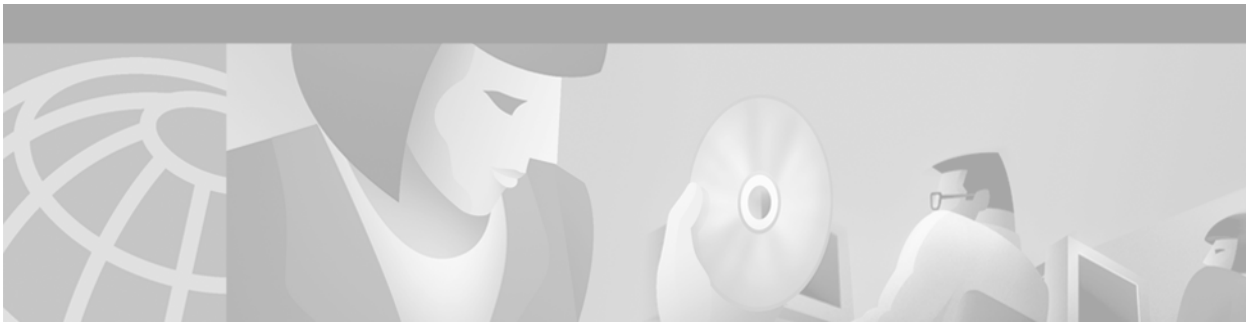

Monitoring Voice and Fax Services on the Cisco AS5350 and Cisco AS5400 Universal Gateways

Feature History

Release	Modification
12.1(5)XM2	This feature was introduced.
12.2(11)T	This feature was integrated into Cisco IOS Release 12.2(11)T and support was added for the Cisco AS5350 and Cisco AS5400 platforms.

This feature module describes Monitoring Voice and Fax Services on the Cisco AS5350 and Cisco AS5400 universal gateways and includes the following sections:

Note The Cisco AS5350 and Cisco AS5400 universal gateways were formerly known as the Cisco AS5350 and Cisco AS5400 universal access servers.

Feature Overview

The universal port dial feature card (DFC) is a hardware card that processes voice and data services port technology for the Cisco AS5350 and Cisco AS5400. The ports on the Universal Port DFC support multiple types of service including modem, digital, voice, and fax. Ports can be aggregated at the slot level of the Universal Port module, the Service Processing Element (SPE) level within the Universal Port module, and the individual port level.

Note You can find the NextPort DFC data commands for the Cisco AS5350 at http://www.cisco.com/univercd/cc/td/doc/product/access/acs_serv/as5350/alexfeat/121_3xq/nextport/alxnxpt.htm. You can find the NextPort DFC data commands for the Cisco AS5400 at http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t3/nextport/dtspecmd.htm.

Instead of the traditional line/modem one-to-one correspondence, lines are mapped to an SPE that resides on the Cisco AS5350 and Cisco AS5400 universal port DFC. Each SPE provides modem services for six ports. Busyout and shutdown can be configured at the SPE or port level. The Universal Port DFC introduces the slot and SPE software hierarchy. On the Cisco AS5350 and Cisco AS5400, the hierarchy designation is *slot/spe*. The Universal Port DFC slot is defined as a value between 1 and 7. Slot 0 is reserved for the motherboard. Each Universal Port DFC provides 18 SPEs. The SPE value ranges from 0 to 17. Because each SPE has six ports, the Universal Port DFC has a total of 108 ports. The port value ranges from 0 to 107.

The universal port DFC performs the following functions:

- Converts pulse code modulation (PCM) bitstreams to digital packet data
- Forwards converted and packetized data to the main processor, which examines the data and forwards it to the backhaul egress interface
- Supports all modem standards (such as V.34 and V.42*bis*) and features, including dial-in and dial-out

SPE Firmware

SPE firmware is automatically downloaded to a Universal Port DFC from the Cisco AS5350 and Cisco AS5400 when you boot the system for the first time, or when you insert a Universal Port DFC while the system is operating. When you insert DFCs while the system is operating, the Cisco IOS image recognizes the cards and downloads the required firmware to the cards.

The SPE firmware image is bundled with the universal gateway Cisco IOS image. The SPE firmware image uses an *auto detect* mechanism, which enables the Universal Port DFC to service multiple call types. An SPE detects the call type and automatically configures itself for that operation. For further information on upgrading SPE firmware from the Cisco IOS image, see the "Configuring SPEs to Use an Upgraded Firmware File" section on page 9.

The firmware is upgradable independent of Cisco IOS upgrades, and different firmware versions can be configured to run on SPEs in the same Universal Port DFC. You can download firmware from the Cisco Systems Cisco.com File Transfer Protocol (FTP) server. For further information on upgrading SPE firmware from the Cisco.com FTP server, see the next section, Upgrading SPE Firmware from the Cisco.com FTP Server.

Upgrading SPE Firmware from the Cisco.com FTP Server

You can upgrade SPE firmware from the Cisco.com FTP server by doing the following:

Downloading SPE Firmware from the Cisco.com FTP Server to a Local TFTP Server

Note You must be a registered Cisco.com user to log in to the Cisco Software Center.

You can download software from the Cisco Systems Cisco.com FTP server using an Internet browser or using an FTP application. Both procedures are described.

Using an Internet Browser

Step 1 Launch an Internet browser.

Step 2 Bring up the Cisco Software Center home page at the following URL (this is subject to change without notice):

http://www.cisco.com/kobayashi/sw-center/

Step 3 Click **Access Products** (under Cisco Software Products) to open the Access Products window.

Step 4 Click **Cisco AS5350 Series Software** or **Cisco AS5400 Series Software** .

Step 5 Click the SPE firmware you want and download it to your workstation or PC. For example, to download SPE firmware for the universal gateway, click **Download Universal Images**.

Step 6 Click the SPE firmware file you want to download, and then follow the remaining download instructions. If you are downloading the SPE firmware file to a PC, make sure that you download the file to the c:/tftpboot directory; otherwise, the download process does not work.

Step 7 When the SPE firmware is downloaded to your workstation, transfer the file to a Trivial File Transfer Protocol (TFTP) server in your LAN using a terminal emulation software application.

Step 8 When the SPE firmware is downloaded to your workstation, transfer the file to a TFTP server somewhere in your LAN using a terminal emulation software application.

Using an FTP Application

Note The directory path leading to the SPE firmware files on Cisco.com is subject to change without notice. If you cannot access the files using an FTP application, try the Cisco Systems URL http://www.cisco.com/cgi-bin/ibld/all.pl?i=support&c=3.

Step 1 Log in to the Cisco.com FTP server, called cco.cisco.com:

```
terminal> ftp cco.cisco.com
Connected to cio-sys.cisco.com.
```

Step 2 Enter your Cisco.com registered username and password (for example, **harry** and **letmein**):

```
Name (cco.cisco.com:harry): harry
331 Password required for harry.
Password: <letmein>
230-###############################################################
230-#  Welcome to the Cisco Systems CCO FTP server.
230-#  This server has a number of restrictions.  If you are not familiar
230-#  with these, please first get and read the /README or /README.TXT file.
230-#  http://www.cisco.com/acs/info/cioesd.html for more info.
230-###############################################################
230-
```

Step 3 Specify the directory path that holds the SPE firmware you want to download. For example, the directory path for the Cisco AS5400 SPE firmware is /cisco/access/5400:

```
ftp> cd /cisco/access/5400
250-Please read the file README
250-  it was last modified on Tue May 27 10:07:38 1997 - 48 days ago
250-Please read the file README.txt
250-  it was last modified on Tue May 27 10:07:38 1997 - 48 days ago
250 CWD command successful.
```

Step 4 Enter the **ls** command to view the contents of the directory:

```
ftp> ls
227 Entering Passive Mode (192,31,7,130,218,128)
150 Opening ASCII mode data connection for /bin/ls.
total 2688
drwxr-s--T   2 ftpadmin ftpcio    512 Jun 30 18:11 .
drwxr-sr-t  19 ftpadmin ftpcio    512 Jun 23 10:26 ..
lrwxrwxrwx  1  root     3          10 Aug   6 1996     README ->README.txt
-rw-rw-r--   1 root     ftpcio   2304 May 27 10:07 README.txt
-r--r--r-- 1 ftpadmin ftpint 377112 Jul 10 18:08 np-spe-upw-1.0.1.2.bin
-r--r--r-- 1 ftpadmin ftpint 635 Jul 10 18:08 SPE-firmware.3.1.30.readme
```

Step 5 Specify a binary image transfer:

```
ftp> binary
200 Type set to I.
```

Step 6 Copy the SPE firmware files from the universal gateway to your local environment with the **get** command.

```
ftp> get
```

Step 7 Quit your terminal session:

```
ftp> quit
Goodbye.
```

Step 8 Enter the **ls -al** command to verify that you successfully transferred the files to your local directory:

```
ftp> ls -al
 total 596
 -r--r--r-- 1 280208 Jul 10 18:08 np-spe-upw-1.0.1.2.bin
 server% pwd
 /auto/tftpboot
```

Step 9 Transfer these files to a local TFTP or Remote Copy Protocol (RCP) server that your universal gateway or router can access.

Copying the SPE Firmware File from the Local TFTP Server to the SPEs

The procedure for copying the SPE firmware file from your local TFTP server to the Universal Port DFC is a two-step process. First, transfer the SPE firmware to the universal gateway's Flash memory. Then, configure the SPEs to use the upgrade firmware. The upgrade occurs automatically, either as you leave configuration mode, or as specified in the configuration.

These two steps are performed only once. After you copy the SPE firmware file into Flash memory for the first time, you will not have to perform these steps again.

Note Because the SPE firmware is configurable for individual SPEs or ranges of SPEs, the Cisco IOS software automatically copies the SPE firmware to each SPE each time the universal gateway restarts.

To download SPE firmware to Flash memory, follow these steps:

Step 1 Check the image in the universal gateway Flash memory:

```
Router# show flash
System flash directory:
File  Length   Name/status
  1   4530624  c5400-js-mx
 [498776 bytes used, 16278440 available, 16777216 total]
16384K bytes of processor board System flash (Read/Write)
```

Step 2 Enter the **copy tftp flash** command to download the code file from the TFTP server into the universal gateway Flash memory. You are prompted for the download destination and the remote host name.

```
Router# copy tftp flash
```

Step 3 Enter the **show flash** command to verify that the file has been copied into the universal gateway Flash memory:

```
Router# show flash
```

Benefits

- Voice and data service at the port level, resulting in greater flexibility of network configuration
- Addressability at the slot, SPE, or port level, resulting in ease and scale of configuration tasks
- High port density in the platform, resulting in scalability
- SPE layer buffers the platform architecture from future changes, resulting in advanced port level technology
- Modular architecture, resulting in ease and economy of maintenance

Restrictions

Mixed SS7 voice and data is not supported simultaneously.

Related Features and Technologies

- Redundant link manager
- Virtual Private Digital Network (VPDN)
- In-band signaling/tone generation and detection
  - DTMF generation
  - DTMF detection
  - MF generation
  - MF detection
- PPP and SLIP framing

Related Documents

For further information about managing port services with Universal Port DFC, see the following documents that ship with your Cisco AS5350 or Cisco AS5400. These documents are also available online and on the documentation CD.

- *Cisco AS5400 Universal Gateway Chassis Installation Guide*
- *Cisco AS5400 Universal Gateway Card Installation Guide*
- *Cisco AS5400 Hardware/Cisco IOS Software Compatibility Matrix*
- *Cisco AS5400 Universal Gateway Regulatory Compliance and Safety Information*
- *Cisco AS5400 Universal Gateway Software Configuration Guide*
- *Cisco AS5350 Universal Gateway Chassis Installation Guide*
- *Cisco AS5350 Universal Gateway Card Installation Guide*
- *Cisco AS5350 Universal Gateway Software Configuration Guide*
- *Cisco AS5350 Universal Gateway Regulatory Compliance and Safety Information*

Supported Platforms

- Cisco AS5350 universal gateways
- Cisco AS5400 universal gateways

The Monitoring Voice and Fax feature runs on all platforms that support Cisco IOS Release 12.1(5)XM2 and 12.2(11)T.

Table 1 Cisco IOS Release and Platform Support for this Feature

Platform	12.1(5)XM2	12.2(11)T
Cisco AS5350	X	X
Cisco AS5400	X	X

Determining Platform Support Through Cisco Feature Navigator

Cisco IOS software is packaged in feature sets that support specific platforms. To get updated information regarding platform support for this feature, access Cisco Feature Navigator. Cisco Feature Navigator dynamically updates the list of supported platforms as new platform support is added for the feature.

Cisco Feature Navigator is a web-based tool that enables you to determine which Cisco IOS software images support a specific set of features and which features are supported in a specific Cisco IOS image. You can search by feature or release. Under the release section, you can compare releases side by side to display both the features unique to each software release and the features in common.

To access Cisco Feature Navigator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to cco-locksmith@cisco.com. An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions at http://www.cisco.com/register.

Cisco Feature Navigator is updated regularly when major Cisco IOS software releases and technology releases occur. For the most current information, go to the Cisco Feature Navigator home page at the following URL:

http://www.cisco.com/go/fn

Availability of Cisco IOS Software Images

Platform support for particular Cisco IOS software releases is dependent on the availability of the software images for those platforms. Software images for some platforms may be deferred, delayed, or changed without prior notice. For updated information about platform support and availability of software images for each Cisco IOS software release, refer to the online release notes or, if supported, Cisco Feature Navigator.

Supported Standards, MIBs, and RFCs

Standards

- ITU-T G.711
- ITU-T G.726
- ITU-T G.728
- ITU-T T.38
- ITU-T T.90
- ITU-T V.92
- ITU-T V.120

Technical characteristics of tones for the telephone service

- ITU-T E.180

MIBs

- CISCO-ISDN-MIB
- IF-MIB(MIB II)
- DIAL-CONTROL=MIB
- CISCO-VOICE-IF-MIB

- CISCO-DSP-MGMT-MIB
- EXPRESSION-MIB
- CISCO-CAS-IF-MIB
- CISCO-MMAIL-DIAL-CONTROL-MIB
- CISCO-VOICE-NUMBER-EXPANSION-MIB
- CISCO-CALL-APPLICATION-MIB
- CISCO-VOICE-DNIS-MIB

To obtain lists of MIBs supported by platform and Cisco IOS release and to download MIB modules, go to the Cisco MIB web site on Cisco.com at http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml.

RFCs

- RFC 2198, *RTP Payload for Redundant Audio Data*
- RFC 2326, *Real Time Streaming Protocol (RTSP)*
- RFC 2833, *RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals*
- RFC 2705, *Media Gateway Control Protocol*

Prerequisites

- Establish a working IP network. For information about configuring IP, refer to the "IP Overview," "Configuring IP Addressing," and "Configuring IP Services" chapters in the *Cisco IOS Release 12.0 Network Protocols Configuration Guide, Part 1* publication available on the World Wide Web from the Cisco home page.
- Cisco IOS Release 12.1(5)XM2 or later release for the Cisco AS5350 or Cisco AS5400
- 256 MB memory
- Basic configuration of the Cisco AS5350 or Cisco AS5400
- Upgraded firmware
- DFC installed

Configuration Tasks

See the following sections for configuration tasks for the Universal Port port service management feature. Each task in the list is identified as either optional or required:

- Configuring Country Code, page 9 (required)
- Configuring SPEs to Use an Upgraded Firmware File, page 9 (optional)
- Disabling SPEs, page 10 (optional)
- Rebooting SPEs, page 11 (optional)
- Configuring Lines and Ports, page 11 (optional)
- Verifying SPE Lines and Port Configuration, page 12 (optional)
- Configuring Universal Port DFC Ports, page 12 (optional)
- Clearing Ports, page 13 (optional)

- Configuring SPE Performance Statistics, page 14 (optional)
- Clearing Log Events, page 14 (optional)

Configuring Country Code

To set the Universal Port DFC to be operational for call set up, you must specify the country name. To specify the country name, perform the following task in global configuration mode:

Command	Purpose
`Router(config)# spe country country name`	Specifies the country to set the DFC parameters (including country code and encoding). If you do not specify a country, the interface uses the default. If the universal gateway is configured with T1 interfaces, the default is **usa**. If the universal gateway is configured with E1 interfaces, the default is **e1-default**. Use the **no** form of this command to set the country code to the default of the domestic country. **Note** All sessions in all DFCs in all slots must be in the idle state for this command to run.

Configuring SPEs to Use an Upgraded Firmware File

To configure the SPEs to use the upgraded firmware file, use the following steps, beginning in privileged EXEC mode:

	Command	Purpose
Step 1	`Router# show spe version`	Displays SPE firmware versions to obtain the On-Flash firmware filename.
Step 2	`Router# config terminal`	Enters global configuration mode.

Step 3	`Router(config)# spe slot/spe`
	or
	`Router(config)# spe slot/spe slot/spe`
		Enters the SPE configuration mode. You can choose to configure a single SPE, or range of SPEs by specifying the first and last SPE in the range.

Step 4	`Router(config-spe)# firmware upgrade {busyout | download-maintenance | reboot}`	Specifies the upgrade method. Three methods of upgrade are available. The **busyout** keyword waits until all calls are terminated on an SPE before upgrading the SPE to the designated firmware. The **download-maintenance** keyword upgrades the firmware during the download maintenance time. The **reboot** keyword requests the universal gateway to upgrade firmware at the next reboot.

	Command	Purpose
Step 5	`Router(config-spe)# firmware location filename`	Specifies the SPE firmware file in Flash memory to use for the selected SPEs. Allows you to upgrade firmware for SPEs after the new SPE firmware image is copied to your Flash memory. Enter the **no firmware location** command to revert back to the default Cisco IOS bundled SPE firmware.
Step 6	`Router(config-spe)# exit`	Exits SPE configuration mode.
Step 7	`Router# exit`	Exits global configuration mode.
Step 8	`Router# copy running-config startup-config`	Saves your changes.

Note The **copy ios-bundled** command is not necessary with Universal Port DFCs. By default, the version of SPE firmware bundled with the Cisco IOS software release transfers to all SPEs not specifically configured for a different SPE firmware file.

Disabling SPEs

To disable specific SPEs in the Universal Port DFC, complete the following tasks starting in global configuration mode:

Command	Purpose

`Router(config)# spe slot/spe`
or
`Router(config)# spe slot/spe slot/spe`
	Enters SPE configuration mode. You can also configure SPEs specifying the first and last SPE in the range.

`Router(config-spe)# busyout`	Gracefully disables an SPE by waiting for all the active services on the specified SPE to terminate. You can do autodiagnostic tests and firmware upgrades when you put the SPEs in the busiedout state. Active ports on the specified SPE will change the state of the specified range of SPEs to the busyoutpending state. The state changes from busyoutpending to busiedout when all calls end. Use the **show spe** command to see the state of the range of SPEs. Use the **no** form of this command to reenable the SPEs.
`Router(config-spe)# shutdown`	Clears active calls on all ports on the SPE. Calls can no longer be placed on the SPE because the SPE state is changed to busiedout. Use the **no** form of this command to reenable the ports on the SPE.

Rebooting SPEs

To reboot specified SPEs, do the following task in privileged EXEC mode:

Command	Purpose
`Router# clear spe slot/spe`	Allows manual recovery of a port that is frozen in a suspended state. Reboots SPEs that are in suspended or Bad state. Downloads configured firmware to the specified SPE or range of SPEs and power-on self-test (POST) is run. **Note** Depending on the problem, sometimes downloading the SPE firmware might not help recover a bad port or an SPE. This command can be run regardless of the state of SPEs. All active ports running on the SPE are prematurely terminated, and messages are logged into the appropriate log.

Configuring Lines and Ports

To configure the lines and ports to dial in to your network, complete the following steps, beginning in global configuration mode:

	Command	Purpose
Step 1	`Router(config)# line slot/port slot/port`	Enters the line configuration mode. Specifies a range of slot and port numbers to configure. **Note** The Universal Port DFC slot is defined as a value between 1 and 7. Slot 0 is reserved for the motherboard. Each Universal Port DFC provides 18 SPEs. The SPE value ranges from 0 to 17. Because each SPE has six ports, the Universal Port DFC has a total of 108 ports. The port value ranges from 0 to 107. For example, to configure 108 ports on slot 3, enter **line 3/00 3/107**. To configure 324 ports on slots 3-5, enter **line 3/00 5/107**.
Step 2	`Router(config-line)# transport input all`	Allows all protocols when connecting to the line.

	Command	Purpose
Step 3	`Router(config-line)# autoselect ppp`	Enables remote IP users running a PPP application to dial in, bypass the EXEC facility, and connect directly to the network.
Step 4	`Router(config-line)# modem inout`	Enables incoming and outgoing calls.
Step 5	`Router(config-line)# modem autoconfigure type` *name*	Configures the attached modem using the entry for name.

Verifying SPE Lines and Port Configuration

To verify your SPE line configuration, do the following steps:

Step 1 Enter the **show spe** command to display a summary for all the lines and ports:

```
Router# show spe
```

Step 2 Enter the **show line** command to display a summary for a single line:

```
Router# show line 1
```

Note If you are having trouble, make sure that you have turned on the protocols for connecting to the lines (**transport input all**) and that your universal gateway is configured for incoming and outgoing calls (**modem inout**).

Configuring Universal Port DFC Ports

This section describes how to configure Universal Port DFC ports. You need to be in port configuration mode to configure the Universal Port ports. The port configuration mode allows you to shut down or put individual ports or ranges of ports in busyout mode. To configure Universal Port ports, do the following steps beginning in global configuration mode:

	Command	Purpose
Step 1	`Router(config)# port` *slot/port*	Enters port configuration mode. Configures a single port.
Step 2	`Router(config-port)# port` *slot/port slot/port*	Configures a range of ports.

	Command	Purpose
Step 3	`Router(config-port)# busyout`	(Optional) Gracefully disables a port by waiting for the active services on the specified port to terminate. Use the **no** form of this command to re-enable the ports. Maintenance activities, such as testing, can still be performed while the port is in busyout mode. **Note** When a port is in busyout mode, the state of the SPE is changed to the consolidated states of all the underlying ports on that SPE.
Step 4	`Router(config-port)# shutdown`	(Optional) Clears active calls on the port. No more calls can be placed on the port in the shutdown mode. Use the **no** form of this command to reenable the ports. **Note** When a port is in shutdown mode, the state of the SPE is changed to the consolidated states of all the underlying ports on that SPE.
Step 5	`Router(config-port)# exit`	Exits the port configuration mode.

Clearing Ports

The following privileged EXEC mode commands allow you to clear ports on an SPE:

Command	Purpose
`Router# clear port 4/1` `Router# This will clear port 4/01 [confirm] yes`	Clears port 1 on slot 4 of the Universal Port port.
`Router# clear port 4` `Router# This will clear port 4/00 - 4/107 [confirm] yes`	Clears all active ports on slot 4 of the Universal Port port.

Configuring SPE Performance Statistics

Depending on the configuration, call record is displayed on the console, or the syslog, or on both. The log contains raw data in binary form, which must be viewed using the **show** commands listed in the "Monitoring and Maintaining SPE Performance Statistics" section on page 16. You can configure some aspects of history events by using the following commands in global configuration mode:

Command	Purpose
`Router(config)# spe call-record modem max-userid`	Requests the universal gateway to generate a modem call record after a call is terminated. To disable this function, use the **no** form of this command.
`Router(config)# spe log-event-size number`	Sets the maximum size of the history event queue log entry for each port. The default is 50 events per port.

Clearing Log Events

The following privileged EXEC mode commands allow you to clear some or all of the log events relating to the SPEs:

Command	Purpose
`Router# clear spe log`	Clears all event entries in the slot history event log.
`Router# clear spe counters`	Clears statistical counters for all types of services for the specified SPE, a specified range of SPEs, or all SPEs. If you do not specify the range of SPEs or an SPE, the statistics for all SPEs are cleared.
`Router# clear port log`	Clears all event entries in the port level history event log. You cannot remove individual service events from the port log.

Troubleshooting Tips

This section provides troubleshooting information for your SPEs regardless of service type mode.

Note SPE ports that pass the diagnostic test are marked as Pass, Fail, and Unkn. Ports that fail the diagnostic test are marked as Bad. These ports cannot be used for call connections. Depending on how many ports are installed, the diagnostic tests may take from 5 to 10 minutes to complete.

- Enter the **port modem startup-test** command to do diagnostic testing for all modems during the system's initial startup or rebooting process. To disable the test, enter the **no port modem startup-test** command.

- Enter the **port modem autotest** command to perform diagnostic testing for all ports during the system's initial startup or rebooting process. To disable the test, enter the **no port modem autotest** command.

  You may can also configure the following options:

  - Enter the **port modem autotest minimum** *ports* command to define the minimum number of free ports available for autotest to begin.
  - Enter the **port modem autotest time** *hh:mm interval* command to enable autotesting time and interval.
  - Enter the **port modem autotest error** *threshold* command to define the maximum number of errors detected for autotest to begin.

- Enter the **show port modem test** command to display results of the SPE port startup test and SPE port auto-test.

When an SPE port is tested as Bad, you can do additional testing by conducting a series of internal back-to-back connections and data transfers between two SPE ports. All port test connections occur inside the . For example, if mobile users cannot dial into port 2/5 (which is the sixth port on the Universal Port DFC in the second chassis slot), attempt a back-to-back test with port 2/5 and a known-functioning port such as port 2/6.

- Enter the **test port modem back-to-back** *slot/port slot/port* command to do internal back-to-back port tests between two ports sending test packets of the specified size.

Note You might need to enable this command on several different combinations of ports to determine which one is not functioning properly. A pair of operable ports successfully connects and completes transmitting data in both directions. An operable port and an inoperable port do not successfully connect with each other.

A back-to-back test might look like the following example:

```
Router# test port modem back-to-back 2/10 3/20
Repetitions (of 10-byte packets) [1]:
*Mar  02 12:13:51.743:%PM_MODEM_MAINT-5-B2BCONNECT:Modems (2/10) and (3/20) connected
in back-to-back test:CONNECT33600/V34/LAP
*Mar  02 12:13:52.783:%PM_MODEM_MAINT-5-B2BMODEMS:Modems (3/20) and (2/10) completed
back-to-back test:success/packets = 2/2
```

Tip You can reboot the port that has problems using the **clear spe** command.

- Enter the **spe recovery** {**port-action** {**disable** | **recover** | **none**} | **port-threshold** *num-failures*} command to perform automatic recovery (removal from service and reloading of SPE firmware) of ports on an SPE at any available time.

  An SPE port failing to connect for a certain number of consecutive times indicates that a problem exists in a specific part or all of the SPE firmware. Such SPEs have to be recovered by downloading firmware. Any port failing to connect *num-failures* times is moved to a state based on the **port-action** value, where you can choose to disable (mark the port as Bad) or recover the port when the SPE is in the idle state and has no active calls. The default for *num-failures* is 30 consecutive call failures.

Tip The default recovery time is at 3 a.m. You can also schedule a recovery time using the **spe download maintenance** command.

- Enter the **spe download maintenance time** *hh:mm* | **stop-time** *hh:mm* | **max-spes** *number* | **window** *time-period* | **expired-window** {**drop-call** | **reschedule**} command to perform a scheduled recovery of SPEs.

  The download maintenance activity starts at the set start **time** and steps through all SPEs that need recovery and the SPEs that need a firmware upgrade. The download maintenance activity starts maintenance on the maximum number of set SPEs for maintenance. The system waits for the **window** delay time for all the ports on the SPE to become inactive before moving the SPE to the Idle state. Immediately after the SPE moves to the Idle state, the system starts to download firmware. If the ports are still in use by the end of **window** delay time, depending on the **expired-window** setting, connections on the SPE ports are shut down and the firmware is downloaded by choosing the **drop-call** option, or the firmware download is rescheduled to the next download maintenance time by choosing the **reschedule** option. This process continues until the number of SPEs under maintenance is below **max-spes**, or until **stop-time** (if set), or until all SPEs marked for recovery or upgrade have had their firmware reloaded.

Monitoring and Maintaining SPE Performance Statistics

This section documents various SPE performance statistics for the Universal Port DFC:

SPE Events and Firmware Statistics

To view SPE events and firmware statistics for the Universal Port DFCs, enter one or more of the following commands in privileged EXEC mode:

Command	Purpose
`Router# show spe slot/spe`	Displays the SPE status for the specified range of SPEs.
`Router# show spe log [reverse | slot]`	Displays the SPE system log.
`Router# show spe version`	Lists all SPEs and the SPE firmware files used. **Note** This list helps you decide if you need to update your SPE firmware files.

Port Statistics

To view port statistics for the Universal Port DFCs, enter one or more of the following commands in privileged EXEC mode:

Command	Purpose
Router# **show port config** {*slot* | *slot/port*}	Displays the configuration information for specified ports or the specified port range. The port should have an active session associated at the time the command is run.
Router# **show port [voice | fax] log** [**reverse** *slot/port*] [*slot* | *slot/port*]	Displays the service events log.
Router# **show port operational-status** [*slot* | *slot/port*]	Displays the operational status of the specified ports or the specified port range. The port should have an active session associated when the command is run.

Voice SPE Statistics

To view voice SPE statistics for the Universal Port DFCs, enter one or more of the following commands in privileged EXEC mode:

Command	Purpose
Router# **show spe voice** [*slot* | *slot/spe*]	Displays history statistics of all voice SPEs.
Router# **show spe voice active** [*slot* | *slot/spe*]	Displays active voice statistics of a specified SPE, the specified range of SPEs, or all SPEs.
Router# **show spe voice summary** [*slot* | *slot/spe*]	Displays voice history statistics of all SPEs, a specified SPE, or the specified range of SPEs for all service types.

Configuration Example

The Universal Port dial feature card (DFC) provides port service management for theCisco AS5350 and Cisco AS5400.

For further information on configuration examples for the Cisco AS5350 or Cisco AS5400, see the *Cisco AS5350 Universal Gateway Software Configuration Guide* or *Cisco AS5400 Universal Gateway Software Configuration Guide*.

Command Reference

This section documents modified commands. All other commands used with this feature are documented in the Cisco IOS Release 12.1 command reference publications.

- **show port config**
- **show port log**
- **show port log (reverse)**

  (see **show port log**, page 25)
- **show port operational-status**
- **show spe**
- **show spe voice**
- **show spe voice active**
- **show spe voice summary**

show port config

To display the active session's configuration parameters, use the **show port config** EXEC command.

show port config {*slot* | *slot/port*}

Syntax Description

slot	All ports on the specified slot. Slot values range from 1 to 7.
slot/port	All ports on the specified slot and SPE. Slot values range from 1 to 7 and port values range from 0 to 107.

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
12.1(1)XD	This command was introduced on the Cisco AS5400.
12.1(3)T	This command was supported on the Cisco AS5400 and Cisco AS5800.
12.1(5)XM2	This command was integrated into Cisco IOS Release 12.1(5)XM2.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and support was added for the Cisco AS5350 and Cisco AS5400 platforms.

Usage Guidelines

The port should have an associated active session when the **show port config** command is entered.

Examples

The following example shows output from the **show port config** command on the Cisco AS5400 with the Universal Port DFC. This example displays port configuration for the voice service port slot 1, SPE 0, shelf 0.

```
Router# show port config 1
Slot/SPE/Port -- 1/0/0
Service Type                          :Voice service
Input Gain                            :0 dB
Output Gain                           :0 dB
In-band signal detection enable       :Fax V.21 Flags          - enabled
                                        Fax CED Tone            - disabled
                                        Fax CNG Tone            - disabled
                                        Modem no phase reversal - disabled
                                        Modem phase reversal    - disabled
                                        Voice or silence        - disabled
                                        Call progress tone      - disabled
Digit detection enable                :DTMF signaling          - enabled
Echo Cancellation Control             :Echo cancellation       - enabled
                                        Echo update             - enabled
                                        Non-linear processor    - enabled
                                        Echo reset coefficients - disabled
```

```
                                          High pass filter enable - disabled
Echo Canceler Length                     :64 taps
Voice activity detection                 :Enabled
Comfort noise generation                 :Generate comfort noise
Digit relay enable                       :OOB Digit relay         - disabled
                                          IB Digit relay          - disabled
Information field size                   :20 ms
Playout de-jitter mode                   :adaptive
Playout de-jitter buffer minimum delay   :40 msec
Playout de-jitter buffer initial delay   :40 msec
Playout de-jitter buffer maximum delay   :200 msec
Loopback enable                          :No loopback
Encapsulation protocol                   :RTP
Transmit SSRC                            :0
Receive SSRC                             :0
Transmit VPXCC                           :128
Disable packet generation                :Disabled
Redundant audio payload type             :121
DTMF payload type                        :101
Redundancy enable                        :no info transmitted
```

The following example shows output from the **show port configuration** command on the Cisco AS5400 with the Universal Port DFC. This example displays port configuration for the fax service port slot 1, SPE 0, shelf 0:

```
Router# show port configuration 1
Slot/SPE/Port -- 1/0/0
Service Type                          : Fax-relay service
Max. transmission rate                : 4800 bps
Information field size                : 20 ms
TCF generation                        : transparent
Max. playout delay                    : 200 ms
Transmit level                        : 0 dBm
Encapsulation protocol                : UDPTL
Redundancy count                      : 0
ECM Disable                           : Disabled
```

- See Table 1 for field definitions for output display of the **show port configuration** command. Voice output definitions first. Fax output definitions last.

Table 2 Field Defintions for Output Display of the Show Port Configuration Command

Field	Definition
Service Type	Fax-relay service type.
Max. transmission rate	0 - No Limit. 1 - 2400 bps 2 - 4800 bps 3 - 7200 bps 4 - 9600 bps 5 - 12000 bps 6 - 14400 bps
Information field size	Maximum size of information field in fax relay packets. range: 0 - 90 (ms)
TCF generation	0 - transparent (remote) 1 - controlled (local)
Max. playout delay	1 - 200 ms
Transmit level	Transmit level of re-modulator (in dBm): -10 to -21
Encapsulation protocol	1 - UDPTL (T.38 - VoIP) (default) 2 - FRF.11 (VoFR) 3 - RTP (IFP in RTP).
Redundancy count	Range 0 - 7. UDPTL packet redundancy count for low speed T30 frames. See section 9.4.1 of ITU T.38 for details.
ECM Disable	0 - ECM is not disabled 1 - ECM is disabled

Table 2 Field Defintions for Output Display of the Show Port Configuration Command (continued)

Field	Definition
Service Type	Voice service.
Input Gain	-6.0 to +6.0 in 0.1 dB increments.
Output Gain	0 to -14.0 in 0.1 dB increments.
In-band signal detection enable	Bit mask where 1 - enabled, 0 - disabled: Bit 0: Fax detection - V.21 Flags Bit 1: Fax detection - CED Tone Bit 2: Fax detection - CNG Tone Bit 3: Modem detection - 2100 Hz Answer tone - no phase reversal Bit 4: Modem detection - 2100 HzAnswer tone - phase reversal Bit 5: Voice or Silence detection Bit 6: Call progress tone detection. Bit 7: COT tone detectione. Bits 8 - 15: Reserved (set to 0)
Digit detection enable	Bit mask where 1 - enabled, 0 - disabled: Bit 0: DTMF signaling detection
Echo cancellation control	Bit mask where 1 - enabled, 0 - disabled Bit 0: Echo cancellation enable Bit 1: Echo update enable Bit 2: Non-linear processor enable Bit 3: Echo reset coefficients (single shot) Bit 4: High Pass filter disable. Bits 5 - 15: reserved (set to 0)
Echo canceler length	Length of echo canceler in number of taps. Ranges from 1 to 1024 (128 msec).
Voice activity detection	0 - enabled, 1 - enabled.
Comfort noise generation	0 - generate silence - G.711 only. 1 - generate comfort noise.
Digit relay enable	Bit mask where 1 - enabled, 0 - disabled: Bit 0: Digit Passthrough supression.
Information field size	Maximum size of the voice information field in ms. Ranges from values between 0 to 90 ms.
Playout de-jitter mode	0 - fixed, 1 - adaptive.
Playout de-jitter buffer minimum delay	0 to 200 msec

Table 2 Field Defintions for Output Display of the Show Port Configuration Command (continued)

Field	Definition
Playout de-jitter buffer initial delay	0 to 200 msec
Playout de-jitter buffer maximum delay	0 to 200 ms
Loopback enable	0 - No loopback (default) 1 - TDM loopback 2 - Pre-encapsulation loopback 3 - Post-encapsulation loopback 4 - Jitter Buffer packet loopback. 5 - 0xffff - Reserved
Encapsulation protocol	1 - RTP (VoIP) 2 - FRF.11 (VoFR) 3 - VoATM.
Transmit SSRC	Value of the Transmission SSRC in the RTP header.
Receive SSRC	Value of the Receiving SSRC in the RTP header.
Transmit VPXCC	First byte of RTP header for transmit packets 0 - 255 (bitfield)
Disable packet generation	Disable voice packet generation (PCM to Packet dir). 0 - disabled (default) (generate voice packets) 1 - enabled (do not generate packets)
Redundant audio payload type	Negotiated payload type used for all In Band signaling event RTP packets.
DTMF payload type	Negotiated sub-payload type used for DTMF digit events inside IB signaling RTP packets.
Redundancy enable	0 - no redundant information transmitted 1 - 1x redundant information sent per RFC-2198.

Related Commands

Command	Description
show port operational-status	Displays the operational status of a specific port or range of ports.

show port log

To display the service events generated by the sessions, use the **show port log** EXEC command.

show port [**voice** | **fax**] **log** [**reverse** *slot/port*] [*slot* | *slot/port*]

Syntax Description

voice	Displays the voice data event log.
fax	Displays the fax data event log.
reverse	(Optional.) Displays the port history event log with the most recent event first.
slot/port	(Optional.) All ports on the specified slot and SPE. Slot values range from 1 to 7 and port values range from 0 to 107.
slot	(Optional.) All ports on the specified slot. Slot values range from 1 to 7.

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
12.1(1)XD	This command was introduced on the Cisco AS5400.
12.1(3)T	This command was supported on the Cisco AS5400 and Cisco AS5800.
12.1(5)XM2	This command was integrated into Cisco IOS Release 12.1(5)XM2.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and support was added for the Cisco AS5350 and Cisco AS5400 platforms.

Examples

The following example shows output for the Cisco AS5400 with universal port Universal Port DFC. The example shows the port voice history event log for slot 4, port 0: Port 4/00 Events Log

```
Router# show port voice log 4/00
03:36:26: incoming caller number: 11001
03:36:26: incoming called number: 21001
03:36:26: Voice Connect event:
Voice Codec : G.711 a-law
Echo Canceler Length : 64 taps
Digit detection enable : DTMF signaling - enabled
Echo Cancellation Control : Echo cancellation - enabled
Echo update - enabled
Non-linear processor - enabled
Echo reset coefficients -
disabled
High pass filter enable -
disabled
Comfort noise generation : Generate comfort noise
Voice activity detection : Disabled
Information field size : 20 ms
```

```
Digit relay enable : OOB Digit relay -
disabled
IB Digit relay -
disabled
Encapsulation protocol : RTP
Playout de-jitter mode : adaptive
Input Gain : 0 dB
Output Gain : 0 dB
Tx/Rx SSRC : 0/0
03:36:27: Voice Terminate event:
Disconnect Reason : Non-specific host disconnect
Call Timer : 122 secs
Current playout delay : 30 ms
Min/Max playout delay : 25/45 ms
Clock offset : 528623613 ms
Predictive concealment : 0 ms
Interpolative concealment : 0 ms
Silence concealment : 0 ms
Buffer overflow discards : 0
End-point detection errors : 0
Tx/Rx Voice packets : 6130/6130
Tx/Rx signaling packets : 0/0
Tx/Rx comfort noise packets : 0/0
Tx/Rx duration : 122615/122615
Tx/Rx voice duration : 90000/82000
:
Out of sequence packets : 0
Bad protocol headers : 0
Num. of late packets : 0
Num. of early packets : 0
Tx/Rx Power : 932/101 dBm
Tx/Rx Mean : 364/325 dBm
:
Background noise level : -1 dBm
ERL level : 623 dB
ACOM level : 586 dB
Tx/Rx current activity : silence/silence
```

The following example shows output for the Cisco AS5400 with Universal Port DFC. The example shows the port fax history event log for slot 1, port 0:Port 1/00 Events Log

```
Router# show port fax log
Port 1/00 Events Log
Port 1/01 Events Log
Port 1/02 Events Log
  *Jan  1 18:39:30.499 UTC: Fax-relay Connect event:
```

Table 3, Part 1

```
Max. transmission rate       :  4800 bps
    Information field size           :   20  ms
    TCF generation                   :   transparent
    Transmit level                   :   -10  dBm
    Encapsulation protocol           :   UDPTL
    IFP Payload Type                 :
    ECM Disable                      :   Disabled
```

- See Table 2 for field definitions for output display of the **show port log** command. Voice output definitions first. Fax output definitions last.

Table 4 Field Definitions for Output Display of the Show Port Log Commands

Field	Definition
Incoming caller number	The incoming caller number.
Incoming called number	The incoming called number.
Voice Codec	Codec used for current call
Echo Canceler Length	Length of echo canceler in number of taps. Ranges from 1 to 1024 (128 ms)
Digit detection enable	Bit mask where 1 - enabled, 0 - disabled: Bit 0: DTMF signaling detection
Echo Cancellation Control	Bit mask where 1 - enabled, 0 - disabled Bit 0: Echo cancellation enable Bit 1: Echo update enable Bit 2: Non-linear processor enable Bit 3: Echo reset coefficients (single shot) Bit 4: High Pass filter disable. Bits 5 - 15: reserved (set to 0)
Echo update	Bit 1: Echo update enable
Non-linear processor	Bit 2: Non-linear processor enable
Echo reset coefficients	Bit 3: Echo reset coefficients (single shot)
High pass filter enable	Bit mask where 1 - enabled, 0 - disabled Bit 0: Echo cancellation enable Bit 1: Echo update enable Bit 2: Non-linear processor enable Bit 3: Echo reset coefficients (single shot) Bit 4: High Pass filter disable. Bits 5 - 15: reserved (set to 0)
Comfort noise generation	0 - generate silence - G.711 only. 1 - generate comfort noise
Voice activity detection	0 - disabled 1 - enabled
Information field size	Maximum size of information field in fax relay packets. range: 0 - 90 (ms)
Digit relay enable	Bit mask where 1 - enabled, 0 - disabled: Bit 0: Digit Passthrough suppression.
IB Digit relay	Bit 1: IB Digit Relay
Encapsulation protocol	1 - RTP (VoIP) 2 - FRF.11 (VoFR) 3 - VoATM.
Playout de-jitter mode	0- fixed 1- adaptive
Input Gain	-6.0 to +6.0 in 0.1 dB increments
Output Gain	0 to -14.0 in 0.1 dB increments
Disconnect Reason	Disconnect reason
Call Timer	In seconds
Current playout delay	Current playout delay estimate (ms)
Min/Max playout delay	Minimum/Maximum playout delay encountered (ms)
Clock offset	Clock offset value (ms)
Predictive concealment	Cumulative Duration (ms)
Interpolative concealment	Cumulative Duration (ms)

Table 4 Field Definitions for Output Display of the Show Port Log Commands (continued)

Field	Definition
Silence concealment	Cumulative Duration (ms)
Buffer overflow discards	Cumulative Number buffer overflow errors.
End-point detection errors	Cumulative Number of end-point detection errors.
TX/RX SSRC	Value of Tx/Rx SSRC in the RTP header.
TX/RX Voice packets	Cumulative count of voice packets transmitted and received.
TX/RX signaling packets	Cumulative count of signaling packets transmitted and received.
TX/RX comfort noise packets	Cumulative count of comfort noise packets transmitted and received.
TX/RX duration	Total duration of voice transmission and reception (ms)
TX/RX voice duration	Total duration of voice transmission/reception (ms)
Out of sequence packets	Cumulative count of packets received out of sequence.
Bad protocol headers	Cumulative count of packets received with bad protocol headers.
Num. of late packets	Cumulative count of packets recieved late.
Num. of early packets	Cumulative count of packets received early.
Background noise level	Current background noise level estimate in 0.1 dBm increments.
ERL level	Current ERL level estimate in 0.1 dB increments.
ACOM level	Current ACOM level estimate in 0.1 dB increments.
TX/RX Power	Current power of transmitted/received signal (to TDM) in 0.1 dBm increments.
TX/RX Mean	Average power of transmitted/received signal (to TDM) in 0.1 dBm increments.
TX/RX current activity	0: silence, 1: voice.

Table 4 Field Definitions for Output Display of the Show Port Log Commands (continued)

Field	Definition
Service Type	Fax-relay service type.
Max. transmission rate	0 - No Limit. 1 - 2400 bps 2 - 4800 bps 3 - 7200 bps 4 - 9600 bps 5 - 12000 bps 6 - 14400 bps
Information field size	Maximum size of information field in fax relay packets. range: 0 - 90 (ms)
TCF generation	0 - transparent (remote) 1 - controlled (local)
Max. playout delay	1 - 200 ms
Transmit level	Transmit level of re-modulator (in dBm): -10 to -21
Encapsulation protocol	1 - UDPTL (T.38 - VoIP) (default) 2 - FRF.11 (VoFR) 3 - RTP (IFP in RTP).
Redundancy count	Range 0 - 7. UDPTL packet redundancy count for low speed T30 frames. See section 9.4.1 of ITU T.38 for details.
IFP Payload Type	0 - 127. Negotiated payload type for Fax Relay over RTP. (Valid only when Encapsulation Protocol is RTP)
ECM Disable	0 - ECM is not disabled 1 - ECM is disabled

Related Commands

Command	Description
clear port log	Clears all port log events.

show port operational-status

To display active session statistics, use the **show port operational-status** EXEC command.

show port operational-status {*slot* | *slot/port*}

Syntax Description

slot	All ports on the specified slot. Slot values range from 1 to 7.
slot/port	All ports on the specified slot and SPE. Slot values range from 1 to 7, and port values range from 0 to 107.

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
12.1(1)XD	This command was introduced on the Cisco AS5400.
12.1(3)T	This command was supported on the Cisco AS5400 and Cisco AS5800.
12.1(5)XM2	This command was integrated into Cisco IOS Release 12.1(5)XM2.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and support was added for the Cisco AS5350 and Cisco AS5400 platforms.

Usage Guidelines

This command displays the operational status of a specific port or range of ports. The port should have an associated active session when the command is entered.

Examples

The following example shows output from the **show port operational-status** command for a voice session. The example below displays operational status for voice service for the Cisco AS5400 on slot 2, SPE 3, port 22:

```
Router# show port operational-status 2
Slot/SPE/Port -- 2/3/22
Service Type                          :Voice service
Voice Codec                           :G.729A
Echo Canceler Length                  :64 taps
Echo Cancellation Control             :Echo cancellation       - enabled
                                        Echo update             - enabled
                                        Non-linear processor    - enabled
                                        Echo reset coefficients - disabled
                                        High pass filter enable - disabled
Digit detection enable                :DTMF signaling          - enabled
Voice activity detection              :Enabled
Comfort noise generation              :Generate comfort noise
Digit relay enable                    :OOB Digit relay         - disabled
                                        IB Digit relay          - disabled
Information field size                :20 ms
Playout de-jitter mode                :adaptive
```

```
Encapsulation protocol                  :RTP
Input Gain                              :0 dB
Output Gain                             :0 dB
Tx/Rx SSRC                              :0/0
Current playout delay                   :80 ms
Min/Max playout delay                   :80/80 ms
Clock offset                            :494557452 ms
Predictive concealment                  :0 ms
Interpolative concealment               :0 ms
Silence concealment                     :0 ms
Buffer overflow discards                :0
End-point detection errors              :0
Tx/Rx Voice packets                     :16/16
Tx/Rx signaling packets                 :0/0
Tx/Rx comfort noise packets             :1/1
Tx/Rx duration                          :235330/235330
Tx/Rx voice duration                    :0/0
Out of sequence packets                 :0
Bad protocol headers                    :0
Num. of late packets                    :0
Num. of early packets                   :0
Tx/Rx Power                             :-900/-602 dBm
Tx/Rx Mean                              :64637/64936 dBm
Background noise level                  :-778 dBm
ERL level                               :1270 dB
ACOM level                              :1270 dB
Tx/Rx current activity                  :silence/silence
```

The example below displays operational status for fax service for the Cisco AS5400 on slot 1, SPE 0, port 3:

```
Router# show port operational-status 1
Slot/SPE/Port -- 1/0/3
Service Type                            : Fax-relay service
Max. transmission rate                  : 4800 bps
Information field size                  : 20 ms
TCF generation                          : transparent
Transmit level                          : -10 dBm
Encapsulation protocol                  : UDPTL
ECM Disable                             : Disabled
Current playout delay                   : 456 ms
Min/Max playout delay                   : 50/490 ms
Buffer underflow discard                : 0
Buffer overflow discard                 : 0
End-point detection errors              : 0
Tx/Rx Fax packets                       : 24/402
Tx/Rx duration                          : 2850/17685 ms
Tx/Rx pages                             : 0/0
Out of sequence packets                 : 0
Bad protocol headers                    : 0
Fax state                               : 2
Current signal level                    : -11 dBm
Phase jitter                            : 0 degrees
Frequency offset                        : 0 Hz
EQM                                     : 32766
```

- SeeTable 3 for field definitions for output display of the **show operational-status** command. Voice output definitions first. Fax output definitions last.

Table 5 Field Definitions for Output Display of the Show Operational-Status Command

Field	Definition
Service type	Voice service
Voice Codec	Codec used for current call.
Echo canceler length	Length of echo canceler in number of taps. Ranges from 1 to 1024 (128 ms).
Echo cancellation control	Bit mask where 1 - enabled, 0 - disabled Bit 0: Echo cancellation enable Bit 1: Echo update enable Bit 2: Non-linear processor enable Bit 3: Echo reset coefficients (single shot) Bit 4: High Pass filter disable. Bits 5 - 15: reserved (set to 0)
Digit detection enable	Bit mask where 1 - enabled, 0 - disabled: Bit 0: DTMF signaling detection.
Voice activity detection	0 - enabled, 1 - enabled.
Comfort noise generation	0 - generate silence - G.711 only. 1 - generate comfort noise.
Digit relay enable	Bit mask where 1 - enabled, 0 - disabled: Bit 0: Digit Passthrough suppression.
Information field size	Maximum size of the voice information field in ms. Ranges from values between 0 to 90 ms.
Playout de-jitter mode	0 - fixed, 1 - adaptive.
Encapsulation protocol	1 - RTP (VoIP) 2 - FRF.11 (VoFR) 3 - VoATM.
Input Gain	-6.0 to +6.0 in 0.1 dB increments.
Output Gain	0 to -14.0 in 0.1 dB increments.
Tx/Rx SSRC	Value of the Tx/Rx SSRC in the RTP header.
Current playout delay	Current playout delay estimate (ms).
Min/Max playout delay	Minimum/Maximum playout delay encountered (mse).
Clock offset	Clock offset value (ms).
Predictive concealment	Cumulative duration (ms)
Interpolative concealment	Cumulative duration (ms)
Silence concealment	Cumulative duration (ms)
Buffer overflow discards	Cumulative number of buffer overflow errors.
End-point detection errors	Cumulative number of end-point detection errors.
Tx/Rx Voice packets	Cumulative count of voice packets transmitted and received.
Tx/Rx signaling packets	Cumulative count of signaling packets transmitted and received.
TX/RX comfort noise packets	Cumulative count of comfort noise packets transmitted and received.
TX/RX duration	Total duration of voice transmission and reception (ms)
TX/RX voice duration	Total duration of voice transmission/reception (ms)
Out of sequence packets	Cumulative count of packets received out of sequence.
Bad protocol headers	Cumulative count of packets received with bad protocol headers.

Table 5 Field Definitions for Output Display of the Show Operational-Status Command (continued)

Field	Definition
Num. of late packets	Cumulative count of packets received late.
Num. of early packets	Cumulative count of packets received early.
TX/RX Power	Current power of transmitted/received signal (to TDM) in 0.1 dBm increments.
TX/RX Mean	Average power of transmitted/received signal (to TDM) in 0.1 dBm increments.
Background noise level	Current background noise level estimate in 0.1 dBm increments.
ERL level	Current ERL level estimate in 0.1 dB increments.
ACOM level	Current ACOM level estimate in 0.1 dB increments.
TX/RX current activity	0: silence, 1: voice.

Table 5 Field Definitions for Output Display of the Show Operational-Status Command (continued)

Field	Definition
Service Type	Fax-relay service type.
Max. transmission rate	0 - No Limit. 1 - 2400 bps 2 - 4800 bps 3 - 7200 bps 4 - 9600 bps 5 - 12000 bps 6 - 14400 bps
Information field size	Maximum size of information field in fax relay packets. range: 0 - 90 (ms)
TCF generation	0 - transparent (remote) 1 - controlled (local)
Max. playout delay	1 - 200 msec
Transmit level	Transmit level of remodulator (in dBm): -10 to -21
Encapsulation protocol	1 - UDPTL (T.38 - VoIP) (default) 2 - FRF.11 (VoFR) 3 - RTP (IFP in RTP).
Redundancy count	Range 0 - 7. UDPTL packet redundancy count for low speed T30 frames. See section 9.4.1 of ITU T.38 for details.
ECM Disable	0 - ECM is not disabled 1 - ECM is disabled
Current playout delay	Current playout delay estimate (ms)
Min/Max playout delay	Minimum/Maximum playout delay encountered (ms)
Buffer underflow discard	Cumulative number buffer underflow errors.
Buffer overflow discard	Cumulative number buffer overflow errors.
End-point detection errors	Cumulative Number of end-point detection errors.
Modulation Standard	Modulation standard which can be V.21, Bell03, V.22, V.22bis, Bell212, V.23, V.32, V.32bis, V.32terbo, V.34, V.34+, K56Flex, or V.90
Tx/Rx Fax packets	Cumulative count of fax packets Transmitted/Received.
Tx/Rx Fax duration	Total duration of Transmission/Reception session (ms)
Tx/Rx Fax pages	Cumulative count of fax pages Transmitted/Received.
Out of sequence packets	Cumulative count of out of sequence packets received.
Bad protocol headers	Cumulative count of packets with bad protocol headers.
Fax state	Current state of the data pump.
Current signal level	Current signal level (in dBm) (dependent on direction).

Table 5 Field Definitions for Output Display of the Show Operational-Status Command (continued)

Field	Definition
Phase Jitter Level	Amount of phase jitter measured and indicates how large the "rocking" is in degrees. On an oscilloscope the constellation points would look like crescent moons. Values can range up to 15 degrees. The typical value is zero (i.e. phase jitter is not normally present).
Frequency offset	Value of frequency offset in Hz (demod only).
EQM	Eye Quality Monitor value (demod only).

Related Commands

Command	Description
show spe voice active	Displays active voice statistics of all SPEs, specified SPE or the specified SPE range.

show spe

To show Service Processing Element (SPE) status, use the **show spe** EXEC command.

show spe [*slot* | *slot/spe*]

Syntax Description

slot	(Optional) All ports on the specified slot. Slot values range from 1 through 7.
slot/spe	(Optional) All ports on the specified slot and SPE. Slot values range from 1 through 7 and SPE values range from 0 through 17.

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
12.1(1)XD	This command was introduced.
12.1(3)T	This command was supported on the Cisco AS5400 and Cisco AS5800.
12.1(5)XM2	This command was integrated into Cisco IOS Release 12.1(5)XM2.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and support was added for the Cisco AS5350 and Cisco AS5400 platforms.

Usage Guidelines

Use the **show spe** command to display current status of all SPEs, a specified SPE, or the specified range of SPEs.

Examples

The following example displays history statistics for all SPEs after a busyout was executed on SPE 2/0 and a shutdown was executed on SPE 2/0:

```
Router# show spe
SPE settings:
==============
Country code configuration:default T1 (u Law)
Polling interval:8 secs.
History log events:50(per port)
Port legends:
============
Port state:(s)shutdown (t)test (r)recovery (d)download
           (b)busiedout (p)busyout pending, (B)bad (a)active call
Call type:(m)modem (d)digital (f)fax-relay (v)voice (_)not in use
System resources summary:
=====================
Total ports:108, in use ports:11, disabled ports:0, free ports:97
Total active calls:modem    0,  voice   11,  digital    0,  fax-relay    0
```

```
                    SPE          SPE      SPE  SPE   Port         Call
SPE#    Port #      State        Busyout  Shut Crash State        Type
2/00    0000-0005   ACTIVE             0     0     0 ______       ______
2/01    0006-0011   ACTIVE             0     0     0 ______       ______
2/02    0012-0017   ACTIVE             0     0     0 ______       ______
2/03    0018-0023   ACTIVE             0     0     0 ____aa       ____vv
2/04    0024-0029   ACTIVE             0     0     0 aaaaaa       vvvvvv
2/05    0030-0035   ACTIVE             0     0     0 aaa___       vvv___
2/06    0036-0041   ACTIVE             0     0     0 ______       ______
2/07    0042-0047   ACTIVE             0     0     0 ______       ______
2/08    0048-0053   ACTIVE             0     0     0 ______       ______
```

Related Commands

Command	Description
show spe voice active	Displays active voice statistics of all SPEs, specified SPE or the specified SPE range.

show spe voice

To show service processing element (SPE) status, use the **show spe voice** EXEC command.

show spe voice [*slot* | *slot/spe*]

Syntax Descriptions

slot	(Optional) All ports on the specified slot. Slot values range from 1 through 7.
slot/spe	(Optional) All ports on the specified slot and SPE. Slot values range from 1 through 7 and SPE values range from 0 to 17.

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
12.1(1)XD	This command was introduced.
12.1(3)T	This command was supported on the Cisco AS5400 and Cisco AS5800.
12.1(5)XM2	This command was integrated into Cisco IOS Release 12.1(5)XM2.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and support was added for the Cisco AS5350 and Cisco AS5400 platforms.

Usage Guidelines

The **show spe voice** command displays history statistics of all digital SPEs, in summary form or for SPEs starting with a specified slot, or a specified shelf/slot/spe range.

Examples

The following example displays history statistics for all SPEs after a busyout was executed on SPE 2/0 and a shutdown was executed on SPE 2/0:

```
Router# show spe voice 2/0
#SPE 2/00
Cisco Universal SPE (Managed); Port 2/0 - 2/5
Last clearing of statistics counters          :  never
     0 Incoming calls              2 Outgoing calls
   Voice:
     2 Rcvd SSRC Changes           0 Rcvd Payload Type Violation
     0 Buffer Overflow Errors      0 End-point Detection Errors
     0 Packets Received Early      0 Packets Received Late
     0 Bad Protocol Headers
   Fax-relay:
     0 Rcvd SSRC Changes           0 Rcvd Payload Type Violation
     0 Buffer Overflow Errors      0 Buffer Underflow Errors
     0 End-point Detection Errors  0 Bad Protocol Headers

Codec        Calls    Codec    Calls    Codec          Calls    Codec    Calls
G.711 u-Law  0        G.729    0        G.723.1 6.3K   0        GSM FR   0
```

```
G.711 a-Law  0        G.729B   0        G.723.1 5.3K   0        GSM HR   0
G.726 32K    0        G.729A   2        G.723.1A 6.3K  0        GSM EFR  0
G.726 24K    0        G.729AB  0        G.723.1A 5.3K  0
G.726 16K    0        G.728    0
```

Related Commands

Command	Description
show spe voice active	Displays active voice statistics of all SPEs, a specified SPE, or the specified range of SPEs.
show spe voice summary	Displays history statistics of all SPEs, specified SPE or the specified SPE range.

show spe voice active

To show service processing element (SPE) status, use the **show spe voice active** EXEC command.

show spe voice active [*slot* | *slot/spe*]

Syntax Description

slot	(Optional) All ports on the specified slot. Slot values range from 1 to 7.
slot/spe	(Optional) All ports on the specified slot and SPE. Slot values range from 1 through 7 and SPE values range from 0 to 17.

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
12.1(1)XD	This command was introduced.
12.1(3)T	This command was supported on the Cisco AS5400 and Cisco AS5800.
12.1(5)XM2	This command was integrated into Cisco IOS Release 12.1(5)XM2.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and support was added for the Cisco AS5350 and Cisco AS5400 platforms.

Usage Guidelines

The **show spe voice active** command displays active voice calls and voice statistics of all SPEs, specified SPE, or the specified SPE range.

Examples

The example below shows output for the **show spe voice active** command. This example displays active voice statistics for slot 2, SPE 3:

```
Router# show spe voice active 2/3
SPE 2/03
Port Codec   Dirn Duration Tx/Rx(Pkts) Tx/Rx Pwr Noise ERL ACOM
22   G.729A  In  00:01:21  16/16    -900/-600 -778 1270 1270
23   G.729A  In  00:01:21  16/16    -900/0598 -778 1270 1270
```

Related Commands

Command	Description
show spe voice	Displays active voice statistics of all SPEs, a specified SPE, or the specified range of SPEs.
show spe voice summary	Displays history statistics of all SPEs, specified SPE or the specified SPE range.

show spe voice summary

To show Service Processing Element (SPE) status, use the **show spe voice summary** EXEC command.

show spe voice summary [*slot* | *slot/spe*]

Syntax Description

slot	(Optional) All ports on the specified slot. Slot values range from 1 through 7.
slot/spe	(Optional) All ports on the specified slot and SPE. Slot values range from 1 through 7 and SPE values range from 0 through 17.

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
12.1(1)XD	This command was introduced.
12.1(3)T	This command was supported on the Cisco AS5400 and Cisco AS5800.
12.1(5)XM2	This command was integrated into Cisco IOS Release 12.1(5)XM2.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and support was added for the Cisco AS5350 and Cisco AS5400 platforms.

Usage Guidelines

The **show spe voice summary** command displays history statistics of all SPEs, specified SPE or the specified SPE range.

Examples

The example below shows output for the **show spe voice summary** command. This example displays active voice statistics for slot 2:

```
Router# show spe voice summary
Cisco Universal SPE (Managed); Port 2/0 - 2/107
Last clearing of statistics counters          :  never
     0 Incoming calls              2 Outgoing calls
   Voice:
     2 Rcvd SSRC Changes           0 RCVD Payload Type Violation
     0 Buffer Overflow Errors      0 End-point Detection Errors
     0 Packets Received Early      0 Packets Received Late
     0 Bad Protocol Headers
   Fax-relay:
     0 Rcvd SSRC Changes           0 RCVD Payload Type Violation
     0 Buffer Overflow Errors      0 Buffer Underflow Errors
     0 End-point Detection Errors  0 Bad Protocol Headers

Codec        Calls    Codec    Calls    Codec          Calls    Codec    Calls
G.711 u-Law  0        G.729    0        G.723.1 6.3K   0        GSM FR   0
G.711 a-Law  0        G.729B   0        G.723.1 5.3K   0        GSM HR   0
```

```
G.726 32K    0        G.729A   2        G.723.1A 6.3K  0        GSM EFR  0
G.726 24K    0        G.729AB  0        G.723.1A 5.3K  0
G.726 16K    0        G.728    0
```

Related Commands

Command	Description
show spe voice	Displays active voice statistics of all SPEs, a specified SPE, or the specified range of SPEs.
show spe voice active	Displays active voice statistics of all SPEs, a specified SPE, or the specified range of SPEs.

Glossary

BITS—Building Integrated Timing Source.

bps—bits-per-second.

byte—Bits of information.

call or port—A name used to represent the binding of a TDM channel, service, and data queue to support a bidirectional service on the Universal Port module.

Control Processor (CP)—A processor on the module that supports the Universal Port messaging interface.

DFC—Dial Feature Card, the Universal Port modem carrier card (AS54-DFC-108NP) that occupies a slot in the universal gateway.

ECM—Error Correction Mode

ERL—Echo Return Loss. The expected amount of loss through the system that the echo canceller will manage.

EST Queue—An Error / Status / Trace message queue used to communicate out-of-band information between the host and the module.

host—A physical card that the Universal Port module connects to. This can be either the platform, backplane, or a carrier card.

Mb—Megabit. 1,048,576 million bits.

MB—Megabyte. 1,048,576 million bytes.

MIB—Management Information Base.

Port Management Database—A database that consists of Service Processing Element and port level management information for all services.

port, timeslot, or DS0—The atomic element of a TDM stream. It provides a bandwidth of 64,000 bps.

Receive or Rx—Indicates the direction from the TDM stream to the module to the host.

RBS—Robbed Bit Signaling: a form of signaling that “robs” bits from the user’s data stream to provide supervisory and signaling information to and from the switch. RBS emulates older analog trunk and line signaling methods by providing a 1:1 mapping of analog supervisory signaling to the signaling bits (A,B,C,D).

RTP/RTCP—Real-Time Control Protocol: provides time-stamp services and allows for the establishment of point to multipoint voice connections.

Service—The algorithm executing on the Universal Port module that implements a particular protocol. Two typical examples of services are a data modem and Voice over IP.

shared memory interface—A communication mechanism where a block of memory can be accessed by multiple processors and that is used to exchange information.

SPE—Service Processing Element. A component of a Universal Port module to which sessions are assigned. An SPE is a logical entity that groups six modems.

Service Processing Unit (SPU)—The processor on the module that runs protocols to process in-band data.

SSRC—Identifies the synchronization source. This identifier is chosen randomly with the intent that no two synchronization sources within the same RTP session will have the same SSRC identifier.

TCF—Training Check Frame. Last step in a series of signals in a fax transmission called a training sequence, designed to let the receiver adjust to telephone line conditions.

TDM—Time division multiplexing. The process whereby a high-bandwidth channel is subdivided into multiple lower-bandwidth channels.

TDM channel—One or more time slots of the HMVIP stream that constitute a single data stream. The TDM channel bandwidth is determined by 64,000 multiplied by the number of time slots in the channel.

TDM stream—An HMVIP serial data stream operating at 8.192 MHz and capable of supporting

8.192 MB throughput.

Transmit or Tx—Indicates the direction from the host to the module to the TDM stream.

Universal Port Module—A voice and data hardware card that supports the Universal Port hardware and software interfaces.

universal service—A port on a Universal Port module that can be switched freely between two or more services without changing the TDM channel.

VoATM—Voice Over ATM. Voice over ATM enables a router to carry voice traffic (for example, telephone calls and faxes) over an ATM network. When sending voice traffic over ATM, the voice traffic is encapsulated using a special AAL5 encapsulation for multiplexed voice.

VoFR—Voice Over Frame Relay. Voice over Frame Relay enables a router to carry voice traffic (for example, telephone calls and faxes) over a Frame Relay network. When sending voice traffic over Frame Relay, the voice traffic is segmented and encapsulated for transit across the Frame Relay network using FRF.12 encapsulation.

VoIP—Voice over IP. The ability to carry normal telephony-style voice over an IP-based internet with POTS-like functionality, reliability, and voice quality.