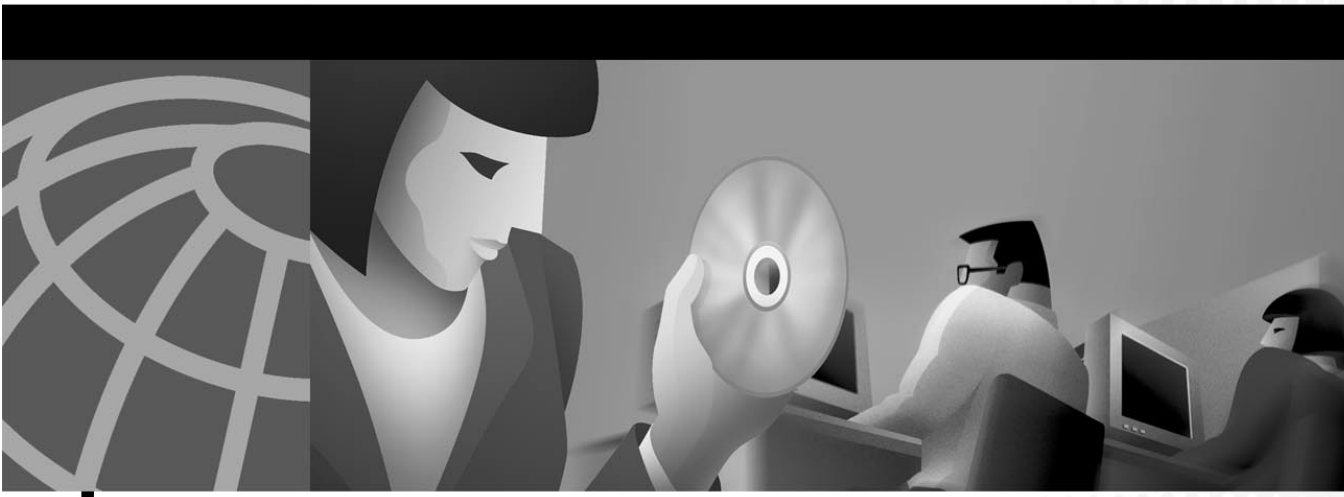

Cisco VG248 Analog Phone Gateway Software Configuration Guide

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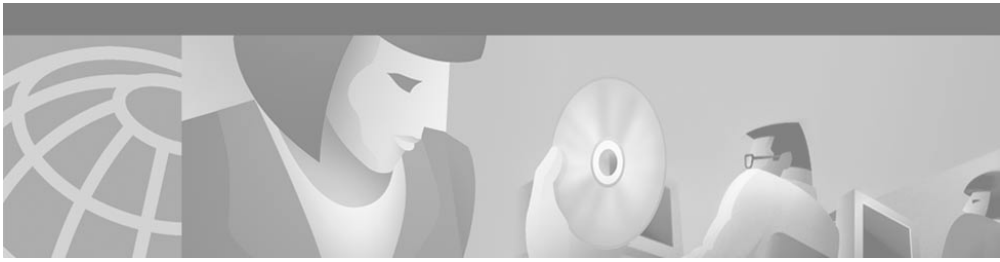

About this Guide

Overview

The *Cisco VG248 Analog Phone Gateway Software Configuration Guide* provides the information you need to configure and manage the Cisco VG248 Analog Phone Gateway (VG248) on your network.

Audience

Network engineers, system administrators, and telecom engineers should review this guide for information about configuring and using the VG248 in the network.

The tasks described in this guide are considered to be administration-level tasks. Because of the close interaction of the VG248 with Cisco CallManager and analog telephony systems, these tasks require that you are familiar with these systems as well.

Objectives

This guide provides the required steps to configure and manage the VG248. You must use this guide in conjunction with the *Cisco VG248 Analog Phone Gateway Hardware Installation Guide* to get the VG248 up and running on your network.

Because of the complexity of an IP telephony network, this guide does not provide detailed information for required procedures performed on other Cisco or third-party devices. Refer to the documentation provided with these systems for installation and configuration instructions.

Organization

Table 1 provides an overview of the organization of this guide.

Table 1 Cisco VG248 Analog Phone Gateway Software Configuration Guide Organization

Chapter	Description
Chapter 1, “Overview”	Provides an overview of software features and how they are implemented on the VG248.
Chapter 2, “Getting Started with the VG248”	Describes the basic network settings you need to configure on the VG248.
Chapter 3, “Configuring the Telephony Settings on the VG248”	Includes the procedures for configuring the telephony settings on the VG248.
Chapter 4, “Configuring Analog Phones Using Cisco CallManager”	Describes necessary steps in Cisco CallManager for adding and configuring the VG248 ports.
Chapter 5, “Integrating Cisco CallManager with Voice Mail Systems Using SMDI”	Provides an overview of SMDI support, configuration options, instructions for configuring, and troubleshooting tips.
Chapter 6, “Troubleshooting the VG248”	Provides troubleshooting tips for the VG248.

Related Documentation

For information about Cisco CallManager and additional information about the VG248, refer to these publications:

- *Cisco VG248 Analog Phone Gateway Hardware Installation Guide*
- *Cisco VG248 Analog Phone Gateway Release Notes*
- *Cisco CallManager Administration Guide*

Obtaining Documentation

The following sections provide sources for obtaining documentation from Cisco Systems.

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You can access the most current Cisco documentation on the World Wide Web at the following sites:

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Contacting TAC by Using the Cisco TAC Website

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http://www.cisco.com/tac

P3 and P4 level problems are defined as follows:

- P3—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.
- P4—You need information or assistance on Cisco product capabilities, product installation, or basic product configuration.

In each of the above cases, use the Cisco TAC website to quickly find answers to your questions.

To register for Cisco.com, go to the following website:

http://www.cisco.com/register/

If you cannot resolve your technical issue by using the TAC online resources, Cisco.com registered users can open a case online by using the TAC Case Open tool at the following website:

http://www.cisco.com/tac/caseopen

Contacting TAC by Telephone

If you have a priority level 1 (P1) or priority level 2 (P2) problem, contact TAC by telephone and immediately open a case. To obtain a directory of toll-free numbers for your country, go to the following website:

http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml

P1 and P2 level problems are defined as follows:

- P1—Your production network is down, causing a critical impact to business operations if service is not restored quickly. No workaround is available.
- P2—Your production network is severely degraded, affecting significant aspects of your business operations. No workaround is available.

Overview

The Cisco VG248 Analog Phone Gateway (VG248) enables you to integrate analog telephones, modems, and fax machines with the Cisco CallManager IP telephony system. You can also integrate legacy voice mail and PBX systems with Cisco CallManager using Simplified Message Desk Interface (SMDI).

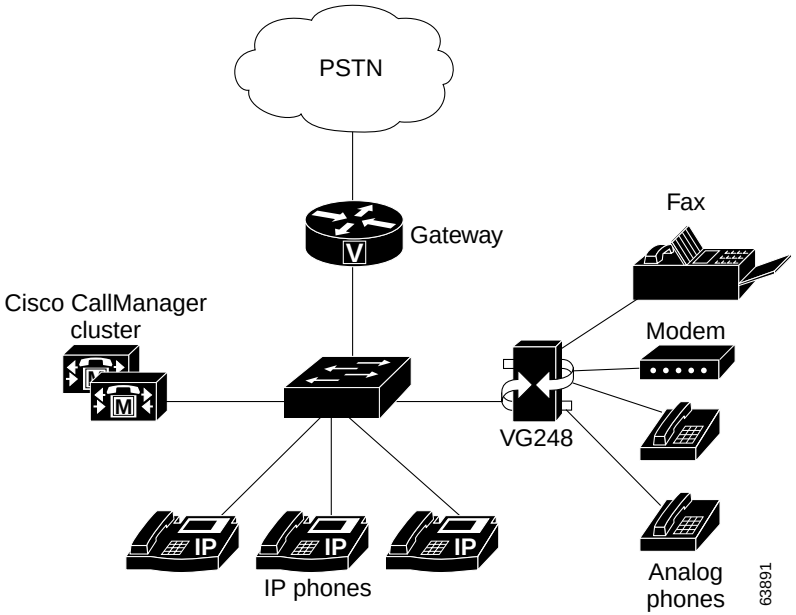
The following topics provide an overview of the supported features and analog devices and describe the supported data and voice protocols:

For details on using SMDI to integrate your existing voice mail systems with Cisco CallManager see the Chapter 5, “Integrating Cisco CallManager with Voice Mail Systems Using SMDI.”

Understanding How the VG248 Integrates with the Cisco IP Telephony Network

The Cisco VG248 is a high-density gateway for using analog phones, fax machines, modems, and speakerphones within the Cisco IP telephony network (see Figure 1-1). The Cisco VG248 offers 48 fully-featured analog phone lines to be used as extensions to the Cisco CallManager system in a compact 19-inch rack-mount chassis.

Figure 1-1 VG248 Integrated in the Cisco IP Telephony Network



Understanding How the VG248 Supports Telephony Features

Review the following sections to understand which telephony features are supported by the VG248 and to understand how they are implemented:

Supported Telephony Features

The VG248 supports the following features:

- Call Transfer (supervised and blind)
- Conference
- Call Waiting (with calling party ID display)
- Hold (including switch between parties on hold)
- Call Forward All
- Send All Calls to Voice Mail
- Pickup
- Call Voice Mail
- Speed Dial (maximum of 9 speed dials)
- Last Number Redial
- Caller ID

To understand how users access and use these features, see Table 1-1.

Understanding Voice-Mail Message Indicators

The VG248 can receive message-waiting indicator (MWI) information from Cisco CallManager and send it to analog phones. The VG248 sends MWI messages using any of the following methods:

- Playing stutter dial tone when a user picks up the phone
- Illuminating the MWI lamp on the phone
- Using caller ID mechanism to send information to the LCD screen on the phone

You can enable or disable any of these options. See the "Choosing Message Waiting Indicator Type" section on page 3-11 for details.

Understanding Call Control Modes

The VG248 supports different call control modes, which indicate how users access and use the supported telephony features. You can choose the call control mode appropriate to the specific needs of your users and the abilities of your analog devices. The supported call control modes include:

- Basic
- Standard
- Feature

To understand the differences among the three modes, keep in mind the following tips:

- The three modes differ in how they support transfer and conference.
- All modes support call waiting, and you can disable it on a per port basis using Cisco CallManager.
- All modes support feature codes for speed dial, redial, call forward and pickup, and you can define or disable them on a per device basis.
- Users can access features using the hook flash, 0-9, *, or # buttons, depending on how you have configured the feature codes.
- You cannot use a double flash hook.

See the "Choosing the Call Control Mode" section on page 3-4 for details about setting the call control mode on the VG248.

Basic

This mode provides the most basic phone interface with no call transfer or conference features. Basic mode might work best for fax machines or modems. See Table 1-1 for details about how the telephony features are accessed in basic mode.

Standard

Standard is the default telephony mode, and it provides standard Bellcore features, such as used in North America.

Users use the flash button or hook flash to transfer, conference and hold calls, with the following requirements:

- You cannot use a double hook flash to end a call.
- When putting calls on hold, the first call can be either incoming or outgoing.
- When transferring a call or establishing conferences, the second call must be outgoing.

Users also use feature codes to activate other features in standard mode. See Table 1-1 for details about how the telephony features are accessed in standard mode.

Feature

For simple calls, the feature mode is indistinguishable from the standard mode. While on calls, users use the flash button or hook flash to get a second dial tone to dial a second party. However, users then must enter feature codes to transfer the call or establish a conference.

When using feature mode with two calls established, the hook flash cycles around four states:

1. First call connected
2. Feature code tone
3. Second call connected
4. Feature code tone

These different states enable you to keep both calls active and switch between them. Thus, unlike Standard mode you can keep both calls active for as long as you want and freely switch between them.

To transfer or conference, you need to enter the relevant feature code at one of the feature tones (which are similar to dial tones except you can only enter feature codes rather than being able to dial a directory number).

See Table 1-1 for details about how the telephony features are accessed in feature mode

Table 1-1 Overview of Default Feature Access in Call Control Modes

Basic		**Standard**		**Feature**	
SpeedDial		**SpeedDial**		**SpeedDial**	
*1	*2	*1	*2	*1	*2
*3	*4	*3	*4	*3	*4
*5	*6	*5	*6	*5	*6
*7	*8	*7	*8	*7	*8
*9		*9		*9	
Call Voice Mail		**Call Voice Mail**		**Call Voice Mail**	
*0		*0		*0	
Last Number Redial		**Last Number Redial**		**Last Number Redial**	
*#		*#		*#	
Forward All to Voicemail		**Forward All to Voicemail**		**Forward All to Voicemail**	
**0		**0		**0	
Forward All[1]		**Forward All**[1]		**Forward All**[1]	
**1 *number*		**1 *number*		**1 *number*	
Disable Forward All		**Disable Forward All**		**Disable Forward All**	
**2		**2		**2	
Pickup		**Pickup**		**Pickup**	
**3		**3		**3	

Table 1-1 Overview of Default Feature Access in Call Control Modes (continued)

Basic	Standard	Feature
Call Waiting	**Call Waiting**	**Call Waiting**
Hook flash to answer and switch between calls.	Hook flash to answer and switch between calls.	Hook flash to answer and switch between calls.
	Blind Transfer	**Blind Transfer**
	Call 1, hook flash, call 2, hang up.	Call 1, hook flash, #2, call 2, hang up
	Supervised Transfer	**Supervised Transfer**
	Call 1, hook flash, call 2, wait for call 2 to be answered, hang up	Call 1, hook flash, call 2, wait for call 2 to be answered, hook flash, #2
	Conference	**Conference**
	Call 1, hook flash, call 2, hook flash	Call 1, hook flash, call 2, hook flash, #3
		Hang up Last Call
		Call 1, hook flash, call 2, hook flash, #1
		Hold
		Call 1, hook flash, call 2; hook flash to toggle

1. When forward all is activated, users hear a distinctive dial tone to indicate that all incoming calls are currently being forwarded to a different directory number.

Understanding Caller ID Support

If you have activated caller ID on Cisco CallManager, the VG248 can collect that information and pass it on to analog phones. You can disable caller ID on a per port basis. This enables you to support caller ID on some analog phones and not on others (see the "Enabling Caller ID" section on page 3-11 for details).

The VG248 supports the following caller ID standards:

- Bellcore GR-30-CORE—North America
- ETS 300 648 and ETS 300 659-1—Europe (excluding the United Kingdom)
- British Telecom SIN227 and SIN 242—United Kingdom

When a call arrives, the VG248 sends the following information:

- Time and date information
- Calling number up to 18 digits when available, otherwise the reason why number is unavailable
- Calling name up to 20 characters when available

Supported Analog Devices

The VG248 has a maximum ringer equivalency number (REN) load of three (3) analog devices per line (using a shared directory number), and only two of these devices can be off-hook at any one time.

You should use analog devices designed to work in the country in which you are using the VG248. For example, if you are using the VG248 in the United Kingdom, you should use analog devices designed for use in that country.

These sections provide an overview of the types of analog devices supported by the VG248:

- Analog Phones, page 1-8
- Speakerphones, page 1-9
- Private Line Automatic Ringdown Phones, page 1-9
- Fax Machines, page 1-9
- Modems, page 1-9

Analog Phones

The VG248 supports analog phones and the standard telephony features available on them.

Speakerphones

The VG248 performs line echo cancellation, but it does not perform acoustic echo cancellation. Speakerphones with built-in echo cancellation such as the Polycom-brand phones should work fine. However the voice quality might be unsatisfactory when using a speakerphone that does not perform acoustic echo cancellation itself.

Private Line Automatic Ringdown Phones

A telephone configured as a Private Line Automatic Ringdown (PLAR) telephone dials a pre-configured number when it goes off-hook. You cannot use PLAR phones to dial any other numbers. Telephones in hotel lobbies and airports are often configured in this way.

Cisco CallManager release 3.0 and later can be configured to support the PLAR phone feature for an IP phone or for an analog telephone connected to the VG248.

Fax Machines

The VG248 supports fax machines in pass-through and Cisco fax relay modes. In fax pass-through mode, the gateways do not distinguish a fax call from a voice call. Cisco fax relay offers a more reliable way of transporting the fax data in order to increase the data rate. However, the terminating gateway must also support Cisco fax relay. If necessary, you can disable Cisco fax relay (see the "Disabling Cisco Fax Relay" section on page 3-3 for details).

Modems

The VG248 supports modems in pass-through mode.

Supported Protocols

The VG248 supports several industry-standard and Cisco networking protocols required for voice communication over an IP network. Additionally, the VG248 supports protocols required for remote network management.

These sections provide an overview of the protocols supported by the VG248:

- Data and Voice Protocols, page 1-10
- Network Management Protocols, page 1-10

Data and Voice Protocols

The VG248 supports the following data and voice communication protocols.

- Internet Protocol (IP)—addresses and sends packets across the network.
- Internet Group Management Protocol (IGMP)—used to report multicast group memberships
- Trivial File Transfer Protocol (TFTP)—allows you to transfer files over the network.
- HyperText Transfer Protocol (HTTP)—defines how messages are formatted and transmitted, and what actions Web servers and browsers should take in response to various commands.
- File Transfer Protocol (FTP)—allows you to transfer files over the network.
- Dynamic Host Configuration Protocol (DHCP)—dynamically allocates and assigns an IP address to network devices.
- Real-Time Transport Protocol (RTP)—enables transporting of real-time data, such as interactive voice and video over data networks.
- Skinny Client Control Protocol (SCCP)—enables communication between the VG248 and Cisco CallManager.

Network Management Protocols

The VG248 supports Simple Network Management Protocol (SNMP) and implements several industry-standard Management Information Bases (MIBs).

Understanding SNMP Support

The VG248 supports SNMP versions 1 and 2, enabling you to perform the following commands:

- Get—Retrieve a specific node's value.
- GetNext—Retrieve the first value present in the ordered tree whose node succeeds the one specified.
- GetBulk—Retrieve bounded number of values whose nodes succeed, in the numerical ordering, the one specified. GetBulk is available only in SNMP v2.
- Set—Set a specific value.

Understanding Trap Support

The VG248 generates the following general traps, as defined in RFC 1157:

- Cold start—when the VG248 starts up and obtains an IP address
- Warm start—when the VG248 changes IP addresses
- Authentication failure—when an invalid community string is used

You must have set at least one network management station in order for the VG248 to generate traps. See the "Configuring Trap Settings" section on page 2-14 for details.

Understanding Supported MIBs

The VG248 supports the following MIBs.

RFC 1213

RFC 1213 is the basic MIB 2 specification which indicates the state of embedded interfaces and statistics for network protocols.

The VG248 supports RFC 1213 with the following caveats:

- ifAdminStatus for the Ethernet interface cannot be written, and it is fixed at "up".
- ifSpecificfor all interfaces returns as "0, 0".
- atTable cannot be written.

- No “ip***” values can be written.
- You cannot write to “tcpConnState” for an active TCP connection.
- The VG248 does not implement the External Gateway Protocol (EGP).

Interface MIB

This MIB is defined in RFC 1573 and extends the range of information available about a device's interfaces from that provided by the ifTable in RFC 1213. The VG248 implements this MIB for its Ethernet interface and the 48 FXS interfaces. However, the octet or packet count values are not available for the FXS interfaces because they are not applicable to these interface types.

RMON

The VG248 implements the Ethernet Statistics group in Remote Monitoring (RMON), with the exception of “EtherStatsStatus.” This is fixed at “valid” and cannot be written.

Cisco CDP MIB

Cisco Discovery Protocol (CDP) is a method that Cisco devices use to advertise their presence and to discover information about other nearby devices. The VG248 supports CDP and implements this MIB. You can enable or disable CDP on the VG248. See the “Enabling CDP” section on page 2-10 for details.

Cisco Process MIB

This MIB describes the processes currently running on the device. However, because the VG248 runs threads, rather than processes, the MIB is implemented with the following caveats:

- The amount of memory allocated is not recorded on a per-thread basis. Therefore, cpmProcExtMemAllocated and cpmProcExtMemFreed are returned as 0.
- All threads run at the same priority. Therefore, every process cpmProcExtPriority are returned as “normal.”
- It is not possible to change a process’s priority, so attempts to write “cpmProcExtPriority” are unsuccessful.

Cisco Memory Pool MIB

This MIB allows detailed information to be retrieved for all memory pools present within a Cisco device. The VG248 implements this MIB, but because all dynamic memory management uses a single heap, the resulting table has one row, which is returned as "Processor".

Cisco EnvMon MIB

"EnvMon" refers to the on-board environmental monitor on the VG248 that monitors the internal voltage, power supply, temperature, and fan settings.

The VG248 routinely measures these values recording the information in the rows within the different tables:

- ciscoEnvMonVoltageStatusTable—records voltage and power supply readings
- ciscoEnvMonFanStatusTable—records fan status readings
- ciscoEnvMonTemperatureStatusTable—records temperature settings

You can use this MIB to access these recorded values. Also, if the VG248 detects readings beyond the acceptable limits, the device generates warning messages. See the "Troubleshooting Hardware Errors" section on page 6-1 for details.

Cisco Voice Interface MIB

This Cisco proprietary MIB (`CISCO-VOICE-IF-MIB.my`) allows access to voice interface parameters such as gain values and echo cancellation status. The VG248 implementation of this MIB provides read access only. You can configure the gain values using the VG248 interface (see the "Setting the Output Gain" section on page 3-13 and the "Setting the Input Gain" section on page 3-14 for details).

Cisco Analog Voice Interface MIB

This Cisco proprietary MIB (`CISCO-VOICE-ANALOG-IF-MIB.my`) allows access to interface parameters related to the analog ports. These parameters include hardware issues such as electrical impedance value and ring frequency and user factors such as whether an attached handset is currently on- or off-hook. The electrical impedance value and ring frequency is determined by the country code you set in the VG248 (see "Identifying the Country Code for VG248" section on page 3-6 for details). You can modify the hook-flash timer using the VG248 interface (see "Changing the Hook Flash Timer for Analog Phones" section on page 3-7).

Getting Started with the VG248

Before you can configure the telephony features on the VG248 to interact with the analog phones, you must first configure the basic network, SNMP, and password settings. These settings enable the VG248 to connect to the IP network and help you manage the device.

These sections provide details about configuring these settings on the VG248:

Accessing Configuration Options

You can access the VG248 configuration options, after the device has started up, using a console terminal connected to the RJ-45 console port or through a Telnet session.

Using the Console Port

You might want to use the console port to connect to the VG248 when you initially install the device. This enables you to observe the initial startup procedure and manually assign an IP address and host name if you are not using DHCP.

To access the VG248 through the console RJ-45 port, perform these steps.

	Task	Description
Step 1	Connect the console terminal to the console port.	See the *Cisco VG248 Analog Phone Gateway Hardware Installation Guide*.
Step 2	At the prompt, enter the password. The VG248 does not have a default password. If no password has been configured, the main menu displays.	*<password>*
Step 3	Choose the necessary options to complete your desired tasks.	Choose the desired option from the menus.
Step 4	When finished, exit the session.	—

Using Telnet

To access the VG248 through a Telnet session, you must know its IP address or host name. By default, the device uses DHCP. If you want to assign a specific IP address or host name, you must first configure the network settings using the console port before connecting through a Telnet session.

To access the VG248 from a remote host with Telnet, perform these steps:

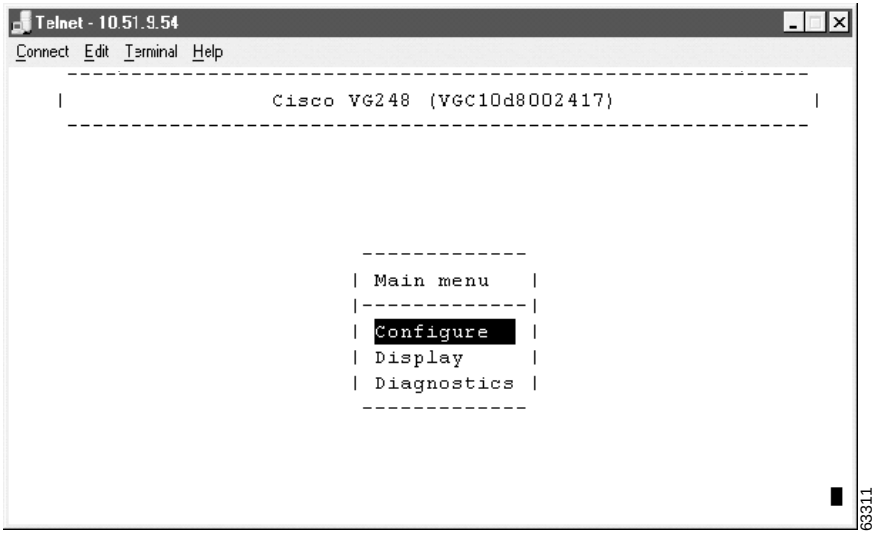
	Task	Command
Step 1	From the remote host, enter the telnet command and the host name or IP address of the VG248 that you want to access.	**telnet** *hostname* | *ip_addr*
Step 2	At the prompt, enter the password, if you have configured one. The VG248 does not have a default password. If no password has been configured, the main menu displays.	*<password>*
Step 3	Choose the necessary options to complete your desired tasks.	Choose the desired option from the menus.
Step 4	When finished, exit the Telnet session	—

Displaying the Main Menu

After connecting to the VG248 through the console port or a Telnet session, the main menu appears (see Figure 2-1). Follow these guidelines to navigate the menus:

- Use the arrow keys or numeric keypad to navigate the available options.
- Press **Enter** to choose an option.
- Press **Esc** to return to the previous menu.

Figure 2-1 VG248 Main Menu



Restarting the VG248

Certain configuration changes to the VG248 do not take effect until you restart the device. To restart the VG248, perform these steps:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Restart**.

Configuring Network Settings

You must configure the network settings on the VG248 to connect it to the IP network. After configuring any network settings, you must restart the VG248. See the "Restarting the VG248" section on page 2-4.

Configuring Ethernet

The VG248 fully supports 10/100 Mbps half- and full-duplex Ethernet. If you choose auto-negotiation, the VG248 automatically adjusts to the speed and duplex mode of the switch to which it is attached. This is the default and recommended setting.

Follow these steps to configure the VG248 as your network requires:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Network interface**.

Step 3 Choose **Ethernet**.

Step 4 Choose the option that matches the setting on the switch to which the VG248 is connected:

- auto-negotiation
- 100Mb/s half duplex
- 100Mb/s full duplex
- 10Mb/s half duplex
- 10Mb/s full duplex

Step 5 Restart the VG248.

Using DHCP

If you are using Dynamic Host Configuration Protocol (DHCP) in your network, the VG248 automatically obtains an IP address when you connect it to the network. Although the VG248 uses DHCP by default, you can disable DHCP and manually assign an IP address to the VG248.

To use DHCP, perform these steps:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Network interface**.

Step 3 Choose **Use DHCP**.

Step 4 Press Enter to toggle between **yes** (use DHCP) and **no** (do not use DHCP).

If you use DHCP, you can only modify the host name; you cannot modify the other network settings. See the "Setting the Host Name" section on page 2-7 for details.

If you do not use DHCP, you must enter the additional network settings. See these sections for details:

- Setting the Host Name, page 2-7
- Setting the IP Address, page 2-7
- Setting the Subnet Mask, page 2-8
- Setting the Default Router, page 2-8
- Setting the DNS Server, page 2-9
- Setting the Domain Name, page 2-9

Renewing IP Address from DHCP

You might need to renew the IP address automatically assigned to the VG248. For example, if you have changed the physical location of the VG248 from one subnet to another or if you need assistance troubleshooting a connectivity problem.

To renew an IP address assigned by DHCP, follow these steps:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Network interface**.

Step 3 Choose **Renew DHCP**.

Setting the Host Name

The host name identifies each VG248 on your TCP/IP network, enabling you to access the device using this name rather than the IP address.

By default, this value is set to be the same as the device name registered in the Cisco CallManager database. This device name is a unique character string generated based on the MAC address for the VG248 (see the "Adding the VG248 to Cisco CallManager" section on page 4-2 for details). However, you can use this setting to modify the host name.

To change the host name, perform these steps:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Network interface**.

Step 3 Choose **Host name**.

Step 4 Enter the host name to be used by the VG248.

Step 5 Restart the VG248.

Setting the IP Address

The IP address identifies each VG248 on your TCP/IP network. You must enter the IP address if you are not using DHCP. The VG248 automatically obtains an IP address if you are using DHCP.

To assign an IP address, perform these steps:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Network interface**.

Step 3 Choose **IP address**.

Step 4 Enter the IP address to be used by the VG248.

Step 5 Restart the VG248.

Setting the Subnet Mask

You must enter the subnet mask if you are not using DHCP. The VG248 automatically obtains a subnet mask if you are using DHCP.

To set the subnet mask, perform these steps:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Network interface**.

Step 3 Choose **Subnet mask**.

Step 4 Enter the subnet mask.

Step 5 Restart the VG248.

Setting the Default Router

You must enter the default router if you are not using DHCP. The VG248 automatically obtains a default router if you are using DHCP.

To set the default router, perform these steps:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Network interface**.

Step 3 Choose **Default router**.

Step 4 Enter the IP address of the default router.

Step 5 Restart the VG248.

Setting the DNS Server

Domain Name System (DNS) allows users to specify remote computers by host names. The VG248 uses DNS to resolve the host name of TFTP servers and Cisco CallManager systems when the system is configured to use names rather than IP addresses.

To set the DNS server, perform these steps:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Network interface**.

Step 3 Choose **DNS server**.

Step 4 Enter the IP address of the DNS server.

Step 5 Restart the VG248.

Tips You can enter a secondary DNS server by choosing **Network interface > DNS server 2** and entering the IP address.

Setting the Domain Name

The domain name is the name of the Domain Name System (DNS) domain in which the VG248 is located.

To set the domain name, perform these steps:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Network interface**.

Step 3 Choose **Domain name**.

Step 4 Enter the domain name.

Step 5 Restart the VG248.

Enabling CDP

The VG248 can advertise itself to other network devices using Cisco Discovery Protocol (CDP). Many network management applications require that CDP is enabled.

To enable CDP, perform these steps:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Network interface**.

Step 3 Choose **CDP**.

Step 4 Press Enter to toggle between **enabled** and **disabled**.

Setting DSCP Quality of Service Values

Differentiated Services Code Point (DSCP) is an IETF standard that uses 6 bits in the IPv4 header's ToS (Type of Service) field to specify the class of service for each packet. This enables you to apply differentiated grades of service to different packet types.

You can modify the assigned DSCP Quality of Service (QoS) value for certain types of traffic. This enables you to give priority to media traffic over control traffic.

To enable modify the DSCP QoS values, perform these steps:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Network interface**.

Step 3 Choose **Set DSCP QoS values**.

Step 4 Choose one of the following options:

- **Media traffic**—RTP packets carrying voice, fax, and modem calls
- **Control traffic**—SCCP data packets carrying telephony control data
- **All other traffic**—such as FTP, HTTP, SNMP, and so on

Step 5 Enter the new value for **Media traffic** or **Control traffic** from 0 to 63, using decimal format.

By default, **Media traffic** is set to 46, and **Control traffic** is set to 26. You cannot change the value for **All other traffic**; it is set to 0.

Configuring Passwords

The VG248 ships without a set or enabled password. You should enable passwords to prevent unauthorized access to and control of the VG248. The VG248 does not support or use user names.

Once you set a password, however, the VG248 requires that you use it, whether you are accessing the device using the console port, telnet, HTTP, or FTP. When using the HTTP, you are required to enter the login password if one is set; you cannot modify any settings when accessing the VG248 using HTTP. When accessing the VG248 using FTP, the FTP server adopts the highest level of security currently set. For example, if you have set both a login and enable password, you must use the enable password to use FTP.

Caution By default, the VG248 does not have an assigned password. To avoid unauthorized access, assign passwords to this device.

Configuring the Login Password

The login password enables you or other users to view the current status of the VG248. To configure the login password, perform these steps:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Passwords**.

Step 3 Choose **Login password**.

Step 4 Enter the new password.

Configuring the Enable Password

The enable password allows you to view current settings and make changes to the VG248. Once set, you must use the enable password to make changes to the VG248.

To configure the enable password, perform these steps:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Passwords**.

Step 3 Choose **Enable password**.

Step 4 Enter the new password.

Configuring SNMP Settings

The VG248 supports Simple Network Management Protocol (SNMP) by supporting standard MIBs. Modify the SNMP settings as appropriate for your network management needs. You need to configure the SNMP settings if you want to manage the VG248 remotely.

Setting Community Strings

The community string settings enable network management systems to access the VG248 for remote management.

You can configure a read-only password, which restricts access to the device, allowing users to view information but not to make changes. You can also configure a read-write community string, which allows users to make changes to the device remotely.

By default, the read-only community string is set to `public`, which provides read-only access. If you do not set these community strings on the VG248, you cannot manage the device remotely using the Simple Network Management Protocol (SNMP).

To set the community strings, perform these steps:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **SNMP**.

Step 3 To set the read-only community string, choose **Read-only community string**.

Step 4 To set the read-write community string, choose **Read-write community string**.

Step 5 Enter the community string value.

Configuring Contact Information

You can enter the contact name of the person responsible for the VG248 and the location of the VG248 on your campus.

Configuring Contact Name

The contact name on the VG248 corresponds to the sysContact variable defined in RFC 1213.

To add a contact name indicating the person responsible for the VG248, perform these steps:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **SNMP**.

Step 3 Choose **Contact name**.

Step 4 Enter the name of the person responsible for the VG248.

Configuring System Name

The system name on the VG248 corresponds to the sysName variable defined in RFC 1213.

To specify the system name of the VG248 to the network management system perform these steps:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **SNMP**.

Step 3 Choose **System name**.

Step 4 Enter the system name of the VG248.

Configuring Location

The location on the VG248 corresponds to the sysLocation variable defined in RFC 1213.

To add the location of the VG248 in your network or on your site, perform these steps:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **SNMP**.

Step 3 Choose **Location**.

Step 4 Enter the location of the VG248.

Configuring Trap Settings

You can configure the VG248 to notify up to four network management systems when certain significant system events occur. You can also specify the IP address for the network management system that is acting as a trap receiver. See the "Understanding Trap Support" section on page 1-11 for information about supported trap types.

Enabling Authentication Traps

To enable authentication traps, perform these steps:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **SNMP**.

Step 3 Choose **Generate authentication traps**.

Step 4 Press Enter to toggle between **yes** and **no**.

Configuring Trap Receiver Stations

To set up to four trap receiver stations, perform these steps:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **SNMP**.

Step 3 Choose **Trap receiver stations**.

Step 4 Enter the IP address or host name of the network management system used to receive the traps.

CHAPTER 3

Configuring the Telephony Settings on the VG248

The telephony settings on the VG248 determine the functionality of the analog phones connected to it. However, before configuring these settings, ensure that you have completed the basic network configuration described in Chapter 2, "Getting Started with the VG248."

After verifying connectivity to the network, review these sections to customize the telephony settings:

Identifying the Cisco CallManager TFTP Server

The VG248 uses the TFTP server to identify the correct Cisco CallManager system. If you are using DHCP, the VG248 attempts to obtain the TFTP server address from the DHCP server. Or, you can select a different TFTP server by modifying this setting. If you are not using DHCP, or if your DHCP server is not configured with a TFTP server address, you should identify the TFTP server using this setting.

To assign a TFTP server, perform these steps:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Telephony**.

Step 3 Choose **CallManager TFTP server**.

Step 4 Enter the IP address or host name of the TFTP server.

Changing the Cisco CallManager Device Name

The VG248 uses the Cisco CallManager device name when registering ports with Cisco CallManager. The actual device name used is the value shown for this menu option followed by the port number. By default, this is set to “VGC” followed by 10 digits of the VG248's MAC address. For example, port one would use VCGxxxxxxxxxx01 as its device name, where xxxxxxxxxx are the last 10 digits of the MAC address.

You can change the default device name, but you must use the standard format described in the “Using Auto-Registration” section on page 4-2.

Step 1 .From the main menu, choose **Configure**.

Step 2 Choose **Telephony**.

Step 3 Choose **CallManager device name**.

Step 4 Enter the new device name.

Disabling Cisco Fax Relay

The VG248 supports Cisco fax relay. Cisco fax relay provides a more reliable method of transporting fax data over the IP network rather than sending the fax information as a voice call. However, the terminating device must also support Cisco fax relay.

By default, Cisco fax relay is enabled on the VG248. However, follow these steps to disable it:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Telephony**.

Step 3 Choose **Fax relay**.

Step 4 Choose one of the following:

- **Enabled**
- **Disabled**

Reverting to Previous Configuration

By default, the VG48 ports identify their configuration using TFTP. This configuration determines the Cisco CallManager system to which these ports connect.

If persistent TFTP problems prevent the VG248 from retrieving this configuration, the VG248 ports can revert to their previous configuration. This enables the ports to connect to the Cisco CallManager system with which they were previously registered.

By default, the VG248 automatically reverts to the previous configuration if the ports fail to connect via TFTP. To disable this functionality, follow these steps:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Telephony**.

Step 3 Choose **Allow last good configuration**.

Step 4 Choose one of the following:

- **yes**
- **no**

Choosing the Call Control Mode

The call control mode determines how users interact with their analog phones to access features such as speed dialing, call transfer, conference, call waiting, and so on.

For assistance determining which call control mode best meets your needs, see the "Understanding Call Control Modes" section on page 1-4.

Follow these steps to set the call control mode:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Telephony**.

Step 3 Choose **Call control mode**.

Step 4 Choose one of the following:

- **Basic**
- **Standard**
- **Feature**

Step 5 Restart the VG248.

Assigning Feature Codes

Many of the telephony features available in standard and feature mode are activated by feature codes, which end users indicate using the dial pad on their telephones.

You can change these feature codes from their default values using these steps:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Telephony**.

Step 3 Choose **Feature codes**.

Step 4 Choose the code to configure.

Step 5 Enter the setting for the code.

The default settings for the feature codes are as follows:

Code	Default Setting	Call Mode
Hang up last call	#1	Feature
Transfer	#2	Feature
Conference	#3	Feature
Forward all to voice mail	**0	All
Call forward all[1]	**1	All
Cancel call forward	**2	All
Pickup	**3	All
Redial	*#	All
SpeedDial Voicemail	*0	All
SpeedDial 1	*1	All
SpeedDial 2	*2	All
SpeedDial 3	*3	All
SpeedDial 4	*4	All
SpeedDial 5	*5	All
SpeedDial 6	*6	All
SpeedDial 7	*7	All
SpeedDial 8	*8	All
SpeedDial 9	*9	All

1. When forward all is activated, users hear a distinctive dial tone to indicate that all incoming calls are currently being forwarded to a different directory number.

Tip

- If you set a feature code to a blank string, users cannot use that feature.
- You cannot disable transfer or conference in standard mode because those features are activated by hanging up or using the hook flash, rather than by feature codes.
- If you have two feature codes assigned to the same setting, one of the features does not work.
- If one feature code setting masks another, you cannot use the masked setting (such as if transfer is * and conference is **, conference does not work).

Identifying the Country Code for VG248

The country code identifies the country in which you are using the VG248. It automatically sets country-specific settings, such as the sound of the tones, the cadence of the rings, impedance, hook flash timer, and gain, for example.

Follow these steps to set the country code,

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Telephony**.

Step 3 Choose **Country**.

Step 4 Choose the country name in which you are using the VG248.

If your country is not available, select a country that uses the same telephony standards.

Step 5 Restart the VG248.

Changing the Hook Flash Timer for Analog Phones

The hook flash timer is the length of time before the hook flash indicates a time-out (or call disconnect). The hook flash timer setting is based on the country of origin of the analog phones. When you set the country code on the VG248, the hook flash timer is automatically set to the default for that country.

However, you can modify this setting, if desired.

To change the hook flash timer, follow these steps:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Telephony**.

Step 3 Choose **Hook flash timer**.

Step 4 Choose the appropriate hook flash timer value for your analog phones.

Setting the Port Enable Policy

To configure the ports on the VG248 and the features required for the analog devices connected to the ports, you must add them to the Cisco CallManager database.

The port enable policy on the VG248 determines whether the VG248 can enable a port and register the phone in Cisco CallManager.

Before You Begin

The port enable policy interacts with the auto-registration settings in Cisco CallManager. Review the following explanations before choosing a port enable policy:

VG248	Cisco CallManager	Analog Phone Behavior	Tips
auto	auto-registration enabled	1. User picks up the phone to use for first time. 2. VG248 attempts to register in Cisco CallManager 3. Cisco CallManager adds phone to database. 4. User makes call.	
auto	auto-registration disabled	1. User picks up the phone to use for first time. 2. VG248 attempts to register in Cisco CallManager 3. Cisco CallManager refuses registration. 4. If phone is not registered, user cannot make call.	If the phone has already been manually added and configured in Cisco CallManager, Cisco CallManager recognizes this, and the phone works.
manual	auto-registration enabled or disabled	1. User picks up the phone to use for first time. 2. VG248 does not attempt to register with Cisco CallManager. 3. User cannot make call.	You can enable the specific port that is connected to this phone. The VG248 will then attempt to register this port with Cisco CallManager. See the "Enabling a Specific Port" section on page 3-9 for details.

To set the port enable policy on the VG248, follow these steps:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Telephony**.

Step 3 Choose **Port enable policy**.

Step 4 Choose one of these options:

- **auto** (default setting)
- **manual**

Configuring Port Parameters

You must configure the VG248 ports using Cisco CallManager. Each of the ports are entered in the Cisco CallManager database as a "VGC" phone type. See the "Configuring the VG248 Analog Ports" section on page 4-3 for details.

These sections provide details of the parameters that you configure on a per port basis:

- Enabling a Specific Port, page 3-9
- Enabling Caller ID, page 3-11
- Choosing Message Waiting Indicator Type, page 3-11
- Enabling Disconnect Supervision, page 3-12
- Setting the Output Gain, page 3-13
- Setting the Input Gain, page 3-14

Although these procedures describe how to make changes to individual ports, you can configure a range of ports to use the same settings. To do this, choose **Telephony > Port specific parameters**, and then press **R** on the keyboard. Then enter a port range (such as 1-10, or 1, 2,3) and apply changes to all of those ports at once.

Enabling a Specific Port

By enabling a specific port on the VG248, you are allowing it to be registered with Cisco CallManager. When used in conjunction with the port enable policy (see the "Setting the Port Enable Policy" section on page 3-7), you can determine whether an analog phone can simply be plugged into a port connected to the VG248 and be ready to use.

Before You Begin

Before changing the port enable status for a specific port, review these guidelines to understand how this setting interacts with the port enable policy.

Port Enable Policy	Port Enable Status	Explanation
auto	enabled	You have used this phone and registered this port in Cisco CallManager.
auto	disabled	You have either manually disabled the specific port using the **Telephony** > **Port specific parameters** menu, or no one has attempted to use a phone connected to this port. This is the default setting. After someone attempts to use a phone connected to this port, the port enable status will change to enabled.
manual	enabled	You have manually enabled the specific port using the **Telephony** > **Port specific parameters** menu. By doing this, you are overriding the manual setting on the port enable policy. When the VG248 starts up, the port will attempt to register with Cisco CallManager.
manual	disabled	The port cannot be enabled by picking up the phone. To use the phone, you must manually change the port from disabled to enabled using the **Telephony** > **Port specific parameters** menu.

Follow these steps to enable a specific port:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Telephony**.

Step 3 Choose **Port specific parameters**.

Step 4 Use the arrow keys to select the port to configure and press Enter.

Step 5 Choose **Status**.

Step 6 Choose **enabled** or **disabled**.

Enabling Caller ID

You can enable caller ID on a per-port basis. This allows caller ID information to be passed to some, all, or none of the analog phones connected to the VG248.

Enabling caller ID determines how the VG248 handles any caller ID instructions received from Cisco CallManager. If you are not using caller ID on Cisco CallManager, then the VG248 does not receive any caller information to pass on to the analog ports, regardless how you set the VG248.

To enable caller ID for a specific port on the VG248, follow these instructions:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Telephony**.

Step 3 Choose **Port specific parameters**.

Step 4 Use the arrow keys to select the port to configure and press Enter.

Step 5 Choose **Caller ID**.

Step 6 Choose from the following options:

- **enabled**
- **not with call waiting—**Caller ID displays only if no other calls are currently active
- **disabled**.

Choosing Message Waiting Indicator Type

The VG248 supports several types of methods for sending MWI messages to analog phones. Because you might have different types of analog phones connected to the VG248, you can modify the MWI type on a per-port basis. So, if

you have some analog phones that have MWI lamps on them, you can notify users of awaiting messages using the lamp. Or, you can choose to play a tone when users pick up their phones.

Keep in mind that the VG248 only sends this information to the phones if it is received from Cisco CallManager. If Cisco CallManager is not integrated with your voice mail system, it does not send this information to the VG248.

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Telephony**.

Step 3 Choose **Port specific parameters**.

Step 4 Use the arrow keys to select the port to configure and press Enter.

Step 5 Choose **MWI type**.

Step 6 Choose from the following options:

- **Lamp**—illuminates lamp on phone
- **Caller ID**—uses caller ID mechanism to send MWI messages to the LCD screen on phone
- **Stutter**—plays tones when user picks up the phone
- **Lamp + stutter**—illuminates lamp and plays tone
- **Caller ID + stutter**—sends message to LCD screen and plays tone
- **None**—does not send MWI information

Enabling Disconnect Supervision

Disconnect supervision indicates to an analog device that the remote caller has hung up. For example, if a user calls someone with an answering machine, leaves a message, and hangs up, disconnect supervision is the electrical state that briefly drops the loop current and indicates to the answering machine that the caller has hung up.

Follow these steps to enable disconnect supervision on a per port basis:

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Telephony**.

Step 3 Choose **Port specific parameters**.

Step 4 Use the arrow keys to select the port to configure and press Enter.

Step 5 Choose **Disconnect supervision**.

Step 6 Choose from **enabled** or **disabled**.

Setting the Output Gain

The output gain specifies, in decibels, the amount of gain from the VG248 to the analog phone.

The country option you set on the VG248 determines the default output gain. However, you might need to modify it to account for different cable lengths (longer cables might require more gain), to make the signal louder or quieter, or to use a phone from a different country.

Follow these steps to modify the input gain. The default setting is based on the country code you set (see the"Identifying the Country Code for VG248" section on page 3-6).

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Telephony**.

Step 3 Choose **Port specific parameters**.

Step 4 Use the arrow keys to select the port to configure and press Enter.

Step 5 Choose **Output gain**.

Step 6 Choose from the available options (ranging from -14dB through 0db)

Keep in mind that the value you are choosing is a delta value and does not reflect the actual gain value. For example, if the base value is -3dB, you might choose +1dB as the delta value. Therefore, the actual gain value for that port is -2dB overall.

Setting the Input Gain

The input gain specifies, in decibels, the amount of gain from the analog phone to the VG248.

The country option you set on the VG248 determines the default input gain. However, you might need to modify it to account for different cable lengths, to make the signal louder or quieter, or to use a phone from a different country.

Follow these steps to modify the input gain. The default setting is based on the country code you set (see the"Identifying the Country Code for VG248" section on page 3-6).

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Telephony**.

Step 3 Choose **Port specific parameters**.

Step 4 Use the arrow keys to select the port to configure and press **Enter**.

Step 5 Choose **Input gain**.

Step 6 Choose from the available options (ranging from -6dB through + 14db)I

Keep in mind that the value you are choosing is a delta value and does not reflect the actual gain value. For example, if the base value is -3dB, you might choose +1dB as the delta value. Therefore, the actual gain value for that port is -2dB overall.

CHAPTER 4

Configuring Analog Phones Using Cisco CallManager

The VG248 connects to Cisco CallManager to provide access from the analog phones to Cisco CallManager. To configure the analog phones using Cisco CallManager, you actually configure the ports on the VG248. The changes you make to a specific port (such as disabling call waiting or assigning speed dials) apply directly to the analog device connected to that port.

The following sections provide an overview of the configuration requirements for Cisco CallManager:

This guide does not contain details about configuring Cisco CallManager. Refer to the documentation and online help provided with Cisco CallManager for installation and configuration instructions.

Overview

Cisco CallManager does not recognize the VG248 as a single IP telephony device. Instead, each of the 48 ports are identified as individual devices, similar to IP phones.

Adding the VG248 to Cisco CallManager

You can add the VG248 ports to Cisco CallManager automatically or manually. These sections provide the details:

Using Auto-Registration

You can choose to have the VG248 automatically added to Cisco CallManager using auto-registration. To do this, you must

- Verify that auto-registration is enabled in Cisco CallManager. Refer to the documentation or online help included with the Cisco CallManager application for details.
- Verify that the VG248 port enable policy is set to "auto." See the "Setting the Port Enable Policy" section on page 3-7 for details.

When the VG248 connects to Cisco CallManager through auto-registration, each port connected to an analog device registers itself as a Cisco VGC phone.

Auto-registration automatically assigns phones a directory number. The directory number assigned is the next one available in sequential order within the device pool assigned to this phone type in Cisco CallManager. However, if you need to, you can modify this directory number for each emulated phone (see the "Configuring the VG248 Analog Ports" section on page 4-3).

During auto-registration, the host name assigned to the VG248 is entered in the Description field in the record for the emulated phone in Cisco CallManager. If you do not enter a host name, the following sequence applies for the device description: VGC + the last 10 digits of the MAC address.

Additionally, Cisco CallManager requires unique MAC addresses for all devices, but all 48 ports on the VG248 share the same MAC address. Therefore, auto-registration includes a process that converts the MAC addresses into this format:

1. The first two digits of the MAC address are dropped.
2. The number is shifted two places to the left.

3. The two-digit port number is added to the right.

For example, if the MAC address on the VG248 is
`000039A44218`

the MAC address registered for port 12 in Cisco CallManager is
`0039A4421812`

After adding each port, make configuration changes as described in the "Configuring the VG248 Analog Ports" section on page 4-3.

Manually Adding the VG248

If you want to assign specific directory numbers to the emulated IP phones on the VG248 without using auto-registration, you must manually add each phone to the Cisco CallManager database. Keep in mind several important facts:

- To add a VG248 port to Cisco CallManager,
  a. From Cisco CallManager, choose **Devices > Add a New Device.**
  b. Choose **Cisco VGC Phone** from the Phone type menu.
  c. Click **Next**.
- Each port must have a unique MAC address. Use the auto-registration formula (see page 4-2) to calculate the MAC address for each port.
- Use the host name or other name for the **Description** for each port. For ease of administration, use a similar name for ports configured on the same VG248.
- Consider adding a descriptive line to the **Display** field, such as "Analog phone."
- Configure each port as described in the "Configuring the VG248 Analog Ports" section on page 4-3.

Configuring the VG248 Analog Ports

Each port on the VG248 corresponds to an analog device in your IP telephony network. To manage these devices using Cisco CallManager you must add each port to the Cisco CallManager database. To Cisco CallManager, each port is recognized and handled as a phone.

For example, if you have 48 devices connected to the VG248, you must add and configure 48 ports to Cisco CallManager. Cisco CallManager recognizes 48 separate phones connected to it.

After these phones are added to Cisco CallManager, treat them as you would any other phone in your IP telephony network. You need to add directory numbers, calling search space, and so on. Refer to the documentation and online help included with Cisco CallManager for details.

If you are using any ports on the VG248 for SMDI connections, refer to the "Configuring VG248 SMDI Ports in Cisco CallManager" section on page 5-13for details.

CHAPTER 5

Integrating Cisco CallManager with Voice Mail Systems Using SMDI

Simplified Message Desk Interface (SMDI) defines how phone systems provide voice mail systems with the information needed to intelligently process incoming calls. It is an industry-standard signaling protocol that supplies calling and called party identification and sets and clears Message Waiting Indicators (MWIs) through an RS-232 serial connection.

Using SMDI and the VG248, you can integrate your existing voice mail systems (such as Lyrix, Octel 200, Octel 250, Octel 300 and Octel 350) and legacy PBX systems with Cisco CallManager.

These sections provide details about designing, installing, configuring, and verifying this integration:

Overview

The VG248 generates call information in an SMDI format for all calls coming into any of the SMDI-enabled ports. The VG248 can also send and receive SMDI messages to and from other SMDI devices, such as other VG248 devices, a legacy PBX, or the legacy voice mail system.

The VG248 provides advantages to other methods used for integrating Cisco CallManager with SMDI-based voice mail systems, including:

- Reliability for SMDI links using Cisco CallManager failover (see Figure 5-1).
- Scalability by linking VG248 devices (see Figure 5-2).
- Multiple SMDI-based voice mail systems can be used on a single cluster, by using one VG248 per voice mail system (see Figure 5-2).
- A single voice mail system to be used by multiple clusters, by using one VG248 per cluster (see Figure 5-3).
- A single voice mail system to be shared between Cisco CallManager and a legacy PBX (see Figure 5-4).

Table 5-1 provides an overview of the tasks required to implement this integration.

Table 5-1 SMDI Configuration Tasks

Task	Description	For More Information
Decide on an integration method	Choose one of the following methods: • Basic—connect a voice mail system to Cisco CallManager system via the VG248 using SMDI (48 port maximum) • Chained—connect a voice mail system to Cisco CallManager system via multiple VG248 devices using SMDI (more than 48 ports) • Multiplexing—connect a voice mail system to multiple Cisco CallManager clusters or legacy PBX systems	See the "Choosing a Configuration Option" section on page 5-4.
Connect the SMDI links to the VG248	Use Async 1 to connect to the voice mail system (any configuration) or SMDI source (chained or multiplexing configuration). Use Async 2 to connect VG248 devices together and to a legacy PBX system.	See the "Connecting the SMDI Links to the VG248" section on page 5-12.
Update service parameters in Cisco CallManager.	You should verify that the voice mail service parameters are properly configured to support the SMDI-based voice mail system.	See the "Configuring Voice Mail Parameters in Cisco CallManager" section on page 5-13.
Add the MWI port to Cisco CallManager.	You must add a special port to Cisco CallManager that is used to set and clear MWI commands.	See the "Adding the MWI Port to Cisco CallManager" section on page 5-14.
Add the voice mail ports to Cisco CallManager.	You must add and configure the VG248 ports used for voice mail to the Cisco CallManager database.	See the "Adding and Configuring Voice Mail Ports in Cisco CallManager" section on page 5-16.
Update end-user phones.	You should update the voice mail settings for the end-user phones that are using the SMDI-based voice mail system.	See the "Configuring End-User Phones" section on page 5-18.

Table 5-1 SMDI Configuration Tasks (continued)

Task	Description	For More Information
Configure the local SMDI settings on the VG248.	You must configure the local SMDI settings on the VG248. Some of these SMDI settings must match settings on the voice mail system or Cisco CallManager.	See the "Configuring SMDI Settings on the VG248" section on page 5-19.
Verify the status of the SMDI configuration.	You can check the status of the SMDI connections to help resolve any problems.	See the "Verifying and Troubleshooting the SMDI Connection" section on page 5-28.

Choosing a Configuration Option

You can use the VG248 to integrate SMDI-based voice mail systems with Cisco CallManager in different configurations depending on your needs:

- Basic—if you need 48 or fewer voice mail ports and do not need to integrate with multiple Cisco CallManager clusters or a legacy PBX system.
- Chained—if you need more than 48 voice mail ports; can be used with the multiplexing configuration.
- Multiplexing—if you need to integrate with multiple Cisco CallManager clusters or with a legacy PBX system.

These sections provide additional information about these methods:

- Basic Configuration, page 5-5
- Chained Configuration, page 5-6
- Multiplexing Configuration, page 5-8

Basic Configuration

In the basic configuration (see Figure 5-1), you can use a single VG248 device to connect up to 48 voice channels to a voice mail system. This configuration enables you to use your existing voice mail system and integrate it with Cisco CallManager using SMDI.

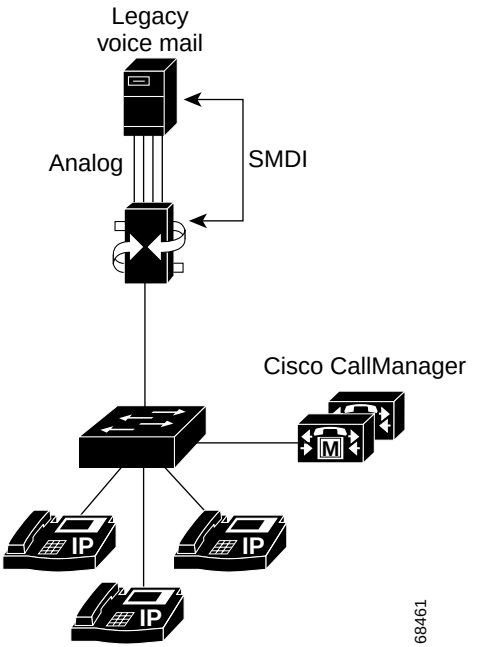
When using the VG248 in this configuration, you have a more flexible failover system than when using a single Cisco CallManager server for SMDI integration. When connecting SMDI directly to Cisco CallManager, if that Cisco CallManager system fails, the SMDI link goes down. The link cannot automatically be switched or transferred to another Cisco CallManager system. However, if you are using the VG248 and the primary Cisco CallManager system fails, the VG248 automatically switches to its backup Cisco CallManager system, and the SMDI link remains.

Configuration Tips

When configuring the VG248 using the basic configuration, refer to these tips. Note, however, that this is not a complete list of the items you must configure; these are tips specific to the basic configuration. Refer to the "Configuring SMDI Settings on the VG248" section on page 5-19 for a description of all SMDI configuration tasks.

- The VG248 should be set to forward MWI commands to Cisco CallManager. See the "Forwarding MWIs to Cisco CallManager" section on page 5-24 for details.
- If the VG248 is set to forward MWI commands to Cisco CallManager, you must set the MWI directory numbers in Cisco CallManager. See the "Identifying the Directory Number for Setting MWI on Cisco CallManager" section on page 5-26 and "Identifying the Directory Number for Clearing MWI on Cisco CallManager" section on page 5-27.

Figure 5-1 Basic Configuration of VG248 SMDI Integration



Chained Configuration

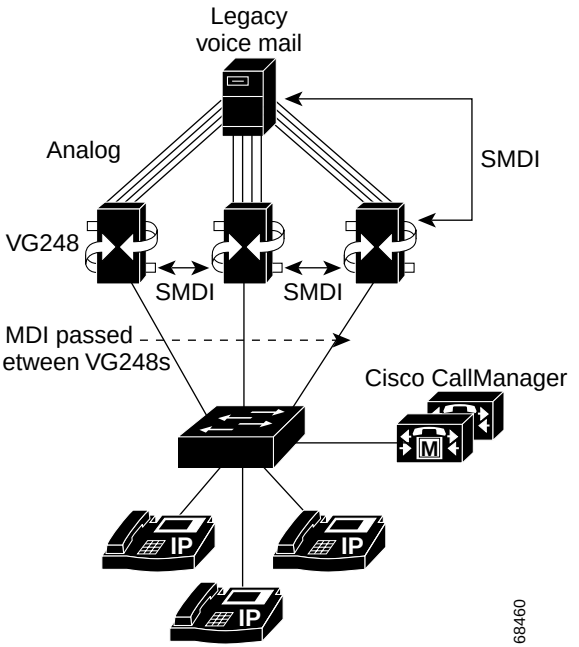
Each VG248 system enables you to use up to 48 ports for voice mail access. If you need more than 48 ports, you can use the chained configuration. The chained configuration (see Figure 5-2) enables you to connect multiple VG248 devices together, expanding the number of voice ports available for your voice mail integration.The SMDI information is shared and passed between the VG248 devices via the Async ports.

Configuration Tips

When using multiple VG248 systems, refer to these tips. Note, however, that this is not a complete list of the items you must configure; these are tips specific to the chained configuration. Refer to the "Configuring SMDI Settings on the VG248" section on page 5-19 for a description of all SMDI configuration tasks.

- All VG248 systems connected together must be connected to a single voice mail system.
- Verify that you identify the first voice mail port correctly on each VG248 device. See the "Identifying the First Voice Mail Port Number" section on page 5-21 for details.
- The first VG248 per CallManager cluster should be set to forward MWI commands to Cisco CallManager. See the "Forwarding MWIs to Cisco CallManager" section on page 5-24 for details.
- You do not need to set the VG248 systems to forward MWI commands along the Async 2 connection unless a second cluster or a legacy voice mail system is attached to the end of the SMDI chain. For example, if you are using the chained configuration in conjunction with the multiplexing configuration. See the "Forwarding MWIs to Async 2" section on page 5-25.
- If a VG248 device is configured to forward MWI commands to Cisco CallManager, you must identify the MWI directory numbers used in Cisco CallManager. See the "Identifying the Directory Number for Setting MWI on Cisco CallManager" section on page 5-26 and "Identifying the Directory Number for Clearing MWI on Cisco CallManager" section on page 5-27.
- All VG248 systems connected together should use the same "Message Desk Number" value. See the "Assigning the Message Desk Number" section on page 5-24 for details.

Figure 5-2 Chained Configuration of VG248 SMDI Integration



Multiplexing Configuration

This method enables you to share a single voice mail system with multiple Cisco CallManager systems or another PBX system. Using the multiplexing configuration, you can integrate SMDI with multiple PBX systems, including:

- Multiple Cisco CallManager clusters (see Figure 5-3)
- Legacy PBX system and Cisco CallManager (see Figure 5-4)

Configuration Tips

When integrating SMDI links from more than one PBX system, refer to these tips. Note, however, that this is not a complete list of the items you must configure; these are tips specific to the multiplexing configuration. Refer to the "Configuring SMDI Settings on the VG248" section on page 5-19 for a description of all SMDI configuration tasks.

- If connecting to a legacy PBX, all VG248 devices should be set to forward MWIs to Async 2. See the "Forwarding MWIs to Async 2" section on page 5-25.
- At least one VG248 per cluster should be set to forward MWI commands to Cisco CallManager. See the "Forwarding MWIs to Cisco CallManager" section on page 5-24.
- If you are not using a legacy PBX, set the VG248 systems to forward MWI commands along the Async 2 connection. You do not need to set this on the VG248 system furthest away on the SMDI chain from the voice mail system. That VG248 device should be configured to forward MWI commands to Cisco CallManager. See the "Forwarding MWIs to Async 2" section on page 5-25.
- If the VG248 is set to forward MWI commands to Cisco CallManager, you must set the MWI directory numbers in Cisco CallManager. See the "Identifying the Directory Number for Setting MWI on Cisco CallManager" section on page 5-26 and "Identifying the Directory Number for Clearing MWI on Cisco CallManager" section on page 5-27.

Figure 5-3 Multiplexing Configuration of VG248 Integration with Multiple Cisco CallManager Clusters

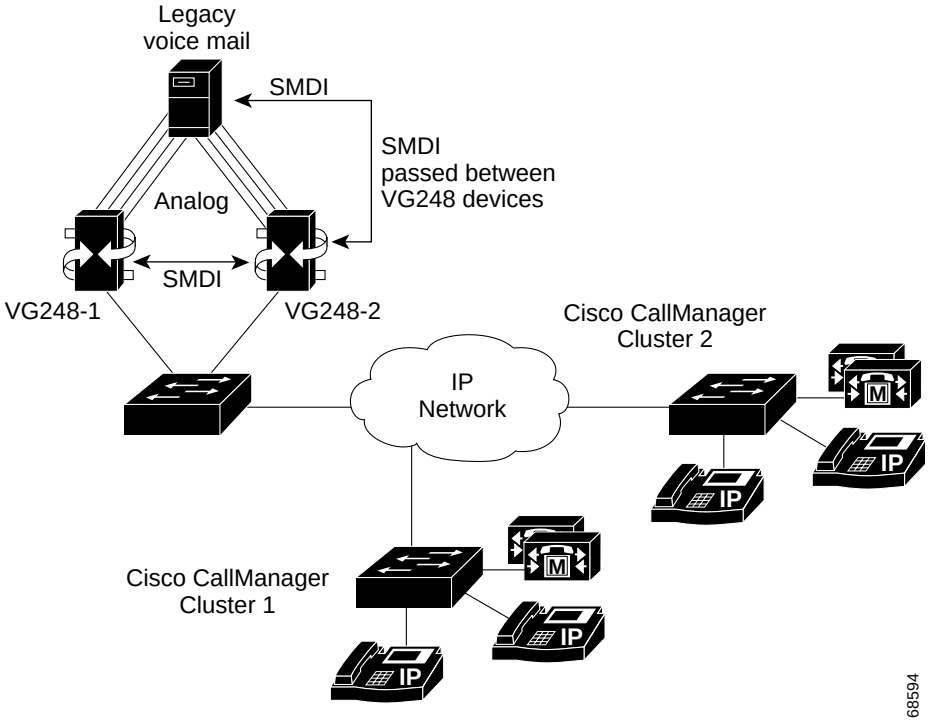
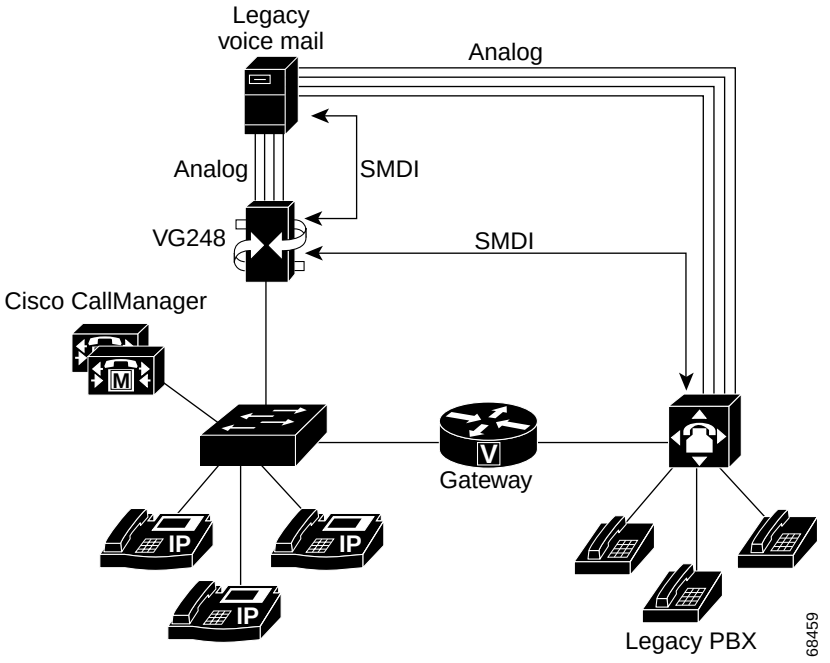


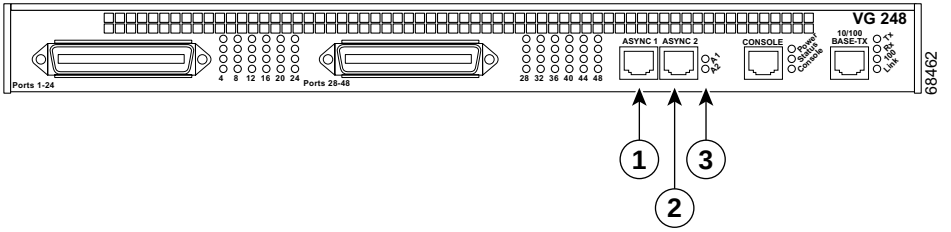
Figure 5-4 Multiplexing Configuration of VG248 Integration with Cisco CallManager and Legacy PBX



Connecting the SMDI Links to the VG248

SMDI is an RS-232-based serial protocol, and the VG248 has two serial ports for supporting SMDI connections, the Async 1 and Async 2 ports (see Figure 5-5).

Figure 5-5 VG248 SMDI Connections



1	Async 1
2	Async 2
3	LEDs

Both serial ports operate at a fixed rate and format of 9600 baud, no parity, 8 data bits, one stop bit, and no flow control. Use a standard RJ-45-to-RJ-45 rollover serial cable (up to 50 feet in length) and an RJ-45-to-DB-9 adapter to connect the VG248 to other SMDI devices using these ports:

- Async 1—the primary serial port used for connecting to the voice mail system (any configuration) or SMDI source (chained or multiplexing configuration). If you are using a single VG248 device, connect the voice mail system's SMDI port to the Async 1 port on the VG248. With multiple VG248 devices, use the Async 1 port to connect to the previous VG248 device's Async 2 port.
- Async 2—used for connecting multiple VG248 devices together. If there are multiple VG248 devices in use, connect the Async 2 port of the first VG248 device (which is connected directly to the voice mail system via the Async 1 port) to the next VG248 device's Async 1 port. Continue to connect all the VG248 devices in the chain similarly. If you are connecting a legacy PBX system to the SMDI chain, connect the Async 2 port of the last chained VG248 device to the SMDI port of the legacy PBX.

Configuring VG248 SMDI Ports in Cisco CallManager

When using the VG248 to integrate SMDI-based voice mail systems with Cisco CallManager, you must make changes to Cisco CallManager to support the VG248 and the end-user phones that will use this voice mail system.

These sections provide details about the necessary changes:

Configuring Voice Mail Parameters in Cisco CallManager

You need to update some of the Cisco CallManager service parameters to support the SMDI-based voice mail system and the VG248.

Step 1 From Cisco CallManager, choose **Service > Service Parameters**.

Step 2 From the Server drop-down list box, choose a server.

Step 3 From the Services list, choose Cisco CallManager.

Step 4 Enter the settings described in Table 5-2.

Step 5 Click **Update**.

Table 5-2 Voice Mail Service Parameter Settings

Field	Description
VoiceMail	Enter the number users use to access their voice mail messages. This number should correspond to the directory number of the first voice mail port (see the "Adding and Configuring Voice Mail Ports in Cisco CallManager" section on page 5-16) and the pilot directory number entered on the VG248 (see the "Identifying the Pilot Directory Number" section on page 5-20). If you are connecting multiple VG248 systems to more than one voice mail system, you have multiple hunt groups. These hunt groups require different voice mail access numbers. For efficiency, enter the directory number of the largest hunt group as the VoiceMail parameter and ensure that the AdvancedCallForwardHopFlag is set to true. **Note** The directory number entered in the VoiceMail parameter should not correspond to the directory numbers assigned to any of the ports attached to a VG248 device.
AdvancedCallForwardHopFlag	Set to true.
VoiceMailMaximumHopCount	Set this value to be at least as high as the total number of SMDI ports in use across all VG248 devices.
MultiTenantMWIMode	Set this flag to True, if you want Cisco CallManager to use translation patterns to convert voice message box numbers into directory numbers when your voice mail system issues a command to set a message waiting indicator.

Adding the MWI Port to Cisco CallManager

When using SMDI, the VG248 requires an extra port registered with Cisco CallManager. The VG248 uses this port when setting or clearing MWIs on phones. On the VG248, this port is defined as port 00 and referred to as the "Device level CallManager connection" on the port status screen (see "Verifying Port Status and Displaying Port Statistics" section on page 5-29 for details).

To add the MWI port to Cisco CallManager, follow these steps.

Step 1 From Cisco CallManager, choose **Devices > Add a New Device.**

Step 2 Choose **Cisco VGC Phone** from the Phone type menu.

Step 3 Click **Next**.

Step 4 Enter a Description for this port in the **Description** field such as *voice mail system* port *x*, where *voice mail system* is the name of your voice mail system and *x* is the port number on the VG248. For example, Generic Voice Mail port 1.

Note This description is particularly useful if you are using the VG248 for analog and SMDI ports. Cisco CallManager does not distinguish between these two types of VGC phone types, and this description can help you quickly see which ports are used for analog devices and which are used for SMDI voice mail

Step 5 Enter the MAC address in the **MAC Address** field.

Each port must have a unique MAC address. Use this formula to calculate the MAC address for each port.

- The first two digits of the MAC address are dropped.
- The number is shifted two places to the left.
- 00 is added to the right.

For example, if the MAC address on the VG248 is 000039A44218, the MAC address registered for this port in Cisco CallManager is 0039A4421800.

Step 6 Select a Calling Search space that enables this MWI port to access all phones on which it might need to set or clear MWI commands.

Step 7 Click **Update**.

Adding and Configuring Voice Mail Ports in Cisco CallManager

Using Cisco CallManager, you must add and configure each of the ports on the VG248 that are SMDI-enabled. To Cisco CallManager, each port is recognized and managed as a phone with the VGC phone type. So, if you have 10 ports on the VG248 that are SMDI-enabled, you need to add these 10 VGC phones (or ports) to Cisco CallManager.

Note If you plan to use the remaining 38 ports on the VG248 for analog devices, refer to the "Configuring the VG248 Analog Ports" section on page 4-3 for instructions.

Cisco CallManager enables you to automatically register the ports from the VG248 or manually add them to the Cisco CallManager database. However, auto-registration works best for analog devices (see the"Adding the VG248 to Cisco CallManager" section on page 4-2) rather than for the SMDI ports because of the additional configuration changes required for voice mail.

To add and configure a VG248 voice mail port to Cisco CallManager, follow these steps.

Cisco CallManager Tasks

Step 1 From Cisco CallManager, choose **Devices > Add a New Device.**

Step 2 Choose **Cisco VGC Phone** from the Phone type menu.

Step 3 Click **Next**.

Step 4 Enter a Description for this port in the **Description** field such as *voice mail system* port *x*, where *voice mail system* is the name of your voice mail system and *x* is the port number on the VG248. For example, Generic Voice Mail port 1.

Note This description is particularly useful if you are using the VG248 for analog and SMDI ports. Cisco CallManager does not distinguish between these two types of VGC phone types, and this description can help you quickly see which ports are used for analog devices and which are used for SMDI voice mail

Step 5 Enter the MAC address in the **MAC address** field.

Each port must have a unique MAC address. Use this formula to calculate the MAC address for each port.

- The first two digits of the MAC address are dropped.
- The number is shifted two places to the left.
- The two-digit port number is added to the right.

For example, if the MAC address on the VG248 is 000039A44218, the MAC address registered for port 12 in Cisco CallManager is 0039A4421812

Step 6 In the Directory Numbers list, click an unassigned line.

Step 7 Enter the settings described in Table 5-3

Table 5-3 Voice Mail Port Configuration Settings

Field	Description
Directory Number	Enter the directory number for this voice mail port. The first port must be assigned the directory number identified as the pilot directory number on the VG248 (see the "Identifying the First Voice Mail Port Number" section on page 5-21) and defined as the VoiceMail number in **Service > Service Parameters** in Cisco CallManager. For ease of managing these ports, assign consecutive directory numbers to the remaining voice mail ports.
Call Waiting	Set this to Off to disable it on each of the voice mail ports.
Forward Busy	Enter the directory number for the next VG248 voice mail port on the SMDI chain. For example, if the directory number for this port is 75001, enter 75002 to forward to the next available port.
Forward No Answer	Enter the directory number for the next VG248 voice mail port on the SMDI chain. For example, if the directory number for this port is 75001, enter 75002 to forward to the next available port.

Step 8 Click **Update**.

VG248 Tasks

Step 1 On the VG248, choose **Configure > SMDI > Number of SMDI ports** to set the number ports used for SMDI.

See the "Assigning Number of SMDI Ports" section on page 5-21 for details.

Step 2 Choose **Configure > Telephony > Port specific parameters**. Ensure that ports from1 to the value set in **Number of SMDI ports** are enabled.

See the "Enabling a Specific Port" section on page 3-9 for details.

Step 3 Choose **Display > Port Status** to verify that these voice mail ports are up-and-running.

See the "Verifying Port Status and Displaying Port Statistics" section on page 5-29 for details.

Configuring End-User Phones

You need to modify some settings on the end-user phones in Cisco CallManager to enable them to access the SMDI-based voice mail system.

Before You Begin

You should modify these settings on any Cisco IP Phones and on any analog phones connected to the VG248 that require access to this voice mail system.

The following steps require that these phones have already been added to the Cisco CallManager database. If you need assistance adding an analog phone or a Cisco IP Phone, see the "Configuring the VG248 Analog Ports" section on page 4-3 and the online help and documentation included with Cisco CallManager.

Step 1 From Cisco CallManager, choose **Device > Phone**.

Step 2 Enter search criteria to locate a specific phone.

Step 3 Click the name of the phone to update.

Step 4 From the Directory Numbers list, click the line that you want to update.

Step 5 Update the settings described in Table 5-4.

Table 5-4 End-User Phone Voice Mail Configuration Settings

Field	Description
Voice Message Box	Enter the voice mailbox that you want to associate with this line. When a call is forwarded to voice mail, Cisco CallManager sends the number that you enter here to your voice-mail application. The voice-mail system then leaves voice-mail messages in the configured mailbox.
Forward Busy	Enter the directory number for the first VG248 voice mail port. This forwards the call to voice mail. This number should match the number entered for the Voicemail parameter in Cisco CallManager (see Table 5-2).
Forward No Answer	Enter the directory number for the first VG248 voice mail port. This forwards the call to voice mail. This number should match the number entered for the Voicemail parameter in Cisco CallManager (see Table 5-2).

Step 6 Click **Update.**

Configuring SMDI Settings on the VG248

To properly prepare the VG248 to support SMDI, you must modify some local configuration settings. Some of these SMDI settings must match settings on the voice mail system or Cisco CallManager. Therefore, you must be familiar with the configuration settings on those systems as well.

These sections provide details about the required configuration options:

- Identifying the Pilot Directory Number, page 5-20
- Assigning Number of SMDI Ports, page 5-21
- Identifying the First Voice Mail Port Number, page 5-21
- Setting SMDI Number Length, page 5-22
- Allowing SMDI Number to be Truncated, page 5-23
- Setting the SMDI Number Format, page 5-23

Identifying the Pilot Directory Number

The pilot directory number corresponds to the number users dial on their phones to access voice mail. The pilot directory number configured on the VG248 must match the **VoiceMail** service parameter configured in Cisco CallManager, which is available by choosing **Service > Service Parameters** in Cisco CallManager. This enables the VG248 to distinguish between calls made to retrieve a user's voice mail from calls made to leave a voice mail for another user.

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **SMDI**.

Step 3 Choose **Pilot directory number**.

Step 4 Enter the number, which corresponds to the **VoiceMail** in Cisco CallManager.

Assigning Number of SMDI Ports

By default, none of the ports on the VG248 are configured to send SMDI information about calls made to those ports. To enable SMDI, you must assign the number of SMDI ports a value from 1 to 48. Using fewer than 48 ports for SMDI means that the remaining ports can be used for connecting analog phones, modems, or fax machines.

If you use fewer than 48 ports for SMDI, you must ensure that the SMDI ports are consecutive ports beginning with port 1. For example, if this value is set to “10”, VG248 ports 1 through 10 should be connected to the voice mail system and ports 11 to 48 are available for analog devices.

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **SMDI**.

Step 3 Choose **Number of SMDI ports**.

Step 4 Enter the number of SMDI ports.

The default setting is 0.

Identifying the First Voice Mail Port Number

With a single VG248 connected to a voice mail system (such as in the basic configuration), port 1 on the VG248 should be connected to port 1 of the voice mail system, and similarly for the other VG248 ports.

However, with multiple VG248 devices connected to a single voice mail system (such as in the chained configuration) this simple mapping is possible only on the first VG248. On the other VG248 devices, port 1 must connect to higher voice mail port numbers.

Using this setting, you can identify the first port used on the voice mail system. This value should correspond to the port number on the voice mail system to which port 1 is connected. In all cases, connections from a single VG248 must use consecutive, successive ports of the voice mail system.

For example, if two VG248 devices are connected to a 96 port voice mail system, one VG248 connects to ports 1-48, and the other connects to ports 49-96. On the first VG248 device, set the **First voice mail port number** to 1 (the default value) and set the value to 49 on the second VG248.

As another example, if 80 voice mail ports were in use and two VG248 devices were each providing 40 ports, the **Number of SMDI ports** on each VG248 would be set to 40, and the **First voice port number** would be set to 1 on the first VG248 and 41 on the second VG248.

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **SMDI**.

Step 3 Choose **First voice mail port number**.

Step 4 Enter the voice mail pot index which corresponds to port 1 of the VG248.

Setting SMDI Number Length

Traditional SMDI includes caller and called party information as 7-digit numbers. If the number is shorter than 7 digits, extra digits (typically zeros) are added to the left. For example, the extension number “12345” becomes “0012345” when sent via SMDI. However, because 7 digits are not enough for external caller ID, an extended SMDI format is available that uses 10-digit numbers.

Most voice mail systems are flexible, supporting either SMDI format. However, some older systems insist on receiving exactly seven digits. Check the voice mail system’s documentation to determine which setting is most appropriate.

You can set the VG248 to output using either 7- or 10-digit numbers. It should match the value required by your voice mail system. You can also set the number length to <unpadded>, which indicates that the voice mail box numbers are always passed unmodified between Cisco CallManager and the analog voice mail system.

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **SMDI**.

Step 3 Choose **SMDI number length**.

Step 4 Choose one of the following:

- **7**
- **10**
- **<unpadded>**

Allowing SMDI Number to be Truncated

If SMDI extension numbers are longer than the traditional 7 or 10 digits, the VG248 can either pass on the entire number or truncate the extension number to the length you defined in the **SMDI number length**. If you have set the **SMDI number length** to unpadded, this setting has no effect.

Most voice mail systems can accept longer numbers, but some systems insist on exactly 7 or 10 digits. Check which format your system supports before selecting this option. If the SMDI number length is set to <unpadded>, this setting has no effect.

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **SMDI**.

Step 3 Choose **Truncate SMDI number if too long**.

Step 4 Choose one of the following:

- **yes**—to restrict the number length to 7 or 10 digits
- **no**—to pass on the entire number

Setting the SMDI Number Format

When the **SMDI number length** is configured to 7 or 10 digits, the VG248 adds digits to any SMDI extension numbers that are shorter. Normally, it does so by adding zeroes to the left of the number, so that, for example, “1234” becomes “0001234” in the 7 digit case.

However, the **SMDI number format** allows other digits to be used. For example, with a **SMDI number format** of 1234567, the extension number 8989 would become 1238989. Zeroes are used for any additional required digits. So, if **SMDI number length** was 10, the final extension number would be 0001238989. If the SMDI number length is set to <unpadded>, this setting has no effect.

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **SMDI**.

Step 3 Choose **SMDI number format**.

Step 4 Enter the required number format.

Assigning the Message Desk Number

Typically, a voice mail system is be configured with a single Message Desk Number (normally 1), and incoming SMDI messages are required to use this value for proper operation. You need to set the message desk number on the VG248 to match the value used by the voice mail system.

Before You Begin

If you are using the chained configuration all devices in the SMDI chain should use the same message desk number.

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **SMDI**.

Step 3 Choose **Message desk number**.

Step 4 Enter the message desk value used by your voice mail system.

Forwarding MWIs to Cisco CallManager

You can specify whether the VG248 sends MWI commands it receives from the voice mail system to Cisco CallManager.

Before You Begin

Follow these guidelines for enabling this setting based on your configuration:

- Basic—Enable this on the VG248 system.
- Chained—Enable this on only one of the VG248s in a chain, and for simplicity, set it on the one directly connected to the voice mail system.
- Multiplexing—Enable this on one VG248 connected to each Cisco CallManager cluster.

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **SMDI**.

Step 3 Choose **Forward MWIs to CallManager**.

Step 4 Choose one of the following:

- **yes**
- **no**

Forwarding MWIs to Async 2

You can specify whether the VG248 forwards SMDI MWI commands received from the voice mail system to the next device in the SMDI chain.

Before You Begin

Follow these guidelines for enabling this setting based on your configuration:

- Chained—Enable this setting on all VG248 devices except the last device in the chain on which you have set **Forward MWIs to CallManager** to **yes**.
- Multiplexed—Enable this setting on all VG248 devices if you are connecting to a legacy PBX system. Otherwise, follow the guidelines for the chained configuration.

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **SMDI**.

Step 3 Choose **Forward MWIs to Async 2**.

Step 4 Choose one of the following:

- **yes**
- **no**

Forwarding INV Responses to Async 1

Some PBX systems generate an INV response to MWI commands from the voice mail system if an error occurs.

The VG248 cannot distinguish which extension numbers are connected to the legacy PBX and which are connected to Cisco CallManager. Therefore, MWI commands are sent to both systems. If the VG248 is connected to a legacy PBX and Cisco CallManager (such as in the multiplexing configuration), the PBX is likely to generate these error responses to commands it receives from the VG248.

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **SMDI**.

Step 3 Choose **Forward INV responses to Async 1**.

Step 4 Choose one of the following:

- **yes**—errors generated by the PBX are sent to the voice mail system.
- **no**—default setting

Identifying the Directory Number for Setting MWI on Cisco CallManager

If you have enabled the VG248 to forward MWI commands from the voice mail system to Cisco CallManager, you must identify the directory number used to set MWI commands. The value should match the value entered in the Cisco CallManager **MessageWaitingOnDN** parameter, which is available by choosing **Service** > **Service Parameters** in Cisco CallManager.

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **SMDI**.

Step 3 Choose **CallManager MWI on DN**.

Step 4 Enter the value that matches the **MessageWaitingOnDN** parameter in Cisco CallManager.

Identifying the Directory Number for Clearing MWI on Cisco CallManager

If you have enabled the VG248 to forward MWI commands from the voice mail system to Cisco CallManager, you must identify the directory number used to clear MWI commands. The value should match the value entered in the Cisco CallManager **MessageWaitingOffDN** parameter, which is available by choosing **Service > Service Parameters** in Cisco CallManager.

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **SMDI**.

Step 3 Choose **CallManager MWI off DN**.

Step 4 Enter the value that matches the **MessageWaitingOffDN** parameter in Cisco CallManager.

Entering a Keep Alive Number

Some voice mail systems use a **Keep alive SMDI number** to determine whether or not the SMDI connection is active. The voice mail system sends out a test MWI operation for this voice mail box number and expects to receive a negative response from the attached VG248.

You must configure the VG248 with this keep alive number so it distinguishes the MWI commands on this number from those on a real extension number.

By default, this value is set to 5551212, which is a number commonly used by analog voice mail systems.

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **SMDI**.

Step 3 Choose **Keep alive SMDI number**.

Step 4 Enter the extension number.

Configuring Disconnect Notification

When a remote party hangs up, the voice mail system should detect this so it can hang up also, freeing the port for use by another caller. If this parameter is set to **yes**, the VG248 sends an additional SMDI message to the voice mail system when a call into it has finished. This message is not part of the SMDI standard. By default, this option is set to **no**.

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **SMDI**.

Step 3 Choose **Disconnect notification**.

Step 4 Choose one of the following:

- **yes**
- **no**

Verifying and Troubleshooting the SMDI Connection

These sections provide methods for verifying the SMDI connections on the VG248, which can provide you with useful information to aid in troubleshooting any problems:

- Checking Link Status, page 5-29

Checking Link Status

You can quickly obtain status about the Async 1 and Async 2 connections to determine whether the links are active and up-and-running.

Step 1 From the main screen, choose **Display**.

Step 2 Choose **System status**.

The following information displays:

- Async 1—**active** or **inactive**
- Async 2—**active** or **inactive**

Verifying Port Status and Displaying Port Statistics

Using the port status, you can obtain detailed statistics about the SMDI links and the traffic passing through them.

Step 1 From the main screen, choose **Display**.

Step 2 Choose **Port status**.

Step 3 Use the arrow keys to select the Device level CallManager connection.

Step 4 Press Enter.

See “Displaying Detailed Port Status” section on page 6-19 for description of this information.

Step 5 To display detailed statistics for the SMDI traffic, press the space bar.

These MWI statistics display for Cisco CallManager and Async 2:

- Completed
- Failed
- Retries
- Queued
- Discarded

These INV responses statistics display:

- Received
- Forwarded
- Discarded

These SMDI packet statistics display:

- Async 1—Received, Transmitted, and Discarded
- Async 2—Received, Transmitted, and discarded

Step 6 To reset these statistics, press the Tab key.

Validating the SMDI Configuration on the VG248 Devices

You can evaluate the status of the SMDI configuration and diagnose misconfigurations on the VG248 and other VG248 devices chained together. However, this diagnosis cannot detect problems in the configuration of Cisco CallManager, legacy PBX, or individual extension's voice mail box numbers.

This diagnosis can identify configuration inconsistencies, such as breaks in the MWI forwarding chain, incorrect wiring of Async 1 and Async 2 ports, and missing configuration items such as the Cisco CallManager MWI directory number strings.

Before You Begin

The diagnostic process requires messages to be sent over the serial links to both the analog voice mail system and any attached legacy PBX. Performing this diagnosis might temporarily interfere with the voice mail system's normal operation.

Step 1 From the main menu, choose **Diagnostics**.

Step 2 Choose **Validate SMDI configuration**.

A window displays with the results of the diagnosis, indicating any errors or warnings.

Suspending SMDI Port Activity

If you are using the chained configuration and want to temporarily remove one of the VG248 devices or upgrade software on it, you should suspend activity on the SMDI ports before shutting down or restarting the VG248.

By suspending activity, the VG248 waits for the port to become idle, then it temporarily removes the port from Cisco CallManager and suspends the port, preventing any activity on it. Once all the ports have been suspended, traffic from Aysnc 1 is also suspended on the device. SMDI traffic from Async 2 from the previous VG248 device in the chain queues up while this device is suspended. Suspending the device does not affect whether ports are enabled or not; if they were enabled before being suspended, they are enabled after being resumed.

Before You Begin

If after following this procedure, the device is not suspended immediately, it is likely that some of the ports still have active calls or there are pending MWI commands on the Cisco CallManager system. You can check individual ports by pressing Escape to exit the "Suspending..." message and choosing **Display > Port Status** from the main menu.

Step 1 From the main menu, choose **Configure**.

Step 2 Choose **Suspend**.

A message appears indicating that the device is being suspended.

Step 3 Shut down, restart, or upgrade software on the VG248, as needed. See "Upgrading Software Images" section on page 6-13 for details.

Step 4 If you are removing a VG248 device from the SMDI chain, you might need to change the SMDI cabling also.

Step 5 To resume activity, choose **Configure > Resume**.

Troubleshooting SMDI Errors and Warnings

Table 5-5 describes SMDI errors and warnings that might appear on the VG248 either on-screen or in the event log (see the "Working with the Event Log" section on page 6-22 for details on accessing the event log) which are caused by SMDI. Use this information to resolve these errors.

Table 5-5 SMDI Errors and Warnings Explanation

System	Message	Explanation	Action
SCCP	CallManager MWI on directory number not defined	These errors are generated when the VG248 attempts to perform a MWI operation on a phone connected to Cisco CallManager, but the required Cisco CallManager directory number has not been configured.	You must enter the MWI set and clear directory numbers for Cisco CallManager. See the "Identifying the Directory Number for Setting MWI on Cisco CallManager" section on page 5-26 and "Identifying the Directory Number for Clearing MWI on Cisco CallManager" section on page 5-27.
SCCP	CallManager MWI off directory number not defined		
SCCP	MWI on attempt failed-directory number may be incorrect	These messages are generated when the VG248 has attempted to set or clear a Message Waiting Indicator for a particular extension but has failed to do so.	Verify that you have entered the correct MWI set and clear directory numbers for Cisco CallManager. See the "Identifying the Directory Number for Setting MWI on Cisco CallManager" section on page 5-26 and "Identifying the Directory Number for Clearing MWI on Cisco CallManager" section on page 5-27.
SCCP	MWI off attempt failed-directory number may be incorrect		

Table 5-5 SMDI Errors and Warnings Explanation (continued)

System	Message	Explanation	Action
SMDI	Required Async 1 link has gone down	Certain SMDI configuration items require the use of one or both Async ports. For example, if the **Number of SMDI ports** is greater than 0, Async 1 must be active. If **Forward MWIs to Async 2** is enabled, Async 2 should be up.	If a required Async port either fails to come up when the box starts up or goes down at some point during its operation, the VG248 generates these messages. Check the cables on the Async 1 and Async 2 ports to verify that they are still connected.
SMDI	Required Async 1 link has not come up		
SMDI	Required Async 2 link has gone down		
SMDI	Required Async 2 link has not come up		
SMDI	Async 1 now active	These messages indicate that the VG248 has detected that it is now connected to another system via the indicated Async port, or the connection has gone down.	These messages are informational only.
SMDI	Async 2 now active		
SMDI	Async 1 now inactive		
SMDI	Async 2 now inactive		

CHAPTER 6

Troubleshooting the VG248

The VG248 includes several built-in troubleshooting and diagnostic features. Use these sections for details about troubleshooting:

Troubleshooting Hardware Errors

The VG248 can identify some potential hardware problems with the fans, power supplies, the operating temperature, and other hardware systems.

These sections provide information about how the VG248 identifies these potential problems and how to resolve them:

- Connecting Too Many Phones to the VG248, page 6-4
- Resolving Additional Hardware Errors, page 6-4

Displaying Hardware Status

If potential hardware failures are detected, warning messages appear on the main interface window. However, you can also proactively monitor the current operating environment on the VG248. To do this, follow these steps:

Step 1 From the main screen, choose **Diagnostics**.

Step 2 Choose **Show environment**.

The following information about the VG248 displays:

- Internal temperature
- 1.8 volts supply
- 3.3 volts supply
- 5.0 volts supply
- 12.0 volts supply
- 48.0 volts supply
- 96.0 volts supply
- Chassis fan state

The voltages and temperatures are indicated with the actual values and “okay”, “too high”, or “too low” annotating the values. The fan status is identified as “okay” or “faulty”.

Identifying Fan Faults

If a fan fault is reported, it indicates that one (or more) of the fans is not functioning. You should verify that nothing is lodged in the holes in the rear of the device, but do not make any attempt to open the device or move the fans. You should contact a technical support representative from Cisco Systems for assistance.

Identifying Power Supply Faults

The internal DC supply voltages are measured continuously (+1.8v, +3.3v, +5.0v, +12.0v, -48v, -96v).

The 1.8v and 3.3v voltages must be within +/- 6% of nominal, and the others must be within +/- 10%. If any of these values are outside this range, then the VG248 reports a power supply fault.

If the phone power supplies (-48v and -96v) fail, it might indicate that the VG248 is overloaded. Verify that you have not exceeded the maximum ringer equivalency number (REN) load for each line. You should only have a maximum of three (3) phones per line.

If one of the other power supplies fails, you should contact a Cisco technical representative for assistance.

Monitoring Internal Operating Temperature

The VG248 monitors its internal temperature to ensure that it is operating within the specified limits (the ambient operating environment should be 0° to 40° C or 32° to 104° F). If the VG248 identifies internal temperatures too low or too high, it generates warning messages. Continuing to operate at ranges exceeding these limits (either too low or too high) can damage the VG248.

If the operating temperature of the VG248 is too low, there is a risk of condensation forming inside the device. You should move the device to a warmer location to prevent this.

If the operating temperature of the VG248 is too high, you should move the device to a cooler location with improved ventilation. The internal fans on the VG248 maintain the internal temperature consistent with the ambient environment. Therefore, if the device is in a location that is too warm, its internal temperature is more likely to exceed the limits. There are two levels of high temperature alert:

- yellow alert—generates and logs an error, but enables the device to continue functioning
- red alert—causes all the phones to be immediately shut down, causing calls to drop and preventing calls from being made. You must manually restart the VG248 either by selecting **Configure** > **Restar**t or by disconnecting power to the device.

Connecting Too Many Phones to the VG248

The VG248 has a maximum ringer equivalency number (REN) load of three (3) analog devices per line (using a shared directory number), and only two of these devices can be off-hook at any one time. If these requirements are ignored, you might experience reduced quality on these analog phones, including:

- Difficulty hearing caller—Users have too many phones off-hook. Do not have more than two phones per line off-hook simultaneously.
- Dialing or caller ID are not working properly—Users have too many phones off-hook. Do not have more than two phones per line off-hook simultaneously.
- Phones not ringing properly or at all—REN load has been exceeded. Do not connect more than three analog devices per line.
- Phone power supplies (-48v and -96v) fail—REN load has been exceeded. Do not connect more than three analog devices per line. See the "Identifying Power Supply Faults" section on page 6-3 for additional information.

Resolving Additional Hardware Errors

Table 6-1 describes errors and warnings that might appear on the VG248 either on-screen or in the event log (see the "Working with the Event Log" section on page 6-22 for details on accessing the event log) which are caused by a hardware fault. Use this information to resolve these errors.

Table 6-1 Hardware Errors and Warnings Explanation

System	Error	Explanation	Action
DSP	DSP X on SIM Y has failed	One of the Digital Signal Processor (DSP) chips inside the VG248 has failed.	Contact a Cisco technical representative for assistance.
DSP	DSP X, SIM Y failed to boot		
OS	Ethernet has gone down	Ethernet has gone down at the physical level.	Verify that the Ethernet cable is properly connected to the VG248 and that the hub or switch to which it is connected is up and running properly.

Table 6-1 Hardware Errors and Warnings Explanation (continued)

System	Error	Explanation	Action
SCCP	Failed to update real-time clock	The on-board real-time clock in the VG248 has failed to set the time from Cisco CallManager.	Contact a Cisco technical representative for assistance.
SLIC	EDSP failure warning received	A transient fault has been detected in the SLICs (the hardware that drives the analog telephony interfaces).	If these messages persist, contact a Cisco technical representative for assistance.
SLIC	over-temperature warning received		

Troubleshooting Software Errors

The VG248 displays informational messages and errors on-screen or in the event log (see the "Working with the Event Log" section on page 6-22 for details on accessing the event log), which indicate potential software problems, such as misconfiguration, time-outs, unreachable servers, and so on.

The following sections provide details about resolving these errors:

- Resolving Network and System Errors, page 6-5
- Resolving Analog Errors, page 6-10
- Resolving Cisco CallManager Errors, page 6-11

Resolving Network and System Errors

Table 6-2 describes errors and warnings that might appear on the VG248 either on-screen or in the event log (see the "Working with the Event Log" section on page 6-22 for details on accessing the event log), which are caused by a misconfiguration or miscommunication with the network or system settings. Use this information to resolve these errors.

Table 6-2 Network and System Errors and Warnings Explanation

System	Error	Explanation	Action
DHCP	IP address refused	The DHCP server rejected the VG248's request for an IP address.	Check configuration of DHCP server. If errors persist, assign a static IP address. Refer to the "Configuring Network Settings" section on page 2-4 for details on assigning a static IP address.
DHCP	IP address cannot be allocated	No DHCP server responded to the request.	Check configuration of DHCP server. If errors persist, assign a static IP address. Refer to the "Configuring Network Settings" section on page 2-4 for details on assigning a static IP address.
DHCP	Static IP address conflict with device <address>	The VG248 has a static IP address that is already assigned to another device on the network.	Assign a different static IP address for either the VG248 or the conflicting device. Refer to the "Configuring Network Settings" section on page 2-4 for details on assigning a static IP address.
DHCP	IP address conflict with device <address>	The DHCP server allocated an IP address to the VG248 that is already in use by another device on the network.	1. Check your DHCP server configuration to ensure that addresses allocated are not reserved for static IP use. 2. Check your network for misconfigured devices.
DHCP	Network interface will be shut down	A previous error caused the network interface to be shut down.	Check the event log for errors.

Table 6-2 Network and System Errors and Warnings Explanation (continued)

System	Error	Explanation	Action
DHCP	Invalid TFTP information received from DHCP server	Although the VG248 received TFTP information from the DHCP server, it was not valid. The VG248 might not have enough information to retrieve telephony port configuration or register with Cisco CallManager.	Check configuration of DHCP server. If errors persist, assign a static IP address and manually enter settings for the TFTP server. Refer to the "Configuring Network Settings" section on page 2-4 for details on assigning a static IP address.
DNS	No response from primary server	The DNS server failed to respond to one or more requests from the VG248.	1. If the VG248 has a static IP address, verify the DNS server has been configured. Refer to the "Setting the DNS Server" section on page 2-9 for details. 2. Verify that the DNS server is working properly.
DNS	Server address not configured	A DNS query has been attempted, but no DNS server has been configured.	1. If the VG248 has a static IP address, verify the DNS server has been configured. Refer to the "Setting the DNS Server" section on page 2-9 for details. 2. If you are using DHCP, the DHCP server has not provided a DNS server. Check the DHCP server configuration.
FTP	Invalid password entered	An attempt was made to connect to the VG248 via FTP with the wrong password.	Verify that you have entered the password for the highest level of security currently set. When using FTP, if you have both a login and an enable password set, you must use the enable password. Refer to the "Configuring Passwords" section on page 2-11 for details.

Table 6-2 Network and System Errors and Warnings Explanation (continued)

System	Error	Explanation	Action
DSP	DTMF tone transmit buffer overflow	There is a finite number of DTMF tones that can be queued up to be played through the VG248's analog ports. Each of these tones takes about 200 milliseconds to be played, and the instructions to play these tones might arrive much faster via the Ethernet interface. Thus, the VG248 might not be able to store all the tones that need to be played.	No action is required. If this situation occurs, the warning appears indicating that some tones have been discarded.
DSP	DTMF tone transmit buffer reactivated	The overflow condition has ceased and DTMF tones are being sent to the attached analog device.	No action is required. This message is informational only.
FTP	Required password absent	An attempt was made to connect to the VG248 via FTP without a password when one was required.	When using FTP, if you have both a login and an enable password set, you must use the enable password. Refer to the "Configuring Passwords" section on page 2-11 for details.

Table 6-2 Network and System Errors and Warnings Explanation (continued)

System	Error	Explanation	Action
FTP	Partial download aborted	An attempt to download a file onto the VG248 was interrupted before the entire file was transferred. The resulting partial file has been deleted from the filing system on the VG248.	Reattempt the file transfer.
OS	Ethernet failed to start	The Ethernet cable is not properly connected to the VG248 or to the hub or switch.	Check the Ethernet cable and reconnect it to the VG248 and the hub or switch. If error persists, replace cable.
OS	Incorrect password entered	A user attempted to use a telnet, console, or FTP connection to the VG248 but entered an incorrect password.	Check the passwords and verify that you are using the correct one. Change the password if you suspect an unauthorized login attempt. Refer to the "Configuring Passwords" section on page 2-11 for details.
SNMP	Attempt to use Get with invalid community name "<name>"	The VG248 received an SNMP request with an invalid read-only community name (password).	Check the community string setting on the VG248 and ensure that your network management system has the correct password. Refer to the "Configuring SNMP Settings" section on page 2-12 for details.
SNMP	Attempt to use Set with invalid community name "<name>"	The VG248 received an SNMP request with an invalid read-write community name (password).	Check the community string setting on the VG248 and ensure that your network management system has the correct password. Refer to the "Configuring SNMP Settings" section on page 2-12 for details.
SNMP	Received invalid packet	The SNMP server received an invalid SNMP request.	Verify that your network management system is set up properly.

Table 6-2 Network and System Errors and Warnings Explanation (continued)

System	Error	Explanation	Action
TFTP	Timeout	The VG248 is unable to retrieve a file using TFTP.	These errors might occur if the network is busy. The errors should resolve themselves when the network load reduces.
TFTP	TFTP: Rx error		

Resolving Analog Errors

Table 6-3 describes errors and warnings that might appear on the VG248 either on-screen or in the event log (see the "Working with the Event Log" section on page 6-22 for details on accessing the event log), which are caused by a misconfiguration or miscommunication with the analog phones or features. Use this information to resolve these errors.

Table 6-3 Analog Errors and Warnings Explanation

System	Error	Explanation	Action
POTS	Feature codes: X same as Y	You have configured the telephone feature codes such that the code for one operation (such as speed dial) is the same as for another (such as call forward).	Users will not be able to use one of these operations. You must set unique feature codes for each operation. To prohibit users from performing an operation, leave the feature code setting empty. See the "Assigning Feature Codes" section on page 3-4..
POTS	Feature codes: X precludes Y	You have configured the telephone feature codes such that the code for one operation masks that for a second operation. For example, if the feature code for speed dial 1 is *** and the code for speed dial 2 is ****, you could never use speed dial 2. Instead, as soon you dial the third *, speed dial 1 activates.	Do not assign features codes that might mask other operations. See the "Assigning Feature Codes" section on page 3-4 for details.

Resolving Cisco CallManager Errors

Table 6-4 describes errors and warnings that might appear on the VG248 either on-screen or in the event log (see the "Working with the Event Log" section on page 6-22 for details on accessing the event log), which are caused by a misconfiguration or miscommunication with the Cisco CallManager system. Use this information to resolve these errors.

Table 6-4 Cisco CallManager Errors and Warnings Explanation

System	Error	Explanation	Action
SCCP	`Registration failed: X`	This message, associated with a particular port (1 – 48), indicates that the port had difficulty registering itself with Cisco CallManager.	If a port is not properly registered, then you cannot make phone calls using it. The reason that registration with Cisco CallManager failed is indicated in the message. If the port cannot successfully register, verify that the port is properly configured in Cisco CallManager. See "Configuring the VG248 Analog Ports" section on page 4-3 for details.
SCCP	`Registration failures; last reason X`		
SCCP	`Attempt to use; currently disabled`	A user has attempted to use a telephone handset attached to a VG248 port, which is currently disabled.	To allow the user to make and receive calls, you must enable the port so it can register with Cisco CallManager. See "Setting the Port Enable Policy" section on page 3-7 for details.

Table 6-4 Cisco CallManager Errors and Warnings Explanation (continued)

System	Error	Explanation	Action
SCCP	TFTP failed; using last known good configuration	A port on the VG248 has failed to retrieve its configuration using TFTP. Instead, the VG248 is using the configuration stored last time the port successfully registered with Cisco CallManager.	No action is required. However, this message might indicate a potential problem with connectivity to the TFTP server. Verify that the TFTP server is up and running.
SCCP	No TFTP server address	The TFTP server has not been set.	1. If using DHCP to obtain TFTP server, check your DHCP server configuration. 2. If you want to use a fixed TFTP server, you must configure it on the VG248 Refer to the "Identifying the Cisco CallManager TFTP Server" section on page 3-2 to assign a TFTP server for details.
SCCP	Unable to resolve TFTP server name	The VG248 was not able to locate the TFTP server.	Verify the name of the TFTP server the VG248 is attempting to locate using **Display > System Status**. • If using DHCP, check the configuration on the DHCP server to verify that it is returning a valid TFTP server name to the VG248. • If you are using a fixed TFTP server, verify the configured server name using **Configure -> Telephony > CallManager TFTP server**.

Upgrading Software Images

The VG248 has two software images: a main software image and a boot loader. If necessary, you can upgrade these software images.

Upgrading the Main Image

The main software image might need to be updated if a new release is available on CCO as a bug update or feature enhancement.

Caution When you send a new software image to the VG248 using FTP, the current image is automatically deleted. If the FTP transfer terminates before the new file is copied to the VG248, the VG248 might not be able to start up. See the "Resolving an Incomplete Upgrade" section on page 6-15 to resolve this problem.

To upgrade the main software image, perform these steps:

Step 1 Obtain a configuration file whose name is in the following format: `vgc-main.<version>.tar`, where <*version*> indicates the release number, such as 1-0-1.

Step 2 Connect to the VG248 using FTP.

Step 3 Send the configuration file to the VG248 using FTP.

Step 4 Restart the VG248 for the new image to take effect.

Step 5 From the main menu on the VG248, choose **Display**.

Step 6 Choose **Version** to verify the updated version has been installed.

Upgrading the Boot Loader

The boot loader is the initial startup image. You should not upgrade this image unless instructed to do so by a Cisco technical representative.

Caution Only upgrade the boot loader if you are instructed to do so by a Cisco technical representative. If you encounter difficulties during this upgrade, such as a loss of power, the VG248 might not be able to start up.

To upgrade the boot loader image, perform these steps:

Step 1 Obtain a configuration file whose name is in the following format: `vgc-load.<version>.bin`, where <*version*> indicates the release number, such as 1-0-1.

Step 2 Connect to the VG248 using FTP.

Step 3 Send the configuration file to the VG248 using FTP.

You must use a destination name that begins with "boot:". For example:

```
put vgc-load.<version>.bin boot:loader
```

Caution If the VG248 loses power or experiences a failure at this step, the VG248 might not start up. If this occurs, contact a Cisco technical representative for assistance.

Step 4 After the FTP command has completed successfully, restart the VG248 for the changes to take effect.

Step 5 Once the VG248 has restarted, choose **Display > Version** to verify that the updated version has been installed.

Resolving an Incomplete Upgrade

If you initiated an upgrade to the main software image, but terminated it before the FTP transfer of the new image completed, the VG248 might not start up properly.

If this occurred, the next time the VG248 starts up, one of the following occurs:

- The boot loader loads, but the VG248 waits indefinitely at the `Pausing for FTP` prompt.
- The VG248 partially loads the main image, pauses, and then restarts.

To resolve either of these errors (while connected to the VG248 boot loader), use the console port to establish an FTP session and transfer the main image file again, following the steps in the "Upgrading the Main Image" section on page 6-13.

Verifying Network Connectivity

To verify that the VG248 is connected to and communicating with your network, you can attempt to ping another device on the network. Follow these steps to ping another device from the VG248:

Step 1 From the main screen, choose **Diagnostics**.

Step 2 Choose **Ping network host**.

Step 3 Enter the IP address or host name of the device.

The VG248 makes an attempt to reach the device once every second.

Step 4 Press Esc to exit.

Displaying Status and Configuration Settings

Use these sections to obtain information about the current status and settings of the VG248 and its connections:

Displaying System Status

The system status provides an overview of the current network settings on the VG248. Use this procedure to quickly check your network settings and connectivity information.

To display system status, perform these steps:

Step 1 From the main screen, choose **Display**.

Step 2 Choose **System status**.

The system status displays:

- Up time
- Real time clock
- Serial number
- Ethernet MAC address
- IP address
- Subnet mask
- Default router
- DNS server

- TFTP server
- Syslog server
- Domain
- Ethernet speed and duplex
- Async 1
- Async 2

Displaying Network Statistics

Use the network statistics to observe the network traffic and packet errors through the IP connection on the VG248.

To display network statistics, perform these steps:

Step 1 From the main screen, choose **Display**.

Step 2 Choose **Network statistics**.

These statistics display:

- Octets
- Unicast packets
- Nonunicast packets
- Discarded packets

Tips Press the **Tab** key to reset the network statistics while viewing.

Displaying Port Status

The port status provides detailed information about each port on the VG248. This is useful when determining the current state of and activity on a particular port.

To display port status, perform these steps:

Step 1 From the main screen, choose **Display**.

Step 2 Choose **Port status**.

The Port status indicates information about the status of the handset of the analog device connected to the port and about the link to Cisco CallManager.

Step 3 Use the information in Table 6-5 to interpret the port status.

Table 6-5 Port Status

Status	Description
Handset Status	
OnHook	Not currently in use.
OffHook	User has lifted the handset.
Ringing	Incoming call to this port.
OnCall	A call has been established and voice packets are moving across the network.
Cisco CallManager Link Status	
Down	Link is not up (either because the port is not enabled or because of a temporary failure).
Register	Port is registering with Cisco CallManager
<directory number>	Directory number for the port displays indicating that the port is up and available for use.
Unregister	Unregistering from Cisco CallManager. Displays if port is being disabled or reset.
PeerInUse	The port's directory number is in use by another phone that shares the directory number. The port is not available for use while a call is active on the other phone.
KeepCall	The Cisco CallManager link has gone down, but the call that was in progress is being maintained.

Displaying Detailed Port Status

Step 1 From the main screen, choose **Display**.

Step 2 Choose **Port status**.

Step 3 Use the arrow keys to select one of the ports and press Enter.

Step 4 Use the information in Table 6-6 to interpret the port status.

Table 6-6 Cisco CallManager Port Status

Type	Description
CallManager link	Status of the connection to Cisco CallManager
TFTP server	Host name or IP address of the TFTP server
Device name	Device name of the port as it appears in Cisco CallManager
Directory number	Extension number assigned to the analog device connected to this port
Forwarded to	Directory number to which calls are being forwarded
Call state	Status of the port from a user's viewpoint.
Remote party	Directory name and number of caller
Remote address	IP address and port of caller
Codec in use	Codec being used by Cisco CallManager: • G.729A • G.711 mu-law • G.711 a-law.
MWI	Whether the message waiting indicator for this port is on or off
CallManager name	DNS name of the Cisco CallManager host
CallManager IP address	IP address of Cisco CallManager

Table 6-6 Cisco CallManager Port Status (continued)

Type	Description
CallManager state	Status of connection to Cisco CallManager: • Active—connected to this Cisco CallManager and using this connection for SCCP communication. • Connecting—in the process of connecting to this Cisco CallManager • Idle—this Cisco CallManager is not being used • Standby—connected to this Cisco CallManager but not currently using the connection. Can use connection if active connection fails. • Pending—attempting to make this Cisco CallManager the active connection as soon as possible.
CallManager type	Type of Cisco CallManager system: • Normal—typical Cisco CallManager system • Failover—Cisco CallManager system reserved for failover situations

Displaying Port Statistics

Step 1 From the main screen, choose **Display**.

Step 2 Choose **Port status**.

Step 3 Use the arrow keys to select one of the ports and press Enter.

Step 4 Press the space bar.

These statistics display for the current call:

- Tx packets
- Rx packets
- Call time
- Rx bad sequence
- Rx bad headers

- Rx packets late
- Rx packets early

These statistics display for the call history:

- Incoming calls
- Outgoing calls
- Connected calls

Displaying Current Configuration

To display all the settings you have configured on the VG248, perform these steps:

Step 1 From the main screen, choose **Diagnostics**.

Step 2 Choose **Show configuration**.

Displaying Software Version

To display the current software version you are using on the VG248, perform these steps:

Step 1 From the main screen, choose **Display**.

Step 2 Choose **Version**.

Monitoring System Status Remotely

The VG248 includes a web server allowing you to monitor system status remotely using a web browser application. These options are similar to the settings accessible via the VG248 user interface directly.

Follow these steps to monitor the system status remotely:

Step 1 From a web browser window, enter the IP address or host name of the VG248.

Step 2 Do one of the following:

a. Click a phone icon to display status for the port. See the "Displaying Port Status" section on page 6-17 for details.

b. Choose these options to display system status:

- Network configuration—See the "Displaying Current Configuration" section on page 6-21 for details.
- Network statistics—See the "Displaying Network Statistics" section on page 6-17 for details.
- Port status—See the "Displaying Port Status" section on page 6-17 for details.
- Port statistics—See the "Displaying Port Statistics" section on page 6-20 for details.
- Version information—See the "Displaying Software Version" section on page 6-21 for details.
- Event log—See the "Working with the Event Log" section on page 6-22 for details.

Working with the Event Log

The event log enables you to capture errors, warnings, and other informational messages from the VG248. Typically, you use these options only when troubleshooting a complex issue, perhaps while working with a Cisco technical representative.

However, using the default settings and these options, you can resolve many errors on your own:

Identifying a Syslog Server

You can identify a syslog server to automatically capture and receive event logs for remote network management.

Enabling Syslog

You can assign a syslog server to the VG248 using DHCP or by identifying a specific syslog server.

Step 1 From the main screen, choose **Diagnostics**.

Step 2 Choose **Event log**.

Step 3 Choose **Syslog**.

Step 4 Choose from the following options:

- **inactive**—syslog disabled
- **use server from DHCP**—syslog server determined by DHCP
- **use specified server**—syslog server must be specified (see the"Identifying a Specific Syslog Server" section on page 6-23)

Identifying a Specific Syslog Server

If you want to use a specific syslog server, you must enter its IP address by performing these steps:

Step 1 From the main screen, choose **Diagnostics**.

Step 2 Choose **Event log**.

Step 3 Choose **Syslog server**.

Step 4 Enter the IP address or host name of the network management system you want to designate as the syslog server.

Selecting Logging Levels and Logged Ports

You can set the VG248 to log progressively more detail (information, errors, or warnings), or you can restrict logging to specific ports.

Typically, you should configure these options only when working with a Cisco technical representative because the nature of the problem determines the amount of information required to resolve it.

To set logging levels or select ports, perform these steps:

Step 1 From the main screen, choose **Diagnostics**.

Step 2 Choose **Event log**.

Step 3 Choose **Set logging levels** or **Set logged ports**.

Step 4 Work with a Cisco technical representative to determine the best options to select and enter.

Displaying Recent Messages

You can obtain a list of recent messages from the VG248 to help you resolve some configuration issues.

To display recent messages, perform these steps:

Step 1 From the main screen, choose **Diagnostics**.

Step 2 Choose **Event log**.

Step 3 Choose **View recent** to display recent messages.

Step 4 See "Understanding Sub-Systems on the VG248" section on page 6-25 for information on resolving these errors.

Tips You can also select **View all** to display all errors, or **View new** to display new errors only.

Understanding Sub-Systems on the VG248

The VG248 generates informational and warning messages and errors from different sub-systems in its software. Many of these messages do not require any intervention on your part; the device simply notifies you of changes or updates. Other errors and warnings require additional troubleshooting or configuration.

Table 6-7 provides an overview of the different sub-systems on the VG248 that might generate informational or warning messages.

Table 6-7 VG248 Sub-Systems

System	Description
DHCP	Communicates with DHCP server.
Ethernet	Concerned with low-level network link integrity.
OS	Runs the low-level services of the VG248.
FTP	Used to send new software images to the VG248.
DNS	Resolves host names to IP addresses.
TFTP	Handles retrieval of Cisco CallManager port configuration.
SLIC	Detects events from analog handsets.
DSP	Provides digital signal processing.
POTS	Bridges between analog and IP telephony.

Table 6-7 VG248 Sub-Systems (continued)

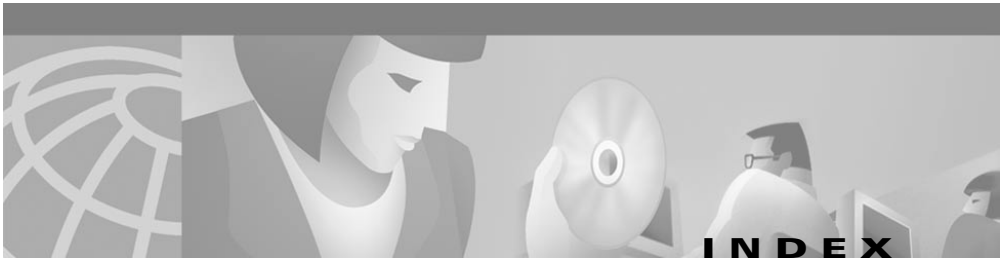
System	Description
SCCP	Transmits and receives telephony events over the IP network; communicates with Cisco CallManager.
SNMP	Coordinates SNMP communication.

Resolving Incorrect Date and Time in Event Log

The VG248 has a built-in real time clock that synchronizes itself periodically with Cisco CallManager to obtain the correct date and time.

The VG248 must have at least one port enabled and registered with Cisco CallManager. You should also verify that the time settings on the Cisco CallManager system are correct.

See the "Enabling a Specific Port" section on page 3-9 for assistance on enabling and registering ports in Cisco CallManager.



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