



# Managing Port Services on the Cisco AS5400 Universal Gateway

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This feature module describes the Managing Port Services on the Cisco AS5400 Universal Gateway feature. It includes the overview, the maintenance and troubleshooting tasks, and the Cisco IOS software commands required for port service management.

This document includes the following sections:

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- Supported Platform, page 6
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## Feature Overview

The Managing Port Services on the Cisco AS5400 Universal Gateway feature implements port service management for the Cisco AS5400 using the NextPort dial feature card (DFC). The NextPort DFC is a hardware card that processes digital service port technology for the Cisco AS5400. A port is defined as an endpoint on a DFC card through which multiservice tones and data flow. The ports on the NextPort DFC support both modem and digital services. Ports can be aggregated at the slot level of the NextPort module, the Service Processing Element (SPE) level within the NextPort module, and the individual port level.

## SPE for the NextPort Dial Feature Card

Instead of the traditional line/modem one-to-one correspondence, lines are mapped to an SPE that resides on the Cisco AS5400 NextPort DFC. Each SPE provides modem services for six ports. Busyout and shutdown can be configured at the SPE or port level. The NextPort DFC introduces the slot and SPE software hierarchy. On the Cisco AS5400, the hierarchy designation is *slot/spe*. The NextPort DFC slot

is defined as a value between 1 and 7. Slot 0 is reserved for the motherboard. Each NextPort DFC provides 18 SPEs. The SPE value ranges from 0 to 17. Because each SPE has six ports, the NextPort DFC has a total of 108 ports. The port value ranges from 0 to 107.

The NextPort 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 NextPort DFC from the Cisco AS5400 when you boot the system for the first time, or when you insert a NextPort 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 access server Cisco IOS image. The SPE firmware image uses an *auto detect* mechanism, which enables the NextPort 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 13.

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



### Note

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Cisco.com was formally Cisco Connection Online (CCO).

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## Upgrading SPE Firmware from the Cisco.com FTP Server

Upgrading SPE firmware from the Cisco.com FTP server can be done in two steps:

- Downloading SPE Firmware from the Cisco.com FTP Server to a Local TFTP Server, page 2
- Copying the SPE Firmware File from the Local TFTP Server to the SPEs, page 4

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



### Note

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

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

## Using an Internet Browser

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- 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 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.
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## 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>.

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- Step 1** Log in to the Cisco.com FTP server:
- ```
terminal> ftp cisco.com
Connected to cio-sys.cisco.com.
```
- Step 2** Enter your Cisco.com registered username and password (for example, **harry** and **letmein**):
- ```
Name (cisco.com:harry): harry
331 Password required for harry.
Password: <letmein>
230-#####
230-# Welcome to the Cisco Systems Cisco.com 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:

```
server% 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 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 NextPort 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 should 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 access server restarts.

Follow these steps to download the SPE firmware to Flash memory:

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**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 was copied into the universal gateway Flash memory:

```
Router# show flash
```

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## Benefits

- Modem or digital 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 universal gateway architecture from future changes, resulting in advanced port level technology.
- Modular architecture, resulting in ease and economy of maintenance.
- Designed to extend to additional port services, resulting in implementation on other Cisco universal gateways.

## Restrictions

The NextPort DFC port is not supported on other Cisco access servers.

## Related Features and Technologies

- Call Tracker
- Redundant Link Manager
- Resource Pooling
- 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 NextPort DFC, see the following documents that ship with your Cisco AS5400. These documents are also available online and on the documentation CD.

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

For further information about dial technology, see the following documents:

- *Cisco IOS Dial Services Configuration Guide: Network Services*, Cisco IOS Release 12.1
- *Cisco IOS Dial Services Configuration Guide: Terminal Services*, Cisco IOS Release 12.1
- *Cisco IOS Dial Services Command Reference*, Cisco IOS Release 12.1

## Supported Platform

- Cisco AS5400 (NextPort dial feature card)



### Note

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The SPE support is also available on the Cisco AS5800 universal port card.

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## Supported Standards, MIBs, and RFCs

### Standards

Carrier protocols

- ITU V.23 at 75/1200 bps
- Telcordia Technologies (formerly Bellcore) 103 at 300 bps
- ITU V.21 at 300 bps
- ITU V.22 at 1200 bps
- Telcordia Technologies (formerly Bellcore) 212A at 1200 bps
- ITU V.22bis at 2400 bps
- ITU V.32 up to 9600 bps
- ITU V.32bis up to 14,400 bps

- V.32 turbo up to 19,200 bps
- V.FC up to 28,800 bps
- V.34 up to 28,800 bps
- V.34+ up to 33.6 bps
- TIA/ITU V.90
- K56flex

Error-correcting link-access protocols

- V.42 LAPM, MNP 2-4

Compression protocols

- V.42*bis* (includes MNP 5)

### MIBs

The following MIBs are supported on the Cisco AS5400:

- CHASSIS-MIB
- RFC1406-MIB(DS1 MIB)
- RFC1407-MIB(DS3 MIB)
- CISCO-MODEM-MGMT-MIB
- DIAL-CONTROL-MIB
- CISCO-DIAL-CONTROL-MIB
- IF MIB
- MIB II
- ENVMON MIB
- ACCESS-ENVMON MIB
- CISCO-CALL-HISTORY

For descriptions of supported MIBs and how to use MIBs, see the Cisco MIB web site on Cisco.com at <http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>.

### RFCs

No new or modified RFCs are supported by this feature.

## Prerequisites

- Cisco IOS Release 12.1(3)T or later releases for the Cisco AS5400
- 256 MB memory
- Basic configuration of the Cisco AS5400
- Upgraded firmware
- NextPort DFC installed

## Comparison of NextPort SPE Command Line Interface (CLI) Commands to MICA Modem CLI Commands

To see how the MICA commands compare to the NextPort SPE commands, use these tables.

**Table 1 EXEC Commands: NextPort to MICA Command Comparison**

| <b>NextPort SPE CLI Commands</b>        | <b>Purpose</b>                                                                                                                             | <b>MICA Modem CLI Commands</b>       |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| <b>show spe</b>                         | Shows the SPE status.                                                                                                                      | <b>none</b>                          |
| <b>show spe log</b>                     | Shows the SPE system log.                                                                                                                  | <b>none</b>                          |
| <b>show spe modem summary</b>           | Shows the modem service history statistics for specific SPEs.                                                                              | <b>show modem</b>                    |
| <b>show spe modem active</b>            | Shows the statistics of all active calls on specified SPEs.                                                                                | <b>show modem</b>                    |
| <b>show spe modem csr</b>               | Displays the call success rate (CSR) for the specified CSR.                                                                                | <b>show modem</b>                    |
| <b>show spe modem disconnect-reason</b> | Displays all modem disconnect reasons for the specified SPEs.                                                                              | <b>show modem call-stats</b>         |
| <b>show spe modem high speed</b>        | Displays the total number of connections negotiated within each modulation or coder-decoder (codec) for a specific range of SPEs.          | <b>show modem speed</b>              |
| <b>show spe modem high standard</b>     | Displays the total number of connections negotiated within each high modulation or codec for a specific range of SPEs or for all the SPEs. | <b>none</b>                          |
| <b>show spe modem low speed</b>         | Displays the connect-speeds negotiated within each low speed modulation or codec for a specific range of SPEs or for all the SPEs.         | <b>show modem speed</b>              |
| <b>show spe modem low standard</b>      | Displays the total number of connections negotiated within each low modulation or codec for a specific range of SPEs or for all the SPEs.  | <b>none</b>                          |
| <b>show spe version</b>                 | Displays all MICA and NextPort firmware versions stored in Flash memory and the firmware assigned to each SPE.                             | <b>show modem mapping</b>            |
| <b>show port modem log</b>              | Displays the events generated by the modem sessions.                                                                                       | <b>show modem log</b>                |
| <b>show port operational-status</b>     | Displays the current active session's statistics.                                                                                          | <b>show modem operational-status</b> |
| <b>show port config</b>                 | Displays the current active session's configuration parameters.                                                                            | <b>show modem config</b>             |
| <b>clear spe</b>                        | Reboots all specified SPEs. All calls will be torndown.                                                                                    | <b>NONE</b>                          |

**Table 1 EXEC Commands: NextPort to MICA Command Comparison**

| NextPort SPE CLI Commands          | Purpose                                                                                                                                                                                   | MICA Modem CLI Commands       |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| <b>clear spe counters</b>          | Clears all statistics.                                                                                                                                                                    | <b>clear modem counters</b>   |
| <b>clear spe log</b>               | Clears all log entries for specified SPEs.                                                                                                                                                | <b>clear modem log</b>        |
| <b>clear port</b>                  | Shutdown and no shutdown on specified ports.                                                                                                                                              | <b>clear modem</b>            |
| <b>clear port log</b>              | Clears all log entries for specified ports.                                                                                                                                               | <b>clear modem log</b>        |
| <b>show port modem calltracker</b> | Displays port level information for an active modem. See the <i>Call Tracker plus ISDN and AAA Enhancements for the Cisco AS5300 and Cisco AS5800</i> documentation for more information. | <b>show modem calltracker</b> |
| <b>show port modem test</b>        | Displays port modem test results.                                                                                                                                                         | <b>show modem test</b>        |

**Table 2 SPE Configuration Commands: NextPort to MICA Command Comparison**

| NextPort SPE CLI Commands         | Purpose                                                | MICA Modem CLI Commands                                                    |
|-----------------------------------|--------------------------------------------------------|----------------------------------------------------------------------------|
| <b>spe country</b>                | Sets the system country code.                          | <b>modem country</b>                                                       |
| <b>spe log-size</b>               | Sets the maximum log entries for each port.            | <b>modem buffer-size</b>                                                   |
| <b>spe poll</b>                   | Sets the statistic polling interval.                   | <b>modem poll</b>                                                          |
| <b>spe call-record</b>            | Generates a modem call record at the end of each call. | <b>modem call-record</b>                                                   |
| <b>spe</b>                        | Configures the SPE.                                    | <b>Already implemented on the Cisco AS5300 and Cisco AS5800 platforms.</b> |
| <b>busyout</b>                    | Busyouts active calls.                                 | <b>modem busyout</b>                                                       |
| <b>shutdown</b>                   | Teardown all active calls on the specified SPEs.       | <b>modem shutdown</b>                                                      |
| <b>port modem autotest</b>        | Enables modem autotest.                                | <b>modem autotest</b>                                                      |
| <b>firmware upgrade</b>           | Specifies the upgrade method.                          | <b>Already implemented on the Cisco AS5300 platform.</b>                   |
| <b>firmware location filename</b> | Specifies the firmware file to be upgraded.            | <b>Already implemented on the Cisco AS5300 and Cisco AS5800 platforms.</b> |

**Table 3 Port Configuration Commands: NextPort to MICA Command Comparison**

| NextPort SPE CLI Commands | Purpose                                                 | MICA Modem CLI Commands |
|---------------------------|---------------------------------------------------------|-------------------------|
| <b>port</b>               | Configures the port range.                              | <b>modem range</b>      |
| <b>default</b>            | Displays the value of the command to its default value. | <b>default modem</b>    |

**Table 3** Port Configuration Commands: NextPort to MICA Command Comparison

| NextPort SPE CLI Commands | Purpose          | MICA Modem CLI Commands |
|---------------------------|------------------|-------------------------|
| <b>busyout</b>            | Busyouts a port. | <b>modem busyout</b>    |
| <b>shutdown</b>           | Shutdown a port. | <b>modem shutdown</b>   |

**Table 4** Global Configuration Commands: NextPort to MICA Command Comparison

| NextPort SPE CLI Commands    | Purpose                                                                          | MICA Modem CLI Commands        |
|------------------------------|----------------------------------------------------------------------------------|--------------------------------|
| <b>ds0 busyout-threshold</b> | Defines a threshold to maintain a balance between the number of DS0s and modems. | <b>modem busyout-threshold</b> |

**Table 5** EXEC Commands: MICA to NextPort Command Comparison

| MICA Modem CLI Commands              | Purpose                                                                                                                            | NextPort SPE CLI Commands               |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>show modem</b>                    | Shows the modem service history statistics for specified SPEs.                                                                     | <b>show spe modem summary</b>           |
| <b>show modem</b>                    | Shows the statistics of all active calls on specified SPEs.                                                                        | <b>show spe modem active</b>            |
| <b>show modem call-stats</b>         | Displays all modem disconnect reasons for the specified SPEs.                                                                      | <b>show spe modem disconnect-reason</b> |
| <b>show modem speed</b>              | Displays the total number of connections negotiated within each modulation or coder-decoder (codec) for a specific range of SPEs.  | <b>show spe modem high speed</b>        |
| <b>show modem speed</b>              | Displays the connect-speeds negotiated within each low speed modulation or codec for a specific range of SPEs or for all the SPEs. | <b>show spe modem low speed</b>         |
| <b>show modem mapping</b>            | Displays all MICA and NextPort firmware versions that are stored in Flash memory and the firmware assigned to each SPE.            | <b>show spe version</b>                 |
| <b>show modem log</b>                | Displays the events generated by the modem sessions.                                                                               | <b>show port modem log</b>              |
| <b>show modem operational-status</b> | Displays the statistics of the current active session.                                                                             | <b>show port operationsl-status</b>     |
| <b>show modem config</b>             | Displays the configuration parameters of the current active session.                                                               | <b>show port config</b>                 |
| <b>clear modem counters</b>          | Clears all statistics.                                                                                                             | <b>clear spe counters</b>               |
| <b>clear modem log</b>               | Clears all log entries for specified SPEs.                                                                                         | <b>clear spe log</b>                    |
| <b>clear modem</b>                   | Activates shutdown and no shutdown on specified ports.                                                                             | <b>clear port</b>                       |

**Table 5 EXEC Commands: MICA to NextPort Command Comparison**

| <b>MICA Modem CLI Commands</b> | <b>Purpose</b>                                                                                                                                                                            | <b>NextPort SPE CLI Commands</b>   |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| <b>clear modem log</b>         | Clears all log entries for the specified ports.                                                                                                                                           | <b>clear port log</b>              |
| <b>show modem calltracker</b>  | Displays port level information for an active modem. See the <i>Call Tracker plus ISDN and AAA Enhancements for the Cisco AS5300 and Cisco AS5800</i> documentation for more information. | <b>show port modem calltracker</b> |
| <b>show modem test</b>         | Displays port modem test results.                                                                                                                                                         | <b>show port modem test</b>        |

**Table 6 SPE Configuration Commands: MICA to NextPort Command Comparison**

| <b>MICA Modem CLI Commands</b>    | <b>Purpose</b>                                              | <b>NextPort SPE CLI Commands</b>  |
|-----------------------------------|-------------------------------------------------------------|-----------------------------------|
| <b>modem country</b>              | Sets the system country code.                               | <b>spe country</b>                |
| <b>modem buffer-size</b>          | Sets the maximum log entries for each port.                 | <b>spe log-size</b>               |
| <b>modem poll</b>                 | Sets the statistic polling interval.                        | <b>spe poll</b>                   |
| <b>modem call-record</b>          | Generates a modem call record at the end of each call.      | <b>spe call-record</b>            |
| <b>spe</b>                        | Configures the SPE.                                         | <b>spe</b>                        |
| <b>modem busyout</b>              | Busyouts active calls.                                      | <b>busyout</b>                    |
| <b>modem shutdown</b>             | Tears down all active calls on the specified SPEs.          | <b>shutdown</b>                   |
| <b>modem autotest</b>             | Enables modem autotest.                                     | <b>port modem autotest</b>        |
| <b>modem startup-test</b>         | Runs a startup test on all modems when the system boots up. | <b>port modem startup-test</b>    |
| <b>firmware upgrade</b>           | Specifies the upgrade method.                               | <b>firmware upgrade</b>           |
| <b>firmware location filename</b> | Specifies the firmware file to be upgraded.                 | <b>firmware location filename</b> |

**Table 7 Port Configuration Commands: MICA to NextPort Command Comparison**

| <b>MICA Modem CLI Commands</b> | <b>Purpose</b>                                          | <b>NextPort SPE CLI Commands</b> |
|--------------------------------|---------------------------------------------------------|----------------------------------|
| <b>modem range</b>             | Configures the port range.                              | <b>port</b>                      |
| <b>default modem</b>           | Displays the value of the command to its default value. | <b>default</b>                   |
| <b>modem busyout</b>           | Busyouts a port.                                        | <b>busyout</b>                   |
| <b>modem shutdown</b>          | Shut down a port.                                       | <b>shutdown</b>                  |

**Table 8** Global Configuration Commands: MICA to NextPort Command Comparison

| MICA Modem CLI Commands              | Purpose                                                                          | NextPort SPE CLI Commands          |
|--------------------------------------|----------------------------------------------------------------------------------|------------------------------------|
| <code>modem busyout-threshold</code> | Defines a threshold to maintain a balance between the number of DS0s and modems. | <code>ds0 busyout-threshold</code> |


## Configuration Tasks

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

- Configuring Country Code (required), page 12
- Configuring SPEs to Use an Upgraded Firmware File (optional), page 12
- Disabling SPEs (optional), page 14
- Rebooting SPEs (optional), page 15
- Configuring Lines and Ports (optional), page 15
- Verifying SPE Lines and Port Configuration (optional), page 16
- Configuring NextPort DFC Ports (optional), page 16
- Clearing Ports (optional), page 17
- Configuring SPE Performance Statistics (optional), page 18
- Clearing Log Events (optional), page 18

## Configuring Country Code

To set the NextPort 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)# <b>spe country</b> <i>country name</i> | 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 <b>usa</b> . If the universal gateway is configured with E1 interfaces, the default is <b>e1-default</b> . Use the <b>no</b> form of this command to set the country code to the default of the domestic country. |
|                                                        |  <p><b>Note</b> All sessions in all DFCs in all slots must be in the idle state for this command to run.</p>                                                                                                                                                                                                                                                     |

## Configuring SPEs to Use an Upgraded Firmware File

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

|        | Command                                                                                   | Purpose                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Step 1 | Router# <b>show spe version</b>                                                           | Displays SPE firmware versions to obtain the On-Flash firmware filename.                                                                                                                                                                                                                                                                                                                                                                                                  |
| Step 2 | Router# <b>config terminal</b>                                                            | Enters global configuration mode.                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Step 3 | Router(config)# <b>spe slot/spe</b><br>or<br>Router(config)# <b>spe slot/spe slot/spe</b> | 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)# <b>firmware upgrade {busyout   download-maintenance   reboot}</b>     | Specifies the upgrade method (three methods are available). <ul style="list-style-type: none"> <li>• The <b>busyout</b> keyword waits until all calls are terminated on an SPE before upgrading the SPE to the designated firmware.</li> <li>• The <b>download-maintenance</b> keyword upgrades the firmware during the download maintenance time.</li> <li>• The <b>reboot</b> keyword requests the universal gateway to upgrade firmware at the next reboot.</li> </ul> |
| Step 5 | Router(config-spe)# <b>firmware location filename</b>                                     | 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.<br><br>Enter the <b>no firmware location</b> command to revert back to the default Cisco IOS bundled SPE firmware.                                                                                                                                                                 |
| Step 6 | Router(config-spe)# <b>exit</b>                                                           | Exits SPE configuration mode.                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Step 7 | Router# <b>exit</b>                                                                       | Exits global configuration mode.                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Step 8 | Router# <b>copy running-config startup-config</b>                                         | Saves your changes.                                                                                                                                                                                                                                                                                                                                                                                                                                                       |



### Note

The **copy ios-bundled** command is not necessary with NextPort 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 NextPort DFC, complete the following steps starting in global configuration mode:

| Command                                                                                   | Purpose                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Router(config)# <b>spe</b> slot/spe<br>or<br>Router(config)# <b>spe</b> 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)# <b>busyout</b>                                                        | 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 busyout 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 busidout when all calls end. Use the <b>show spe</b> command to see the state of the range of SPEs.<br><br>Use the <b>no</b> form of this command to re-enable the SPEs. |
| Router(config-spe)# <b>shutdown</b>                                                       | 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.<br><br>Use the <b>no</b> 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# <b>clear spe</b> slot/spe | <p>Allows manual recovery of a port that is frozen in a suspended state. Reboots SPEs in suspended or Bad state. Downloads configured firmware to the specified SPE or range of SPEs and power-on self-test (POST) is run.</p> <p> <b>Note</b> Depending on the problem, sometimes downloading the SPE firmware may not help recover a bad port or an SPE.</p> <p>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.</p> |

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

|        | Command                                                   | Purpose                                                                                                                      |
|--------|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| Step 3 | Router(config-line)# <b>autoselect ppp</b>                | 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)# <b>modem inout</b>                   | Enables incoming and outgoing calls.                                                                                         |
| Step 5 | Router(config-line)# <b>modem autoconfigure type name</b> | 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 NextPort DFC Ports

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

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

|        | Command                              | Purpose                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Step 3 | Router(config-port)# <b>busyout</b>  | <p>(Optional) Gracefully disables a port by waiting for the active services on the specified port to terminate. Use the <b>no</b> form of this command to re-enable the ports.</p> <p>Maintenance activities, such as testing, can still be performed while the port is in busyout mode.</p> <p> <b>Note</b> 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.</p> |
| Step 4 | Router(config-port)# <b>shutdown</b> | <p>(Optional) Clears active calls on the port. No more calls can be placed on the port in the shutdown mode. Use the <b>no</b> form of this command to re-enable the ports.</p> <p> <b>Note</b> 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.</p>                                                                                                             |
| Step 5 | Router(config-port)# <b>exit</b>     | Exits port configuration mode.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## Clearing Ports

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

| Command                                                                                       | Purpose                                                                     |
|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| Router# <b>clear port 4/1</b><br>Router# This will clear port 4/01 [confirm] <b>yes</b>       | Clears port 1 on slot 4 of the NextPort port on the Cisco AS5400.           |
| Router# <b>clear port 4</b><br>Router# This will clear port 4/00 - 4/107 [confirm] <b>yes</b> | Clears all active ports on slot 4 of the NextPort port on the Cisco AS5400. |

## 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 SPE Performance Statistics” section on page 20. You can configure some aspects of history events by using the following commands in global configuration mode:

| Command                                                        | Purpose                                                                                                                                                      |
|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Router(config)# <b>spe call-record modem</b> <i>max-userid</i> | Requests the universal gateway to generate a modem call record after a call is terminated. To disable this function, use the <b>no</b> form of this command. |
| Router(config)# <b>spe log-event-size</b> <i>number</i>        | 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# <b>clear spe log</b>      | Clears all event entries in the slot history event log.                                                                                                                                                          |
| Router# <b>clear spe counters</b> | 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# <b>clear port log</b>     | Clears all event entries in the port level history event log. You cannot remove individual service events from the port log.                                                                                     |

## Troubleshooting SPEs

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 additionally 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 may 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 universal gateway. For example, if mobile users cannot dial in to port 2/5 (which is the sixth port on the NextPort 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
```



**Tips** You may 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 the whole of 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.



**Tips** You may also schedule recovery 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 SPE Performance Statistics

This section documents various SPE performance statistics for the NextPort DFC:

- SPE Events and Firmware Statistics, page 20
- Port Statistics, page 21
- Digital SPE Statistics, page 21
- SPE Modem Statistics, page 22

## SPE Events and Firmware Statistics

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

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

## Port Statistics

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

| Command                                                                                                     | Purpose                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Router# <b>show port config</b> { <i>slot</i>   <i>slot/port</i> }                                          | 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# <b>show port digital log</b> [ <b>reverse</b> <i>slot/port</i> ] [ <i>slot</i>   <i>slot/port</i> ] | Displays the digital data event log.                                                                                                                                      |
| Router# <b>show port modem log</b> [ <b>reverse</b> <i>slot/port</i> ] [ <i>slot</i>   <i>slot/port</i> ]   | Displays the port history event log.                                                                                                                                      |
| Router# <b>show port modem test</b> [ <i>slot</i>   <i>slot/port</i> ]                                      | Displays the test log for the specified SPE port range or all the SPE ports.                                                                                              |
| Router# <b>show port operational-status</b> [ <i>slot</i>   <i>slot/port</i> ]                              | 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.            |

## Digital SPE Statistics

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

| Command                                                                                              | Purpose                                                                                                                                     |
|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Router# <b>show spe digital</b> [ <i>slot</i>   <i>slot/spe</i> ]                                    | Displays history statistics of all digital SPEs.                                                                                            |
| Router# <b>show spe digital active</b> [ <i>slot</i>   <i>slot/spe</i> ]                             | Displays active digital statistics of a specified SPE, the specified range of SPEs, or all SPEs.                                            |
| Router# <b>show spe digital csr</b> [ <b>summary</b>   <i>slot</i>   <i>slot/spe</i> ]               | Displays the digital call success rate statistics for a specific SPE, a range of SPEs, or all SPEs.                                         |
| Router# <b>show spe digital disconnect-reason</b> [ <b>summary</b>   <i>slot</i>   <i>slot/spe</i> ] | Displays the digital disconnect reasons for the specified SPE or range of SPEs. The disconnect reasons are displayed with Class boundaries. |
| Router# <b>show spe digital summary</b> [ <i>slot</i>   <i>slot/spe</i> ]                            | Displays digital history statistics of all SPEs, a specified SPE, or the specified range of SPEs for all service types.                     |

## SPE Modem Statistics

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

| Command                                                                     | Purpose                                                                                                                                         |
|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Router# <b>show spe modem active</b> {slot   slot/spe}                      | Displays the active statistics of a specified SPE, a specified range of SPEs, or all SPEs serving modem traffic.                                |
| Router# <b>show spe modem csr</b> {summary   slot   slot/spe}               | Displays the call success rate statistics for a specific SPE, a specified range of SPEs, or all SPEs.                                           |
| Router# <b>show spe modem disconnect-reason</b> {summary   slot   slot/spe} | Displays the disconnect reasons for the specified SPE or a specified range of SPEs. The disconnect reasons are displayed with Class boundaries. |
| Router# <b>show spe modem high speed</b> {summary   slot   slot/spe}        | Shows the connect-speeds negotiated within each high speed modulation or codecs for a specific range of SPEs or all SPEs.                       |
| Router# <b>show spe modem low speed</b> {summary   slot   slot/spe}         | Shows the connect-speeds negotiated within each low speed modulation or codecs for a specific range of SPEs or all SPEs.                        |
| Router# <b>show spe modem high standard</b> {summary   slot   slot/spe}     | Displays the total number of connections within each low modulation or codec for a specific range of SPEs.                                      |
| Router# <b>show spe modem low standard</b> {summary   slot   slot/spe}      | Displays the total number of connections within each high modulation or codec for a specific range of SPEs.                                     |
| Router# <b>show spe modem summary</b> {slot   slot/spe}                     | Displays the history statistics of all SPEs, a specified SPE, or the specified range of SPEs.                                                   |

## Configuration Example

The NextPort dial feature card (DFC) provides port service management for the Cisco AS5400.

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