COMPAQ

MICROCOM 4000

Quick Setup

You can configure your Compaq Microcom 4000 system for four different operation modes:

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

For all operations, install the system and its cards. For PRI, channelized T1, or channelized E1 operations, also:

- Order PRI or T1/E1 service
- Use DIP switches to configure the PRI card(s)
- Use DIP switches and a configuration file to configure the PRI card(s) for channelized E1 operation
- Upgrade modem firmware to the latest version if your modem's firmware revision is 3.1.x or earlier (for 4-port) or 4.1.x or earlier (for 8-port)
- Upgrade PRI or channelized T1 firmware to the latest version if your PRI card's firmware revision is 1.7.x or earlier
- Upgrade the Compaq 4000 Manager software to version 4.0 if you are currently running version 3.0 Build 19 or earlier

Ordering PRI or Channelized T1/E1 Service

We recommend ordering your PRI or T1/E1 line with the following options, which are the 4000 system defaults. Contact your local telephone company about purchasing these options.

Table 1. PRI and Channelized T1/E1 Line Options

PRI over T1	*PRI over E1*	*Channelized T1*	*Channelized E1*
ESF (Extended Superframe)	CRC4	ESF (Extended Superframe)	E1 Doubleframe

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Table 1. PRI and Channelized T1/E1 Line Options (Continued)

PRI over T1	*PRI over E1*	*Channelized T1*	*Channelized E1*
B8ZS (Bipolar Eight-Zero Substitution)	HDB3	B8ZS (Bipolar Eight-Zero Substitution)	HDB3
—	—	E&M wink start	—
—	—	DTMF (Dual Tone Multi-Frequency)	—

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

Modem Port and Slot Information

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

- Type of operation you will use
- Types of modem card(s) you install

Table 2 describes your various options when installing one type of modem card. By default, you can mix 8-port and 4-port digital modem cards within one span.

Table 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. Modem Type and Slot Position Options (Continued)

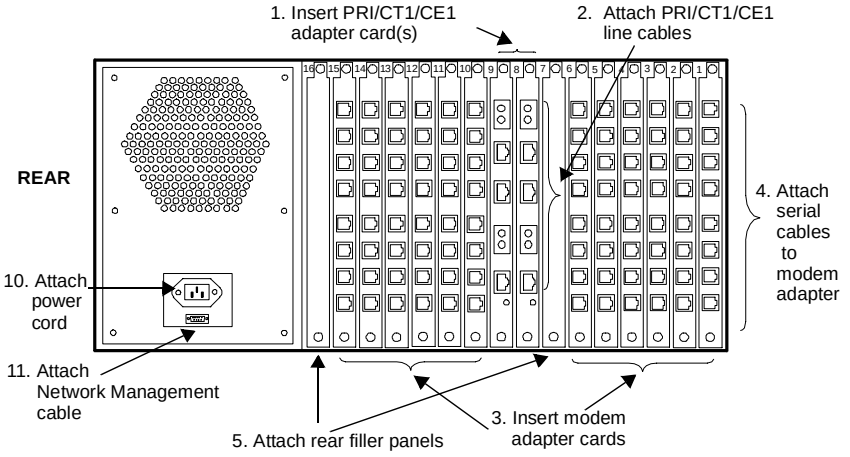
Interface	*Modem Type*	*Slot Positions: PRI/CT1/CE1*	*Slot Positions: Modems*	*Maximum Number of Modem Ports*
Channelized T1	4-port digital	8	1 to 7, 9 to 13	48
	8-port digital	8	1 to 6	48
	8-port digital	8 & 9[1]	1 to 6, 10 to 15	96
Channelized E1	4-port digital	8	1 to 7, 9 to 16	60
	8-port digital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

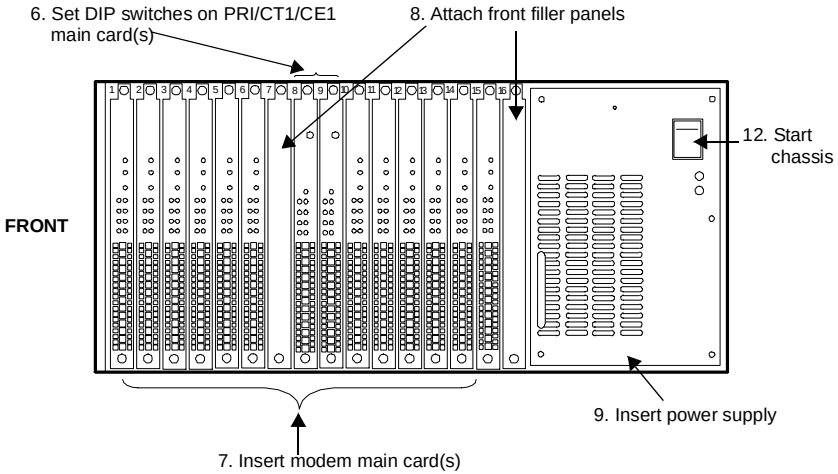
1 Indicates there are two dual PRI cards installed.

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.

Installing Hardware

The following illustrations identify where to install hardware in the chassis. The steps below the illustrations give further descriptions. Refer to Chapter 2 in your *Compaq Microcom 4000 Installation Guide* for complete hardware and software instructions.





1. If you are installing only analog modems, skip to step 3. Insert a PRI adapter card into rear slot 8, making sure you align the card with the metal guides. Optionally, install a second adapter card in slot 9.

2. Attach RJ48 cables to the Line 1 and Line 2 jacks on the card in slot 8. Optionally, you can also connect an Ethernet cable to the Ethernet jack.

   Optionally, attach RJ48 cables and an Ethernet cable on a second adapter card in slot 9.

3. Insert modem adapter cards starting at rear slot 1 and work up to the PRI card, making sure you align each card with the metal guides. For PRI, channelized T1, or channelized E1 operation, install digital adapter cards. For analog operation, install analog adapter cards starting at rear slot 1 and work up to slot 16.

4. For **8-port digital modems**, attach serial cables from the RJ45-style serial receptacles labeled A, B, C, D, E, F, G, and H to your terminal device connectors.

   For **4-port digital modems**, attach serial cables from the RJ45-style serial receptacles labeled A, B, C, and D to your terminal device connectors.

   For **4-port analog modems**, attach phone cables from the RJ11 receptacles at the top of each card labeled A, B, C, and D to wall jacks. Then attach serial cables from the RJ45-style serial receptacles at the bottom of each card labeled A, B, C, and D to your terminal device connectors. Skip to step 7.

5. If more than eight cards are installed in the chassis, install filler panels over any unused rear slots.
6. If your PRI, channelized T1, or channelized E1 configuration is different than the default settings, change the DIP switches on the main card now. For valid settings, refer to the "Using DIP Switches to Configure a PRI Card" section that follows.
7. Insert main cards:
    a. Insert a PRI main card into front slot 8, making sure you align the card with the metal guides. Optionally, insert a second main card into front slot 9.
    b. Insert modem main cards starting at front slot 1 and work up to the PRI card, making sure you align the card with the metal guides. Make sure that 8-port main cards are installed in the front slots that correspond to 8-port adapter cards, and that 4-port main cards are installed in the front slots that correspond to 4-port adapter cards.

Note: By default, you can mix 8-port and 4-port digital modem cards within one span.

    c. For analog operation only, insert modem main cards starting at front slot 1 and work up to slot 16.
8. If more than eight cards are installed in the chassis, install filler panels over any unused front slots.
9. Remove the power supply screws from the chassis. Insert the power supply and leave it turned Off. Secure the power supply by re-inserting the screws.
10. Plug the female end of the supplied power cord into its receptacle on the rear of the power supply. Plug the male end of the cord into a grounded AC power outlet.
11. Optionally 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. 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.
12. Press the power switch to the **ON** (|) position.

13. For PRI operation, 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 *Compaq Microcom 4000 PRI, Channelized T1, and Channelized E1 User's Guide* for instructions.

Using DIP Switches to Configure a PRI Card

Note: For fast configuration, Compaq recommends using DIP switches. Refer to the *Compaq Microcom 4000 PRI, Channelized T1, and Channelized E1 User's Guide* for alternate ways of configuring the card.

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 3. PRI Card DIP Switch 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.

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 on-line help for details.

Note: Channelized T1 cards are set to a signaling value of E&M Wink. If your T1 line uses a different value, you must edit the channelized T1 configuration file. Refer to either the *PRI, Channelized T1, and Channelized E1 User's Guide* or the Compaq 4000 Manager on-line help for details.

SW2 Factory Default Switch Settings

SW2 is at the rear of the PRI main card where it connects to the chassis' mid-plane. Table 4 identifies the switch settings and functionality. Default settings are shown in **bold**. Open = Up / Off; Closed = Down / On.

Table 4. SW2 Factory Default Switch Settings

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

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

SW3 Factory Default Switch Settings

SW3 is located at the rear of the PRI main card (to the right of SW2) where it connects to the chassis' mid-plane. Table 5 identifies the switch settings and functionality. Default settings are shown in **bold**. Open = Up / Off; Closed = Down / On.

Table 5. SW3 Factory Default Switch Settings

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

Channelized T1 and Channelized E1 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. Open = Up/Off; Closed = Down/On

Table 6. SW2 Switches for Channelized T1 or Channelized E1

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 7. SW3 Switches for Channelized T1 or Channelized E1

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

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

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

For channelized E1 operation, you also need to use the ch_e1.cfg configuration file as well as set switches. This file contains standard channelized E1 settings for E1 Doubleframe, HDB3, loop start, channelized E1 signal variance, and a modem pool set up for eight modem cards. If your E1 line does not use loop start, you must edit the ModemSignaling line. You cannot set the channelized E1 signal variance parameter via switches; in order to change this parameter, you must edit the 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.

Configuring the Modem Cards for PRI, Channelized T1, or Channelized E1 Operation

To configure the modem cards for either PRI, channelized T1, or channelized E1 operation, you must upgrade **all** your modems' firmware to operate with the PRI card(s) 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 system:

- An additional channelized T1 card

- One or two PRI cards

You do not need to upgrade a new chassis with new modems.

A new modem firmware file is located on your Compaq 4000 Manager diskette shipped with the PRI card, and on Compaq Microcom's BBS*connection* and World Wide Web sites. Complete upgrade instructions are found in your *Compaq Microcom 4000 Installation Guide*.

↪ **Important:** If you will use the Compaq 4000 Manager software, make sure you install version 4.0 of this software after you install the hardware and upgrade the firmware. This is found on your Compaq 4000 Manager diskette shipped with the PRI card.

To check the modems' firmware revision, you can:

- Issue the **AT%V1** command, or
- 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**.

■ Upgrading PRI or Channelized T1 Firmware

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

↪ **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.

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 for 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.

Troubleshooting Tips

- Verify that the PRI card is seated correctly in the chassis and is receiving power by checking the PWR and SY LEDs on the front of the PRI main card. The LEDs should be on (solid green) for all PRI or T1/E1 lines.
- Verify that the settings on the PRI card match those of the PRI or T1/E1 line for frame format, line coding, etc.
- Verify that the PRI main and adapter cards are attached tightly to the mid-plane.

For further tips, see Chapter 2 in the *Compaq Microcom 4000 Installation Guide*.

You should access Compaq's World Wide Web site at http://www.compaq.com/products/networking/products.html on a regular basis to get/download last-minute product changes.