Cisco 7200 Series Gateway-PBX
Interoperability: PA-VXC-2T1E1+ card to Alcatel 4400 PBX with E1 ISDN PRI QSIG Signaling

This document describes the interoperability and configuration of a Cisco 7206 series voice gateway with a PA-VXC-2T1E1+ card to an Alcatel 4400 PBX using ISDN PRI E1 QSIG signaling. It includes the following sections:

- System Components
- Configuration Tasks
- Caveats

### System Components

<table>
<thead>
<tr>
<th>Component</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBX Model</td>
<td>Alcatel 4400</td>
</tr>
<tr>
<td>PBX Release</td>
<td>R3.2</td>
</tr>
<tr>
<td>Telephony Signaling</td>
<td>E1 QSIG</td>
</tr>
<tr>
<td>Voice Gateway</td>
<td>Cisco 7206 series router</td>
</tr>
<tr>
<td>Gateway Release</td>
<td>Cisco IOS Release 12.2(1a)</td>
</tr>
<tr>
<td>VoX Protocol</td>
<td>H.323</td>
</tr>
</tbody>
</table>

### Configuration Tasks

See the following sections for configuration tasks for this feature:

- Set Up
- Alcatel PBX Configuration
- Cisco 7206VXR Gateway 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: an Alcatel 4400 PBX connected to a Cisco 7206VXR voice gateway via an E1-QSIG connection.

Set Up Notes

- The Cisco 7206 router with ISDN switch type setting of primary-qsig supports both protocol sides by using the “isd protocol-emulate network/user” command.
- The Alcatel 4400 supports both “USER” (slave) and “NETWORK” (master) protocol sides.
- The following options are of particular interest:
  - Trunk interface type must be set to PRA2.
  - Network/User options are set in the Board/Digital Access Options menu. Network mode must be set to Yes for Master/Network or No for Slave/User.
  - Access Type must be set to T2.
  - Q931 variant determines Protocol type. ABC-F is Alcatel proprietary.
Alcatel PBX Configuration

Alcatel PBX Version Information

- Software: Version R3.2
- Hardware: PRA2, 3BA23076.

Version Information

\compidea\Node

<table>
<thead>
<tr>
<th>Node Number (reserved)</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software Version</td>
<td>R3.2</td>
</tr>
<tr>
<td>Version name</td>
<td>c1.712</td>
</tr>
<tr>
<td>Patch No.</td>
<td>5</td>
</tr>
<tr>
<td>Notes</td>
<td></td>
</tr>
<tr>
<td>Object Identity</td>
<td></td>
</tr>
<tr>
<td>Node Number (reserved)</td>
<td>1</td>
</tr>
<tr>
<td>Ethernet Notes</td>
<td></td>
</tr>
<tr>
<td>Netmask</td>
<td></td>
</tr>
<tr>
<td>Local CPU</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>x000000_tun</td>
</tr>
<tr>
<td>IP Address</td>
<td>172.30.253.253</td>
</tr>
<tr>
<td>Twin CPU</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td></td>
</tr>
<tr>
<td>IP Address</td>
<td></td>
</tr>
<tr>
<td>Main CPU</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>xm000000</td>
</tr>
<tr>
<td>IP Address</td>
<td>10.253.253.3</td>
</tr>
<tr>
<td>StandBy Cpu</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td></td>
</tr>
<tr>
<td>IP Address</td>
<td></td>
</tr>
<tr>
<td>SL Notes</td>
<td></td>
</tr>
<tr>
<td>IP/X25 Tunnel Notes</td>
<td></td>
</tr>
<tr>
<td>Netmask</td>
<td>255.255.0.0</td>
</tr>
<tr>
<td>Local Node</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>x000000_tun</td>
</tr>
<tr>
<td>IP Address</td>
<td>172.30.253.253</td>
</tr>
</tbody>
</table>

Alcatel PBX Sample Configuration

See the following sections for sample configuration information:

- Trunk Cards Were Configured the Same
- Digital Access Options
- Trunk Group
- Trunk Detail
Trunk Cards Were Configured the Same

Interface type must be set to **PRA2**.

```
compidea\Shelf::0\Board::4

<table>
<thead>
<tr>
<th>Board Address</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Interface Type</strong></td>
<td>PRA2</td>
</tr>
<tr>
<td>Usage State</td>
<td>Busy</td>
</tr>
<tr>
<td>Operational State</td>
<td>Enabled</td>
</tr>
<tr>
<td>Main/Standby State</td>
<td>Main (Master)</td>
</tr>
<tr>
<td>Number Of Sets Being Connect.</td>
<td>1</td>
</tr>
<tr>
<td>CRC4</td>
<td>YES</td>
</tr>
<tr>
<td>Country Protocol Type</td>
<td>Default</td>
</tr>
<tr>
<td>Incidents Teleservice</td>
<td>YES</td>
</tr>
<tr>
<td>ISDN Board Layer 2 Parameters</td>
<td></td>
</tr>
<tr>
<td>Retransmission Timer</td>
<td>100</td>
</tr>
<tr>
<td>TEI Identity Check Timer</td>
<td>100</td>
</tr>
<tr>
<td>Polling Timer</td>
<td>1000</td>
</tr>
<tr>
<td>Nb_Of_Retransmission</td>
<td>3</td>
</tr>
<tr>
<td>Max Frame Size (Bytes)</td>
<td>260</td>
</tr>
<tr>
<td>Window Size In Frames SAPI S T0</td>
<td>1</td>
</tr>
<tr>
<td>Window Size In Frames SAPI P T0</td>
<td>3</td>
</tr>
<tr>
<td>Window Size In Frames SAPI S T2</td>
<td>7</td>
</tr>
<tr>
<td>Window Size In Frames SAPI P T2</td>
<td>7</td>
</tr>
<tr>
<td>Passive board</td>
<td>NO</td>
</tr>
<tr>
<td>SS7 signalling</td>
<td>NO</td>
</tr>
</tbody>
</table>
```

Digital Access Options

**Network mode** must be set to **Yes** for Master/Network or **No** for Slave/User. **Access Type** must be set to **T2**.

```
\compidea\Shelf::0\Board::4\Digital Access::0

<table>
<thead>
<tr>
<th>T0/T2 Access No.</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Access Type</strong></td>
<td>T2</td>
</tr>
<tr>
<td>Synchronisation Priority</td>
<td>255</td>
</tr>
<tr>
<td><strong>Network Mode</strong></td>
<td>NO</td>
</tr>
<tr>
<td>Max Nb Of Used B Channels</td>
<td>30</td>
</tr>
<tr>
<td>Max_Nb_Of_Compressed_B_Channels</td>
<td>0</td>
</tr>
<tr>
<td>TieLine Mode</td>
<td>NO</td>
</tr>
<tr>
<td>With Alarm</td>
<td>NO</td>
</tr>
<tr>
<td>Reserved1</td>
<td>NO</td>
</tr>
<tr>
<td>Reserved2</td>
<td>NO</td>
</tr>
<tr>
<td>Network Date Time Update</td>
<td>NO</td>
</tr>
<tr>
<td>CRC4</td>
<td>YES</td>
</tr>
</tbody>
</table>
```

Trunk Group

Q931 variant is used to determine Protocol type. ABC-F is Alcatel proprietary.

```
\compidea\Trunk Groups::0

<table>
<thead>
<tr>
<th>Trunk Group Id</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trunk Group Type</strong></td>
<td>T2</td>
</tr>
<tr>
<td><strong>Trunk Group Name</strong></td>
<td>PRA2-QSIG</td>
</tr>
<tr>
<td>Node number</td>
<td>1</td>
</tr>
<tr>
<td>Transcom Trunk Group</td>
<td>False</td>
</tr>
<tr>
<td>Auto.reserv.by Attendant</td>
<td>False</td>
</tr>
<tr>
<td>Overflow trunk group No.</td>
<td>-1</td>
</tr>
<tr>
<td>Tone on seizure</td>
<td>True</td>
</tr>
<tr>
<td>Private Trunk Group</td>
<td>False</td>
</tr>
</tbody>
</table>
```
### Q931 signal variant
- ABC-F

### Number Compatible With
- 1

### Channel selection type
- Quantum

### Remote Network
- 15

### Shared Trunk Group
- False

### auto.DTMF dialing on outgoing call
- NO

### T2 Specificity
- None

### Public Network Category
- 0

### DDI transcoding
- False

### Special Services
- Nothing

### Can support UUS in SETUP
- True

---

### Trunk Detail

```
\compidea\Trunk Groups::1\Trunk Group::1

Instance (reserved)          1
Trunk Group Type             T2
Public Network Ref.          NO
Dialling end to end          NO
DTMF end to end signal.      NO
Trunk group used in DISA     NO
DISA Secret Code             NO
VG for non-existent No.      YES
Routing To Executive         NO
Trunk Category Id            18
Nb of digits unused (ISDN)   4
B Channel Choice             NO
Channels Reserved By Attend. 0
Dissuasion For ACD           NO
DTO joining                   NO
Enquiry Call On B Channel    NO
Automated Attendant          NO
Calling party Rights category 0
Entity Number                0
TS Overflow                  YES
Number To Be Added           NO
Supervised by Routing        NO
VPN Cost Limit for Incom.Calls 0
Immediat Trk Listening For VPNCall YES
VPN TS %                     50
Csta Monitored               NO
Max.% of trunks out CCD      0
Charge Calling And ADN Creation NO
Ratio analog.to ISDN tax     NO
LogicalChannel               1__15 & 17__31
TS Distribution on Accesses  YES
Use Split Acces              NO
Heterogeneous Remote Network NO
Barring mode                 Not barred
ARS class of service         31
Quality profile for voice on IP Profile #1
IP compression type          Default
Use of volume in system      YES
```
Cisco 7206VXR Gateway Configuration

The following is the configuration of the Cisco 7206VXR voice gateway connected to the Alcatel 4400 ISDN PRI E1 QSIG signaling interface.

- Cisco 7206VXR Voice Gateway Version Information
- Cisco 7206VXR Voice Gateway Sample Configuration

Cisco 7206VXR Voice Gateway Version Information

- Cisco IOS™ (C7200-JS-M), Version 12.2(1).
- Cisco 7206VXR (NPE400) processor (revision A) with 114688K/16384K bytes of memory.

```
7206VXR#sh ver
Cisco Internetwork Operating System Software
IOS (tm) 7200 Software (C7200-A3JS-M), Version 12.2(1a), RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2001 by Cisco Systems, Inc.
Compiled Sat 26-May-01 15:44 by pwade
Image text-base: 0x60008960, data-base: 0x61830000
ROM: System Bootstrap, Version 12.1(20000710:044039) [nlaw-121E_npeb 117], DEVELOPMENT SOFTWARE
BOOTFLASH: 7200 Software (C7200-KBOOT-M), Version 12.1(3a)E5, EARLY DEPLOYMENT RELEASE SOFTWARE (fc1)
7206VXR uptime is 1 hour, 31 minutes
System returned to ROM by power-on
System image file is "disk0:c7200-a3js-mz.122-1a.bin"
cisco 7206VXR (NPE400) processor (revision A) with 114688K/16384K bytes of memory.
Processor board ID 23656935
R7000 CPU at 350Mhz, Implementation 39, Rev 3.2, 256KB L2, 4096KB L3 Cache
6 slot VXR midplane, Version 2.1
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.
2 FastEthernet/IEEE 802.3 interface(s)
31 Serial network interface(s)
2 Channelized E1/PRI port(s)
2 Voice resource(s)
125K bytes of non-volatile configuration memory.
46976K bytes of ATA PCMCIA card at slot 0 (Sector size 512 bytes).
8192K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x102
7206VXR#
```
Cisco 7206VXR Voice Gateway Sample Configuration

The following is a sample configuration of the Cisco 7206VXR series router directly connected to Alcatel 4400 PBX, slot 3 ISDN PRI interface.

```
7206VXR#sh diag
Slot 0:
   Dual FastEthernet (RJ-45) I/O Card Port adapter, 2 ports
   Port adapter is analyzed
   Port adapter insertion time 01:31:20 ago
   EEPROM contents at hardware discovery:
      Hardware Revision       : 1.2
      Top Assy. Part Number   : 800-07114-04
      Part Number             : 73-5003-04
      Board Revision          : A0
      PCB Serial Number       : 23998864
      RMA History             : 00
      Fab Version             : 02
      Fab Part Number         : 28-3455-02
      Product Number          : C7200-I/O-2FE/E
      Board Revision          :
      EEPROM format version   4
      EEPROM contents (hex):
         0x00: 04 FF 40 02 15 41 01 02 C0 46 03 20 00 1B CA 04
         0x10: 82 49 13 8B 04 42 41 30 C1 8B 32 33 39 39 38 38
         0x20: 36 34 00 00 00 04 00 02 02 85 1C 0D 7F 02 CB 8F
         0x30: 43 37 32 30 30 2D 49 2F 4F 2D 32 46 45 2F 45 42
         0x40: 00 00 0C 02 FF FF FF FF FF FF FF FF FF FF FF FF
         0x50: FF 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 FF
         0x70: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF

Slot 1:
   VXC-2TE1+ Port adapter, 2 ports
   Port adapter is analyzed
   Port adapter insertion time 01:31:20 ago
   EEPROM contents at hardware discovery:
      Hardware Revision       : 0.2
      PCB Serial Number       : MIC05012P3T
      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: 31 32 50 53 54 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 3D 32 54 31 45 31 2B 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 FF
         0x60: FF 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 FF

Slot 5:
   VXC-2TE1+ Port adapter, 2 ports
   Port adapter is analyzed
   Port adapter insertion time 01:31:20 ago
   EEPROM contents at hardware discovery:
      Hardware Revision       : 0.2
      PCB Serial Number       : MIC043626H6
      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 34 33
0x10: 36 32 36 48 36 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
0x40: 0C 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 FF
0x60: FF 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 FF
7206VXR#
7206VXR#sh 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 (51 seconds elapsed):
0 Line Code Violations, 0 Path Code Violations
0 Slip Secs, 0 Fr Loss Secs, 0 Degraded Mins
0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs, 0 Unavail Secs
7206VXR#
7206VXR#sh conf
Using 1761 out of 129016 bytes
!
version 12.2
no service single-slot-reload-enable
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname 7206VXR
!
card type e1 1
logging rate-limit console 10 except errors
enable secret 5 $1$/v5Z$5CKMcCbc1v8yLn8C/DrpXg/
enable password cisco
!
dspint DSPfarm1/0
!
dspint DSPfarm5/0
!
ip subnet-zero
!
no ip finger
no ip domain-lookup
!
no ip dhcp-client network-discovery
isdn switch-type primary-qsig
call rsvp-sync
!
!
controller E1 1/0
pri-group timeslots 1-31
!
controller E1 1/1
!
interface FastEthernet0/0
```
ip address 10.1.1.249 255.255.255.0
duplex auto
speed auto
!
interface FastEthernet0/1
  ip address 1.1.1.1 255.255.255.0
duplex full
speed auto
!
interface Serial1/0:15
  no ip address
  no logging event link-status
  isdn switch-type primary-qsig
  isdn overlap-receiving
  isdn incoming-voice voice
  isdn T203 30000
  isdn T310 60000
  isdn bchan-number-order ascending
  no cdp enable
!
router rip
  network 1.0.0.0
!
ip kerberos source-interface any
ip classless
ip http server
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
snmp-server packetsize 4096
snmp-server manager
!
voice-port 1/0:15
!
dial-peer voice 1 pots
  destination-pattern 3001
direct-inward-dial
  port 1/0:15
  prefix 3001
!
dial-peer voice 2 voip
  destination-pattern 3000
  progress_ind setup enable 1
  session target ipv4:1.1.1.2
!
dial-peer voice 3 pots
  destination-pattern 3002
direct-inward-dial
  port 1/0:15
  prefix 3002
!
dial-peer voice 4 voip
  destination-pattern 3003
  progress_ind setup enable 1
  session target ipv4:1.1.1.2
!
gatekeeper
  shutdown
!
line con 0
  transport input none
line aux 0
```
line vty 0 3
exec-timeout 0 0
password cisco
login
line vty 4
no exec
eexec-timeout 0 0
login
line vty 5 15
login
!
end

7206VXR#

Caveats

- Calling/Called Number is not shown on Alcatel phone display (one line display phone show Name only) due to limitation on one line display phone.