COMPAQ

MICROCOM 4000

Installation Guide

Part Number 380006-001

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Part Number 380006-001

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Chapter 1
Introduction

Compaq Microcom 4000 System

Compaq Microcom's 4000 system is a high density, high performance, central site modem communications system. You can configure your system for one of four different operation modes:

- Primary Rate Interface (PRI)
- Channelized T1
- Channelized E1
- Analog

Compaq Microcom 4000 modems use the V.90 protocol, providing you with the most reliable, high speed data connections available. PRI (provisioned over T1) and Channelized T1 cards provide North American T1 1.544 Mbps (megabits per second) access to the PSTN using Compaq Microcom 4000 modems. The PRI (provisioned over E1) and Channelized E1 cards provide European CEPT (E1) 2.048 Mbps access to the PSTN using Compaq Microcom 4000 modems.

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 operation, it means "PRI over T1 operation or PRI over E1 operation."

The 4000 system supports:

- 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 the *Quick Setup*, the *PRI, Channelized T1, and Channelized E1 User's Guide*, or the Compaq 4000 Manager's on line help 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

You can control and configure the 4000 system's 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 remotely access the PRI card via an ftp or telnet session.

The 4000 chassis, which fits into a standard EIA approved 19 inch rack, uses a high speed, full duplex intrachassis bus. It has been designed to allow access to all major components and controls from the front and rear of the unit. PRI and modem main cards are inserted through the front of the unit; adapter cards, providing connection to the telephone network and DTE equipment, are inserted through the back of the chassis.

Intended Audience

This guide provides the central site network manager or system administrator with the information necessary to install and maintain the 4000 system in a central site application.

If you are not the network manager or system administrator, you will want to involve that person in planning the installation of the 4000 system.

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

Document	***Contents***
Compaq Microcom 4000 Quick Setup	Describes the major steps necessary to quickly set up your chassis for either PRI, channelized T1, channelized E1, or analog operation.
Compaq Microcom 4000 Installation Guide	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.
Compaq Microcom 4000 PRI, Channelized T1, and Channelized E1 User's Guide	Describes in detail how to configure the PRI cards.
Compaq Microcom 4000 Modem User's Guide	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.
Compaq 4000 Manager User's Guide	Describes how to install the 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

When you see...	*It means...*
■	The start of a main section.
➥	An Important, WARNING, or CAUTION note.
Enter	Press the Enter key.
X+k	Hold down a key *X* (such as Ctrl or Alt) while pressing key *k*.
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.

Also, the terms computer, terminal, or PC, refer to a workstation or other DTE you connect to your modem.

Features

4000 System General Features

- Two dual PRI main cards with associated adapter card per chassis (each PRI dual 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 E1 (2.048 Mbps) for compatibility with the public network
- 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 immediate, or loop start signaling; and Dual Tone Multi Frequency (DTMF), Multi Frequency (MF), or pulse dialing for reliable high speed data transmissions
- Removal and replacement of modem cards (hot swap) with chassis fully operational
- Standard EIA approved 19 inch rack mountable chassis
- Modem firmware updates to flash memory through the network management port to an attached PC
- Dedicated high speed, full duplex intrachassis bus (mid plane) for each 8-port or 4-port modem card
- 8-port and 4-port digital modem adapter cards supporting RJ45 serial connections for PRI, channelized T1, and channelized E1 operations
- 4-port analog modem Data Access Arrangement (DAA) adapter cards supporting standard RJ11 telephone connections as well as RJ45 serial connections for asynchronous operations
- Front buttons for reset and busy out functions on each modem card, and reset functions on each PRI card
- Front panel LEDs for modem power, modem status monitoring, and PRI, channelized T1, and channelized E1 line status monitoring
- Auto-ranging 100-250V power supply
- Upgrade path from analog to digital operation (PRI, channelized T1, or channelized E1)
- DB 9-pin management port allowing modem or PC access to chassis modems

4000 System Modem Features

- 8-port digital modems with ITU-T V.90 protocol (28,000 through 56,000 bps[1]) or K56flex protocol (32,000 through 56,000 bps) modem port speeds
- 4-port digital and 4-port analog modems compatible with the ITU-T V.34 Annex 12 protocol (2400 through 33,600 bps) modem port speeds
- Microcom Networking Protocol (MNP) Class 10 and MNP Class 10 EC (Enhanced Cellular) for multiple cellular negotiation attempts, negotiated speed upshifts, Adaptive Packet Assembly, and Dynamic Transmit Level Adjustment (DTLA) in cellular networks
- Classes 1, 2, and 2.0 Fax send and receive operation at up to 14,400 bps

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.

- For data (non-fax) operation, serial-port speeds up to 230,400 bps (8-port modems) or 115,200 bps (4-port modems) using 4-to-1 V.42bis data compression
- V.42bis as well as MNP Class 5 Data Compression
- ITU-T protocols: V.21, V.22, V.22bis, V.23, V.32, V.32bis, V.34, and V.90
- Rockwell International's V.FC technology for 28,800 bps data rates
- Bell 212A and Bell 103 protocols
- V.42 error correction, including LAPM and MNP Class 2 to 4
- Trellis coded modulation for forward error correction
- Near and far end echo cancellation
- Auto dial, auto answer, manual dial, and manual answer
- Automatic power up diagnostics
- Multi-protocol auto- answering to answer incoming calls automatically using various modulation protocols
- Dial out support for PRI and channelized T1 calls
- 11-bit character support
- Hewlett Packard ENQ / ACK in serial mode
- Dial Access Security
- Remote access configuration and security (8-port digital modems only)
- Password Connection Security (PCS)
- Distinctive Ring
- 2-wire leased line operation (4-port analog modems only)

4000 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
- Point to Point Tunneling Protocol (PPTP)
- 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.

4000 Chassis Components

The 4000 system is designed to allow access to all major components and controls from both the front and rear of the unit. This section describes the 4000 system's major components, controls, and indicators.

Note: Illustrations shown throughout this guide show a chassis configured for PRI over T1 operation using two dual PRI cards and twelve 8-port digital modems. Other configurations appear differently.

Front Panel

The front of the 4000 chassis (see Figure 1-1) contains the following components:

- Power supply
- Power switch
- Power supply fan fail/chassis fan fail LEDs
- Modem cards containing power and signal LEDs, and reset and busy out buttons
- Up to two dual PRI main cards containing power, synchronous, frame slip, bipolar violations, and alarm LEDs; and a reset button

Note: All LEDs are either green or yellow. Previous versions may have red LEDs instead of yellow.

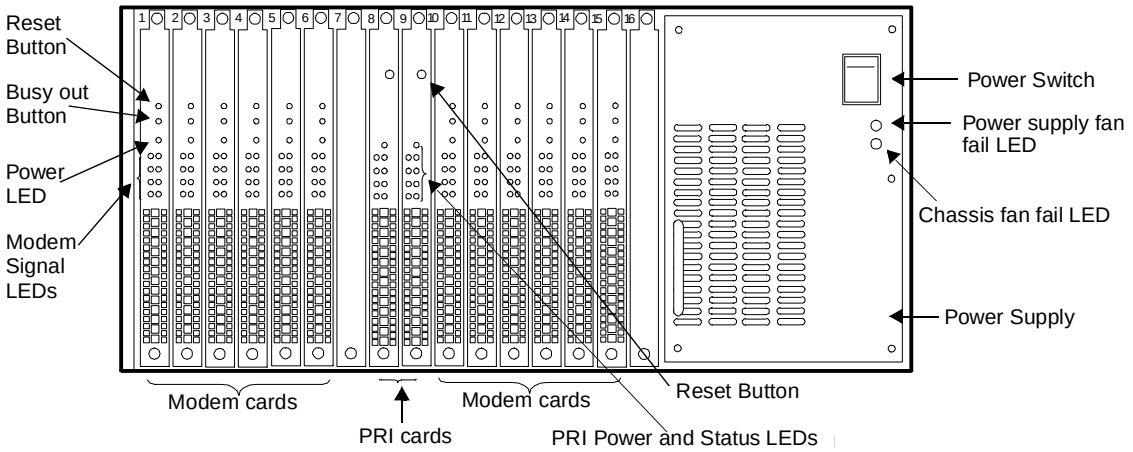


Figure 1-1. The 4000 Front Panel

Power Supply: Located on the right side of the unit, the power supply provides power to the PRI and modem cards.

CAUTION: At least one modem main card and one modem adapter card must be installed in your 4000 chassis ***before*** you turn on your power supply to ensure the correct minimum load is supplied. Failure to do so may result in a malfunction of your power supply.

Power Switch: The power supply switch turns the chassis **ON** (|) or **OFF** (**0**).

Power Supply Fan Fail/Chassis Fan Fail LEDs: The power supply fan fail and chassis fan fail LEDs, located on the face of the power supply, should be off when the power and chassis fans are operating properly. Each LED lights solid yellow when that specific fan failure occurs.

PRI Reset Button and Power LED: As shown in Figure 1-2, the front of each dual PRI card has one **RST** (reset) button and one **PWR** (power) LED.

PRI Status LEDs: As shown in Figure 1-2, the front of each dual PRI card has two columns of four LEDs each, marked as follows: **SY**, **SL**, **BP**, and **AL**.The left column of LEDs shows the status of the first PRI or T1/E1 circuit (Line 1) which corresponds to the top RJ48 connector found on the corresponding adapter card. The right column of LEDs shows the status of the second PRI or T1/E1 circuit (Line 2) which corresponds to the bottom RJ48 connector found on the corresponding adapter card. (See Figure 2-3 on page 2-11.)

When the PRI card is *not* operational, the AL LED is yellow. When the PRI card is operational, the PWR and SY LEDs are on (green) and all other PRI and T1/E1 LEDs should be off.

The RST button allows you to reset the PRI card.

➥ **CAUTION:** Resetting the PRI card automatically disconnects any modem calls in progress!

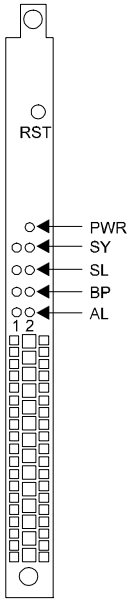


Figure 1-2. The PRI Main Card

Table 1-3 lists the LEDs and their functions.

Table 1-3. PRI Main Card LEDs

LED	*Name*	*Function*
PWR	Power	Lights green when the card is operational.
SY	Sync	Indicates synchronization. The card needs to synchronize itself with the PRI or T1 / E1 line so that the data stream is recognized and interpreted properly. If this is successful, the LED remains on.
SL	Frame and Slip errors	Indicates the frame buffer was re aligned or a frame error occurred. There are two methods of structuring the flow of data on a PRI or T1 / E1 line. The older technique is SuperFrame (SF), also known as D4. The newer method is Extended SuperFrame (ESF). The card must be configured for the same framing format being used by the PRI or T1 / E1 provider. When the network timing changes by 125 microseconds, the card makes a frame slip adjustment. This LED is normally off unless there are errors with the framing or timing.
BP	Bipolar violations	Indicates bipolar violations. There are two methods of encoding the stream of bits on the PRI or T1 / E1 line. The older technique is Alternate Mark Inversion (AMI); the newer method is Bipolar Eight Zero Substitution (B8ZS). With AMI, the coding of binary ones alternate in polarity. This convention is also adhered to by the B8ZS scheme, with one exception. With B8ZS, whenever eight successive binary zeros occur, they are replaced by a specific code that contains bipolar violations. That is, these codes have binary ones which do not alternate in polarity. This LED is normally off unless unexpected bipolar violations occur.
AL	Alarm	Indicates an alarm. When the PRI or T1 / E1 switch senses a major alarm condition, such as a loss of signal or framing synchronization, the card lights this LED. An example of this condition is when the transmit pairs from the card to the PRI or T1 / E1 switch are cut while the receive pairs are still functional, or when a PRI or T1 / E1 line is not plugged in.

Modem Reset and Busy Out Buttons: Two buttons [**RST** (Reset) and **B/O** (Busy Out)] are located on the front of each modem card. These buttons allow you to reset or busy out all modems on the modem card. During busy out operation, the modem signal LEDs flash yellow in the following sequence: 1 second on, 1 second off, 1 second on, 1 second off, etc.

Note: If you busy out a modem card using the Busy Out button, you must press the button again to remove the busy out state from the modem card. Issuing the AT*Y0 busy out modem command does not work.

Modem Signal LEDs: There are two types of modem main cards: 8-port and 4-port. The front of each 8-port modem card has the following LEDs: **PWR**, **A**, **B**, **C**, **D**, **E**, **F**, **G**, and **H**. The front of each 4-port modem card has the following LEDs: **PWR**, **A**, **B**, **C**, and **D**. The PWR LED is green when the modem card is operational. The A through H LEDs refer to the eight modems on the 8-port card, and A through D refer to the four modems on the 4-port card.

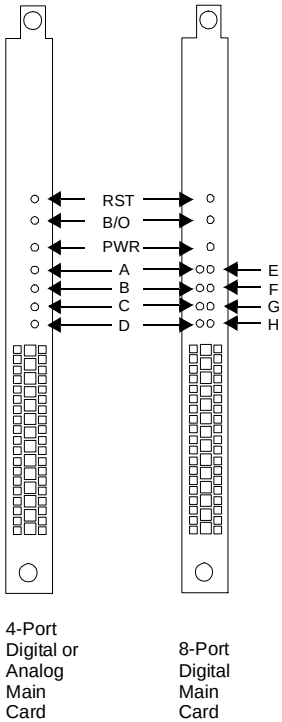


Figure 1-3. 4-Port and 8-Port Modem Main Cards

The modem signal LEDs can be different colors depending on their operation:

- At power up, these LEDs flash green, flash yellow, flash green, and then turn off.
- When a modem is idle, the LED is off.
- When a modem receives a Ring or goes off hook, the LED flashes green.
- Once a connection is established, the LED becomes solid green.
- If a modem signal LED is solid yellow or flashing yellow, this indicates either a software or hardware failure. Refer to the section, "Verifying the 4000 Chassis Installation" on page 2-33, for further information.

Note: A flashing yellow modem signal LED:
- — Is the default state when modems are powered up if nothing is connected to the serial port
- — May also indicate that the modem is busied out

Rear Panel

As shown in Figure 1-4, the rear of the 4000 chassis contains the following components:

- Up to two PRI adapter cards
- Modem adapter cards (digital adapter cards have RJ45 serial connectors as shown in Figure 1-4; analog adapter cards have RJ11 phone connectors and RJ45 serial connectors)
- Power connector
- Network management connector

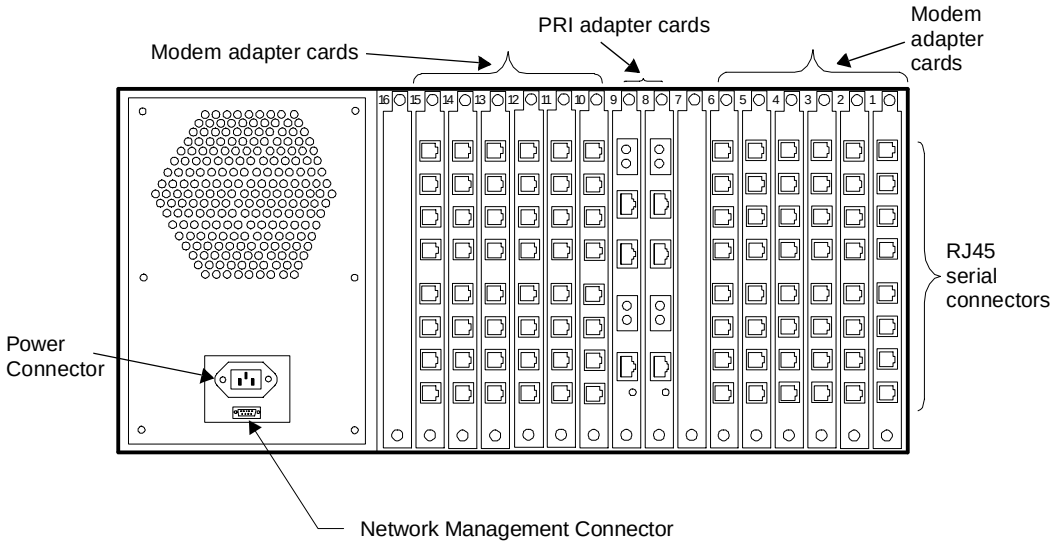


Figure 1-4. The 4000 Chassis Rear Panel

PRI Adapter Card: Provides the interface between digital modem cards and the telephone network. This card contains two sets of Bantam test jacks, two PRI or T1/E1 line jacks, one Ethernet jack, and one LED indicating whether an Ethernet connection is available.

Modem Adapter Cards: There are three types of modem adapter cards: 8-port digital, 4-port digital, and 4-port analog. 8-port **digital** modem adapter cards have eight RJ45 serial connectors, and 4-port **digital** modem adapter cards have four RJ45 serial connectors. The PRI card provides the connection to the Public Switched Telephone Network (PSTN) for the digital modem adapter cards. 4-port **analog** modem adapter cards have four RJ11 phone jacks for connection to the PSTN and four RJ45 serial connectors for connecting to terminal servers or other DTE devices.

Note: If you are adding a PRI card to your current chassis, you have to upgrade firmware to the latest code for **modems currently in service** to operate correctly with the PRI card. See page 2-24 for instructions.

Power Connector: Plug ***only*** the supplied power cord into this connector. This chassis' power rating label is located directly above the power connector.

Network Management Connector: Use this connector to attach a PC, terminal, or external modem to the chassis for local or remote access of the chassis for network management, and to run the console command line interface.

Note: Pinouts for all serial connectors are provided in Chapter 3, *Specifications and Pinouts*.

Compaq recommends that you use the Compaq 4000 Manager software (shipped with the chassis). It has an easy-to-use Windows interface that lets you obtain a graphical status of the PRI card and all modems in a particular chassis. For each PRI card, you can reboot it, set an IP address, create and update PRI, channelized T1, or channelized E1 configuration files, and perform an upgrade of PRI, channelized T1, or channelized E1 boot and main code. For modems, you can view a detailed status of their operating condition, perform a remote reset or busy out of one or all modems in a chassis, and issue AT commands to modify the configuration of a modem.

Refer to the *Compaq 4000 Manager User's Guide* for detailed information on installing and using the Manager software.

Chapter 2

Setting Up a Compaq Microcom 4000 Chassis

Introduction

This chapter describes how to set up and connect your 4000 chassis. It includes step by step installation instructions and procedures for testing the installation.

This chapter discusses:

- Planning your installation
- Unpacking the 4000 chassis and components
- Installing the chassis in a rack mount configuration (optional)
- Installing chassis components, such as the power supply; PRI and modem main and adapter cards; and filler panels
- Cabling the chassis
- Setting up the chassis for network management operation
- Testing your installation

↪ **WARNING:** In order to be compliant with the safety standard IEC 950, you must cover all unused slots in the rear of the chassis with filler panels. The filler panels prevent you from being harmed by contact with components carrying hazardous voltages on the chassis' interior. The Compaq part number for a set of eight filler panels is 167556-B21.

Planning Your Installation

Before you install your 4000 chassis, consider the location of the chassis, how much space you need for one or more chassis, and the distance between the chassis and the Data Terminal Equipment (DTE) to determine the length of cables needed.

To enhance the performance of the 4000 chassis system:

- Install the chassis in a clean area that is free from temperature extremes and dust.
- Locate the chassis no more than 6.5 feet (2m) from the DTE and within 6 feet (1.83m) of a grounded AC power outlet.

Note: 6.5 feet (2m) is the recommended distance when data is passed at 230.4K bps. 10 feet (3m) is the recommended distance when data is passed at 115.2K bps. At lower baud rates, a longer cable can be used.

- Install multiple chassis in a rack (refer to "Rack Mounting Considerations" below).
- Leave at least one rack space (1.75 inches / 4.4 cm) between multiple chassis in a rack.

There are three types of modem cards: 8-port digital, 4-port digital, and 4-port analog. Table 2-1 indicates how many RJ45 serial cables and RJ11 phone cables you will need to set up the chassis. For your convenience, the pinouts for RJ45-to-DB25 (EIA232) and RJ45-to-DB9 cables are listed starting on page 3-6.

Table 2-1. Required Cables

Modem Adapter Type	***Required Number of RJ45 Serial Cables***	***Required Number of RJ11 Phone Cables***
8-port digital	8 (one for each modem on card)	Not Applicable
4-port digital	4 (one for each modem on card)	Not Applicable
4-port analog	4 (one for each modem on card)	4 (one for each modem on card)

Note: Refer to the Compaq Microcom 4000 System Cabling White Paper, found on Compaq Microcom's World Wide Web, ftp, and FAX*connection* sites, for information on common cables sold by Compaq.

Power Cord Set Requirements

The automatic line switching feature of your 4000 chassis permits it to operate from any line voltage between 100 to 240 volts AC.

The power cord set (appliance coupler, flexible cord, and wall plug) you received with your 4000 meets the requirements for use in the country where you purchased your equipment.

Power cord sets for use in other countries must meet the requirements of the country where you use the 4000 chassis. For more information on power cord set requirements, refer to Table A-1 on page A-3 or contact your authorized Compaq Dealer.

General Requirements

The requirements listed below are applicable to all countries:

1. The length of the power cord set must be at least 5.00 feet (1.5m) and a **maximum of 6.56 feet (2.0m)**.
2. All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country where the power cord set will be used.
3. The power cord set must have a minimum current capacity of 10A and a nominal voltage rating of 125 or 250 volts AC, as required by each country's power system.
4. The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with appliance inlet on the 4000 chassis.

Rack Mounting Considerations

The 4000 chassis fits into a standard EIA approved, 19 inch rack. Once mounted, its design allows you full access to rear and front components.

Two sets of threaded holes on the left and right sides of the chassis allow you to attach the chassis to a rack, in either a front or center mount configuration. You also receive two extender brackets with retaining screws in the 4000 chassis shipping container.

When installing the 4000 chassis in a rack mount configuration:

- Leave one rack space (1.75 inches / 4.4 cm) between each chassis installed in the rack to maintain proper ventilation and performance.
- Ensure both the rack and chassis are level.
- Mount the chassis securely in the rack *first*, and then install components.
- Install rear chassis components *first*, then install front components.

Modem Port and Slot Information

The total number of modem ports available in your 4000 system and the slots they are installed in depends on the:

- Type of operation you will use (PRI, channelized T1, channelized E1, or analog)
- Types of modem card(s) (4- or 8-port digital, or 4-port analog) you install

Table 2-2 describes your various options when installing one type of modem card. If necessary, you can also mix 4-port digital and 8-port digital cards within one PRI, channelized T1, or channelized E1 span.

Table 2-2. Modem Type and Slot Position Options

Interface	*Modem Type*	*Slot Positions: PRI/CT1/CE1*	*Slot Positions: Modems*	*Maximum Number of Modem Ports*
PRI over T1	4-port digital	8	1 to 7, 9 to 13	46[2]
	8-port digital	8	1 to 6	46[2]
	8-port digital	8 & 9[1]	1 to 6, 10 to 15	92[2]
PRI over E1	4-port digital	8	1 to 7, 9 to 16	60
	8-port digital	8	1 to 7, 9	60
	8-port digital	8 & 9[1]	1 to 7, 10 to 16	112

Table 2-2. Modem Type and Slot Position Options (Continued)

Interface	*Modem Type*	*Slot Positions: PRI/CT1/CE1*	*Slot Positions: Modems*	*Maximum Number of Modem Ports*
Channelized T1	4-port digital	8	1 to 7, 9 to 13	48
	8-port digital	8	1 to 6	48
	8-port digital	8 & 9[1]	1 to 6, 10 to 15	96
Channelized E1	4-port digital	8	1 to 7, 9 to 16	60
	8-port digital	8	1 to 7, 9	60
	8-port digital	8 & 9[1]	1 to 7, 10 to 16	112
Analog	4-port analog	N / A	1 to 16	64

[1] Indicates there are two dual PRI cards installed.

[2] The maximum number of modem ports used for PRI provisioned over T1 is based on 23 B channels per span. PRI uses one channel per span for management purposes.

Unpacking the 4000 Chassis

Unpack the 4000 system carton(s) and inspect the contents. Refer to the checklist that follows to ensure you received the correct components.

The 4000 chassis is wrapped in reusable shock absorbent packing material. Save the carton and packing material in case you have to ship or store the chassis in the future.

Remove all shipping labels from the outside of the box(es). As you unpack, you will find registration cards. Please fill these in and return to Compaq to ensure you have access to support services. Keep the shipping labels you removed in a folder or envelope for your records.

4000 Chassis Checklist

Depending on your system configuration and components ordered, your 4000 chassis ships with some or all of the following:

The Chassis box contains:

- ❑ Compaq Microcom 4000 chassis (with mid-plane and chassis fan installed)
- ❑ Two extender brackets with retaining screws (two screws for each bracket)
- ❑ DB9-to-DB9 DTE serial cable to connect a PC to the chassis' network management port
- ❑ DB9-to-RJ45 null modem cable adapter and an RJ45-to-RJ45 cable to connect a modem to the chassis' network management port
- ❑ *Compaq Microcom 4000 Installation Guide* (this guide)

- ❏ *Compaq Microcom 4000 Quick Setup*
- ❏ Compaq 4000 Manager software (1 diskette)

The Power Supply box contains:

- ❏ Auto-ranging power supply (110-250V) with four retaining screws
- ❏ Power cord

The PRI/Channelized T1/Channelized E1 box (optional) contains:

- ❏ One dual PRI main card and one adapter card with mounting brackets and retaining screws
- ❏ Two RJ48 cables for PRI, channelized T1, or channelized E1 operation

The Modem box contains:

- ❏ One or more modem adapter cards with mounting brackets and retaining screws

Optionally, you may need:

- ❏ RJ11-to-RJ11 phone cords (for analog operation)
- ❏ RJ45-to-DB25 (EIA232) serial DTE cables
- ❏ One Ethernet RJ45 cable
- ❏ One or more 8-pack filler panel(s) with retaining screws (two screws for each panel)

If any item is missing or damaged, contact your dealer or shipper immediately. If you have further concerns about damaged or missing parts, contact your dealer or Compaq. Refer to Appendix B, *Customer Support*, for information about Customer Support options.

What You Need to Provide

Before installing the 4000 chassis, make sure you have the following tools and equipment on hand:

- A small Phillips screwdriver
- A small flat tip screwdriver
- Scissors or pocket knife to open static wrappers
- Rack retaining screws. If you are rack mounting one or more chassis, ensure you have the correct number of retaining screws to secure the chassis in the rack. These screws are not provided by Compaq.

Before connecting the 4000 chassis to the telephone network, you need to supply:

- For PRI, channelized T1, or channelized E1 operation, up to four PRI or T1/E1 lines (see the "Ordering PRI, Channelized T1, or Channelized E1 Service" section that follows)
- For analog operation, a separate phone line for each analog modem (four per card)
- For Compaq 4000 Manager operation, a PC running Windows 95 or Windows NT 4.0

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 2-3. PRI, Channelized T1, and Channelized E1 Line Options

Feature	*PRI over T1 Options (Defaults shown in bold)*	*PRI over E1 Options (Defaults shown in bold)*	*Channelized T1 Options (Defaults shown in bold)*	*Channelized E1 Options (Defaults shown in bold)*
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

Switch Settings

Your PRI card is shipped from the factory set to common PRI over T1 or PRI over E1 default settings. You need to change the switch settings only if your PRI or T1/E1 line uses different settings.

Table 2-4 lists the switch default settings.

Table 2-4. PRI Switch Factory Default Settings

PRI Over T1	***PRI Over E1***
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 PRI over E1 mode. You do not need to select it via switches.

If you want to change switch settings, refer to either the *PRI, Channelized T1, and Channelized E1 User's Guide* or the Compaq 4000 Manager's on line help for instructions. 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** also 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.

Installing the 4000 Chassis

This section provides an overview of the steps needed to set up and install the 4000 chassis. Detailed instructions for each step follow this overview.

1. Rack mount the chassis (optional).
2. Insert and secure the PRI adapter card(s) and attach cables.

   Note: This step is optional if you are installing an analog-only 4000 chassis.
3. Insert and secure modem adapter cards and attach cables.
4. Attach filler panels for unused modem card slots on the rear of the chassis.
5. If your PRI configuration is different than the default settings, change the switches on the PRI card now. Refer to either the *Quick Setup,* the *PRI, Channelized T1, and Channelized E1 User's Guide,* or the Compaq 4000 Manager's on line help for complete settings.

   Note: This step is optional if you are installing an analog-only 4000 chassis.

6. Insert and secure PRI main card(s).

   Note: This step is optional if you are installing an analog-only 4000 chassis.

7. Insert and secure modem main cards.
8. Attach filler panels for unused modem card slots on the front of the chassis.
9. Insert and secure the power supply.
10. Attach the power cord and network management cable to the rear of the chassis.
11. Start the 4000 chassis.
12. This step is not required for a new chassis. If your modems' firmware revision is 3.1.x or earlier (for 4-port) or 4.1.x or earlier (for 8-port), you must upgrade the modem firmware to work with PRI, T1, or E1 operation.

    Note: This step is optional if you are installing an analog-only 4000 chassis.

13. This step is not required for a new chassis. If your PRI card's firmware revision is 1.7.x or earlier, you must upgrade the PRI, channelized T1, or channelized E1 firmware.

    Note: This step is optional if you are installing an analog-only 4000 chassis.

14. This step is not required for a new chassis. If you are installing a Channelized E1 card into an existing chassis, you need to upgrade to version 4.0 of the Compaq 4000 Manager software.
15. Optionally, if your T1 line does not use E&M Wink signaling (default), change the signaling value.

    Note: This step is optional if you are installing an analog-only, PRI, or channelized E1 4000 chassis.

16. Optionally for channelized E1 operation, you must set your channelized E1 line to loop start signaling.

    Note: This step is optional if you are installing an analog-only, PRI, or channelized T1 4000 chassis.

17. Configure the PRI card(s) to route digital calls to a comm server.

    Note: This step is optional if you are installing an analog-only, channelized T1, or channelized E1 4000 chassis.

1. Rack Mount the Chassis

This step is optional. If you are not installing the chassis in a standard rack, go to "2. Insert and Secure the PRI Adapter Card and Attach Cables," on page 2-9.

If you will install the chassis in a standard rack, you need to attach the supplied extender brackets to the left and right sides of the chassis, as follows:

1. Position the chassis on a flat surface with the front of the unit facing forward.

2. Position the rack mount extender brackets over one of the two sets of threaded holes on the right of the chassis, depending on whether you will center or front mount the chassis in the rack. Refer to Figure 2-1.
3. Using a Phillips screwdriver, secure the extender bracket to the side of the chassis using the two Phillips retaining screws provided.
4. Repeat to install the remaining extender bracket on the left side of the chassis.
5. After you have installed both extender brackets, secure the 4000 chassis in the rack. Follow the recommended installation notes in the section, "Rack Mounting Considerations," starting on page 2-3. For specific installation instructions for your rack, refer to the manufacturer's instructions.

Note: Rack retaining screws *are not* provided by Compaq. Ensure you have the correct number of retaining screws to secure the chassis in the rack.

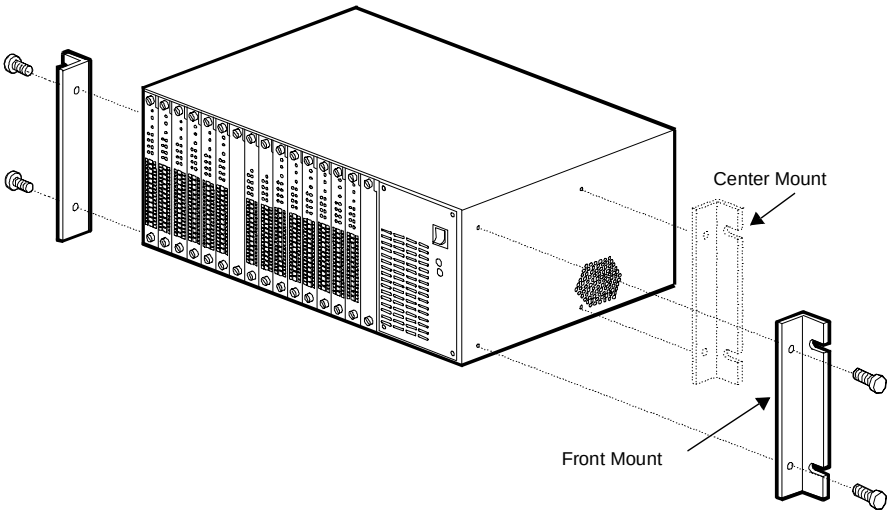


Figure 2-1. Attaching Rack Mount Extender Brackets

2. Insert and Secure the PRI Adapter Card and Attach Cables

This step is optional. If you are installing only 4-port analog modems in your chassis, skip to "3. Insert and Secure Modem Adapter Cards and Attach Cables," on page 2-12.

To insert the PRI adapter card into the rear of the chassis:

1. Remove the PRI adapter card from its packaging.

➥ **CAUTION:** Follow static protection procedures when handling adapter cards.

2. Starting at slot 8, hold the card by the edges with the rear panel facing towards you and align the card with the metal guides. Refer to Figure 2-2.

Note: Compaq requires that you insert the PRI card in slot 8, or slots 8 and 9 if you are installing two PRI cards. Using another slot may require you to reconfigure the modem card slot assignments.

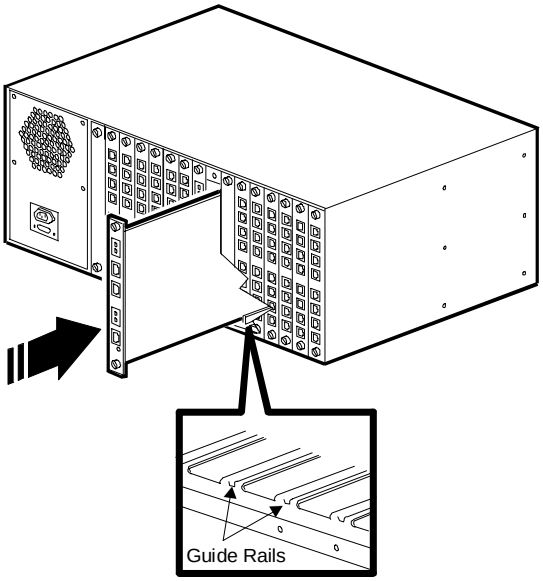


Figure 2-2. Inserting the PRI Adapter Card

3. Gently push the card along the guides into the chassis. The card is fully seated when rear connectors on the card mate with the mid-plane connectors. **Do not force the card**. It should slide easily on the rails. If insertion is difficult, remove the card and re align it with the guide rails.

   Continue to apply pressure until the front panel of the PRI adapter card is flush with the rear of the chassis.

4. Secure the retaining screws at the top and bottom of the card by turning them in a clockwise direction.

5. Attach one RJ48 cable to the Line 1 RJ48 jack as shown in Figure 2-4. Attach a second RJ48 cable to the Line 2 RJ48 jack. The connectors on the PRI adapter card are shown in Figure 2-3.

   The two sets of Bantam monitoring jacks (**MJ IN**, **MJ OUT**) are for connecting a PRI or T1 test set monitor cable.

6. The bottom jack on the PRI adapter card is for an RJ45 Ethernet cable. Attach an Ethernet cable into the Ethernet connector (this is required for making digital calls over PRI; otherwise, it is optional). There is also an LED (labeled **Link**) that lights to indicate when the Ethernet connection is operational. The Ethernet connection can be used to perform a remote ftp session to configure the PRI card.

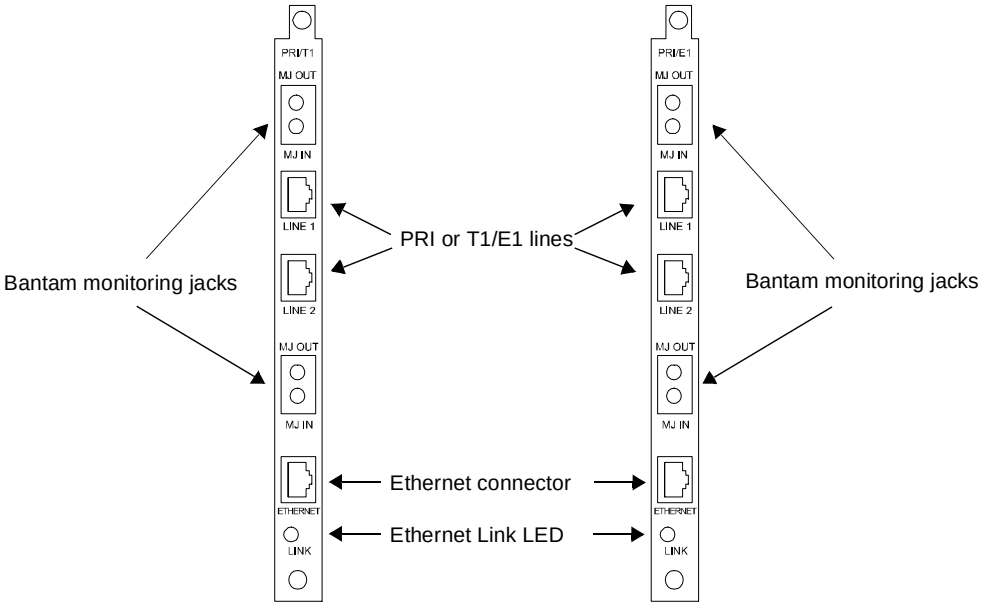


Figure 2-3. The PRI Adapter Cards

Note: If you add PRI main and adapter cards into an **analog chassis already in service**, you must replace analog modem adapter cards with digital modem adapter cards in order to operate correctly with a PRI card. If you have any empty slots, you can keep analog modem cards in the chassis for regular analog PSTN connections, along with the digital modem cards. If you do not fill the chassis, you must attach filler panels over the empty slots in the rear of the chassis. Refer to the section, "4. Attach Rear Filler Panels," on page 2-16 for instructions.

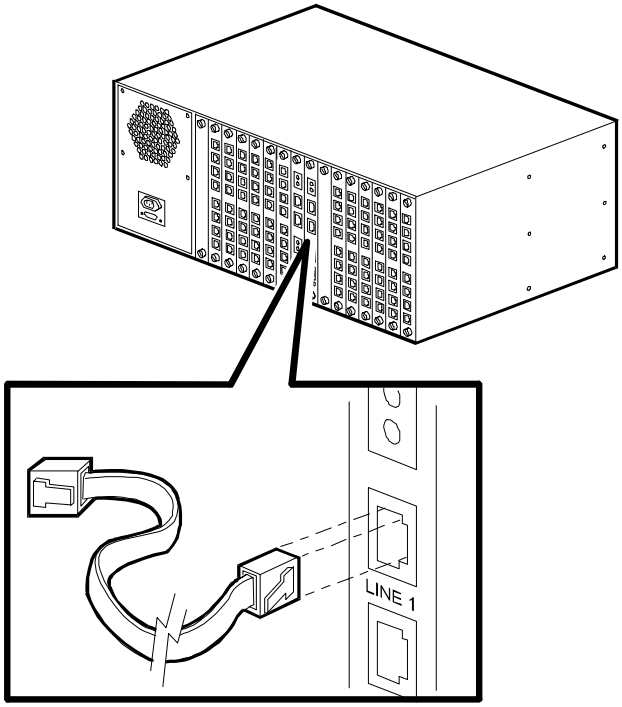


Figure 2-4. Attaching the Cables to the PRI Adapter Card

7. If you are installing two PRI cards, repeat steps 1 through 6, but install the second card in slot 9.

3. Insert and Secure Modem Adapter Cards and Attach Cables

There are three types of modem adapter cards: 8-port digital and 4-port digital for PRI, channelized T1, or channelized E1 operation; and 4-port analog for PSTN operation. See Figure 2-5.

You will insert digital modem adapter cards starting at slot 1 in the rear of the chassis and then attach RJ45 serial cables to the rear of each adapter card. After digital adapters are installed, you will insert analog modem adapter cards into any empty slots in the rear of the chassis and then attach phone cords and serial cables to the backplane of each analog adapter card.

Note: For chassis performing analog-only operation, insert analog modem adapter cards starting at slot 1 and work towards the middle of the chassis.

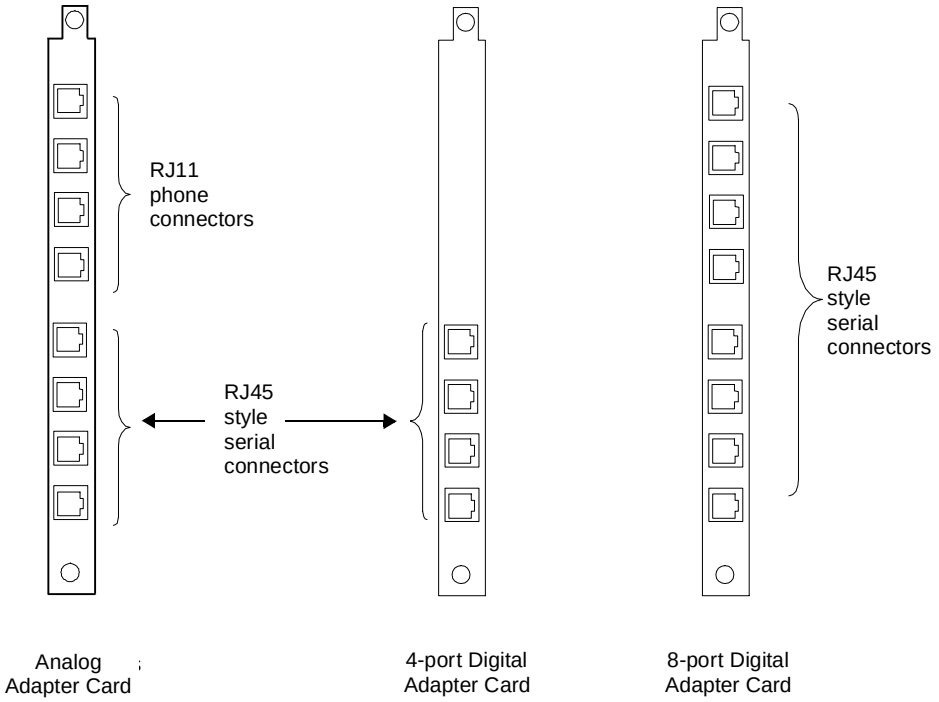


Figure 2-5. Analog and Digital Modem Adapter Cards

To insert modem adapter cards and attach cables:

1. Remove the modem adapter card from its packaging.

➥ **CAUTION:** Follow static protection procedures when handling modem adapter cards.

2. Starting at slot 1, hold the modem adapter card by the edges with the rear panel facing towards you and align the card with the metal guides of the slot in which you wish to install the card. Refer to Figure 2-6.

➥ **Important:** You must insert digital modem cards starting at slot 1 and working towards the middle of the chassis, until all cards are installed. For the remaining slots, you can also install analog modem adapter cards along with the digital cards. If you do not fill the chassis, you must attach filler panels over the empty slots in the rear of the chassis. Refer to the section, "4. Attach Rear Filler Panels," on page 2-16 for instructions.

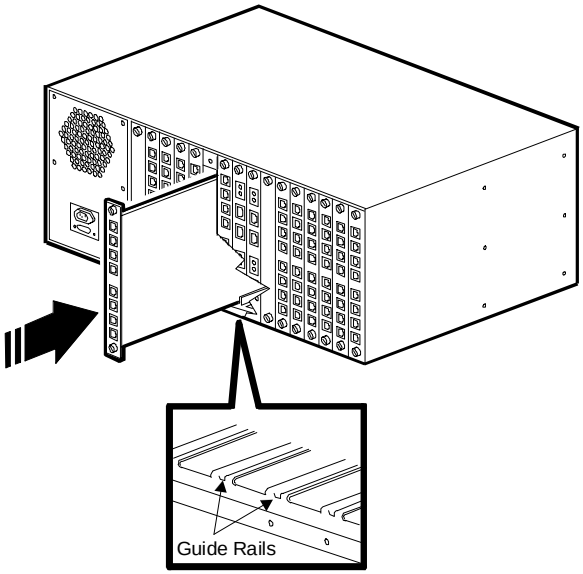


Figure 2-6. Inserting Modem Adapter Cards

3. Gently push the card along the guides into the chassis. The card is fully seated when rear connectors on the card mate with the mid-plane connectors. **Do not force the card**. It should slide easily on the rails. If insertion is difficult, remove the card and re align it with the guide rails.

   Continue to apply pressure until the front panel of the adapter card is flush with the rear of the chassis.

4. Secure the retaining screws at the top and bottom of the card by turning them in a clockwise direction.

5. Repeat for each modem adapter card to be installed in the chassis.

6. Once you have installed all digital adapter cards, you need to attach serial cables by plugging RJ45 cables into the RJ45 style connectors labeled **A**, **B**, **C**, **D**, **E**, **F**, **G**, and **H** (for 8-port) or **A**, **B**, **C**, and **D** (for 4-port) of each adapter card. See Figure 2-7. Attach each serial connector to a terminal server or other DTE device.

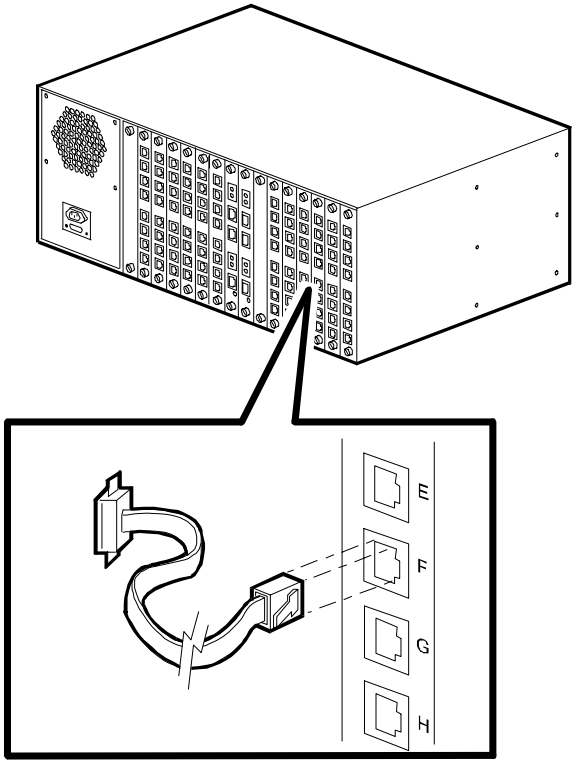


Figure 2-7. Connecting an RJ45 Serial Cable

Tip: Compaq recommends labeling each cable that is connected to the adapter cards and tying each group of modem cables together. This simplifies upgrade and troubleshooting procedures.

7. If you installed 4-port analog adapter cards, you also need to attach phone cords. Plug telephone connector cables (RJ11) into the RJ11 receptacles labeled **A**, **B**, **C**, and **D** at the top of each adapter card. Use a separate phone line for each receptacle. Attach the other end of each phone line to wall jacks. See Figure 2-8.

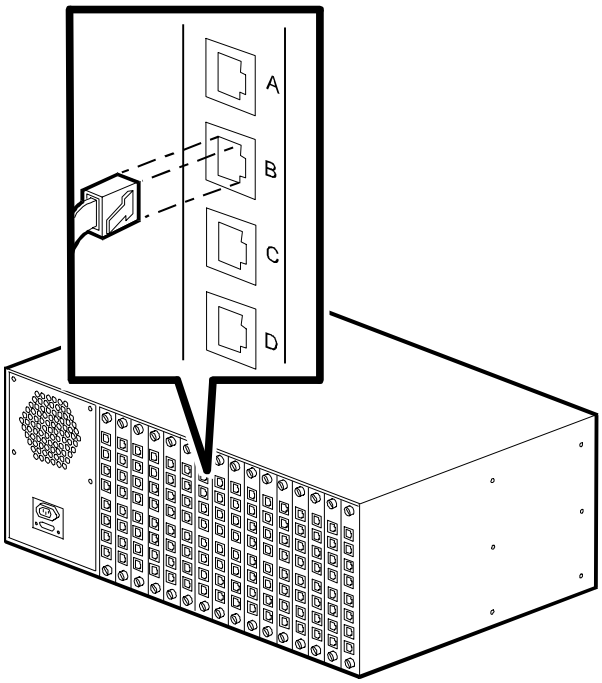


Figure 2-8. Attaching RJ11 Phone Cords

Tip: Compaq recommends labeling each cable that is connected to the adapter cards and tying each group of modem cables together. This simplifies upgrade and troubleshooting procedures.

4. Attach Rear Filler Panels

Filler panels are required to cover unused slots in the rear of the chassis. The panels help to ensure that adequate cooling is maintained in the chassis. Compaq sells the panels and retaining screws in packages of eight. If you didn't receive filler panels, contact your distributor or Compaq.

➥ **WARNING:** In order to be compliant with safety requirement IEC950, you must cover all unused slots in the rear of the chassis with filler panels. These filler panels prevent you from being harmed by contact with components on the chassis' interior due to hazardous voltages. The Compaq part number for a set of eight filler panels is 167556-B21.

How Many Filler Panels Do I Need?

You **must cover all unused rear slots** with filler panels for optimum chassis operation. Compaq recommends you cover all unused **front slots** as well. However, if you find it necessary to leave some front slots uncovered, use the following guidelines to keep the operating environment within specified limits:

Important: If you install more than 8 cards (PRI and modem) in the chassis, you must install filler panels on all the unused slots in both the front and rear of the chassis or you will void your warranty.

- For PRI, channelized T1, or channelized E1 operation, if you install 8 or fewer cards in the chassis, install the modem cards starting at slot 1 and work towards the middle of the chassis. Install one PRI card in slot 8. Install two PRI cards in slots 8 and 9. You do not have to cover the unused slots in the front of the chassis with filler panels, but you must cover the unused slots in the rear of the chassis.
- For analog operation, if you install 4 or fewer cards in the chassis, install the cards in any four slots. Compaq suggests you start with slot 1 and work up to slot 4. You do not have to cover the unused slots in the front of the chassis with filler panels, but you must cover the unused slots in the rear of the chassis.
- For analog operation, if you install 8 or fewer cards in the chassis, install the cards in alternating slots (for example, slots 1, 3, 5, etc.). Compaq suggests you start with slot 1. You do not have to cover the unused slots in the front of the chassis with filler panels, but you must cover the unused slots in the rear of the chassis.

Installing Filler Panels

1. Remove the filler panels from their wrappers. Set the wrappers aside.
2. Position one filler panel in front of the slot opening you wish to cover. Cutouts in the top and bottom of the panel should align with threaded holes in the front and rear of the chassis. See Figure 2-9.

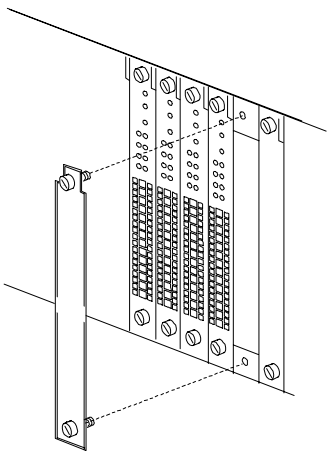


Figure 2-9. Installing Filler Panels

3. Secure the retaining screws at the top and bottom of the filler panel by turning them in a clockwise direction.

5. Set PRI Main Card DIP Switches

Notes: For fast configuration, Compaq recommends using DIP switches.

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 either the *PRI, Channelized T1, and Channelized E1 User's Guide* or the Compaq 4000 Manager's on line help for details.

The PRI card ships with 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. The switch defaults are:

Table 2-5. PRI DIP Switch Factory Default Settings

PRI Over T1 Operation	***PRI Over E1 Operation***
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 PRI over E1 mode. You do not need to select it via switches.

For channelized T1 or channelized E1 operation, set the switches as follows. If your PRI or T1/E1 line uses different settings, refer to either the *PRI, Channelized T1, and Channelized E1 User's Guide* or the Compaq 4000 Manager's on line help for complete switch settings.

Table 2-6.SW2 Switches

SW2 Switches	***Positions***	***Description***
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 2-7. SW3 Switches

SW3 Switches	*Positions*			*Description*
1,2,3	Closed	Closed	Closed	T1, bit robbing (Channelized T1 operation)
	Open	Open	Closed	PRI over 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 Che1SigVar line. If you need to add modem cards, you must change the ModemPool line. Refer to either the *PRI, Channelized T1, and Channelized E1 User's Guide* or the Compaq 4000 Manager's on-line help for instructions.

6. Insert and Secure the PRI Main Card

This step is optional. If you are installing only 4-port analog modems in your chassis, skip to "7. Insert and Secure the Modem Main Cards," on page 2-20.

To insert the PRI main card in the front of the chassis:

1. Remove the PRI main card from its packaging.

CAUTION: Follow static protection procedures when handling PRI cards.

2. Starting at slot 8, hold the card by the edges with the front panel facing towards you and align the card with the metal guides. Refer to Figure 2-10.

Note: You must insert the PRI card in slot 8, or slots 8 and 9 if you are installing two PRI cards. Using different slots may require you to reconfigure the modem card slot assignments.

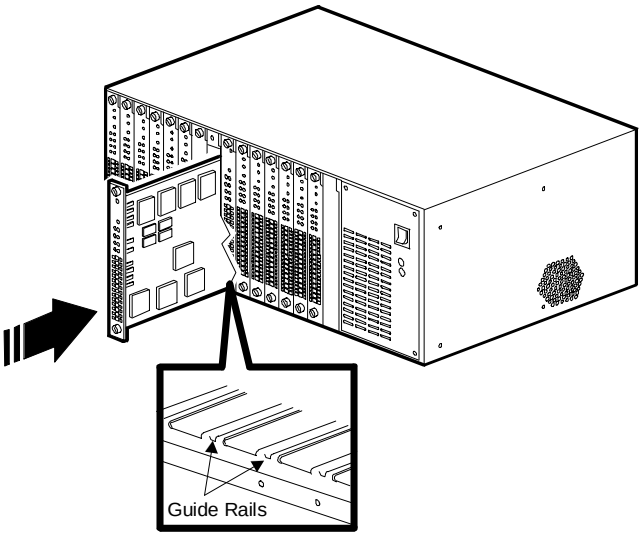


Figure 2-10. Inserting the PRI Main Card

➥ **CAUTION:** The PRI main card must be inserted in the front slot that matches the rear slot where the adapter card was inserted or damage may occur to the card. DO NOT install the PRI main card in a front slot that has a modem adapter card in the associated rear slot.

3. Gently push the card along the guides into the chassis. The card is fully seated when rear connectors on the card mate with the mid-plane connectors. **Do not force the card**. It should slide easily on the rails. If insertion is difficult, remove the card and re align it with the guide rails.

   Continue to apply pressure until the front panel of the card is flush with the front of the chassis and the cutouts on the front panel align with the threaded holes on the front of the chassis.

4. Secure the retaining screws at the top and bottom of the PRI main card by turning them in a clockwise direction.

5. If you are installing two PRI cards, repeat steps 1 through 4, but install the second card in slot 9.

7. Insert and Secure the Modem Main Cards

To insert modem main cards into the front of the chassis:

1. Remove the modem card from its packaging.

➥ **CAUTION:** Follow static protection procedures when handling modem cards.

2. Starting at slot 1, hold the modem card by the edges with the front panel facing towards you and align the card with the metal guides of the slot in which you wish to install the card. Refer to Figure 2-11.

Important: Compaq requires that you insert digital modem cards starting at slot 1 and work up to the PRI card, continuing on the other side of the PRI card if necessary, until all cards are installed. For the remaining slots, you can also install analog modem adapter cards along with the digital cards. If you do not fill the chassis, you must attach filler panels over the empty slots in the rear of the chassis to ensure adequate cooling of the chassis. Refer to the section, "4. Attach Rear Filler Panels," on page 2-16 for instructions.

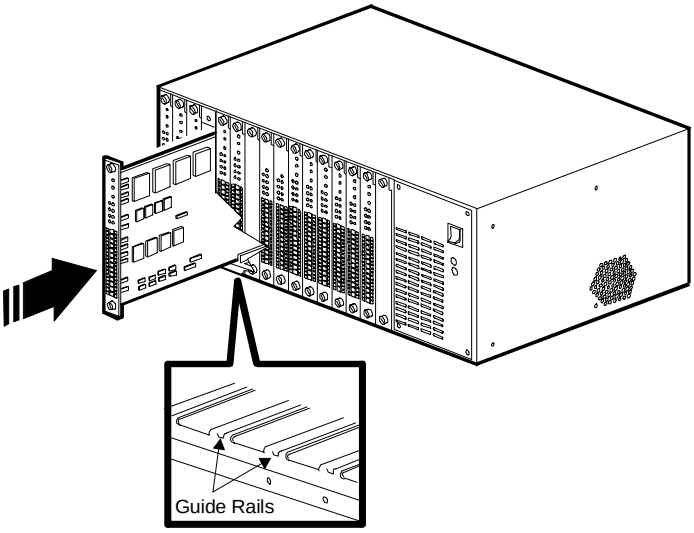


Figure 2-11. Inserting Modem Main Cards

3. Gently push the card along the guides into the chassis. The card is fully seated when rear connectors on the card mate with the mid-plane connectors. **Do not force the card**. It should slide easily on the rails. If insertion is difficult, remove the card and re align it with the guide rails.

   Continue to apply pressure until the front panel of the card is flush with the front of the chassis and the cutouts on the front panel align with the threaded holes on the front of the chassis.

4. Secure the retaining screws at the top and bottom of the modem card by turning in a clockwise direction.

5. Repeat for each modem card to be installed in the chassis.

8. Attach Front Filler Panels

Attach filler panels over any unused slots in the front of the chassis. Refer to page 2-16 for instructions.

9. Insert and Secure the Power Supply

To insert the power supply in the right front of the chassis:

➥ **CAUTION:** At least one modem main card and one modem adapter card must be installed in your 4000 chassis ***before*** you turn on your power supply to ensure the correct minimum load is supplied. Failure to do so may result in a malfunction of your power supply.

1. Remove the power supply from its protective packaging. Set the packaging aside.
2. Using a Phillips screwdriver, remove the four power supply screws from the front of the chassis.
3. While grasping the handle on the front of the power supply with one hand and supporting the bottom of the supply with your other hand, align the power supply with the metal guides of the power supply slot. See Figure 2-12.

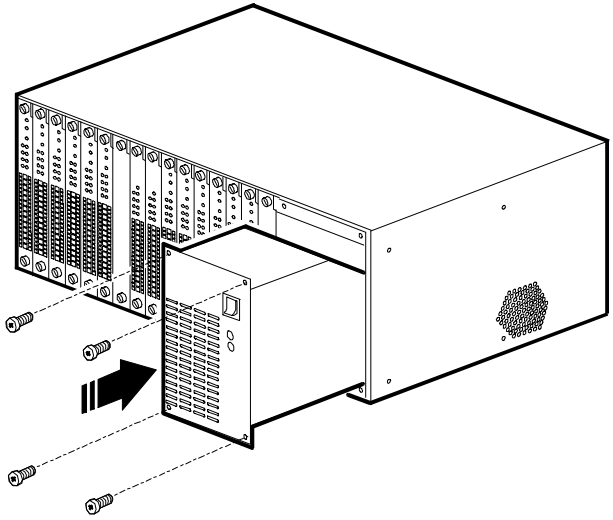


Figure 2-12. Inserting and Securing the Power Supply

4. Gently push the power supply into the chassis. The power supply is fully seated when the connector on the rear of the power supply mates with its mid-plane connector. **Do not force the power supply.** It should slide easily into the slot. If insertion is difficult, remove the power supply and re-align it with the guide rails. Leave it turned Off.
5. One at a time, insert each of the four Phillips screws through the threaded holes in the front of the power supply. Tighten using a Phillips screwdriver. See Figure 2-12.

10. Attach Power and Network Management Cables

To attach the power and network management cables:

1. Plug the female end of the power cord into its receptacle on the rear of the power supply. See Figure 2-13.
2. Plug the male end of the cable into a grounded AC power outlet.
3. If you are attaching a local PC or modem to the chassis for network management, attach a DB9 connector of a serial network management cable (Compaq supplies a DB9 to DB9 serial cable with your chassis) to its connector on the rear of the power supply. See Figure 2-13.
4. Using a flat tip screwdriver, secure the flat head screw on each side of the connector by turning each screw in a clockwise direction.
5. Attach the other end of the serial network management cable to a serial port on a PC with Windows 95 or Windows NT 4.0 running the Compaq 4000 Manager.

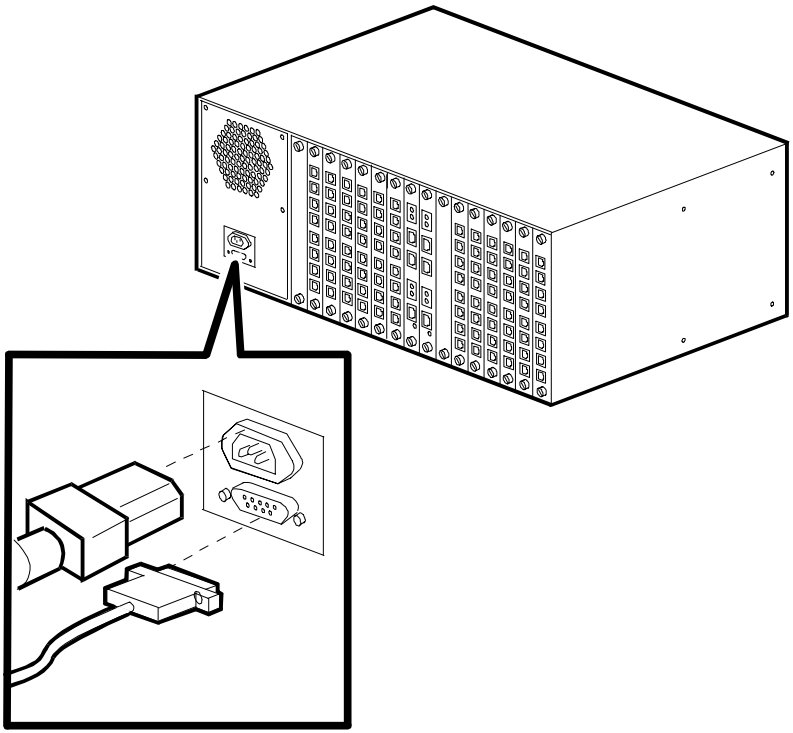


Figure 2-13. Attaching Power and Network Management Cables

11. Start the 4000 Chassis

To start the 4000 chassis, simply press the power switch on the front of the power supply to the **ON (|)** position.

12. Upgrade Modem Firmware

This step is not required if you are installing a new chassis. The modems already contain the correct firmware.

If your modems' firmware revision is 3.1.x or earlier (for 4-port) or 4.1.x or earlier (for 8-port) and if you are adding the following to your current analog chassis, you must upgrade **all** your modems' firmware to operate with the PRI card(s):

- An additional Channelized T1 card
- One or two PRI cards

A new modem firmware file is located on your Compaq 4000 Manager diskette shipped with the PRI card. It is also available on Compaq Microcom's BBS*connection* and World Wide Web sites.

Perform one of the following to check the modem card's firmware version:

- Issue the **AT%V1** command
- In the Compaq 4000 Manager's Chassis Snapshot window, point the mouse at the modem, click the right mouse button, and choose **Properties**
- In the Compaq 4000 Manager's Chassis Snapshot window, point the mouse at the modem, and double-click the left mouse button
- In the Compaq 4000 Manager's Chassis Snapshot window, select the modem, and from the main menu choose **View→Modem→Boot Code** or **View→Modem→Main Code**.

↪ **Important:** If you will use the Compaq 4000 Manager software, make sure you install version 4.0 of this software. This is found on your Compaq 4000 Manager diskette shipped with the PRI card. Refer to the *Compaq 4000 Manager User's Guide* for installation instructions.

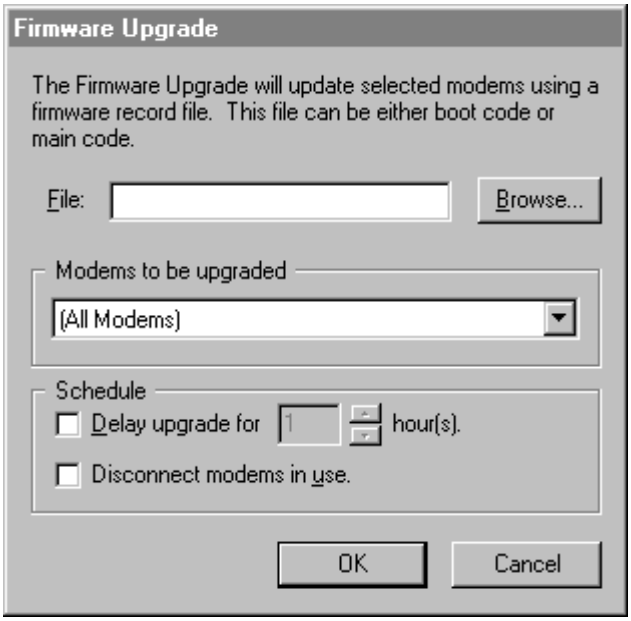
You can upgrade the firmware for one or more modems in a 4000 chassis by using the Compaq 4000 Manager's group firmware upgrade feature, or a data communications software package. The following section describes using the Compaq 4000 Manager to upgrade the modem's firmware. To use a data communications software package, refer to either the Compaq 4000 Manager's on line help or the *Modem User's Guide* for details.

↪ **CAUTION:** If you use a 4000 chassis modem to perform remote management, do not upgrade that modem while connected. If you do, the remote connection will drop.

To perform a global firmware upgrade to all modems:

1. In the Compaq 4000 Manager's Chassis Snapshot window, select one or more modems by single clicking on them. To select an entire modem card, click on the chassis slot number. You can also create a modem group, and then perform the upgrade on the group.
2. In the Chassis Snapshot window, either:
   - Click the **Firmware Upgrade** button on the toolbar, or
   - Choose **Group→Firmware Upgrade** from the menu bar.

   The Firmware Upgrade dialog appears.



3. Insert the Compaq 4000 Manager diskette in drive A: (substitute another drive letter, if necessary).
4. Click the **Browse...** button, change to drive A: (substitute another drive letter, if necessary), select the ***.cm4** file, and click **OK**. Upgrade boot code first, and then main code.
5. In the **Modems to be upgraded**: section, if you are upgrading a group, choose the group from the drop down list. If you selected specific modems, choose **(selected modems)** from the drop down list.
6. To wait to perform the upgrade, select the **Delay upgrade for *x* hours** checkbox and choose how many hours you want to wait before the upgrade is performed. You can choose from 1 to 12 hours.

7. If modems are in use and you want to disconnect them, select the **Disconnect modems in use** checkbox. Otherwise, if this box is not checked, modems that are connected are not upgraded when the upgrade operation starts and you will need to upgrade them at a later time. Record which modems are not upgraded, since all modems on a card must be upgraded to the latest firmware or the entire card will not function correctly.
8. Click **OK**.

   The Firmware Upgrade Status dialog appears, and the modems being upgraded are busied out (the LEDs flash Yellow). This dialog contains a status bar indicating upgrade progress, identifies the modems being upgraded, and shows a message log with upgrade status information.

   If a problem occurs, refer to the *Troubleshooting and Customer Support* chapter in the *Compaq 4000 Manager User's Guide*.
9. The upgrade process takes approximately 10 minutes. When the upgrade is completed, the Firmware Upgrade Completed dialog appears. Click **OK**. You are returned to the Firmware Upgrade Status dialog.
10. Click **Close**.
11. Repeat steps 2 through 10 to upgrade the main code for the same modems.

13. Upgrade PRI Firmware

This step is not required if you are installing a new chassis. The PRI card already contains the correct firmware.

If your PRI card's firmware version is 1.7.x or earlier, you must upgrade the PRI card(s) main and boot code.

New firmware can be downloaded from Compaq's World Wide Web home page, BBS*connection*, or ftp directory. Refer to the Compaq 4000 Manager's on line help for details on downloading firmware.

↪ **Important:** Compaq recommends that you download the firmware file to the hard drive of the PC where the Compaq 4000 Manager resides. Then upgrade a card's firmware while connected to the 4000 chassis using one of the following methods, listed in recommended order of preference, to ensure accuracy:

- A local COM port connection
- A remote connection via an external modem
- A remote connection via a TCP/IP connection

To upgrade the PRI card(s) firmware:

1. Download the latest boot code and main code firmware files.
2. Remove the PRI card and set SW2 switch 8 **Open**.

3. Reinsert the PRI card. It will come up in Boot mode.
4. In the Compaq 4000 Manager's Chassis Snapshot window, point the mouse at a card, click the right mouse button, and choose **Burn Boot Code** from the pop up menu.
5. Select the boot code file, **B*.pri**. Use the Windows browse feature to find the file, if necessary.
6. Click **OK**.

   A dialog displays indicating that the file is being uploaded to the card. When the upload is completed, another dialog displays asking if you want to "flash" (copy) the file to permanent memory.
7. Click **Yes** to copy the file to permanent memory, or **No** to exit the upgrade process.
8. In the Compaq 4000 Manager's Chassis Snapshot window, point the mouse at a card, click the right mouse button, and choose **Burn Main Code** from the pop up menu.
9. Select the main code file, **M*.pri**. Use the Windows browse feature to find the file, if necessary.
10. Click **OK**.

    A dialog displays indicating that the file is being uploaded to the card. When the upload is completed, another dialog displays asking if you want to "flash" (copy) the file to permanent memory.
11. Click **Yes** to copy the file to permanent memory, or **No** to exit the upgrade process.
12. On the PRI card, set SW2 switch 8 **Closed**.
13. Press the **Reset** button on the PRI card.
14. If you have two PRI cards, repeat steps 2 through 13 for the second card.

14. Upgrade the Compaq 4000 Manager Software

This step is not required if you are installing a new chassis.

If you are adding a PRI card set to channelized E1 operation to an existing chassis, you must upgrade the Compaq 4000 Manager software to version 4.0. Refer to the *Compaq 4000 Manager User's Guide* for installation instructions.

15. Configure T1 Signaling

This step is optional. **For channelized T1 only**, the modem automatically detects whether it is using an analog or digital adapter card and sets the T1 signaling mode accordingly. If your T1 line uses a setting different than the default (E&M Wink), you can set the modem signaling to match the T1 line configuration. Edit the T1 configuration file and change the Modem Signaling value to either 1 (loop start) or 2 (E&M). For example:

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

Refer to either the *PRI, Channelized T1, and Channelized E1 User's Guide* or the Compaq 4000 Manager's on line help for instructions.

16. Configure Channelized E1 Signaling

This step is optional. **For channelized E1 only**, make sure that the Modem Signaling value is set to 1 (loop start) in the ch_e1.cfg configuration file.

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

Refer to either the *PRI, Channelized T1, and Channelized E1 User's Guide* or the Compaq 4000 Manager's on line help for instructions.

17. Set Up the Chassis for Digital Calls

This step is optional. If your end users will dial into the chassis using a terminal adapter (instead of an analog modem), you'll need to configure your PRI card(s) to route the digital calls to a comm server. Refer to "The priconfg.dig File" section in Chapter 2 of the *PRI, Channelized T1, and Channelized E1 User's Guide* or the Compaq 4000 Manager's on line help for instructions.

Setting up the 4000 Chassis for Network Management

Note: You need to have the Compaq 4000 Manager installed on a PC with Windows 95 or Windows NT 4.0 to perform network management operation. Refer to the *Compaq 4000 Manager User's Guide* for information on installing and operating Compaq 4000 Manager software.

You can set up the 4000 chassis for network management in four ways:

- Use a straight through serial cable to connect the chassis directly to a PC for local management
- Use a serial cable to connect the chassis to a comm server for remote management via a TCP/IP network
- Use a serial null modem cable to connect the chassis to an external modem for dial up remote management via the PSTN
- Use a serial null modem cable to connect the chassis to a 4000 chassis analog modem for dial up remote management via the PSTN

Connecting the Chassis to a Local PC

To connect the chassis to a local PC:

1. Attach a DB9 connector of a straight through serial cable to the network management connector on the rear of the chassis' power supply. (Compaq supplies a DB9-to-DB9 straight through serial cable with your chassis.) See Figure 2-14. Make sure that the cable contains all nine pins.

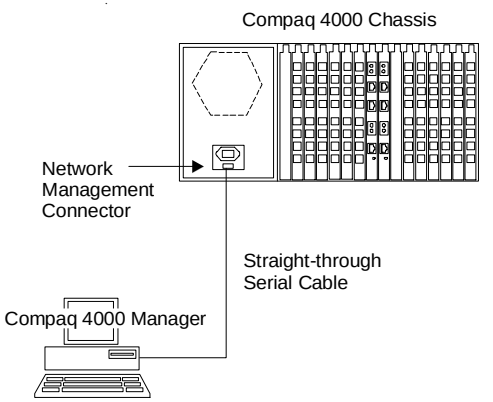


Figure 2-14. Attaching a Straight Through Cable

2. Attach the other end of the serial cable connector (either a DB25 or DB9, depending on the PCs configuration) to the serial (COM) port on the local PC.
3. Start the Compaq 4000 Manager on the local PC.

   You can now perform network management on the 4000 chassis. Refer to the *Compaq 4000 Manager User's Guide* for instructions.

Connecting the Chassis to a Comm Server for Remote Management via a TCP/IP Network

Note: The following instructions assume that you have already installed Compaq 4000 Manager on a PC with Windows 95 or Windows NT 4.0.

To connect the chassis to a comm server:

1. Attach a DB9 connector of a straight through serial cable to the network management connector on the rear of the chassis' power supply. See Figure 2-15.
2. Attach the other end of a serial cable (either a DB25 or RJ45, depending on the comm server's configuration) to a serial port on your comm server. See Figure 2-15.

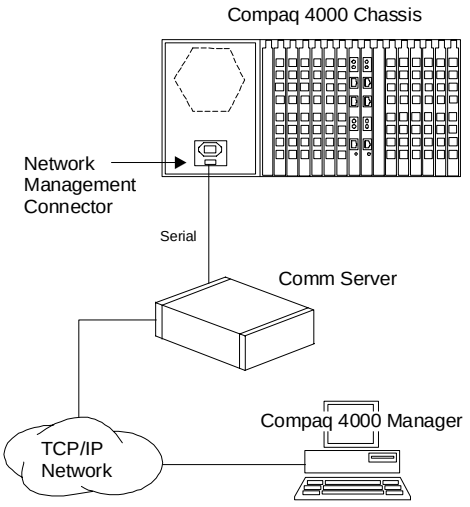


Figure 2-15. Connecting to a Remote Comm Server

3. Configure the comm server so that it views the 4000 chassis as a device.
4. One port on the comm server must be dedicated for network management operation. Configure the port for the following:
   - Do not require login information
   - 9600 bps
   - 8, N, 1
   - No flow control
5. Using the Compaq 4000 Manager, make a TCP / IP connection. Refer to either the *Compaq 4000 Manager User's Guide* or Compaq 4000 Manager's on line help for details on creating and establishing connections.

Connecting the Chassis to an External Modem for Dial Up Remote Management

To connect the chassis to an external modem:

1. The network management channel operates at 9600 bps so you need to set your modem to the same speed. On the local PC, start your data communications software.

   For Compaq modems, set the external modem to 9600 bps, maintain the serial port speed, ignore DTR, enable auto answer, and save the new settings by issuing the following command line to the external modem and pressing **Enter**:
   AT&F$B9600%U1&D0S0=1Q2\Q0*W

For non-Compaq modems, set your communications software to 9600 bps. Reset the modem to factory defaults, enable auto answer, ignore DTR, set the CD signal to follow the remote modem's carrier, and save the new settings by issuing the following command line to the external modem and pressing **Enter**:
AT&FS0=1&D0&C1&W

2. Attach one end of a serial null modem cable to the network management connector on the rear of the chassis' power supply. See Figure 2-16.

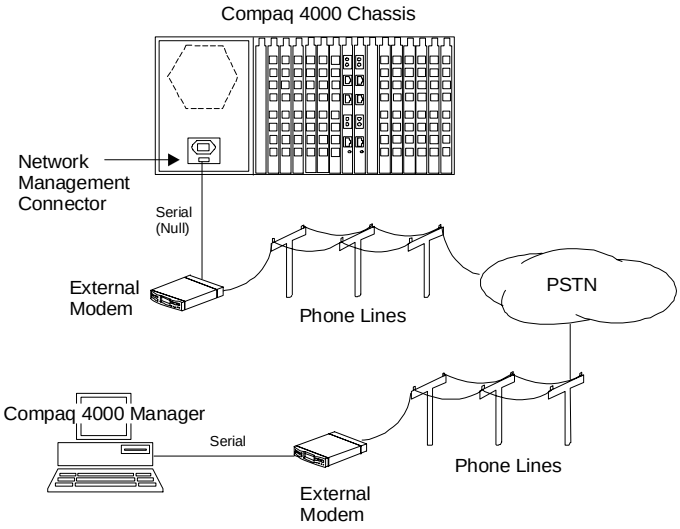


Figure 2-16. Connecting to an External Modem

3. Attach the other end of the serial null modem cable to the modem's serial port. See Figure 2-16.
4. Attach one end of a phone cable to the external modem and the other end to a phone wall jack.
5. On the remote PC, also attach a modem and its phone line.
6. Using the Compaq 4000 Manager on the remote PC, dial the number of the modem attached to the 4000 chassis. Refer to the *Compaq 4000 Manager User's Guide* for details on creating connections.

Connecting the Chassis to a 4000 Chassis Analog Modem for Dial Up Remote Management

➥ **Important**: This procedure works only with 4-port analog modem cards.

To connect the chassis to one of its own modems:

1. The network management channel operates at 9600 bps so you need to set your modem to the same speed. Use Compaq 4000 Manager's DC Session feature to issue AT commands to the 4000 modem. On the Chassis Snapshot window, select the modem, click the right mouse button, and choose **DC Session**.

➥ **CAUTION:** If you use a 4000 modem to perform remote management, do not reset or upgrade it while it is in use. Otherwise, the remote connection will drop.

2. Issue the following command line: **AT&F$B9600&D0*Y0S0=1Q2\Q0*W** and press **Enter**. This sets the 4000 modem to 9600 bps, ignores DTR, cancels busy out and puts the modem on hook, enables auto answer, and saves the new settings.

3. Attach one end of a serial null modem cable (Compaq supplies an RJ45 to DB9 serial null modem cable adapter and an RJ45-to-RJ45 serial null modem cable with your chassis) to the network management connector on the rear of the chassis' power supply. See Figure 2-17.

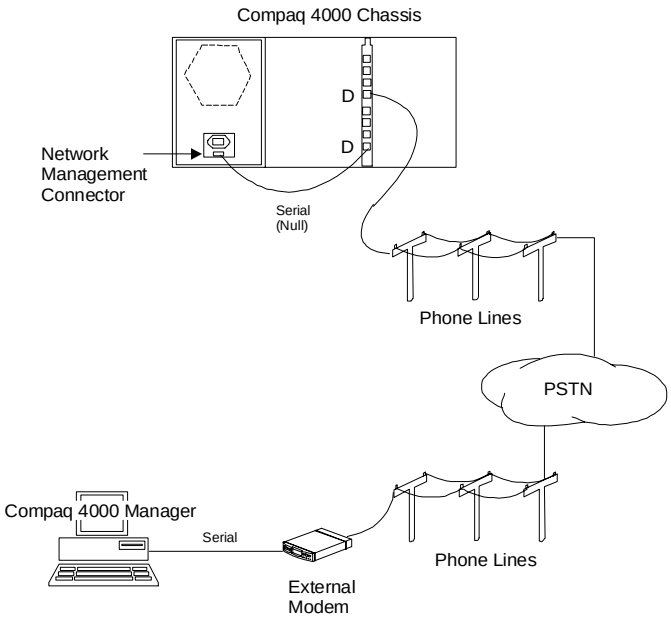


Figure 2-17. Connecting to a 4000 Chassis Modem

4. Attach the other end of the serial null modem cable to a 4000 modem's RJ45 style serial connector. See Figure 2-17.

Note: The 4000 modem used for network management operation must be a dedicated port. It cannot be used for normal chassis operation.

5. Attach a phone cable in the corresponding modem's RJ11 phone connector. (For example, if you attached the serial null modem cable to modem **D**'s RJ45 style connector, attach the phone cable to modem **D**'s RJ11 connector.)
6. On the remote PC, also attach a modem and its phone line.
7. Using the Compaq 4000 Manager on the remote PC, dial the number of the modem in the 4000 chassis. Refer to the *Compaq 4000 Manager User's Guide* for details.

Using the 4000 Chassis in a Rotary Application

Rotary calls are not performed by modems in the 4000 chassis. If you need to use a rotary application, check with your telephone company.

Verifying the 4000 Chassis Installation

Verify that you have successfully installed the 4000 chassis by observing the front panel LEDs. Also, check that the power cable is properly attached to the rear of the chassis and that it is plugged into the power receptacle.

Table 2-8 shows the condition of the LEDs during a normal installation. If you have any problems during the installation, refer to Table 2-9.

Table 2-8. LED Conditions During a Normal Installation

LEDs	***Condition During Normal Power on***
Power Supply Fan Fail	Off
Chassis Fan Fail	Off
Modem Power	Solid Green
Modem Ports A, B, C, D, E, F, G, H	Flash Green / flash Yellow / flash Green / Off
PRI or T1 / E1 Power	Solid Green
PRI or T1 / E1 Synchronization	Solid Green
PRI or T1 / E1 Framing and Slip Errors	Off
PRI or T1 / E1 Bipolar Violations	Off
PRI or T1 / E1 Yellow Alarm	Off

Table 2-9 indicates the status of the front panel LEDs when a problem occurs during installation, the possible cause of the problem, and a workaround.

Table 2-9. Problem LED Conditions During Installation

LEDs	***Condition if Problem Occurs***	***Possible Problem***	***Workaround***
Power Supply Fan Fail	Solid Yellow	Power supply fan failure **CAUTION:** Immediately power down the chassis or risk severe heat damage to the modem cards	Return the power supply to your distributor or Compaq for a replacement.
Chassis Fan Fail	Solid Yellow	Chassis fan failure **CAUTION:** Immediately power down the chassis or risk severe heat damage to the modem cards	Replace the chassis fan. Refer to Appendix C, *Fan Replacement Instructions*, for instructions on how to replace the chassis fan.
Modem Power	Off	Modem adapter card not plugged in correctly No modem adapter card in the slot that corresponds to this modem main card	Remove and replace the modem adapter card, making sure it connects to the mid-plane. Make sure there is a modem adapter card for this modem main card. If not, install one.
Modem Ports A, B, C, D, E, F, G, H	Solid Yellow Flashing Yellow pattern*	Software failure Hardware failure	Reset the card. Replace the card.
PRI or T1/E1 Power	Off	PRI adapter card not plugged in correctly No PRI adapter card in slot 8 or 9	Remove and replace the PRI adapter card. Make sure it connects to the mid-plane. Make sure there is a PRI adapter card in slot 8 or slot 9 to correspond to the PRI main card in slot 8 or 9. If not, install one.
PRI or T1/E1 SY	Off	Wrong framing Signal loss; No clock recovery; Defective PRI or T1/E1 line Defective PRI card or PRI, channelized T1, 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.

Table 2-9. Problem LED Conditions During Installation (Continued)

LEDs	*Condition if Problem Occurs*	*Possible Problem*	*Workaround*
PRI or T1/E1 SL	On	PRI card frame type does not match PRI or T1/E1 line frame type	Test alternate framing type. Have carrier provide a printout with line configurations and match these settings to your PRI card.
		PRI or T1/E1 line problems	Have the carrier perform a BERT test on the line.
PRI or T1/E1 BP	On	Incorrect line coding set	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.
		Bad or noisy PRI or T1/E1 line	Have the carrier run a BERT test on the line to determine if it is within specifications.
PRI or T1/E1 AL	On	PRI card transmit bad	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.
		Line bad on transmit side	Have carrier perform a loopback test on the line to d mark at customer premises.
		D mark mis wired	Place the PRI card in loopback mode, and have the carrier perform a loopback test.

***** If a modem fails power up diagnostics, the specific modem LED flashes Yellow in the following sequence:

SRAM failure: 1 flash (100 ms on/100 ms off) followed by 1 second of inactivity

DSP failure: 2 flashes (100 ms on/100 ms off/100 ms on/100 ms off) followed by 1 second of inactivity

Controller failure: 3 flashes (100 ms on/100 ms off/100 ms on/100 ms off/100 ms on/100 ms off) followed by 1 second of inactivity

Configuring and Operating 4000 Chassis Modems

Use the Compaq 4000 Manager to configure and operate 4000 chassis modems. The management software allows you to issue AT commands to change the modem's configuration or operation, reset modems, busy out modems, and perform global firmware upgrades.

Refer to the *Compaq 4000 Manager User's Guide* for further information about using the management software, the *Modem User's Guide* for supported modem functionality and AT commands, and the *PRI, Channelized T1, and Channelized E1 User's Guide* for supported PRI, channelized T1, or channelized E1 functionality.

Chapter 3

Specifications and Pinouts

Chassis Specifications

Dimensions and Weight

Height: 7.0 in (17.8 cm)

Width: 19.0 in. (48.3 cm)

Depth: 12.0 in (30.5 cm)

Weight: Empty: 17.0 lbs (7.7 kg)
Fully loaded: 38.0 lbs (17.3 kg)

Operating Environment

Operating Temperature: 0° to 40° C

Storage Temperature: -40° to 70° C

Relative Humidity: 0% to 95%, noncondensing

Air Flow: 55 cubic ft. / min.

Primary Power Requirements

Current Requirements:	3.5 A @ 90 to 130 VAC, 1.75 A @ 180 to 260VAC (Auto Ranging)
Nominal Power Requirements:	200w (680 BTU per hour)
Maximum Power Requirements:	450w (1540 BTU per hour)

PRI Card Power

The power is provided to the PRI main and adapter cards from the 4000 chassis backplane:

+5V approximately 1.0 Amps (PRI main card)

+5V 0.75 Amps (PRI adapter card)

8-Port and 4-Port Modem Card Power

The power is provided to the 8-port and 4-port modem main and adapter cards from the 4000 chassis backplane:

+5V 1.81 Amps (8 port main card)

+5V 1.5 Amps (4-port main card)

+5V 14.5 mA (8-port adapter card)

+5V 25 mA (4-port digital adapter card)

Modem Specifications

Memory

128K x 8 Flash ROM

32K x 8 SRAM

Protocols

MNP Classes 2, 3, 4, 5, 10, and 10EC

K56flex and ITU-T V.90 (8-port digital modems only)

ITU-T V.34 (with Annex 12), V.FC, V.32bis, V.32, V.23, V.22bis, V.22, V.21, Bell 212A, and Bell 103

ITU-T V.42bis data compression

ITU-T V.42 error correction

Microprocessor

8-port: Z80182 with 29 MHz clock

4-port: Z80182 with 18.4 MHz clock

Telephone Connector

RJ11 connector (4-port analog modems only)

Data Connector

RJ45-style serial connector

Ringer Equivalence Number (REN)

REN=0.8B

Load Number

Load number=8

PRI Specifications

Table 3-1. PRI Specifications

Where...	***Can Be...***
Line Code	Bipolar Eight Zero Substitution (B8ZS) or Alternate Mark Inversion (AMI) [PRI over T1] HDB3 [PRI over E1]
Framing Format	Extended SuperFrame (ESF) or D4/SuperFrame (SF) [PRI over T1] CRC4 or DoubleFrame [PRI over E1]
Line Signaling	E&M wink start, E&M immediate, or loop start
Dialing Type	MF (Multi Frequency), DTMF (Dual Tone Multi Frequency), or Pulse
Transmit/Receive Impedance	100 ohms (nominal), balanced
Input Line Rate	1.544 Mbps ±100 parts per million (PRI over T1) 2.048 Mbps ±100 parts per million (PRI over E1)
Input Sensitivity	0 to -10 dBm
Output Signal	3 ±0.3V base to peak
Output Timing	Master, looped, or external
Output Timing Rate	
Master	1.544 Mbps ±30 parts per million (PRI over T1) 2.048 Mbps ±30 parts per million (PRI over E1)
Looped	Rate or received, dejittered bit stream
DS1 Output Equalization	0 to 655 feet of ABAM 22 AWG cable or equivalent

Channelized T1 Specifications

Table 3-2. Channelized T1 Specifications

Where...	***Can Be...***
Line Code	Bipolar Eight Zero Substitution (B8ZS) or Alternate Mark Inversion (AMI)
Framing Format	Extended SuperFrame (ESF) or D4/SuperFrame (SF)
Line Signaling	E&M wink start, E&M immediate, or loop start
Dialing Type	MF (Multi Frequency), DTMF (Dual Tone Multi Frequency), or Pulse
Transmit/Receive Impedance	100 ohms (nominal), balanced
Input Line Rate	1.544 Mbps ±200 bps
Input Sensitivity	0 to -10 dBm
Output Signal	3 ±0.3V base to peak
Output Timing	Master, looped, or external
Output Timing Rate Master Looped	 1.544 Mbps ±50bps Rate or received, dejittered bit stream
DS1 Output Equalization	0 to 655 feet of ABAM 22 AWG cable or equivalent

Channelized E1 Specifications

Table 3-3. Channelized E1 Specifications

Where...	***Can Be...***
Line Code	HDB3
Framing Format	CRC4 or DoubleFrame
Line Signaling	E&M wink start, E&M immediate, or loop start
Dialing Type	MF (Multi Frequency), DTMF (Dual Tone Multi Frequency), or Pulse
Transmit/Receive Impedance	100 ohms (nominal), balanced
Input Line Rate	2.048 Mbps ±100 parts per million
Input Sensitivity	0 to -10 dBm
Output Signal	3 ±0.3V base to peak
Output Timing	Master, looped, or external
Output Timing Rate	
Master	2.048 Mbps ±30 parts per million
Looped	Rate or received, dejittered bit stream
DS1 Output Equalization	0 to 655 feet of ABAM 22 AWG cable or equivalent

Serial DTE Connector Pinouts

Note: Refer to the Compaq Microcom 4000 System Cabling White Paper, found on Compaq Microcom's World Wide Web, ftp, and FAX*connection* sites, for information on common cables sold by Compaq.

RJ45-to-DB25 (EIA232) Pinouts

The RJ45-to-DB25 serial DTE cable has the following pin assignments:

Table 3-4. RJ45-to-DB25 Pinouts

RJ45	*DB25*	*Function*	*Abbrev.*
—	1	Shield	—
6	2	Transmitted Data	TXD
5	3	Received Data	RXD
8	4	Request To Send	RTS
7	5	Clear To Send	CTS
—	6	Data Set Ready	DSR
4	7	Signal Ground	—
2	8	Carrier Detect	DCD
—	15	Transmit Clock	—
—	17	Receive Clock	—
—	18	Local Loopback	LL
3	20	Data Terminal Ready	DTR
—	21	Remote Loopback	RL
1	22	Ring Indicator	RI
—	24	External Clock	EXCK
—	25	Test Indicator / Mode	—

RJ45-to-DB9 Pinouts

The RJ45-to-DB9 serial DTE cable has the following pin assignments:

Table 3-5. RJ45-to-DB9 Pinouts

RJ45	*DB9*	*Function*	*Abbrev.*
2	1	Carrier Detect	DCD
5	2	Received Data	RXD
6	3	Transmitted Data	TXD
3	4	Data Terminal Ready	DTR
4	5	Signal Ground	—
—	6	Data Set Ready	DSR
8	7	Request To Send	RTS
7	8	Clear To Send	CTS
1	9	Ring Indicator	RI

DB9-to-RJ45 Serial Null Modem Pinouts

The serial null modem cable has the following pin assignments:

Table 3-6. DB9-to-RJ45 Serial Null Modem Pinouts

DB-9	*Pin*	*Pin*	*RJ-45*
TXD	3	6	TXD
RXD	2	5	RXD
RTS	7	8	RTS
CTS	8	7	CTS
DSR	6	—	—
CD	1	2	CD
DTR	4	3	DTR
GND	5	4	GND
RI*	9	1	RI*

***** The Ring Indicator (RI) signal does not have to connect from one side of the cable to the other.

DB9-to-DB25 (EIA232) Serial Network Management Pinouts

The DB9-to-DB25 serial Network Management cable has the following pin assignments:

Table 3-7. DB9-to-DB25 Pinouts

DB9	*DB25*	*Function*	*Abbrev.*
—	1	Shield	—
3	2	Transmitted Data	TXD
2	3	Received Data	RXD
7	4	Request To Send	RTS
8	5	Clear To Send	CTS
6	6	Data Set Ready	DSR
5	7	Signal Ground	—
1	8	Carrier Detect	DCD
—	15	Transmit Clock	—
—	17	Receive Clock	—
—	18	Local Loopback	LL
4	20	Data Terminal Ready	DTR
—	21	Remote Loopback	RL
9	22	Ring Indicator	RI
—	24	External Clock	EXCK
—	25	Test Indicator/Mode	—

PRI or T1 RJ48 Pinouts

Table 3-8. PRI or T1 RJ48 Pinouts

Pin Number	*Pin Name*
1	RX Ring
2	RX Tip
3	—
4	TX Ring
5	TX Tip

Ethernet RJ45 Pinouts

Table 3-9. Ethernet RJ45 Pinouts

Pin Number	*Pin Name*
1	TPOUT+
2	TPOUT-
3	TPIN+
4	—
5	—
6	TPIN-

Bantam Monitoring Jacks

The MJ OUT jack is for transmit signals.

The MJ IN jack is for receive signals.

Appendix A

Regulatory Requirements

U.S. and Canadian Telephone Company and FCC Requirements

The following regulations apply to Compaq Microcom 4000 PRI and modem cards used within the United States and Canada.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Complies with Canadian ICES-003 Class A.

Conforme à la réglementation canadienne ICES-003 de classe A.

Telephone Company and FCC Regulations

- FCC rules permit this device to be directly connected to the telephone network, using a standardized jack. Do not use this equipment on a party line or coin line.
- Malfunctioning equipment may damage the telephone network. If this device is not functioning properly, disconnect it until the problem has been determined and the device has been repaired. Otherwise, the telephone company may temporarily disconnect service.
- Equipment repair can be performed only by Compaq. It is the responsibility of the user to report the need for any service of the device to Compaq or to one of our authorized agents.

  See Appendix B, *Customer Support*, for information about service.
- If you encounter any problems with your telephone after installing any new device, disconnect it from the telephone line to see if the device is the source of the problem.
- The telephone company may change its technical operations and procedures. If such changes affect the compatibility or use of this device, the telephone company is required to provide adequate notice of the changes.

Telephone Company Information

For PRI Cards

If the telephone company requests information about the equipment connected to their lines, inform them of the FCC registration number, which is found on the FCC sticker attached to the device.

Facility Interface Code: 04DU9-1SN
Service Order Code: 6.0F
USOC Jack: RJ48C

For Channelized T1 Cards

If the telephone company requests information about the equipment connected to their lines, inform them of the FCC registration number, which is found on the FCC sticker attached to the device.

Facility Interface Code: 04DU9-DN, 04DU9-1SN
Service Order Code: 6.0F
USOC Jack: RJ48C

For Modem Cards

If the telephone company requests information about the equipment connected to their lines, inform them of:

- The telephone number to which the device is connected.
- The ringer equivalence number (REN), which is 0.8B. The REN determines how many devices may be connected to the same telephone line. In most areas, the sum of the RENs of all devices connected to one line should not exceed five. If too many devices are attached, they may not ring properly.
- The USOC telephone jack required (RJ11, RJ41, or RJ45).
- The FCC registration number, which is found on the FCC sticker attached to the device.

What To Do If Interference Occurs

CAUTION: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits provide reasonable protection against harmful interference in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harm to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

There is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user should:

- Re orient the receiving antenna.
- Relocate the receiving antenna and / or equipment away from the device.
- Relocate the device away from the receiving antenna and / or equipment.
- Plug the device into a different outlet so that the device and the receiving equipment are on different electrical circuits.

If none of these actions resolves the problem, consult your distributor or an experienced radio / television technician for additional suggestions.

Power Cord Set Requirements

Table A-1. Power Cord Set Requirements by Country

Country	*Accredited Agency*	*Applicable Note Numbers (see below)*
Australia	EANSW	1
Austria	OVE	1
Belgium	CEBC	1
Canada	CSA	2
China (P. R. C.)	CCEE	1
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
Italy	IMQ	1
Japan	JIS	3
Netherlands	KEMA	1
Norway	NEMKO	1
Singapore	PSB or PUB	1
Sweden	SEMKO	1
Switzerland	SEV	1
United Kingdom	BSI	1

Table A-1. Power Cord Set Requirements by Country (Continued)

Country	*Accredited Agency*	*Applicable Note Numbers (see below)*
United States	UL	2

Notes:

1. Flexible cord must be <HAR> Type HO5VV-F, 3 conductor, 1.0 mm^2 conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country where it will be used.
2. Flexible cord must be Type SVT or equivalent, No. 18 AWG, 3 conductor. Wall plug must be a two pole grounding type with a NEMA 5-15P (15A, 125V) or NEMA 6-15P (15A, 250V) configuration.
3. Appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. Flexible cord must be Type VCT or VCTF, 3 conductor, 0.75mm^2 conductor size. Wall plug must be a two pole grounding type with a Japanese Industrial Standard C8303 (15A, 125V) configuration.

Fax Branding in the U.S. and Canada

The Telephone Consumer Protection Act of 1991 makes it unlawful for any person to use a computer or other electronic device, including fax machines, to send any message unless such message clearly contains in a margin at the top or bottom of each transmitted page or on the first page of the transmission, the date and time it is sent and an identification of the business, or other entity, or other individual sending the message and the telephone number of the sending machine or such business, other entity, or individual. (The telephone number provided may not be a 900 number or the number for which charges exceed local or long distance transmission charges.)

In order to program this information into your fax machine, you should complete the following steps:

If you are using FaxWorks, you can type in your name and telephone number of your faxmodem when you install the program. FaxWorks will store these and print them on each faxed page as required.

If you have already installed FaxWorks, you can check your identification or change it through the communications center.

1. Start FaxWorks by double-clicking on its icon.
2. Next, click on **More** and in the next dialog, click on **Fax Setup**.
3. In that dialog, click on **Banner**.

   This brings up the Banner Setup screen.

4. Type your name, faxmodem number and other desired information in the appropriate boxes.
5. When you close these dialogs, FaxWorks saves your identification.

If you will use another fax program, refer to its manual for instructions on entering your identification information.

Canadian Department of Communications Requirements

The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure, for their own protection, that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together (this may be particularly important in rural areas).

CAUTION: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority or electrician, as appropriate.

The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that the total number of devices does not exceed one hundred.

Canadian EMI Limits

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la class A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

Appendix B

Customer Support

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 FAX*connection*
- Compaq Microcom's BBS*connection*
- World Wide Web site
- Compaq's ftp site
- Compaq Microcom's Response Center

Compaq Microcom's FAX*connection*

You can get tips on fine tuning your system performance from Compaq Microcom's FAX*connection*. 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 FAX*connection* 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 BBS*connection*

You can use Compaq Microcom's BBS*connection* to ask questions of customer support, read about solutions to common problems, and download tech tips and utility programs. The BBS*connection* 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 BBS*connection* 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 BBS*connection* 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 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 C

Fan Replacement Instructions

This appendix explains how to replace a fan assembly on the 4000 chassis.

The fan assembly is located at the rear of the chassis on the left hand side. Look for the panel with the power rating printed on it.

To replace a fan assembly:

1. Turn off the chassis' power switch.
2. Unplug all external power from the 4000 chassis.
3. Remove the backplane adapters or blank plates from the last three slots in the rear of the chassis.
4. Remove the 3-pin connector end of the fan power cable from the midplane. See Figure C-1.

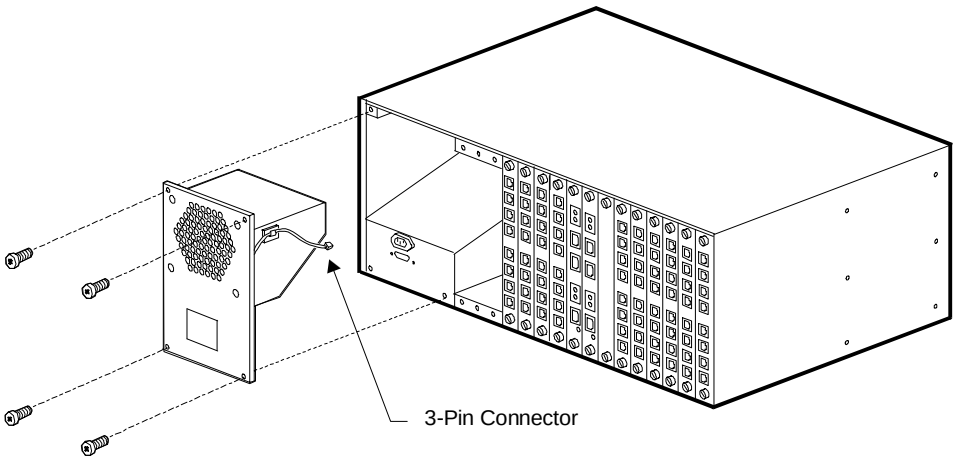


Figure C-1. Removing the 3-Pin Connector and Metal Plate

5. Remove the four screws holding the metal plate protecting the fan assembly. See Figure C-1.
6. Pull the fan housing out of the chassis. See Figure C-1.
7. Remove the fan cable from the cord clip attached to the fan assembly. See Figure C-2.

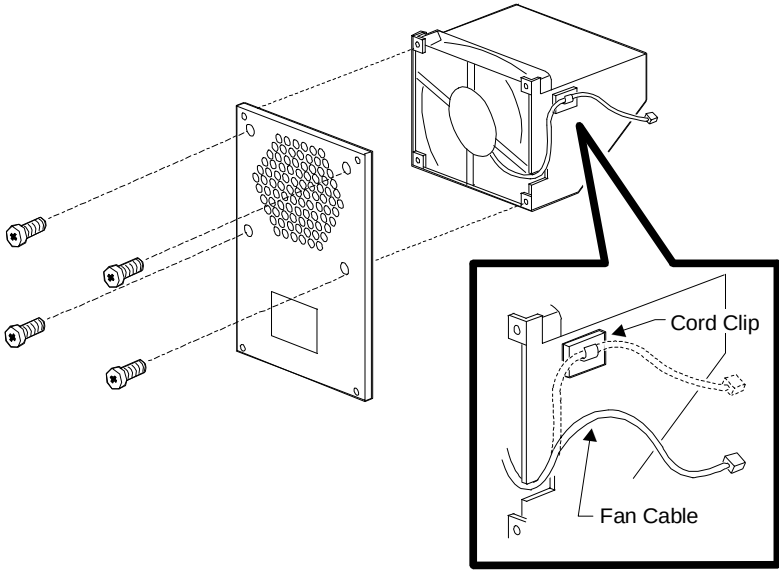


Figure C-2. Removing the Fan Cable and Fan Assembly Screws

8. Remove the four screws holding the fan assembly together. (See Figure C-2.) Save the screws.
9. Pull the wires through the cutout on the fan assembly.
10. Slide the fan out of the fan assembly.
11. Slide a new fan into the fan assembly. The fan must be positioned with its cable next to the cutout. See Figure C-3. The label must be facing out toward the rear panel.

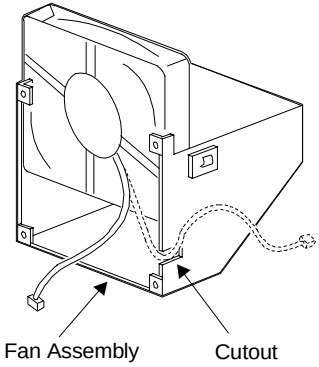


Figure C-3. Replacing the Fan and Fan Cable

12. Replace the four screws on the fan assembly.
13. Attach the fan cable to the cord clip on the fan assembly.

14. Return the fan housing to the chassis by sliding the flanges into the mating slots of the chassis. Connect the fan cable to the backplane.
15. Replace the metal plate protecting the fan assembly with the four screws you removed in Step 4.
16. Attach the 3-pin connector end of the fan power cable to the chassis backplane.
17. Re attach any adapters, blank plates, cables, or cords.
18. Press the power switch on the front of the chassis to the **ON (|)** position.

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Compaq Microcom Warranty Information

Standard Compaq Warranty

The CM4000 units carry a 3-year warranty on new equipment. Specific Warranty information for your unit is described in the

Access Solutions Division Warranty Attachment

Option Kits Limited Warranty

Option parts for the CM4000 product are warranted for the longer of (a) 1 year from the date of purchase or (b) the remainder of the warranty period on the Compaq product in which it is installed.

Spare Parts Limited Warranty

In-warranty replacement parts for CM4000 product (including, but not limited to, replacement of the entire unit) are warranted for the longer of (a) 90 days or (b) the remainder of the warranty period on the Compaq product in which it is installed.

Specific Option Kit and Spare Parts Warranty information for your unit is described in the

Limited Warranty Option Kit and Spare Parts Attachment

Software Warranty information is detailed on the license agreement envelope.

If you have any questions regarding warranty coverage, please contact your authorized reseller or Compaq Computer Corporation.