



Cisco 7200 Series Router-PBX Interoperability: Nortel Option 11c PBX and PA-VXC-2TE1+ E1 Card with ISDN PRI

This document describes the interoperability and configuration of a Cisco 7200 series router with a Nortel Option 11c PBX using E1 PRI signaling. It includes the following sections:

- System Components
- Configuration Tasks
- Caveats

System Components

PBX Model	Nortel Option 11c
PBX Release	Version 1411 Rel. 21
Telephony Signaling	E1 PRI
Voice Gateway	Cisco 7200 Series Router
Gateway Release	12.2(1)
VoX Protocol	H.323

Configuration Tasks

See the following sections for configuration tasks for this feature:

- Set Up
- Nortel Option 11c PBX Configuration
- Call Manager Configuration

Set Up

This section includes the following information:

- Connectivity Diagrams
- Set Up Notes

Connectivity Diagrams

Figure 1: Test Configuration

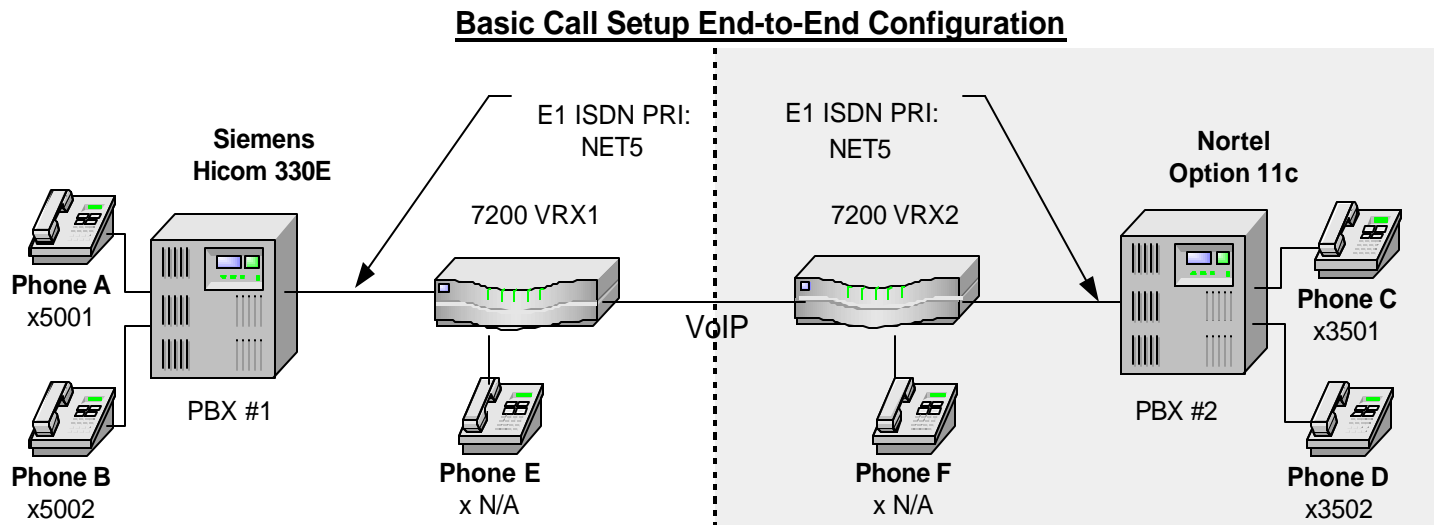


Figure 1 represents the configuration used for testing: a Cisco 7200 connected to a Nortel Option 11c PBX via an E1 PRI link.

Set Up Notes

If the Nortel Option 11c operation is set for the user side, layers 2 and 3 protocol side is set for the user side. The Cisco 7200 series router is set to network protocol side by issuing the command: **isdn protocol-emulate network**.

The Nortel configuration screen for the E1 trunk interface is reached using LD 17, setting the CEQU (Common Equipment parameters).

E1 Clocking on the Nortel Meridian Option 11C PBX is set to the card and slot number holding the clock controller. This is configured using LD 73.

Nortel Option 11c PBX Configuration

Use the following information to configure the Nortel Option 11c PBX:

- Nortel Option 11c PBX Version Information
- Nortel Option 11c PBX Sample Configuration
- System Software Release / Version
- Nortel Option 11c PBX Sample Configuration
- Trunk Configuration
- Route Data Block Configuration
- D-Channel Configuration
- Common Equipment Configuration
- Digital Station Phone Configuration
- System Package Information

Nortel Option 11c PBX Version Information

- Software: Version 1411 Release 21 Issue 54
- Hardware:

System Software Release / Version

```
REQ ****
>
OVL000
>LD 22PT2000
MARP NOT ACTIVATED
```

```
REQ ISS
VERSION 1411
RELEASE 21
ISSUE 54
```

```
REQ ****
>
OVL000
>
```

Nortel Option 11c PBX Sample Configuration

See the following sections for sample configuration information on the Nortel Option 11c PBX:

- Trunk Configuration
- Route Data Block Configuration
- D-Channel Configuration
- Common Equipment Configuration
- Digital Station Phone Configuration
- System Package Information

Trunk Configuration

```
LD 20
PT0000
```

```
MARP NOT ACTIVATED

REQ: PRRTYPE: TNBTN 5 1DATE PAGE DES
TN 005 01
TYPE TIE
CDEN SD
CUST 0
TRK PRI2
PDCA 1
PCML A
NCOS 0
RTMB 105 1
B-CHANNEL SIGNALING
TGAR 0
CLS UNR DTN WTA LPR APN XREP
P10 VNL

TKID
DATE 1 APR 1993

NACT ****
>
```

Route Data Block Configuration

```
OVL000
>LD 21PT1000

REQ: PRRTYPE: RDBCUST 0ROUT 105
TYPE RDB
CUST 00
DMOD
ROUT 105
TKTP TIE
ESN NO
RPA NO
CNVT NO
SAT NO
RCLS EXT
DTRK YES
BRIP NO
DGTP PRI2
ISDN YES
MODE PRA
IFC EURO
CNTY ETSI
SBN NO
PNI 00000
NCNA NO
NCRD NO
CTYP UKWN
INAC NO
ISAR NO
TGAR 0

PTYP DTT
AUTO NO
DNIS NO
DCDR NO
ICOG IAO
SRCH RRB
TRMB YES
STEP
ACOD 705
TCPP NO
TARG
BILN NO
OABS
INST
IDC NO
DCNO 0 *
```

```
NDNO 0
DEXT NO
SIGO STD
TIMR ICF 1920
      OGF 1920
      EOD 13952
      LCT 256
      NRD 10112
      DDL 70
      ODT 4096
      RGV 640
      GTO 896
      GTI 896
      SFB 3
      PRPS 800
      NBS 2048
      NBL 4096
      NRAG 30
      IENB 5
      TFD 0
      VSS 0
      VGD 6
DTD NO
SCDT NO
2 DT NO
DRNG NO
CDR NO
NATL YES
SSL
CFWR NO
IDOP NO
VRAT NO
MUS NO
PANS YES
EQAR NO
FRL 0 0
FRL 1 0
FRL 2 0
FRL 3 0
FRL 4 0
FRL 5 0
FRL 6 0
FRL 7 0
OHQ NO
OHQT 00
CBQ NO
AUTH NO
TTBL 0
PLEV 2
ALRM NO
ART 0
PECL NO
DCTI 0
TIDY 705 105
SGRP 0

REQ: ****
```

D-Channel Configuration

```
>
OVL000
>LD 22PT2000
MARP NOT ACTIVATED

REQ PRTTYPE ADAN
ADAN HIST
      SIZE 5000
      USER MTC SCH BUG
ADAN TTY 0
```

```
CARD 00
PORT 0
DES
USER MTC SCH BUG
XSM NO
ADAN      TTY 1
CARD 00
PORT 1
DES
BPS 9600
BITL 8
STOP 1
PARY NONE
FLOW NO
USER MTC SCH BUG
XSM NO
ADAN      TTY 2
CARD 00
PORT 2
DES
BPS 9600
BITL 8
STOP 1
PARY NONE
FLOW NO
USER MTC SCH BUG
XSM NO
ADAN      DCH 5
CTYP MSDL
CARD 05
PORT 1
DES EURO
USR PRI
DCHL 5
OTBF 32
PARM RS422 DTE
DRAT 64KC
CLOK EXT
NASA NO
IFC EURO
CNTY ETSI
SIDE USR
CNEG 1
RLS ID **
RCAP ND2
MBGA NO
OVLN NO
OVLN YES
OVLN 0
T310 30
T200 3
T203 10
N200 3
N201 260
K 7
ADAN      DPNSS DCH 9
```

PAGE 001

```
CTYP DCHI
CARD 09
PORT 1
DES FUCT
USR DPNSS
```

Common Equipment Configuration

REQ PRTTYPE CEQU

```
CEQU
MPED 8D
SUPL 000 004 008 012
      016 032 036 040
      048
DDCS 09
DTCS
XCT 000
CONF 029 030 031

DLOP NUM DCH FRM LCMT YALM TRSH
PRI 006 23 ESF B8S FDL 15
PRI2 05
APVL
DTI2
MISP
MTYP 384K

REQ *****
>
OVL000
```

Digital Station Phone Configuration

```
>LD 11
REQ: PRTTYPE: 2616

MARP NOT ACTIVATED

TN 001 0 00 00DATE PAGE DES
DES TEST1
TN 001 0 00 00
TYPE 2616
CDEN 8D
CUST 0
AOM 0
FDN
TGAR 0
LDN NO
NCOS 0
SGRP 0
RNPG 0
SCI 0
SSU
LNRS 16
XLST
SCPW
CLS CTD FBD WTA LPR MTD FND HTD ADD HFA
MWA AAD IMD XHD IRD NID OLD VCE DRG1
POD DSX VMD CMSD CCSD SWD LNA CNDA
CFTA SFD MRD PDN DDV CNIA
ICDD CDMD MCTD CLBD AUTU
GPUD DPUD DNDA CFXA ARHD CLTD ASCD
ABDD CFHD FICD NAID
UDI HBTD AHD DDGA NAMA MIND PRSD NRWD NRCD NROD
EXR0
USRD ULAD OCBP
CPND_LANG ENG
RCO 0
EFD
HUNT
EHT
PLEV 02
AST
IAPG 0
ITNA NO
DGRP
DNDR 0
KEY 00 SCR 3501 MARP
      CPND
      NAME BIG BIRD
```

```
XPLN 8
  DISPLAY_FMT FIRST, LAST
01
02
03 CFW 16 7055002
04 AO6
05 TRN
06 DSP
07
08 ADL 16
09 ADL 16
10 ADL 16
11 ADL 16
12 ADL 16
13 ADL 16
14 ADL 16
15
DATE 1 APR 1993
```

NACT ****

System Package Information

```
>
OVL000
>LD 22PT2000
MARP NOT ACTIVATED
```

REQ	PRTTYPE	PKGOPTF	1
CUST	2		
CDR	4		
CTY	5		
RAN	7		
TAD	8		
DNDI	9		
EES	10		
INTR	11		
BRTE	14		
DNDG	16		
MSB	17		
SS25	18		
DDSP	19		
ODAS	20		
DI	21		
DISA	22		
CHG	23		
CAB	24		
BAUT	25		
BQUE	28		
NTRF	29		
NCOS	32		
CPRK	33		
SSC	34		
IMS	35		
UST	35		
UMG	35		
ROA	36		
NSIG	37		
MCBQ	38		
NSC	39		
BACD	40		
ACDB	41		
ACDC	42		
LMAN	43		
MUS	44		
ACDA	45		
MWC	46		
AAB	47		
GRP	48		
NFCR	49		

ACDD	50
LNK	51
FCA	52
SR	53
AA	54
HIST	55
AOP	56
NARS	58
CDP	59
PQUE	60
FCBQ	61
OHQ	62
NAUT	63
SNR	64
NXFR	67
HOT	70
DHLD	71
LSEL	72

PAGE 001

SS5	73
DRNG	74
PBXI	75
DLDN	76
CSL	77
SCI	80
CCOS	81
RSDB	82
CDRQ	83
TENS	86
DSET	88
LNR	90
PXLT	92
CPND	95
DNIS	98
BGD	99
RMS	100
MR	101
AWU	102
PMSI	103
MCT	107
ICDR	108
APL	109
TVS	110
TOF	111
IDC	113
AUXS	114
DCP	115
PAGT	116
CCDR	118
EMUS	119
PLDN	120
COMDT	122
IDA	122
DPNSS	123
DASS2	124
FTC	125
BKI	127
DTI2	129
SUPP	131
TBAR	132
ENS	133
AFNA	134
LSCM	137
DTD	138
FFC	139
DCON	140
MPO	141
ABCD	144

ISDN 145
PRA 146
ISL 147
NTWK 148
DNXP 150
CDRE 151
IAP3P 153
PRI2 154
ACNT 155
NAS 159
FNP 160
ISDN INTL SUP 161

PAGE 002

SAR 162
MINT 163
LAPW 164
COOP 169
ARIE 170
CPGS 172
ECCS 173
AAA 174
NMS 175
EOVF 178
HVS 179
DKS 180
SACP 181
VNS 183
OVL P 184
EDRG 185
RPA 187
UK 190
SECL 191
ORC-RVQ 192
RCK 193
AINS 200
IPRA 202
XPE 203
XCT0 204
XCT1 205
NACD 207
HSE 208
MLM 209
MAID 210
VAWU 212
EAR 214
ECT 215
BRI 216
IVR 218
MSDL 222
CWNT 225
SSAU 229
DNWK 231
FCDR 234
BRIL 235
ACRL 236
MCMO 240
ALRM_FILTER 243
CALL ID 247
DPNA 250
SCDR 251
ARFW 253
PHTN 254
ADMINSET 256
ATX 258
CDRX 259
EURO 261
SAMM 262
QSIG 263

```
UIGW      283
DPNSS189I 284
DPNSS_ES  288
ADSP      289
MQA       297
CPP       301
```

PAGE 003

TATO 312

Cisco 7200 Series Router Configuration

The following is the configuration of the Cisco 7200 series router connected to a Nortel Option 11c PBX ISDN interface:

- Cisco 7200 Series Router Version Information
- Cisco 7200 Series Router Sample Configuration
- Cisco 7200 Series Router Sample Diagnostics

Cisco 7200 Series Router Version Information

The following example shows how to obtain the software version information of the Cisco 7200 series router connected to a Nortel Option 11c PBX ISDN interface.

- Cisco IOS™ (C7200-JS-M), Version 12.2(1).
- Cisco 7206VXR (NPE300) processor (revision D) with 122880K/40960K bytes of memory.

```
Router# show version
Cisco Internetwork Operating System Software
IOS (tm) 7200 Software (C7200-JS-M), Version 12.2(1), RELEASE SOFTWARE (fc2)
Copyright (c) 1986-2001 by cisco Systems, Inc.
Compiled Thu 26-Apr-01 22:10 by cmong
Image text-base: 0x60008960, data-base: 0x616B0000

ROM: System Bootstrap, Version 12.0(19990210:195103) [12.0XE 105], DEVELOPMENT SOFTWARE

VXR2 uptime is 19 minutes
System returned to ROM by power-on
System image file is "slot0:c7200-js-mz.122-1"

cisco 7206VXR (NPE300) processor (revision D) with 122880K/40960K bytes of memory.
Processor board ID 18282879
R7000 CPU at 262Mhz, Implementation 39, Rev 1.0, 256KB L2, 2048KB L3 Cache
6 slot VXR midplane, Version 2.0

Last reset from power-on
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
TN3270 Emulation software.
Primary Rate ISDN software, Version 1.1.
Channelized E1, Version 1.0.
1 FastEthernet/IEEE 802.3 interface(s)
31 Serial network interface(s)
2 Channelized E1/PRI port(s)
1 Voice resource(s)
125K bytes of non-volatile configuration memory.

16384K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
4096K bytes of Flash internal SIMM (Sector size 256K).
```

Configuration register is 0x0

Cisco 7200 Series Router Sample Configuration

The following is a sample configuration of the Cisco 7200 series router directly connected to a Nortel Option 11c PBX ISDN interface.

```
Router# show run
Building configuration...

Current configuration : 1238 bytes
!
version 12.2
no service single-slot-reload-enable
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname VXR2
!
card type e1 1
logging rate-limit console 10 except errors
!
frame-clock-select 1 E1 1/0
dspint DSPfarm1/0
!
ip subnet-zero
!
!
no ip finger
!
no ip dhcp-client network-discovery
isdn switch-type primary-net5
call rsvp-sync
!
!
!
!
!
controller E1 1/0
  pri-group timeslots 1-31
!
controller E1 1/1
!
!
interface FastEthernet0/0
  ip address 18.0.0.2 255.255.255.0
  no ip mroute-cache
  duplex full
  fair-queue
!
interface Serial1/0:15
  no ip address
  no logging event link-status
  isdn switch-type primary-net5
  isdn overlap-receiving
  isdn incoming-voice modem
  isdn guard-timer 3000
  isdn T309-enable
  isdn T203 30000
  isdn T310 60000
  isdn bchan-number-order ascending
  no cdp enable
!
ip kerberos source-interface any
ip classless
no ip http server
!
!
!
```

```
voice-port 1/0:15
!
dial-peer voice 1 pots
 destination-pattern 3...
 direct-inward-dial
 port 1/0:15
 prefix 3
!
dial-peer voice 2 voip
 destination-pattern 5...
 session target ipv4:18.0.0.1
!
!
gatekeeper
 shutdown
!
!
line con 0
 transport input none
line aux 0
line vty 0 4
 login
line vty 5 15
 login
!
end
```

Cisco 7200 Series Router Sample Diagnostics

The following example shows sample diagnostic information of the Cisco 7200 series router connected to a Nortel Option 11c PBX ISDN interface.

```
Router# show diag
Slot 0:
Fast-ethernet on C7200 I/O card with MII or RJ45 Port adapter, 1 port
Port adapter is analyzed
Port adapter insertion time 00:19:16 ago
EEPROM contents at hardware discovery:
Hardware revision 2.1 Board revision B0
Serial number 18517759 Part number 73-4092-03
Test history 0x0 RMA number 00-00-00
EEPROM format version 1
EEPROM contents (hex):
 0x20: 01 83 02 01 01 1A 8E FF 49 0F FC 03 00 00 00 00
 0x30: 58 00 00 00 00 04 16 00 00 00 FF FF FF FF FF FF

Slot 1:
VXC-2TE1+ Port adapter, 2 ports
Port adapter is analyzed
Port adapter insertion time 00:19:15 ago
EEPROM contents at hardware discovery:
Hardware Revision : 0.2
PCB Serial Number : MIC05022QA2
Part Number : 73-5340-03
Board Revision : A0
RMA Test History : 00
RMA Number : 0-0-0-0
RMA History : 00
Deviation Number : 0-0
Product Number : PA-VXC-2T1E1+
Top Assy. Part Number : 8034-08469-01
EEPROM format version 4
EEPROM contents (hex):
 0x00: 04 FF 40 02 11 41 00 02 C1 8B 4D 49 43 30 35 30
 0x10: 32 32 51 41 32 82 49 14 DC 03 42 41 30 03 00 81
 0x20: 00 00 00 00 04 00 80 00 00 00 00 CB 94 50 41 2D
 0x30: 56 58 43 2D 32 54 31 45 31 2B 20 20 20 20 20 20
 0x40: 20 C0 46 1F 62 00 21 15 01 FF FF FF FF FF FF FF
 0x50: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
```

```
0x60: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x70: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF

Router# clear counters
Clear "show interface" counters on all interfaces [confirm]
Router#
00:19:35: %CLEAR-5-COUNTERS: Clear counter on all interfaces by console
Router#
Router# show controllers e1 1/0
E1 1/0 is up.
  Applique type is Channelized E1 - balanced
  No alarms detected.
  alarm-trigger is not set
  Framing is CRC4, Line Code is HDB3, Clock Source is Line.
  International Bit: 1, National Bits: 11111
  Active xconns: 0
  Data in current interval (16 seconds elapsed):
    0 Line Code Violations, 0 Path Code Violations
    0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins
    0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs, 0 Unavail Secs
Router#
```

Caveats

- As of Nortel Option 11C software release 24, Calling Name delivery and presentation is only supported on the European ETSI QSIG types ESGF, EGF4 and ISO ISGF.