



Cisco VG310 and Cisco VG320 Voice Gateways Hardware Installation Guide

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Preface

This preface discusses the audience, organization, and conventions of this publication and describes how to obtain additional documentation.

- [Related Documentation, on page ix](#)
- [Obtaining Documentation, on page ix](#)
- [Conventions, on page x](#)
- [Obtaining Technical Assistance, on page xi](#)
- [Obtaining Additional Publications and Information, on page xii](#)

Related Documentation

The Cisco IOS software running your Cisco Voice Gateway includes extensive features and functionality. For information that is beyond the scope of this document, or for additional information, use the resources listed here:

- *Cisco VG310 and Cisco VG320 Voice Gateways Regulatory Compliance and Safety Information*—Provides essential safety information applicable to your Cisco VG310 or Cisco VG320 and contains multiple-language translations of the safety warnings applicable to the device.
- *Cisco VG310 and Cisco VG320 Voice Gateways Software Configuration Guide*— Provides detailed configuration information about the Cisco VG310 and Cisco VG320 voice gateways.
- Release Notes—Provides up-to-date information about Cisco IOS software releases used in Cisco VG310 and Cisco VG320 voice gateways.
- Installing and Replacing Field Replaceable Units in Cisco VG310 and Cisco VG320 Voice Gateways—This document is intended for trained and qualified service personnel. This document describes how to install field-replaceable units (FRUs) in the Cisco VG310 and Cisco VG320 voice gateways.

Obtaining Documentation

Cisco documentation is available on Cisco.com. Cisco also provides several ways to obtain technical assistance and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

You can access the most current Cisco documentation at:

<http://www.cisco.com/cisco/web/psa/default.html?mode=prod>

You can access the Cisco website at:

<http://www.cisco.com/>

You can access international Cisco websites at:

<http://www.cisco.com/web/siteassets/locator/index.html>

Ordering Documentation

Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Ordering tool:

<http://www.cisco.com/web/ordering/root/index.html>

Non-registered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, USA) at 408 526-7208 or, elsewhere in North America, by calling 800 553-NETS (6387).

Conventions

This document use the following conventions: Cisco

**Note**

Means *reader take note*. Notes contain helpful suggestions or references to materials that may not be contained in this manual.

**Caution**

Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

Safety Warnings

Safety warnings appear throughout this publication in procedures that, if performed incorrectly, might harm you. A warning symbol precedes each warning statement. The safety warnings provide safety guidelines that you should follow when working with any equipment that connects to electrical power or telephone wiring. Warnings are translated into several languages. For information about compliance guidelines and translated safety warnings, refer to the Regulatory Compliance and Safety Information document for the Cisco VG310 and Cisco VG320 Voice Gateways.

**Warning****IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Obtaining Technical Assistance

For all customers, partners, resellers, and distributors who hold valid Cisco service contracts, Cisco Technical Support provides 24-hour-a-day, award-winning technical assistance. The Cisco Technical Support Website on Cisco.com features extensive online support resources. In addition, Cisco Technical Assistance Center (TAC) engineers provide telephone support. If you do not hold a valid Cisco service contract, contact your reseller.

Cisco Technical Support Website

The Cisco Technical Support Website provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The website is available 24 hours a day, 365 days a year at this URL:

<http://www.cisco.com/cisco/web/support/index.html>

Access to all tools on the Cisco Technical Support Website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register at:

<https://tools.cisco.com/RPF/register/register.do>

Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool automatically provides recommended solutions. If your issue is not resolved using the recommended resources, your service request will be assigned to a Cisco TAC engineer. The TAC Service Request Tool is located at:

<https://tools.cisco.com/ServiceRequestTool/scm/mgmt/case>

For S1 or S2 service requests or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco TAC engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)

EMEA: +32 2 704 55 55

USA: 1 800 553 2447

For a complete list of Cisco TAC contacts, go to:

<http://www.cisco.com/c/en/us/support/web/tsd-cisco-worldwide-contacts.html>.

Definitions of Service Request Severity

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

- Severity 1 (S1)—Your network is “down,” or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.
- Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.
- Severity 3 (S3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.
- Severity 4 (S4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- Cisco Marketplace provides a variety of Cisco books, reference guides, and logo merchandise. Visit Cisco Marketplace, the company store, at: <http://www.cisco.com/go/marketplace>.
- Cisco Press publishes a wide range of general networking, training and certification titles. Both new and experienced users will benefit from these publications. For current Cisco Press titles and other information, go to Cisco Press at: <http://www.ciscopress.com/>.
- Packet magazine is the Cisco Systems technical user magazine for maximizing Internet and networking investments. Each quarter, Packet delivers coverage of the latest industry trends, technology breakthroughs, and Cisco products and solutions, as well as network deployment and troubleshooting tips, configuration examples, customer case studies, certification and training information, and links to scores of in-depth online resources. You can access Packet magazine at: <http://www.cisco.com/packet>.
- Internet Protocol Journal is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at: <http://www.cisco.com/ipj>.
- World-class networking training is available from Cisco. You can view current offerings at: <http://www.cisco.com/web/learning/index.html>.



CHAPTER 1

Overview of the Cisco VG310 and Cisco VG320 Voice Gateways

This chapter provides a brief description of the Cisco VG310 and Cisco VG320 voice gateways and contains the following sections:

- [Introduction to Cisco VG310 and Cisco VG320 Analog Voice Gateways, on page 1](#)
- [Locating the Product Serial Number, on page 2](#)
- [Interfaces and Service Capabilities of Cisco VG310 and Cisco VG320 , on page 3](#)
- [Physical Description and LEDs, on page 4](#)
- [Gigabit Ethernet Ports and LED Indicators, on page 6](#)
- [Port Numbering Conventions, on page 7](#)
- [Hardware Features, on page 7](#)
- [Periodic Inspection and Cleaning, on page 9](#)
- [Software Elements, on page 9](#)

Introduction to Cisco VG310 and Cisco VG320 Analog Voice Gateways

The Cisco VG310 and Cisco VG320 Analog Voice Gateways provide an intermediate path to enable the Time Division Multiplex (TDM) to IP transition.

Cisco VG310 and Cisco VG320 support the following interfaces:

- Gigabit Ethernet
- USB
- Enhanced High-Speed WAN Interface Card (EHWIC), Voice Interface Card (VIC), and Voice WAN Interface Card (VWIC)



Warning

This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means by security. Statement 1017

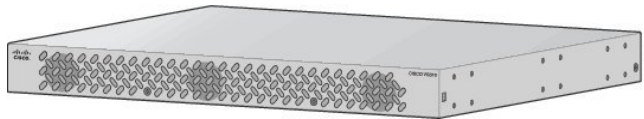
The Cisco VG310 and Cisco VG320 chassis support the following:

- Two 10/100/1000BASE-T Gigabit Ethernet ports
- External compact flash memory
- AC and DC power inputs
- (For Cisco VG310 only)—24-analog Foreign Exchange Station (FXS) voice ports using one RJ-21 analog voice interface connector
- (For Cisco VG320 only)—48-analog FXS voice ports using two RJ-21 analog voice interface connectors

Front Panel View

The following figure shows the front panel of the Cisco VG310 and Cisco VG320 chassis.

Figure 1: Front Panel of the Cisco VG310 and Cisco VG320 Chassis



Back Panel View

The following figures show the back panel views of the Cisco VG310 and Cisco VG320 chassis respectively.

Figure 2: Back Panel of the Cisco VG310 Chassis

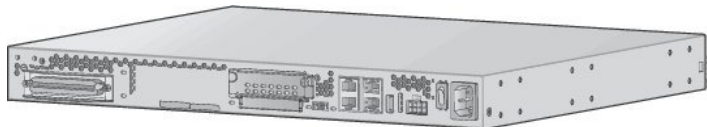
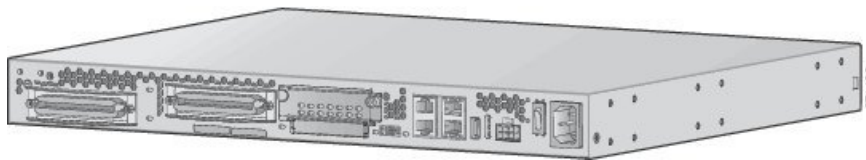
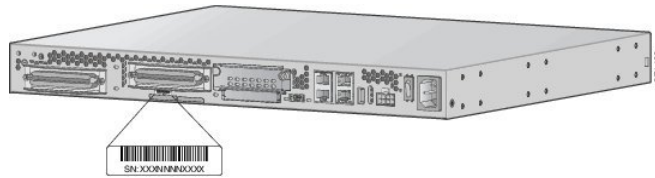


Figure 3: Back Panel of the Cisco VG320 Chassis



Locating the Product Serial Number

The serial number label for the Cisco VG310 and Cisco VG320 Analog Voice Gateways is located on the back panel of the chassis, as shown in the following figure.

Figure 4: Locating the Product Serial Number

Note The serial number for Cisco VG310 and Cisco VG320 is 11 characters long.

Interfaces and Service Capabilities of Cisco VG310 and Cisco VG320

The following table describes the physical ports and the services supported by each port type:

- Two administrative ports—One console and one auxiliary
- Two 10/100BASE-T Gigabit Ethernet LAN ports
- Cisco VG310 is equipped with an RJ-21 port for connection to a distribution panel
- Cisco VG320 has two RJ-21 ports for connection to a distribution panel



Note WAN Interface is not supported on Cisco VG310 and Cisco VG320.

Table 1: Cisco VG310 and Cisco VG320 Analog Voice Gateway Interfaces and Service Capabilities

Port	Interface Configuration	Interface To	Services Supported	Details
Console Port 0/0	EIA/TIA-232 asynchronous serial (data communications equipment)	ASCII terminal Personal computer	Local administrative access	RJ-45 physical interface
Auxiliary Port 0/1	EIA/TIA-232 asynchronous serial (data terminal equipment)	Modem	Remote administrative access Data backup	RJ-45 physical interface
Gigabit Ethernet Port 0/0, 0/1	1000BASE-T (802.3)	LAN	Data	RJ-45 physical interface

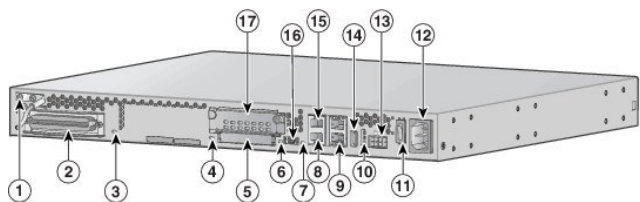
Port	Interface Configuration	Interface To	Services Supported	Details
(For Cisco VG310 only) RJ-21 24 analog FXS voice ports Port 0/0/0 to 0/0/23	FXS (loop start or ground-start)	Analog phone, fax, or modem Network side of key system Network side of analog PBX	Analog voice/fax or modem	RJ-21 physical interface
(For Cisco VG320 only) RJ-21 48 analog FXS voice ports Port 0/0/0 to 0/0/23 and port 0/1/0 to 0/1/23	FXS (loop start or ground-start)	Analog phone, fax, or modem Network side of key system Network side of analog PBX	Analog voice/fax or modem	RJ-21 physical interface
Compact slot memory slot 0	Compact slot memory slot 0	—	—	Flash card

Physical Description and LEDs

All interface ports, connectors, and LEDs are on the back panel of the chassis.

The following figure describes the back panel features of Cisco VG310.

Figure 5: Back Panel Features of Cisco VG310

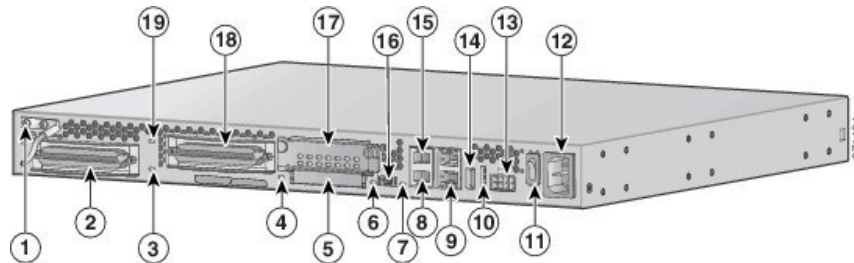


1	Chassis ground connection	10	Status LEDs for DC input power
2	FXS RJ-21 connector	11	On/off switch
3	Status LED for FXS RJ-21 connector	12	AC power input
4	Status LED for CompactFlash card	13	DC power input
5	CompactFlash card slot	14	USB connector
6	Status LED for mini USB	15	RJ-45 serial AUX port
7	Status LED for console	16	Mini USB connector

8	RJ-45 serial console port	17	EHWIC slot
9	Gigabit Ethernet ports (2)		

The following figure describes the back panel features of Cisco VG320.

Figure 6: Back Panel Features of Cisco VG320



1	Chassis ground connection	11	On/off switch
2	FXS RJ-21 connector 1	12	AC power input
3	Status LED for FXS RJ-21 connector 1	13	DC power input
4	Status LED for CompactFlash card	14	USB connector
5	CompactFlash card slot	15	RJ-45 serial AUX port
6	Status LED for mini USB	16	Mini USB connector
7	Status LED for console	17	EHWIC slot
8	RJ-45 serial console port	18	FXS RJ-21 connector 2
9	Gigabit Ethernet ports (2)	19	Status LED for FXS RJ-21 connector 2
10	Status LEDs for DC input power		

LED Indicators

The following table summarizes the LED indicators that are located on the chassis of both VG310 and VG320, but not on the removable modules or interface cards.

For descriptions of LEDs in removable modules and interface cards, see the applicable documentation for those products.

Table 2: Cisco VG310 and Cisco VG320 LED Indicators

LED	Color	Description
SYS	Green	Normal operation. System is receiving power.
	Blinking green	Operating system boot up in progress.
	Amber	Power supply is available, but the unit has an error condition.
	Off	System is not receiving power.

LED	Color	Description
ACT	Green	Indicates packet activity between the forwarding and routing engine and an I/O port.
	Off	No packet transfers are occurring.
PVDM	Green	PVDM3 is detected and enabled.
	Amber	PVDM3 is detected, but has an error condition.
	Off	PVDM3 is not installed
CF	Green	Flash memory is being accessed. Do not remove the CompactFlash memory card.
	Amber	CompactFlash error.
	Off	Flash memory is not being accessed. Safe to remove the CompactFlash memory card, if required.
PWR	Green	System is running.
	Off	System is off.
LNK	Green	Indicates that the Ethernet port has a link partner.
	Off	No link available.
SPD	Green, blinking	Frequency of blinking indicates speed of the port. For information about the LED blinking pattern, see Gigabit Ethernet Ports and LED Indicators, on page 6 .
	Off	No link available.
SER CON	Green	Indicates that the RJ-45 port is the active console port. Note When SER CON LED is On, the USB CON LED will be Off.
USB CON	Green	Indicates that the USB port is the active console port. Note When USB CON LED is On, the SER CON LED will be Off.

Gigabit Ethernet Ports and LED Indicators

There are two RJ-45 Gigabit Ethernet (GE) ports (GE0/0 and GE0/1) on the Cisco VG310 and Cisco VG320 chassis. These ports support 10BASE-T, 100BASE-TX, and 1000BASE-T standards.

The LED indicators for the GE ports display a sequence of blinks followed by a pause to indicate the link speed. The following table describes the link speed indicated by the LED indicators of the GE ports.

Table 3: LED Indicator Pattern for GE Ports

LED Indicator Pattern	Link Speed
Blinks once followed by a pause	10 Mbps
Blinks twice followed by a pause	100 Mbps
Blinks thrice followed by a pause	1000 Mbps

Port Numbering Conventions

The following are the port numbering conventions for the Cisco VG310 chassis and Cisco VG320 chassis:

- An external compact flash card is numbered CF 0.
- 10/100/1000BASE-T ports are numbered 10/100/1000BASE-T 0/0 (bottom) and 10/100/1000BASE-T 0/1 (top).
- (For Cisco VG310 chassis only)—FXS and E/M voice port numbering begins at 0/0/0 and extends to 0/0/23.
- (For Cisco VG320 chassis only)—FXS and E/M voice port numbering begins at 0/0/0 and extends to 0/0/23 for FXS RJ-21 connector 1. For FXS RJ-21 connector 2, port numbering begins at 0/1/0 and extends to 0/1/23. To locate the FXS voice ports, see [Physical Description and LEDs, on page 4](#).

Hardware Features

This section describes the hardware features of Cisco VG310 and Cisco VG320 and includes the following:

- [Real-Time Clock, on page 7](#)
- [USB Serial Console Port, on page 8](#)
- [Removable and Interchangeable Modules and Cards, on page 8](#)

Real-Time Clock

When the system powers up, the internal real-time clock with battery backup provides the system software with the time of day. This allows the system to verify the validity of the certification authority (CA) certificate. Cisco VG310 and Cisco VG320 have a lithium battery. This battery lasts for the duration of the life time of Cisco VG310 or Cisco VG320 under the operating environmental conditions specified for the chassis, and is not field replaceable.



Note If the lithium battery unit in Cisco VG310 and Cisco VG320 fails, the unit must be returned to Cisco for repair.

Built-In Interface Ports

The following table summarizes the interface ports built into the chassis.

Table 4: Summary of Built-In Interfaces on Cisco VG310 and Cisco VG320

Data Ports		Management Ports		
10/100/1000 GE RJ-45	USB Type A	Console Serial, RJ-45	Console Serial, Mini-USB (Type B)	Auxiliary, RJ-45
2	1	1	1	1

USB Serial Console Port

The Mini-USB Type B serial port is enabled to perform management tasks on Cisco VG310 and Cisco VG320. Before establishing physical connectivity between a personal computer and a voice gateway using this port, make sure that a Windows USB device driver is installed.

Removable and Interchangeable Modules and Cards

The following table summarizes the type of removable modules and cards that can be installed in Cisco VG310 and Cisco VG320 to provide specific capabilities.

Table 5: Removable and Interchangeable Modules and Cards

Modules and Cards	Internal or External	Description
EHWIC	External	The EHWIC slot on the chassis supports one EHWIC card. Legacy interface single-width cards such as WAN interface cards (WICs), voice interface cards (VICs), and high-speed WAN interface cards (HWICs) are supported in the EHWIC slot. For a list of supported VICs and VWICs, see Supported Voice Interface Cards and Voice WAN Interface Cards .
Packet Voice Data Modules (PVDM3)	Internal	The PVDM slot on the motherboard supports only a PVDM3. Older PVDM cards are not supported.
Flash memory	External	A CompactFlash memory card stores the operating system software image. The CompactFlash memory card can have sizes of 512 MB, 1 GB, 2 GB, 4 GB, and 8 GB.
Cisco USB flash memory	External	A Cisco USB flash memory (USB 2.0 compliant) supports 1 GB of memory. Note We recommend that you do not use third-party USB devices on Cisco VG310 or Cisco VG320. USB 1.x devices are also not supported on Cisco VG310 and Cisco VG320.

Modules and Cards	Internal or External	Description
DC power supply (Optional)	External	Provides backup power using a 12-volt battery backup system if AC power is not available.

Supported Voice Interface Cards and Voice WAN Interface Cards

The EHWIC slot on the Cisco VG310 and Cisco VG320 chassis supports the following VICs and VWICs:

- Cisco VIC3-2FXS/DID
- Cisco VIC3-2FXS-E/DID
- Cisco VIC3-4FXS/DID
- Cisco VIC3-2E/M
- Cisco VIC2-2FXO
- Cisco VIC2-4FXO
- Cisco VWIC3-1MFT-T1/E1
- Cisco VWIC3-2MFT-T1/E1
- Cisco VIC2-2BRI-NT/TE

Periodic Inspection and Cleaning

Periodic inspection and cleaning of the external surface of the voice gateway is recommended to minimize the negative impact of dust or debris. The frequency of inspection and cleaning is dependent upon the severity of the environmental conditions, but a minimum of every six months is recommended. Cleaning involves vacuuming the unit's air intake and exhaust vents.

Software Elements

The operating system for Cisco VG310 and Cisco VG320 is Cisco IOS software, which resides in the flash memory.

- [Configuration Connections, on page 9](#)
- [Configuration Methods, on page 10](#)

Configuration Connections

You can use an ASCII terminal or a PC to configure a Cisco VG310 or Cisco VG320 Analog Voice Gateway. The configuration can be performed in several ways:

- Locally, with a direct connection through the console port
- Remotely, with a connection through the auxiliary port and a modem

- Through Telnet and TFTP

Configuration Methods

For information on performing the initial configuration on an analogy voice gateway, see [Configuring the Cisco VG310 and Cisco VG320 Voice Gateways](#), on page 47.



CHAPTER 2

Planning Your Installation

Before you install your Cisco VG310 or Cisco VG320 Analog Voice Gateway, read the information provided in the following sections:

- [Safety Recommendations, on page 11](#)
- [Preventing Electrostatic Discharge Damage, on page 12](#)
- [Temperature Control and Ventilation, on page 13](#)
- [Access to Chassis, on page 13](#)
- [Rack Requirements, on page 14](#)
- [Chassis Grounding, on page 14](#)
- [Power Source, on page 14](#)
- [Cable Types, on page 14](#)
- [Distance Limitations for Interface Cables, on page 14](#)
- [Console Port and Auxiliary Port Considerations, on page 15](#)
- [Interference Considerations, on page 17](#)
- [Mounting Tools and Equipment, on page 17](#)
- [Keeping Track—Checklist, on page 18](#)

Safety Recommendations

The following information is included to alert you about safety recommendations and best practices to be followed when working with this equipment.

General Safety Practices

Follow these guidelines to ensure personal safety and protect the equipment:

- Keep the area around the chassis clear of obstacles and free from dust during and after installation.
- If you remove a chassis during installation and maintenance, place the chassis cover in a safe place.
- Keep tools away from walk areas to prevent hazards such as slips, trips, and falls.
- Do not wear loose clothing that may get caught in the chassis.
- Wear safety glasses if you are working under conditions that might be hazardous to the eyes.

**Warning**

This equipment must be installed and maintained by service personnel as defined by AS/NZS 3260. Incorrectly connecting this equipment to a general-purpose outlet could be hazardous. The telecommunications lines must be disconnected 1) before unplugging the main power connector or 2) while the housing is open, or both. Statement 1043

Safety Tips

Use these tips as safety guidelines when installing and working around this equipment:

- Locate the emergency power off switch for the room in which you are working in order to be able to quickly turn off power, if an electrical accident occurs.
- Disconnect all power before installing or removing a chassis.
- Do not work alone if potentially hazardous conditions exist.
- Never assume that power is disconnected from a circuit. Always check.
- Look carefully for possible hazards in your work area, such as moist floors, ungrounded power extension cables, and missing safety grounds.
- If an electrical accident occurs, proceed as follows:
 - Use caution; do not become a victim yourself.
 - Turn off power to the system.
 - If possible, send another person to get medical aid. Otherwise, assess the condition of the victim and then call for help.
 - Determine if the person needs rescue breathing or external cardiac compressions, and then take appropriate action.

Preventing Electrostatic Discharge Damage

Always follow ESD-prevention procedures when removing and replacing components. These procedures include:

- Ensure that the chassis is electrically connected to earth ground.
- Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact.
- Connect a clip to the ESD-strap connection jack (to the left of the power switch on the rear of the chassis) or to an unpainted chassis frame surface.

**Caution**

For safety, periodically check the resistance value of the antistatic strap, which should be between 1 MΩ and 10 MΩ.

Temperature Control and Ventilation

The installation location (room, closet, or cabinet) for Cisco VG310 and Cisco VG320 should always be well ventilated and provide adequate air circulation to ensure proper cooling. The room temperature should be between 32 °F and 104 °F (0 °C to 40 °C).



Note The Cisco VG310 and Cisco VG320 analog voice gateway chassis is designed for back-to-front airflow.

Enclosed Racks



Note Enclosed racks must have adequate ventilation. An enclosed rack should never be overcrowded and should have louvers and a fan.

If the Cisco VG310 or Cisco VG320 analog voice gateway is installed in an enclosed rack with a ventilation fan at the top, make sure that heated air drawn upward from other equipment does not prevent adequate cooling.

If the chassis is installed using slide rails, check for blocked ventilation ports when it is in position in the rack or cabinet. Make sure that the ventilation ports of the unit are not blocked.



Note Baffles can help isolate exhaust air from intake air. Baffles also help draw cooling air through the cabinet. The best location for baffles depends on the airflow patterns in the rack. You can test the airflow by experimenting with different equipment arrangements.

Wall-Mounted

If Cisco VG310 or Cisco VG320 is installed on a wall, there should be plenty of space on both sides to ensure that there is adequate airflow through the chassis.

Bench-Mounted

If the unit is placed on a bench top, do not stack other equipment or paper on the chassis. Provide plenty of space for air circulation (front to back). Inadequate ventilation can result in overheating and damage.

Access to Chassis

Allow space at the rear of the chassis for cable connections. Also consider the need to access the chassis for future upgrades, maintenance, and troubleshooting.

Rack Requirements

Use the following information to plan your equipment-rack configuration:

- Allow clearance around the rack for maintenance.
- Enclosed racks must have adequate ventilation. Ensure that the rack is not congested, because each voice gateway generates heat. An enclosed rack should have louvered sides and a fan to provide cooling air. Heat generated by equipment near the bottom of the rack can be drawn upward into the intake ports of the equipment above it.
- When mounting a chassis in an open rack, ensure that the rack frame does not block the ports. If the chassis is installed on slides, check the position of the chassis when it is seated in the rack.

Chassis Grounding

Chassis grounding is provided through the power cable, which uses a standard grounding plug. However, the chassis also requires a reliable earth ground using the earth ground lug and hardware provided. For more information, see [Installing the Ground Connection, on page 30](#).

Power Source

You can connect Cisco VG310 or Cisco VG320 to either an AC power source or a +12V DC power supply.

**Caution**

The chassis provides inputs for both AC and DC power. Design your installation to use only one type of power. *Do not use AC and DC power at the same time.* If you do, the unit stops operating, and you must reboot it with only a single power source.

For more information, see [Connecting Power, on page 33](#).

Cable Types

The cable types are dependent on the Cisco VG310 or Cisco VG320 analog voice gateway that you are using. For more information, see [Interfaces and Service Capabilities of Cisco VG310 and Cisco VG320 , on page 3](#) and [Cable Specifications and Information, on page 61](#).

Distance Limitations for Interface Cables

When planning your installation, consider distance limitations and potential electromagnetic interference (EMI) as defined by the Electronic Industries Association (EIA). Distance-limitation information is included for the following Voice Gateway ports:

- Gigabit Ethernet ports—The maximum segment distance for Gigabit Ethernet is 330 feet (100 meters) (specified in IEEE 802.3).
- FXS analog voice ports—The maximum distance is established by a total allowable loop resistance, including the phone or terminal equipment, of 600 Ohms.

Console Port and Auxiliary Port Considerations

Cisco VG310 and Cisco VG320 include an asynchronous serial console port and an auxiliary port. The console and auxiliary ports provide access to the unit either locally using a console terminal connected to the console port, or remotely, using a modem connected to the auxiliary port. This section discusses important cabling information to consider before connecting the unit to a console terminal or modem.

The main difference between the console and auxiliary ports is that the auxiliary port supports hardware flow control and the console port does not. Flow control paces the transmission of data between a sending device and a receiving device. Flow control ensures that the receiving device can absorb the data sent to it before the sending device sends more. When the buffers on the receiving device are full, a message is sent to the sending device to suspend transmission until the data in the buffers has been processed. Because the auxiliary port supports flow control, it is ideally suited for use with the high-speed transmissions of a modem. Console terminals send data at speeds slower than modems do; therefore, the console port is ideally suited for use with console terminals.

Console Port Connections

Cisco VG310 and Cisco VG320 have EIA/TIA-232 asynchronous (RJ-45) and USB 5-pin mini Type B, 2.0-compliant serial console ports. The console port do not have any hardware flow control. Shielded USB cables with properly terminated shields are recommended.

EIA/TIA-232

Depending on the cable and the adapter used, this port appears as a Data Terminal Equipment (DTE) or Data Circuit-Terminating Equipment (DCE) device at the end of the cable. Only one port can be used at the same time.

The default parameters for the console port are 9600 baud, 8 data bits, 1 stop bit, and no parity. The console port does not support hardware flow control.

USB Serial Console

Use the USB console port on the chassis to access the Cisco IOS CLI and perform configuration tasks. A terminal emulation program, such as Microsoft HyperTerminal for Windows, is required to establish communication between the voice gateway and a PC. The USB serial console port connects directly to the USB connector of a PC using a 5-pin mini USB Type A or USB Type-B cable. The USB console supports full-speed (12 Mbps) operation.



Note Always use shielded USB cables with a properly terminated shield.

The default parameters for the console port are 9600 baud, 8 data bits, no parity, and 1 stop bit. The USB console port does not support hardware flow control.

For operation with Microsoft Windows, the Cisco USB Console Driver must be installed on the PC connected to the console port. If the driver is not installed, a series of prompts guide you through a simple installation process.



Note You may encounter USB driver-related errors if you are using a PC with Microsoft Windows 7.0, 64-bit operating system to establish connectivity with a voice gateway. As a workaround, you can install the Cisco USB console driver from:

The Cisco USB Console Driver allows plugging and unplugging of the USB cable from the console port without affecting Microsoft HyperTerminal operations. No special drivers are needed for Mac OS X or Linux.

Only one console port can be active at a time. When a cable is plugged into the USB console port, the RJ-45 port becomes inactive. Conversely, when the USB cable is removed from the USB port, the RJ-45 port becomes active.

Baud rates for the USB console port are 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115200 bps.



Note 4-pin mini USB Type-B connectors are easily confused with 5-pin mini USB Type-B connectors. Only the 5-pin mini USB Type-B is supported.

USB Console OS Compatibility

- Microsoft Windows 7.0, 32 bit and 64 bit
- Microsoft Windows 2000, Microsoft Windows XP 32 bit, and Microsoft Windows Vista 32 bit
- Mac OS X Version 10.9
- Redhat 10 or Fedora 10 with kernel 2.6.27.5-117
- Ubuntu 8.10 with kernel 2.6.27-11
- Debian 5.0 with kernel 2.6
- SUSE 11.1 with kernel 2.6.27.7-9

Auxiliary Port Connections

The Cisco VG310 and Cisco VG320 have an EIA/TIA-232 asynchronous serial auxiliary port (RJ-45) that supports flow control. Depending on the cable and the adapter used, this port appears as a DTE or DCE device at the end of the cable.

For connection to a modem, your unit is provided with an RJ-45-to-DB-25 adapter cable. (A DB-9-to-DB-25 adapter is also included with the unit.) For more information, see [Connecting an Auxiliary Port to a Modem, on page 39](#).

Interference Considerations

When you run cables for any significant distance in an electromagnetic field, interference can occur between the electromagnetic field and the signals on the cables. This has the following implications on the installation of terminal plant cabling:

- Unshielded plant cabling can emit radio interference.
- Strong electromagnetic interference (EMI), especially as caused by lightning or radio transmitters, can destroy the EIA/TIA-232 drivers and receivers in Cisco VG310 or Cisco VG320.

Consider the following guidelines:

- To prevent emitted radio interference, use twisted-pair cables with a good distribution of grounding conductors in your plant cabling.
- If you have cables exceeding recommended distances, or if you have cables that pass between buildings, give special consideration to the effect of lightning strikes or ground loops. If your site has these characteristics, consult experts in lightning suppression and shielding. The electromagnetic pulse caused by lightning or other high-energy phenomena can easily couple enough energy into unshielded conductors to destroy electronic devices. Take precautions to avoid these problems by providing a properly grounded and shielded environment and by installing electrical surge suppression.
- All module openings must be either occupied or covered to prevent electromagnetic interference—you must either install a module in its vacant slot or install a cover plate over the opening.
- Consult experts in radio-frequency interference (RFI) for advice on the prevention of electromagnetic interference.

Mounting Tools and Equipment

The following are the tools and parts required to install the voice gateway:

- ESD-preventive cord and wrist strap.
- Standard flat-blade screwdrivers—small (3/16-in. [4 mm to 5 mm]) and medium (1/4-in. [6 mm to 7 mm]):
 - To attach brackets to a rack or wall.
 - To install or remove modules.
 - To remove the cover if you are upgrading memory or other components.
- Phillips screwdriver for attaching brackets to the chassis.
- Mounting brackets and screws for 24-inch rack, if required:
 - Four Telco machine screws for installing the chassis in a rack (use the screw size required by the rack).
- Screws and anchors for wall-mounting, if required:
 - Eight wood screws or other fasteners for installing the chassis on a wall. An additional starter screw can be used to facilitate wall-mounting.

- Wire crimper.
- Wire for connecting the chassis to an earth ground:
 - AWG 14 (2 mm²) or larger wire for NEC-compliant chassis grounding.
 - AWG 18 (1 mm²) or larger wire for EN or IEC 60950-compliant chassis grounding.
 - For NEC-compliant grounding, an appropriate user-supplied ring terminal, with an inner diameter of 1/4 in. (5 mm to 7 mm).

In addition, depending on the type of modules you plan to use, you may need the following external equipment:

- Console terminal or personal computer with terminal emulation software.
- Cables for connecting to the WAN and LAN ports (dependent on configuration).
- PC-running terminal-emulation software for administrative access.
- Modem for remote access.
- Analog voice RJ-21 cable.
- Ethernet switch.
- Modem for remote configuration.

Keeping Track–Checklist

We recommend that you use an installation checklist and maintain a Site Log.

Installation Checklist

Include a copy of an installation checklist in your Site Log for each Cisco VG310 or Cisco VG320. The installation checklist provides a record of the tasks performed for installing a unit. Print a copy of this checklist and mark the entries as you complete each task.

Table 6: Installation Checklist

Installation Checklist for Site _____		
Cisco VG Name/Serial Number _____		
Task	Verified by	Date
Background information placed in Site Log		
Environmental specifications verified		
Site power voltages verified		
Installation site prepower check completed		

Installation Checklist for Site _____		
Cisco VG Name/Serial Number _____		
Required tools available		
Additional equipment available		
Cisco VG received		
Information packet, warranty card, and Cisco.com card received		
Software version verified		
Rack, desktop, or wall-mounting of chassis completed		
Initial electrical connections established		
ASCII terminal attached to console port		
Modem attached to console port (for remote configuration)		
Signal distance limits verified		
Startup sequence steps completed		
Initial operation verified		

Site Log

We recommend that you maintain a Site Log to record all the actions relevant to the system. Site Log entries can include the following:

- Installation—Print a copy of the Installation Checklist and include it into the Site Log
- Upgrades and maintenance—Use the Site Log to record ongoing maintenance and expansion history. Update the Site Log to display the following:
 - Configuration changes
 - Maintenance schedules, requirements, and procedures performed
 - Comments, notes, and problems
 - Changes and updates to Cisco IOS software



CHAPTER 3

Installing the Cisco VG310 and Cisco VG320 Voice Gateways

This document describes how to install and connect Cisco VG310 and Cisco VG320 voice gateways to LAN, WAN, and voice networks. The following sections are included:

- [Safety Recommendations, on page 21](#)
- [General Safety Practices, on page 23](#)
- [Safety Tips, on page 24](#)
- [Preventing Electrostatic Discharge Damage, on page 24](#)
- [What You Need to Know, on page 25](#)
- [Before You Begin, on page 25](#)
- [Unpacking and Inspecting, on page 25](#)
- [Mounting the Chassis, on page 25](#)
- [Connecting Power, on page 33](#)
- [Connecting to a Console Terminal or Modem, on page 37](#)
- [Connecting a Gigabit Ethernet Port to a Gigabit Ethernet Switch, on page 39](#)
- [Ports and Cabling, on page 39](#)
- [Voice Cables, on page 40](#)
- [Ports, Connectors, and Pinouts, on page 42](#)
- [Remote Terminal Connections \(If Applicable\), on page 43](#)
- [Removing and Installing a CompactFlash Memory Card, on page 44](#)

Safety Recommendations

The following information is included to alert you about safety recommendations and best practices to be followed when working with this equipment.

Maintaining Safety with Electricity

Follow these guidelines when working on equipment powered by electricity.

**Warning**

When installing the product, please use the provided or designated connection cables/power cables/AC adaptors/batteries. Using any other cables/adaptors could cause a malfunction or a fire. Electrical Appliance and Material Safety Law prohibits the use of UL-certified cables (that have the "UL" or "CSA" shown on the cord), not regulated with the subject law by showing "PSE" on the cord, for any other electrical devices than products designated by CISCO. Statement 371

**Warning**

Do not work on the system or connect or disconnect cables during periods of lightning activity. Statement 1001

**Warning**

This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than 120 V, 15 A or 240 V, 16 A for the Circuit Breaker. Statement 1005

**Warning**

Class 1 laser product. Statement 1008

**Warning**

There is the danger of explosion if the battery is replaced incorrectly. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions. Statement 1015

**Warning**

To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telephone-network voltage (TNV) circuits. LAN ports contain SELV circuits, and WAN ports contain TNV circuits. Some LAN and WAN ports both use RJ-45 connectors. Use caution when connecting cables. Statement 1021

**Warning**

This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available. Statement 1024

**Warning**

Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place. Statement 1029

**Warning**

Do not use this product near water; for example, near a bathtub, wash bowl, kitchen sink or laundry tub, in a wet basement, or near a swimming pool. Statement 1035

**Warning**

Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface. Statement 1037

**Warning**

Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning. Statement 1038

**Warning**

To report a gas leak, do not use a telephone in the vicinity of the leak. Statement 1039

**Warning**

Before opening the unit, disconnect the telephone-network cables to avoid contact with telephone-network voltages. Statement 1041

**Warning**

This equipment contains a ring signal generator (ringer), which is a source of hazardous voltage. Do not touch the RJ-11 (phone) port wires (conductors), the conductors of a cable connected to the RJ-11 port, or the associated circuit-board when the ringer is active. The ringer is activated by an incoming call. Statement 1042

**Warning**

For diverging beams, viewing the laser output with certain optical instruments within a distance of 100 mm may harm your eyes. For collimated beams, viewing the laser output with certain optical instruments designed for use at a distance may harm your eyes. Statement 1054

**Warning**

Installation of the equipment must comply with local and national electrical codes. Statement 1074

General Safety Practices

Follow these guidelines to ensure personal safety and protect the equipment:

- Keep the area around the chassis clear of obstacles and free from dust during and after installation.
- If you remove a chassis during installation and maintenance, place the chassis cover in a safe place.
- Keep tools away from walk areas to prevent hazards such as slips, trips, and falls.
- Do not wear loose clothing that may get caught in the chassis.
- Wear safety glasses if you are working under conditions that might be hazardous to the eyes.

**Warning**

This equipment must be installed and maintained by service personnel as defined by AS/NZS 3260. Incorrectly connecting this equipment to a general-purpose outlet could be hazardous. The telecommunications lines must be disconnected 1) before unplugging the main power connector or 2) while the housing is open, or both. Statement 1043

Safety Tips

Use these tips as safety guidelines when installing and working around this equipment:

- Locate the emergency power off switch for the room in which you are working in order to be able to quickly turn off power, if an electrical accident occurs.
- Disconnect all power before installing or removing a chassis.
- Do not work alone if potentially hazardous conditions exist.
- Never assume that power is disconnected from a circuit. Always check.
- Look carefully for possible hazards in your work area, such as moist floors, ungrounded power extension cables, and missing safety grounds.
- If an electrical accident occurs, proceed as follows:
 - Use caution; do not become a victim yourself.
 - Turn off power to the system.
 - If possible, send another person to get medical aid. Otherwise, assess the condition of the victim and then call for help.
 - Determine if the person needs rescue breathing or external cardiac compressions, and then take appropriate action.

Preventing Electrostatic Discharge Damage

Always follow ESD-prevention procedures when removing and replacing components. These procedures include:

- Ensure that the chassis is electrically connected to earth ground.
- Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact.
- Connect a clip to the ESD-strap connection jack (to the left of the power switch on the rear of the chassis) or to an unpainted chassis frame surface.

**Caution**

For safety, periodically check the resistance value of the antistatic strap, which should be between 1 MΩ and 10 MΩ.

What You Need to Know

Slot and Port Numbers

Cisco VG310 and Cisco VG320 have built in ports and slots to accommodate modules and interface cards that include the Enhanced High-Speed WAN Interface Card (EHWIC) and the Packet Voice and Data Module (PVDM3). For information on slot and port numbering, see [Interfaces and Service Capabilities](#).

Before You Begin

Read the [Safety Recommendations, on page 11](#) before installing and connecting Cisco VG310 or Cisco VG320.

Unpacking and Inspecting

Do not unpack the voice gateway until you are ready to install it. If the installation site is not ready, keep the chassis in its shipping container to prevent accidental damage.

The voice gateway, cables, printed publications, and any optional equipment you ordered might be shipped in more than one container. When you unpack each shipping container, check the packing list to ensure that you have received all the following items:

- The Cisco VG310 or Cisco VG320 Analog Voice Gateway
- Power cord, 6 foot (1.8 m)
- RJ-45-to-DB-25 adapter cable (labeled *Console*)
- RJ-45-to-DB-9 adapter cable (labeled *Auxiliary*)
- Rack-mounting brackets for 19-inch rack (one pair) with screws for attaching to chassis
- Chassis guard for wall-mounting applications
- Grounding lug and fasteners

Inspect all items for shipping damage. If anything appears damaged, or if you encounter problems when installing or configuring your system, contact Cisco customer service representative. (See [Obtaining Technical Assistance, on page xi](#).)

Mounting the Chassis

There are three methods of installing the chassis:

- [Mounting the Chassis on a Rack, on page 26](#)
- [Mounting the Chassis on a Wall, on page 28](#)
- [Installing the Voice Gateway on a Bench, on page 30](#)

Mounting Screws

Two types of mounting screws are provided in separate packages to attach the mounting brackets to the chassis. Take care to use the correct screw type and washers for the required mounting option (rack mounting or wall mounting). The following table shows the differences between rack-mounting and wall-mounting screws.

Table 7: Difference Between Rack-Mounting and Wall-Mounting Screws

Rack-Mounting Screws	Wall-Mounting Screws
Eight countersunk Phillips head screws (four per bracket)	Four 6–32 slotted hexagonal head screws (two per bracket) and four plastic washers
Washers are not required	Washers are required

Mounting the Chassis on a Rack

To mount the chassis on a rack:

Before you begin

Your chassis ships with a pair of brackets and mounting screws for use with a 19-inch rack. For information about the mounting screws that you must use, see [Mounting Screws, on page 26](#).



Warning

To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack. Statement 1006
- The unit should be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting the unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.



Warning

This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available. Statement 1024



Warning

Take care when connecting units to the supply circuit so that wiring is not overloaded. Statement 1018



Warning

To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of: 40 °C (104 °F). Statement 1047

**Caution**

If installed on enclosed racks, the racks must have adequate ventilation. An enclosed rack should never be overcrowded and should have louvers and a fan.

If the Cisco VG310 or Cisco VG320 is installed in an enclosed rack with a ventilation fan at the top, make sure that heated air drawn upward from other equipment does not pass through the Cisco VG310 or Cisco VG320 chassis.

If the chassis is installed using slide rails, check for blocked ventilation ports when it is in position in the rack or cabinet. Make sure that the ventilation ports of the chassis are not blocked.

**Tip**

Baffles can help isolate exhaust air from intake air. Baffles also help draw cooling air through the cabinet. The best location for the baffles depends on the airflow patterns in the rack. You can test the airflow by experimenting with different equipment arrangements.

**Note**

Machine screws for securing the chassis in a rack are not included in the package. You must arrange for machine screws of the appropriate size required by your rack.

Procedure

- Step 1** Attach the long leg of the mounting brackets to the chassis.

Figure 7: Attaching the Brackets to a Chassis (For 19-Inch Rack)

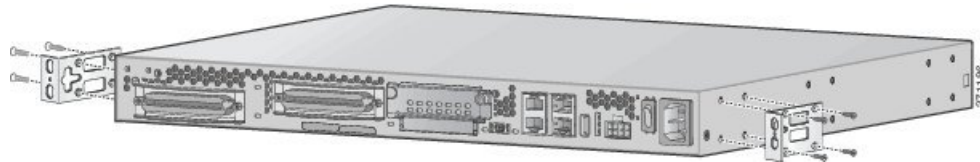
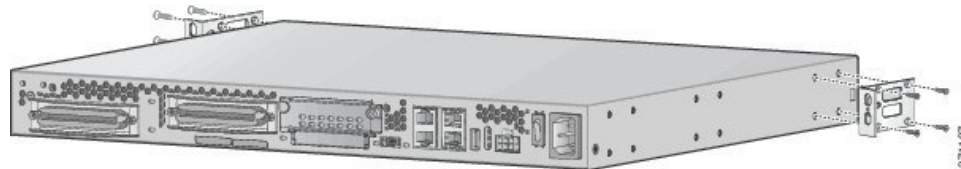
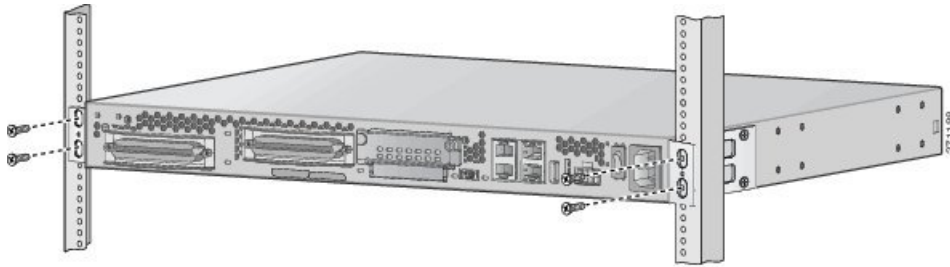


Figure 8: Attaching the Brackets to a Chassis (For Telco 19-Inch Rack)



- Step 2** Position the chassis on the rack to align the holes on the short leg of the bracket with the appropriate holes on the 19-inch rack.
- Step 3** Using the machine screws (not supplied), attach the bracket to the rack to secure the chassis in the rack. (See the following figure.)

Figure 9: Attaching the Chassis to the 19-Inch Rack



Mounting the Chassis on a Wall

Before you begin



Warning

This unit is intended to be mounted on a wall. Read the wall-mounting instructions carefully before beginning installation. Failure to use the correct hardware or to follow the correct procedures could result in a hazardous situation to people and damage to the system. Statement 248



Caution

Ensure that the chassis is oriented with the back panel connectors aligned sideways and not facing vertically upward or downward.



Caution

Two types of mounting screws are provided in separate packages to attach the mounting brackets to the chassis. Take care to use the correct screw type and washers for the required mounting option (rack mounting or wall mounting). For more information, see [Mounting Screws, on page 26](#).



Note

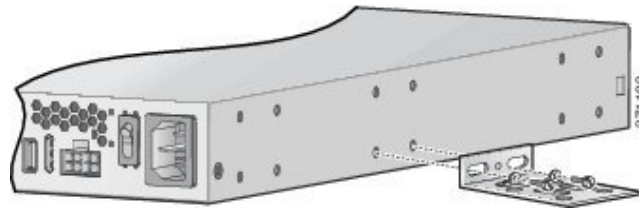
You must arrange for the fasteners required to install the chassis on a wall. These fasteners are not included in the package. We recommend that you select the fasteners that are appropriate for the material the wall is made of.

To mount the chassis on a wall:

Procedure

Step 1

Attach the short leg of one bracket to the chassis, using two 6-32 \times 1/4 slotted hex screws (provided). Use a plastic washer (provided) with each screw, with the narrow end of the washer fitting into the bracket slot, and facing the chassis.

Figure 10: Attaching the Brackets for Wall Mounting

Step 2 Attach the second bracket to the opposite side of the chassis.

Step 3 Orient the chassis to ensure that the back panel with connectors faces sideways.

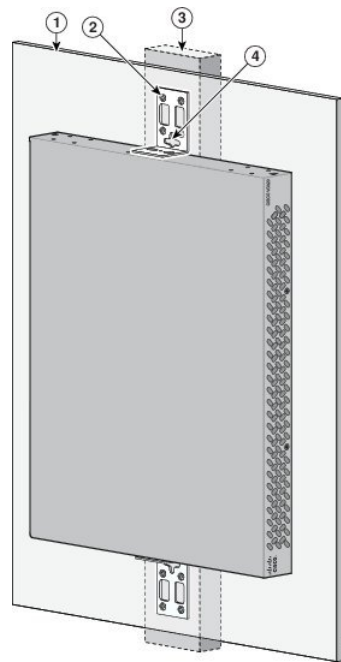
Note Vertical orientation of the chassis with the back panel connectors facing up or down is not recommended.

Step 4 Secure the long legs of the brackets to the wall with fasteners that are appropriate for the material that wall is made of:

- a) To hold the unit in place for easy installation, install a starter screw in the wall, and hook the bracket keyhole over the screw.
- b) Secure both brackets to the wall using the fasteners (not supplied).

Note To attach the brackets to a wall stud, each bracket requires two #10 wood screws (round-head or pan-head) with #10 washers, or two #10 washer-head screws. The screws must be long enough to penetrate at least 3/4 inch (20 mm) into the supporting wood or metal wall stud.

Note For hollow-wall mounting, each bracket requires two wall anchors with washers. Wall anchors and washers must be #10.

Figure 11: Mounting the Chassis on a Wall

1	Wall	3	Wall stud
---	------	---	-----------

2	Bracket	4	Keyhole for starter screw
---	---------	---	---------------------------

Installing the Voice Gateway on a Bench



Caution

Do not plug this unit into an AC outlet that does not have a UL-certified receptacle that is properly tied to the building ground.



Caution

If the unit is placed on a bench top, do not stack other equipment or paper on the chassis. Provide plenty of space for air circulation (front to back). Inadequate ventilation can result in overheating and damage.



Note

Ensure that a suitable AC power outlet is available.

1. Place the four rubber feet (from the accessory kit) in the four indentations on the underside of the chassis. This facilitates proper airflow through and around the chassis.
2. Place the unit on a smooth, flat surface.

Installing the Ground Connection

To ground the Cisco VG310 or Cisco VG320 chassis, follow this procedure:

Before you begin



Warning

This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available. Statement 1024



Warning

Use copper conductors only. Statement 1025

You must connect the chassis to a reliable earth ground; the ground wire must be installed in accordance with local electrical safety standards.

- For NEC-compliant grounding, use size AWG 14 (2 mm²) or larger wire and an appropriate user-supplied ring terminal.
- For EN/IEC 60950-compliant grounding, use size AWG 18 (1 mm²) or larger wire and an appropriate user-supplied ring terminal.

Procedure

Step 1 Locate a suitable ground location.

Tip Use a multimeter to measure the resistance between various ground locations:

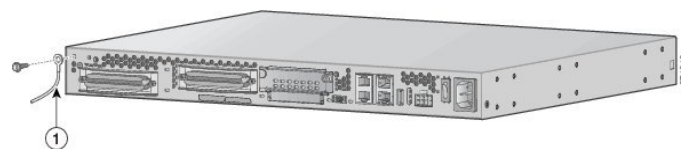
- Between the ground of a junction box (outlet) and the ground of a power tap
- Between the ground of a junction box and a metal water pipe
- Between the chassis and the ground of a power tap
- Between the chassis and the ground of a junction box

Note A good ground connection should read between 0.0 Ω and 0.5 Ω .

Step 2 Strip one end of the ground wire till the length required for the ground lug or terminal is reached.

Step 3 Crimp the ground wire to the ground lug or ring terminal using a crimp tool of the appropriate size.

Figure 12: Chassis Ground Connection Using Ring Terminal



1	Ring terminal attachment
---	--------------------------

Step 4 Attach the ground lug or ring terminal to the chassis as shown in the following figures. For the ground lug, use the two screws with captive locking washers provided. For a ring terminal, use one of the screws provided. Use a number 2 Phillips screwdriver and tighten the screws to a torque of 8 in-lb to 10 in-lb (0.9 N-m to 1.1 N-m).

Note You can orient the crimped end of the ground lug in either direction (right or left).

Step 5 Connect the other end of the ground wire to a grounding point at your site.

Connecting Cables



Warning

Do not work on the system or connect or disconnect cables during periods of lightning activity. Statement 1001



Warning

This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than 120 V, 15 A or 240 V, 16 A for the Circuit Breaker. Statement 1005

**Warning**

To prevent accidental discharge in the event of a power line cross, route on-premise wiring away from power cables and off-premise wiring, or use a grounded shield to separate the on-premise wiring from the power cables and off-premise wiring. A power line cross is an event, such as a lightning strike, that causes a power surge. Off-premise wiring is designed to withstand power line crosses. On-premise wiring is protected from power line crosses by a device that provides overcurrent and overvoltage protection. Nevertheless, if the on-premise wiring is in close proximity to, or not shielded from, the off-premise wiring or power cables during a lightning strike or power surge, the on-premise wiring can carry a dangerous discharge to the attached interface, equipment, and nearby personnel. Statement 338

The voice gateway ports are color-coded for identification.

**Note**

The installation must comply with all applicable codes.

**Note**

For information on cables and pinouts, see [Cable Specifications and Information, on page 61](#).

LAN and Power Cables

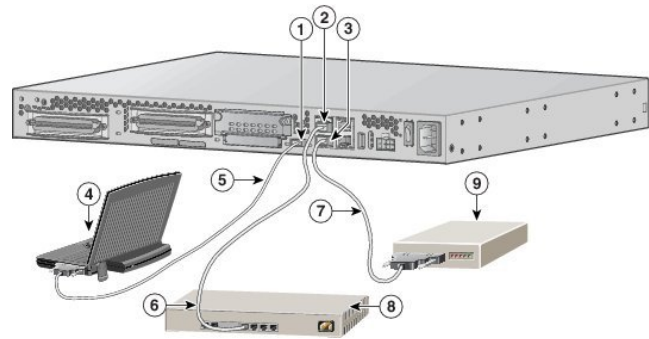
The cables and connections are described in the following table.

Table 8: LAN and Power Cables

Port or Connection	Color or Type	Connected To	Cable
Gigabit Ethernet	Yellow	Gigabit Ethernet switch	Straight-through Gigabit Ethernet cable (not included)
Console	Light blue	PC or ASCII terminal communication (COM) port	RJ-45-to-DB9 console cable (included)
Auxiliary	Black	Modem for remote access	RJ-45-to-DB25 auxiliary cable (included)
Power (not shown)	Power	100–240 VAC, 50–60 Hz	Grounding power cord (included) Note Power cables may vary according to meet local requirements.

The following figure shows the LAN and administrative access connections.

Figure 13: LAN and Administrative Access Connections



1	Mini USB port	6	RJ-45-to-DB9 auxiliary cable
2	AUX port	7	RJ-45-to-DB25 console cable
3	Console port	8	Ethernet hub
4	PC	9	Modem
5	USB cable		

Connecting Power


Warning

Do not work on the system or connect or disconnect cables during periods of lightning activity. Statement 1001


Warning

Read the installation instructions before you connect the system to its power source. Statement 1004


Warning

This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than 120 V, 15 A or 240 V, 16 A for the Circuit Breaker. Statement 1005


Warning

This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means by security. Statement 1017


Caution

The Cisco chassis provides inputs for both AC and DC power. Design your installation to use only one type of power. *Do not use AC and DC power at the same time.* If you do, the unit stops operating, and you must reboot it with only a single power source.

Depending on the power source you want to connect, see:

- [Connecting the Chassis to an AC Power Source, on page 34](#)
- [Connecting the Chassis to a +12V DC Power Supply, on page 35](#)

Connecting the Chassis to an AC Power Source

Before you begin



Warning

AC connected units must have a permanent ground connection in addition to the power cable ground wire.



Caution

Design your installation to use either AC or DC power source. *Do not use AC and DC power at the same time.* If you do, the unit stops operating, and you must reboot it with only a single power source.



Note

If you suspect that your AC power is not clean—if lights flicker often or there is machinery with large motors nearby—have a qualified person test the power. Install a power conditioner if necessary.

The Cisco VG310 or Cisco VG320 voice gateway with AC power supply autoselects either 100–127 volt or 200–240 volt operation. AC versions include a 6-foot (1.8-meter) electrical power cord. A label near the power cord indicates the correct voltage, frequency, current draw, and power dissipation.

Follow these guidelines before you connect the chassis to an AC power source:

- While being connected to an AC power source, *do not* connect the chassis to the DC power supply as an arrangement for backup power in the event of AC power failures.
- To ensure uninterrupted power, connect the chassis to an uninterruptible power supply (UPS). For more information on connecting a UPS to the chassis, see [Connecting a UPS to an AC-Powered Voice Gateway, on page 35](#).

To connect the chassis to an AC power source:

Procedure

-
- Step 1** Connect the AC power cable (supplied) to the recessed power plug on the rear of the concentrator.
- Step 2** Plug the cable into an AC power source with a voltage of 100 VAC to 240 VAC.
-

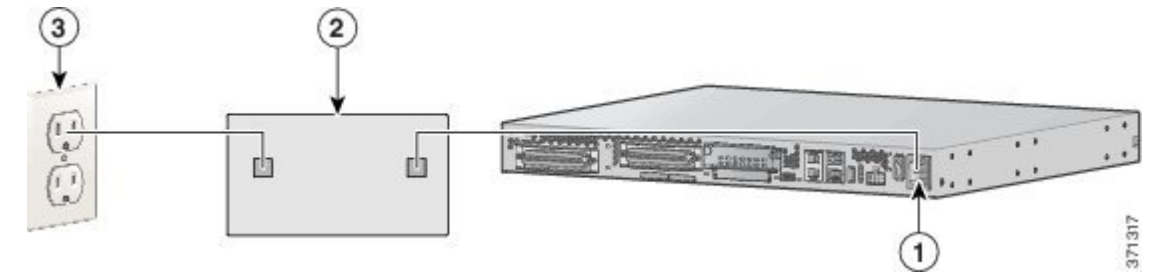
Connecting a UPS to an AC-Powered Voice Gateway



Note Before you install a UPS, make sure that you read the installation instructions.

The following figure shows a setup using a UPS.

Figure 14: Connecting a UPS to an AC-Powered Chassis



1	AC plug	3	AC wall plug
2	UPS		

Connecting the Chassis to a +12V DC Power Supply



Caution If you are powering the chassis using a +12V DC power supply, ensure that you have not connected the chassis to an AC power source. *Do not use AC and DC power at the same time.* If you do, the unit stops operating, and you must reboot it with only a single power source.

Power to a DC-powered chassis is provided by a 12 Volt battery.

Follow these guidelines before you install a battery:

- Review the documents accompanying the battery before setting up your system.
- When you make the settings for the DC source voltage, you must consider the voltage drops between the DC power supply and the DC input connector on Cisco VG310 or Cisco VG320. To ensure optimal performance, the input voltage at the DC input connector should not be less than 11.5 V.
- Use a battery of higher capacity if you require longer periods of battery operation (for example, up to 8 hours).
- If you use a battery of high capacity or a high-capacity DC source to power the chassis, install an external fuse for protection against fault and fire.

Power Connector for the DC Power Supply

The Cisco VG310 and Cisco VG320 analog voice gateways support the Molex Mini-Fit Jr. 5557 Series, 8-circuit dual-row, +12V DC power connector (Molex P/N 39-01-2085). The +12V DC power input is designed

to be used with an external UPS system, and it has status signals that are reported to Cisco VG310 or Cisco VG320.

The following table shows the connector pin assignment for the +12V DC power connector pin assignment.

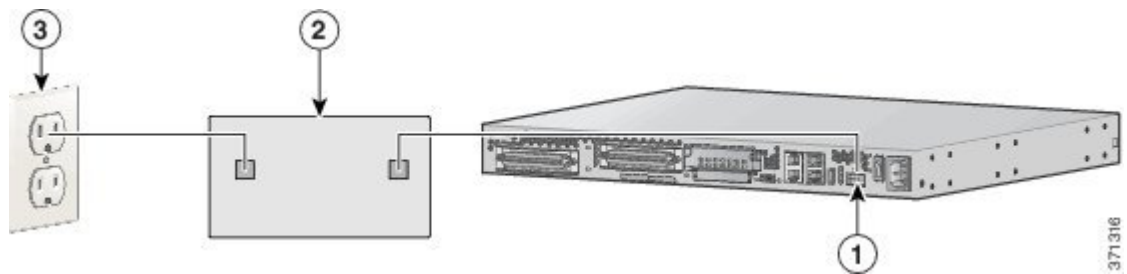
Table 9: +12V DC Connector Pin Assignment

Pin	Direction	Description	SW Register 0x4A80_0038	Definition
1	Input	Enable (tie low)	—	—
2	Input	+12V (power)	—	—
3	Output	REP_BAT (tie low)	Bit 6: REP_MIS_BAT	Battery Missing: Fail 1 = missing Fail 0 = good
4	Input	GND (power return)	—	—
5	Output	ON_BAT (tie low)	Bit 4: BAT_ON	Battery on/off: Status 1 = off Status 0 = on
6	Input	+12V (power)	—	—
7	Output	LOW_BAT (tie low)	Bit 5: BAT_LOW	Battery power: Level status 1 = low Level status 0 = okay
8	Input	GND (power return)	—	—

Connecting a Battery to a DC-Powered Chassis

The following figure shows a setup that uses an external battery. This is one of the many possible setups.

Figure 15: Connecting a Battery to a DC-Powered Chassis

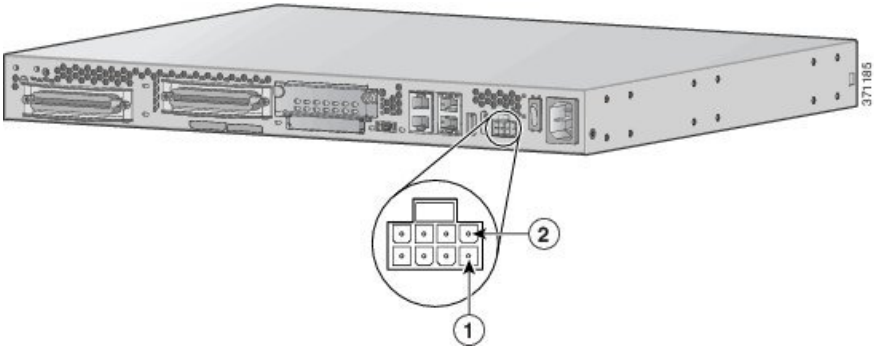


1	DC plug	3	AC wall plug
---	---------	---	--------------

2	Battery		
---	---------	--	--

Connect the battery to the DC input connector on your Cisco VG310 or Cisco VG320. The following figure shows the DC power connector.

Figure 16: +12V DC Power Connector



1	Pin 1	2	Pin 5
---	-------	---	-------

Pinouts for the DC Power Connector

The following table provides information about the pinouts for the DC power connector on Cisco VG310 and Cisco VG320.

Table 10: Pinouts for the DC Power Connector

Pin Number	Description
1	GND (input enable)
2	+12V (power)
3	REP_BAT (replace battery)
4	GND (power return)
5	ON_BAT (battery is on)
6	+12V (power)
7	LOW_BAT (battery is low)
8	GND (power return)

Connecting to a Console Terminal or Modem

The Cisco VG310 or Cisco VG320 analog voice gateway unit has an asynchronous serial port and an auxiliary port. These ports provide administrative access to the unit either locally (with a console terminal or a PC) or remotely (with a modem). To configure the unit using the Cisco IOS CLI, you must establish a connection between the console port on the voice gateway and either a terminal or a PC.

Use the cables and adapters listed in the following table to establish a local or remote connection.

Port Type	Cable	Section Containing Additional Information
Serial (RJ-45)	EIA RJ-45	Connecting to a Serial Port with Microsoft Windows, on page 38
Serial (USB)	USB 5-pin mini USB Type-B-to-USB Type-A	
Auxiliary (Modem)	DB-9-to-DB-25	Connecting an Auxiliary Port to a Modem, on page 39

Connecting to a Serial Port with Microsoft Windows

Before you begin



Note Install the USB device driver before establishing a physical connection between the voice gateway and the PC using the USB console cable plugged into the USB serial port. Otherwise, the connection will fail.



Note You may encounter USB driver-related errors if you are using a PC with Microsoft Windows 7, 64-bit operating system to connectivity with the voice gateway. As a workaround, you can install the Cisco USB Console Driver from the Cisco software section at <http://software.cisco.com/download/release.html?mdfid=282774223&flowid=7438&softwareid=282855122&release=3.1&reind=AVAILABLE&rellifecycle=&reltype=latest>

For information on cabling, see [Cable Specifications and Information, on page 61](#).

Procedure

- Step 1** Connect the end of the console cable with the RJ-45 connector to the console port on the voice gateway.
- or
- Connect a USB 5-pin mini-USB Type B to the USB console port, as shown in the figure in [LAN and Power Cables, on page 32](#).
- Note** When the USB port is used, it takes priority over the RJ-45 EIA port.
- Step 2** Connect the end of the cable with the DB-9 connector (or USB Type A) to the terminal or PC. If your terminal or PC has a console port that does not accommodate a DB-9 connector, you must provide an appropriate adapter for that port.
- Step 3** To communicate with the voice gateway, start a terminal emulator application, such as Microsoft HyperTerminal for Windows. This software should be configured with the following parameters:
- 9600 baud
 - 8 data bits
 - No parity

- 1 stop bit
- No flow control

Connecting an Auxiliary Port to a Modem

To connect a modem to the voice gateway, follow these steps:

Before you begin

When a modem is connected to the auxiliary port, a remote user can dial in to Cisco VG310 or Cisco VG320 and configure it. Use the console cable and the DB-9-to-DB-25 connector adapter that comes with the accessory kit.

For information on cabling, see [Cable Specifications and Information, on page 61](#).

Procedure

Step 1 Connect the RJ-45 end of the adapter cable to the AUX port on the voice gateway.

Step 2 Connect the other end of the cable to the connector on the modem.

See the figure in [LAN and Power Cables, on page 32](#).

Connecting a Gigabit Ethernet Port to a Gigabit Ethernet Switch

Procedure

Step 1 Connect the cable from a Gigabit Ethernet port to an available port on the Gigabit Ethernet switch.

Step 2 If required, connect the second cable.

Ports and Cabling

The following table summarizes typical WAN, LAN, and voice connections for your Cisco VG310 or Cisco VG320 voice gateway. For more information on cabling, see [Cable Specifications and Information](#).

Table 11: WAN, LAN, and Voice Connections

Port or Connection	Port Type, Color	Connection	Cable
Ethernet	RJ-45, yellow	Ethernet hub or Ethernet switch	Category 5 or higher Ethernet

Port or Connection	Port Type, Color	Connection	Cable
T1/E1	RJ-48C/CA81A RJ-48S, tan	T1 or E1 network External T1 CSU or other T1 equipment	RJ-48 T1/E1 RJ-48S to RJ-48S TE RJ-48S to RJ-48S NT RJ-48S to RJ-48S T1 RJ-48S to bare RJ-48S to BNC RJ-48S to twinaxial cable RJ-48S to DB-15 RJ-48S to DB-15 null
Cisco serial	60-pin D-sub, blue	CSU/DSU and serial network or equipment	Cisco serial transition cable that matches the signaling protocol (EIA/TIA-232, EIA/TIA-449, V.35, X.21, or EIA-530) and the serial port operating mode (DTE or DCE)
Cisco Smart serial	Cisco Smart compact connector, blue	CSU/DSU and serial network or equipment	
Analog voice FXS	RJ-11, gray	Telephone, fax	RJ-11; RJ21, straight-through
Analog voice FXO	RJ-11, pink	Central office, analog PBX	

Cable-Connection Procedures and Precautions

- Connect each WAN, LAN, and voice cable to the appropriate connector on the chassis or on a network module or interface card.
- Position the cables carefully, so that they do not put strain on the connectors.
- Organize cables in bundles so that cables do not intertwine.
- Inspect the cables to make sure that the routing and bend radius is satisfactory. Reposition cables, if necessary.
- Install cable ties in accordance with site requirements.

Voice Cables



Warning

Do not use this product near water; for example, near a bath tub, wash bowl, kitchen sink or laundry tub, in a wet basement, or near a swimming pool. Statement 1035

**Warning**

Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations. Statement 1036

**Warning**

Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface. Statement 1037

**Warning**

Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning. Statement 1038

**Warning**

To report a gas leak, do not use a telephone in the vicinity of the leak. Statement 1039

**Warning**

This equipment contains a ring signal generator (ringer), which is a source of hazardous voltage. Do not touch the RJ-11 (phone) port wires (conductors), the conductors of a cable connected to the RJ-11 port, or the associated circuit-board when the ringer is active. The ringer is activated by an incoming call. Statement 1042

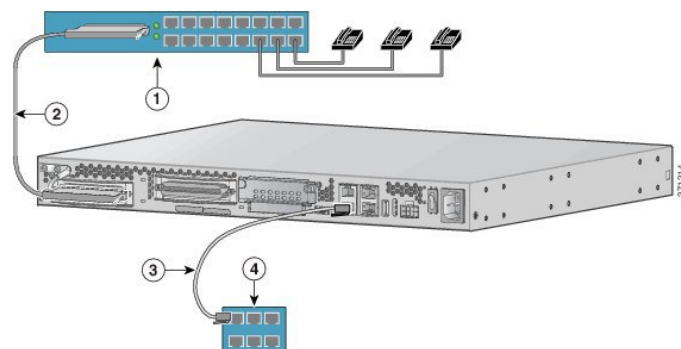
**Warning**

For connections outside the building where the equipment is installed, the following ports must be connected through an approved network termination unit with integral circuit protection. FXS/T3/E3 Statement 1044

The following table describes the analog FXS voice cables and connections.

Color or Type	Connected To	Cable
RJ-21	Distribution panel	RJ-21-to-RJ-21 straight-through cable (not included)

Figure 17: WAN and Voice Connections



1	Distribution panel	3	RJ-45 cable (through a patch panel) to central office
2	RJ-21 cable	4	Network demarcation

Connecting the Analog Voice Interface to a Distribution Panel

Before you begin

Make sure that you have an RJ-21 cable with Amphenol 50-pin connectors.

For information on RJ-21X/CA21A pinouts, see [Cable Specifications and Information, on page 61](#).



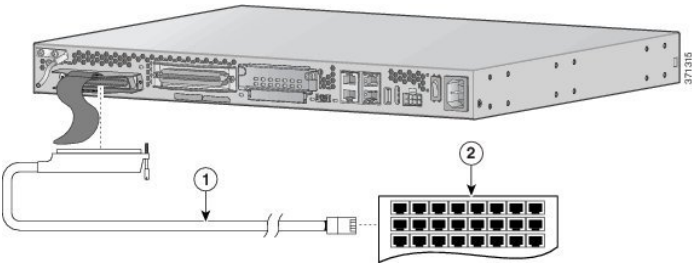
Warning

This equipment contains a ring signal generator (ringer), which is a source of hazardous voltage. Do not touch the RJ-11 (phone) port wires (conductors), the conductors of a cable connected to the RJ-11 port, or the associated circuit-board when the ringer is active. The ringer is activated by an incoming call. Statement 1042

Procedure

- Step 1** Connect the RJ-21 cable from the analog voice multiport to the distribution panel.
- Step 2** Secure the cable in place using the strap.

Figure 18: Analog Voice Connection



1	RJ-21 cable	2	Distribution panel
---	-------------	---	--------------------

Ports, Connectors, and Pinouts

The following table summarizes the cable connections between the voice gateway and the network and user interfaces. Find the port and the equipment or network type in the table and then look at the applicable pinout table in [Cable Specifications and Information, on page 61](#).

Table 12: Reference Guidelines for Cable Usage

Voice Gateway Port	Port Color	Connector/Cable	Interface To	Pinout Information
Console	Light blue	RJ-45/Rollover	PC	Console and Auxiliary Port Signals and Pinouts, on page 61
			ASCII terminal	Console Port to ASCII Terminal, on page 64
Auxiliary	Black	RJ-45/Rollover	Modem	Auxiliary Port Signals and Pinouts, on page 63
Gigabit Ethernet	Yellow	RJ-45/Gigabit Ethernet	LAN	Gigabit Ethernet Connector Pinouts (RJ-45), on page 65
Analog voice multiport	Gray	RJ-21X/ 50-conductor	Distribution panel for analog telephone, fax, PBX, or central office line	Analog Voice RJ-21 Pinouts, on page 68

Remote Terminal Connections (If Applicable)

If you are configuring a voice gateway from a remote location, connect the modem and the remote PC or terminal to the telephone network as described in this section.

Connecting to a Modem

To connect the local modem and the remote modem to live telephone outlets, use standard telephone cables.

Connecting to a Remote PC

Before you begin



Note The remote PC must be running terminal emulation software.

Procedure

- Step 1** Connect the remote PC to the modem.
- Step 2** Set the PC terminal emulation software requirements as follows:

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

Step 3 Key in and dial the telephone number of the voice gateway's external modem.

Connecting to a Remote ASCII Terminal

Procedure

Step 1 Connect the remote ASCII terminal and modem.

Step 2 Set the terminal requirements:

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

Step 3 Key in the telephone number of the voice gateway external modem, or, if you are using a Hayes-compatible modem, enter `ATDT` and the number to be dialed.

Removing and Installing a CompactFlash Memory Card

This section describes how to remove and replace a CompactFlash memory card in Cisco VG310 and Cisco VG320:

- [Removing a CompactFlash Memory Card, on page 45](#)
- [Replacing a CompactFlash Memory Card, on page 46](#)

Removing a CompactFlash Memory Card



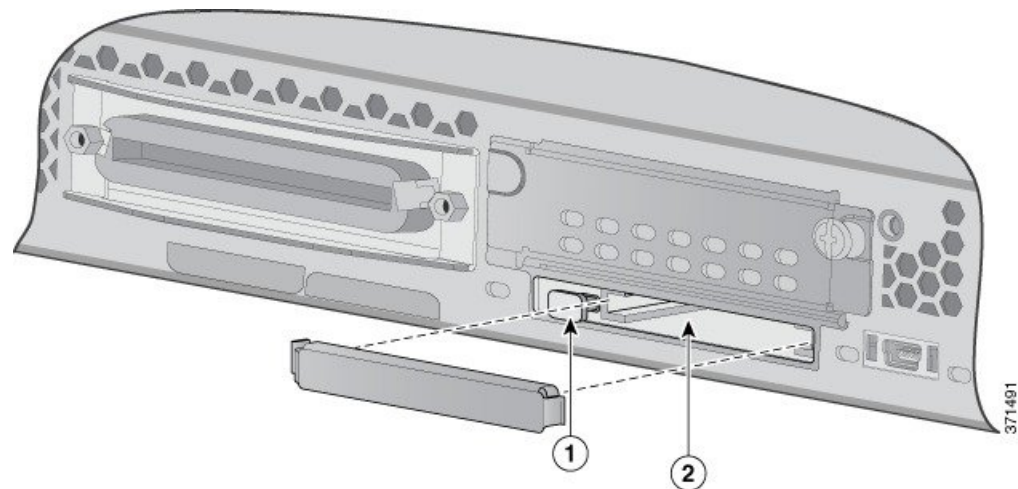
Caution Do not remove a CompactFlash memory card from the chassis while it is being accessed. This can cause data corruption and erratic operation. The CompactFlash memory card LED blinks to indicate when flash memory is being accessed. Removing the CompactFlash memory card from the chassis while flash memory is being accessed can cause data corruption and erratic operation.

Procedure

- Step 1** Read the [Safety Recommendations, on page 11](#) and disconnect the power supply before you replace any module.
- Step 2** Press the ejector button next to the CompactFlash memory card. The ejector button moves outward so that it projects from the panel.
- Step 3** Press the ejector button again to eject the CompactFlash memory card partially out of its slot.
- Step 4** Pull the memory card out of its slot.
- Step 5** Push the ejector button until the button is flush with the chassis.

To prevent damage to the ejector mechanism, the ejector button must remain pressed all the way in (flush against the bezel) when not being used to eject a CompactFlash memory card.

Figure 19: CompactFlash Memory Card Slot



1	Ejector button	2	CompactFlash memory card slot
---	----------------	---	-------------------------------

Replacing a CompactFlash Memory Card

Procedure

- Step 1** Read the [Safety Recommendations, on page 11](#) and disconnect the power supply before you replace any module.
- Step 2** Make sure that the ejector button is fully seated until it is flush with the chassis.
- Note** If the ejector button is projecting out from the panel, push it in until it is flush with the chassis.
- Step 3** Insert the CompactFlash memory card into the slot until it is fully seated. The ejector button remains flush with the panel.
- If the ejector button is projecting from the chassis after you insert the CompactFlash memory card, remove the CompactFlash memory card, press the ejector button until it clicks, and reinsert the CompactFlash memory card.
- Caution** To prevent damage to the ejector mechanism, the ejector button must remain fully seated when not being used to eject a CompactFlash memory card.
-



CHAPTER 4

Configuring the Cisco VG310 and Cisco VG320 Voice Gateways

This chapter describes how to power up the Cisco VG310 and Cisco VG320 and perform the initial configuration in the following sections:

- [Getting Your Network Information, on page 47](#)
- [Checklist for Power Up, on page 47](#)
- [Power-On Procedure, on page 48](#)
- [Performing the Initial Configuration on the Voice Gateway, on page 49](#)
- [Troubleshooting Cisco VG310 and Cisco VG320, on page 53](#)

Getting Your Network Information

Before you begin the configuration process, get the IP address for the 10/100/1000BASE-T ports.

Checklist for Power Up

Check the following items before powering up Cisco VG310 or Cisco VG320:

- Chassis is securely mounted and grounded.
- Power and interface cables are connected.
- The external CompactFlash memory card is properly seated into its slot.
- PC with terminal-emulation program (HyperTerminal or equivalent) is connected to the console port and configured for 9600 baud, 8 data bits, 1 stop bit, no parity, and flow control is set to **None**.
- Suitable PC COM port is selected in the terminal-emulation program.
- Passwords for access control are selected.
- IP addresses for the Ethernet and serial interfaces have been determined.

Power-On Procedure

Before you begin

Perform this procedure to power on your voice gateway and verify that it goes through its initialization and self-test. When this is finished, the voice gateway is ready to configure.

Procedure

Step 1 Power on your terminal or PC, and configure it for 9600 bps, 8 data bits, 1 stop bit, and no parity.

Step 2 Move the voice gateway power switch to the ON position.

- The SYS LED on the back panel of the chassis begins blinking green.
- The fan begins to operate.
- Startup messages appear in your Console window. When the startup messages finish, the SYS LED appears solid green.

Caution It takes a few minutes for the messages to stop. Do not press any keys on the keyboard until the messages stop and the SYS LED is solid green. Any keys pressed during this time are interpreted as the first command typed when the messages stop, which might cause the voice gateway to power off and start over.

Step 3 Use any of the following tools to perform the initial configuration:

- The Setup Command Facility—This enables you configure the initial settings for the voice gateway using a configuration dialog. If you see the following messages, it indicates that the gateway has booted and is ready for initial configuration using the **setup** command facility:

```
--- System Configuration Dialog ---
```

```
At any point you may enter a question mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '[]'.
Would you like to enter the initial configuration dialog? [yes/no]:
```

For information about using the CLI to configure the voice gateway, see [Performing the Initial Configuration on the Voice Gateway](#).

- Cisco Configuration Professional Express—See [Using Cisco Configuration Professional Express](#).
- Cisco CLI—This enables you to configure the initial settings for the voice gateway manually. If you see the following messages, it indicates that the gateway has booted and is ready for initial configuration using the CLI:

```
--- System Configuration Dialog ---
```

```
At any point you may enter a question mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '[]'.
Would you like to enter the initial configuration dialog? [yes/no]:
```

For information about using the CLI to configure the gateway, see [Using Cisco IOS CLI—Manual Configuration](#).

If the `rommon 1>` prompt is displayed, your system has booted in ROMmon mode. For information on the ROMmon, see the section on using the ROMmon in the *Cisco VG350, Cisco VG310 and Cisco 320 Voice Gateway Software Administration and Configuration Guide* at Cisco.com.

Performing the Initial Configuration on the Voice Gateway

Use the following tools to perform the initial configuration on the voice gateway:

- [Using the setup Command Facility, on page 49](#)
- [Using Cisco Configuration Professional Express, on page 52](#)
- [Using Cisco IOS CLI—Manual Configuration, on page 52](#)

Using the setup Command Facility

Before you begin

The **setup** command facility prompts you to enter the information that is needed to configure Cisco VG310 or Cisco VG320 quickly. The facility steps you through a initial configuration, including LAN and WAN interfaces. For more general information about the **4719407618** command facility, see the chapter *Configuration Using Setup and Autoinstall in the Cisco IOS Configuration Fundamentals Configuration Guide, Release 12.4*, at [Configuration Fundamentals Configuration Guide, Cisco IOS Release 15.0S](#).

This section explains how to configure a hostname for the voice gateway, set passwords, and configure an interface for communication with the management network.



Note If you make a mistake while using the **setup** command facility, you can exit and run the **setup** command facility again. Press **Ctrl-C**, and enter the **setup** command in privileged EXEC mode (`Router#`).

Procedure

Step 1 From the Cisco IOS CLI, enter the **setup** command in privileged EXEC mode:

```
Router> enable
Password: <password>
Router# setup
```

```
--- System Configuration Dialog ---
Continue with configuration dialog? [yes/no]:
```

You are now in the Setup Configuration Utility.

Step 2 To proceed using the setup command facility, enter *yes*.

The following message is displayed:

Continue with configuration dialog? [yes/no]:

At any point you may enter a question mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '[]'.

Step 3 To continue with the configuration, enter *yes*.

The following message is displayed:

Would you like to enter basic management setup? [yes/no]:

Note Basic management setup configures the minimum settings required for connectivity.

Step 4 Enter *yes* to continue.

The following message is displayed:

Configuring global parameters:
Enter host name [Router]:

Step 5 Enter a hostname for the voice gateway.

The following message is displayed:

The enable secret is a password used to protect access to privileged EXEC and configuration modes. This password, after entered, becomes encrypted in the configuration.
Enter enable secret:

Step 6 Enter an *enable secret password*. This password is encrypted and cannot be seen when viewing the configuration.

The following message is displayed:

The enable password is used when you do not specify an enable secret password, with some older software versions, and some boot images.
Enter enable password:

Step 7 Enter an *enable password* that is different from the *enable secret password*. This password is not encrypted (and is less secure) and can be seen when viewing the configuration.

The following message is displayed:

The virtual terminal password is used to protect access to the router over a network interface.
Enter virtual terminal password:

Step 8 Enter the *virtual terminal password* and press **Enter**. The virtual terminal password prevents unauthenticated access to the gateway through ports other than the console port. The following message is displayed:

Configure SNMP Network Management? [no]:
Community string [public]:

Step 9 Enter *yes*.

A summary of the available interfaces is displayed, as shown in the following example:

Current interface summary

Interface	IP-Address	OK?	Method	Status	Protocol
GigabitEthernet0/0	unassigned	YES	NVRAM	administratively down	down
GigabitEthernet0/1	10.10.10.12	YES	DHCP	up	up

Any interface listed with OK? value "NO" does not have a valid configuration

Step 10 Select one of the available interfaces to connect the voice gateway to the management network. In the following example, **gigabitethernet0/1** is selected:

Enter interface name used to connect to the management network from the above interface summary: gigabitethernet0/1

Step 11 Respond to the following prompts as appropriate for your network:

```
Configuring interface GigabitEthernet0/1:
  Configure IP on this interface? [yes]: yes
  IP address for this interface [10.10.10.12]:
  Subnet mask for this interface [255.0.0.0] : 255.255.255.0
  Class A network is 10.0.0.0, 24 subnet bits; mask is /24
```

The configuration command script is created.

```
hostname myrouter
enable secret 5 $1$t/Dj$yAeGKviLLZNOBX0b9eif00 enable password cisco123 line vty 0 4
password cisco snmp-server community public !
no ip routing

!
interface GigabitEthernet0/0
shutdown
no ip address
!
interface GigabitEthernet0/1
no shutdown
ip address 10.10.10.12 255.255.255.0
!
end
```

Step 12 Respond to the following prompts. Enter 2 to save the initial configuration:

```
[0] Go to the IOS command prompt without saving this config.
[1] Return back to the setup without saving this config.
[2] Save this configuration to nvram and exit.
Enter your selection [2]: 2
Building configuration...
Use the enabled mode 'configure' command to modify this configuration.
Press RETURN to get started! RETURN
```

The user prompt is displayed:

```
myrouter>
```

The facility prompts you to save the configuration.

- If you answer *no*, the configuration information you entered is not saved, and you return to the voice gateway enable prompt (Router#). Enter **setup** to return to the System Configuration dialog box.
- If you answer *yes*, the configuration is saved, and you are returned to the user EXEC prompt (Router>).

Step 13 To save the configuration, enter *yes*. The following message is displayed:

```
Use this configuration? {yes/no} : yes

Building configuration...
Use the enabled mode 'configure' command to modify this configuration.

Press RETURN to get started!

%LINK-3-UPDOWN: Interface Ethernet0/0, changed state to up
%LINK-3-UPDOWN: Interface Ethernet0/1, changed state to up
```

```
%LINK-3-UPDOWN: Interface Serial0/0/0, changed state to up
%LINK-3-UPDOWN: Interface Serial0/0/1, changed state to down
%LINK-3-UPDOWN: Interface Serial0/2, changed state to down
%LINK-3-UPDOWN: Interface Serial1/0, changed state to up
%LINK-3-UPDOWN: Interface Serial1/1, changed state to down
%LINK-3-UPDOWN: Interface Serial1/2, changed state to down
```

<Additional messages omitted.>

Step 14

When the messages stop appearing on your screen, press **Return** to get the `Router>` prompt.

The `Router>` prompt indicates that you are now at the CLI and you have just completed the initial configuration.

At this stage, you have the following two options:

- Run the **setup** command facility again, and create another configuration:

```
Router> enable
Password: password
Router# setup
```

- Modify the existing configuration or configure additional features by using the CLI:

```
Router> enable
Password: password
Router# configure terminal
Router(config)#
```

Using Cisco Configuration Professional Express

Use Cisco Configuration Professional Express web-based application to configure the initial router settings. For detailed instructions, see the *Cisco Configuration Professional Express User Guide* at:

http://www.cisco.com/c/en/us/td/docs/net_mgmt/cisco_configuration_professional_express/v2_7/guides/userguide/ccp_express_EndUser_Guide.html.

Using Cisco IOS CLI—Manual Configuration

Before you begin

This section shows how to access the CLI to perform the initial configuration on Cisco VG310 or Cisco VG320.

If the system configuration dialog message does not appear, a default configuration file was installed on the voice gateway before it was shipped. See [Using Cisco Configuration Professional Express, on page 52](#) to configure the voice gateway.

Procedure**Step 1**

Enter *no* as the response when the following system message is displayed:

Example:

```
--- System Configuration Dialog ---
```


At any point you may enter a question mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '[]'.

Would you like to enter the initial configuration dialog? [yes/no]: **no**

- Step 2** Press **Return** to terminate autoinstall and continue with manual configuration when the following message is displayed:

Would you like to terminate autoinstall? [yes] **Return**

Several messages are displayed, ending with lines similar to the following:

```
...
Copyright (c) 1986-2004 by cisco Systems, Inc.
Compiled <date> <time> by <person>
```

- Step 3** Press **Return** to bring up the Router> prompt:

```
...
flashfs[4]: Initialization complete.
Router>
```

- Step 4** Enter *enable* to enter privileged EXEC mode:

```
Router> enable
Router#
```

What to do next

See the *Using the Cisco IOS CLI to Perform Initial Configuration* section in the [Cisco VG310 and Cisco VG320 Voice Gateways Software Configuration Guide](#) to complete the initial configuration settings on Cisco VG310 or Cisco VG320.

Troubleshooting Cisco VG310 and Cisco VG320

If there appears to be a malfunction, check all the cables and connections first. If these are in order, see the following table for specific troubles and solutions.

For problems with the configuration, refer to the [Cisco VG350, Cisco VG310 and Cisco 320 Voice Gateway Software Administration and Configuration Guide](#) at Cisco.com.

Table 13: Troubleshooting Cisco VG310 and Cisco VG320

Symptom	Possible Cause	Corrective Action
Power LED and fans are off	Power source switched off.	Power on the chassis.
	Faulty power cable.	Check and replace the power cable, if required.
	Faulty power source.	Check and correct the input power, if required.
	Faulty internal power supply.	Contact Cisco or your Cisco reseller.

Symptom	Possible Cause	Corrective Action
Power LED on; fan off	Faulty Cisco VG310 or Cisco VG320.	Contact Cisco ¹ Technical Service Center or your Cisco reseller.
Power LED off; fan on	Faulty Cisco VG310 or Cisco VG320.	Contact Cisco ¹ or your Cisco reseller.
No initialization response from Cisco VG310 or Cisco VG320	Faulty modem console terminal.	Check and replace the modem or terminal, if required.
	Faulty cabling to terminal.	Check and replace the cable, if required.
	Faulty Cisco VG310 or Cisco VG320.	Contact Cisco ¹ or your Cisco reseller.
Unit shuts off after operating for some time	Overheating.	Check the ventilation of the chassis.
	Faulty Cisco VG310 or Cisco VG320.	Contact Cisco ¹ or your Cisco reseller.
Console screen display freezes	Console fault.	Reset or replace the console.
	Software error.	Repeat the power-on procedure.
	Faulty Cisco VG310 or Cisco VG320.	Contact Cisco ¹ or your Cisco reseller.
¹ See Obtaining Technical Assistance .		



CHAPTER 5

Getting Software Licenses for Cisco VG310 and Cisco VG320 Voice Gateways

The Cisco VG310 and Cisco VG320 come with an evaluation license, also known as a temporary license, for most packages and features supported on the voice gateway. To try a new software package or feature, activate the evaluation license for that package or feature. The licensing provisions provided by the licensing package offer greater flexibility to deploy new features while also improving visibility and management of existing licenses on the voice gateways in the network.

When you order a new Cisco VG310 or a Cisco VG320, it is shipped with the software image and the corresponding permanent licenses preinstalled for the packages and features that you specified. The software does not need to be activated or registered before use.

Use the Cisco management application such as Cisco License Manager (CLM) to determine the licenses activated on your system. CLM is a free software application available at: <http://www.cisco.com/go/clm>.

The following sections are included in this chapter:

- [Activating a New Software Package or Feature, on page 55](#)
- [RMA License Transfer, on page 56](#)

Activating a New Software Package or Feature

Before you begin



Note

You must have the serial number of Cisco VG310 or Cisco VG320, where the license should be installed. For information on locating the serial number, see [Locating the Product Serial Number, on page 2](#).

Procedure

- Step 1** Purchase the software package or feature you want to install. You will receive a product activation key (PAK) with your purchase.
- Step 2** If you do not have a Cisco.com username and password, register for an account at: <https://tools.cisco.com/RPF/register/register.do>

Step 3 Get the license file using one of the following options:

- Cisco License Manager—This is a free software application available at: <http://www.cisco.com/go/clm>
- Cisco License Registration Portal— This is a web-based portal for getting and registering individual software licenses, and is available at: <http://www.cisco.com/go/license>

Step 4 Install the license file using one of the following options:

- Cisco License Manager— This is a free software application available at: <http://www.cisco.com/go/clm>
 - Simple Network Management Protocol— This should be used to install and manage software licenses.
-

RMA License Transfer

To transfer a software license from a failed device to a new device, go to the Cisco licensing portal at: <http://www.cisco.com/go/license> You need the serial number of the defective device to initiate an RMA replacement license. To locate this information, see [Locating the Product Serial Number, on page 2](#).



APPENDIX **A**

Technical Specifications

The following sections list the technical specifications for the Cisco VG310 and Cisco VG320:

- [Physical Specifications, on page 57](#)
- [Power Specifications, on page 57](#)
- [Ports, on page 58](#)
- [Environmental Specifications, on page 58](#)
- [Acoustic, on page 59](#)
- [Transportation and Storage, on page 59](#)
- [Regulatory Compliance, on page 59](#)

Physical Specifications

Description	Value
Depth	14.3 in. (363.22 mm)
Width	17.5 in. (444.5 mm)
Height	1.75 in. (44.4 mm)
Weight (Maximum)	12.015 lb (5.45 kg) (Cisco VG310) 12.875 lb (5.84 kg) (Cisco VG320)

Power Specifications

Table 14: AC Input Power

Description	Value
Input voltage	100 VAC to 240 VAC, Autoranging
Frequency	47 Hz to 63 Hz
Input current	2 A (Maximum)

Description	Value
Surge current	30 A maximum at 115 VAC, 60 Hz 60 A maximum at 230 VAC, 50 Hz
Power consumption	140 W (480 BTU/h) (Maximum)

Table 15: DC Input Power

Description	Value
DC, 12 Volt battery	140 W (480 BTU/h) (Maximum) Caution Do not use AC and DC input power at the same time. If you do, the unit stops operating and you will have to reboot it using a single power source.

Ports

Description	Value
Console	One mini USB Type B, USB 2.0 compliant
Auxiliary port	RJ-45 connector
USB port	One USB Type A, USB 2.0 compliant, high speed (480 Mb/s), 2.5 W (500 mA maximum)
10/100/1000 Gigabit Ethernet	Two RJ-45 connectors (GE0/0, GE0/1)

Environmental Specifications

Description	Value
Nonoperating temperature	−4 °F to 149 °F (−20 °C to 65 °C)
Nonoperating humidity	5% to 95% relative humidity
Nonoperating altitude	0 ft to 15,000 ft (0 m to 4570 m)
Operating temperature	32 °F to 104 °F (0 °C to 40 °C)
Operating humidity	10% to 85% relative humidity
Operating altitude	0 ft to 10,000 ft (0 m to 3000 m)

**Warning**

Ultimate disposal of this product should be handled according to all national laws and regulations. Statement 1040

Acoustic

Description	Value
Acoustic: Sound Pressure (Typical/Maximum)	36 dBA/65 dBA at 3 ft (91.44 cm)

Transportation and Storage

Description	Value
Nonoperating temperature	−40 °F to 158 °F (−40 °C to 70 °C)
Nonoperating humidity	5% to 95%
Nonoperating altitude	15,000 ft (4570 m)

Regulatory Compliance

This section provides the regulatory compliance pertaining to the Cisco VG310 and Cisco VG320 Analog Voice Gateways.

Safety Compliance

- IEC 60950-1, Safety of information technology equipment
- EN 60950-1, Safety of information technology equipment
- UL 60950-1, Standard for safety for information technology equipment (U.S.)
- CAN/CSA C22.2 No. 60950-1-07, Safety of information technology equipment including electrical business equipment (Canada)
- AS/NZS 60950.1 2011
- GB 4943 (PRC)
- IEC60950, 3rd edition (PRC)
- IEC60950, 2nd Edition (Mexico)

EMC Immunity

- CISPR24
- EN300386: V1.4.1
- EN55024
- EN61000-6-1
- KN24
- TCVN 7317

EMC Emission

- 47 CFR Part 15
- CISPR22: Edition 5.2
- CNS13438
- EN300386, Class A
- EN300386: V1.4.1
- EN55022
- EN61000-3-2 (Inc amd 1 '&' 2)
- EN61000-3-3
- ICES-003 Issue 5
- KN 22
- TCVN 7189
- VCCI: V-3

Note For detailed compliance information, see the Regulatory Compliance and Safety Information Guide pertaining to the Cisco VG310 and Cisco VG320 Analog Voice Gateways.



APPENDIX **B**

Cable Specifications and Information

This appendix provides the connector and pinout information you need for making or purchasing cables used with the Cisco VG310 and the Cisco VG320 voice gateways. To order cables from Cisco, see [Obtaining Technical Assistance](#), on page xi.

This appendix contains the following sections:

- [Console and Auxiliary Port Signals and Pinouts](#), on page 61
- [Console Port Signals and Pinouts](#), on page 61
- [Auxiliary Port Signals and Pinouts](#), on page 63
- [Console Port to ASCII Terminal](#), on page 64
- [Gigabit Ethernet Connector Pinouts \(RJ-45\)](#), on page 65
- [ISDN BRI Interface](#), on page 66
- [Analog Voice RJ-21 Pinouts](#), on page 68
- [Serial Connection Signals and Pinouts](#), on page 70
- [USB Type A-to-USB 5-Pin Mini Type B Cable](#), on page 73

Console and Auxiliary Port Signals and Pinouts

Cisco VG310 and Cisco VG320 come with the cable and adapters you need to connect a PC, an ASCII terminal, or a modem to your Cisco VG310 or Cisco VG320.

The cable kit includes:

- RJ-45-to-RJ-45 rollover cable
- RJ-45-to-DB-9 adapter cable for console connection
- DB-9-to-DB-25 adapter cable for modem connection

The console port is configured as data communications equipment (DCE), and the auxiliary port is configured as data terminal equipment (DTE). Both are asynchronous serial ports and use RJ-45 connectors.

Console Port Signals and Pinouts

Use the thin, flat, RJ-45-to-RJ-45 rollover cable and RJ-45-to-DB-9 female DTE adapter (labeled TERMINAL) to connect the console port to a PC-running terminal-emulation software. Figure 20 shows how to connect

the console port to a PC. The following table lists the pinouts for the asynchronous serial console port, the RJ-45-to-RJ-45 rollover cable, and the RJ-45-to-DB-9 female DTE adapter (labeled TERMINAL).

Table 16: Console Port Signaling and Cabling Using a DB-9 Adapter

Console Port (DTE)	RJ-45-to-RJ-45 Rollover Cable		RJ-45-to-DB-9 Console Device Terminal Adapter (connected to Rollover Cable)	Console Device
Signal	RJ-45 Pin	RJ-45 Pin	DB-9 Pin	Signal
RTS	1 ¹	8	8	CTS
DTR	2	7	6	DSR
TXD	3	6	2	RXD
GND	4	5	5	GND
GND	5	4	5	GND
RXD	6	3	3	TXD
DSR	7	2	4	DTR
CTS	8	1	7	RTS

¹ Pin 1 is connected internally to pin 8.

The following table lists the pinouts for the asynchronous serial console port, the RJ-45-to-RJ-45 rollover cable, and the RJ-45-to-DB-25 female DTE adapter (labeled TERMINAL).

Table 17: Console Port Signaling and Cabling Using a DB-25 Adapter

Console Port (DTE)	RJ-45-to-RJ-45 Rollover Cable		RJ-45-to-DB-25 Terminal Adapter	Console Device
Signal	RJ-45 Pin	RJ-45 Pin	DB-25 Pin	Signal
RTS	1 ¹	8	5	CTS
DTR	2	7	6	DSR
TXD	3	6	3	RXD
GND	4	5	7	GND
GND	5	4	7	GND
RXD	6	3	2	TXD
DSR	7	2	20	DTR
CTS	8 ²	1	4	RTS

Console Port (DTE)	RJ-45-to-RJ-45 Rollover Cable	RJ-45-to-DB-25 Terminal Adapter	Console Device
¹ You can use the same cabling to connect a console to the auxiliary port.			
² Pin 1 is connected internally to pin 8.			

Auxiliary Port Signals and Pinouts

The following table lists the pinouts for the asynchronous serial auxiliary port, the RJ-45-to-RJ-45 rollover cable, and the RJ-45-to-DB-25 male DCE adapter (labeled MODEM).

Table 18: Auxiliary Port Signaling and Cabling Using a DB-25 Adapter

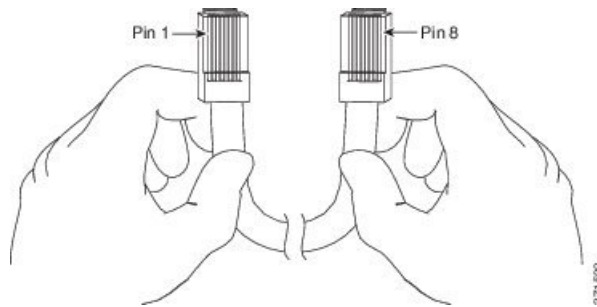
Auxiliary Port (DTE)	RJ-45-to-RJ-45 Rollover Cable		RJ-45-to-DB-25 Modem Adapter	Modem
Signal	RJ-45 Pin	RJ-45 Pin	DB-25 Pin	Signal
RTS	1 ¹	8	4	RTS
DTR	2	7	20	DTR
TXD	3	6	2	TXD
GND	4	5	7	GND
GND	5	4	7	GND
RXD	6	3	3	RXD
DSR	7	2	8	DCD
CTS	8 ¹	1	5	CTS
¹ Pin 1 is connected internally to pin 8.				

Identifying a Rollover Cable

You can identify a rollover cable by holding the plugs side by side, with the tab at the back, and comparing the modular plugs at the two ends of the cable. The wire connected to the pin on the outside of the left plug should be the same color as the wire connected to the pin on the outside of the right plug. (Figure 20.)

If your cable is from Cisco Systems, pin 1 is white on one plug, and pin 8 is white on the opposite plug.

Figure 20: Identifying a Rollover Cable



Note Pin 1 and pin 8 are of the same color.

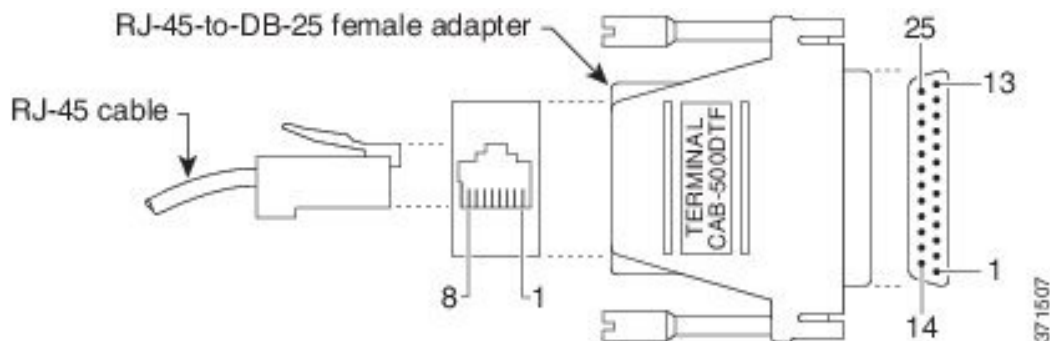


Note A rollover cable reverses the wire connections at the opposite ends: 1 to 8, 2 to 7, 3 to 6, 4 to 5, 5 to 4, 6 to 3, 7 to 2, and 8 to 1.

Console Port to ASCII Terminal

The following figure shows the RJ-45-to-RJ-45 rollover cable assembly and the RJ-45-to-DB-25 female DTE adapter (labeled TERMINAL).

Figure 21: Console Port to ASCII Terminal—Cable and Adapter



The following table lists the pinouts.

Table 19: Console Port to ASCII Terminal—Cable Pinouts (RJ-45 to DB-25)

Console Port (DCE, RJ-45)	RJ-45-to-RJ-45 Rollover Cable		RJ-45-to-DB-9 Adapter "TERMINAL"		PC Port (DTE, DB-9)
Signal	RJ-45 Pin	RJ-45 Pin	RJ-45 Pin	DB-9 Pin	Signal
RTS	1 ¹	8	8	5	CTS

Console Port (DCE, RJ-45)	RJ-45-to-RJ-45 Rollover Cable		RJ-45-to-DB-9 Adapter "TERMINAL"		PC Port (DTE, DB-9)
DTR	2	7	7	6	DSR
TxD	3	6	6	3	RxD
GND	4	5	5	7	GND
GND	5	4	4	7	GND
RxD	6	3	3	2	TxD
DSR	7	2	2	20	DTR
CTS	8 ¹	1	1	4	RTS

¹ Pin 1 is connected to pin 8 inside the Cisco VG310 or Cisco VG320.

Gigabit Ethernet Connector Pinouts (RJ-45)

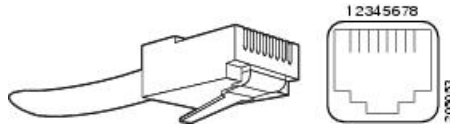
The following figure shows the Gigabit Ethernet RJ-45 connector for the Gigabit Ethernet cable.



Note

The RJ-45 ports are capable of operating in both 100BASE-T and 1000BASE-T modes.

Figure 22: RJ-45 Connector and Port



The following table lists the pinouts.

Table 20: Gigabit Ethernet Connector Pinouts (RJ-45)

Pin 1	FE Signal	GE Signal
1	TX data+	TX A+
2	TX data-	TX A-
3	RX data+	RX B+
4	Not used	TX C+
5	Not used	TX C-
6	RX data-	RX B-
7	Not used	RX D+

Pin 1	FE Signal	GE Signal
8	Not used	RX D–

ISDN BRI Interface

This section contains the following topics:

- [ISDN BRI Connections, on page 66](#)
- [ISDN BRI Pinouts, on page 67](#)
- [E&M Pinouts, on page 67](#)



Warning

Network hazardous voltages are present in the BRI, fractional T1/T1, and switched 56 cables. If you detach the cable, detach the end away from the router first to avoid possible electric shock. Network hazardous voltages also are present on the system card in the area of the BRI port (RJ-45 connector), fractional T1/T1 port (RJ-48C connector), and switched port (RJ-11 or RJ-48S connector), regardless of when power is turned OFF. Statement 59

ISDN BRI Connections



Warning

The ISDN connection is regarded as a source of voltage that should be inaccessible to user contact. Do not attempt to tamper with or open any public telephone operator (PTO)-provided equipment or connection hardware. Any hardwired connection (other than by a nonremovable, connect-one-time-only plug) must be made only by PTO staff or suitably trained engineers. Statement 23

BRI WAN interface cards provide ISDN BRI connections. The BRI modules and BRI WAN interface cards are available with either an S/T interface that requires an external Network Terminator 1 (NT1), or a U interface that has a built-in NT1.

Use a BRI cable (not included with...) to connect BRI ports on WAN interface cards (WICs) or on high-speed WICs (HWICs) directly to an ISDN.



Warning

Hazardous network voltages are present in WAN ports regardless of whether power to the unit is OFF or ON. To avoid electric shock, use caution when working near WAN ports. When detaching cables, detach the end away from the unit first. Statement 1026

Use a BRI cable (not included) to connect the BRI WAN interface card directly to an ISDN. The following table lists the specifications for ISDN BRI cables.

Table 21: ISDN BRI Cable Specifications

Specification	High-Capacitance Cable	Low-Capacitance Cable
Resistance (at 96 kHz)	160 ohm/km	160 ohm/km
Capacitance (at 1 kHz)	120 nF/km Note nF= nano Farad	30 nF/km
Impedance (at 96 kHz)	75 ohm	150 ohm
Wire diameter	0.024 in. (0.6 mm)	0.024 in. (0.6 mm)
Distance limitation	32.8 ft (10 m)	32.8 ft (10 m)

ISDN BRI Pinouts



Caution

To prevent damage to the system, ensure that you connect the BRI cable only to the BRI connector and not any other RJ-45 connector. Also, make certain that you connect the E&M cable to an E&M connector only.

The following table lists the connector signals and pinouts for an ISDN BRI S/T port.

Table 22: ISDN BRI S/T Port Signals and Pinouts (RJ-45)

8-Pin ¹	TE ²	NT ³	Polarity
3	TX	RX	+
4	RX	TX	+
5	RX	TX	–
6	TX	RX	–

The following table lists the connector signals and pinouts for ISDN BRI U Port Signals and Pinouts (RJ-45).

Table 23: ISDN BRI U Port Signals and Pinouts (RJ-45)

8-Pin ¹	Function
3	No connection
4	Signal—Tip or Ring
5	Signal—Tip or Ring

E&M Pinouts

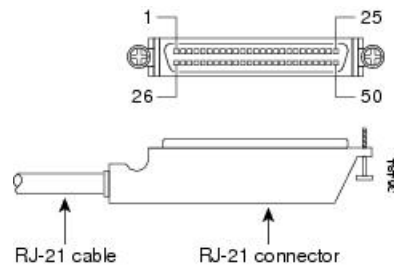
The following table lists the connector signals and pinouts for an E&M port

Table 24: E&M Pinouts

Pin	Signal	Description	Two-Wire Operation, Type				Four-Wire Operation, Type			
			1	2	3	4	1	2	3	4
1	SM	-48V signaling battery	—	SB	—	—	—	SB	SB	—
2	M-lead	Signaling input	M	M	M	M	M	M	M	M
3	R	Ring, audio input	—	—	—	—	R	R	R	R
4	R or R1	Ring, audio input or output	R	R	R	R	R1	R1	R1	R1
8	T or T1	Tip, audio input or output	T	T	T	T	T1	T1	T1	T1
6	T	Tip, audio input	—	—	—	—	T	T	T	T
7	E-lead	Signaling output	E	E	E	E	E	E	E	E
8	SG	Signaling ground return	—	SG	SG	—	—	SG	SG	—

Analog Voice RJ-21 Pinouts

The following figure shows RJ-21 connector wiring for a 50-pin Amphenol cable.

Figure 23: RJ-21 Connector Wiring

The following table lists the pinouts for the RJ-21 connector.

Table 25: Pinouts for FXS and FXO Voice Ports

Pair	Ring Conductor	Tip Conductor
1	1	26
2	2	27
3	3	28
4	4	29
5	5	30
6	6	31
7	7	32
8	8	33
9	9	34
10	10	35
11	11	36
12	12	37
13	13	38
14	14	39
15	15	40
16	16	41
17	17	42
18	18	43
19	19	44
20	20	45

Pair	Ring Conductor	Tip Conductor
21	21	46
22	22	47
23	23	48
24	24	49

Serial Connection Signals and Pinouts

This section provides information about the 1-port serial WAN interface card (WIC). With the appropriate serial transition cable, this WIC can provide an EIA/TIA-232, EIA/TIA-449, V.35, X.21, DTE/DCE, EIA-530 DTE, or NRZ/NRZI serial interface.

Types of Serial Cables

Five types of serial cables (also called serial adapter cables or serial transition cables) are available from Cisco Systems:

- [EIA/TIA-232 Connections, on page 71](#)
- [EIA/TIA-449 Connections, on page 71](#)
- [V.35 Connections, on page 71](#)
- [X.21 Connections, on page 72](#)
- [EIA/TIA-530 Connections, on page 72](#)

All serial cables provide a universal plug at the WIC end. The network end of each cable provides the physical connectors most commonly used for the interface. For example, the network end of the EIA/TIA-232 serial cable is a DB-25 connector, the most widely used EIA/TIA-232 connector.

All serial interface types except EIA-530 are available in DTE or DCE format: DTE with a plug connector (male) at the network end and DCE with a receptacle (female) at the network end. V.35 is available in either mode with either gender at the network end. EIA-530 is available in DTE only.

Connecting the WIC to the Network

The serial WIC uses a universal high-density, 60-pin receptacle. Each universal port requires a serial port adapter cable that determines the port's electrical interface type and mode: DTE or DCE. Although all port adapter cables use a universal plug at the serial module end, the network end of each cable type uses the physical connectors commonly used for the interface. For example, the network end of the EIA/TIA-232 port adapter cable is a DB-25 connector, the most widely used EIA/TIA-232 connector.

After you install the serial WIC, use the appropriate serial cable to connect the WIC DB-60 serial port to one of the following types of equipment:

- An asynchronous modem if connecting to an analog telephone line.

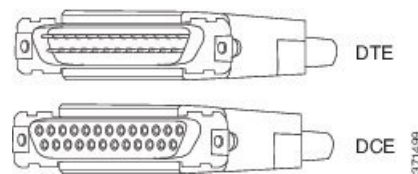
- A synchronous modem data service unit/channel service unit (DSU/CSU), or other data circuit-terminating equipment (DCE), if connecting to a digital WAN line.

EIA/TIA-232 Connections

The EIA/TIA-232 standard supports unbalanced circuits at signal speeds up to 64 kbps.

For connection to a Cisco VG310 or Cisco VG320 serial port, use the EIA/TIA-232 serial transition cable with the Cisco 12-in-1 connector on one end and a DB-25 connector on the other (Figure 24). The DB-25 connector can be male for DTE or female for DCE. To order a cable, see [Obtaining Technical Assistance](#), on page xi.

Figure 24: EIA/TIA-232 Adapter Cable Connectors, Network End



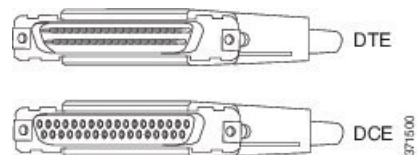
EIA/TIA-449 Connections

The EIA/TIA-449 standard, which supports balanced and unbalanced transmissions, is a faster (up to 2 Mbps) version of the EIA/TIA-232 standard that provides more functions and supports transmission over greater distances.

The EIA/TIA-449 standard was intended to replace the EIA/TIA-232 standard. However, this standard was not widely adopted because of the large installed base of DB-25 hardware. Also, the larger size of the 37-pin EIA/TIA-449 connectors limited the number of connections possible (fewer than are possible with the smaller, 25-pin EIA/TIA-232 connector).

To make a connection to a Cisco VG310 or a Cisco VG320 voice gateway serial port, use the EIA/TIA-449 serial transition cable with the Cisco 12-in-1 connector on one end and a DB-37 connector on the other (Figure 25). The DB-37 connector can be male for DTE or female for DCE. To order a cable, see [Obtaining Technical Assistance](#), on page xi.

Figure 25: EIA/TIA-449 Adapter Cable Connectors, Network End



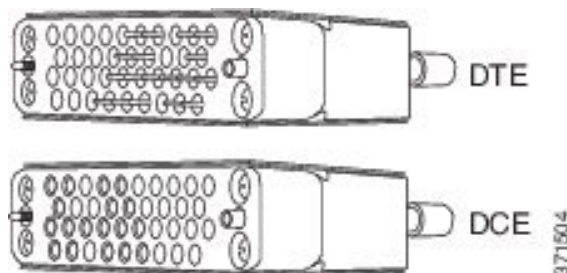
V.35 Connections

The V.35 standard is recommended for speeds up to 48 kbps, although in practice, it is used successfully at 4 Mbps. Cisco VG310 and Cisco VG320 support speeds up to 2.048 Mbps.

Use the V.35 serial transition cable (not included with...) the Cisco 12-in-1 connector on one end and a standard 34-pin Winchester-type connector (as shown in Figure 26) on the other. The 34-pin Winchester-type

connector can be male for DTE or female for DCE. To order a cable, see [Obtaining Technical Assistance, on page xi](#).

Figure 26: V.35 Adapter Cable Connectors, Network End

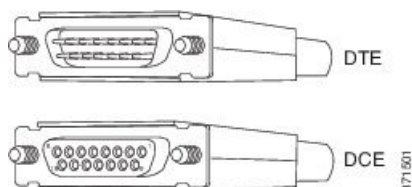


X.21 Connections

The X.21 connector uses a 15-pin connector for balanced circuits, and is commonly used in the United Kingdom to connect to the public data network. X.21 relocates some of the logic functions to the DTE and DCE interfaces and, as a result, requires fewer circuits and a smaller connector than EIA/TIA-232.

Use the X.21 serial transition cable (not included with...) the Cisco 12-in-1 connector on one end and a DB-15 connector on the other (Figure 27). The DB-15 connector can be male for DTE or female for DCE. To order a cable, see [Obtaining Technical Assistance, on page xi](#).

Figure 27: X.21 Adapter Cable Connectors, Network End



EIA/TIA-530 Connections

The EIA/TIA-530 standard, which supports balanced transmission, provides increased functionality, speed, and distance of EIA/TIA-449 on the smaller DB-25 connector used for EIA/TIA-232. Like EIA/TIA-449, EIA/TIA-530 refers to the electrical specifications of EIA/TIA-422 and EIA/TIA-423. Although the specification recommends a maximum speed of 2 Mbps, EIA/TIA-530 is used successfully at 4 Mbps or faster speeds over short distances. The Cisco VG310 and Cisco VG320 Analog Voice Gateways support speeds up to 2.048 Mbps.

Use the EIA/TIA-530 serial transition cable (not included) with the Cisco 12-in-1 connector on one end and a DB-25 connector on the other (Figure 28). The DB-25 connector can be male for DTE or female for DCE. To order a cable, see [Obtaining Technical Assistance, on page xi](#).

Figure 28: EIA-530 Adapter Cable Connector, Network End



USB Type A-to-USB 5-Pin Mini Type B Cable

The USB console port uses a USB Type A to 5-pin mini Type B cable. The USB Type A-to-USB mini Type B cable is not supplied. You can order an accessory kit that contains this cable. To order a cable, see [Obtaining Technical Assistance, on page xi](#).

The RJ-45 console port uses an eight-pin RJ-45 connector (Table 25 and Table 26). The supplied RJ-45-to-DB-9 adapter cable is used to connect the console port of Cisco VG310 or Cisco VG320 to a console PC. Provide a RJ-45-to-DB-25 female DTE adapter if you want to connect the switch console port to a terminal.

Table 26: Console Port Signaling Using a DB-9 Adapter

Switch Console Port (DTE)	RJ-45-to-DB-9 Terminal Adapter	Console Device
Signal	DB-9 Pin	Signal
RTS	8	CTS
No connection	6	DSR
TxD	2	RxD
GND	5	GND
GND	5	GND
RxD	3	TxD
No connection	4	DTR
CTS	7	RTS

Table 27: Console Port Signaling Using a DB-25 Adapter

Switch Console Port (DTE)	RJ-45-to-DB-25 Terminal Adapter	Console Device
Signal	DB-25 Pin	Signal
RTS	5	CTS
No connection	6	DSR
TxD	3	RxD
GND	7	GND
GND	7	GND
RxD	2	TxD
No connection	20	DTR

Switch Console Port (DTE)	RJ-45-to-DB-25 Terminal Adapter	Console Device
CTS	4	RTS