd: 08/27/97 16:43:20

```

Last Command: dspphyslnerrs 10.1

Table 14-51 dspphyslnerrs—Parameters

Parameter	Description
physical line number	Specifies a physical line for the error display. The form of a specific physical line is <i>slot</i> for single-physical line cards or <i>slot.port</i> for multi-physical line cards.

dspphyslns

Displays a summary of the connection type and current alarm status for physical lines at the local IGX node. If no trunk number is entered, a one-line summary of errors for all trunks at the local node is displayed. If a specific slot number is entered with the command, a detailed analysis, including error threshold (ETH), is displayed. Disabled trunks have their trunk number displayed in dim, reverse video on the screen. The **clrphyslnerrs** command resets all error counts to 0. Table 14-52 contains a brief description of each error.

In this release, you can configure nonconsecutive physical lines on the same IMA trunk. You can use **dspphyslns** to display all physical lines belonging to a particular IMA trunk.

Table 14-52 Description of the Errors in the dspphyslnerrs Display

Line Type	Error	Explanation
All except ATM	Bipolar errors	Number of times two consecutive pulses have the same polarity (AMI coding only).
	Frame slips	Number of times a frame is discarded to re-establish synchronization.
	Out of frames	Number of times a loss-of-frame synchronism is detected on this circuit line.
	Loss of signal	Number of times the signal level at the circuit line input went below the minimum acceptable level.
	Frame bit errors	Number of times the frame bit failed to alternate (frame error).
	CRC errors	Number of times the generated CRC character did not match the received CRC character (applies only if CRC checking is enabled).
	Out of MFrames	Number of times a multiframe synch error was detected (E1 lines only).
	AIS - 16	Number of times the Alarm Information Signal (Blue signal) was received.
Only ATM	Out of Frames	Number of times a momentary loss of-DS3 frame alignment was detected.
	Loss of sync (XX)	Number of times a loss of-DS3 frame alignment lasting more than XX seconds was detected.
	Packet Error	Number of CRC errors for a packet address.
	Line Code Errors	Number of B3ZS code errors detected.
	P-bit Parity Errors	Number of parity errors for the DS3 parity bit (P-bit) sequence.
	C-bit Parity Errors	Number of parity errors for the DS3 control bit (C-bit) sequence.
	Comm Fails	Number of BCC failed to communicate to the other node.
	Loss of signal	Number of times the signal level at the trunk line input went below the minimum acceptable level.
Only ATM	AIS (BLU)	Number of times the Alarm Information Signal (Blue signal) was received.
	Out of MFrames	Number of times a loss of-frame synchronism in the DS3 multiframe alignment was detected.
	Remote Oof	Number of times the DS3 remote alarm (indicating remote end was out of frame alignment) was received.

Full Name

Display physical lines

Syntax

```
dspphyslns [slot]
```

Related Commands

```
clrphyslnerrs, prtphyslnerrs
```

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX	No

Example 1

```
dspphyslns
```

Description

Display a summary of the connection type and current alarm status for all the physical lines at the local IGX node.

System Response

```
sw228          TN      SuperUser      IGX 16      9.1.w2      Aug. 27 1998 17:52 PST

PHYSLN  Type  Current Line Alarm Status      TRK
 6.2    OC-3  Major - Loss of Sig (RED)      6.2
 6.3    OC-3  Clear - OK                      6.3
 8.1    T3    Clear - OK                      8.1
10.1    E3    Clear - OK                     10.1
11.3    E1/30  Clear - OK                     11.3
11.4    E1/30  Major - Loss of Sig (RED)     11.4-6
11.5    E1/30  Major - Loss of Sig (RED)     11.4-6
11.6    E1/30  Major - Loss of Sig (RED)     11.4-6
```

```
Last Command: dspphyslns
```

Example 2

```
dspphyslns 11
```

Description

Display a detailed description of the type and current alarm status for the physical lines in slot 11 (an E1 IMA trunk).

System Response

```

sw228          TN      SuperUser      IGX 16      9.1.w2      Aug. 27 1998 17:53 PST

PHYSLN  Type  Current Line Alarm Status      TRK
11.3    E1/30  Clear - OK                       11.3
11.4    E1/30  Major - Loss of Sig (RED)       11.4-6
11.5    E1/30  Major - Loss of Sig (RED)       11.4-6
11.6    E1/30  Major - Loss of Sig (RED)       11.4-6

```

Last Command: dspphyslns 11

Table 14-53 dspphyslns—Optional Parameters

Parameter	Description
slot number	Specifies a particular slot to display.

dsppwr

The **dsppwr** command displays the current status of the power supplies and the temperature in the cabinet.

Full Name

Display power

Syntax

dsppwr

Related Commands

resetcd

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

dsppwr

Description

Display the power status and temperature inside the current IPX node.

System Response

```
pubsipx1      TN      SuperUser      IGX 8420      9.2      Aug. 8 1998  04:24 PDT

      Power Supply Status                                Cabinet Temperature

Monitor      Status      Revision
Installed    Active      FP
      26      78

      Power Supply Type  +5v  +12v  -12v  -48v  Temp
A Empty
B Empty
C AC 400W IPX      Ok   Ok   Ok
D AC 400W IPX      Ok   Ok   Ok

      C 60 | | 140 F
      e 50 |--| 122 h
      t 40 | | 104 e
      g 30 | | 86  n
      a 20 | | 68  e
      e  |--|  t

Last Command: dsppwr

Next Command:
```

Example 2

dsppwr

Description

Display the power status and temperature inside the current IGX node.

System Response

```

sw151          TN      SuperUser      IGX 16      9.2          Aug. 23 1998 11:50 GMT

Power Supply Status                                Cabinet Temperature

Monitor Rev AK, Ser # 247582 - Status: Active      30          86

  AC Supply      Status
A 1 875W         OK
B 1 875W         OK
C 1 Empty
D 2 Empty
E 2 Empty
F 2 Empty

C 60 | | 140 F
e   | |   a
n 50 |--| 122 h
t   | |   r
i 40 | | 104 e
g   | |   n
r 30 | | 86  h
a   | |   e
d 20 | | 68  i
e   |--|  t

```

Last Command: dsppwr

Next Command:

Example 3

dsppwr

Description

Display the power status and temperature inside the current BPX node.

System Response

```

bootzilla TN      SuperUser      BPX 8620      9.2      May 17 1998 11:06 GMT

      Power Status                                Cabinet Temperature

ASM Status: Active                                21          69

Power voltage A/B:      0 / 49 V

PSU  Ins Type Rev SerNum Failure
A    N  N/A N/A  N/A    N/A
B    Y  ??? 00  ..... None

      Fan Status

FAN   1    2    3
      0000 3300 3240 RPM

Cabinet Temperature
C 60 | | 140 F
e 50 |--| 122 h
t 40 | | 104 e
g 30 | | 86 h
a 20 | | 68 i
e   | |  e

Last Command: dsppwr

Next Command:

```

dspslotalmcnf

Displays the slot alarm configuration for the BPX node.

Full Name

Display slot alarm configuration.

Syntax

```
dspslotalmcnf [slot]
```

Related Commands

dspslotalms

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	BPX	No

Example 1

```
dspslotalmcnf 7
```

Description

Display the slot alarm configuration for the BPX.

System Response

```
D1.jea          TRM   SuperUser          BPX 8620    9.2    Aug. 30 1998 12:04 GMT
```

Slot Alarm Configuration

Minor				Major		
Violation	Rate	Alarm Time	Clear	Rate	Alarm Time	Clear
1) SBus	.01%	10 min	3 min	.1%	10 sec	10 sec
2) InvP	.01%	10 min	3 min	.1%	10 sec	10 sec
3) PollA	.01%	10 min	3 min	.1%	10 sec	10 sec
4) PollB	.01%	10 min	3 min	.1%	10 sec	10 sec
5) BGE	.01%	10 min	3 min	.1%	10 sec	10 sec
6) TBip	.01%	10 min	3 min	.1%	10 sec	10 sec
7) RBip	.01%	10 min	3 min	.1%	10 sec	10 sec
8) Bfrm	.01%	10 min	3 min	.1%	10 sec	10 sec
9) SIU	.01%	10 min	3 min	.1%	10 sec	10 sec

Last Command: dspslotalmscnf 7

Next Command:

Table 14-54 dspslotstatcnf—Optional Parameters

Parameter	Description
slot number	Specifies the slot number of the card to be displayed.

dspslotalms

Displays statistical alarms associated with the SIU on each BPX card. The **dspslotalms** command displays a single line for each slot in a local BPX node occupied by a card. Both the card type and the current card alarm status appears. If a card is operating normally, the display shows “Clear - Slot OK.” If fault conditions continue to cause the slot errors to exceed a preset threshold, the column labeled Current Card Alarm Status reflects this fact. The **clrslotalms** command clears these alarm messages if the alarm condition has disappeared. For a list of slot errors, see the **dspsloterrs** description.

Full Name

Display slot alarms

Syntax

dspslotalms

Related Commands

dspsloterrs

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	BPX	No

Example 1

```
dspslotalms 1
```

Description

Display the status of the card in slot 1.

System Response

```
D1.jea          TRM   SuperUser          BPX 8620    9.2    Aug. 30 1998 12:00 GMT

Slot  Type      Current Slot Alarm Status
 7 BCC          Clear - Slot OK
11 BNI-T3      Clear - Slot OK
```

```
Last Command: dspslotalms
```

```
Next Command:
```

Table 14-55 dspslotalms—Parameters

Parameter	Description
slot number	Specifies the slot number of the card to display.

dspsloterrs

Displays statistical alarms associated with the SIU on each BPX card. The **dspsloterrs** command takes a slot number as an optional parameter: if you enter **dspsloterrs** without a slot number, the display shows a single line for each slot with statistics that have accumulated for all slots.

Both the card type and current status are displayed. If a card is operating normally, the status is “Clear - Slot OK.” If fault conditions persistently cause the slot errors (described in the Display Slot Errors command) to exceed a preset threshold, this fact is displayed under the column labeled Current Card Alarm Status. The **clrslotalm** command clears the alarm messages if the alarm condition has been cleared. Table 14-56 describes the errors in the display.

Table 14-56 Errors Displayed by the dspsloterrs Command

Error	Description
Standby Bus Errors	Indicates a background test over the standby bus produced an error.
Invalid Port Errors	Indicates port number was out of the range 1–3.
Polling Bus A Errors	Parity error occurred on this polling bus.
Polling Bus B Errors	Parity error occurred on this polling bus.
Bad Grant Errors	Error indicates arbiter did not issue a grant to send data before a timeout.
Tx BIP-16 Errors	Data frame transmitted had a checksum error.
Rx BIP-16 Errors	Data frame received with a checksum error.
SIU Phase Errors	Serial Interface Unit on the card did not detect the frame synch properly.
Bframe Errors	Errors detected in the BPX frame on the StrataBus or in a memory operation.

Full Name

Display slot errors.

Syntax

dspsloterrs [slot]

Related Commands

dspslotalms

Attributes

Privilege	Jobs	Log	Node	Lock
1–6	No	No	BPX	No

Example 1

```
dspsloterrs 7
```

Description

Display the alarm statistics for the card in slot 7 of the BPX.

System Response

```
pubsbsp1      TN      SuperUser      BPX 8620      9.2 Aug. 6 1998 17:54 PDT

BCC 7          Status: Clear - Slot OK          Clrd: Date/Time Not Set
Type          Count ETS  Status    Type          Count ETS  Status
Stby PRBS Errs      0    0
Rx InvlD Prt Errs   0    0
Poll Bus A Parity   0    0
Poll Bus B Parity   0    0
Bad Grant Errs      0    0
Tx BIP-16 Errs     0    0
Rx BIP-16 Errs     0    0
SIU Phase Errs     0    0
Bfrm. Par. Errs     0    0
Rx FIFO Sync Errs  0    0
Poll Clk Errs      0    0
CK 192 Errs        0    0
```

Last Command: dspsloterrs 7

Next Command:

Example 2**dspsloterrs****Description**

Display the error status for all slots.

System Response

```
pubsbsp1      TN      SuperUser      BPX 8620      9.2 Aug. 6 1998 18:01 PDT
```

Summary of Slot Errors

Slot	Stdby PRBS Errs	Rx Port Errs	InvlD Poll Par Errs	Poll Bus B Par Errs	Bad Grant Errs	Tx BIP-16 Errs	Rx BIP-16 Errs	SIU Phase Errs	B- Frame Par Errs	Rx FIFO Sync Errs	Poll Clk Errs	CK-192 Errs
1	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0

Last Command: dspsloterrs

Next Command:

Table 14-57 dspsloterrr—Optional Parameters

Parameter	Description
slot number	Specifies the slot number of a card for the display.

dspslotstatcnf

Displays the enabled statistics for the specified slot.

Full Name

Display statistics enabled for a slot

Syntax

dspslotstatcnf [slot]

Related Commands

dspslotalmcnf

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	BPX	No

Example 1

dspslotstatcnf 7

Description

Display thresholds for slot 7.

System Response

```
Dl.jea          TRM   SuperUser          BPX 8620    9.2    Aug. 30 1998 12:03 GMT
```

```
Statistics Enabled on Slot 7
```

Statistic	Samples	Interval	Size	Peaks	Owner
Standby PRBS Errors	60	0	4	NONE	Automatic
Rx Invalid Port Errors	60	0	4	NONE	Automatic
Polling Bus A Parity Errors	60	0	4	NONE	Automatic
Polling Bus B Parity Errors	60	0	4	NONE	Automatic
Bad Grant Errors	60	0	4	NONE	Automatic
Transmit Bip 16 Errors	60	0	4	NONE	Automatic
Receive Bip 16 Errors	60	0	4	NONE	Automatic
Bframe parity Errors	60	0	4	NONE	Automatic
SIU phase Errors	60	0	4	NONE	Automatic

```
Last Command: dspslotstatcnf 7
```

```
Next Command:
```

dspsv3

Displays the Cisco StrataView Plus L3 (Layer 3) Link Control Blocks. (StrataView Plus is now called Cisco WAN Manager.)

Full Name

Display Cisco StrataView Plus L3 (Layer 3) Link Control Blocks

Syntax

dspsv3

or

dspsv3 <LCB number>

Table 14-58 Description of the Fields in the dspsv3 Display

Field	Explanation
Serial Admin	Serial link admin window
LAN Admin	LAN Admin window
LCB	Link Control Block number (0 is the gateway link)
Node	SV+ gateway node number (0 is local IO)
IP	IP address (* indicates nwip is enabled)

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	BPX	No

Example 1

```
dspsv3
```

Description

Display Cisco StrataView Plus L3 Link Control Blocks.

System Response

```
nsaigx2      TN      StrataCom    IGX 16      8.4.18     June 8 1998 06:11 GMT
Number of Active SV3 Links: 2      Serial Admin: None      LAN Admin: None
LCB:  0 Node:  0 IP:*172.16.64.20
LCB:  1 Node:  3 IP:*172.16.64.20
>Last Command: dspsv3
```

Example 2

```
dspsv3 0
```

Description

Display Cisco StrataView Plus L3 Link Control Blocks.

Table 14-59 Description of the Fields in the Previous dspsv3 Display

Field	Explanation
LCB	LCB number
Alloc	LCB allocated (1) or no (0)
sv3_lcb_ptr	Address of LCB in memory
IP Address	SV+ IP Address
Response Timer	SV+ Link Response Timer
Idle Timer	Display SV+ Link Idle Timer
Retry Count	SV+ Link Retry Count
Current Protocol State	Link state (idle, reset, transfer, poll)
No. of buffers in the data_q	Messages in the data queue
No. of buffers in the xmit_q	Messages in the transmit queue
No. of buffers in the nflow_q	Messages in the non-flow-controlled queue

Table 14-59 Description of the Fields in the Previous dspsv3 Display (continued)

Field	Explanation
Subscribed applications	Applications to which SV+ has subscribed
Update object(s)	Robust object types that have updated status
Pending	Robust object types that have been updated to SV+, and are waiting for an acknowledgment from SV+
Robust database update bitmap addresses	Robust database update bitmap addresses.

System Response

```
nsaix2      TN      StrataCom   IGX 16     8.4.18    June 8 1998 06:11 GMT
```

```
LCB: 0 Alloc: 1 sv3_lcb_ptr: 3120248C
IP Address: 172.29.9.60
Response Timer: 0
Idle Timer: 600
Retry Count: 120
Current Protocol State: SV3_TRANSFER
No. of Buffers in the data_q: 0
No. of Buffers in the xmit_q: 0
No. of Buffers in the nflow_q: 0
```

```
This Command: dpsv3 0
```

```
Continue?
```

```
LCB: 0 Alloc: 1 sv3_lcb_ptr: 3120248C
Subscribed Applications: Topology MaintLog
                        312024C0
```

	Update	Pending							
Revision:	0	0							
Stats Rebuild:	0	0							
Subscription:	0	0							
Feeder Obj:	0 312029D2	0 312029D4	Feeder Alarm:	0 31202ED8	0 31202EDA				
Port Obj:	0 312029C6	0 312029CC	Port Alarm:	0 31202ECC	0 31202ED2				
Conn Obj:	0 312024D0	0 31202741	Conn Alarm:	0 312029D6	0 31202C47				
Cline Obj:	0 312029B2	0 312029B7	Cline Alarm:	0 31202EB8	0 31202EBD				
Trunk Obj:	0 312029BC	0 312029C1	Trunk Alarm:	0 31202EC2	0 31202EC7				

```
Last Command: dpsv3 0
```

```
Continue?
```

```
LCB: 0 Alloc: 1 sv3_lcb_ptr: 3120248C
Robust Database Updates data:
db_update_flags:      30D6E16C db_pending_flags:      30D6E355
flag_offset_table:   30D6E56C
  1:0   2:0   3:0   4:0   5:0   6:0   7:0   8:1   9:16  10:1A
11:59 12:0  13:D6 14:D7 15:0  16:DC 17:FC 18:0  19:13B 20:0
21:17B 22:17D 23:0  24:0  25:17F 26:0  27:180 28:0  29:181 30:183
31:0  32:0  33:0  34:185 35:0  36:0  37:186 38:0  39:0  40:0
41:0  42:0  43:0  44:0  45:0  46:187 47:0  48:0  49:0  50:0
51:18C 52:0  53:0  54:0  55:0  56:0  57:0  58:0  59:0  60:0
61:0  62:0  63:0  64:0  65:0  66:18D 67:0  68:0  69:0  70:0
71:0  72:0  73:18E 74:0  75:0  76:0  77:0  78:0  79:0  80:0
81:0  82:0  83:0  84:0  85:0  86:0  87:0  88:0  89:0  90:0
91:0  92:18F 93:18F 94:190 95:1A5 96:1A9 97:0  98:0  99:1E8 100:0
101:0 102:0 103:0 104:0
```

```
Last Command: dpsv3 0
```

LCB	- LCB number
Alloc	- LCB allocated (1) or not (0)
sv3_lcb_ptr	- address of LCB in memory
IP Address	- SV+ IP Address
Response Timer	- SV+ Link Response Timer
Idle Timer	- Display SV+ Link Idle Timer
Retry Count	- SV+ Link Retry Count

```

Current Protocol State      - Link state (idle, reset, transfer, poll)
No. of Buffers in the data_q - Messages in the data queue
No. of Buffers in the xmit_q - Messages in the transmit queue
No. of Buffers in the nflow_q - Messages in the non-flow-controlled queue

Subscribed Applications    - Applications to which SV+ has subscribed

Update                    - Robust object types that have updated object(s)
                           status.
Pending                   - Robust object types that have been updated to
                           SV+, and are waiting for an acknowledge from
                           SV+.

Robust database update bitmap addresses.

```

dsptrafficgen

The **dsptrafficgen** command displays for a given card slot the enabled state of the Traffic Generation feature, and when enabled, the PVC on which it is enabled. You must enable this feature by using the switch software command **cnftrafficgen**, and it must be supported by the firmware on the card. (See the **cnftrafficgen** command.) The **cnftrafficgen** command lets you enable the Traffic Generation test in switch software, which determines if the firmware supports Traffic Generation by checking the response from the **upcd** command. All user levels have permission to use this command.

The **dsptrafficgen** command will take as input the following value:

- the logical card slot number

The Traffic Generation test does not directly log alarms. To find out if traffic generation is enabled, use the **dsptrafficgen** command.

When the Traffic Generation or OAM Loopback test is enabled, it affects the **dspchstats** command results in the following ways. The “To Network” and “From Network” totals include user traffic, OAM traffic, and RM traffic. The OAM traffic is generated by the Traffic Generation and OAM Loopback tests. The “To Port” and “From Port” work as they did previous to Release 9.2.

Full Name

Display traffic generation test state (enabled/disabled)

Syntax

```
dsptrafficgen <logical slot>
```

Related Commands

dsptrafficgen, **cnftrafficgen**, **dspscons**

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	Yes	Yes	IGX, BPX	Yes

Example 1

```
dspttrafficgen 2
```

Description

Display for the specified card slot 2 whether the Traffic Generation test is enabled or not. (If it is enabled, **dspttrafficgen** shows what PVC it is enabled on.

System Response

```
sw99      TN      StrataCom   BPX 8620      9.2.10      Aug. 27 1998 08:59 GMT

           generating      supported
slot      traffic            in fw      Channel
-----
2         Yes              Yes        2.2.6.18
```

```
Last Command: dspttrafficgen 2
```

```
Next Command:
```

Description

Display whether the Traffic Generation Test is enabled on card slot 2. If it is enabled, shows you what PVC it is enabled on.

Table 14-60 dspttrafficgen—Parameters

Parameter	Description
card slot number	Specifies logical card slot number on which you want to see if the Traffic Generation test is enabled or not.

dsptrkerrs

Displays the accumulated line error counts, by failure type, for the specified trunk(s). If you do not enter a trunk number, a one-line summary of errors for all trunks at the local node is displayed. If you enter a specific trunk number with the command, a detailed analysis, including error threshold (ETH), is displayed. Disabled trunks have their trunk number displayed in dim, reverse video on the screen.

Error rates to be concerned about are any that are incrementing. For example, a yred- switchover may cause some statistical errors. These are expected. But if there are errors happening in a stable situation, then they indicate a problem.

The `clrtrkerrs` command resets all error counts to 0. Table 14-61 contains a brief description of each error.

Table 14-61 Description of the Errors in the dsptrkerrs Display

Line Type	Error	Explanation
All except ATM	Bipolar errors	Number of times two consecutive pulses have the same polarity (AMI coding only).
	Frame slips	Number of times a frame is discarded to re-establish synchronization.
	Out of frames	Number of times a loss-of-frame synchronism is detected on this circuit line.
	Loss of signal	Number of times the signal level at the circuit line input went below the minimum acceptable level.
	Frame bit errors	Number of times the frame bit failed to alternate (frame error).
	CRC errors	Number of times the generated CRC character did not match the received CRC character (applies only if CRC checking is enabled).
	Out of MFrames	Number of times a multiframe synch error was detected (E1 lines only).
	AIS - 16	Number of times the Alarm Information Signal (Blue signal) was received.
	Only ATM	Out of Frames
Loss of sync (XX)		Number of times a loss of DS3 frame alignment lasting more than XX seconds was detected.
Packet Error		Number of CRC errors for a packet address.
Line Code Errors		Number of B3ZS code errors detected.
P-bit Parity Errors		Number of parity errors for the DS3 parity bit (P-bit) sequence.
C-bit Parity Errors		Number of parity errors for the DS3 control bit (C-bit) sequence.
Comm Fails		Number of BCC failed to communicate to the other node.

Table 14-61 Description of the Errors in the dsprkerrs Display (continued)

Line Type	Error	Explanation
	Loss of signal	Number of times the signal level at the trunk line input went below the minimum acceptable level.
Only ATM	AIS (BLU)	Number of times the Alarm Information Signal (Blue signal) was received.
	Out of MFrames	Number of times a loss-of-frame synchronism in the DS3 multiframe alignment was detected.
	Remote Oof	Number of times the DS3 remote alarm (indicating remote end was out of frame alignment) was received.

Full Name

Display trunk errors

Syntax

dsprkerrs [slot | slot.port]
 or
dsprkerrs <slot.port> (for virtual trunks)

Related Commands

clrtrkerrs, prttrkerrs

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IGX, BPX	No

Example 1

dsprkerrs

Description

Display a summary of all trunk errors at the local node.

System Response

```
alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 16 1998 13:13 PST
```

```
Total Errors
```

PLN	Code	Rx Pkts	Out of	Loss of	Frame	CRC	Tx Pkts	Packet	Packet
	Errors	Dropped	Frames	Signal	BitErrs	Errors	Dropped	Errors	Oofs
10	-	-	0	0	0	0	0	0	1
14	0	0	0	-	0	-	218M	0	-

```
Last Command: dsptkerrs
```

```
Next Command:
```

The errors in the left column are statistical counts of transitions into alarm. Statistical alarms are based on these counts.

The errors in the right hand column are integrated alarm counts—how many times has the LOS/OOF/ alarm been declared on the trunk. There is no statistical alarm associated with the integrated alarm, so these have an ETS field of -.

Example 2

dsptkerrs 16

Description

Display a detailed description of the errors for trunk 16.

System Response

```

D2.ipx4          TRM   YourID:1          IGX 8420      9.2      Aug. 4 1998  16:34 PST

Packet Line 16  Status: Clear - Line OK          Clrd: Date/Time Not Set
Type           Count ETS   Status   Type           Count ETS   Status
Bipolar Err00Comm Fails0-
Out of Frms00Loss of Sig(RED)1-
Loss of Sig00AIS(BLU)0-
Frame BitErrs00Out of Frms(RED)0-
Tx Voice Pkt Drp00Rmt Oof(YEL)0-
Tx TS Pkt Drp00Packet Oofs(RED)1-
Tx Non-TS Pkt Drp00Rmt Alarms(YEL)0-
Tx NPC Pkt Drp00
Tx Bdata A Pkt Drp00
Tx Bdata B Pkt Drp00
Packet Err41
Packet Oofs00

```

Last Command: dsptkerrs 16

Next Command:

Table 14-62 dsptkerrs—Parameters

Parameter	Description
trunk number	Specifies a trunk for the error display. Without a trunk number, a summary for all physical trunks appears. To display error statistics for virtual trunks, however, you must specify a trunk number in the form <i>slot.port.vtrk</i> . For all physical trunk types, the trunk number is optional: entering dsptkerrs without a trunk number lists all trunks with errors. For standard trunks, the form of a specific trunk is <i>slot</i> for single-trunk cards or <i>slot.port</i> for multi-trunk cards.

prtcInerrs

Prints the accumulated error count since the last time errors were reset. This command uses the same syntax and prints the same information as is displayed using the **dsplnerrs** command. The **clrlnerrs** command clears the error counters for circuit lines by resetting all error counts to 0.

Full Name

Print circuit line errors

Syntax

```
prtcInerrs
```

Related Commands

clrtrkerrs, prttrkerrs

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	Yes	Yes	IGX	Yes

Example 1

```
prtcnerrs
```

Description

Print a summary of all trunk errors at the local node.

System Response

None available as command produces hardcopy.

prtlog

Prints the event log for a node. Events affecting the node are displayed in chronological order with the most recent events at the top of the log. The printout includes a description of the event, the date and time of the event, and the alarm class of the event. This command uses the same syntax and prints the same information as is displayed using the **dsplog** command. See the **dsplog** command for output information.

Full Name

Print event log

Syntax

```
prtlog
```

Related Commands

dsplog

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	Yes	No	IGX, BPX	Yes

Example 1

```
prtlog
```

Description

Print the event log for a node.

System Response

None available as command produces hardcopy.

prtlnerrs

Prints the accumulated error count since the last time errors were reset. This command uses the same syntax and prints the same information as is displayed using the **dsplnerrs** command. The **clrlnerrs** command clears the error counters for circuit lines by resetting all error counts to 0.

Full Name

Print line errors

Syntax

prtlnerrs

Related Commands

dsplnerrs

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	Yes	No	IGX, BPX	Yes

Example 1

prtlnerrs

Description

Print errors for all upped lines on a node.

System Response

None available as command produces hardcopy.

prtlnerrs

Prints the accumulated error count since the last time errors were reset. This command uses the same syntax and prints the same information as is displayed using the **dsplnerrs** command. The **clrlnerrs** command clears the error counters for circuit lines by resetting all error counts to 0.

Full Name

Print physical line errors

Syntax

prtpphyslnerrs

Related Commands

dspphyslnerrs

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	Yes	No	IGX	Yes

Example 1

prtpphyslnerrs

Description

Print errors for all physical lines on an IGX node.

System Response

None available as command produces hardcopy.

prtrkerrs

Prints a summary of the trunk error counts for both physical and virtual trunks on the local node. This is the same information that displays when you use the **dsptrkerrs** command. See the **dsptrkerrs** command for output information.

Full Name

Print trunk errors

Syntax

prtrkerrs

Related Commands

dsptrkerrs

Attributes

Privilege	Jobs	Log	Node	Lock
1–6	Yes	No	IGX, BPX	Yes

Example 1

```
prtrkerrs
```

Description

Print a summary of trunk errors.

System Response

None available as command produces hardcopy.

resetcd

Resets the hardware and software for a card. The **resetcd** command lets you cause a switch between a primary and redundant service card that has been configured for Y-cable redundancy. (Normally, a failure would cause a switch between Y-cabled cards, but you may want to cause the switch to remove the active card to upgrade its hardware, for example.)

Do not use **resetcd** on an *active* NPC, NPM, or BCC because resetting an active controller card interrupts traffic while it boots. (Resetting a controller card does not destroy configuration information.) If a redundant controller card is present and you want to switch between controllers, use the **switchcc** command to switch the active controller card to standby and the standby controller card to active. You can subsequently reset the standby controller without bringing it to the active state (and therefore not disrupt service).

An example of when you might use the **resetcd r** command is if you ran out of memory and had no standby card. If there were a memory leak problem somewhere in the system, you might execute a **resetcd r** command before you run the **switchcc** command (if you do not have a standby card, or you are not sure of the health of the standby card if there is one), then you might execute it locally on the active processor card (BCC or NPM). Note that you do not need to enter the minus symbol before the “r” in the **resetcd r** command (just **resetcd r**) is acceptable.

The **resetcd** command takes an argument to indicate a hardware or failure reset. A hardware reset (**resetcd h**) is equivalent to physically removing and reinserting the front card and causes the card’s logic to be reset. When you reset the hardware of an active card other than a controller card (an NPC, NPM, or BCC), a standby card takes over if one is available. A *failure* reset (**resetcd f**) clears the card failures associated with the specified slot. If a slot contains a front card and back card, **resetcd** resets both cards. A **resetcd r** performs a card reset on processor cards (such as an NPC, NPM, or BCC). Note when the node is in degraded mode, the “r” option is disabled.

You can use the **resetcd** command to initiate a hitless rebuild manually. The Hitless Rebuild feature provides the ability to effectively rebuild without affecting user traffic. It substantially decreases the time it takes for the BPX to settle into its normal operating state after a rebuild.

Previous to Release 9.2, the **resetcd** command accepted the options “h” for Hard Reset, “f” for Failure Reset, and “b” for Arbiter. The “b” is for BPX nodes only. A new option “r” lets you manually initiate a hitless rebuild on processor cards only. Note that the “r” option becomes disabled when the node is in degraded mode.

Full Name

Reset card

Syntax

```
resetcd <slot_num> <reset_type>
```

Related Commands

resetcd

Attributes

Privilege	Jobs	Log	Node	Lock
1-3	Yes	Yes	IGX, BPX	Yes

Example 1

```
resetcd
```

Description

Reset the card in slot 23.

System Response

No display produced.

Table 14-63 resetcd—Parameters

Parameter	Description
slot number	Specifies the card number to be reset.
h/f	Specifies whether the hardware or failure history for the card is to be reset. h—specifies hardware; performs a hardware test f—specifies failure history; performs a failure reset
b	Specifies to use hardware to reset the card, not the CBUS message. This option is also known as the “arbiter” option. You can use the b option only on BPX nodes.
r	Specifies that a hitless rebuild is performed only on processor cards.

resetpc

The **resetpc** command resets a PCS attached to a specified FRM-2 or FRP-2 physical port. Concentrated links, logical ports, and all connections are temporarily suspended while the PCS hardware performs a warm boot.

Once the PCS re-establishes communication with the FRM-2 or FRP-2, logical ports are reconfigured and connections repaired. A series of messages describing each of the concentrated links failing and being re-established is generated.

Full Name

Reset Port Concentrator

Syntax

```
resetpc <slot.port>
```

Related Commands

tstpcs, dsppcs

Attributes

Privilege	Jobs	Log	Node	Lock
1-3	Yes	Yes	IGX, BPX	Yes

Example 1

```
resetpc 2.3
```

Description

Reset the card in slot 23.

System Response

No display produced. (Use **dsppcs** to check status.)

Table 14-64 resetpc-Parameters

Parameter	Description
slot.port	Specifies the card and port number to reset.

switchcc

Switches the standby BCC or NPC (or NPM) card to active and the active card to standby. If a standby BCC card is not available, the command is not executed. If a standby BCC is available but is not ready to go active, a prompt asks you to confirm or abort the switch of the control card. This command was previously called **switchpcc**. Executing **switchcc** has the following effect:

- Control is transferred to the standby controller card.
- Any job currently running is aborted.
- The user is logged off.

Immediately after the switch, the controller card that was previously active reverts to a download mode. This is indicated by the flashing front panel FAIL lamp. The system software image that is always stored in ROM is downloaded to RAM in the event that the system software was corrupted.

After this is completed, the configuration database is downloaded from the newly active controller card to complete the download. This process takes a number of minutes so this controller card is not available for standby operation until this download process is completed. The **switchcc** command results in a very brief interruption of all traffic. Consequently, you should use **switchcc** only when the network can tolerate a brief interruption.

The [f] option for the **switchcc** command will force a cc switchover even if there are pending updates. If you don't specify the [f] option, the system will warn you about pending updates before the switch and give you a choice to not switch over.

In support of the Hitless Rebuild feature, there is no change directly to the user command **switchcc**. However, if the Hitless Rebuild feature is enabled (with **cnfnodeparm** command), the databases needed for a hitless rebuild will be preserved during the subsequent standby rebuild. This will allow for a hitless rebuild if the new standby processor encounters a fatal hardware error shortly after the switchover.

Full Name

Switch control card

Syntax

switchcc [f]

Related Commands

dspcd, **dspcds**

Attributes

Privilege	Jobs	Log	Node	Lock
1-3	Yes	No	IGX, BPX	Yes

Example 1

switchcc

Description

Change the active NPC/BCC to standby, and the standby NPC/BCC to active.

System Response

No display produced.

tstcon

The **tstcon** command tests the integrity of an IPX or IGX data path by inserting node-generated test data. The connection service is affected for only a few seconds during the test. You can only test existing connections. One channel at a time is tested to minimize disruption. Because service is disrupted for a short time, no conditioning is applied during the test. If a failure is detected, the fault is isolated to a replaceable IPX or IGX node, and the standby card (if available) automatically goes into service. During fault isolation, conditioning is applied to both ends of the connection.

In addition to IPX and IGX routing nodes, the **tstcon** command can test an IPX that has been configured as an interface shelf (IPX/AF) in a tiered network but only after a local-remote loopback has been set up with the **addlocrmtlp** command. After testing is complete, you must remove the loopback established with **addlocrmtlp** by using **dellp**.

Table 14-65 describes the results of executing **tstcon**.

Table 14-65 Results of tstcon Execution

Result	Description
Completed	Total number of tests that were run.
Aborted	Number of tests that did not run because the connection was not testable because of loopbacks or missing or failed hardware.
Failures	Number of tests that failed.
Repaired	Number of connections that failed a previous test and have passed the current test.

If you enter a range of channels (some with connections and some without), the unconnected channels are skipped. You can enter the **tstcon** command on the node at either end of the connection. Unlike the **addloclp** and **addrmtlp** commands, **tstcon** does not require external test equipment. You cannot test connections with the **tstcon** command if they are currently looped back with either the **addloclp** or **addrmtlp** commands.

Table 14-66 describes examples of the **tstcon** command with various arguments. Table 14-67 and Table 14-68 describe the required parameters and optional parameters in these examples.

Table 14-66 Examples of tstcon Specification

Command	Description
tstcon *	Test all connections.
tstcon * f	Test all Frame Relay connections.
tstcon * v x	Test all voice connections, abort on first failure.
tstcon 1.3	Test connection on channel 1.3.

Table 14-66 Examples of *tstcon* Specification (continued)

Command	Description
tstcon 4.2.200	Test connection on channel 4.2.200.
tstcon 1.13-16	Test connections on channels 1.13-16.
tstcon 3.21-24 x	Test connections on channels 3.21-24, abort on first failure.
tstcon 3.11-20 v	Test voice connections only on channels 3.11-20.
tstcon 3.11-20 v x	Test voice connections only on channels 3.11-20, abort on first failure.
tstcon 3.21-22 v 5	Test voice connections only on channels 3.21-22 and repeat the test five times.
tstcon 3.14-15 d x 5	Test data connections on channels 3.14-15 and repeat test five times. Abort on failure.

For V.35 ports configured for DTE, the following three items apply:

- Model D FRP, along with software Release 8.1 or higher, supports ForeSight dynamic congestion avoidance feature. The Model D FRP is required for the AIP application in system software Release 7.1. The enhanced V.35 loop back test is available with this card when using Firmware Revision F and system software 7.1.
- A loopback test pattern signal (Test Mode) is transmitted to a modem or NTU to initiate a loopback. Some modems and NTUs recognize this code but do not return the TM signal even though a loop has been set up. The FRPs, with the exception of the Model D Firmware Rev. F, wait to receive the TM signal from the external equipment before the data test is performed. If the FRP Model D Firmware Rev. F receives the TM signal return, it responds. If FRP Model D Firmware Rev. F does not receive the TM signal, it waits 10 seconds and then sends the test pattern. If the external equipment is inoperative or disconnected, the test fails. After the test is completed, transmission of the codes is terminated and the circuit returns to normal operation. The test result is displayed on the node's terminal **tstport** screen.
- Some external equipment support loopback testing but do not recognize the loop test pattern signal (Test Mode) in the data stream. The FRP/FRI toggles the V.35 LLB (local loopback) or the LRB (remote loopback) leads and then sends the test pattern after the time-out period (10 seconds). If the external equipment is inoperative or disconnected, the test fails. The IPX or IGX control terminal displays the result of **tstport** execution.

Full Name

Test connections

Syntax

```
tstcon <channel(s)> [-nolp] [type] [failure abort] [repeat count]
```

Related Commands

dspcons, **dspcons**

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1

tstcon 9.1.100

Description

Test connection 9.1.100. The connections screen appears with the connection for channel 9.1.100 highlighted. The system prompts to confirm the test. A “T” after channel under test indicates that the test is currently running on that channel. When the first test is completed, a message appears indicating the results of the tests. As each test is completed, the T moves to the next channel to be tested and the message is updated to include the cumulative results of the tests. When the test is completed for all the specified connections, the “T” disappears and the message indicates the total number of tests and the cumulative results of the test.

System Response

```
alpha          TRM   YourID:1      IGX 8420    9.2   Aug. 23 1998 11:04 PST

Local          Remote      Remote
Channel        NodeName    Channel     State  Type    Compression  Code Avoid COS O
5.1 T          beta        )25.1       Ok    256                    7/8      0  L
9.1.100        gamma       8.1.200     Ok    fr
9.1.200        gamma       8.1.300     Ok    fr
9.2.400        beta        19.2.302    Ok    fr(Grp)
14.1           gamma       15.1        Ok    v                    0  L
```

Last Command: tstcon 9.1.100

Tests: Completed = 1, Aborted = 0, Failed = 1, Connections Repaired = 0
Next Command:

Table 14-67 *tstcon* – Parameters

Parameter	Description
channels	Specifies the specifies the channel or set of channels whose connections are to be tested. An "*" specifies all connections. Channel is specified in one of the following formats: slot.channelvoice connection slot.portdata connection slot.port.DLCIFrame Relay connection

Table 14-68 *tstcon* – Optional Parameters

Parameter	Description
-nolp	No automatic loopback. This parameter applies only to local-remote loopbacks and is mandatory for testing a multisegment connection in a tiered network.
type	Restricts the test to the designated connection type. Valid connection types are listed below. If no connection type is designated, all connections are tested. v–Tests only voice connections. d–Tests only data connections. f–Tests only Frame Relay connections
x	Aborts the test as soon as a failure is detected. If an "x" is not entered, all specified connections are tested regardless of the test results for each individual connection.
repeat count	Specifies the number of times the test is to be repeated. The range is 1–50. If no test count is specified, the test is run once.

tstconseq

Externally tests the integrity of a connection by sending OAM segment loopback cells over the specified channel for the specified number of times.

Table 14-69 describes the reported results of executing **tstconseq**.

Table 14-69 Results of the *tstconseq* Display

Result	Description
Completed	Total number of tests that were run.
Aborted	Number of tests that did not run because the connection was not testable because of loopbacks or missing or failed hardware.
Failures	Number of tests that failed.
Repaired	Number of connections that failed a previous test and have passed the current test.

Full Name

Test connection segment

Syntax

tstconseg <channel> <iteration count> [A | a]

Related Commands

dspscons

Attributes

Privilege	Jobs	Log	Node	Lock
1-5	Yes	Yes	BPX, IGX	Yes

Example 1

tstconseg 11.2.10.17

Description

Test connection segment 11.2.10.17. The connections screen appears with the connection for channel 11.2.10.17 highlighted. The system prompts to confirm that the test should begin. A “T” after the channel under test indicates the test is currently running on that channel. When the first test is complete, a message appears indicating the results of the tests. As each test is completed, the T moves to the next channel to be tested and the message is updated to include the cumulative results of the tests. When the test is completed for all the specified connections, the T disappears and the message indicates the total number of tests and the cumulative results of the test.

System Response

```

nmsbpx23      TN      SuperUser      BPX 8620      9.2      Aug. 16 1998 12:37 PST

Local          Remote      Remote
Channel        NodeName   Channel
11.2.10.17    nmsbpx23  11.1.11.17      State  Type      Route
                                       Avoid COS 0

```

This Command: `tstconseg 11.2.10.17 1`

Perform a `tstconseg` on this connection (y/n)?

```

nmsbpx23      TN      SuperUser      BPX 8620      9.2      Aug. 16 1998 12:38 PST

```

External Connection Segment Test

Status: Test Complete

Connection ID	Test Count	Failure Count	Success Count
11.2.10.17	1	1	0

Last Command: `tstconseg 11.2.10.17 1`

Next Command:

Table 14-70 `tstconseg`—Parameters

Parameter	Description
channel	Specifies the slot.port.vpi.vci of the channel to be tested.
iteration	Number of times to repeat the test.

Table 14-71 `tstconseg`—Optional Parameters

Parameter	Description
Ala	Specifies that the test be aborted if an error occurs (not case sensitive).

tstdelay

Puts the remote end of the connection into a loopback state, requests the FRP (Frame Relay) or ASI (ATM) to generate a test packet, calculates and displays the round-trip delay (RTD). This delay includes the FRP or ASI and trunk queuing and processing delays throughout the network. The measured delay using **tstdelay** differs from the ForeSight RTD, which uses a high-priority packet and does not include processing and queuing delays.

Using the **tstdelay** command requires that the FRP is at least a Model D. This test interrupts transmission on the connection during the test. Test results appear at the bottom of the screen (this may include a timeout message, as in Example 1).

Testing an IPX or IGX node that has been configured as an interface shelf requires execution of **addlocrmtlp** prior to **tstdelay** and a **tstdelay** parameter that applies only to tiered networks (see optional parameter table). After testing is complete, the loopback established with **addlocrmtlp** must be removed by **dellp**.

Full Name

Test Frame Relay connection delay

Syntax

```
tstdelay <slot.port.DLCI> [count] | tstdelay <slot.port.vpi.vci> [-nolp] [count] [y]
```

Related Commands

addlocrmtlp, **dellp**, **dspcons**, **dspcons**

Attributes

Privilege	Jobs	Log	Node	Lock
1–5	Yes	Yes	IGX, BPX	Yes

Example 1

```
tstdelay 9.1.100
```

Description

Test the delay on Frame Relay channel 9.1.100.

System Response

```

alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 23 1998 11:05 PST

Conn: 9.1.100   gamma      8.1.200   fr
      MIR      CIR      VC Q Depth  PIR      Cmax    ECN QThresh  QIR      FST
      9.6/9.6   9.6/9.6   5/5       256/256   10/10   65535/65535 9.6/9.6   n
% Util: 100/100
Owner: LOCAL  Restriction: NONE  COS: 0                      Status: Failed Test
Group: NONE   Priority: H   TestRTD: 0 msec

Path:   alpha  14--13beta  15--15gamma
Pref:   alpha  14--13beta  15--15gamma

alpha 9.1.100          gamma 8.1.200
FRP:   OK              FRP:   OK
FRI:   OK              FRI:   OK

Last Command: tstdelay 9.1.100

Test delay timed out
Next Command:

```

Example 2

tstdelay 9.1.1.1

Description

Test the delay on ATM connection 9.1.1.1. The first prompt that follows initial command entry is for whether the ForeSight RTD should be included. The second prompt is for confirming that the test should proceed.

System Response

```

bpx1          TN   SuperUser          BPX 8620    9.2    Aug. 31 1998 13:45 PST

Conn: 9.1.1.1   ]bpx6      11.1.1.1   abr      Status: OK
      SCR      MBS      MCR      ABR PCR   UPC FST CLP % util
      4000/4000 1000/1000 4000/4000 4000/4000 y y y 100/100
Owner: REMOTE  Restriction: NONE  COS: 0
Group: NONE   ForeSightRTD: 40 msec  TestRTD: 10 msec

Path:   bpx1    1.3-- 3.3bpx6
Pref:   Not Configured

bpx1          ASI-T3    : OK          bpx6      ASI-T3    : OK
          Line 9.1 : OK          Line 11.1 : OK
          OAM Cell RX: Clear

Last Command: tstdelay 9.1.1.1 n

Round trip delay is 10 msec.
Next Command:

```

Table 14-72 tsdelay—Parameters

Parameter	Description
channel	Specifies the channel of the connection to be tested. It can be a Frame Relay connection specified as slot. port. DLCI or an ATM connection is specified as slot.port.vpi.vci.

Table 14-73 tstfdelay—Optional Parameters

Parameter	Description
-nolp	No automatic loopback. This parameter applies to only local-remote loopbacks and is mandatory for testing a multisegment connection in a tiered network.
repeat count	Specifies the number of times the test is to be repeated. The range is 1–50. If you do not specify a count, the test runs once.
ForeSight RTD (y/n)	Specifies that the ForeSight RTD is included and applies to ATM connections only.

tstpcs

The **tstpcs** command tests the data path for PCS ports for a selected module. The *port* parameter specifies the particular PCS module. The *port* parameter specifies an FRM-2 or FRP-2 physical port to which one of the PCS modules connects.

Upon command entry, each of the 11 ports for the PCS goes into a loop state. In this state, data goes to each port and loops back to the PCS module. Test frames go to a port and are checked for integrity when they return. The test frames also go out on the port.

During this test, any Frame Relay connection data received by the FRM-2 or FRP-2 destined for one of the ports is discarded. The other three Port Concentrator modules are unaffected. After the test, the port is returned to its previous configuration.

The PCS tests available RAM, and sets each of the 11 ports into a loop mode. Ten frames of data are sent to each port and checked to make sure the same frames are received in entirety and in order.

During a test, the **dsppcs** screen shows “Testing” then either “Passed” or “Failed.” The test takes about 15 seconds.

Full Name

Test Port Concentrator Shelf

Syntax

```
tstpcs <slot.port>
```

Related Commands

dsppcs, **resetpc**

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	Yes	Yes	IGX	Yes

Table 14-74 *tstpcs-Parameters*

Parameter	Description
slot.port	<i>Slot</i> is the location of an FRM-2 or FRP-2 card. <i>Port</i> selects the physical port to which a PCS module connects. The range for port is 1–4.

tstport

Executes a port loopback test on the specified data port. Using **tstport** without the optional parameter performs an internal test. The loopback for the internal test is performed on the IPX or IGX back card and is used to test just the IPX or IGX front and back cards. The test disables the communications for that port and the back card is placed into a loopback mode. The applicable card sets for the **tstport** command are the FRP, FRM, SDP, HDM, LDP, and LDM. The card under test sends several frames of data to the port on the interface card, loops them back, and checks their integrity.

If connections exist on the port being tested, the **dspscons** screen appears. If no connections are present, the **dspsrport** screen appears. A flashing T in the connections screen indicates those connections affected by the test. Either a “(” character or a “)” character indicates the loopback in the **dspsrport**. If a local or remote test fails, the port itself is automatically tested (internal) to determine if the IPX or IGX node caused the failure. The following are example command lines:

```
tstport 5.3          internal loopback port test—this is the default loopback
tstport 5.3 n       near external port loopback test
tstport 5.3 f       far external port loopback test.
```

For a Frame Relay port or an LDP or LDM port, an external loopback may be placed at the near (local) or far (remote) modem during the test. For a DDS port, the external loopback is a CSU or DSU loopback at the remote DSU device. If an external port loopback test fails, the internal port loopback test is executed to determine if the IPX or IGX node caused the failure. The **cnfict** command can be used to specify the interface control lead template used to condition the output control leads during loopback.

The local and remote modem tests that test the near end and far end modems or NTUs require the IPX or IGX back card to operate as a DTE, so the modem acts as a DCE in this case. The back card asserts the local or remote loopback pin of the V.35 port. For X.21 ports, which do not have a loopback pin defined, the back card sends a loopback command in the data stream to cause the NTU to go into loopback mode. The test then begins.

The loopback test operation sends several frames of test data, receives them back, compares them, and verifies their integrity. The loopback pin subsequently returns to the inactive state, and the modems return to normal operation. The local or remote test works with only those modems that recognize a local and remote loopback command.

Before starting a test, the user must be sure the cabling is correct for the specific equipment. The test conventions are described in CCITT V.54 and X.21 specifications. Only the near (n) and far (f) options are available for the Model C SDP. If the near or far tests fail, no internal test is executed on the SDP to isolate the problem. The SDP is not failed due to a **tstport** failure.

Full Name

Test port

Syntax

tstport <slot.port> [n | f]

Related Commands

cnfict, **dspcons**,

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IGX	Yes

Example 1

tstport 9.1

Description

Perform an internal port test on a Frame Relay port.

System Response

```

alpha          TRM   YourID:1          IGX 8420    9.2    Aug. 23 1998 11:27 PST

Conn: 9.1.100   gamma      8.1.200   fr
      MIR      CIR      VC Q Depth   PIR      Cmax    ECN QThresh   QIR      FST
      9.6/9.6   9.6/9.6   5/5      256/256   10/10   65535/65535 9.6/9.6   n
% Util: 100/100
Owner: LOCAL   Restriction: NONE   COS: 0                      Status: Failed Test
Group: NONE    Priority: H   TestRTD: 0 msec

Path:   alpha  14--13beta  15--15gamma
Pref:   alpha  14--13beta  15--15gamma

alpha 9.1.100          gamma 8.1.200
FRP:   OK              FRP:   OK
FRI:   OK              FRI:   OK

```

Last Command: `tstport 9.1`

No external clock is detected for DTE
Next Command:

Example 2

tstport 32.1 n

Description

Perform a local (near end) loopback test on port 32.1 (requires port to be configured as DTE).

Example 3

tstport 32.1 f

Description

Perform a remote (far end) loopback test on port 32.1 (requires port to be configured as DTE).

Example 4

tstport 9.1

Description

Perform a test of an FRP port.

■ tstport



Access Device Commands on a Node

This chapter describes the commands that apply specifically to the Cisco access devices (such as the Cisco 3801). The commands in this chapter apply to the trunk between the FTC or FTM card set in an IGX node and an access device.

The contents in this chapter are as follows:

- Introduction
- Descriptions of access device procedures
- Descriptions of access device commands

The commands you enter at the terminal attached to the access device itself are IOS commands. Refer to the documentation for the access device for descriptions of the IOS commands.

Introduction

This chapter describes the commands that apply to an access device. When you use other, common commands such as **addcon**, **dspcon**, **cnfchutl**, use the following syntax to, for example, specify the access device when adding a connection:

```
addcon slot.port.connection_ID,
```

where *slot.port.connection_ID* is the slot and port number of the FTC or FTM and *connection_ID* is the connection identifier.

Summary of Commands

Table 15-1 shows the name and starting page for the description of each command.

Table 15-1 Access Device Commands

Command	Full Name	Page
addad	Add access device	15-3
addcon	Add connection	15-5
cnfadcmtnr	Configure access device congestion management timer	15-8
cnfadcon	Configure access device connection (bandwidth) parameters	15-10

Table 15-1 Access Device Commands (continued)

Command	Full Name	Page
delad	Delete access device	15-14
dspads	Display (all) access devices	15-16
dspcon	Display a connection	15-18
dspcons	Display connections	15-20
resetad	Reset access device	15-23
restartad	Restart access device protocol handshake	15-24

addad

Adds an access device to a node.

Full Name

Add access device

Syntax

addad <slot.port> <access_device_ID> <DLCI> [IP address] [number of mask bits]

Related Commands

dspads

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IPX, IGX	Yes

Example 1

```
addad 12.3 3 990 0
```

Description

Add an access device at slot 12, port 3. The access device ID is 3. The DLCI is 990.

System Response

```

duvel          TRM   SuperUser      IGX 8420      9.2 Mar. 28 1998 08:19 GMT
                Access Devices Information
Slot.Port  Name      ID  DLCI  Type      Alarm IP Address
  12.1      sbrin02  7   990           UNREACHABLE
  12.3      sbrin02  3   990  3800      OK 192.168.6.162/24
Last Command: dspads
This Command: addad 12.2 4 990
Enter Cong Mgmt. Timer (0=Disabled or 4-350 in 10ms units): 0

```

Last Command: addad 12.3 3 990

Next Command:

Table 15-2 addad—Parameters

Parameter	Description
slot.port	Specifies the slot and port number of the trunk to add.
access_device_ID	Device ID of the access device. The range for the ID is 0–255.
DLCI	The available range is 16–1007.

Table 15-3 addad—Optional Parameters

Parameter	Description
IP address	The IP address of the access device is optional. If you enter an IP address, it overrides the IP address that currently exists on the access device.
number of mask bits	The number of bits in the IP subnet mask.

addcon

Adds a connection between an access device and another endpoint. You add connections between the following endpoints:

- UVM and FTM/FTC
- FTM/FTC and FTM/FTC
- FTM/FTC and FRM/FRP
- CVM/CDP and FTM/FTC

Note that, if one end of the connection is a CVM or CDP, you must add the connection at the CVM/CDP.

Three connection types are possible for an access device. After you have specified the local and remote connection identifiers, the interface prompts you for a connection type. The type depends on the endpoint cards, as follows:

- For UVM and FTM/FTC endpoints, and CVM/CDP and FTM/FTC endpoints, the connection type is “voice.”
- For FTM/FTC and FTM/FTC endpoints, the connection type is “session.”
- For FTM/FTC and FRM/FRP endpoints, you specify the type as a Frame Relay class.

Full Name

Add a connection

Syntax

The syntax depends on the endpoint cards.

UVM to FTM/FTC:

```
addcon <slot.line.channel> <node> <slot.port>.<Access Device ID>.<Connection ID>
<Algorithm = a32 | c32 | g729r8 | g729r8v | g729ar8 | g729ar8v>
```

FTM/FTC to FTM/FTC:

```
addcon <slot.port>.<Access Device ID>.<Connection ID> <remote node> <slot.port>.<Access Device
ID>.<Connection ID>
```

FTM/FTC to FRM/FRP:

```
addcon <slot.port>.<Access Device ID>.<Connection ID> <remote node> <slot.port>.<DLCI>
```

CVM/CDP to FTM/FTC:

```
addcon <slot.port> <remote node> <slot.port>.<Access Device ID>.<Connection ID>[compression
algorithm]
```

Related Commands

dspads

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IPX, IGX	Yes

Example 1

```
addcon 4.3.5.31 sw25 4.1.5.31
```

Description

Add a local connection from 4.3.5.31 to 4.1.5.31. The access device ID is 5, the connection ID is 31.

System Response

```

sw25          TN      SuperUser      IGX 8410      9.2 May 26 1998 00:26 GMT

From          Remote      Remote
4.3.31        NodeName   Channel
4.3.31        sw25       4.1.31      State  Type      Compress  Code COS
4.3.32        sw25       4.1.32      Ok     fst
4.3.33        sw25       4.1.33      Ok     fst

```

This Command: addcon 4.3.5.31 sw25 4.1.5.31 session

Add these connections (y/n)?

Table 15-4 addcon—Parameters

Parameter	Description
slot.port	Specifies the slot and port number of the trunk to add. (FTM/FRM)
slot.line.channel	Specifies the slot, line, and channel number of the trunk to add. (UVM/CVM)
access device_ID	Specifies the access device ID number. The range for the access device_ID is 1–255. Access devices on the same trunk are assigned in increasing order.
connection_ID	Specifies a connection identifier. The range for the connection_ID is 1–252.
DLCI (only for FRP or FRM endpoints)	The available range is 16–1007.

Table 15-5 addcon—Optional Parameters

Parameter	Description
compression algorithm	The optional compression algorithm can be one of the following: <ul style="list-style-type: none"> • a16 • a24 • a32 • g729r8 • g729r8v • g729ar8 • g729ar8v

cnfadcmtr

Configures the congestion management timer. The timer is applicable only if ForeSight is active.

The configuration management timer specifies how often rate-adjustment messages are passed between the FTC or FTM and the access device. This timer mechanism lets the congestion management provided by ForeSight extend to access devices. If you enter a 0 for the value, the interface card and device do not exchange rate adjustment messages.

Full Name

Configure access device congestion management timer

Syntax

cnfadcmtr <slot.port> <Cong. Mgmt. Timer>

Related Commands

addad, dspads

Attributes

Privilege	Jobs	Log	Node	Lock
1	No	Yes	IPX, IGX	Yes

Example 1

cnfadcmtr 4.3 350

Description

Configure the congestion management timer for port 3 of the card in slot 4 for 350 milliseconds.

System Response

```
sw25          TN      SuperUser      IGX 8410      9.2 Apr. 1 1998 11:17 GMT
```

```

      FrontCard  BackCard
      Type  Rev  Type      Rev  Status
1  NPC    BFF
2  Empty reserved for NPC
3  CDP    BFC  E1      AD   Active
4  FTC    CF15 FPC-V35 AA   Active
5  AIT    AJF  AIT-T3 AE   Active
6  NTC    EUJ  E1      AN   Active
7  Empty
8  FTC    BHJ  FPC-V35 AA   Standby

```

This Command: cnfadcmtmr 4.3

Enter Cong Mgmt. Timer (0=Disabld or 40-350 in 10ms units): 350

Table 15-6 *cnfadcmtmr—Parameters*

Parameter	Description
slot.port	Specifies the slot and port number.
Cong. Mgmt. Timer	The setting for the timer. The number you enter is actually a multiplier for the base of 10 milliseconds, so the granularity is automatically 10 milliseconds. The range for the multiplier is 4–350, so the range for the timer is 40–3500 milliseconds. The default (no user-input) is 100 milliseconds. To disable the timer, enter a 0.

cnfadcon

Configures bandwidth parameters for the trunk connection between an access device and the FTC or FTM. The parameters for **cnfadcon** are bidirectional. (Type a slash between the parameter for each direction.) The first parameter is from the node to the access device. The second parameter is from the access device to the node. An asterisk (*) indicates that the value is to remain unchanged for that direction. The only parameter that is not bidirectional is FST (ForeSight enable = y or n).

The command line interface does not prompt for individual bandwidth parameters. Therefore, refer to the **cnfadcon** options table to see the order in which you type the parameters.

Full Name

Configure access device connection

Syntax

```
cnfadcon <slot.port> <bw_parameters>
```

Related Commands

dspscon, cnffrcon, cnfcon

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IPX, IGX	Yes

Example 1

```
cnfadcon 4.2 76.8/76.8
```

Description

Configure the device trunk at port 2 of the card in slot 4 to have MIR (and so on) of 76.8 Kbps.

System Response

```
sw25          TN      SuperUser      IGX 8410      9.2 Apr. 2 1998 18:44 GMT
Conn: 4.2.100      ]  sw25      4.3.101      session      76 Kbps
                                      Status:OK
      MIR      CIR      VC Q Depth      PIR      Cmax      ECN QThresh      QIR
76.8/76.8 76.8/76.8 600/600      76.8/76.8 1/1      300/300      76.8/76.8
Priority: H      TestRTD: 0 msec      FST: n % Util: 100/100
```

```
Path: Route information not applicable for local connections
```

```
sw25      FTC: OK      sw25      FTC: OK
          FPC: OK      sw25      FPC: OK
          Access Device: OK      Access Device: OK
```

```
Last Command: cnfadcon 4.2.100 76.8/76.8
```

```
Next Command:
```

Table 15-7 cnfadcon—Parameters

Parameter	Description
slot.port	Specifies the slot and port on an FTC/ FTM for an access device connection.
bw_parameters	<p>The bandwidth parameters are as follows:</p> <ul style="list-style-type: none"> • MIR/MIR is defined as fr_MIR_Tx /fr_MIR_Rx, where fr_MIR is the minimum information rate for a connection. The range is 2.4 Kbps–2048 Kbps. • CIR/CIR is defined as fr_CIR_Tx and fr_CIR_Rx, where fr_CIR is defined as the committed information rate guaranteed to the user. The CIR range is 2.4 Kbps–2048 Kbps. • VC_Q/VC_Q is defined as fr_vc_q_Tx/fr_vc_q_Rx, where fr_vc_q_Tx is the maximum transmit VC queue depth. The VC_Q range is 1–65535 bytes. (An alternative to this parameter is possible, as the description of <i>Bc</i> shows.) <p>or</p> <p>Bc/Bc is defined as fr_Bc_Tx /fr_Bc_Rx. Bc has meaning for only ForeSight connections. If you have selected Frame Relay Forum standard parameters (through the cnfsysparm command), the Committed Burst (Bc) parameter appears instead of VC_Q. Bc is the amount of data the network can accept over a variable time interval (Tc) for committed delivery on a specific PVC. The range for Bc is 1–65535 bytes. The relationship between Bc and VC_Q is:</p> $Bc = VC_Q / ((1 - (CIR/port\ speed)))$ <ul style="list-style-type: none"> • PIR/PIR is defined as fr_PIR_Tx /fr_PIR_Rx, where fr_PIR_Tx is the peak transmit rate for the PVC. The PIR range is 2.4–2048 Kbps. You can also specify the value 0 to cause PIR to default to the port speed. Thus, you can modify PIR, leave it the same, or set it to the port speed. (An alternative specification for this parameter is possible, as the description of <i>Be</i> shows.) <p>or</p> <p>Be/Be is defined as fr_Be_Tx /fr_Be_Rx. If you have selected Frame Relay Forum standard parameters (through the cnfsysparm command), the PVC uses Excess Burst (Be) instead of PIR. Be is the <i>amount</i> of transmit/receive data above the number of bytes set by Bc if enough bandwidth is available. Specify Be in bytes within the range 1–65535. Delivery of Be-data is not guaranteed. Be has meaning to only ForeSight. The relationship between Be and PIR is:</p> $Be = Bc * ((PIR/CIR) - 1)$

Table 15-7 *cnfadcon—Parameters (continued)*

Parameter	Description
bw_parameters	<ul style="list-style-type: none"> • Cmax/Cmax is defined as fr_cmax_Tx /fr_cmax_Rx, where cmax is the maximum credits the connection can accrue. The Cmax range is 1–255 packets per second (pps). • ECNQ_thresh/ECNQ_thresh are the transmit and receive threshold settings for the explicit congestion notification control queues. The range for ECNQ_thresh is 1–65535 bytes. • QIR/QIR is defined as fr_QIR_Tx /fr_QIR_Rx, where fr_QIR is the quiescent information rate for a connection, which is the initial transmit rate after a period of inactivity on the channel. If you do not specify the quiescent receive rate fr_QIR_Rx, the system sets it to the transmit value. The values are specified in Kbps and must be in the range MIR–PIR. In addition, you can specify the value 0 to default to the MIR. QIR has meaning for only ForeSight connections. • FST enables or disables (purchased) ForeSight option for a connection. Valid entries are y (use ForeSight) or n (do not use ForeSight). If the ForeSight status changes, the network reroutes the connection.

delad

Deletes an access device from a node. Before you can delete an access device, you must remove all connections from the device by using the **delcon** command.

Full Name

Delete access device

Syntax

delad <slot.port>

Related Commands

addad, **dspads**

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	No	Yes	IPX, IGX	Yes

Example 1

delad 31.1

Description

Delete the access device at 31.1.

System Response

```
IPX          TRM   SuperUser          IGX 8430    9.2 Date/Time Not Set
```

```
Access Device Information
```

Slot.Port	Name	ID	DLCI	Port_ID	Alarm
31.1	ad1	1	17	0	OK
31.2	ad2	2	18	0	OK
31.3	ad3	3	19	0	OK
31.4	ad4	4	20	0	OK

```
This Command: delad 31.1
```

```
Delete access device (y/n)?
```

Table 15-8 delad—Parameters

Parameter	Description
slot.port	Specifies the slot and port number.

dspads

Displays all access devices in the node. The **dspads** command takes no parameters. The displayed information consists of the following:

- The IPX or IGX slot and port that connect to each access device.
- The name of the access device.
- The access device ID number of the channel between the interface card and the device. Multiple access devices on the same channel are displayed in increasing order.
- The DLCI of the device.
- The type of access device (such as a Cisco 3810), as reported by the device.
- The alarm status (which can be OK, init, or failed).
- The setting for the Congestion Management Timer (in 10-millisecond multiples, 0 if the CMT is disabled).
- The IP address of the device and the number of bits in the subnet mask.

**Note**

If an access device name and IP address are not relevant, such as when an FTC/FTM port loopback is simulating access devices, blank spaces appear in the “Name,” “Type,” and “IP Address” fields of the display.

Full Name

Display (all) access devices

Syntax

dspads

Related Commands

addad, delad, cnfadcmtr

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	Yes	Yes	IPX, IGX	Yes

Example 1

dspads

Description

Display all the access devices in the current node.

System Response

```
sw25          TN      SuperUser      IGX 8410      9.2 Apr. 1 1998 13:12 GMT

                Access Devices Information

Slot.Port  Name      ID  DLCI  Type      Alarm      CMT  IP Address
-----
   4.2                8   990                OK          0
   4.3    sbrin01  4   990  3800      OK          91  192.168.6.161/24
```

Last Command: dspads

Next Command:

dspcon

Displays connection information for a connection. The information displayed includes:

- The channel number at both the local and remote ends of the connection.
- The node name at both ends of the connection.
- The type or data rate of the connection.
- The connection priority (low or high).
- The preferred route for the connection (if configured).
- The status of the front and back cards and access devices associated with the connection.
- Any Y-cable conflicts (LDI, CDP for example).
- If one endpoint is a CDP or CVM, the compression status (VAD on or off, ADPCM on or off).
- The bandwidth parameters for the connection.
- The ForeSight enable status.
- The percent of utilization.
- The connection descriptor (if configured).
- The circuit round-trip delay (RTD) if ForeSight is enabled.

A failure that affects the connection flashes on the screen. The possible status messages are:

- OK Connection OK.
- FAILED Connection failed.

Full Name

Display connections

Syntax

dspcon <channel>

Related Commands

addcon, cnfcondsc, cnfcos, cnfpref, dspcons

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IPX, IGX	No

Example 1

dspcon 4.1.33

Description

Display connection information for Frame Relay channel 4.1.33.

System Response

```
sw25          TN      SuperUser      IGX 8410      9.2 May 25 1998 23:07 GMT
Conn:  4.1.33          sw25          4.3.33          fst
                                           Status:OK
      MIR      CIR      VC Q Depth      PIR      Cmax      ECN QThresh      QIR
      56/56      56/56      65535/65535      512/512      10/10      65535/65535      128/128
Priority: L  ForeSightRTD: 40 msec  TestRTD: 0 msec  FST: y  % Util: 100/100
```

Path: Route information not applicable for local connections

```
sw25          FTC:  OK          sw25          FTC:  OK
          FPC:  OK          sw25          FPC:  OK
          Access Device: OK      Access Device: OK
```

Last Command: **dspcon 4.1.33**

Next Command:

Table 15-9 *dspcon-Parameters*

Parameter	Description
channel	Specifies the channel in the format <i>slot.port.connection_ID</i> . The range for <i>connection_ID</i> is 1–252. The dspcon command displays information for one connection at a time.

dspcons

Displays a summary of the connections on an IPX or IGX node. Table 15-10 shows the fields displayed in the **dspcons** screens.

Table 15-10 *Information in the dspcons Display*

Field	Description
Local Channel	The connection's channel at this node.
Remote Node Name	The name of the node at the other end of the connection.
Remote Channel	The connection's channel at the remote node.
State	The state of the connection(s) as follows: <ul style="list-style-type: none"> • OK = Routed • Down = Downed • OK Downed = Waiting for onhook to occur to allow courtesy down to take place for connection(s) that have been courtesy downed using the dncon command. • Failed = Unrouted, but trying
Type	The type of connection (v = voice, d = data, fr = Frame Relay, atrf = ATM to Frame Relay interworking, atfst = ATM to Frame Relay interworking with ForeSight, -fail = failed connections; data rate in Kbps for data)
Route Avoid	The type of lines to avoid when routing (satellite lines, terrestrial lines, lines with zero code suppression).
Compression	The type of compression applied to the connection (PCM, PCM and VAD, ADPCM, VAD and ADPCM for voice connections), (DFM for data connections).
COS	The Class of Service.
Owner	The end of the connection in control of rerouting.
Descriptor	The connection descriptor string (if +d option specified).

Table 15-10 Information in the dspcons Display (continued)

Field	Description
Loopback	A connection with a local loopback is indicated by a right parenthesis symbol between the Local Channel and Remote NodeName columns. A Frame Relay connection with a port loopback is indicated by a right bracket symbol between the Local Channel and Remote NodeName columns. A connection with a remote loopback is indicated by a right parenthesis symbol before the channel number in the Remote Channel column.
Local/Remote A-bit	A-bit status on the local and remote nodes if -abit option selected. Note that -abit is incompatible with -v, -d, and +d.

Full Name

Display connections

Syntax

```
dspcons [start_channel] [nodename] [state] [type]
[-g | +d | -v | -d | -f | -abit | -fabit | -atfr | -siw | -fail | -down]]
```

Related Commands

addcon, cnfchadv, chfchdfm, cnfcondsc

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	IPX, IGX	No

Example 1

```
dspcons
```

Description

Display a summary of all connections.

System Response

```

sw25          TN      SuperUser      IGX 84208      9.2 May 25 1998 23:29 GMT

Local         Remote      Remote
Channel       NodeName   Channel     State  Type      Compress  Code COS
4.1.32        sw25       4.3.32     Ok     fst
4.1.33        sw25       4.3.33     Ok     fst
4.3.32        sw25       4.1.32     Ok     fst
4.3.33        sw25       4.1.33     Ok     fst

```

Last Command: dspcons

Next Command:

Table 15-11 dspcons—Optional Parameters

Parameter	Description
start channel	Specifies the channel to begin the display. The start channel on a CDP or CVM is specified as <i>slot.channel</i> . The start channel on a UVM is <i>slot.line.channel</i> .
node name	Specifies that only connections to this remote node from the local node be displayed. If no <i>nodename</i> is designated, connections from the local node to all other nodes are displayed.

Table 15-11 dspcons—Optional Parameters (continued)

Parameter	Description
connection type	<p>Specifies that only connections of a certain type be displayed. If you do not add at least one argument to specify a particular connection type, all connections appear. When you enter the connection type on the command line, precede it with a hyphen (-). In some cases, you can add more than one connection type (with a space between), but not all compound arguments are compatible, so you may not always see the expected combination of types. The connection types are:</p> <ul style="list-style-type: none"> -v displays only voice connections. -d displays only data connections. -f displays only Frame Relay connections. -abit shows A-bit (nni) status. -fabit shows connections with failed A-bit (nni) status. -fail shows only failed connections -g shows only grouped connections -siw shows service interworking connections. -atfr shows only network interworking connections.
+d	Causes the display to show the user-configured descriptor for the connection instead of the compression and ownership fields.

resetad

Directs an access device to reset itself from a node terminal. The reset initiated by **resetad** is a cold-boot start of the access device. (The **restartad** command re-initiates the control session between the node and the access device.)

Full Name

Reset access device

Syntax

resetad <slot.port>.<Access Device ID>

Related Commands

restartad, **dspads**

Attributes

Privilege	Jobs	Log	Node	Lock
1–3	Yes	Yes	IPX, IGX	Yes

Table 15-12 resetad—Parameters

Parameter	Description
slot.port	Specifies the slot and port number that connects to the access device.
access device_ID	Specifies the access device ID number. The range for the access device_ID is 1–255. Access devices on the same trunk are assigned in increasing order.

restartad

Restarts an access device session from a node's command terminal. The **restartad** command restarts the control session of an access device on an IGX node. A control session is first established when the following conditions are true:

1. You add an access device to the node with **addad**.
2. The port speed and other parameters on the device and the port match.

Once a control session is established, you can configure and manage the access device by commands you issue at the node. These commands are the access device commands in this chapter and the other, common commands in this manual.

The **restartad** command does not perform a hard reset of the access device itself. See **resetad** regarding a hard reset of the access device.

Full Name

Restart access device

Syntax

restartad <slot.port>.<Access Device ID>

Related Commands

resetad, **dspads**

restartad

Attributes

Privilege	Jobs	Log	Node	Lock
1-2	Yes	Yes	IPX, IGX	Yes

Table 15-13 restartad-Parameters

Parameter	Description
slot.port	Specifies the slot and port number.
access device_ID	Specifies the access device ID number. The range for the access device_ID is 1-255. Access devices on the same trunk are assigned in increasing order.



VSI Commands

Virtual Switch Interface (VSI) is a common control interface for MSSBU switches such as the BPX 8650 and the MGX 8850. Virtual Switch Interfaces (VSIs) allow a node to be controlled by multiple controllers, such as MPLS (Multiprotocol Label Switching, formerly called Tag Switching) and PNNI.

When a virtual switch interface (VSI) is activated on a port, trunk, or virtual trunk so that it can be used by a master controller, such as a SES PNNI or an MPLS controller, the resources of the virtual interface associated with the port, trunk or virtual trunk are made available to the VSI. These control planes can be external or internal to the switch. The Virtual Switch Interface provides a mechanism for networking applications to control the switch and use a partition of the switch resources.

VSI was implemented first on the BPX 8650 in Release 9.1, which uses VSI to perform Multiprotocol Label Switching. Release 9.1 allowed support for VSI on BXM cards and for partitioning BXM resources between Automatic Routing Management (formerly called AutoRoute) and a VSI-MPLS controller. Previous to this release, you could configure partition resources to be shared between Automatic Routing Management PVCs and one VSI control plane, but not both. You now can configure partition resources between Automatic Routing Management PVCs and two VSI controllers (LSC or PNNI).

The second implementation of VSI on the BPX provides the following extended functionality:

- class of service templates
- virtual trunks support for VSI
- support for VSI master redundancy
- multiple VSI partitions
- SV+ support for VSI



Caution

You can use the VSI features (such as to configure a VSI-MPLS controller or a PNNI controller). However, you can still configure and use Automatic Routing Management PVCs. Use the **cnfrsrc** command to configure Automatic Routing Management PVCs.

For more overview information and specific information on how to configure a BPX 8650 switch, refer to the *<CellCommand>Cisco BPX Series Installation and Configuration*. For information about configuring a 6400, 7200 or 7500 router for MPLS operation, refer to the *MPLS Configuration Guide*.

VSI Terms and Acronyms

These terms relate to Virtual Switching Interface and MPLS (Multiprotocol Label Switching):

ATM Edge LSR

A label switching router that is connected to the ATM-LSR cloud through LC-ATM interfaces. The ATM edge LSR adds labels to unlabeled packets and strips labels from labeled packets.

ATM-LSR

An ATM-LSR is a MPLS (Multiprotocol Label Switching) router in which packets are forwarded by switching cells rather than frames, and all packet interfaces are MPLS (Label) Controller-ATM interfaces.

A label switching router with a number of LC-ATM interfaces. The router forwards the cells from these interfaces using labels carried in the VPI and/or VCI field.

BCC

The switch control card in the BPX is the Broadband Control Card, which has a 68040 processor.

BPX

A high-end ATM switch called the Cisco Broadband Packet Exchange (BPX). The BPX is a carrier-quality switch, with trunk and CPU hot-standby redundancy.

BPX-LSR

An ATM label switch router consisting of a label switch controller (series 6400, 7200 or 7500 router) and a label controlled switch (BPX switch).

BXM

The Broadband Switch Module (BXM) cards are ATM port cards for the BPX switch that use the Monarch chipset. Various different port configurations are supported by the BXM card: 8×DS3, 12×DS3, 4×OC-3, 8×OC-3, 1×OC-12 or 2×OC-12. The Monarch architecture supports up to 64K bidirectional cross-connect legs per BXM card, although only 16K or 32K options are supported in the first release. The BXM has very flexible input and output queueing facilities, a Segmentation Assembly and Reassembly (SAR) capability, and a MIPS 4650 control processor.

Class of Service (CoS) Buffer

A buffer or queue that serves connections with similar QoS requirements. Also called “QBin” (though a QBin is a platform-specific instance, such as a BXM card, of the more general Class of Service Buffer (CoSB)).

Class of Service (CoS) Buffer Descriptor Template

A component of a Service Class Template that contains Class of Service Buffer configurations indexed by CoSB number.

A QBin is a platform-specific (BXM in this case) instance of the more general Class of Service Buffer (or CosB).

CLI

There are two separate Command-Line Interfaces on the BPX-LSR: One on the BPX itself and one on the MPLS (Multiprotocol Label Switching) Controller. The Control Point integrate these into a single command line interface.

CommBus

The CommBus is the BPX’s internal messaging protocol.

CosB

See Class of Service (CoS) Buffer.

Feeder

A feeder is a small switch that acts as an extension shelf, typically with lower-bandwidth interfaces, for a larger switch. The larger switch is referred to as the Routing node with the feeder(s) it supports. Collectively, the feeder(s) and routing node form a type of supernode.

LC-ATM Interface

A Label Controlled ATM interface is an MPLS (Multiprotocol Label Switching) interface where labels are carried in the VPI/VCI bits of ATM cells, and where VC (virtual circuit) connections are established under the control of MPLS (Multiprotocol Label Switching) control software.

LCN

Each interface card in a BPX has a certain number of Logical Connection Numbers. A Logical Connection Number is used for each cross connect leg through the card in question. “LCN” is often roughly synonymous with “cross-connect leg.” In VSI terminology, an LCN is an example of an Other End Reference.

Logical Interface

Each physical interface and every virtual trunk endpoint on a platform is represented to the VSI controllers as a different logical interface with partitions, and other VSI configuration. Logical Interface numbers are 32-bit with a format which is, in general, known only to the platform.

LSR

Label Switching router, which is an MPLS (Multiprotocol Label Switching) router.

PNNI

Private Network-to-Network Interface controller software that runs on the SES hardware platform. The term PNNI controller and SES may be used interchangeably.

Port

The VSI makes no distinction between trunk ports and endpoint ports. “Port” is synonymous with “Interface.”

Routing Node

In tiered networks terminology, a routing node is a larger switch to which one or more feeders is attached. Collectively, the feeder(s) and routing node form a type of supernode.

Service Class (aka Service Type)

A concept for grouping connections that share a common set of traffic characteristics and QoS requirements. The terms service class and service type are sometimes used interchangeably.

**Note**

In this release, there are some major service categories, such as VbrRt, VbrNRt, CBR, Abr, and Ubr, and under these major service categories are service types such as VbrRt1, VbrRt2, VbrRt3, and VbrNRt1, VbrNrt2, and so on.

Service Class Database

The collection of data items that support the service class template concept, and implemented on a per-VI basis on the BXM. These items include a B2_Body2copy of the specific Service Class Template selected for a VI, as well as additional data as required.

Service Class Template (SCT):

A set of data structures that map VSI service types to sets of pre-configured VC and QBin parameters. Consists of two sub-components—a VC Descriptor Template and a Class of Service Buffer descriptor template.

VC

ATM and Frame Relay traffic is carried in Virtual Channels that are set up between adjacent ATM or Frame Relay switches before data transmission occurs. An ATM link between switches may support up to 2^{28} different VCs, although a small number of VCs is reserved for special purposes.

VCI

Each VC within a specific Virtual Path on a link has a unique Virtual Channel Identifier, which is a 16-bit number.

VC Descriptor Template

A component of a Service Class Template which contains platform-specific VC configurations that are indexed primarily by service type. Together with a Class of Service Buffer (CoSB) descriptor template, it defines a Service Class Template (SCT).

VP, VPC, VPI

A Virtual Path is a bundle of 2^{16} Virtual Connections with the same Virtual Path Identifier, that is, the first 12 bits of the VPCI. Most ATM switches can switch VPs using only a single cross-connect (instead of up to 2^{16}). An end-to-end sequence of VPs cross-connected at the intermediate switches is a Virtual Path Connection.

VPCI

Each VC on a link has a unique Virtual Path and Channel Identifier, which is a 28-bit number. The VPCI consists of a 12-bit VPI concatenated with a 16-bit VCI.

Virtual Trunks

A Virtual Trunk is a Virtual Path Connection which appears to VSI masters as ordinary trunk (except that the trunk supports 64K VCs at most). In a VSI platform, a virtual trunk endpoint has its own logical interface.

VSI

Virtual Switch Interface is a proposed common control interface to all Cisco MSSBU switches. It embodies both connection management and switch configuration discovery capabilities.

VSI 2

Virtual Switch Interface, Protocol Version 2: this is revision 2 of a proposed common control interface to all MSSBU switches. It embodies both connection management and switch configuration discovery capabilities.

VSI Controller

A controller, such as a PNNI SVC Controller, Portable AutoRoute or Label Switch Controller, which controls a switch using the VSI.

VSI Master

A VSI master process implementing the master side of the VSI protocol in a VSI controller. Sometimes the whole VSI controller might be referred to as a “VSI Master”, but this is not strictly correct.

- 1) A device that controls a VSI switch, for example, a VSI Label Switch Controller.
- 2) A process implementing the master side of the VSI protocol.

VSI Slave

- 1) A switch (in the “Single Slave model”) or a port card (in the “Multiple Slave Model”) that implements the VSI.
- 2) A process implementing the slave side of the VSI protocol.

Summary of Commands

Table 16-1 shows the command name and starting page for the description of each VSI-related command.

Table 16-1 *Commands for Setting up a Virtual Switch Interface (VSI) Controller*

Mnemonic	Description	Page
addctrlr	Attach a controller to a node; for controllers that require Annex G capabilities in the controller interface. Add a PNNI VSI controller to a BPX node through an AAL5 interface shelf.	16-6
addshelf	Add a trunk between the hub node and interface shelf, VSI-MPLS (Multiprotocol Label Switching) controller, or and SES PNNI.	16-9
cnfqbin	Configure QBin parameters.	16-17
cnfrsrc	Configure resources, for example, for Automatic Routing Management PVCs and MPLS (Multiprotocol Label Switching) Controller (LSC).	16-24
cnfvsiif	Configure VSI Interface or a different template to an interface.	16-34
cnfvsiipart	Configure VSI partition characteristics for VSI.	16-36
delctrlr	Delete a controller, such as a PNNI ESP (Extended Services Processor) 4.0 controller, from a BPX node.	16-37
delsshelf	Delete a trunk between a hub node and access shelf.	16-40
dspchuse	Display a summary of channel distribution in a given slot.	16-43
dspctrlrs	Display the VSI controllers, such as an PNNI controller, on a BPX node.	16-46
dspqbin	Display QBin card.	16-42
dspqbint	Display QBin template.	16-46
dsprsrc	Display LSC (Label Switching Controller) resources.	16-46
dspsect	Display Service Class Template assigned to an interface.	16-46
dspvsiif	Display VSI Interface.	16-76
dspvsiipartenf	Display information about VSI ILMI functionality.	16-78
dspvsiipartinfo	Display VSI resource status for the partition.	16-42

addctrlr

Adds VSI capabilities to a trunk interface to which a feeder of type AAL5 is attached. The **addctrlr** command is used only to connect a Private Network to Network Interface (PNNI) controller. PNNI controller software resides on the SES hardware.

The **addctrlr** command is the second step in the adding of a PNNI controller to a BPX node.

The first step is to run the command **addshelf** with shelf type set to P to add a AAL5 feeder. This ensures that Annex G protocol runs between the BPX and the SES.

Then run the **addctrlr** command to set up the VSI control channels from the PNNI SES controller to the VSI slave processes running on the BXM cards to ensure full VSI functionality for the PNNI controller. You execute the **addctrlr** command on an existing AAL5 interface shelf.

Also note that you can add a PNNI controller to a trunk interface only if the interface already has an active VSI partition corresponding to the partition that is controlled by the PNNI controller. Suppose a PNNI controller controlling the partition 1 were added to a trunk interface 12.1. Then it would be necessary that a VSI partition corresponding to partition 1 be active on the interface 12.1. Otherwise the **addctrlr** command would fail.

When you add VSI controller capabilities onto an AAL5 interface shelf (or feeder), the switch software prompts you for the specifics of the VSI controller:

- controller ID of the PNNI controller
- partition ID of the VSI partitions controlled by the PNNI controller
- VPI used for the VSI control channels set up by the PNNI controller
- start VCI value for the VSI control channels set up by the PNNI controller

There could be 12 BXM cards on the BPX node and the PNNI controller would control VSI partitions on those BXM cards that support VSI capability. Hence a separate VSI control channel must be set up from the PNNI control to each BXM card that supports VSI. Suppose you specify a VPI value of 0 and start VCI value of 40 for the VSI control channels. Then the control channel corresponding to any BXM card on slot 1 would use VPI, VCI values <0, 40>. The VSI control channels to other slots would use the VPI, VCI values of <0, 40+slot-1>, where “slot” corresponds to the slot number of the BXM card.



Caution

For feeder trunk interfaces, the **addctrlr** command will fail if the AutoRoute connections terminating on the feeder interface use the same VPI VCI as those specified for the VSI control channels. You must delete the connections before proceeding if connections with VPI and VCI in the range exist in the range you specified.

The addition of a controller to a node will fail if there are not enough channels available to set up the control VCs in one or more of the BXM slaves.



Full Name

Add VSI capabilities to a AAL5 feeder interface

Syntax

```
addctrlr < slot.port> <controller id> <partition id> <control_vpi> <start_vci>
```


Table 16-2 Parameters—addctrlr

Parameter	Description
<slot.port>	Slot and Port numbers corresponding to the feeder trunk.
<controller-id>	Controller ID corresponding to the PNNI controller, values 1 – 32.
<partition-id>	Partition ID of the VSI partition controlled by the PNNI controller.
<control_vpi>	<p>Starting VPI of the VSI control channels used for communication between the VSI master residing on the SES and VSI slaves residing on the BXM cards. There can be a total of 12 such channels one for each slave residing on each BXM card.</p> <p>For a trunk interface with NNI header type: Valid values for this parameter are: 0–4095</p> <p>For a trunk interface with UNI header type Valid values for this parameter are: 0–255.</p> <p>Default value: 0</p> <p> Note For a PNNI controller, we recommend against to modifying control_vpi and start_vci</p>
<start_vci>	<p>Starting VCI of the VSI control channels. This VCI value is assigned to the first VSI control channel (between the VSI master and the VSI slave residing on the BXM card in slot 1). The last VSI control channel corresponding to communication with the VSI slave on slot 14 will use the VCI value of (<start_vci>+14-1).</p> <p>The valid values are: 33 – 65521.</p> <p>Default value: 40</p> <p> Note For a PNNI controller, we recommend against to modifying control_vpi and start_vci</p>

Related Commands

addshelf, delctrlr, dspctrlrs

Attributes

Privilege	Jobs	Log	Node	Lock
1	No	Yes	BPX	Yes

Example 1

addctrlr 10.4 3 2 0 40

Description

Add controller to port 4 on slot 10, partition ID of 2, and controller ID of 3.

System Response

```
night          TN    StrataCom    BPX 8600    9.2.00 Apr. 11 1998 14:31 GMT
```

```
          BPX Controllers Information
```

Trunk	Name	Type	Part Id	Ctrl ID	Ctrl IP	State
10.3	PNNI	VSI	1	1	192.0.0.0	Enabled
11.1	VSI	VSI	2	2	192.0.0.0	Disabled

Warning partition already in use do you want to add redundant controller

Last Command: **addctrlr 10.4 3 2 0 40**

Next Command:

Description

Adds a controller, such a PNNI controller, to a BPX interface shelf.

System Response

```
night          TN    StrataCom    BPX 8600    9.2.00 Apr. 11 1998 14:31 GMT
```

```
          BPX Controllers Information
```

Trunk	Name	Type	Part Id	Ctrl ID	Ctrl IP	State
10.3	PNNI	VSI	1	1	192.0.0.0	Enabled
11.1	VSI	VSI	2	2	192.0.0.0	Disabled

Warning partition already in use do you want to add redundant controller

Last Command: **addctrlr 10.3 3 1 0 40**

Next Command:

addshelf

Adds an ATM link between a hub node and an interface shelf such as an MGX 8220, an MGX 8850, or IGX shelf in a tiered network; or an ATM link between a BXM card on a BPX node and an MPLS (Multiprotocol Label Switching) controller such as a series 6400, 7200 or 7500 router; or an ATM link between a BXM card on a BPX node and an SES PNNI Controller. (An MPLS Controller or an SES PNNI Controller is considered an interface shelf from the BPX switch's perspective.) The routing hub can be either a BPX or an IGX.

The interface shelf can be one of the following:

- An MGX 8220 shelf connected to a BPX node
- An IGX shelf connected to an IGX routing node which serves as a hub for the IGX/AF
- An SES PNNI Controller connected to a BPX node
- An MGX 8850 shelf connected to a BPX node
- An MPLS (Multiprotocol Label Switching) Controller connected to a BPX node
- An SES (Service Expansion Shelf) connected to an IGX node

The signaling protocol that applies to the trunk on an interface shelf is Annex G. For example, in this release, the IGX 8400 interface shelf with a BTM E1 interface communicates with the routing hub through the Annex G LMI using STI cell format. However, the MGX 8850 interface shelf, or feeder, communicates over a UXM/UXM-E interface with the routing hub over Annex G LMI using AAL5 format.



Note

Because tiered network capability is a paid option, personnel in the Cisco Technical Assistance Center (TAC) must telnet to the unit and configure it as an interface shelf before you can execute **addshelf**.

Each IGX/AF, MGX 8220, or MGX 8850 shelf has one trunk that connects to the BPX or IGX node serving as an access hub. A BPX routing hub can support up to 16 T3 trunks to the interface shelves, which can be IGX/AF, MGX 8220, or MGX 8850 interface shelves. An IGX hub can support up to four trunks to the interface shelves, which can be IGX/AF shelves only.

An IGX 8400 interface shelf can connect to an IGX 8400 routing hub over a BTM E1 interface using STI cell format. In Release 9.1, an IGX 8400 interface shelf can connect to an MGX 8800 over a UXM/UXM-E interface using ATM cell format.

Before it can carry traffic, you must “up” trunk on an interface shelf (using **uptrk**) on both the interface shelf and the hub node and “add” it to the network (using **addshelf**). Also, a trunk must be free of major alarms before you can add it with the **addshelf** command.

In this release, the new parameters “Control VPI” and “Control VCI start” have been added.

In this release, **addshelf** will prevent adding a feeder to a trunk if a VSI ILMI session is active on a VSI partition on the trunk interface.

Adding a VSI Controller

The maximum number of controllers that can be attached to a given node is limited by the maximum number of feeders (16) that can be attached to a BPX hub. Therefore the total number of feeders and controllers cannot exceed 16.

You add a VSI controller, such as an MPLS (Multiprotocol Label Switching) Controller, to a switch with the **addshelf** command using the *vsi* option. The *vsi* option of the **addshelf** command is used to identify VSI controllers and tell them apart from interface shelves (feeders). The VSI controllers are allocated a partition of the switch resources. VSI controllers manage their partition through the VSI interface. The controllers run the VSI master. The VSI master entity interacts with the VSI slave running on the BXMs through the VSI interface, to set up VSI connections using the resources in the partition assigned to the controller. Two controllers that are intended to be used in a redundant configuration must specify the same partition when added to the node through the **addshelf** command.

When a controller is added to the node switch software will set up the infrastructure so that the controllers can communicate with the slaves in the node. The VSI entities decide how and when to use these communication channels.

In addition, the controllers require a communication channel between them. This channel could be in-band or out-of-band. When a controller is added to the switch, switch software will send controller information to the slaves. This information will be advertised to all the controllers in the partition. The controllers may decide to use this information to set up an intermaster channel. Alternatively the controllers may use an out-of-band channel to communicate.

The maximum number of controllers that can be attached to a given node is limited by the maximum number of interface shelves (feeders) that can be attached to a BPX hub. This number in Release 9.2 is 16. Therefore the total number of feeders and controllers cannot exceed 16.

To add a controller to the node, use the **addshelf** command. A redundant controller is added in the normal way, except that it specifies a partition that may be already in use by another controller. In this release the **addshelf** command allows for up to two controllers to manage the same partition.

One of the parameters that must be specified with the **addshelf** command when a VSI controller is added to the switch is the controller id. This is a number between 1 and 32 that uniquely identifies the controller. Two different controllers must always have different controller IDs.

The management of resources on the VSI slaves requires that each slave in the node has a communication control VC to each of the controllers attached to the node. When a controller is added to the BCC via the **addshelf** command, the BCC sets up the set of master-slave connections between the new controller port and each of the active slaves in the switch. The master slave connections are specified via the <Control VPI> and <Control Start VCI> parameters. The default for these parameters is 0/0.

Feature Mismatching to Verify VSI Support

The **cnfrsrc** and **addshelf** commands, in addition to other configuration commands, will perform mismatch verification on the BXM and UXM cards. For example, the **cnfrsrc** and **addshelf** commands will verify whether the cards both have VSI 2.0 support configured.

The Feature Mismatching capability will not mismatch cards unless the actual feature has been enabled on the card. This allows for a graceful card migration from an older release.

Full Name

Add an interface shelf (feeder) or a controller to a routing node or hub.

Syntax

Interface shelf:

addshelf <slot.port> <shelf-type> <vpi> <vci>

MPLS (Multiprotocol Label Switching) controller:

addshelf <trunk slot.port> v <ctrlr id> <part id> <control vpi> <control vci start> <redundant ctrlr warning>



Note

If you manage a tiered network through the command line interface, you can manage only Frame Relay interworking connections (ATFR) across the network. Three-segment connections for carrying serial data or voice between IGX/AFs is allowed, but you must manage them through WAN Manager.

Related Commands

addctrlr, delshelf, dspnode, dsptrks

Attributes

Privilege	Jobs	Log	Node	Lock
1–4	Yes	Yes	BPX switch with IGX interface shelf IGX switch with IGX shelves BPX switch with the MGX 8220 shelf BPX with the MGX 8850 shelf BPX switch for MPLS (Multiprotocol Label Switching) controller (LSC)	Yes

Example 1

Interface shelf: **addshelf** 11.1 a 21 200

MPLS (Multiprotocol Label Switching) controller: **addshelf** 4.1 vsi 1 1

Description

Interface shelf:

Add trunk 11.1 as an MGX 8220 interface shelf. After you add the shelf, the screen displays a confirmation message and the name of the shelf.

MPLS (Multiprotocol Label Switching) controller:

Add trunk 4.1 as a VSI-MPLS (Multiprotocol Label Switching) Controller interface shelf. After you add the LSC, the screen displays a confirmation message and the name of the shelf.

Description for Interface Shelves

An interface shelf can be one of the following:

- An MGX 8220 connected to a BPX node.
- An MGX 8850 connected to a BPX node.
- An IGX node connected to a BPX node, which serves as a hub for the IGX/AF.
- An IGX node connected to an IGX routing node, which serves as a hub for the IGX/AF.

Table 16-3 *addshelf—Interface Shelf Parameters*

Parameter	Description
slot.port (trunk)	slot.port Specifies the slot and port number of the trunk.
shelf-type	I or A or X On a BPX node, shelf type specifies the type of interface shelf when you execute addshelf . The choices are I for /AF or IGX/AF, A for the MGX 8220 and PNNI SES, V for VSI, or X for the MGX 8800. On an IGX hub, only the IGX/AF is possible, so <i>shelf type</i> does not appear.
vpi vci	Specifies the VPI and VCI (Annex G VPI and VCI used). For the MGX 8220 only, the valid range for VPI is 5–14 and for VCI is 16–271. For an IGX/AF interface shelf, the valid range for both VPI and VCI is 1–255. On an IGX 8400 node, when using an MGX 8800 interface shelf, the following VPI/VCI limits apply: <ul style="list-style-type: none"> • Use the VPI/VCI combination of 3/31 for the LMI signaling channel. When adding an MGX 8800 as an interface shelf, do not use 3/31 for anything else but the LMI signaling channel. • For VCC addressing, the VPI range is 1–255 and the VCI range is 1–65535. • For VPC addressing, the interface type is significant: UNI or NNI may be supported. When the interface type is UNI, the available VPI range is 1–255 and VCI range is 1–65535. When the interface type is NNI the available VPI range is 1–4095 and VCI range is 1–65535.
control_vpi	Choose the value for <control_VPI> such that: if <control_VPI> = 0, <control_VCI_start> can be set to a value > 40. If any VSI partition exists on the interface, then control_VPI < start_VPI or control_VPI > end_VPI for all partitions on that interface. An error message appears if the control VPI falls into the VPI range belonging to a VSI partition. No AutoRoute connection exists on (VPI.start_VCI to VPI.start_VCI+14). If any AutoRoute connection exists on these VPI/VCI values, you are not allowed to use these VPI/VCI values. This VPI is reserved for control VCs. Default = 0
control_vci_start	Default = 40

The (VPI.VCI) of the 15 control VCs is:
 (control_VPI.control_VCI_start) to (control_VPI.control_VCI_start+14).
 The control VC used for slot n (1<= n<=15) is:
 (control_VPI.control_VCI_start + n -1).

Example for Interface Shelves

Add an MGX 8220 at trunk 11.1 After you add the shelf, the screen displays a confirmation message and the name of the shelf. Add the MGX 8220 (may be referred to on screen as AXIS) as follows:

addshelf 11.1 a

The sample display shows a partially executed command prompting you for the interface shelf type:

System Response

```
nmsbpx23      TN      SuperUser      BPX 8620      9.2      Apr. 4 1998 13:28 PST
```

BPX Interface Shelf Information

Trunk	Name	Type	Alarm
1.3	AXIS240	AXIS	OK
11.2	A242	AXIS	OK

```
This Command: addshelf 11.1
```

```
Enter Interface Shelf Type: I (IGX/AF), A (AXIS), P (APS), V (VSI), X (AAL5)
```

```
Next Command:
```

Example for Adding an MGX 8850 AAL5 (ATM Adaptive Layer/5) Interface Shelf

Add an MGX 8850 at trunk 4.8. After you add the MGX 8800 shelf, the screen displays a confirmation message and the name of the shelf. Add the MGX 8850 (may be referred to on screen as AAL5) as follows:

addshelf 4.8 x

The sample display shows that an MGX 8850 was added on trunk 4.8 as an AAL5 (ATM Adaptive Layer/5 type of interface shelf. (Adding an MGX 8850 interface shelf is similar to adding an MPLS Controller interface shelf.)

System Response

```
pswbp3      TN      SuperUser      BPX 8600      9.1      June 6 1998 13:28 PST
```

BPX Interface Shelf Information

```
Trunk      Name      Type      Part Id      Ctrl Id      Alarm
4.8        SIMFDR0   AAL5      -            -            OK
```

This Command: `addshelf 4.8 x`

Enter Interface Shelf Type: I (IGX/AF), A (AXIS), P (APS), V (VSI), X (AAL5)

Next Command:

Description for MPLS

For MPLS, before it can carry traffic, you need to up the link to a MPLS controller (by using **uptrk**) at the BPX node. You can then add the link to the network (by using **addshelf**). Also, the link must be free of major alarms before you can add it with the **addshelf** command.



Note

Once you up a port on the BXM in either trunk or port mode by using either the **uptrk** or **upport** commands, respectively, you can only up the ports in the same mode.

Table 16-4 *addshelf—MPLS Parameters*

Parameter	Description
slot.port	Specifies the BXM slot and port number of the trunk. You can configure the port for either trunk (network) or port (service) mode.
device-type	VSI, which is “virtual switch interface, specifies a virtual interface to an MPLS controller (TSR) such as a Cisco 6400, 7200 or 7500 series router.
control ID	Control IDs must be in the range of 1 to 32, and you must set these identically on the LSC and in the addshelf command. A control ID of “1” is the default used by the MPLS (Multiprotocol Label Switching) controller (LSC).

Table 16-4 addshelf—MPLS Parameters (continued)

Parameter	Description
control VPI	<p>Starting VPI of the VSI control channels used for communication between the VSI master residing on the SES and VSI slaves residing on the BXM cards. There can be a total of 12 such channels one for each slave residing on each BXM card.</p> <p>For a trunk interface with NNI header type: Valid values for this parameter are: 0-4095</p> <p>For a trunk interface with UNI header type Valid values for this parameter are: 0-255.</p> <p>Default value: 0</p>
start VCI	<p>Starting VCI of the VSI control channels. This vci value is assigned to the first VSI control channel (between the VSI master and the VSI slave residing on the BXM card in slot 1). The last VSI control channel corresponding to communication with the VSI slave on slot 14 will use the vci value of (<start_vci>+14-1).</p> <p>The valid values are: 33 - 65521.</p> <p>Default value: 40</p>

Example for MPLS

Add a MPLS controller link to a BPX node by entering the **addshelf** command at the desired BXM port as follows:

```
addshelf 4.1 vsi 1 1
```

System Response

```
nmsbpx23      TN      SuperUser      BPX 15      9.1      Apr. 4 1998 13:28 PST
```

```
BPX Interface Shelf Information
```

```
Trunk  Name      Type      Alarm
5.1    j6c      AXIS     MIN
5.3    j5c      /AF      MIN
4.1    VSI      VSI      OK
```

```
This Command: addshelf 4.1 v 1 1
```

```
Next Command:
```

Example for VSI Controller

Add a VSI controller link to a BPX node by entering the **addshelf** command at the desired BXM port as follows:

```
addshelf 13.2
```

System Response

```
sw237          TN      StrataCom      BPX 8620  9.2.L3      May  10 1999 14:48 PST

TRK           Type      Current Line Alarm Status      Other End
  4.1         [T3      Clear - OK                      VSI (VSI)
 10.1         OC-3     Clear - OK                      VSI (VSI)
 10.5         OC-3     Clear - OK                      VSI (VSI)
 13.1.1       OC-3     Clear - OK                      -
 13.2         OC-3     Clear - OK                      -
```

This Command: addshelf 13.2

addyred

Enables card redundancy for IGX and BPX cards. Use the **addyred** command to specify the slots of the primary and secondary (standby) cards that form the redundant pair.

You must use the **addyred** command to configure a VSI slave redundant card. When a standby slave card is first started (either by having been inserted into the slot, or if the user issues the **addyred** command from the CLI console), the active slave VSI forward all VSI messages it had received from the Master VSI controller card to the standby slave VSI controller card.

Redundant card sets must have the following characteristics:

- The primary and secondary card sets must be identical.
- When configuring APS 1+1, primary and secondary card sets must be in adjacent slots. (Note that this restriction only applies to the BPX chassis for APS 1+1 redundancy.)
- Secondary card sets must not currently be active.
- Neither the primary nor secondary card set may already be part of a redundant set.
- Redundancy applies to the entire card and not specific trunks or lines.

In both the single and multiport card sets, if the secondary card set becomes active, the primary card set serves as its backup (assuming the primary card set is complete and not failed). You cannot use the **addyred** command if the primary and secondary slots are empty. If cards reside in the primary and secondary slots, the system checks for card compatibility. Two types of incompatibility can occur: back card and jumper or cable inconsistencies. (On SDI, FRI, and FTI cards, jumpers determine whether a

port is configured as DCE or DTE. On LDI cards, either a DCE or DTE adapter cable connects to the LDI port. For descriptions of the jumper positions and cabling, see the *Cisco IGX 8400 Series Installation and Configuration* manual.)

Note that the **addyred** command prevents invalid configurations when you try to configure the SONET APS feature. When SONET Automatic Protection Switching (APS) is configured, you will not be able to use the **addyred** or **delyred** commands on a card configured for APS 1:1 architecture. That is, you will not be able to execute the **addyred** command, then configure the APS 1:1 architecture. Similarly, you will not be able to configure APS 1:1, then execute the **addyred** command. You will be blocked from executing these commands at the command line interface.

If incompatibilities exist, the message “Y-Cable Conflict” appears on the screen. Specific conflicts are listed in reverse video in the **dspyred** display. See the **dspyred** description for more information.

To ensure that only cards with the Idle Code Suppression feature enabled on them are allowed to be a Y-redundancy pair, **addyred** blocks cards that have different idle code suppression capability.

Full Name

Add Y-cable redundancy.

Syntax

```
addyred <primary slot> <secondary slot>
```

Related Commands

delyred, **dspyred**, **prtyred**

Attributes

Privilege	Jobs	Log	Node	Lock
1-4	No	Yes	IGX, BPX	Yes

Example 1

```
addyred 25 26
```

Description

Add Y-cable redundancy to the SDP/SDI card sets in slots 25 and 26.

System Response

```

beta          TRM   YourID:1          IGX 8420      9.2      Aug. 15 1998 14:27 MST

      Slot Other Front  Back  Channel Configuration
Slot Type Slot  Card  Card   1    2    3    4    5    6    7    8
2   Pri   3   BXM   LM-BXM
3   Sec   2   BXM   LM-BXM

```

Last Command: addcdred 2 3

Next Command:

Table 16-5 *baddyred-Parameters*

Parameter	Description
primary slot	Specifies the slot number of the primary card set.
secondary slot	Specifies the slot number of the secondary card set.

cnfqbin

Use the **cnfqbin** command to configure the Qbin (Class of Service Buffers parameters) on a selected BXM port or trunk. The **cnfqbin** command prompts you to configure the Qbin from the template assigned to a logical interface.

This command now lets you accept the interface template as the values, as an option. For example, you can type in Yes when prompted whether the interface service class template (SCT) should be used, and the command will use the card Qbin values from the Qbin templates. You will not be allowed to enter values for any Qbin parameter in this case. You can, however, enter desired values if the template option has not been chosen.

When a VSI interface is activated, the default template gets assigned to an interface. The corresponding Qbin template gets copied into the card Qbin data structure for that interface. When you want to change this, by giving new values using the **cnfqbin** command, the Qbin is now user configured as opposed to template configured. This information is displayed on the **dspqbin** screen. It indicates whether the values in the Qbin are from the template assigned to the interface OR the values have been changed to user-defined values. The **cnfqbin** command will prompt you whether template should be used for Qbin parameters. In this release, the **dspqbin** command now displays all the fields of a Qbin template.

The **cnfqbin** command was introduced in Release 9.1 to configure any Qbin on the BXM cards. In this release, it has been extended to support virtual trunks. When the virtual trunk is dedicated to the controller, you can only configure Qbin 10–15.

VC connections are grouped into large buffers called Qbins. (Per-VC queues can be specified on a connection-by-connection basis also). In this release, all VSI connections use Qbin 10 on each interface.

You configure Multiprotocol Label Switching (formerly Tag Switching) for VSIs on a BXM card is configured using the **cnfrsrc** and **cnfqbin** commands. Qbin 10 is assigned to tag switching.

Use the **cnfqbin** command is used to adjust the threshold for the traffic arriving in Qbin 10 of a given VSI interface as away of fine tuning traffic delay.

If you use the **cnfqbin** command to set an existing Qbin to disabled, the egress of the connection traffic to the network is disabled. Re-enabling the Qbin restores the egress traffic.

**Note**

Cell Delay Variation (CDV) is based on the Qbin depths and the transmission speed of the virtual switch interface. The default Qbin depths are specified in the service class templates (SCTs). You can configure the Qbin depths by using the **cnfqbin** command. Cell Tolerance Delay (CTD), which is the fixed delay, is based on a fixed value, and is not configurable.

The **cnfqbin** command prompts you whether “template” should be used for Qbin parameters.

Full Name

Configure Qbin

Syntax

cnfqbin <slot number>.<port number>.<vtrk>

Related Commands

dspqbin

Attributes

Privilege	Jobs	Log	Node	Lock
1–6	Yes	No	BPX	No

Example 1

cnfqbin 13.1

Description

Create a Qbin configuration on the OC-3 trunk on port 1 of slot 13 on the BPX to support MPLS.

System Response

```
sw57          TN      SuperUser      BPX 8600      9.2      Mar. 10 1997 10:41 GMT
```

```
Port/Trunk:      13.1      [ACTIVE ]
Qbin Id :
Enable Qbin (Y/N) :
Minimum Bandwidth :
Qbin Discard threshold:
Low CLP threshold: [80] %
High CLP threshold: [80] %
EFCI threshold: [30]%
```

```
Last Command: cnfqbin 13.1
```

Example 2

cnfqbin 4.1 10

Description

Configure the Qbin 10 for port 4.1; also configure ports 4.2 and 4.3, and enter port 4.2 and 4.3 where applicable.

If the Qbin is not configured, configure the queues on the ports using the **cnfqbin** command:

cnfqbin 4.1 10

enable/disable: e

For all other parameters, accept the (default).

The previous parameters can also be set for Qbin 10 as follows:

cnfqbin 4.1 10 e 0 65536 95 100 40

System Response

```
Sample Display:
n4          TN      SuperUser      BPX 15      9.2      Apr. 4 1998 16:41 PST
Qbin Database 4.1 on EXM qbin 10
Qbin State:      Enabled
Minimum Bandwidth:      0
Qbin Discard threshold:      65536
Low CLP/EPD threshold:      95%
High CLP/EPD threshold:      100%
EFCI threshold:      40%
```

```
This Command: cnfqbin 4.1 10
'E' to Enable, 'D' to Disable [E]:
```

```
Next Command:
```

System Response

```
n4          TN      SuperUser      BPX 8620    9.2      Apr. 4 1998 16:41 PST
```

```
Qbin Database 4.1 on EXM qbin 10
```

```
Qbin State:           Enabled
Minimum Bandwidth:    0
Qbin Discard threshold: 65536
Low CLP/EPD threshold: 95%
High CLP/EPD threshold: 100%
EFCI threshold:      40%
```

```
Last Command: cnfqbin 4.1 10 e 0 65536 95 100 40
```

```
Next Command:
```

Table 16-6 *cnfqbin—Parameters*

Parameter	Description
slot.port	Specifies the BXM card slot and port number.
Qbin ID	Specifies the ID number of the Qbin available for use by the LSC (MPLS Controller) for VSI. The range is 0 to 255.; 0 is the default. Always use 10 in 9.1.
Enable Qbin	Answer yes or no to enable your Qbin configuration.
Minimum Bandwidth	Specifies the minimum bandwidth in cells per second available for the Qbin. The range is 0 to 352207; 0 is the default.
Qbin Discard Threshold	Specifies the threshold in percentage for Qbin discard. The range is 0 to 100.
CLP Low Threshold	Specifies the threshold in percentage for CLP low. The range is 0 to 100; 80% is the default.
CLP High Threshold	Specifies the threshold in percentage for CLP high. The range is 0 to 100; 80% is the default.
EFCI threshold	Specifies the threshold in percentage for EFCI. The range is 0 to 100; 30% is the default.
Template	Specifies that the interface service class template should be used to configure the Qbin parameters. Thus the cnfqbin command will use the card's Qbin values from the Qbin template. If you do not chose the template option, you can enter your own desired values for the Qbin parameters.

Qbin Dependencies

The available Qbin parameters are shown in Table 16-7. Notice that the Qbins available for VSI are restricted to Qbins 10–15 for that interface. All 32 possible virtual interfaces are provided with 16 For Qbin default settings, see Table 16-7. Qbins. Refer to Table 16-8 for a listing of **cnfqbin** parameters with possible values and ranges.

Table 16-7 Qbin Default Settings

Qbin	Max Qbin Threshold (usec)	CLP High	CLP Low/EPD	EFCI	Discard Selection
LABEL					
Template 1					
10 (Null, Default, Signalling, Tag0,4)	300,000	100%	95%	100%	EPD
11 (Tag1,5)	300,000	100%	95%	100%	EPD
12 (Tag2,6)	300,000	100%	95%	100%	EPD
13 (Tag3,7)	300,000	100%	95%	100%	EPD
14 (Tag Abr)	300,000	100%	95%	6%	EPD
15 (Tag unused)	300,000	100%	95%	100%	EPD
PNNI					
Templates 2 (with policing) and 3					
10 (Null, Default, CBR)	4200	80%	60%	100%	CLP
11 (VbrRt)	53000	80%	60%	100%	EPD
12 (VbrNrt)	53000	80%	60%	100%	EPD
13 (Ubr)	105000	80%	60%	100%	EPD
14 (Abr)	105000	80%	60%	20%	EPD
15 (Unused)	105000	80%	60%	100%	EPD
Full Support for ATMF and reduced support for Tag CoS without Tag-Abr					
Templates 4 (with policing) and 5					
10 (Tag 0,4,1,5, Default, UBR, Tag-Abr*)	300,000	100%	95%	100%	EPD
11 (VbrRt)	53000	80%	60%	100%	EPD
12 (VbrNrt)	53000	80%	60%	100%	EPD
13 (Tag 2,6,3,7)	300,000	100%	95%	100%	EPD
14 (Abr)	105000	80%	60%	20%	EPD
15 (Cbr)	4200	80%	60%	100%	CLP
Full Support for Tag ABR and ATMF without Tag CoS					
Templates 6 (with policing) and 7					
10 (Tag 0,4,1,5,2,6,3,7 Default, UBR)	300,000	100%	95%	100%	EPD
11 (VbrRt)	53000	80%	60%	100%	EPD
12 (VbrNrt)	53000	80%	60%	100%	EPD
13 (Tag-Abr)	300,000	100%	95%	6%	EPD
14 (Abr)	105000	80%	60%	20%	EPD
15 (Cbr)	4200	80%	60%	100%	CLP

Table 16-7 Qbin Default Settings (continued)

Qbin	Max Qbin Threshold (usec)	CLP High	CLP Low/EPD	EFCI	Discard Selection
Full Support for Tag CoS and reduced support for ATMF Templates 8 (with policing) and 9					
10 (Cbr, Vbr-rt)	4200	80%	60%	100%	CLP
11 (Vbr-nrt, Abr)	53000	80%	60%	20%	EPD
12 (Ubr, Tag 0,4)	300,000	100%	95%	100%	EPD
13 (Tag 1, 5, Tag-Abr)	300,000	100%	95%	6%	EPD
14 (Tag 2,6)	300,000	100%	95%	100%	EPD
15 (Tag 3, 7)	300,000	100%	95%	100%	EPD

Table 16-8 cnfqbin—Parameters

Template Object Name	Template Units	Template Range/Values
Qbin Number	enumeration	0 –15 (10–15 valid for VSI)
Max Qbin Threshold	u sec	1–2000000
Qbin CLP High Threshold	% of max Qbin threshold	0 – 100
Qbin CLP Low Threshold	% of max Qbin threshold	0 – 100
EFCI Threshold	% of max Qbin threshold	0 – 100
Discard Selection	enumeration	1 – CLP Hysteresis 2 – Frame Discard
Weighted Fair Queueing	enable/disable	0: Disable 1: Enable

cnfrsrc

Use the **cnfrsrc** command to partition resources for Automatic Routing Management PVCs or VSI-MPLS (Multiprotocol Label Switching).

This command was introduced in Release 9.1 to support physical trunks. It has been extended to support virtual trunks. After VSI has been enabled, the virtual trunk becomes a “dedicated” VSI virtual trunk. Note that if the trunk has already been added or if the VPI value has not been configured, you will not be able to configure the VPI value. (Switch software will block you from doing so.)

You can configure a virtual trunk to be dedicated to VSI or to Automatic Routing Management. You cannot configure a virtual trunk for both VSI and Automatic Routing Management.

The switch software:

- Allows start VPI = 0 for a VSI partition on a port interface, provided there is only one VSI partition on the port interface.

- Prevents a second VSI partition from being enabled on a port interface if the first VSI partition uses a start VPI = 0.
- Prevents a VSI partition from being disabled on a trunk interface if a PNNI controller is attached to the trunk interface controlling partition being disabled.

Configurable resources (using **cnfrsrc**) are:

- Template number (new field in Release 9.2)
- Maximum PVC LCNs
- Maximum PVC Bandwidth
- Configure Partition (Y/N)
- Partition ID
- Enable Partition (Enable/Disable)
- Minimum VSI LCNs
- Maximum VSI LCNs
- Start VSI VPI
- End VSI VPI - **Warning message will tell you that the end vsi vpi is equal to the start vsi vpi for virtual trunks**
- Minimum VSI Bandwidth
- Maximum VSI Bandwidth

Resource Partitioning

The VSIs need to partition the resources between competing controllers: Automatic Routing Management, MPLS (Multiprotocol Label Switching), and PNNI for example. You can have different types of controllers splitting up a partition's assets. For example, Automatic Routing Management, and MPLS, or Automatic Routing Management and PNNI (SVCs), but not PNNI and MPLS.

This release supports one or two partitions only. In this release, two controllers of a single type are supported. The user interface will block the activation of partitions with ID higher than 1 if the card does not support multiple partitions.

When enabling a partition, If [start_VPI, end_VPI] of the partition contains any "reserved" VPI, an error message is displayed and you are prompted for different values for start_VPI, end_VPI. Thus, if VPI 10 is used for control VCs on an interface, then you cannot include VPI 10 in any VSI partition by using the **cnfrsrc** command. An error message would be displayed.

The resources that you need to configure for a partition are shown in Table 16-9 for a partition designated ifci, which stands for interface controller 1, in this example. The three parameters that need to be distributed are: 1) number of logical connections (lcns); 2) bandwidth (bwi); and 3) virtual path identifiers (vpi).

Table 16-9 ifci—Parameters (Virtual Switch Interface)

ifci parameters	Min	Max
lcns	min_lcnsi	max_lcnsi
bwi	min_bwi	max_bwi
vpi	min_vpi	max_vpi

The controller is supplied with a logical LCN connection number, that is slot, port, and so on. Information is converted to a logical connection number (lcns).

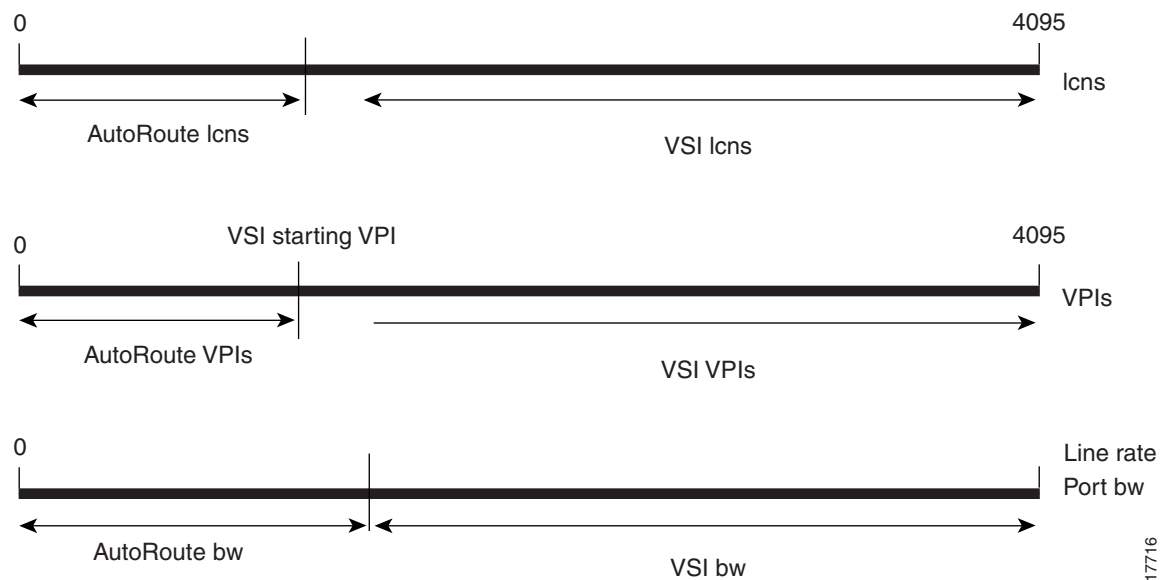
Some ranges of values available for a partition are listed in Table 16-10:

Table 16-10 Partition Criteria

Partition	Range
trunks	1–4095 VPI range
ports	1–4095 VPI range
virtual trunk	Only one VPI available per virtual trunk since a virtual trunk is currently delineated by a specific VP
virtual trunk	Each virtual trunk can either be Automatic Routing Management or VSI, not both

When you add a trunk, the entire bandwidth is allocated to Automatic Routing Management (formerly known as AutoRouting). To change the allocation to provide resources for a VSI, use the **cnfrsrc** command on the BPX switch. A view of the resource partitioning available is shown in Figure 16-1.

Figure 16-1 Graphical View of Resource Partitioning, Automatic Routing Management and VSI



17716

Partition Information Sent to Cisco WAN Manager

When the partition information is configured for the first time or any parameters are changed, Cisco WAN Manager will be updated through a robust message.

- **vsi_min_channels:**
This field represents the minimum guaranteed channels available for a given port.

- **vsi_max_channels:**
This field represents the maximum number of channels available, but not guaranteed, for a port.
- **vsi_vpi_start:**
This field represents the starting VPI that can be used by VSI.
- **vsi_vpi_end:**
This field represents the end of the VPI range that can be used by VSI.
- **vsi_min_bw:**
This field represents the minimum guaranteed bandwidth available for a port.
- **vsi_max_bw:**
This field represents the maximum bandwidth available, but not guaranteed, for a port.

Partitioning

On each interface (port or trunk) on the BXM cards used for label switching, two sets of resources must be divided up between traditional PVC connections and tag switching connections. The traditional PVC connections are configured directly on the BPX platform, and tag switching connections are set up by the TSC using the VSI. The following resources are partitioned on each interface:

- Bandwidth
- Connections

As with all ATM switches, the BPX switch supports up to a specified number of connections. On the BPX switch, the number of connections supported depends on the number of port/trunk cards installed. On each interface, space for connections is divided up between traditional BPX switch permanent virtual circuit (PVC) connections, and Label Switching VCs (LVCs).

cnfrsrc Parameters, Possible Values, and Descriptions

See Table 16-11 for a listing of **cnfrsrc** parameters, ranges and values, and descriptions. These parameters appear on the **cnfrsrc** screen.

Table 16-11 cnfrsrc Parameters, Ranges/Values, and Descriptions

Object Name	Range/Values	Default	Description
VSI Start LCN	0... 64K-1	NA	Start LCN for the whole VSI partition. Each VSI sub-partition (specific partition-id) will be given lcms from this partition. subject to the min/max ranges for that partition-id specified in object 3. The Start LCN once set will not be permitted to change if there are any active/configured VSI partitions.
VSI End LCN	0...64 K-1	NA	End LCN for the whole VSI partition. If End LCN cannot be satisfied due to existing VSI connections or other constraints in this range then firmware will reject this request with a get response (same message tag) with this Object indicating the possible new End LCN that firmware can accommodate.

Table 16-11 cnfrsrc Parameters, Ranges/Values, and Descriptions (continued)

Object Name	Range/Values	Default	Description
VSI partition	0...255	0	identifies the partition
Partition state	0 = Disable Partition 1 = Enable Partition	NA	For Partition state = 1, Objects (8, 9, A, B, C, D, E, F) are mandatory
Min LCNs	0...64K	NA	Min lcns (conns) guaranteed for this partition
Max LCNs	0...64K	NA	Maximum LCNs permitted on this partition
Start VPI	0 .. 4095	NA	Partition Start VPI
End VPI	0 .. 4095	NA	Partition End VPI
Min Bw	0 .. Line Rate	NA	Minimum Partition bandwidth
Max Bw	0 .. Line Rate	NA	Maximum Partition bandwidth

Feature Mismatching to Verify VSI Support

In this release, the **cnfrsrc** and **addshelf** commands, in addition to other configuration commands, performs mismatch verification on the BXM and UXM cards. For example, the **cnfrsrc** and **addshelf** commands will verify whether the cards both have VSI 2.0 support configured.

The Feature Mismatching capability will not mismatch cards unless the actual feature has been enabled on the card. This allows for a graceful card migration from an older release.

Full Name

Configure resources

Syntax

```
cnfrsrc <slot.port.vtrk>
```

or

```
cnfrsrc <slot>.<port>.<vtrk> <maxpvclens> <maxpvcbw> <partition> <e/d> <minvsilens>
<maxvsilens> <vsistartvpi> <vsientvpi> <vsiminbw> <vsimaxbw>
```

Related Commands

dsprsrc

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	BPX	No

Example 1

```
cnfrsrc 4.1 256 26000 1 e 512 16384 2 15 26000 100000
```

Description

Configure the VSI partition for port 4.1.

System Response

```
n4          TN      SuperUser      BPX 8620    9.2      Apr. 4 1998 16:40 PST
Port/Trunk : 4.1
Maximum PVC LCNS:          256      Maximum PVC Bandwidth:26000
Min Lcn(1) : 0 Min Lcn(2) : 0
Partition 1
Partition State :          Enabled
Minimum VSI LCNS:          512
Maximum VSI LCNS:          7048
Start VSI VPI:             2
End VSI VPI :             15
Minimum VSI Bandwidth :    26000      Maximum VSI Bandwidth :    100000

Last Command: cnfrsrc 4.1 256 26000 1 e 512 7048 2 15 26000 100000

Next Command:
```

Example 2**cnfrsrc 13.1****Description**

Partition resources on the OC-3 trunk on port 1 of slot 13 on the BPX to support a service such as VSI-MPLS (or PNNI SVCs).

System Response

```
n4          TN      SuperUser      BPX 8620    9.2      Apr. 4 1998 16:40 PST
Port/Trunk : 4.1
Maximum PVC LCNS:          256      Maximum PVC Bandwidth:26000
Min Lcn(1) : 0 Min Lcn(2) : 0
Partition 1
Partition State :          Enabled
Minimum VSI LCNS:          512
Maximum VSI LCNS:          7048
Start VSI VPI:             2
End VSI VPI :             15
Minimum VSI Bandwidth :    26000      Maximum VSI Bandwidth :    100000

Last Command: cnfrsrc 4.1 256 26000 1 e 512 7048 2 15 26000 100000

Next Command:
```

Example 3**cnfrsrc 4.1**

Description

Port 4.1 is the slave interface to the label switch controller. Configure the VSI partitions for port 4.1 as follows:

```

cnfrsrc 4.1
PVC LCNs: [256] {accept default value}
max PVC bandwidth: 26000
partition: 1
enabled: e
VSI min LCNs: 512
VSI max LCNs: 7048           {varies with BXM type}
VSI start VPI: 2
VSI end VPI: 15
VSI min b/w: 26000
VSI max b/w: 100000

```

or with one entry as follows:

```
cnfrsrc 4.1 256 26000 1 e 512 7048 2 15 26000 100000
```

System Response

```

n4          TN      SuperUser      BPX 15      9.2      Apr. 4 1998 16:40 PST

Port/Trunk : 4.1

Maximum PVC LCNS:          256      Maximum PVC Bandwidth:26000

Min Lcn(1) : 0 Min Lcn(2) : 0
Partition 1

Partition State :          Enabled
Minimum VSI LCNS:          512
Maximum VSI LCNS:          7048
Start VSI VPI:             2
End VSI VPI :              15
Minimum VSI Bandwidth :    26000      Maximum VSI Bandwidth :    100000

Last Command: cnfrsrc 4.1 256 26000 1 e 512 7048 2 15 26000 100000

Next Command:

```



Note

It is possible to have PVCs terminating on the Tag Switch Controller itself. This example reserves approximately 10 Mbps (26000 cells/sec) for PVCs, and allows up to 256 PVCs on the switch port connected to the LSC.

**Note**

The VSI max and min logical connections (LCNs) will determine the maximum number of tag virtual connections (TVCs) that can be supported on the interface. The number of TVCs required on the interface depends on the routing topology of the tag switch.

**Note**


By default the LSC will use either a starting VSI VPI of 1 or 2 for tag switching, whichever is available. If both are available, a starting VSI VPI of 1 is used. The VPI range should be 2–3 on a BPX VSI connected to a 6400, 7200 or 7500 AIP. If VPI 2 is not to be used, the tag switching VPI interface configuration command can be used on the TSC to override the defaults

**Note**

The VSI range for tag switching on the BPX switch is configured as a VSI partition, usually VSI partition number 1. VSI VPI 1 is reserved for Automatic Routing Management, so the VSI partition for tag switching should start at VPI 2. Two VPIs are sufficient for the current release, although it may be advisable to reserve a larger range of VPIs for later expansion, for example, VPIs 2–15.

Table 16-12 lists the **cnfrsrc** parameters, focusing more on configuring resources for VSI partitions (an MPLS controller, for example). For more information on configuring resources for Automatic Routing Management PVCs, refer to the **cnfrsrc** command.

Table 16-12 cnfrsrc—Parameters

Parameter	Description																														
slot.port.vtrk	Specifies the BXM card slot and port number and virtual trunk.																														
Maximum PVC LCNs	<p>The maximum number of LCNs allocated for Automatic Routing Management PVCs for this port. The range is 1 to 256; 256 is the default. For trunks, there are additional LCNs allocated for Automatic Routing Management that are not configurable.</p> <p>You can use the dspcd <slot> command to display the maximum number of LCNs you can configure using the cnfrsrc command for the given port. For trunks, configurable LCNs represent the LCNs remaining after the BCC has subtracted the networking LCNs needed. A trunk has 270 networking LCNs, or channels. You can use the dspcd command to display VSI channels also.</p> <p>For a port card, a larger number is shown, as compared with a trunk card. This is because a trunk uses 270 networking LCNs, as compared with a port card, which uses no networking LCNs. You can use dspcd to display VSI channels also.</p> <p>Setting this field to “0” would disable Automatic Routing Management PVCs on the specified port.</p> <p> Note You must specify a value greater than 0 for the Maximum PVC LCNs, Maximum PVC Bandwidth, and Maximum VSI LCNs parameters. Otherwise, you will not be able to create any Automatic Routing Management connections on a BXM card. Also, if these parameters do not have values greater than 0, you will be unable to change the connection channel amount when you configure the BXM trunk using cnftrk.</p> <p>Logical Interface (slot.port.vtrk for trunks and slot.port for lines).</p> <p>The bandwidth is logical interface based. The default value for this object is the line rate of this interface.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="border: none;">-----</th> <th style="border: none;">Card Type</th> <th style="border: none;"> </th> <th style="border: none;">Bandwidth</th> <th style="border: none;">-----</th> </tr> </thead> <tbody> <tr> <td style="border: none;"></td> <td style="border: none;">BXE E3</td> <td style="border: none;"> </td> <td style="border: none;">80000</td> <td style="border: none;"></td> </tr> <tr> <td style="border: none;"></td> <td style="border: none;">BXE T3</td> <td style="border: none;"> </td> <td style="border: none;">96000</td> <td style="border: none;"></td> </tr> <tr> <td style="border: none;"></td> <td style="border: none;">BXE OC-3</td> <td style="border: none;"> </td> <td style="border: none;">353208</td> <td style="border: none;"></td> </tr> <tr> <td style="border: none;"></td> <td style="border: none;">BXE OC-12</td> <td style="border: none;"> </td> <td style="border: none;">1412830</td> <td style="border: none;"></td> </tr> <tr> <td style="border: none;"></td> <td style="border: none;">-----</td> <td style="border: none;"></td> <td style="border: none;"></td> <td style="border: none;"></td> </tr> </tbody> </table>	-----	Card Type		Bandwidth	-----		BXE E3		80000			BXE T3		96000			BXE OC-3		353208			BXE OC-12		1412830			-----			
-----	Card Type		Bandwidth	-----																											
	BXE E3		80000																												
	BXE T3		96000																												
	BXE OC-3		353208																												
	BXE OC-12		1412830																												

Maximum PVC Bandwidth	<p>Specifies the maximum bandwidth of the port allocated for Automatic Routing Management use. The range is 0 to 352207; 0 is the default. You can configure the Maximum PVC Bandwidth value for ports, but not for trunks.</p> <p>Note that you must specify a value greater than 0 for the Maximum PVC LCNs, Maximum PVC Bandwidth, and Maximum VSI LCNs parameters. Otherwise, you will not be able to create any Automatic Routing Management PVCs on the BXM card.</p>																														

Table 16-12 cnfrsrc—Parameters (continued)

Parameter	Description
Configure Partition	Answer yes or no to begin configuring resources for the partition. To configure Automatic Routing Management PVCs, enter n for No. You will not be prompted to enter VSI options to configure VSI partition resources. However, if you want to configure VSI options, enter y for yes, and you will be prompted to configure partition resources for VSI.
Partition ID	Specifies the ID number of the partition. In previous releases, use 1. In release 9.1, use 1 for the partition ID. (The default is 0. The range of values for Partition ID is 0–255.) In this release, you may use 2.
Enable Partition	Answer yes or no to enable your configured partition.
Minimum VSI LCNs	<p>The minimum number of LCNs guaranteed for this partition. The range is 1 to 256; 0 is the default. The VSI controller guarantees at least this many connection endpoints in the partition, provided there are sufficient free LCNs in the common pool to satisfy the request at the time the partition is added. When a new partition is added or the value is increased, it may be that existing connections have depleted the common pool so that there are not enough free LCNs to satisfy the request. The BXM gives priority to the request when LCNs are freed. The net effect is that the partition may not receive all the guaranteed LCNs (min LCNs) until other LCNs are returned to the common pool.</p> <p>You can increase this value dynamically when there are enough unallocated LCNs in the port group to satisfy the increase.</p> <p>You may not decrease the value dynamically. All partitions in the same port group must be deleted first and reconfigured in order to reduce this value.</p> <p>To avoid this deficit condition, which could occur with maximum LCN usage by a partition or partitions, it is recommended that all partitions be configured ahead of time before adding connections. Also, it is recommended that all partitions be configured before adding a VSI controller using the addshelf command.</p>
Maximum VSI LCNs	<p>The total number of LCNs the partition is allowed for setting up connections. The min LCNs is included in this calculation. If max LCNs equals min LCNs, then the max LCNs are guaranteed for this partition.</p> <p>Otherwise, (max – min) LCNs are allocated from the common pool on a FIFO basis.</p> <p>If the common pool is exhausted, new connection setup requests will be rejected for the partition, even though the maximum LCNs has not been reached.</p> <p>You may increase this value dynamically when there are enough unallocated LCNs in the port group to satisfy the increase.</p> <p>You may not decrease the value dynamically. All partitions in the same port group must be deleted first and reconfigured in order to reduce this value.</p> <p>Different types of BXM cards support different maximum values. If you enter a value greater than the allowed maximum, a message is displayed with the allowable maximum value.</p> <p>Note that you must specify a value greater than 0 for the Maximum VSI LCNs, Maximum PVC Channels, and Maximum PVC Bandwidth parameters. Otherwise, you will not be able to add any connections on a BXM card.</p>

Table 16-12 cnfrsrc—Parameters (continued)

Parameter	Description
Start VSI VPI	<p>By default the LSC (for example, the 6400, 7200 or 7500 series router) will use either a starting VSI VPI of 1 or 2 for MPLS, whichever is available. If both are available, a starting VSI VPI of 1 is used. The VPI range should be 2–15 on a BPX 8620 VSI. The VSI range for MPLS on the BPX 8620 is configured as a VSI partition, usually VSI partition number 1. VSI VPI 1 is reserved for Automatic Routing Management PVCs. (This restriction applies only to trunks, not to ports. For a port, you can use any VPI value.) For a port UNI, the VPI range is 1 to 255. For a port NNI, the range is 1 to 4095. For trunks that do not have Automatic Routing Management configured, the VPI ranges are the same as for ports.</p> <p>The VSI partition for MPLS should start at VPI 2. If VPI 2 is not to be used, you can use the MPLS VPI interface configuration on the LSC to override the defaults.</p> <p>For trunks with Automatic Routing Management configured, the range is 2 to 4095. Always set to 2 for trunks. For ports in port mode it should be set to “1”. By default the TSC (for example, 6400, 7200 or 7500 series router) will use either a starting VSI VPI of 1 or 2 for tag switching, whichever is available. They default to 1.</p>
End VSI VPI	<p>Two VPIs are sufficient for Release 9.1, although it may be advisable to reserve a larger range of VPIs for later expansion, for example, VPIs 2–15.</p> <p>The range is the <Start VSI VPI > value to 4095.</p>
Minimum VSI Bandwidth	<p>The minimum port bandwidth that can be used by this partition in cells per second.</p> <p>The range is 0 to <Maximum Line Rate>. For example, the OC-3 line rate is 352207; 0 is the default.</p>
Maximum VSI Bandwidth	<p>The maximum port bandwidth that can be used by this partition. This value is used for VSI Qbin bandwidth scaling.</p> <p>The range is 0 to <Maximum Line Rate>. For example, the OC-3 line rate is 352207; 0 is the default.</p>

cnfvsiiif

Use the **cnfvsiiif** command to assign a Service Class Templates (SCT) to an interface.

Use the **dspvsiiif** command to display a service class template assigned to an interface (VI), as well as display a summary of the resources allocated to the VSI partition on a given interface.

Assigning a Service Template to an Interface

A default service template is assigned to a logical interface (VI) when you up the interface by using **upport/uptrk**.

For example:

- **uptrk 1.1**
- **uptrk 1.1.1 (virtual trunk)**

- **upport 1.1**

This default template has the identifier of 1. You can change the service template from service template 1 to another service template using the **cnfvsiiif** command. The **dspvsiiif** command allows you to display the template associated with the interface. For example:

- **cnfvsiiif 1.1 2**
- **cnfvsiiif 1.1.1 2**
- **dspvsiiif 1.1**
- **dspvsiiif 1.1.1**

cnfvsiiif Example

You use the **cnfvsiiif** command to assign a selected service template to an interface (VI) by specifying the template number. It has the following syntax:

```
cnfvsiiif <slot.port.vtrk> <tmplt_id>
```

Full Name

Configure a service class template and assign it to an interface

Syntax

```
cnfvsiiif <slot.port.vtrk> <tmplt_id>
```

Related Commands

cnfrsrc, dsprsrc, cnfqbin, dspqbin

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	Yes	Yes	BPX	Yes

Example 1

```
cnfvsiiif 11.1 2
```

System Response

```
sw53          TN      StrataCom      BPX 8600  9.2.a5      Date/Time Not Set

              Port: 11.1

              Service Class Template ID: 2
```

Last Command: cnfvsiif 11.1 2

Next Command:

cnfvsipart

Use the **cnfvsipart** command to enable or disable VSI ILMI support.

Full Name

Configure VSI partition characteristics

Syntax

cnfvsipart <slot.port.[vtrk]> <part_id> <enable_option>

Table 16-13 *cnfvsipart-Parameters*

Parameter	Description
slot.port.[vtrk]	Slot, port (and virtual port if applicable) of the interface.
part_id	Partition ID corresponding to the VSI partition.
enable_option	This parameter indicates whether to enable or disable VSI ILMI functionality. Valid values: <ul style="list-style-type: none"> • Y enables the VSI ILMI session. • N disables the VSI ILMI session.

Related Commands

cnfrsrc, dspvsipartenf, cnfport, cnftrk

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	Yes	Yes	BPX	Yes

delctrlr

Deletes VSI capabilities on a trunk interface to which a feeder of type AAL5 is attached. Use this command to delete a controller, such as a PNNI SES controller, from a BPX node. It deletes the VSI control channels used to communicate between the VSI master on the PNNI controller and the VSI slaves on the BXM cards.

You run this command as the first step in deleting a PNNI controller from a BPX node. The second step is to run the command **delshef** to delete the AAL5 feeder.

(Do not use **delctrlr** to delete a VSI Label Switching controller from a BPX node; you must use **delshef** to delete a VSI Label Switching controller from a BPX node.)

In this release, PNNI runs on the Service Expansion Shelf (SES) hardware.

To add VSI controller capabilities onto the newly created AAL5 interface, you use the **addctrlr** command. You are prompted to enter the controller ID and partition ID. This creates an interface through which a PNNI controller can use the VSI protocol to control the node resources that were previously specified by using the **cnfrsrc** command.

You remove a PNNI controller from a BPX node by using the **delctrlr** command. For example, this might be a VSI controller such as an PNNI controller configured with VSI capabilities as an AAL5 interface shelf to a BPX. When you delete one of the controllers by using the **delctrlr** command, the master-slave connections associated with this controller are deleted. The control VCs associated with other controllers managing the same partition will not be affected.

**Note**

To add a VSI Label Switch Controller, you use **addshelf** and **delshef** commands, as in releases previous to Release 9.2.

Full Name

Delete VSI capabilities from a AAL5 feeder interface

Syntax

```
delctrlr <slot.port> <controller id>
```

Table 16-14 delctrlr-Parameters

Parameter	Description
slot.port	Slot and port numbers corresponding to the feeder trunk.
controller id	Controller ID number corresponding to the PNNI controller you are deleting. ID numbers should correspond to an active PNNI controller. Valid controller values are 1 – 32

Related Commands

addctrlr, dspctrlrs, dspnode

Attributes

Privilege	Jobs	Log	Node	Lock
1	Yes	Yes	BPX	Yes

Example 1

delctrlr 10.3

Description

Delete VSI controller with interface shelf (feeder) type of AAL5 connected on trunk 10.3 from the list of controllers connected to BPX node named “night.”

System Response

```
night          TN      StrataCom      BPX 8600      9.2.00 Apr. 11 1998 14:31 GMT
```

BPX Controllers Information

Trunk	Name	Type	Part Id	Ctrl Id	Ctrl IP	State
10.3	PAR	VSI	1	2	192.0.0.0	Enabled
11.1	VSI	VSI	2	2	192.0.0.0	Disabled

Last Command: delctrlr 10.3

System Response

```
night          TN      StrataCom      BPX 8600      9.2.   Apr. 11 1998 14:31 GMT
```

```
                BPX Controllers Information
```

Trunk	Name	Type	Part Id	Ctrl Id	Ctrl IP	State
10.3	PAR	VSI	1	2	192.0.0.0	Enabled
11.1	VSI	VSI	2	2	192.0.0.0	Disabled

```
Last Command: delctrlr 10.3
```

Example 2

```
delctrlr <slot.port><controller_id>
```

Description

Deletes controller from port 3 on slot 10, with controller name E, and controller ID of 1.

System Response

```
night          TN      StrataCom      BPX 8600      9.2.00 Apr. 11 1998 14:31 GMT
```

```
                BPX Controllers Information
```

Trunk	Name	Type	Part Id	Ctrl Id	Ctrl IP	State
10.3	PAR	VSI	1	1	192.0.0.0	Enabled
11.1	VSI	VSI	2	2	192.0.0.0	Disabled

```
Last Command: delctrlr 10.3
```

delshelf

Deletes an interface shelf from a tiered network. The identifier for an interface shelf is either the trunk number or the name of the shelf. Normally, you do not execute **delshelf** only at the hub node, but on the IGX/AF itself. The command **delshelf** has the single function of letting you turn off LMI if the trunk is not allowing communication. In contrast to the **deltrk** command, you can execute **delshelf** at any time if no connections terminate at the trunk.

Deleting a Controller

You remove a controller from the node by using the **delshelf** command. When one of the controllers is deleted using the **delshelf** command, the master-slave connections associated with this controller will be deleted. The control VCs associated with other controllers managing the same partition will not be affected.

The deletion of the controller will trigger a new VSI configuration CommBus (internal BPX protocol) message. This message will include the list of the controllers attached to the node. The controller deleted will be removed from the list. This message will be sent to all active slaves in the shelf. In cluster configurations, deleting a controller will be communicated to the remote slaves by the slave directly attached through the inter-slave protocol.

While there is at least one controller attached to the node controlling a given partition, the resources in use on this partition should not be affected by a controller being deleted. Only when a given partition is disabled, the slaves will release all the VSI resources used on that partition.

Full Name

Delete an interface shelf

Syntax

```
delshelf <trunk> | <shelf-name>
```

Related Commands

addshelf, dspnode

Attributes

Privilege	Jobs	Log	Node	Lock
1	Yes	Yes	IGX, BPX	Yes

Example 1

```
delshelf 4.1
```

Description

Delete shelf trunk A241 from a BPX node.

System Response

```
nmsbpx23      TN      SuperUser      BPX 8600      9.2      Aug. 16 1998 13:26 PST
```

BPX Interface Shelf Information

Trunk	Name	Type	Alarm
1.3	AXIS240	AXIS	OK
11.2	A242	AXIS	OK

```
Last Command: delshelf A241
```

```
Shelf has been deleted
```

```
Next Command:
```

Table 16-15 delshelf-Parameters

Parameter	Description
trunk or shelf name	Specifies the slot and port number of the trunk or the name of the interface shelf.

delyred

This command disables Y-redundancy for the card set in the specified primary slot number. If the secondary card slot is being used as the active slot at the time you use the **delyred** command, the system attempts to switch back to the primary slot. The substitution takes place only if the primary slot has a complete set of cards and the cards are in a Standby or a Standby-F state (not if they are Failed). See the **dspcds** description for information on card states. See the **addyred** and **dspyred** commands for more information on Y-cable redundancy.

When you issue the **delyred** command, it always completes. If the primary card is incomplete, control will still be given to the primary card.

Full Name

Delete Y-cable redundancy

Syntax

```
delyred <primary slot>
```

Related Commands

addyred, dspsyred, prtyred

Attributes

Privilege	Jobs	Log	Node	Lock
1-4	No	Yes	IGX, BPX	Yes

Example

```
delyred 16
```

Description

Disable Y-cable redundancy at slot 16.

dspchuse

The **dspchuse** command displays the a summary of the channel distribution in a given slot. It shows the distribution of channels between AutoRoute pvcs, networking channels, VSI management channels, and channels allocated to the VSI slave.

This command applies only to BXM cards. Previously a debug command; **dspchuse** is available to multiple users at all privilege levels in this release.

Full Name

Display channel distribution

Syntax

```
dspchuse <slot >
```

Related Commands

dspsviif, dspsvipartinfo

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	BPX	No

Parameters**Table 16-16 dspchuse—Parameters**

Parameter	Description
max	Maximum number of channels supported on the card or port group.
used	Number of channels currently used; this includes all types of channels: networking channels, pvcs, svcs, vsi master-slave vcs, and channels allocated to VSI partitions.
avail	Number of channels still available for use.
netw	Number of network channels used. For each trunk interface (feeder trunk, physical trunk, or virtual trunk) that is upped some channels are reserved for networking. For a feeder or a physical trunk 271 channels are reserved. For a virtual trunk, the first one upped on the port will reserve 271, any subsequent virtual trunk on the same port will reserve 1 more channel.
pvc cnfg	Number of pvcs configured.
svc cnfg	Number of svcs configured.
vsi mgmt	Number of channels used for VSI master-slave vcs. Note: the sum of port group VSI management vcs may be less than the number of VSI management vcs at the card level. This is because the backplane management connection (the leg of the connection from the backplane to the slave) requires resources at the card level but not at the port group level.
vsi cnfg	VSI channels reserved for use by the slave to set up connections requested via the VSI interface. Although the configuration of the partitions is done on a per-interface basis, the pool of LCNs is managed at the card level and at the port group level.
pvc used	Channels currently used by AutoRoute connections.
vsi min	VSI min channels configured for a partition via the cnfrsrc command.
vsi max	VSI max channels configured for a partition via the cnfrsrc command.

Example 1

```
dspchuse 13
```

Description

Display channel management summary for slot 13.

System Response

```
sw53 TN StrataCom BPX 8600 9.2.10 Jan. 10 1999 14:31 GMT

Channel Management Summary for Slot 13

      max      used      avail      netwpvc      cnfgvsi      mgmt      vsi      cnf
card 13: 16320  8675   7645    1358      2304       13      5000
port grp 1:8160  5849   2311     813      1024       12      4000
port grp 2:8160  2825   5335     545      1280        0      1000

      pvc      cnfg      pvc      used      nw      used      vsi      mgmt      vsi      min      vsi      max
port 1:    256                                0      271          0
part 1:                                1000      4000
part 2:                                2000      4000
port 2:    256                                0      271          0
port 3:    256                                0      271          12

This Command: dspchuse 13

Continue?
```

dspctrlrs

Use the **dspctrlrs** command to display all VSI controllers, such as a SES PNNI controller on a BPX or IGX node. This command lists:

- the controller ID
- the partition the controller use
- the trunk/interface to which a controller is attached
- the controller type (always a VSI controller)
- the interface type (AAL5, VSI Label Switching)
- MGX 8220 (formerly called AXIS) interface shelf
- the name of the controller/entity on which the controller exists (that is, node name, equipment name).



Note You use **addshelf** and **delshef** to add and delete a VSI controller such as a Label Switching Controller to a BPX node

You can also the **dspnode** command to display the VSI controllers on a BPX node.

Full Name

Displays all VSI controllers, for example, all PNNI controllers such as PNNI, on a BPX or IGX node.

Syntax

```
dspctrlrs <slot.port><controller name string><partition_id><controller_id>
```

Related Commands

addctrlr, addshelf, cnfctrlr, delctrlr, dspnode

Attributes

Privilege	Jobs	Log	Node	Lock
1	No	Yes	IGX, BPX	Yes

Example 1

```
dspctrlrs
```

Description

Display VSI controllers on BPX node sw174.

System Response

```
sw174          TRM      StrataCom      BPX 8620      9.2.xS  Sep 20 1998 14:31 GMT
```

```
BPX 8620 VSI controller information
```

Ctrl Id	Part Id	Trunk	Ctrlr Type	Intfc Type	Name
1	1	2.1	VSI	AAL5	SIMFDR0

```
Last Command: dspctrlrs
```

dspqbin

The **dspqbin** command displays the Qbin resources on a selected trunk, port, or virtual trunk. It displays the Qbin parameters currently configured for an interface, and shows whether the Qbin resources have been configured by the user OR by a template. The **dspqbin** command displays whether the Qbin has been configured by a user or by the template assigned to the interface. It also displays whether the Qbin has EPD enabled/disabled.

For this release, Class of Service buffer 10 is used for tag switching connections. Check the queue buffer 10 configurations for port 4.1 as follows:

dspqbin 4.1 10**Full Name**

Display Qbin

Syntax

```
dspqbin <slot number>.<port number> [qbin-id]
```

**Note**

To display a specific Qbin configuration on the selected port, enter qbin-id as an optional parameter to the **dspqbin** command. For Release 9.1, use only Qbin 10 for VSI connections.

Related Commands

cnfqbin

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	Yes	No	BPX	No

Example 1

```
dspqbin 13.1
```

Description

Display the current Qbin configuration on the OC-3 trunk on port 1 of slot 13 on the BPX to support MPLS.

System Response

```
sw53          TN      StrataCom      BPX 8600  9.2.a5      Date/Time Not Set
```

```
Qbin Database 11.1 on BXM qbin 10      (Configured by ATMF1 Template)
                                         (EPD Disabled on this qbin)
```

```
Qbin State:                Enabled
Qbin Discard threshold:    8
Low CLP threshold:         90%
High CLP threshold:        95%
EFCI threshold:            50%
```

```
Last Command: dspqbin 11.1 10
```

```
Next Command:
```

Example 2**dspqbin 4.1 10****Description**

Display the current Qbin configuration on slot 4, port 1, Qbin 10.

System Response

```
sw237          TN      StrataCom      BPX 8620  9.2.L3      May 10 1999 14:42 PST

Qbin Database 4.1 on EXM qbin 10      (Configured by MPLS1 Template)
                                       (EPD Enabled on this qbin)

Qbin State:           Enabled
Discard Threshold:    28800 cells
EPD Threshold:        95%
High CLP Threshold:   100%
EFCI Threshold:       100%
```

Last Command: dspqbin 4.1 10

Example 3**dspqbin 2.1.1 10****Description**

Display Qbin 10 on slot 2, port 1, virtual trunk 1.

System Response

```
Qbin Database 2.1.1 on EXM qbin 10

Qbin Discard threshold:    9800
Low CLP/EPD threshold:    60%
High CLP threshold:       80%
EFCI threshold:           80%
```

Example 4**dspqbin 13.1.1 10**

Description

Display Qbin 10 configuration for virtual trunk 1, on port 1 of card slot 13.

System Response

```
sw237          TN      StrataCom      BPX 8620  9.2.L3      May  10 1999 14:42 PST

Qbin Database 13.1.1 on BXM qbin 10      (Configured by ATMF1 Template)
                                           (EPD Disabled on this qbin)

Qbin State:           Enabled
Discard Threshold:    12 cells
Low CLP Threshold:    60%
High CLP Threshold:   80%
EFCI Threshold:       100%
```

Last Command: dspqbin 13.1.1 10

Table 16-17 dspqbin Parameters

Parameter	Description
slot.port	Specifies the BXM card slot and port number.
Qbin ID	Specifies the ID number of the Qbin available for use by the LSC (MPLS Controller) for VSI. The range is 0 to 255; 0 is the default. Always use 10 in Release 9.1; use Qbin 13 in Release 9.2.

Class of Service Buffer Descriptor Template Configuration

Table 16-18 lists parameters included in the Class of Service (CoS) Buffer (Qbin) portion of the Service Class Templates. (Note that a Qbin is a platform-specific instance (for example, BXM) of the more general Class of Service Buffer. A firmware command sends a command (message) to switch software to initialize the CoS Buffer Descriptors in the Service Class Templates. This command may contain multiple instances of Qbin number, each indicating a new Qbin configuration.

Table 16-18 Class of Service Buffer Parameters That Display on dspqbin Screen

Object (Parameter) Name	Range/Values	Default	Description
Service Template ID	0 – 7	R	Service Class Template number for this parameter set.
Qbin Number	0 – 15	R	Identifies the target Qbin to modify.
Direction	0: Ingress 1: Egress	R	Indicates whether the Qbin configuration applies to the ingress or egress of the card.

Table 16-18 Class of Service Buffer Parameters That Display on dspqbint Screen (continued)

Object (Parameter) Name	Range/Values	Default	Description
Priority	0 – 15	R	Parameter defines the relative priority of the Qbin in relationship to the other Qbins in the VI. Zero is the highest priority and 15 is the lowest priority.
Discard Selection	1 – CLP Hysteresis 2 – Frame Discard	R	Indicates whether Qbin should perform the CLP Hysteresis or the Frame Discard option. The Qbin can only be configured to do one or the other.
Max Threshold	0 – ? cells	R	Determines the amount of cell memory to dedicated to this Qbin.
CLP High Threshold	0 – 100%	R	Parameter determines at which level in the Qbin CLP-tagged cells get discarded. Discard continues until the Qbin depth drops below the Qbin CLP Low Threshold.
CLP Low Threshold	0 – 100%	R	Parameter determines at which level in the Qbin CLP-tagged cells get admitted.
EFCI Threshold	0 – 100%	R	Parameter determines at which level in the Qbin EFCI bits get tagged in the departing cell(s).
EPD 0 Threshold	0 – 100%	R	Qbin Frame Discard threshold for CLP 0 traffic.
WFQ enable	0: Disable 1: Enable	R	Indicates whether weighted fair queueing/ traffic shaping is enabled for this Qbin.

dspqbint

Display the Qbin (class of service buffer) templates. You can enter optional parameters to display the service classes in a specified Qbin template.

Use the **dspqbint** command to display the service class template number assigned to an interface (VI). The **dspcsmplt** command has three levels of operation:

- **dspqbint** With no arguments lists all the service templates resident in the node.
- **dspqbint <tmplt_id>** Lists all the service classes in the template
- **dspqbint <tmplt_id>** Lists all the parameters of that service class

Additional service template commands you can use are:

- **cnfqbin** Configures the Qbin. You can answer yes when prompted and the **cnfqbin** command will use the card's Qbin values from the Qbin templates.
- **dspqbint** Displays Qbin parameters currently configured for the virtual interface.
- **dspcd** Display the card configuration.

See the sections that precede the VSI commands at the front of this chapter for more high-level information on VSI and more detailed information on service class templates in Release 9.2 and how you use them to configure connections with specified service classes.

Full Name

Display Qbin template

Syntax

dspqbint <template #><qbin #>

Description

Display a service class template number, which identifies one of the templates between 1–3, and the Qbin number.

Related Commands

dspset, dspqbin, cnfrsrc, dsprsrc, cnfvsiif, dspvsiif

Attributes

Privilege	Jobs	Log	Node	Lock
1–6	No	No	BPX	No

Example 1

dspqbint <template #> <qbin>

Description

Displays the Qbin template number 1 for a specified Qbin (10).

System Response

```

sw53          TN      StrataCom      BPX 8600  9.2.a5      Date/Time Not Set

              Qbin Template:  1          Qbin:  10

CLP High      95          (% of Max Depth)
CLP Low       90          (% of Max Depth)
EFCI Threshold 50          (% of Max Depth)
EPD           Enabled
Vc Shaping    Enabled
Max Depth     2000       (micro secs)

```

Last Command: dspqbint 1 10

Next Command:

dsprsrc

The **dsprsrc** command displays the partition of all the resources on the specified trunk or port. It also displays virtual trunks for a specified trunk or port. Resources not applicable to virtual trunks are not displayed.

Full Name

Display resources

Syntax

dsprsrc <slot number>.<port number>.<vtrk> [partition_id]

**Note**

To display a specific partition, you can enter the optional partition_id parameter for the **dsprsrc** command. In this release, the valid partitions are 1 and 2.

Related Commands

cnfrsrc, cnfqbin, dspqbin

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	BPX	No

Example 1**dsprsrc 3.2.1****Description**

Display partition resources on the OC-3 trunk on card slot 3, port 2, and virtual trunk 1 on the BPX node.

System Response

```
sw57          TN      SuperUser      BPX 8620      9.2      Mar. 10 1998 10:41 GMT
```

```
Port/Trunk : 3.2.1
Template: 3
Maximum PVC LCNS:          256      Maximum PVC Bandwidth:1411679
Min Lcn(1) : 0 Min Lcn(2) : 0
Partition 1
Partition State :          Enabled
Minimum VSI LCNS:          0
Maximum VSI LCNS:          1      Used VSI LCNs: 25
Start VSI VP:              1
End VSI VPI :              1
Minimum VSI Bandwidth :    0      Maximum VSI Bandwidth :      0
```

Example 2**dsprsrc 13.1****Description**

Display partition resources on the OC-3 trunk on port 1 of slot 13 on the BPX to support MPLS.

System Response

```
sw57          TN      SuperUser      BPX 8620      9.2          Mar. 10 1997 10:41 GMT
```

```
Port/Trunk:   13.1    [ACTIVE  ]
Interface:    OC-3-2
Available Channels: 16000
```

```
Maximum PVC Channels      : 256 (default)
Maximum PVC Bandwidth    : 352207 cps
```

```
Partition ID              : 0
VSI Signalling VCI        : 32 (default)
Minimum VSI LCNs          : 0
Maximum VSI LCNs          : 0
Start VSI VPI             : 0
End VSI VPI               : 0
Minimum VSI Bandwidth     : 0 cps
Maximum VSI Bandwidth     : 0 cps
```

```
Last Command: dsprsrc 13.1
```

Example 3**dsprsrc 4.1 1****Description**

Display partition resources on VSI trunk 4.1 (slot.port), specifying partition ID of 1. Note that if the partition is disabled, you only see the Max PVC LCNs Max. PVC Bandwidth available, and Partition ID number parameters.

System Response

```

sw237          TN      StrataCom      BPX 8620  9.2.L3    May 10 1999 14:27 PST

Port/Trunk :4.1

Maximum PVC LCNS:          256      Maximum PVC Bandwidth:95000

Partition 1

Partition State :          Disable

```

```
Last Command:dsprsrc 4.1 1
```

Example 4**dsprsrc 4.1 1****Description**

Display partition resources on VSI trunk 4.1, and partition ID 1. (If the partition is enabled, more parameters related to how resources are partitioned are displayed.)

System Response

```

sw237          TN      StrataCom      BPX 8620  9.2.L3    May 10 1999 14:35 PST

Port/Trunk :4.1

Maximum PVC LCNS:          256      Maximum PVC Bandwidth:92000

Partition 1

Partition State :          Enabled
Minimum VSI LCNS:          20
Maximum VSI LCNS:          30
Start VSI VPI:             4
End VSI VPI :              6
Minimum VSI Bandwidth :    2000      Maximum VSI Bandwidth :      3000

```

```
Last Command:dsprsrc 4.1 1
```

Example 5**dsprsrc 4.1 1****Description**

Display partition resources on VSI trunk 4.1.

System Response

```
n4          TN      SuperUser      BPX 8620      9.2      Apr. 4 1998  16:47 PST
```

```
Port/Trunk : 4.1
```

```
Maximum PVC LCNS:          256      Maximum PVC Bandwidth:26000
```

```
Min Lcn(1) : 0 Min Lcn(2) : 0
Partition 1
```

```
Partition State :          Enabled
Minimum VSI LCNS:          512
Maximum VSI LCNS:          7048
Start VSI VPI:             2
End VSI VPI :              15
Minimum VSI Bandwidth :    26000      Maximum VSI Bandwidth :      100000
```

```
Last Command: dsprsrc 4.1 1
```

```
Next Command:
```

Table 16-19 dsprsrc-Parameters

Parameter	Description
slot.port	Specifies the BXM card slot and port number.
Partition ID	Specifies the ID number of the partition available for use by the LSC (MPLS Controller) for VSI. The range is 0 to 255; 0 is the default. Always use 1 in Release 9.1.

dspst

The **dspst** command displays a list of nine supported Service Class Templates (SCT).

Extended Services Types Support

The service-type parameter for a connection is specified in the connection bandwidth information parameter group. The service-type and service-category parameters determine the service class to be used from the service template.

Connection Admission Control (CAC)

For this release, when a connection request is received by the VSI Slave, it is first subjected to a Connection Admission Control process before being forwarded to the firmware layer responsible for actually programming the connection. The granting of the connection is based on the following criteria:

LCNs available in the VSI partition

- Qbin
- Service Class

QoS guarantees

- max CLR
- max CTD
- max CDV

When the VSI slave accepts (that is, after CAC) a connection setup command from the VSI master in the Label Switch Controller, it receives information about the connection including service type, bandwidth parameters, and QoS parameters. This information is used to determine an index into the VI's selected Service Template's VC Descriptor table thereby establishing access to the associated extended parameter set stored in the table.

Supported Service Types

The service type identifier is a 32-bit number. The service type identifier appears on the **dspst** screen when you specify a service class template number and service type; for example:

```
dspst <2> <vbrt1>
```

A list of supported service templates and associated Qbins, and service types is shown in Table 16-20.

Table 16-20 Service Template and Associated Qbin Selection

Template Type	Service Type ID	Service Type	Parameters	Associated Qbin	
VSI Special Types	0x0001	Default		13	
	0x0002	Signaling		10	
ATMF Types	0x0100	cbr.1	ATM Forum (ATMF) Types	10	
ATMF1 and	0x0101	vbr.rt1		11	
ATMF2 templates	0x0102	vbr2.rt		11	
(for PNNI	0x0103	vbr3.rt		See dpsct command for sample parameters for various service types, such as VbrRt1, Cbr1, and so on.	11
controllers)	0x0104	vbr1.nrt			12
	0x0105	vbr.2nrt			12
	0x0106	vbr.3nrt			12
	0x0107	ubr.1			13
	0x0108	ubr.2			13
	0x0109	abr			14
	0x010A	cbr.2			10
	0x010B	cbr.3			10
MPLS Types	0x0001	Default			
(for MPLS	0x0200	Signaling		10	
controllers)	0x0201	label cos0		10	
	0x0202	label cos1		11	
	0x0203	label cos2		12	
	0x0204	label cos3		13	
	0x0205	label cos4		10	
	0x0206	label cos5		11	
	0x0207	label cos6		12	
	0x0210	label cos7		13	
		label ABR		14	

Details of Connection (VC) Parameters Used in Service Class Templates

Listed below is some detailed information on connection (VC) parameters used in service class templates. Some of these parameters may appear on the **dpsct** display.

```

Qbin #
Description      CoS Buffer (Qbin) to use for this CoS
Range/Values:   10 - 15 (for Release 9.2)
Units:          enumeration
UPC Enable
Description:     Enable/Disable Policing function. The first 2 values are
consistent with the definition for the older cards. Option #2 and #3 are new
and provide the ability to turn on policing on just GCRA #1 (PCR policing) or
#2 (SCR policing).

```

Range/Values: 0 -3
 0: Disable both GCRA's
 1: Enable both GCRA's
 2: Enable GCRA #1 only (PCR policing)
 3: Enable GCRA #2 only (SCR policing)
 Units: enumeration
 UPC CLP Selection
 Description: Selects processing of policing Buckets based on the CLP bit.
 Range/Values: 0 -2
 0 - Bk 1: CLP (0+1), Bk 2: CLP (0)
 1 - Bk 1: CLP (0+1), Bk 2: CLP (0+1)
 2 - Bk 1: CLP (0+1), Bk 2: Disabled
 Units: enumeration
 Policing Action (GCRA #1)
 Description: Indicates how cells that fail the second bucket (SCR bucket) of the policer should be handled, if policing is enabled.
 Range/Values: 0 - Discard
 1 - Set CLP bit
 2 - Set CLP of untagged cells, disc. tag'd cells
 Units: enumeration
 Policing Action (GCRA #2)
 Description: Indicates how cells that fail the second bucket (SCR bucket) of the policer should be handled, if policing is enabled.
 Range/Values: 0 - Discard
 1 - Set CLP bit
 2 - Set CLP of untagged cells, disc. tag'd cells
 Units: enumeration
 PCR
 Description: Peak Cell Rate; used as default value if not supplied in VSI connection request.
 Range/Values: 0 - 100
 Units: cells/sec
 MCR
 Description: Minimum Cell Rate; used as default value if not supplied in VSI connection request.
 Range/Values: 0 - 100
 Units: cells/sec
 SCR
 Description: Sustained Cell Rate; used as default value if not supplied in VSI connection request.
 Range/Values: 0 - 100
 Units: cells/sec
 ICR
 Description: Initial Cell Rate . Used only for ABR VCs to set initial ACR value after idle traffic period.
 Range/Values: 0 - 100
 Units: cells/sec
 MBS
 Description: Maximum Burst Size - used to set bucket depth in policer function.
 Range/Values: 1 - 5M
 Units: cell count
 CoS Min BW
 Description: Bandwidth reserved for this Class of Service; used to initialize the CoS Buffer (Qbin) Minimum Service Rate (HW param. = ICG), and for CAC purposes (subject to CAC treatment type).
 Range/Values: 0% - 100%
 Units: % of Partition Min BW.
 CoS Max BW
 Description: Maximum value allowed for the sum of VC Min. BW's for this CoS; used by CAC (subject to CAC treatment type).
 Range/Values: 0% - 100%
 Units: % of Partition Max BW
 Scaling Class

Description: Scaling table used for modifying per-VC thresholds under VI or Global cell-memory congestion.

Range/Values: choices are 0 - 3,
 0: CBR
 1: VBR
 2: ABR
 3: UBR

Units: enumeration

CAC Treatment

Description: Connection Admission Control algorithm used by this CoS

Range/Values: 0 - 256
 0: No CAC performed; all connections admitted.
 1: LCN_CAC; check for LCN availability only; no BW consideration.
 2: MINBW_CAC; LCN + simple min. BW test (sum_of_VC_min_BW <= CoS_max_BW)
 3: CAC_2 w/ overbooking allowed
 4: ECR_CAC; LCN + ECR calculation (from table) & BW test (sum_of VC_ECR <= Cos_max_BW).
 5: CAC_4 w/ overbooking allowed
 6: MEASURED_CAC; LCN + ECR calculation (from dynamic measurement) & BW test (sum_of VC_ECR <= Cos_max_BW).

Units: enumeration

VC Max

Description: Maximum VC-cell-count threshold; all cells are discarded on a VC when this threshold has been exceeded.

Range/Values: 0 - VI_max_cell_count

Units: cell count

VC CLPhi

Description: VC cell count above which CLP=1 cells are discarded

Range/Values: 0 - 100

Units: % of VC Max threshold

VC CLPlo

Description: VC cell count below which CLP=1 cells are no longer discarded (discards having begun when CLPhi was exceeded).

Range/Values: 0 - 100

Units: % of VC Max threshold

VC EPD

Description: VC cell count above which AAL-5 frames are discarded

Range/Values: 0 - 100

Units: % of VC Max threshold

VC EFCI

Description: VC cell count above which congestion notification is activated

Range/Values: 0 - 100

Units: % of VC Max threshold

VC Discard Selection

Description: Choice of frame-based discard (EPD) or CLP-hysteresis

Range/Values: 0 - 1
 0: CLP Hysteresis
 1: EPD

Units: enumeration

VSVD/FCES

Description: For ABR VC's, enable/disable Virtual Source/Virtual Destination (VSVD) and/or Flow Control on External Segments (FCES) functionality

Range/Values: 0 -2
 0: None
 1: VSVD
 2: VSVD w/ FCES

Units: enumeration

ADTF

Description: ABR only parameter

Range/Values: 10 - 1023

Units: milliseconds

RDF

Description: ABR only parameter

```

Description:      Rate Decrease Factor
ACR = ACR - (ACR * RDF)
Range/Values: 2 - 512, in powers of 2
Units:           Inverse decrease factor
RIF              ABR only parameter
Description:      Rate Increase Factor
ACR = ACR + (PCR * RDF)
Range/Values: 2 - 512, in powers of 2
Units:           Inverse decrease factor
NRM              ABR only parameter
Description:      Number of data cells between FRM cells
Range/Values: 2 - 512, in powers of 2
Units:           cells
TRM              ABR only parameter
Description:
Range/Values:
Units:
CDF              ABR only parameter
Description:
Range/Values:
Units:
TBE              ABR only parameter
Description:
Range/Values:
Units:

FRTT             ABR only parameter
Description:
Range/Values:
Units:

```

Full Name

Display service class template (SCT)

Syntax

```
dpsct [template #][service_type]
```

Related Commands

dspqbint, cnfvsiiif, dspvsiiif

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	No	No	BPX	No

Example 1

```
dpsct
```

Description

Displays all the templates in the node.

System Response

```
sw53          TN      StrataCom      BPX 8620  9.2.a5      May 11 1999 14:24 PST
```

```
Service Class Templates
```

```
Template  Name
  1      MPLS1
  2      ATMF1
  3      ATMF2
```

```
Last Command: dspst
```

```
Next Command:
```

Example 2**dspst 2****Description**

Display service class template 2, which displays service classes (also referred to as service categories or service sub-categories) for the ATMF1 template, along with designated Qbins (class of service buffers).

System Response

```
sw237          TN      StrataCom      BPX 8620      9.2.1G      June 91999 17:48PST
```

```
Service Class Map for ATMF1 Template
```

Service Class	Qbin	Service Class	Qbin	Service Class	Qbin
Default	13	Cbr2	10		
VbrRt1	11	Cbr3	10		
VbrRt2	11				
VbrRt3	11				
VbrNRT1	12				
VbrNRT2	12				
VbrNRT3	12				
Ubr1	13				
Ubr2	13				
Abr	14				
Cbr1	10				

```
Last Command: dspst 2
```

```
Next Command:
```

Example 3**dpsct 3****Description**

Display service class template 3, which displays service classes (also referred to as service categories or service sub-categories) for the ATMF1 template, along with designated Qbins (class of service buffers).

System Response

```
sw237          TN      StrataCom      BPX 8620  9.2.1G   June 9 1999  17:45 PST
```

```
Service Class Map for ATMF2 Template
```

Service Class	Qbin	Service Class	Qbin	Service Class	Qbin
Default	13	Cbr2	10		
VbrRt1	11	Cbr3	10		
VbrRt2	11				
VbrRt3	11				
VbrNRt1	12				
VbrNRt2	12				
VbrNRt3	12				
Ubr1	13				
Ubr2	13				
Abr	14				
Cbr1	10				

```
Last Command: dpsct 3
```

```
Next Command:
```

Example 4**dpsct 2 vbrt1****Description**

Display service class template (SCT) for template number 2 called vbrt1.

System Response

```

sw53          TN          BPX 8620 9.2.a3      Apr. 13 1999  17:30 PST

          Service Template:ATMF1 (2)      Service Type:  VbrRt1 (101)

Service Category          VbrRt (101)
Qbin                      11
UPC Enable                GCRA_1_2
UPC CLP Selection         CLP01_CLP01
Policing Action 1        DISCARD
Policing Action 2        DISCARD
Sustained Cell Rate      100                      (% of PCR)
Maximum Burst Size       1024                      (cells)
Scaling Class            Scaled 3rd
CAC Treatment            CAC4
VC Max Threshold         1280                      (cells)
VC Dscd Selection        Hysteresis
VC CLP High              80                      (% of Vc MAX
Threshold)

Last Command:dspst 2 vbrt1

sw236         TRM      StrataCom      BPX 8620 9.2.a8      May  11 1999 14:35 PST

          Service Template:ATMF1 (2)      Service Type:  VbrRt1 (101)

VC CLP Low                35                      (% of Vc MAX Threshold)
Cell Delay Variation Tolerance 250000

Last Command:dspst 2 vbrt1

```

Example 5**dspst 2 Abr****Description**

Display all the parameters of the service class template ID 2, specified by Abr.

System Response

```

sw53          TN      StrataCom      BPX 8600  9.2.a5      Date/Time Not Set

          Service Template: ATMF1 (2)      Class: Abr (104)

Service Class Type      109
Qbin                    14
UPC Enable              2
UPC CLP Selection      2
Policing Action 1      2
Peak Cell Rate         100                (%age of PCR)
Minimum Cell Rate      50                (% of PCR)
Initial Cell Rate      50                (% of PCR)
Scaling Class          0
CAC Treatment          2
VC Max Threshold      0                (cells)
VC CLP High           75                (% of Vc MAX Threshold)
VC CLP Low            30                (% of Vc MAX Threshold)

This Command: dpsct 2 abr

Continue?

```

Example 6**dpsct 1 Default****Description**

Displays the parameters for service class template 1 (the MPLS1 service class template), for the Default service type.

System Response

```

sw237          TN      StrataCom      BPX 8620  9.2.1G      June 9 1999  17:53 PST

          Service Template: MPLS1 (1)      Service Type:  Default (1)

Service Category      Default (1)
Qbin                  13
UPC Enable            NONE
Scaling Class         Scaled 1st
CAC Treatment         LCN
VC Max Threshold     61440                (cells)
VC Dscd Selection    EPD
VC CLP High          100                (% of Vc MAX Threshold)
VC EPD                40                (% of Vc MAX Threshold)
Cell Delay Variation Tolerance  250000

Last Command: dpsct 1 Default

Next Command:

```

Example 7**dspst 1 Signaling****Description**

Displays the parameters for service class template 1 (the MPLS1 service class template), for the Signaling service type.

System Response

```
sw237          TN      StrataCom      BPX 8620  9.2.1G      June 9 1999  17:57 PST

                Service Template: MPLS1 (1)      Service Type:  Signaling (2)

Service Category      Signaling (2)
Qbin                  10
UPC Enable            NONE
Scaling Class         Scaled 1st
CAC Treatment         LCN
VC Max Threshold      0                      (cells)
VC Dscd Selection     Hysteresis
VC CLP High           75                      (% of Vc MAX Threshold)
VC CLP Low            30                      (% of Vc MAX Threshold)
```

Last Command: dspst 1 signaling

Next Command:

CD

MAJOR ALARM

Example 8**dspst 1 Signaling****Description**

Displays the parameters for service class template 1 (the MPLS1 service class template), for the Signaling service type.

System Response

```

sw237          TN      StrataCom      BPX 8620  9.2.1G      June 9 1999  17:59 PST

          Service Template: MPLS1 (1)      Service Type:      Tag0 (200)

Service Category      Tag0 (200)
Qbin                  10
UPC Enable            NONE
Scaling Class         Scaled 1st
CAC Treatment         LCN
VC Max Threshold      61440              (cells)
VC Dscd Selection     EPD
VC CLP High           100                (% of Vc MAX Threshold)
VC EPD                40                  (% of Vc MAX Threshold)

```

Last Command: dpsct 1 Tag0

Next Command:

Example 9

dpsct 1 Tag0

Description

Displays the service classes in the service template 3, which is a service class template for use with a PNNI controller.

System Response

```

sw237          TN      StrataCom      BPX 8620  9.2.1G   June 9 1999  17:59 PST

          Service Template: MPLS1 (1)      Service Type:   Tag0 (200)

Service Category      Tag0 (200)
Qbin                  10
UPC Enable            NONE
Scaling Class         Scaled 1st
CAC Treatment         LCN
VC Max Threshold      61440          (cells)
VC Dscd Selection     EPD
VC CLP High           100             (% of Vc MAX Threshold)
VC EPD                40             (% of Vc MAX Threshold)

```

Last Command: dspst 1 Tag0

Next Command:

Example 10**dspst 1 Tag1****Description**

Displays the service classes in the service template 3, which is a service class template for use with a PNNI controller.

System Response

```

sw237          TN      StrataCom      BPX 8620  9.2.1G   June 9 1999  18:02 PST

          Service Template: MPLS1 (1)      Service Type:  Tag1 (201)

Service Category      Tag1 (201)
Qbin                  11
UPC Enable            NONE
Scaling Class         Scaled 1st
CAC Treatment         LCN
VC Max Threshold      61440                (cells)
VC Dscd Selection     EPD
VC CLP High           100                (% of Vc MAX Threshold)
VC EPD                40                (% of Vc MAX Threshold)

```

Last Command: dpsct 1 Tag1

Next Command:

Example 11**dpsct 1 Tag2****Description**

Displays the service classes in the service template 3, which is a service class template for use with a PNNI controller.

System Response

```

sw237          TN      StrataCom      BPX 8620  9.2.1G   June 9 1999  18:02 PST

          Service Template: MPLS1 (1)      Service Type:   Tag1 (201)

Service Category      Tag1 (201)
Qbin                  11
UPC Enable            NONE
Scaling Class         Scaled 1st
CAC Treatment         LCN
VC Max Threshold     61440          (cells)
VC Dscd Selection     EPD
VC CLP High          100          (% of Vc MAX Threshold)
VC EPD               40          (% of Vc MAX Threshold)

```

Last Command: dspst 1 Tag2

Next Command:

Example 12**dspst 1 VbrRt1****Description**

Displays the service classes in the service template 3, which is a service class template for use with a PNNI controller.

System Response

```
sw237          TN      StrataCom      BPX 8620  9.2.1G   June 9 1999  18:09 PST
```

```
      Service Template: ATMF1 (2)      Service Type:  VbrRt1 (101)
```

```
Service Category      VbrRt (101)
Qbin                  11
UPC Enable            GCRA_1_2
UPC CLP Selection     CLP01_CLP01
Policing Action 1    DISCARD
Policing Action 2    DISCARD
Sustained Cell Rate  100              (% of PCR)
Maximum Burst Size   1024             (cells)
Scaling Class        Scaled 3rd
CAC Treatment        CAC4
VC Max Threshold     1280             (cells)
VC Dscd Selection    Hysteresis
VC CLP High          80              (% of Vc MAX Threshold)
```

```
This Command: dpsct 2 VbrRt1
```

```
Continue?
```

Example 13**dpsct 1 VbrRt1****Description**

Displays the service classes in the service template 3, which is a service class template for use with a PNNI controller.

System Response

```
sw237          TN      StrataCom      BPX 8620  9.2.1G   June 9 1999  18:11 PST
```

```
      Service Template: ATMF1 (2)      Service Type:  Cbr1 (100)
```

```
Service Category          Cbr (100)
Qbin                      10
UPC Enable                GCRA_1
UPC CLP Selection         CLP01
Policing Action 1        DISCARD
Scaling Class             Scaled 4th
CAC Treatment             CAC4
VC Max Threshold          160                (cells)
VC Dscd Selection         Hysteresis
VC CLP High               80                (% of Vc MAX Threshold)
VC CLP Low                35                (% of Vc MAX Threshold)
Cell Delay Variation Tolerance 250000
```

```
Last Command: dpsct 2 Cbr1
```

```
Next Command:
```

dspvsiif

You can use the **dspvsiif** command to display a service class template assigned to an interface (VI). You can also display a summary of the resources allocated to the VSI partition on a given interface. Multiple users are allowed to use the **dspvsiif** at one time.

Example

After using **cnfvsiif** command to assign a selected service class template to an interface, you can use the **dspvsiif** command to display the type of service template assigned to an interface (VI). It has the following syntax:

```
dspvsiif <slot.port.vtrk>
```

Full Name

Display a service class template assigned to an interface.

Syntax

```
dspvsiif <slot.port.vtrk> <tmplt_id>
```

Related Commands

cnfrsrc, dsprsrc, cnfqbin, dspqbin

Attributes

Privilege	Jobs	Log	Node	Lock
1-6	Yes	Yes	IGX, BPX	Yes

Example 1

dspvsiif 13.1.1

Description

Display the service class template ID assigned to an interface configured on slot 13, port 1, virtual trunk of 1. In this case, service class template 2 has been assigned to this interface.

System Response

```
sw237          TN      StrataCom      BPX 8620  9.2.L3    May 10 1999 14:39 PST
Virtual Trunk :13.1.1
Service Class Template ID:2
```

```
Last Command:dspvsiif 13.1.1
```

Example 2

dspvsiif 11.1 2

Description

Display a service class template assigned to an interface.

System Response

```
sw53          TN      StrataCom      BPX 8600  9.2.30 Date/Time Not Set
```

```
Port: 11.1
```

```
Service Class Template ID: 2
```

```
VSI Partitions
```

Part	E/D	channels		bw		vpi		ilmi
		min	max	min	max	start	end	
1	E	1000	4000	10000	40000	240	249	Off
2	E	2000	4000	20000	40000	250	255	On

```
Last Command: dspvsiif 11.1 2
```

```
Next Command:
```

dspvsipartcnf

Use this command to display VSI partition characteristics. It displays information about only VSI ILMI functionality. This command displays:

- whether VSI ILMI is enabled for a given partition
- the LCN used for the sessions (only for trunk interfaces)
- the type of IP address downloaded to the BXM card for topology discovery purposes

If no partition is specified, this command displays the above information about all the VSI partitions and also the Sys_Id downloaded to the BXM card for ILMI functionality.

Full Name

Display VSI partition characteristics

Syntax

```
dspvsipartcnf <slot.port.[vtrk]> [partition_id]
```

Table 16-21 *dspvsipartcnf—Parameters*

Parameter	Description
slot.port.[vtrk]	Slot, port (and virtual port if applicable) of the interface.
partition_id	Partition ID corresponding to the VSI partition. This parameter is optional and if not specified, this command will display information about all VSI partitions.

Related Commands

cnfrsrc, cnfvsiipart, cnfport, cnftrk

Attributes

Privilege	Jobs	Log	Node	Lock
1–2	Yes	No	BPX	Yes

dspvsipartinfo

Use the **dspvsipartinfo** command to display VSI statistics for a particular active partition on an interface. You can use the **dspvsipartinfo** command on only one partition at a time, to get VSI statistics on an interface (can be a port or virtual trunk). You can optionally specify an interval in seconds, which will display VSI statistics for the specified active partition every *x* seconds. The command shows you some of the same parameters that display on the **cnfrsrc** screen, such as Min LCNs and Max LCNs, Used LCNs and Available LCNs, and Min BW, Max BW, and Used BW.

The command **dspvsipartinfo** also displays a line that provides slave redundancy status. It tells you whether the standby card is in synch with the active card. You must have cards in Y-redundancy configuration for this line to display.

Multiple users may use the **dspvsipartinfo** command at the same time.

Job mode is not allowed.

Full Name

Display VSI statistics per partition

Syntax

dspvsipartinfo <interface>.<partition>[<interval>]

<interface> the slot.port.[vtrk] of the interface being monitored.

<partition> partition id for which information is to be displayed.

<interval> the refresh interval for displaying data. Range:1–60 seconds. Default: 1 second.

Related Commands

cnfrsrc, dsprsrc, cnfvsiif, dspvsiif

Attributes

Privilege	Jobs	Log	Node	Lock	Multiple Users
1-6	No	No	BPX	Yes	Yes

Table 16-22 dspvsipartinfo— Field Description

Parameter	Description
Min BW	Configured minimum bandwidth for this partition (for reference only).
Max BW	Configured maximum bandwidth for this partition (for reference only).
Used BW	Bandwidth currently used by connections on this partition.
Available BW	Bandwidth currently available to connections on this partition. This is determined based on the minimum and maximum bandwidth configured for the partition and the bandwidth currently available in the common pool.
Min Lcns	Configured minimum LCNs for this partition (for reference only).
Max Lcns	Configured maximum LCNs for this partition (for reference only).
Used Lcns	Number of LCNs currently used by connections in this partition.
Available Lcns	Number of LCNs available to this partition. This is determined based on the minimum and maximum LCNs configured for the partition and the LCNs currently available in the common pool.

Example 1**dspvsipartinfo 3.1 1 10****Description**

Display VSI statistics for slot 3, port 1 for interface configured on partition ID 1, at an interval of every 10 seconds.

System Response

```
sw237          TN      StrataCom      BPX 8620  9.2.1G   June 9 1999  17:32 PST

                VSI Resources Status for trunk  3.1 Partition 1

Min Lcns       : 0           Min BW (cps)   : 0
Max Lcns       : 20          Max BW (cps)   : 0
Used Lcns      :             Used BW (cps)    :
Available Lcns :             Available BW(cps):
```

Next Command: dspvsipartinfo 3.1 1

Example 2**dspvsipartinfo 11.1 2 10****Description**

Display VSI statistics for port 1 for interface configured on partition ID 2, at an interval of every 10 seconds.

```
sw53 TN StrataCom BPX 8600 9.2.10 Jan. 10 1999 14:31 GMT
```

```
VSI Resource Status for port 11.1 Partition 2
```

Min Lcns	1000	Min BW (cps)	20000
Max Lcns	4000	Max BW (cps)	40000
Used Lcns	500	Used BW (cps)	20000
Available Lcns::	1000	Available BW(cps)	10000

```
This Command: dspvsipartinfo 11.1 2 10
```

```
Hit DEL key to quit:
```

Example 3**dspvsipartinfo 4.1 1****Description**

Display VSI statistics for slot 4, port 1 for interface configured on partition ID 1.

System Response

```
sw237 TN StrataCom BPX 8620 9.2.L3 May 10 1999 14:58 PST
```

```
VSI Resources Status for trunk 4.1 Partition 1 Snapshot
```

Min Lcns	:20	Min BW (cps)	:2000
Max Lcns	:30	Max BW (cps)	:3000
Used Lcns	:	Used BW (cps)	:
Available Lcns :		Available BW(cps):	

```
Last Command:dspvsipartinfo 4.1 1
```

dspvsich

The **dspvsich** command is a debug command that displays VSI logical connections. These VSI logical connections are also sometimes referred to as management LCNs (1–6, 9–15). The **dspvsich** command displays the LCN number, type of channel (for example, interslave, master-slave, or intershelf); the destination slot, and destination LCN.

(Note that you must have debug level privileges to use this command, that is, either Service or StrataCom level privileges. Check with the TAC for assistance in accessing these commands.)

In this release, this command displays the control_VPI and control_VCI_start of the particular controller.

Full Name

Display VSI logical connections

Syntax

```
dspvsich <slot>
```

Description

Display the VSI channels (or LCNs) on the specified slot.

Related Commands

cnfqbin

Attributes

Privilege	Jobs	Log	Node	Lock
Service Level	No	No	BPX	No

Example 1

```
dspqbin 13.1
```

Description

Display the current Qbin configuration on the OC-3 trunk on port 1 of slot 13 on the BPX to support MPLS (Multiprotocol Label Switching).

Example 2

```
dspvsich 4
```

Description

Display VSI management channels (or LCNs) on slot 4.

System Response

```
sw237          TN      StrataCom      BPX 8620  9.2.a3      June 16 1999 05:10 PST
```

```
VSI lcons for Slot 4
```

lcn	type	dest_slot	dest_lcn	vpi	vci
272	slave-end msvc	13	546	-	-
16365	control-port msvc	local	-	1	23
16364	control-port msvc	3	16365	1	22
16374	control-port msvc	13	8173	1	32
16349	interslave	3	16350	-	-
16359	interslave	13	8158	-	-

```
Last Command: dspvsich 4
```

Table 16-23 dspvsich—Parameters

Parameter	Description
slot.port	Specifies the BXM card slot and port number.
Qbin ID	Specifies the ID number of the Qbin available for use by the LSC (MPLS Controller) for VSI. The range is 0 to 255; 0 is the default. Always use 10 in 9.1.

dspyred

Displays information for Y-cable pairings. A single slot can be specified, or all pairings are displayed when no slot is specified. Slot numbers appearing in high intensity indicate active card status. Front card, back card, and channel configuration conflicts appear in reverse video. A conflict occurs when the port interfaces are different for corresponding ports in a redundant slot pair. The output display contains the following information:

- First column (Slot) designates the slot of the displayed card.
- Second column (Slot Type) designates its status, Pri (primary) or Sec (secondary).
- Third column (Other Slot) designates the slot number of the associated Y-redundant card.
- Fourth column (Front Card) designates the type of card in the front slot.
- Fifth column (Back Card) designates the type of card in the back slot.

Remaining columns (Channel Configuration) describe the channel configurations when appropriate.

Full Name

Display Y-cable redundancy

Syntax

```
dspyred [slot]
```

Related Commands

addyred, delyred, prtyred

Attributes

Privilege	Jobs	Log	Node	Lock
1-4	No	No	IGX, BPX	No

Example 1

dspyred

Description

Display Y-redundancy for all cards.

System Response

```
beta          TRM   YourID:1          IGX 8420    9.2    Aug. 15 1998 14:28 MST
```

Slot	Type	Other Slot	Front Card	Back Card	Channel Configuration									
					1	2	3	4	5	6	7	8		
25	Pri	26	SDP	RS232	DCE	DCE	DCE	DCE						
26	Sec	25	SDP	RS232	DCE	DCE	DCE	DCE						

Last Command: dspyred

Next Command:



Miscellaneous Features

This chapter provides information on High-Priority Login Feature (Hi-Pri).

High-Priority Login Feature

The High-Priority (Hi-Pri) login feature provides a solution to ensure that network floods do not cause outages to occur.

Introduction

The network flooding control feature is an enhancement to switch software that prevents network traffic floods from aborting the processor card CPU and thus keeps the user traffic flowing. This ensures that multiple node failures no longer occur due to overload conditions that were created in these networks. The secondary changes are to provide a high-priority console login to allow you to view and correct flooding problems, and build tolerance into the communication between nodes and between hubs and feeders to allow user traffic to continue flowing when this communication breaks down.

Problem Description for Which Network Flooding Control Enhancement Provides a Solution

A problem occurred that resulted in a flood of network messages being sent to most of the network. The problem was caused by a combination of things on the BPX. A firmware bug caused a standby BXM to loop real traffic back to the bus. An active BXM card in a Y-cable hot-standby pair had its firmware upgraded. In doing so, a card switchover occurred their correctly put the card in a standby state but caused all traffic to loop back toward the bus without being blocked. Software had programmed the networking channels on the card so that traffic destined to leave the card would be sent back to the active card. The BPX crosspoint architecture allows standby cards to loop their traffic back to themselves as well as send it to the true destination. The BXM normally rejects cells not destined for the slot they are in except in the case of a hot standby. As a result of these steps, a loop was formed where traffic would loop continuously on the standby card but would also be sent to the active card for transmission out the trunks. This caused a very high rate of duplicate network messages to many nodes downstream from the trunks on this BXM card.

This network traffic flooding resulted in overloading the processor cards at multiple nodes. This overload exhausted critical resources within the processor cards which caused the nodes to abort. The resulting aborts caused CC switchovers but then these processor cards aborted as well. The second abort resulted in derouting all connections at each node.

One factor prolonging the outage was the difficulty in locating and disabling the source of the traffic flood. Aborts continued to occur as the flooding continued. The user interface at each node was unavailable as the nodes serviced the overload of traffic and aborted. This made isolation of the flood difficult. (Physically removing trunk cards at nodes ultimately isolated the source of the flood.)

An additional factor that prolonged the outage was the inability of the routing mechanism to quickly route so many connections at once. The ineffectiveness of the single threaded routing and its back-off collision mechanism led to an unacceptably slow rate of routing (and restoring the user traffic flow). (Manual intervention to shut off routing at key nodes reduced the collision rate and allowed the routing mechanism to efficiently restore all connections.)

This network flooding control enhancement is meant to solve the above problem with the following requirements:

- must be 8.4 compatible or higher
- must keep user traffic flowing if possible
- network communication is secondary to user traffic
- prevent the problem from affecting multiple nodes if possible

Note that the BXM firmware is expected to be upgraded (carefully) to “W” or beyond to prevent the known flood from reoccurring.

Configuring the High-Priority Login Mode Feature

You do not need to configure anything to get the functionality of the network flooding control feature enhancement or the high-priority login feature.

Using the High-Priority Login Feature

A flood of network traffic can lead to a node becoming unreachable from other nodes in the network. The high-priority login feature allows you to log in at the console port and execute a small set of commands. You log in as follows:

Enter User ID: **StrataCom**

Password:*****

Next Command: **hipri**

At this point you may detect excessive network messages using the **nwstats** command or see excessive network handler processing using the **dspprf** command.

To lessen the CPU use of the network handler task and allow lower priority tasks to execute, you can use the **cnfnhparm** command to decrease the loop count before the network handler task suspends processing.

If the source of the traffic flood cannot be quickly located and shut off, you can disable LMI error detection using the **addfdrlp** command on the hub and at all connected feeders. After the network returns to its normal state, you can re-enable LMI at the hub and feeder nodes using the **delfdrfp** command. You can see the loopback state of the feeder trunk LMI using the **dsptime** command.

Functional Description

The following subsections describe the individual features in detail.

Software Loop Prevention

The network channel programming on the BPX now blocks trunk channels that loop incoming traffic back to the same trunk. This eliminates the possibility that undetected hardware loopbacks create a flood of traffic on the trunk.

For each node in the network there exists one channel on each BPX trunk to receive control traffic for that node and forward it to the one trunk that transmits the traffic for that node. To avoid looping back traffic that unexpectedly arrives on the transmit trunk, a CLP object was set for that channel. On BNI cards the firmware interpreted this to turn off the receive part of the channel. The BXM firmware does not have this functionality. The software now sets the receive VPI/VCI to 0/0. This has the same effect on BXM firmware as the CLP object had on BNI firmware (the receive part of the channel is turned off). The BXM firmware does not sink cells with VPI/VCI equal to 0/0.



Note

This change first went into effect in Release 8.4.20.

Duplicate Coerced Message Dumping

The network message handler checks for receiving duplicate network messages without sequence numbers (coerced messages) within a small amount of time. If duplicates are detected, they are quickly discarded without acknowledgment. Duplicates are considered coerced messages received within one second of each other. This has the effect of limiting the remaining flow to other parts of the software to one coerced message per second. Floods of network messages that use sequence numbers appear as messages with duplicate sequence numbers. Duplicate messages are already handled efficiently. The `nwstats` screen shows “Dropped flooding msgs.”

Network Message Read Limit

A configurable limit is added to the network handler to control the number of cells that may be read from the SAR receive queue before giving up the CPU to lower priority tasks. This has the effect of limiting the amount of CPU usage by this high-priority task even when floods of network traffic are present. The command and its syntax for controlling this feature are defined below.

```
cnfnhparm <parm> <value>
```

where parm is 1

value is from 0 to 1200 cells per loop [default = 1200]

The setting of this parameter to a low number may lead to the dropping of network traffic, possibly resulting in comm breaks, comm fails, or background test failures.

High-Priority Console Login

A special high-priority console user login is created to allow you to log in and execute some commands on the node even during periods of node congestion. The console login executes as high-priority before the user logs in. When you log in as “StrataCom” and the first command typed is the new command is **hipri**, then the user task stays in high-priority mode. If the user logs in using another account or uses “StrataCom” but does not use the **hipri** command first, then the user task reverts to the normal (lower) priority.

The following error message is displayed when the **hipri** command is used by a non-Cisco login.

- “Incorrect privilege group”

The following error message is displayed when **hipri** is not the first command immediately after login.

- “Allowed only immediately after login”

The following error message is displayed when you try to use command but not from the control port.

- “Allowed only through Control Port”

The high-priority user task executes above all tasks but the resource handler. This allows this feature to execute even in cases of network message flooding, connection routing, extreme CommBus usage, and so on. Notification is given when high-priority mode is in use by the “High-Priority!” string on the **dsplog** screen. A sample screen is shown in Example 4 under the “**dsplog**” section on page 14-77.

Only a subset of the user commands is allowed to run during a high-priority login. Due to the high-priority of this task, some commands may not work correctly or may affect other features in the system. For that reason, the list of commands is limited and are blocked at the command line. The user receives the following message when an invalid command is attempted from high-priority:

- “Not allowed with High-Priority Login”

Table 17-1 lists the commands allowed in high-priority mode for the StrataCom user level:

Table 17-1 High-Priority Mode StrataCom User Level Commands

addfdrlp	bye	cbstats	cbtrace	ccb	cnw
cnfnhparm	dcb	dcct	delfdrlp	dlcon	dm
dncd	dspalms	dnib	dnw	dspalms	dspcd
dspcderrs	dspcds	dsplog	dspnds	dspnode	
dspnw	dspprf	dspprfhist	dspqs	dspsust	dspswlog
dsptrkerrs	dsptrks	dsptrkstats	dsptrkutl	dspusertask	dspusertasks
dvc	help or “?”	killuser	logoutuser	nwstats	nwtrace
off1	off2	off3	on1	on2	on3
pm	resetcd	resetsys	runrev	stopjob	switchcc
vt	“.” (history)				

ARP Table Expansion

The ARP cache table size has been increased to provide more efficient management of IP to Ethernet (MAC) addresses and prevent processor overloads from excessive ARP messages.

Address Resolution Protocol (ARP) is used by IP hosts on an Ethernet LAN to determine the Ethernet (MAC) addresses of fellow hosts. This protocol will, using Ethernet broadcast packets, allow for mapping an IP address to an Ethernet address. To assist in maintaining the mappings, an ARP cache is usually resident on each IP host. By eavesdropping on ARP messages, each IP host can build its ARP cache quickly and efficiently.

When large numbers of IP hosts are resident on the same physical Ethernet, lots of ARP broadcast messages can be normal. Each new translation of IP address to Ethernet address is placed in a local ARP cache entry on the BPX node. Previously, this ARP cache had a size limit of four entries. In situations where a large number of ARP translations exist on the Ethernet, bumping of ARP cache entries to make room for new entries is necessary. In fact, a sort of thrashing in the ARP cache can occur.

Increasing the table size to 16 entries improves the performance of the processor when more than 4 physical devices are on the same LAN segment. ARP broadcasts are minimized as are updates to the ARP cache. This is expected to address the large number of Cisco WAN Manager workstations that a node can support.

Comm Fail Tolerance

The trunk keep-alive mechanism, also known as the Comm Fail test, allows you to select whether or not connections are derouted on keep-alive time-outs. Previously when the Comm Fail test failed, all connections on the trunk were derouted affecting user traffic. This test runs in addition to the physical line alarm mechanism.

In the event of a network flood, the network handler will inevitably end up dropping numerous network messages. Among these will be messages for the comm break and comm fail tests, leading to a failure of the tests and the declaration of comm breaks with other nodes and comm fails on its trunks.

To provide more tolerance to a flood of network messages, the Comm Fail test functions so that the default for physical trunks is to leave connections routed in spite of a failure detected by the Comm Fail test. Network alarms and log events are still generated for Comm Fail failures, but connections are not derouted.

In the case of virtual trunks, the Comm Fail test may be the only indication that a virtual trunk crossing an ATM cloud is not passing traffic. For this reason, virtual trunks must continue to deroute connections on Comm Fail failures.

Control of whether Comm Fail test failures cause deroutes on physical trunks is provided by the **cnfnodeparm** command. A new parameter *Reroute on Comm Fail* indicates whether connections should be derouted on failures. If enabled, a Comm Fail test failure on any local trunk results in all nodes rerouting the connections they own that are currently on that trunk. If this is not enabled, a Comm Fail test failure will not result in the rerouting of the connections. A comm fail on a virtual trunk will always result in the rerouting of all the connections on the trunk, regardless of the setting of the enable flag.

Regardless of the Reroute on Comm Fail parameter setting, a trunk that fails the Comm Fail test is still declared as failed. Route-op still runs and will consider this trunk unusable for network traffic. Network clock routing also considers the trunk unusable for clocking and builds a route around this trunk. These operations continue to work as in releases previous to Release 9.2.

The syntax of this command is shown below.

```
cnfnodeparm 38 [Y | N]
```

where: Y = deroute conns when any local physical trunk fails the Comm Fail test

N = don't deroute connections on a local physical trunk Comm Fail test failure

(N = default)

LMI Failure Prevention—Manual Command

A manual command is added to IGX and AXIS feeder software to allow control over the endpoint connection status. If the BPX cannot communicate LMI messages with its feeders, then the LMI status at the feeders must be maintained to keep the connections “active” to their external devices.

If the BPX hub is flooded with network messages, then LMI/ILMI communication with its feeders may be interrupted. LMI normally runs a keep-alive between the hub node and feeder node. If the keep-alive fails, then the other end changes the status of all connections to failed. If the outage is only due to a network message flood, then it is desirable to override this mechanism to keep the connection status as active.

The BPX and IGX software now has the **addfdrlp** and **delfdrlp** commands. On the BPX hub with attached feeders, the **delfdrlp** command clears any communication failures on the specified feeder and sends messages to the remote nodes (the routing nodes for the other end of the feeder connections) informing them of this clearing. In addition, the BPX no longer sends any status updates to the feeder yet it continues to acknowledge any feeder LMI messages received. The **dspnode** command indicates loopbacks on feeders.

The syntax for **addfdrlp** is shown below.

```
addfdrlp <slot>.<port>
```

where: slot is the slot number for the feeder trunk and port is the port number for the feeder trunk

The following error messages may be displayed.

“Shelf has not been added on this trunk.”

“Feeder loop is already added”

The BPX command **delfdrlp** restores the BPX’s feeder LMI protocol to the normal state and triggers an update of connection status toward the feeder.

The syntax for **delfdrlp** is shown below.

```
delfdrlp <slot>.<port>
```

where: slot is the slot number for the feeder trunk and port is the port number for the feeder trunk

The following error messages may be displayed.

“Shelf has not been added on this trunk.”

“Feeder loop is not added”

The following log messages occurs as a result of using the feeder loopback commands.

MajorIPX/AF shelf on TRK 10.2: Major Alarm

InfoIPX/AF shelf on TRK 10.2: Cleared

On the IPX/IGX feeder, the **addfdrlp** command clears any communication failure on the feeder to the routing node (hub). It also, clears any ingress (coming from the routing node) A-bit failures. In addition, the feeder does not send the routing nodes any status updates but continues to acknowledge any routing node LMI messages received.

The syntax for **addfdrlp** is shown below:

```
addfdrlp <slot>.<port>
```

where: slot is the slot number for the feeder trunk and port is the port number for the feeder trunk

The following error messages may be displayed.

- Shelf has not been added on this trunk
- Feeder loop is already added

The IGX command **delfdrlp** restores the routing node’s LMI protocol to the normal state and triggers an update of connection status toward the routing node.

The syntax for **delfdrlp** is shown below:

```
delfdrlp <slot>.<port>
```

where: slot is the slot number for the feeder trunk and port is the port number for the feeder trunk
The following error messages can be displayed:

- Shelf has not been added on this trunk
- Feeder loop is not added

The implementation of the LMI disabling feature is manual in this release.

cnfnodeparm Screen

Figure 17-1 is a sample **cnfnodeparm** command screen. More than one screen is needed to show all the parameters for this command.

Figure 17-1 cnfnodeparm Screen

```
sw45          TN      SuperUser      BPX 8620      9.2 Aug. 27 1998 18:26 PDT

31 TFTP Write Retries      [  3] (D)
32 SNMP Event logging     [  Y] (Y/N)
33 Job Lock Timeout       [ 60] (D)
34 Max Via LCONs          [50000] (D)
35 Max Blind Segment Size [ 3570] (D)
36 Max XmtMemBlks per NIB [ 3000] (D)
37 Max Stby Update Q Sz (%) [ 33] (D)
38 Stat Config Proc Cnt   [ 1000] (D)
39 Stat Config Proc Delay [ 2000] (D)
40 Enable Degraded Mode   [N]      (Y/N)
41 Trk Cell Rtnng Restrict [N]      (Y/N)
42 Enable Feeder Alert    [N]      (Y/N)
43 Reroute on Comm Fail   [N]      (Y/N)
44 Auto Switch on Degrade [Y]      (Y/N)
45 Max Degraded Aborts    [100]   (D)
46 Max Htls Rebuilt Count [100]   (D)
47 Htls Counter Reset Time [1000]  (D)
48 Send Abit Early        [Y]      (Y/N)
49 Abit Timer Multiplier M [2]      (D)
50 Abit Timer Granularity M [3]      (0)
51 FBTC with PPD Policing [  N]   (Y/N)
```

This Command: cnfnodeparm

Enter parameter index:

dsnode Screen

Figure 17-2 is a sample **dsnode** command screen.

Figure 17-2 *dspnode* Screen

```

-----
sw237          TN      StrataCom      BPX 8620  9.2.3      June 16 1999 05:06 PST

                BPX 8620 Interface Shelf Information

Trunk   Name      Type          Part Id   Ctrl Id      CntrlVC      Alarm
        VPI   VCIRange
 4.1    VSI       VSI           1         1            1           20 - 34      OK
13.2    SIMFDR0  AXIS          1         2            0           40 - 54      OK

Last Command: dspnode

```




Command List

Click on page number to go to command definition.

Command	Page
.	2-4
? or Help	2-6
addad	15-2
addalmslot (Nodes)	3-12
addalmslot (Troubleshooting)	14-3
addapsln	4-46
addcdred	3-14
addcon (Voice)	6-3
addcon (Data)	7-4
addcon (Frame Relay)	8-7
addcon (ATM)	9-3
addcon (Access Device)	15-3
addctrlr	16-6
addextlp	14-4
addfrport	8-18
addjob	12-5
addjobtrig	12-8

Command	Page
addlnloclp	14-6
addlnlocrmtlp	14-7
addloclp	14-9
addlocrmtlp	14-7
addshelf	3-14
addshelf (VSI)	16-9
addtrk	4-49
addtrkred	4-51
adduser	13-3
addcdred	3-14
addyred	3-27
bye	2-9
clrchstats (ATM)	9-16
clrchstats (Troubleshooting)	14-21
clrclkalm (Network Clocks)	11-5
clrclkalm (Troubleshooting)	14-22
clrcnalm	14-22
clrcnerrs	14-26
clreventq	14-23
clrfreportstats	8-20
clrlog	14-27
clrnerrs	14-26
clrmsgalm	14-28
clrportstats	14-34
clrscrn	2-10

Command	Page
clrslotalms	14-36
clrsloterrs	14-36
clrtrkalm	14-37
clrtrkerrs	14-39
clrtrkstats	14-40
cnfabrparm	9-18
cnfadcmtr	15-6
cnfadcon	15-7
cnfasm	3-29
cnfbus	14-41
cnfcassw	5-8
cnfcdaps	4-57
endapsln	4-53
cnfchadv	6-8
cnfchdfm	7-16
cnfchdl	6-9
cnfcheia	7-18
cnfchec	6-12
cnfchfax	6-15
cnfchgn (Data)	6-16
cnfchpri	8-22
cnfchutl	10-11
cnfcldir	7-19
cnfclksrc	11-6
cnfcls	9-20

Command	Page
cnfcluster	16-16
cnfcmb	10-14
cnfcon	9-23
cnfcond	6-18
cnfcos	10-16
cnfdate	13-4
cnfdch	7-21
cnfdchtp	7-21
cnfdelk (Data)	7-29
cnffswinit	13-5
cnffrcls	8-24
cnffrecon	9-23
cnffreport (Fr Rly - PCS)	8-28
cnffrport (Fr Rly)	9-25
cnffswinit	13-5
cnffunc	3-31
cnfict (Data)	7-33
cnfict (Fr Rly)	8-43
cnfleadmon	14-43
cnfln	5-10
cnflnalm	14-47
cnflnpass	6-21
cnfmode	8-49
cnfname	3-37
cnfport	9-25

Command	Page
cnfportq	9-33
cnfpref	10-17
cnfprt	3-38
cnfpwd	14-4
cnfqbin (VSI)	16-16
cnfrevsig	6-23
cnfrtcost	10-20
cnfrsrc	4-53
cnfrsrc	5-20
cnfrsrc (VSI)	16-23
cnfslotalm	14-52
cnfsnmp	13-6
cnfstatmast	13-7
cnfsysparm	13-8
cnfterm	3-40
cnftime	13-13
cnftmzn	3-42
cnftrafficgen	14-53
cnftrk	4-53
cnftrkalm (Trunks)	4-86
cnftrkalm (Troubleshooting)	14-37
cnftrkict	4-91
cnfvchtp (Voice)	6-25
cnfvsiiif	16-33
cnfvsipart	16-35

Command	Page
cnfxmtsiz	6-28
cpyict (Data)	7-38
cpyict (Fr Rly)	8-52
cpytrkict	4-92
delad	15-10
delalmslot	3-45
delapsln	4-46
delcdred	3-46
delcon (Voice)	6-30
delcon (Data)	7-39
delcon (Fr Rly)	9-36
delcon (ATM)	9-36
delctrlr	16-36
delfrport	8-55
deljob	12-11
deljobtrig	13-4
dellp	14-55
delshelf	3-46
delshelf (VSI)	16-38
deltrk	4-95
deltrkred	4-97
deluser	13-13
delyred	3-46
dncd	14-57
dncon	10-22

Command	Page
dnfrport	8-56
dnln	5-20
dnport	9-37
dntrk	4-99
dspads	15-11
dspalms	14-58
dspapsln	4-94
dspasm	3-50
dspbob	14-64
dspbusbw	14-67
dspbuses	14-69
dspcd	3-51
dspcdred	3-53
dspcds	3-53
dspchcnf (Voice)	6-31
dspchcnf (Data)	7-40
dspchcnf (Fr Rly)	8-58
dspchdlcnf	6-33
dspchec	6-35
dspchstats (Fr. Rly.)	8-59
dspchstats (ATM)	9-40
dspchuse	16-41
dspclksres	11-8
dspclnerrs	14-71
dspcls	9-47

Command	Page
dspclustercnf	16-40
dspcon (Voice)	6-36
dspcon (Data)	7-43
dspcon (Fr Rly)	8-74
dspcon (ATM)	9-49
dspcon (Access device)	15-13
dsponcnf	9-55
dspond	6-38
dspons (Voice)	6-39
dspons (Data)	7-44
dspons (Fr Rly)	8-75
dspons (ATM)	9-58
dspons (Access device)	15-15
dsponst	6-43
dsptrlrs	16-43
dspcurelk	11-10
dspeventq	14-74
dspfrcbob	14-75
dspfrcs	8-83
dspfrcport	9-69
dspfrcportstats	9-73
dspfrcport (Frame Relay)	9-69
dspict (Data)	7-50
dspict (Fr Rly)	9-73
dspjob	13-6

Command	Page
dspjobs	13-7
dsplancnf	3-59
dsplmistats (access shelf)	3-61
dsplmistats (ATM trunks)	9-65
dsplnalmcnf	14-87
dsplncnf	5-27
dsplnerrs	14-89
dsplns	5-32
dspload	10-24
dspllog	14-77
dsplmode	8-93
dsplmodes	8-95
dsplnds	3-62
dsplnode	3-64
dsplnw	4-100
dsplnwip	13-14
dsplnwrt	13-7
dsplospace	10-32
dsplpcs	8-96
dsplport	9-69
dsplportids	8-99
dsplportq	9-71
dsplportstats (Fr Rly)	8-101
dsplportstats (ATM)	9-73
dsplprtcnf	3-71

Command	Page
dsppwd	13-16
dsppwr	14-100
dspqbintmpl	16-41
dspsectmpl	16-54
dsprsrc (VSI)	16-43
dsprts	10-33
dsprtcache	6-45
dsprtcache	7-48
dsprtcache	8-111
dsprtcache	9-78
dsprtcache	10-33
dsprtcache	10-33
dpsigqual	6-45
dpssectmpl	16-54
dpslotalmcnf	14-103
dpslotalms	14-104
dpsloterrs	14-105
dpslotstatcnf	14-108
dpsnmp	13-18
dpsnmpstats	13-19
dpsv3	13-21
dpsvest	6-49
dsptermcnf	3-69
dsptermfunc	3-70
dsptrafficgen	14-109

Command	Page
dsprkbob	4-106
dsprkcnf	4-107
dsprkerrs	14-109
dsprkict	4-114
dsprkred	4-116
dsprks	4-117
dsprkutl	10-36
dsprkstats	4-122
dsptsmap	5-35
dspusers	13-21
dspusertask	13-28
dspusertasks	13-31
dspvsich	16-76
dspvsiiif	16-70
dspvsipartcnf	16-72
dspvsipartinfo	16-73
dspvsistats	16-70
dspyred	3-74
editjob	12-17
help or ?	2-6
prtcdrd	3-75
prtchcnf (Voice)	6-50
prtchcnf (Data)	7-52
prtchcnf (Fr Rly)	9-78
prtchdlcnf	6-51

Command	Page
prtclnerrs	14-118
prtcons (Voice)	6-52
prtcons (Data)	7-53
prtcons (Fr Rly)	9-78
prtict (Data)	7-54
prtict (Fr Rly)	8-115
prtjob	12-19
prtjobs	12-20
prtlerrs	14-120
prtlns	5-37
prtlog	14-119
prtrts	10-39
prtscrn	2-11
prtrrkerrs	14-121
prtrrks	4-131
prtyred	3-76
redscrn	2-12
resetad	15-18
resetcd	14-122
resetpc	14-124
restartad	15-19
runjob	12-21
stopjob	12-23
switchapsln	4-132
switchcdred	3-77

Command	Page
switchcc	14-125
tstcon	14-126
tstconseg	14-129
tstdelay	14-132
tstpcs	14-134
tstport	14-135
upcd	3-77
upcon	10-40
upfrport (Fr Rly)	9-78
upln	5-38
upport	9-78
uptrk	4-134
vt	2-13
window	3-83

