



Managing and Troubleshooting the Universal Port and Dial-Only Feature Cards

The information in this chapter applies to the Cisco AS5350XM and Cisco AS5400XM universal gateways, and includes the following sections:

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Two different types of Nextport digital signal processor (DSP) feature cards are available for Cisco AS5350XM and Cisco AS5400XM universal gateways.

- Universal port feature card—The universal port feature card supports 60 (NP-60) to 108 (NP-108) voice, fax, and dial calls in a Cisco AS5350XM and Cisco AS5400XM universal gateway.
- Dial-only feature card—The dial-only feature card supports 60 (DL-60) to 108 (DL-108) dial calls in a Cisco AS5350XM and Cisco AS5400XM universal gateway. It does not support voice or fax services.



Note

Dial services include modem calls (all modulations), ISDN digital calls, V.110 data calls, and V.120 data calls. Modem pass-through calls are not included in dial services.

You can manage your port connections at the feature card slot level, service processing element (SPE) level, or port level using monitoring and troubleshooting commands. A port is defined as an endpoint on a trunk card through which multiservice tones, voice, and data flow. There are multiple ports on each SPE.

The universal port and dial-only feature cards include SPE and slot software hierarchies. On the Cisco AS5350XM and Cisco AS5400XM universal gateways, the hierarchy designation is *slot/spe* and *slot/port*:

- Slot values range from 1 to 7.



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- Port values range from 0 to one less than the total port count available on the card.
- SPEs range from 0 to 17.

For example, universal port card port 2/5 is the sixth port in the second chassis slot on the gateway. Slot 0 is reserved for the motherboard.

You can perform the following functions on an SPE:

- General configuration such as busyout, shutdown, or clear
- View statistics and states
- Configure automatic and manual recovery processes
- Upgrade firmware

Configuring SPE Performance Statistics

By default, an event log is enabled and based on one event queue per SPE port. The log contains raw data in binary form, which must be viewed using the **show** commands listed in the “[Viewing SPE Performance Statistics](#)” section on page 3. You may configure some aspects of how the record is kept using the following global configuration mode commands (at the `AS5350(config)#` or `AS5400(config)#` prompt):

- **spe call-record modem *max-userid***—Generates a modem call record after a modem call is terminated. The *max-userid* is the maximum user ID size, in bytes, allowable in the modem. The **call-record** default is 30; the range is 0 to 100. You can display this record on the console or a configured syslog server. This call record is not stored in the port event log. To disable this function, use the **no** form of this command. This replaces the **modem call-record** command.
- **spe log-size *number***—Allows you to configure the size of the history event queue buffer for manageable SPEs in the gateway. The default is 100 events per port. Use the **show port [modem | voice | fax] log** command to view port events. This command is used in the same way as the **modem buffer-size** command is used for MICA modems.
- **show port [modem | voice | fax] log reverse**—Displays port events with the most recent event first.



Note

The dial-only feature card only supports dial services. Dial services include modem calls (all modulations), ISDN digital calls, V.110 data calls, and V.120 data calls. Modem pass-through calls are not included in dial services.

The following privileged EXEC mode commands allow you to clear some or all of the log events relating to the SPEs (at the `AS5350#` or `AS5400#` prompt):

- **clear spe log**—Allows you to clear all event entries in the slot history event log.
- **clear spe counters**—Clears statistical counters for all types of services for the specified SPE, a range of SPE range, or all the SPEs. If you do not specify a range of SPEs or a specific SPE, all SPE statistics are cleared. It is used in the same way the **clear modem counters** command is used for MICA modems.
- **clear port log**—Allows you to clear all event entries in the port level history event log. This command clears the entire port log. You cannot remove individual service events from the port log. You can use **show port modem log** or **show port digital log** to display specific service events, but you must use **clear port log** to clear the entire port log.

Viewing SPE Performance Statistics

You can view SPE statistics using the Cisco IOS software with the gateway. To view performance statistics for the universal port or dial-only feature cards, enter one or more of the following commands in privileged EXEC mode (at the `AS5350#` or `AS5400#` prompt):

show spe voice Commands

- **show spe voice active**—Displays the active statistics of all SPEs, a specified SPE, or a specified SPE range serving voice traffic.
- **show spe voice slot | slot/spe summary**—Displays the history statistics of all SPEs in a particular slot, specified SPE, or specified SPE range serving voice traffic.

**Note**

The dial-only feature card only supports dial services. Dial services include modem calls (all modulations), ISDN digital calls, V.110 data calls, and V.120 data calls. Modem pass-through calls are not included in dial services.

show spe digital Commands

- **show spe digital active**—Displays the active statistics of all SPEs, a specified SPE, or a specified SPE range serving digital traffic.
- **show spe digital csr**—Displays the digital call success rate statistics for a specific SPE, range of SPEs, or all the SPEs.
- **show spe digital disconnect-reason**—Displays the digital disconnect reasons for the specified SPE or SPE range. The disconnect reasons are displayed with Class boundaries.
- **show spe digital slot | slot/spe summary**—Displays the history statistics of all SPEs in a particular slot, specified SPE or the specified SPE range serving digital traffic.

show spe modem Commands

- **show spe modem active**—Displays the active statistics of all SPEs, a specified SPE, or a specified SPE range serving modem traffic. It is used in the same way as the **show modem** command is used for MICA modems. (The **show modem** command is not supported on the Cisco AS5350XM or Cisco AS5400XM universal gateway.)
- **show spe modem csr**—Displays the call success rate statistics for a specific SPE, range of SPEs, or all the SPEs.
- **show spe modem disconnect-reason**—Displays the reason for disconnection for the specified SPE or SPE range. Disconnection reasons are displayed with class boundaries. This command is used in the same way as the **show modem call-stats** command is used for MICA modems. (The **show modem call-stats** command is not supported on the Cisco AS5350XM or Cisco AS5400XM universal gateway.)
- **show spe modem {high | low} speed**—Shows the connection speeds negotiated within each high or low speed modulation or codecs for a specific range of SPEs or all the SPEs.

- **show spe modem slot | slot/spe summary**—Displays the history statistics of all SPEs in a particular slot, specified SPE, or specified SPE range. It is used in the same way as the **show modem** command is used for MICA modems. (The command is not supported on the Cisco AS5350XM or Cisco AS5400XM universal gateway.)

show spe Commands

- **show spe log**—Displays the oldest event first from the slot history event log.
- **show spe log reverse**—Displays the latest event first from the log.
- **show spe version**—Lists all SPEs and the SPE firmware files used. This helps you decide if you need to update your SPE firmware files. This command is used in the same way as the **show modem mapping** command is used for MICA modems. (The **show modem mapping** command is not supported on the Cisco AS5350XM or Cisco AS5400XM universal gateway.)
- **show spe fax active**—Displays the active statistics of all SPEs, a specified SPE, or a specified SPE range serving fax-relay traffic.

show port Commands

- **show port config**—Displays the configuration information for specified ports or the specified port range. The port should have an active session associated with it at the time the command is executed.
- **show port [digital | modem | voice | fax] log**—Displays the event log with oldest event first. For modems, this command is used the same way as the **show modem log** command is used for MICA modems. (The **show modem log** command is not supported on the Cisco AS5350XM or Cisco AS5400XM universal gateway.)
- **show port [digital | modem | voice | fax] log reverse**—Displays the latest event first from the port history event log.
- **show port modem calltracker**—Displays the port level information for an active modem call using the call tracker database. If there is no call on the specified port, the information of the most recent call is displayed. The call tracker feature must be enabled by invoking the **calltracker enable** command. (For detailed information about the call tracker feature, see the *Call Tracker plus ISDN and AAA Enhancements for the Cisco AS5300 and Cisco AS5800* document, available online at http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121limit/121x/121xh/121xh_2/dt_cltrk.htm)
- **show port modem test**—Displays the test log for the specified SPE port range or all the SPE ports.
- **show port operational-status**—Displays the operational status of the specified ports or the specified port range. The port should have an active session associated with it at the time the command is executed.

Managing Ports

This section describes how to manage universal-port and dial-only feature card ports. You can clear ports, remove ports from service, and disable ports from dial-up service by using port configuration mode. For details on disabling a port from dial-up service, see the “[Troubleshooting](#)” section on page 8.

Clear Ports

To clear a port means to deactivate calls on a port or to clear the *Bad* state on a port and reset it. Ports need to be cleared if communication attempts with the port have failed or if the port is to be removed from operation.

Use the **show spe slot/spe** command to view the active ports on an SPE. To clear ports on an SPE, enter the following command in privileged EXEC mode. You can clear all ports on the gateway, all ports on a slot, or a port. This replaces the **clear modem** command.

- The example below clears port 1 on slot 4.

```
AS5400# clear port 4/1
AS5400# This will clear port 4/01 [confirm] yes
AS5400#
```

- The example below clears all active ports on slot 4.

```
AS5400# clear port 4
AS5400# This will clear port 4/00 - 4/107 [confirm] yes
AS5400#
```

If *slot/port* is specified, the port on that SPE is cleared. If *slot* is specified, all active ports on that particular slot are cleared. If no argument is specified, all ports are cleared.

Additionally, this command clears the *Bad* state on a port and resets it. However, the port is not cleared if the SPE was previously in a *Bad* state because of an SPE firmware download.

Port Configuration Mode

Port configuration mode allows you to enter a mode similar to line configuration mode. This mode allows individual ports or ranges of ports to be shut down or put in busyout mode. Port configuration mode commands replace the **modem range**, **modem busyout**, and **modem shutdown** commands used with MICA modems.

- The example below demonstrates how to enter port configuration mode for a single port.

```
AS5400# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
AS5400(config)# port 3/1
AS5400(config-port)#
```

- The example below demonstrates how to enter port configuration mode for a range of ports.

```
AS5400# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
AS5400(config)# port 3/1 3/18
AS5400(config-port)#
```

Port Configuration Mode Commands

The following commands are available in port configuration mode:

- busyout card/port**—Gracefully disables a port or all ports on a feature card by waiting for the active services on the specified port to terminate. You can busy out all ports or just one port on a card—for example, **busyout 1** specifies all ports on card 1; **busyout 1/4** specifies just port 4 on card 1. Use the **no** form of this command to reenable the ports. This replaces the **modem busyout** command. Maintenance activities such as testing can still be performed while a port is in busyout mode.



Note **port busyout** and **spe busyout** are different commands, and do not affect one another. If you busyout a port or SPE with one command, you can clear it only with the analogous **clear** command.

- **shutdown**—Clears active calls on the port. No more calls can be placed on the port. The state of the SPEs are reflected in the **show spe** command display. Use the **no** form of this command to reenable the ports. This command replaces the **modem shutdown** command.

**Note**

When a port is in busyout mode or shutdown mode, the state of the SPE is changed to the consolidated states of all the underlying ports on that SPE.

Managing SPEs

This section describes how to manage SPEs by setting the SPE country code, entering SPE configuration mode, upgrading the SPE firmware, performing busyout on SPEs, and clearing active calls on the SPEs.

SPE Country

On the Cisco AS5350XM and Cisco AS5400XM universal gateways, DS0 companding law selection is configured for the entire system rather than on individual voice ports.

To configure companding on your T1, E1, or T3 controller lines, you must use the **spe country** command in global configuration mode. (This command replaces the **modem country** command. If you do not specify a country, your controller line uses the default.)

For T1 interfaces, the default is **t1-default** (Mu-law); for E1 interfaces, the default is **e1-default** (A-law). Use the **no** form of this command to set the country code to the default.

Supported countries include, but are not limited to, those shown in [Table 10](#):

Table 10 *Supported Countries and Corresponding Companding Law*

Country	Companding Law	Country	Companding Law
Australia	A-law	Netherlands	A-law
Austria	A-law	New Zealand	A-law
Belgium	A-law	Norway	A-law
China	A-law	Poland	A-law
Cyprus	A-law	Portugal	A-law
Czech/Slovak Republic	A-law	Russia	A-law
Denmark	A-law	Singapore	A-law
Finland	A-law	South Africa	A-law
France	A-law	Spain	A-law
Germany	A-law	Sweden	A-law
Hong Kong	Mu-law	Switzerland	A-law

Table 10 Supported Countries and Corresponding Companding Law (continued)

Country	Companding Law	Country	Companding Law
India	A-law	Taiwan	Mu-law
Ireland	A-law	Thailand	A-law
Israel	A-law	Turkey	A-law
Italy	A-law	United Kingdom	A-law
Japan	Mu-law	USA	Mu-law
Malaysia	A-law	—	—



Note

The gateway must be in idle state (no calls are active) to execute the SPE country command.

- The following example sets the country code to **usa**.

```
AS5400(config)# spe country usa
AS5400(config)#
```

- The following example verifies that DS0 companding was set to **usa** (or Mu-law). It also displays the SPE busyout status.

```
AS5400# show spe
```

```
SPE settings:
=====
Country code configuration usa
Polling interval: 12 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 (v)voice (__)not in use
```

SPE#	Port #	SPE State	SPE Busyout	SPE Shut	SPE Crash	Port State	Call Type
4/00	0000-0005	ACTIVE	0	0	0	_____	_____
4/01	0006-0011	ACTIVE	0	0	0	_____	_____
4/02	0012-0017	ACTIVE	0	0	0	_____	_____
4/03	0018-0023	ACTIVE	0	0	0	_____	_____
4/04	0024-0029	ACTIVE	0	0	0	_____	_____
4/05	0030-0035	ACTIVE	0	0	0	_____	_____
4/06	0036-0041	ACTIVE	0	0	0	_____	_____
4/07	0042-0047	ACTIVE	0	0	0	_____	_____
4/08	0048-0053	ACTIVE	0	0	0	_____	_____
4/09	0054-0059	ACTIVE	0	0	0	_____	_____
4/10	0060-0065	ACTIVE	0	0	0	_____	_____
4/11	0066-0071	ACTIVE	0	0	0	_____	_____
4/12	0072-0077	ACTIVE	0	0	0	_____	_____
4/13	0078-0083	ACTIVE	0	0	0	_____	_____
4/14	0084-0089	ACTIVE	0	0	0	_____	_____
4/15	0090-0095	ACTIVE	0	0	0	_____	_____
4/16	0096-0101	ACTIVE	0	0	0	_____	_____
4/17	0102-0107	ACTIVE	0	0	0	_____	_____

SPE Configuration Mode

SPE configuration mode allows you to configure SPEs, similar to line configuration mode. You can configure an SPE by specifying a slot and an SPE associated with the slot or, you can choose to configure a range of SPEs by specifying the first and last SPE in the range.

The following example demonstrates how to enter SPE configuration mode.

```
AS5400# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
AS5400(config)# spe 1/1 1/17
AS5400(config-SPE)#
```

SPE Configuration Mode Commands

The following commands are available in SPE configuration mode:

- **firmware location**—Allows you to transfer a specified version of SPE firmware from system flash memory to the SPEs named upon entering SPE configuration mode. For further information on firmware upgrades, see the [“Upgrading SPE Firmware” section on page 11](#).
- **firmware upgrade** *busyout* | *download-maintenance* | *reboot*—Allows you to specify the upgrade method. Three methods of upgrade are available.
 - *Busyout* (the default) upgrades when all calls are terminated on an SPE.
 - *Download-maintenance* waits to upgrade at the next download maintenance. For further information on firmware upgrades, see the [“Upgrading SPE Firmware” section on page 11](#). The default download-maintenance time is 0300.
 - *Reboot* upgrades at the next reboot. Note that for the **firmware upgrade reboot** command to take effect after a reload, you must have saved the running configuration with the **copy running-config startup-config** command.
- **busyout**—Gracefully disables an SPE by waiting for all the active services on the specified SPE to terminate. If there are active ports on the specified SPE, the state of the SPE is changed to *Busiedout*. The SPE is temporarily disabled. Use the **no** form of this command to reenoble the SPEs.
- **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 *Out-of-Service*. The state of the SPEs is reflected in the **show spe** command display. Use the **no** form of this command to reenoble the ports on the SPE.

Troubleshooting

This section provides troubleshooting information that applies to your modems regardless of service type mode. You learn how to perform diagnostic tests on installed ports or SPEs, configure automatic recovery of ports on an SPE, and configure a scheduled recovery of SPEs.

Configure SPE Diagnostic Tests

You can perform three types of diagnostic tests on your SPE modem:

- SPE startup test
- SPE autotest
- SPE back-to-back test

SPE Startup Test

To perform diagnostic testing on all your installed SPE ports during the initial system startup or rebooting process, in global configuration mode with the prompt displayed as `AS5350#` or `AS5400#`, enter the following command:

port modem startup-test—Perform diagnostic testing for all modems.

The results of the SPE port startup test are displayed in the **show port modem test** command output. SPE ports that pass the diagnostic test are *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, this diagnostic test may take from 5 to 10 minutes to complete. Perform additional testing on an inoperative SPE port by executing the **test port modem back-to-back** command. The **no port modem startup-test** command disables startup testing.

SPE Autotest

To perform diagnostic testing on all the installed SPE ports during the initial system startup or rebooting process, or during service, in global configuration mode with the prompt displayed as `AS5350(config)#` or `AS5400(config)#`, enter the following command:

port modem autotest—Perform diagnostic testing for all ports.

The results of the SPE port autotest are displayed in the **show port modem test** command output. Ports that pass the diagnostic test are marked as *Idle*, *Busy*, *Downloading*, and *Reset*, and are put into service. Ports that fail the diagnostic test are marked as *Bad*, and are not put into service or tested again until they are no longer marked as *Bad*. If all the ports of an SPE are bad, the corresponding SPE is also marked bad. These ports cannot be used for call connections. Depending on how many ports are present and not marked *Bad*, this diagnostic test may take from 5 to 10 minutes to complete. Perform additional testing on an inoperative port by executing the **test port modem back-to-back** command. The **no port modem autotest** command disables testing.

You can additionally configure the following options:

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

A sample diagnostic autotest setting the time at 12:45 and at 8-hour intervals looks like the following:

```
AS5400(config)# port modem autotest time 12:45 8
AS5400(config)#
```

SPE Back-to-Back Test

When an SPE port fails testing and is labeled *Bad*, you can perform 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 gateway. For example, if mobile users cannot dial in to port 2/5 (the sixth port on the card 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 following command in privileged EXEC mode (the prompt is displayed as `AS5350#` or `AS5400#`) to perform internal back-to-back port tests between two ports:

test port modem back-to-back *slot/port slot/port* [*num-packets*]—Performs internal back-to-back port tests between two ports, sending test packets of the specified size.

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

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

```
AS5400# 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
```

A port that has been confirmed to have problems can often be fixed using the **clear spe** command. For more information, see the “[Clear an SPE](#)” section on page 11.

The results of the **test port modem back-to-back** command are displayed in the **show port modem test** command output:

```
AS5400# show port modem test
```

Date	Time	Modem	Test	Reason	State	Result
3/02	12:00:57 PM	2/01	Back-To-Back	:STARTUP TEST	Idle	PASS
3/02	12:00:57 PM	2/00	Back-To-Back	:STARTUP TEST	Idle	PASS
3/02	12:00:58 PM	2/02	Back-To-Back	:STARTUP TEST	Idle	PASS
3/02	12:00:58 PM	2/03	Back-To-Back	:STARTUP TEST	Idle	PASS
3/02	12:00:58 PM	2/04	Back-To-Back	:STARTUP TEST	Idle	PASS
3/02	12:00:58 PM	2/05	Back-To-Back	:STARTUP TEST	Idle	PASS
...						
3/02	12:01:14 PM	3/95	Back-To-Back	:STARTUP TEST	Idle	PASS
3/02	12:01:14 PM	3/94	Back-To-Back	:STARTUP TEST	Idle	PASS
3/02	12:01:15 PM	3/75	Back-To-Back	:STARTUP TEST	Idle	PASS
3/02	12:01:15 PM	3/74	Back-To-Back	:STARTUP TEST	Idle	PASS
3/02	12:13:52 PM	3/20	Back-To-Back	:USER INITIATED	Idle	PASS
3/02	12:13:52 PM	2/10	Back-To-Back	:USER INITIATED	Idle	PASS
...						
3/02	12:44:00 PM	3/102	No Test (Time)	:MIN IDLE MODEMS	Idle	NOTST
3/02	12:44:00 PM	3/103	No Test (Time)	:MIN IDLE MODEMS	Idle	NOTST
3/02	12:44:00 PM	3/104	No Test (Time)	:MIN IDLE MODEMS	Idle	NOTST
3/02	12:44:00 PM	3/105	No Test (Time)	:MIN IDLE MODEMS	Idle	NOTST
3/02	12:44:00 PM	3/106	No Test (Time)	:MIN IDLE MODEMS	Idle	NOTST
3/02	12:44:00 PM	3/107	No Test (Time)	:MIN IDLE MODEMS	Idle	NOTST
3/02	12:44:21 PM	2/73	Back-To-Back	:TIME INTERVAL	Idle	PASS
3/02	12:44:21 PM	2/72	Back-To-Back	:TIME INTERVAL	Idle	PASS
3/02	12:44:21 PM	2/33	Back-To-Back	:TIME INTERVAL	Idle	PASS
3/02	12:44:21 PM	2/32	Back-To-Back	:TIME INTERVAL	Idle	PASS
3/02	12:44:21 PM	3/37	Back-To-Back	:TIME INTERVAL	Idle	PASS



Note

The *Reason* column indicates why the test was started. The *TIME INTERVAL* is one of the triggers under autotest; the other is the error threshold.

SPE Recovery

You can configure automatic recovery (removal from service and reloading of SPE firmware) of ports on an SPE at any available time from global configuration mode (the prompt is AS5350(config)# or AS5400(config)#):

spe recovery {**port-action** {**disable** | **recover** | **none**} | **port-threshold** *num-failures*}

When an SPE port fails to connect for a certain number of consecutive times, a problem exists in a specific part or the whole of SPE or 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 **port-action**, 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.

You can also schedule recovery using the **spe download maintenance configuration** command.

SPE Download Maintenance

You can configure a scheduled recovery of SPEs from global configuration mode (the prompt is AS5350(config)# or AS5400(config)#):

spe download maintenance time *hh:mm* | **stop-time** *hh:mm* | **max-spes** *num-of-spes* | **window** *time-period* | **expired-window** {*drop-call* | *reschedule*}

Download maintenance starts at **time**, steps through all the SPEs that need recovery and SPEs that need a firmware upgrade, and starts maintenance on **max-spes** at a time. It waits for the **window** delay time for all the ports on the SPE to become inactive before moving the SPE to the *idle* state. It downloads firmware immediately after the SPE moves to idle. If the ports are still in use by the end of **window**, 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. The default download-maintenance time is 0300.

Clear an SPE

The **clear spe** privileged EXEC mode command allows you to manually recover a port that is frozen in a suspended state. This command causes the firmware configured for that SPE to be downloaded to the specified SPE or the range of SPEs and power-on self test (POST) to be executed. This command can be executed regardless of the state of the SPEs. All active ports running on the SPE are prematurely terminated and messages are logged into the appropriate log. This replaces the **clear modem** command.

The following example shows a cold start on SPE 1 on slot 1:

```
AS5400# clear spe 1/1
AS5400# Are you sure you want to clear SPE 1/1(Y/N)? Y
```

Upgrading SPE Firmware

With new systems, Cisco loads a Cisco IOS software-compatible version of SPE firmware into each installed SPE. A map of the version or versions of SPE firmware copied to RAM for each SPE is stored in nonvolatile random-access memory (NVRAM) so that it is retained over power cycles.



Note

You do not have to take any action to use the preinstalled version of SPE firmware with new systems.

You can acquire new SPE firmware from the Cisco Software Center in one of two ways:

- **Bundled** in regular Cisco IOS releases. See the “[Using SPE Firmware Bundled with Cisco IOS Software](#)” section on [page 19](#) for details.

- **Unbundled** from Cisco.com. This is a more up-to-date version of SPE firmware released before the next Cisco IOS release, or a special version of SPE firmware shipped with a new board. See the [“Upgrading SPE Firmware from the Cisco.com FTP Server” section on page 13](#) for details.

When you have the new firmware, you can configure different firmware versions onto individual SPEs or ranges of SPEs on a universal port or dial-only feature card. You can also configure different upgrade methods by using the **firmware upgrade** command.

Important Upgrade Commands

There are several commands you use to upgrade SPE firmware. For examples on using the commands, see the [“Upgrading SPE Firmware from the Cisco.com FTP Server” section on page 13](#) and the [“Using SPE Firmware Bundled with Cisco IOS Software” section on page 19](#).

- Use the **copy tftp flash filename** command to copy any version of SPE firmware (no matter how it is obtained) into system flash memory. You can store several versions of the SPE firmware in system flash memory under different filenames.
- Use the **firmware location** SPE configuration command to transfer a specified version of SPE firmware from system flash memory to the SPEs named on entering SPE configuration mode.
- Use the **firmware upgrade busyout | download-maintenance | reboot** SPE configuration command to configure when the file named in the **firmware location** command will be loaded to the SPEs. Three methods of upgrade are available:
 - *Busyout* (the default) upgrades when all calls are terminated on an SPE.
 - *Download-maintenance* waits to upgrade at the next download maintenance (see the [“SPE Download Maintenance” section on page 11](#)). The default download-maintenance time is 03:00.
 - *Reboot* upgrades at the next reboot. Note that for the **firmware upgrade reboot** command to take effect after a reload, you must have saved the running configuration with the **copy running-config startup-config** command.



Note

The **copy ios-bundled** command is not necessary with the universal port or dial-only feature card. 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.

Displaying SPE Firmware Versions

Use the **show spe version** command to list the versions of SPE firmware running on the SPEs, residing in system flash memory, and bundled with Cisco IOS software. This helps you decide if you need to change the version running on the modems.



Note

The version number (version column) may not match the filename (UPG firmware-filename column) for a short period of time while a range of SPEs is in the process of downloading new firmware. The version number is updated at the beginning of the upgrade process, whereas the filename is updated upon completion of the process. This is done intentionally to enable you to recognize the upgrade process from the **show spe version** output.

```
AS5400# show spe version
```

```
IOS-Bundled Default Firmware-Filename          Version  Firmware-Type
```

```

=====
system:/ucode/np_spe_firmware1          0.0.6.75  SPE firmware

On-Flash Firmware-Filename              Version  Firmware-Type
=====
flash:np.spe                            0.6.4.5  SPE firmware
flash:np_6_77.spe                       0.0.6.77 SPE firmware
flash:np_6_79.spe                       0.0.6.79 SPE firmware

SPE-#  SPE-Type  SPE-Port-Range  Version  UPG Firmware-Filename
2/00   CSMV6     0000-0005      0.0.6.75 N/A ios-bundled default
2/01   CSMV6     0006-0011      0.0.6.75 N/A ios-bundled default
2/02   CSMV6     0012-0017      0.0.6.75 N/A ios-bundled default
2/03   CSMV6     0018-0023      0.0.6.75 N/A ios-bundled default
2/04   CSMV6     0024-0029      0.0.6.75 N/A ios-bundled default
2/05   CSMV6     0030-0035      0.0.6.75 N/A ios-bundled default
2/06   CSMV6     0036-0041      0.0.6.77 N/A np_6_77.spe
2/07   CSMV6     0042-0047      0.0.6.77 N/A np_6_77.spe
2/08   CSMV6     0048-0053      0.0.6.77 N/A np_6_77.spe
2/09   CSMV6     0054-0059      0.0.6.77 N/A np_6_77.spe
2/10   CSMV6     0060-0065      0.0.6.77 N/A np_6_77.spe
2/11   CSMV6     0066-0071      0.0.6.77 N/A np_6_77.spe
2/12   CSMV6     0072-0077      0.0.6.79 N/A np_6_79.spe
2/13   CSMV6     0078-0083      0.0.6.79 N/A np_6_79.spe
2/14   CSMV6     0084-0089      0.0.6.79 N/A np_6_79.spe
2/15   CSMV6     0090-0095      0.0.6.79 N/A np_6_79.spe
2/16   CSMV6     0096-0101      0.0.6.79 N/A np_6_79.spe
2/17   CSMV6     0102-0107      0.0.6.79 N/A np_6_79.spe
    
```

Upgrading SPE Firmware from the Cisco.com FTP Server

Upgrading SPE firmware from the Cisco.com FTP server is a three-step process:

- Downloading the SPE firmware from Cisco.com FTP server to a local TFTP server
- Copying the SPE firmware file to the gateway and SPEs (which may also involve removing old firmware)
- Configuring SPEs to use an upgraded firmware file

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



Note

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

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

-
- Step 1** Launch an Internet browser.
 - Step 2** Bring up the Cisco Software Center home page at the following URL (subject to change without notice): <http://www.cisco.com/kobayashi/sw-center/>
 - Step 3** Under Software Products & Downloads, click **Access Software**.
 - Step 4** Click **AS5350 Series** or **AS5400 Series**.

- 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 port feature card, click **Download Nextport SPE Software**.
- 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 you download it 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 using a terminal emulation software application to a TFTP server that can be accessed by the universal gateway.

Using an FTP Application



Note

The directory path leading to the SPE firmware files on [cco.cisco.com](http://www.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.
220-
220- Cisco Connection Online          |          | Cisco Systems, Inc.
220- Email: cco-team@cisco.com      |||      ||| 170 West Tasman Drive
220- Phone: +1.800.553.2447  .:|||||:..:|||||:. San Jose, CA 95134
220-
220- NOTE: As of February 1,1997 ftp.cisco.com will now point to this
220- service. Please be advised. To use the former ftp.cisco.com after
220- February 1, connect to ftpeng.cisco.com
220-
220- You may login with:
220- + Your CCO username and password, or
220- + A special access code followed by your e-mail address, or
220- + "anonymous" followed by your e-mail address for guest access.
220-
220 cio-sys FTP server (CIOESD #103 Sun Dec 15 14:43:43 PST 1996) ready.
```

- Step 2** Enter your CCO 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-
230- ***** NOTE: As of February 1, 1997, "cco.cisco.com", *****
230- ***** "www.cisco.com" and "ftp.cisco.com" are now all *****
230- ***** logical names for the same machine. *****
230- *****
230- ***** The old "ftp.cisco.com" is an entirely *****
230- ***** different machine, which is now known as *****
230- ***** "ftpeng.cisco.com" or "ftp-eng.cisco.com". *****
230- *****
230- ***** In general, "ftpeng.cisco.com" is used only for *****
```

```

230- ***** distribution of Cisco Engineering-controlled *****
230- ***** projects, such as beta programs, early field *****
230- ***** trials, developing standards documents, etc. *****
230- *****
230- ***** Be sure to confirm you have connected to *****
230- ***** the machine you need to interact with. *****
230-
230- If you have any odd problems, try logging in with a minus sign (-) as
230- the first character of your password. This will turn off a feature
230- that may be confusing your ftp client program.
230- Please send any questions, comments, or problem reports about this
230- server to cco-team@cisco.com.
230-
230- NOTE:
230- o To download files from CCO, you must be running a *passive-mode*
230- capable FTP client.
230- o To drop files on this system, you must cd to the /drop directory.
230- o Mirrors of this server can be found at
230-
230- + ftp://www-europe.cisco.com European (Amsterdam)
230- + ftp://www-fr.cisco.com France (Paris)
230- + ftp://www-au.cisco.com Australia (Sydney)
230- + ftp://www-jp.cisco.com Japan (Tokyo)
230- + ftp://www-kr.cisco.com Korea (Seoul)
230-
230- Please read the file README
230- it was last modified on Sat Feb 1 12:49:31 1997 - 163 days ago
230 User harry logged in. Access restrictions apply.
Remote system type is UNIX.
Using binary mode to transfer files.

```

Step 3 Specify the directory path that holds the SPE firmware you want to download. For example, the directory path for the universal gateway SPE firmware is **/cisco/access/nextport**:

```
ftp> cd /cisco/access/nextport
```

```

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 View the contents of the directory with the **ls** command:

```
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
226 Transfer complete.

```

Step 5 Specify a binary image transfer:

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

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

Step 7 Quit your terminal session:

```
ftp> quit
Goodbye.
```

Step 8 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 RCP server that your gateway or router can access.

Copy 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 a universal port or dial-only feature card is a two-step process:

1. Transfer the SPE firmware to the gateway's flash memory.
2. 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. 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 gateway restarts.

Transfer SPE Firmware to Flash Memory

Follow these steps to download the universal SPE firmware to flash memory:

Step 1 Check the image in the gateway flash memory:

```
AS5400# show flash
System flash directory:
File Length Name/status
  1 4530624 c5350-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 gateway flash memory. You are prompted for the download destination and the remote host name.



Note The system no longer asks you if you want to erase flash memory before reloading it. SPE firmware code is small; unlike system images, you can sometimes hold more than one version of SPE firmware in flash memory.

If you do not have available space to copy the SPE firmware, during the copy operation the system displays a message telling you to delete the current file and squeeze the flash memory to make room for the new image. Enter the **delete flash:version** command, followed by the **squeeze flash** command, to perform this delete-and-squeeze operation. Then proceed with the copy operation.

```
AS5400# copy tftp flash

Address or name of remote host [192.168.19.91]?
Source filename [c5350-js-mz.xml.Feb16]?
Destination filename [c5350-js-mz.xml.Feb16]?
Accessing tftp://192.168.19.91/c5350-js-mz.xml.Feb16...
Loading c5350-js-mz.xml.Feb16 from 192.168.19.91 (via GigabitEthernet0/0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 10573848/21147648 bytes]
10573848 bytes copied in 77.356 secs (137322 bytes/sec)
```

Step 3 Verify that the file has been copied into the gateway flash memory:

```
AS5400# show flash

-#- ED --type-- --crc--- -seek-- nlen -length- -----date/time----- name
1 .. unknown 12375B0E 92704 6 337539 Feb 21 2001 22:46:51 np.spe
2 .. image 1A58C7EA AA7F9C 20 10573848 Feb 21 2001 23:11:59 c5350-js-mz.xml.Feb16
5079140 bytes available (10911644 bytes used)
```

Configure SPEs to Use an Upgraded Firmware File

Follow these steps to configure the SPEs to use the upgraded firmware:

Step 1 Enter the **enable** command.

```
AS5400> enable
```

Step 2 Enter your password.

```
Password: password
AS5400#
```

You are in privileged EXEC mode when the prompt changes to AS5350# or AS5400#.

Step 3 Display SPE firmware versions to obtain the filename of the firmware on flash memory.



Note As explained previously, the version number and UPG firmware filename may not match until the upgrade is complete.

```
AS5400# show spe version

IOS-Bundled Default Firmware-Filename          Version  Firmware-Type
```

```

=====
system:/ucode/np_spe_firmware1                               0.0.6.75 SPE firmware

On-Flash Firmware-Filename                                Version  Firmware-Type
=====
flash:np.spe                                              0.6.4.5  SPE firmware
flash:np_6_77.spe                                         0.0.6.77 SPE firmware
flash:np_6_79.spe                                         0.0.6.79 SPE firmware
flash:np-spe-upw-1.0.1.2.bin                              1.0.1.2  SPE firmware

SPE-#  SPE-Type  SPE-Port-Range  Version  UPG Firmware-Filename
2/00   CSMV6       0000-0005      0.0.6.75 N/A ios-bundled default
2/01   CSMV6       0006-0011      0.0.6.75 N/A ios-bundled default
2/02   CSMV6       0012-0017      0.0.6.75 N/A ios-bundled default
2/03   CSMV6       0018-0023      0.0.6.75 N/A ios-bundled default
2/04   CSMV6       0024-0029      0.0.6.75 N/A ios-bundled default
2/05   CSMV6       0030-0035      0.0.6.75 N/A ios-bundled default
2/06   CSMV6       0036-0041      0.0.6.77 N/A np_6_77.spe
2/07   CSMV6       0042-0047      0.0.6.77 N/A np_6_77.spe
2/08   CSMV6       0048-0053      0.0.6.77 N/A np_6_77.spe
2/09   CSMV6       0054-0059      0.0.6.77 N/A np_6_77.spe
2/10   CSMV6       0060-0065      0.0.6.77 N/A np_6_77.spe
2/11   CSMV6       0066-0071      0.0.6.77 N/A np_6_77.spe
2/12   CSMV6       0072-0077      0.0.6.79 N/A np_6_79.spe
2/13   CSMV6       0078-0083      0.0.6.79 N/A np_6_79.spe
2/14   CSMV6       0084-0089      0.0.6.79 N/A np_6_79.spe
2/15   CSMV6       0090-0095      0.0.6.79 N/A np_6_79.spe
2/16   CSMV6       0096-0101      0.0.6.79 N/A np_6_79.spe
2/17   CSMV6       0102-0107      0.0.6.79 N/A np_6_79.spe

```

Step 4 Enter global configuration mode by typing the **configure** terminal command.

```

AS5400# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
AS5400(config)#

```

You are in global configuration mode when the prompt changes to AS5350(config)# or AS5400(config)#.

Step 5 Enter SPE configuration mode, which is similar to line configuration mode. You can choose to configure a single SPE or range of SPEs by specifying the first and last SPE in the range.

```

AS5400(config)# spe slot/spe

or

AS5400(config)# spe slot/spe slot/spe

```

You are in SPE configuration mode when the prompt changes to AS5350(config-SPE)# or AS5400(config-SPE)#.

Step 6 Specify the SPE firmware file in flash memory to use for the selected SPEs. This is the firmware filename that you obtained in Step 3.

```

AS5400(config-SPE)# firmware location np-spe-upw-1.0.1.2.bin

```

Step 7 Specify when the SPE firmware upgrade is to occur.

```

AS5400(config-SPE)# firmware upgrade busyout | download-maintenance | reboot

```

Step 8 Type the **exit** command to exit SPE config mode.

```

AS5400(config-SPE)# exit

```

```
AS5400(config)#
```

- Step 9** Press the **Enter** key to make the changes and then type **Ctrl-Z** to return to privileged EXEC mode.

```
AS5400(config)# Ctrl-Z
AS5400#
```

- Step 10** Save your changes when ready.

```
AS5400# copy running-config startup-config
```

Using SPE Firmware Bundled with Cisco IOS Software

Use this procedure to update SPE firmware on the SPEs in your gateway if you decide to use the version of SPE firmware bundled with Cisco IOS software instead of the version already mapped to your ports.

To set the SPE firmware mapping to the SPE firmware version bundled with Cisco IOS software, enter the following commands:

- Step 1** Enter the **enable** command.

```
AS5400> enable
```

- Step 2** Enter your password.

```
Password: password
AS5400#
```

You are in privileged EXEC mode when the prompt changes to AS5350# or AS5400#.

- Step 3** Enter global configuration mode by typing the **configure terminal** command.

```
AS5400# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
AS5400(config)#
```

You are in global configuration mode when the prompt changes to AS5350(config)# or AS5400(config)#.

- Step 4** Enter SPE configuration mode, which is similar to line configuration mode. You can choose to delete the configuration for a single SPE or range of SPEs by specifying the first and last SPE in the range. The SPE firmware used by the SPEs automatically reverts to the version bundled with the current Cisco IOS image.

```
AS5400(config)# spe slot/spe
```

or

```
AS5400(config)# spe slot/spe slot/spe
```

You are in SPE configuration mode when the prompt changes to AS5350(config-SPE)# or AS5400(config-SPE)#.

- Step 5** If the previous download was unbundled firmware, enter the **no** form of the **firmware location** command to revert to the default Cisco IOS bundled SPE firmware:

```
AS5400(config-SPE)# no firmware location
```

- Step 6** Type the **exit** command to exit SPE configuration mode.

```
AS5400(config-SPE)# exit
```

```
AS5400 (config) #
```

- Step 7** Press the **Enter** key to verify your command registers, and then type **Ctrl-Z** to return to privileged EXEC mode.

```
AS5400 (config) # Ctrl-Z
AS5400 #
```

- Step 8** Save your changes when ready.

```
AS5400 # copy running-config startup-config
```

This process does not delete any existing SPE firmware that resides in system flash memory in case you later want to revert to it. If you decide to delete the code from system flash memory, remember that *all* files in system flash memory are deleted; therefore, save and restore any important files (for example, the Cisco IOS software image).



Note

If the new Cisco IOS image contains the same SPE firmware as the old one, no new code is downloaded to the SPEs.

Where to Go Next

At this point you can go to these references:

- [Chapter 7, “Configuring Voice over IP”](#) to learn how to configure voice and fax traffic over an IP network.
- [Appendix C, “Comprehensive Configuration Examples.”](#)



Tip

The following publications are useful for those familiar with the Cisco universal gateway products that use MICA modems.

- [Comparing Universal Port SPE Commands to MICA Modem Commands](http://www.cisco.com/warp/customer/76/nextport_compare.html), available online at http://www.cisco.com/warp/customer/76/nextport_compare.html.
- [Managing Port Services on the Cisco AS5350 Universal Gateway](http://www.cisco.com/univercd/cc/td/doc/product/access/acs_serv/as5350/sw_conf/alxnxpt.htm), available online at http://www.cisco.com/univercd/cc/td/doc/product/access/acs_serv/as5350/sw_conf/alxnxpt.htm.
- [Managing Port Services on the Cisco AS5400 Universal Gateway](http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t3/nextport/index.htm), available online at <http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t3/nextport/index.htm>.
- For more advanced configuration topics, see the Cisco IOS software configuration guide, feature modules, and command reference publications *Dial Solutions Configuration Guide* and *Dial Solutions Command Reference Guide* for your software release.

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