Cisco Dial Access Switching and Dial-Up Frame Relay Installation and Operation

Release 1.4
Revised April 1998

AccessPath, AtmDirector, Cache Director System, CD-PAC, Cisco IOS, the Cisco IOS logo, *CiscoLink*, the Cisco Powered Network logo, ClickStart, ControlStream, Fast Step, FragmentFree, IGX, JumpStart, LAN²LAN Enterprise, LAN²LAN Remote Office, MICA, NetBeyond, NetFlow, Netsys Technologies, *Packet*, PIX, Point and Click Internetworking, RouteStream, SMARTnet, StrataSphere, StrataSphere BILLder, StrataSphere Connection Manager, StrataSphere Modeler, StrataSphere Optimizer, Stratm, StreamView, SwitchProbe, *The Cell*, TokenSwitch, TrafficDirector, VirtualStream, VlanDirector, Workgroup Director, Workgroup Stack, and XCI are trademarks; The Network Works. No Excuses. is a service mark; and BPX, Catalyst, Cisco, Cisco Systems, the Cisco Systems logo, EtherChannel, FastHub, FastPacket, ForeSight, IPX, LightStream, OptiClass, Phase/IP, StrataCom, and StrataView Plus are registered trademarks of Cisco Systems, Inc. in the U.S. and certain other countries. All other trademarks mentioned in this document are the property of their respective owners.

About This Manual

Welcome to the installation and operation documentation for the Dial Access Switching (DAS) system. The DAS system supports dial-up and dial-backup Frame Relay applications. 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 up to date than printed documentation. For more information, see the section, Cisco CD ROM.

This preface contains the following sections:

- Objectives
- Audience
- Organization
- Related Documentation
- Cisco CD ROM
- Conventions
- New Features in DAS 1.4

Objectives

This publication will step you through the initial site preparation, installation, and configuration of the DAS Server Shelf, which is the processor for the Dial Access Switching system, and the Dial-Up Frame Relay application. The DAS Server Shelf works with, and is typically co-located with, a Cisco wide-area switch, such as a Cisco BPX® 8600 series wide-area switch, a Cisco IGX™ series wide-area switch, or a Cisco IPX® wide-area switch.

Audience

This publication is designed for the person installing the DAS Server Shelf, who should be familiar with electronic circuitry and wiring practices and have experience as an electronic or electromechanical technician. It is also intended for the network administrator who will configure the DAS Server Shelf and the Dial-Up Frame Relay application. The installers and network administrators should also be familiar with Cisco wide-area switches, Frame Relay connections, Cisco StrataView Plus ® network management systems, and Cisco WAN switching networks. During the initial installation of a DAS Server Shelf, it is also helpful to have a system administrator on-hand who is familiar with your network and UNIX servers.

Organization

Chapter 1 **Introduction the Dial Access Switching System**

Provides a brief description of the DAS Server Shelf and the Dial-Up Frame Relay application. It includes examples of dial-up and dial-backup connections.

Chapter 2 **Site Requirements**

Provides information about the electrical power and rack requirements necessary to install a DAS Server Shelf.

Chapter 3 **Unpack and Inspect the DAS Server Shelf**

Provides a description of the DAS Server Shelf shipping container, as well as front- and rear-views of both the AC and DC versions of the DAS Server Shelf.

Chapter 4 **Rack Mounting the DAS Server Shelf**

Provides procedures for installing the DAS Server Shelf in a rack.

Chapter 5 **Connecting Power to the DAS Server Shelf**

Provides procedures for connecting AC or DC power to the DAS Server Shelf.

Chapter 6 **DAS Server Shelf Interface Connections**

Provides procedures for connecting the DAS Server Shelf to the Cisco wide-area switch (PBX, IGX, or IPX switch) and the StrataView Plus Workstation.

Chapter 7 **Loading DAS Daemon Software on the StrataView Plus Workstation**

Provides instructions for loading DAS (INS) daemon software on the StrataView Plus workstation.

Chapter 8 **Configuring the Dial-Up Frame Relay Application**

Provides an overview of the steps that are necessary to configure Dial-Up or Dial-Backup Frame Relay connections, after the DAS Server Shelf is installed and connected.

Chapter 9 **Creating a DAS Topology Object with HP OpenView**

Provides a procedure for creating an DAS object with the HP OpenView Topology tools.

Chapter 10 **Understanding the DAS Command Line Interface**

Provides procedures for using the Dial-Up Frame Relay Command Line Interface (CLI) to view and set parameters on the DAS Server Shelf. The CLI, which is not integrated with StrataView Plus, can be accessed through a remote connection or through a terminal directly connected to the DAS Server Shelf.

Chapter 11   **Configuring Automatic Number Identifiers**

Describes how to use the INS ANI Configuration Interface which is accessed via the StrataView Plus Main Menu, to define parameters for Dial-Up and Dial-Backup calls associated with an Integrated Services Digital Network (ISDN) ANI.

Chapter 12   **Configuring Dial-Up Connections**

Describes how to use the StrataView Plus Connection Manager to configure Dial-Up Connections.

Chapter 13   **Configuring Dial-Backup Connections**

Describes how to use the StrataView Plus Connection Manager to configure Dial-Backup connections. Note that this also involves "associating" a "normal" frame-relay connection with a Dial-Backup connection.

Chapter 14   **Dial-Up Frame Relay Operation**

Provides some quick reference tables for frequently done INS Dial-Up Frame Relay tasks.

Appendix A   **Cable Information**

Provides information about the DAS Server Shelf power cables suppled by Cisco.

Appendix B   **Dial-In Support**

Provides information about attaching a modem to the DAS Server Shelf to allow Cisco StrataCom's Customer Service to dial-in and provide support for Dial-Up Frame Relay.

Appendix C   **Troubleshooting**

Provides some overall troubleshooting hints and a description of some DAS system troubleshooting tools such as the Frame Relay Status Utility, INS Daemon Log, and the INS SNMP Alarms and Traps.

Appendix D   **Call Detail Records**

Provides information about the format and content of the Call Detail Records (CDRs) that are kept for each dial-up and dial-backup call. It also includes information about the DAS-applicable Failure/Error Cause Codes which are included in some CDRs.

Appendix E   **Upgrading DAS Server Shelf Software**

Provides procedures for reinstalling DAS Server Shelf and DAS Daemon software.

Appendix F   **Dial-Up Frame Relay Terminology**

Provides definitions of some terms that have specific meaning for the DAS Server Shelf and the Dial-Up Frame Relay application.

Related Documentation

- *Cisco StrataView Plus Operations Guide* for release 8.1 or release 8.4 provides procedures for using the StrataView Plus network management system.

- Release 8.1 or Release 8.4 of the Cisco WAN switching documentation set includes:

  — *Cisco WAN Switching System Overview* provides an introduction to Cisco StrataCom networks and a detailed description of the supported technologies.

  — *Cisco BPX 8620 Reference* provides a general description and technical details of the BPX switch.

  — *Cisco IPX Reference* provides a general description and technical details of the IPX narrowband node.

  — *Cisco IGX 8400 Series Reference* provides a general description and technical details of the IGX node.

  — *Cisco MGX 8220 Reference* provides a general description and technical details of the Cisco MGX™ 8220 edge concentrator. (Note that the MGX 8220 was previously known as the Cisco StrataCom AXIS interface shelf.)

  — *Cisco WAN Switching Command Reference* provides detailed information on operating the BPX, IGX and IPX switches through their command line interfaces.

The DAS Dial-Up Frame Relay application is compatible with Release 8.1 and Release 8.4 of Cisco StrataCom's StrataView Plus, and the IPX switch, IGX switch, BPX switch, and MGX 8220, switched software. Contact Cisco Customer Service with any questions about switch software and StrataView Plus compatibility with DAS 1.4.

Cisco CD ROM

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 up to date 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.

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.

- Elements in square brackets ([ ]) are optional.

- Alternative but required keywords are grouped in braces ({ }) and 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 ([ ]).

Warning   This warning symbol means *danger*. You are in a situation that could cause bodily injury. Before you work on any equipment, you must be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. (To see translated versions of this warning, refer to the *Regulatory Compliance and Safety Information* document that accompanied the product.

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

Note   Means *reader take note*. Notes contain helpful suggestions or references to materials not contained in the manual.

New Features in DAS 1.4

The Dial Access Switching system, the DAS Server Shelf, and the Dial-Up Frame Relay application have been enhanced in DAS Release 1.4 with the following features:

- Enhanced call connection performance through parallel processing of connection requests. To achieve maximum performance the user sets up the PRI port manually and leaves it up during Dial-Up Frame Relay operation. (This feature is added by modifying the watchdog.conf file on the StrataView Plus Workstation and wd.config file on the DAS Server Shelf and should be performed only with the advice of Customer Support.)

- Call rejection of far-end port failures enables the DAS to reject call requests when far-end ports have failed. With this feature, the DAS rejects call requests to failed far-end ports and transmits a Release message to the ISDN network.

- PVC monitoring feature monitors Dial-Up and Dial-Backup calls. If far-end port fails, this feature disconnects the call and sends PVC disconnect and ISDN Release messages. For multiple dormant connections, this feature issues the ISDN Release message only if all the dormant connections are gone, that is, if all the far-end ports failed and PVCs were disconnected.

- INS Daemon software operates with both StrataView Plus Release 8.1 and StrataView Plus Release 8.4. A separate binary file is provided for these two versions of the INS Daemon software. See the chapter, "Loading DAS Daemon Software on the StrataView Plus Workstation", for information about loading the separate files.

- Combining DAS Server Shelf Installation and Operation publications into a single publication. Previous releases of Dial Access Switching (DAS) Server Shelf and the INS Dial-Up Frame Relay application were documented with separate Installation and Operation publications. With DAS Release 1.4, these two publications have been combined into a single Installation and Operation publication.

In addition, this manual introduces the following product name changes:

- The Cisco BPX® 8600 series wide-area switch was previously known simply as the Cisco StrataCom BPX switch.

- The Cisco IGX™ 8400 series wide-area switch was previously known simply as the Cisco StrataCom IGX switch.

- The Cisco IPX® wide-area switch was previously known simply as the Cisco StrataCom IPX switch.

- The Cisco MGX™ 8220 edge connector was previously known as the Cisco StrataCom AXIS interface shelf.

Introduction the Dial Access Switching System

This chapter introduces the Dial Access Switching (DAS) system, which consists of the DAS Server Shelf (the hardware) and the Dial-Up Frame Relay application (the software). It contains the following sections:

- Overview
- Dial Access Switching System Components
- Integrated Services Digital Network
- Frame Relay Networks
- Dial-Up Frame Relay Application

Overview

The DAS Dial-Up Frame Relay system (DAS Server Shelf and DAS Dial-Up Frame Relay application software) provides dial-up and dial-backup for frame-relay Permanent Virtual Circuits (PVCs) in Cisco WAN switching networks. These dial-up and dial-backup PVCs are activated by ISDN calls to the Cisco WAN switching network.

The DAS Server Shelf is a rack-mounted adjunct processor connected to a Cisco WAN switching node typically through an IGX Frame Relay Module (FRM), an IPX Frame Relay Port (FRP), or a BPX switch with an MGX 8220 Frame Relay Service Module (FRSM). The DAS Server Shelf must also have IP connectivity to a StrataView Plus Workstation.

Figure 1-1 shows the DAS Server Shelf along with some of the other components that compose a Dial-Up Frame Relay network.

Figure 1-1   Dial Access Switching System Components
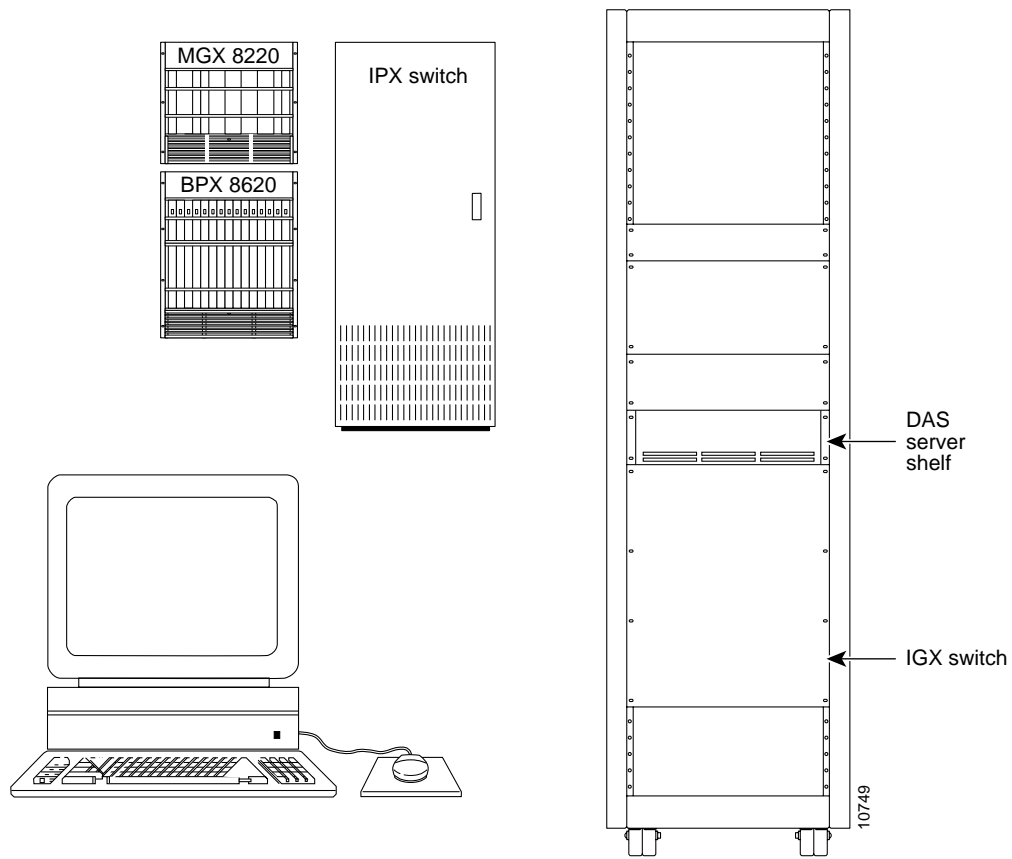
Dial Access Switching System Components

The Dial Access Switching system is added to Cisco WAN switching networks through two components:

- DAS Server Shelf(s), the hardware

- DAS Dial-Up Frame Relay software

Hardware

The DAS Server Shelf, the hardware component of the Dial-Up Frame Relay application, is a rack-mounted adjunct processor. This scalable UNIX platform comes in four models:

- DAS-AC (AC powered)

- DAC-DC (DC powered)

- DAS-AC-E (AC powered)

- DAC-DC-E (DC powered)

Note All four DAS Server Shelf models are functionally equivalent. The slight differences between the AC and DC models are pointed out in this documentation where it is appropriate.

All DAS Server Shelf models feature:

- 140 MIPS CPU
- 128 Megabytes of memory
- 2 Gigabyte hard disk

The DAS Server Shelf is typically connected to a co-located Cisco wide area switch through a frame-relay (V.35) port. The DAS Server Shelf is also connected to the StrataView Plus Workstation. When the StrataView Plus Workstation is located close by, the DAS Server Shelf and StrataView Plus Workstation can be connected to the same Ethernet segment. When the StrataView Plus Workstation and the DAS Server Shelf are not located close enough to be connected to the same Ethernet segment, they are connected through a frame relay PVC configured to provide IP connectivity (that is, IP over frame relay).

Software

The DAS Dial-Up Frame Relay software is distributed, using a client-server architecture, between the DAS Server Shelf and the DAS Daemon software that runs on the StrataView Plus Workstation.

The DAS Server Shelf, which runs the client software to control application-specific ISDN call processing, includes the following components:

- Solaris 2.4 Operating System for the DAS Server Shelf
- ISDN protocol stack (also referred to as the ISDN software variant)
- Integrated SNMP agents providing DAS Dial-Up Frame Relay configuration and system information

The DAS Daemon software is the server component of the DAS Dial-Up Frame Relay software and is loaded on the StrataView Plus Workstation. Designed to run with StrataView Plus Release 8.1 or Release 8.4, many DAS Dial-Up Frame Relay functions are integrated into the StrataView Plus Graphical User Interface (GUI) menus.

Note The DAS Dial-Up Frame Relay system (i.e., DAS Server Shelf and software) is designed to run with Cisco WAN switching network switches running software release 8.1 or higher.

ISDN Switch Software Variants

Since all ISDN switch manufacturers have not implemented ISDN signalling in exactly the same way, Cisco has developed DAS software to work with the major signaling variations and switches used around the world. There are seven ISDN switch software variants supplied with the standard Dial-Up Frame Relay application software:

- **AT&T 4ESS** protocol variant for North American ISDN signalling
- **AT&T 5 ESS** protocol variant for North American ISDN signalling
- **NT DMS100** protocol variant for a Northern Telecom switch, used in North America
- **NT DMS250** protocol variant for a Northern Telecom switch, used in North America

- **ETSI EUROISDN** protocol variant for the ISDN signalling used primarily in Europe, the Middle-East, South America, and Africa

- **NTT** protocol variant used for ISDN signalling in Japan

- **AUSTEL** protocol variant used for ISDN signalling in Australia

Integrated Services Digital Network

The integrated services digital network (ISDN) technology allows for the creation of a worldwide public telecommunications network that delivers a variety of voice and data services. While it is not yet universal, ISDN services are becoming increasingly available. These pockets or islands of ISDN do provide standardized interfaces for enterprise networks.

Typically, ISDN connections are provided through a Basic Rate Interface (BRI) or a Primary Rate Interface (PRI). The BRI provides two 64 kbps channels for user data, known as B (or bearer) channels, and a signalling channel. Currently, the BRI is the most common user interface into an ISDN network. Providing 23 64-kbps B channels and a signalling channel, the PRI implements ISDN trunks. For either interface, the signalling channel is referred to as a D channel. D channels provide the signalling information for all its associated B channels. The PRI is therefore referred to as 23B+D, and the BRI is referred to as 2B+D.

Each B channel is equivalent to a DS0 channel in a T1 signal and is capable of carrying user data at a rate of 64 kbps. The D channel in a PRI is also a 64 kbps channel, so the 24 ISDN PRI channels (i.e., 23B+D) can be carried over T1 facilities. (The European ISDN PRI consists of 30 B channels and one D channel and likewise corresponds to the E1 transmission rate and is carried over E1 facilities.)

The D channel is devoted to transporting message-oriented signalling information. These messages set up, maintain, and terminate B-channel connections. ISDN D-channel signalling is essentially a group of related protocols, complying with the Q.921 and Q.931 ITU standards. Q.921 frames are formatted very similarly to frame-relay frames and hence the node's frame-relay interface cards may be used to interface to ISDN PRI trunks at the physical level. The Cisco Dial Access Switching (Dial-Up Frame Relay) system interprets D-channel messages and activates semi-permanent virtual circuits (SPVCs) to route the ISDN calls through frame-relay networks.

A single Cisco DAS Server Shelf can manage up to 20 PRIs.

Frame Relay Networks

Frame relay provides a standard interface to the wide-area network for bridges, routers, front-end processors (FEPs), and other LAN devices. A frame relay interface is designed to act like a wide-area LAN--it relays data frames directly to their destinations at very high speeds. Frame relay frames travel over predetermined virtual circuit paths, are self-routing, and arrive at their destination in the correct order.

Frame relay connections are identified by their Data Link Connection Identifier (DLCI), which identify logical connections within a shared physical channel. Network nodes normally route frames through a frame-relay network based on their DLCIs. Frames with the same DLCI are associated with the a single logical channel.

The *Cisco WAN Switching System Overview* contains further information about Cisco WAN switching networks and Frame Relay connections.

Permanent Virtual Circuits

A virtual circuit only allocates a physical connection when there is data to send. The connection between two devices is set up at the start of transmission, or when the network is configured. A PVC is similar to a dedicated private line because the connection is set up on a permanent basis.

Semi-Permanent Virtual Circuits

A semi-permanent virtual circuit is a PVC that is configured in the system's database but is not activated until some event occurs. SPVCs, which are also referred to as soft PVCs, effectively conserve the network's resources until they are actually needed by a user.

Dial-Up Frame Relay Application

The DAS Dial-Up Frame Relay application operates through both the DAS Server Shelf and StrataView Plus Workstation. It configures frame-relay PVCs through a Cisco frame-relay network. These connections lie dormant in the database on the StrataView Plus Workstation until they are activated by an ISDN call into the network. During the DAS Dial-Up Frame Relay application configuration, the PVC has been associated to an ISDN call to a specific number through the Automatic Number Identification (ANI) feature. A single ISDN call can activate up to seven dormant PVCs. During operation when an ISDN call with that number (the ANI) is validated, StrataView Plus activates the dormant PVC between two preconfigured endpoints. When the call is terminated, the StrataView Plus returns the PVC to the its dormant state.

During a dial-up or dial-backup call, the DAS Server Shelf client software performs ISDN call processing and requests connections from the DAS Daemon on the StrataView Plus Workstation. The StrataView Plus Workstation, with the DAS Daemon software, performs the connection management function and directs the frame-relay network to set up and take down the virtual circuits. DAS Dial-Up Frame Relay events are also recorded in the StrataView Event Log.

You configure DAS Server Shelf functions by using the DAS Dial-Up Frame Relay Command Line Interface (CLI). The DAS CLI can be accessed either through a remote connection, such as Telnet, or from a directly-connected dumb terminal (e.g., VT-100). Connections must be configured in the DAS database before an ISDN call is received. These connections are configured with StrataView Plus Automatic Numbering Identifier (ANI) interface and Connection Management windows. (The bulk of this publication describes the different tasks required to configure the DAS Server Shelf and the StrataView Plus connections.)

Two types of connections are preconfigured in the StrataView Plus database:

- Dial-Up
- Dial-Backup

Dial-Up Connection

For the example shown in Figure 1-2, a PVC is configured in the StrataView Plus database between the routers at Customer Sites A and B. (In actuality, the PVC is configured between the ports on the Cisco wide-area switches which connect to these routers, that is, the ports on the two IGX switches.)

Figure 1-2   DAS Dial-Up Application
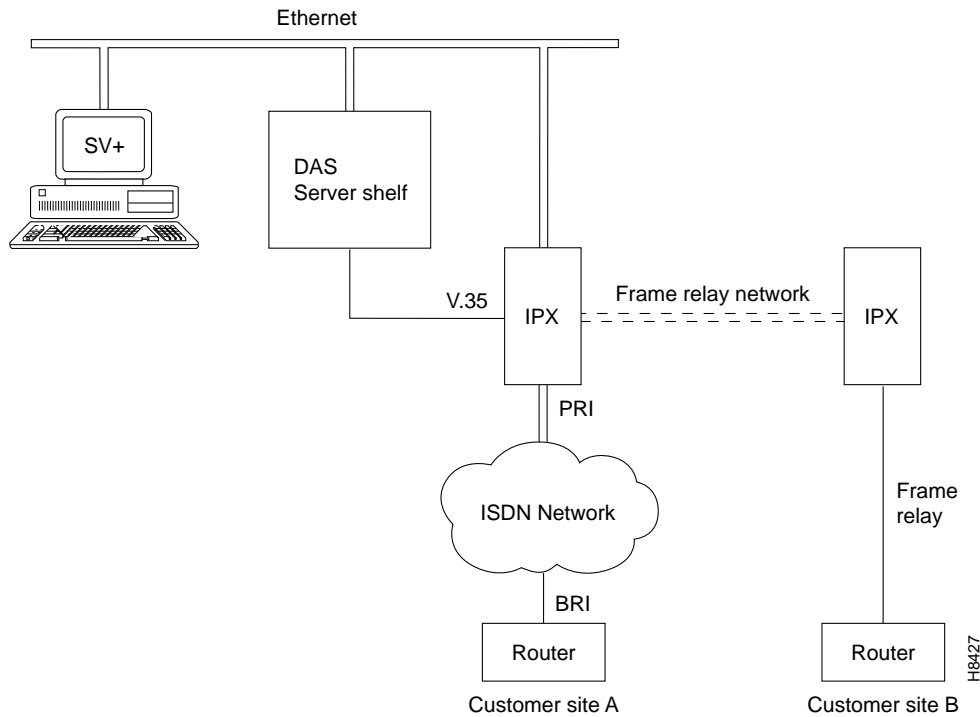
To begin a dialup process, customer premise equipment, such as the router at Customer Site A, issues call setup commands to the ISDN network. The ISDN network routes the incoming call to the PRI access port of the Cisco WAN switching frame-relay network (i.e., IGX or IPX switch). These call requests and call setup messages are carried on the ISDN D channel. The IGX (or IPX) switch passes the ISDN message, encapsulated in an V.35 frame-relay frame, to the DAS Server Shelf. The DAS processes this message and initiates DAS server function on the StrataView Plus Workstation. The DAS server searches the database for the appropriate connection information which has previously been configured (e.g., a virtual connection to Customer Site B), then passes this information to the frame-relay network. In other words, the DAS Dial-Up Frame Relay determines the identity of the calling device (using the ANI) and directs the frame-relay network to activate the virtual circuits associated with the call source.

Once the dial up connection is established, all of the routing, switching and (when needed) rerouting are handled by Cisco wide-area switches (i.e., nodes) in the same way that they are handled for PVCs that are connected with leased access lines. When the call is terminated, the virtual circuits are torn-down in a similar manner.

Note Enhanced Dial-Up Frame Relay connection performance can be achieved when the user sets up and leaves up the PRI port connected to the ISDN network. The Frame Relay port setting functionality of the DAS Server Shelf must be disabled for this to work.

Dial-Backup Connection

Backup strategies for critical business applications are a concern in any network. Frame relay provides automatic re-routing around failed lines and equipment, but for many users the leased line connecting the remote site to the frame relay network, as well as the frame relay port to which the leased line is connected, represent single points of failure,

ISDN Dial-up Frame Relay provides a reliable, economical dial backup solution by using an ISDN switched connection as the backup link into the frame relay network. If the site's leased line connection to the network fails, a dial-up ISDN backup link, shown in Figure 1-3, can quickly and automatically re-establish communications. If the network offers the capability to provide a pool of ports to support dial-in users, the possibility of a single failed port disrupting communication is minimal.

Figure 1-3   DAS Dial Backup Application
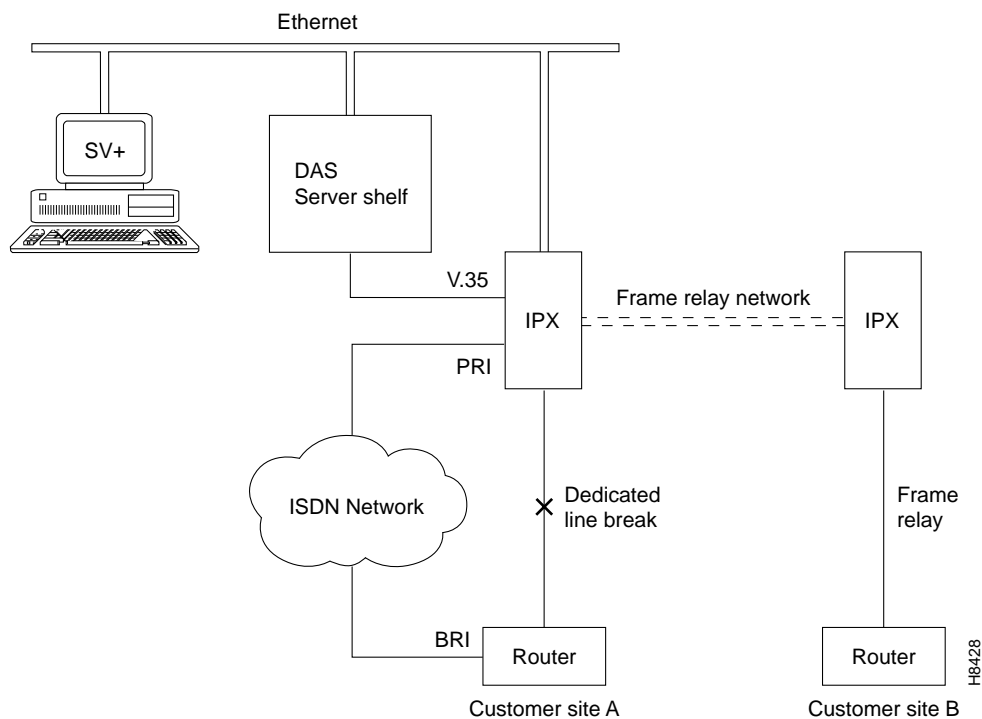
The call processing is similar to that of the Dial-Up Call Process, except that the ISDN call is initiated automatically, and the original PVC for the dedicated line is torn down. Because Dial-Backup calls are associated with an active PVC (i.e., normal mode frame-relay connection), they must use the DLCI of the original circuit. When the router at Customer Site A senses that the dedicated line to the frame-relay network is down, it will after a configured delay, automatically dial into the ISDN network. This call will reach the DAS Dial-Up Frame Relay application, which will have already been configured to process this backup call. First it will tear down the PVC that was supporting the dedicated line, then it will establish the dial-backup PVC. When the endpoints terminate the dial-backup call, the backup PVC will be torn down and the original PVC re-established.

Communication Between DAS Server Shelf and StrataView Plus Workstation

The DAS Server Shelf is typically co-located with a Cisco wide-area switch (that is, a BPX, IGX, or IPX switch). These network elements can also be co-located with the StrataView Plus Workstation. When they are close enough, the DAS Server Shelf and the StrataView Plus Workstation can be connected to the same Ethernet segment. When they are not co-located, a frame relay connection must be configured between them to provide IP over frame relay. The chapter, DAS Server Shelf Interface Connections, describes the different types of connections between the DAS Server Shelf and local and remote StrataView Plus Workstations.

The DAS Server Shelf also keeps Call Detail Records (CDRs) of each dial-up and dial-backup call. These CDRs record the calling ANI (Automatic Number Identification), the called number, the start and stop times for the call, and the cause of the call being terminated. Configuration parameters on the DAS specify the time duration that will constitute a single CDR file. Thus, the CDR file size will be proportional to this parameter, and the call activity rate. The higher the duration specified and/or higher the call activity rate, the larger the CDR file. A number of backup files, up to a maximum limit, may also be created. The CDR files are expected to be continually uploaded to StrataView Plus Workstations in order to prevent file over-writes and disk capacity problems. Every 30 minutes the StrataView Plus Workstation will read and copy any new CDR files.

The appendix, Call Detail Records, provides further information about the format and content of the CDRs.

Site Requirements

This chapter provides information about the site requirements required to install a DAS Server Shelf and Dial-Up Frame Relay system. Normally, the DAS Server Shelf is co-located with an IGX, IPX, or BPX switch and installed in the same rack; the node's rack requirements are covered in the appropriate *Cisco IGX 8400 Series Installation* or the *Cisco IPX Installation* publications.

This chapter contains the following sections:

- Electrical Power Source
- Environment
- Rack Requirements
- Terminal
- 10BaseT Ethernet Hub

Electrical Power Source

An AC or DC power source must be easily accessible within six feet of the DAS Server Shelf. The DAS Server Shelf must be powered from a dedicated branch circuit. An easily accessible disconnect device should also be included in the facility wiring.

AC Power

The AC Power input must meet the requirements listed in Table 2-1. The DAS Server Shelf automatically adjusts to input voltages within its range.

Table 2-1   AC Power Input

	Minimum	Nominal	Maximum
Input voltage	90 VAC	120/208 VAC	264 VAC
Line frequency	47 Hz	50/60 Hz	63 Hz

DC Power

The DC power input must meet the requirements listed in Table 2-2.

Table 2-2   **DC Power Input**

	Minimum	Nominal	Maximum
Input voltage	-40 VDC	-48 VDC	-60 VDC

Ground

DC   Ground a 48V DC power feed if used on the positive 48 volt and safety ground pins. Ensure that the DAS Server Shelf frame, and all other frames, are attached to an isolated ground connection.

               The nominal operating voltage of the DC-model DAS Server Shelf is –48V DC. The DC source should be capable of supplying 5 amperes. Only power supplies complying with SELV requirements in EN60950 may be connected to the -48 VDC input.

AC   An insulated grounding conductor that is identical in size to the grounded and ungrounded branch circuit supply conductors is to be installed as part of the branch circuit that supplies the device. This conductor has green insulation with yellow stripes.

Circuit Breakers

A 15A DC circuit breaker is recommended for the 48 VDC power source which supplies DC power to the DC version of the DAS Server Shelf. In North America, this circuit breaker should conform to NEC (ANSI/NFPA 70) and CEC (Part 1, C22.1) for protection against excess currents, short circuits, and earth faults.

A 20A AC circuit breaker is recommended for the 120/208 VAC power source which supplies AC power to the AC version of the DAS Server Shelf. In North America, this circuit breaker should conform to NEC (ANSI/NFPA 70) and CED (Part 1. C22.1) for protection against excess currents, short circuits, and earth faults.

Environment

The site must be capable of maintaining a maximum ambient temperature of 50º C while the system is operating (recommended range is 20° C to 30° C). Cooling airflow direction is from front to rear.

Rack Requirements

You can mount the DAS Server Shelf into standard 19-inch rack or a 23-inch racks. (The *Cisco IGX 8400 Series Installation* or the *Cisco IPX Installation* documentation has information about the Cisco-supplied cabinet.) The DAS Server Shelf is 5 1/4 inches high. The DAS Server Shelf has front mounting flanges and is shipped with attachable rear and mid-mounting brackets.

19-Inch Rack

You can mount the DAS Server Shelf into a standard 19-inch rack (17.75 " +0.12 and -0.00 inches between the rails), such as Cisco-supplied cabinet, which contains two front and rear mounting rails.

23-Inch Rack

To install a DAS Server Shelf in a 23-inch rack, you need to provide adapter brackets to adjust the width of the rack opening to 17.75 (+0.12 and -0.00) inches. Adapter brackets for installation of 19-inch equipment are commercially available.

Center Mount Rack

The DAS Server Shelf chassis contains two sets of holes, with attached PEM nuts, for the installation of mid-mounting brackets. These sets of holes are set back, 5 and 10 inches, from the front of the unit.

Terminal

If you are using a terminal to configure your DAS Server Shelf, communication parameters should be set for VT100, 9600 baud, parity none, 8 bits, and 1 stop bit.

Note Customer Service suggests that a modem be attached to the DAS Server Shelf to provide them with dial-in access. The appendix, Dial-In Support, contains further information about dial-in access.

10BaseT Ethernet Hub

Installation of the DAS Server Shelf typically requires an additional 10BaseT hub to connect the DAS Server Shelf's Ethernet port to the IGX or IPX switch's LAN port. The10BaseT hub must be purchased separately.

Unpack and Inspect the DAS Server Shelf

This chapter describes the contents of your Dial Access Switching system shipping package and the physical characteristics of the DAS Server Shelf front and back panels. It also includes a table listing the currently available models of the DAS Server Shelf. It includes the following sections:

- Unpack the DAS Server Shelf

- Examine the DAS Server Shelf

- DAS Server Shelf Models

- Observe Safety Measures

Unpack the DAS Server Shelf

If the shipping container is damaged, or if any of the various shipping indicators show improper handling of the container, contact your local shipping representative.

The contents of the container are listed under Figure 3-1.

Figure 3-1   Shipping Contents
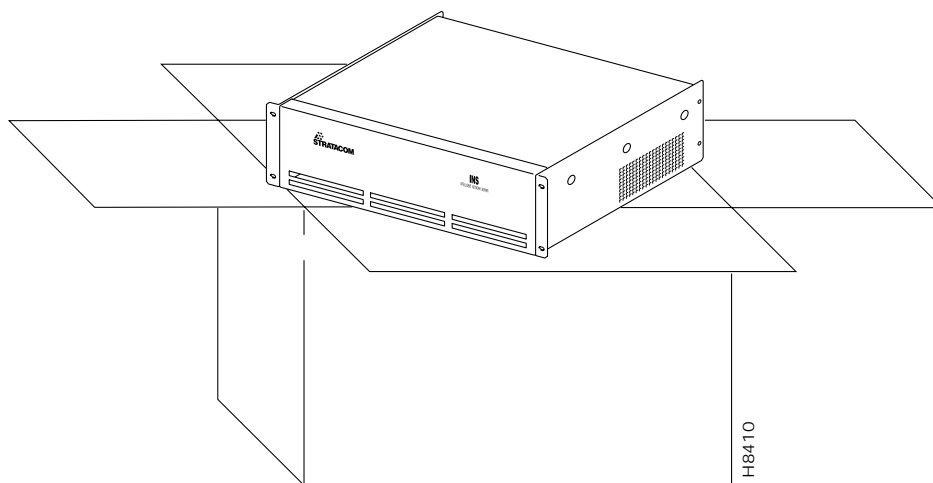
The container will contain:

- DAS Server Shelf

- Power cord (AC or DC)

- 10BaseT Ethernet Cable

- Frame Relay Interface Cable (RS449 to V.35 or to X.21)

- Rear-mounting brackets and fasteners (2 sets) for mounting

Three tapes:

- Tape 1. DAS (INS) Frame Relay/PPP Release xxxx

- Tape 2. DAS (INS) DIAL-UP FR STATION Release xxxx

- Tape 3. DAS (INS) DIAL-UP FR DAEMON Release xxxx

One *Cisco Dial Access Switching Shelf and Dial-Up Frame Relay Installation and Operation* publication for Release 1.4

Note Tape 1, DAS (INS) Frame Relay/PPP, and Tape 2, DAS (INS) DIAL-UP FR STATION, have been preinstalled on the DAS Server Shelf at the factory. Tape 3, DAS (INS) DIAL-UP FR DAEMON, must be installed on the StrataView Plus Workstation (see the chapter, Loading DAS Daemon Software on the StrataView Plus Workstation, for the procedure).

Examine the DAS Server Shelf

This section provides descriptions of the front and rear panels of the four DAS Server Shelf models:

- DAS-AC

- DAS-DC

- DAS-AC-E

- DAS-DC-E

The external physical differences in the DAS Server Shelf models are pointed out in this section.

DAS-AC or DAS-DC Front Panel

The DAS-AC or DAS-DC front panel displays the Cisco logo and the product name. There are no functional components on the front of DAS-AC or DAS-DC models, as shown in Figure 3-2.

Figure 3-2   DAS Server Shelf
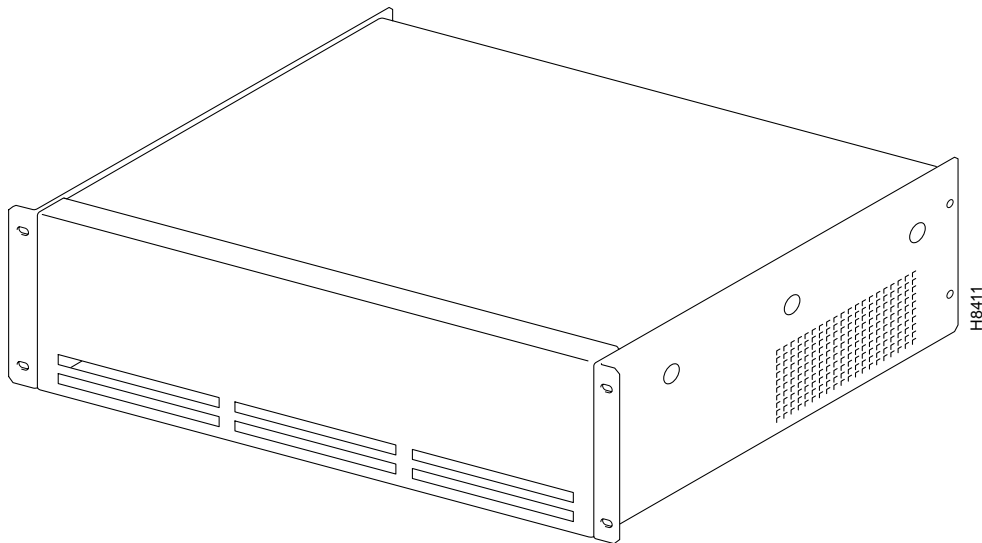
DAS-AC-E or DAS-DC-E Front Panel

The DAS-AC-E or DAS-DC-E front panel, illustrated in Figure 3-3, displays the Cisco logo, the product name and the following two indicators:

- Power-On indicator indicates that the power is on.

- Status indicator is a tri-colored LED that indicates system status. The status indications are:

    — Off–DAS is off.

    — Blinking red–Unit booting, unit shutting down, factory installed soft-switch cable missing.

    — Red–Unit temperature to high.

    — Green--Unit powered on and ready.

    — Yellow–Reserved for future use.

    These status indications apply to both the front- and rear-panel Status LEDs.

Figure 3-3   DAS-AC-E or DAS-DC-E Front Panel
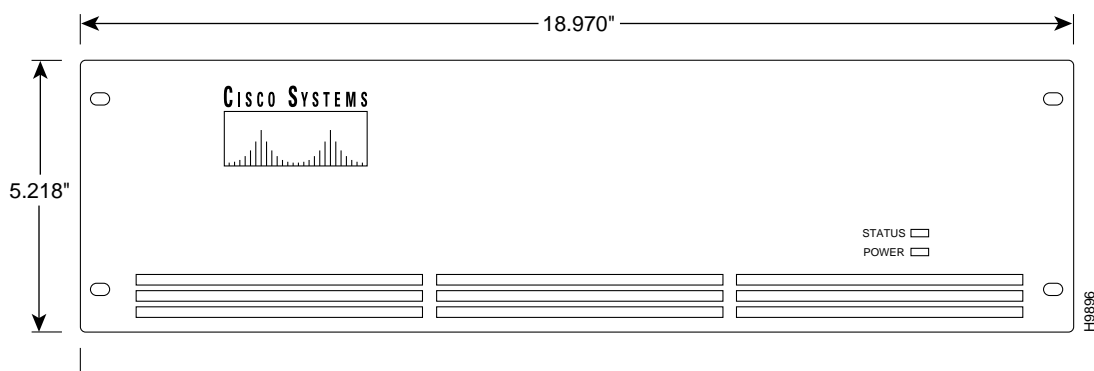
DAS-AC and DAS-DC Rear Panel

All physical connections are made to the DAS Server Shelf's rear panel. The DAS-AC and DAS-DC have different rear panels.

DAS-AC Rear Panel

The DAS-AC contains the components and connectors shown in Figure 3-4. The Power On/Off Switch is to the left of the AC-Power Input connector. Later models of the AC-powered DAS Server Shelf come with an AC-power cord clamp. This clamp secures to the bottom edge of the DAS Server Shelf with a set screw, which can be loosened to slide the clamp over the AC-power cord.

Figure 3-4   AC-Powered DAS Server Shelf Rear Panel
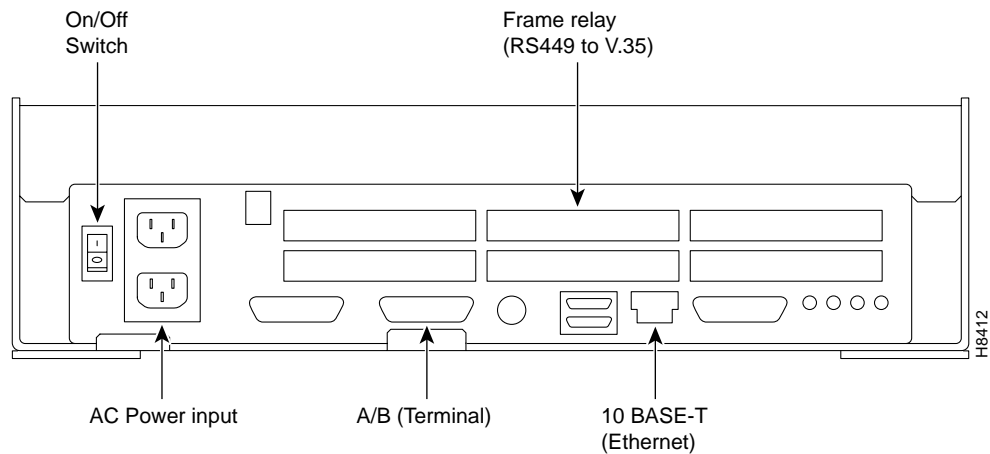
Note   Unlabeled connectors are not used in DAS Server Shelf and Dial-Up Frame Relay applications.

DAS-DC Rear Panel

The DC-Powered DAS Server Shelf contains the components and connectors shown in Figure 3-5. As shown, the DC-powered DAS Server Shelf has inputs for two DC power inputs (DC Input A and DC Input B). Typically these DC inputs are from separate DC power sources to provide protection against a DC power source failure. Each DC Input has its own On/Off Switch.

Figure 3-5   DC-Powered DAS Server Shelf Rear Panel
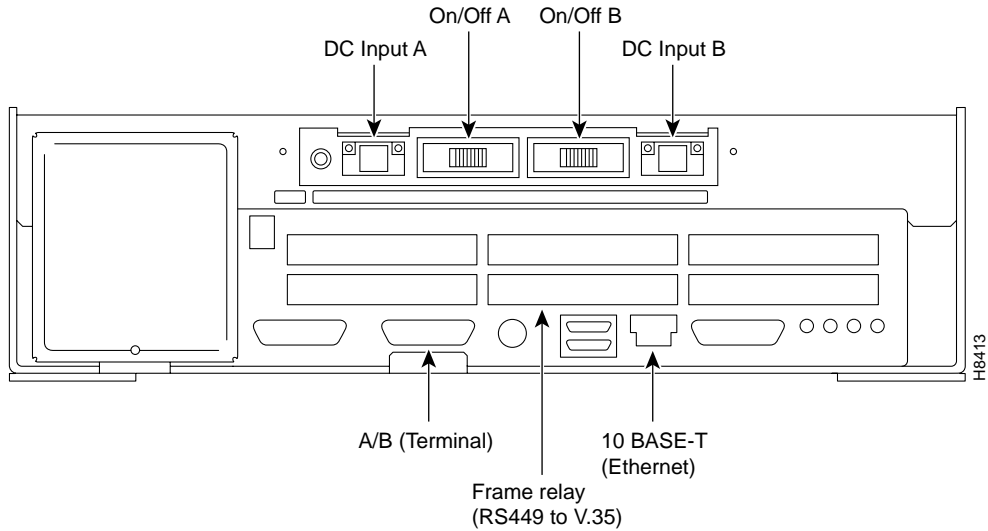
Note   Unlabeled connectors are not used in DAS Server Shelf and Dial-Up Frame Relay applications.

DAS-AC-E and DAS-DC-E Rear Panels

This section contains descriptions of the DAS-AC-E and DAS-DC-E rear panels.

DAS-AC-E Rear Panel

The DAS-AC-E contains the components and connectors shown in Figure 3-6. The Power On/Off Switch is to the left of the AC-Power Input connector.

Figure 3-6   DAS-AC-E Rear Panel
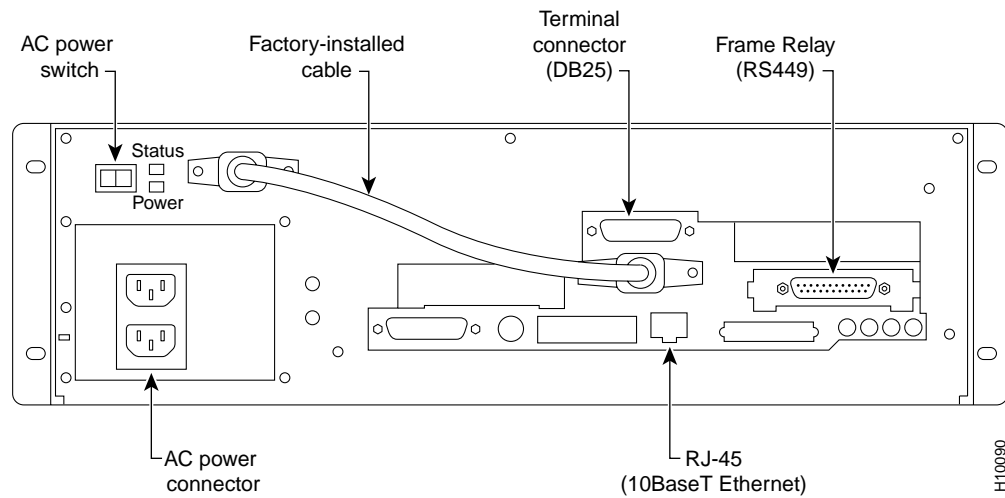
The DAS-AC-E has the following connectors and switches:

- AC Power Switch, ⏻ , providing both graceful and emergency shutdown capability
- AC Power Connector (Single IEC 20)
- Power-On LED lights green when there is power to the unit
- Status LED providing the same indications as the front-panel Status LED
- Frame Relay Card (RS449) connector
- Ethernet Port RJ-45 Connector (referred to as a 10BaseT connector)
- Two Serial Port DB25 Connectors (for attaching a local terminal)

Note   The factory-installed cable shown in Figure 3-6 is known as the soft-switch cable. It is installed from one of the DB25 connectors to a DB15 connector next to the AC power switch. If it is not installed, the Status LEDs will blink red.

Note   Unlabeled connectors are not used in DAS applications.

DAS-DC-E Rear Panel

The DAS-DC-E rear panel contains the components and connectors shown in Figure 3-7. As shown, the DAS-DC-E has inputs for two DC power inputs (DC Input A and DC Input B). Typically these DC inputs are from separate DC power sources to provide protection against a DC power source failure. Each DC input has its own circuit breaker.

Figure 3-7   DAS-DC-E Rear Panel
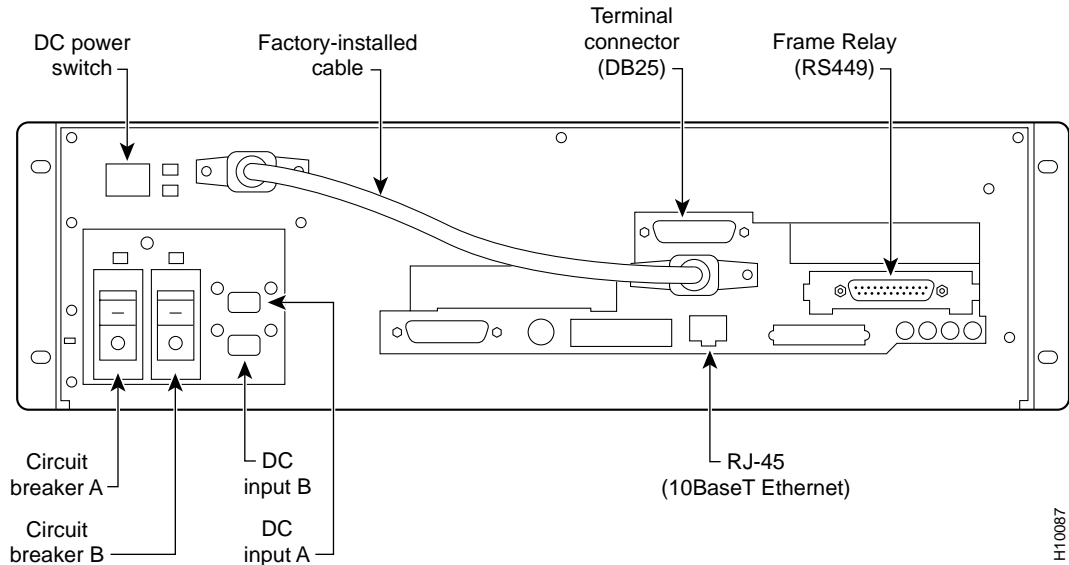
The DAS-DC-E has the following connectors and switches:

- DC Power Switch, ⏻ ,providing both graceful and emergency shutdown capability

- Two DC Power Connectors (Euro-style plugable terminal connector receptacles) (Phoenix P/N DFK-MSTB 2,5/3-GF-5.08)

- Power-On LED lights green when there is power to the unit

- Status LED providing the same indications as the front-panel Status LED

- Two circuit breakers:

    — Breaker A GOOD green LED is on when circuit breaker A is not tripped, off when circuit breaker is tripped

    — Breaker B GOOD green LED is on when circuit breaker B is not tripped, off when circuit breaker is tripped

- Frame Relay Card (RS449) connector

- Ethernet Port RJ-45 Connector (referred to as a 10BaseT connector)

- Two Serial Port DB25 Connectors (for attaching a local terminal)

Note   Unlabeled connectors are not used in DAS applications.

Note   The factory-installed cable shown in Figure 3-7 is known as the soft-switch cable. It is installed from one of the DB25 connectors to a DB15 connector next to the DC power switch. If it is not installed, the Status LEDs will blink red.

DAS Server Shelf Models

The currently available models of the DAS Server Shelf are listed in the following table.

Table 3-1   **DAS Server Shelf Models**

DAS Server Shelf Models	Description
DAS-AC	DAS Server Shelf with AC power supply (older model)
DAS-DC	DAS Server Shelf with DC power supply (older model)
DAS-AC-E[1]	DAS Server Shelf with AC power supply
DAS-DC-E[1]	DAS Server Shelf with DC power supply

1. The DAS-AC-E and DAS-DC-E (the -E models) are the only models that are currently shipping.

Observe Safety Measures

To ensure safe performance as well as to maintain the integrity of your DAS Server Shelf, please observe a few safety measures as you proceed with this installation.

- Do not modify the internal or electrical assembly of DAS Server Shelf equipment.

- Protect the DAS Server Shelf from overheating; ensure that openings in the equipment are not blocked or covered. Never place the unit near any source of heat.

- Handle with care; rough treatment may damage sensitive components.

- Always turn off the power to the DAS Server Shelf before moving it.

Rack Mounting the DAS Server Shelf

This chapter describes three mounting methods for positioning your DAS Server Shelf in a rack. Although all DAS Server Shelf models are rack mounted in essentially the same way, there are some minor differences between the DAS-AC and DAS-DC procedure and the DAS-AC-E and DAS-AC-E procedure. The different mounting procedures are described in different sections.

This chapter contains the following sections:

- Rack Types
- Rack Mounting DAS-AC or DAS-DC Models
- Rack Mounting DAS-AC-E or DAS-DC-E Models

⚠ **Caution**   Installation should be performed by authorized personnel only.

Rack Types

You can flush mount the DAS Server Shelf into a 19-inch rack or 23-inch rack or you can center mount it. For either mounting method, you need to allow enough clearance space at the front of the rack to enable removal and replacement of the DAS Server Shelf.

19-Inch Rack

You can mount the DAS Server Shelf into a standard 19-inch rack (17.75" +0.12 and –0.00 inches between the rails), such as Cisco-supplied cabinet, which contains two front and rear mounting rails. The DAS Server Shelf has a front mounting flange and rear-mounting brackets that will align with the mounting rails.

23-inch Rack

To use a 23-inch rack for DAS Server Shelf installation, you need to provide adapter brackets to adjust the width of the rack opening to 17.75 (+0.12 and -0.00) inches. Adapter brackets for installation of 19-inch equipment are commercially available.

Center Mount Rack

The DAS Server Shelf can be mid-mounted by using the holes at the sides of the chassis.

Rack Mounting DAS-AC or DAS-DC Models

⚠ **Caution** The DAS-AC or DAS-DC are single, enclosed units and weigh approximately 60 lbs. Two people are required to lift it into place.

To rack mount the DAS-AC or DAS-DC, follow these steps:

Step 1 From the front of the rack, slide the DAS-AC or DAS-DC into the rack and secure the holes in the front mounting flanges to the holes in the rack mounts. If you have a DC-powered unit, go to Step 2. If you have an AC-powered unit, go to Step 3.

Step 2 Go around to the rear of the rack and remove the two screws that secure the AC-power cover, shown in Figure 4-1, to gain access to the holes on the left rear side of the DAS Server Shelf.

Figure 4-1   **AC Cover on DAS-DC**
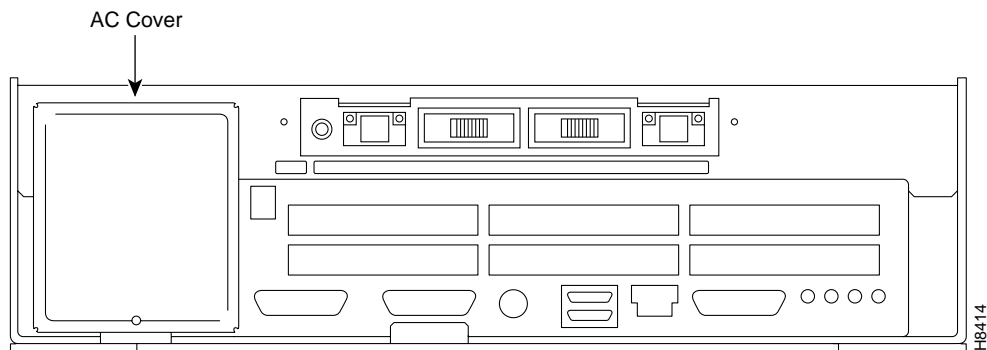
Step 3 From the rear of the rack, position the rear-mounting brackets, shown in Figure 4-2, on the outside of the DAS-AC or DAS-DC chassis.

Step 4 Using the four #10 screws supplied in the accessories kit, loosely secure the rear-mounting brackets to the DAS Server Shelf. The #10 screws go from inside out into the heads on the rear-mounting brackets.

Step 5 Secure the rear-mounting brackets to the rack's mounting posts.

Step 6 Tighten the four #10 screws holding the rear-mounting brackets to the DAS-AC or DAS-DC chassis.

Step 7 Replace the AC-power cover on the DAS-DC with the screws removed in Step 2.

Figure 4-2   DAS Server Shelf Mounting Brackets
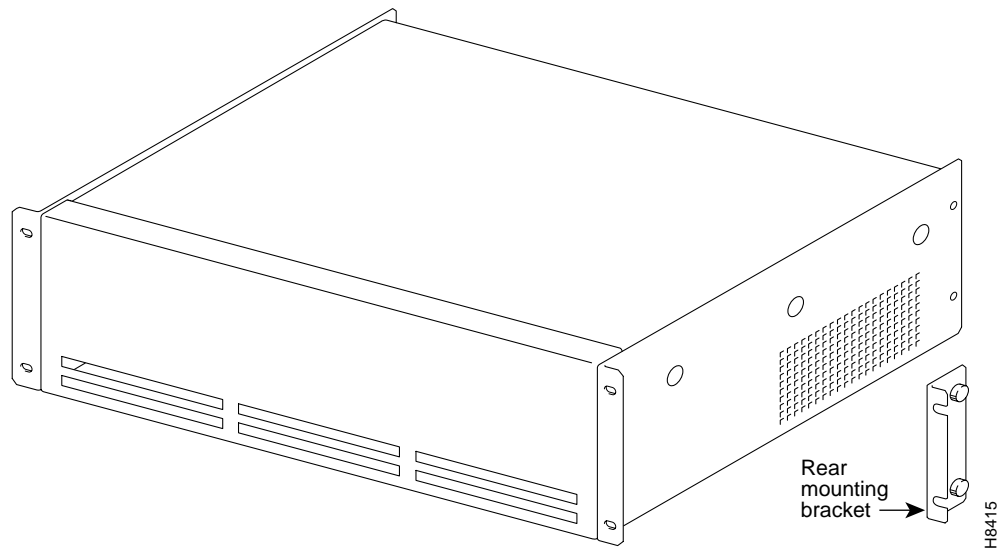
Rack Mounting DAS-AC-E or DAS-DC-E Models

⚠ **Caution**   The DAS Server Shelf is a single, enclosed unit and weighs approximately 60 lbs. Use two people when it is necessary to lift it into place.

To rack mount the DAS-AC-E or DAS-DC-E, follow these steps:

Step 1   From the front of the rack, slide the DAS-AC-E or DAS-DC-E into the rack and secure the holes in the front mounting flanges to the holes in the rack mounts.

Step 2   From the rear of the rack, position the rear-mounting brackets, shown in Figure 4-3, on the outside of the DAS-AC-E or DAS-DC-E chassis.

Figure 4-3   DAS-AC-E or DAS-DC-E Rear-Mounting Brackets
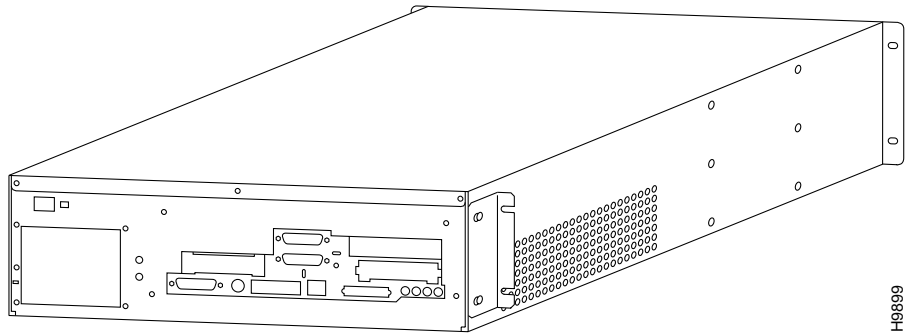
Step 3 Loosely secure the rear-mounting bracket to the DAS-AC-E or DAS-DC-E chassis using the screws that were supplied.

Step 4 Secure the rear-mounting brackets to the rack's mounting posts.

Step 5 Tighten the four screws holding the rear-mounting brackets to the DAS-AC-E or DAS-DC-E chassis, shown in Figure 4-4.

Figure 4-4   Rack-Mounted DAS-AC-E or DAS-DC-E
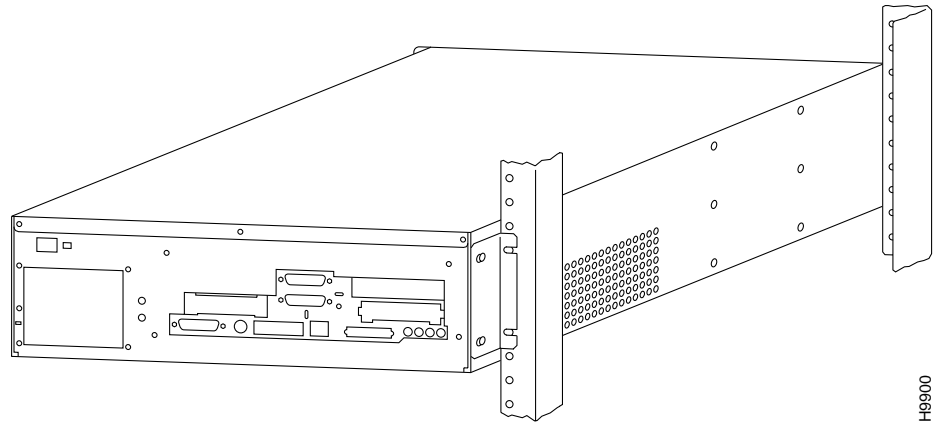
To mid-mount the DAS-AC-E or DAS-DC-E, follow these steps:

Step 1 Attach the mid-mount right-angle brackets to the DAS-AC-E or DAS-DC-E chassis using the mounting holes shown in Figure 4-5. (Make sure to use the same set of holes, either 4.5-inch or 10-inch, on each side.)

Step 2 From the front of the rack, slide the DAS-AC-E or DAS-DC-E into the rack until the Mid-Mounting brackets are up against the rack posts.

Step 3 Secure the holes in the Mid-mounting Right-Angle brackets to the holes in the rack mounts.

Step 4 From the rear of the rack, position the mid-mounting brackets on the outside of the DAS-AC-E or DAS-DC-E chassis.

Step 5 Loosely secure the rear-mounting bracket to the DAS-AC-E or DAS-DC-E chassis using the screws that were supplied.

Step 6 Secure the rear-mounting brackets to the rack's mounting posts.

Step 7 Tighten the four screws holding the rear-mounting brackets to the DAS-AC-E or DAS-DC-E chassis.

Figure 4-5   Mid-Mounting Holes and Right-Angle Bracket
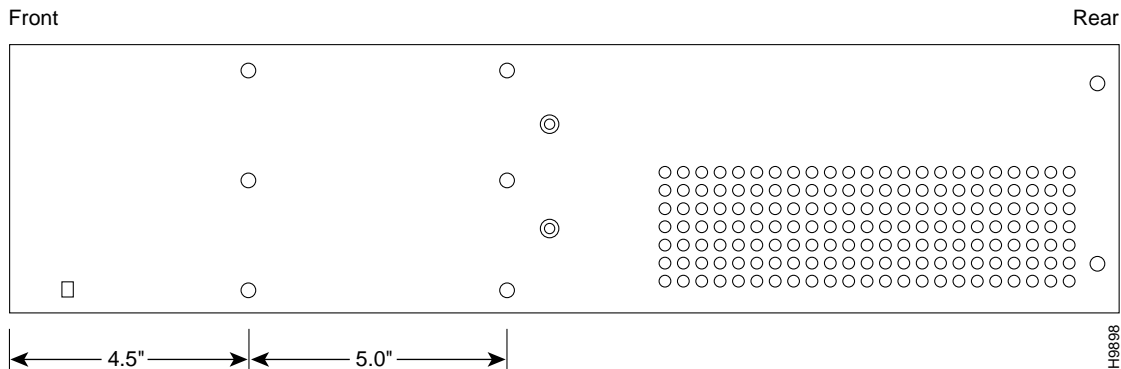
Figure 4-6 shows a DAS Server Shelf installed in a STRATM rack.

Figure 4-6   Rack-Mounted DAS Server Shelf

DAS server shelf

IGX or IPX or BPX
switch

10750
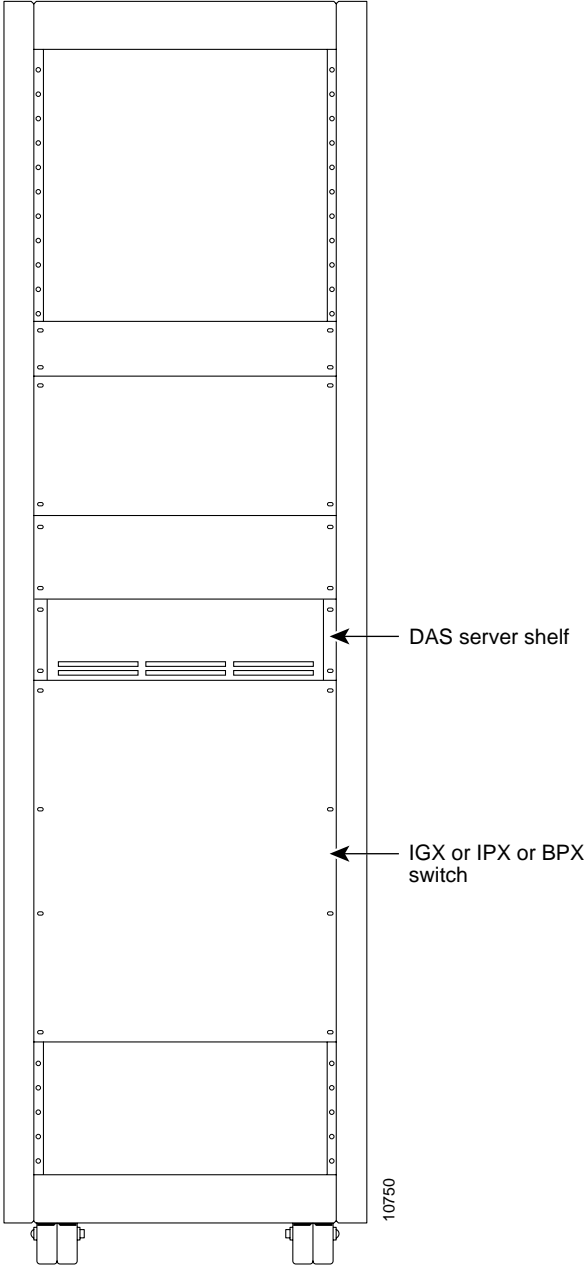
Connecting Power to the DAS Server Shelf

This chapter assumes that your DAS Server Shelf is racked, cabled, and ready for startup. You are now ready to connect AC or DC power, turn on the DAS Server Shelf, and access a UNIX login prompt. Guidelines for DAS Server Shelf shutdown are provided at the end of this chapter. This chapter includes the following sections:

* Connecting AC Power

* Connecting DC Power

* Powering Up the DAS Server Shelf

* Shutting Down the DAS Server Shelf

Connecting AC Power

The DAS Server Shelf AC power cord is designed to work with single-phase power systems. The appendix, Cable Information, provides further information about the AC Power cable supplied with your DAS Server Shelf. There is a slight difference in connecting AC power to the DAS-AC and the DAS-AC-E; therefore, this section contains the two following procedures:

* Connect AC Power to the DAS-AC

* Connect AC Power to the DAS-AC-E

Connect AC Power to the DAS-AC

The AC-Power connector and the ON/OFF Switch are on the left-side of the rear panel as shown in Figure 5-1.

Figure 5-1   DAS-AC Power Switch and Connector
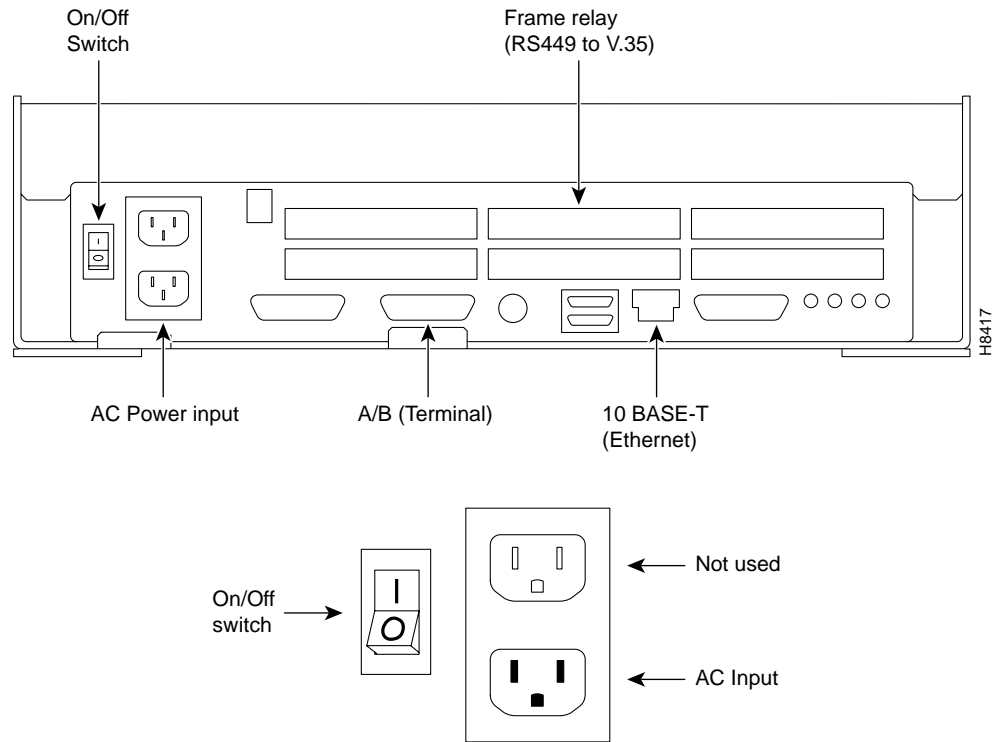
To connect AC power to the DAS-AC, follow these steps:

Step 1   Make sure the power switch is in the Off position by pressing the side of the On/Off Switch labeled 0.

Step 2   Attach the power cord to the AC Input connector. Some DAS Server Shelves have an AC-power cord clamp. The clamp, a slotted flange, is secured to the DAS-AC with a screw. Loosen the screw to slide the clamp to one side and allow room to plug in the AC-power cord. Then slide the clamp back over the cable and tighten the screw.

Step 3   Attach the other end of the power cord to the AC power source.

Step 4   Turn power on by pressing the side of the On/Off Switch labeled 1.

Connect AC Power to the DAS-AC-E

The AC-Power connector and the ON/OFF Switch are on the left-side of the rear panel as shown in Figure 5-2.

To connect AC power to the DAS-AC-E, follow these steps:

Step 1 Make sure the power switch is in the Off position by pressing the side of the On/Off Switch labeled 0.

Step 2 Attach the power cord to the AC Input connector.

Step 3 Attach the other end of the power cord to the AC power source.

Step 4 Turn power on by pressing the side of the On/Off Switch labeled 1.

Figure 5-2   **DAS-AC-E Power Switch and Connector**
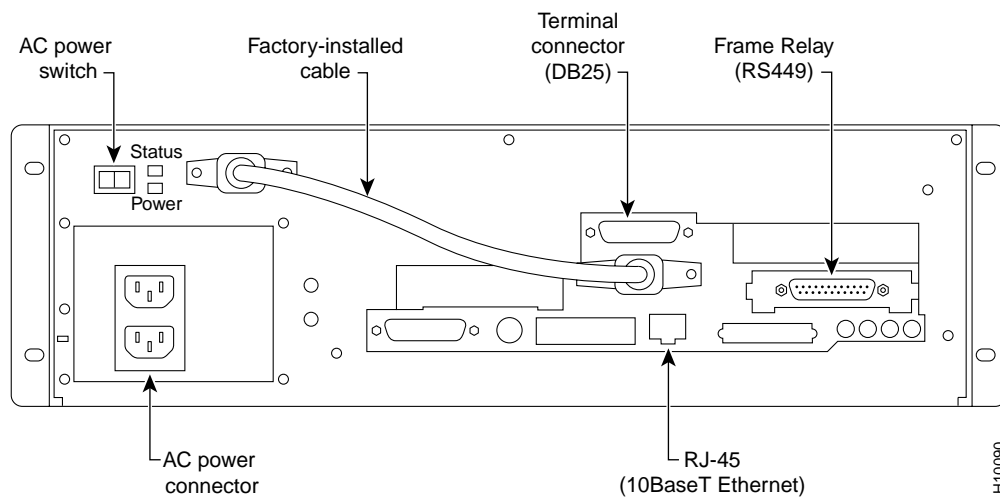
Connecting DC Power

There is a slight difference in connecting DC power to the DAS-DC and to the DAS-DC-E; therefore, this section contains the two following procedures:

- Connect DC Power to the DAS-DC
- Connect DC Power to the DAS-DC-E

Connect DC Power to the DAS-DC

The DC Input Connectors and On/Off Switches are on the top of the rear panel as shown in Figure 5-3.

Figure 5-3   DAS-DC Power Switches and Connectors
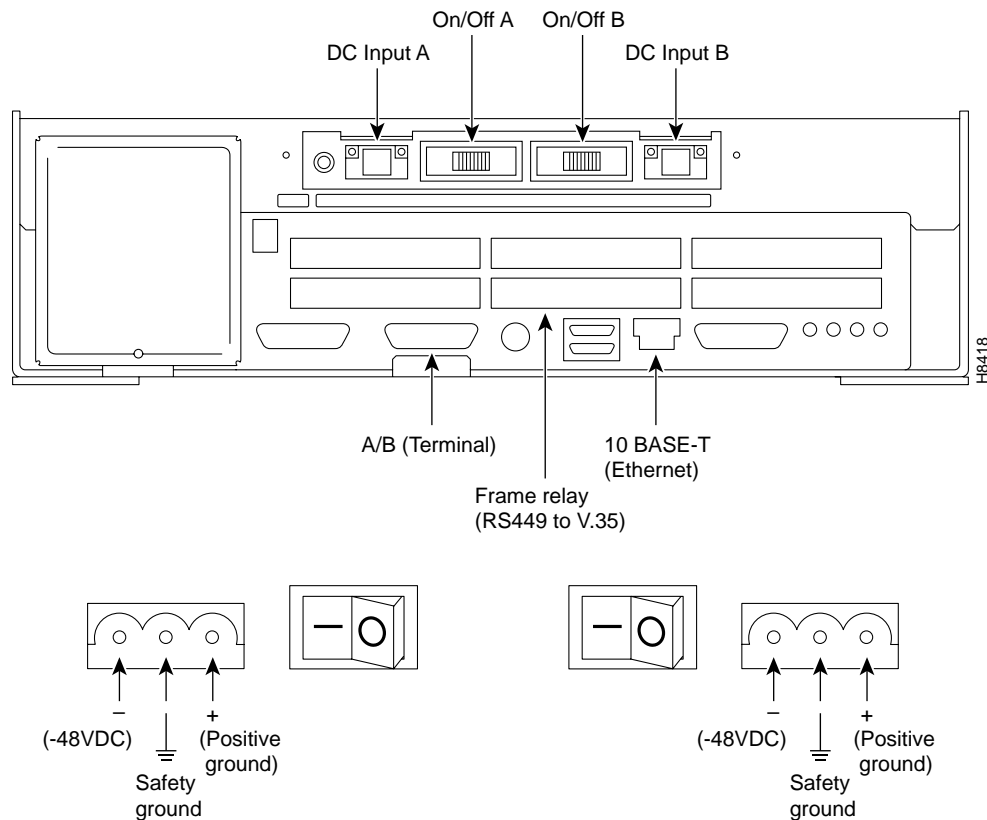
The DC Input connectors are EURO Block three-pin male receptacles. There are two DC Input Connectors, one for DC source A and one for DC source B. A is on the left, B is on the right. When only one DC power source is available, we recommend that you use DC Input A. Female EURO mating connectors are provided in the DAS Server Shelf accessories bag.

To connect DC power, follow these steps:

Step 1   Make sure that both DC power supplies are off by pressing the 0-side of their On/Off Switches.

Step 2   Make sure the DC source is off.

Step 3 The cable from the DC-power source should have 3 insulated #14 AWG wires (stranded); the insulation should be stripped back 0.25" (6 mm) on each wire end, where you connect the female EURO connectors supplied in the accessories bag.

Step 4 Observe the way the polarized female EURO connectors will mate with the DC input connector. Insert each wire into the correct hole in the female Euro connector (see Figure 5-3). Secure each wire by tightening the screws in the connector.

Step 5 Insert one (or both) female EURO connectors now connected to the cable from the DC source into DC Inputs A and/or B.

Step 6 Turn on the DC source.

Step 7 Turn on DC power to the DAS Server Shelf by pressing the 1-side(s) of the On/Off switches, Power A and/or Power B, as required.

Connect DC Power to the DAS-DC-E

The DC Input Connectors and On/Off Switches are on the rear panel as shown in Figure 5-4. The two DC Input connectors are EURO Block three-pin male receptacles. Female EURO mating connectors are provided in the DAS-DC accessories bag which was part of the shipping kit.

To connect DC power, follow these steps:

Step 1 Make sure that both DC power inputs are off by pressing the 0-side of their circuit breakers.

Step 2 Make sure the DC source is off.

Step 3 The cable from the DC-power source should have 3 insulated #14 AWG wires (stranded); the insulation should be stripped back 0.25" (6 mm) on each wire end, where you connect the female EURO connectors supplied in the accessories bag.

Step 4 Observe the way the polarized female EURO connectors will mate with the DC input connector. Insert each wire into the correct hole in the female Euro connector (see Figure 5-4). Secure each wire by tightening the screws in the connector. As you face the rear panel, both DC input connectors are oriented as follows:

Pin 1: -48 VDC, is on the left as you face the unit

Pin 2: Safety Ground

Pin 3: -48 VDC Return

Step 5 Insert one (or both) female EURO connectors now connected to the cable from the DC source into DC Inputs A and/or B.

Step 6 Turn on the DC source.

Step 7 Turn on DC power to the DAS Server Shelf by pressing the 1-side(s) of the DC circuit breakers, Power A and/or Power B, as required. The press the 1-side of the DC power switch.

Figure 5-4   DAS-DC-E Power Switches and Connectors
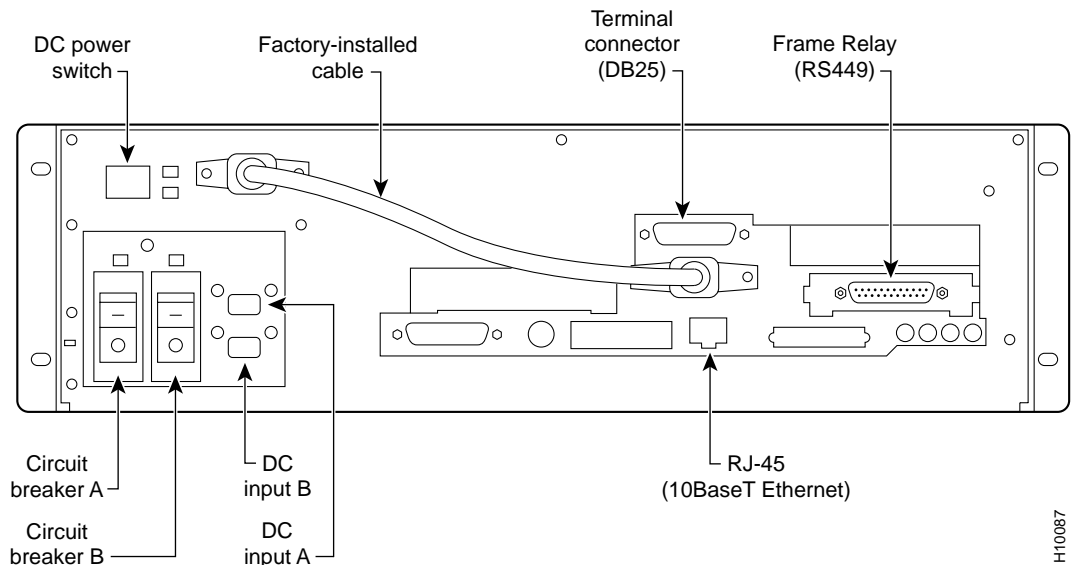
Powering Up the DAS Server Shelf

The first time you power on your DAS Server Shelf, you should perform the procedures described in the next chapter, DAS Server Shelf Interface Connections. These procedures include connecting a terminal to the DAS Server Shelf, connecting it to the BPX/MGX 8220 or IGX or IPX switch, and connecting it to a StrataView Plus workstation and creating a DAS (INS) Object on the StrataView Plus Maps.

Before turning on the DAS Server Shelf, it is a good idea to read chapters, DAS Server Shelf Interface Connections, and Configuring the Dial-Up Frame Relay Application, to understand the sequence of operations that have to be completed to bring up a DAS Server Shelf and Dial-Up Frame Relay application for the first time. Once either the DC- or AC-model DAS has been turned on with the On/Off switch, it will began to start running automatically. If a terminal has been connected, the UNIX login prompt appears at an attached terminal interface.

Shutting Down the DAS Server Shelf

Once the DAS Server Shelf is powered up, you must be careful how you shut it down. The procedures for shutting down a DAS-AC and DAS-DC are different from shutting down a DAS-AC-E and a DAS-DC-E. Therefore, this section contains the two following procedures:

- Shutdown the DAS-AC or DAS-DC

- Shutdown the DAS-AC-E or DAS-DC-E

Shutdown the DAS-AC or DAS-DC

You should shutdown the DAS software processes before you turn off the DAS Server Shelf (DAS-AC or DAS-DC models). To do this, execute the INS STOP script before you proceed with UNIX shutdown or halt commands. The INS STOP script shuts down all the DAS Dial-Up Frame Relay software components running on the DAS Server Shelf.

At the UNIX prompt available on the attached terminal interface, type the following:

INS_STOP

Go ahead with any operation requiring this shutdown.

The *INS_STOP* command only stops the DAS processes on the DAS Server Shelf. The UNIX *halt* command shuts down all the UNIX processes. Ideally you should stop the DAS processes before halting and removing power from the DAS Server Shelf.

Note The INS_START command will start the DAS Server Shelf processes when they have been stopped but the system has not been turned off.

Shutdown the DAS-AC-E or DAS-DC-E

During the normal operation of DAS-AC-E or DAS-DC-E and the BPX, IGX, or IPX switch, the DAS Server Shelf is typically not turned off. However, in the rare cases where it might be necessary to turn off the DAS, both AC or DC power switches provide for graceful or emergency shutdowns.

Graceful Shutdown

To gracefully shut down DAS-AC-E or DAS-DC-E, where DAS processes are stopped and the file system is protected, momentarily press the DC Power Switch. The graceful shutdown will take approximately 30 seconds.

Emergency Shutdown.

In an emergency situation where it is necessary to remove power from the DAS-AC-E and DAS-DC-E immediately, press and hold the Power Switch down for approximately 5 seconds. The DAS will shutdown without going through the 30-second graceful shutdown.

For the AC unit, the power cord inlet is the disconnecting device.

DAS Server Shelf
Interface Connections

After you have rackmounted the DAS Server Shelf and connected the power, you must connect it to the Cisco wide-area switches (i.e., IGX, IPX, BPX/MGX 8220 switches) and to the StrataView Plus Workstation. You must also configure these connections for proper operation. Some of the configuration can be performed locally, through a directly connected terminal. Other portions of the configuration must be performed from the StrataView Plus Workstation.

Since the StrataView Plus Workstation and the DAS Server Shelf are often connected as part of a local area network (LAN), Cisco advises you to have your system administrator available for assigning IP address, subnet masks, host names, etc., consistent with your network. Ideally, the system administrator should be familiar with UNIX and the Sun Microsystems Solaris 2.4 or 2.5 operating systems.

- Physical Interfaces
- Connecting a Terminal
- Typical DAS Server Shelf and Dial-Up Frame Relay Turn-Up
- Connecting to the Cisco Switch
- Connectivity with the StrataView Plus Workstation
- Ping the DAS Server Shelf
- Connecting a Modem

Physical Interfaces

The DAS Server Shelf has three physical interfaces

- Terminal (DB25 connector)
- Frame Relay Card (RS449 connector)
- Ethernet (10BaseT connector)

These interfaces are the same on all DAS Server Shelf models. Figure 6-1 points out the interface connectors on the DAS-AC. (These connectors will be located in the same place on the DAS-DC.) Figure 6-2 points out the interface connectors for the DAS-AC-E. (These connectors will be located in the same place on the DAS-DC-E.)

Figure 6-1   DAS-AC Physical Interfaces
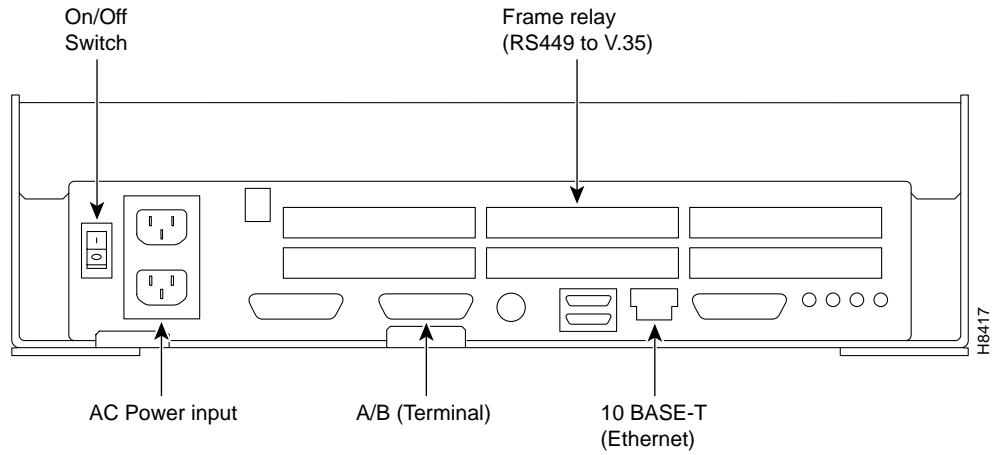
Figure 6-2   DAS-AC-E Physical Interfaces
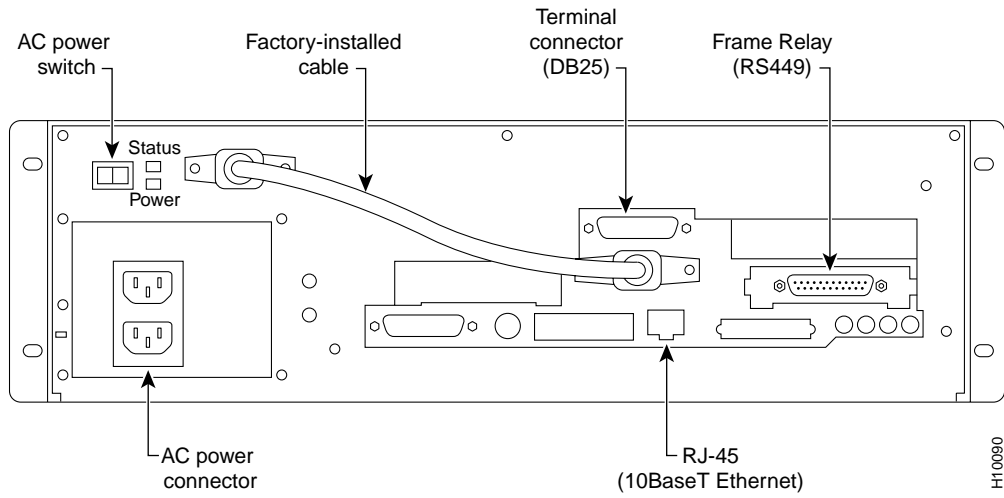
Connecting a Terminal

You can attach a terminal (or PC running a terminal emulation program, such as ProCom) to the DAS Server Shelf to perform some of the configuration locally.

Attach your terminal cable, typically a null modem cable, to the terminal connector on the DAS Server Shelf's rear panel. (There is an illustration of the pin connections of a typical null modem cable in the appendix, Cable Information.) The terminal connector is labeled A/B on the DAS-DC or DAS-AC models, and shown on Figure 6-1. The location of the terminal connector for DAS-AC-E and DAS-DC-E models is shown on Figure 6-2. This is an asynchronous ttya port on the UNIX-based DAS Server Shelf. Your terminal or PC and emulation software must be set to match the DAS Server Shelf's communication parameters:

- Terminal emulation for VT100

- 9600 baud

- Parity none

- 1 stop bit

Note The DAS Server Shelf terminal port has been set up at the factory. If you have trouble displaying DAS Server Shelf files and menus cleanly, you might reset the following parameters :
stty rows 24
stty erase ^h
setenv TERM vt100

Typical DAS Server Shelf and Dial-Up Frame Relay Turn-Up

This section provides a sequence of the general steps used to bring up a Cisco WAN switching network to which an DAS Server Shelf and the Dial-Up Frame Relay application are being added. It is a general overview and omits some of the obvious details, such as rack-mounting and connecting power. (These omitted details are covered in previous sections of this publication.) It is intended for Customer Support to understand the sequence that various elements of the DAS Server Shelf and Dial-Up Frame Relay application installation and configuration must be performed.

To bring-up the DAS Server Shelf and Dial-Up Frame Relay application, follow this sequence:

Step 1   Configure the Cisco switch's network IP addresses. (Specifically, use **cnflan**, **cnfnwip**, and **cnfsnmp**.) (This is covered in the section, Configure the Network IP Addresses.)

Step 2   Configure the DAS Server Shelf IP connectivity:

- Stop the DAS (INS) processes. Run INS_STOP (covered in section, Shutting Down the DAS Server Shelf).

- Edit the UNIX file /etc/hosts to contain the proper IP addresses and host names.

- Edit the UNIX file /usr/net/fr/hosts to contain the proper IP addresses and host names. (You can copy the contents of /etc/hosts into /usr/net/fr/hosts.)

- Verify the hostname in /etc/hosthane.le0 is the same as the hostname in /etc/nodename. (These steps are covered in the section, Modifying Host and Network Files.)

Step 3   Install the DAS (INS) Daemon software on the StrataView Plus Workstation (covered in the chapter, Loading DAS Daemon Software on the StrataView Plus Workstation).

Step 4   Add the DAS (INS) object (icon) to the HP OpenView Topology Map (covered in the chapter, Creating a DAS Topology Object with HP OpenView).

Step 5 Add the signalling PRI PVC, using the StrataView Plus Connection Manager. This is a "Normal" mode frame-relay connection, typically using channel 24 (T1 DS0 #24) and a DLCI 0. (This is described in the section, Configuring a PVC between the PRI and the DAS Server Shelf.)

Step 6 Add the PRI to the DAS Server Shelf, using the DAS CLI (described in the chapter, Understanding the DAS Command Line Interface).

Step 7 Connect the PRI to the end-user equipment (e.g., the ISDN network) and bring up layers 1 and 2 of the ISDN protocol.

Step 8 Configure Dial-Up and/or Dial-Backup connections (covered in Chapter 12, Configuring Dial-Up Connections, and Chapter 13, Configuring Dial-Backup Connections.)Then check Layer two statistics, using the DAS CLI, (described in the chapter, Understanding the DAS Command Line Interface).

Connecting to the Cisco Switch

The DAS Server Shelf connection to the Cisco switch provides the ISDN signalling connection to the Dial-Up Frame Relay application, as shown in Figure 6-3. This connection consists of two steps:

Step 1 Making the Physical Connection.

Step 2 Configuring a PVC between the PRI and the DAS Server Shelf.

Figure 6-3 **Connection Between the DAS Server Shelf and Cisco Switch**
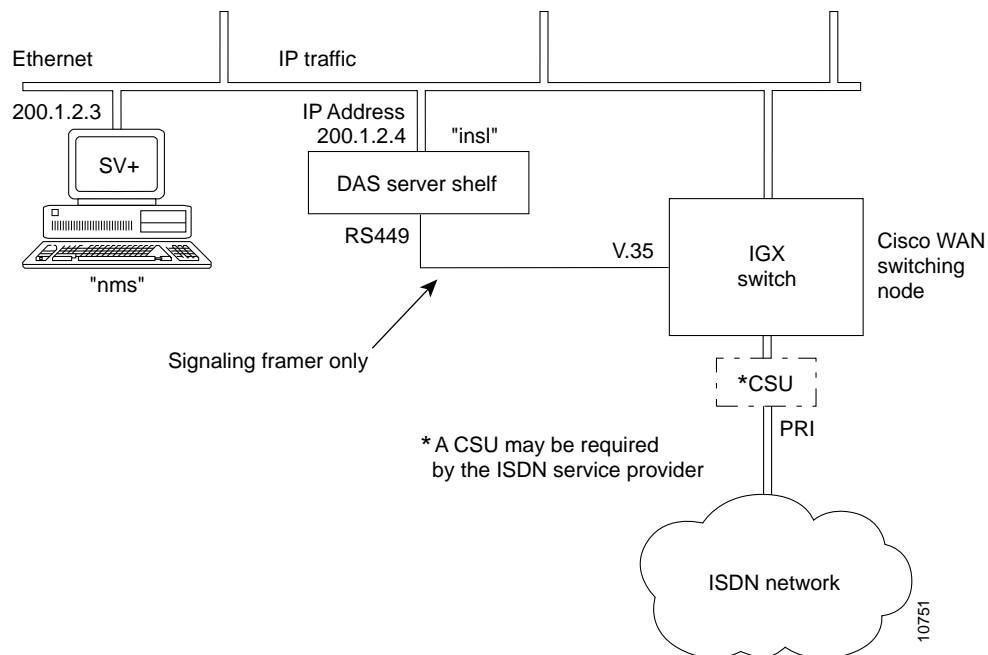
Note The physical connection between the DAS Server Shelf and the Cisco switch will also carry the IP connection to the StrataView Plus when the DAS Server Shelf and the StrataView Plus Workstation are not on the same Ethernet.

When configured the IGX or IPX will route the ISDN signaling channel, shown as a dashed line, over the physical serial (V.35 to RS-422) connection. The connection between the DAS Server Shelf and the StrataView Plus workstation is also shown as a dashed line because this connection will vary, depending on whether the StrataView Plus Workstation and the DAS Server Shelf are connected to the same Ethernet.

Making the Physical Connection

The DAS Server Shelf must be connected to a co-located Cisco switch (e.g., IGX or IPX switch) through a Frame Relay Port (V.35) connection.

1 Connect the RS-449 cable (supplied with the DAS Server Shelf) to the Frame Relay (RS449 to V.35 or to X.21) port on the rear of the DAS Server Shelf.

2 Connect the V.35-end of the cable to the selected Frame Relay Port (V.35) port of the co-located node (if necessary, see appropriate Cisco WAN switching publication, BPX, IGX, or IPX switch or MGX 8220).

Configuring a PVC between the PRI and the DAS Server Shelf

The PRI from the ISDN network is connected to a standard Cisco T1 (or E1) Frame Relay Port. (Refer to the appropriate Cisco WAN switching publication, IGX or IPX switch, etc., for instructions on making this physical connection.)

Note A CSU may be required by the ISDN service provider.

Next you must configure a PVC with a DLCI of 0 at the PRI's Frame Relay Port on the Cisco wide-area switch to the DAS Server Shelf serial port. For a PRI on a T1 interface, the channel of this connection is normally 24, because the ISDN signalling channel is DS024.

Configuring this PVC consists of two steps:

Step 1 You must use the DAS Command Line Interface (INS_CLI), which is described in the chapter, Understanding the DAS Command Line Interface. You also use the INS_CLI to assign a unique DLCI in the switch table for each PRI that will signal the DAS Server Shelf. (You can also assign these DLCIs through the SNMP.)

Step 2 You use the StrataView Plus Connection Manager to add a Normal mode connection between the PRI port at the Cisco wide-area switch and the Frame Relay Port (V.35) to which the DAS Server Shelf is connected. The DLCI at the PRI-port end (i.e., the port on the Cisco wide-area switch connected to the ISDN PRI) should always be *0*. The channel of the PRI-port is normally either 24 (or 16) to match the ISDN signalling channel, i.e., DS024 for T1 (or TS16 for E1). This procedure is also described in Chapter 14 in the section Add a PRI Dial-Up Port.

Connectivity with the StrataView Plus Workstation

The DAS Server Shelf must also have connectivity with the StrataView Plus Workstation. The procedures for doing this are different when the DAS Server Shelf and the StrataView Plus Workstation are located on the same Ethernet and when they are not. These different procedures are described as:

- Configure the Network IP Addresses

- Local Ethernet Connection

- Remote StrataView Plus Workstation

Your system administrator should prescribe the IP address, hostname, and other parameters necessary for operating the DAS Server Shelf in your local area network environment

Configure the Network IP Addresses

Before actually configuring the Ethernet connectivity, you should ensure that the Cisco wide-area switch and WAN switching network have been set up for proper IP connectivity. If necessary, refer to the *Cisco WAN Switching Command Reference* publication and use the following commands:

- **cnflan** to configure the node's communication parameters so the node can communicate with the StrataView Plus Workstation over an ethernet LAN using TCP/IP protocol.

- **cnfnwip** to configure the node's IP address and subnet mask.

- **cnfsnmp** to configure the node's SNMP GET and SET community strings.

Local Ethernet Connection

When the DAS Server Shelf is connected to the same Ethernet as the StrataView Plus, as shown in Figure 6-4, you may have to modify some of the UNIX operating system (i.e., Solaris 2.4) files for your local LAN environment. To do this, you need to use a text editor such as *vi* to modify files and a few simple Sun operating system (SunOS) commands. (When you are logged in to the DAS Server Shelf, you can find the use and syntax of the operating system commands with the **man** command; for instance, enter *man login* to find the login command.)

To connect the DAS Server Shelf to the Ethernet connect the appropriate cable to the connector on the back of the DAS Server shelf (shown in Figure 6-1 or Figure 6-2). (This is typically a 10BaseT connection to an Ethernet hub.)

Figure 6-4   **Connecting DAS Server Shelf to Same Ethernet as StrataView Plus Workstation**
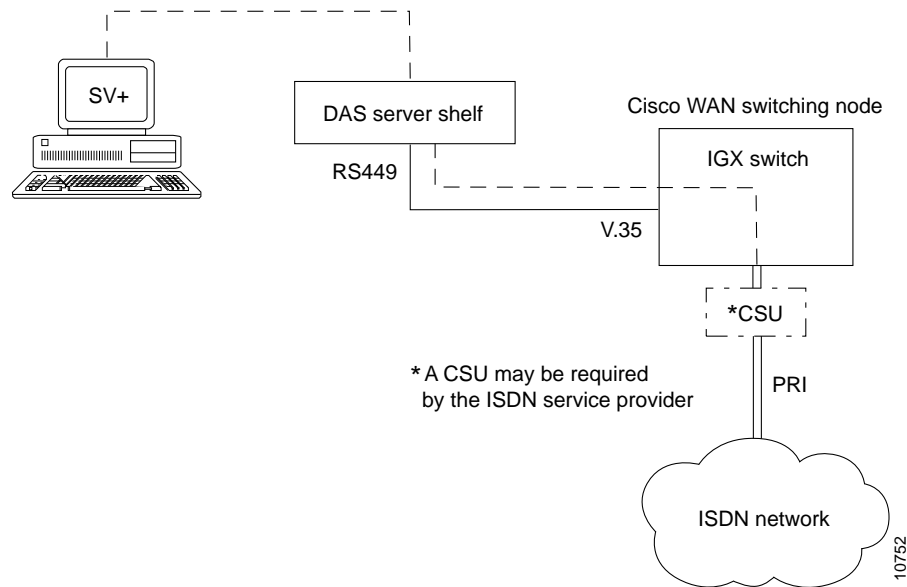
Using vi

vi is a UNIX-based screen editor which can be used to make some minor modifications to the UNIX-based files. You can find out more about vi, by typing *man vi* at the DAS Server Shelf's UNIX prompt and pressing Enter. In vi there is a command mode and an editing (i.e., insertion) mode. Since only minor changes need to be made to DAS Server Shelf UNIX files, you need to know a few commands:

- *vi "file name"* opens the file you are about to edit.

- *i* enters the insertion mode. You can start editing the file at the cursor. You end the insertion mode with *ESC*.

- *o* opens a line in the file below the position of the cursor. Enter data on this line until you hit *ESC*.

- *:* opens up the one line command mode at the bottom of the screen.

- *ESC* takes you out of the editing mode and returns you to the command code.

- *:q!* quits the file without saving changes.

- *:w* saves the file while your editing it.

- *ZZ* saves the file and quits.

A quick procedure for editing any of the files: CD to where the file is located. vi file name. Position cursor where you want to add or change text. Enter o to add a new line, or i to edit a line. Hit ESC when you are done adding text. At the command mode, ZZ saves file.

Modifying Host and Network Files

After checking with your system administrator, set the IP address, hostname, and other parameters necessary for operating the DAS Server Shelf in your local area network environment, as follows:

Step 1 Connect a terminal to the DAS Server Shelf.

Step 2 Log in to DAS Server Shelf as superuser.

Step 3 Stop the DAS (INS) processes:

- cd /opt/ins/admin
- execute INS_STOP

Note Once you start changing host names and IP addresses, you must make sure you complete all the files. Do not turn off power or reboot in the middle of this process or you could disable your DAS Server Shelf.

Step 4 Use vi to screen edit the file */etc/hosts* and add the IP address for DAS Server Shelf and the IP address for the StrataView Plus Workstation.

For direct Ethernet connection, as shown in Figure 6-4, where you have a StrataView Plus Workstation with a hostname of *nms* and an IP address of 200.1.2.3 and a DAS Server Shelf with a hostname of *ins1* and an IP address of 200.1.2.4, you would add the two lines shown in bold type to the *hosts* file:

```
Contents of /etc/hosts
#
127.0.0.1         localhost
#
200.1.2.4         ins1      loghost    # INS1 (DAS 1 local Ethernet port)
200.1.2.          nms       # SV+ Workstation
#192..x.x.x       fr-ins1   frhost     # INS1 (Frame-Relay)
# End of hosts
```

Note that the frhost (frame-relay host) IP address is used for remote SV+ Workstation connectivity and can be commented out by adding a # sign to beginning of line.

Step 5 Also use vi to edit */usr/net/fr/hosts* file to contain these same IP address for the DAS Sever Shelf and the IP address for the StrataView Plus Workstation. (You could also copy /etc/hosts to /usr/net/fr/hosts.)

Step 6 If required for your local network, use vi to screen edit the file */etc/networks*, which will appear similar to the following:

```
Contents of /etc/networks file:
#
# The loopback network is used only for intra-machine communication
#
loopback         127
#
# Internet networks
#
arpanet          10              arpa# Historical
nms-net          200.1.2         # SV+ network
# End of networks
```

For our example, the line in bold text, **nms-net . . .**, is added to the networks file.

Step 7   If required for your local network, use vi to screen edit the file */etc/netmasks* to add the appropriate subnet mask for your LAN segment.

Step 8   If required for your local network, use vi to screen edit the file */etc/hostname.le0* to name the DAS Server Shelf's ethernet port.

Step 9   If required for your local network, use vi to screen edit the file */etc/nodename* to name the DAS Server Shelf node, and verify that this name is the same name as /etc/hostname.le0.

Step 10   Use the **date** SunOS command to set the local date and time.

Step 11   Execute the **reboot** command to restart the DAS Server Shelf.

Note   The UNIX ifconfig command could be used to configure the DAS Server Shelf's Ethernet port IP address. An example:

ifconfig le0 200.1.2.4

This should not be necessary if the IP address has been added to /etc/hosts.

Remote StrataView Plus Workstation

Where the DAS Server Shelf and the StrataView Plus Workstation are not on the same Ethernet, they must communicate over a frame-relay connection. There are two ways this can be done:

- Option 1: Connectivity Using Two Ethernet Segments.

- Option 2: Connectivity with IP Over Frame Relay.

Figure 6-5   Option 1: Connectivity Using Two Ethernet Segments
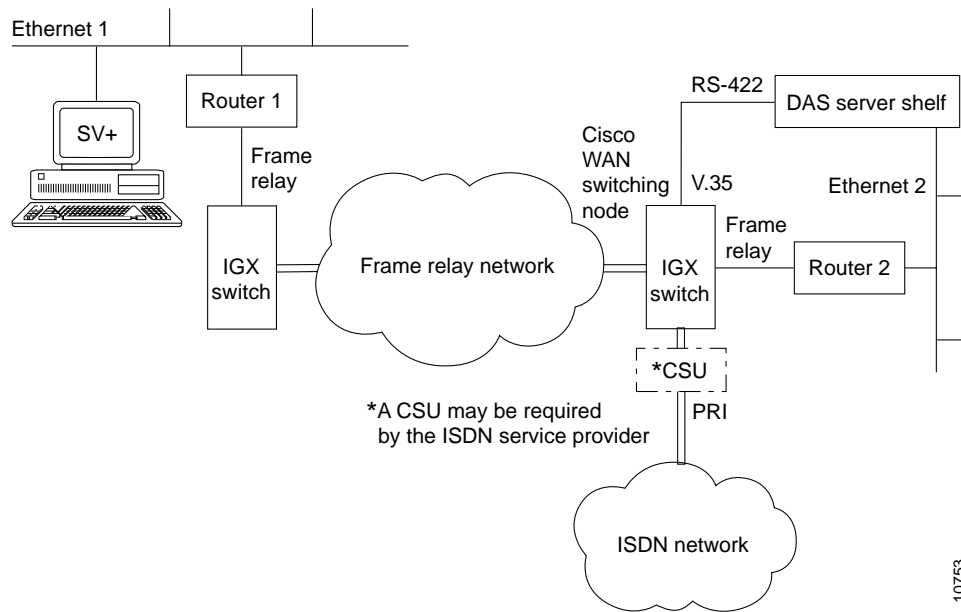
In option 1, the route from the remote DAS Server Shelf to the StrataView Plus Workstation does not go over the RS422 to V.35 serial link to the Cisco wide-area switch. Instead the messages are routed over Ethernet 2 to Router 2 to the Frame Relay Network to Router 1 to Ethernet 1 to the StrataView Plus Workstation. The only configuration that needs to be done is to provide the route from the DAS to the StrataView Plus Workstation on the IP network. Consult your network administrator for help in setting up this route over the routers.

In option 2, shown in Figure 6-6, the IP traffic between the StrataView Plus Workstation and the DAS Server Shelf is carried over frame relay (i.e., IP over Frame Relay). The StrataView Plus Workstation communicates with the DAS Server Shelf using IP addressing. Thus, a router must be added to the Ethernet segment to convert between IP addressing and frame relay DLCIs. The messages between the StrataView Plus and DAS Server Shelf are then routed over the Frame Relay Network. At the Cisco wide-area switch co-located with the DAS Server Shelf, these messages are routed over the serial connection from the Frame Relay Port (V.35) to the RS-422 port on the DAS Server Shelf. (This serial connection also carries the signalling frames from the PRI.) (This option reduces the number of PRIs supported by the DAS Server Shelf because bandwidth must be allocated for the IP traffic.)

Figure 6-6   Option 2: Connectivity with IP Over Frame Relay
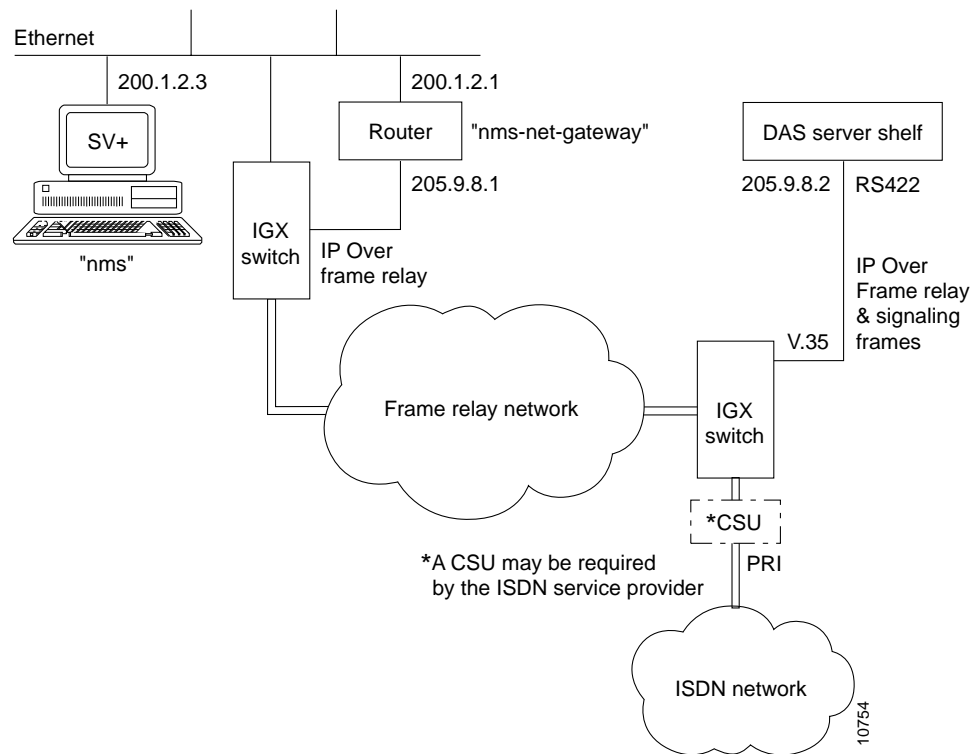
Note The physical connection between the DAS Server Shelf and the Cisco wide-area switch also carries the ISDN PRI's signalling on a separate PVC. This PVC is not the IP over Frame Relay connection, and was configured in a previous section.

Four files on the UNIX-based DAS Server Shelf must be modified to complete the IP over Frame Relay PVC at the DAS Server Shelf's frame relay port. They are:

- */usr/net/fr/fr_conv*—This file must contain the IP address to DLCI mapping for any IP networks accessible across the frame relay network. In this case, the router's serial port address must be specified since it acts as the gateway to the remote NMS network.

- */etc/hosts*—This file must contain the StrataView Plus Workstation's address.

- */usr/net/fr/hosts*—This file must also contain the StrataView Plus Workstation's address.

- */etc/networks*—This file must contain the router's gateway address.

Note In any of the file fragments shown here, the "#" character precedes comments on the same line. The bold text represents lines of the file that must be added or modified.

To modify the DAS Serve Shelf UNIX files, follow these steps:

Step 1 Connect a terminal to the DAS Server Shelf.

Step 2 Log in to DAS Server Shelf as superuser.

Step 3 Use vi to screen edit the file */usr/net/fr/fr_conv*. The */fr_conv* file will be similar to the following:

```
Contents of /usr/net/fr/fr_conv file:
#
# ADAX Frame Relay IP address to DLCI (0, . . . , 1023) to port mapping
#
# IP Address    Frame Relay DLCI   Port
205.9.8.1       12                 0       # Cisco Serial 0 (nms-net-gateway) on DLCI12
#
# Raw Frame Relay conns
–        35       0          35     9       # PRI using DLCI 35
# End of fr_conv
```

Step 4 Add the router's serial port address (shown here as 205.9.8.1....) and save the file.

Step 5 Use vi to screen edit the file */etc/inet/hosts*. The */hosts* file will be similar to the following:

```
Contents of /etc/inet/hosts file, assuming the router is named "nms-net-gateway" and the
SV+ Workstation is named "nms":
#
# Internet host table
#
127.0.0.1        localhost
#
192.250.252.4           ins1       loghost    # INS1 (Ethernet)
205.9.8.2               fr-ins1    frhost      # INS1 (Frame-Relay)
200.1.2.3               nms                    # NMS
205.9.8.1               nms-net-gateway        # Cisco Router Serial 0
# End of hosts
```

It is important to include the "frhost" alias for the frame relay interface on the DAS Server Shelf. This tag is used by the DAS Server Shelf frame relay interface start up software to find this IP address.

Be sure to update the correct IP addresses and names for:

1. Local DAS Server Shelf (e.g., 192.250.252.4 if the DAS Server Shelf is physically connected to an Ethernet segment)

2 Frame relay network IP address for the DAS Server Shelf (205.9.8.2)

3. StrataView Plus Workstation (200.1.2.3)

4. Router acting as a gateway (205.9.8.1)

Step 6 Save the hosts file.

Step 7 Use vi to screen edit the file */usr/net/fr/hosts*. This hosts file must also contain the IP addresses of the StrataView Plus Workstation and the DAS Sever Shelf's loghost. It will appear similar to the following:

```
#
#Internet host table
#

#local ethernet
200.1.2.3       NMS             #NMS
192.250.252.4     ins1     loghost    # INS1 (Ethernet)
#end of hosts
```

Step 8 Save this hosts file.

Step 9 Use vi to screen edit the file */etc/networks*. The */networks* file will be similar to the following:

```
Contents of /etc/networks file:
#
# The loopback network is used only for intra-machine communication
#
loopback      127
#
# Internet networks
#
arpanet        10          arpa        # Historical
frnet          205.9.8                 # Frame relay IP DAS/SV+ network
nms-net        200.1.2                 # SV+ network
# End of networks
```

Step 10 Save the file and **reboot** the DAS Server Shelf.

Router Configuration

The router connected to the StrataView Plus Workstation's Ethernet must also be configured properly for IP over frame relay. Its serial port connected to a Cisco wide-area switch's Frame Relay Port must be configured to support frame relay. Its Ethernet port must be configured as a bi-directional gateway between the StrataView Plus Workstation and the IP over frame relay network. Refer to the appropriate router documentation for further information on configuring these ports.

Multiple Remote DAS Server Shelves

When there are multiple remote DAS Server Shelves, each one must communicate with the StrataView Plus Workstation via IP over frame relay links. In this case, you must carefully configure the frame relay links and IP addresses. Figure 6-7 illustrates three DAS Server Shelves that require remote (i.e., IP over frame relay) connectivity with a StrataView Plus Workstation. The Cisco wide-area switch to which the DAS Server Shelves are connected (and are co-located with) are assumed to be in the Frame Relay (FR) Network cloud. A router interfaces the StrataView Plus Workstation's ethernet segment to the Frame Relay Network, providing a gateway to the logical IP subnetwork (over frame relay) of the DAS Server Shelves.

To implement this configuration, which is provided as an example for the following discussion, you must

- Configure the Frame Relay Network.

- Configure the IP Subnet.

- Configure the StrataView Plus Network and Hosts files.

- Configure the Router.

Figure 6-7   Multiple DAS Server Shelves
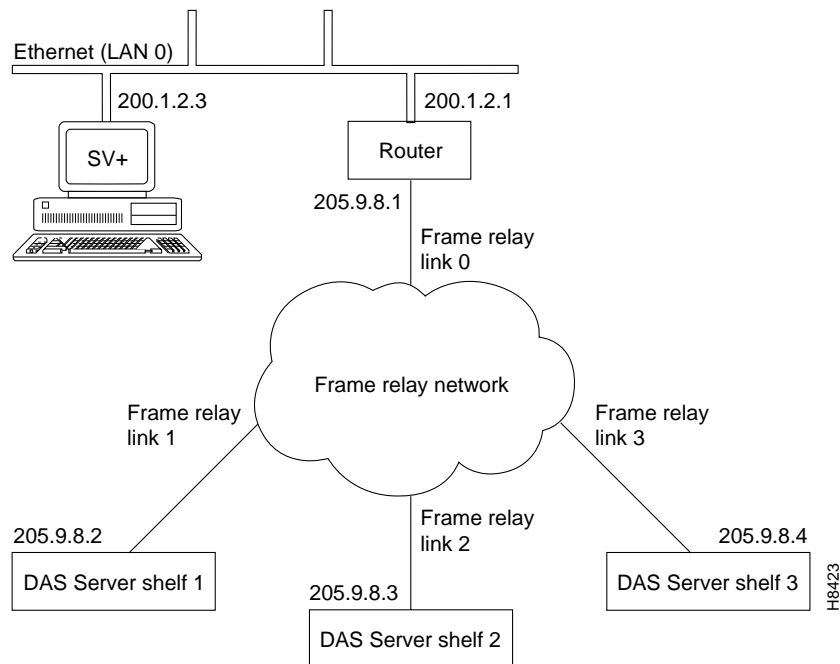
Configure the Frame Relay Network

For DAS connectivity to the StrataView Plus Workstation, you must configure the four frame relay links (numbered 0 through 3) shown in the figure. The first one, Frame Relay (FR) Link 0, connects the router to the FR Network, which in effect connects the StrataView Plus Workstation Ethernet segment to the FR Network. The speed of this link is a function of the number of DAS Server Shelves in the network, and also of other IP traffic that is transferred between the Ethernet (LAN 0) and the frame relay network (if any). You should configure bandwidth of 128 kbps per DAS Server Shelf over the router.

The remaining three FR links, FR link 1 through 3, connect the three DAS Server Shelves to the FR Network. The links connect to the DAS Server Shell through the individual serial ports (RS-422).

Note   These RS-422 ports also carry "raw frame relay" traffic (to/from ISDN PRIs) as well as the IP-over-FR traffic (to/from StrataView Plus Workstation). You should allow bandwidth of 128 kbps for the IP traffic on these links.

All connections on the FR links which constitute the virtual IP subnet are implemented using Frame Relay PVCs. These PVCs are set up through the Cisco wide-area switch's command line interface (or the StrataView Plus Connection Manager). The PVC topology should thus be reconciled with the existing PVCs on the FR network.

PVC and DLCI Assignment

Each DAS Server Shelf needs to communicate only with the StrataView Plus Workstation. The DAS Server Shelves do not need connections between one another. Therefore, you need to configure only a single PVC from/to each DAS Server Shelf. In other words, each DAS Server Shelf needs a single PVC for connecting to the IP/FR subnet. Thus, a single DLCI must be reserved for the serial port (on the DAS Server Shelf) and the corresponding interface on the Cisco wide-area switch. We recommend a common DLCI be chosen for all DAS Server Shelves. In this example, the common DLCI is 12.

It is more complicated at the StrataView Plus Workstation and router- end of the frame relay network. The StrataView Plus Workstation needs to know the IP address of each DAS Server Shelf at their FR interface. It has no knowledge of DLCI assignments, however. This routing of the IP traffic over the appropriate FR PVC to/from the correct DAS Server Shelf is implemented by the router. Thus there are three PVCs over the FR link between the router and the FR network.

The frame relay network and the router must be configured in a complimentary manner. The link between the frame relay network and the Cisco router must be configured to pass many different DLCIs, one for each of the remote DAS Server Shelves (i.e., INS Stations). The router controls mapping between IP addresses and DLCIs (i.e., FR PVCs). The frame relay network controls routing between the router and DAS Server Shelf PVCs, using the appropriate DLCIs. Table 6-1 illustrates this mapping.

Table 6-1   Frame Relay Network Routing Map

Source System	Destination System	Destination IP Address	FR Link Used	PVC /DLCI Used
DAS Server Shelf 1	Router	205.9.8.1	1	12
DAS Server Shelf 2	Router	205.9.8.1	2	12
DAS Server Shelf 3	Router	205.9.8.1	3	12
Router	DAS Server Shelf 1	205.9.8.2	0	15
Router	DAS Server Shelf 2	205.9.8.3	0	16
Router	DAS Server Shelf 3	205.9.8.4	0	17

Configure the IP Subnet

The IP sub-network, along with the relevant IP addresses, is shown in Figure 6-7. Note that all the IP addresses on the frame relay network are on one class C IP network (205.9.8). Each DAS Server Shelf has to know the address of the StrataView Plus Workstation, while only the StrataView Plus Workstation and the router have to know the addresses of all the DAS Server Shelves.

DAS Server Shelf Serial/Frame-Relay Port Configuration

The following files should be checked or modified during the Serial/Frame Relay Port configuration:

- Frame Relay General Configuration File (*fr.cf*)

- Frame Relay Port Configuration File (*fr_config*)

- Frame Relay Address Mapping (*fr_conv*)

- Network Command File for Networks (*rc.inet*)

Note   In any of the file fragments shown here, the "#" character precedes comments on the same line.

Frame Relay General Configuration File (fr.cf)

The Frame Relay General Configuration File (*fr.cf*), found at */usr/net/fr/fr.cf*, is installed at the factory and does not need to be changed. The contents of the *fr.cf* file will appear similar to:

```
#
# ADAX Frame Relay daemon configuration file
#
mode          LAC             # TCP/IP compatibility mode:  ATT, SCO, LAC, or WOL
prom          YES
debug         0               # debug level:  0 (off), 1, 3, 5, 7, 9 (most output)
# End of fr.cf
```

Frame Relay Port Configuration File (fr_config)

The Frame Relay Port Configuration File (*fr_config*), found at */usr/net/fr/fr_config*, is also installed at the factory. The contents of fr_config will contain:

```
port 0
              HOST RS449 N393 0 INARP NO
port 8
              PID 0xCC
port 9
              PID 0xDD TRANS
# End of fr_config
```

The factory sets the following necessary parameters:

- "N393 0" turns off LMI signaling. (You could also turn on LMI by changing "N393 0" to "N393 4". It must match the FRP's or FRM's parameters on the IGX or IPX switch, however.)

- "INARP NO" turns off inverse address resolution.

- "TRANS" parameter for port 9 means include FR header when passing frames to the upper level application.

Frame Relay Mapping (fr_conv)

This Frame Relay Address Mapping file (*fr_conv*), found at */usr/net/fr/fr_conv*, must contain the IP address to DLCI mapping for any IP networks accessible across frame relay. In our example, the router's serial port address is specified since it acts as a gateway to the remote StrataView Plus Workstation's ethernet segment. (The rc.inet file will have the route command to map StrataView Plus Workstation network addresses through this gateway.) The DAS Server Shelf serial port needs to know what DLCI to use to access that gateway.

For our example, the fr_conv file on each DAS Server Shelf must be edited to include the IP address to DLCI, shown here as 205.9.8.1 ...., for the router:

```
#
# ADAX Frame Relay IP address to DLCI (0, . . . , 1023) to port mapping
#
# IP Address Frame Relay DLCI Port
205.9.8.1      12            0               # Router's Serial 0 (SV+ gateway)
#
# Raw Frame Relay port
-      35     0      35     9                # PRI using DLCI 35
# End of fr_conv
```

Network Command File (rc.inet)

This Network Command file (*rc.inet*), found at */usr/net/fr/rc.inet*, contains the appropriate network commands to enable routing across the DAS Server Shelf's IP Frame Relay network. This shell script is executed at boot time from /etc/rc2.d/S72fr (installed by the factory).

For our example, the rc.inet file on each DAS Server Shelf must be modified to include nms-net gateway information:

```
ifconfig frmux0 frhost plumb -arp
ifconfig frmux0 frhost up
#
# frnet is defined in /etc/networks
# frhost is defined in /etc/inet/hosts
route add net frnet frhost 0
#
# Use cisco (router) serial port as gateway
# nms-net is defined in /etc/networks
# nms-net-gateway is defined in /etc/inet/hosts
route add net nms-net nms-net-gateway 1
#
/usr/net/fr/set_addr -h `nawk '/frhost/ { print \$1 } ' /etc/hosts` -port 0
# End of rc.inet
```

Note   There must be only one "frhost" present in */etc/inet/hosts* for the "set_addr" line to work.

DAS Network Configuration

For our example, there are two other DAS Server Shelf (INS) network configuration parameters that must be considered:

- Specifying the frame relay network number in */etc/networks.*

- Specifying the router gateway address and the StrataView Plus address in */etc/inet/hosts*.

To specify the frame relay network number, you would edit */etc/networks* for each DAS Server Shelf to include *frnet* and *nms-net* as follows:

```
#
# The loopback network is used only for intra-machine communication
#
loopback        127
#
# Internet networks
#
arpanet         10              arpa    # Historical
frnet           205.9.8                 # Frame relay IP INS/NMS network
nms-net         200.1.2                 # NMS network
# End of networks
```

To specify the router gateway address and the StrataView Plus address in */etc/inet/hosts,* you must include the "frhost" alias for the frame relay interface on the DAS Server Shelf. (This must be done for all three DAS Server Shelves in our example. The sample of the *hosts* file is for DAS Server Shelf 1, which is ins1.)This tag is used by the frame relay start up software to find this IP address. Be sure to update the correct IP addresses for the:

1 Local machine (DAS Server Shelf 1, 2, etc.)

2 Frame relay network IP address for the local machine (fr-ins1)

3 Network management system (nms)

4 Router gateway (nms-net-gateway)

For our example, for DAS Server Shelf 1, you would edit the contents of */etc/inet/hosts* file to include the IP addresses of fr-ins1, nms, and nms-net-gateway, as follows:

```
#
# Internet host table
#
127.0.0.1     localhost
#
192.250.252.4 ins1              loghost     # INS1 (DAS 1 local Ethernet port)
                                            # (not shown in Figure 6-7)
205.9.8.2     fr-ins1           frhost      # INS1 (DAS 1Frame-Relay port)
200.1.2.3     nms                           # NMS
205.9.8.1     nms-net-gateway               # Router Serial 0
# End of hosts
```

Configure the StrataView Plus Network and Hosts Files

The StrataView Plus Workstation needs to know how to route packets to the DAS Server Shelves across the frame relay IP network. The files to be configured on the StrataView Plus Workstation are */etc/networks*, */etc/inet/hosts*, and a new startup file must be created to hold the route command (/etc/rc2.d/S72insroute.)

For our example, you would edit */etc/networks* to include the *ins-net* as follows:

```
#
# The loopback network is used only for intra-machine communication
#
loopback     127
#
# Internet networks
#
arpanet      10         arpa          # Historical
ins-net       205.9.8                 # INS (DAS Server Shelf) Frame Relay Network
# End of networks
```

Next, you edit /etc/inet/hosts on the StrataView Plus Workstation to update the correct IP addresses for:

1 Local machine (the StrataView Plus Workstation is called nms)

2 Router gateway (ins-net-gateway)

3 All DAS Server Shelves (called ins1, ins2, and ins3)

```
#
# Internet host table
#
127.0.0.1     localhost
#
200.1.2.3     nms     loghost        # NMS
205.9.8.2     ins1                   # DAS Server Shelf 1
205.9.8.3     ins2                   # DAS Server Shelf 2
205.9.8.4     ins3                   # DAS Server Shelf 3
200.1.2.1     ins-net-gateway        # Router's Ethernet 0
# End of hosts
```

Finally, have your system administrator establish a static route through the router gateway to all hosts on the DAS Server Shelf (INS) network. This is done by creating a new file */etc/rc2.d/S72insroute*. This file should be owned by root, group sys, permissions 0744.

For our example, the */etc/rc2.d/S72insroute* file would appear as:

```
#
# Add a static route for the INS frame relay network accessible on the
# other side of the local Cisco router.
#
echo "Setting default interface for INS network: \c"
/usr/sbin/route add net ins-net ins-net-gateway 1
# End of S72insroute
```

Configure the Router

The router in our example is assumed to be a Cisco 2500 series. This product has one ethernet port and two high speed serial ports, only one of which is used in this example. One serial port is configured to support frame relay with IETF encapsulation. The ethernet port and the serial port are configured as a bi-directional gateway between the StrataView Plus Workstation ethernet segment and the DAS/NMS frame relay IP network. After all Cisco configuration information is entered, be sure to save the configuration with the appropriate command.

Ethernet 0 Port Configuration

The router's ethernet port need only have an IP address assigned. For our example, this IP address is 200.1.2.1. The configuration commands for a Cisco 2500 series router, after entering the "enable" password, are:

```
configure terminal
interface ethernet 0
ip address 200.1.2.1 255.255.255.0
```

Serial 0 Port Configuration

The serial port needs an IP address assigned, and must be configured for frame relay IETF protocol encapsulation. The Cisco 2500 series router commands are:

```
configure terminal
interface serial 0
ip address 205.9.8.1 255.255.255.0
encapsulation frame-relay ietf
^Z
```

Frame Relay Mapping Configuration

The router also needs to know the DLCI to use for each IP address to be accessed over the frame relay IP network. The system administrator must determine DLCI assignments for each frame relay link and enter appropriate map commands on the router. The configuration commands for our example 3 DAS Server Shelf network with a Cisco 2500 series router, assuming DLCI usage as detailed previously in the DLCI Assignment section, would be:

```
configure terminal
interface serial 0
frame-relay map ip  205.9.8.2  15
frame-relay map ip  205.9.8.3  16
frame-relay map ip  205.9.8.4  17
^Z
```

Ping the DAS Server Shelf

After you have connected and configured the DAS Server Shelf(s), you should log in (or have someone log in) to the StrataView Plus Workstation and Ping the DAS Server Shelf to ensure that they are communicating. If they are not communicating, Appendix C, Troubleshooting, contains troubleshooting information.

Connecting a Modem

Cisco recommends that a modem be attached to the DAS Server Shelf to allow Product Support to dial in and provide remote support.

Appendix B, Dial-In Support, provides the information about connecting a modem to the DAS Server Shelf.

Loading DAS Daemon Software on the StrataView Plus Workstation

The DAS Daemon software must be loaded on the StrataView Plus Workstation as part of the Dial Access Switching system (DAS Server Shelf and Dial-Up Frame Relay application) installation. This must be performed at the StrataView Plus Workstation and can be performed before or after the DAS Server Shelf is installed at the Cisco wide-area switch.

Note   The DAS Server Shelf comes with its DAS software preinstalled. The appendix, Upgrading DAS Server Shelf Software, contains procedures for reloading DAS Server Shelf software when Cisco provides a software upgrade.

Installing DAS Daemon Software

The following are prerequisites for installing the DAS Daemon software on the StrataView Plus Workstation:

- StrataView Plus Workstation with Software Version 8.1 (or Version 8.4) already installed and running

- Tape 3, DAS (INS) DIAL-UP FR DAEMON, Release 1.4

Note   The tape containing the DAS Daemon software contains two DAS (INS) Daemon binary files: one for StrataView Plus 8.1, the other for StrataView Plus 8.4. The Release Note for DAS 1.4 describes how to extract the appropriate DAS (INS) Daemon file.

Caution   If the DAS daemon has already been installed on your StrataView Plus Workstation, this procedure should not be performed or you could destroy your existing DAS Dial-Up Frame Relay database.

To install the DAS Daemon software on the StrataView Plus Workstation, follow these steps:

Step 1   Stop StrataView Plus core processes by selecting option 2 of the StrataView Plus menu.

Step 2   Login as user "root" on the StrataView Plus Workstation by entering the following:

```
su <return>

password:  <superuser password> <RETURN>
```

Step 3   Insert the DAS (INS) Tape 3 Release 1.4 in the tape drive and slide the latch to the right.

Step 4   On the StrataView Plus Workstation, change directory (cd) to the /usr/users/svplus.

Step 5   Extract the DAS (INS) Daemon files with the command:

```
 tar -xvfp /dev/rst0
```

This will load a single file daemon.tar in the directory /usr/users/svplus.

Step 6   From the svplus directory untar the file:

```
tar -xvfp daemon.tar
```

This will load the DAS (INS) Daemon software files into the /usr/users/svplus hierarchy.

Step 7   Edit /usr/users/svplus/config/watchdog.conf to add the following line at the bottom of the file (unless it already exists):

```
insd on  .  insd
```

Note   This command line (insd on . insd) can take two arguments: -p and -x. The -p argument configures the DAS (INS) Daemon software to run with the multi-service feature of the DAS 1.4 server which increases the dial-up performance. The -x argument allows the AXIS shelf of the BPX Service Node to be used as a local end point. These arguments are described in the README text file which accompanies the DAS (INS) Daemon tar file. The -p or -x arguments should not be used, however, without the direction of Customer Support.

Step 8   Log out from the root account and back into the svplus user account.

Step 9   Execute the following commands:

```
% rehash
```

```
% createInsDb
```

If the DAS (INS) Daemon software has been correctly installed on the StrataView Plus Workstation, the StrataView Plus main menu will show the INS ANI Configuration option. This appears as item 9 in StrataView Plus 8.1 as shown in Figure 7-1 and as item 8 in StrataView Plus 8.4 as shown in Figure 7-2.

Figure 7-1   StrataView Plus 8.1 Main Menu

```
Welcome to StrataView Plus 8.1.18 Patch5 (SUNOS)(Mon Aug 25 17:52:01 PDT 1997)
    StrataView Plus is being run from the workstation, "cypress".

     MAIN MENU
     ---------
    1) Start Core
    2) Stop Core
    3) Start Desktop
    4) Dump db data
    5) Start SNMP Agent
    6) Current db name
    7) Bulk Statistics
    8) Start Stats Mgr GUI
    9) INS ANI Configuration

    enter number or x to exit:
```

Figure 7-2   **StrataView Plus 8.4 Main Menu**

```
    Welcome to StrataView Plus 8.4.07 (Sun Sep 7 11:08:45 PDT 1997)
StrataView Plus is being run from the workstation, "almond".

    MAIN MENU
    ---------
  1) Start Core
  2) Stop Core
  3) Start Desktop
  4) Dump db data
  5) Start SNMP Agent
  6) Current db name
  7) Start Stats Mgr GUI
  8) INS ANI Configuration


    enter number or x to exit:
```

Start the StrataView Plus processes by selecting option 1 of the StrataView Plus main menu.

Note   Note that INS is an early name for DAS.

Configuring the Dial-Up Frame Relay Application

This chapter provides an overview of DAS Dial-Up Frame Relay Configuration, using the DAS Server Shelf Command Line Interface (INS_CLI), and StrataView Plus Map Object, Automatic Number Identification, and Connection Management tools.

These configuration procedures can be performed only after:

- DAS (INS) Daemon software has been installed on the StrataView Plus Workstation.

- DAS Server Shelf has been rack-mounted and connected to a Cisco wide-area switch.

- There is connectivity between the StrataView Plus Workstation and the DAS Server Shelf. (You should be able to Ping the DAS Server Shelf from the StrataView Plus Workstation.)

All of these preliminary steps have been described in previous chapters.

Configuring the Application

This is essentially a continuation of the process that began with the installation of the DAS Server Shelf and is performed primarily with StrataView Plus at the StrataView Plus Workstation. The configuration can be divided into five general steps:

Step 1 Set up an INS (DAS Server Shelf) object on the network topology map. You use HP OpenView topology map tools at StrataView Plus Workstation, as described in the chapter, Creating a DAS Topology Object with HP OpenView.

Note The DAS processes on the DAS Server Shelf must be turned off when you create the DAS (INS) object.

Step 2 Set parameters for the DAS Server Shelf by using the Command Line Interface (INS CLI) described in the chapter, Understanding the DAS Command Line Interface.

Step 3 Configure the parameters associated with the ISDN ANI. These parameters will apply to the frame-relay PVC for that specific ANI, and are similar to standard Frame Relay Port parameters. The INS ANI Configuration menu is accessed through the StrataView Plus Main Menu. This process is described in the chapter, Configuring Automatic Number Identifiers.

Step 4 Configure Dial-Up connections, using the StrataView Plus Connection Manager. This process is described in the chapter, Configuring Dial-Up Connections.

Step 5 Configure Dial-Backup connections, using the StrataView Plus Connection Manager.

Note This includes "associating" a "normal" mode frame-relay connection with a Dial-Backup connection. This process is described in the chapter, Configuring Dial-Backup Connections.

Configuring Dial-Up and Dial-Backup connections are similar to adding connections (**addcon**) in a standard Cisco wide-area frame-relay network; however, they must be configured with the StrataView Plus Connection Manager in the Dial-Up mode.

The following chapter, Dial-Up Frame Relay Operation, provides a quick reference and a summary of many of the procedures used to configure the Dial-Up Frame Relay application.

Creating a DAS Topology Object with HP OpenView

This chapter provides procedures for using the HP OpenView tools on the StrataView Plus Workstation to place INS objects on your topology map. For DAS 1.4 operating with StrataView Plus Release 8.4, you have to add both a DAS Server Shelf (INS) object and a DAS Daemon (INSD) object. Previous releases of DAS only required the INS object. This chapter includes the following sections:

- Set Up a DAS Server Shelf Object

- Set Up a DAS Daemon Object

- Removing the INS (DAS) Objects From the Topology Map

Set Up a DAS Server Shelf Object

After you determine that StrataView Plus and the DAS Server Shelf are ready for operation (as a result of PING), you need to install a network map icon at StrataView Plus which represents the DAS Server Shelf. This process requires access to the HP OpenView network topology main menu.

To add a DAS Server Shelf object (INS icon), follow these steps:

Step 1 At the DAS Server Shelf, turn off the INS processes. Log in, and at the /opt/ins/admin directory, run:

```
INS_STOP
```

Note The DAS Server Shelf processes must not be running when the DAS Server Shelf icon is created to properly initialize the INS Daemon software with the StrataView Plus and with the DAS Server Shelf processes.

Step 2 At the StrataView Plus Workstation open an HP OpenView window (at the UNIX prompt, change to the OV directory, then enter `Ovw`).

Step 3 Double-click your network icon to open a Network Topology window and map, shown in Figure 9-1. (The example Network Topology window--and other examples in this section-- is from StrataView Plus 8.1; the window may appear slightly different in StrataView Plus 8.4.)

Step 4 Select the Edit - Add Object... menu. The Add Object: Palette window, shown in Figure 9-1, appears.

Figure 9-1   HP OpenView Network Topology and Add Object Palette
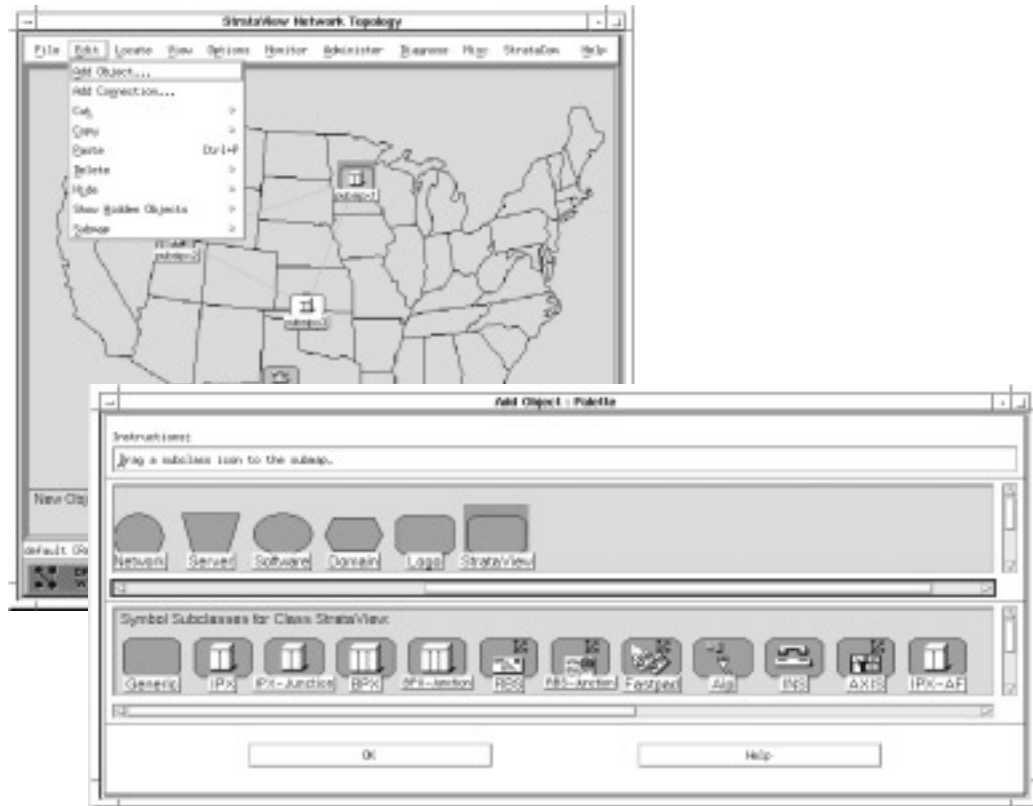
Step 5 Drag and drop the INS symbol from the Palette to the map. The Add Object window, shown in Figure 9-2, appears.

Step 6 In the Add Object window, you name the INS (DAS Server Shelf) object and call up another window to set its object attributes by identifying the Cisco wide-area switch to which it is attached. To name the INS object:

- Click in the `Label:` box and enter the host name of the INS (DAS Server Shelf). (This name will be displayed with the symbol on the map if you select Yes at the `Display Label` field.)

- Select one of the Display Label: radio buttons:

  Set to *Yes* to display the name of the symbol.

  Set to *No* if you do not want to see an object label on the map.

- Select one of the Behavior: radio buttons:

  Selecting Explode causes the submap to display when the symbol is double-clicked.

  Selecting Execute permits the symbol to execute an application which performs an action on a set of objects when it is double-clicked.

Figure 9-2   Add Object Window
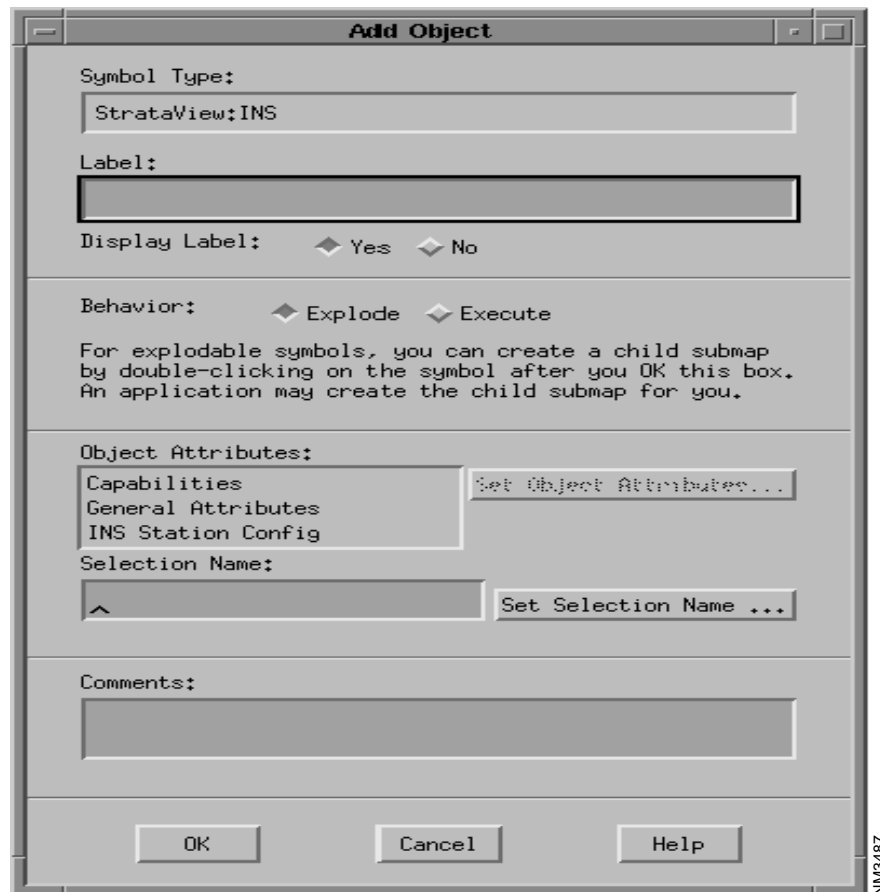
Note   HP OpenView on-line help explains the difference between explodable and executable symbols.

Step 7   Next Select INS Station Config in the Object Attributes: box. This will activate the Set Object Attributes... button.

Step 8   Click the Set Object Attributes... to present the Add Object - Set Attributes window for INS Station Config, shown in Figure 9-3. The host name of the INS (DAS Server Shelf) that you entered in the previous window will appear in the INS Station Name box.

Figure 9-3   Add Object - Set Attributes Window
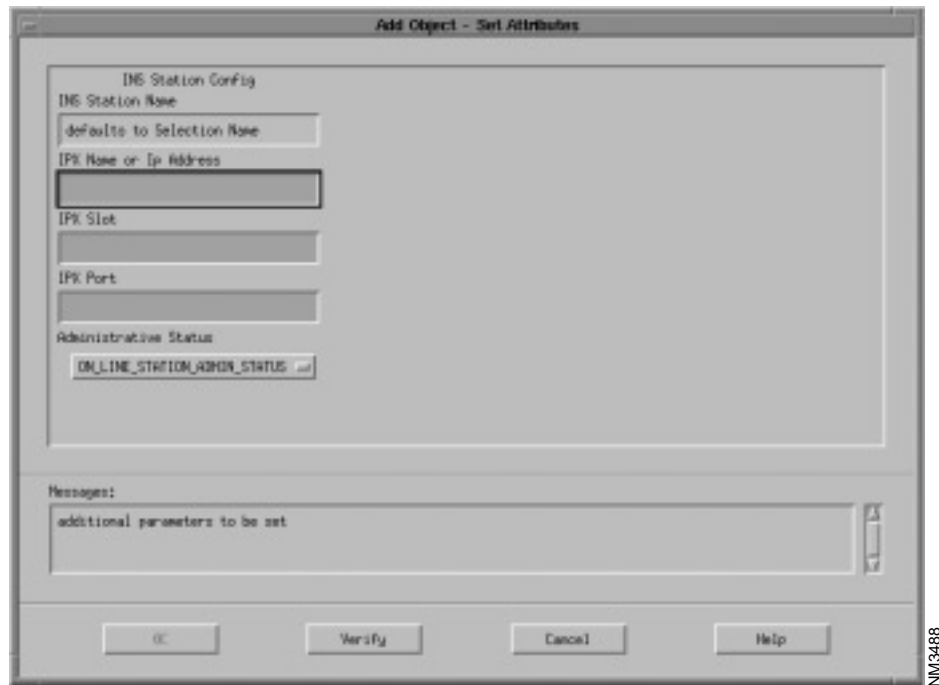
Step 9   In the next three boxes, you enter information about the Cisco wide-area switch to which the INS (DAS Server Shelf) is attached:

- In the IPX Name or IP Address box, enter the node name of the Cisco wide-area switch to which the INS (i.e., DAS Server Shelf) is attached.

- In the IPX Slot box, enter the slot number to which the INS (DAS Server Shelf) is attached.

- In the IPX Port box, enter the port number to which the INS (DAS Server Shelf) is attached.

Note   Although these boxes are labeled with IPX, they refer to any Cisco wide-area switch to which the DAS Server Shelf attaches.

Step 10 Select the ON.LINE.STATION.ADMIN.STATUS button to indicate the Admin Status (ON-LINE , powered up; or OFF-LINE, not powered up).

Step 11 If you have entered your information correctly, press the `Verify` button. The OK button will activate.

Step 12 Press the OK button, you will return to the Add Object window. Press the OK button on the Add Object window and you will return to the HP OpenView network topology map.

Step 13 At the DAS Server Shelf, log in to /opt/ins/admin and restart the DAS processes:

INS_START

Set Up a DAS Daemon Object

With operating with StrataView Plus Release 8.4, you also have to add a DAS Daemon (INSD) to the HP OpenView topology map. StrataView Plus 8.4's Add Object: Palette also contains a icon for the INSD (DAS daemon) as shown in Figure 9-4.

Figure 9-4   INSD (DAS Daemon) Icon
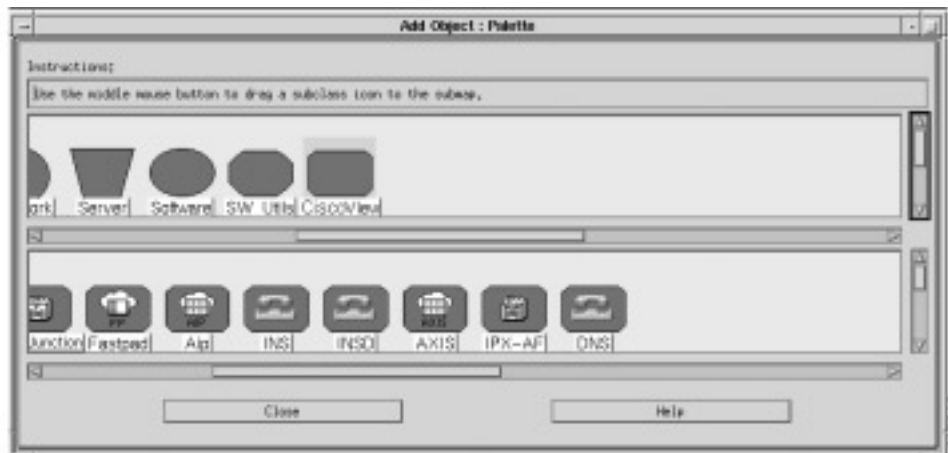
The procedure for adding the INSD icon is nearly identical to that for adding an INS (DAS) object to the topology map as described in the previous section, Set Up a DAS Server Shelf Object.

Since the DAS Daemon software runs on the StrataView Plus Workstation, when adding the INSD icon, you must remember the following information:

- On the Add Object menu, be sure to give the INSD the Selection Name / Label of the StrataView Plus on which the INSD is running.

Removing the INS (DAS) Objects From the Topology Map

You must use the StrataCom pull down menu to remove an INS icons from a network topology map. Using any of the other HP OpenView tools, such as Edit--Delete, will cause an error.

To remove the INS icon from you network topology map, follow these steps:

Step 1   With your network topology map displayed, select the INS icon on the map.

Step 2   Pull down the StrataCom menu from the top menu bar.

Step 3   Select Remove INS Station from the StrataCom pull down menu.

Understanding the DAS Command Line Interface

This chapter provides a description of Dial-Up Frame Relay Command Line Interface (CLI), also known as the INS_CLI. It includes the following sections:

- Accessing the Dial-Up Frame Relay CLI

    1. List Active PRIs

    2. Display CDR Configuration

    3. List Configured PRIs

    4. List Configured INS Daemon

    5. Display Current INS Daemon

    6. Display INS Status

    7. Display Call Processor Stats

    8. Display Layer 3 Statistics (Stats)

    9. Display Layer 2 Statistics (Stats)

    10. Modify CDR Configuration

    11. Configure a PRI

    12. Delete a PRI Configuration

    13. Configure an INS (DAS) Daemon

    14. Delete an INS (DAS) Daemon

    15. Set INS Admin Status

    16. Quit Command Line

This Command Line Interface is used to view and configure the PRIs providing ISDN signalling information to the DAS Server Shelf and the DAS (INS) Daemon software running on the StrataView Plus Workstation. (Note that INS was an early name for DAS.) In other words, the Dial-Up Frame Relay Command Line Interface provides a way to link the PRIs terminated on the Cisco wide-area switch to the INS Daemon software on the StrataView Plus Workstation. This CLI also provides status information about the DAS Server Shelf and statistics for the ISDN Q.931 (layer 3) and Q.921 (layer 2) messages and frames passed between the DAS Server Shelf and the PRI.

The Dial-Up Frame Relay CLI, which is not integrated with StrataView Plus, can be accessed through a remote connection (i.e., a telnet session) or through a terminal directly connected to the DAS Server Shelf.

Accessing the Dial-Up Frame Relay CLI

To access the DAS command line interface:

1 Log in to the DAS Server Shelf through either a telnet session or from a terminal directly connected to the DAS Server Shelf. (Chapter 6 provides instructions for connecting a terminal. You can also telnet from StrataView Plus Workstation.)

2 Log in as `root` and enter the password (if applicable) that you normally use in your UNIX environment. Set path for `root/opt/ins/admin`:

cd /opt/ins/admin

3 If the INS processes are not running, start them:

INS_START

4 Type INS_CLI at the prompt. The Dial-Up Frame Relay Command Line Interface main menu appears, as shown in the following example.

```
 DAS (INS) CLI Main Example Menu
********************************************************************************
*  cedar                                                                      *
*                                                                             *
*              DIAL-UP FRAME RELAY COMMAND LINE INTERFACE                      *
*              Rel. 1.4 (Fri Aug 22 15:12:34 PDT 1997).                        *
*                                                                             *
*                                                                             *
*     1   List Active PRIs.              10   Modify CDR Configuration.        *
*     2   Display CDR Configuration.     11   Configure a PRI.                 *
*     3   List Configured PRIs.          12   Delete a PRI Configuration.      *
*     4   List Configured INS Daemons.   13   Configure an INS Daemon.         *
*     5   Display Current INS Daemon.    14   Delete an INS Daemon Config.     *
*     6   Display INS Status.            15   Set INS Admin Status.            *
*     7   Display Call Processor Stats.  16   Quit Command Line.               *
*     8   Display Layer 3 Stats.                                              *
*     9   Display Layer 2 Stats.                                              *
*                                                                             *
*  Enter number of the command and hit return:                                *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
?********************************************************************************?
```

As shown in the example, the Dial-Up Frame Relay Command Line Interface main menu presents 16 options. Each option is indexed by a number. You select one of the options by typing its number and pressing Enter. For instance, to display the list of active PRIs, you would type 1 and press Enter. (Throughout the rest of this book, the Dial-Up Frame Relay Command Line Interface main menu will be referred to as the INS CLI main menu.)

Options 1 through 9 select read-only Command Response screens and displays. Options 10 through 15 select configuration screens and menus. Option 16 quits The INS CLI main menu and returns you to the DAS Server Shelf's UNIX prompt.

When you display read-only screens, the following information lines appear on some screens:

- **Hit any key to continue** informs you that pressing any key will return you to the INS CLI main menu.

- **—More—** informs you there are other read-only displays that are part of this option. For instance, **—More—** on the List Configured PRIs Command Response screen indicates that there are further PRIs configured. Pressing any key will display the next PRI in the list. At the end of the list, the **Hit any key to continue** message will appear.

When you display the Configuration screens, the following information line appears:

Enter 'c' to Commit Changes or 'q' to Quit

When using these screens to configure an option, type in the value and press Enter to move the cursor to the next field, the square brackets. When you reach the final field, make sure you have entered the desired values in each field, then type c and press Enter to save your changes. If you do not want to save the values you entered, type q and press Enter. You can re-access the configuration menu from the INS CLI main menu.

Some configuration screens will have additional information fields describing a field's parameters.

The rest of this chapter describes the read-only Command Response screens and configuration menus.

To reach any of these screens or menus, follow these steps:

Step 1 From the INS CLI main menu, enter the index number of desired option.

Step 2 Press Enter, the desired screen or menu will appear.

1. List Active PRIs

The List Active PRIs Command Response screen, in the following example, lists the current active PRIs.

```
List Active PRIs Example Screen
********************************************************************************
*  cedar                                                                       *
*                                                                              *
*    LIST ACTIVE PRIs COMMAND RESPONSE                                         *
*    ------------------------------------                                      *
*                                                                              *
*       Session #    Call Processor Name            DLCI #                     *
*                                                                              *
*       1               CallProc_100                   100                     *
*                                                                              *
*    Hit any key to continue                                                   *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
?*******************************************************************************?
```

This menu contains the following fields:

- Session #

- Call Processor Name—The Call Processor is a software process running on the DAS Server Shelf. There is a separate Call Processor Name for each unique validated DLCI.

- DLCI—This is the Data Link Connection Identifier (DLCI) identifying the frame relay PVC carrying the ISDN signalling information from a PRI terminated on the Cisco wide-area switch to the DAS Server Shelf. This is the DLCI for the DAS Server Shelf's end (i.e., V.35 port) of the PVC. Since the DLCIs are unique at this port, they can be used to identify PRIs. (Remember the DLCI for the PRI's end of the PVC is always 0.)

2. Display CDR Configuration

The Display CDR Configuration Command Response screen, shown in the example, lists the collection parameters that have been provided for Call Detail Records (CDRs). CDRs are the records of each Frame Relay Dial-Up or Dial-Backup call. A CDR contains the calling Automatic Number Identification (ANI), the called number, the start and stop times for the call, and the cause for the call being terminated.

```
Display CDR Configuration Command Response Screen
******************************************************************************
*  cedar                                                                     *
*                                                                            *
*     DISPLAY CDR CONFIGURATION COMMAND RESPONSE                             *
*     -----------------------------------                                    *
*                                                                            *
*     Cdr Interval  30.                                                      *
*                                                                            *
*     Cdr Backup Count  10.                                                  *
*                                                                            *
*     Hit any key to continue                                               *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
?******************************************************************************
```

The CDR configuration parameters are:

- CDR Interval—Number of minutes during which CDRs are stored in a one file on the DAS Server Shelf.

- CDR Backup Count—Number of call detail record files to backup at on the DAS Server Shelf.

CDR collection parameters are modified by using option 10 (Modify CDR Configuration) on the INS CLI main menu.

The following appendix, Call Detail Records, provides additional information about the format and content of CDRs.

3. List Configured PRIs

The List Configured PRIs Command Response screen, shown in the example, presents information about the PRI associated with a particular DLCI at the DAS Server Shelf.

```
List Configured PRIs Screen
********************************************************************************
*  cedar                                                                       *
*                                                                              *
*    LIST CONFIGURED PRIs COMMAND RESPONSE                                     *
*    ---------------------------------------                                   *
*                                                                              *
*    Switch Type:  ETSI                                                        *
*    Interface Type:  E1                                                       *
*    DLCI #:  100                                                              *
*                                                                              *
*    --More--                                                                  *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
?********************************************************************************?
```

For each configured PRI, this menu contains the following fields:

- Switch Type—Displays the type of ISDN switch configured for the PRI. The switch types supported by INS ISDN software variants are:

  — ATT 4ESS

  — ATT 5ESS

  — NT DMS100

  — NT DMS250

  — NTT

  — ETSI

  — AUSTEL

- Interface Type—Either E1 or T1, representing the facilities carrying the ISDN PRI to the Cisco wide-area switch.

- DLCI—This is the Data Link Connection Identifier (DLCI) identifying the frame relay PVC carrying the ISDN signalling information from a PRI terminated on the Cisco wide-area switch to the DAS Server Shelf. This is the DLCI for the DAS Server Shelf's end (i.e., V.35 port) of the PVC. Since the DLCIs are unique at this port, they can be used to identify PRIs. (Remember the DLCI for the PRI's end of the PVC is always 0.)

PRIs are configured with option 11 (Configure a PRI) of the INS CLI main menu.

4. List Configured INS Daemon

The List Configured INS Daemons Command Response screen, shown in the example, presents information about the INS Daemon software running on the StrataView Plus Workstation.

```
List Configured INS Daemon Example Screen
********************************************************************************
*  cedar                                                                       *
*                                                                              *
*    LIST CONFIGURED INS DAEMONS COMMAND RESPONSE                              *
*    -----------------------------------                                       *
*                                                                              *
*    IP Address:  192.168.200.100                                             *
*    Name:  cypress                                                            *
*    Preference:  1                                                            *
*    Administration Status:  UP                                                *
*                                                                              *
*    Hit any key to continue                                                   *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
?********************************************************************************?
```

This menu contains the following fields:

- IP Address—The IP Address of the StrataView Plus Workstation where the INS Daemon software is running.

- Name—Server name associated with the displayed IP Address.

- Preference—The preference of the INS Daemon software. Since there can be multiple StrataView Plus Workstations running in a WAN switching network and each can have its own INS Daemon software, this value indicates the preference for this INS Daemon to function as the INS server over the others. The displayed values can be 1 to 16, with 1 being the highest preference and 16 being the lowest preference.

- Administration Status—Indicates whether the INS Daemon software is on-line (UP) or off-line (DOWN). Administration Status is typically used to bring the INS Daemon off-line for testing or troubleshooting. When the testing is done, the INS Daemon software can returned to the UP Administration Status.

The INS Daemon software is configured with option 13 of the INS CLI main menu.

5. Display Current INS Daemon

The Display Current INS Daemon Command Response screen, shown in the example, displays the IP Address of the StrataView Plus Workstation running the currently connected INS Daemon software.

```
Display Current INS Daemon Example Screen
****************************************************************************
*  cedar                                                                  *
*                                                                         *
*    DISPLAY CURRENT INS DAEMON COMMAND RESPONSE                          *
*    ------------------------------------                                 *
*                                                                         *
*    INS Daemon  IP Address  192.168.200.100 .                           *
*    Connection Status  CONNECTED.                                        *
*                                                                         *
*    Hit any key to continue                                             *
*                                                                         *
*                                                                         *
*                                                                         *
*                                                                         *
*                                                                         *
*                                                                         *
*                                                                         *
*                                                                         *
*                                                                         *
*                                                                         *
*                                                                         *
?****************************************************************************?
```

6. Display INS Status

The Display INS Status Command Response screen, shown in the example, presents the Administration and Operational statuses of the DAS Sever Shelf.

```
Display INS Status Example Screen
*******************************************************************************
*  cedar                                                                      *
*                                                                             *
*    DISPLAY INS STATUS COMMAND RESPONSE                                      *
*    -------------------------------                                          *
*                                                                             *
*    INS Administration Status is   ON-LINE.                                  *
*                                                                             *
*    INS Operational Status is   ON-LINE.                                     *
*                                                                             *
*    Hit any key to continue                                                  *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
?*******************************************************************************?
```

This menu includes the following fields:

- INS Administration Status can be:

  — ON-LINE—INS is powered up

  — OFF-LINE—INS is not powered up

- INS Operational Status can be:

  — ON-LINE—INS is operational

  — OFF-LINE—INS is not operational

7. Display Call Processor Stats

This option displays call processor statistics. When you select option 7, the following screen appears:

```
Display Call Processor Stats Example Screen
*******************************************************************************
*  cedar                                                                     *
*                                                                            *
*    LIST CALL PROCESSORS STATISTICS COMMAND                                 *
*    ------------------------------------------------                        *
*                                                                            *
*    DLCI # of the Configured PRI                      [        ]            *
*                                                                            *
*    Enter 'c' to Commit Changes OR 'q' to Quit        [        ]            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
?*******************************************************************************?
```

Enter the DLCI of a configured PRI for which you want to see activity information. When you enter 'c' to commit, a screen similar to the following will display information about the call processing for that PRI . The Number of Call_In_Progress indicates the number of parallel calls that the Dial-Up Frame Relay application will process. Its default is 1.

```
Call Processor Statistics Information Example Screen
*******************************************************************************
*  cedar                                                                     *
*                                                                            *
*    LIST CALL PROCESSORS STATISTICS COMMAND RESPONSE                        *
*    ------------------------------------------------                        *
*                                                                            *
*    Number of Call_In_Progress  =  1                                        *
*    Active Calls  =  1                                                      *
*    Total Calls  =  2                                                       *
*                                                                            *
*                                                                            *
*    End of Statistics.                                                      *
*                                                                            *
*    Hit any key to continue                                                 *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
?*******************************************************************************?
```

8. Display Layer 3 Statistics (Stats)

The Display Layer 3 Stats option calls up the Display Layer 3 Statistics Menu, shown in the example. With this screen, you specify the DLCI of the configured PRI whose Layer 3 Statistics you want. It has a Clear Stats After [y/n] option. Selecting y (yes) for this option will clear these layer 3 statistic counters after you have viewed them.

```
Display Layer 8 Statistics Menu
********************************************************************************
*  cedar                                                                      *
*                                                                             *
*    LIST LAYER 3 STATISTICS COMMAND                                          *
*    -----------------------------------------------                          *
*                                                                             *
*    DLCI # of the Configured PRI                      [100     ]             *
*                                                                             *
*    Clear Stats After [y/n]                           [n       ]             *
*                                                                             *
*    Enter 'c' to Commit Changes OR 'q' to Quit        [        ]             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
?*******************************************************************************?
```

After you have specified the PRI's DLCI, and the Clear Stats After option, type c in the Commit Changes field to display the The List Layer 3 Statistics Command Response screen shown in the following example. Depending on the size of your X-window, this screen may not display all the available statistics at once. Press Enter to see the continuation of the screen.

```
List Layer 3 Statistics Command Response Screen
********************************************************************************
*  cedar                                                                      *
*                                                                             *
*    LIST LAYER 3 STATISTICS COMMAND RESPONSE                                 *
*    -----------------------------------------------                          *
*                                                                             *
*    Alerting Msgs Txd  =  2              Disconnect Msgs Txd  =  0           *
*    Call Proc Msgs Txd  =  2             Release Msgs Txd  =  1              *
*    Connect Msgs Txd  =  2               Release Complete Msgs Txd  =  0     *
*    Connect Ack Msgs Txd  =  0           Restart Msgs Txd  =  0              *
*    Progress Msgs Txd  =  0              Restart Ack Msgs Txd  =  0          *
*    Setup Msgs Txd  =  0                 Segment Msgs Txd  =  0              *
*    Setup Ack Msgs Txd  =  0             Cong Control Msgs Txd  =  0         *
*    Resume Msgs Txd  =  0                Information Msgs Txd  =  0          *
*    Resume Ack Msgs Txd  =  0            Notify Msgs Txd  =  0               *
*    Resume Reject Msgs Txd  =  0         Status Msgs Txd  =  0               *
*    Suspend Msgs Txd  =  0               Status Enquiry Msgs Txd  =  0       *
*    Suspend Ack Msgs Txd  =  0           Facility Msgs Txd  =  0             *
*    Suspend Reject Msgs Txd  =  0        Facility Ack Msgs Txd  =  0         *
*    User Info Msgs Txd  =  0             Facility Reject Msgs Txd  =  0      *
*    Hold Msgs Txd  =  0                  Register Msgs Txd  =  0             *
*    Hold Ack Msgs Txd  =  0              Alerting Msgs Rxd  =  0             *
*    Hold Reject Msgs Txd  =  0           Call Proc Msgs Rxd  =  0            *
?****Retrieve Msgs Txd  =  0***************Connect Msgs Rxd  =  0***************?
```

```
List Layer 3 Statistics Command Response Screen Continued
*****************************************************************************
*   cedar                                                                   *
*                                                                           *
*     LIST LAYER 3 STATISTICS COMMAND RESPONSE                              *
*     ------------------------------------------------                      *
*                                                                           *
*     Setup Msgs Rxd  =  45                  Segment Msgs Rxd  =  0         *
*     Setup Ack Msgs Rxd  =  0               Cong Control Msgs Rxd  =  0    *
*     Resume Msgs Rxd  =  49                 Information Msgs Rxd  =  0      *
*     Resume Ack Msgs Rxd  =  0              notify Msgs Rxd  =  0          *
*     Resume Reject Msgs Rxd  =  0           Status Msgs Rxd  =  0          *
*     Suspend Msgs Rxd  =  0                 Status Enquiry Msgs Rxd  =  0  *
*     Suspend Ack Msgs Rxd  =  0             Facility Msgs Rxd  =  0        *
*     Suspend Reject Msgs Rxd  =  0          Facility Ack Msgs Rxd  =  0    *
*     user Info Msgs Rxd  =  0               Facility Reject Msgs Rxd  =  0 *
*     Hold Msgs Rxd  =  0                    Register Msgs Rxd  =  0        *
*     Hold Ack Msgs Rxd  =  0                Total Connects  =  0           *
*     Hold Reject Msgs Rxd  =  0             Total Disconnects  =  0        *
*     Retrieve Msgs Rxd  =  0                Average # Open Calls  =  0     *
*     Retrieve Ack Msgs Rxd  =  0
*     Retrieve Reject Msgs Rxd  =  0
*     Disconnect Msgs Rxd  =  0
*     Release Msgs Rxd  =  0
?****Release Complete Msgs Rxd  =  45
```

The List Layer 3 Statistics Command Response screen, shown in the example, displays counts of the various ISDN D-channel Layer 3 messages. These messages, which control the process of establishing, controlling, and terminating an ISDN call, are defined in the ISDN specification, Q.931, and recommendations I.450 and I.451.

Since there are both transmitted (Txd) and received (Rxd) messages listed, they can be useful for pointing to which end of the ISDN signalling channel is not responding.

9. Display Layer 2 Statistics (Stats)

The Display Layer 2 Stats option calls up the List Layer 2 Statistics Command Menu, shown in the example. With this screen, you specify the DLCI of the configured PRI whose Layer 2 Statistics you want. It has a Clear Stats After [y/n] option. Selecting y (yes) for this option will clear these layer 2 statistic counters after you have viewed them.

```
List Layer 2 Statistics Command Example Menu
********************************************************************************
*  cedar                                                                      *
*                                                                             *
*    LIST LAYER 2 STATISTICS COMMAND                                          *
*    ---------------------------------------------                            *
*                                                                             *
*    DLCI # of the Configured PRI                   [100    ]                 *
*                                                                             *
*    Clear Stats After [y/n]                        [n      ]                 *
*                                                                             *
*    Enter 'c' to Commit Changes OR 'q' to Quit     [       ]                 *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
?******************************************************************************?
```

After you have specified the PRI's DLCI and the Clear Stats After option, type c in the Commit Changes field to display the The List Layer 2 Statistics Command Response screen:

```
List Layer 2 Statistics Command Response Example Screen
*******************************************************************************
*  cedar                                                                      *
*                                                                             *
*    LIST LAYER 2 STATISTICS COMMAND RESPONSE                                 *
*    ----------------------------------------------                           *
*                                                                             *
*    I Frames Xtd  =  7                    XID Frames Rxd  =  0               *
*    RR Frames Xtd  =  9345                UI Frames Rxd  =  0                 *
*    RNR Frames Xtd  =  0                  Invalid Frames Rxd  =  0           *
*    RJ Frames Xtd  =  0                   Sabm Errors  =  0                  *
*    SABME Frames Xtd  =  0                Frame RJ Errors  =  0              *
*    DISC Frames Xtd  =  0                                                    *
*    UA Frames Xtd  =  4                                                      *
*    DM Frames Xtd  =  0                                                      *
*    Frame RJ Frames Xtd  =  0                                                *
*    XID Frames Xtd  =  0                                                     *
*    UI Frames Xtd  =  0                                                      *
*    I Frames Rxd  =  7                                                       *
*    RR Frames Rxd  =  9348                                                   *
*    RNR Frames Rxd  =  0                                                     *
*    RJ Frames Rxd  =  0                                                      *
*    SABME Frames Rxd  =  4                                                   *
*    DISC Frames Rxd  =  0                                                    *
?****UA Frames Rxd  =  0****************************************************?
```

The List Layer 2 Statistics Command Response screen, shown in the example, displays counts of various ISDN D-channel layer 2 protocol frames. This link-layer protocol, specified in ISDN specification Q.921, is Link Access Protocol D (LAP-D). LAP-D is used to convey user information, i.e., the layer 3 D-channel messages between layer 3 entities, between the DAS Server Shelf and the ISDN switch providing the PRI.

There are transmitted (Xtd) and received (Rxd) frames listed which can be useful for pointing out which side of the ISDN interface is having a problem.

10. Modify CDR Configuration

The Modify CDR Configuration Command menu, shown in the example, allows you to configure the collection parameters for Call Detail Records (CDRs). CDRs which are described in detail in the following appendix, Call Detail Records, are the records of each Frame Relay Dial-Up or Dial-Backup call. A CDR contains the calling Automatic Number Identification (ANI), the called number, the start and stop times for the call, and the cause for the call being terminated.

```
Modify CDR Configuration Menu Example
********************************************************************************
*  cedar                                                                       *
*                                                                              *
*     MODIFY CDR CONFIGURATION COMMAND                                         *
*     -------------------------------                                          *
*                                                                              *
*    CDR Interval                               [        ]                     *
*                                                                              *
*    # of backups allowed                       [        ]                     *
*                                                                              *
*    Enter 'c' to Commit Changes OR 'q' to Quit [        ]                     *
*                                                                              *
*    INFO: 30 to 1440 minutes. OPTIONAL                                        *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
?******************************************************************************?
```

The CDR configuration parameters are:

- CDR Interval—Number of minutes during which CDRs are stored in a one file on the DAS Server Shelf. To modify this parameter:

  — Type the number of minutes, within the range of 30 to 1440, during which CDRs are stored in one file. When the interval expires, this file is backed up and another interval file is opened. The default is 30 minutes.

- CDR Backup Count—Number of call detail record files to backup at on the DAS Server Shelf. To modify this parameter:

  — Type the number of CDR files within the range of 0 to 10, to back up at the DAS Server Shelf. The default is 10. If the CDR interval is 30 and the CDR backup count is 10, there will be ten 30-minute CDR files backed up on the DAS Server Shelf before it starts writing over files. (The INS Daemon on the StrataView Plus Workstation always reads and retrieves any new CDR files in the backup directory every 30 minutes.)

11. Configure a PRI

The Configure a PRI Command menu, shown in the following example, allows you to configure the following parameters for a specific PRI:

```
Configure a PRI Command Menu
*******************************************************************************
*  cedar                                                                      *
*                                                                             *
*     CONFIGURE A PRI COMMAND                                                 *
*     --------------------------------                                        *
*                                                                             *
*     DLCI #                                       [         ]                *
*     Select one of the Variiant Types listed below   [         ]            *
*          [1] ATT 4ESS.                                                      *
*          [2] ATT 5ESS.                                                      *
*          [3] NT DMS100.                                                     *
*          [4] NT DMS250.                                                     *
*          [5] NTT.                                                           *
*          [6] ETSI.                                                          *
*          [7] AUSTEL.                                                        *
*     Select one of the Interface Types listed below  [         ]            *
*          [1] T1.                                                            *
*          [2] E1.                                                            *
*                                                                             *
*     Enter 'c' to Commit Changes OR 'q' to Quit         [         ]         *
*                                                                             *
*     INFO: 0 to 1023. REQUIRED.                                              *
*                                                                             *
?*******************************************************************************?
```

This menu contains the following fields:

- DLCI—Enter the Data Link Connection Identifier (DLCI) identifying the frame relay PVC carrying the ISDN signalling information from a PRI terminated on the Cisco wide-area switch to the DAS Server Shelf. This must be the DLCI for the DAS Server Shelf's end (i.e., V.35 port) of the PVC. Since the DLCIs are unique at this port, they can be used to identify PRIs. (Remember the DLCI for the PRI's end of the PVC is always 0.) As shown by the information line at the bottom of the screen, DLCIs can range between 0 and 1023.

- Switch Type— Enter the index number (1 through 7) for the ISDN switch providing the PRI:

    — [1] ATT 4ESS

    — [2] ATT 5ESS

    — [3] NT DMS100

    — [4] NT DMS250

    — [5] NTT

    — [6] ETSI

    — [7] AUSTEL

(The Switch type depends on the service provider for the ISDN network PRI to the Cisco wide-area switch.)

- Interface Type— Enter the index number 1 for T1 or 2 for E1, depending on the facilities, i.e., the physical interface, carrying the ISDN PRI to the Cisco wide-area switch.

12. Delete a PRI Configuration

The Delete a PRI Configuration Command menu, shown in the following example, allows you to delete a configured PRI from the list of configured PRIs. All you have to enter is the DLCI, a number within the range of 0 to 1023, that identifies the PRI you want to delete from the list.

```
Delete a PRI Configuration Command Example Menu
********************************************************************************
*  cedar                                                                       *
*                                                                              *
*    DELETE A PRI CONFIGURATION COMMAND                                        *
*    ---------------------------------                                         *
*                                                                              *
*    DLCI #                                          [         ]               *
*                                                                              *
*    Enter 'c' to Commit Changes OR 'q' to Quit      [         ]               *
*                                                                              *
*    INFO: 0 to 1023. REQUIRED.                                                *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
?*******************************************************************************?
```

13. Configure an INS (DAS) Daemon

The Configure an INS Daemon Command menu, shown in the following example, allows you specify which INS Daemon will be active:

```
Configure an INS (DAS) Daemon Example Menu
********************************************************************************
*  cedar                                                                       *
*                                                                              *
*    CONFIGURE AN INS DAEMON COMMAND                                           *
*    ----------------------------                                              *
*                                                                              *
*    IP Address                                      [               ]         *
*    Daemon Name                                     [                 ]       *
*    Preference                                      [       ]                 *
*    Admin Status [1] UP, [2] DOWN                   [       ]                 *
*                                                                              *
*    Enter 'c' to Commit Changes OR 'q' to Quit      [       ]                 *
*                                                                              *
*    INFO: Dotted Decimal IP Address. REQUIRED.                                *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
?*******************************************************************************?
```

The Configure an INS Daemon menu contains the following fields:

- IP Address—Type the IP Address of the INS Daemon on the StrataView Plus Workstation. Use dotted decimal notation.

- Daemon Name—Type the host name associated with the IP address.

- Preference—Type a number within the range of 1 to 16. Remember the lower the number the higher the preference. The INS (DAS) Daemon you prefer to be active should have a preference of 1.

- Admin status—Enter the index 1 for UP or 2 for DOWN to specify the Administration Status of the INS Daemon. Use DOWN when you are bringing the INS Daemon off-line for testing and troubleshooting. When you are done, you can bring it back on-line, UP.

14. Delete an INS (DAS) Daemon

The Delete an INS Daemon Configuration Command menu, shown in the following example, allows you to delete an INS Daemon from the list of configured INS Daemons. All you have to enter is the IP Address, in dotted decimal notation, for that INS Daemon.

```
Delete an INS Daemon Example Menu
********************************************************************************
*  cedar                                                                      *
*                                                                             *
*    DELETE AN INS DAEMON CONFIGURATION COMMAND                               *
*    ------------------------------                                           *
*                                                                             *
*    IP Address #                                   [               ]         *
*                                                                             *
*    Enter 'c' to Commit Changes OR 'q' to Quit     [      ]                  *
*                                                                             *
*    INFO: Dotted Decimal IP Address. REQUIRED.                              *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
?*******************************************************************************?
```

15. Set INS Admin Status

The Set INS ADMIN Status Command menu, shown in the following example, allows you to change the Administration Status of the DAS Server Shelf. Enter the index 1 for ON-LINE or 2 for OFF-LINE. You can bring the DAS Server Shelf OFF-LINE for testing or troubleshooting purposes, then bring it back ON-LINE with this command screen.

```
Set INS Administrative Status Command Example Menu
*********************************************************************************
*  cedar                                                                       *
*                                                                              *
*    SET INS ADMIN STATUS COMMAND                                              *
*    ----------------------------                                              *
*                                                                              *
*    Administration Status [1] ON-LINE, [2] OFF-LINE  [        ]              *
*                                                                              *
*    Enter 'c' to Commit Changes OR 'q' to Quit        [        ]             *
*                                                                              *
*    INFO: 1 to  2. REQUIRED.                                                  *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
?********************************************************************************?
```

16. Quit Command Line

The Quit Command Line option, removes you from the INS CLI main menu and returns you to the DAS Server Shelf's UNIX prompt. To quit the INS CLI, type 16 and press Enter.

```
Quit Command Line Option
*********************************************************************************
*  cedar                                                                       *
*                                                                              *
*                DIAL-UP FRAME RELAY COMMAND LINE INTERFACE                     *
*                Rel. 1.4 (Fri Aug 22 15:12:34 PDT 1997).                       *
*                                                                              *
*                                                                              *
*    1   List Active PRIs.             10   Modify CDR Configuration.          *
*    2   Display CDR Configuration.    11   Configure a PRI.                   *
*    3   List Configured PRIs.         12   Delete a PRI Configuration.        *
*    4   List Configured INS Daemons.  13   Configure an INS Daemon.           *
*    5   Display Current INS Daemon.   14   Delete an INS Daemon Config.       *
*    6   Display INS Status.           15   Set INS Admin Status.              *
*    7   Display Call Processor Stats. 16   Quit Command Line.                 *
*    8   Display Layer 3 Stats.                                                *
*    9   Display Layer 2 Stats.                                                *
*                                                                              *
*  Enter number of the command and hit return:16                               *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
?********************************************************************************?
```

Configuring Automatic Number Identifiers

This chapter provides procedures for using the INS (DAS) ANI Configuration menus, which are selected from the StrataView Plus Main Menu. It includes the following sections:

- Accessing the ANI Configuration Interface
- Using the ANI Configuration Interface

    1. Add an ANI entry

    2. Modify an ANI entry

    3. Delete an ANI entry

    4. List all ANI entries

The DAS (INS) Daemon software must be installed on the StrataView Plus Workstation for the DAS (INS) ANI Configuration menu option to appear on the StrataView Plus Main Menu. The DAS (INS) Daemon software installation is covered in Chapter 7, Configuring Automatic Number Identifiers.

Accessing the ANI Configuration Interface

This section describes how to use the DAS (INS) ANI Configuration Interface to configure frame-relay port parameters for Dial-Up and Dial-Backup calls. DAS (INS) ANI Configuration must be completed for each ANI before you can configure a Dial-Up or Dial-Backup connection for that ANI.

To access the ANI Configuration Interface, follow these steps:

Step 1 Log in to StrataView Plus and access the StrataView Plus main menu.

Step 2 Select 9, INS ANI Configuration, and the ANI Configuration Interface menu, shown in the following example, appears.

```
ANI Configuration Interface Example Menu
*******************************************************************************
*                                                                             *
*                           INS/DAS Dial-up Frame Relay                       *
*                           ANI Configuration Interface                       *
*                                                                             *
*                                                                             *
*                                                                             *
*         1. Add an ANI entry                                                 *
*                                                                             *
*         2. Modify an ANI entry                                              *
*                                                                             *
*         3. Delete an ANI entry                                              *
*                                                                             *
*         4. List all ANI entries                                             *
*                                                                             *
*         5. Exit the program                                                 *
*                                                                             *
*         Enter your selection:                                               *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*******************************************************************************
```

Using the ANI Configuration Interface

You can use the INS/DAS ANI Configuration Interface menu to establish, list, or delete ANI parameters. (These parameters are similar to the standard Cisco wide-area switch frame relay port parameters configured with the Configure Frame Relay Port [**cnffrport**] command for a T1/E1 port.)

To use the ANI Configuration Interface menu, simply select an index number (1-4) and press Enter. The ANI Configuration Interface menu options are described in the following sections.

1. Add an ANI entry

Use this menu to configure the Frame Relay port parameters associated with an ISDN calling number, i.e., ANI.

```
 Add an ANI Entry Example Menu
*******************************************************************************
*                                                                             *
*                                                                             *
*                                                                             *
*  ANI         [                    ] ANI Type                  [      ]      *
*  Max Transmit Queue Depth  [      ] Port ECN Queue Threshold  [      ]      *
*  DE Threshold              [      ] Signaling Protocol         [      ]      *
*  NNI Status                [      ] Asynchronous Status        [      ]      *
*  Polling Verification Timer [     ] Error Threshold            [      ]      *
*  Monitored Events Count    [      ] Communicate Priority       [      ]      *
*  Upper RNR Threshold       [      ] Lower RNR Threshold        [      ]      *
*  OAM Threshold             [      ] ForeSight over Port (CLLM) [      ]      *
*  Map IDE to DE at Egress   [      ] Min Flags between Frames   [      ]      *
*                                                                             *
*  Enter 'c' to commit changes or 'q' to quit [    ]                          *
*                                                                             *
*                                                                             *
*                                                                             *
*  INFO: caller phone number, up to 20 digits long                            *
*******************************************************************************
```

On this screen, the cursor moves from left-to-right between fields, then down to the next row. So the fields are listed below in the order that the cursor will move through them:

ANI   Type the caller phone number. Maximum 20 digits without punctuation.

ANI Type   Specifies whether the ANI is a dialup or dial backup.

                                Type either 1 (dial-up) or 2 (dial backup).

Max Transmit Queue Depth   Type the maximum bytes to be queued for transmission from the port. Use a value within the range 0 to 65535 bytes.

Port ECN Queue Limit   Specifies the port explicit congestion notification. This value controls the point at which the BECN and FECN bits will be set in the communications to the user device.

                                Type a value within the range of 0 to 65535 bytes.

DE Threshold   Type a number to define the port queue depth above which frames with the Discard Eligibility bit set will be discarded. Use a value within the range 0 to 100%. A setting of 100% effectively disables DE for the port.

Signaling Protocol   Specifies the LMI operation mode.

                                Use a value within the range 1 to 4:

                                • No signaling protocol

                                • Strata LMI

                                • Annex A

                                • Annex D

NNI Status   This field is not configurable. It will contain a 0 in the List All ANI entries records.

Asynchronous Status   This field is not configurable. It will contain a 0 in the List All ANI entries records.

Polling Verification Timer   This field is not configurable. It will contain a 0 in the List All ANI entries records.

Error Threshold   This field is not configurable. It will contain a 0 in the List All ANI entries records.

Monitored Events Count   This field is not configurable. It will contain a 0 in the List All ANI entries records.

Communicate Priority   This field is not configurable. It will contain a 0 in the List All ANI entries records.

Upper RNR Threshold   This field is not configurable. It will contain a 0 in the List All ANI entries records.

Lower RNR Threshold   This field is not configurable. It will contain a 0 in the List All ANI entries records.

OAM Threshold | This field is not configurable. It will contain a 0 in the List All ANI entries records.

ForeSight over Port (CLLM) | Specifies the interval to send ForeSight congestion messages across the NNI port. Networks incorporating this value must be Cisco WAN switching networks.

Type 0 to disable, or

Type a value within the range 4 to 35 in 100ths of a second (i.e., 4 equals 40 milliseconds and 35 equals 350 milliseconds).

Map IDE to DE at Egress | Specifies whether the internal DE bit (IDE) status in the FastPacket should be mapped to the frame relay bit at the destination.

Type either 1 (no) or 2 (yes).

Min Flags between Frames | Specifies the minimum number of flags between frames.

Type a value within the range 1 to 255 flags.

2. Modify an ANI entry

Use this menu to modify an ANI configuration recorded which has already been "added". You enter the configured ANI, such as 8821244 in the ANI field, then enter 'm' in the next field as shown in the example screen. The ANI Record screen shown in the next example appears. This screen is exactly the same as the Add an ANI screen, described previously, with the configured parameters displayed. You can tab through these fields and modify any of the configurable parameters with the exception of the ANI field.

```
Modify an ANI entry Example Screen
********************************************************************************
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*    ANI                  [8821244              ]                              *
*                                                                              *
*    Enter 'm' to modify or 'q' to quit         [m ]                           *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
?******************************************************************************?


ANI Record Screen
********************************************************************************
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*    ANI      [8821244              ] ANI Type                   [1    ]        *
*    Max Transmit Queue Depth  [65535] Port ECN Queue Threshold  [65535]        *
*    DE Threshold              [100 ] Signaling Protocol         [1    ]        *
*    NNI Status                [0   ] Asynchronous Status        [0    ]        *
*    Polling Verification Timer [0   ] Error Threshold           [0    ]        *
*    Monitored Events Count    [0   ] Communicate Priority       [0    ]        *
*    Upper RNR Threshold       [0   ] Lower RNR Threshold        [0    ]        *
*    OAM Threshold             [0   ] ForeSight over Port (CLLM) [0    ]        *
*    Map IDE to DE at Egress   [1   ] Min Flags between Frames   [1    ]        *
*                                                                              *
*    Enter 'c' to commit changes or 'q' to quit [   ]                          *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*    INFO: 1=dial-up, 2=dial-backup                                            *
*                                                                              *
*                                                                              *
?******************************************************************************?
```

3. Delete an ANI entry

Use this screen to remove an ANI from the INS/DAS configuration list. Before deleting an ANI record, you must delete all the dormant connections configured for it with the StrataView Plus Connection Manager.

```
Delete an ANI Entry Example Screen
*******************************************************************************
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*     ANI               [8821234              ]                               *
*                                                                             *
*     Enter 'm' to modify or 'q' to quit         [   ]                        *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*******************************************************************************
```

4. List all ANI entries

Use this screen to view the current list of configured ANIs. The --More-- at the bottom of the screen indicates that there are other configured ANIs to scroll through. The top of the screen (for example, Router entries: 1 of 47) indicates the current position in the list of ANI records. Pressing Enter will step through the individual records. After the last record, you are returned to the ANI Configuration Interface menu.

```
List all ANI Entries Example Menu

Router entries: 1 of 47
******************************************************************************
*                                                                            *
*    ANI                       8831240                                       *
*    ANI Type                  1                                             *
*    Max Transmit Queue Depth  65535                                         *
*    Port ECN Queue Threshold  65535                                         *
*    DE Threshold              100                                           *
*    Signaling Protocol        1                                             *
*    NNI Status                0                                             *
*    Asynchronous Status       0                                             *
*    Polling Verification Timer 0                                            *
*    Error Threshold           0                                             *
*    Monitored Events Count    0                                             *
*    Communicate Priority      0                                             *
*    Upper RNR Threshold       0                                             *
*    Lower RNR Threshold       0                                             *
*    OAM Threshold             0                                             *
*    ForeSight over Port (CLLM) 0                                            *
*    Map IDE to DE at Egress   1                                             *
*    Min Flags between Frames  1                                             *
*                                                                            *
*    --More--                                                                *
 ******************************************************************************
```

Configuring Dial-Up Connections

This chapter provides procedures for configuring Dial-Up Frame Relay connections using the StrataView Plus Connection Manager. It includes the following sections:

*   Opening the Connection Manager

*   Adding a Dial-Up Connection

*   Modifying a Previously Configured Dial-Up Connection

In a Dial-Up application, users end equipment signals the Cisco WAN switching network to activate a dormant connection maintained in its database. The signalling messages are routed over pre-configured signalling channel from a T1 or E1 PRI connected to a node to the DAS Server Shelf. The DAS Server Shelf call processing software handles the signaling protocol and discovers the caller information from the ANI field of the signalling message. When the call is accepted, the call processor forwards the ANI to the DAS (INS) Daemon software running on the StrataView Plus Workstation. After validating the ANI, the DAS Daemon has StrataView Plus set up the requested connection. Using connection information in its database, StrataView Plus adds the connection to the Cisco WAN switching network. The DAS Server Shelf monitors the now active connection for disconnects and signals StrataView plus to remove the connection when it is no longer needed. (The DAS Server Shelf also keeps Call Detail Records (CDRs) concerning the call, which are described in Appendix D, Call Detail Records.)

This chapter provides procedures for using the StrataView Plus Connection Manager to configure Dial-Up connection parameters, i.e., to create the dormant connection in the StrataView Plus (the network's) database. The examples in this chapter are taken from StrataView Plus 8.1; the procedures for StrataView Plus 8.4 are nearly identical. Where there are significant differences between StrataView Plus 8.1 and 8.4, they will be pointed out.
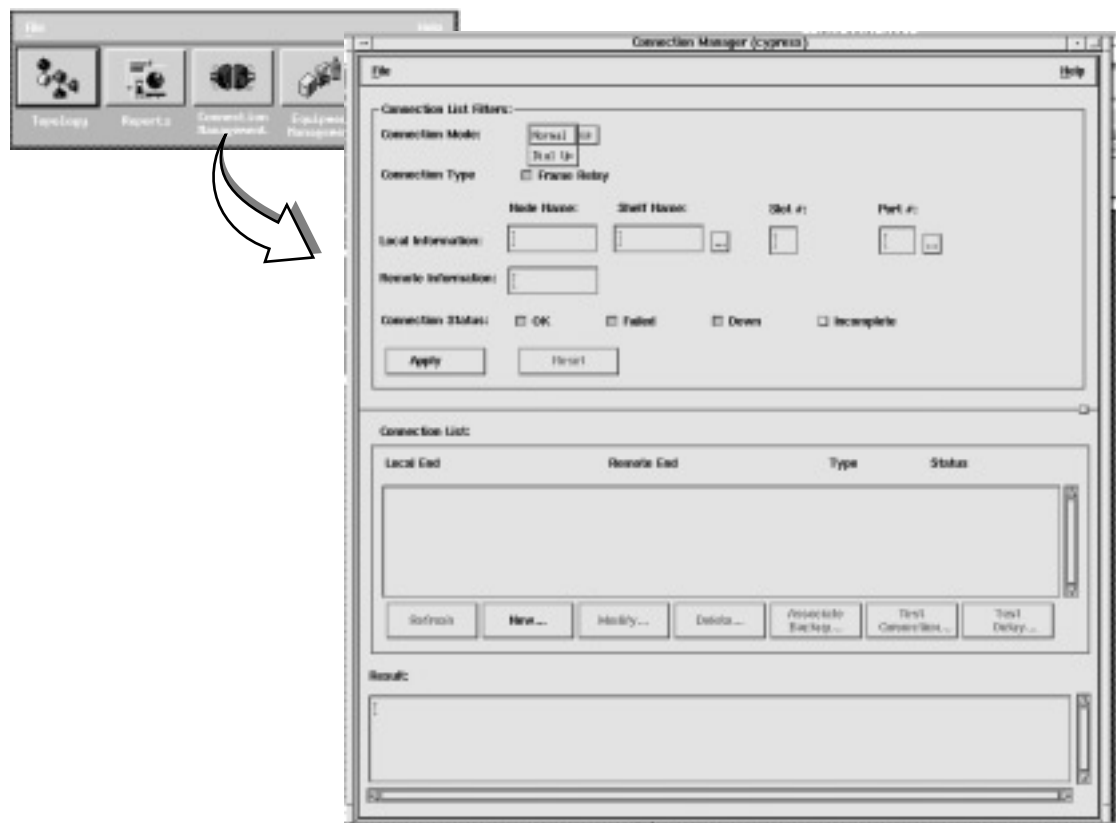
Opening the Connection Manager

After the INS (DAS) CLI and ANI Configuration Interface parameters are set, you use the StrataView Plus Connection Manager to add the Dial-Up connection (i.e., dormant frame relay PVC) to the database.

To access the StrataView Plus Connection Manager, follow these steps:

Step 1   Start StrataView Plus.

Step 2   Select 3 to Start Desktop.

Step 3   Select the Connection Manager icon from the StrataView Plus Desktop toolbox. The Connection Manger menu, shown in Figure 12-1 appears. (The Connection Mode field shown with the Normal or Dial-Up option pulled down normally only shows Normal, the default Connection Mode.)

> **Note** The *Cisco StrataView Plus Operations Guide* for Release 8.1 or for Release 8.4 contains detailed information about using the Connection Manager.
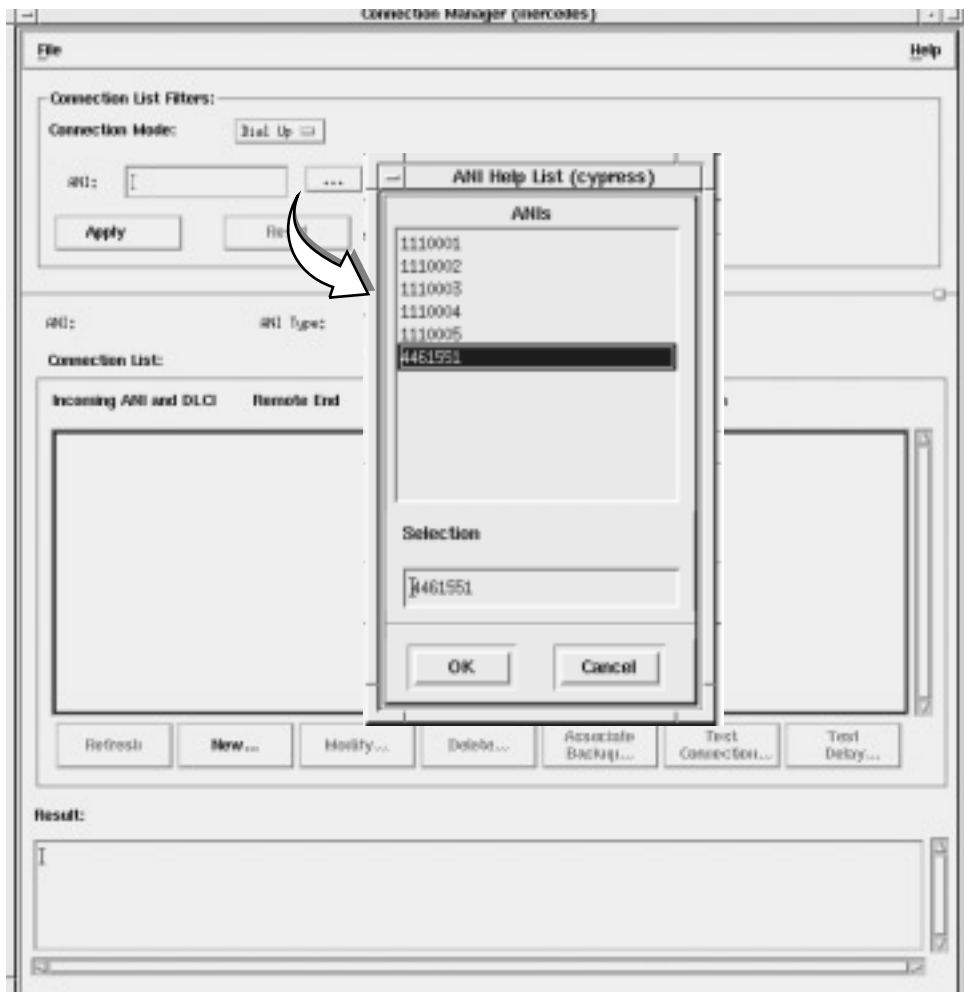
Figure 12-1   Connection Manager Window
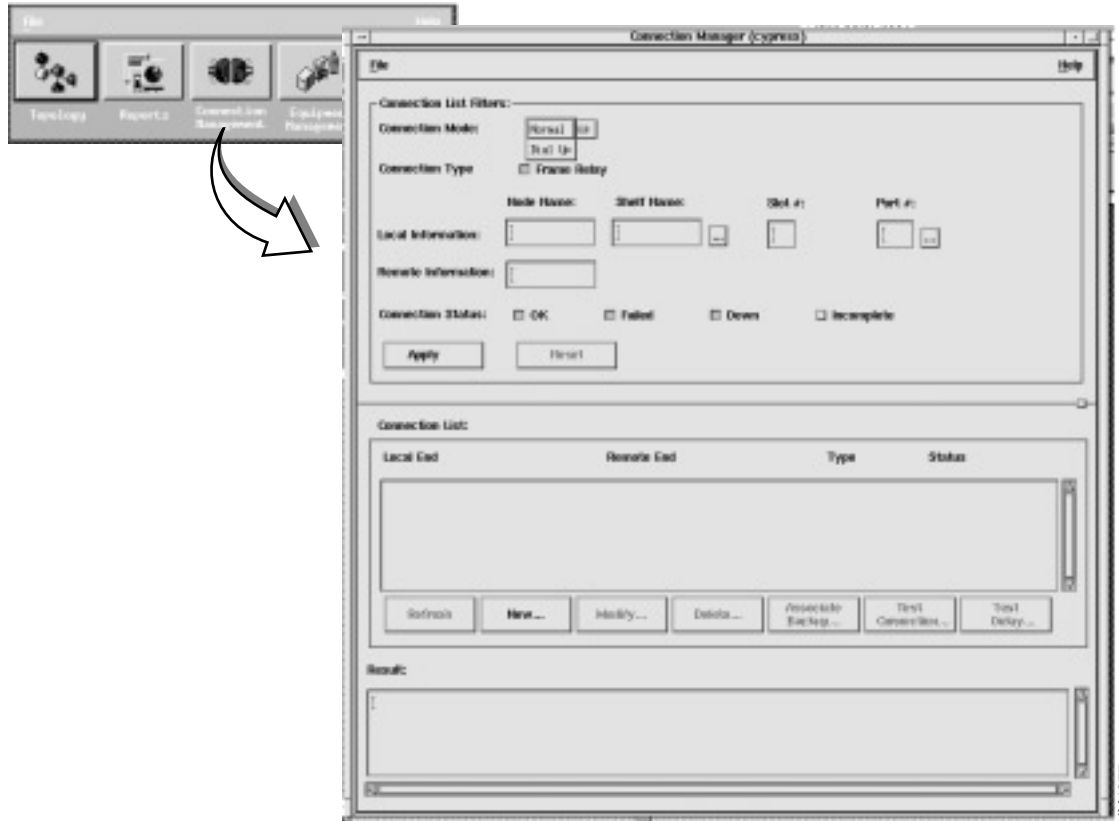
Adding a Dial-Up Connection

To add a Dial-Up connection, follow these steps:

Step 1 In the Connection Manager window, click on the Connection Mode button (Normal or Dial-Up) and select Dial-Up. The ANI Help List window, shown in Figure 12-2, appears. (The ANI Help List window lists all the ANIs that were configured with the INS/DAS ANI Configuration Menu described in Chapter 11, Configuring Automatic Number Identifiers.) Also, when you select the Dial-Up mode, the Connection Type of the Connection List Filters also changes to reflect the Dial-Up Mode. (The ANI field replaces the Normal connection Local Information, Remote Information, and Connection Status fields.)

Figure 12-2   Dial Up mode and ANI Help List
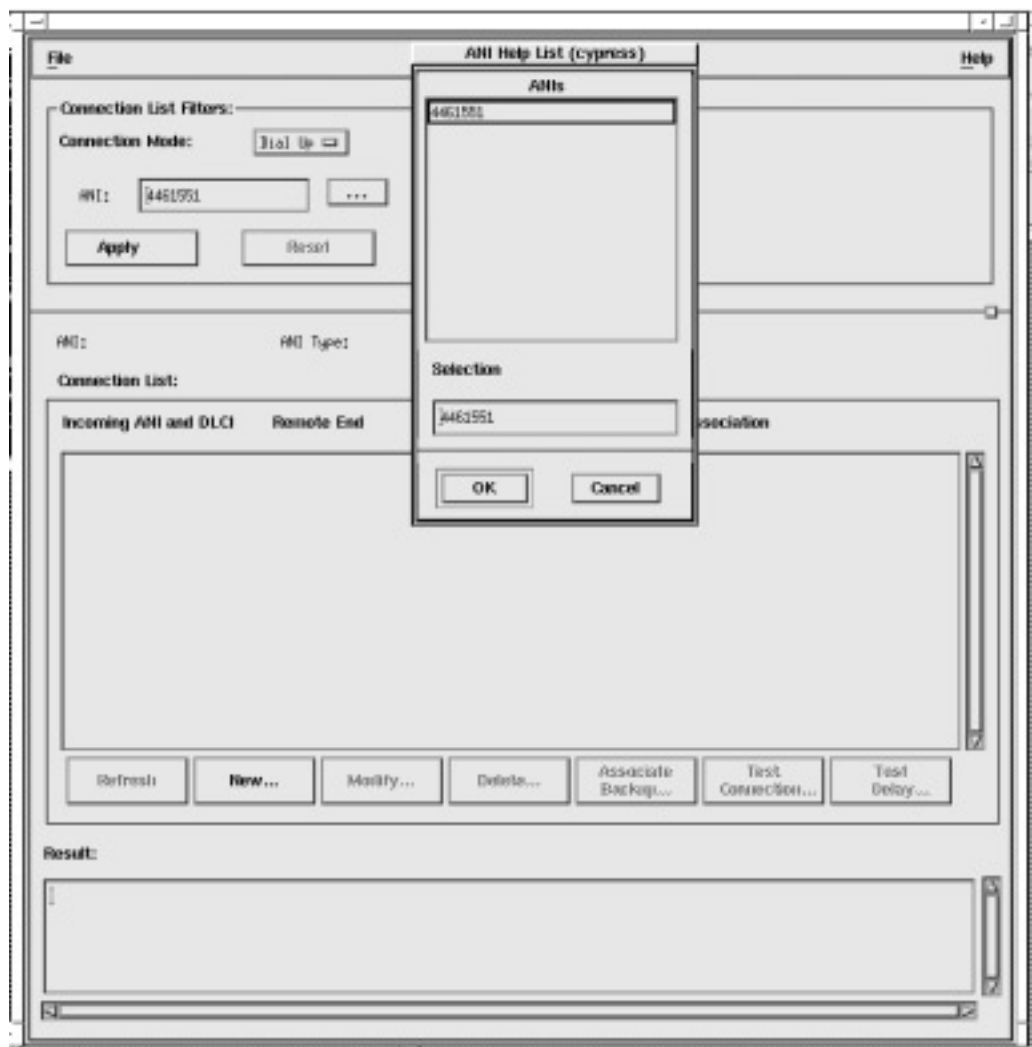
Step 2   In the ANI Help List window, select the ANI for which you are configuring a Dial-Up
connection. Press the OK button. The selected ANI will appear in the Connection Manager
Connection List Filters: ANI box, shown in Figure 12-3.

Figure 12-3   ANI for New Dial-Up Connection
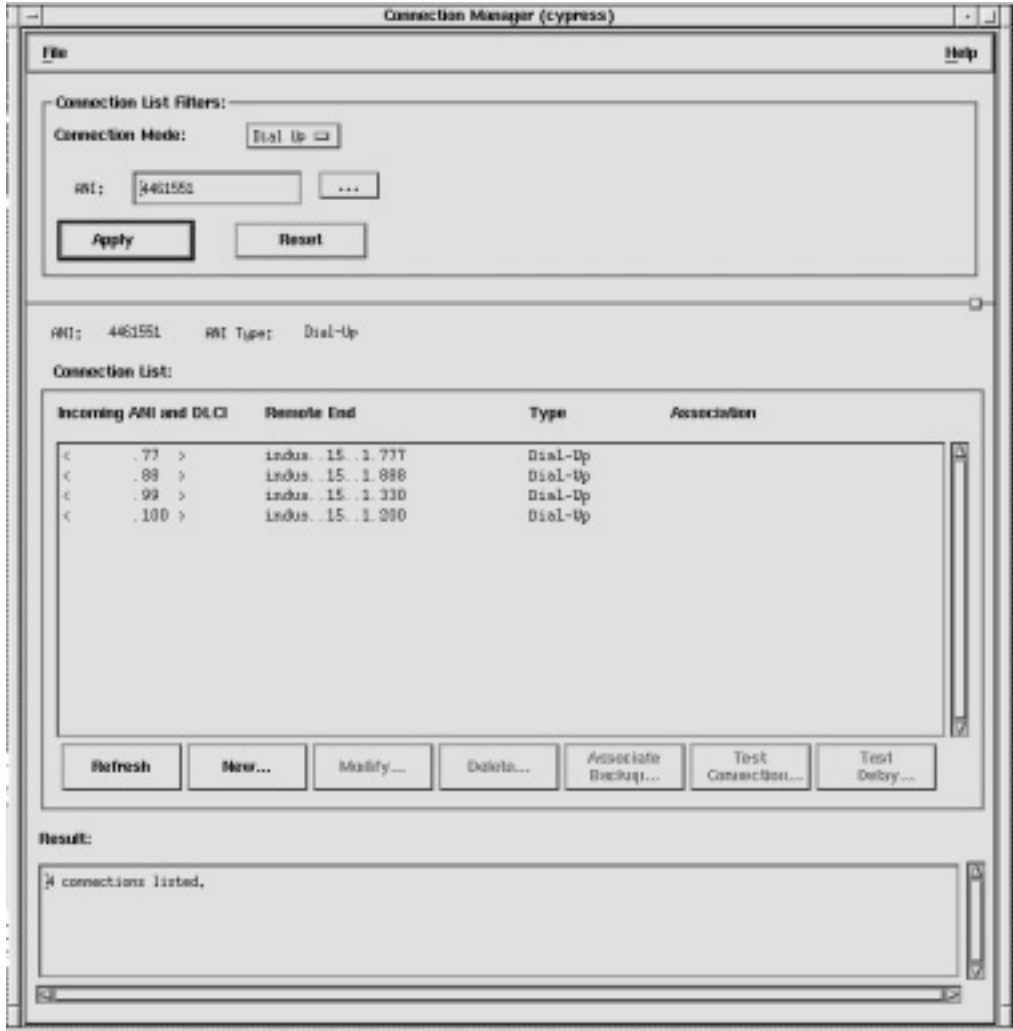
Step 3   Click on the Apply button. All of the connections previously configured for the specified
ANI will appear in the Connection List box, also shown in Figure 12-3.

Step 4   New Dial-Up connections are added slightly differently in StrataView Plus 9.1 and
StrataView Plus 8.4:

- In StrataView Plus 8.1, to add a new Dial-Up connection for the specified ANI, click
on the New button. The New Connection window, for a Dial-Up connection, shown in
Figure 12-4 appears.

- In StrataView Plus 8.4, to add a new Dial-Up connection in StrataView Plus 8.4, pull
down Configure Menu at the top of the window and select New ANI Connection as
shown in Figure 12-5; the New ANI FR-FR Connection menu, show in Figure 12-6,
appears.

Figure 12-4   StrataView Plus 8.1 New Dial-Up Connection Window
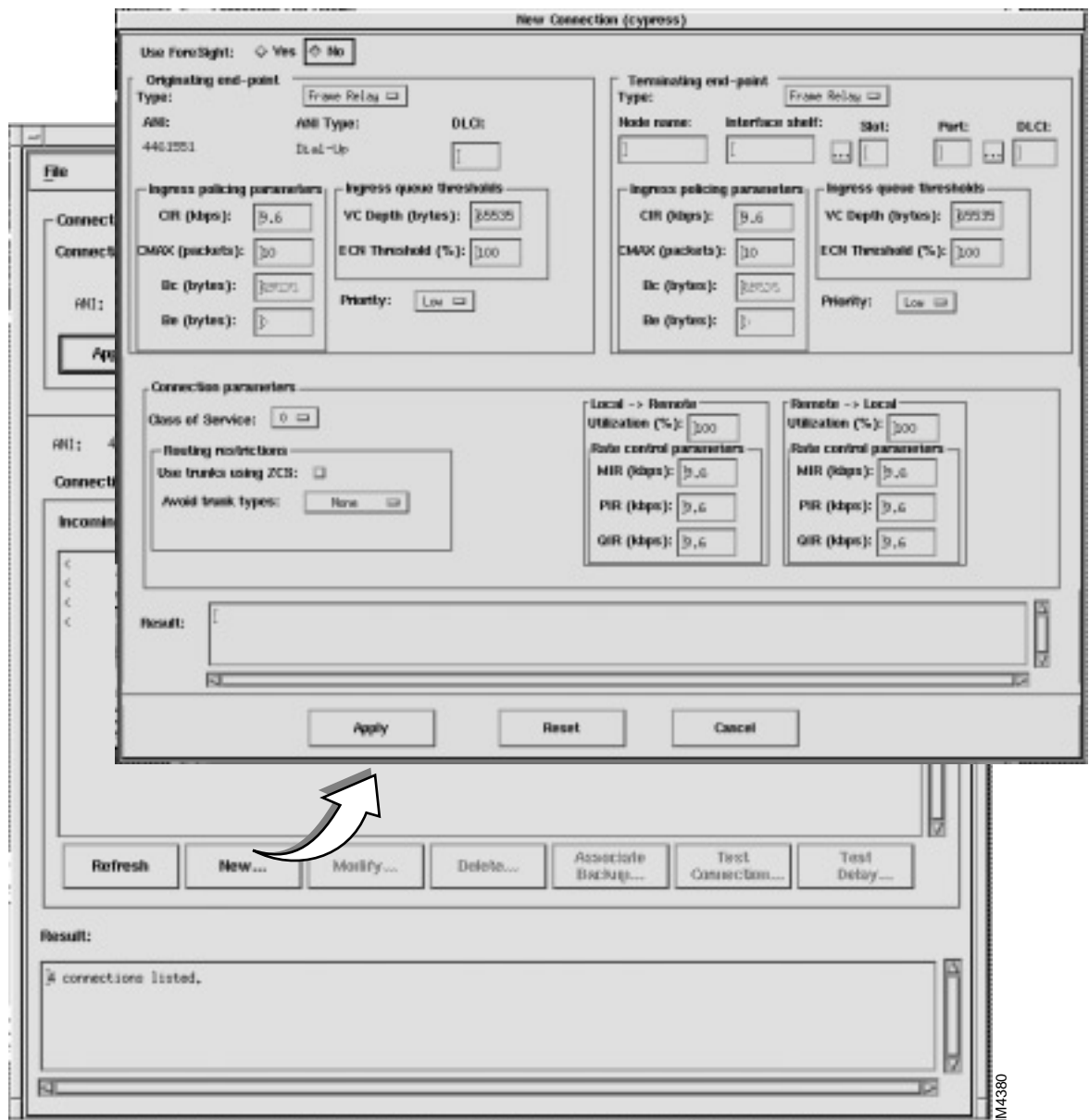
Figure 12-5   StrataView Plus 8.4 New ANI Connection Menu
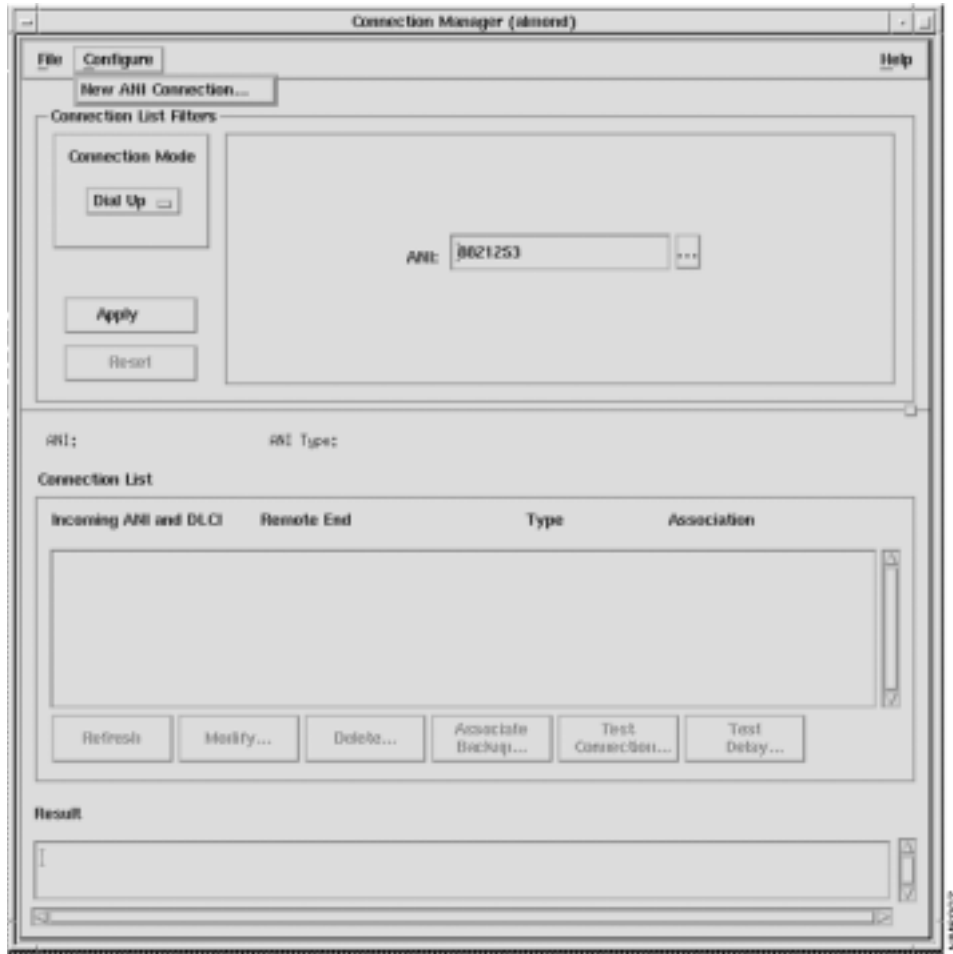
Note   Terminating end-points (slot.port) must be upped through the node's command line interface to be seen on the StrataView Plus Connection Manger's New Connection (or New FR-FR Connection) windows.
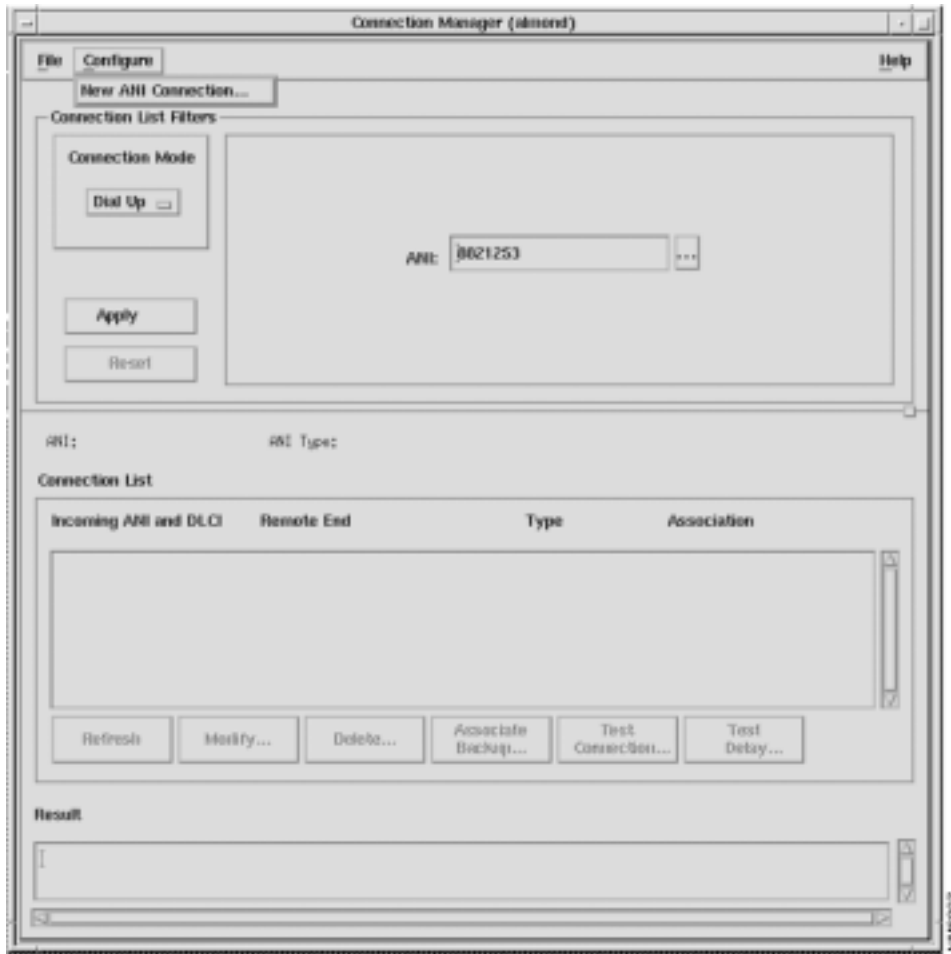
Figure 12-6   StrataView Plus 8.4 ANI New FR-FR Connection Menu

Step 5   Complete the New Dial-Up (StrataView Plus 8.1) or new ANI FR-FR Connection
(StrataView Plus 8.4) menu for frame-relay parameters:

- Originating end-point defines the originating end-point, Ingress policing parameters,
  Ingress queue thresholds, and Egress queue Priority. The originating end-point
  parameters are identical to the Normal frame relay connection parameters with the
  exception that Originating end-point is defined by an ANI, ANI Type, and DLCI as
  opposed to a Cisco wide-area switch standard Node.Slot.Port.DLCI. This is because the
  DAS Dial-Up Frame Relay application determines these end-point physical parameters
  from the PRI signalling connection, which has been pre-configured, and the ISDN
  network (i.e., the switch attached to the Cisco wide-area switch) will assign the logical
  channel (i.e., the T1 or E1 timeslot) for the connection.

- Terminating end-point defines the originating end-point, Ingress policing parameters,
  Ingress queue thresholds, and Egress queue Priority.

- Connection parameters defines the Class of Service, Routing Restrictions, and Local to
  Remote and Remote to Local % Utilization and Rate control parameters (MIR, QIR,
  PIR).

Note Frame-relay connection parameters are described in detail in the *Cisco StrataView Plus Operations Guide*, the *Cisco WAN Switching System Overview,* and the *Cisco WAN Switching Command Reference* for either Release 8.1 or Release 8.4.

Step 6 After you have entered your Dial-Up connection frame-relay parameters, click the Apply button to set them. The result field of the window should read Connection addition successful.

Step 7 Click the Cancel button to exit the New Connection window and return to the Connection Manager window. The new connection should appear in the Connection List field. If not, press the Refresh button to view connection information.

Note For the MGX 8220, Frame Relay connection end points must be configured through a command line in the watchdog.conf file on the StrataView Plus Workstation. This command line (insd on . insd) takes an -x parameter with sub-options for MGX 8220 Frame Relay end points. These arguments are described in the README text file which accompanies the DAS (INS) Daemon tar file. The -x arguments should not be used, however, without the direction of Customer Support.

Modifying a Previously Configured Dial-Up Connection

Modify a previously configure Dial-Up connection, follow these steps:

Step 1 From StrataView Plus, open the Connection Manager window.

Step 2 Select Dial-Up for the Connection Mode. The ANI Help List, shown in Figure 12-7, appears.

Figure 12-7 Selecting an ANI as a Connection List Filter
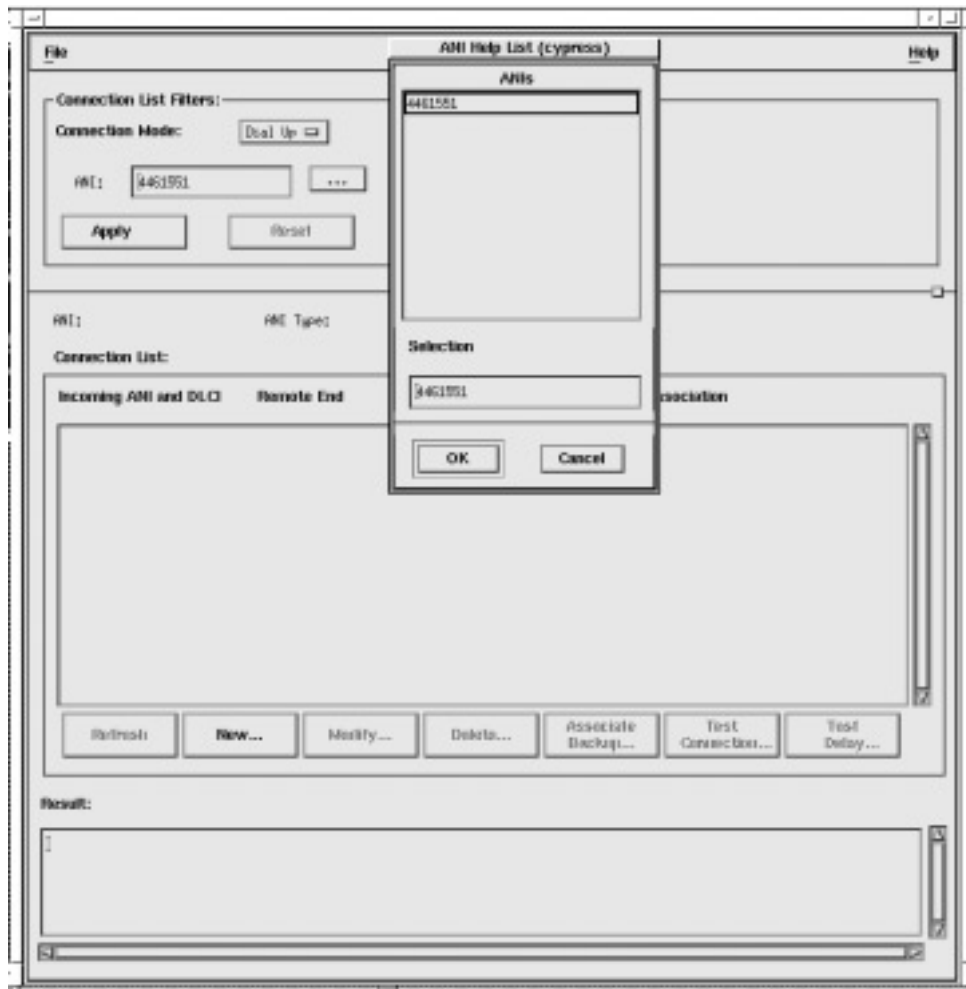
Step 3 Select the ANI you are using to modify the connection parameters. Press the OK button and, if there are any connections already configured for that ANI, a Connection List similar to the one in Figure 12-8 will appear.

Step 4 Select the desired connection in the Connection List by clicking on it. When selected, the connection is highlighted and the Modify and Delete buttons will become active (i.e., no longer be grayed out).

Figure 12-8   Filtered Connection List
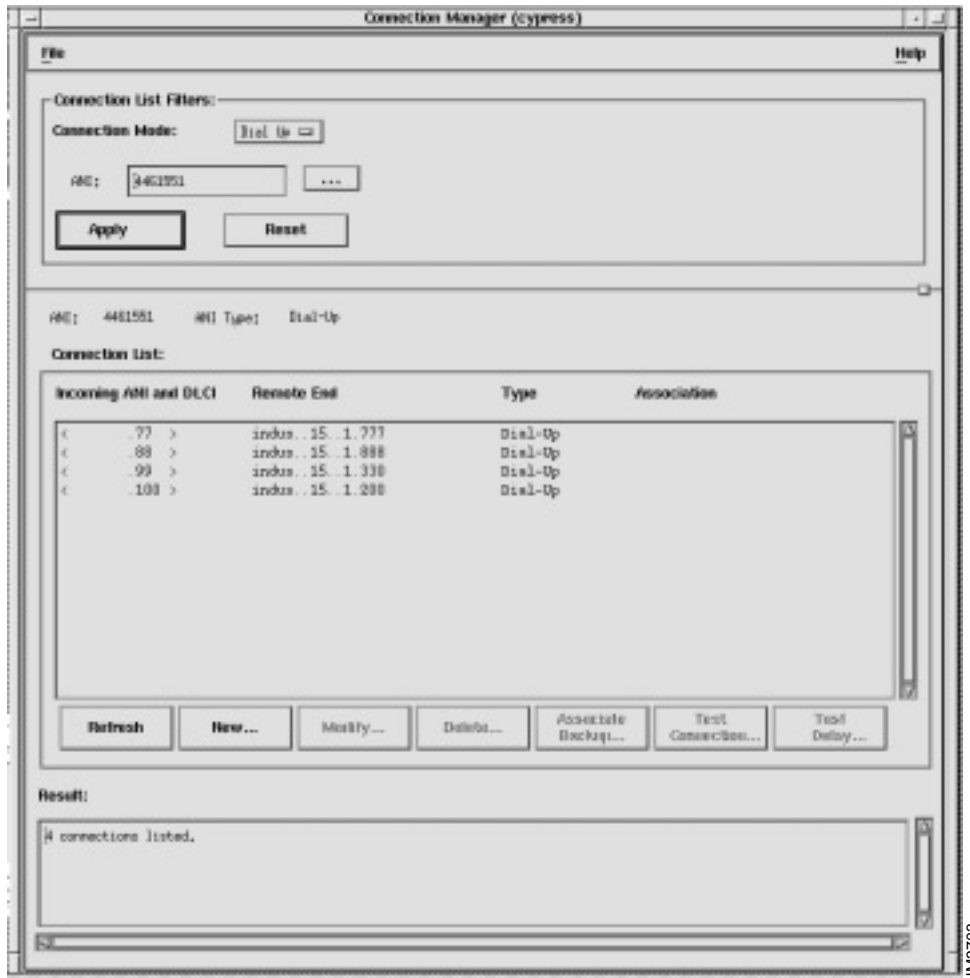
Step 5 Press the Modify button. The Modify Connection window, shown in Figure 12-9, appears.

Figure 12-9   Modify Dial-Up Connection Window
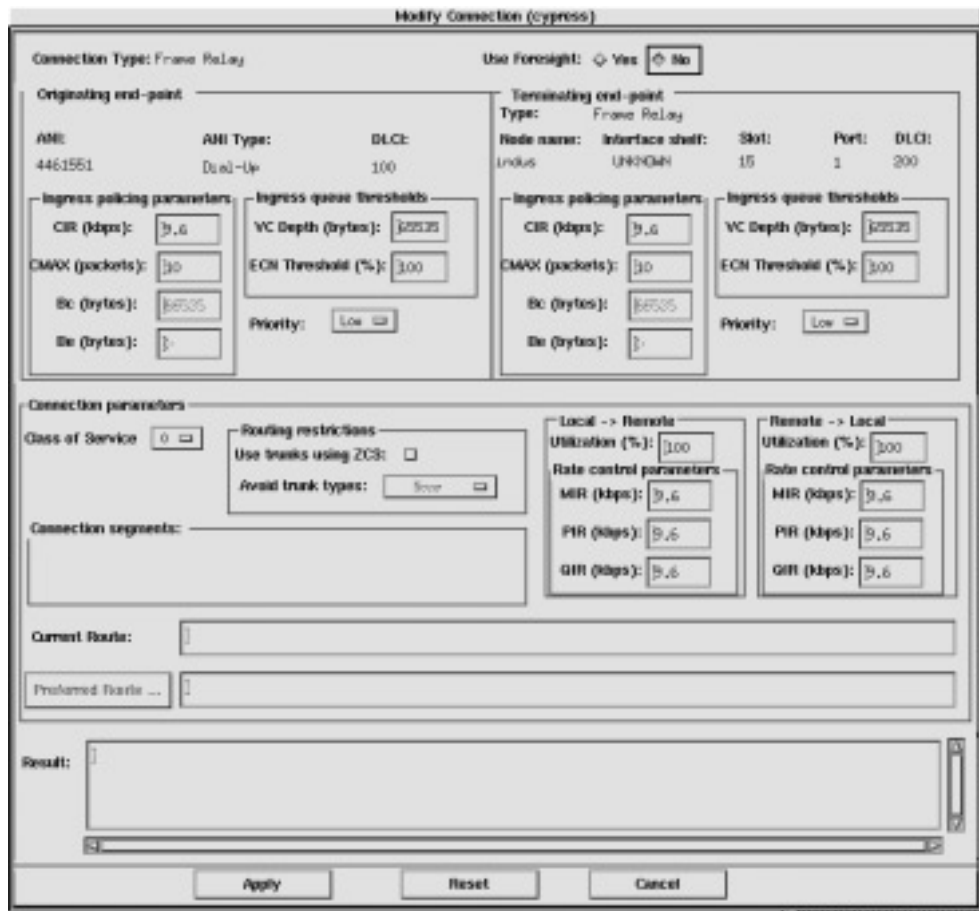
Step 6   Modify the Dial-Up Frame Relay connection parameters in this window just as you would when adding a new connection. (For StrataView Plus 8.4, the Modify the Dial-Up Frame Relay connection parameters screen will be similar to the New FR-FR Connection menu shown in Figure 12-6.)

Step 7   When the connection parameters have been modified, press the Apply button to set them.

Step 8   Press the Cancel button to return to the Connection Manager window.

Configuring Dial-Backup Connections

This chapter provides procedures for configuring Dial-Backup Frame Relay connections. It includes the following sections:

- Opening the Connection Manager

- Adding a Dial-Backup Connection

- Associate a Normal Connection with a Dial-Backup Connection

The DAS Dial-Up Frame Relay system provides an automatic backup mechanism into the frame relay network in case a dedicated access line fails. Illustrated in Figure 13-1, the Dial-Backup feature provides two connections into the Cisco WAN switching network. The first is a dedicated line between the router at Customer Site A and the IGX. The second is an ISDN dial-up line which terminates as a PRI on a Frame Relay Port on the IGX. The dedicated line carries a "Normal" PVC between Customer Site A and Customer Site B. There is also a "dormant" Dial-Backup connection configured in the networks database between the PRI and Customer Site B. These two connections are "Associated" in the StrataView Plus database and will use this same DLCI at the far end, i.e., Customer Site B.

The router at Customer Site A has been configured to dial out through the ISDN network if the dedicated line breaks, as shown in Figure 13-1. This dial out call is routed through the ISDN network to the Cisco WAN switching frame-relay network and delivered to the DAS Server Shelf over a pre-configured signalling PVC. The DAS Server Shelf call processing software handles the signalling process and discovers the caller information from the ANI field of the signalling message. When the call is accepted, the call processor forwards the ANI and other relevant information, to the DAS (INS) Daemon software on the StrataView Plus Workstation.

Figure 13-1   Dial Access Switching Dial-Backup Application
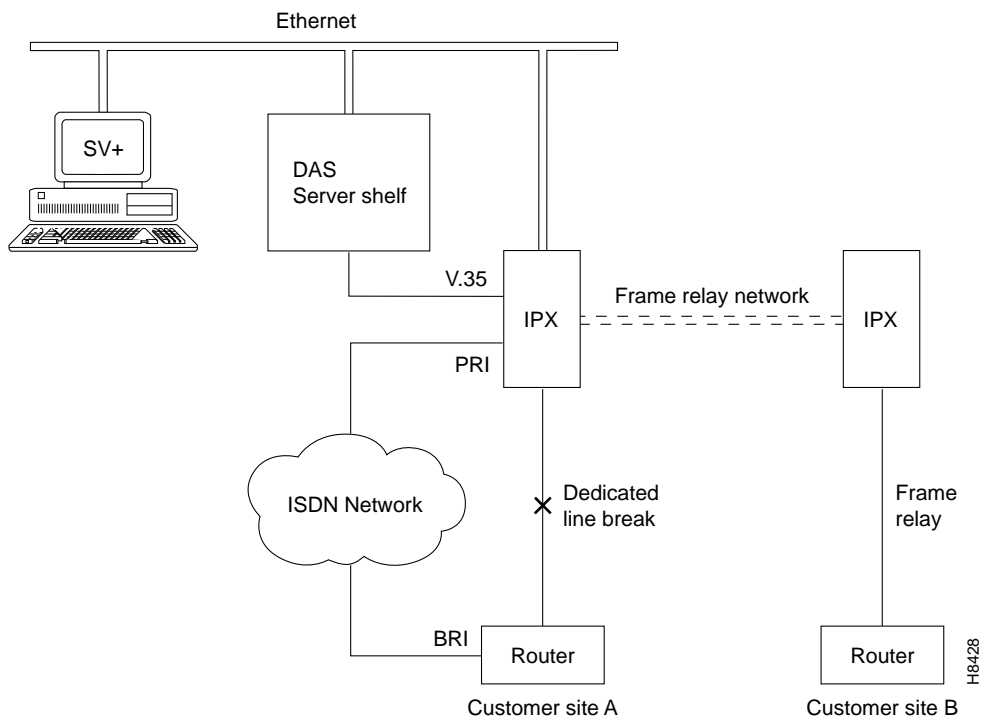
After validating the ANI, the DAS (INS) Daemon has StrataView Plus delete the Normal connection associated with this ANI. Using the Dial-Backup connection information in its database, StrataView Plus then adds the dormant Dial-Backup connection to Customer Site B. The DAS Dial-Up Frame Relay application monitors the Dial-Backup connection for disconnects so it can remove the connection (PVC) when it is no longer needed. It will also restore the Normal frame-relay connection configured for the original dedicated line. In addition, the DAS Server Shelf also collects Call Detail Records (CDRs) for the Dial-Up connection, which are read and retrieved by the StrataView Plus Workstation. (Appendix D contains further information about Call Detail Records.)

A Dial-Backup connection requires three steps:

Step 1 Configuring an ANI with ANI Type set to Dial-Backup (This step is done using the INS/DAS ANI Configuration option from the StrataView Plus Main Menu and was covered in Chapter 11, Configuring Automatic Number Identifiers.)

Step 2 Configure a Dial-Backup Connection with the StrataView Plus Connection Manager.

Step 3 Configure a Normal Frame Relay PVC with the StrataView Plus Connection Manager and "Associate" it with the Dial-Backup Connection.

This chapter provides procedures for using the Connection Manager window tools to configure Dial-Backup connections, i.e, add dormant Dial-Backup connections to the StrataView Plus database and associate them with Normal frame-relay connections.The examples in this chapter are taken from StrataView Plus 8.1; the procedures for StrataView Plus 8.4 are nearly identical. Where there are significant differences between StrataView Plus 8.1 and StrataView Plus 8.4, they will be pointed out.

Note The *Cisco StrataView Plus Operations Guide* for Release 8.1 or Release 8.4 contains detailed information about using StrataView Plus and the Connection Manager.

Opening the Connection Manager

After the INS (DAS) CLI and ANI Configuration Interface parameters are set, you use the StrataView Plus Connection Manager to add the Dial-Backup connection (i.e., dormant frame relay PVC) to the database.

To access the StrataView Plus Connection Manager, follow these steps:

Step 1 Start StrataView Plus.

Step 2 Select 3 to Start Desktop.

Step 3 Select the Connection Manager icon from the StrataView Plus Desktop toolbox. The Connection Manager menu, shown in Figure 13-2 appears. (The Connection Mode field shown with the Normal or Dial-Up option pulled down normally only shows Normal, the default Connection Mode.)

Figure 13-2   Connection Manager Window

Adding a Dial-Backup Connection

To add a Dial-Backup connection, follow these steps:

Step 1   In the Connection Manager window, click on the Connection Mode button (Normal or Dial-Up) and select Dial-Up. The ANI Help List window, shown in Figure 13-3, appears. (The ANI Help List window lists all the ANIs that were configured with the INS/DAS ANI Configuration menu described in Chapter 11, Configuring Automatic Number Identifiers.) Also when you select Dial-Up mode, the Connection List Filters section of the Connection Manager window changes. The ANI field replaces the Normal Connection Mode, Local Information, Remote Information, and Connection Status fields.)

Figure 13-3   Connection Manager Window with ANI Help List

Step 2   Select the ANI from the ANI Help List and click the OK button. (This ANI must be configured as ANI Type: Dial-Backup with the ANI Configuration Interface menu described in Chapter 5.)

Step 3   Click the Apply button on the Connection Manager window. (If there are any Dial-Up or Dial-Backup connections configured for this ANI, they will appear in the Connection List window.)

Step 4 New Dial-Backup connections are added slightly differently in StrataView Plus 9.1 and StrataView Plus 8.4:

- In StrataView Plus 8.1, to add a new Dial-Backup connection for the specified ANI, click on the New button. The New Connection window for a Dial-Up connection, shown in Figure 13-4, appears.

- To add a new Dial-Backup connection in StrataView Plus 8.4, pull down Configure Menu at the top of the window and select New ANI Connection as shown in Figure 13-5; the New ANI FR-FR Connection menu, show in Figure 13-6, appears.

Figure 13-4   New Dial-Backup Connection Window
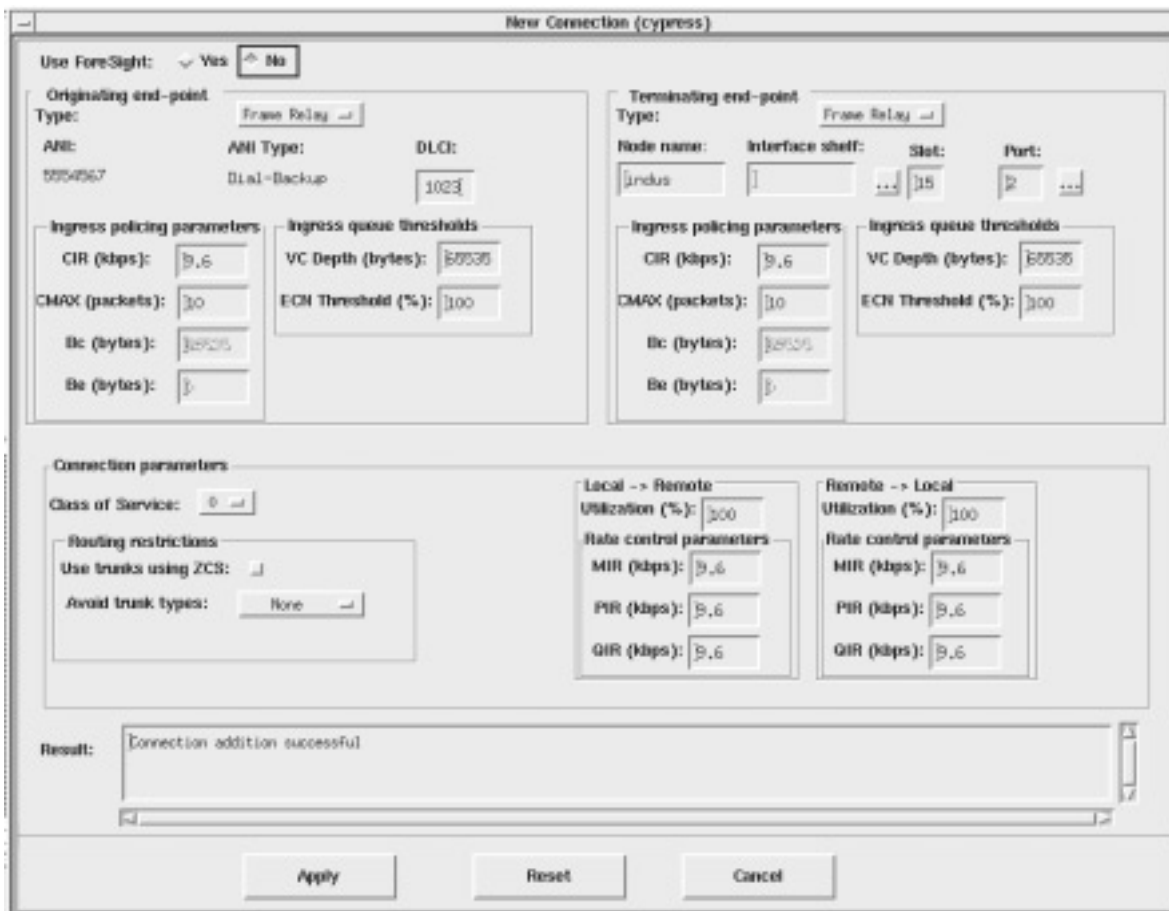
Figure 13-5   StrataView Plus 8.4 New ANI Connection Menu

Figure 13-6 StrataView Plus 8.4 ANI New FR-FR Connection Menu

Step 5 Complete the New Dial-Backup (for Release 8.1) or new ANI FR-FR Connection (for Release 8.4) menu for frame-relay parameters:

- Originating end-point specifies a DLCI for the ANI, Ingress policing parameters and Ingress queue thresholds. The originating end-point parameters are similar to Normal frame relay connection parameters with the exception that Originating end-point is defined only by an ANI, ANI Type, and DLCI as opposed to a Cisco wide-area switch standard Node.Slot.Port.DLCI. This is because the DAS Dial-Up Frame Relay application determines these end-point parameters from the PRI signalling connection, which has been pre-configured, and the ISDN network (i.e., the switch attached to Cisco wide-area switch) will assign the logical channel (i.e., the T1 or E1 timeslot) for the connection.

- Terminating end-point defines the originating end-point, Ingress policing parameters and Ingress queue thresholds. (Note that there is no DLCI for the Terminating end-point. This DLCI will be taken from the Normal connection that is "Associated" with this Dial-Backup connection.)

- Connection parameters defines the Class of Service, Routing Restrictions, and Local-to-Remote and Remote-to-Local % Utilization and Rate control parameters (MIR, QIR, PIR).

> **Note** Frame-relay connection parameters are described in detail in the *Cisco StrataView Plus Operations Guide* , the *Cisco WAN Switching System Overview,* and the *Cisco WAN Switching Command Reference* for Release 8.1 and Release 8.4.

Step 6 After you have entered your Dial-Backup connection parameters, click the Apply button. The result field of this window should read Connection Addition Successful.

Step 7 Click the Cancel button to exit this window and return to the Connection Manager window. The new connection should appear in the Connection List field. If not, press the Refresh button to view connection information.

Associate a Normal Connection with a Dial-Backup Connection

To associate a Normal frame relay connection with a Dial-Backup connection, follow these steps:

Step 1 From the StrataView Plus Desktop, open the Connection Manager and select Normal Connection mode.

Step 2 If there is not already a Normal Frame Relay connection that you wish to "Associate" with the Dial-Backup connection, click on the New button on the bottom of the Connection Manger window. The Normal New Connection window, shown in Figure 13-7, appears.

Step 3 Complete the Normal frame-relay New Connection window as described in the StrataView Plus Operations Guide. When the Normal frame-relay connection parameters are correct, click on the Add button. A Connection Addition Successful message should appear in the Result window. Click on the Cancel button to return to the Normal Connection Manager window.

Figure 13-7   Normal New Connection Window

Step 4   On the Normal Connection Manager window, shown in Figure 13-2, specify the Local Information (node.slot.port) and Remote Information (node name) for connection you want to associate with a Back-Up connection. Click on the Apply button and all connections which match the filter criteria appear in the List Connections box.

If no connections appear in the Connection List box, be sure that you have specified one or more Connection Status types: OK, Failed, Down, Incomplete.

Figure 13-8   Connection Manager with Connection List
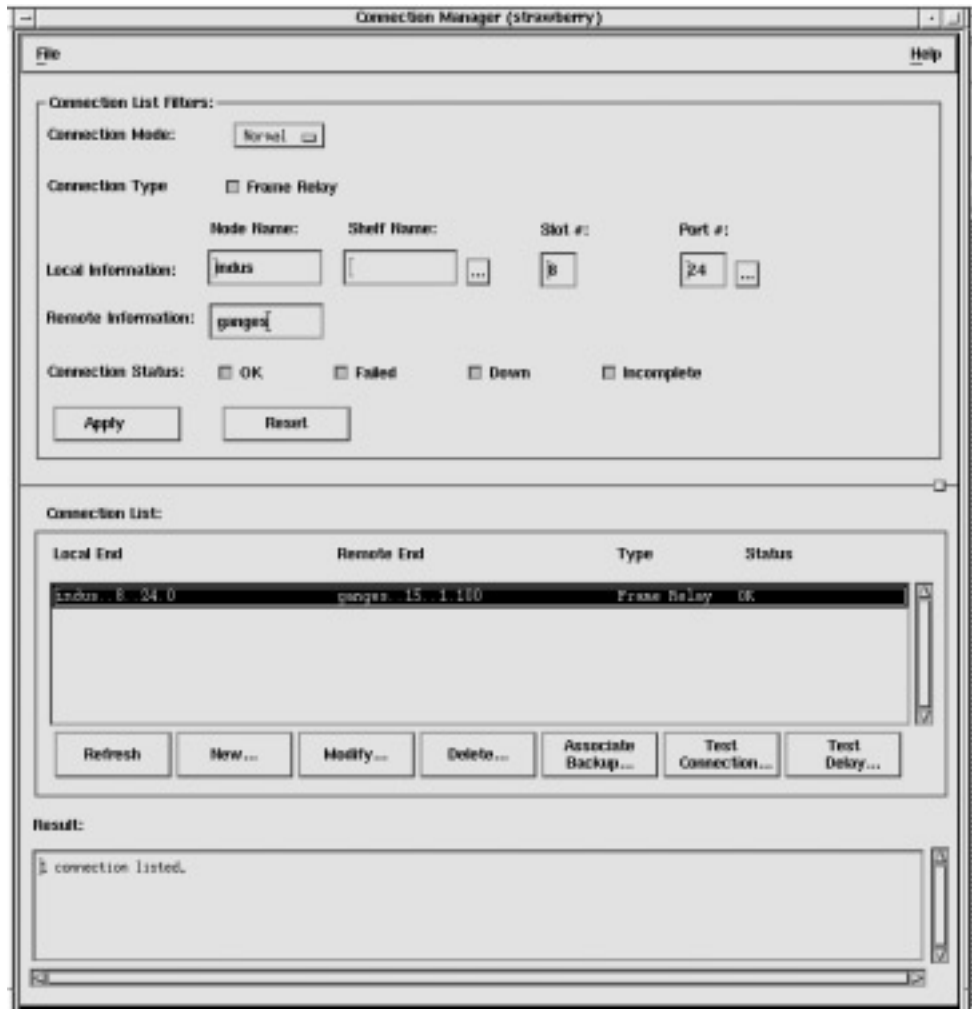
Step 5 In the Connection List box, click on the connection to which you wish to Associate a
Dial-Backup Connection. When selected the connection will be high-lighted as shown in
Figure 13-8.

Step 6 Press the Associate Backup... button to access the Associate Backup window, shown in Figure 13-9. The Backup ANI's box will list all the ANIs that have been configured with ANI Type: Dial-Backup as described in Chapter 5. The Dial-Backup PVCs for Selected Backup ANI box will list the Dial-Backup connections that have been configured for that ANI.

Step 7 Select the appropriate ANI and the appropriate Dial Backup PVC and press the Add Association button.

Step 8 Click the Close button to return to the Connection Manager window

Figure 13-9   Associate Backup Window

Dial-Up Frame Relay Operation

This chapter provides procedures for using the configuration interfaces at the DAS Server Shelf and the StrataView Plus Workstation to set up typical DAS Dial-Up Frame Relay network applications.

This chapter describes the following Dial Access Switching tasks:

- Local Access

- Remote Network Access Via Telnet

- Add DAS (INS) Daemon

- Add a PRI Dial-Up Port

- Set Up a Dormant Dial-Up Connection

- Set Up a Dormant Dial-Backup Connection

- Remove a Dial-Up Frame Relay Connection

- Remove a Dial-Backup Frame Relay Connection

- Remove a PRI Configuration

- Remove an DAS (INS) Daemon

- Configure Call Detail Record Parameters

- Using the StrataView Plus Event Log

These procedures are divided into tasks that should be performed at either the DAS Server Shelf or at the StrataView Plus Workstation. Some tasks must be (or can be) performed from both (or either) locations. An empty area indicates that nothing needs to be performed from that location at that time.

Local Access

Table 14-1 provides a quick procedure for gaining local access to the DAS Server Shelf.

Table 14-1   Local Access

At the DAS Server Shelf	At the StrataView Plus Workstation
• Connect the terminal or PC/terminal emulation to the serial port (A/B [Terminal]) on the DAS Server Shelf. Note the different locations of the Terminal connector on DAS-AC, DAS-DC and -E models.	
• Log in as *inuser* at the login prompt.	

Remote Network Access Via Telnet

Table 14-2 provides a quick procedure for telneting to the DAS Server Shelf.

Table 14-2   Remote Network Access Via Telnet

At the DAS Server Shelf	At the StrataView Plus Workstation
	• Open a new XTerm window.
	Method 1
	• At the HP OpenView network topology window:
	• Select the INS/DAS icon.
	• Select *telnet* from the StrataView Plus menu to access the telnet window.
	• Use the telnet window to execute.
	Method 2
	• At the system prompt, run *telnet hostname* where hostname is the name of the DAS Server Shelf.
	• Log in as insuser at the prompt.

Add DAS (INS) Daemon

This process defines the StrataView Plus that is running the DAS (INS) Daemon software. An DAS (INS) Daemon enables communication between the DAS Server Shelf and the StrataView Plus. Each DAS Server Shelf can only communicate with one DAS (INS) Daemon that resides on a StrataView Plus system. You can add as many entries of DAS (INS) Daemon as you want, but only the one with the lowest "Preference" number and whose "Admin Status" is UP will be used by the DAS Server Shelf. Table 14-3 provides a quick procedure for adding an DAS (INS) Daemon to the Dial-Up Frame Relay Configuration.

Table 14-3   Add an DAS (INS) Daemon

At the DAS Server Shelf	At the StrataView Plus Workstation
• Run INS_CLI after you log in as insuser.	
• Choose option 13 from the INS_CLI main menu and fill in the IP address and other information of the StrataView Plus workstation that has the DAS (INS) Daemon running.	

Add a PRI Dial-Up Port

For each PRI Dial-Up port on a Cisco wide-area switch, the corresponding switch table entry must be added to the DAS Server Shelf. A signaling PVC with DLCI=0 also must be set up between this port and the DAS Server Shelf port before it can be used for Dial-Up or Backup Frame Relay. The switch table entry can be added by using the INS_CLI on the DAS Server Shelf or using SNMP set on the DAS Dial-Up Frame Relay MIB objects. Table 14-4 provides the quick steps for adding a PRI Dial-Up port.

Table 14-4   Add a PRI Dial-Up Port

At the DAS Server Shelf	At the StrataView Plus Workstation
• Add the switch table entry by using the INS_CLI option 11, Configure a PRI. Each switch table entry corresponds to one PRI. Assign a unique DLCI for each entry which will be used for the signalling PVC at the DAS Dial-Up Frame Relay end. This process can also be done with SNMP.	
	• Telnet to the node connected to the PRI. Add an FRP port on DS024 (for a T1 line).
	• Start the Connection Manager from the StrataView Plus Desktop interface. Add a normal mode connection between the PRI Dial-Up port and the Frame Relay port to which the DAS Server Shelf is connected. The DLCI at the PRI Dial-Up port end should be 0 (zero), and the DLCI at the DAS Server Shelf end should be the same as configured in the switch table for this PRI.

For example, the DLCI for a PRI switch table entry is 1, the PRI port is on Node A Slot 15, and the DAS Server Shelf is connected to Node B Port 16.1. An FRP port 15.24 should be added on Node A and the signalling PVC should be Node A 15.24.0 to Node B 16.1.1. In addition, the LMI for the connection should be set to none.

Set Up a Dormant Dial-Up Connection

This procedure adds the dormant dial-up connection to the StrataView Plus Workstation database for a specific ANI. Table 14-5 provides the quick steps for adding an ANI and its associated Dial-Up connection.

Table 14-5   Set up Dial-Up Frame Relay

At the DAS Server Shelf	At the StrataView Plus Workstation
	• Select Option 9 from the StrataView Plus Main Menu to start configuration process for ANI.
	• Choose Option 1 to add an ANI entry. Use the ANI configuration interface to provide port parameters. Save the configuration.
	• Start the Connection Manager from the StrataView Plus Desktop icon, and add the connection for the newly configured ANI. Make sure the Connection Mode is set to Dial Up on the Connection Manager window.

Set Up a Dormant Dial-Backup Connection

This procedure adds the dormant dial-backup connection for a specific ANI and associates it with an existing frame relay PVC. Table 14-6 provides the quick steps for adding a Dial-Backup connection.

Table 14-6   Set up Dial Backup Frame Relay

At the DAS Server Shelf	At the StrataView Plus Workstation
	• Select Option 9 from the StrataView Plus Main Menu to start configuration process for ANI.
	• Choose Option 1 to add an ANI entry. Use the ANI configuration interface to provide port parameters. Save the configuration.
	• Start the Connection Manager from the StrataView Plus Desktop icon, and add the connection for the newly configured ANI. Make sure the Connection Mode is set to Dial Up on the Connection Manager window.
	• Select the normal connection you need dial backup, and associate it with the dial-up connection you just added.

Remove a Dial-Up Frame Relay Connection

Table 14-7 provides the quick steps removing a Dial-Up connection. Dormant Dial-Up connections must be removed through the StrataView Plus Connection Manager before configured ANIs can be removed from the Dial-Up Frame Relay Configuration Interface as was described in Chapter 11 in the section, 3. Delete an ANI entry.

Table 14-7   Remove a Dial-Up Frame Relay Connection

At the DAS Server Shelf	At the StrataView Plus Workstation
	At the Connection Manager window:
	• Select dialup mode.
	• Select an ANI and a connection.
	• Press the Delete key.

Remove a Dial-Backup Frame Relay Connection

Table 14-8 provides the quick steps for removing a Dial-Backup connection. Dormant Dial-Backup connections must be removed through the StrataView Plus Connection Manager before configured ANIs can be removed from the Dial-Up Frame Relay Configuration Interface as described in Chapter 11 in section, 3. Delete an ANI entry.

Table 14-8   Remove a Dial Backup Frame Relay Connection

At the DAS Server Shelf	At the StrataView Plus Workstation
	At the Connection Manager window:
	• Select dialup mode.
	• Select an ANI and a connection.
	• Press the Delete key.

Remove a PRI Configuration

Table 14-9 provides the quick steps for removing a configured PRI.

Table 14-9   Remove a PRI Configuration

At the DAS Server Shelf	At the StrataView Plus Workstation
At the INS CLI:	
• Use option 12, Delete a PRI Configuration. The Delete Switch Type screen appears.	
• Type the DLCI in the Delete Switch Type screen.	

Remove an DAS (INS) Daemon

Table 14-10 provides the quick step for removing an DAS (INS) Daemon form the Dial-Up Frame Relay configuration.

Table 14-10   Remove an DAS (INS) Daemon

At the DAS Server Shelf	At the StrataView Plus Workstation
• Perform the reverse operation as described in the Dial-Up Frame Relay setup	

Configure Call Detail Record Parameters

Table 14-11 provides the quick steps for configuring Call Detail Record parameters.

Table 14-11   Configure Call Record Information

At the DAS Server Shelf	At the StrataView Plus Workstation
• Run INS_CLI after you log in as insuser. (The insuser process must be enabled for the CDR process to work.)	When the INS Daemon is running on the StrataView Plus Workstation, it automatically retrieves any CDR files in the DAS Server Shelf CDR backup directory and stores them as compressed files in an archive. The StrataView Plus Workstation maintains these compressed files for 30 days.
At the INS CLI:	
• Use option 10, Modify CDR Configuration	
• Enter the desired CDR interval, a value within the range of 30 to 1440 minutes.	
• Enter the desired CDR Backup Count, a value within the range of 0 to 10 files.	

Using the StrataView Plus Event Log

The StrataView Plus event log displays descriptions of network- and operator-generated occurrences. Internally, event descriptions are generated as a result of the trap information which is transmitted between the DAS Dial-Up Frame relay agents and the network management system. StrataView Plus uses the HP OpenView Event Browser application to display the list of events and alarms. The event browser application allows you to selectively browse through the events. Table 14-12 provides the quick steps for viewing the StrataView Plus 8.1 Event Browser.

Table 14-12   StrataView Plus Event Log

At the DAS Server Shelf	At the StrataView Plus Workstation
	• Start HP OpenView at the StrataView Plus Workstation.
	• Select StrataCom Events from the Event Categories window. The Event Browser window shown below will appear.

Figure 14-1   StrataView Plus 8.1 Events Browser
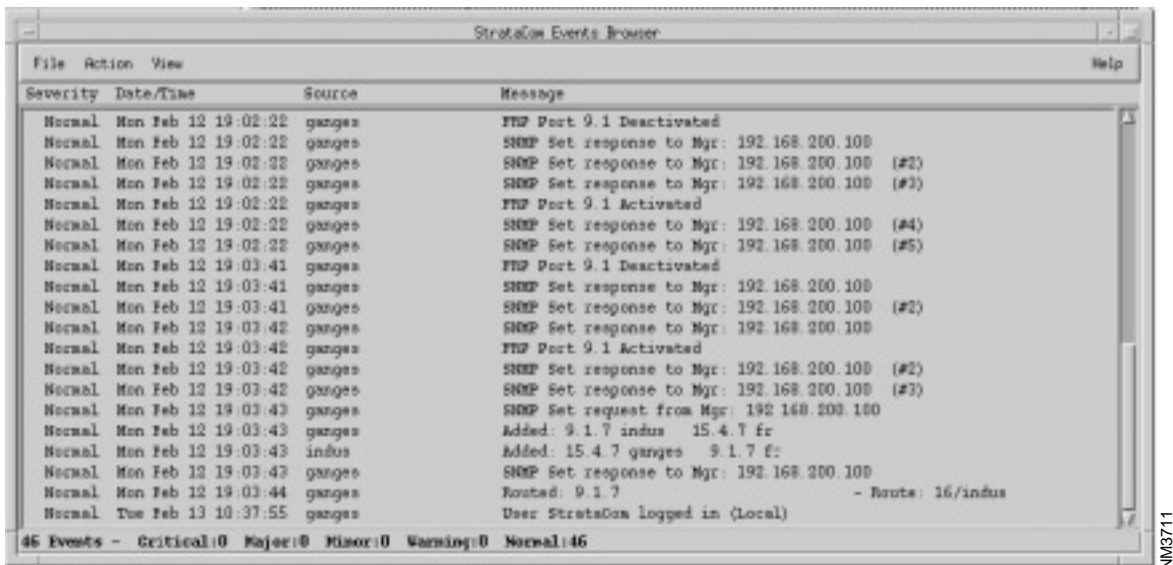
The browser displays the following information about each event:

Severity   This column displays the criticality of the event. Severity values are: critical, major, minor, and normal.

Date/Time   The week day, calendar date, and time of the event occurrence.

Source   The object identifier affected by the event.

Message   Description of the event.

Refer to the *Cisco StrataView Plus Operations Guide* for Release 8.1 for more information about the Event Log and the Event Browser.

StrataView Plus 8.4 has more tools built in for monitoring the Cisco WAN switching network. Refer to the *Cisco StrataView Plus Operations Guide* for Release 8.4 for more information.

Note   There is also an independent DAS (INS) Daemon log (insd.log), which records error messages specific to DAS processes. insd.log is described in Appendix C, Troubleshooting.

Cable Information

This appendix provides information about the DAS Server Shelf AC power cables and includes an illustration of a sample null modem cable.

AC Power Cabling

Cable: Cisco provides a 6-foot (1.8m), 3-conductor cord with an IEC 320 C-13 appliance coupler for mating with the DAS Server Shelf on the system end. The other end of the power cord should be a grounding-type attachment plug as described in the paragraphs that follow.

Connector: For North America and Japan: NEMA 5-15

For Continental Europe: CEE 7/7 (Schuko)

For Italy: CEI 23-16/VII (16 Amp plug)

For United Kingdom and Ireland: BS 1363

For Australia and New Zealand: AS 3112

For those countries not appearing in the preceding list, use a power cord with an IEC 320 C-13 appliance coupler for the system-end and an appropriate grounding-type attachment plug at the other end in accordance with local standards.

Cable

Source-end connector information is not available for all countries, so local codes must be known or obtained by either the customer or installer.

Sample Null Modem Cable

Figure A-1 shows a typical null modem cable. Cisco does not supply this cable.

Figure A-1   Null Modem Cable

```
1  ————————————————————————  1

2  ——————————⟍      ⟋——————————  2
                    ╳
3  ——————————⟋      ⟍——————————  3

4  ——————————⟍      ⟋——————————  4
                    ╳
5  ——————————⟋      ⟍——————————  5

6  ——————————⟍      ⟋——————————  6

7  ————————————————————————  7

8  ——————————⟍●  ●⟋——————————  8

20 ——————————⟋      ⟍——————————  20
```

H8424
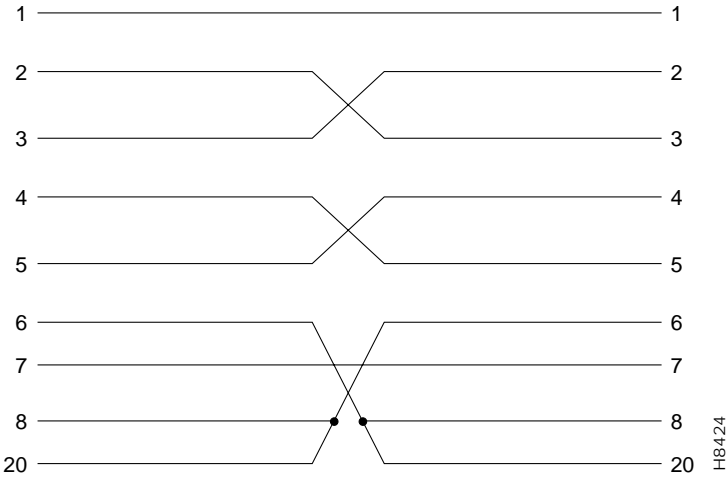
Dial-In Support

Motorola V.34R DNS Dial-In Configuration

During the initial installation of the DAS Server Shelf, Cisco strongly recommends that a modem be attached to the serial port and configured to auto-answer calls from our Customer Service. By dialing in, Customer Service can access your system remotely and resolve potential problems. An optional Motorola V.34R Modem can be purchased from Cisco.

This setup prepares a modem attached to the DAS Server Shelf to answer a call from Customer Service. You should arrange to work with Customer Service to initially set up and test the modem for dial-in operation (i.e., auto answer). Customer Service must record the telephone number for dialing into the your system.

The port on the DAS Server Shelf should be factory-configured for 9600 bps and VT100 mode. Table B-1 lists the modem interface requirements.

Table B-1   Modem Interface Requirements

Parameter	Requirement
DAS Server Shelf Port	Serial port, A/B (Terminal)
Code	Standard 8-bit ASCII, 1 stop bit, no parity.
Interface	RS232 DCE.
Cable	25-pin straight through cable.
Phone Lines	Dedicated dial-up business telephone line for ISC-to-DAS modem connection.
Data Rate	All standard asynchronous data rates from 300 to 19200 bps, independently selectable.
Supported Modems	Motorola Model V.34R 9600 baud modem.

There are two procedures to be performed before Customer Service can dial into the DAS Server Shelf:

- Configure the DAS Server Shelf's Serial Port.

- Connect and Configure the Modem for the DAS Server Shelf.

These procedures are for a typical connection. Refer also to the *Modem User's Guide*.

Configure the DAS Server Shelf's Serial Port

Typically the serial port on the DAS-AC or DAS-DC is factory-configured for 9600 bps and VT100 mode. If it is not, you can configure the serial port (A/B [Terminal]) as follows:

Step 1   Login to the DAS Server Shelf as superuser (i.e., root).

Step 2   Edit the /etc/ttytab file as follows:

```
ttyb "/usr/etc/getty D9600" dialup on remote
```

Step 3   Check to see if **getty** is running for ttyb by entering:

```
ps -aux | fgrep getty
```

Step 4   Note the process ID so you can kill it and restart the **getty**.

Step 5   If a **getty** is already running for the specified port, find its process id, then issue:

```
kill -9 <process ID>
```

Step 6   Restart init by entering:

```
kill -HUP 1
```
This command restarts the new **getty**.

Note   To connect a modem to a DAS-AC-E or DAS-DC-E, the factory installed soft-switch cable may have to be removed. Contact Customer Service for details.

Connect and Configure the Modem for the DAS Server Shelf

To connect and configure the modem for dial-in operation, follow these steps:

Step 1   Connect power to the modem.

Step 2   Temporarily attach a terminal to the modem EIA port, using a straight-through cable. The modem's EIA port will automatically match the 9600 bps setting of the terminal.

Step 3   Configure the modem for 8 bits, no parity, and 1 stop bit.

Step 4   Enter the commands listed in Table B-2 to set up the modem for proper operation.

Step 5   Disconnect the terminal and connect that end of the cable to the DAS Server Shelf port (A/B [Terminal]). (The other end remains connected to the EIA port on the modem.)

Step 6   Connect the modem to the phone line.

Step 7   Ask Customer Service to test the operation of the dial-in modem.

Table B-2   Setting up the Motorola V.34R Modem for Auto-Answer Mode

Step	Command	Function
1.	AT&F&W	Reset to factory default and save.
2.	ATS0=1	Enables Auto-Answer Mode (answer on first ring).
3.	ATL1	Modem speaker at low volume.
4.	AT*SM3	Enables automatic MNP error correction.
5.	AT*DC0	Disables data compression.
6.	AT*FL0	Disables XON/XOFF flow control.
7.	AT&S1	Sets DSR to "normal".
8.	ATE0	Disables local character echo.
9.	ATQ1	Disables result codes. (Modem will appear "dead".)
10.	AT&W	Saves current configuration settings in non-volatile memory.

Hayes Modems

Not all of the modem EIA leads are supported by the DAS Server Shelf. If a Hayes modem is used in place of the MotorolaV34 Modem, configure the Hayes modem using the following AT commands:

DCD - On	AT&CØ
DTR - On	AT&DØ
DSR - Normal	AT&S1
CTS - ON when connected	AT&R1
	ATSØ=1 (answer on first ring)

When the system is up, Customer Service will be able to dial in to the DAS Server Shelf and login as any other user on the system.

Troubleshooting

This Troubleshooting appendix is divided into the following sections:

- Troubleshooting StrataView Plus Workstation to DAS Server Shelf Connectivity
- Troubleshooting PRI to DAS Server Shelf
- Troubleshooting PVCs
- DAS (INS) Daemon LOG
- INS Alarms

Troubleshooting StrataView Plus Workstation to DAS Server Shelf Connectivity

Problems with the StrataView Plus Workstation to DAS Server Shelf connection are divided into two categories:

- Over an Ethernet Connection
- Over a V.35 Frame Relay Connection

Over an Ethernet Connection

When there is a problem with the StrataView Plus Workstation to DAS Server Shelf communication and they are connected over ethernet, the following is a list of things that you should check:

Step 1 Check the cabling between the StrataView Plus Workstation and a router and 10Base-T hub.

Step 2 Check the cabling between the hub or router and the DAS Server Shelf.

Step 3 If the DAS Server Shelf is on a subnet, make sure the IP Address is set correctly with respect to subnet masks.

Step 4 If the ethernet connection is through routers, make sure the routers are set up correctly.

Step 5 Check with your network system administrator to see if you need to modify the DAS Server Shelf's */etc/defaultrouter* file to identify the router.

Step 6 Check with your network system administrator to see if you need to modify StrataView Plus Workstation's */etc/defaultrouter* file to identify the router.

Step 7 Ping the StrataView Plus Workstation from the DAS Server Shelf:

ping *hostname of StrataView Plus Workstation*

then

ping *IP address of StrataView Plus Workstation*

If you can ping with the IP address but not with the hostname, then */etc/hosts* has not been set up correctly.

Step 8 If you can talk to the StrataView Plus Workstation but not to the DAS (INS)Daemon software, make sure that the file */usr/net/fr/hosts* also contains the IP address of the StrataView Plus Workstation.

Step 9 Repeat Step 7, but ping from the StrataView Plus Workstation.

Over a V.35 Frame Relay Connection

When there is a problem with the StrataView Plus Workstation to DAS Server Shelf communication and they are connected via IP over frame relay, the following is a list of things that you should check:

Step 1 Check the cabling between the StrataView Plus Workstation and the router.

Step 2 Make sure that the router has been setup correctly, i.e., */etc/defaultrouter*.

Step 3 Check the cabling between the router and the Cisco wide-area switch, i.e., make sure the router is connected to the Frame Relay network.

Step 4 Make sure the router's V.35 port and the remote DAS Server Shelf are on the same subnetwork. (Refer to this chapter, DAS Server Shelf Interface Connections.)

Step 5 Make sure there's a PVC between the router and the remote DAS Server Shelf and that this PVC is configured for at least 128 kbps of bandwidth.

Step 6 Use **testcon** to connect to test the PVC. (Refer to the *Cisco WAN Switching Command Reference* for more information about **testcon**.)

Step 7 From the StrataView Plus Workstation ping the remote DAS Server Shelf, by hostname, then by IP address.

Step 8 It may be necessary to setup a route from StrataView Plus to the remote DAS (INS) through the router as described in the chapter, DAS Server Shelf Interface Connections.

Troubleshooting PRI to DAS Server Shelf

When there appears to be a problem with the PRI to DAS Server Shelf, check the following list of things:

Step 1 Ensure that the CSU connected to the Cisco wide-area switch circuit line interface (T1 or E1 FRP) is configured properly: ESF with B8ZS for T1; HDB3 with CCS for E1.

Step 2 Ensure that there is a PVC between the PRI port and the DAS Server Shelf with the correct logical channel (T1 = 24; E1 = 16) and a DLCI of 0 at the PRI end.

Step 3 Ensure that the PVC between the PRI and the DAS Server Shelf has been configured for a PIR, MIR, and QIR of 64 kbps.

Step 4 Ensure that the DAS Server Shelf has been configured for the correct Switch Type. (See the chapter, Understanding the DAS Command Line Interface for information on using the DAS (INS) Command Line Interface [INS_CLI].)

Troubleshooting PVCs

This section contains some generic hints for troubleshooting PVCs. These PVCs could be the signalling PVCs used to configure the DAS Dial-Up Frame Relay system, or the Dial-Up or Dial-Backup PVCs.

When there appears to be a problem with an existing PVC, try these things:

1   Use the **dspportstats** command to see if frames are being passed across the port. Reset the port stats counters with the **clrportstats** command. Look for frame errors. (The *Cisco WAN Switching Command Reference* describes this command in detail.)

2   Use the **dspchstats** command at both endpoints of the PVC. Reset the channel stats counters to with the clrchstats command. (The *Cisco WAN Switching Command Reference* describes this command in detail.)

3   Use the Frame Relay Status Utility on the DAS Server Shelf to verify data on the PVC, identified by its DLCI, at the DAS Server Shelf. (The next section describes Using the Frame Relay Status Utility.)

4   Ensure that the factory-configured file *usr/net/fr/ fr_config* file appears as it is shown in Chapter 6, DAS Server Shelf Interface Connections.

5   Ensure that the *usr/net/fr/fr_conv* file contains the IP address to DLCI mapping for any IP networks accessible across the frame relay network, as shown in chapter, DAS Server Shelf Interface Connections.

6   Log in as root on the DAS Server Shelf. Change directory to *opt/ins/log*. List (*ls*) the directory. There should be a log file for each DLCI on the DAS Server Shelf serial frame-relay (RS422/V.35) port.

7   In the same directory look at the IFM_LOG file, by entering *more* IFM_LOG. If you see 0-length received frames, you can tell there is a problem with the frames received.

8   If no connections can be made, look in the *insd.log*, described in the section DAS (INS) Daemon Log, for a specific error message. Take the appropriate action.

9   If a Dial-Backup cannot be made, look in the *insd.log*, described in the section DAS (INS) Daemon Log, for a specific error message. Take the appropriate action.

10 If the DAS (INS) Daemon is not accepting calls, look in the *insd.log*, described in the section DAS (INS) Daemon Log, for a specific error message. Take the appropriate action.

11 If calls are not successfully processed, look in the insd.log, described in the section DAS (INS) Daemon Log, for a specific error message. Log into the node and use **dspsnmp**, described in the *Cisco WAN Switching Command Reference*, to ensure that the node allows SNMP sets. Look for hanging PRI B channel connections. Take the appropriate action.

12 If the original connection cannot be restored, look in the *insd.log*, described in the section DAS (INS) Daemon Log, for a specific error message. Take the appropriate action.

Using the Frame Relay Status Utility

The Frame Relay Status Utility runs on the DAS Server Shelf and monitors the frame relay connections over the serial frame-relay port (RS422/V.35).

To use the Frame Relay Status Utility, follow these steps:

Step 1   Log into the DAS Server Shelf as root.

Step 2   Change directory to *usr/net/fr*.

Step 3   Type *frstatus* and press Enter. The Frame Relay/PPP Status Report screen, as shown in Figure C-1, appears.

Figure C-1   Frame Relay/PPP Status Report Screen


```
Frame Relay/PPP Status Report - Link/Network States Mon Apr 29 15:02:41 1996


            Port 0 Host - State: LINKUP MODEM_PRESENT

    LINKUP since                                        -
    Bad FCS frames received                             0
    Short frames received                               0
    I-Frames and keep-alives received                   0
    I-Frames and keep-alives transmitted                0
    Link Management Trials                              0
    Link Management Errors                              0




[p <port>, d <dlci>, u, aa, ad, r (redraw), q (quit), z, h (help), <cr> ]:
```

Step 4   Type *ad* and press enter to get a list of all the currently configured DLCIs. A DLCI Report screen, similar to Figure C-2, appears.

Figure C-2   DLCI Report Screen


```
Frame Relay/PPP Status Report   -   DLCI Report    Mon Mar 25 12:53:45 1996


        DLCI         8: UP Frames in      150 last - Mon Mar 25 12:53:41 1996
                        Frames out      150 last - Mon Mar 25 12:53:41 1996
        DLCI         9: UP Frames in        0 last -  -
                        Frames out        0 last -  -
        DLCI        11: UP Frames in        0 last -  -
                        Frames out        0 last -  -
        DLCI        20: UP Frames in        0 last -  -
                        Frames out        0 last -  -
        DLCI        21: UP Frames in        0 last -  -
                        Frames out        0 last -  -
        DLCI        22: UP Frames in        0 last -  -
                        Frames out        0 last -  -
        DLCI        23: UP Frames in        0 last -  -
                        Frames out        0 last -  -
        DLCI        24: UP Frames in        0 last -  -
                        Frames out        0 last -  -

q (return to menu), <cr> to continue list: 
```

Step 5 Find the DLCI you wish to monitor and press *q*. You will return to the previous screen. Type *d*, followed by a space, then the number of the DLCI, and press Enter. A Frame Relay/PPP Status Report screen similar to Figure C-3, which includes Frames-in and Frames-out counters for the specified DLCI, will appear.

Figure C-3   Frame Relay/PPP Status Report Screen


```
Frame Relay/PPP Status Report - Link/Network States Mon Mar 25 12:57:57 1996


       Port 0 Host - State: LINKUP MODEM_PRESENT

   LINKUP since                                  -
   Bad FCS frames received                       0
   Short frames received                         0
   I-Frames and keep-alives received             168
   I-Frames and keep-alives transmitted          168
   Link Management Trials                        0
   Link Management Errors                        0

   DLCI        8: UP Frames in        166 last - Mon Mar 25 12:57:44 1996
                   Frames out         166 last - Mon Mar 25 12:57:44 1996




u (auto update), <cr> to continue: █
d 8
```

Step 6 To clear the Frames-in and Frames-out counters, press Enter, the *q*, and you will return to the DAS Server Shelf UNIX file directories. Type *frroute* and press Enter.

Step 7 To return to the Frame Relay Status Utility, type *frstatus* and press Enter. Type z and press Enter to zero the other Frame Relay Status counters.

Step 8 Type *d*, followed by a space, then the number of the DLCI, and press Enter. The Frame Relay Status Report screen will appear with all counters zeroed.

Step 9 Type *u 1*, to update the screen at one second intervals. Observe the seconds indicators in the current time at the top of the screen are incrementing. This screen is now being refreshed and you can observe the counters to detect what is happening on the selected DLCI.

Note   You can access a Help menu from the main Frame Relay/PPP Status Report screen, by typing *h* and pressing Enter.
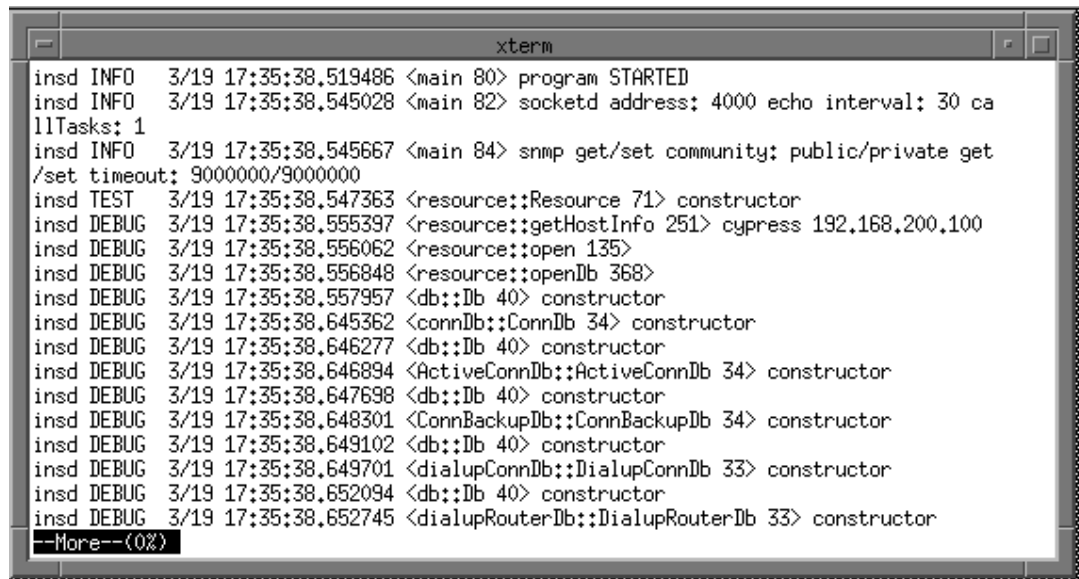
DAS (INS) Daemon LOG

DAS (INS) Daemon messages are stored in *usr/users/svplus/insd.log* on the StrataView Plus Workstation. These messages can also be helpful in resolving DAS Dial-Up Frame Relay Application problems. (The next sub-section lists all the *insd.log* Error Messages.)

To view the *insd.log*, follow these steps:

Step 1   Log into the StrataView Plus Workstation as root.

Step 2   Change directory to */usr/users/svplus/log*.

Step 3   Look at the *insd.log*, which will appear similar to Figure C-4, with a UNIX-level command, such as *more insd.log*.

Figure C-4   insd.log


```
insd INFO    3/19 17:35:38.519486 <main 80> program STARTED
insd INFO    3/19 17:35:38.545028 <main 82> socketd address: 4000 echo interval: 30 ca
llTasks: 1
insd INFO    3/19 17:35:38.545667 <main 84> snmp get/set community: public/private get
/set timeout: 9000000/9000000
insd TEST    3/19 17:35:38.547363 <resource::Resource 71> constructor
insd DEBUG   3/19 17:35:38.555397 <resource::getHostInfo 251> cypress 192.168.200.100
insd DEBUG   3/19 17:35:38.556062 <resource::open 135>
insd DEBUG   3/19 17:35:38.556848 <resource::openDb 368>
insd DEBUG   3/19 17:35:38.557957 <db::Db 40> constructor
insd DEBUG   3/19 17:35:38.645362 <connDb::ConnDb 34> constructor
insd DEBUG   3/19 17:35:38.646277 <db::Db 40> constructor
insd DEBUG   3/19 17:35:38.646894 <ActiveConnDb::ActiveConnDb 34> constructor
insd DEBUG   3/19 17:35:38.647698 <db::Db 40> constructor
insd DEBUG   3/19 17:35:38.648301 <ConnBackupDb::ConnBackupDb 34> constructor
insd DEBUG   3/19 17:35:38.649102 <db::Db 40> constructor
insd DEBUG   3/19 17:35:38.649701 <dialupConnDb::DialupConnDb 33> constructor
insd DEBUG   3/19 17:35:38.652094 <db::Db 40> constructor
insd DEBUG   3/19 17:35:38.652745 <dialupRouterDb::DialupRouterDb 33> constructor
--More--(0%)
```

UNIX-Level Commands

UNIX provides multiple ways to view the *insd.log*, such as

- *tail* to display the last part of a file.

- *more* (or *page*) to browse through a text file.

- *view* to run a visual display in the read-only mode.

You can find out more about these methods of viewing the insd.log by using the UNIX man command. For example, *man view* will provide the details about view.

If you do use view to display the insd.log, the following list of commands are helpful:

control-f   pages forward

control-b   pages backward

G   goes to the end of the file

:#   (where number is an integer) goes to a specific line number

/pattern   searches for the pattern, e.g., /ERROR will search for ERROR

:q!   quits the file

:set number   displays the file with line numbers

:set ic   makes the search pattern case insensitive

Remember that UNIX is normally case sensitive.

If you happen to get stuck in an editing mode, use the esc (Escape) key to return to the command mode.

INSD.LOG Error Messages

The DAS (INS) daemon error messages are listed in Table C-1. Some common abbreviations used in these error messages are:

- emd   Equipment Manager daemon

- cmgrd   Connection Manager daemon

- ConnManager   Connection Manager daemon

- <Connection end point 1.DLCI> represents a frame-relay connection end point

All mentions of records in these messages are related to the data base.

Table C-1   DAS (INS) Daemon Error Messages

Error Message	Description
ERROR: received invalid msg (integer value)	Invalid message received by a task.
ERROR: request from invalid station	An unconfigured DAS (INS) station (i.e., DAS Server Shelf) has made a service request.
ERROR: invalid calling number (character string)	A call request with an invalid ANI has been received. *Appropriate action: Configure the ANI.*
ERROR: cannot find ANI end-point	Failed to find other end-point of the PVC that connects the DAS (INS) (i.e., DAS Server Shelf) to the PRI; i.e., cannot find the PRI end-point.
ERROR: can't send disconnect to INS. INS is down	DAS (INS) Daemon cannot find the DAS Server Shelf for a call it is trying to disconnect in the station list. The DAS (INS) Daemon initializes a disconnect when the PVCs of a call have failed.
ERROR: no conns for calling number (character string)	There are no Dial-Up/Dial-Backup connections for this ANI. *Appropriate action: Configure Dial-Up PVC.*
ERROR: dialup conn to conn translation failure	Error in translating a dial-up connection to a connection record suitable for connection creation.
ERROR: setFrPort failure	Cannot set the Frame Relay Port to the attributes specified by the insAniConfig program. *Appropriate action: 1. Ensure that Cisco wide-area switch allows SNMP sets with* **dspsnmp** *command;* *2. Look for hanging PRI B channels.*
ERROR: back-up conn has no assoc	The Dial-Backup connection in the database is not associated to a standard frame relay connection. *Appropriate action: Set up an associate normal PVC for this Back-Up PVC.*
ERROR: user_connection db has no assoc conn	Cannot find a matching standard frame relay connection for the Dial-Backup connection. *Appropriate action: Set up a normal Frame Relay connection.*
ERROR: cannot find the conn in user_connection table using conn backup info	This is part of the failure recovery mechanism: if the normal connection is not in the network, but is found in the ins_conn_backup table, the DAS (INS) Daemon (insd) will assume that the previous call from the user may not have terminated appropriately. It will attempt to verify that the previous dial-up connection is removed and will attempt to remove it again if it is not. This error message is then notifying you that a record in the ins_conn_backup table suggesting that there is still a connection in the network is not valid.
ERROR: Problem conn <Connection end point 1.DLCI> <Connection end point 2.DLCI>	This identifies a "problem connection"—one that was not previously removed successfully.
ERROR: connBackup create failure	This indicates a failure in creating a record of the standard frame relay connection that is about to be removed from the database. *Appropriate action: Look for duplicate entry in data base.*
ERROR: connBackup record delete failure	Failure to delete a record in the ins_conn_backup database from a previous run that is no longer needed.

Table C-1   DAS (INS) Daemon Error Messages (Continued)

Error Message	Description
ERROR: assoc conn <Connection end point 1.DLCI> <Connection end point 2.DLCI>	Could not remove a standard frame relay connection that is associated with a Dial-Backup connection.
ERROR: activeConnDb create failure	Failure to create a record in the ins_active_conn table. *Appropriate action: 1. Look for duplicate entry in data base; 2. Look for bad data base.*
ERROR: activeConnDb ani (character string) remote record delete failure	Failure to delete a record in the ins_active_conn table.
ERROR: activeConnDb ani (character string) remote <Connection end point 1.DLCI> record create failure	Failure to create a record in the ins_active_conn table.
ERROR: conn <Connection end point 1.DLCI> <Connection end point 2.DLCI> create failure	Failure to create a connection.
ERROR: conn <Connection end point 1.DLCI> <Connection end point 2.DLCI> restore failure	Failure to restore a standard frame relay connection after an attempt to replace it with a dial-backup connection has failed.
ERROR: conn record restore failure	Failure to remove a record from the ins_conn_backup database after successfully restoring the standard frame relay connection due to the back-up connection creation failure.
ERROR: no conn for assoc	There are no connections in the ins_conn_backup table to be restored for this ANI.
ERROR: active con ani (character string) <Connection end point 1.DLCI> record delete failure	Failed to remove a record from the ins_active_conn table.
ERROR: getNodeName on (integer value) failure	Cannot get node name using node id from database.
ERROR: getNodeInfo on (integer value) failure	Cannot get node info such as platform type from the database.
ERROR: <Connection end point1.DLCI> getFrPortSpeed	Cannot get the speed of the Frame Relay Port from the database.
ERROR: <Connection end point1.DLCI> getFrPortEcn failure	Cannot get the Frame Relay Port ECN threshold from the database.
ERROR: invalid 1_cir of 0	Invalid CIR of 0 for the connection.
ERROR: invalid conn for dlci (integer value)	Cannot find a connection associated with the DLCI at the INS (i.e., DAS Server Shelf) end-point in order to resolve the PRI end-point.
ERROR: cannot get results of downFrPort	SNMP request failure.
ERROR: cannot get results of deleteFrPort	SNMP request failure.
ERROR: failed to down the port	SNMP request for downing a Frame Relay Port has failed.
ERROR: failed to delete the port	SNMP request for deleting a Frame Relay Port has failed.
ERROR: failed to add the port in (integer value) tries	Failed to add a Frame Relay Port.
ERROR: failed to up the port in (integer value) tries	Failed to up a Frame Relay Port.
ERROR: failed to set the port in (integer value) tries	Failed to set a Frame Relay Port's attributes.

Table C-1   DAS (INS) Daemon Error Messages (Continued)

Error Message	Description
ERROR: failed to add the port	Failed to set an MGX 8220 FRSM port.
ERROR: no stationList available	There are no INS (i.e., DAS Server Shelf) stations configured.
ERROR: connDb getList failure	Database failure on access to a list of possible connections leftover on the B-channel (that the call has been received).
ERROR: existing conn delete failure	Failed to delete leftover connections on the B-channel.
ERROR: lost cmgrd connection	No connection to Connection Manager daemon.
ERROR: cannot reconnect to cmgrd	Failed to reconnect to Connection Manager daemon.
ERROR: cannot connect to ConnManager	Failed to reconnect to Connection Manager daemon.
ERROR: time out on request	Connection Manager daemon response timed out.
ERROR: cmgrd returned (integer value)	Connection Manager daemon returned an ERROR (-1) or PARTIAL (1) error code.
ERROR: source (integer value) (character string) code (integer value), (character string)	Error code and strings returned by server processes. (Note that there can be multiple errors returned per request.)
ERROR: invalid cmgrd response	An unrecognized return value received from the Connection Manager daemon.
ERROR: cmgrd failure response (integer value)	Connection Manager daemon returned failure.
ERROR: cmgrd partial failure response (integer value)	Connection Manager daemon returned a partial failure; i.e., it is possible the request was only carried out partially—not all segments of the connection were successfully handled by the Connection Manager daemon.
ERROR: lost emd connection	No connection to Equipment Manager daemon.
ERROR: cannot reconnect to emd	Failed to reconnect to Equipment Manager daemon.
ERROR: timed out on request	Equipment Manager daemon timed out.
ERROR: emd returned (integer value)	Equipment Manager daemon response code.
ERROR: invalid emd response (integer value)	An unrecognized return value received from the Equipment Manger daemon.
ERROR: emd failure response (integer value)	Equipment Manager daemon returned failure.
ERROR: assoc_conn match failure	Failed to find an end-point match between a Dial-Backup connection and a connection in the database when attempting to use its remote DLCI.
ERROR: unsupported msg (integer value) (integer value)	An unsupported feature is being exercised by INS.
ERROR: invalid command line argument (character)	An invalid command line argument specified.
ERROR: cannot register with ILOG	Failed to establish communications with the ILOG broker.
ERROR: init_ipc_watchdog failure	IPC failure; cannot connect with socket daemon.
ERROR: gethostbyname failure	Gethostbyname function failure; cannot resolve the hostname.
ERROR: InitRpc failure	IPC failure; cannot initialize the IPC library.
ERROR: database open failure	Database name does not exist or the database daemons have not been started. *Appropriate action: Ensure that the DAS (INS) Daemon is installed on the SV + Workstation.*
ERROR: cannot connect to EMDAEMON	Cannot connect to the Equipment Manger daemon.
ERROR: invalid asnType (integer value)	Error creating a varbind list; invalid data type.

Table C-1	DAS (INS) Daemon Error Messages (Continued)

Error Message	Description
ERROR: send failed	Error sending SNMP requests.
ERROR: request failed, error (integer value) index (integer value) reqId %lu	SNMP request failed.

INS Alarms

Alarms are generated by the INS processes in response to the detection of any fault conditions during normal operation of the INS. These alarms may be system or call related. As shown in Figure B-5, the alarms generated on the DAS Server Shelf by the INS processes are reported to the resident SNMP agent. These alarms are then transmitted via SNMP traps to "registered" RTM (robust trap mechanism) processes on StrataView Plus Workstations. Figure C-5 shows two StrataView Plus Workstations; one with an active DAS (INS) Daemon (INSD) and the other with a passive INSD. (The RTM trap manager processes on any StrataView Plus Workstation in the network may register with the INS for receiving the alarms.) In Figure C-5, the StrataView Plus Workstation with the passive INSD is also connected to a Customer network management systems (CNMS). The CNMS may then be informed or collect the INS alarm information from the appropriate RTM processes.

Figure C-5   INS Call and Alarm Message Flow
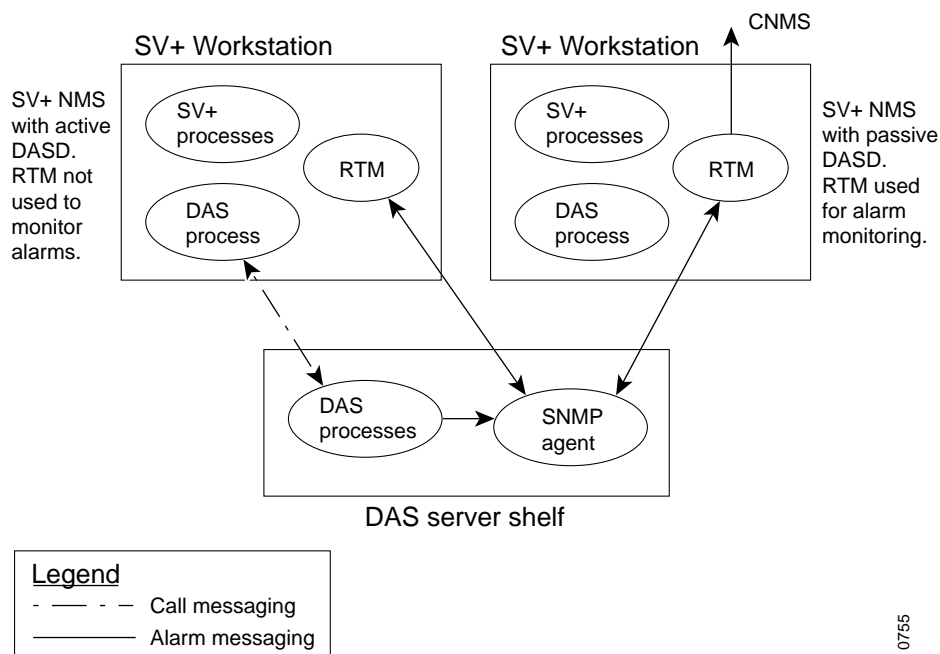
INS alarms include only essential and unique information. There is only a minimum of data that may be derived from other information. This reduces the real-time impact of alarm generation and transmission on system resources.

INS alarms are classified under two categories:

- System Alarms
- Call Progress Alarms

System Alarms

System alarms provide status information on individual system entities. Table C-2 lists and describes the INS system alarms. System alarm messages are sent as SNMP Traps. Each trap usually has a number associated with it corresponding to a value in the INS Management Information Base (MIB). The trap normally includes the system name, the host name of the DAS Server Shelf in ASCII, and a timestamp. The timestamp variable (insEventTimeStamp) is in 1/100 of a second, referenced to January 1, 1970 UTC. The traps will also include other variables that help define the alarm as necessary.

Table C-2   System Alarms and Traps

TRAP	Description
coldStart	Standard SNMP trap generated whenever the DAS Server Shelf is powered on or reset.
v35InterfaceFailure	Generated whenever the DAS Server Shelf cannot communicate with the co-located IGX or Cisco wide-area switch.
v35InfterfaceCleared	Generated when the problem with the ipxCommunicationFailure has cleared.
insServerCommunicationFailure	Generated whenever there is a transition in the connectivity status between the INS and the INSD process running on an associated StrataView Plus Workstation.
	Note: This alarm will be effective only if the alarm monitoring process (i.e., RTM in Figure B-5 is located on a separate StrataView Plus Workstation from the active INSD.)
insServerCommunicationFailureCleared	Generated when the connectivity status problem between the INS and the INSD process has cleared.
insAlarmStatusChanged	Generated whenever the insAlarmStatus changes.
insOperStatusChanged	Generated when the DAS Server Shelf Operation Status changes.
InsFRInterfaceFailure InsFRInterfaceFailureCleared	Generated whenever the state of the frame-relay link between the DAS Server Shelf and the Cisco wide-area switch changes. The link state is determined by LMI (Annex-D) protocol running on the Frame Relay Interface Card (RS422 to V.35). The frame-relay link is operated in the UNI mode. The LMI is configured such that the DAS Server Shelf port is considered to be the user-side, and the Cisco wide-area switch (IPX FRP) is the network side. Even though Annex-D LMI issues and expects full status reports on all configured DLCIs, the status of individual virtual connections is not retrievable by the INS/DAS software from the Frame Relay Card software. Thus, this alarm is not generated on individual connection failures (see the isdnNetworkCommunicationFailure alarm.) This alarm is sent once for every transition in the frame-relay link status.

Table C-2　　System Alarms and Traps (Continued)

TRAP	Description
isdnNetworkComunicationFailure	Generated when the DAS (INS) processes detect a PRI failure.
isdnNetworkCommunicationFailureCleared	In addition to the DAS Server Shelf system name and time stamp, this alarm will include:
	insDialupSwitchDlci variable–the DAS Server Shelf end of the PRI D-channel PVC;
	insPRIFailCause variable–1) Link down, 2)Process error.
insConfigCleared	Generated when the configuration of the DAS (INS) is cleared.
diskThresholdReached	Generated when one or more disk partitions have been filled beyond a configured threshold. (The DAS (INS) usually clears itself.)
diskThresholdReachCleared	Generated when the problem with the disk partitions being full has been fixed.

Call Progress Alarms

Call progress alarms provide call progress information and flags call-related problems. Table C-3 lists and describes the DAS (INS) call progress alarms. Call progress alarm messages are sent as SNMP Traps. Each trap usually has a number associated with it corresponding to a value in the DAS (INS) Management Information Base (MIB). The trap normally includes the system name, the host name of the DAS Server Shelf in ASCII, and a timestamp. The timestamp variable (insEventTimeStamp) is in 1/100 of a second, referenced to January 1, 1970 UTC. The traps will also include other variables that help define the alarm as necessary.

Table C-3　　Call Process Alarms and Traps

TRAP	Description
insIncomingCallNotification	Generated for "informational" purposes by the DAS (INS) to report an incoming call request, i.e., whenever a SETUP message with a specific ANI is received. The alarm is generated at the outset of the request; the call has yet to be processed. The call request must have been parsed with no errors before this alarm is issued.
	The call to be traced is specified by setting the "insDialupCallTraceNumber" object in the DAS (INS) MIB. The number is compared to the Calling Party number in incoming SETUP messages on all PRIs (on a single INS/DAS) and a trap issued if a match is detected.
	In addition to the system name and timestamp, the insIncomingCallNotification includes the following variables:
	insSwitchDlci—The DAS Server Shelf end DLCI of the PRI D-channel PVC.
	insCallingNumber (ANI)—The 20-digit maximum number.
	insCalledNumber—The 20-digit maximum number.
	insBearerChannel—1 thru 24 for T1; 1 thru 31 for E1.

Table C-3   Call Process Alarms and Traps (Continued)

TRAP	Description
insCallOperationFailure	Generated to indicate call operation failures. The operation may be a setup of a new dial-in/backup connection or a teardown of existing connections (PVCs or SPVCs). The information included in this alarm is dependent on the state of the call, and the amount of information that is retrievable from the protocol message. For example, if the ANI is not present in the Q.931 SETUP message, then the ANI cannot be provided in the alarm.
	In addition to the system name and timestamp, the insCallOperationFailure includes the following variables:
	insCallOperation—1) Setup request; 2) Disconnect request.
	insCallFailureCause—The Failure/Error Cause Code described in the appendix, Call Detail Records.
	insSwitchDlci—The DAS Server Shelf end DLCI of the PRI D-channel PVC.
	insCallingNumber (ANI)—The 20-digit maximum number; 0 if an invalid ANI.
	insCallingNumber (ANI)—The 20-digit maximum number 0 if an invalid number.
	insCalledNumber—The 20-digit maximum number.
	insBearerChannel—1 thru 24 for T1; 1 thru 31 for E1; 0 if an invalid bearer channel.
insProtocolError	Generated in response to layer-2 (Q.921) and layer-3 (Q.931) protocol engine errors. The amount of information provided will depend on the specific error type. Call identification data may not be available in very rudimentary protocol failures.
	In addition to the system name and timestamp, the insProtocolErrors includes the following variables:
	insProtocolMessage—The ISDN protocol message involved.
	insProtocolErrorCause—The Failure/Error Cause Code described in Appendix D, Call Detail Records.
	insSwitchDlci—The DAS Server Shelf end DLCI of the PRI D-channel PVC.
	insCallingNumber (ANI)—The 20-digit maximum number.
	insCalledNumber—The 20-digit maximum number.
	insBearerChannel—1 thru 24 for T1; 1 thru 31 for E1; 0 if invalid.

Note   The cause codes used in the insProtocolError trap are proprietary error codes and consist of an extensive set of codes designed to isolate internal protocol and/or functional problems. The intent of this trap is to report the occurrence of the error for debugging purposes and does not indicate a "user-remediable" problem.

Call Detail Records

As described in Chapter 1, the DAS Server Shelf records information about each Frame Relay Dial-Up or Dial-Backup call in a Call Detail Record (CDR). This appendix contains information about the format of CDRs. It includes the following sections:

- CDR Format

- Start of Call Demarcation

- Call Failures

- Failure/Error Cause Codes

The call detail record (CDR) feature creates text records of call related data. The data recorded includes calling and called numbers, call origination/connect time, the time the call was disconnected, the disconnect reason, the DLCI field to identify the originating PRI, and the bearer (B) channel used. There are CDRs for normal calls, i.e., calls that were successfully completed and for failed calls.

The CDRs are collected in files so that they can be uploaded by an StrataView Plus Workstation and to prevent file over-writes and disk capacity problems. The DAS Server Shelf stores up to 10 files of CDRs at any time. Each CDR file contains CDRs that are collected during the time period configured by the CDR Interval. (To configure the CDR Interval and the number of CDR files, see the Modify CDR Configuration section in the chapter, Understanding the DAS Command Line Interface.) If the CDR Interval is configured for 30 minutes (the default), each CDR file will hold CDRs for calls that are accepted during a 30-minute interval. The size of the CDR files will be proportional to the CDR configuration parameters and the call activity rate.

The StrataView Plus Workstation uploads the CDR files from the DAS Server Shelf every 30 minutes, archives and stores them. These archived files are kept for 30 days on the StrataView Plus Workstation before they are deleted.

Note   The CDR files are continually updated to the StrataView Plus Workstation or a customer NMS to prevent file over-writes and disk capacity problems.

CDR Format

The CDR is logged in character (ASCII) and fixed-space format, i.e., each data entity (field) occupies a fixed number of spaces in the record. Table D-1 illustrates the fixed-spaced format of the CDRs. The bold text (e.g., Time [26]) identifies the data entity (field) and the number of spaces in the record that it occupies. There is one CDR event, such as a call origination (orig) or a call disconnect (disc), per line in the record. Each line is terminated by an end-of-line character. The time logged in a CDR is the time kept by the DAS Server Shelf.

Table D-1   CDR Format

Time [26]	Qualifier [11]	Calling Number [21]	Called Number [21]	PRI ID Number [5]	B-Channel Number [3]	Time [26]	Text [35]
orig time	Call Rqst	calling	called	PRI id	B-channel		
disc time	Call Disc	calling	called	PRI id	B-channel	connect time	cause
orig time	Setup Fail	calling	called	PRI id	B-channel		
disc time	Disc Fail	calling	called	PRI id	B-channel	connect time	cause

The fields of each record are defined as follows:

- Time—The date and time of the call origination (orig time) or disconnection (disc time).

- Qualifier—A "type" qualifier consisting of a short ASCII string. There are four qualifiers:

    — Call Rqst—Incoming call enunciator, i.e., call request. Result of request unknown at the time of recording.

    — Call Disc—Call disconnected. The time at which the call was connected is recorded along with the disconnect rqst time. A connect time of 00:00 implies no connection was made.

    — Setup Fail—An incoming call request was denied or failed.

    — Disc Fail—A disconnect request was denied or failed.

- Calling Number—The 20-digit (maximum) ANI telephone number.

- Called Number—The 20-digit (maximum) telephone number.

- PRI ID Number—The local-end DLCI of the PRI D-channel PVC. (This is the DLCI at the DAS Server Shelf.)

- B-Channel Number—The bearer channel: 1 through 24 for T1, or 1 through 31 for E1.

- Time—A connection time associated with a disconnect event.

- Text—A description of the cause for the disconnect. These text descriptions are similar to the Cause Mnemonics listed in Table D-2 and Table D-3 in the section Failure/Error Cause Codes.

Start of Call Demarcation

All incoming call requests are recorded, time-stamped, and identified by the *Call Rqst* qualifier to help trace network events triggered by the call request. For each call request, the DAS Server Shelf will record the following:

- Date and time of the call.

- Calling Number (ANI), a 20-digit maximum.

- Called Number 20-digit maximum.

- PRI identifier, the local-end DLCI of the PRI D-channel PVC. (This is the DLCI at the DAS Server Shelf.)

- Bearer Channel 1 through 24 for T1, or 1 through 31 for E1.

Call failures may occur during call setup or teardown. These failures will be recorded in CDR files, which include all available information identifying the call, as well as failure codes.

Call Failures

All call-related operation failures will also be recorded in a CDR. The information in a CDR for a failed call will include:

- Date and time of the call.

- Call Operation, either a Setup Request or a Disconnect request.

- Failure Cause Code. These are either the Cause Codes defined in the Q.931 specifications or some codes that are more specific to the DAS Server Shelf and the Dial-Up Frame Relay application. (The next section, Failure/Error Cause Codes, describes the DAS (INS) specific Cause Codes.)

- PRI identifier, the local-end DLCI of the PRI D-channel PVC. (This is the DLCI at the DAS Server Shelf.)

- Calling Number (ANI), a 20-digit maximum.

- Called Number 20-digit maximum.

- Bearer Channel 1 through 24 for T1, or 1 through 31 for E1.

Failure/Error Cause Codes

The majority of the failure/error Cause Codes maintained by the DAS Server Shelf are identical to those described in Q.931 specifications. The set of Q.931 Cause Codes has been enhanced, however, for the DAS (INS) Dial-Up Frame Relay application in the following two ways:

- Standard Q.931 Cause Codes with Expanded Definitions.

- Cause Codes specific only to DAS (INS) Dial-Up Frame Relay.

Table D-2 lists the Standard Q.931 Cause Codes which have slightly enhanced meanings when applied to the DAS Server Shelf or the DAS (INS) Dial-Up Frame Relay application. These altered meanings are very closely aligned with the Cause Codes defined in Q.931.

Table D-2   Standard Q.931 Cause Codes with Expanded Definitions

Cause Code [Decimal]	Cause Mnemonic	Exception/error condition
16	Normal call clearing	1. Normal disconnect/release
		2. Cause not present/unavailable
18	No user response	Call timed out awaiting connection in FR network
21	Call rejected	Caller/calling length error
31	Normal unspecified	Call declined by Server
41	Temporary failure	Call processing suspended
58	Bearer cap not available	1. Rate adaptation not V110
		2. Non restricted/unrestricted data
		3. Data transfer rate not 64kbp
		4. User rate not 56 or 64kbps
66	Channel type not implemented	1. H type or mapped channel type
		2. Call on D-channel
96	Info element missing	Calling number (ANI) missing

In addition, there are a few failure conditions for the DAS Server Shelf and DAS (INS) Dial-Up Frame Relay application that do not have close equivalents in the set of Q.931 Cause Codes. Cisco has designed some Error/Failure Cause Codes that are specific only to the DAS Server Shelf and DAS Dial-Up Frame Relay application. These "new" Cause Codes are listed in Table D-3 . These codes are never sent in the "cause information element" of any Q.931 messages. They are used only in the alarm traps and CDR files.

Table D-3   **Cause Codes Specific Only to the Dial Access Switching System**

Cause Code [Decimal]	Cause Mnemonic	Exception/error condition
512	Database error	Problem accessing call database
513	ANI not subscribed	Specified ANI not in call database
514	Local FR port busy	Port at local-end of connection is busy
515	Far-end FR port busy	Port at far-end of connection is busy
516	Connection exists	Requested connection already exists in the network
517	Routing failure	Connection could not be routed in network
518	Conn. removal failure	Could not delete original connection in backup connections during setup, or backup/dialup connection during disconnect
519	Node operation failure	Setup declined/timed-out by FR network node
520	Indeterminate PRI endpoint	PRI location in network could not be determined
521	INSD suspended	INSD not processing new calls temporarily
522	INS off-line	INS (DAS Server Shelf) not processing calls
523	Miscellaneous failure	Unknown failure
524	INSD response timeout	INS/DAS timed out waiting for response from INSD

Upgrading DAS Server Shelf Software

The DAS Server Shelf is initially delivered from the factory with its software pre-installed. It should only have to be reloaded when Cisco provides a software upgrade. This appendix provides procedures for:

- Reloading DAS Server Shelf Software
- Reloading DAS (INS) Daemon Software

Reloading DAS Server Shelf Software

The upgrades are executed from the StrataView Plus Workstation. To reload the DAS Server Shelf software, follow these steps:

Step 1 Upload the new DAS (INS) Dial-Up Frame Relay software from the tape onto the StrataView Plus Workstation:

- Make a directory on the StrataView Plus Workstation to hold the DAS (INS) software, for example:

  `mkdir usr/users/inssw`

- Change to the directory you just created:

  `cd usr/users/inssw`

- Extract the DAS (INS) Software into your current directory:

  `tar -xvf /dev/rst0`

Step 2 Log in to the DAS Server Shelf as **root**.

Step 3 Shutdown the DAS (INS) process on the DAS Server Shelf with the shutdown command:

  `/opt/ins/admin/INS_STOP`

Note The **INS_STOP** command only stops the DAS (INS) processes on the DAS Server Shelf. The UNIX **halt** command shuts down all the UNIX processes. Ideally you should stop the DAS (INS) processes before halting and removing power from the DAS Server Shelf. Power does not have to be removed from the DAS Server Shelf to complete this software upgrade.

Step 4 Save the configuration of the DAS Server Shelf, by saving the files in opt/ins/mib directory into a temporary directory:

- Make a directory to temporarily store the MIB files:

  mkdir opt/ins/mibbak

- Move the files in opt/ins/mib to opt/ins/mibbak

  mv **filenamen target**

  where **filenamen** is the name of the file being moved
  and **target** is the directory to which it is being moved.

Step 5 Download the new software (ins.tar) from the StrataView Plus workstation via FTP, for example:

- At the DAS Server Station, change to the directory where you will copy the DAS (INS) file:

  cd opt

- FTP to the StrataView Plus Workstation.

  FTP hostname

  where hostname is the StrataView Plus Workstation.

- Login to the StrataView Plus Workstation.

- Change to the directory where the ins.tar file is located; for example:

  cd usr/users/inssw

- Switch to binary mode by typing:

  bin

  and press Return

- FTP the ins.tar file to the DAS Server Shelf.

  get ins.tar

  This will FTP ins.tar to the DAS Server Shelf directory opt.

Step 6 Untar the ins.tar:

- tar -xf ins.tar

Step 7 Run INS_INSTALL from the /admin directory to install the new DAS Server Shelf software. This will also clear the existing configuration.

Step 8 Move the saved configuration files (see Step 4) from the temporary directory (e.g., mibbak) back into the /opt/ins/mib directory:

- Move the files in opt/ins/mibbak to opt/ins/mib

  mv **filenamen target**

  where **filenamen** is the name of the file being moved
  and **target** is the directory to which it is being moved.

  (As an alternative to moving the exiting MIB files to a backup directory, then moving them back to their original directory after the DAS (INS) files are installed, you could run INS_MIBINSTALL from the opt/ins/admin directory after installing the INS files. INS_MIBINSTALL will create a new unconfigured MIB database, however.)

Step 9   Reboot the workstation.

Reloading DAS (INS) Daemon Software

To reload DAS (INS) Daemon software, follow these steps:

Step 1   Stop the StrataView Plus processes.

Step 2   cp or tar a new daemon.tar file to the /usr/users/svplus directory.

```
cd /usr/users/svplus/bin
```

Step 3   ps -aux insd; confirm insd is not runnning.

Step 4   mv insd to insd.old

Step 5   tar xvpf daemon.tar (file) from /usr/users/svplus

Step 6   cd /bin and confirm insd now exists

Step 7   Start the StrataView Plus processes.

Step 8   ps -aux insd and confirm insd is running.

Step 9   Confirm the DAS Server Shelf comes back on line by:

```
 tail -f /usr/users/svplus/log/insd.log
```

Dial-Up Frame Relay Terminology

Because the Dial Access Switching system functions are spread between the DAS hardware (that is, the DAS Server Shelf), the Cisco WAN switching network, and the StrataView Plus Workstation, the following terms need to be defined to avoid confusion:

Cisco WAN switching network is a public or private network built around Cisco wide-area switches. These switches utilize standards-based ATM and Cisco's patented FastPacket technology and are designed to support multiple applications integrating voice, constant and variable-bit rate data, video, frame relay, and ATM services on one multimedia wide area network.

Cisco wide-area switch could be a Cisco StrataCom IPX switch, IPX-AF access feeder, IGX switch, BPX/MGX 8220 switch and edge concentrator. Typically the DAS Server Shelf is co-located with a Cisco wide-area switch (e.g., an IGX switch) and is usually installed in the same rack.

Dial Access Switching (DAS) system provides dial-up and dial-backup Frame Relay services, which are accessed through ISDN calls, for permanent virtual circuits (PVCs) in Cisco WAN switching networks. The Dial Access Switching application is implemented by the DAS Server Shelf and DAS (INS) Dial-Up Frame Relay software.

DAS Dial-Up Frame Relay application is the software that works with the DAS Server Shelf to provide Dial Access Switching. This software is split between the client software running on the DAS Server Shelf and the DAS (INS) Server software (the INS Daemon) running on the StrataView Plus Workstation.

DAS (INS) Daemon software is that portion of the DAS (INS) Dial-Up Frame Relay software that is loaded on the StrataView Plus Workstation and runs in conjunction with StrataView Plus. (The INS Daemon software is also referred to as the DAS Daemon software.)

DAS Server Shelf is a rack-mounted adjunct processor that is normally co-located with a Cisco wide-area switch (e.g., a BPX, IGX, or IPX switch) and has IP connectivity to a StrataView Plus Workstation. DAS Server Shelf will be used in Dial Access Switching documentation to refer only to the hardware, i.e., the rack-mounted box. (The DAS Server Shelf is sometimes referred to as an INS.)

Intelligent Network Server (INS) is the former name for a range of products that added specific capabilities to Cisco WAN switching networks. The Dial Access Switching (DAS) was a product in the INS family. The other INS product was the Voice Network Switching application. (You will occasionally see INS on a product label or on some of the software menus.)

StrataView Plus® Workstation is the network management platform for managing Cisco StrataCom networks. StrataView Plus, the application running on the workstation, provides status information for INS processes, configuration menus for configuring the dial-up and dial-backup PVCs, as well as all the functions and features described in the *Cisco StrataView Plus Operations Guide* for Release 8.1 or Release 8.4. The StrataView Plus Workstation is referred to as the StrataView Plus Workstation in INS documentation.