Cisco VG350, Cisco VG310, and Cisco VG320 Voice Gateway Software Configuration and Administration Guide

Cisco Systems, Inc.
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First Published: December 05, 2012
Last Revised: March 21, 2017
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Preface

This preface discusses the objectives, audience, organization, and conventions of this software configuration guide and where to get the latest version of this guide.

This preface presents the following major topics:

- Objectives, page i
- Audience, page i
- Related and Referenced Documents, page ii
- Obtaining Documentation, page iv
- Obtaining Technical Assistance, page vi
- Obtaining Additional Information, page vii

Objectives

After installing the voice-gateway, use this guide to complete a basic router configuration using the setup command facility.

This guide also contains information on using the Cisco IOS software to perform other configuration tasks, such as configuring voice ports and other features.

This guide does not provide complete configuration instructions. Refer to the Cisco IOS configuration guides and command references for detailed configuration instructions. These publications are available on the Documentation CD-ROM that came with your router and on Cisco.com. See the “Obtaining Documentation” section on page iv for more information.

Audience

This publication is designed for the person who will be responsible for configuring your router. This guide is intended primarily for the following audiences:

- Customers with technical networking background and experience
- System administrators who are familiar with the fundamentals of router-based internetworking, but who might not be familiar with Cisco IOS software
- System administrators who are responsible for installing and configuring internetworking equipment, and who are familiar with Cisco IOS software
Document Organization

The major sections of this document are summarized below:

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter 1</td>
<td>Understanding Interface Numbering and Cisco IOS Software Basics</td>
<td>Provides an overview of the interface numbering conventions for the Cisco VG350, Cisco VG310, and Cisco VG320. Also provides a basic understanding of Cisco IOS software.</td>
</tr>
<tr>
<td>Chapter 2</td>
<td>Configuring with the Command-Line Interface</td>
<td>Describes how to use the Cisco IOS software CLI to configure basic router functionality.</td>
</tr>
<tr>
<td>Chapter 3</td>
<td>Configuring Voice Ports</td>
<td>Describes the modified and newly created CLIs for the Cisco VG350, Cisco VG310, and Cisco VG320 platforms.</td>
</tr>
<tr>
<td>Chapter 4</td>
<td>Configuring Next-Generation High-Density PVDM3 Modules</td>
<td>Describes the next-generation packet voice and data module (PVDM3) digital signal processor (DSP) modules which provides up to four times the density (per slot) of existing audio applications on Cisco voice gateway routers.</td>
</tr>
<tr>
<td>Appendix A</td>
<td>Cisco VG350, Cisco VG310, and Cisco VG320 Configuration Examples</td>
<td>Provides configuration examples for the Cisco VG350, Cisco VG310, and Cisco VG320 Analog Voice Gateway and associated service modules.</td>
</tr>
<tr>
<td>Appendix B</td>
<td>Cisco VG350, Cisco VG310, and Cisco VG320 Analog Voice Gateway-Supported Software and Platforms</td>
<td>Provides information on supported software, platforms, and features for the Cisco VG350, Cisco VG310, and Cisco VG320 Analog Voice Gateways.</td>
</tr>
</tbody>
</table>

Related and Referenced Documents

The documents described here are available online and on the documentation CD-ROM that you received with your router. To be sure of obtaining the latest information, you should access the online documentation.

To print a document in its original page format, access the online document, and click the PDF icon.

You can also order printed copies of documents. See the “Obtaining Documentation” section on page iv.

Access Online User Documentation (PDF and HTML Formats)

Access User Documentation on the Documentation CD-ROM (HTML Format Only)

On the Documentation CD-ROM, select **Cisco Product Documentation**.

Paths to specific documents are provided below, starting at **Cisco Product Documentation**.

Tip

To navigate up to the next higher level in the documentation hierarchy, click **CONTENTS** in the navigation bar at the top of each page.
## Obtaining Documentation

<table>
<thead>
<tr>
<th>Cisco Product</th>
<th>Document Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco VG350 Analog Voice Gateway</td>
<td>• Cisco VG350 Analog Voice Gateway Hardware Installation Guide</td>
</tr>
<tr>
<td>Cisco VG310 Analog Voice Gateway</td>
<td>• Regulatory Compliance and Safety Information for Cisco Voice Gateway</td>
</tr>
<tr>
<td>Cisco VG320 Analog Voice Gateway</td>
<td>• Cisco VG310 and Cisco VG320 Analog Voice Gateway Hardware Installation Guide</td>
</tr>
<tr>
<td>Cisco VG350, Cisco VG310, and Cisco VG320 Analog Voice Gateway Software Configuration and Administration Guide</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cisco IOS 15.4(3)M software</th>
<th>Document Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note Refer to the Software Administration and Configuration guide that corresponds to the Cisco IOS software release installed on your server.</td>
<td>• Cisco IOS Configuration Fundamentals Configuration Guide, Release 12.3(4)T</td>
</tr>
<tr>
<td></td>
<td>• Cisco IOS Configuration Fundamentals Command Reference, Release 12.3(4)T</td>
</tr>
<tr>
<td></td>
<td>• Cisco IOS Dial Technologies Configuration Guide, Release 12.3(4)T</td>
</tr>
<tr>
<td></td>
<td>• Cisco IOS Wide-Area Networking Configuration Guide, Release 12.3(4)T</td>
</tr>
<tr>
<td></td>
<td>• Cisco IOS IP Configuration Guide, Release 12.3(4)T</td>
</tr>
<tr>
<td></td>
<td>• Cisco IOS Wide-Area Networking Command Reference, Release 12.3(4)T</td>
</tr>
<tr>
<td></td>
<td>• Cisco IOS Debug Command Reference, Release 12.3(4)T</td>
</tr>
<tr>
<td></td>
<td>• Cisco IOS Software System Error Messages, Release 12.3(4)T</td>
</tr>
<tr>
<td></td>
<td>• Cisco IOS Software Command Summary, Release 12.3(4)T</td>
</tr>
<tr>
<td></td>
<td>• Cisco IOS Release Notes for your release</td>
</tr>
<tr>
<td>Other documents</td>
<td>• Supplementary Service Features for FXS Ports on Cisco IOS Voice Gateways Configuration Guide, Release 12.4T</td>
</tr>
</tbody>
</table>

Cisco provides several ways to obtain documentation, technical assistance, and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

### Cisco.com

You can access the most current Cisco documentation on the World Wide Web at this URL:

http://www.cisco.com/univercd/home/home.htm
You can access the Cisco website at this URL:
http://www.cisco.com
International Cisco websites can be accessed from this URL:

Documentation CD-ROM
Cisco documentation and additional literature are available in a Cisco Documentation CD-ROM package, which may have shipped with your product. The Documentation CD-ROM is updated regularly and may be more current than printed documentation. The CD-ROM package is available as a single unit or through an annual or quarterly subscription.
Registered Cisco.com users can order a single Documentation CD-ROM (product number DOC-CONDOCCD=) through the Cisco Ordering tool:
All users can order annual or quarterly subscriptions through the online Subscription Store:
http://www.cisco.com/go/subscription
Click Subscriptions & Promotional Materials in the left navigation bar.

Ordering Documentation
You can find instructions for ordering documentation at this URL:
You can order Cisco documentation in these ways:
• Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Networking Products MarketPlace:
• Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, USA) at 408 526-7208 or, elsewhere in North America, by calling 800 553-NETS (6387).

Documentation Feedback
You can submit e-mail comments about technical documentation to bug-doc@cisco.com.
You can submit comments by using the response card (if present) behind the front cover of your document or by writing to the following address:
Cisco Systems
Attn: Customer Document Ordering
170 West Tasman Drive
San Jose, CA 95134-9883
We appreciate your comments.
Obtaining Technical Assistance

For all customers, partners, resellers, and distributors who hold valid Cisco service contracts, the Cisco Technical Assistance Center (TAC) provides 24-hour-a-day, award-winning technical support services, online and over the phone. Cisco.com features the Cisco TAC website as an online starting point for technical assistance. If you do not hold a valid Cisco service contract, please contact your reseller.

Cisco TAC Website

The Cisco TAC website (http://www.cisco.com/tac) provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The Cisco TAC website is available 24 hours a day, 365 days a year.

Accessing all the tools on the Cisco TAC website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a login ID or password, register at this URL:

Opening a TAC Case

Using the online TAC Case Open Tool (http://www.cisco.com/tac/caseopen) is the fastest way to open P3 and P4 cases. (P3 and P4 cases are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Case Open Tool automatically recommends resources for an immediate solution. If your issue is not resolved using the recommended resources, your case will be assigned to a Cisco TAC engineer.

For P1 or P2 cases, (cases in which your production network is down or severely degraded) or if you do not have Internet access, contact Cisco TAC by telephone. Cisco TAC engineers are assigned immediately to P1 and P2 cases to help keep your business operations running smoothly.

To open a case by telephone, use one of the following numbers:
Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)
EMEA: +32 2 704 55 55
USA: 1 800 553-2447

For a complete listing of Cisco TAC contacts, go to this URL:

TAC Case Priority Definitions

To ensure that all cases are reported in a standard format, Cisco has established case priority definitions.

Priority 1 (P1)—Your network is “down” or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Priority 2 (P2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Priority 3 (P3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.
Priority 4 (P4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

Obtaining Additional Information

Information about Cisco products, services, technologies, and networking solutions is available from various online sources.

- Sign up for Cisco e-mail newsletters and other communications at the Cisco Subscription Center at:
  [http://www.cisco.com/offer/subscribe](http://www.cisco.com/offer/subscribe)
- Learn about modifications to or updates about Cisco products. Go to the Product Alert Tool to create a profile, and then choose those products for which you want to receive information. Go to:
- Order the Cisco Product Quick Reference Guide, a reference tool that includes product overviews, key features, sample part numbers, and abbreviated technical specifications for many Cisco products that are sold through partners. Go to:
- Visit the Cisco Services website to learn the latest technical, advanced, and remote services available to increase the operational reliability of your network. Go to:
  [http://www.cisco.com/go/services](http://www.cisco.com/go/services)
- Visit Cisco Marketplace, the company store, for a variety of books, reference guides, documentation, and logo merchandise at:
- Purchase a copy of Cisco technical documentation on a DVD, (Cisco Product Documentation DVD) from the product documentation store at:
- Obtain general networking, training, and certification titles from Cisco Press publishers at:
  [http://www.ciscopress.com](http://www.ciscopress.com)
- Read the Internet Protocol Journal, a quarterly journal published by Cisco that is intended to serve as an informational and educational resource for engineering professionals involved in the design, development, and operation of public and private internet and intranet. To learn more, go to:
  [http://www.cisco.com/ipj](http://www.cisco.com/ipj)
- What's New in Cisco Product Documentation is an online publication that provides information about the latest documentation releases for Cisco products. Updated monthly, this online publication is organized by product category:
- Access international Cisco websites at:
Understanding Interface Numbering and Cisco IOS Software Basics

This chapter provides an overview of interface numbering in the Cisco VG350, Cisco VG310, and Cisco VG320 Analog Voice Gateways (VG). It also describes how to use the Cisco IOS software commands.

This chapter presents the following major topics:

- Identifying the Cisco Voice Gateways, page 1-10
- Cisco VG350 Port Numbering Conventions, page 1-10
- Identifying the Cisco VG310 and Cisco VG320, page 1-11
- Upgrading to a New Cisco IOS Release, page 1-15
- Where to Go Next, page 1-15
Identifying the Cisco Voice Gateways

This section describes how to identify and differentiate between Cisco VG350, Cisco VG310 and Cisco VG320 voice gateways platforms.

Identifying the Cisco VG350

Figure 1-1 shows the front panels of the Cisco VG350 Voice Gateway Chassis:

Cisco VG350 Port Numbering Conventions

Figure 1-2 shows the Cisco VG350 back panel:
Chapter 1  Understanding Interface Numbering and Cisco IOS Software Basics

Identifying the Cisco Voice Gateways

Figure 1-2  Cisco VG350 Back Panel

![Cisco VG350 Back Panel](image)

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EHWIC slots 1, 2, and 3 (0, Far right)</td>
</tr>
<tr>
<td>2</td>
<td>RJ-45 serial console port</td>
</tr>
<tr>
<td>3</td>
<td>SFP1 and SFP2 (2, Top)</td>
</tr>
<tr>
<td>4</td>
<td>10/100/1000 Ethernet ports GE 0/1 and GE 0/2 (GE 0/2, Top)</td>
</tr>
<tr>
<td>5</td>
<td>10/100/1000 Ethernet port GE 0/0</td>
</tr>
<tr>
<td>6</td>
<td>USB0 and USB1 (1, Top)</td>
</tr>
<tr>
<td>7</td>
<td>Ground</td>
</tr>
<tr>
<td>8</td>
<td>CompactFlash 0 and 1 (0, Far right)</td>
</tr>
<tr>
<td>9</td>
<td>SM-D-72FXS Service Module</td>
</tr>
<tr>
<td>10</td>
<td>SM-D-48FXS-E Service Module</td>
</tr>
</tbody>
</table>

Identifying the Cisco VG310 and Cisco VG320

Figure 1-3 shows the front panels of the Cisco VG310 and Cisco VG320 Voice Gateway Chassis:

![Cisco VG310 and Cisco VG320 Front Panel](image)

Cisco VG310 Port Numbering Conventions

Figure 1-4 shows the Cisco VG310 back panel:
Identifying the Cisco Voice Gateways

Chapter 1  Understanding Interface Numbering and Cisco IOS Software Basics

Cisco VG350, Cisco VG310 and Cisco 320 Voice Gateway Software Administration and Configuration Guide

Figure 1-4  Cisco VG310 Back Panel

1 FXS Status LEDs  6 AC Power Connector
2 CF Storage Card  7 DC PS Connector
3 USB Console Management  8 Two 1-Gbps Ethernet L3 interfaces
4 USB Storage Port  9 HWIC module slot
5 Power On/Off Switch  10 RJ-21 24FXS Ports Connector

Cisco VG320 Port Numbering Conventions

Figure 1-5 shows the Cisco VG320 back panel:

Figure 1-5  Cisco VG320 Back Panel

1 FXS Status LEDs  6 AC Power Connector
2 CF Storage Card  7 DC PS Connector
3 USB Console Management  8 Two 1-Gbps Ethernet L3 interfaces
4 USB Storage Port  9 HWIC module slot
5 Power On/Off Switch  10 2xRJ-21 48FXS Ports Connector
Understanding Cisco IOS Software Basics

This section describes what you need to know about the Cisco IOS software before you configure the router using the CLI. This chapter includes the following:

- Getting Help, page 1-13
- Command Modes, page 1-13
- Undoing a Command or Feature, page 1-14
- Saving Configuration Changes, page 1-15
- Where to Go Next, page 1-15

Understanding these concepts will save time as you begin to use the CLI. If you have never used Cisco IOS software or need a refresher, take a few minutes to read this chapter before you proceed to the next chapter.

If you are already familiar with Cisco IOS software, proceed to the “Configuring the Host Name and Password” section on page 2-17

Getting Help

Use the question mark (?) and arrow keys to help you enter commands:

- For a list of available commands, enter a question mark:
  
  ```
  Router> ?
  ```

- To complete a command, enter a few known characters followed by a question mark (with no space):
  
  ```
  Router> s?
  ```

- For a list of command variables, enter the command followed by a space and a question mark:
  
  ```
  Router> show ?
  ```

- To redisplay a command you previously entered, press the **Up Arrow** key. You can continue to press the **Up Arrow** key for more commands.

Command Modes

The Cisco IOS user interface is divided into different modes. Each command mode permits you to configure different components on your router. The commands available at any given time depend on which mode you are currently in. Entering a question mark (?) at the prompt displays a list of commands available for each command mode. Table 1-1 lists the most common command modes.
Chapter 1  Understanding Interface Numbering and Cisco IOS Software Basics

Understanding Cisco IOS Software Basics

Table 1-1  Common Command Modes

<table>
<thead>
<tr>
<th>Command Mode</th>
<th>Access Method</th>
<th>Router Prompt Displayed</th>
<th>Exit Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>User EXEC</td>
<td>Log in.</td>
<td>Router&gt;</td>
<td>Use the logout command.</td>
</tr>
<tr>
<td>Privileged EXEC</td>
<td>From user EXEC mode, enter the enable command.</td>
<td>Router#</td>
<td>To exit to user EXEC mode, use the disable, exit, or logout command.</td>
</tr>
<tr>
<td>Global configuration</td>
<td>From the privileged EXEC mode, enter the configure terminal command.</td>
<td>Router (config)#</td>
<td>To exit to privileged EXEC mode, use the exit or end command, or press Ctrl-Z.</td>
</tr>
<tr>
<td>Interface configuration</td>
<td>From the global configuration mode, enter the GigabitEthernet interface command such as, gigabitethernet0/0.</td>
<td>Router (config-if)#</td>
<td>To exit to global configuration mode, use the exit command. To exit directly to privileged EXEC mode, press Ctrl-Z.</td>
</tr>
</tbody>
</table>

Timesaver

Each command mode restricts you to a subset of commands. If you are having trouble entering a command, check the prompt, and enter the question mark (?) for a list of available commands. You might be in the wrong command mode or be using the wrong syntax.

In the following example, notice how the prompt changes after each command, to indicate a new command mode for Cisco VG350:

```
Router> enable
Password: <enable password>
Router# configure terminal
Router(config)# interface gigabitEthernet 0/0
Router# %SYS-5-CONFIG_I: Configured from console by console
```

The last message is normal and does not indicate an error. Press Return to get the Router# prompt.

Note

On Cisco VG310 and Cisco VG320, the Ethernet interface since the serial interface is not supported.

Note

Press Ctrl-Z in any mode to immediately return to enable mode (Router#), instead of entering exit, which returns you to the previous mode.

Undoing a Command or Feature

If you want to undo a command you entered or disable a feature, enter the keyword no before most commands; for example, no ip routing.

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On Cisco VG310 and Cisco VG320, the Ethernet interface since the serial interface is not supported.

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Undoing a Command or Feature

If you want to undo a command you entered or disable a feature, enter the keyword no before most commands; for example, no ip routing.
Saving Configuration Changes

You need to enter the `copy running-config startup-config` command to save your configuration changes to nonvolatile random-access memory (NVRAM), so the changes are not lost if there is a system reload or power outage. For example:

```
Router# copy running-config startup-config
Building configuration...
```

It might take a minute or two to save the configuration to NVRAM. After the configuration has been saved, the following appears:

```
[OK]
Router#
```

Upgrading to a New Cisco IOS Release

To install or upgrade to a new Cisco IOS release, see How to Update/Upgrade Cisco IOS Software.

Where to Go Next

Now that you have learned some Cisco IOS software basics, you can begin to configure the router using the CLI.

Remember that:

- You can use the question mark (?) and arrow keys to help you enter commands.
- Each command mode restricts you to a set of commands. If you have difficulty entering a command, check the prompt and then enter the question mark (?) for a list of available commands. You might be in the wrong command mode or be using the wrong syntax.
- To disable a feature, generally enter the keyword `no` before the command; for example, `no ip routing`.
- You need to save your configuration changes to NVRAM so the changes are not lost if there is a system reload or power outage.

Proceed to Chapter 2, “Configuring the Host Name and Password,” to begin configuring the router.
Configuring with the Command-Line Interface

This chapter describes how to use the Cisco IOS software CLI to configure basic Cisco VG350, Cisco VG310, and Cisco VG320 Analog functionality.

This chapter presents the following major topics:

- Configuring the Host Name and Password, page 2-17
- Configuring a Gigabit Ethernet Interfaces, page 2-19
- Saving Configuration Changes, page 2-20
- Enabling UC License, page 2-21
- Where to Go Next, page 2-22

Follow the procedures in this chapter to configure the Cisco VG350, Cisco VG310, and Cisco VG320 Analog manually, or if you want to, change the configuration after you have run the setup command facility.

This chapter does not describe every configuration possible—only a small portion of the most commonly used configuration procedures. For advanced configuration topics, refer to the Cisco IOS configuration guide and command reference publications. See the “Obtaining Documentation” section on page iv.

Configuring the Host Name and Password

One of the first configuration tasks you might want to do is to configure the host name and set an encrypted password. Configuring a host name allows you to distinguish multiple Cisco VG350s, Cisco VG310s or Cisco VG320s and routers from each other. Setting an encrypted password allows you to prevent unauthorized configuration changes.

**Summary Steps**

1. `enable`
2. `configure terminal`
3. `hostname`
4. `enable secret guessme`
5. `line con 0`
6. `exec-timeout 0 0`
7. `exit`
Configuring the Host Name and Password

Detailed Steps

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
</table>
| **Step 1**  
Router> enable  
Password: password  
Router# | Enters enable mode. Enter the password.  
You have entered enable mode when the prompt changes to Router#. |
| **Step 2**  
Router# configure terminal  
Enter configuration commands, one per line.  
End with CNTL/Z.  
Router(config)# | Enters global configuration mode. You have entered global configuration mode when the prompt changes to Router(config)#. |
| **Step 3**  
Router(config)# hostname | Changes the name of Cisco VG350, Cisco VG310, or Cisco VG320 to a meaningful name. Substitutes the host name to Router. |
| **Step 4**  
Router(config)# enable secret guessme | Enters an enable secret password. This password provides access to privileged EXEC mode. When you enter enable at the user EXEC prompt (Router>), you must enter the enable secret password to gain access to configuration mode. Substitute your enable secret password for guessme. |
| **Step 5**  
Router(config)# line con 0  
Router(config-line)# exec-timeout 0 0 | Enters line configuration mode to configure the console port.  
Prevents the Cisco VG350, Cisco VG310, or Cisco VG320, EXEC mode from timing out if you do not enter any information on the console screen for an extended period. |
| **Step 6**  
Router(config-line)# exit | Exits from the config-line mode and enters into the global configuration mode. |

Verifying the Host Name and Password

To verify that you configured the correct host name and password, perform the following steps:

**Step 1** Enter the show config command:

Router# show config

Using 2745 out of 262136 bytes

! version XX.X
    .
    .
    .
    ! hostname
    ! enable secret 5 $1$60L4$X2JYowoDc8.kqalIoO/w8/
    .
    .
Check the host name and encrypted password displayed near the top of the command output.

**Step 2** Exit global configuration mode and attempt to re-enter it using the new enable password:

```
Router# exit

Router con0 is now available
Press RETURN to get started.
Router> enable
Password: guessme
Router#
```

---

**Tip**
If you are having trouble, ensure the following:

- **Caps Lock** is off.
- You entered the correct passwords. Passwords are case sensitive.

---

**Configuring a Gigabit Ethernet Interfaces**

To configure a Gigabit Ethernet interface, use the configuration software provided with your Cisco VG350, Cisco VG310, or Cisco VG320 or network module, if any. Otherwise, for high power and flexibility, use configuration mode (manual configuration).

**Note** Before you begin, disconnect all the WAN cables from Cisco VG350, Cisco VG310, or Cisco VG320 to prevent it from running the AutoInstall process. Cisco VG350, Cisco VG310, and Cisco VG320 attempt to run AutoInstall whenever you power them on if there is a WAN connection on both ends, and the Cisco VG350, Cisco VG310, and Cisco VG320 do not have a valid configuration file stored in NVRAM (for instance, when you add a new interface). It can take several minutes for Cisco VG350, Cisco VG310, and Cisco VG320 to determine that AutoInstall is not connected to a remote TCP/IP host.

This section describes a basic configuration, including enabling the interface and specifying IP routing. Depending on your own requirements and the protocols you plan to route, you might also have to enter other configuration commands.

Before you begin configuring the interfaces, perform the following tasks:

- Connect a console to Cisco VG350, Cisco VG310, or Cisco VG320.
- Power on Cisco VG350, Cisco VG310, or Cisco VG320.
Saving Configuration Changes

To prevent the loss of the Cisco VG350 configuration, save it to NVRAM.

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
</table>
| **Step 1**  
Router> **enable**  
Password: **password**  
Router# | Enters enable mode. Enter the password.  
You have entered enable mode when the prompt changes to Router#. |
| **Step 2**  
Router# **configure terminal**  
Enter configuration commands, one per line.  
End with CNTL/Z.  
Router(config)# | Enters global configuration mode. You have entered global configuration mode when the prompt changes to Router(config)#. |
| **Step 3**  
Router# **ip routing**  
Router# **ip**?  
ip ipc iphc-profile ipv6 | Enables routing protocols as required for your global configuration. This example uses IP routing. |
| **Step 4**  
Router(config)# **interface gigabitEthernet 0/0**  
Router(config-if)# | Enters interface configuration mode. You have entered interface configuration mode when the prompt changes to Router(config-if)#. |
| **Step 5**  
Router(config-if)# **ip address 172.16.74.3 255.255.255.0** | Assigns an IP address and subnet mask to the interface. |
| **Step 6**  
Router(config-if)# **exit** | Exits back to global configuration mode.  
Repeat Step 4 through Step 6 if your Cisco VG350 has more than one interface that you need to configure. |
| **Step 7**  
Router(config-if)# **Ctrl-z**  
Router# | Returns to enable mode when you finish configuring interfaces. |
Enabling UC License

To enable the UC license in the Cisco VG350, Cisco VG310 or Cisco VG320, perform the following steps:

**Summary Steps**

1. `enable`
2. `configure terminal`
3. `license accept end user agreement`
4. `license boot module module-name technology-package package-name`
5. `exit`
6. `save`
7. `reload`

**Detailed Steps**

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1 enable</td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>Router&gt;enable</td>
<td>Enter your password if prompted.</td>
</tr>
<tr>
<td>Step 2 configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>Router# configure terminal</td>
<td></td>
</tr>
<tr>
<td>Step 3 license accept end user agreement</td>
<td>Configures a one-time acceptance of the UC license.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>Router(config)# license accept end user</td>
<td>Accepts UC license by typing YES.</td>
</tr>
<tr>
<td>agreement</td>
<td></td>
</tr>
<tr>
<td>Step 4 license boot module module-name</td>
<td>Enables the license.</td>
</tr>
<tr>
<td>technology-package package-name</td>
<td></td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>Router(config)# license boot module &lt;vg3xx&gt;</td>
<td><code>&lt;.vg3xx&gt;</code>: Replace with <code>v350</code> or <code>vg3x0</code> depending on your requirement.</td>
</tr>
<tr>
<td>technology-package uck9</td>
<td></td>
</tr>
<tr>
<td>Step 5 exit</td>
<td>Exits to privileged EXEC configuration mode.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>Router(config)# exit</td>
<td></td>
</tr>
</tbody>
</table>
Where to Go Next

At this point, you can proceed to the following:

- The Cisco IOS software configuration guide and command reference publications for more advanced configuration topics. These publications are available on Cisco.com or on the Documentation CD-ROM, or you can order printed copies.

- *Cisco System Error Messages, Release 12.3(4)T* and *Cisco Debug Command Reference, Release 12.3(4)T* provide troubleshooting information. For these and other documents, see the “Obtaining Documentation” section on page -iv.

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 6</strong></td>
<td><strong>save</strong></td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td><strong>Router# write</strong></td>
</tr>
<tr>
<td><strong>Step 7</strong></td>
<td><strong>reload</strong></td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td><strong>Router# reload</strong></td>
</tr>
</tbody>
</table>
**Configuring Voice Ports**

This chapter explains how to configure voice ports using the CLIs created and modified for the Cisco VG350, Cisco VG310, and Cisco VG320 Analog Voice Gateways and associated service modules.

This chapter contains the following topics:
- Prerequisites, page 3-23
- Configuring the Voice Port, page 3-23
- Cisco IOS Bulk Configuration, page 3-24
- Where to Go Next, page 3-26

**Prerequisites**

Before you configure voice ports on Cisco VG350, Cisco VG310, or Cisco VG320, you must establish a working IP network.

**Configuring the Voice Port**

This section discusses the changes and modifications on the following CLIs. For configuration examples, see the “Cisco VG350, Cisco VG310, and Cisco VG320 Configuration Examples” section on page A-1

- loop-length, page 3-23
- ren, page 3-24
- ring dc-offset, page 3-24
- cm-current-enhance, page 3-24
- vmwi, page 3-24

**loop-length**

The loop-length CLI is created to configure the analog FXS voice port. It has the following format:

```
voice-port x/y/z
[no] loop-length [long | short]
```

The loop-length CLI has the following characteristics:
• For Cisco VG350 platform, the default is short loop-length. This CLI is not applicable to analog FXS on motherboard slot.
• This CLI is only applicable to all 48 FXS voice ports on SM-D-48FXS-E and the first 4 (0-3) FXS voice ports on SM-D-72FX like the Cisco VG350 platform.
• For Cisco VG310 and VG320 platforms, the default FXS is short loop-length and long loop-length FXS needs to be configured.
• On Cisco VG310, only the first eight voice ports 0/0/0-7 can be configured as long loop (OPX-lite). On Cisco VG320, the first four voice ports 0/0/0 - 0/0/3 can be configured as long loop (OPX-lite).
• On Cisco VG320, FXS voice ports on VIC 1 (0/1/0 - 0/1/23) will not support long loop. By default, they are short-loop FXS.
• Shutdown and no shutdown are required on the voice port after loop-length is configured for it to take effect.
• Because up to 2 ren is supported on long-loop (OPX-lite) FXS, when loop-length long is configured on the FXS voice port, if its existing ren configuration is greater than 2, it will be changed automatically to 2, a message “The existing ren configuration is changed to 2” is displayed on the console.
• When loop-length short is configured on the FXS voice port, if the voice port has ring dc-offset configured, the ring dc-offset configuration will be removed. A message “The existing ring dc-offset configuration is removed” is displayed on the console.

ren

The existing ren CLI under FXS voice port will accept value 1-2 for FXS voice port with loop-length long configured. For short loop-length analog FXS voice port, ren CLI will accept value 1-5.

ring dc-offset

The existing ring dc-offset CLI is configurable on the long loop-length FXS voice port.

cm-current-enhance

The existing cm-current-enhance CLI is configurable on the long loop-length FXS voice port.

vmwi

The existing vmwi [fsk | dc-voltage] is configurable on all on-board FXS voice ports.

Cisco IOS Bulk Configuration

An optional bulk-configuration mechanism for voice-port and voice dial peer is introduced on Cisco VG350, Cisco VG310, and Cisco VG320 Analog to save on time.
Chapter 3  Configuring Voice Ports

Configuring the Voice Port

**group**

The **group** option is added to **dial-peer** CLI for dial peer bulk configuration. It has the following formats:

```
dial-peer group <tag> pots
```

```
dial-peer group <tag> pots all stcapp
```

The second CLI above will create dial peers on all analog voice ports as stcapp ports by expanding it to the following three CLIs:

```
dial-peer group <tag> pots
service stcapp
port all
```

**Note**

The group CLI is mainly for stcapp controlled analog ports therefore only a subset of dial peer subcommands are supported.

The following are the subcommands currently supported:

1. port
2. description
3. service
4. shutdown
5. preference

**port**

The **port** subcommand specifies what ports to configure for a specific **group** CLI.

It has the following formats:

```
port <voice port#> [ans | called | dest] <E164 address> [desc <description>]
```

```
port <voice port#> [desc <description>]
```

```
port <voice port#>
```

```
port <start voice port#>-<end port#> [ans | called | dest] <E164 address> <interval> [desc <description>]
```

```
port <start voice port#>-<end port#> [ans | called | dest] <E164 address> [desc <description>]
```

```
port all [ans | called | dest] <E164 address> <interval> [desc <description>]
```

```
port all [desc <description>]
```

```
port all
```

- The **voice port#** is composed of slot#/subunit#/port# or slot#/port#.
- The **ans** is the abbreviation for answer-address, which has the same meaning as the subcommand under **dial-peer voice <tag> pots**.
- The **called** is the abbreviation for incoming called-number which has the same meaning as the subcommand under **dial-peer voice <tag> pots**.
- The **dest** is the abbreviation for destination-pattern which has the same meaning as the subcommand under **dial-peer voice <tag> pots**.
- The **desc** is the abbreviation for description which has the same meaning as the subcommand under **dial-peer voice <tag> pots**.
• The <interval> denotes the interval value of the E164 number for each adjacent port. The default is zero and the allowable value is from 1 to 100, inclusively.

• Multiple port CLIs are allowed and can be removed one by one with exact port specification or all at once using no port all.

• No overlay port CLIs are allowed. As a result, no other port CLIs are allowed if port all is configured.

description
The 'description' subcommand has the same meaning as the one under "dial-peer voice <tag> pots" CLI.

preference
The 'preference' subcommand has the same meaning as the one under "dial-peer voice <tag> pots" CLI.

service
The 'service' subcommand has the same meaning as the one under "dial-peer voice <tag> pots" CLI.

shutdown
The 'shutdown' subcommand has the same meaning as the one under "dial-peer voice <tag> pots" CLI except that a parameter, all or voice port number, needs to be specified.

shut [all | <voice port#]

For more information and configuration examples, see the “Group configuration on the dial-peer command” section on page A-4.

Where to Go Next

For further information on VoIP configuration procedures and debug commands, refer to the following: Cisco IOS Voice Configuration Library
Configuring Next-Generation High-Density PVDM3 Modules

The next-generation Pack Voice Digital Signal Processor Modules (PVDM3) digital signal processor (DSP) modules provide up to four times the density (per slot) of existing audio applications on Cisco voice gateway routers. One universal DSP image for these DSP modules provides resources for time-division multiplexing-to-Internet Protocol (TDM-to-IP) gateway functionality for digital and analog interfaces, audio transcoding, and audio conferencing.

This enhanced DSP architecture accommodates a new packet-processing engine for rich-media voice applications and supports the TDM voice framework used by the PVDM3 module. The PVDM3 has a Gigabit Ethernet interface with a MultiGigabit Fabric to increase IP throughput, and a DSP hardware-based health monitor provides DSP failure detection that is ten times faster than existing technology.

The DSP Resource Manager has been enhanced so that PVDM3 modules can pool DSP resources and share DSP resources across voice service modules.

Warning
You can configure Next-Generation High-Density PVDM3 Modules only on Cisco VG310 and Cisco VG320 platforms.

Contents

- Prerequisites for Configuring the PVDM3 Module on Cisco Voice Gateway Routers, page 30
- Restrictions for Configuring the PVDM3 Module on Cisco Voice Gateway Routers, page 30
- Information About Configuring the PVDM3 Module on Cisco Voice Gateway Routers, page 30
- How to Verify and Troubleshoot the Functionality of the PVDM3 Cards on Cisco Voice Gateways, page 35
- Configuration Examples for Configuring the PVDM3 Module on Cisco Voice Gateway Routers, page 43
- Additional References, page 45
  . page 46
Prerequisites for Configuring the PVDM3 Module on Cisco Voice Gateway Routers

To configure the PVDM3 Module on your Cisco VG310 or Cisco VG320 series voice gateway router, you must have Cisco IOS Release 15.4(3)M or a later release installed. The image must provide a voice-capable feature set.

If you have installed the PVDM3 cards in your Cisco gateway, make certain that you have complied with the hardware installation instructions in *Cisco VG310 and Cisco VG320 Voice Gateways Hardware Installation Guide*.

Restrictions for Configuring the PVDM3 Module on Cisco Voice Gateway Routers

The PVDM3 card can be installed and used on the Cisco VG310 or Cisco VG320 voice gateway routers. All codecs that are supported on the PVDM2 are supported on the PVDM3, except that the PVDM3 does not support the G.723 (G.723.1 and G.723.1A) codecs. The PVDM2 can be used to provide G.723 codec support or the G.729 codec can be as an alternative on the PVDM3.

Information About Configuring the PVDM3 Module on Cisco Voice Gateway Routers

To take full advantage of the PVDM3 cards on Cisco voice gateway routers, you should understand the following concepts:

- DSP Resource Manager Enhancement and DSP Numbering
- DSP Image for the PVDM3
- Broadcast Fast Busy Tone for DSP Oversubscription
- Broadcast Fast Busy Tone for DSP Oversubscription

DSP Resource Manager Enhancement and DSP Numbering

Each PVDM3 DSP card can hold up to two devices, and each device can hold up to three DSP cores. The host recognizes each DSP card as one individual DSP and each physical DSP as a device. This virtual DSP concept provides a maximum of six DSPs per PVDM3. For backward compatibility for 5510 DSPs, the existing numbering scheme is maintained (see Table 4-1), and for PVDM3 DSPs, a new numbering scheme is applied (see Table 4-1).

Note

The numbering schemes shown in Table 4-1 are examples only, and the DSP cards must be installed in the PVDM slots as shown for these sample numbering schemes to be correct. For more information about DSP and device numbering, see the documents listed in the “Additional References” section on page 45.
DSP Image for the PVDM3

The DSP image for the PVDM3 supports all features supported on PVDM2 except Cisco Fax Relay. The DSP image provides feature capability to implement the signal processing layer for a TDM-to-IP gateway:

- TDM-to-IP gateway for voice telephony, including support for multicast conferencing through the mixing of multiple IP streams out a single TDM port.
- Low-level processing of CAS from a T1/E1 interface through the use of digital signaling channels.
- Control and low-level processing of the signaling for analog telephony interface implemented on Cisco’s voice interface card (VIC) hardware.
- Support for Voice Band Data (VBD) through the use of upspeeding channels.
- Support of facsimile using T.38 Fax Relay technology.
- Support of high-speed modems (V.32 and V.34) using Modem Relay technology.
- Interface with Secure Telephony (STU) phones using Secure Telephony over IP standard technology.
- Support for interfacing VoIP channel to Land Mobile Radio (LMR) networks.
- Support for secure VoIP through the implementation of SRTP for both encryption and authentication of RTP packets.
- Support for text telephony (Baudot) using Text Relay technology.

The DSP image for the PVDM3 also provides a complete set of features to implement the signal processing layer of an IP-to-IP gateway and an IP-based conference server. Highlights of this functionality include:

- G.711 transcoding for implementing a LAN-WAN gateway.
- Universal Transcoding between any two voice codecs (narrowband or wideband).
- Trans-scripting services for conversion between SRTP configurations or between secured and unsecured networks.
- IP-based voice conferencing, including narrowband and wideband participants.

Note: Transcoding, LMR and Conferencing features are not supported on Cisco VG310 and Cisco VG320 Voice Gateways.
Chapter 4 Configuring Next-Generation High-Density PVDM3 Modules

Broadcast Fast Busy Tone for DSP Oversubscription

There should always be a dial tone when a telephone is lifted. However, when DSP oversubscription occurs, and a caller goes off-hook, dead-air is received. With this feature, the caller receives a fast-busy tone instead of silence. This feature is not supported on application-controlled endpoints, Foreign Exchange Office (FXO) signaling endpoints, and BRI and Primary Rate Interface (PRI) endpoints.

The following lists the maximum number of different fast busy tone (specific to country) that can be supported by each PVDM type:

- PVDM3-16 1
- PVDM3-32 1
- PVDM3-64 2
- PVDM3-128 3
- PVDM3-192 3
- PVDM3-256 3

Prior to Cisco IOS Release 15.4(3)M, a new call attempt failed and dead silence occurred when DSPs were oversubscribed. When the PVDM3 is installed, a fast busy tone is broadcast to session application endpoints when DSP over-subscription occurs for both analog ports and digital ports, except PRI and BRI. FXO signaling and application controlled endpoints are not supported. This feature does not apply to insufficient DSP credits due to mid-call codec changes (while a call is already established).

Online Insertion and Removal

Cisco VG350 support only managed online insertion and removal. All voice ports and controllers should be shut down. Transcoding, conferencing, and MTP DSPfarm profiles need to be shut down in addition to the controller and voice port shutdown. Also, remove the DSP sharing (that is, DS0-group and DSPfarm sharing).

If the power efficiency management is configured on the module, the EnergyWise level must be set to 10 or online insertion and removal is not allowed.

Perform the following tasks for managed online insertion and removal on the Cisco VG350:

1. Shut down the controller and voice ports.
2. Perform online insertion and removal.
3. Restart the controller and voice ports.

Shut down the controller and voice ports

Perform the steps detailed in this section to shut down the controller and voice ports

SUMMARY STEPS

1. enable
2. configure terminal
3. controller e1 slot/port
4. shutdown
5. exit
6. voice-port slot number/port
Information About Configuring the PVDM3 Module on Cisco Voice Gateway Routers

7. shutdown
8. exit

DETAILED STEPS

<table>
<thead>
<tr>
<th>Step</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
</table>
| Step 1 | enable | Enable privileged EXEC mode  
• Enter your password if prompted. |
| Example: | Router> enable |

| Step 2 | configure terminal | Enter global configuration mode. |
| Example: | Router# configure terminal |

| Step 3 | controller e1 slot/port | Enter config-controller mode. |
| Example: | Router(config)# controller e1 0/2/0 |

| Step 4 | shutdown | Administratively shuts down the controller port. |
| Example: | Router(config-controller)# shutdown |

| Step 5 | exit | Exit config-controller mode. |
| Example: | Router(config-controller)# exit |

| Step 6 | voice-port slot number/port | Enter config-voiceport mode. |
| Example: | Router(config)# voice-port 0/0/0:1 |

| Step 7 | shutdown | Administratively shuts down the voice port. |
| Example: | Router(config-voiceport)# shutdown |

| Step 8 | exit | Exit config-voiceport mode.  
Use the exit command till you are in privileged EXEC mode. |
| Example: | Router(config-voiceport)# exit |
Perform online insertion and removal

Note
This feature is available only on Cisco VG350.

SUMMARY STEPS

1. `hw-module sm slot oir-stop`
2. Confirm that the board is ready for removal. The LED blinks for 3 seconds and turns off. After the LED is off, the board is ready for removal.
3. Insert the replacement board in the same slot or in an empty slot.
4. `hw-module sm slot oir-start`

DETAILED STEPS

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong> hw-module sm slot oir-stop</td>
<td>Shuts down the specified module to prepare it for removal.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Router# hw-module sm 2 oir-stop</td>
<td></td>
</tr>
</tbody>
</table>

Step 2
Wait until the LED signals that the board is ready for removal. The LED blinks for 3 seconds and turns off. After the LED is off, the board is ready for removal.

Step 3
Insert the replacement board in the same slot or in an empty slot.

Step 4
`hw-module sm slot oir-start`
Restores power to the module.

**Example:**
Router# hw-module sm 2 oir-start

Restart the controller and voice ports

SUMMARY STEPS

1. `configure terminal`
2. `controller e1 slot/port`
3. `no shutdown`
4. `exit`
5. `voice-port slot number/port`
6. `no shutdown`
7. `exit`
### Detailed Steps

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td>configure terminal</td>
</tr>
<tr>
<td>Example:</td>
<td>Router# configure terminal</td>
</tr>
<tr>
<td></td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td>controller e1 slot/port</td>
</tr>
<tr>
<td>Example:</td>
<td>Router(config)# controller e1 0/0/0</td>
</tr>
<tr>
<td></td>
<td>Enters config-controller mode.</td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td>no shutdown</td>
</tr>
<tr>
<td>Example:</td>
<td>Router(config-controller)# no shutdown</td>
</tr>
<tr>
<td></td>
<td>Restarts the controller port.</td>
</tr>
<tr>
<td><strong>Step 4</strong></td>
<td>exit</td>
</tr>
<tr>
<td>Example:</td>
<td>Router(config-controller)# exit</td>
</tr>
<tr>
<td></td>
<td>Exits config-controller mode.</td>
</tr>
<tr>
<td><strong>Step 5</strong></td>
<td>voice-port slot number/port</td>
</tr>
<tr>
<td>Example:</td>
<td>Router(config)# voice-port 0/0/0:1</td>
</tr>
<tr>
<td></td>
<td>Enters config-voiceport mode.</td>
</tr>
<tr>
<td><strong>Step 6</strong></td>
<td>no shutdown</td>
</tr>
<tr>
<td>Example:</td>
<td>Router(config-voiceport)# no shutdown</td>
</tr>
<tr>
<td></td>
<td>Restarts the voice port.</td>
</tr>
<tr>
<td><strong>Step 7</strong></td>
<td>exit</td>
</tr>
<tr>
<td>Example:</td>
<td>Router(config-voiceport)# exit</td>
</tr>
<tr>
<td></td>
<td>Exits config-voiceport mode.</td>
</tr>
</tbody>
</table>

### How to Verify and Troubleshoot the Functionality of the PVDM3 Cards on Cisco Voice Gateways

Use the following commands in global configuration mode to verify and troubleshoot the functionality of the PVDM3 modules in your Cisco voice gateway.

**Summary Steps**
1. show platform hw-module-power
2. show voice call slot/port
3. show voice dsp group all
How to Verify and Troubleshoot the Functionality of the PVDM3 Cards on Cisco Voice Gateways

3. show voice dsp sorted-list
4. show voice dsp capabilities slot number dsp number
5. show voice dsp group slot number
6. show voice dsp statistics device
7. show voice dsp statistics tx-rx
8. show voice dsp statistics ack
9. debug voice dsp crash-dump
**DETAILED STEPS**

**Step 1**  
**show platform hw-module-power**

*Note*  
Only on Cisco VG350, effective from Cisco IOS Releases 15.1(1)T and 15.0.1M(2), the `hw-module energywise level` command is not available in Cisco IOS software. For more information, see the *Cisco 3900 Series, 2900 Series, and 1900 Series Software Configuration Guide*.  

Use this command to display power settings of PVDM3 service modules, for example:

```
Router# show platform hw-module-power
```

**PVDM:**

```
Slot 0/1
   Levels supported 0x441 : SHUT FRUGAL FULL
   CURRENT level : 10 (FULL)
   Previous level : 10 (FULL)
   Transitions : Successful Unsuccessful
     SHUT : 0          0
     FRUGAL : 0         0
     FULL : 0          0

Slot 0/2
   Levels supported 0x441 : SHUT FRUGAL FULL
   CURRENT level : 10 (FULL)
   Previous level : 0 (SHUT)
   Transitions : Successful Unsuccessful
     SHUT : 1          0
     FRUGAL : 0         1
     FULL : 1          0

Slot 0/3
   Levels supported 0x441 : SHUT FRUGAL FULL
   CURRENT level : 10 (FULL)
   Previous level : 10 (FULL)
   Transitions : Successful Unsuccessful
     SHUT : 0          0
     FRUGAL : 0         0
     FULL : 0          0
```

**Step 2**  
**show voice call slot/port**

*Note*  
If you are connected using a Telnet session, you must enter the `terminal monitor` command before the `show voice call` command to see console messages. This step is not necessary if you are connected to the console port.

Use this command to display statistics for voice calls on a specific slot and port, for example:

```
Router# show voice call 0/1:23
```

```
0/2/1:23 1
  vtsp level 0 state = S_CONNECT
callid 0x0011 B01 state S_TSP_CONNECT clld 4085001112 cllg 4085001112
0/2/1:23 2
  vtsp level 0 state = S_CONNECT
callid 0x0012 B02 state S_TSP_CONNECT clld 4085001112 cllg 4085001112
0/2/1:23 3 - -
0/2/1:23 4 - -
```
Chapter 4  Configuring Next-Generation High-Density PVDM3 Modules

How to Verify and Troubleshoot the Functionality of the PVDM3 Cards on Cisco Voice Gateways

Step 3  show voice dsp group all

Use this command to display information for each DSP group, for example:

Router# show voice dsp group all

DSP groups on slot 0:

dsp 1:
  State: UP, firmware: 26.0.135
  Max signal/voice channel: 43/43
  Max credits: 645
  num_of_sig_chns_allocated: 35
  Transcoding channels allocated: 0
  Group: FLEX_GROUP_VOICE, complexity: FLEX
    Shared credits: 630, reserved credits: 0
    Signaling channels allocated: 35
    Voice channels allocated: 1
    Credits used (rounded-up): 15
    Voice channels:
      Ch01: voice port: 0/1:23.2, codec: g711alaw, credits allocated: 15
  Slot: 0
  Device idx: 0
  PVDM Slot: 0
  Dsp Type: SP2600


dsp 2:
  State: UP, firmware: 26.0.135
  Max signal/voice channel: 43/43
  Max credits: 645
  num_of_sig_chns_allocated: 0
  Transcoding channels allocated: 0
  Group: FLEX_GROUP_VOICE, complexity: FLEX
    Shared credits: 645, reserved credits: 0
    Signaling channels allocated: 0
    Voice channels allocated: 0
    Credits used (rounded-up): 0
  Slot: 0
  Device idx: 0
  PVDM Slot: 0
  Dsp Type: SP2600


dsp 3:
  State: UP, firmware: 26.0.135
  Max signal/voice channel: 42/43

0/2/1:23  5  -  -  -  -
0/2/1:23  6  -  -  -  -
0/2/1:23  7  -  -  -  -
0/2/1:23  8  -  -  -  -
0/2/1:23  9  -  -  -  -
0/2/1:23 10-  -  -  -  -
0/2/1:23 11-  -  -  -  -
0/2/1:23 12-  -  -  -  -
0/2/1:23 13-  -  -  -  -
0/2/1:23 14-  -  -  -  -
0/2/1:23 15-  -  -  -  -
0/2/1:23 16-  -  -  -  -
0/2/1:23 17-  -  -  -  -
0/2/1:23 18-  -  -  -  -
0/2/1:23 19-  -  -  -  -
0/2/1:23 20-  -  -  -  -
0/2/1:23 21-  -  -  -  -
0/2/1:23 22-  -  -  -  -
0/2/1:23 23-  -  -  -  -
Max credits: 645
num_of_sig_chnlsl allocated: 0
Transcoding channels allocated: 0
Group: FLEX_GROUP_VOICE, complexity: FLEX
  Shared credits: 645, reserved credits: 0
  Signaling channels allocated: 0
  Voice channels allocated: 0
  Credits used (rounded-up): 0
Slot: 0
Device idx: 0
PVDM Slot: 0
dsp Type: SP2600
dsp 4:
State: UP, firmware: 26.0.135
Max signal/voice channel: 43/43
Max credits: 645
num_of_sig_chnlsl allocated: 0
Transcoding channels allocated: 0
Group: FLEX_GROUP_VOICE, complexity: FLEX
  Shared credits: 645, reserved credits: 0
  Signaling channels allocated: 0
  Voice channels allocated: 0
  Credits used (rounded-up): 0
Slot: 0
Device idx: 1
PVDM Slot: 0
dsp Type: SP2600
dsp 5:
State: UP, firmware: 26.0.135
Max signal/voice channel: 43/43
Max credits: 645
num_of_sig_chnlsl allocated: 0
Transcoding channels allocated: 0
Group: FLEX_GROUP_VOICE, complexity: FLEX
  Shared credits: 645, reserved credits: 0
  Signaling channels allocated: 0
  Voice channels allocated: 0
  Credits used (rounded-up): 0
Slot: 0
Device idx: 1
PVDM Slot: 0
dsp Type: SP2600
dsp 6:
State: UP, firmware: 26.0.135
Max signal/voice channel: 42/43
Max credits: 645
num_of_sig_chnlsl allocated: 0
Transcoding channels allocated: 0
Group: FLEX_GROUP_VOICE, complexity: FLEX
  Shared credits: 645, reserved credits: 0
  Signaling channels allocated: 0
  Voice channels allocated: 0
  Credits used (rounded-up): 0
Slot: 0
Device idx: 1
PVDM Slot: 0
dsp Type: SP2600
How to Verify and Troubleshoot the Functionality of the PVDM3 Cards on Cisco Voice Gateways

dsp 7:
  State: UP, firmware: 26.0.135
  Max signal/voice channel: 32/32
  Max credits: 480
  num_of_sig_chnl_s_allocated: 0
  Transcoding channels allocated: 0
  Group: FLEX_GROUP_VOICE, complexity: FLEX
    Shared credits: 465, reserved credits: 0
    Signaling channels allocated: 0
    Voice channels allocated: 1
    Credits used (rounded-up): 15
    Voice channels:
      Ch01: voice port: 0/1/23.1, codec: g711alaw, credits allocated: 15
      Slot: 0
      Device idx: 0
      PVDM Slot: 1
      Dsp Type: SP2600

DSP groups on slot 1:

DSP groups on slot 2:
  dsp 1:
    State: UP, firmware: 26.0.133
    Max signal/voice channel: 16/16
    Max credits: 240
    num_of_sig_chnl_s_allocated: 0
    Transcoding channels allocated: 0
    Group: FLEX_GROUP_VOICE, complexity: FLEX
      Shared credits: 240, reserved credits: 0
      Signaling channels allocated: 0
      Voice channels allocated: 0
      Credits used (rounded-up): 0

  dsp 2:
    State: UP, firmware: 26.0.133
    Max signal/voice channel: 16/16
    Max credits: 240
    num_of_sig_chnl_s_allocated: 0
    Transcoding channels allocated: 0
    Group: FLEX_GROUP_VOICE, complexity: FLEX
      Shared credits: 240, reserved credits: 0
      Signaling channels allocated: 0
      Voice channels allocated: 0
      Credits used (rounded-up): 0

  dsp 3:
    State: UP, firmware: 26.0.133
    Max signal/voice channel: 16/16
    Max credits: 240
    num_of_sig_chnl_s_allocated: 0
    Transcoding channels allocated: 0
    Group: FLEX_GROUP_VOICE, complexity: FLEX
      Shared credits: 240, reserved credits: 0
      Signaling channels allocated: 0
      Voice channels allocated: 0
      Credits used (rounded-up): 0
Step 4 show voice dsp sorted-list

Use this command to display the hunt order in which DSPs are utilized for particular services (in this example, voice, conferencing, and transcoding are shown for slot 0):

Router# show voice dsp sorted-list slot 0

DSP id selection list for different service for Card 0:
=========================================================================
Voice :01,02,03,04,05,06,07
Conf :07,06,05,04,03,02,01
Xcode :01,02,03,04,05,06,07

Step 5 show voice dsp capabilities slot number dsp number

Use this command to display capabilities data for a particular DSP on a particular slot (in this example, DSP 2 on slot 0):

Router# show voice dsp capabilities slot 0 dsp 2

DSP Type: SP2600 -43
Card 0 DSP id 2 Capabilities:
Credits 645 , G711 Credits 15, HC Credits 32, MC Credits 20, FC Channel 43, HC Channel 20, MC Channel 32,
Conference 8-party credits:
G711 58 , G729 107, G722 129, ILBC 215
Secure Credits:
Sec LC Xcode 24, Sec HC Xcode 64,
Sec MC Xcode 35, Sec G729 conf 161,
Sec G722 conf 215, Sec ILBC conf 322,
Sec G711 conf 92 ,
Max Conference Parties per DSP:
G711 88, G729 48, G722 40, ILBC 24,
Sec G711 56, Sec G729 32,
Sec G722 24 Sec ILBC 16,
Step 6  show voice dsp group slot number

Use this command to display the current status or selective statistics of DSP voice channels for a specific DSP group. For example:

Router# show voice dsp group slot 0
dsp 1:
  State: UP, firmware: 8.4.0
  Max signal/voice channel: 16/16
  Max credits: 240
  Group: FLEX_GROUP_VOICE, complexity: FLEX
  Shared credits: 240, reserved credits: 0
  Signaling channels allocated: 0
  Voice channels allocated: 0
  Credits used: 0
  Oversubscription: can either be an indicator or a counter
  DSP type: SP260x

Step 7  show voice dsp statistics device

Use this command to display DSP voice statistics for the device:

Router# show voice dsp statistics device

<table>
<thead>
<tr>
<th>DEVICE ID</th>
<th>DSP CURR</th>
<th>AI/RST/WDT</th>
<th>ACK</th>
<th>MAC ADDRESS</th>
<th>TX/RX PACK</th>
<th>KEEPALIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0/0/0</td>
<td>1</td>
<td>0/0/0</td>
<td>0</td>
<td>00fa.ce25.0000</td>
<td>51645919/37972871</td>
<td>29875/29875/0</td>
</tr>
<tr>
<td>0/0/0</td>
<td>2</td>
<td>0/0/0</td>
<td>0</td>
<td>00fa.ce25.0000</td>
<td>51645919/37972871</td>
<td>29875/29875/0</td>
</tr>
<tr>
<td>0/0/0</td>
<td>3</td>
<td>0/0/0</td>
<td>0</td>
<td>00fa.ce25.0000</td>
<td>51645919/37972871</td>
<td>29875/29875/0</td>
</tr>
<tr>
<td>0/0/1</td>
<td>4</td>
<td>0/0/0</td>
<td>0</td>
<td>00fa.ce25.0001</td>
<td>28355309/20859980</td>
<td>29875/29875/0</td>
</tr>
<tr>
<td>0/0/1</td>
<td>5</td>
<td>0/0/0</td>
<td>0</td>
<td>00fa.ce25.0001</td>
<td>28355309/20859980</td>
<td>29875/29875/0</td>
</tr>
<tr>
<td>0/0/1</td>
<td>6</td>
<td>0/0/0</td>
<td>0</td>
<td>00fa.ce25.0001</td>
<td>28355309/20859980</td>
<td>29875/29875/0</td>
</tr>
</tbody>
</table>

Step 8  show voice dsp statistics tx-rx

Use this command to display transmitted and received packet counts for the device:

Router# show voice dsp statistics tx-rx

Device and Port Statistics: PVDM-0

8903 input packets at port, 15374 output packets at port
Device 0:
6893 packets from device, 11793 packets to device
0 Ctrl & 0 Media out of sequence packets, 0 packets drop
0 input error packets, 0 output error packets
0 resource errors packets, 0 gaints
vlan id: 2
Device 1:
2048 packets from device, 3579 packets to device
0 Ctrl & 0 Media out of sequence packets, 0 packets drop
0 input error packets, 0 output error packets
0 resource errors packets, 0 gaints
vlan id: 2

Device and Port Statistics: PVDM-1
------------------------------------
29083 input packets at port, 32627 output packets at port
Device 2:
29081 packets from device, 32627 packets to device
0 Ctrl & 0 Media out of sequence packets, 0 packets drop
0 input error packets, 0 output error packets
0 resource errors packets, 0 gaints
vlan id: 2

BP throttle change count 0, Current throttle flag 0
TX messages at congestion count 0

**Step 9**  
*show voice dsp statistics ack*

Use this command to display ACK statistics for the device:

```plaintext
Router# show voice dsp statistics ack
DSP ACK RETRY TOTAL WAITING
ID DEPTH COUNT RETRANSMISSION FOR ACK
=== ===== ====== ==============  ========
ACK is enabled
```

**Step 10**  
*debug voice dsp crash-dump*

Use this command to display debugging information for the crash dump feature (for detailed information about this, see the section *Voice DSP Crash Dump File Analysis* in *Cisco IOS Voice Troubleshooting and Monitoring Guide*):

```plaintext
Router# debug voice dsp crash-dump keepalives
```

**Configuration Examples for Configuring the PVDM3 Module on Cisco Voice Gateway Routers**

This section provides an example of a running configuration. This example is for reference purposes only and contains IP addresses and telephone numbers that are not actual, valid addresses and telephone numbers; they are provided for illustrative purposes only.
Configuration Examples for Configuring the PVDM3 Module on Cisco Voice Gateway Routers

Chapter 4  Configuring Next-Generation High-Density PVDM3 Modules

show running-config: Example

Router# show running-config
Building configuration...

! voice-card 0:

Current configuration : 3726 bytes

! version 12.4
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname Router
!
boot-start-marker
boot-end-marker
!
card type t1 0 2
logging message-counter syslog
logging buffered 10000000
!
no aaa new-model
clock timezone PST 8
no network-clock-participate slot 0
network-clock-participate wic 0
network-clock-select 1 T1 0/0/1
!
no ipv6 cef
ip source-route
ip cef
!
!
!
ip host hostname 223.255.254.254 255.255.255.255
ntp update-calendar
ntp server 10.1.32.153
ntp peer 10.1.32.153
multilink bundle-name authenticated
!
!
!
isdn switch-type primary-ni
!
!
!
voice-card 0
!
end
## Additional References

The following sections provide references related to the PVDM3 on Cisco Gateway Routers feature.

### Related Documents

<table>
<thead>
<tr>
<th>Related Topic</th>
<th>Document Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehensive command reference information for Cisco IOS voice commands.</td>
<td><em>Cisco IOS Voice Command Reference</em></td>
</tr>
<tr>
<td>Configuration information for Cisco Voice Gateway Routers that are configured for Cisco Unified Communications Manager.</td>
<td><em>Cisco Unified Communications Manager and Cisco IOS Interoperability Guide</em></td>
</tr>
<tr>
<td>Complete hardware installation instructions for installing the PVDM3.</td>
<td><em>Cisco 2900 Series and 3900 Series Integrated Services Routers Hardware Installation Guide</em></td>
</tr>
</tbody>
</table>

### Standards

<table>
<thead>
<tr>
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<th>Title</th>
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<td>None</td>
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### MIBs

<table>
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<tr>
<th>MIB</th>
<th>MIBs Link</th>
</tr>
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<tbody>
<tr>
<td>CISCO-DSP-MGMT-MIB</td>
<td>To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at: <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a></td>
</tr>
</tbody>
</table>

### RFCs

<table>
<thead>
<tr>
<th>RFC</th>
<th>Title</th>
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<tbody>
<tr>
<td>None</td>
<td>—</td>
</tr>
</tbody>
</table>
Technical Assistance

<table>
<thead>
<tr>
<th>Description</th>
<th>Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Cisco Support and Documentation website provides online resources to</td>
<td><a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a></td>
</tr>
<tr>
<td>download documentation, software, and tools. Use these resources to install</td>
<td></td>
</tr>
<tr>
<td>and configure the software and to troubleshoot and resolve technical</td>
<td></td>
</tr>
<tr>
<td>issues with Cisco products and technologies. Access to most tools on the</td>
<td></td>
</tr>
<tr>
<td>Cisco Support and Documentation website requires a Cisco.com user ID and</td>
<td></td>
</tr>
<tr>
<td>password.</td>
<td></td>
</tr>
</tbody>
</table>

Feature Information for Configuring the PVDM3 Module on Cisco Voice Gateway Routers

Table 4-2 lists the release history for this feature.

Not all commands may be available in your Cisco IOS software release. For release information about a specific command, see the command reference documentation.

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which Cisco IOS and Catalyst OS software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account at Cisco.com is not required.

**Note**

Table 4-2 lists only the Cisco IOS software release that introduced support for a given feature in a given Cisco IOS software release train. Unless noted otherwise, subsequent releases of that Cisco IOS software release train also support that feature.

<table>
<thead>
<tr>
<th>Feature Name</th>
<th>Releases</th>
<th>Feature Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuring the PVDM3 Module on Cisco Voice Gateway Routers</td>
<td>15.4(3)M</td>
<td>The PVDM3 DSP(^1) modules support high-density audio applications on the Cisco voice gateways. These DSP modules provide resources for voice termination, voice compression algorithms, echo cancellation, conferencing and transcoding, and support for modems and fax calls. In Release 15.4(3)M, this feature is supported only on the Cisco VG310 and Cisco VG320.</td>
</tr>
</tbody>
</table>

1. DSP = digital signal processor
Cisco VG350, Cisco VG310, and Cisco VG320 Configuration Examples

This appendix presents the following sample configurations for the Cisco VG350, Cisco VG310, and Cisco VG320:

- Cisco IOS Bulk Configuration on the voice-port Command, page A-1
- Group configuration on the dial-peer command, page A-4
- Loop-length configuration, page A-7
- ren configuration, page A-7
- ring dc-offset configuration, page A-8
- cm-current-enhance configuration, page A-8
- vmwi configuration, page A-9
- Configuring multiple ports and dial-peers in one instance, page A-9
- Configuring EnergyWise, page A-10

Cisco IOS Bulk Configuration on the voice-port Command

The voice-port command will take a new '-' following the port# entry to signify range mode configuration. A second port# will be prompted, which will be interpreted as ending port# and the previous one as starting port.

```
vg350(config)#voice-port 2/0/0-71
  vg350(config-voiceport)#caller-id block
  vg350(config-voiceport)#exit
vg350(config)#voice-port 2/0/0-2
  vg350(config-voiceport)#ren 3
```

Subcommands entered will apply to all the affected ports. This is a one-shot emulation of the manual configuration N times by internally invoking the parser action function on the affected ports.
The following shows a snapshot of the resulting running-config display:

```
v350#
! voice-port 2/0/0
caller-id block
ren 3
!
voice-port 2/0/1
caller-id block
ren 3
!
voice-port 2/0/2
caller-id block
ren 3
!
voice-port 2/0/3
caller-id block
!

!
voice-port 2/0/71
caller-id block
!
```

Under the range mode, the `description` and `station-id` commands will take new `base` and `interval` keywords to automatically customize the contents for each port.

```
v350(config)#voice-port 0/0/0-3
v350(config-voiceport)#description base 100 interval 5 DESCRIPTION-
v350(config-voiceport)#station-id name base 50 interval 2 NAME
v350(config-voiceport)#station-id number base 20 interval 1 70000
v350(config-voiceport)#end
v350#sh run | b voice-port
voice-port 0/0/0
description DESCRIPTION-100
station-id name NAME50
station-id number 70020
!
voice-port 0/0/1
description DESCRIPTION-105
station-id name NAME52
station-id number 70021
!
voice-port 0/0/2
description DESCRIPTION-110
station-id name NAME54
station-id number 70022
!
voice-port 0/0/3
description DESCRIPTION-115
station-id name NAME56
station-id number 70023
!```
The following commands will be supported for range mode:

```
vg350(config)#voice-port 2/0/0-71
vg350(config-voiceport)#?
```

**Note**
For Cisco VG310, the range is from 0 to 23 and for Cisco VG320, the range is from 0 to 47.

The following are voice-port configuration commands:

**Table A-1 Voice-Port Configuration Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Command Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>battery-reversal</td>
<td>Enables FXS battery-reversal generation.</td>
</tr>
<tr>
<td>busyout</td>
<td>Configures busyout trigger event &amp; procedure.</td>
</tr>
<tr>
<td>caller-id</td>
<td>Configures port caller ID parameters.</td>
</tr>
<tr>
<td>default</td>
<td>Sets a command to its defaults.</td>
</tr>
<tr>
<td>description</td>
<td>Describes the port where the router is connected to.</td>
</tr>
<tr>
<td>disconnect-ack</td>
<td>Acknowledges FXS sending disconnect.</td>
</tr>
<tr>
<td>exit</td>
<td>Exits from voice-port configuration mode.</td>
</tr>
<tr>
<td>mwi</td>
<td>Enables MWI on this port.</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or set its defaults.</td>
</tr>
<tr>
<td>ren</td>
<td>Ringer Equivalence Number.</td>
</tr>
<tr>
<td>ring</td>
<td>Ring frequency Parameters.</td>
</tr>
<tr>
<td>shutdown</td>
<td>Takes voice port offline.</td>
</tr>
<tr>
<td>signal</td>
<td>Configures signal parameters for FXS/DID VIC.</td>
</tr>
<tr>
<td>snmp</td>
<td>Modifies SNMP voice port parameters.</td>
</tr>
<tr>
<td>station-id</td>
<td>Configures station ID.</td>
</tr>
<tr>
<td>loop-length</td>
<td>Configures loop length on FXS port.</td>
</tr>
</tbody>
</table>

**Note**
The bulk configuration CLIs are not HotIce compliant.
Group configuration on the dial-peer command

All dial peers created with **group** have the same defaults as legacy dial peers. However, they are not saved in the NVRAM and cannot be modified using legacy dial peer CLI after being created. Although no created dial peers are saved in the NVRAM, these dial peer bulk configuration lines will be saved in the NVRAM before the legacy dial peer CLIs, and hence, they will be parsed and their associated dial peers will be created first at the reboot time.

This bulk configuration feature will not only provide a configuration shortcut but also save a lot of NVRAM space. The following example shows how to configure **dial-peer group <group tag> pots**. The **dial peer group** submode is prompted for further parameters specification.

```
vg350(config)#dial-peer ?
group Define group parameters
cor Class of Restriction
data Data type
hunt Define the dial peer hunting choice
inbound Define the inbound options
no-match Define the disconnect cause for no dialpeer match
outbound Define the outbound options
search Define dial peer search service
terminator Define the address terminate character
voice Voice type

vg350(config)#dial-peer group ?
<1-10> dial-peer group tag

vg350(config)#dial-peer group 1 ?
pots Telephony

vg350(config)#dial-peer group 1 pots
vg350(config-dp-group)#?
Dial Peer Group commands:
default Set a command to its defaults
description Dial peer specific description
exit Exit from dial-peer configuration mode
no Negate a command or set its defaults
port Voice port number or range
preference Configure the preference order of group configured dial peers
service The selected service
shutdown Change the Admin State to down (no->up)
```
When configuring a voice port number, a port range, or all ports, users can specify port-specific parameters in a line.

**Note**

For E164 associated parameters, only one can be configured and it has to be configured before the description.

```
vg350(config-dp-group)# port 0/0/0 ?
ans The Call Destination Number
called Incoming Called number
desc Dial peer description
dest A full E.164 telephone number prefix
cr>
```

```
v350(config-dp-group)# port 0/0/0 ans ?
WORD A sequence of digits - representing the prefix or full telephone number
```

```
v350(config-dp-group)# port 0/0/0 ans ?
desc Dial peer description
<cr>
```

```
v350(config-dp-group)# port 0/0/0 called 1000 desc **Security Panel**
v350(config-dp-group)# port 0/0/1 desc **Alarm 1**
v350(config-dp-group)# port 0/0/2 dest 1001 desc **Alarm 2**
v350(config-dp-group)# port 0/0/3 ans 1002
```

If the E164 number among each port is the same or incremented by an interval not larger than 100, users can provision dial peers using a port range or the "all" option. The interval value is zero by default and can range from 1 to 100.

```
v350(config-dp-group)# port 4/0/0-9 dest 1000 desc Sales
v350(config-dp-group)# port 4/0/10-19 dest 2000 1 desc Marketing
v350(config-dp-group)# port 4/0/20-29 dest 3000 100
v350(config-dp-group)# port 4/0/30-39 dest 4000
v350(config-dp-group)# port 4/0/40-49 desc Marketing
v350(config-dp-group)# port 4/0/50-59
```

The users need to use legacy dial peer CLI to configure the dial peer with unsupported subcommands when the configurable subcommands for a specific port or non-default common attributes for a set of ports are limited and the group-configured dial peers are not presented for further modification.

If one port in a range of ports requires unsupported attributes, the user will have to configure two port ranges for auto bulk configuration and one manual dial peer for the voice port.

If a user wants to troubleshoot a group-configured dial peer specified in a port range using "pcm-dump" subcommand, he needs to shut down the dial peer for this port or remove the whole port range and reconfigure other ports using two port ranges before manually creating a dial peer using legacy dial-peer CLI.

After finishing the troubleshooting for a voice port with the manual dial peer, the user can shut down or remove the manual dial peer or just continue using this manual dial peer.

The group-configured dial peer is created in the same way as a manual dial peer, and hence, it has the default preference value, 0, and would be selected as inbound dial peer according to the configured or created order.

Because the group dial peer CLI will be saved in the NVRAM before the legacy dial peer, it will be parsed before the legacy dial peer.
All dial peers configured under the group CLI or the dial peer for a specific port can be shut at the same
time.

vg350(config-dp-group)# shut ?
WORD Shut down a group configured dial peer for a specified port
all Shut down all group configured dial peers

Although these group-configured dial peers are not saved in the NVRAM, they are visible using
show dial-peer group [<tag>] [summary|detail]:

vg350# show dial-peer auto
dial-peer group 1:
    description Analog ports
    service stcapp
    port 2/0/0/0-9
    port 2/0/10-19 desc Marketing
dial-peer group 2:
    port all dest 1000 10 desc group configured analog ports

vg350# show dial-peer auto 1
description Analog ports
    service stcapp
    port 2/0/0/0-9
    port 2/0/10-19 desc Marketing

vg350# show dial-peer auto summary
dial-peer group 1:
    TAG   TYPE   ADMIN OPER PREFIX DEST-PATTERNPREFERPASSTHRUSESS-TARGET OUT STATE PORT
    21474- pots up up  0 down 0/0/0
    83647

    dial-peer group 2:
    TAG   TYPE   ADMIN OPER PREFIX DEST-PATTERNPREFERPASSTHRUSESS-TARGET OUT STATE PORT
    21474- pots up up 1000 0    down 0/0/0
    83678
    21474- pots up up 1000 0    down 0/0/1
    83678

vg350# show dial-peer auto 1 summary
dial-peer group 1:
    TAG   TYPE   ADMIN OPER PREFIX DEST-PATTERNPREFERPASSTHRUSESS-TARGET OUT STATE PORT
    21474- pots up up  0 down 0/0/0
    83647

vg350# show dial-peer auto 1 detail
VoiceEncapPeer2147483648
    peer type = voice, system default peer = FALSE, information type = voice,
description = '',
tag = 2147483648, destination-pattern = '',
voice reg type = 0, corresponding tag = 0,
answer-address = '', preference=0,
group = 8, Admin state is up, Operation state is up,
Outbound state is down,
incoming called-number = '', connections/maximum = 0/unlimited,
inbound application associated: 'stcapp'
outbound application associated: ''
Loop-length configuration

The following configuration shows the use of the `loop-length` command:

```
vg350#config t
Enter configuration commands, one per line. End with CNTL/Z.
vg350(config)#voice-port 2/0/0
vg350(config-voiceport)#loop-length ?
  long  long loop length
  short short loop length
vg350(config-voiceport)#loop-length long
vg350(config-voiceport)#shut
vg350(config-voiceport)#no shut
vg350(config-voiceport)#
*Mar 21 21:19:17.790: %LINK-3-UPDOWN: Interface Foreign Exchange Station 2/0/0, changed
  state to Administrative Shutdown
*Mar 21 21:19:19.094: %LINK-3-UPDOWN: Interface Foreign Exchange Station 2/0/0, changed
  state to up
vg350(config-voiceport)#
default to loop-length short.
```

ren configuration

In the `ren x` configuration, `x` is the actual REN specified on the analog phone. It is important to enter a proper value for `x` that should match with the actual REN required on the analog phone in use. Normally, this REN number is specified on the back label of the analog phone.

The following example shows the `ren` command:

```
vg350(config-voiceport)#loop-length short
vg350(config-voiceport)#shut
vg350(config-voiceport)#no shut
vg350(config-voiceport)#
*Mar 21 21:20:23.242: %LINK-3-UPDOWN: Interface Foreign Exchange Station 2/0/0, changed
  state to Administrative Shutdown
*Mar 21 21:20:24.122: %LINK-3-UPDOWN: Interface Foreign Exchange Station 2/0/0, changed
  state to up
vg350(config-voiceport)#ren ?   <<< with short loop FXS, ren 1-5 is supported
  <1-5>  REN Value
vg350(config-voiceport)#ren 5
vg350(config-voiceport)#loop-length long    <<<< change loop-length from short to long
when ren 5 is configured, warning msg is printed out
The existing ren configuration is changed to 2 due to loop-length long is configured
vg350(config-voiceport)#sh
vg350(config-voiceport)#no sh
vg350(config-voiceport)#
*Mar 21 21:20:44.354: %LINK-3-UPDOWN: Interface Foreign Exchange Station 2/0/0, changed
  state to Administrative Shutdown
*Mar 21 21:20:45.242: %LINK-3-UPDOWN: Interface Foreign Exchange Station 2/0/0, changed
  state to up
vg350(config-voiceport)#ren ?    <<<< with long loop FXS, ren 1 - 2 is supported
  <1-2>  REN Value
```
**ring dc-offset configuration**

The following example shows how to configure the `dc-offset` command. Default is no `ring dc-offset`:

```plaintext
vg350(config-voiceport)#loop-length long
vg350(config-voiceport)#shut
vg350(config-voiceport)#no shut
vg350(config-voiceport)#
*Mar 21 21:34:28.370: %LINK-3-UPDOWN: Interface Foreign Exchange Station 2/0/0, changed state to Administrative Shutdown
*Mar 21 21:34:29.274: %LINK-3-UPDOWN: Interface Foreign Exchange Station 2/0/0, changed state to up
vg350(config-voiceport)#ring dc-offset ?   <<< this CLI is only existed for loop-length long FXS
  10-volts Ring DC offset 10 volts
  20-volts Ring DC offset 20 volts
  24-volts Ring DC offset 24 volts
  30-volts Ring DC offset 30 volts
  35-volts Ring DC offset 35 volts
vg350(config-voiceport)#ring dc-offset 10
vg350(config-voiceport)#shut
vg350(config-voiceport)#no shut
*Mar 21 21:34:42.986: %LINK-3-UPDOWN: Interface Foreign Exchange Station 2/0/0, changed state to Administrative Shutdown
vg350(config-voiceport)#
*Mar 21 21:34:44.478: %LINK-3-UPDOWN: Interface Foreign Exchange Station 2/0/0, changed state to up
vg350(config-voiceport)#loop-length short   <<< change loop-length from long to short when ring dc-offset is configured, warning msg is printed out
The existing ring dc-offset configuration is removed due to loop-length short is configured
vg350(config-voiceport)#shut
vg350(config-voiceport)#no shut
vg350(config-voiceport)#
*Mar 21 21:34:55.362: %LINK-3-UPDOWN: Interface Foreign Exchange Station 2/0/0, changed state to Administrative Shutdown
*Mar 21 21:34:56.322: %LINK-3-UPDOWN: Interface Foreign Exchange Station 2/0/0, changed state to up
```

**cm-current-enhance configuration**

---

**Note**

The `cm-current-enhance` command is used to improve immunity to extreme levels of longitudinal noise on the long loop-length FXS and the command should not be used under normal conditions.

The following example shows how to configure the `cm-current-enhance` command:

```plaintext
vg350(config-voiceport)#loop-length long
vg350(config-voiceport)#shut
vg350(config-voiceport)#no shut
*Mar 21 21:41:05.362: %LINK-3-UPDOWN: Interface Foreign Exchange Station 2/0/0, changed state to Administrative Shutdown
vg350(config-voiceport)#
*Mar 21 21:41:06.778: %LINK-3-UPDOWN: Interface Foreign Exchange Station 2/0/0, changed state to up
vg350(config-voiceport)#cm-current-enhance <<< this CLI is only existed for loop-length long FXS
vg350(config-voiceport)#shut
vg350(config-voiceport)#no shut
```
vg350(config-voiceport)#
*Mar 21 21:41:18.778: %LINK-3-UPDOWN: Interface Foreign Exchange Station 2/0/0, changed
state to Administrative Shutdown
*Mar 21 21:41:19.658: %LINK-3-UPDOWN: Interface Foreign Exchange Station 2/0/0, changed
state to up

Default is no cm-current-enhance.

**vmwi configuration**

**VMWI CLI** is only applicable to loop start signaling FXS. Default is vmwi fsk.
This CLI is only applicable to analog FXS voice ports on SM-D-72FXS and SMD-48FXS-E modules. It
is not applicable to FXS voice ports on motherboard slot (slot 0).
The following shows a sample configuration showing the vmwi command:

```
vg350(config-voiceport)#vmwi ?
   dc-voltage   Enable DC Voltage VMWI on this FXS port
   fsk         Enable FSK VMWI on this FXS port

vg350(config-voiceport)#vmwi dc-voltage
vg350(config-voiceport)#vmwi fsk
vg350(config-voiceport)#no vmwi
```

**Configuring multiple ports and dial-peers in one instance**

The following example shows how to configure multiple ports and dial-peers in one instance for Cisco
VG350:

```
! Voice-port 2/0/0 - 2/0/0-71
Caller-id enable
!
! port all
service stcapp

! Dial-peer voice 1 - 160
Service stcapp
!
```

**Note** This example is also applicable to the Cisco VG310 and Cisco VG320 platforms that enable you to
configure multiple ports and dial peers in one instance.
Configuring EnergyWise

The following shows how to configure the EnergyWise feature on the module:

```
xfr_cube(config)#energywise ?
   allow       Configure which EnergyWise settings are allowed on this domain
   member
   domain      Set the EnergyWise domain this entity should join
   endpoint    Set the EnergyWise endpoint access options
   importance  A rating of the importance this EnergyWise parent entity has in the network
   keywords    EnergyWise keywords associated with this parent entity
   level       Set the EnergyWise level of this parent entity
   management  energywise management access options
   name        EnergyWise name for this parent entity
   neighbor    Specify a static neighbor
   role        The role this EnergyWise entity has in the network
```

**Note**

This feature is not supported on Cisco VG310 and Cisco VG320 platforms.
APPENDIX B

Cisco VG350, Cisco VG310, and Cisco VG320
Analog Voice Gateway-Supported Software and Platforms

This appendix describes the software, features, and platforms supported by the Cisco VG350, Cisco VG310, and Cisco VG320 Analog Voice Gateway and contains the following sections:

- DS0 Dump Support on T1/E1 and BRI Modules, page B-12
- Cable Detection on Analog FXS and FXO Support, page B-12
- Non-payload encryption (NPE) capabilities, page B-12
- MIB Support, page B-13
- CUCM Support, page B-16
- CUCME Support, page B-17
- Cisco Unified Communications (CUOM, CUPM, CUSSM, CUSM), page B-18
- FXS Support, page B-18
- ROMMON, page B-19
- EnergyWise Support, page B-19
- OIR Support, page B-20
DS0 Dump Support on T1/E1 and BRI Modules

This feature provides the capability to capture the PCM data flow through the ISR G2 motherboard TDM switch.

You can find additional information about this feature at the following URL:

Cable Detection on Analog FXS and FXO Support

This feature detects the presence of a cable that is connected between analog FXS and FXO VICs. This feature only supports the following VIC/EM:

- Analog FXOLS: VIC/EM that uses si3050 chip set. This includes the VIC2-2FXO, VIC2-4FXO, EM-HDA-6FXO, EM-HDA-3FXS/4FXO, and EM-HDA4FXO.
- Analog FXOGS: all analog FXO VIC/EM
- Analog FXSLS and FXSGS: VIC/EM that uses si3241 chipset. This includes VIC3-2FXS/DID, VIC3-2FXS-E/DID, VIC3-4FXS/DID, EM3-HDA-8FXS/DID, SM-D-72-FXS, SM-D-48FXS-E, onboard analog FXS on VG202, VG204, Cisco 2435, and Cisco 880.

Note

This feature is applicable on Cisco VG350, Cisco VG310 and VG320 platforms. However, it is not supported on Direct-Inward-Dial (DID-IN) and E/M voice port.

You can find additional information about this feature at the following URLs:


Non-payload encryption (NPE) capabilities

The Cisco VG350 Voice Gateway is loaded with image (vg350-universalk9_npe-mz) and the Cisco VG310 and Cisco VG320 are loaded with image (vg3xx-universalk9_npe-mz) that enables the no payload encryption capabilities—no VPN, no SRTP, no TLS, no crypto features.
MIB Support

The Cisco VG350, Cisco VG310, and Cisco VG320 Analog Voice Gateways are designed to allow the management of CiscoWorks, CiscoView, Cisco Security Manager, and other enterprise and service provider management platforms.

From a platform perspective, the following MIBs will be supported in Cisco VG350, Cisco VG310, and Cisco VG320 Analog Voice Gateways:

**Table B-1 Supported MIBs**

<table>
<thead>
<tr>
<th>NM Product</th>
<th>Function, Technology</th>
<th>Platform MIB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco Monitor Manager/Director (Herbie)</td>
<td>Monitoring</td>
<td>IF-MIB, Etherlike-MIB, CISCO-Flash-MIB, ENTITY-MIB, OLD-CISCO-Chassis-MIB, SNMPV2-MIB, IP-MIB, CISCO-CDP-MIB, CISCO-Copy-Config-MIB, CISCO-Ccme-Mib, CISCO-Voice-If-Mib</td>
</tr>
<tr>
<td>Cisco netManager IP Infrastructure (Luna Data)</td>
<td>Monitoring</td>
<td>HR-MIB, IF MIB, ENTITY-MIB, processor mib, memory pool mib, VLAN mib, MIB-2, Cisco-cdp-mib</td>
</tr>
</tbody>
</table>
### Appendix B  Cisco VG350, Cisco VG310, and Cisco VG320 Analog Voice Gateway-Supported Software and MIB Support

Cisco VG350 also supports the following MIBs:

<table>
<thead>
<tr>
<th>NM Product</th>
<th>Function, Technology</th>
<th>Platform MIB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco Unified Operations Manager (CUOM)</td>
<td>Monitoring</td>
<td>All Platforms: ciscoMemoryPoolMIB, ciscoProcessMIB, entityMIB, mib-2, ciscoCdpMib, ciscoEntityFRUCtrlMIB Routers: ciscoSrStMIB, ciscoRttMonMIB, ciscoFrameRelayMIB, ciscoHsrpMIB, tcpMIB, udpMIB CME: ciscoCcmeMIB CUE: ciscoUnityExpressMIB</td>
</tr>
<tr>
<td>QoS Policy Manager (QPM)</td>
<td>Performance</td>
<td>IF-MIB CISCO-VLAN-MEMBERSHIP-MIB CISCO-CLASS-BASED-QOS-MIB CISCO-CAR-MIB</td>
</tr>
</tbody>
</table>

Cisco VG350 also supports the following MIBs:

<table>
<thead>
<tr>
<th>NM Product</th>
<th>Platform MIBs</th>
</tr>
</thead>
</table>
Cisco VG310 and Cisco VG320 also use the following OIDs from Cisco Active Network Abstraction (CANA) for new chassis type, CPU type, new onboard analog voice port, and AC and DC power supply.

<table>
<thead>
<tr>
<th>OID Name</th>
<th>Description</th>
<th>ID Type</th>
<th>Group</th>
<th>MIB FILE Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>cevChassisVG310</td>
<td>Cisco VG310 Medium Density Voice Gateway</td>
<td>cevChassis</td>
<td>CISCO-ENTITY-VENDORTYPE-OID-MIB</td>
<td></td>
</tr>
<tr>
<td>cevCpuVG310</td>
<td>Cisco VG310 Medium Density Voice Gateway</td>
<td>cevModuleCpuType</td>
<td>CISCO-ENTITY-VENDORTYPE-OID-MIB</td>
<td></td>
</tr>
<tr>
<td>VG310</td>
<td>Cisco VG310 Medium Density Voice Gateway</td>
<td>ChassisType</td>
<td>OLD-CISCO-CHASSIS-MIB</td>
<td></td>
</tr>
<tr>
<td>ciscoVG310</td>
<td>Cisco VG310 Medium Density Voice Gateway (2 GE, 124 onboard analog FXS, 1 EHWIC, 1 PVDM3, 1 CF, 1GB DRAM)</td>
<td>ciscoProducts</td>
<td>CISCO-PRODUCTS-OID-MIB</td>
<td></td>
</tr>
<tr>
<td>cevChassisVG320</td>
<td>Cisco VG320 Medium Density Voice Gateway</td>
<td>cevChassis</td>
<td>CISCO-ENTITY-VENDORTYPE-OID-MIB</td>
<td></td>
</tr>
<tr>
<td>cevCpuVG320</td>
<td>Cisco VG320 Medium Density Voice Gateway</td>
<td>cevModuleCpuType</td>
<td>CISCO-ENTITY-VENDORTYPE-OID-MIB</td>
<td></td>
</tr>
<tr>
<td>VG320</td>
<td>Cisco VG320 Medium Density Voice Gateway</td>
<td>ChassisType</td>
<td>OLD-CISCO-CHASSIS-MIB</td>
<td></td>
</tr>
<tr>
<td>ciscoVG320</td>
<td>Cisco VG320 Medium Density Voice Gateway (2 GE, 1 48 onboard analog FXS, 1 EHWIC, 1 PVDM3, 1 CF, 1GB DRAM)</td>
<td>ciscoProducts</td>
<td>CISCO-PRODUCTS-OID-MIB</td>
<td></td>
</tr>
<tr>
<td>cevVG3X0Ob24fxs</td>
<td>24 onboard analog FXS in Cisco VG310 and Cisco VG320 voice gateway</td>
<td>cevModule24xxType</td>
<td>CISCO-ENTITY-VENDORTYPE-OID-MIB</td>
<td></td>
</tr>
</tbody>
</table>
CUCM Support

Cisco VG310 and Cisco VG 320 are supported from CUCM Release 10.5 and CUCM Release 9.1.2SU2 version onwards. Existing Cisco IOS CUCM code changes implemented for Cisco ISR G2 platforms are leveraged to support the voice gateway auto configuration requirement for Cisco VG310 and Cisco VG320 platforms. CUCM supports both Media Gateway Control Protocol (MGCP) an Skinny Client Control Protocol (SCCP) protocols for Cisco VG310 and Cisco VG320 platforms. You must configure both CUCM and Cisco VG310 and Cisco VG320. For MGCP protocol, you can configure ccm-manager config command on Cisco VG310 and Cisco VG320 for CUCM to download platform configuration.

Cisco IOS CUCM depends on the following information to generate an XML configuration file to support the new platforms:

- Product type
- Voice-port format

Qualification and Evaluation of Devices

Qualification and Evaluation of Devices support is required for new platforms to perform SCCP and MGCP voice gateway configuration via the CUCM administration GUI web interface.

The QED changes for the Cisco VG350, Cisco VG310, and Cisco VG320 Analog platforms support the following configuration alternatives:

- Auto download of voice gateway configuration
- Group configuration (plug-and-play) with CUCM

Bulk Administration Tool

The CUCM Bulk Administration Tool (BAT) is a web-based application that allows administrators to perform and automate bulk transactions, such as adding, updating, or deleting, on a large number of phones, users, and ports on the Cisco VG350, Cisco VG310, Cisco VG320 Analog and other Cisco Catalyst FXS analog interface modules in the CUCM database.

BAT is supported on Cisco VG350, Cisco VG310, and Cisco VG320 Analog Voice Gateways, but it should be requested for targeted CUCM releases to update the device templates and the default Excel bat.xls spreadsheet for the new platforms associated with Cisco VG350, Cisco VG310, and Cisco VG320.

From CUCME Release 10.5 and CUCM Release 9.1.2.SU2 onwards, BAT will be supported on Cisco VG310 and Cisco VG320.
CUCME Support

Existing Cisco IOS CUCME code changes implemented for Cisco ISR G2 platforms are leveraged to support the voice gateway auto configuration requirement for Cisco VG350, Cisco VG310, and Cisco VG320 Analog platforms.

Cisco IOS CUCME depends on the following information to generate an XML configuration file to support the new platforms:

- Product type
- Voice-port format

The following example shows how to execute the CUCME command under the voice-gateway system, for Cisco VG310 and Cisco VG320:

type vg310
voice port vic0 1,2,3

type vg320
voice port vic0 1-20
voice port vic2 1,3,5,6-20
Configure mac-address for the Ethernet interface mac address of VG3x0
Configure network-local xx for country code
use create cnf-file to generate XML file

Hunt Group Support

The Hunt Group feature on Cisco VG310 and Cisco VG320 platforms, allows an analog phone user to enter a predefined access code to log in to a hunt group to receive calls or to log out from a hunt group and not to receive any calls from that hunt group. The default Forced Authorization Code (FAC) for hunt group login and logout is 9. User should dial ** 9 to get connected to a specific hunt group.

HWIC Module Support

The Cisco VG310 and Cisco VG320 platforms support one HWIC slot. This HWIC slot is intended to provide TDM line-side extensions for connecting TDM PBX (over T1/PRI), and legacy key systems (over FXO) ports.

Note This feature is not applicable to Cisco VG350.

The HWIC slot has the flexibility to support voice cards such as T1/E1 PRI, BRI, FXS, FXS-E, E/M and FXO. Both VG310 and VG320 will support existing analog VICs and digital T1/E1/BRI VWIC, and their voice port numbers are 0/2/0-x. The voice card list is as follows:

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

T1/E1 data link is not supported that is no data feature are supported on VWIC3-1MFT-T1/E1, VWIC3-2MFT-T1/E1 and VIC2-2BRI-NT/TE.

Cisco Unified Communications (CUOM, CUPM, CUSSM, CUSM)

Cisco Unified Communications Management Suite (CUCMS) is a suite of applications developed to help enterprise customers configure, deploy, and manage their unified communications networks.

CUOM and CUPM require certain MIBs to be present in Cisco VG350 IOS image. See the “MIB Support” section on page B-13 for additional information regarding MIB support for CUOM and CUPM.

FXS Support

The SM-D-72FXS and the SM-D-48FXS-E service module supports 72 and 48 regular or OPX-lite analog FXS voice ports. They can be configured as loop-start and ground-start signaling types.

Note

Cisco VG350, Cisco VG310, and Cisco VG320 Analog platforms can be configured as loop-start and ground-start signaling types. However, DID signaling type is not supported on these platforms.

REN configuration on FXS voice port defaults to 1 REN configuration can be done via existing CLI, ren <1-5> under FXS voice port. For long loop FXS, up to 2 REN can be configured. For short loop FXS, up to 5 REN can be configured.

FXS ports 4-71 on SM-D-72FXS are fixed to short loop length.

The first four (ports 0-3) FXS ports on SM-D-72FXS and all 48 FXS ports on SM-D-48FXS-E can be configured with short or long loop length. A CLI will be used to configure loop-length under these analog FXS voice ports.

The loop-length CLI is only applicable on ports 0 to 3 of SM-D-72FXS and all ports of SM-D-48FXS-E. For more information and configuration examples, see the “loop-length” section on page 3-23.
Cisco VG350, Cisco VG310, and Cisco VG320 have the following motherboard HW components:

**Table B-2  Cisco VG350, Cisco VG310 and Cisco VG320 Hardware Components**

<table>
<thead>
<tr>
<th>Hardware Component</th>
<th>Cisco Analog Voice Gateway 350</th>
<th>Cisco Analog Voice Gateway 310</th>
<th>Cisco Analog Voice Gateway 320</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEPROM Format Version</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Compatibility Byte</td>
<td>ff</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>PCB Serial Number</td>
<td>FHH1244000J</td>
<td>FOC17384C0U</td>
<td>FOC180764N4</td>
</tr>
<tr>
<td>Controller Type</td>
<td>0x0613 ------&gt; 0x0b0a</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Hardware Revision</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Part Number (73)</td>
<td>73-11838-03</td>
<td>74-12363-01</td>
<td>74-12364-02</td>
</tr>
<tr>
<td>Part Number (800)</td>
<td>800-32329-01</td>
<td>800-41644-01</td>
<td>800-41651-01</td>
</tr>
<tr>
<td>PCB Revision</td>
<td>13</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>New Deviation Number</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Fab Version</td>
<td>3</td>
<td>01</td>
<td>01</td>
</tr>
<tr>
<td>Product Num/ID (PID)</td>
<td>C3900-SPE150/K9 -------&gt;VG350-SPE150/K9</td>
<td>VG310</td>
<td>VG320</td>
</tr>
<tr>
<td>Version Identifier (VID)</td>
<td>V00</td>
<td>V00</td>
<td>V00</td>
</tr>
<tr>
<td>Digital Signature List</td>
<td>40 c1 cb</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>CLEI Code</td>
<td>IPUCAV9BAA</td>
<td>—</td>
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VG310, and VG320 Hardware Components

**EnergyWise Support**

Cisco VG350 platform will leverage EnergyWise Support to support the SM-D-72FXS and the SM-D-48FXS-E modules.
The new modules will be integrated to support the EnergyWise Green initiative to allow configuring of CLI to turn on/off the module.

**Note**

This feature is not supported on Cisco VG310 and Cisco VG320 platforms.

For more information and sample configurations on the EnergyWise support, see the “Configuring EnergyWise” section on page A-10.

**OIR Support**

Online Insertion and removal (OIR) is supported, but can only be done one service module at a time. OIR supports only the same service module type, that is, if you remove an SM-D-72FXS, only another SM-D-72FXS can be inserted.

**Note**

This feature is not supported on Cisco VG310 and Cisco VG320 platforms.

**Glossary**

- AGC—Automatic Gain Control.
- BCN—Backward Congestion Notification.
- CM—Connection manager (TDM).
- COS—Class of service, 802.1p.
- DA—Ethernet Destination Address.
- DMA—Direct Memory Access.
- DSA—Distributed Switch Architecture.
- DSP—Digital Signal Processor.
- DSPRM—DSP Resource Manager.
- DTMF—Dual-tone multi-frequency.
- ECAN—Echo Canceller.
- EVSM—Extended Voice Service Module.
- FC—Flex Complexity.
- FPGA—Field-Programmable Gate Array.
- HC—High Complexity.
- HDLC—High-level Data Link Control Protocol.
- HPI—Host Port Interface.
- LC—Low Complexity.
- MAC—Media Access Control.
- MC—Medium Complexity.
McBSP—Multi-Channel Buffer Serial Port.
MTBF—Mean Time Between Failures.
MTP—Media Termination Point.
NTE—Named Telephone Events.
OIR—Online Insertion and Removal.
PCE—Packet Classification Engine.
PVDM3—Next generation Packet Voice Data Module.
PVDM2—PVDM hosting 5510 DSP.
QOS—Quality of Service.
REA—Ethernet Ready Announcement, like bootp message.
RI—Restart indication from DSP/Device.
RTP—Real-time Transport Protocol.
SA—Ethernet source address.
SGMII—Serial Gigabit Media Independent Interface.
SM—Service Module.
SRTP—Secure Real-time Transport Protocol.
TDM—Time Division Multiplexing.
UHPI—Universal Host Port Interface.
VIC—Voice Interface Card.
VLAN—Virtual LAN.
VNM—Voice Network Module.
VWIC—Voice/WAN Interface Card.