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Installing the Contivity 5000

NORTEL NETWORKS™

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Contents

Figures

Tables

Preface

The Contivity* 5000 is part of the Nortel Networks* Contivity Secure IP Services Gateway product family. Contivity Secure IP Services Gateways support secure, reliable IP VPNs in a single, integrated hardware device. Throughout this guide, the Contivity 5000 is also referred to as *the gateway.*

This guide provides instructions for installing the Contivity 5000 for the first time and for replacing any field replaceable unit (FRU). This guide also provides some initial configuration information and includes technical specifications for the Contivity 5000.

For complete information about configuring and monitoring the Contivity 5000, see the documentation on the software CD. (For information about Contivity documentation, see "Related publications" on page 17.)

Before you begin

This guide is intended for qualified service personnel who are installing the Contivity 5000 for the first time or who need to install or replace any of the following field replaceable units (FRUs):

- LAN, WAN, and serial interface cards
- Hardware accelerator cards
- SSL VPN Module 1000
- Dual inline memory modules (DIMMs)
- Power supplies
- Hard disk drives
- Fan trays

Before you install the Contivity 5000, make sure that all network wiring has been installed on the premises using standard cable system practices.

Text conventions

This guide uses the following text conventions:

`bold Courier text`	Indicates command names and options and text that you need to enter. Example: Use the **`show health`** command. Example: Enter **`terminal paging`** {**`off`** | **`on`**}.
italic text	Indicates new terms and book titles.
`plain Courier text`	Indicates system output, for example, prompts and system messages. Example: `File not found.`
separator (>)	Shows menu paths. Example: Choose Status > Health Check.

Acronyms

This guide uses the following acronyms:

ADSL	asymmetric digital subscriber line
AES	Advanced Encryption Standard
AIS	alarm indication signal
CSU	channel service unit
DIMM	dual inline memory module
DSU	digital service unit
DTE	data terminal equipment
HSSI	High Speed Serial Interface
IP	Internet Protocol
IPsec	IP Security
ISDN	Integrated Services Digital Network
LAN	local area network

LED	light emitting diode
LOS	loss of signal
OOF	out of frame
PCI	peripheral component interconnect
SSL	Secure Sockets Layer
URL	uniform resource locator
VPN	virtual private network
WAN	wide area network

Related publications

For complete information about configuring, monitoring, and managing the Contivity 5000, refer to the following publications (included on the software CD):

- Release notes provide the latest information, including brief descriptions of the new features, problems fixed in this release, and known problems and workarounds.
- *Configuring Basic Features for the Contivity Secure IP Services Gateway* introduces the product and provides information about initial setup and configuration.
- *Configuring Servers, Authentication, and Certificates for the Contivity Secure IP Services Gateway* provides instructions for configuring authentication servers and services, as well as digital certificates.
- *Configuring Firewalls, Filters, NAT, and QoS for the Contivity Secure IP Services Gateway* provides instructions for configuring the Contivity Stateful Firewall, NAT, and Contivity interface and tunnel filters.
- *Configuring Tunneling Protocols for the Contivity Secure IP Services Gateway* provides instructions for configuring the tunneling protocols IPsec, L2TP, PPTP, and L2F.
- *Configuring Advanced Features for the Contivity Secure IP Services Gateway* provides instructions for configuring 802.1Q VLANs, circuitless IP, advanced WAN settings, PPP, PPPoE, frame relay, ADSL and ATM, T1/E1 CSU/DSU interfaces, dial services and BIS, DLSw, IPX, and hardware accelerator cards.

- *Configuring Routing for the Contivity Secure IP Services Gateway* provides instructions for configuring RIP, OSPF, and VRRP, as well as instructions for configuring ECMP, routing policy services, and client address redistribution.
- *Configuring SSL VPN Services for the Contivity Secure IP Services Gateway* provides instructions for configuring services on the SSL VPN Module 1000, including authentication, networks, user groups, and portal links.
- *Reference for the Contivity Secure IP Services Gateway Command Line Interface* provides syntax, descriptions, and examples for the commands that you can use to configure, manage, and monitor the gateway.
- *Managing and Troubleshooting the Contivity Secure IP Services Gateway* provides information about backup and recovery, file management, upgrading software, and troubleshooting. This guide also provides instructions for monitoring gateway status and performance.

You can print selected technical manuals and release notes free, directly from the Internet. Go to the www.nortelnetworks.com/documentation URL. Find the product for which you need documentation. Then locate the specific category and model or version for your hardware or software product. Use Adobe* Acrobat Reader* to open the manuals and release notes, search for the sections you need, and print them on most standard printers. Go to Adobe Systems at the www.adobe.com URL to download a free copy of the Adobe Acrobat Reader.

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If you purchased a Nortel Networks service program, contact Nortel Networks Technical Support. To obtain contact information online, go to the www.nortelnetworks.com/cgi-bin/comments/comments.cgi URL, then click on Technical Support.

From the Technical Support page, you can open a Customer Service Request online or find the telephone number for the nearest Technical Solutions Center. If you are not connected to the Internet, you can call 1-800-4NORTEL (1-800-466-7835) to learn the telephone number for the nearest Technical Solutions Center.

An Express Routing Code (ERC) is available for many Nortel Networks products and services. When you use an ERC, your call is routed to a technical support person who specializes in supporting that product or service. To locate an ERC for your product or service, go to the http://www.nortelnetworks.com/help/contact/erc/index.html URL.

Chapter 1
Installing the Contivity 5000 chassis

This chapter describes how to install the Contivity 5000 chassis.

Note: Before you install the chassis, make sure that all network wiring has been installed on the premises using standard cable system practices.

This chapter contains the following topics:

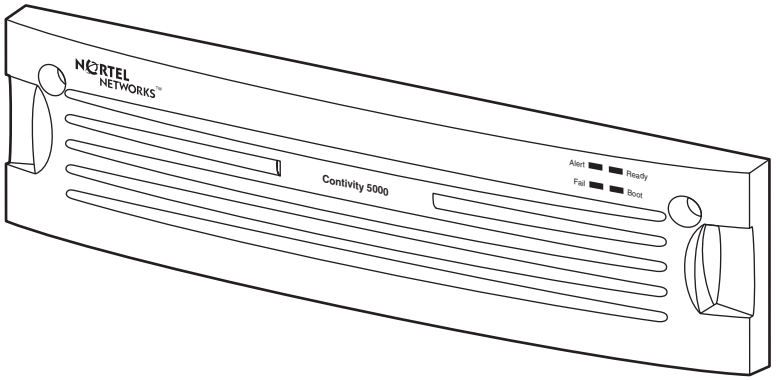
Description of the Contivity 5000

The Contivity 5000 is a high-performance, business-class IP services gateway that enables scalable, secure, and robust IP VPNs across the public data network. The Contivity 5000 uses the infrastructure of the Internet to replace traditional remote access gear.

The Contivity 5000 provides routing, firewall, bandwidth management, encryption, authentication, and data integrity services to ensure secure tunneling across IP networks and the Internet. An individual user or group of users can be associated with a set of attributes that provide custom access to an extranet.

Figure 1 shows the front view of the Contivity 5000.

Figure 1 Front view of the Contivity 5000



The Contivity 5000 chassis provides the following:

- Dual redundant hard disk drives
- One 1.44 MB floppy disk drive
- One 1000BASE-T Ethernet* LAN port on the base system
- One 10/100BASE Ethernet LAN port on the base system
- One serial port for out-of-band management of the Contivity 5000
- Dual redundant 350-watt hot-swappable power supplies with dual AC input connections
- One Contivity Security Accelerator card or one Hardware Accelerator card installed in PCI slot 6
- Six expansion PCI slots that can contain interface cards, a second hardware accelerator card, and the SSL VPN Module 1000
- 512 MB memory (two memory modules of 256 MB each) upgradeable to 1.5 GB total
- Replaceable front and rear fan trays

Preparing to install the Contivity 5000

Before you begin the installation, verify that:

- Your shipment is complete and undamaged.
- You have the cables, tools, and other equipment that you need.
- Your installation site meets the physical, electrical, and environmental requirements.

The sections that follow provide information to help you prepare for installation.

Shipment contents

In addition to the gateway and this guide, the shipping container for the Contivity 5000 contains a number of hardware accessories and other items.

Note: Unless you specifically ordered power cables, no power cables are shipped with the Contivity 5000.

Table 1 lists the items shipped with the Contivity 5000.

Table 1 Items shipped with the Contivity 5000

Quantity	Item	Purpose
1	Rack-mount shelf	Supports the chassis in the equipment rack
2	Rack-mount brackets	Support the back of the rack-mount shelf and attach the shelf to the rear of the rack
4	10-32 truss screws, 1/2 inch long	Secure the front of the rack-mount shelf and the chassis itself to the equipment rack
8	10-32 panhead screws, 3/8 inch long	Secure the rack-mount brackets to the back of the rack-mount shelf and to the equipment rack
8	10-32 panhead cage nuts	Used if the equipment rack does not have threaded rail holes
4	Rubber feet	Used to install the chassis on a surface
1	Antistatic wrist strap	Directs the discharge of static electricity from your body to the chassis to prevent damage to sensitive electronic components

Table 1 Items shipped with the Contivity 5000 (continued)

Quantity	Item	Purpose
1	Molded serial cable DB9/DB25-to-DB9/DB25	Connects the Contivity 5000 to a PC or to a local terminal
1	*Installing the Contivity 5000* (this book)	Provides instructions for installing the chassis and hardware options
1	Recovery diskette	Used to restore the software image and file system
1	Contivity software kit	Contains Contivity Secure IP Services Gateway software and documentation on CD
1	Contivity client kit	Contains Contivity VPN Client software and documentation on CD

Inspect all items for shipping damage. If you detect any damage, do not install the Contivity 5000. Call the Nortel Networks Technical Solutions Center in your area (see "How to get help" on page 18).

Additional equipment

You may need items that are not included in the Contivity 5000 shipping container. Before you begin the installation, make sure that you have all the cables, tools, and other equipment that you need.

Cables

You will need cables that are not included in the Contivity 5000 shipping container. For information about which cables are shipped and which ones you can order, see "Connecting communications cables" on page 34. If you do not have the proper cables, contact your network administrator.

Hardware for mounting the chassis in an equipment rack

To install the Contivity 5000 in an equipment rack, you need a Phillips screwdriver and an equipment rack that meets the following specifications:

- Heavy-duty steel construction
- Four-post rack 19 in. (48.26 cm) wide and 24 in. (60.96 cm) deep

Caution: Install the Contivity 5000 in a four-post rack only.

- Electronic Industries Association (EIA) standard hole-spacing

If the rack does not have threaded rail holes, you must use the cage nuts shipped with the Contivity 5000.

Site requirements

The installation site must provide sufficient free space around the Contivity 5000 to ensure proper ventilation and access for servicing. For information about the physical, electrical, and environmental requirements for the Contivity 5000, see "Chassis specifications" on page 93.

Installing the chassis

To install the Contivity 5000, do one of the following:

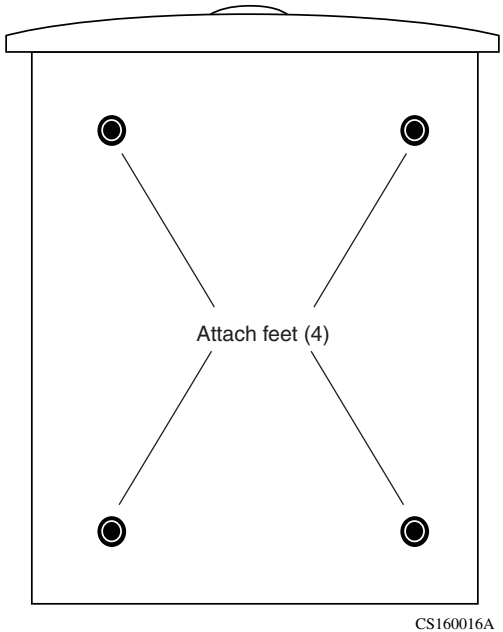
- Position the chassis on a flat, sturdy, horizontal surface.
- Mount the chassis in a standard four-post equipment rack (see "Installing the chassis in an equipment rack" on page 26).

Installing the chassis on a flat surface

If you decide to place the Contivity 5000 on a flat surface, make sure that the surface is large enough for the gateway and sturdy enough to support the combined weight of the Contivity 5000 and the cables that you attach to it.

The Contivity 5000 accessory kit includes four rubber feet that can be attached to the bottom of the chassis. Figure 2 shows the placement of these rubber feet.

Figure 2 Placement of rubber feet on the bottom of the chassis



Installing the chassis in an equipment rack

To mount the Contivity 5000 in an equipment rack, you need the following equipment:

- Standard four-post 19-inch equipment rack

Caution: Install the Contivity 5000 in a four-post rack only.

- 12 screws (supplied with the chassis)
- 8 cage nuts (supplied with the chassis) if the rack does not have threaded holes
- #2 Phillips screwdriver

Rack-mount recommendations

When you mount the chassis in the rack, observe the following recommendations:

- The maximum recommended ambient temperature is 40°C (104°F). Make sure that the internal temperature of the rack does not exceed 40°C (104°F).
- Do not block the power supply vents or otherwise restrict air flow when installing the chassis in a rack.
- Stabilize your rack so that it does not tip over under the weight of the gateway and other devices.

Warning: The Contivity 5000 weighs approximately 50 pounds (23 kg). This weight is not evenly distributed; the right side of the gateway weighs more than the left. Two people must lift the system into the equipment rack.

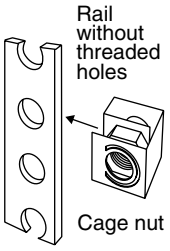
- Make sure that the electrical branch circuits can handle the Contivity 5000 and other units in the rack before you install and turn on the system.
- Maintain a reliable earth-ground path in the rack system. The gateway is intended to connect to an earth ground.

Attaching the shelf in the equipment rack

The Contivity 5000 ships with a rack-mount shelf to support the chassis in the equipment rack. To attach the shelf to the equipment rack:

1 If the holes in the rack's vertical supports are not threaded, attach a cage nut in four locations at the front of the rack (Figure 3).

Figure 3 Attaching the cage nuts to the rack



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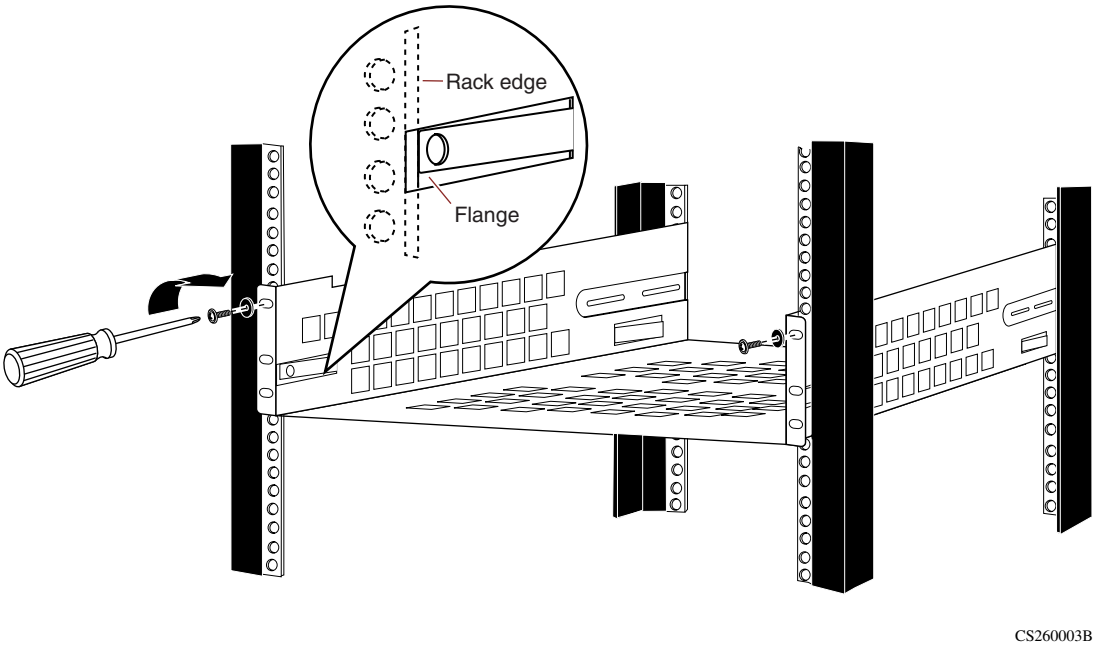
2 Position the rack-mount shelf inside the rack as shown in Figure 4.

To ease the shelf into the rack, tilt it slightly or squeeze its sides together gently before moving it into the rack.

Figure 4 Installing the shelf in the equipment rack



3 Align the holes in the shelf with holes in the front of the rack.

4 Make sure that the support flange snaps into place (Figure 4).

5 Insert one of the supplied 1/2-in. truss screws through the top hole on each side of the shelf into the hole in the rack and tighten the screws (Figure 4).

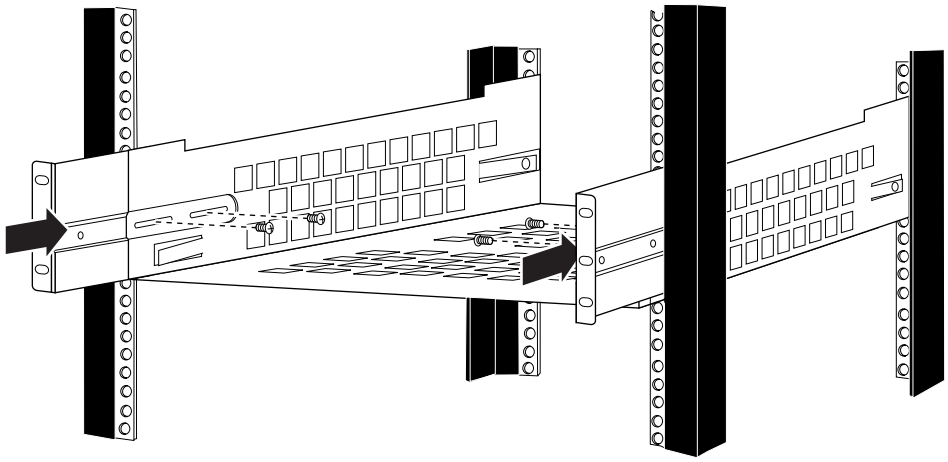
6 Go to the rear of the equipment rack and attach the two rack-mount brackets to the shelf and to the equipment rack as follows:

a If the holes in the rack's vertical supports are not threaded, attach a cage nut in four locations at the rear of the rack.

b Align each bracket with the rear of the rack-mount shelf (Figure 5).

Position the bracket between the shelf and the equipment rack.

Figure 5 Attaching the rack-mount brackets to the rear of the equipment rack



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c Insert two of the supplied 3/8 in. panhead screws into the horizontal slots in the rack-mount shelf through the two holes on the bracket (Figure 5).

d Turn the screws a few times so that they are only loosely attached.

e Insert two of the supplied 3/8 in. panhead screws through the bracket into the hole on the rear rail of the rack and tighten the screws (Figure 5).

f Tighten the 2 screws that you inserted through the rack-mount shelf.

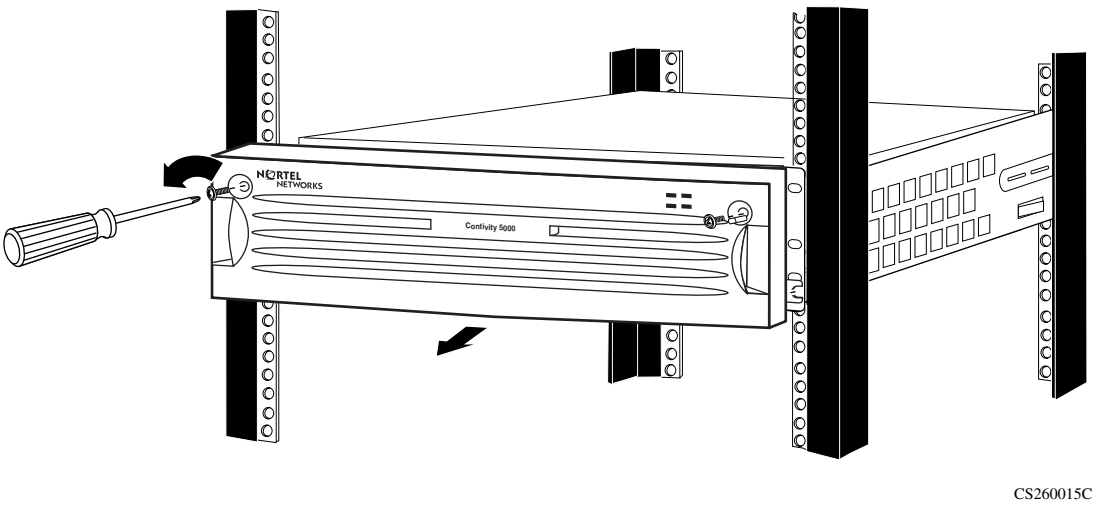
Mounting the chassis in the equipment rack

Warning: The Contivity 5000 weighs approximately 50 pounds (23 kg). This weight is not evenly distributed; the right side of the gateway weighs more than the left. For this reason, two people should install the system in the equipment rack.

To install the Contivity 5000 in the equipment rack:

1. With two people facing the front of the equipment rack, set the Contivity 5000 on the rack-mount shelf (Figure 6).
2. Remove the front bezel from the Contivity 5000.
   a. Using the screwdriver, turn each of the 2 screws on the front bezel a quarter turn counterclockwise (Figure 6).

Figure 6 Removing the front bezel



   b. Grip the two handles and firmly pull the bezel toward you to unsnap it from the chassis.

      The first few times that you remove the front bezel, it may be somewhat difficult to remove because the ball studs and socket clips are new.

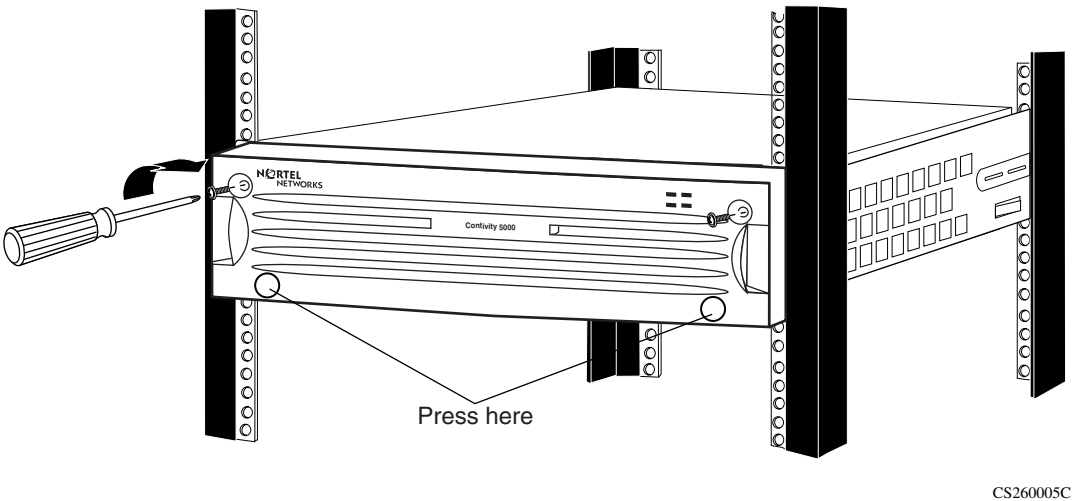
3 Insert one of the supplied 1/2-in. truss screws through the bottom hole on each side of the shelf into the hole in the rack and tighten the screws (see Figure 4 on page 28).

4 Replace the front bezel (Figure 7).

a Hold the two handles on the bezel and push it onto the chassis.

b Using the screwdriver, tighten the 2 screws to secure the bezel to the chassis.

Figure 7 Replacing the front bezel



Chapter 2
Cabling the gateway and turning the power on

This chapter provides information about how to connect communications cables and the two power cords to the Contivity 5000.

Caution: Connect the cables to the built-in Ethernet ports and to the ports on the interface cards installed in the Contivity 5000 before you plug the power cords into the outlets.

This chapter contains the following topics:

Caution: Cabling for all WAN, LAN, and serial connections is not to be routed outside the building environment.

Connecting communications cables

Gather the cables that you will attach to the Contivity 5000.

Table 2 lists the system ports and the ports provided on the optional interface cards that you can install in the Contivity 5000. The table also indicates whether you can obtain cables for the ports from Nortel Networks.

Table 2 Interfaces and cables for the Contivity 5000

	Cable available from Nortel Networks		
Interface	**Included**	**Ordered separately**	**Contact supplier**
10/100BASE Ethernet system port			X
1000BASE-T Ethernet system port			X
Serial port	X		
10/100BASE Ethernet			X
1000BASE-T Ethernet (copper)			X
1000BASE-SX Ethernet (fiber)		X[1]	
56/64K CSU/DSU WAN			X
ADSL WAN	X		
ISDN BRI			X
V.90 modem	X		
T1/E1 CSU/DSU WAN			X
Quad T1/E1 CSU/DSU WAN			X
Single V.35/X.21 WAN		X[2]	
Dual V.35 WAN	X		
HSSI WAN	X		

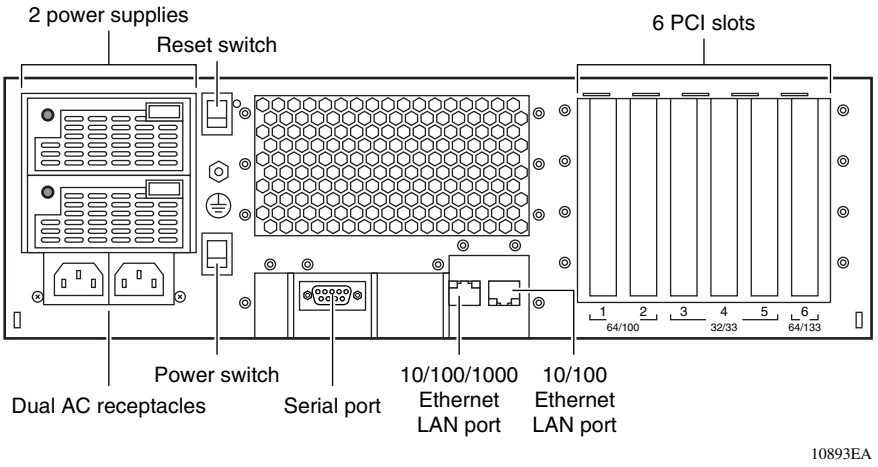
1 Order either the LC-to-LC cable or the LC-to-SC cable.

2 Order either the V.35 cable or the X.21 cable.

For information about the connectors and cable pinouts, see Appendix A, “Technical specifications,” on page 93.

Figure 8 shows the back of the Contivity 5000. All interface cables and the power cords attach to the rear of the gateway.

Figure 8 Rear view of the Contivity 5000



Note: When one or both AC power cords are connected to power outlets, the system is set to standby mode with voltages applied to the system motherboard. The power switch on the back of the Contivity 5000 is a *system activation switch* and is not directly connected to AC power or to the system power supplies. This switch controls the motherboard, which turns the system on via processor initiation.

Connect the interface cables to the Contivity 5000 in this order:

1. Connect the appropriate RJ-45 cables to the built-in LAN ports (10/100BASE and 1000BASE-T) on the gateway (see Figure 8 on page 35).

   For more information about the cables that you can connect to these ports, see "System ports" on page 94.

2. If you plan to connect a terminal or PC to the gateway, connect the serial cable shipped with the gateway to the serial port (see Figure 8 on page 35).
3. Connect all other cables to the ports on the installed interface cards.

   If you ordered optional interface cards, connect the cables for these interfaces to the ports.

Connecting the power cords

You must order two power cords for the Contivity 5000 separately.

Warning: Do not modify or use an AC power cord if it is not the exact type that is required for your power outlet.

The power cords must meet the requirements described in Table 3.

Table 3 Power cord requirements

Requirement	Description
Current rating	The power cords must be rated for the available AC voltage and must have a current rating that is at least 125 percent of the gateway's current rating (6.2 A @ 100 VAC or 3.1 A @ 220 VAC).
Certification	The power cords must have certification marks from an acceptable regional agency.
Cord length and flexibility	Each power cord must be less than 4.5 meters (14.7 feet) long. It must be a flexible HAR (harmonized) cord or VDE-certified cordage to comply with the gateway's safety certifications.
Power supply connector	The connector that you plug into the AC receptacle on the gateway must be an IEC 320, C13 female.
Wall outlet connector	The power cords must terminate in a male plug with appropriate grounding.

To connect the power cords and turn on the system power:

1. Connect each power cord to an AC receptacle on the back of the gateway (see Figure 8 on page 35).
2. Connect each power cord to a power outlet.

Caution: You should protect the Contivity 5000 by plugging it into a surge suppressor.

3 Press and release the power switch on the rear of the Contivity 5000 (see Figure 8 on page 35) and wait for the gateway to boot.

Note: When you press the power switch, 3 or 4 seconds may elapse before the system power turns on.

See the next section, "Verifying a successful installation."

Verifying a successful installation

After you connect the Contivity 5000 to the power source and turn the system power on, you can verify a successful installation by checking the LEDs on the front panel (Figure 9).

The following sequence of LEDs should occur:

1 After you turn on the system power, all four front panel LEDs light up.

2 After a few seconds, all LEDs other than the Boot LED turn off. The Boot LED is yellow to indicate that the gateway is booting.

3 When the boot process completes successfully, the Boot LED turns off and the Ready LED lights green, indicating that the gateway is operational.

4 After approximately 10 seconds, the Alert LED lights yellow because the gateway is not configured.

   For a newly installed gateway, a yellow Alert LED does not indicate an alarm condition. After you configure the management IP address on the gateway, the Alert LED turns off. (See Chapter 3, "Configuring the management IP interface," on page 51.)

If the LEDs on the front panel light in this sequence, your installation is successful. If the LEDs do not light in this sequence, check that the bezel is on the gateway and that the power cords are properly attached to the power supplies (see "Connecting the power cords" on page 36).

If the Contivity 5000 still does not boot, contact your local Nortel Networks Technical Solutions Center (see "How to get help" on page 18).

Understanding the LEDs

This section describes the LEDs on the front panel and on the power supplies, as well as on the interface cards that have LEDs. You can confirm that the LAN and WAN interfaces are cabled properly by examining the LEDs.

Front panel LEDs

The front panel of the Contivity 5000 has four system LEDs (Figure 9). These LEDs indicate the status of the Contivity 5000.

Figure 9 Front panel LEDs

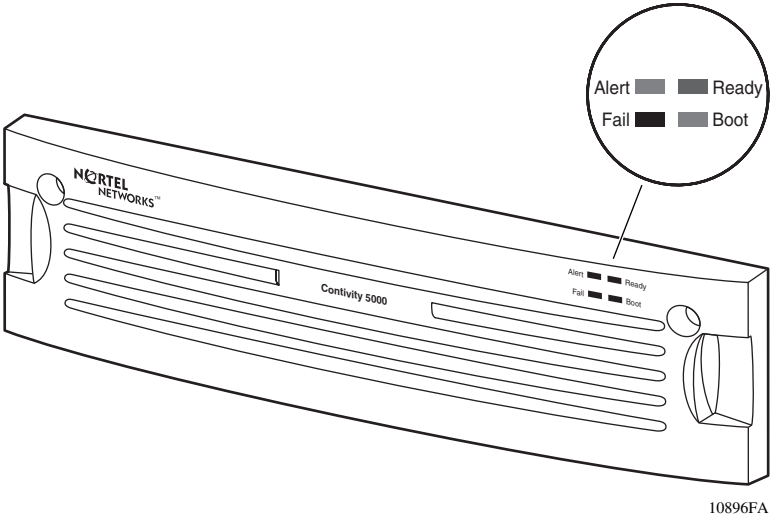


Table 4 describes the LEDs on the Contivity 5000 front panel.

Table 4 Front panel LED indicators

LED	Indicator	Description
Alert	Yellow	A non-fatal alarm condition exists. The yellow alert condition is described in the health check display.
Fail	Red	A serious alarm condition exists that requires attention. A red alert usually indicates a hardware error. The red alert condition is described in the health check display.
Boot	Yellow	The system is booting and is in a non-ready state.
Ready	Green	The boot process has completed successfully and the system has reached a state of readiness.

For complete information about the health check, event log, and system log, see *Managing and Troubleshooting the Contivity Secure IP Services Gateway.*

Power supply LED

Each of the two power supplies has one LED that indicates the status of the power supply itself and of the system as a whole (Figure 10).

Figure 10 Power supply LED

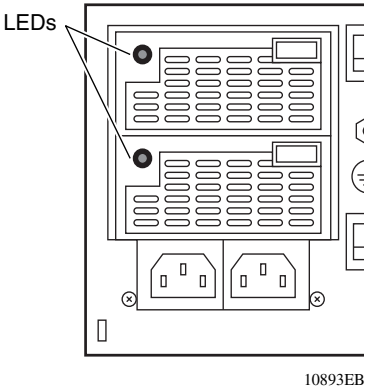


Table 5 describes the LED on the power supply.

Table 5 Power supply LED

LED indicator	Description
Steady green	This power supply and the system are receiving power.
Flashing green	This power supply is receiving power, but the system is not turned on.
Yellow	The power cord is not plugged into this power supply, or the power supply has failed and you need to replace it.

LEDs on the system 1000BASE-T Ethernet port

Figure 11 shows the LEDs for the 1000BASE-T Ethernet port located on the rear of the Contivity 5000.

Figure 11 LEDs on the system 1000BASE-T Ethernet port

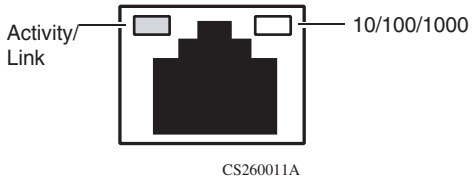


Table 6 describes the LEDs on the system 1000BASE-T Ethernet port.

Table 6 LED indicators on the system 1000BASE-T Ethernet port

LED	Indicator	Description
Activity/Link	Green steady	The port is connected to a valid link partner.
	Green flashing	The LAN port is sending or receiving network data.
	Off	The port is not linked to a valid partner.
10/100/1000	Orange	The LAN port is operating at 1000 Mb/s.
	Green	The LAN port is operating at 100 Mb/s.
	Off	The LAN port is operating at 10 Mb/s.

LEDs on the system 10/100BASE Ethernet port

Figure 12 shows the LEDs for the 10/100BASE Ethernet port located on the rear of the Contivity 5000.

Figure 12 LEDs on the system 10/100BASE Ethernet port

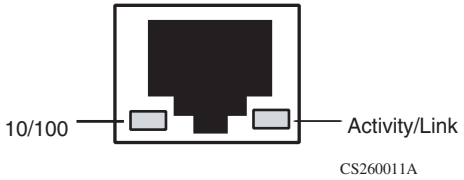


Table 7 describes the LEDs on the system 10/100BASE Ethernet port.

Table 7 LED indicators on the system 10/100BASE Ethernet port

LED	Indicator	Description
10/100	On	The LAN port is operating at 100 Mb/s.
	Off	The LAN port is operating at 10 Mb/s.
Activity/Link	On	The cable connections between the LAN port and the hub are good.
	Flashing	The LAN port is sending or receiving network data. The frequency of the flashes increases with increased traffic.
	Off	The cable connections between the LAN port and the hub are faulty.

10/100BASE Ethernet interface card LEDs

Figure 13 shows the LEDs on the 10/100BASE Ethernet interface card.

Figure 13 LEDs on the 10/100BASE Ethernet interface card

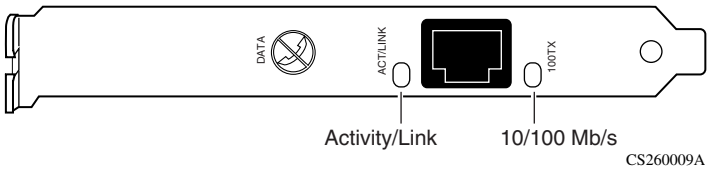


Table 8 describes the LEDs on the 10/100BASE Ethernet interface card.

Table 8 LED indicators on the 10/100BASE Ethernet interface card

LED	Indicator	Description
ACT/LINK	Steady Green or Flashing Green	The card is sending or receiving network data. The frequency of the flashes increases with increased traffic.
	Off	The card is not sending or receiving data.
10/100TX	Green	The port is operating at 100 Mb/s.
	Off	The port is operating at 10 Mb/s.

1000BASE-T Ethernet interface card LEDs

Figure 14 shows the LEDs on the 1000BASE-T Ethernet interface card.

Figure 14 LEDs on the 1000BASE-T Ethernet interface card

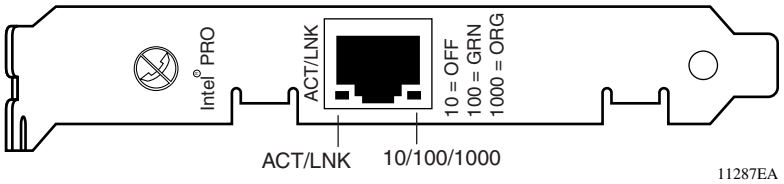


Table 9 describes the LEDs on the 1000BASE-T Ethernet interface card.

Table 9 LED indicators on the 1000BASE-T Ethernet interface card

LED	Indicator	Description
ACT/LNK	Green steady	The port is connected to a valid link partner.
	Green flashing	The LAN port is sending or receiving network data.
	Off	The port is not linked to a valid partner.
10/100/1000	Off	The LAN port is operating at 10 Mb/s.
	Green	The LAN port is operating at 100 Mb/s.
	Orange	The LAN port is operating at 1000 Mb/s.

1000BASE-SX Ethernet interface card LED

Figure 15 shows the LED on the 1000BASE-SX Ethernet interface card.

Figure 15 LED on the 1000BASE-SX Ethernet interface card

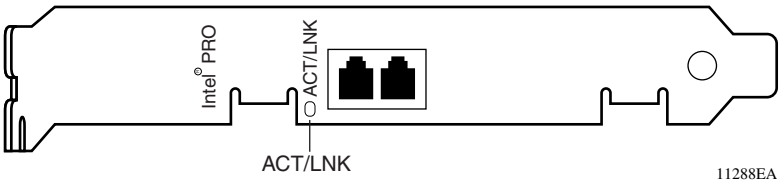


Table 10 describes the LED on the 1000BASE-SX Ethernet interface card.

Table 10 LED indicator on the 1000BASE-SX Ethernet interface card

LED	Indicator	Description
ACT/LNK	Green steady	The port is connected to a valid link partner.
	Green flashing	The LAN port is sending or receiving network data.
	Off	The port is not linked to a valid partner.

56/64K CSU/DSU WAN interface card LEDs

Figure 16 shows the LEDs on the 56/64K CSU/DSU WAN interface card.

Figure 16 LEDs on the 56/64K CSU/DSU WAN interface card

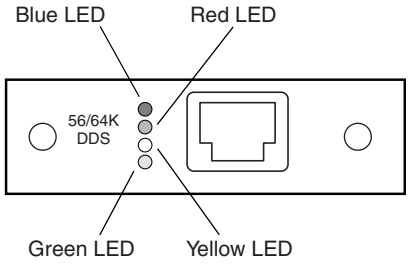


Table 11 describes the LEDs on the 56/64K CSU/DSU WAN interface card.

Table 11 LED indicators on the 56/64K CSU/DSU WAN interface card

LED	Description
Blue	Blue alarm LED is lit when receiving an upstream failure denoted by an alarm indication signal (AIS).
Red	Red alarm LED is lit when a loss-of-signal (LOS) or out-of-frame (OOF) condition is detected on the receive signal.
Yellow	Yellow alarm LED is lit when the far-end equipment is in the red alarm condition.
Green	Normal operation.

ADSL WAN interface card LEDs

Figure 17 shows the LEDs on the ADSL WAN interface card.

Figure 17 LEDs on the ADSL WAN interface card

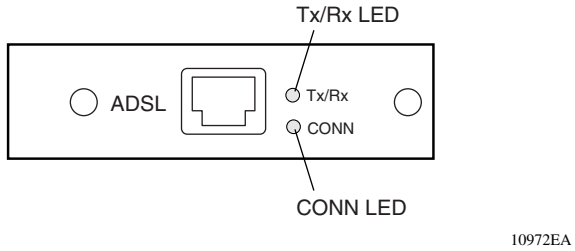


Table 12 describes the LEDs on the ADSL WAN interface card.

Table 12 LED indicators on the ADSL WAN interface card

CONN LED	Tx/Rx LED	Description
Steady green	Steady green	The ADSL interface card is not initialized; the software driver is not installed.
Off	Off	The ADSL interface card is initialized, but has not established a link with the ADSL network.
Flashing green	Off	The ADSL interface card is attempting to establish a link with the ADSL network.
Steady green	Off	The ADSL interface card has established a link with the ADSL network.
Steady green	Flashing green	The ADSL interface card is sending or receiving network data. (The LED may be dim.)

T1/E1 CSU/DSU WAN interface card LEDs

Figure 18 shows the LEDs on the T1/E1 CSU/DSU WAN interface card.

Figure 18 LEDs on the T1/E1 CSU/DSU WAN interface card

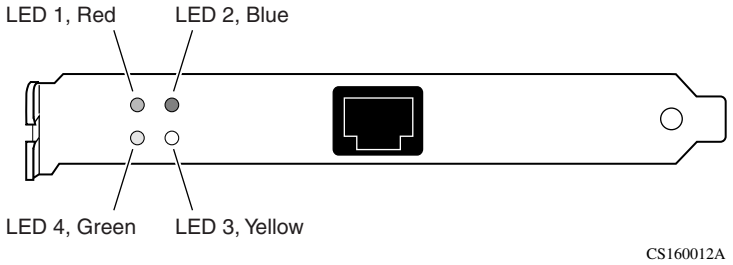


Table 13 describes the LEDs on the T1/E1 CSU/DSU WAN interface card.

Table 13 LED indicators on the T1/E1 CSU/DSU WAN interface card

LED	Indicator	Description
LED 1	Red	Red alarm LED is lit when a loss-of-signal (LOS) or out-of-frame (OOF) condition is detected on the receive signal.
LED 2	Blue	Blue alarm LED is lit when receiving an upstream failure denoted by an alarm indication signal (AIS).
LED 3	Yellow	Yellow alarm LED is lit when the far-end equipment is in the red alarm condition.
LED 4	Green	Normal operation.

Quad T1/E1 CSU/DSU WAN interface card LEDs

Figure 19 shows the LEDs on the quad T1/E1 CSU/DSU WAN interface card.

Figure 19 LEDs on the quad T1/E1 CSU/DSU WAN interface card

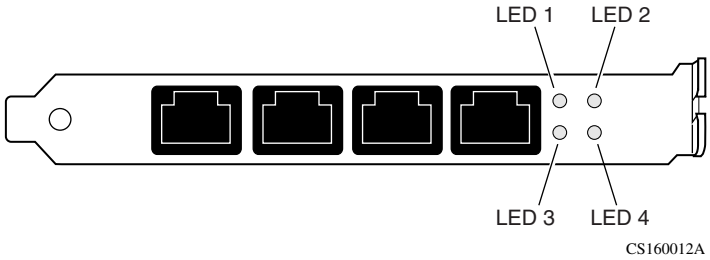


Table 14 describes the LEDs on the quad T1/E1 CSU/DSU WAN interface card.

Table 14 LED indicators on the quad T1/E1 CSU/DSU WAN interface card

LED	Indicator	Description
LED 1	Off	Port 1 is disabled.
	On	Port 1 is enabled and operating normally.
	Flashing	Port 1 is enabled and in an alarm state (red, yellow, or blue).
LED 2	Off	Port 2 is disabled.
	On	Port 2 is enabled and operating normally.
	Flashing	Port 2 is enabled and in an alarm state (red, yellow, or blue).
LED 3	Off	Port 3 is disabled.
	On	Port 3 is enabled and operating normally.
	Flashing	Port 3 is enabled and in an alarm state (red, yellow, or blue).
LED 4	Off	Port 4 is disabled.
	On	Port 4 is enabled and operating normally.
	Flashing	Port 4 is enabled and in an alarm state (red, yellow, or blue).

Single V.35/X.21 WAN interface card LEDs

Figure 20 shows the LEDs on the single V.35/X.21 WAN interface card.

Figure 20 LEDs on the single V.35/X.21 WAN interface card

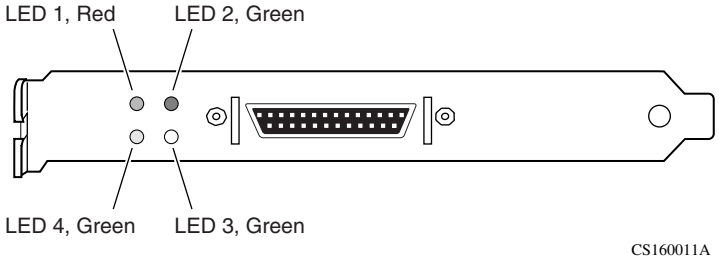


Table 15 describes the LEDs on the single V.35/X.21 WAN interface card.

Table 15 LED indicators on the single V.35/X.21 WAN interface card

LED	Indicator	Description
LED 1	Red	No external transmit clock source is available.
LED 2	Green	The signals CDC and DSR are on between the DSU and the adapter. LED 2 detects receive link status.
LED 3	Green	Power to the adapter is on and the onboard microcode is loaded.
LED 4	Green	Cable is detected.

SSL VPN Module 1000 LEDs

Figure 21 shows the LEDs on the SSL VPN Module 1000.

Figure 21 LEDs on the SSL VPN Module 1000

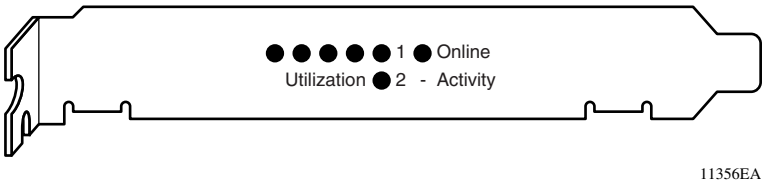


Table 16 describes the LEDs on the SSL VPN Module 1000.

Table 16 LED indicators on the SSL VPN Module 1000

LEDs	Indicator	Description
Online	Steady Green	The SSL VPN Module 1000 is operating normally.
	Yellow	A reset occurred on the SSL VPN Module 1000.
	Off	The SSL VPN Module 1000 is not receiving power.
Activity LED 1	Steady Green	The SSL VPN Module 1000 is operating normally.
	Flashing Green	Activity is occurring on the SSL VPN Module 1000.
	Yellow	A reset occurred on the SSL VPN Module 1000.
Activity LED 2	—	Not used. (This LED is often lit, but it has no meaning.)
Utilization (4 LEDs)	Steady green	Together, these four LEDs indicate an approximate average level of CPU utilization. When one LED is lit, CPU utilization is approximately 25%; when two LEDs are lit, CPU utilization is approximately 50%.
	Blinking in unison	The SSL VPN Module 1000 is idle.

Chapter 3
Configuring the management IP interface

This chapter describes how to configure a management IP address, subnet mask, and default gateway address on a newly installed Contivity 5000. After you complete the procedures in this chapter, you will be able to configure and manage the gateway using a Web browser from a PC.

To configure the management IP address, you use the serial interface configuration menu. You must connect a PC or terminal to the serial port on the Contivity 5000.

This chapter contains the following topics:

Required information

Before you configure the management interface, collect this information:

- IP address for the management interface

  The management IP address must be accessible from one of the private physical interfaces on the Contivity 5000. For example, if you plan to assign IP address 10.2.3.3 with subnet mask 255.255.0.0 to the private physical interface, the management IP address must reside in the 10.2 network.

- Subnet mask

  The subnet mask specifies which IP addresses are directly reachable on the network and which ones must be routed through a gateway. For example, the IP address 10.2.3.3 with a subnet mask of 255.255.0.0 indicates that all hosts with addresses 10.2.*n*.*n* are directly reachable.

- Default gateway (optional)

  The default gateway routes packets to destinations for which there is no specific route in the routing table. You can configure a default gateway when you assign the management IP address, or you can configure it at a later time.

Note: Write down and save the management IP address. You will need it to configure the Contivity 5000.

Configuring the management IP address

You use the serial interface to assign the Contivity 5000 a management IP address and subnet mask so that you can then use a Web browser for management.

To configure the management IP address using the serial interface:

1. Turn on the terminal or PC.

   The terminal or PC should be configured as follows:

   - 9600 baud
   - 8 data bits
   - 1 stop bit
   - No parity
   - No flow control

2. Connect the serial cable (supplied with the Contivity 5000) from the gateway's serial port to a terminal or to the communications port on a PC.

3. On the PC, start HyperTerminal* or another terminal emulation program and press Enter.

   The Welcome screen appears.

```
Welcome to the Contivity Secure IP Services Gateway
Copyright (c) 1999-2004 Nortel Networks, Inc.

Version:              V04_90.188
Creation date:        April 27, 2004, 20:51:06
Date:                 04/27/2004
Unit Serial Number:   317563

Please enter the administrator's user name:
```

4. Enter the default user name and password for the administrator.

   The factory default user name is *admin* and the default password is *setup*. The user name and password are case sensitive.

```
Please enter the administrator's user name: admin

Please enter the administrator's password: *****
```

The serial main menu appears.

```
Main Menu: System is currently in NORMAL mode.

1) Interfaces
2) Administrator
3) Default Private Route Menu
4) Default Public Route Menu
5) Create A User Control Tunnel (IPsec) Profile
6) Restricted Management Mode       FALSE
7) Allow HTTP Management            TRUE
8) Firewall Options
9) Shutdown
B) System Boot Options
P) Configure Serial Port
C) Controlled Crash
L) Command Line Interface
R) Reset System to Factory Defaults
E) Exit, Save and Invoke Changes

Please select a menu choice (1 - 9,B,P,C,L,R,E):
```

5 Type **1** and press Enter.

The Interface menu appears.

```
- Interface Menu

0) Slot 0, Port 1, Private LAN
     Interface IP Address =
     Subnet Mask = 0.0.0.0
     Speed/Duplex = AutoNegotiate

1) Slot 1, Port 1, Public LAN
     IP Address =
     Subnet Mask = 0.0.0.0
     Speed/Duplex = AutoNegotiate

R) Return to the Main Menu.

Please select a menu choice:
```

6 Type **0** and press Enter to configure the management IP address.

The default settings appear, followed by the prompt for the management IP address. The old management IP address field is blank on a new gateway.

```
0) Slot 0, Port 1, Private LAN
     Interface IP Address =
     Subnet Mask = 0.0.0.0
     Speed/Duplex = AutoNegotiate

   * Type 0.0.0.0 to delete.
   * Just type <CR> to skip.

Old Management IP Address =
New Management IP Address* =
```

7 At the New Management IP Address prompt, type the management IP address and press Enter.

The prompt for the interface IP address appears.

```
Old Interface IP Address =
New Interface IP Address* =
```

8 Enter the IP address for the private LAN or press Enter to skip this prompt.

The subnet mask prompt appears.

```
Old Subnet Mask = 0.0.0.0
New Subnet Mask =
```

9 At the New Subnet Mask prompt, type the subnet mask for the management IP address and press Enter.

The Speed/Duplex prompt appears.

10 Press Enter to leave the speed and duplex settings unchanged.

The Interface menu appears again with the changes you made.

```
- Interface Menu

0) Slot 0, Port 1, Private LAN
     Management IP Address = 47.33.245.66, (Subnet Mask =
     255.255.0.0)
     Interface IP Address = 47.33.245.64
     Subnet Mask = 255.255.0.0
     Speed/Duplex = AutoNegotiate

1) Slot 1, Port 1, Public LAN
     IP Address =
     Subnet Mask = 0.0.0.0
     Speed/Duplex = AutoNegotiate

R) Return to the Main Menu.

Please select a menu choice:
```

11 Type **R** and press Enter to return to the serial main menu.

12 From the serial main menu, type **E** and press Enter to save the new management IP address and mask and to exit the serial menu.

13 Go to the next section, "Testing the configuration," to verify that you can access the Contivity 5000 from a Web browser.

For detailed information about configuring and managing the Contivity 5000, refer to the documentation on the software CD.

Testing the configuration

After you assign a management IP address to the Contivity 5000, start your Web browser to verify that you can access the gateway from the browser.

To manage the Contivity 5000 using the GUI, your PC must be running one of the following browsers:

- Internet Explorer Version 5.5 or later
- Netscape* Navigator 4.79 or 6.2

To test the management IP address on the Contivity 5000:

1. Open a Web browser.
2. In the URL field, enter **http://** followed by the management IP address that you assigned to the Contivity 5000.

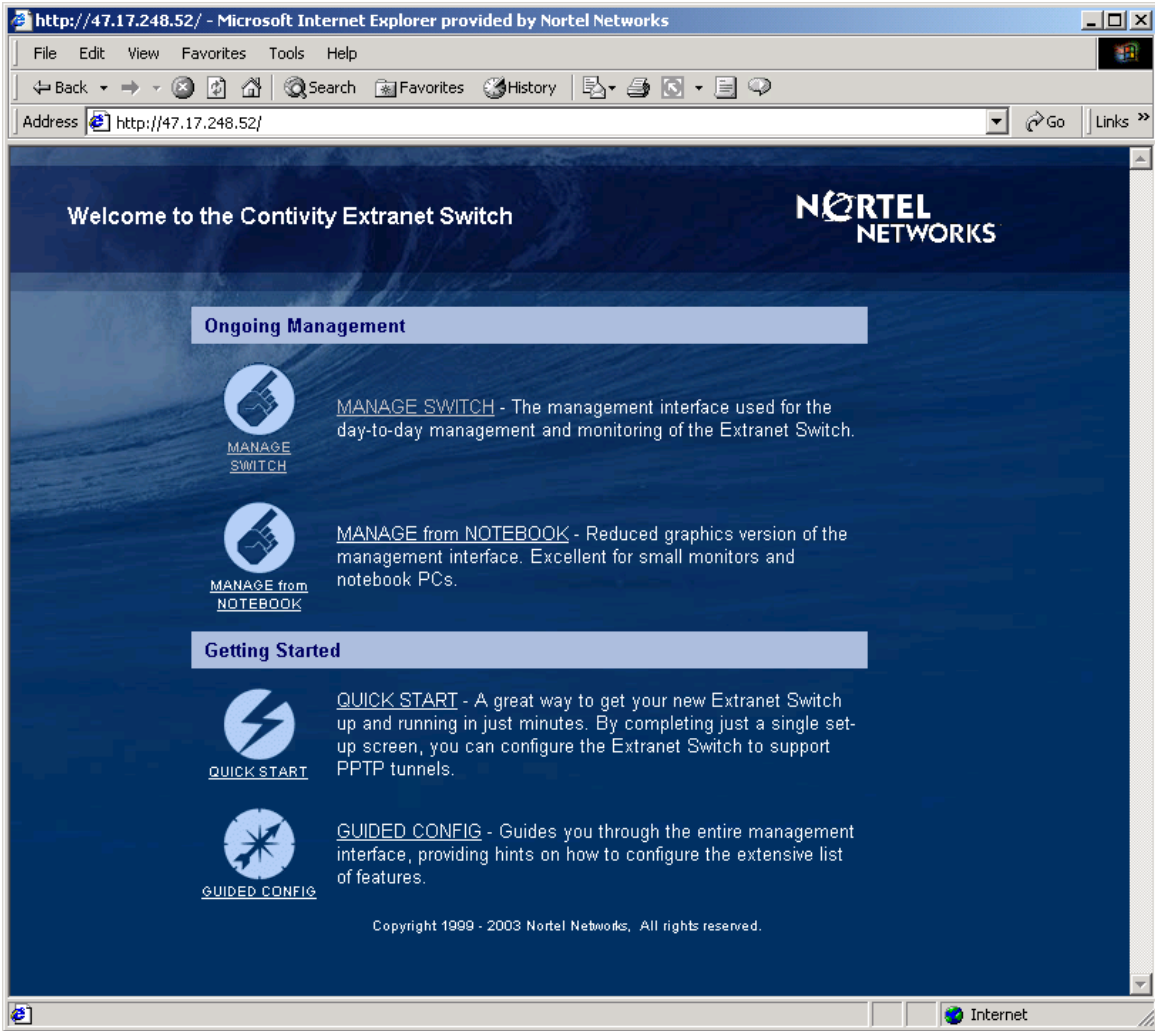
   For example, if the management IP address is 10.2.3.2, enter **http://10.2.3.2**.

   If the Welcome screen (Figure 22) appears, you correctly configured the management IP address for the gateway.

Note: If the Welcome screen does not appear, see "Troubleshooting" on page 59.

3. Go to *Configuring Basic Features for the Contivity Secure IP Services Gateway* for information about configuring the Contivity 5000.

Figure 22 Welcome screen



Troubleshooting

If you cannot connect to the Contivity 5000 using your browser, check the following items:

- Make sure that you entered the correct IP address in the browser window.
- Type a known URL in the browser window to make sure that your network connection is good.
- Check that the management IP address that you configured is on the same subnet as the physical LAN attached to the gateway.
- Make sure that your PC is running a supported browser, either Internet Explorer Version 5.5 or later, or Netscape Navigator* 4.79 or 6.2.
- Check the physical connections on the Contivity 5000, especially the LAN cable and both power cords.

If you still cannot connect to the Contivity 5000 using a browser, connect a terminal or PC to the gateway with the serial cable and check the management IP address listed in the serial menu (see "Configuring the management IP address" on page 53). Reconfigure the management IP address if necessary.

If you cannot resolve the problem, contact the Nortel Networks Technical Solutions Center closest to you (see "How to get help" on page 18).

Chapter 4
Installing option cards and field replaceable units

This chapter provides instructions on how to install and replace the following field replaceable units (FRUs) in the Contivity 5000:

- LAN, WAN, and serial interface cards
- SSL VPN Module 1000
- Hardware accelerator cards
- Dual inline memory modules (DIMMs)
- Power supplies
- Hard disk drives
- Fan trays

This chapter contains the following topics:

Preparing to install hardware options

This section describes preliminary steps for installing and replacing field replaceable units in the Contivity 5000.

Option cards, DIMMs, and fan trays

To install an option card, pair of DIMMs, or fan tray, you must first follow these steps:

1. Shut down the Contivity 5000 and unplug it.
2. Remove the front bezel from the chassis.
3. Remove the chassis from the equipment rack.
4. Remove the top cover from the chassis.

If you need to add or replace an option card, pair of DIMMs, or fan tray, see "Shutting down the system to add or replace hardware" on page 63.

Power supplies

The Contivity 5000 power supplies are hot-swappable. You do not need to shut down the system to replace a power supply. For instructions, see "Replacing a power supply" on page 80.

Hard disk drives

The backup hard disk drive is hot-swappable, but the primary disk drive is not.

- To replace either hard disk drive, you must remove the front bezel.
- To replace the primary hard disk drive, you must first shut down the gateway.

For complete information about replacing a hard disk drive, see "Replacing a hard disk drive" on page 83.

Shutting down the system to add or replace hardware

Shut down the Contivity 5000 and unplug it to install or replace any of these field replaceable units:

- Option card
- Pair of DIMMs
- Fan tray

To replace the primary hard disk drive, shut down the system as described in this section. However, you do not need to unplug the chassis to replace a hard drive.

Caution: Shut down the Contivity 5000 as described in this section before you attempt to add or replace option cards, DIMMs, fan trays, or hard disk drives.

To shut down the Contivity 5000:

1. Use the Web GUI or the command line interface to shut down the gateway.
   - Web GUI: Choose Admin > Shutdown. Select the option to power off the gateway after shutdown.
   - Command line interface: Use the **`reload`** command to shut down the system. For example, enter **`reload power-off disable-logins "Upgrade hardware"`**

     For the complete syntax of the **`reload`** command, see the *Reference for the Contivity Secure IP Services Gateway Command Line Interface*.
2. Wait for the system to shut down. You may need to wait several minutes.
3. Disconnect the two power cords from the power outlets and then disconnect the cords from the Contivity 5000.

   The power receptacles are located on the rear of the Contivity 5000 (see Figure 8 on page 35).

Danger: Make sure to turn off the Contivity 5000 and unplug *both* power cords before you attempt to remove or install an option card, DIMM, or fan tray.

Removing the front bezel and top cover

To replace a hard disk drive, you must remove the front bezel from the Contivity 5000. To install option cards or DIMMs, or to replace a fan tray, you must remove the front bezel and the top cover from the Contivity 5000.

To remove the front bezel:

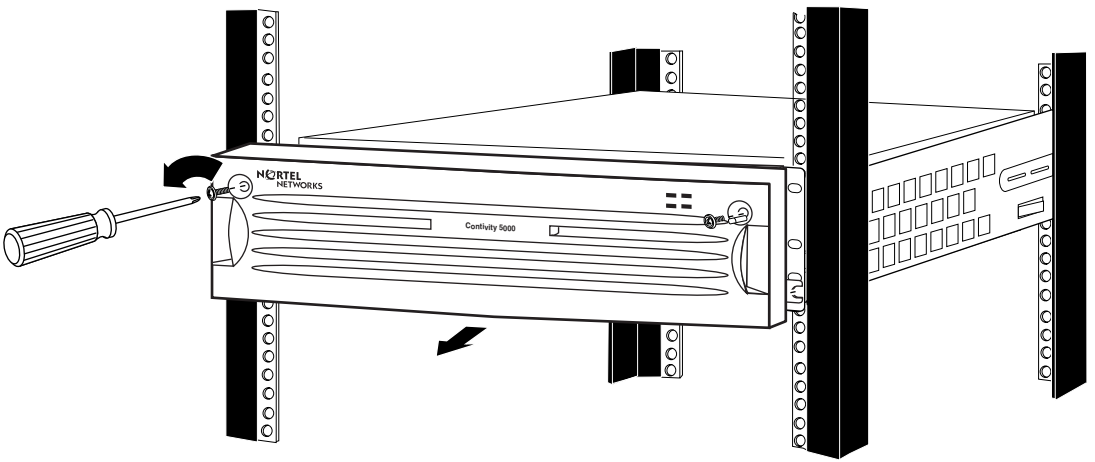
1 Shut down the Contivity 5000 using the Web GUI or the command line interface and then unplug it as described in "Shutting down the system to add or replace hardware" on page 63.

You do not need to unplug the gateway to replace a hard disk drive.

Danger: Make sure to turn off the Contivity 5000 and unplug it before you attempt to install an option card, DIMM, or fan tray.

2 Using a Phillips screwdriver, turn each of the 2 screws on the front bezel a quarter turn counterclockwise (Figure 23).

Figure 23 Removing the front bezel



3 Grip the two handles and firmly pull the bezel toward you to unsnap it from the chassis.

The first few times that you remove the front bezel, it may be somewhat difficult to remove because the ball studs and socket clips are new.

Note: If you are replacing a hard disk drive, you do not need to remove the chassis from the equipment rack; go to "Replacing a hard disk drive" on page 83.

If the Contivity 5000 is installed in an equipment rack, you must remove it from the rack to add or replace DIMMs, option cards, or fan trays.

To remove the chassis from the rack:

1 At the front of the chassis, remove the two 1/2-in. truss screws that secure the bottom of the chassis to the equipment rack.

Warning: The Contivity 5000 weighs approximately 50 pounds (23 kg). This weight is not evenly distributed; the right side of the gateway weighs more than the left. For this reason, two people should remove the system from the equipment rack.

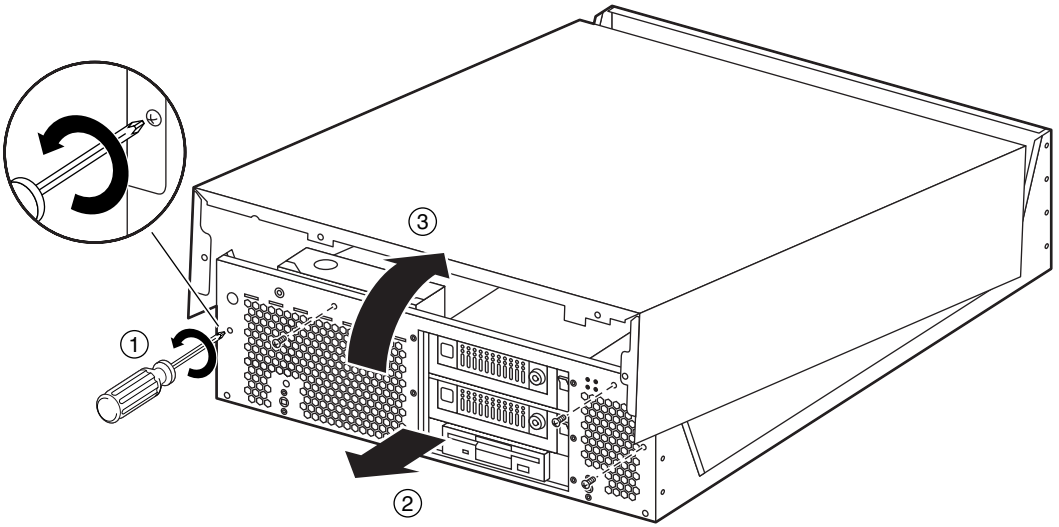
2 With two people facing the front of the equipment rack, remove the Contivity 5000 from the rack-mount shelf and set it on a sturdy surface.

To remove the top cover:

1 Using a Phillips screwdriver, remove the 4 screws that secure the cover to the chassis (Figure 24).

2 Slide the top cover forward approximately 1/4 inch.

Figure 24 Removing the top cover



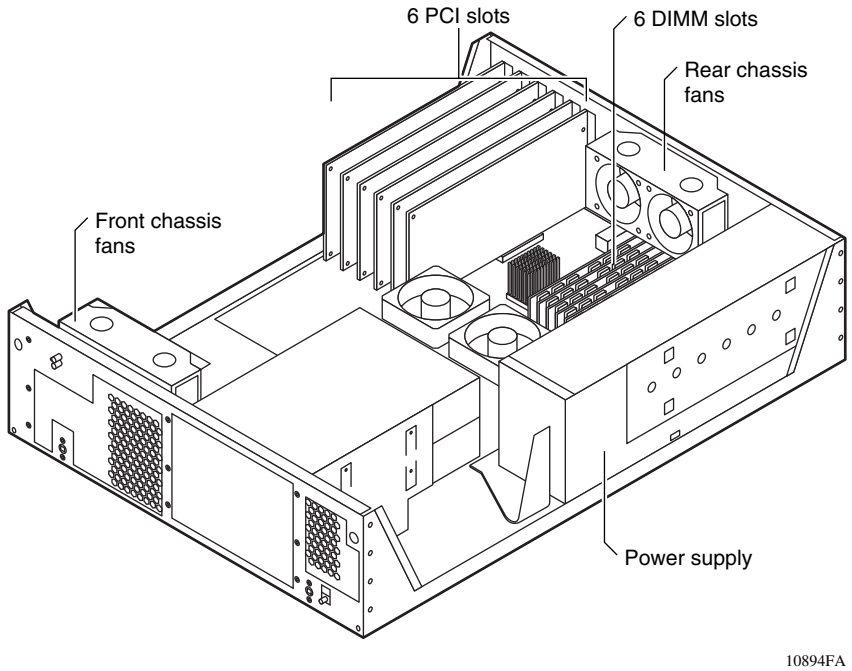
3 Lift the lid 2 or 3 inches and pull it toward you to remove it from the chassis.

The Contivity 5000 system board is now exposed. Figure 25 shows the location of the option card slots, the DIMM slots, and the fan trays on the system board.

Go to the appropriate section in this chapter.

- "Installing and replacing option cards" on page 69
- "Installing and replacing DIMMs" on page 76
- "Replacing a fan tray" on page 87

Figure 25 Location of option cards, DIMMs, and fan trays on the system board



Warning: Beware of danger if battery is incorrectly replaced. Replace with the *same* or an *equivalent battery* only, as recommended by the manufacturer's instructions.

Danger: In spite of the above warning, which is mandated for regulatory approval, *you should not change the battery.* If you suspect a dead battery, contact Nortel Networks Customer Support.

Attaching the antistatic wrist strap

Nortel Networks ships the Contivity 5000 with an antistatic wrist strap. The antistatic wrist strap directs the discharge of static electricity from your body to the chassis of the gateway to avoid damage to sensitive electronic components.

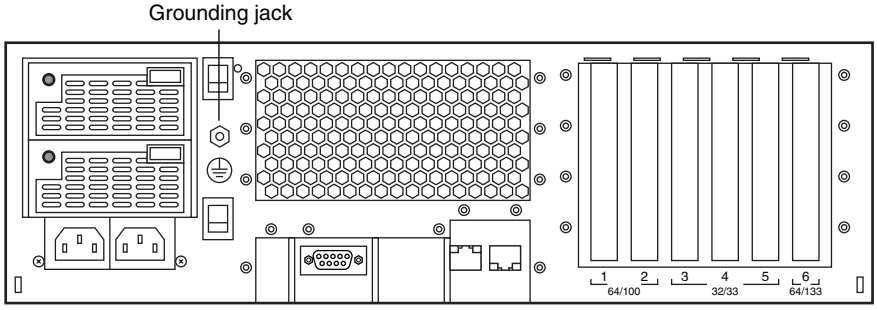
You must wear an antistatic wrist strap on your arm whenever you remove, install, or handle option cards, DIMMs, power supplies, hard disk drives, and fan trays.

Caution: Electrostatic discharge can damage hardware. Follow the procedure in this section to protect your equipment from damage.

To attach the antistatic wrist strap:

1. Locate the antistatic wrist strap and verify that the cable is attached to the wrist strap.
2. Place the strap around your wrist and adjust it to ensure that the metal buckle inside the strap touches your skin.
3. Insert the banana plug into the grounding jack at the rear of the chassis (Figure 26).

Figure 26 Location of the grounding jack for the antistatic wrist strap



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Installing and replacing option cards

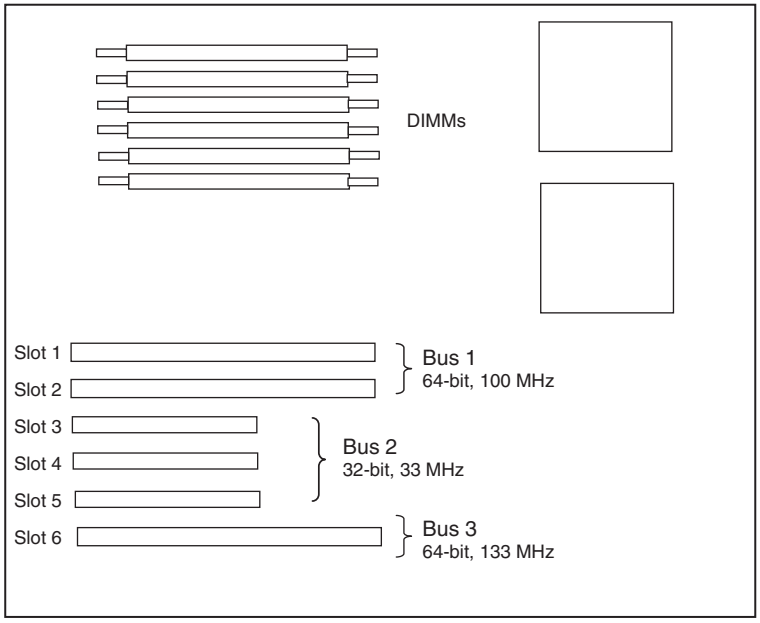
This section provides information about the optimal placement of option cards in the Contivity 5000 and instructions for installing option cards.

Considerations for installing option cards

The Contivity 5000 has six slots for option cards (see Figure 25 on page 67). These slots are connected to three separate buses (Figure 27).

- Slots 1 and 2 are connected to the 64-bit/100-MHz bus (Bus 1).
- Slots 3, 4, and 5 are connected to the 32-bit/33-MHz bus (Bus 2).
- Slot 6 is connected to the 64-bit/133-MHz bus (Bus 3).

Figure 27 Contivity 5000 option card slots and buses



The 1000BASE-T, 1000BASE-SX, and CSA cards are high-speed cards; most other option cards are low-speed (33-bit/33-MHz) cards. To maximize system performance, reserve slots 1, 2, and 6 for high-speed cards, and install low-speed cards in slots 3, 4, and 5. (The SSL VPN Module 1000 must be installed in slot 1.)

If you install a slower (32-bit/33-MHz) card such as the 10/100 Ethernet LAN in a slot attached to a faster bus, the speed of the whole bus is reduced to the width and speed of the slower card. For example, if you install a 10/100 Ethernet LAN card in slot 1, a 1000BASE-T card installed in slot 2 runs at 32-bit/33-MHz, not at the bus speed of 64-bit/100-MHz.

Table 17 lists all option cards that you can install in the Contivity 5000. Table 18 provides guidelines for the placement of the cards in the chassis.

Table 17 Supported option cards for the Contivity 5000

Option card	Maximum number	Restrictions
SSL VPN Module 1000[1]	1	Install this card in slot 1 only.
Contivity Security Accelerator (CSA)[2]	2	You can install two cards of either type or one card of each type. See Table 18 for information about slot placement.
Hardware Accelerator		
10/100 Ethernet interface	5	If possible, install in slots 3, 4, and 5.
1000BASE-T interface (copper)[2]	2	Install two 1000BASE-T cards, two 1000BASE-SX cards, or one card of each type. See Table 18 for more information about slot placement.
1000BASE-SX interface (fiber)[2]		
56/64K CSU/DSU WAN interface[1]	5	If possible, install in slots 3, 4, and 5.
ADSL WAN interface[2]	5	If possible, install in slots 3, 4, and 5.
ISDN BRI S/T or U interface[3]	5	If possible, install in slots 3, 4, and 5.
T1 CSU/DSU WAN interface (full-height)	5	If possible, install in slots 3, 4, and 5. For E1 support, you must install the half-height interface card.
T1/E1 CSU/DSU WAN interface (half-height)	5	
Quad T1/E1 CSU/DSU WAN interface[1]	3	If possible, install in slots 3, 4, and 5.
V.90 modem interface[3]	5	If possible, install in slots 3, 4, and 5. If an SSL VPN Module 1000 is installed in slot 1, do not install the V.90 modem interface card in slot 2.
Single V.35/X.21 WAN interface	5	If possible, install in slots 3, 4, and 5.
HSSI WAN interface	2	Install in slots 3, 4, and 5 only.
Dual V.35 WAN interface[4]	3	Install in slots 3, 4, and 5 only.

1 The Contivity 5000 must be running Version 5.0 or later.

2 The Contivity 5000 must be running Version 4.90 or later.

3 The Contivity 5000 must be running Version 4.80 or later.

4 This option card is no longer available for purchase.

Table 18 provides guidelines for the placement of option cards in the chassis.

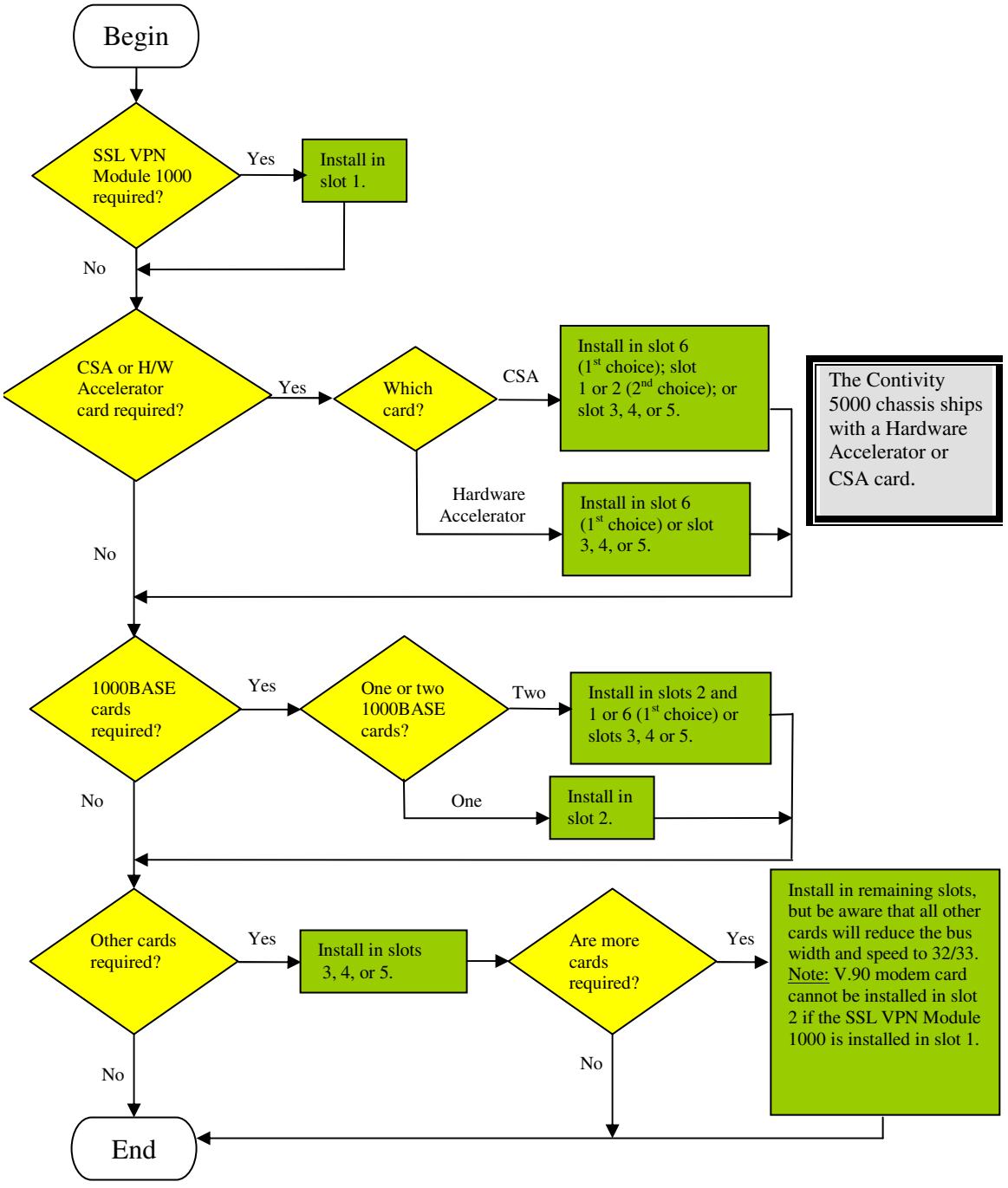
Table 18 Optimal placement of option cards in the Contivity 5000

Installation order	Option card	Slot placement in order of preference	
		With SSL VPN card in slot 1	No SSL VPN card in slot 1
1	SSL VPN Module 1000 (slot 1)	---	---
2	Contivity Security Accelerator (CSA)	First card: slot 6 Second card: slot 2	First card: slot 6 Second card: slot 2 or 1
3	Hardware Accelerator	First card: slot 6; slot 3, 4, or 5 Second card: slot 3, 4, or 5	First card: slot 6; slot 3, 4, or 5 Second card: slot 3, 4, or 5
4	1000BASE-T or 1000BASE-SX interface	First card: slot 2; slot 6; slot 3, 4, or 5 Second card: slot 6; slot 3, 4, or 5	First card: slot 2 or 1; slot 6; slot 3, 4, or 5 Second card: slot 1 or 6; slot 3, 4, or 5
5	V.90 modem interface	Slots 3, 4, and 5 (Do not install this card in slot 2.)	Slots 3, 4, and 5
6	Other option cards (see Table 17)	Slots 3, 4, and 5; slot 6; slot 2	Slots 3, 4, and 5; slot 6; slot 2

Figure 28 is a flowchart that illustrates the placement of option cards in the Contivity 5000. The typical order for installing option cards is as follows:

1. Hardware accelerator cards, from highest speed to lowest speed:
   a. SSL VPN Module 1000
   b. Contivity Security Accelerator
   c. Hardware Accelerator
2. High-speed (64-bit) I/O cards (that is, the 1000BASE-T and 1000BASE-SX)
3. Lower-speed (32-bit) I/O cards

Figure 28 Flowchart for option card installation in the Contivity 5000



Support for 16 I/O ports

The Contivity 5000 supports a maximum of 16 I/O ports. This number includes the two built-in LAN ports on the gateway. When you provision a Contivity 5000 with I/O cards, do not exceed the 16-port maximum. For example, the following configuration results in 17 I/O ports:

- Two built-in LAN ports (2 ports)
- Three quad T1/E1 CSU/DSU WAN interface cards (12 ports)
- One 1000BASE-SX Ethernet interface card (1 port)
- One (legacy) dual V.35 WAN interface card (2 ports)

Installing and replacing an option card

To install or replace an interface card or a hardware accelerator card:

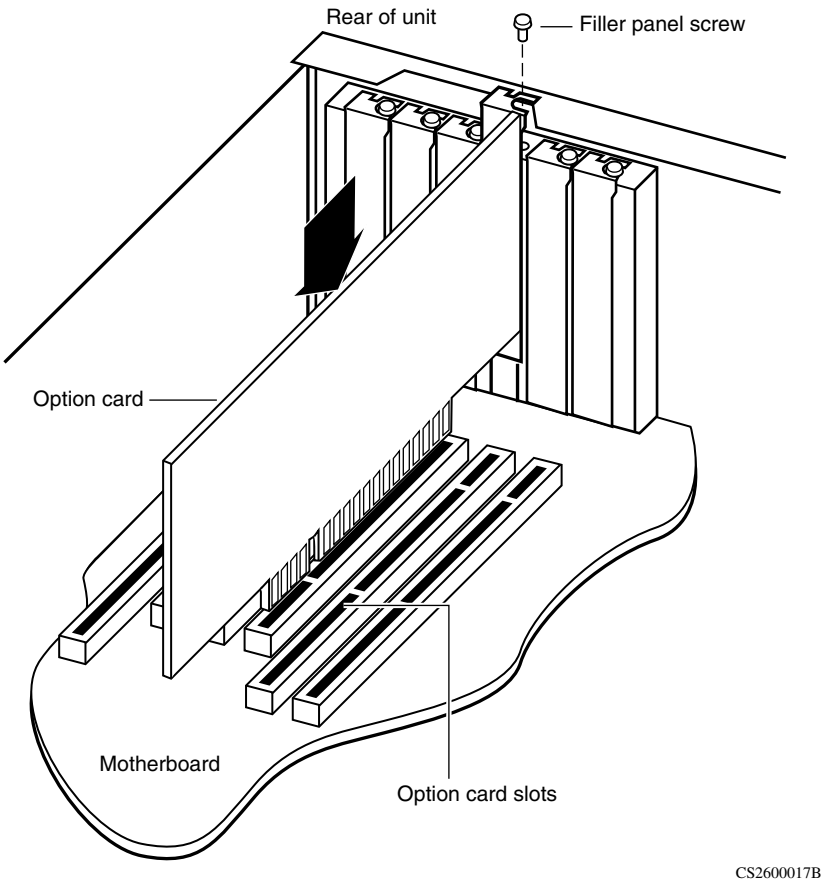
1. Shut down the Contivity 5000 using the Web GUI or the command line interface and then unplug it as described in "Shutting down the system to add or replace hardware" on page 63.

Danger: Turn off the Contivity 5000 and unplug it before you attempt to install an option card.

2. Remove the front bezel from the chassis, then remove the chassis from the equipment rack (see "Removing the front bezel and top cover" on page 64).
3. Remove the top cover from the chassis (see "Removing the front bezel and top cover" on page 64).
4. Attach the antistatic wrist strap that was shipped with the Contivity 5000 (see "Attaching the antistatic wrist strap" on page 68).
5. Locate the slot where you plan to install the new or replacement option card (see Table 17 on page 70 for guidelines).
6. Remove the filler panel screw and pull out the filler panel (or the option card that you are replacing) from the slot (Figure 29).
7. Lower the new option card into the slot connector and gently press the option card into the connector.

Make sure that the card is seated firmly in the slot. If the card is not seated properly, it will not work.

Figure 29 Installing and removing an option card



8 Replace the screw that secures the card to the slot (Figure 29).

9 Replace the top cover on the chassis (see Figure 24 on page 66).

a Hold the cover at an angle and slide it onto the chassis.

b Using a screwdriver, insert and tighten the 4 screws that secure the cover to the chassis.

Warning: The Contivity 5000 weighs approximately 50 pounds (23 kg). Two people are needed to install the gateway in the equipment rack.

10 With two people facing the front of the equipment rack, set the Contivity 5000 on the rack-mount shelf.

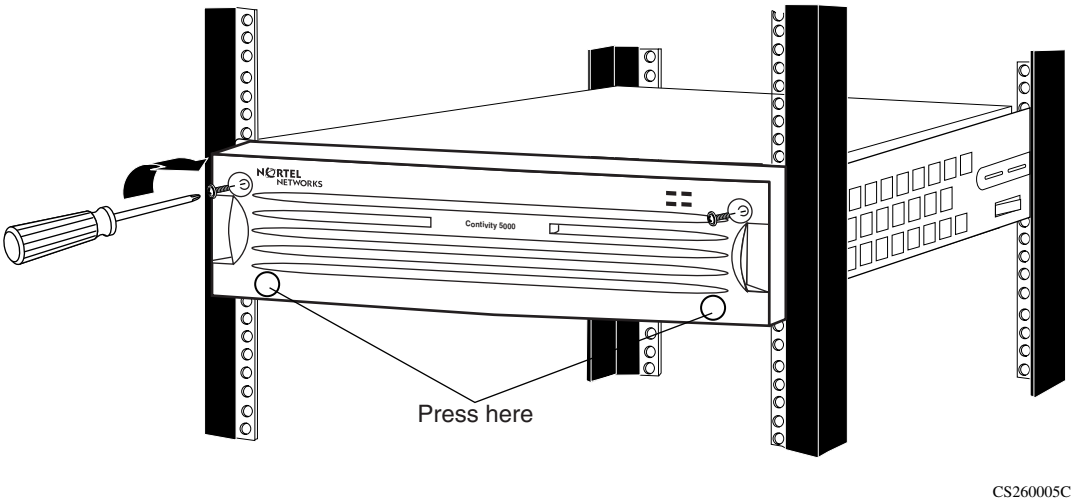
11 Insert one of the 1/2-in. truss screws through the bottom hole on each side of the shelf into the hole in the rack and tighten the screws (see Figure 4 on page 28).

12 Replace the front bezel (Figure 30).

a Hold the bezel by its two handles and push it onto the chassis.

b Using a screwdriver, tighten the 2 screws to secure the bezel to the chassis.

Figure 30 Replacing the front bezel



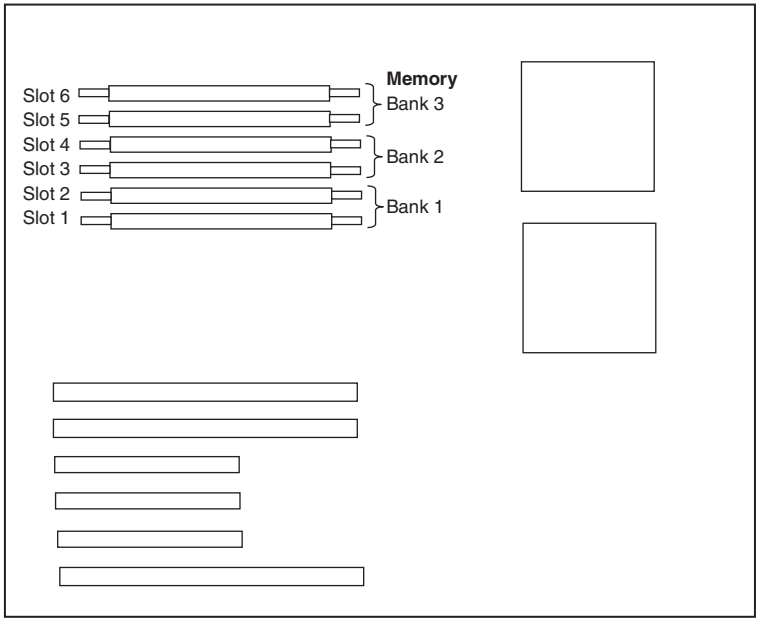
Installing and replacing DIMMs

This section provides information about the placement of dual inline memory modules (DIMMs) in the Contivity 5000 and instructions for installing them.

Considerations for installing DIMMs

The Contivity 5000 has six slots for DIMMs. These six slots are divided into three memory banks (Figure 31).

Figure 31 DIMM memory banks on the Contivity 5000 motherboard



Unless you ordered additional memory, the Contivity 5000 is shipped with two 256 MB DIMMs installed in slots 1 and 2 (memory bank 1).

You can upgrade memory by installing one or two additional *pairs* of DIMMs.

- The new DIMMs must be installed in slots 3 and 4 *or* in slots 5 and 6. (Do not remove the DIMMs installed in slots 1 and 2.)

- The new DIMMs to be installed in a memory bank must be of the same type. The memory type is printed on the label on each DIMM (Figure 32 and Figure 33).

Caution: Do not mix different types of DIMMs within a memory bank. For example, you must install a DIMM of type AVM7232R37C226K0-A with a second DIMM of the same type in slots 3 and 4 or in slots 5 and 6.

Model numbers for DIMMs include the following:

- Avant: AVM232R37C2266K0-A
- Avant: AVM7232R39C5266K1-A
- Micron: MT9VDDT3272G-265C3

Figure 32 illustrates one type of DIMM that you could receive.

Figure 32 DIMM label: Example 1

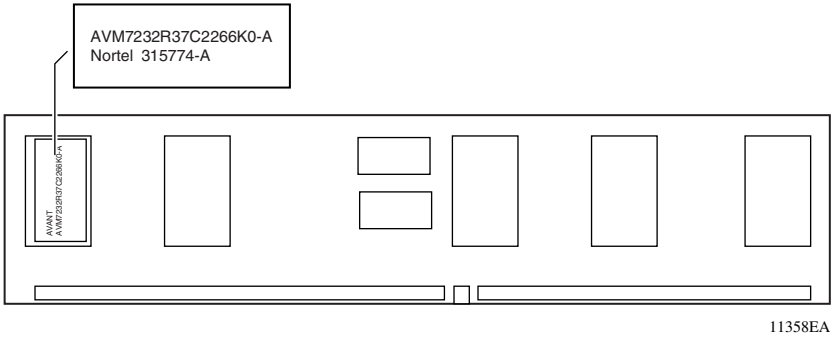
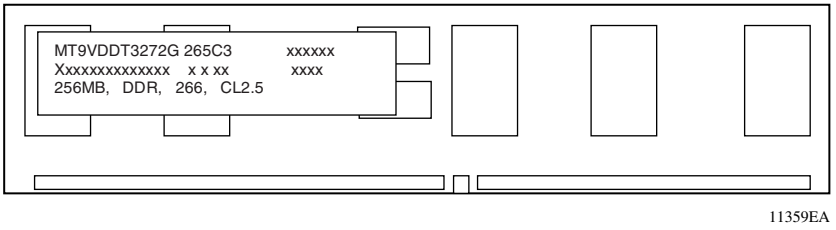


Figure 33 illustrates a second type of DIMM that you could receive.

Figure 33 DIMM label: Example 2



Installing DIMMs

To install or replace a DIMM:

1 Shut down the Contivity 5000 using the Web GUI or the command line interface and then unplug it as described in "Shutting down the system to add or replace hardware" on page 63.

Danger: Turn off the Contivity 5000 and unplug it before you attempt to install DIMMs.

2 Remove the front bezel from the chassis, then remove the chassis from the equipment rack (see "Removing the front bezel and top cover" on page 64).

3 Remove the top cover from the chassis (see "Removing the front bezel and top cover" on page 64).

4 Attach the antistatic wrist strap that was shipped with the Contivity 5000 (see "Attaching the antistatic wrist strap" on page 68).

5 If you are replacing a DIMM, remove the installed DIMM as follows:

   a Press down the locking lever on either side of the DIMM (Figure 34).

   b Pull the DIMM up to remove it from the slot.

Caution: Replace and install a *pair* of DIMMs of the same type in a single memory bank. See "Considerations for installing DIMMs" on page 76.

6 Install the new DIMM by pressing down the locking lever on either side of the empty DIMM slot (Figure 34).

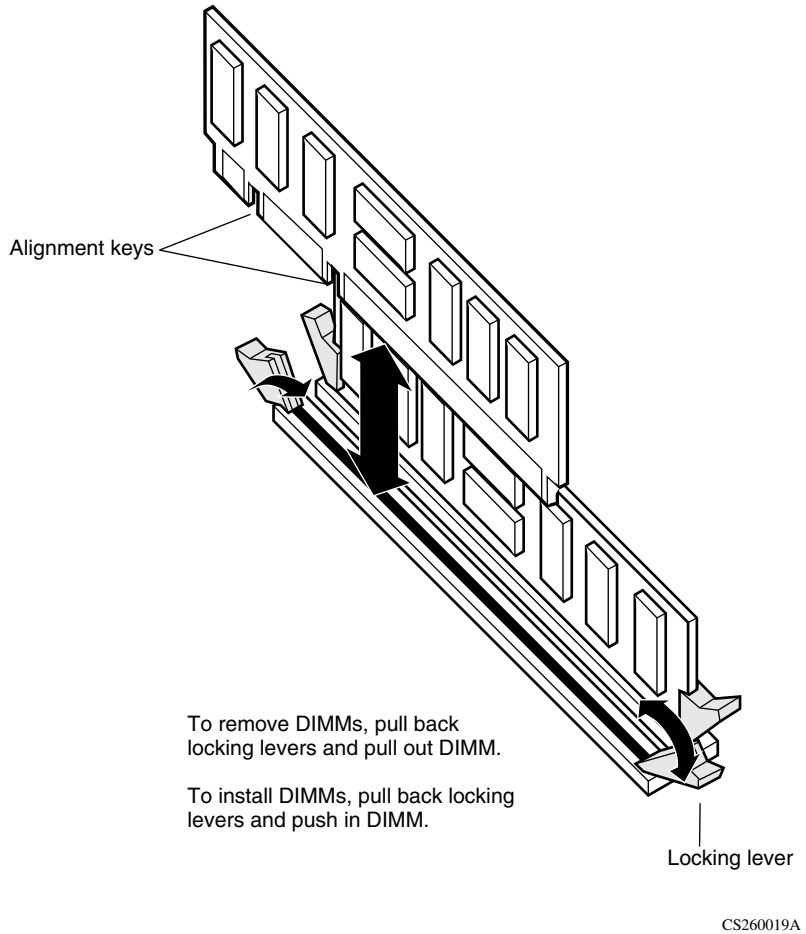
7 Place the new or replacement DIMM in the slot (Figure 34).

   Use the alignment keys to properly position the DIMM in the slot. The alignment keys enforce the proper installation of the DIMM.

8 Press the DIMM firmly into the socket.

9 Pull up the locking lever on either side of the DIMM to snap it into position.

Figure 34 Installing and removing a DIMM



10 Replace the top cover on the chassis (see Figure 24 on page 66).

a Hold the cover at an angle and slide it onto the chassis.

b Using a screwdriver, insert and tighten the 4 screws to secure the cover to the chassis.

Warning: The Contivity 5000 weighs approximately 50 pounds (23 kg). Two people are needed to install the gateway in the equipment rack.

11 With two people facing the front of the equipment rack, set the Contivity 5000 on the rack-mount shelf.

12 Insert one of the 1/2-in. truss screws through the bottom hole on each side of the shelf into the hole in the rack and tighten the screws (see Figure 4 on page 28).

13 Replace the front bezel (see Figure 30 on page 75).

a Hold the bezel by its two handles and push it onto the chassis.

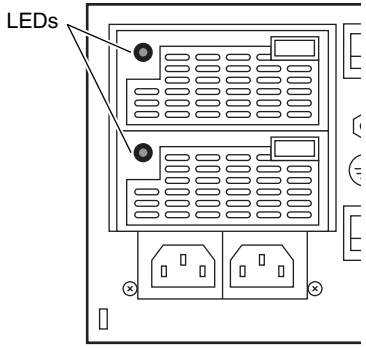
b Using the screwdriver, tighten the 2 screws to secure the bezel to the chassis.

Replacing a power supply

The Contivity 5000 ships with dual hot-swappable 350 W power supplies installed in the chassis. The power supplies share the load of providing power to the Contivity 5000. If one power supply fails, the second one provides all the power required by the gateway.

The power supplies are accessible from the rear of the chassis (Figure 35).

Figure 35 Location of the Contivity 5000 power supplies



If a power supply fails, the following indicators report the failure:

- LED on the power supply lights yellow.
- Front-panel Fail LED lights red.
- Audible alarm beeps.
- Event and system logs report the failure.

Replace a failed power supply as soon as possible.

Caution: Two power supplies must be installed to ensure proper airflow. If a power supply fails and you do not have a replacement power supply, leave the failed power supply installed until a replacement is available.

You can replace a power supply with the system power on or off. (To turn off the system, see "Shutting down the system to add or replace hardware" on page 63.)

To replace a power supply:

1. Attach the antistatic wrist strap that was shipped with the Contivity 5000 (see "Attaching the antistatic wrist strap" on page 68).
2. Remove the failed power supply from the chassis.
   a. Squeeze up on the metal portion of the power supply handle that is on the underside of the handle (Figure 36).
   b. Pull on the handle to remove the power supply from the chassis.

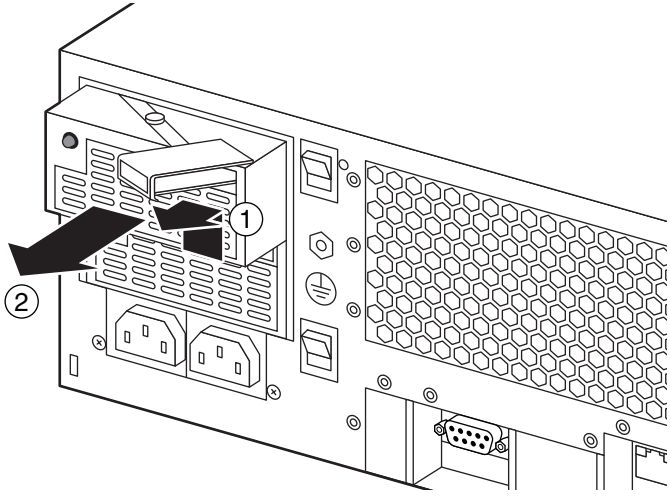
      As you pull on the handle, the handle rotates to the left.

Caution: The power supply will feel hot to the touch, even if the Contivity 5000 has been turned off. The power supply is operating as designed.

   c. Support the bottom of the power supply as you pull it free of the chassis.

   When you remove a power supply, the Contivity 5000 automatically redistributes the power load to the remaining power supply.

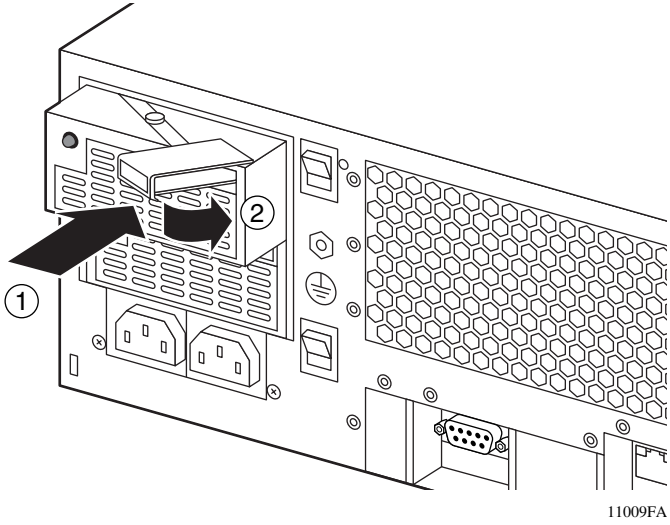
Figure 36 Removing a power supply



3 Insert the replacement power supply into the chassis.

a Guide the power supply into the slot (Figure 37).

Figure 37 Inserting a power supply



b Push the power supply all the way into the slot.

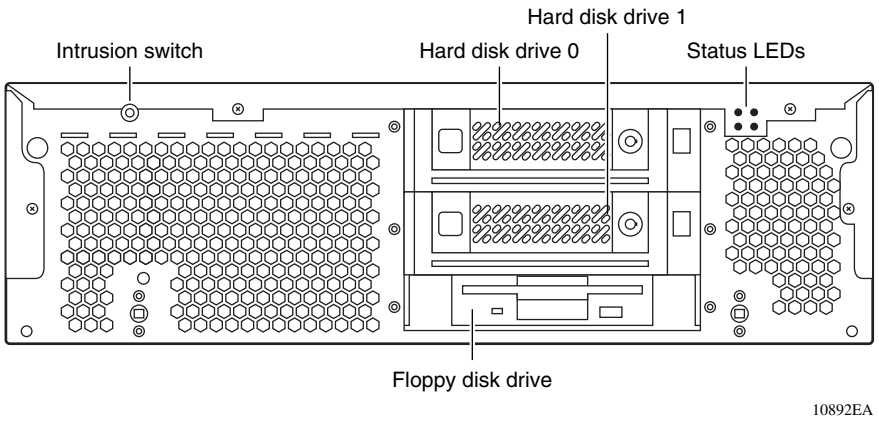
When you push the power supply in, the handle rotates to the right.

When the replacement power supply is correctly inserted into the slot, its LED should light green and the front-panel Fail LED should turn off. The Contivity 5000 automatically redistributes the power load between the two power supplies.

Replacing a hard disk drive

The Contivity 5000 ships with dual hard disk drives installed in the chassis. The hard disk drives are accessible from the front of the chassis (Figure 38). Remove the front bezel to access the hard disk drives.

Figure 38 Location of the Contivity 5000 hard disk drives



The top disk drive slot is slot 0; the bottom disk drive slot is slot 1. The hard disk drive in slot 0 is referred to as “hard drive 0”; the hard disk drive in slot 1 is referred to as “hard drive 1.”

One hard disk drive is the primary drive, that is, the active system disk. The other hard disk drive is the backup drive. By default, the disk drive installed in slot 0 is the primary disk, but you can select either disk drive as the primary on the Admin > Shutdown screen.

The backup disk drive is redundant and is used only to store a copy of the primary disk in case the primary disk fails. You configure the frequency of the backup operation to the redundant drive on the Admin > Auto Backup screen.

Note: For instructions on configuring automatic backups and designating the primary disk drive, see *Managing and Troubleshooting the Contivity Secure IP Services Gateway.*

You can hot-swap the backup disk drive only. To replace the primary disk drive, you must first shut down the system.

Note: If you do not want to shut down the Contivity 5000 to replace the primary disk drive, you can reboot the system from the backup disk. For example, if disk 0 is the primary disk, reboot the gateway from disk 1. After the reboot, disk 1 is the primary disk and you can hot-swap disk 0.

To replace a hard disk drive:

1 If you are replacing the primary disk drive, shut down the Contivity 5000. (If you are replacing the backup disk drive, go to step 2.)

Caution: To avoid damage to the hard disk drive, you must shut down the Contivity 5000 before you replace the primary disk drive.

a Use the Web GUI or the command line interface to shut down the gateway.

— Web GUI: Choose Admin > Shutdown. Select the option to power off the gateway after shutdown.

— Command line interface: Use the **`reload`** command to shut down the system. For example, enter **`reload power-off disable-logins "Upgrade hardware"`**

For the complete syntax of the **`reload`** command, see the *Reference for the Contivity Secure IP Services Gateway Command Line Interface*.

b Wait for the system to shut down. You may need to wait several minutes.

c Go to step 3.

2 If you are replacing the secondary disk drive, save any data that has not yet been saved to the hard disk from the disk cache.

a Using the Web GUI, go to the Admin > File System screen and select the backup disk drive from the Devices list.

b Click on the Prepare button to prepare the hard drive for removal.

3 Remove the front bezel from the chassis (see "Removing the front bezel and top cover" on page 64).

4 Attach the antistatic wrist strap that was shipped with the Contivity 5000 (see "Attaching the antistatic wrist strap" on page 68).

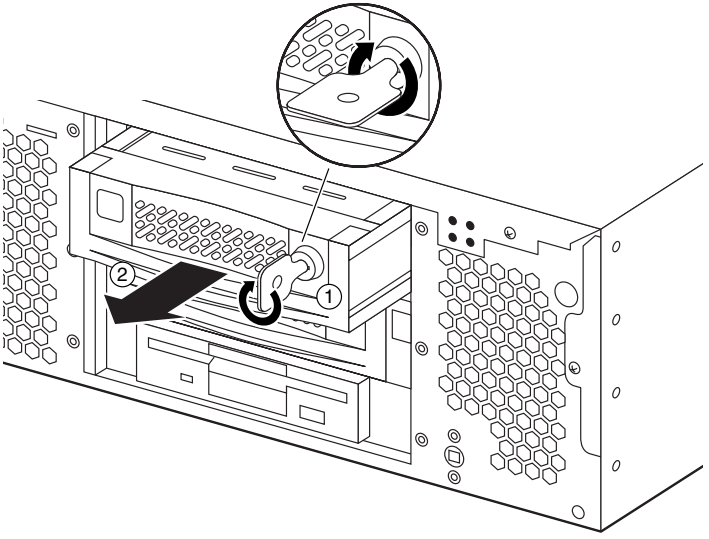
5 Insert the hard disk drive key into the lock and turn it to the right (Figure 39). The LED displays the letter "U" (for "unlocked").

You may need to push the key in before you can turn it. The key should now be straight up and down.

Note: Turning the key shuts off the power to the hard disk drive.

6 Grasp the handle on the hard disk drive and pull the drive out of the chassis.

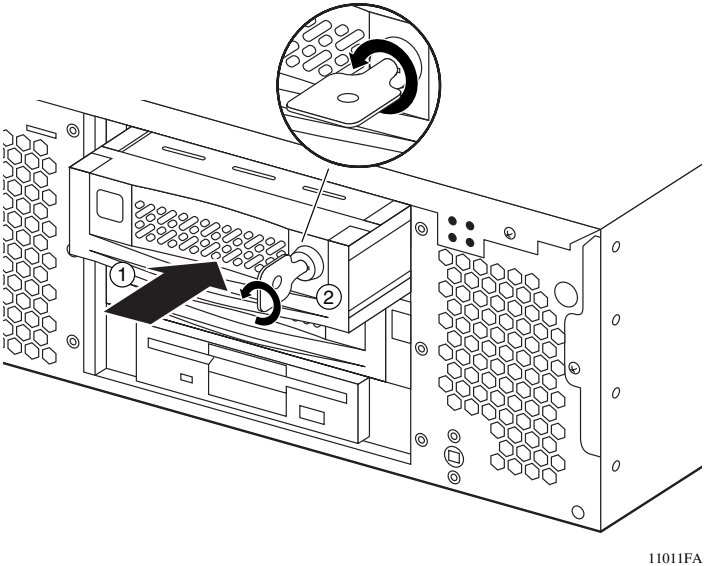
Figure 39 Removing a hard disk drive



7 Insert the replacement hard drive into the chassis and push it all the way into the chassis (Figure 40).

8 Insert the hard disk drive key into the lock and turn the key left (Figure 40). Make sure that the hard disk drive LED displays the drive number.

Figure 40 Inserting a hard disk drive



9 Replace the front bezel (see Figure 30 on page 75).

a Hold the bezel by its two handles and push it onto the chassis.

b Using the screwdriver, tighten the 2 screws to secure the bezel to the chassis.

10 If you shut down the gateway before you replaced the hard disk drive, press and release the power switch on the rear of the Contivity 5000 (see Figure 8 on page 35) and wait for the gateway to boot.

11 Use your Web browser to navigate to the Contivity 5000.

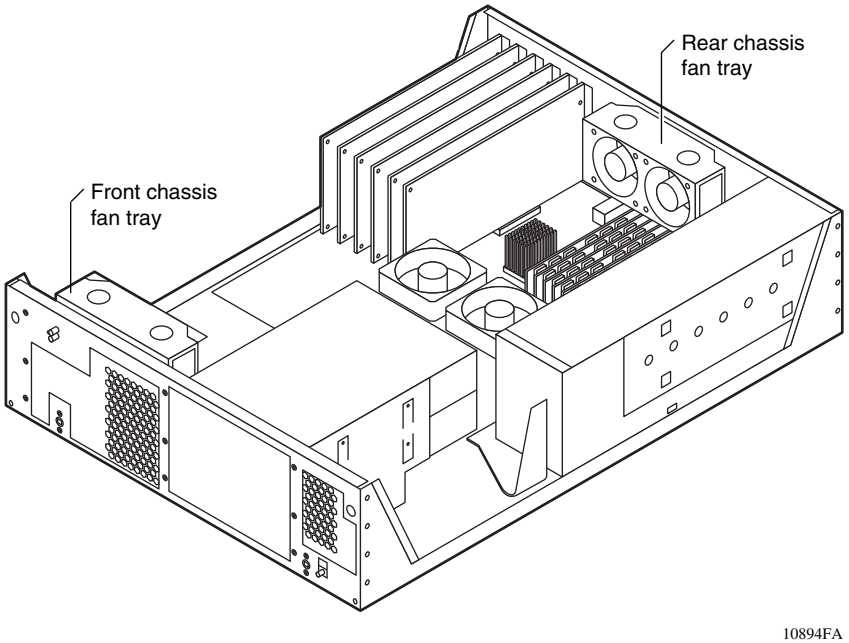
12 Go to the Admin > File System screen and select the new disk drive from the Devices list.

13 Click on the Enable button.

Replacing a fan tray

The Contivity 5000 ships with two fan trays installed in the chassis: one tray in the front of the chassis and the other in the rear of the chassis (Figure 41).

Figure 41 Location of the Contivity 5000 fan trays



If a fan fails, the following indicators report the failure:

- Front-panel Fail LED lights red.
- Audible alarm beeps.
- Event and system logs report the failure.

Caution: Replace a failed fan tray as soon as possible. Overheating can damage Contivity 5000 components.

To replace a fan tray:

1 Shut down the Contivity 5000 using the Web GUI or the command line interface and then unplug it as described in "Shutting down the system to add or replace hardware" on page 63.

Danger: Turn off the Contivity 5000 and unplug it before you attempt to replace a fan tray.

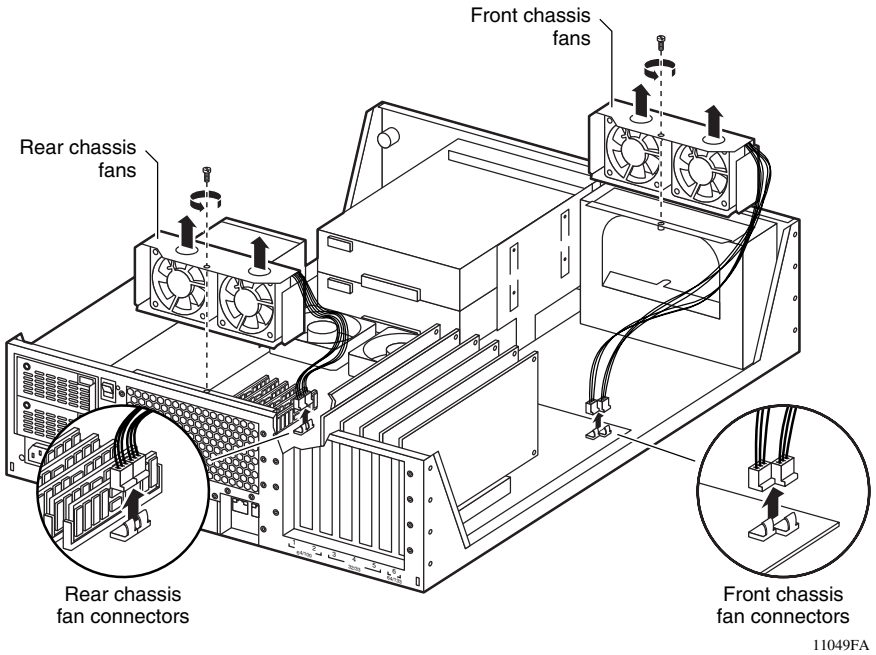
2 Remove the front bezel from the chassis, then remove the chassis from the equipment rack (see "Removing the front bezel and top cover" on page 64).

3 Remove the top cover from the chassis (see "Removing the front bezel and top cover" on page 64).

4 Attach the antistatic wrist strap that was shipped with the Contivity 5000 (see "Attaching the antistatic wrist strap" on page 68).

5 Locate the connectors on the system board where the two fan plugs for the fan tray are attached (Figure 42).

Figure 42 Removing a fan tray



Each fan tray has a bundle of cables attached to it. The cables are terminated by two 3-hole plugs. When you replace a fan tray, you must attach the fan plugs to the correct connectors on the system board. (However, either plug can go onto either of the connectors.)

Caution: Do not remove the fan tray cables from the system board until you are certain that you know where to attach them again when you replace the fan tray (see Figure 42 on page 88).

6 After you note the location of the fan plugs, disconnect the plugs for the fan tray that you are replacing from the system board.

7 Remove the cables from the plastic hooks that secure them to the chassis base and to the fan tray itself.

8 Using a flat-tip screwdriver, unscrew the single captive screw in the center of the fan tray (see Figure 42 on page 88).

9 Insert two fingers into the holes on top of the fan tray and pull it straight up, out of its enclosure.

The front fan tray is contained in a bay; the rear fan tray rests on a metal support.

10 Insert two fingers into the holes in the replacement fan tray and lower it straight down to install it (Figure 43).

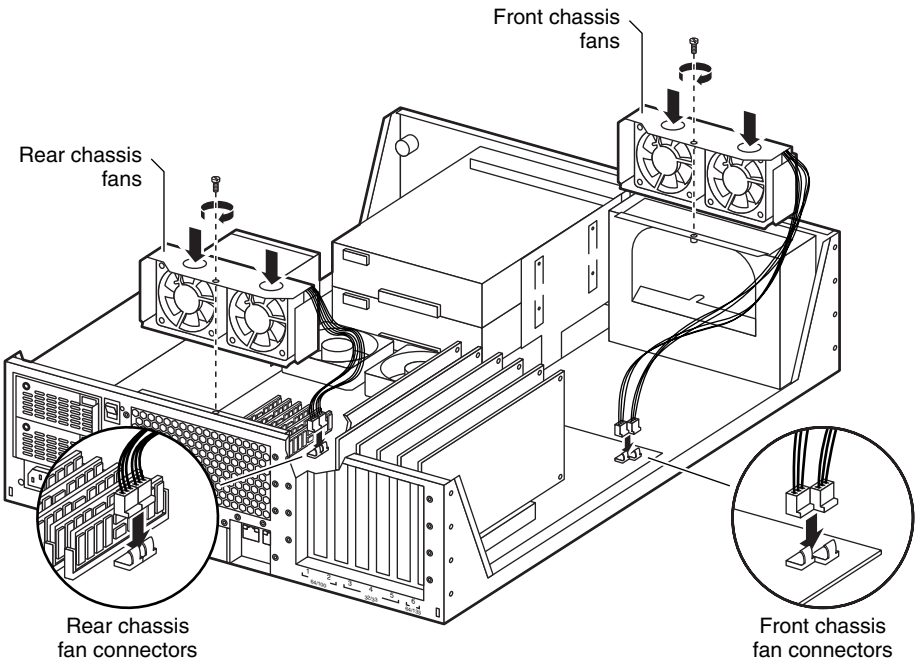
If you are replacing the front fan tray, the fans face the outside of the chassis; for the rear fan tray, the fans face the inside of the chassis.

Note: There is only one type of fan tray for the Contivity 5000. You install the same fan tray in the front or the rear of the chassis.

11 Insert the single captive screw into the hole in the bay (front fan tray) or the support (rear fan tray) and use the flat-tip screwdriver to secure the screw (Figure 43).

12 Secure the cables to the side of the fan tray and to the chassis base by inserting the cable bundles into the small plastic hooks.

Figure 43 Installing a fan tray



13 Attach the two fan plugs to the correct 3-pin connectors on the system board (Figure 43). Either plug can go onto either connector.

When you replace the rear fan tray, make sure that the excess cable length is neatly folded below the top of the fan tray.

14 Replace the top cover on the chassis (see Figure 24 on page 66).

a Hold the cover at an angle and slide it onto the chassis.

b Using a screwdriver, insert and tighten the 4 screws to secure the cover to the chassis.

Warning: The Contivity 5000 weighs approximately 50 pounds (23 kg). Two people are needed to install the gateway in the equipment rack.

15 With two people facing the front of the equipment rack, set the Contivity 5000 on the rack-mount shelf.

16 Insert one of the 1/2-in. truss screws through the bottom hole on each side of the shelf into the hole in the rack and tighten the screws (see Figure 4 on page 28).

17 Replace the front bezel (see Figure 30 on page 75).

a Hold the bezel by its two handles and push it onto the chassis.

b Using the screwdriver, tighten the 2 screws to secure the bezel to the chassis.

Appendix A
Technical specifications

This appendix provides technical specifications for the Contivity 5000 chassis and its interfaces.

Chassis specifications

Table 19 lists physical, electrical, and environmental specifications for the chassis.

Table 19 Physical, electrical, and environmental specifications

Specification	Description
Physical	
Height	5.25 in. (13.335 cm)
Width	17 in. (43.18 cm)
Depth	23 in. (58.42 cm)
Weight	50 lbs. (22.7 kg)
Electrical	
Voltage	100–120 VAC; 220–240 VAC
Current	6.2 A @ 100 VAC; 3.1 A @ 220 VAC
Frequency	50–60 Hz
Environmental	
Operating temperature	32–104°F (0–40°C)
Storage temperature	-40–185°F (-40–85°C)
Operating humidity	10–90% noncondensing
Storage humidity	10–95% noncondensing
Operating altitude	-500–7000 ft (2133.6 m) maximum
Storage altitude	-1000–40,000 ft (12,192 m) maximum

System ports

The Contivity 5000 system board provides the following built-in interfaces:

- 1000BASE-T Ethernet LAN port
- 10/100BASE Ethernet LAN port
- Serial port

This section provides information about the two Ethernet LAN ports and the serial port on the system board.

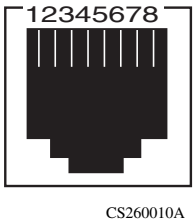
1000BASE-T Ethernet LAN port

The system board provides one copper 1000BASE-T Ethernet LAN interface on the rear of the chassis. This LAN interface, which accommodates an RJ-45 straight-through cable, is generally used to connect to Gigabit Ethernet interfaces on other devices in your network, as well as to provide increased throughput. Select cables for this port as follows:

- For 1000BASE-T operation, use Category 5 four-pair Ethernet wiring. The cable must comply with the TIA 568 wiring specification. The maximum recommended cable segment length is 100 meters.
- For 100BASE-TX operation, use Category 5 twisted-pair wiring: one pair each for transmit and receive operations. The cable must comply with the EIA 568 wiring specification. The maximum recommended cable segment length is 100 meters.
- For 10BASE-T operation, use Category 3 or better twisted-pair wiring.

Table 20 provides the 1000BASE-T Ethernet port pinouts.

Table 20 1000BASE-T Ethernet port pinouts



Pin	Description
1	TP0+
2	TP0-
3	TP1+
4	TP2+
5	TP2-
6	TP1-
7	TP3+
8	TP3-

10/100BASE Ethernet LAN port

The system board provides one 10/100BASE Ethernet LAN interface on the rear of the chassis. This LAN interface, which accommodates an RJ-45 straight-through cable, is generally used for Web management. Depending on whether you will use the interface for 10BASE-T or 100BASE-TX operation, select cables for the interface as follows:

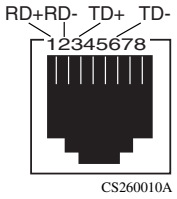
- 100BASE-TX connections require Category 5 twisted-pair wire. The 100BASE-TX specification supports 100 Mb/s transmission over two pairs of Category 5 twisted-pair Ethernet wiring: one pair each for transmit and receive operations.

  The maximum recommended cable segment length is 100 meters between a 100BASE-TX repeater and a workstation (due to signal timing requirements). This wiring scheme complies with the EIA 568 wiring standard.

- 10BASE-T connections can use Category 3, 4 or 5 twisted-pair wiring.

Table 21 provides the 10/100BASE Ethernet port pinouts.

Table 21 10/100BASE Ethernet port pinouts

	Pin	Description
	1	RD +
	2	RD -
	3	TD +
	6	TD -

Serial port

The system board provides a serial port on the rear of the chassis to enable out-of-band management. Using the serial port, you can assign the management IP address and subnet mask to the newly installed gateway (see Chapter 3, “Configuring the management IP interface,” on page 51).

The serial cable provided with the gateway is a DB9/DB25-to-DB9/DB25 cable. This cable provides a crossover connection (transmit-to-receive and receive-to-transmit). The DB9 connector goes into the gateway and the other DB9 or DB25 connector goes into your workstation.

Table 22 provides the multiple DB9/DB25 serial interface cable pinouts.

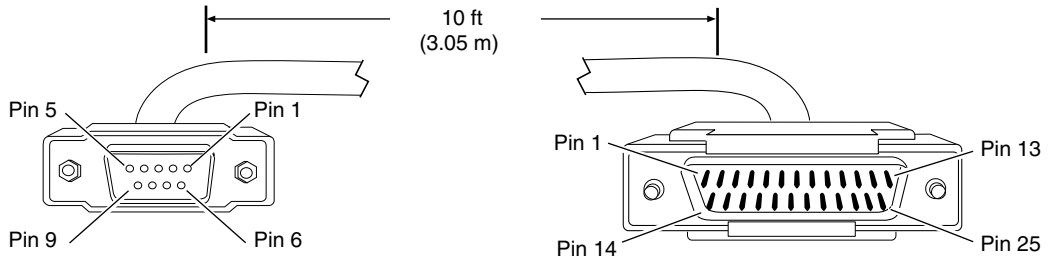
Table 22 Multiple DB9 and DB25 connector pinouts

Serial port DB9 connector		**Serial port DB25 connector**			**Serial port DB25 connector**		**Serial port DB9 connector**	
Pinout	Signal	Pinout	Signal		Pinout	Signal	Pinout	Signal
2	RXD	3	TXD	>	2	RXD	3	TXD
3	TXD	2	RXD	>	3	TXD	2	RXD
4	DTR	20	DSR	>	6	DTR	6	DSR
5	Ground	7	Ground	>	7	Ground	5	Ground
6	DSR	6	DTR	>	20	DSR	4	DTR
7	RTS	4	RTS	>	5	CTS	8	CTS
8	CTS	5	CTS	>	4	RTS	7	RTS

Modem cable specifications

If you need to connect a modem to a Contivity 5000, you must obtain an appropriate modem cable. The modem cable must have a 9-pin D-sub plug that connects to the Contivity 5000 serial port and a 25-pin D-sub plug that connects to the RS-232-C modem port (Figure 44).

Figure 44 Modem cable (9-pin D-sub plug to RS-232-C modem plug)



9-position D-sub receptacle with screw locks (ground shield connected to backshell)

25-position D-sub plug with screw locks (ground shield connected to backshell)

CAB0056A

Table 23 provides the modem cable pinouts.

Table 23 Modem cable pinouts

Nortel Networks termination		Modem termination	
Signal	**Pin # to Pin #**		**Signal**
Data Carrier Detect	1	8	Data Carrier Detect
Transmit Data (TXD)	2	2	Transmit Data (TXD)
Receive Data (RXD)	3	3	Receive Data (RXD)
Data Set Ready	4	6	Data Set Ready
Data Terminal Ready	6	20	Data Terminal Ready
Clear to Send	7	5	Clear to Send
Request to Send	8	4	Request to Send

Hardware option cards

The Contivity 5000 provides six PCI slots that support a combination of the following option cards:

- Contivity Security Accelerator and Hardware Accelerator cards
- SSL VPN Module 1000
- 10/100BASE Ethernet interface card
- 1000BASE-T Ethernet interface card
- 1000BASE-SX Ethernet interface card
- 56/64K CSU/DSU WAN interface card
- ADSL WAN interface card
- ISDN BRI interface card
- T1/E1 CSU/DSU WAN interface card
- Quad T1/E1 CSU/DSU WAN interface card
- V.90 modem interface card
- Single V.35/X.21 WAN interface card
- Dual V.35 WAN interface card
- HSSI WAN interface card

This section provides information about the option cards, including the connector and the cable pinouts for each supported network interface card.

Contivity Security Accelerator (CSA) and Hardware Accelerator cards

Nortel Networks supports two option cards that perform bulk encryption and compression algorithms for IPsec tunnel traffic:

- Contivity Security Accelerator (CSA) card

  The CSA card uses a single Hifn* 7854 chip for encryption and compression and has 64 MB of onboard RAM. It supports AES-128 cryptography with SHA-1 authentication and triple DES cryptography with either MD5 or SHA-1 authentication.

- Hardware Accelerator card

  The Hardware Accelerator card uses a single Hifn 7811 chip for encryption and compression. It performs triple DES and DES cryptography, LZS* compression, and MD5 or SHA-1 authentication.

The CSA card is the successor to the Hardware Accelerator card. Along with providing support for AES, the CSA card provides increased encryption throughput and improved compression performance.

Note: The CSA card has one green LED; the Hardware Accelerator card has no LEDs.

At startup, whenever an accelerator card is manually enabled, or whenever the accelerator recovers from a failure, the power-on self-test (POST) verifies the integrity of the hardware. This test includes validation of the accelerator's encryption, MAC, and compression algorithms against their software counterparts. In the event POST fails, the accelerator card is set offline.

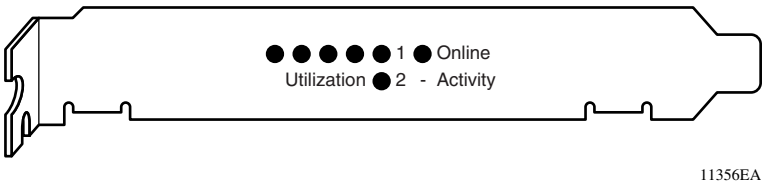
For more information about the Contivity Security Accelerator card and the Hardware Accelerator card and instructions for configuring these cards, see the guide *Configuring Advanced Features for the Contivity Secure IP Services Gateway.*

SSL VPN Module 1000

The SSL VPN Module 1000 provides complete SSL VPN processing capability to the Contivity gateway. This module provides a unified solution for IPsec and remote access SSL VPN.

Figure 45 shows the SSL VPN Module 1000.

Figure 45 SSL VPN Module 1000



The SSL VPN Module 1000 has no external access: all traffic to and from the SSL VPN Module 1000 card occurs over an internal high-speed link.

The SSL VPN Module 1000 is supported on Contivity 5000, 2700, and 1740 gateways running Contivity Version 5.0 software. You must install the SSL VPN Module 1000 in slot 1 of the Contivity 5000, 2700, or 1740.

The Contivity gateway distinguishes between the services that it provides and the services that the SSL VPN Module 1000 provides and immediately forwards the appropriate traffic to the SSL VPN module.

Note: For complete information about the SSL VPN Module 1000 and instructions for configuring it, see *Configuring SSL VPN Services on the Contivity Secure IP Services Gateway.*

10/100BASE Ethernet interface card

The 10/100BASE Ethernet interface card has a single RJ-45 connector that provides the signals needed to interface to 10BASE-T and 100BASE-TX Ethernet equipment.

Figure 46 shows the 10/100BASE Ethernet interface card.

Figure 46 10/100BASE Ethernet interface card

CS260009A

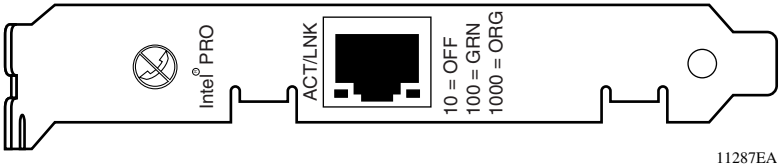
For information about the cables that you can connect to this interface and the cable pinouts, see "10/100BASE Ethernet LAN port" on page 95.

1000BASE-T Ethernet interface card

The 1000BASE-T Ethernet interface card is generally used to connect to Gigabit Ethernet interfaces on other devices in your network, as well as to provide increased throughput. This interface card has a single RJ-45 connector.

Figure 47 shows the 1000BASE-T Ethernet interface card.

Figure 47 1000BASE-T Ethernet interface card



11287EA

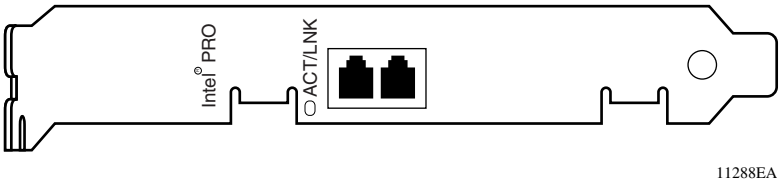
For information about the cables that you can connect to this interface and the cable pinouts, see "1000BASE-T Ethernet LAN port" on page 94.

1000BASE-SX Ethernet interface card

The 1000BASE-SX Ethernet interface card implements short-wavelength (850 nm) laser transmissions. This interface card is generally used to connect to fiber Gigabit Ethernet interfaces on other devices in your network, as well as to provide increased throughput. The 1000BASE-SX Ethernet interface card has a single type LC fiber connector.

Figure 48 shows the 1000BASE-SX Ethernet interface card.

Figure 48 1000BASE-SX Ethernet interface card



The port on the 1000BASE-SX Ethernet interface card accommodates a multimode fiber (MMF) cable that meets MMF standards. Select fiber cable for this interface as follows:

- 50-micron MMF cable: provides a distance range of 500—550 meters (m)
- 62.5-micron MMF cable: provides a distance range of 220—275 m

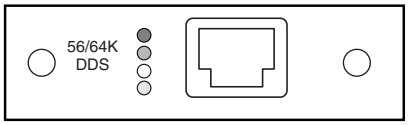
You can order a 10-foot MMF cable from Nortel Networks:

- Order no. DM0011117 provides an LC-to-LC connector
- Order no. DM0011118 provides an LC-to-SC connector

56/64K CSU/DSU WAN interface card

The 56/64K CSU/DSU WAN interface card has a single RJ-48 connector that provides the signals needed to interface to network equipment. Figure 49 shows the 56/64K CSU/DSU WAN interface card.

Figure 49 56/64K CSU/DSU WAN interface card



10972EA

The connector on the 56/64K CSU/DSU WAN interface card accommodates an 8-pin RJ-48 modular patch cord. These cables are commonly sold as Category 5, or Ethernet, cables.

Note: Nortel Networks does not supply an interface cable with the 56/64K CSU/DSU WAN interface card.

The cable you use should be wired in accordance with EIA-568-A wiring style. This wiring style ensures that the transmit signal (pins 1 and 2) and the receive signal (pins 7 and 8) are carried on a twisted pair inside the patch cord. The use of factory-made patch cords is strongly recommended.

You connect the 56/64K CSU/DSU WAN interface card to the service provider network using a straight-through cable or a crossover cable, depending on how the service provider wired its jack.

- For a straight-through connection, you can use a standard Category 5 (Ethernet) straight-through cable.
- For a crossover connection, you cannot use a standard Category 5 crossover cable. The 56/64K CSU/DSU crossover cable and the Ethernet crossover cable are not interchangeable.

Table 24 provides the 56/64K CSU/DSU cable pinouts for a crossover connection.

Table 24 56/64K CSU/DSU cable pinouts for crossover connection

Nortel Networks termination		Remote termination	
Signal	**Pin # to Pin #**		**Signal**
Transmit tip	1	7	Receive tip
Transmit ring	2	8	Receive ring
not used	3	3	not used
not used	4	4	not used
not used	5	5	not used
not used	6	6	not used
Receive tip	7	1	Transmit tip
Receive ring	8	2	Transmit ring

The cable will operate properly if pins 3, 4, 5, and 6 are not connected.

Caution: For crossover connections, do not use Ethernet cable. The link will not be established.

Table 25 provides the 56/64K CSU/DSU cable pinouts for a straight-through connection.

Table 25 56/64K CSU/DSU cable pinouts for straight-through connection

Nortel Networks termination		Remote termination	
Signal	**Pin # to Pin #**		**Signal**
Transmit tip	1	1	Transmit tip
Transmit ring	2	2	Transmit ring
not used	3	3	not used
not used	4	4	not used
not used	5	5	not used
not used	6	6	not used
Receive tip	7	7	Receive tip
Receive ring	8	8	Receive ring

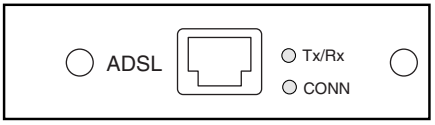
ADSL WAN interface card

The ADSL Annex A and Annex B WAN interface cards have a single RJ-11 connector that provides the signals needed to interface to the digital subscriber line access multiplexer (DSLAM) and to telephone equipment.

Figure 50 shows the ADSL WAN interface card.

Note: The ADSL Annex A and ADSL Annex B cards look identical.

Figure 50 ADSL WAN interface card



10972EA

Included in the accessory box is a 7-foot RJ-11 cable to attach to the DSLAM.

Table 26 provides the ADSL port pinouts.

Table 26 ADSL cable pinouts

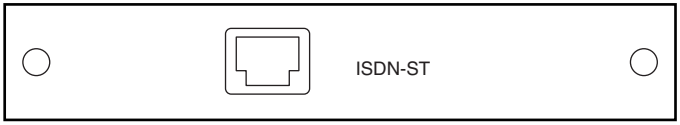
Pin	Function
1	N/C
2	Tip
3	Ring
4	N/C

ISDN BRI interface card

The ISDN BRI S/T and ISDN BRI U interface cards have a single RJ-45 connector that provides the signals needed to interface to ISDN equipment. (To connect the ISDN BRI S/T interface to the ISDN network, you must attach an external NT-1 device to the RJ-45 connector.)

Figure 51 shows the ISDN BRI S/T interface card.

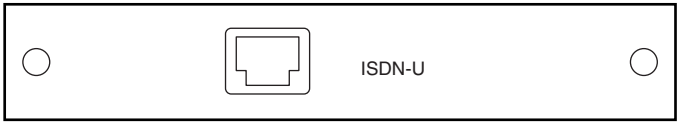
Figure 51 ISDN BRI S/T interface card



10972EA

Figure 52 shows the ISDN BRI U interface card.

Figure 52 ISDN BRI U interface card



10972EB

The connector on the ISDN BRI S/T and ISDN BRI U interface cards accommodates an 8-pin RJ-45 modular patch cord. These cables are commonly sold as Category 5, or Ethernet, cables.

Note: Nortel Networks does not supply a cable with the ISDN BRI interface cards.

Table 27 provides the ISDN BRI S/T cable pinouts.

Table 27 ISDN BRI S/T cable pinouts

Pin	Function
1	N/C
2	N/C
3	Receive +
4	Transmit +
5	Transmit -
6	Receive -
7	N/C
8	N/C

Table 28 provides the ISDN BRI U cable pinouts.

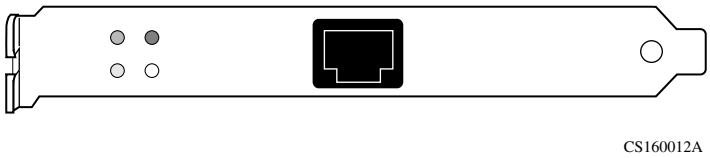
Table 28 ISDN BRI U cable pinouts

Pin	Function
1	N/C
2	N/C
3	N/C
4	U interface network connection (tip)
5	U interface network connection (ring)
6	N/C
7	N/C
8	N/C

T1/E1 CSU/DSU WAN interface card

The T1/E1 CSU/DSU WAN interface card has a single connector that provides the signals needed to interface to T1 or E1 equipment. Figure 53 shows the T1/E1 CSU/DSU WAN interface card. This interface card ships as a half-height card and as a full-height card.

Figure 53 T1/E1 CSU/DSU WAN interface card



Note: For E1 service, you must install the half-height version of the T1/E1 CSU/DSU WAN interface card.

The connector on the T1/E1 CSU/DSU WAN interface accommodates an 8-pin RJ-48 modular patch cord. These cables are commonly sold as Category 5, or Ethernet, cables.

Note: Nortel Networks does not supply the T1/E1 CSU/DSU WAN interface cable with the WAN interface card.

The cable you use should be wired in accordance with EIA-568-A wiring style. This wiring style ensures that the transmit signal (pins 4 and 5) and the receive signal (pins 1 and 2) are carried on a twisted pair inside the patch cord. The use of factory-made patch cords is strongly recommended.

You connect the T1/E1 CSU/DSU WAN interface card to the service provider network using a straight-through cable or a crossover cable, depending on how the service provider wired its jack.

- For a straight-through connection, you can use a standard Category 5 (Ethernet) straight-through cable.
- For a crossover connection, you cannot use a standard Category 5 crossover cable. The T1/E1 CSU/DSU crossover cable and the Ethernet crossover cable are not interchangeable.

Table 29 provides the T1/E1 CSU/DSU cable pinouts for a crossover connection.

Table 29 T1/E1 CSU/DSU cable pinouts for crossover connection

Standard-wired end 8-pin male	Signal name	Pair number and conductor	Special-wired end 8-pin male
1	RXDA<-TXDA	wht/org pair 2A	5
2	RXDB<-TXDB	orange pair 2B	4
3	not used	wht/grn pair 3A	3
4	TXDB->RXDB	blue pair 1B	2
5	TXDA->RXDA	wht/blu pair 1A	1
6	not used	green pair 3B	6
7	not used	wht/brn pair 4A	7
8	not used	brown pair 4B	8

The cable will operate properly if pins 3, 6, 7, and 8 are not connected.

Caution: For crossover connections, do not use Ethernet cable. The T1/E1 CSU/DSU will not work to specifications. Data may be corrupted.

Table 30 provides the T1/E1 CSU/DSU cable pinouts for a straight-through connection.

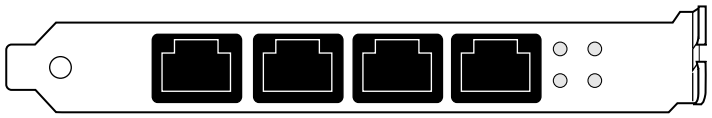
Table 30 T1/E1 CSU/DSU cable pinouts for straight-through connection

Nortel Networks termination		Remote termination	
Signal	**Pin # to Pin #**		**Signal**
Receive A (RXDA)	1	1	Receive A (RXDA)
Receive B (RXDB)	2	2	Receive B (RXDB)
not used	3	3	not used
Transmit B (TXDB)	4	4	Transmit B (TXDB)
Transmit A (TXDA)	5	5	Transmit A (TXDA)
not used	6	6	not used
not used	7	7	not used
not used	8	8	not used

Quad T1/E1 CSU/DSU WAN interface card

The quad T1/E1 CSU/DSU WAN interface card has four connectors that provide the signals needed to interface to T1 or E1 equipment. Figure 54 shows the quad T1/E1 CSU/DSU WAN interface card.

Figure 54 Quad T1/E1 CSU/DSU WAN interface card



Each connector on the quad T1/E1 CSU/DSU WAN interface card accommodates an 8-pin RJ-48 modular patch cord. These cables are commonly sold as Category 5, or Ethernet, cables.

Note: Nortel Networks does not supply cables with the quad T1/E1 CSU/DSU interface card.

The cables you use should be wired in accordance with EIA-568-A wiring style. This wiring style ensures that the transmit signal (pins 4 and 5) and the receive signal (pins 1 and 2) are carried on a twisted pair inside the patch cord. The use of factory-made patch cords is strongly recommended.

You connect the quad T1/E1 CSU/DSU WAN interface card to the service provider network using a straight-through cable or a crossover cable, depending on how the service provider wired its jack.

- For a straight-through connection, you can use a standard Category 5 (Ethernet) straight-through cable.
- For a crossover connection, you cannot use a standard Category 5 crossover cable. The T1/E1 CSU/DSU crossover cable and the Ethernet crossover cable are not interchangeable.

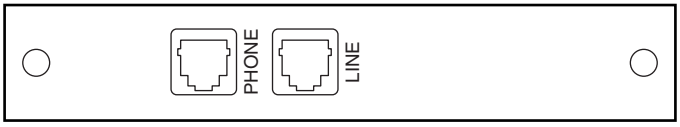
For information about the cable pinouts for a crossover connection, see Table 29 on page 109. For information about the cable pinouts for a straight-through connection, see Table 30 on page 109.

V.90 modem interface card

The V.90 modem interface card has two RJ-11 connectors that provide the signals needed to interface to an incoming telephone line and to telephone equipment.

Figure 55 shows the V.90 modem interface card.

Figure 55 V.90 modem interface card



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Included in the accessory box is a 7-foot RJ-11 cable to attach to a telephone jack.

Table 31 provides the V.90 modem port cable pinouts.

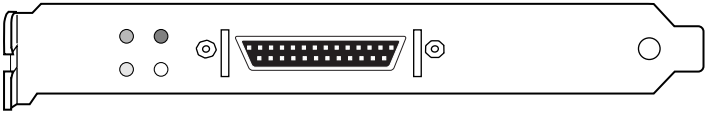
Table 31 V.90 modem cable pinouts

Pin	Function
1	N/C
2	Tip
3	Ring
4	N/C

Single V.35/X.21 WAN interface card

The single V.35/X.21 WAN interface card has a single DB28S connector that provides the signals needed to interface to V.35 and X.21 equipment. Figure 56 shows the single V.35/X.21 WAN interface card.

Figure 56 Single V.35/X.21 WAN interface card



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You need a DSU/CSU (digital service unit/channel service unit) between the WAN connection and the gateway. You can order a V.35 or X.21 cable to attach to the connector. This cable enables the WAN adapter to function as DTE (data terminal equipment).

Table 32 provides the V.35 cable pinouts. Table 33 on page 113 provides the X.21 cable pinouts. (The pair suffix A or B refers to an individual wire within a twisted pair.)

Table 32 V.35 cable pinouts

Standard-wired end 28-pin male	Signal name	Pair number and conductor	Special-wired end 34-pin male	Notes
2	TXDA	pair 1A	P	
14	TXDB	pair 1B	S	
3	RXDA	pair 2A	R	
16	RXDB	pair 2B	T	
15	TXCA	pair 3A	Y	
12	TXCB	pair 3B	AA	
17	RXCA	pair 4A	V	
9	RXCB	pair 4B	X	
24	SCTEA	pair 5A	U	
11	SCTEB	pair 5B	W	
4	RTSA	pair 6A	C	
19	RTSB	pair 6B	no conn	Note 1
5	CTSA	pair 7A	D	
13	CTSB	pair 7B	no conn	Note 1
6	DSRA	pair 8A	E	
22	DSRB	pair 8B	J	
20	DTRA	pair 9A	H	
23	DTRB	pair 9B	no conn	Note 1
8	DCDA	pair 10A	F	
10	DCDB	pair 10B	no conn	Note 1
18	LL	pair 11A	L	
21	RL	pair 11B	N	

Table 32 V.35 cable pinouts (continued)

Standard-wired end 28-pin male	Signal name	Pair number and conductor	Special-wired end 34-pin male	Notes
25	TM	pair 12A	NN	
26	M0<-SIGNAL GROUND	pair 12B	B	Note 2
27	M1<-SIGNAL GROUND	pair 13A	B	Note 2
28	M2	pair 13B	no conn	Note 1
1	SHIELD	pair 14A	A	Notes 3,4
7	SIGNAL GROUND	pair 14B	B	Notes 2,4

The following notes apply to the single V.35 DTE cable:

1. The term “no conn” means the wire is not connected to a pin in the 34-pin connector.
2. Wires 12B, 13A, and 14B connect to pin B in the 34-pin connector.
3. At each end, the cable shield and connector shell must connect respectively to pin A of the 34-pin connector and pin 1 of the standard 28-pin connector.
4. Do not connect Shield to Signal Ground because these are separate signals.

Table 33 provides the X.21 cable pinouts. (The pair suffix A or B refers to an individual wire within a twisted pair.)

Table 33 X.21 cable pinouts

Standard-wired end 28-pin male	Signal name	Pair number and conductor	Standard-wired end 15-pin male	Notes
2	TXDA	pair 1A	2	
14	TXDB	pair 1B	9	
3	RXDA	pair 2A	4	
16	RXDB	pair 2B	11	
15	TXCA	pair 3A	6	
12	TXCB	pair 3B	13	
17	RXCA	pair 4A	pair 5A	Note 1
9	RXCB	pair 4B	pair 5B	Note 1
24	SCTEA	pair 5A	pair 4A	Note 1
11	SCTEB	pair 5B	pair 4B	Note 1
4	RTSA	pair 6A	3	
19	RTSB	pair 6B	10	

Table 33 X.21 cable pinouts (continued)

Standard-wired end 28-pin male	Signal name	Pair number and conductor	Standard-wired end 15-pin male	Notes
5	CTSA	pair 7A	5	
13	CTSB	pair 7B	12	
6	DSRA	pair 8A	no conn	Note 2
22	DSRB	pair 8B	no conn	Note 2
20	DTRA	pair 9A	no conn	Note 2
23	DTRB	pair 9B	no conn	Note 2
8	DCDA	pair 10A	no conn	Note 2
10	DCDB	pair 10B	no conn	Note 2
18	LL	pair 11A	no conn	Note 2
21	RL	pair 11B	no conn	Note 2
25	TM	pair 12A	no conn	Note 2
26	M0	pair 12B	no conn	Note 2
27	M1	pair 13A	no conn	Note 2
28	M2<-SIGNAL GROUND	pair 13B	8	Note 3
1	SHIELD	pair 14A	1	Note 4,5
7	SIGNAL GROUND	pair 14B	8	Note 3,5

The following notes apply to the single X.21 cable:

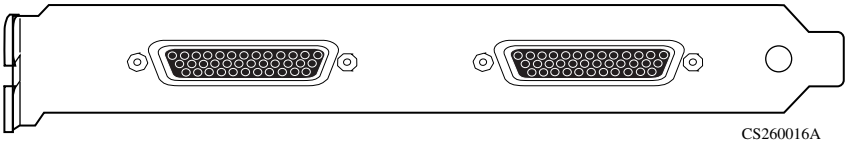
1. Wires of pair 4 connect to wires of pair 5, but not to any pins in the DA-15.
2. The term “no conn” means the wire is not connected to a pin in the 15-pin connector.
3. Wires 13B and 14B connect to pin 8 in the 15-pin connector.
4. At each end, the cable shield and connector shell must connect to pin 1 of the connector.
5. Do not interconnect Shield to Signal Ground because these are separate signals.

Dual V.35 WAN interface card

The dual V.35 WAN interface card has two DB26 connectors that provide the signals needed to interface to V.35 equipment.

Figure 57 shows the dual V.35 WAN interface card.

Figure 57 Dual V.35 WAN interface card



Note: The dual V.35 WAN interface card is no longer available for purchase. Version 5.0 is the last release of Contivity software that will support the dual V.35 WAN interface card.

You need a DSU/CSU (digital service unit/channel service unit) between the WAN connection and the gateway. This section documents the connector and cables used with V.35 WAN synchronous adapters.

If you build your own V.35 DTE cables, observe the following guidelines:

- All connector hoods must be metal.
- Braid must enter and make contact inside the metal connector hood.
- V.35 conn strain relief must be conductive.

Included in the accessory box are two cables to attach to the V.35 connectors. These cables enable the WAN adapter to function as DTE (data terminal equipment).

Table 34 provides the DB26-to-V.35 cable pinouts.

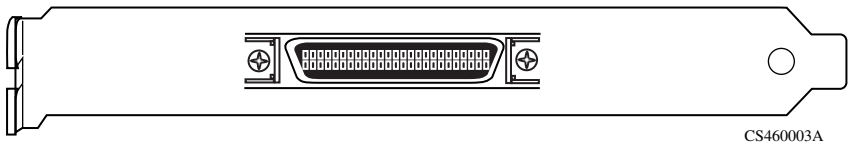
Table 34 DB26-to-V.35 cable pinouts

Standard-wired end 26-pin male	Signal name	Pair number and conductor	Special-wired end 34-pin male
2	TDA	pair 1A	P
14	TDB	pair 1B	S
3	RDA	pair 2A	R
16	RDB	pair 2B	T
24	ETA	pair 3A	U
11	ETB	pair 3B	W
17	RCA	pair 4A	V
9	RCB	pair 4B	X
15	TCA	pair 5A	Y
12	TCB	pair 5B	AA
4	RTS	pair 6A	C
		pair 6B	no conn
5	CTS	pair 7A	D
		pair 7B	no conn
6	DSR	pair 8A	E
		pair 8B	no conn
8	DCD	pair 9A	F
		pair 9B	no conn
20	DTR	pair 10A	H
		pair 10B	no conn
7	SGND	pair 11A	B
		pair 11B	no conn
1	CGND	pair 12A	A
		pair 12B	no conn

HSSI WAN interface card

The HSSI WAN interface card has a 50-pin SCSI II female connector that provides the signals needed to interface to a T3 modem or modem eliminator. Figure 58 shows the HSSI WAN interface card.

Figure 58 HSSI WAN interface card



Included in the accessory box is a cable that maps the T3 signals out to a 50-pin SCSI II male connector.

Table 35 provides the T3 cable pinouts.

Table 35 T3 cable pinouts

50-pin SCSI male	Signal name	50-pin SCSI male
1	GND	1
2	RCB	2
3	CAB	3
4	RDB	4
5	LCB	5
6	STB	6
7	GND	7
8	TAB	8
9	TTB	9
10	LAB	10
11	TDB	11
12	LBB	12
13	GND	13
19	GND	19
24	TESTB	24
25	GND	25

Table 35 T3 cable pinouts (continued)

50-pin SCSI male	Signal name	50-pin SCSI male
26	GND	26
27	RCA	27
28	CAA	28
29	RDA	29
30	LCA	30
31	STA	31
32	GND	32
33	TAA	33
34	TTA	34
35	LAA	35
36	TDA	36
37	LBA	37
38	GND	38
44	GND	44
49	TESTA	49
50	GND	50

Index

Numbers

A

B

C

D

E

F

G

H

I

L

M

N

O

P

Q

R

S

T

U

V

W

X