



PRI, Channelized T1, and Channelized E1 User's Guide

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Chapter 1

Introduction

This guide describes information for the PRI card that you install in a Compaq Microcom 4000 chassis.

Note: PRI is provisioned over either T1 or E1, depending on the country where you use the chassis. T1 is used in the United States, Canada, and certain other countries outside North America. E1 is used in the European Union and many other countries. When this guide refers to PRI, it means “PRI over T1 or PRI over E1.”

Overview

The 4000 system supports a variety of digital access lines, including PRI, channelized T1, and channelized E1 lines. As noted above, PRI service is provisioned over T1 lines in United States, Canada, and certain other countries outside North America and over E1 lines in the European Union and many other countries.

The advantages of using digital access lines include:

- Elimination of analog phone lines (up to 24 or 30) by replacing them with one PRI or T1/E1 line
- Easier installation and support
- Lower tariffing from phone companies in many areas
- With PRI, additional support for BRI ISDN terminal adapter calls
- 56Kbps¹ modem support (such as V.90 or K56flex) from the central site

The 4000 chassis supports:

- Up to two dual PRI cards

Note: The PRI card performs either PRI, channelized T1, or channelized E1 operation, depending on how you set the switches on the main card. The default is PRI operation. Refer to [Chapter 2, PRI, Channelized T1, and Channelized E1 Configuration](#), for information.

- Up to:
 - 92 digital ports using PRI over T1
 - 112 digital ports using PRI over E1
 - 96 digital ports using channelized T1
 - 112 digital ports using channelized E1
 - 64 analog ports

With the 4000 system, you can control and configure Compaq Microcom 4000 modems locally or remotely using the Compaq 4000 Manager, a Windows-based GUI management program for Windows 95 or Windows NT 4.0. You can also access the PRI card(s) via an ftp or telnet session.

1. Designed only to allow faster downloads from V.90 or K56flex compliant sources. Maximum achievable download transmissions rates currently do not reach 56Kbps and will vary with line conditions.

PRI Provisioned over T1 (U. S., Canada, and Other Countries)

- Each PRI line contains 23 B channels and 1 D channel. Each B channel is 64,000 bps (bits per second) and the D channel is 64,000 bps (used for out-of-band signaling), for a total of 1.544 Mbps (megabits per second).
- Each B channel supports either:
 - One B channel call from a BRI terminal adapter, or
 - One modem call
- For B channel calls from a BRI terminal adapter, data is processed by the PRI card and sent out the Ethernet port via a tunneling protocol (such as PPTP).
- For modem calls, data is sent over the backplane to the modem card for processing, and then sent out the modem's serial port.

PRI Provisioned over E1 (European Union and Other Countries)

- Each PRI line contains 30 B channels and 2 D channels. Each B channel is 64,000 bps and each D channel is 64,000 bps (used for out-of-band signaling), for a total of 2.048 Mbps (megabits per second).
- Each B channel supports either:
 - One B channel call from a BRI terminal adapter, or
 - One modem call
- For B channel calls from a BRI terminal adapter, data is processed by the PRI card and sent out the Ethernet port via a tunneling protocol (such as PPTP).
- For modem calls, data is sent over the backplane to the modem card for processing, and then sent out the modem's serial port.

Channelized T1 (North America only)

- Each T1 line (or DS-1) contains 24 Digital Signal level 0 (DS-0) channels (or timeslots). Each DS-0 channel is 64,000 bps, for a total of 1,536,000 bps. In order to ensure that information is not lost, a control channel of 8,000 bps is added to the T1 data stream, making the final total 1,544,000 bps or 1.544 Mbps.
- Each DS-0 channel supports one modem call.
- For each modem call, data is sent over the backplane to the modem card for processing, and then sent out the modem's serial port.

Channelized E1 (European Union and Other Countries)

- Each PRI line contains 30 B channels and 2 CAS (Channel Associated Signaling) channels. Each B channel is 64,000 bps and each CAS channel is 64,000 bps (used for out-of-band signaling), for a total of 2.048 Mbps (megabits per second).
- Each B channel supports either:
 - One B channel call from a BRI terminal adapter, or
 - One modem call
- For modem calls, data is sent over the backplane to the modem card for processing, and then sent out the modem's serial port.

PRI, Channelized T1, and Channelized E1 Features

4000 Chassis General Features

- Two dual PRI cards with associated adapter card per chassis (each dual PRI card supports either two PRI, two channelized T1, or two channelized E1 connections)

- Up to:
 - 92 digital ports using PRI over T1
 - 112 digital ports using PRI over E1
 - 96 digital ports using channelized T1
 - 112 digital ports using channelized E1
 - 64 analog ports
- North American T1 (1.544 Mbps) or European Union E1 (2.048 Mbps) for compatibility with the public network
- Primary Rate Interface (PRI) with:
 - One D channel and 23 B channels (for the United States, Canada, and other countries using PRI over T1)
 - Two D channels and 30 B channels (for the European Union and other countries using PRI over E1)
- Bipolar Eight-Zero Substitution (B8ZS), Alternate Mark Inversion (AMI), or HDB3 line coding; Extended SuperFrame (ESF), SuperFrame (SF), E1 with CRC4, or Doubleframe frame formatting; E&M wink start, E&M start, or loop start signaling; and Dual-Tone Multi Frequency (DTMF), Multi Frequency (MF), or pulse dialing for reliable high-speed data transmissions
- Point-to-Point Tunneling Protocol (PPTP) supported for PRI only
- 8-port and 4-port digital modem adapter cards supporting RJ45 serial connections for PRI, channelized T1, and channelized E1 operations

4000 Chassis Control and Configuration Features

- Local and remote management and configuration of 4000 system PRI and modem cards through an attached PC, a remote PC via dial-up access, or through a WINSOCK 1.1-compliant IP connection
- A local console command line interface for controlling the PRI cards from a dumb terminal or an attached PC
- Remote upgrade of PRI, channelized T1, or channelized E1 firmware through an ftp or telnet session
- An Ethernet interface for telnet and ftp access to the PRI cards
- Compaq 4000 Manager, a GUI-based management software interface for control over a Windows-based PC (Windows 95 or Windows NT 4.0). Using the Compaq 4000 Manager, you can:
 - Send and/or get a PRI, channelized T1, or channelized E1 configuration file to and/or from a PRI card
 - Assign an IP address to a PRI card
 - View a graphical status snapshot of the PRI cards, including sync and alarm status
 - Upgrade the PRI, channelized T1, or channelized E1 firmware
 - Perform a telnet session from the PRI card
 - View a graphical status snapshot of all modems in a single chassis, including the status of EIA232 signals, transmit and receive signals, and modem status (connection speed and modem state)
 - Create modem groups, as well as issue AT commands, easily upgrade firmware, busy-out, or reset one modem, a group of modems, or all modems in a chassis
 - Obtain complete status of each individual modem including full EIA232 signals, transmit and receive signals, signal to noise ratio, connection information, current modem state, call duration, last connection status, and firmware information

Note: You can run multiple copies of the Compaq 4000 Manager on one PC to manage more than one chassis.

Using the 4000 System Documentation

The 4000 system documentation provides you with all of the information you need to install your chassis, connect it to the telephone network, and configure and operate PRI and modem cards using the Compaq 4000 Manager.

Table 1-1. Documentation Set

<i>Document</i>	<i>Contents</i>
<i>Compaq Microcom 4000 Quick Setup</i>	Describes the major steps necessary to quickly set up your chassis for either PRI, channelized T1, channelized E1, or analog operation.
<i>Compaq Microcom 4000 Installation Guide</i>	Describes the 4000 chassis and components; how to install and connect the chassis to the telephone network; and how to use the chassis controls and indicators.
<i>Compaq Microcom 4000 PRI, Channelized T1, and Channelized E1 User's Guide</i>	Describes in detail how to configure the PRI cards.
<i>Compaq Microcom 4000 Modem User's Guide</i>	Describes in detail all of the features and AT commands supported by the 4000 chassis' modem cards. This guide should be used with the management software user's guide to configure modems for your network.
<i>Compaq 4000 Manager User's Guide</i>	Describes how to install Compaq 4000 Manager software in Windows 95 or Windows NT 4.0. It explains how to use the software to configure, monitor, and control a 4000 system.

Conventions and Symbols

Table 1-2. Documentation Set Conventions and Symbols

<i>When you see...</i>	<i>It means...</i>
■	The start of a main section.
➡	An Important, WARNING, or CAUTION note.
Enter	Press the Enter key.
<i>X+k</i>	Hold down a key <i>X</i> (such as Ctrl or Alt) while pressing key <i>k</i> .
raise DTR	The DTR signal is turned on. Most data communications software raises (turns on) DTR when it loads. Refer to your software manual.
bold	Information you will type or see on the screen in step-by-step procedures.

Chapter 2

PRI, Channelized T1, and Channelized E1 Configuration

This chapter explains PRI, channelized T1, and channelized E1 information, including:

- Ordering PRI, channelized T1, or channelized E1 service from your phone carrier
- Configuring the PRI card using DIP switches, the Compaq 4000 Manager, or console commands
- Editing, retrieving, and sending PRI, channelized T1, or channelized E1 configuration files

■ Ordering PRI, Channelized T1, or Channelized E1 Service

The following line options are available for PRI, channelized T1, or channelized E1 connections. Contact your local telephone company for information about purchasing these options. Compaq recommends ordering your PRI or T1/E1 line with the 4000 system default settings (shown in bold).

Table 2-1. PRI, Channelized T1, and Channelized E1 Line Options

<i>Feature</i>	<i>PRI over T1 Options (Defaults shown in bold)</i>	<i>PRI over E1 Options (Defaults shown in bold)</i>	<i>Channelized T1 Options (Defaults shown in bold)</i>	<i>Channelized E1 Options (Defaults shown in bold)</i>
Frame Format	ESF (Extended SuperFrame) SF (SuperFrame)	CRC4 E1 Doubleframe	ESF (Extended SuperFrame) SF (SuperFrame)	CRC4 E1 Doubleframe
Line Code	B8ZS (Bipolar Eight-Zero Substitution) AMI (Alternate Mark Inversion)	HDB3	B8ZS (Bipolar Eight-Zero Substitution) AMI (Alternate Mark Inversion)	HDB3
Line Signaling	—	—	E&M wink start E&M immediate Loop start	—
Dialing Type	—	—	DTMF (Dual-Tone Multi Frequency) MF (Multi Frequency) Pulse	—

For optimal performance, also ask your carrier for:

- 0 dB loss/gain of transmit (TX) and receive (RX) signals
- Fewer than 16 repeaters to minimize the route from the central office
- Assurance that the maximum bit error rate is 1 in 1,000,000 by running multiple pattern tests of the PRI or T1/E1 line
- Line conformance to AT&T 62411 quality standards
- Trunk side, advanced, or data grade T1/E1 circuits
- The type of switch installed at the carrier's Central Office (CO) for PRI lines

■ Configuring a PRI Card

You can configure a PRI card in three ways:

- Configuration DIP switches
- Compaq 4000 Manager in Windows 95 or Windows NT 4.0
- Console command-line interface commands

Note: You cannot run both the Compaq 4000 Manager and the local console command-line interface simultaneously.

You can have one or two PRI cards in your chassis. Install card 1 in slot 8. Install card 2 in slot 9. When using DIP switches to configure the card, the card in slot 8 defaults to TDM Highway 1 and the card in slot 9 defaults to TDM Highway 2.

■ **Using DIP Switches to Configure a PRI Card**

The quickest way to set up a PRI card is by using DIP switches. Your PRI card is shipped from the factory set to common PRI over T1 or PRI over E1 default settings, depending on whether you are using a T1 or E1 line. Change the switch settings only if your PRI or T1/E1 line uses different settings.

Note: When configuring channelized E1 operation, you must use both DIP switches **and** a configuration file to set all valid channelized E1 parameters.

There are two banks of eight switches to configure the PRI main card: SW2 and SW3. See [Figure 2-1](#).

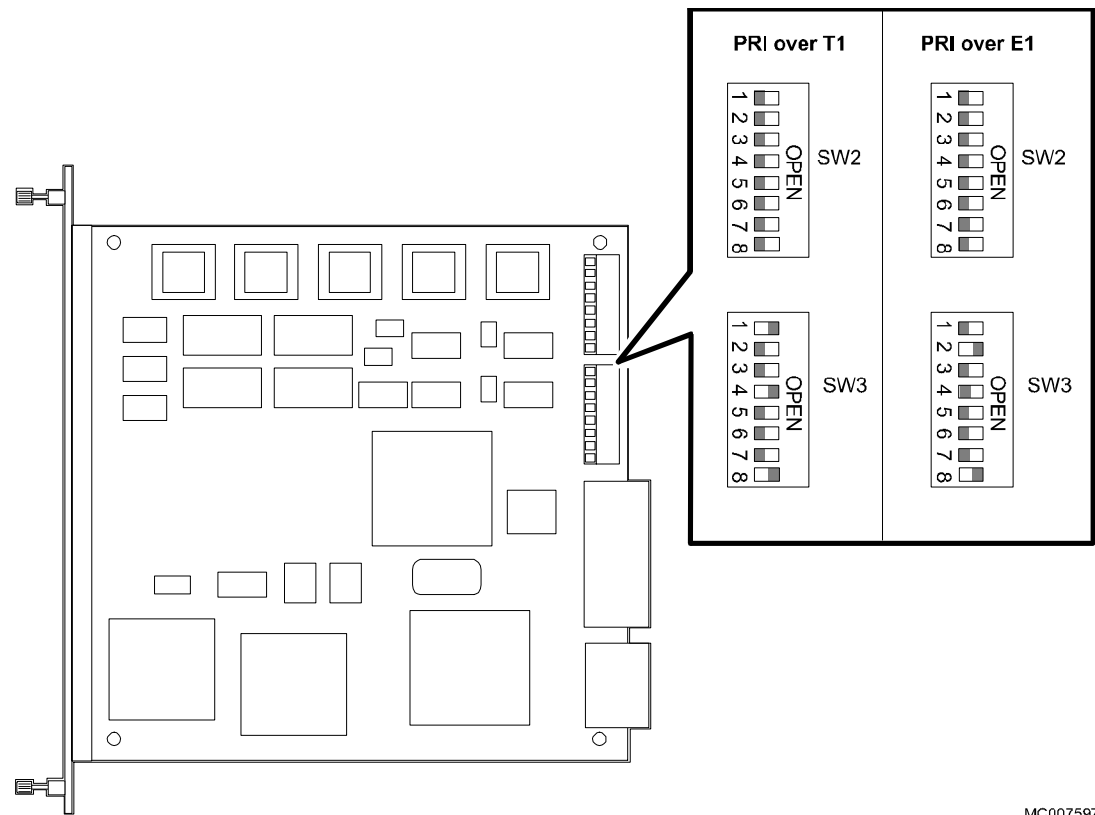


Figure 2-1. PRI Card Default Switch Settings

MC007597

[Table 2-2](#) lists the switch default settings.

Table 2-2. PRI Card DIP Switch Default Settings

<i>PRI Over T1 Operation</i>	<i>PRI Over E1 Operation</i>
PRI over T1	PRI over E1
ESF (Extended SuperFrame)	E1 with CRC4
0 dB attenuation	0 dB attenuation
Functions are selected via switch settings (instead of via configuration file)	Functions are selected via switch settings (instead of via configuration file)
B8ZS (Bipolar Eight-Zero Substitution)	See Note below

Note: HDB3 is automatically set by default when choosing E1 mode. You do not need to select it via switches.

Some items to note about switch settings include:

- **Important:** PRI and channelized T1 functions can be automatically set by switch settings. If you want to use a configuration file instead, you must set SW3 switch 8 Closed to ignore switches and use the configuration file settings. For channelized E1 operation, you must do both: set switches **and** use a configuration file.
- When using DIP switches to configure PRI over E1 operation, the default number of modem ports is 56. If you need to set up additional modem ports, you must use the pri_e1.cfg configuration file, instead of using switches. Refer to “[The pri_e1.cfg File](#)” for further details.

The switch settings are described on the following pages.

SW2 Factory Default Switch Settings

SW2 is at the rear of the PRI main card where it connects to the chassis mid-plane and is used as follows:

- Switches 1 and 2 select transmit line build out for the PRI or T1/E1 line
- Switches 3 through 5 perform diagnostic loopbacks
- Switch 6 **must be Closed** for PRI operation
- Switch 7 selects line code
- Switch 8 selects main or boot operating mode

[Table 2-3](#) identifies the switch settings and functionality. Factory default settings are shown in **bold**.

Open = Up/Off; Closed = Down/On.

Table 2-3. SW2 Factory Default Switch Settings

<i>SW2 Switches</i>	<i>Positions</i>	<i>Description</i>
1,2	Closed Closed Open Closed Closed Open Open Open	0 dB attenuation 7.5 dB attenuation 15 dB attenuation 22.5 dB attenuation
3,4,5	Closed Closed Closed Open Closed Closed Closed Open Closed Open Open Closed Closed Closed Open Open Closed Open Closed Open Open Open Open Open	No loopback diagnostics Reserved CSU Span 1 Local Loopback Reserved CSU Span 1 Remote Loopback CSU Span 2 Local Loopback CSU Span 2 Remote Loopback Transmit all ones Span 1 (TAOS)
6	Closed Open	PRI operation Channelized operation
7	Closed Open	B8ZS (PRI over T1 default) AMI
8	Closed Open	Main mode Boot mode

Note: HDB3 is automatically set by default when choosing PRI over E1 mode. You do not need to select it via switches.

SW3 Factory Default Switch Settings

SW3 is located at the rear of the PRI main card where it connects to the chassis mid-plane and is used as follows:

- Switches 1 through 3 select the operational mode
- Switches 4 through 6 select the framing format for PRI
- Switch 7 performs hardware diagnostics
- Switch 8, under software control, can enable or overwrite different functions

Table 2-4 identifies the switch settings and functionality. Factory default settings are shown in **bold**.

Open = Up/Off; Closed = Down/On.

Table 2-4. SW3 Switch Default Settings

<i>SW3 Switches</i>	<i>Positions</i>			<i>Description</i>
1,2,3	Closed	Closed	Closed	T1, bit robbing
	Open	Closed	Closed	PRI over T1 (PRI over T1 default)
	Closed	Open	Closed	PRI over E1 with CRC4 (PRI over E1 default)
	Open	Open	Closed	E1 DoubleFrame
4,5,6	Closed	Closed	Closed	SF (SuperFrame) or D4
	Open	Closed	Closed	ESF (Extended SuperFrame) (PRI over T1 default)
	Closed	Open	Closed	Reserved
	Open	Open	Closed	Reserved
7	Closed			Normal
	Open			Continuous diagnostics
8	Closed			Switch functions are set via configuration file
	Open			Select functions via switch setting

Channelized T1 and Channelized E1 Switch Settings

For channelized T1 or channelized E1 operation, set the switches as follows. If your PRI or T1/E1 line uses different settings, refer to “[Using DIP Switches to Configure a PRI Card](#)” or the Compaq 4000 Manager’s on-line help for complete switch settings. Open = Up/Off; Closed = Down/On.

Table 2-5. SW2 Switches for Channelized T1 and Channelized E1

<i>SW2 Switches</i>	<i>Positions</i>			<i>Description</i>
1,2	Closed	Closed		0 dB attenuation
3,4,5	Closed	Closed	Closed	No loopback diagnostics
6	Open			Channelized operation
7*	Closed			B8ZS (Channelized T1 operation)
8	Closed			Main mode

* For channelized E1 operation only, switch 7 is ignored.

Table 2-6. SW3 Switches for Channelized T1 and Channelized E1

<i>SW3 Switches</i>	<i>Positions</i>			<i>Description</i>
1,2,3	Closed	Closed	Closed	T1, bit robbing (Channelized T1 operation)
	Open	Open	Closed	E1 DoubleFrame (Channelized E1 operation)
4,5,6*	Open	Closed	Closed	ESF (Extended SuperFrame) (Channelized T1 operation)
7	Closed			Normal
8	Closed			Switch functions are set via configuration file (Channelized E1 operation)
	Open			Select functions via switch setting (Channelized T1 operation)

* For channelized E1 operation only, switches 4, 5, and 6 are ignored.

Note: HDB3 is automatically set by default when choosing E1 mode. You do not need to select it via switches.

For channelized E1 operation, you also need to use the ch_e1.cfg configuration file as well as set switches. This file contains standard channelized E1 settings for E1 Doubleframe, HDB3, loop start, channelized E1 signal variance, and a modem pool set up for eight modem cards. If your E1 line does not use loop start, you must edit the ModemSignaling line. You cannot set the channelized E1 signal variance parameter via switches; in order to change this parameter, you must edit the ChelSigVar line. If you need to add modem cards, you must change the ModemPool line. Refer to “[The pri_e1.cfg File](#)” or the Compaq 4000 Manager’s on-line help for instructions.

Using the Compaq 4000 Manager to Configure a Card

For the PRI card, you can use the Compaq 4000 Manager in Windows 95 or Windows NT 4.0 to:

- Send an edited configuration file to a PRI card
- Retrieve and view the current configuration

To perform the above operations, use the card’s pop-up menu as described below.

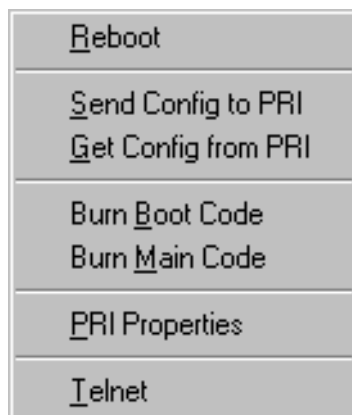
Important: On the PRI card, SW3 switch 8 must be **Closed** for switch settings to be ignored and configuration file settings to take effect.

Accessing a Card’s Pop-Up Menu

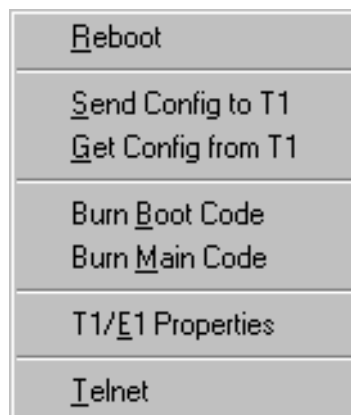
To access a card’s pop-up menu:

1. In the Chassis Snapshot window, point the mouse at the card.
2. Click the right mouse button.

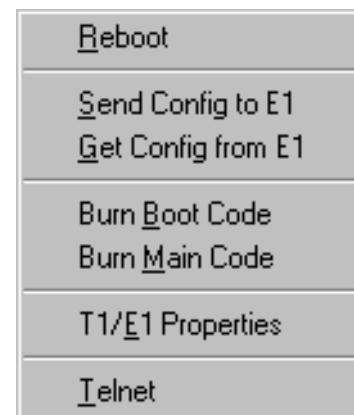
The pop-up menu for that card displays.



PRI pop-up menu



Channelized T1 pop-up menu



Channelized E1 pop-up menu

Editing a Configuration File

Each PRI card contains a configuration file that contains standard configuration parameters, such as line type (frame format) and line coding. For PRI operation, there is a second configuration file (priconfg.dig) that contains PRI parameters to be used for routing digital calls through a chassis.

Compaq provides the following configuration files. These files are found in a folder on the PC where you installed Compaq 4000 Manager.

Table 2-7. Configuration Files

<i>File Name</i>	<i>Default Folder File Found In</i>
pri_t1.cfg	C:\Programs Files\Compaq 4000 Manager\pri-t1 config
pri_e1.cfg	C:\Programs Files\Compaq 4000 Manager\pri-e1 config
priconfg.dig	either: C:\Programs Files\Compaq 4000 Manager\pri-t1 config or C:\Programs Files\Compaq 4000 Manager\pri-e1 config
t1_b8zs_esf.cfg	C:\Program Files\Compaq 4000 Manager\ch-t1 config
t1_ami_d4.cfg	C:\Program Files\Compaq 4000 Manager\ch-t1 config
ch_e1.cfg	C:\Program Files\Compaq 4000 Manager\ch-e1 config

Use the file that contains the format that is valid for your PRI or T1/E1 line. For example, if your T1 line is set for a line code of B8ZS and a frame format of ESF, then use the t1_b8zs_esf.cfg configuration file.

If you have two cards, you will need two configuration files. For example, for a PRI card you can use the *pri_t1_1.cfg* file on PRI card 1 and use the *pri_t1_2.cfg* file on PRI card 2.

In most cases, the default settings should work fine. If you need different settings, you can edit the configuration files to reflect your required parameters.

There are two ways you can edit a configuration file:

1. Open the configuration file in a text editor, such as Windows Notepad.
2. Copy the current configuration from a PRI card, save it to a file, and edit the file.

Important: On the PRI card, SW3 switch 8 must be **Closed** for switch settings to be ignored and configuration file settings to take effect.

The pri_t1.cfg File

The pri_t1.cfg file contains standard PRI line configuration parameters, such as line type and line coding, to be used for PRI over T1 operation. You need to change this information only if your PRI line uses different settings.

If you need to change the default settings in the pri_t1.cfg file, the following fields are the most common ones you would change (defaults are shown in **bold**). If you don't see the field you want to change listed here, a complete description for all the fields in this file is found in [Appendix B, Sample Configuration Files](#).

Engine Type	4=T1, 6=PRI
Modem Pool	1,1,2,1,3,1,4,1,5,1,6,1
	Modem cards are in <i>slot.engine</i> format, where <i>slot</i> =1 to 16 and <i>engine</i> =1.
	Note: For analog over ISDN calls, if you use two PRI cards, assign different modem pools to each PRI card. Make sure the modem cards in each pool do not overlap. For example, for two PRI over T1 cards and twelve 8-port modems, assign the modem cards in slots 1 to 6 to PRI card 1 (in slot 8) and the modem cards in slots 10 to 15 to PRI card 2 (in slot 9). Refer to the Compaq 4000 Manager's on-line help for further details.
Line Type	2=ESF , 3=D4, 4=E1, 7=E1DF
Line Coding	2=B8ZS , 3=HDB3, 5=AMI
Line Build Out	1=0 dB , 2=7.5 dB, 3=15 dB, 4=22.5 dB
Loopback	1=None , 5=ACFA, 6=TAOS, 7=CSU Local, 8=CSU Remote
Modem Signaling	1=Loop Start, 2=E&M, 3=E&M Wink , 4=MF E&M, 5=MF E&M Wink
ISDN SwitchType	3=ETSI, 5=AT&T 4ESS, 6=AT&T 5ESS , 7=DMS100, 8=DMS250, 10=NI2, 16=NTT, 22=TS014

The pri_e1.cfg File

The pri_e1.cfg file contains standard PRI line configuration parameters, such as line type and line coding, to be used for PRI over E1 operation. You need to change this information only if your PRI line uses different settings.

If you need to change the default settings in the pri_e1.cfg file, the following fields are the most common ones you would change (defaults are shown in **bold**). If you don't see the field you want to change listed here, a complete description for all the fields in this file is found in [Appendix B, Sample Configuration Files](#).

Engine Type	4=T1, 6=PRI
Modem Pool	1.1,2.1,3.1,4.1,5.1,6.1,7.1,9.1
	Modem cards are in <i>slot.engine</i> format, where <i>slot</i> =1 to 16 and <i>engine</i> =1.
	Note: For analog over ISDN calls, if you use two PRI cards, assign different modem pools to each PRI card. Make sure the modem cards in each pool do not overlap. For example, for two PRI over E1 cards, assign the modem cards in slots 1 to 7 to PRI card 1 (in slot 8) and the modem cards in slots 10 to 16 to PRI card 2 (in slot 9). Refer to the Compaq 4000 Manager's on-line help for further details.
Line Type	2=ESF, 3=D4, 4=E1 , 7=E1DF
Line Coding	2=B8ZS, 3= HDB3 , 5=AMI
Line Build Out	1=0 dB , 2=7.5 dB, 3=15 dB, 4=22.5 dB
Loopback	1=None , 5=ACFA, 6=TAOS, 7=CSU Local, 8=CSU Remote
Modem Signaling	1=Loop Start, 2=E&M, 3=E&M Wink , 4=MF E&M, 5=MF E&M Wink
ISDN SwitchType	3=ETSI , 5=AT&T 4ESS, 6=AT&T 5ESS, 7=DMS100, 8=DMS250, 10=NI2, 16=NTT, 22=TS014

The priconfg.dig File

This file contains PRI parameters to be used for routing digital calls through a 4000 chassis. You must edit this file with values that are appropriate for your network.

If you need to change the default settings in the priconfg.dig file, the following fields are the most common ones you would change (defaults are shown in **bold**). A complete description for this file is found in [Appendix B, Sample Configuration Files](#).

Note: If you use two PRI cards to make digital calls, you need one configuration file for each PRI card. For example, use *priconfg1.dig* for configuring PRI card 1 in slot 8 and use *priconfg2.dig* for configuring PRI card 2 in slot 9.

Network Server N	<i>NetworkSrvr(1 to 64)=Addr, TunnelingProtocol, FlowControl, NmbrOfPorts</i> where: <i>Addr</i> =IP address of a Network Server <i>TunnelingProtocol</i> = PPTP <i>FlowControl</i> =1 (enabled) or 0 (disabled) <i>NmbrOfPorts</i> =number of logical ports that the server can support Note: If the Network Server is a Windows NT server, then set FlowControl=1 and NmbrOfPorts=0.
Default Algorithm	<i>DfltAlg</i> = SVC (service type routing) or CA (called address routing)
Engine ID	<i>EngineID</i> = <i>slot.engine</i> , where <i>slot</i> =8 or 9 and <i>engine</i> = 1. Default = 8.1

The t1_b8zs_esf.cfg File

The t1_b8zs_esf.cfg file contains T1 line configuration parameters for B8ZS line coding with an ESF line type.

If you need to change the default settings in the t1_b8zs_esf.cfg configuration file, the following fields are the most common ones you would change (defaults are shown in **bold**). If you don't see the field you want to change listed here, a complete description for all the fields in this file is found in [Appendix B, Sample Configuration Files](#).

Engine Type	4=T1 , 6=PRI
Modem Pool	1,1,2,1,3,1,4,1,5,1,6,1
Modem cards are in <i>slot.engine</i> format, where <i>slot</i> =1 to 16 and <i>engine</i> =1.	
Note: For analog over ISDN calls, if you use two PRI cards set for channelized T1 operation, assign different modem pools to each card. Make sure the modem cards in each pool do not overlap. For example, for two channelized T1 cards, assign the modem cards in slots 1 to 6 to channelized T1 card 1 (in slot 8) and the modem cards in slots 10 to 15 to channelized T1 card 2 (in slot 9). Refer to the Compaq 4000 Manager's on-line help for further details.	
Line Type	2=ESF , 3=D4, 4=E1, 7=E1DF
Line Coding	2=B8ZS , 3=HDB3, 5=AMI
Line Build Out	1=0 dB , 2=7.5 dB, 3=15 dB, 4=22.5 dB
Loopback	1=None , 5=ACFA, 6=TAOS, 7=CSU Local, 8=CSU Remote
Modem Signaling	1=Loop Start, 2=E&M, 3=E&M Wink , 4=MF E&M, 5=MF E&M Wink

The t1_ami_d4.cfg File

The t1_ami_d4.cfg file contains T1 line configuration parameters for AMI line coding with a D4 line type.

If you need to change the default settings in the t1_ami_d4.cfg configuration file, the following fields are the most common ones you would change (defaults are shown in **bold**). If you don't see the field you want to change listed here, a complete description for all the fields in this file is found in [Appendix B, Sample Configuration Files](#).

Engine Type	4=T1 , 6=PRI
Line Type	2=ESF, 3=D4 , 4=E1, 7=E1DF
Line Coding	2=B8ZS, 3=HDB3, 5=AMI
Line Build Out	1=0 dB , 2=7.5 dB, 3=15 dB, 4=22.5 dB
Loopback	1=None , 5=ACFA, 6=TAOS, 7=CSU Local, 8=CSU Remote
Modem Pool	1,1,2,1,3,1,4,1,5,1,6,1
Modem cards are in <i>slot.engine</i> format, where <i>slot</i> =1 to 16 and <i>engine</i> =1.	
Note: For analog over ISDN calls, if you use two PRI cards set for channelized T1 operation, assign different modem pools to each card. Make sure the modem cards in each pool do not overlap. For example, for two channelized T1 cards, assign the modem cards in slots 1 to 6 to channelized T1 card 1 (in slot 8) and the modem cards in slots 10 to 15 to channelized T1 card 2 (in slot 9). Refer to the Compaq 4000 Manager's on-line help for further details.	
Modem Signaling	1=Loop Start, 2=E&M, 3=E&M Wink , 4=MF E&M, 5=MF E&M Wink

The ch_e1.cfg File

The ch_e1.cfg file contains standard E1 line configuration parameters, such as line type and line coding.

If you need to change the default settings in the ch_e1.cfg file, the following fields are the most common ones you would change (defaults are shown in **bold**). If you don't see the field you want to change listed here, a complete description for all the fields in this file is found in [Appendix B, Sample Configuration Files](#).

Engine Type	4=T1, 6=PRI
Modem Pool	1,1,2,1,3,1,4,1,5,1,6,1,7,1,9,1
Modem cards are in <i>slot.engine</i> format, where <i>slot</i> =1 to 16 and <i>engine</i> =1.	
Note: For analog over ISDN calls, if you use two PRI cards set for channelized E1 operation, assign different modem pools to each channelized E1 card. Make sure the modem cards in each pool do not overlap. For example, for two channelized E1 cards, assign the modem cards in slots 1 to 7 to channelized E1 card 1 (in slot 8) and the modem cards in slots 10 to 16 to channelized E1 card 2 (in slot 9). Refer to the Compaq 4000 Manager's on-line help for further details.	
Line Type	2=ESF, 3=D4, 4=E1, 7=E1DF
Line Coding	2=B8ZS, 3=HDB3 , 5=AMI
Line Build Out	1=0 dB , 2=7.5 dB, 3=15 dB, 4=22.5 dB
Loopback	1=None , 5=ACFA, 6=TAOS, 7=CSU Local, 8=CSU Remote
Modem Signaling	1=Loop Start , 2=E&M, 3=E&M Wink, 4=MF E&M, 5=MF E&M Wink
ISDN SwitchType	3=ETSI , 5=AT&T 4ESS, 6=AT&T 5ESS, 7=DMS100, 8=DMS250, 10=NI2, 16=NTT, 22=TS014
Channelized E1	<i>n</i> =Country code
Signal Variance	

Sending a Configuration File to a Card via the Compaq 4000 Manager

Note: The following steps assume you have a configuration file that contains settings valid for your specific line configuration. If you don't have a valid configuration file, refer to ["Editing a Configuration File"](#) for instructions on creating a configuration file.

To copy a configuration file to a card:

1. In the Compaq 4000 Manager's Chassis Snapshot window, point the mouse at a PRI card, click the right mouse button, and choose **Send Config to xxx** from the pop-up menu, where *xxx* is either PRI, T1, or E1, depending on the card you selected. The Open file window displays, listing all your configuration files.
2. Select the configuration file with the configuration settings needed for your PRI or T1/E1 line.
3. Click **OK**. The file is automatically copied to the selected card.
4. On the PRI card, set SW3 switch 8 to the **Closed** position in order to use the configuration file settings.
5. Press the **Reset** button on the card. It is initialized with the new settings.

CAUTION: Wait until all modem connections are ended before resetting the card or you may lose data.

6. If you have two PRI cards, repeat steps 1 through 5 for the second card.

Getting a Configuration File from a Card via the Compaq 4000 Manager

Note: On the PRI card, SW3 switch 8 must be **Closed** for the configuration file settings to take effect.

If you want to see what options are currently being used on a card, you can retrieve the configuration file and view it:

1. In the Compaq 4000 Manager's Chassis Snapshot window, point the mouse at a PRI card, click the right mouse button, and choose **Get Config From xxx** from the pop-up menu, where *xxx* is either PRI, T1, or E1, depending on the card you selected.
2. Type a name to save the file as in the Save As dialog that displays. A copy of the current configuration settings in use by the card is saved to that file.
3. Open Notepad, or a similar text editor, to view the file.
4. If you have two PRI cards, repeat steps 1 through 3 for the second card.

If you want to edit the configuration file, refer to [“Editing a Configuration File.”](#) If you edit the configuration file, refer to [“Sending a Configuration File to a Card via the Compaq 4000 Manager”](#) to make the new settings take effect.

■ Using the Console Command-Line Interface to Remotely Configure a Card

You need to use the console command-line interface only if you don't use Windows 95 or Windows NT 4.0 (and, therefore, don't use Compaq 4000 Manager), or if you want to customize your system using commands not available through Compaq 4000 Manager. Accessed through the 4000 chassis' Network Management port, the console command line interface lets you use shell commands for control and configuration. A telnet server (provided by you) allows remote PCs and workstations to access the command shell over a network. For complete command descriptions, refer to [Appendix A, Console Commands](#).

To remotely configure a PRI card:

- Use the local management port to issue commands to set up an IP address for a card, and
- Use the Ethernet port to issue commands to configure the card.

Note: You cannot run both the Compaq 4000 Manager and the console command-line interface simultaneously.

Setting Up an IP Address

Note: Using the Compaq 4000 Manager is the fastest and easiest way to set up an IP address for a PRI card. However, if the Compaq 4000 Manager is not available, use the following steps to set up an IP address through the Network Management port.

To set up an IP address for a card:

1. Attach a DB9 connector of a straight-through serial cable to the Network Management port on the rear of the chassis' power supply.
 2. Attach the other end of the serial cable (either a DB9 or DB25, depending on your terminal device's configuration) to a COM port on your terminal device.
 3. Start a terminal emulation program on your terminal device.
 4. Set the following options in the terminal emulation software:
 - Select the COM port to which you connected the chassis (in step 2 above).
 - Set the terminal emulation software for 9600 bps, 8 data bits, no parity, and 1 stop bit.
 - Set flow control to none.
 5. If you have one PRI card, press the **Reset** button on it.
If you have two PRI cards, remove the card from slot 9. Then press the **Reset** button on the card in slot 8.
 6. As the PRI card goes through the power-up sequence, it detects the presence of the attached terminal emulator. When the following message displays in the terminal emulation window, send a Break character:

Enter Break char. within 10 secs. to enter Console Port
 7. At the login and password prompts, type the following default settings:
login: **system**
password: **isp**
- Note:** We recommend that you change the default password. See [page A-14](#) for a description of the **password** command.
8. Once the console command line interface has started, you should see the **pSH+>** prompt. If you don't see the **pSH+>** prompt, ensure that:
 - One end of the serial cable is connected to the chassis' Network Management port, and the other end is connected to a COM port on your PC.
 - The terminal emulation software is started, and that it is set to the COM port where the serial cable is attached.
 9. Set an IP address, using an IP address that is appropriate for your network. At the **pSH+>** prompt, type **ipconfig le0 <ip address>**, where **<ip address>** is in the format **xxx.xxx.xxx.xxx**.
 10. Re-install the second PRI card into slot 9, and remove the first PRI card from slot 8.
 11. Press the **Reset** button on the PRI card in slot 9. Repeat steps 6 through 9.

12. Re-install the first PRI card into slot 8.
13. Type **exit** to log out of the console session.

Using the Ethernet Port to Remotely Configure a Card

Note: In order to use your Ethernet port, you must first set up an IP address as described in the previous section.

To use the Ethernet port to configure a PRI card:

1. Attach one end of an RJ45 Ethernet cable to the Ethernet port on a PRI adapter card on the rear of the chassis.
2. Attach the other end of the Ethernet cable to your network. The Ethernet LED on the adapter card should be on (green) if an Ethernet connection is operational.
3. On your terminal device (such as a UNIX workstation) connected to the network, change to the directory where the configuration file(s) reside. The configuration files are named as follows:

PRI over T1:	pri_t1.cfg and priconfg.dig
PRI over E1:	pri_e1.cfg and priconfg.dig
Channelized T1:	t1_b8zs_esf.cfg and t1_ami_d4.cfg
Channelized E1:	ch_e1.cfg

4. If necessary, edit the PRI, channelized T1, or channelized E1 configuration file, using a text editor such as DOS edit or Windows Notepad, and save the file.
5. Start an ftp session by typing **ftp <ip address>**, where *<ip address>* is the IP address of the PRI card.
6. At the name and password prompts, type the following default settings:
name: **system**
password: **isp**

Note: If you changed the default password, make sure you type in your new password.

The ftp> prompt displays.

7. Type **put <filename>** to copy the file, where *<filename>* is either:

PRI over T1:	pri_t1.cfg or priconfg.dig
PRI over E1:	pri_e1.cfg or priconfg.dig
Channelized T1:	t1_b8zs_esf.cfg or t1_ami_d4.cfg
Channelized E1:	ch_e1.cfg

If necessary, repeat until all files are copied.

8. When all files have finished copying, exit the ftp session by typing **quit**.
9. Start a telnet session by typing **telnet <ip address>**, where *<ip address>* is the IP address of the PRI card.
10. At the login and password prompts, type the following default settings:
login: **system**
password: **isp**

Note: If you changed the default password, make sure you type in your new password.

The pSH+> prompt displays.

11. Load the PRI, channelized T1, or channelized E1 configuration file(s) to the PRI card by typing **loadcfg -f <filename>** at the pSH+> prompt, where *<filename>* is either:

PRI over T1:	pri_t1.cfg or priconfg.dig
PRI over E1:	pri_e1.cfg or priconfg.dig
Channelized T1:	t1_b8zs_esf.cfg or t1_ami_d4.cfg
Channelized E1:	ch_e1.cfg

This automatically initializes the new PRI, channelized T1, or channelized E1 configuration. If necessary, repeat until all files are loaded.

12. You can view the PRI, channelized T1, or channelized E1 configuration file by typing **cfgcurr** at the pSH+> prompt. The current PRI, channelized T1, or channelized E1 configuration file displays.
13. Exit the session. At the pSH+> prompt, type **exit**.

14. If you have two PRI cards, repeat steps 1 through 13 for the second card.

Chapter 3

Updating PRI, Channelized T1, or Channelized E1 Firmware Remotely Using ftp

Your PRI card is shipped with the most current PRI, channelized T1, or channelized E1 firmware. If Compaq releases new firmware, you can update your PRI, channelized T1, or channelized E1 firmware through a remote ftp session by performing the following steps:



Important: You must have already set up an IP address for your PRI card before updating your firmware files. Refer to [“Setting Up an IP Address.”](#)

1. Download the new firmware files (B*.pri or M*.pri) from Compaq, if necessary. Refer to the Compaq 4000 Manager’s on-line help for instructions.
2. Attach one end of an RJ45 Ethernet cable to the Ethernet port on a PRI adapter card on the rear of the 4000 chassis.
3. Attach the other end of the Ethernet cable to your network. The Ethernet LED on the PRI adapter card should be on (green) if an Ethernet connection is operational.
4. On your terminal device (such as a UNIX workstation) connected to the network, change to the directory where the firmware files (B*.pri or M*.pri) reside.
5. Start an ftp session by typing **ftp <ip address>**, where **<ip address>** is the IP address of the PRI card.

6. At the name and password prompts, type the following default settings:

name: **system**
password: **isp**

Note: If you changed the default password, make sure you type in your new password.

The ftp> prompt displays.

7. Type **bin** to set binary mode.
8. Type **put <filename>**, where **<filename>** is either **B*.pri** or **M*.pri**.

Note: You can copy only one file at a time to a PRI card. If you need to update both files, copy the boot code file first. Once the file is burned (see step 13), you will have to repeat this process for the main code.

9. When the file has finished copying, exit the ftp session by typing **quit**.
10. Start a telnet session by typing **telnet <ip address>**, where **<ip address>** is the IP address of the PRI card.
11. At the login and password prompts, type the following default settings:

login: **system**
password: **isp**

Note: If you changed the default password, make sure you type in your new password.

The pSH+> prompt displays.

12. To check that the file copied correctly, type **ls -l**, look for the file, and check that the file size is greater than zero. If the file size is zero, repeat steps 4 through 10.
13. At the pSH+> prompt, type one of the following commands:
burn -b (for boot code)
burn -m (for main code)

The PRI card reboots. The new firmware is copied to the card permanently.

14. If you also need to download main code, repeat steps 5 through 13.
15. If you have two PRI cards, repeat steps 2 through 13 for the second card.

Chapter 4

Using SNMP MIBs

You cannot manage the 4000 chassis using SNMP MIBs. However, Compaq provides three SNMP MIBs that allow you to view basic statistical information about the PRI card when using a third-party SNMP management platform, such as HP OpenView. SNMP MIBs for the modem cards are not available at this time.

The MIBs are:

- ISDN MIB (PRI only)
- MIB-II
- Compaq Microcom's Channel MIB (PRI only)

To use these MIBs with third-party systems, simply compile them. If you are not familiar with doing this for your management system, contact your system administrator or the third party that supplied the system.

ISDN MIB

The 4000 chassis supports the following groups and parameters found in the ISDN MIB:

- isdnBearerGroup
- isdnMibSignalingGroup

isdnBearerTable

isdnBearerEntry

ibg	isdnBearerChannelType
ibg	isdnBearerOperStatus
ibg	isdnBearerChannelNumber
ibg	isdnBearerPeerAddress
ibg	isdnBearerPeerSubAddress
ibg	isdnBearerCallOrigin
ibg	isdnBearerInfoType
ibg	isdnBearerMultirate
ibg	isdnBearerCallSetupTime
ibg	isdnBearerCallConnectTime
ibg	isdnBearerChargedUnits

isdnSignalingTable

isdnSignalingEntry

imsg	isdnSignalingIfIndex
imsg	isdnSignalingProtocol
imsg	isdnSignalingCallingAddress
imsg	isdnSignalingSubAddress
imsg	isdnSignalingBchannelCount
imsg	isdnSignalingInfoTrapEnable
imsg	isdnSignalingStatus

isdnSignalingStatsTable

isdnSignalingStatsEntry

imsg	isdnSigStatsInCalls
imsg	isdnSigStatsInConnected

imsg	isdnSigStatsOutCalls
imsg	isdnSigStatsOutConnected
imsg	isdnSigStatsChargedUnits

■ MIB-II

The 4000 chassis supports the following groups and parameters found in the MIB-II Interfaces Group:

- ifGeneralGroup
- ifStackGroup
- ifPacketGroup (mutually exclusive of ifFixedLengthGroup, ifHCFixedLengthGroup, ifHCPacketGroup, and ifTestGroup)
- ifStackStatus (part of ifStackGroup)
- ifAdminStatus

ifTable

ifEntry

	ifIndex
igg	ifDescr
igg	ifType
ipg	ifMtu
igg	ifSpeed
igg	ifPhysAddr
igg	ifAdminStatus
igg	ifOperStatus
igg	ifLastChange
ipg	ifInOctets
ipg	ifInUcastPkts
	ifInNUcastPkts
ipg	ifInDiscards
ipg	ifErrors
ipg	ifInUnknownProtos
ipg	ifOutOctets
ipg	ifOutUcastPkts
	ifOutNUcastPkts
ipg	ifOutDiscards
ipg	ifOutErrors
	ifOutQLen
	ifSpecific

linkDown

ifIndex
ifAdminStatus
ifOperStatus

linkUp

ifIndex
ifAdminStatus
ifOperStatus

Note: LinkUp and LinkDown traps are sent just after **ifOperStatus** leaves or just before it enters the “down” state, respectively.

Compaq Microcom's Channel MIB

The 4000 chassis supports the following commands found in Compaq Microcom's Channel MIB:

Channel In Service — puts a B-channel in service, and allows incoming or outgoing data transmissions.

Channel Out of Service — takes a B-channel out of service, and does not allow incoming or outgoing data transmissions. This does not interrupt any data transmission in progress on the B-channel.

Channel Disconnect — forces the close of a B-channel and any active call on that channel. This interrupts any existing data transmission in progress on the B-channel.

Proprietary Events

Listed below are several proprietary events relevant to the PRI card and the suggested parameters that should accompany the event notification.

Table 4-1. PRI Card Proprietary Events

<i>Event</i>	<i>Description</i>	<i>Parameters</i>
ISDN_CONN_EST	Indicates that an ISDN connection was established on the specified B-channel	B-channel, protocol, data_rate, incoming/outgoing
ISDN_CONN_DISC	Indicates that an ISDN connection was disconnected on the specified B-channel	B-channel
ANALOG_CONN_EST	Indicates that an analog connection was established on the specified B-channel	B-channel, protocol, data_rate, incoming/outgoing
ANALOG_CONN_DISC	Indicates that an analog connection was disconnected on the specified B-channel	B-channel
CHANNEL_DISCONNECT	The specified B-channel was disconnected	B-channel
CHANNEL_ENABLED	The specified B-channel was enabled (in_service)	B-channel
CHANNEL_DISABLED	The specified B-channel was disabled (out-of-service)	B-channel
CALL_REFUSED	The call was refused on this B-channel for stated reason code	B-channel, reason_code (no channel available, directory number mismatch, etc.)
M32_LPBK	Munich32 has been placed in loopback mode	None

MIB Usage

B-channel Support

The ifGeneralGroup and the ifPacketGroup of the MIB-II Interfaces MIB are required by the ISDN MIB to support the B-channel entities. These groups are supported by elements of the ifTable. Each B-channel has an entry in the ifTable. The isdnBearerGroup of the ISDN MIB is also required support per B-channel. This group is supported by elements of the isdnBearerTable.

An ifEntry is maintained for each B-channel.

For each B-channel, there is an entry in the ifTable with a unique ifIndex for this B-channel. This ifIndex is used to define the relationship between this B-channel and the physical layer. The corresponding data in the isdnBearerTable is indexed by ifIndex.

D-channel Support

The ifEntry, the ifGeneralGroup, and the ifPacketGroup of the MIB-II Interfaces MIB are required by the ISDN MIB to support the D-channel entities. These groups are supported by elements of the ifTable. The isdnMibSignalingGroup of the ISDN MIB is also required support per D-channel. This group is supported by the isdnSignalingTable, the isdnSignalingStatsTable, and the isdnLapdTable.

For a D-channel, there is an entry in the ifTable with a unique ifIndex for D-channel layer 2 and layer 3 entities. This ifIndex is used to define the relationship between the D-channel layer 3 entity and the D-Channel layer 2 entity and between the D-channel layer 2 entity and the physical layer (PRI). Data in the isdnSignalingTable (augmented by the isdnSignalingStatsTable) contains the ifIndex. Finally, the isdnLapdTable is indexed by ifIndex allowing for reference to D-channel layer 2 data.

ifTable

The ISDN MIB uses the ifType of the ifEntry of each B-channel to represent the client of that B-channel. For example, an ifType of ds0 (81) would indicate a PPP client for that B-channel. This eliminates definition of a second interface per B-channel, limiting the number of ifEntries required in the ifTable to the actual number of B-channels.

[Table 4-2](#) specifies an ifIndex and ifType per interface.

Table 4-2. ifIndex Table

<i>ifIndex</i>	<i>ifType</i>	<i>Description</i>
1	63 - isd	ISDN signaling channel #1
2	77 - lapd	LAPD Interface
3	81 - ds0	B-channel #1 (PPP client)
4	1 - other	B-channel #2 (V.120 client)
5	18 - T1/E1	PRI physical interface

Chapter 5

Troubleshooting and Customer Support

You can solve most problems that may occur when installing and using your equipment by carefully reading the appropriate chapters in this guide. However, if you cannot resolve your problem, you can find general tips for troubleshooting PRI, channelized T1, and channelized E1 equipment in this chapter.

■ Ordering PRI, Channelized T1, or Channelized E1 Service

The following line options are available for PRI, channelized T1, or channelized E1 connections. Contact your local telephone company for information about purchasing these options. Compaq recommends ordering your PRI or T1/E1 line with the 4000 system default settings (shown in bold).

Table 5-1. PRI, Channelized T1, and Channelized E1 Line Options

<i>Feature</i>	<i>PRI over T1 Options (Defaults shown in bold)</i>	<i>PRI over E1 Options (Defaults shown in bold)</i>	<i>Channelized T1 Options (Defaults shown in bold)</i>	<i>Channelized E1 Options (Defaults shown in bold)</i>
Frame Format	ESF (Extended SuperFrame) SF (SuperFrame)	CRC4 E1 Doubleframe	ESF (Extended SuperFrame) SF (SuperFrame)	CRC4 E1 Doubleframe
Line Code	B8ZS (Bipolar Eight-Zero Substitution) AMI (Alternate Mark Inversion)	HDB3	B8ZS (Bipolar Eight-Zero Substitution) AMI (Alternate Mark Inversion)	HDB3
Line Signaling	—	—	E&M wink start E&M immediate Loop start	—
Dialing Type	—	—	DTMF (Dual-Tone Multi Frequency) MF (Multi Frequency) Pulse	—

For optimal performance, also ask your carrier for:

- 0 dB loss/gain of transmit (TX) and receive (RX) signals
- Fewer than 16 repeaters to minimize the route from the central office
- Assurance that the maximum bit error rate is 1 in 1,000,000 by running multiple pattern tests of the PRI or T1/E1 line
- Line conformance to AT&T 62411 quality standards
- Trunk side, advanced, or data grade T1/E1 circuits
- The type of switch installed at the carrier's Central Office (CO) for PRI lines

■ Troubleshooting Tips

- Verify that the PRI card is seated correctly in the chassis and is receiving power by checking the PWR and SY LEDs on the front of the PRI main card. The LEDs should be on (solid green) for all PRI or T1/E1 lines.
- The PRI main and adapter cards must be attached tightly to the mid-plane.
- Verify that the settings on the PRI card match those of the T1/E1 line.
- Internal wiring should be 22-gauge twisted pair.
- Do not use a voice-grade T1 circuit.
- Do not use ADPCM compression.

Table 5-2. Troubleshooting Tips

<i>Symptom</i>	<i>Possible Cause</i>	<i>Solution</i>
No synchronization (SY LED Off)	Wrong framing Signal loss; No clock recovery; Defective PRI or T1/E1 line Defective PRI card or PRI, channelized T1, or channelized E1 backplane New line not turned up	Test alternate framing type. Have the carrier provide a printout with line configuration and match these settings to your PRI card. Have carrier perform a loopback test on the line from the central office to your customer premises. Place PRI card in loopback mode and have carrier perform a loopback test. If necessary, replace the card. Have the carrier check that the line has been activated.
Framing errors (SL LED On)	PRI card frame type does not match PRI or T1/E1 line frame type PRI or T1/E1 line problems	Test alternate framing type. Have carrier provide a printout with line configurations and match these settings to your PRI card. Have the carrier perform a BERT test on the line.
Bipolar violation (BP LED On) This indicates a local loop problem.	Incorrect line coding set Bad or noisy PRI or T1/E1 line	Make sure the PRI card and PRI or T1/E1 line are configured for the same line coding technique (B8ZS, AMI, or HDB3). If the line coding is not the same on both, you will see BP LED activity. Have the carrier run a BERT test on the line to determine if it is within specifications.
Yellow alarm (AL LED On) Generated by active devices on the phone network to indicate a loss of signal from device.	PRI card transmit bad Line bad on transmit side D-mark miswired	Perform a local loopback of the PRI card. If the AL LED stays on, the PRI card is bad. Replace the card. If the AL LED goes off, the problem is with the PRI or T1/E1 line. Have carrier perform a loopback test on the line to d-mark at customer premises. Place the PRI card in loopback mode, and have the carrier perform a loopback test.
No dialtone	New line not turned up PRI or modem cards are not in the correct slots	Try to dial into the modem lines. If this fails, check with phone carrier that the PRI or T1/E1 line is active. Try cards in another slot and try blind dialing (ATX3).
No dialtone	Signaling type incorrectly matched between the PRI or T1/E1 line and the modem	Have phone carrier provide a printout of line configuration including signaling. Try alternate signal type of E&M, E&M wink, or loop start.
Cannot Dial	Modem line incorrectly configured for dial type DTMF, MF, or Pulse	Test alternate dial type by changing the Modem Signaling parameter in the card's configuration file or check with the phone carrier on the dial type required.
Modem does not answer	No DTR or RTS supplied to the modem TXD to the modem during Ring	Check EIA232 signals for the presence of DTR and RTS. If not present, check the attached DTE equipment and serial cabling or ignore DTR and RTS with AT&D0\Q0*W for testing purposes. Modem will not answer if TXD is active. Try setting ATQ1E0-H1*W.
Modem does not answer	Signaling type incorrectly set	Have phone carrier provide a printout of line configuration including signaling. Try alternate signal type of E&M, E&M wink, or loop start.
All modems busy	New line not turned up yet; Existing line made busy Modems busied out Signaling type incorrectly set	Contact phone carrier to reconfigure and test the line. Check the modem configuration. Make sure AT*Y0 is set. Have phone carrier provide a printout of line configuration including signaling. Try alternate signal type of E&M, E&M wink, or loop start.

Cabling

When looking at the PRI adapter card, pin 1 is on the bottom and pin 8 is at the top for the PRI or T1/E1 line.

- Pins 1 and 2 are for Receive
- Pins 4 and 5 are for Transmit
- Pin 8 is for Ground

The PRI card is considered a DTE device. When connecting a PRI or T1/E1 line from a DCE device, use a straight through cable. If the PRI or T1/E1 line is coming from a DTE device, use a crossover cable. Crossover cables bring pins 4 and 5 from one end to pins 1 and 2 on the other end and vice versa.

Only one end of the cable should be grounded. Otherwise, a ground loop will occur.

Clocking

The PRI card obtains a clock signal from the PRI or T1/E1 line.

Channelized T1 and Channelized E1 Card Control Signaling

When the PRI card set for either channelized T1 or channelized E1 operation is connected correctly, the modems interact with the T1/E1 line using two incoming and two outgoing control bits called the “A” and “B” bits. For each channelized T1 or channelized E1 channel, these two bits are used to indicate conditions such as on hook/off hook, busy, and ring. In order for the call process to work, both the modems and the T1/E1 switch must be using the same type of signaling. The modems are set to the signaling type using the Modem Signaling value found in the card’s configuration file. The default for channelized T1 cards is E&M Wink signaling. The default for channelized E1 cards is Loop Start signaling. For example:

ModemSignaling1=3 ; 1=Loop Start, 2=E&M, 3=E&M Wink, 4=MF E&M, 5=MF E&M Wink

Loopbacks

There is a Customer Service Unit (CSU) built into the dual PRI card. This integral CSU responds to loopback requests by the PRI or T1/E1 switch. This functionality is useful in troubleshooting PRI or T1/E1 impairments.

Monitoring Jacks

For each PRI or T1/E1 line, there are two Bantam monitor jacks on the dual PRI adapter card (total of four per card), labeled MJ IN and MJ OUT. Plugging a PRI or T1/E1 test set into a jack allows for the non-intrusive monitoring of twenty-four channels. The information you can gather includes the A and B bits, bit errors, frame errors, and bipolar violations.

Customer Support Options

You have a variety of options in getting help with your 4000 chassis. Your dealer can often help you answer installation and operations questions.

This section describes:

- Compaq Microcom's *FAXconnection*
- Compaq Microcom's *BBSconnection*
- World Wide Web site
- Compaq's ftp site
- Compaq Microcom's Response Center

Compaq Microcom's *FAXconnection*

You can get tips on fine tuning your system performance from Compaq Microcom's *FAXconnection*. It offers a wide range of faxes with technical tips and troubleshooting suggestions. You can call this 24-hour service from any touch-tone phone. Leave a fax machine or faxmodem number to receive the fax. A voice system helps you select the fax you want and then sends it to you automatically.

You can request up to three documents per call. Call the *FAXconnection* at:

(800) 285-2802 (inside USA)

or

(781) 551-2050 (outside USA)

You can also fax a question to us 24 hours a day. We return answers 8 a.m. to 7 p.m., Eastern time. Please allow 24 hours for a response. Be sure to describe your 4000 chassis, computer system, software and its setup in detail. Make your question as specific as you can. Include your name, company, telephone number, chassis serial number, and a return fax number. Fax questions to us at:

(781) 255-2699

Compaq Microcom's *BBSconnection*

You can use Compaq Microcom's *BBSconnection* to ask questions of customer support, read about solutions to common problems, and download tech tips and utility programs. The *BBSconnection* operates 24 hours a day. To call, set a modem to 8 bits, no parity, 1 stop bit, and then use the modem to dial:

(781) 551-4750

The *BBSconnection* leads you through on-line registration the first time.

If you leave a question for customer support, supply as much detail as possible about the problem and your system. Support staff members check the *BBSconnection* for questions throughout the business day. They post responses as soon as possible, leaving a message for the customer.

World Wide Web

Our World Wide Web site offers up to date information about product features and availability, troubleshooting tips, and technical data about Compaq products.

Set your browser for the following Internet address:

<http://www.compaq.com/products/networking/products.html>

Compaq's ftp Site

Download the latest technical bulletins and program files from an ftp directory by simply pointing and clicking with a mouse. You can also e-mail messages to Compaq Microcom sales and support groups. Support staff checks for messages throughout the business day and responds to your questions as soon as possible.

For program files, check Compaq's ftp site at:

ftp.compaq.com/pub/softpaq/IPG/microcom/4000_series

Compaq Microcom's Response Center

For customers located outside North America, contact your dealer or distributor for help if you cannot resolve a problem after carefully reading the 4000 chassis documentation.

For customers located within North America, if you cannot resolve a problem with your system after carefully reading the 4000 chassis documentation, you can call our Response Center at:

(781) 255-2700

The Response Center operates Monday through Friday, 8 a.m. to 7 p.m., Eastern Time. Our support professionals devote as much time as necessary to each customer.

Note: The Response Center processes Returned Materials Authorization (RMA) requests Monday through Friday, 8 a.m. to 5:30 p.m., Eastern Time.

If you call:

- Know your model and serial number.
- Know the modem firmware version. Use the Compaq 4000 Manager to do one of the following:
 - In the Chassis Snapshot window, double-click on the modem card to access the Modem Properties dialog. The main and boot code versions are shown at the bottom of the dialog.
 - In the Chassis Snapshot window, choose **View→Modem→Boot Code** or **View→Modem→Main Code**. This requires version 4.0 of the Compaq 4000 Manager software.
 - In the Chassis Snapshot window, point the mouse at a modem, click the right mouse button and choose **DC Session**. Then issue **AT%V1** to view the main code version or **AT^V** to view the boot code version.
- Know the PRI, channelized T1, or channelized E1 firmware version.
 - In the Chassis Snapshot window, double-click on the PRI card to access either the PRI Properties dialog or the T1/E1 Properties dialog.
- Be ready to give your name, company, address, phone number, and fax number, if any.
- Have your 4000 system and computer available.
- If possible, have the 4000 system and computer connected to a different phone line for testing.

Then:

- Describe your problem to the customer support representative. You can use a 4000 system modem to perform simple tests to determine the nature of the problem.
- If our representatives cannot solve the problem, they will issue you an RMA number and tell you how to package the system for return.

Note: Use the original packaging to return the system.

- Inside the package, be sure to include:
 - your return address and telephone number,
 - a brief description of the problem, and
 - your modem's serial number
- Mark the outside of the package clearly with the RMA number assigned to you by Customer Support. Compaq cannot process any returned product without an RMA number. Address the package to:

Compaq Computer Corporation

Attn: Repair Department, RMA # _____

500 River Ridge Drive

Norwood, MA 02062-5028 USA

Appendix A

Console Commands

The 4000 chassis features a console command-line interface to its resident operating system. This appendix contains complete descriptions for the console commands.

You can connect to the 4000 chassis in the following ways:

- A direct connection from the Network Management port to any PC or terminal running terminal emulation software
- A remote modem connection to the Network Management port to any PC or terminal running terminal emulation software, or
- Using a telnet session

The console command-line interface provides access to the shell commands. Use these commands to perform real-time PRI and modem card monitoring and troubleshooting, to control individual ports, and to upgrade PRI, channelized T1, or channelized E1 code. If you need to upgrade modem firmware, refer to either the Compaq 4000 Manager's on-line help or the *Modem User's Guide*.

Entering Commands

When you log onto the 4000 chassis using the direct or remote method, you see the **pSH+>** prompt. At the prompt, type a command with any of its options as described in the following pages. Press **Enter** at the end of a command to execute it.

Important: The command line is *case sensitive*. Enter commands and their options exactly as they appear in this manual.

A command begins with the command name. Type a space after the command name when you use any of the options. Most options begin with a dash (hyphen) and the option letter, and may or may not be followed by a parameter (number or file name) with or without a space. Separate one option from another with a space. For example, **cmp -l file1.txt file2.txt**.

You can get help at any time. Use the following syntax variations to display help from the commands that have this option.

Syntax: **help** Displays a complete list of shell commands.

help <command name> Displays a brief help message for the specified command.

<command name> -h Displays detailed information for the specified command.

Command Descriptions

When you use the command shell, specify filenames following the DOS style 8.3 format (for example, **filename.ext**). [Table A-1](#) describes command argument syntax notation.

Table A-1. Syntax Usage and Conventions

<i>Notation</i>	<i>Meaning</i>
text	information you must type exactly as shown
<i>italics</i>	user-supplied arguments you must type
[]	indicates that an argument is optional
{ }	indicates that an argument is mandatory
< >	indicates that a given option takes a mandatory argument
	indicates that one of the given set of arguments must be used

[Table A-2](#) lists the commands that are available in the 4000 system.

Table A-2. Commands

<i>Command</i>	<i>Title</i>	<i>Page</i>
arp	Address Resolution Display and Control	A-3
auto	Autodetection of T1/E1 Framing	A-4
burn	Upgrade Firmware	A-4
cat	Concatenate and Display Files	A-4
cfgcurr	Display Current Configuration	A-5
ci	Call Processing Subsystem Information	A-5
cmp	Compare Two Files	A-7
cp	Copy Files	A-8
date	Set or Display a Date	A-8
df	Display Free Disk Blocks	A-8
du	Display Disk Blocks Used	A-9
echo	Echo String	A-9
eelist	Display Contents of EEPROM	A-9
exit	Exit Command Session	A-9
factory	Set Configuration to Factory Defaults	A-10
ftp	File Transfer Application	A-10
head	Display Beginning Lines of a File	A-10
help	Display Help Information About Command	A-11
imageinf	Image Information	A-11
ipconfig	Internet Protocol Configuration	A-11
loadcfg	Load Configuration File	A-12
loop	Set/Clear System-Wide Loopback on PRI Card	A-12
ls	List the Files in a Directory	A-13
mv	Move or Rename File or Directory	A-13
password	Change System Password	A-14
ping	Send ICMP ECHO_REQUEST Packets to Host	A-14
primaint	PRI Channel Maintenance	A-14
prstat	Obtain Status of PRI Card	A-15
pwv	Display Current Working Volume	A-15
reboot	Reboot Card	A-15
rm	Remove a File or Directory	A-16
storcfg	Store Configuration File	A-16
sysclk	Enable/Disable T1 System Clock	A-16
tail	Display Last Lines of a File	A-16
telnet	Communicate with a Host	A-17
ver	Display Main or Boot Code Version	A-17

arp Address Resolution Display and Control

Displays, sets, or deletes Address Resolution Protocol (ARP) table entries.

Syntax: **arp** [-a] [-d <hostname>] [-f <filename>] [-s <hostname ether_address>] [temp] [pub] [trail]]

Options:

- a** Display all of the current ARP entries
- d** Delete an entry for the host called <hostname>. This option is used only by the super user
- f** Read the file named <filename> and set multiple entries in the ARP tables. See option -s for argument definitions
- s** Create an ARP entry for the host <hostname> with the Ethernet address <ether_address>. The Ethernet address is represented as six hexadecimal bytes separated by colons. The following words are used to assign a particular state to the entry
 - temp** Create a temporary entry. If *temp* is not specified, the entry is permanent
 - pub** Publish the entry. For instance, the system will respond to ARP requests for hostname, even though the hostname is not its own
 - trail** Trailer encapsulations may be sent to this host

arp -s can be used for a limited form of proxy ARP when a host on one of the directly attached networks is not physically present on the subnet. Another computer can then be configured to respond to ARP requests using **arp -s**. This option is useful in certain SLIP or PPP configurations.

Example: **arp -f -s pub**

```
150.30.8.230 (150.30.8.230) at 0:0:90:4:d9:d9
150.30.8.231 (150.30.8.231) at 0:0:90:4:e1:d2
150.30.8.232 (150.30.8.232) at 0:0:90:7:79:74
150.30.8.233 (150.30.8.233) at 0:0:90:4:d9:db
150.30.8.234 (150.30.8.234) at 0:0:90:4:d9:f5
150.30.8.235 (150.30.8.235) at 0:0:90:4:e0:49
150.30.8.236 (150.30.8.236) at 0:0:90:5:df:76
150.30.8.237 (150.30.8.237) at 0:0:90:4:e2:f
150.30.8.238 (150.30.8.238) at 0:0:90:4:e1:cd
150.30.8.239 (150.30.8.239) at 0:0:90:4:e3:cb
150.30.8.240 (150.30.8.240) at 0:0:90:4:e2:51
150.30.8.241 (150.30.8.241) at 0:0:90:5:f9:a8
150.30.8.242 (150.30.8.242) at 0:0:90:4:dc:bd
150.30.8.243 (150.30.8.243) at 0:0:90:4:e0:3a
150.30.8.244 (150.30.8.244) at 0:0:90:4:e2:56
150.30.8.245 (150.30.8.245) at 0:0:90:7:79:79
150.30.8.246 (150.30.8.246) at 0:0:90:4:d0:d6
150.30.8.247 (150.30.8.247) at 0:0:90:4:da:d1
```

auto Autodetection of T1/E1 Framing

Provides autodetection of T1/E1 framing and returns results via an event. The following events are supported:

<i>Module Type</i>	<i>Events Supported</i>
T1	<ul style="list-style-type: none"> • ESF framing detected event • D4 framing detected event • No framing detected (defaults back to configured framing)
E1	<ul style="list-style-type: none"> • E1 Multiframe with CRC4 framing detected event • E1 Doubleframe without CRC4 framing detected event • No framing detected (defaults back to configured framing)

Syntax: **auto** {-t<target>} {-s <span#>} [-h]

Options:

- t** Slot.engine location of card
- s** Span (#1 or #2) on which to perform autodetection
- h** Display help message

Example: **auto -t 8.1 -s 1**
 Performs an autodetect on the card in slot 8, span 1.

burn Upgrade Firmware

Burns the boot or main firmware image onto a PRI card from a local console port. The **-n** and **-r** options are always used together.

Syntax: **burn** {-b|-m} [-f <filename>] [-n<IPaddress>] [-r<dirpath>] [-h]

Options:

- b** Burn boot code image
- m** Burn main code image
- n** IP address for Network File System (NFS) host
- r** Remote directory for NFS host. Specify path name.
- f** Code image filename
 defaults: **-b** B*.pri
 -m M*.pri
- h** Display help message

Example: **burn -b -f B200.pri**
 The example above indicates that the boot section of the channelized T1 firmware will be upgraded using the file *B200.pri*.

cat Concatenate and Display Files

Reads each file in sequence and displays the contents. Type one or more file names after the command.

Syntax: **cat** {<filename>} [-b] [-e] [-n] [-s] [-t] [-v] [-h]

Options:

- b** Number all nonblank lines, starting at 1
- e** Display a \$ at the end of each line and display non-printing characters
- n** Number all output lines, starting at 1
- s** Substitute one blank line for multiple blank lines
- t** Display TABs as “^I” or “Ctl I” and display non-printing characters
- v** Display non-printing characters except TAB and NEWLINE so they are visible
- h** Display help message

Example: **cat file1.txt file2.txt**
 This reads *file1.txt*, then *file2.txt* and displays the contents of both files.

cfgcurr Display Current Configuration

Displays the current PRI, channelized T1, or channelized E1 configuration to a standard output, such as a screen.

Syntax: **cfgcurr**

Options: **None**

Example: **cfgcurr**

For a channelized T1 card, this example displays the current channelized T1 configuration. For a PRI or Channelized E1 card, the display appears differently.

```
pSH> cfgcurr
Engine ID      8.1
Engine Status  2    1=Disabled, 2=Enabled
Engine Type    4    4=T1, 6=PRI
Clock Source   1    1=Span 1, 2=Span 2
TDM Highway    1    1=Highway 1, 2=Highway 2

Modem Pool     1 2 3 4 5 6

Circuit ID 1   This is Circuit Number One.
Circuit ID 2   This is Circuit Number Two.

          S1 S2
          -- --
Span Status    2 2    1=Disabled, 2=Enabled
Line Type      2 2    2=ESF, 3=D4, 4=E1, 7=E1DF
Line Coding    2 2    2=B8ZS, 3=HDB3, 5=AMI
Signal Mode    2 2    2=Bit Robbing, 3=Bit Oriented, 4=Msg Oriented
Line Build Out 1 1    1=0 dB, 2=7.5 dB, 3=15 dB, 4=22.5 dB
FDL            8 8    1=Other, 2=ANSI, 4=ATT, 8=None
Equalizer Gain 1 1    1=36 dB, 2=26 dB
Send Code      1 1    1=No Code, 2=Line Code
Loopback       1 1    1=None, 5=ACFA, 6=TAOS, 7=CSU Local, 8=CSU Remote
Modem Signaling 3 3    1=Loop Start, 2=E&M, 3=E&M Wink, 4=MF E&M, 5=MF E&M Wink
```

ci Call Processing Subsystem Information

Allows you to view information about the current state of the Call Processing Subsystem.

Syntax: **ci [-b | -c | -p <x> | -i | -m] [-u] [-f <x> | -s <x.x.x.x> | -l <x.x.x.x>] [-d] [-h]**

Options:

- b** Display summary of CPS Control Session Information
- c** Display CDP Control Session Information
- d** Modem free timer
- f** Enable/Disable FSM Debug for Port *x*
- h** Display help message
- i** Display module level CPS information
- l** Enable/Disable L2F FSM Debug peer *x.x.x.x*
- m** Display PRI modem pool information (PRI module only)
- p** Display CDP Information about Port *x* (1-Max Ports) 0 indicates all ports
- s** Enable/Disable FSM Debug for Control Session with peer *x.x.x.x*
- u** Display ports in Connected on In Progress states

Example: **ci -c**

```
Control Session Information: 8750158
Destination Address   : 0.0.0.0
Current State         : SessionUp
Session in Use By     : 4 Ports
Current Echo ID       : 0 0h
Current Missed Echoes: 0
```

```
Control Peer is      : PRI
Peer Protocol Version: 0
Peer Framing Cap     : 0
Peer Max Channels    : 0
Peer Firmware Version: 0
Peer Hostname        :
Peer Vendor String   :

Control Session Information: 874FF58
Destination Address  : 192.168.0.201
Current State        : idle
Session in Use By    : 0 Ports
Current Echo
Control Session Information: 8750158
Destination Address  : 0.0.0.0
Current State        : SessionUp
Session in Use By    : 4 Ports
Current Echo ID      : 0 0h
Current Missed Echoes: 0
Control Peer is      : PRI
Peer Protocol Version: 0
Peer Framing Cap     : 0
Peer Max Channels    : 0
Peer Firmware Version: 0
Peer Hostname        :
Peer Vendor String   :

Control Session Information: 874FF58
Destination Address  : 192.168.0.201
Current State        : idle
Session in Use By    : 0 Ports
Current Echo ID      : 0 0h
Current Missed Echoes: 0
Control Peer is      : Service Provider
Peer Protocol Version: 0
Peer Framing Cap     : 0
Peer Max Channels    : 0
Peer Firmware Version: 0
Peer Hostname        :
Peer Vendor String   :
```

Example: **ci -i**

```
CPS Module Information
Call Count          : 37155
Max Ports           : 64
Available Ports     : 23
PPTP Protocol       : 0100
PPTP Framing Cap    : 00000003
PPTP Bearer Cap     : 00000002
PPTP Firmware       : 0101
PPTP HostName       :
PPTP Vendor Str     : PRI Module %PPTP+v2:0010
PPTP Echo Timer     : 3000
PPTP Echo Limit     : 2
Modem Free Timer    : 0 secs
Info Blocks Information:
Current Count       : 128 Correct
Internal IBs        : 128 Correct
Extension IBs       : 64 Correct
```

Example: **ci -p17** (where 17 = connected port 17)

```
Information about CPS Port 17 Name: PRI17
Current State: ConnAssigned
Service Provider is 0.0.0.0
Port Status is Bh
  CPS Avail =Yes
  UL Avail  =Yes
  InProgress=No
  Connected =Yes
CallID           : 37149 911Dh
PeerCallID       : 37278 919Eh
AssignCallID     : 0 0h
Calling Number   :
Called Number    : 9722
SubAddress       :
Packet Window    : 8
Packet Delay     : 10
Peer Pkt Window  : 0
Peer Pkt Delay   : 0
Physical Channel : 0
Min BPS          : 0, Max BPS : 0
Connect Speed    : 64000
Cause Value      : 0
TDM Info         : Highway : 0 Span : 1 TimeSlot : 17
Analog/Dig Flag  : Analog
Async/Sync Flag  : 1
Call Mode        : 1
Call Route Alg   : 0
```

cmp **Compare Two Files**

Performs a byte-by-byte comparison of two files. With no options, it reports the first difference by byte and line number only.

Syntax: **cmp [-l] [-s] *filename1 filename2* [skip1] [skip2] [-h]**

Options:

- l** Print decimal byte number and octal differing byte for all differences
- s** Print nothing for differing files; set exit codes only
- skipn** Initial byte offsets into *filename* (may be either octal or decimal)
- h** Display help message.

Example: **cmp -l file1.txt file2.txt**

Compares *file1.txt* then *file2.txt* and prints decimal byte number and octal differing byte for all differences.

cp Copy Files

Copies the contents of one file to another file. Two names are necessary. The command **cp** does not copy a file onto itself.

Syntax: **cp** <filename1 filename2> [-i] [-h]

Options: **-i** Intercede when the file *to be copied to* already exists. Query user to prevent overwriting the wrong file.
-h Display help message

Example: **cp file1.txt file2.txt -i**

Copies *file1.txt* to *file2.txt*. If *file2.txt* does not exist, the **cp** command creates it. If the file exists, the following message displays:

```
overwrite file2.txt? (y/n)
```

The **-i** option intercedes because the file **file2.txt** already exists. You are prompted for a **y** (yes) or **n** (no) entry. To cancel the copy operation, enter **n**.

date Set or Display a Date

With no argument, displays the 4000 chassis' date and time setting. With a date entered in the format **yymmddhhmm**, sets the chassis' date and time. The hours (**hh**) are in 24-hour format.

Syntax: **date** [-d <date string>] [-h]

Options: Without arguments, display current date and time:

-d Set chassis' date, using the date string format **yymmddhhmm**
-h Display help message

Examples: **date -d 9712301630**

This sets the chassis to December 30, 1997, at 4:30 p.m.

date

This displays the current date and time in the format:

```
16:30:00 30 December 1997
```

df Display Free Disk Blocks

Reports the free disk blocks on the PRI card's RAM disk.

Syntax: **df** [-h]

Options: **-h** Display help message

Example: **df**

Displays RAM disk usage as shown below:

```
Filesystemkbytesusedavailcapacity  
4.0/17031716861%
```


du Display Disk Blocks Used

Reports the number of 512-byte disk blocks used by a file or directory. Without options, displays blocks used by the directory.

Syntax: **du** [-a] [-s] [*filename . . .*] [-h]

Options: **-a** Display one entry for each file
 -s Display only the grand total for each of the specified filenames
 -h Display help message

Example: **du -a**

This command returns a report similar to the following example:

```
3 ./BITMAP.SYS
27 ./FLIST.SYS
1 ./diag.log
```

echo Echo String

Writes a string to a standard output, such as the screen. Arguments in the string require **Space** or **Tab** characters, terminated by pressing Enter, unless the **-n** option is used.

Syntax: **echo** [-n] [*string*]

Options: **-n** Write without adding **Enter** to the output

Example: **echo -n This is an example of an echo**

The screen would display the string you typed:

```
This is an example of an echo
```

eelist Display contents of EEPROM

Displays the configuration data stored in EEPROM of a PRI card to a standard output, such as the screen.

Syntax: **eelist**

Options: **None**

Example: **eelist**

```
pSH+> eelist
ip_address:172.16.36.16
subnet_mask:255.255.0.0
gateway_address:0.0.0.0
MAC Address:12:34:56:78:90:12
sys_password:isp
PRI Config File:
  length:3127
  filename:priconfg.cfg
DIG Config File:
  length:6520
  filename:priconfg.dig
```

exit Exit Command Session

Logs out of a command session.

Syntax: **exit**

Options: **None**

Example: **exit**

Logs you out of a command session.

factory Set Configuration to Factory Defaults

Resets the PRI, channelized T1, or channelized E1 configuration to factory defaults. This command does not load or store any configuration files. Use **loadcfg**, **storcfg**, or both, to modify the PRI card configuration.



Caution: Use care when entering this command. Also be aware that, if you enter only **f** and then press **Enter**, the PRI card is set to the factory default configuration. Any changes that you saved (password, IP addresses, RAM disk contents) are erased.

Syntax: **factory** [-h]

Options: **-h** Display help message

Example: **factory**
Resets the PRI card to its factory default configuration.

ftp File Transfer Application

Opens an ftp (file transfer protocol) session with the specified device. You must specify the host PRI card by IP address, in the format, **xxx.xxx.xxx.xxx**.

Once the terminal or PC connects to the PRI, channelized T1, or channelized E1 host, it displays the **ftp>** prompt. At that prompt, enter either **binary** or **ascii** command and press **Enter** to set the file type. Use binary format for code image files and use ASCII format for configuration files.

Next, enter the **get filename** command and press **Enter** to transfer a file to the terminal or PC; or enter the **put filename** command and press **Enter** to transfer a file from the terminal or PC to the PRI card.

To end an **ftp** session and return to the **pSH+>** prompt, type **quit** and press **Enter**.

Syntax: **ftp** {*ip address*}

Options: **None**

Example: **ftp 182.300.131.000**
You are prompted for a user name and a password by the system to which you are connected. When you provide them, the **ftp>** prompt appears. Perform the desired file transfers. Type **?** or **help** at the **ftp>** prompt for a list of the standard ftp commands.

head Display Beginning Lines of a File

Displays a specified number of lines of one or more files. The default is 10 lines.

Syntax: **head** {<*num*>|<*filename*>}

Options: **None**

Example: **head -6 file1.txt file2.txt**
Displays, in sequence, the first 6 lines of *file1.txt* and *file2.txt*.

help Display Help Information About Command

Displays a list of shell commands, or either brief or detailed information about a specific command. Not all commands have help options.

Syntax:

help	Displays a complete list of shell commands
help <command name>	Displays a brief help message for the specified command
<command name> -h	Displays detailed information for the specified command

Example: **help date**

Displays the following message:

```
Display or set the system date (not reentrant, not locked)
Invoke with the -h switch for options
```

imageinf Image Information

Reports the following information for a specified file:

- pSOS version
- Starting address of pSOS
- Image file engine type (PRI)
- Whether image file is main or boot version

Syntax: **imageinf** {-b | -m} {-f <filename>}

Options:

- b** boot image
- f** specify *filename* for information on a particular image file
- m** main image

Example: **imageinf -b**

```
Boot code info
Image type      PRI_BOOT
PSOS Version    2. 2
PSOS Location   40000
```

ipconfig Internet Protocol Configuration

Displays or modifies TCP/IP settings for an Ethernet network interface.

Syntax:

```
ipconfig [-d|le0|net|-m|dgw]
ipconfig <interface IP address>
ipconfig <interface source IP address destination IP address> (point-to-point links
only)
-d      Display IP network interface parameters
le0     Specify IP address for Ethernet
net     Specify net mask; use with le0
-m      Display Ethernet address (MAC address)
dgw     Set a default gateway
```

Examples: **ipconfig le0 192.10.10.27**

Assigns IP address 192.10.10.27 to the Ethernet network interface.

ipconfig dgw -a 193.0.0.5

Sets 193.0.0.5 as the default gateway.

When you set an IP address, the subnet mask is set to the class of the IP address.

loadcfg Load Configuration File

Loads one or more configuration files from a PRI card RAM disk into active memory. If you do not specify a filename, you are prompted for a filename before you can continue.

Syntax: **loadcfg { -a|-f <filename/file extension> } [-h]**

Options: **-a** Read all configuration files based on internal default file values

-f Specific filename or file extension of form *.cfg*

-h Display help message

Example: **loadcfg -f t1_b8zs_esf.cfg**

Loads the configuration file from a channelized T1 card's RAM disk into active memory.

loop Set/Clear System-Wide Loopback on PRI Card

Sets or clears system-wide loopback per span on the PRI card.

Syntax: **loop [-c | -s [1 | 2] [l | r] <device name>] [device name] [-h]**

(for device name **acfa** or **munich** only) **--channel{= | }<channel#>]**

(for device name **acfa** only) **--idlechar{= | }<idle char>]**

(for device name **munich** only) **--channel{= | }255]** means 'complete' loopback

Options: **-c** Clear

-s Set span (1 or 2) and direction (local or remote). Unspecified span = 1 and unspecified direction = l

-h Display help message [diagram(s) for named device, all devices if no device name supplied]

channel#: Any number from 1 through 30

device name: csu, acfa, fpga, taos, hscx (PRI only), munich (PRI only)

idle char: hh (hex representation of idle character)

Example: **loop -s1l csu taos**

The example above establishes a local csu loopback on span 1 with TAOS enabled.

Example: **loop -c csu taos**

The example above clears the loopback established by the previous command.

Example: **loop -s2 fpga**

The example above establishes an FPGA remote loopback on span 2.

Example: **loop -s1r --channel=17 munich**

The example above establishes a MUNICH remote loopback on span 1 for channel 17.

ls List the Files in a Directory

Displays a list of files on the PRI card RAM disk.

Syntax: **ls** [-l|-A|-C|-F|-a|-d|-f|-g|-i|-l|-q|-r|-s] [-h] [filename]

Options:

- a** All entries
- A** All entries except “.” and “..”
- C** Multiple-column display
- d** Directory status without file names
- f** Force each argument to be interpreted by a directory and list name found in each slot. This option turns off **-l**, **-s**, **-r**, and **-a**.
- F** Display directories with “/” and executables with “*” following them
- g** Show group ownership of file in long format
- i** For each file, print the “i” number in the first column of the report
- l** Long format with links, owner, size in bytes, and last modification time
- q** Display non-graphic characters as “?” — the default to a terminal
- r** Display in reverse order
- s** Display size in kilobytes, including any indirect blocks
- 1** Force single-column display
- h** Brief help list

Example: **ls -l**

This command displays a message similar to the following:

```
total 157
-r--r--r--1 root1024 BITMAP.SYS
-r--r--r--1 root13312 FLIST.SYS
-rwxrwxrwx1 root52 Mar 01 1997 12:14 config.ini
-rwxrwxrwx1 root447 diag.log
-rwxrwxrwx1 root1603 Mar 01 1997 12:02 t1_b8zs_esf.cfg
```

mv Move or Rename File or Directory

Moves a file or directory, in the format **mv file1.txt file2.txt**. If the second file does not exist, this command renames the file. If the second file already exists, it is removed before the first file moves. In the format **mv directory1 directory2**, if the second directory does not exist, it changes the name of the first directory. If the second directory exists, it moves the directory and its files into the second directory. In the format **mv file1.txt directory1**, the file moves into the directory.

Syntax: **mv** [-f] [-i] *src target* [-f] [-i] *src1... srcN directory* [-h]

Options:

- i** Interactive; prompts whether to replace a file
- f** Force file move—overrides mode restrictions and **-i**
- h** Display help message

Example: **mv xyz206 -f abc206**

Forces the file **xyz206** to replace the file **abc206**.

passwordChange System Password

Changes the single password used for logging into the 4000 chassis using ftp or telnet. You must know the old password to change it. The new password may be any alphanumeric combination up to 8 characters long. The password is case sensitive.

The default user name is **system** and the default password is **isp**.

When you type a password, asterisks display instead of the characters you type. Follow each entry by pressing **Enter**. You must type the old password correctly to receive the new password prompts. Then you must type the new password identically two times.

Syntax: **password [-r]**

Options: **-r** Reset password to factory default

Example: pSH+> **password**
Enter Old Password:*****
Enter New Password: *****
Reenter New Password: *****

➡ **Important:** The new password takes effect immediately. Be careful to record any changes.

ping Send ICMP ECHO_REQUEST Packets to a Host

Attempts to elicit a response from a host specified by IP address. By default, it sends 10 ICMP ECHO_REQUEST packets to the host or gateway. If the host responds, it stops and reports the response in the format “xxx.xxx.xxx.xxx is alive”. It times out and displays “No answer from host” if it does not receive a response within 10 seconds.

Syntax: **ping host [-h]**

Options: **host** IP address in the format *a.b.c.d*
-h Display help message

Example: **ping 199.38.23.181**
This sends the request packets to that address.

primaint PRI Channel Maintenance

Issues a maintenance command to one or more B-channels a span. There are four maintenance commands which allow channels to be disconnected, restarted, taken out of service, or put into service.

Syntax: **primaint {-s 1 | 2} {-c <channel#(s)>} [-f] {command}**

Options: **-s** Specify span (1 or 2)
-c Specify one or more channel numbers. Select multiple channels by typing a list of channels separated by commas, or select a range by specifying the low number and high number separated by a dash. The maintenance command is applied to each channel selected. Valid B-channels are 1-23 on a PRI/T1, and 1-15 and 16-31 on a PRI/E1.
command Choices are Disconnect, Restart, Out-of-service, and In-service. Only the first letter needs to be typed
-f Turns off the “yes/no/all” prompt displayed before the maintenance command is applied to each channel
If the -f option is not specified, typing “y” or “yes” causes the maintenance command to be applied to the channel, typing “n” or “no” causes the command to skip the channel, and typing “a” or “all” turns off the prompting and applies the maintenance command to all *remaining* channels.

Example: **primaint -s2 -c16-21 -f D**
This example above disconnects B-channels 16 through 21 on span 2 and turns off the command prompt.

pristat Obtain Status of PRI Card

With no arguments, this command displays information, one span at a time, for both spans:

- The interface section shows whether or not the span is in sync with the network.
- The D-channel section shows whether the D-channel's layer 2 is up or down and which ISDN type is configured.
- The summary channel table displays the status of each channel in a compact format, one channel per line of display.

The display stops after the first span and you are prompted with the following message: "Please, press ENTER to continue..." Press ENTER to display the second span.

You can specify a shorter report by using the optional arguments -s, -i, -c, and -d.

Syntax: **pristat [-s 1 | 2] [-i] [-d] [-c]**

Options:

- s** Display span (1 or 2)
- i** Display interface information.
- c** Display summary channel table
- d** Display D-channel information

Example: **pristat -s 1**

```
Span 1
  Interface:
    Sync
  D-Channel:
    Layer 2: Up
    Switch Type: AT&T 5ESS
  Summary Channel Table:
    Idle      Idle      Idle      Idle      Idle      Idle
    Idle      Idle      Idle      Idle      Idle      Idle
    Idle      Idle      Idle      Idle      Conn     Conn
    Idle      Idle      Idle      Conn     Conn     D/Up
```

pwv Display Current Working Volume

Displays the name of the current working volume.

Syntax: **pwv**

Options: **None**

Example: **pwv**

A message similar to the following displays:

```
4.0
```

reboot Reboot Card

Reboots the PRI card.



Important: This command abruptly stops all current processing in the module. Use it with care. You might want to try busy-ing out modems instead.

Syntax: **reboot**

Options: **None**

Example: **reboot**

The PRI card restarts.

rm Remove a File or Directory

Deletes one or more files.

Syntax: **rm** [-r] [-i] [-f] *filename* [-h]

Options:

- f** Force removal without permission, prompting or reporting errors
- i** Interactive; prompts whether to delete a file, and with **-r**, whether to examine a specified directory
- r** Recursively delete a directory's files, subdirectories, then the directory
- h** Display help message

Example: **rm xyz206**

The file **xyz206** is removed from the RAM disk.

storcfg Store Configuration File

Stores the current configuration parameters into one or more configuration files. Store individual files by giving the full filename. See also **loadcfg**.

Store individual files in the format **storcfg** <*filename*>.

Syntax: **storcfg** { **-a**|-**f** <*filename*/file extension>} [-h]

Options:

- a** Write all configuration files based on internal current values
- f** Specific filename or file extension of form *.cfg*
- h** Display help message

Example: **storcfg -f t1_b8zs_esf.cfg**

Stores current configuration data for a channelized T1 card in the **t1_b8zs_esf.cfg** configuration file.

sysclk Enable/Disable T1 System Clock

Syntax: **sysclk** <*flag*>

Options: *flag* 0=disable, 1=enable

Example: **sysclk 0**

This example above disables the T1 system clock.

tail Display Last Lines of a File

Prints lines (**-l**) or characters (**-lc**) from the end of a file to the screen. The default is 10 lines or characters.

Syntax: **tail** [+ | - | c | l] {*filename*}

Options:

- x** Where **x** is a number, displays from the bottom of a file (see **l** and **c**)
- +x** Where **x** is a number, displays from the top of a file (see **l** and **c**)
- c** Count number in units of characters instead of lines (see **l**)
- l** Number of lines of the file(s) to display

Example: **tail -20 c file1.txt**

Displays the last 20 characters in *file1.txt*.

telnet Communicate with a Host

Uses the telnet protocol to communicate with a specified host. Specify the host by IP address. When successful, this displays the `telnet>` prompt.

With no host in the command, telnet defaults to its command mode. Type `?` or **help** from the prompt to list the available commands.

Syntax: **telnet** [**host**]

Options: **host** Given as an ip address of the form *a.b.c.d*

Example: **telnet 192.168.0.1**

You are connected to the remote host system. You are prompted for a user name and password from the system to which you have connected. Provide them. An operating system prompt is displayed.

ver Display Main or Boot Code Version

Displays the main or boot code version of a PRI card.

Syntax: **ver** [**-b**] [**-m**] [**-t**] [**-v**] [**-h**]

Options: **-b** Display boot version
 -m Display main version
 -t Display main internal version
 -v Display all. Used with **-b|-m**
 -h Display help message

Example: **ver -b**

A message similar to the following displays:

```
PRI Boot Version:      2.0.0
```


Appendix B

Sample Configuration Files

DIP switches, set at the factory to the most common parameters for PRI over T1 or PRI over E1 operation, are the easiest way to set parameters for PRI operation. However, if the switch defaults aren't valid for your PRI or T1 line, or if you need to set parameters not available via DIP switches, you can edit the supplied configuration files to customize the files for your site.

When configuring channelized E1 operation, you must use both DIP switches and a configuration file to set all valid channelized E1 parameters.

This appendix includes complete descriptions for the PRI, channelized T1, and channelized E1 configuration files:

- pri_t1.cfg and pri_e1.cfg
- priconfg.dig

Note: You need to edit the priconfg.dig file only if you will use the PPTP tunneling protocol for calls from a digital terminal adapter to a PPTP server.

- t1_ami_d4.cfg and t1_b8zs_esf.cfg
- ch_e1.cfg

The pri_t1.cfg and pri_e1.cfg Files

Configuration information for common PRI settings, such as framing format and line coding, is found in the **pri_t1.cfg** and **pri_e1.cfg** files. These files are found in the folders on the PC where you installed the Compaq 4000 Manager. The default folder names are:

- C:\Program Files\Compaq 4000 Manager\pri-t1 config
- C:\Program Files\Compaq 4000 Manager\pri-e1 config

Use the file that contains the format that is valid for your PRI line. For example, if your PRI line is set for PRI over T1 operation, then use the pri_t1.cfg configuration file. Sample configuration files are found starting on [page B-6](#).

There are five sections where you enter parameters:

Table B-1. pri_t1.cfg and pri_e1.cfg File Parameter Sections

<i>Section</i>	<i>Description</i>
Contents Level Configurables	Contains a required parameter setting for reading this configuration file
Card Level Configurables	Affects operation of a particular PRI card
Span Level Configurables	Affects the electrical, coding, and framing characteristics of the PRI interface for each span on the PRI card
PRI-Specific Level Configurables	Configures ISDN-specific settings for the PRI card
Directory Number Level Configurables	Maps incoming directory numbers or called addresses specified by the telephone company to one or more spans on the PRI card

Parameters specified at the Span level override settings for the same parameter at the Card level.

The following tables identify the parameters you can define within each section:

[Table B-2](#) describes Contents Level Configurables.

[Table B-3](#) describes Card Level Configurables.

[Table B-4](#) describes Span Level Configurables.

[Table B-5](#) describes PRI-Specific Level Configurables.

[Table B-6](#) describes Directory Number Level Configurables.

Examples of the values you enter for parameters and options are indicated in the sample configuration file by semicolons found to the left of each descriptive line. You type in actual configuration values after the parameter/option examples.

Contents Configurables Section

The Contents Configurables section contains information for parsing (counting) the configuration file. Default settings are shown in **bold**.

Table B-2. Contents Configurables Parameters

<i>Parameter Name</i>	<i>Description</i>
EntryCount	This required parameter is always 1 .

Card Level Configurables Section

The Card Level Configurables section contains parameters that affect the operation of each PRI card. Default settings are shown in **bold**.

Table B-3. Card Level Configurables Parameters

<i>Parameter Name</i>	<i>Description</i>
Engine ID	Each PRI card is identified by an ID, indicating its position in the chassis (known as <i>slot.engine</i> notation). <i>slot</i> is the physical slot in which the card is located (8 or 9); engine always equals 1. For example, EngineID=8.1 identifies the PRI card installed in slot 8; EngineID=9.1 identifies the PRI card installed in slot 9.
Engine Enabled	Lets you enable or disable a PRI card. The format of this parameter is: EngineEnabled= <i>n</i> where <i>n</i> is: 1=Disabled, 2=Enabled
LIU Engine Type	This parameter is always 6 for PRI.
System Clock Source	Identifies from which span (1 or 2) the PRI card receives its clocking information. The format of this parameter is: SystemClockSource= <i>n</i> where <i>n</i> is: 1=Span 1, 2=Span 2
TDM Highway	Selects the TDM bus used by the PRI card. The format of this parameter is: TDMHighway= <i>n</i> where <i>n</i> is: 1=TDM Highway 1, 2=TDM Highway 2
Modem Pool	Identifies the individual cards configured to participate in the analog modem pool. The format of this parameter is: ModemPool= <i>EngineID</i> , ... , ... , ... where: <i>EngineID</i> equals the identification numbers, in <i>slot.engine</i> notation, for all modems in the chassis belonging to that modem pool. <i>slot</i> equals the slot position from 1 to 16. <i>engine</i> always equals 1. For example, 3.1 means the modem card in slot 3. Defaults are: ModemPool= 1.1,2.1,3.1,4.1,5.1,6.1 (PRI over T1 operation) ModemPool= 1.1,2.1,3.1,4.1,5.1,6.1,7.1,9.1 (PRI over E1 operation) Note: For analog over ISDN calls, if you use two PRI cards, you need to create two configuration files and assign different modem cards to each PRI card. For example: For two PRI over T1 cards, in <i>pri_t1_1.cfg</i> assign the modem cards in slots 1 to 6 to PRI card 1 (in slot 8) and in <i>pri_t1_2.cfg</i> assign the modem cards in slots 10 to 15 to PRI card 2 (in slot 9). For two PRI over E1 cards, in <i>pri_e1_1.cfg</i> assign the modem cards in slots 1 to 7 to PRI card 1 (in slot 8) and in <i>pri_e1_2.cfg</i> assign the modem cards in slots 10 to 16 to PRI card 2 (in slot 9).

Span Level Configurables Section

The Span Level Configurables section lets you make selections that affect the electrical, coding, and framing characteristics of the PRI T1/E1 interface for each span on the PRI card. Default settings are shown in **bold**.

Table B-4. Span Level Configurables Parameters

<i>Parameter Name</i>	<i>Description</i>
Circuit ID	Lets you enter descriptive information for each span on a PRI card. The format of this parameter is: CircuitID x = <i>description</i> where: x is the Span number (1=Span 1 or 2=Span 2) <i>description</i> is a maximum of 30 characters
Span Enabled	Lets you enable or disable a span on a PRI card. The format of this parameter is: SpanEnabled x = n where: x is the Span number (1=Span 1 or 2=Span 2) n is 1=Disabled, 2=Enabled
Line Type	Lets you select the type of line and framing mode for PRI circuits. This information is provided by your local telephone company. The format of this parameter is: LineType x = n where: x is the Span number (1=Span 1 or 2=Span 2) n is 2=ESF (PRI over T1 default) , 3=D4, 4=E1 (PRI over E1 default) , 7=E1DF
Line Coding	Lets you choose encoding/decoding protocols used on the PRI line. This information is provided by your local telephone company. The format of this parameter is: LineCoding x = n where: x is the Span number (1=Span 1 or 2=Span 2) n is 2=B8ZS (PRI over T1 default) , 3=HDB3 (PRI over E1 default), 5=AMI
Signal Mode	This parameter is always 4 (Message Oriented) for PRI lines.
Tx Line Build Out	Lets you select the transmit level (in decibels) for the Channel Service Unit (CSU) on the PRI card. The value you choose depends on the location of the 4000 chassis in proximity to the PBX. The format of this parameter is: TxLineBuildOut x = n where: x is the Span number (1=Span 1 or 2=Span 2) n is 1=0 dB , 2=7.5 dB, 3=15 dB, 4=22.5 dB
FDL (Facility Data Link)	Lets you enable the 4Kbps FDL inband diagnostic channel used by Telcos for diagnostic testing during normal operations. The format of this parameter is: FDL x = n where: x is the Span number (1=Span 1 or 2=Span 2) n is 1=Other, 2=ANSI, 4=ATT, 8=None
Equalizer Gain	Lets you select the maximum gain that can be applied to the CSU equalizer. The format of this parameter is: EqualizerGain x = n where: x is the Span number (1=Span 1 or 2=Span 2) n is 1=36 dB , 2=26 dB
Send Code	Lets you select the type of payload loopback code sent across the DS1 circuit. This parameter is used with the Loopback parameter to perform diagnostic testing of the circuit or equipment. The format of this parameter is: SendCode x = n where: x is the Span number (1=Span 1 or 2=Span 2) n is 1=None , 2=Line Code

Table B-4. Span Level Configurables Parameters (Continued)

<i>Parameter Name</i>	<i>Description</i>
Loopback	Lets you enable the loopback configuration of the DS1 circuit. This parameter is used with the SendCode parameter to perform diagnostic testing of the circuit or equipment. The format of this parameter is: Loopback $x=n$ where: x is the Span number (1=Span 1 or 2=Span 2) n is 1=None , 5=ACFA, 6=TAOS, 7=CSU Local, 8=CSU Remote
Modem Signaling	Lets you select the type of modem signaling. The format of this parameter is: ModemSignaling $x=n$ where: x is the Span number (1=Span 1 or 2=Span 2) n is 1=Loop Start, 2=E&M, 3=E&M Wink , 4=MF E&M, 5=MF E&M Wink

PRI-Specific System Level Configurables Section

The PRI-specific System level Configurables section lets you configure ISDN-specific parameters for each PRI card in the chassis. Default settings are shown in **bold**.

Table B-5. PRI-Specific System Level Configurables Parameters

<i>Parameter Name</i>	<i>Description</i>
ISDN Switch Type	Selects the protocol to use on the D-channel. The format of this parameter is: ISDNSwitchType $x=n$ where: x is the Span number (1=Span 1 or 2=Span 2) n is 3=Euro ISDN (ETSI) (PRI over E1 default) 5=North America (AT&T 4ESS) 6=North America AT&T 5ESS (PRI over T1 default) 7=North America (Northern Telecom DMS100) 8=North America (Northern Telecom DMS250) 10=United States (NI2 National ISDN-2) 16=NTT 22=TS014
ISDN L2 Protocol	Selects the type of transmission protocol in use on a B-channel after a connection is established. The format of this parameter is: ISDNL2Protocol $x=n$ where: x is the Span number (1=Span 1 or 2=Span 2) n is 1=Auto Detect , 2=V120, 3=PPP, 4=PassThru
ISDN Out Data Rate	Specifies the speed at which an outgoing call is connected. The format of this parameter is: ISDNOutDataRate $x=n$ where: x is the Span number (1=Span 1 or 2=Span 2) n is 1=64KOnly , 2=56KOnly, 3=64KAuto, 4=56KAuto
ISDN In Data Rate	Specifies the speed at which an incoming call is connected. The format of this parameter is: ISDNInDataRate $x=n$ where: x is the Span number (1=Span 1 or 2=Span 2) n is 1=64KOnly, 2=56KOnly, 3=64KAuto , 4=56KAuto
Call Accept Mode	Specifies how calls are accepted by the PRI card. The format of this parameter is: CallAcceptMode $x=n$ where: x is the Span number (1=Span 1 or 2=Span 2) n is 1=Accept all , 2=Verify calls

Table B-5. PRI-Specific System Level Configurables Parameters (Continued)

<i>Parameter Name</i>	<i>Description</i>
Call Reject Reason	Specifies the message displayed when system resources are not available to process an incoming call. The format of this parameter is: CallRejectReason $x=n$ where: x is the Span number (1=Span 1 or 2=Span 2) n is a cause code number from 1 to 127 (Default = 44). Refer to Appendix C, Cause Codes , for a list of cause codes.
Call Proceeding Mode	Specifies whether to send a message to the Telco stating that a call is in progress. The format of this parameter is: CallProceedingMode $x=n$ where: x is the Span number (1=Span 1 or 2=Span 2) n is 1=Off , 2=On
Call Alert Mode	Specifies whether to send a message to the Telco stating that the phone receiving the call is ringing. The format of this parameter is: CallAlertMode $x=n$ where: x is the Span number (1=Span 1 or 2=Span 2) n is 1=Off , 2=On
IE Error Mode	Specifies whether calls are accepted or rejected based on the called party number information element. The format of this parameter is: IEErrorMode= n where n is: 1=Accept calls even though they contain an invalid Called Party Number IE , 2=Reject calls when the Called Party Number IE is invalid

Directory Number Level Configurables Section

The Directory Number Level Configurables section lets you specify the incoming directory numbers assigned by the telephone company, and map these numbers to one or more PRI spans on a PRI card. Default settings are shown in **bold**.

Table B-6. Directory Number Level Configurables Parameters

<i>Parameter Name</i>	<i>Description</i>
Directory Number	Specifies up to 60 incoming directory (telephone) numbers assigned by the telephone company. The format of this parameter is: DirectoryNumber $n=xxxxyyyzzzz$ where: n is the number (1 to 60) of the directory you are specifying $xxxxyyyzzzz$ is the directory (phone) number provided by the Telco in the form: xxx (3-digit area code) yyy (3-digit exchange number) zzzz (4-digit station number) Note: The directory number usually consists of 10 digits as indicated in the above example. You can enter a maximum of 20 characters, however, for each directory number.
Dn Map	Lets you map each individual directory number to one or more PRI spans on a PRI card. The format of this parameter is: DnMap $x=y.y.y$ where: x is the corresponding number (1 to 60) you are specifying $y.y.y$ identifies the span to which a directory number is mapped in the format <i>slot.engine.span</i> where <i>slot</i> equals the PRI card in slot 8 or 9, <i>engine</i> always equals 1, and <i>span</i> =1 or 2. For example, 8.1.1 means Span 1 on the PRI card in slot 8.

Sample pri_t1.cfg File

The following is a sample of the default pri_t1.cfg file, with settings for ESF, B8ZS, and AT&T 5ESS.

;PRI T1 Configuration File

[Contents]

EntryCount=1

[Entry0]

; -----

; Card Level Configurables

; -----

EngineID=8.1

EngineEnabled=2 ; 1=Disabled, 2=Enabled

LiuEngineType=6 ; 4=T1, 6=PRI

SystemClockSource=1 ; 1=Span1, 2=Span2

TdmHighway=1

ModemPool=1.1, 2.1, 3.1, 4.1, 5.1, 6.1

; -----

; Span Level Configurables

; -----

; Span 1

CircuitID1=This is Circuit Number One.

SpanEnabled1=2 ; 1=Disabled, 2=Enabled

LineType1=2 ; 2=ESF, 3=D4, 4=E1, 7=E1DF

LineCoding1=2 ; 2=B8ZS, 3=HDB3, 5=AMI

SignalMode1=4 ; 2=RobbedBit, 3=BitOriented, 4=MessageOriented

TxLineBuildOut1=1 ; 1=0, 2=7.5, 3=15, 4=22.5

Fdl1=8 ; 1=Other, 2=ANSI, 4=ATT, 8=None

EqualizerGain1=1 ; 1=36, 2=26

SendCode1=1 ; 1=None, 2=LineCode

Loopback1=1 ; 1=None, 5=ACFA, 6=TAOS, 7=CSU Local, 8=CSU Remote

ModemSignaling1=3 ; 1=Loop Start, 2=E&M, 3=E&M Wink, 4=MF E&M, 5=MF E&M Wink

; Span 2

CircuitID2=This is Circuit Number Two.

SpanEnabled2=2

LineType2=2

LineCoding2=2

SignalMode2=4

TxLineBuildOut2=1

Fdl2=8

EqualizerGain2=1

SendCode2=1

Loopback2=1

ModemSignaling2=3

; -----

; PRI specific System Level Configurables

; -----

IsdnSwitchType=6 ; 3=ETSI, 5=AT&T 4ESS, 6=AT&T 5ESS, 7=DMS100,
; 8=DMS250, 10=NI2, 16=NTT, 22=TS014

IsdnL2Protocol=1 ; 1=AUTODetect, 2=V120, 3=PPP, 4=PassThru

IsdnOutDataRate=1 ; 1=64KOnly, 2=56KOnly, 3=64KAuto, 4=56KAuto

IsdnInDataRate=3 ; 1=64KOnly, 2=56KOnly, 3=64KAuto, 4=56KAuto

CallAcceptMode=1 ; 1=AcceptAll, 2=VerifyCalls

CallRejectReason=44 ; Channel not available

CallProceedingMode=1 ; 1=off, 2=on

CallAlertMode=1 ; 1=off, 2=on


```
IeErrorMode=1          ; 1=Accept calls even though they contain an invalid
                        ;   Called Party Number IE
                        ; 2=Reject calls when the Called Party Number IE is
                        ;   invalid
```

```
[Dn]
```

```
;IsdnL2Protocol1=3      ; 1=AUTODetect, 2=V120, 3=PPP, 4=PassThru
;IsdnInDataRate1=2      ; 1=64KOnly, 2=56KOnly, 3=64KAuto, 4=56KAuto
;Directory Number1=802
;CallProceedingMode1=1  ; 1=off, 2=on
;CallAlertMode1=1       ; 1=off, 2=on
;DnMap1=8.1.1
                        ; format: slot.engine.span, slot.engine.span
```

Sample pri_e1.cfg File

The following is a sample of the default pri_e1.cfg file, with settings for E1, HDB3, and AT&T 5ESS.

```
;PRI E1 Configuration File
```

```
[Contents]
```

```
EntryCount=1
```

```
[Entry0]
```

```
;
;-----
; Card Level Configurables
;-----
```

```
EngineID=8.1
EngineEnabled=2          ; 1=Disabled, 2=Enabled
LiuEngineType=6           ; 4=T1, 6=PRI
SystemClockSource=1       ; 1=Span1, 2=Span2
TdmHighway=1
ModemPool=1.1, 2.1, 3.1, 4.1, 5.1, 6.1, 7.1, 9.1
```

```
;-----
; Span Level Configurables
;-----
```

```
; Span 1
```

```
CircuitID1=This is Circuit Number One.
```

```
SpanEnabled1=2           ; 1=Disabled, 2=Enabled
LineType1=4              ; 2=ESF, 3=D4, 4=E1, 7=E1DF
LineCoding1=3            ; 2=B8ZS, 3=HDB3, 5=AMI
SignalMode1=4            ; 2=RobbedBit, 3=BitOriented, 4=MessageOriented
TxLineBuildOut1=1         ; 1=0, 2=7.5, 3=15, 4=22.5
Fdl1=8                   ; 1=Other, 2=ANSI, 4=ATT, 8=None
EqualizerGain1=1         ; 1=36, 2=26
SendCode1=1              ; 1=None, 2=LineCode
Loopback1=1              ; 1=None, 5=ACFA, 6=TAOS, 7=CSU Local, 8=CSU Remote
ModemSignaling1=3        ; 1=Loop Start, 2=E&M, 3=E&M Wink, 4=MF E&M, 5=MF E&M Wink
```

```
; Span 2
```

```
CircuitID2=This is Circuit Number Two.
```

```
SpanEnabled2=2
LineType2=4
LineCoding2=3
SignalMode2=4
TxLineBuildOut2=1
Fdl2=8
EqualizerGain2=1
SendCode2=1
Loopback2=1
```

ModemSignaling2=3

```
; -----
; PRI specific System Level Configurables
; -----
IsdnSwitchType=6      ; 3=ETSI, 5=AT&T 4ESS, 6=AT&T 5ESS, 7=DMS100,
                      ; 8=DMS250, 10=NI2, 16=NTT, 22=TS014
IsdnL2Protocol=1      ; 1=AUTODetect, 2=V120, 3=PPP, 4=PassThru
IsdnOutDataRate=1     ; 1=64KOnly, 2=56KOnly, 3=64KAuto, 4=56KAuto
IsdnInDataRate=3      ; 1=64KOnly, 2=56KOnly, 3=64KAuto, 4=56KAuto
CallAcceptMode=1      ; 1=AcceptAll, 2=VerifyCalls
CallRejectReason=44   ; Channel not available
CallProceedingMode=1  ; 1=off, 2=on
CallAlertMode=1       ; 1=off, 2=on
IeErrorMode=1         ; 1=Accept calls even though they contain an invalid
                      ;    Called Party Number IE
                      ; 2=Reject calls when the Called Party Number IE is
                      ;    invalid

[Dn]
;IsdnL2Protocol1=3     ; 1=AUTODetect, 2=V120, 3=PPP, 4=PassThru
;IsdnInDataRate1=2     ; 1=64KOnly, 2=56KOnly, 3=64KAuto, 4=56KAuto
;Directory Number1=802
;CallProceedingMode1=1 ; 1=off, 2=on
;CallAlertMode1=1      ; 1=off, 2=on
;DnMap1=8.1.1
                      ; format: slot.engine.span, slot.engine.span
```

The priconfg.dig File

The priconfg.dig file contains PRI configuration parameters, such as Network Server address and tunneling protocol. A sample file is found on [page B-11](#).

Note: You need to edit the priconfg.dig file only if you will use the PPTP tunneling protocol for calls from a digital terminal adapter to a PPTP server.

There are three sections where you enter parameters:

Table B-7. priconfg.dig File Parameter Sections

Section	Description
Chassis Level Configurables	Parameters entered at the chassis level affect operation of the entire chassis.

To set a parameter for all cards in the system, add it to the Chassis level section.

The following tables identify the parameters you can define within each section:

[Table B-8](#) describes Chassis Level Configurables.

Examples of the values you enter for parameters and options are indicated in the sample configuration file by semicolons found to the left of each descriptive line. You type in actual configuration values after the parameter/option examples. A sample configuration file appears on [page B-11](#).

Chassis Level Configurables Section

The Chassis Level Configurables section is used to globally define the setting of parameters that affect the operation of the entire chassis.

Table B-8. Chassis Level Configurables Parameters

<i>Parameter Name</i>	<i>Description</i>
Network Server Parameter	<p>The Network Server parameter defines each network server used by the 4000 chassis for digital modem calls. The network servers can be located outside of the chassis on the same network, or they can reside in a remote location.</p> <p>To properly configure the chassis for digital modem calls, you must create a Network Server table. This is not needed for analog modem calls.</p> <p>The format of this parameter is:</p> <p>NetworkSvrn=<i>Addr</i>, <i>Tunneling Protocol</i>, <i>FlowControl</i>, <i>Number of Ports</i> where:</p> <p><i>n</i> is a number from 1 to 64, the number of network servers supported by one 4000 chassis.</p> <p><i>Addr</i> equals the IP address of the network server, in the XXX.XXX.XXX.XXX format.</p> <p><i>Tunneling Protocol</i> specifies the tunneling protocol supported by this server. Currently, PPTP (Point-to-Point Tunneling Protocol) is the only supported protocol.</p> <p><i>Flow Control</i> equals 1 for enabled or 0 for disabled.</p> <p><i>Number of Ports</i> equals the total number of logical ports that the network server supports. If this field equals 0, the value that the network server specified in the control session response is used. For example, enter 0 for a Windows NT server because the NT server defines how many ports are available.</p>
Services Parameter	<p>The Services parameter is a user-defined name that identifies the type of service to which you are routing calls. You can enter any name for the service that you want. Choose a name that is meaningful for the type of network service (for example, Alpha or Beta). Each service is then mapped to one or more network servers supporting that service.</p> <p>To properly configure the chassis, you must define a Services table.</p> <p>The format of this parameter is:</p> <p>Svcn=<i>ServiceName</i>, <i>NetworkSvrn</i>, <i>NetworkSvrn</i>, ... , ... where:</p> <p><i>n</i> equals the number of the network service currently being defined. A maximum of 64 services can be defined.</p> <p><i>ServiceName</i> equals the user-defined name of the service to which calls are being routed (for example, Alpha or Beta).</p> <p><i>NetworkSvrn</i> is the name of the network server (NetworkSvr1-64), as defined in the Network Server Table, that provides a connectivity to the type of service specified.</p>
Called Address Parameter	<p>The Called Address parameter allows all called addresses (dialed telephone numbers) to be defined and then mapped to a user-defined service type (for example, Alpha or Beta) to which the digital call is routed.</p> <p>Note: This table is specified only when called address routing is used (DfltAlg=CA) for a PRI ISDN application.</p> <p>The format of this parameter is:</p> <p>CAn=<i>PhoneNumber</i>, <i>ServiceName</i> where:</p> <p><i>n</i> equals the number of the called address that is currently being defined. A maximum of 64 called addresses can be defined.</p> <p><i>PhoneNumber</i> equals the telephone number of the incoming call. This is the number that the remote user dials to reach the specified destination. (The call number is also referred to as directory number when setting PRI configuration parameters; it is however the same number.)</p> <p><i>ServiceName</i> equals the user-defined name of the service to which calls are being routed (for example, Alpha or Beta) as defined in the Services Table.</p> <p>Delimiters and spaces are not supported when entering called addresses.</p>

Table B-8. Chassis Level Configurables Parameters (Continued)

<i>Parameter Name</i>	<i>Description</i>
Default Algorithm	<p>This parameter defines the type of call routing algorithm (service type routing or called address routing) to use.</p> <p>The format of this parameter is <code>DfltAlg=AlgorithmType</code> where: <i>AlgorithmType</i> equals SVC (service type routing) or CA (called address routing).</p>
Default Service Type	<p>This parameter defines the name of a single service type to which incoming calls are routed. The service type listed here is defined (and mapped to a list of network servers) in the Services table.</p> <p>If service type routing is used (DfltAlg=SVC), this parameter <i>must be configured</i> to specify a service to which the PRI card routes incoming calls.</p> <p>If called address routing is set (DfltAlg=CA), this optional parameter <i>can</i> be used to configure the PRI card to route incoming calls to this service type if the phone number dialed is not found in the Called Address table.</p> <p>If a dialed number is not in the Called Address table, and if a DfltSvcType is set, the PRI card routes the call to the specified service type.</p> <p>If a dialed number is not in the Called Address table and if the DfltSvcType is not set, the PRI card checks if a default service provider (DfltSvcProv) is set. If it is set, the PRI card routes the call to the network server indicated; otherwise, the call fails.</p> <p>Enter a default service type at the Chassis level for all PRI cards.</p> <p>The format of this parameter is <code>DfltSvcType=ServiceName</code> where: <i>ServiceName</i> specifies the name of the service (as defined in the Services table) to which incoming calls can be routed.</p>

Sample priconfg.dig File

This sample file contains settings for a chassis with one PRI card attached to a Windows NT 4.0 Comm Server, with a tunneling protocol of PPTP, flow control enabled, and a number of ports equal to 0.

```
; -----
; ISDN Digital Configuration File
; This file is used to configure ISDN digital call routing.
; The PRI card supports two types of digital call routing.
; 1) Service based          - The user specifies a primary server and a secondary
;                             or list of secondary servers. Secondary servers are
;                             only used if the primary is out of resources or
;                             unavailable.
; 2) Called Address Based  - The user specifies a called phone number and a
;                             server. When digital calls come in with that
;                             specified called number they will be routed to
;                             the specified server. If the incoming call doesn't
;                             match a specified phone number it will be routed to
;                             the default server.
; -----
; Do Not modify the next 4 lines.
[Contents]
EntryCount=1
[Entry0]
[Chassis]
;
; Follow the 5 steps below to configure your system. Detailed
; descriptions on each parameter follows this list.
;
; *Step 1: Uncomment the NetworkSrvr1 line and enter your Server's IP address.
;   Note: You can specify multiple NetworkServers.
;NetworkSrvr1=150.30.19.1, PPTP, 1, 0
;NetworkSrvr2=150.30.19.2, PPTP, 0, 24
;NetworkSrvr3=150.30.19.3, PPTP, 0, 24
;
; *Step 2: Uncomment the Svc1 line and specify a Service name ie) NET1.
;   Note: You can specify multiple services.
;Svc1=NET1, NetworkSrvr1
;Svc2=NET2, NetworkSrvr2
;
; *Step 3: Specify phone# and service for call address routing.
;   Note: Uncomment and use only if you're using CA routing.
;CA1=721, NET1
;CA2=809, NET2
;
; *Step 4: Uncomment the DfltAlg line and specify Routing Algorithm (SVC or CA)
;DfltAlg=CA
;
; *Step 5: Uncomment the DfltSvcType line and setup your default Service type.
;DfltSvcType=NET1
; -----
; Network Server Parameter:
; This parameter is used to setup a network server. You can specify multiple
; servers.
; The format is as follows:
;
; NetworkSrvrN=Addr, TunnelingProtocol, FlowControl, NmbrOfPorts
;
; Where:
```

```
;
; Addr                = the IP address of a Network Server. The IP address for
;                      each Network Server must be unique.
;
; TunnelingProtocol   = the Tunneling Protocol Type, currently PPTP is the only
;                      supported type.
;
; FlowControl         = 1 (for enabled) or 0 (for disabled)
;
; NmbrOfPorts         = The number of logical ports that the server can support.
;                      If NmbrOfPorts = 0, the value is that which the Network
;                      Server specifies in the control session response.
;
; NOTE: If the Network Server is a Windows NT server, set FlowControl = 1
;       and NmbrOfPorts = 0
;
; Examples:
; NetworkSrvr1=192.168.0.220, PPTP, 1, 0
; NetworkSrvr2=192.168.0.221, PPTP, 0, 24
; -----
;
; -----
; Services Parameter:
; This is used for service based routing. Specify a primary and
; a secondary or multiple secondary servers.
; The format is as follows:
;
; Svcn=ServiceName, NetworkSrvr1, NetworkSrvr2, etc.
;
; Where:
; ServiceName         = User defined name.
;
; NetworkSrvr's       = The names of one or more of the previously defined Network
;                      Servers starting with the primary first.
;
; Examples:
; Svc1=NET1, NetworkSrvr1, NetworkSrvr2
; Svc2=NET2, NetworkSrvr2, NetworkSrvr1
; -----
;
; -----
; Called Address Parameter:
; This is used for called address based routing. Specify a phone number and
; a previously defined service name to associate with it. You can specify
; multiple CAs.
; The format is as follows:
;
; CAn=PhoneNumber, ServiceName
;
; Where:
; PhoneNumber         = Dialed phone number
; ServiceName         = User defined service name previously specified in the
;                      services table.
;
; If the called address matches an entry in the Called Address Table,
; a search is performed comparing the configured service name against
; the Services Table. If the name is found in the Services Table, a
; connection is established to the LAN based service provider. If
; the phone number doesn't match an entry the default service type
; is used.
```

```

;
; NOTE: This table is ONLY valid if DfltAlg = CA.
; Examples:
; CA1=8005551211, NET1
; CA2=8009675309, NET2
; -----

; -----
; DfltAlg:
; This parameter is used to specify service or call address based routing.
; The format is as follows:
;
; DfltAlg=AlgorithmType
;
; Where:
;
; AlgorithmType    = SVC (for service type routing), or CA (for called
;                    address routing).
; Examples:
; DfltAlg=SVC
; DfltAlg=CA
; -----

; -----
; DfltSvcType:
;
; The format is as follows:
;
; DfltSvcType=ServiceName
; Where:
; ServiceName      = User defined service name specified in the Services Table.
;
; Note:
; If DfltAlg=SVC then this parameter specifies a service type to which the PRI
; will route incoming calls. This service type is mapped through the Services
; Table to a list of Network Servers.
;
; If DfltAlg=CA, the PRI will route an incoming call to this Service Type,
; if the phone number dialed is not found in the Called Address table.
;
; Examples:
; DfltSvcType=NET1
; DfltSvcType=NET2
; -----

```

Channelized T1 Configuration Files

Configuration information for common channelized T1 settings is found in the **t1_b8zs_esf.cfg** and **t1_ami_d4.cfg** files. These files are found in the folder on the PC where you installed the Compaq 4000 Manager. The default folder name is C:\Program Files\Compaq 4000 Manager\ch-t1 config.

Use the file that contains the format that is valid for your T1 line. For example, if your T1 line is set for a line code of B8ZS and a frame format of ESF, then use the t1_b8zs_esf.cfg configuration file.

Each configuration file has three sections where you enter parameters:

Table B-9. Channelized T1 Configuration File Parameter Sections

<i>Section</i>	<i>Description</i>
Contents Level Configurables	Contains a required parameter setting for reading this configuration file.
Card Level Configurables	Affects operation of a particular channelized T1 card.
Span Level Configurables	Affects the electrical, coding, and framing characteristics of the T1 interface for each span on the channelized T1 card.

Parameters specified at the Span level override settings for the same parameter at the Card level.

The following tables identify the parameters you can define within each section:

[Table B-10](#) describes Contents Level Configurables.

[Table B-11](#) describes Card Level Configurables.

[Table B-12](#) describes Span Level Configurables.

Examples of the values you enter for parameters and options are indicated in the configuration file by semicolons found to the left of each descriptive line. You type in actual configuration values after the parameter/option examples.

Contents Configurables Section

The Contents Configurables section contains information for parsing (breaking the file into smaller pieces so that the program can act upon the information) the configuration file. Default settings are shown in **bold**.

Table B-10. Contents Configurables Parameters

<i>Parameter Name</i>	<i>Description</i>
EntryCount	This parameter is always 1 .

Card Level Configurables Section

The Card Level Configurables section contains parameters that affect the operation of each channelized T1 card. Default settings are shown in **bold**.

Table B-11. Card Level Configurables Parameters

<i>Parameter Name</i>	<i>Description</i>
Engine ID	Each channelized T1 card is identified by an ID, indicating its position in the chassis (known as <i>slot.engine</i> notation). <i>slot</i> is the physical slot in which the card is located (8 or 9); engine always equals 1. For example, EngineID=8.1 identifies the channelized T1 card installed in slot 8; EngineID=9.1 identifies the channelized T1 card installed in slot 9.
Engine Enabled	Lets you enable or disable a channelized T1 card. The format of this parameter is: EngineEnabled= <i>n</i> where <i>n</i> is: 1=Disabled, 2=Enabled
LIU Engine Type	This parameter is always 4 for channelized T1 operation.
System Clock Source	Identifies the span (1 or 2) from which the channelized T1 card receives its clocking information. The format of this parameter is: SystemClockSource= <i>n</i> where <i>n</i> is: 1=Span 1 , 2=Span 2

Table B-11. Card Level Configurables Parameters (Continued)

<i>Parameter Name</i>	<i>Description</i>
TDM Highway	Selects the TDM bus used by the channelized T1 card. The format of this parameter is: TDMHighway= <i>n</i> where <i>n</i> is: 1=TDM Highway 1, 2=TDM Highway 2
Modem Pool	Identifies the individual cards configured to participate in the analog modem pool. The format of this parameter is: ModemPool= <i>EngineID</i> , ... , ... , ... where: <i>EngineID</i> equals the identification numbers, in <i>slot.engine</i> notation, for all modems in the chassis belonging to that modem pool. <i>slot</i> equals the slot position from 1 to 16. <i>engine</i> always equals 1. For example, 3.1 means the modem card in slot 3. Default is ModemPool= 1.1,2.1,3.1,4.1,5.1,6.1 Note: For analog over ISDN calls, if you use two channelized T1 cards, you need to create two configuration files and assign different modem cards to each channelized T1 card. For example, in <i>t1_b8zs_esf1.cfg</i> assign the modem cards in slots 1 to 6 to channelized T1 card 1 (in slot 8) and in <i>t1_b8zs_esf2.cfg</i> assign the modem cards in slots 10 to 15 to channelized T1 card 2 (in slot 9).

Span Level Configurables Section

The Span Level Configurables section lets you make selections that affect the electrical, coding, and framing characteristics of the T1 interface for each span on the channelized T1 card. Default settings are shown in **bold**.

Table B-12. Span Level Configurables Parameters

<i>Parameter Name</i>	<i>Description</i>
Circuit ID	Lets you enter descriptive information for each span on a channelized T1 card. You can enter a maximum of 30 characters. The format of this parameter is: CircuitID <i>x</i> = <i>description</i> where <i>x</i> is the Span number (1=Span 1 or 2=Span 2)
Span Status	Lets you enable or disable a span on a channelized T1 card. The format of this parameter is: SpanEnabled <i>x</i> = <i>n</i> where: <i>x</i> is the Span number (1=Span 1 or 2=Span 2) <i>n</i> is 1=Disabled, 2=Enabled
Line Type	Lets you select the type of line and framing mode for channelized T1 circuits. The format of this parameter is: LineType <i>x</i> = <i>n</i> where: <i>x</i> is the Span number (1=Span 1 or 2=Span 2) <i>n</i> is 2=ESF (t1_b8zs_esf.cfg default) , 3=D4 (t1_ami_d4.cfg default) , 4=E1, 7=E1DF
Line Coding	Lets you choose encoding/decoding protocols used on the T1 line. The format of this parameter is: LineCoding <i>x</i> = <i>n</i> where: <i>x</i> is the Span number (1=Span 1 or 2=Span 2) <i>n</i> is 2=B8ZS (t1_b8zs_esf.cfg default) , 3=HDB3, 5=AMI (t1_ami_d4.cfg default)
Signal Mode	This parameter is always 2 (bit robbing) for T1 lines.
Tx Line Build Out	Lets you select the transmit level (in decibels) for the Channel Service Unit (CSU) on the channelized T1 card. The value you choose depends on the location of the chassis in proximity to the PBX. The format of this parameter is: TxLineBuildOut <i>x</i> = <i>n</i> where: <i>x</i> is the Span number (1=Span 1 or 2=Span 2) <i>n</i> 1=0 dB , 2=7.5 dB, 3=15 dB, 4=22.5 dB

Table B-12. Span Level Configurables Parameters (Continued)

<i>Parameter Name</i>	<i>Description</i>
FDL (Facility Data Link)	<p>Lets you enable the 4 kbps FDL inband diagnostic channel used by Telcos for diagnostic testing during normal operations. The format of this parameter is:</p> <p>FDLx=n where:</p> <p>x is the Span number (1=Span 1 or 2=Span 2)</p> <p>n is 1=Other, 2=ANSI, 4=ATT, 8=None</p>
Equalizer Gain	<p>Lets you select the maximum gain that can be applied to the CSU equalizer. The format of this parameter is:</p> <p>EqualizerGainx=n where:</p> <p>x is the Span number (1=Span 1 or 2=Span 2)</p> <p>n is 1=36 dB, 2=26 dB</p>
Send Code	<p>Lets you select the type of payload loopback code sent across the DS1 circuit. This parameter is used with the Loopback parameter to perform diagnostic testing of the circuit or equipment. The format of this parameter is:</p> <p>SendCodex=n where:</p> <p>x is the Span number (1=Span 1 or 2=Span 2)</p> <p>n is 1=No Code, 2=Line Code</p>
Loopback	<p>Lets you enable the loopback configuration of the DS1 circuit. This parameter is used with the SendCode parameter to perform diagnostic testing of the circuit or equipment. The format of this parameter is:</p> <p>Loopbackx=n where:</p> <p>x is the Span number (1=Span 1 or 2=Span 2)</p> <p>n is 1=None, 5=ACFA, 6=TAOS, 7=CSU Local, 8=CSU Remote</p>
Modem Signaling	<p>Lets you select the type of modem signaling. The format of this parameter is:</p> <p>ModemSignalingx=n where:</p> <p>x is the Span number (1=Span 1 or 2=Span 2)</p> <p>n is 1=Loop Start, 2=E&M, 3=E&M Wink, 4=MF E&M, 5=MF E&M Wink</p>

Sample T1 Configuration File (t1_b8zs_esf.cfg)

This sample file contains default settings for a T1 line set for ESF and B8ZS.

```
; -----
; Chan T1 Configuration File (B8ZS, ESF)
; -----
```

[Contents]

EntryCount=1

[Entry0]

```
; -----
; Card Level Configurables
; -----
```

EngineID=8.1

EngineEnabled=2 ; 1=Disabled, 2=Enabled

LiuEngineType=4 ; 4=T1, 6=PRI

SystemClockSource=1 ; 1=Span1, 2=Span2

TdmHighway=1

ModemPool=1.1, 2.1, 3.1, 4.1, 5.1, 6.1

```
; -----
; Span Level Configurables
; -----
```

; Span 1

CircuitID1=This is Circuit Number One.

SpanEnabled1=2 ; 1=Disabled, 2=Enabled

LineType1=2 ; 2=ESF, 3=D4, 4=E1, 7=E1DF

LineCoding1=2 ; 2=B8ZS, 3=HDB3, 5=AMI

SignalMode1=2 ; 2=RobbedBit, 3=BitOriented, 4=MessageOriented

TxLineBuildOut1=1 ; 1=0, 2=7.5, 3=15, 4=22.5

Fdl1=8 ; 1=Other, 2=ANSI, 4=ATT, 8=None

EqualizerGain1=1 ; 1=36, 2=26

SendCode1=1 ; 1=None, 2=LineCode

Loopback1=1 ; 1=None, 5=ACFA, 6=TAOS, 7=CSU Local, 8=CSU Remote

ModemSignaling1=3 ; 1=Loop Start, 2=E&M, 3=E&M Wink, 4=MF E&M, 5=MF E&M Wink

; Span 2

CircuitID2=This is Circuit Number Two.

SpanEnabled2=2

LineType2=2

LineCoding2=2

SignalMode2=2

TxLineBuildOut2=1

Fdl2=8

EqualizerGain2=1

SendCode2=1

Loopback2=1

ModemSignaling1=3

Sample T1 Configuration File (t1_ami_d4.cfg)

This sample file contains default settings for a T1 line set for AMI and D4.

```
;-----
;Chan T1 Configuration File (AMI, D4)
;-----

[Contents]
EntryCount=1

[Entry0]
;-----
; Card Level Configurables
;-----
EngineID=8.1
EngineEnabled=2          ; 1=Disabled, 2=Enabled
LiuEngineType=4          ; 4=T1, 6=PRI
SystemClockSource=1      ; 1=Span1, 2=Span2
TdmHighway=1
ModemPool=1.1, 2.1, 3.1, 4.1, 5.1, 6.1

;-----
; Span Level Configurables
;-----
; Span 1
CircuitID1=This is Circuit Number One.
SpanEnabled1=2           ; 1=Disabled, 2=Enabled
LineType1=3              ; 2=ESF, 3=D4, 4=E1, 7=E1DF
LineCoding1=5            ; 2=B8ZS, 3=HDB3, 5=AMI
SignalMode1=2            ; 2=RobbedBit, 3=BitOriented, 4=MessageOriented
TxLineBuildOut1=1        ; 1=0, 2=7.5, 3=15, 4=22.5
Fdl1=8                   ; 1=Other, 2=ANSI, 4=ATT, 8=None
EqualizerGain1=1         ; 1=36, 2=26
SendCode1=1              ; 1=None, 2=Line Code
Loopback1=1              ; 1=None, 5=ACFA, 6=TAOS, 7=CSU Local, 8=CSU Remote
ModemSignaling1=3        ; 1=Loop Start, 2=E&M, 3=E&M Wink, 4=MF E&M, 5=MF E&M Wink

; Span 2
CircuitID2=This is Circuit Number Two.
SpanEnabled2=2
LineType2=3
LineCoding2=5
SignalMode2=2
TxLineBuildOut2=1
Fdl2=8
EqualizerGain2=1
SendCode2=1
Loopback2=1
Modem Signaling2=3
```

The ch_e1.cfg File

Configuration information for common channelized E1 settings, such as framing format and line coding, is found in the **ch_e1.cfg** file. This file is found in the folder on the PC where you installed the Compaq 4000 Manager. The default folder name is C:\Program Files\Compaq 4000 Manager\pri-e1 config.

There are five sections where you enter parameters:

Table B-13. ch_e1.cfg File Parameter Sections

<i>Section</i>	<i>Description</i>
Contents Level Configurables	Contains a required parameter setting for reading this configuration file
Card Level Configurables	Affects operation of a particular channelized E1 card
Span Level Configurables	Affects the electrical, coding, and framing characteristics of the PRI interface for each span on the channelized E1 card
PRI-Specific Level Configurables	Configures ISDN-specific settings for the channelized E1 card
Directory Number Level Configurables	Maps incoming directory numbers or called addresses specified by the telephone company to one or more spans on the channelized E1 card

Parameters specified at the Span level override settings for the same parameter at the Card level.

The following tables identify the parameters you can define within each section:

[Table B-14](#) describes Contents Level Configurables.

[Table B-15](#) describes Card Level Configurables.

[Table B-16](#) describes Span Level Configurables.

[Table B-17](#) describes PRI-Specific Level Configurables.

[Table B-18](#) describes Directory Number Level Configurables.

Examples of the values you enter for parameters and options are indicated in the sample configuration file by semicolons found to the left of each descriptive line. You type in actual configuration values after the parameter/option examples.

Contents Configurables Section

The Contents Configurables section contains information for parsing (breaking the file into smaller pieces so that the program can act upon the information) the configuration file. Default settings are shown in **bold**.

Table B-14. Contents Configurables Parameters

<i>Parameter Name</i>	<i>Description</i>
EntryCount	This required parameter is always 1 .

Card Level Configurables Section

The Card Level Configurables section contains parameters that affect the operation of each PRI card. Default settings are shown in **bold**.

Table B-15. Card Level Configurables Parameters

<i>Parameter Name</i>	<i>Description</i>
Engine ID	Each channelized E1 card is identified by an ID, indicating its position in the chassis (known as <i>slot.engine</i> notation). <i>slot</i> is the physical slot in which the card is located (8 or 9); engine always equals 1. For example, EngineID=8.1 identifies the channelized E1 card installed in slot 8; EngineID=9.1 identifies the channelized E1 card installed in slot 9.
Engine Enabled	Lets you enable or disable a channelized E1 card. The format of this parameter is: EngineEnabled= <i>n</i> where <i>n</i> is: 1=Disabled, 2=Enabled
LIU Engine Type	This parameter is always 6 for PRI.

Table B-15. Card Level Configurables Parameters (Continued)

<i>Parameter Name</i>	<i>Description</i>
System Clock Source	Identifies from which span (1 or 2) the channelized E1 card receives its clocking information. The format of this parameter is: SystemClockSource= <i>n</i> where <i>n</i> is: 1=Span 1, 2=Span 2
TDM Highway	Selects the TDM bus used by the channelized E1 card. The format of this parameter is: TDMHighway= <i>n</i> where <i>n</i> is: 1=TDM Highway 1, 2=TDM Highway 2
Modem Pool	Identifies the individual cards configured to participate in the analog modem pool. The format of this parameter is: ModemPool= <i>EngineID</i> , ... , ... , ... where: <i>EngineID</i> equals the identification numbers, in <i>slot.engine</i> notation, for all modems in the chassis belonging to that modem pool. <i>slot</i> equals the slot position from 1 to 16. <i>engine</i> always equals 1. For example, 3.1 means the modem card in slot 3. Default is: ModemPool= 1.1,2.1,3.1,4.1,5.1,6.1,7.1,9.1 Note: For analog over ISDN calls, if you use two channelized E1 cards, you need to create two configuration files and assign different modem cards to each channelized E1 card. For example, in <i>ch_e1_1.cfg</i> assign the modem cards in slots 1 to 7 to channelized E1 card 1 (in slot 8) and in <i>ch_e1_2.cfg</i> assign the modem cards in slots 10 to 16 to channelized E1 card 2 (in slot 9).

Span Level Configurables Section

The Span Level Configurables section lets you make selections that affect the electrical, coding, and framing characteristics of the E1 interface for each span on the channelized E1 card. Default settings are shown in **bold**.

Table B-16. Span Level Configurables Parameters

<i>Parameter Name</i>	<i>Description</i>
Circuit ID	Lets you enter descriptive information for each span on a channelized E1 card. The format of this parameter is: CircuitID <i>x</i> = <i>description</i> where: <i>x</i> is the Span number (1=Span 1 or 2=Span 2) <i>description</i> is a maximum of 30 characters
Span Enabled	Lets you enable or disable a span on a channelized E1 card. The format of this parameter is: SpanEnabled <i>x</i> = <i>n</i> where: <i>x</i> is the Span number (1=Span 1 or 2=Span 2) <i>n</i> is 1=Disabled, 2=Enabled
Line Type	Lets you select the type of line and framing mode for E1 circuits. This information is provided by your local telephone company. The format of this parameter is: LineType <i>x</i> = <i>n</i> where: <i>x</i> is the Span number (1=Span 1 or 2=Span 2) <i>n</i> is 2=ESF, 3=D4, 4=E1, 7=E1DF
Line Coding	Lets you choose encoding/decoding protocols used on the E1 line. This information is provided by your local telephone company. The format of this parameter is: LineCoding <i>x</i> = <i>n</i> where: <i>x</i> is the Span number (1=Span 1 or 2=Span 2) <i>n</i> is 2=B8ZS, 3=HDB3 , 5=AMI
Signal Mode	This parameter is always 3 (Bit Oriented) for E1 lines.

Table B-16. Span Level Configurables Parameters (Continued)

<i>Parameter Name</i>	<i>Description</i>
Tx Line Build Out	<p>Lets you select the transmit level (in decibels) for the Channel Service Unit (CSU) on the channelized E1 card. The value you choose depends on the location of the 4000 chassis in proximity to the PBX. The format of this parameter is:</p> <p>TxLineBuildOut$x=n$ where:</p> <p>x is the Span number (1=Span 1 or 2=Span 2)</p> <p>n 1=0 dB, 2=7.5 dB, 3=15 dB, 4=22.5 dB</p>
FDL (Facility Data Link)	<p>Lets you enable the 4Kbps FDL inband diagnostic channel used by Telcos for diagnostic testing during normal operations. The format of this parameter is:</p> <p>FDL$x=n$ where:</p> <p>x is the Span number (1=Span 1 or 2=Span 2)</p> <p>n is 1=Other, 2=ANSI, 4=ATT, 8=None</p>
Equalizer Gain	<p>Lets you select the maximum gain that can be applied to the CSU equalizer. The format of this parameter is:</p> <p>EqualizerGain$x=n$ where:</p> <p>x is the Span number (1=Span 1 or 2=Span 2)</p> <p>n is 1=36 dB, 2=26 dB</p>
Send Code	<p>Lets you select the type of payload loopback code sent across the DS1 circuit. This parameter is used with the Loopback parameter to perform diagnostic testing of the circuit or equipment. The format of this parameter is:</p> <p>SendCode$x=n$ where:</p> <p>x is the Span number (1=Span 1 or 2=Span 2)</p> <p>n is 1=None, 2=Line Code</p>
Loopback	<p>Lets you enable the loopback configuration of the DS1 circuit. This parameter is used with the SendCode parameter to perform diagnostic testing of the circuit or equipment. The format of this parameter is:</p> <p>Loopback$x=n$ where:</p> <p>x is the Span number (1=Span 1 or 2=Span 2)</p> <p>n is 1=None, 5=ACFA, 6=TAOS, 7=CSU Local, 8=CSU Remote</p>
Modem Signaling	<p>Lets you select the type of modem signaling. The format of this parameter is:</p> <p>ModemSignaling$x=n$ where:</p> <p>x is the Span number (1=Span 1 or 2=Span 2)</p> <p>n is 1=Loop Start, 2=E&M, 3=E&M Wink, 4=MF E&M, 5=MF E&M Wink</p>

PRI-Specific System Level Configurables Section

The PRI-specific System level Configurables section lets you configure ISDN-specific parameters for each channelized E1 card in the chassis. Default settings are shown in **bold**.

Table B-17. PRI-Specific System Level Configurables Parameters

<i>Parameter Name</i>	<i>Description</i>
ISDN Switch Type	<p>Selects the protocol to use on the D-channel. The format of this parameter is:</p> <p>ISDNSwitchType$x=n$ where:</p> <p>x is the Span number (1=Span 1 or 2=Span 2)</p> <p>n is 3=Euro ISDN (ETSI)</p> <p>5=North America (AT&T 4ESS)</p> <p>6=North America AT&T 5ESS</p> <p>7=North America (Northern Telecom DMS100)</p> <p>8=North America (Northern Telecom DMS250)</p> <p>10=United States (NI2 National ISDN-2)</p> <p>16=NTT</p> <p>22=TS014</p>
ISDN L2 Protocol	<p>Selects the type of transmission protocol in use on a B-channel after a connection is established. The format of this parameter is:</p> <p>ISDNL2Protocol$x=n$ where:</p> <p>x is the Span number (1=Span 1 or 2=Span 2)</p> <p>n is 1=Auto Detect, 2=V120, 3=PPP, 4=PassThru</p>
ISDN Out Data Rate	<p>Specifies the speed at which an outgoing call is connected. The format of this parameter is:</p> <p>ISDNOutDataRate$x=n$ where:</p> <p>x is the Span number (1=Span 1 or 2=Span 2)</p> <p>n is 1=64KOnly, 2=56KOnly, 3=64KAuto, 4=56KAuto</p>
ISDN In Data Rate	<p>Specifies the speed at which an incoming call is connected. The format of this parameter is:</p> <p>ISDNInDataRate$x=n$ where:</p> <p>x is the Span number (1=Span 1 or 2=Span 2)</p> <p>n is 1=64KOnly, 2=56KOnly, 3=64KAuto, 4=56KAuto</p>
Call Accept Mode	<p>Specifies how calls are accepted by the channelized E1 card. The format of this parameter is:</p> <p>CallAcceptMode$x=n$ where:</p> <p>x is the Span number (1=Span 1 or 2=Span 2)</p> <p>n is 1=Accept all, 2=Verify calls</p>
Call Reject Reason	<p>Specifies the message displayed when system resources are not available to process an incoming call. The format of this parameter is:</p> <p>CallRejectReason$x=n$ where:</p> <p>x is the Span number (1=Span 1 or 2=Span 2)</p> <p>n is a cause code number from 1 to 127 (Default = 44). Refer to Appendix C, Cause Codes, for a list of cause codes.</p>
Call Proceeding Mode	<p>Specifies whether to send a message to the Telco stating that a call is in progress. The format of this parameter is:</p> <p>CallProceedingMode$x=n$ where:</p> <p>x is the Span number (1=Span 1 or 2=Span 2)</p> <p>n is 1=Off, 2=On</p>

Table B-17. PRI-Specific System Level Configurables Parameters (Continued)

<i>Parameter Name</i>	<i>Description</i>
Call Alert Mode	Specifies whether to send a message to the Telco stating that the phone receiving the call is ringing. The format of this parameter is: CallAlertMode= <i>x</i> = <i>n</i> where: <i>x</i> is the Span number (1=Span 1 or 2=Span 2) <i>n</i> is 1=Off , 2=On
IE Error Mode	Specifies whether calls are accepted or rejected based on the called party number information element. The format of this parameter is: IEErrorMode= <i>n</i> where <i>n</i> is: 1=Accept calls even though they contain an invalid Called Party Number IE , 2=Reject calls when the Called Party Number IE is invalid
Channelized E1 Signal Variance	Specifies the country code. The format of this parameter is: Ch1SigVar= <i>n</i> where <i>n</i> is the country code, as follows: 1=Czech Republic , 2=Poland, 16=Mexico, 19=Columbia, 21=Panama, 28=China, 30=Argentina, 31=Malta

Directory Number Level Configurables Section

The Directory Number Level Configurables section lets you specify the incoming directory numbers assigned by the telephone company, and map these numbers to one or more E1 spans on a channelized E1 card. Default settings are shown in **bold**.

Table B-18. Directory Number Level Configurables Parameters

<i>Parameter Name</i>	<i>Description</i>
Directory Number	Specifies up to 60 incoming directory (telephone) numbers assigned by the telephone company. The format of this parameter is: DirectoryNumber= <i>n</i> = xxx <i>yyyzzzz</i> where: <i>n</i> is the number (1 to 60) of the directory you are specifying <i>xxx</i> <i>yyyzzzz</i> is the directory (phone) number provided by the Telco in the form: xxx (3-digit area code) <i>yyy</i> (3-digit exchange number) <i>zzzz</i> (4-digit station number) Note: The directory number usually consists of 10 digits as indicated in the above example. You can enter a maximum of 20 characters, however, for each directory number.
Dn Map	Lets you map each individual directory number to one or more PRI spans on a channelized E1 card. The format of this parameter is: DnMap= <i>x</i> = <i>y.y.y</i> where: <i>x</i> is the corresponding number (1 to 60) you are specifying <i>y.y.y</i> identifies the span to which a directory number is mapped in the format <i>slot.engine.span</i> where <i>slot</i> equals the channelized E1 card in slot 8 or 9, <i>engine</i> always equals 1, and <i>span</i> =1 or 2. For example, 8.1.1 means Span 1 on the channelized E1 card in slot 8.

Sample Channelized E1 Configuration File (ch_e1.cfg)

This sample file contains default settings for an E1 line.

```
; Chan E1 Configuration File
```

```
[Contents]
```

```
EntryCount=1
```

```
[Entry0]
```

```
; -----
```

```
; Card Level Configurables
```

```
; -----
```

```
EngineID=8.1
```

```
EngineEnabled=2 ; 1=Disabled, 2=Enabled
```

```
LIUEngineType=6 ; 4=T1, 6=PRI
```

```
SystemClockSource=1 ; 1=Span1, 2=Span2
```

```
TdmHighway=1
```

```
ModemPool=1.1,2.1,3.1,4.1,5.1,6.1,7.1,9.1
```

```
; -----
```

```
; Span Level Configurables
```

```
; -----
```

```
; Span 1
```

```
CircuitID1=This is Circuit Number One.
```

```
SpanEnabled1=2 ; 1=Disabled, 2=Enabled
```

```
LineType1=7 ; 2=ESF, 3=D4, 4=E1, 7=E1DF
```

```
LineCoding1=3 ; 2=B8ZS, 3=HDB3, 5=AMI
```

```
SignalMode1=3 ; 2=RobbedBit, 3=BitOriented, 4=MessageOriented
```

```
TxLineBuildOut1=1 ; 1=0, 2=7.5, 3=15, 4=22.5
```

```
Fdl1=8 ; 1=Other, 2=ANSI, 4=ATT, 8=None
```

```
EqualizerGain1=1 ; 1=36, 2=26
```

```
SendCode1=1 ; 1=None, 2=Line Code
```

```
Loopback1=1 ; 1=None, 5=ACFA, 6=TAOS, 7=CSU Local, 8=CSU Remote
```

```
ModemSignaling1=1 ; 1=Loop Start, 2=E&M, 3=E&M Wink, 4=MF E&M, 5=MF E&M Wink
```

```
; Span 2
```

```
CircuitID2=This is Circuit Number Two.
```

```
SpanEnabled2=2
```

```
LineType2=7
```

```
LineCoding2=3
```

```
SignalMode2=3
```

```
TxLineBuildOut2=1
```

```
Fdl2=8
```

```
EqualizerGain2=1
```

```
SendCode2=1
```

```
Loopback2=1
```

```
ModemSignaling2=1
```

```
; -----
```

```
; PRI specific System Level Configurables
```

```
; -----
```

```
IsdnSwitchType=3 ; 3=ETSI, 5=AT&T 4ESS, 6=AT&T 5ESS, 7=DMS100,  
; 8=DMS250, 10=NI2, 16=NTT, 22=TS014
```

```
IsdnL2Protocol=1 ; 1=AUTODetect, 2=V120, 3=PPP, 4=PassThru
```

```
IsdnOutDataRate=1 ; 1=64KOnly, 2=56KOnly, 3=64KAuto, 4=56KAuto
```

```
IsdnInDataRate=3 ; 1=64KOnly, 2=56KOnly, 3=64KAuto, 4=56KAuto
```

```
CallAcceptMode=1 ; 1=AcceptAll, 2=VerifyCalls
```

```
CallRejectReason=44
```

```
CallProceedingMode=1 ; 1=off, 2=on
```

```
CallAlertMode=1 ; 1=off, 2=on
```

```
IeErrorMode=1          ; 1=Accept calls even though they contain an invalid
                        ;   Called Party Number IE
                        ; 2=Reject calls when the Called Party Number IE is
                        ;   invalid
Che1SigVar=1           ; Country code

[Dn]
;IsdnL2Protocol1=3      ; 1=AUTODetect, 2=V120, 3=PPP, 4=PassThru
;IsdnInDataRate1=2      ; 1=64KOnly, 2=56KOnly, 3=64KAuto, 4=56KAuto
;DirectoryNumber1=802
;CallProceedingMode1=1  ; 1=off, 2=on
;CallAlertMode1=1       ; 1=off, 2=on
;DnMap1=8.1.1
                        ; format: slot.engine.span, slot.engine.span
```


Appendix C

Cause Codes

Table C-1 lists the valid cause codes associated with the Call Reject Reason field in the pri_t1.cfg or pri_e1.cfg configuration file.

Note: Not all cause values are universally supported across switch types. Before a particular cause value is used, its validity should be compared with the appropriate switch vendor specifications.

Table C-1. Cause Codes

<i>Cause Code Number</i>	<i>Cause Code</i>
01	UNASSIGNED_NUMBER
02	NO_ROUTE
06	CHANNEL_UNACCEPTABLE
16	NORMAL_CLEARING
17	USER_BUSY
18	NO_USER_RESPONDING
21	CALL_REJECTED
22	NUMBER_CHANGED
27	DEST_OUT_OF_ORDER
28	INVALID_NUMBER_FORMAT
29	FACILITY_REJECTED
30	RESP_TO_STAT_ENQ
31	UNSPECIFIED_CAUSE
34	NO_CIRCUIT_AVAILABLE
38	NETWORK_OUT_OF_ORDER
41	TEMPORARY_FAILURE
42	NETWORK_CONGESTION
43	ACCESS_INFO_DISCARDED
44	REQ_CHANNEL_NOT_AVAIL (default)
45	PRE_EMPTED
50	FACILITY_NOT_SUBSCRIBED
52	OUTGOING_CALL_BARRED
54	INCOMING_CALL_BARRED
58	BEAR_CAP_NOT_AVAIL
63	SERVICE_NOT_AVAIL
65	CAP_NOT_IMPLEMENTED
66	CHAN_NOT_IMPLEMENTED
69	FACILITY_NOT_IMPLEMENT
81	INVALID_CALL_REF
82	CHAN_DOES_NOT_EXIST
88	INCOMPATIBLE_DEST
95	INVALID_MSG_UNSPEC
96	MANDATORY_IE_MISSING
97	NONEXISTENT_MSG
98	WRONG_MESSAGE
99	BAD_INFO_ELEM

Table C-1. Cause Codes (Continued)

<i>Cause Code Number</i>	<i>Cause Code</i>
100	INVALID_ELEM_CONTENTS
101	WRONG_MSG_FOR_STATE
102	TIMER_EXPIRY
103	MANDATORY_IE_LEN_ERR
111	PROTOCOL_ERROR
127	INTERWORKING_UNSPEC

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