

SPE and Firmware Download Enhancements

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Feature Overview

The **spe** configuration command enables you to download firmware into your modems. When the access server is booted, the **spe** command controls the location from where the firmware image is downloaded to the service processing element (SPE). An SPE unit is defined as the smallest software downloadable unit. For Microcom, an SPE is an individual modem; for MICA an SPE is either 6 or 12 modems, depending on whether the MICA module is single or double density.

Benefits

The **spe** command provides the capability to download firmware into your modems. The current setting of the SPE **firmware location** value is visible through the normal running-config or startup-config.

Restrictions

This command is available in Cisco IOS Release 12.0(4)X11 or later releases.

Related Features and Technologies

- SPE Manager

Related Documents

- *Cisco AS5200 Universal Access Server Software Configuration Guide*
http://www.cisco.com/univercd/cc/td/doc/product/access/acs_serv/as5200/52swcfg2/index.htm
- *Cisco AS5300 Software Configuration Guide*
http://www.cisco.com/univercd/cc/td/doc/product/access/acs_serv/5300/53swcf2/index.htm
- *Cisco AS5800 Access Server Software ICG*
http://www.cisco.com/univercd/cc/td/doc/product/access/acs_serv/as5800/58sw_icg/index.htm
- *Dial Solutions Quick Configuration Guide (Cisco IOS Release 12.0)*
<http://www.cisco.com/univercd/cc/td/doc/product/software/ios120/12supdoc/dsqcg3/index.htm>
- *Release Notes for Cisco MICA Portware on Cisco AS5200/AS5300/3600 Version 2.7.1.0 Cisco IOS 12.0/N.110 Support*
http://www.cisco.com/univercd/cc/td/doc/product/access/acs_serv/5300/mod_info/53fw_pw/53micaa/rnv110bp.htm#xtocid214860
- *Firmware Release Notes Version 5.2.30 for Cisco Universal Access Server 56K 12-Port Modem Modules*
http://www.cisco.com/univercd/cc/td/doc/product/access/acs_serv/5300/mod_info/53fw_pw/5356ka/mcv9_fw3.htm

Supported Platforms

These platforms support the **spe** command in Network Access Server (NAS) stand-alone and group scenarios for Cisco IOS Release 12.0(5)T and later releases:

- Cisco AS5200
- Cisco AS5300
- Cisco AS5800

Supported MIBs and RFCs

MIBs

- No MIBs supported for this feature.

RFCs

- No RFCs supported for this feature.

Prerequisites

- Cisco IOS Release 12.0(5)T or later must be running on the NAS.

- Use the **dir** command to determine what Cisco IOS images are available for download. The following examples show the **dir** command entered with accompanying keywords/arguments to display directory contents:

```
Router# dir system:/ucode
Directory of system:/ucode/

 14 -r--      516060          <no date> mica_board_firmware
 15 -r--      381540          <no date> mica_port_firmware
 16 -r--      388741          <no date> microcom_firmware
```

No space information available

```
Router# dir flash:
Directory of flash:/

 1 -rw-      6988532          <no date> c5300-is-mz.120-6.5.T
```

8388608 bytes total (1400012 bytes free)

```
Router# dir bootflash:
Directory of bootflash:/

 1 -rw-      1006128          <no date> c5300-boot-mz.112-9.XA1
```

8388608 bytes total (7382416 bytes free)

- Use the **show modem version** command or the **show spe version** command to see what slot/spe address options you have for downloading destinations before you enter the **spe** command. The slot/spe (for AS5800, shelf/slot/spe) addresses are required for completing the **spe** command.

Two pieces of information are needed to enter the SPE configuration mode:

- The SPEs on the system
- The filespecs for the available SPE code

The **show spe version** command will deliver both bits of information. If **show spe version** is not available, then use **show modem mapping**.

The following example shows the output from an AS5300 with a single SPE (1/0) when the **show spe version** command is used:

```
Router# show spe version
IOS-Bundled Default Firmware-Filename          Version  Firmware-Type
=====
system:/ucode/mica_board_firmware             2.0.2.0  Mica Boardware
system:/ucode/mica_port_firmware              2.6.2.0  Mica Portware
system:/ucode/microcom_firmware               5.1.20   Microcom F/W and DSP

On-Flash Firmware-Filename                    Version  Firmware-Type
=====
flash:pw2621.ios                             2.6.2.1  Mica Portware

SPE-#  SPE-Type  SPE-Range  Version  Upgrade  Firmware-Filename
1/0    MICA-DMM    1/0 - 1/11  2.6.2.0  N/A      system:/ucode/mica_port_firmware
```

From this output, you can determine that the SPE range (SPE-#) is 1/0 and the available MICA firmware files are system:/ucode/mica_port_firmware (2.6.2.0) and flash:pw2621.ios (2.6.2.1).

If you don't have **show spe version** as an available command option, then use **show modem mapping** to get the following output:

```
Router# show modem mapping

Slot 1 has Mica Carrier card.

      Modem      Firmware  Firmware
Module Numbers  Rev       Filename
   0   1/0   - 1/11  2.6.2.0   IOS-Default

Firmware-file                               Version  Firmware-Type
=====
system:/ucode/mica_board_firmware           2.0.2.0  Mica Boardware
system:/ucode/mica_port_firmware            2.6.2.0  Mica Portware
system:/ucode/microcom_firmware             5.1.20   Microcom F/W and DSP
flash:pw2621.ios                            2.6.2.1  Mica Portware
```

Determine the SPE range from the slot and module information—Slot 1 is the MICA carrier and Module 0 in it is populated, so the SPE is 1/0. The files are listed above.

Configuration Tasks

Perform the following tasks to download the firmware.

- Configuring for the spe Command

Configuring for the spe Command

Step	Command	Purpose
1	configure terminal	Enter the global configuration mode.
2	spe {slot spe_begin} {slot spe_end}	Enter the SPE configuration mode. For AS5200s and AS5300s, use <i>slot/spe</i> to indicate the <i>spe_begin</i> and <i>spe_end</i> . For AS5800s, use <i>shelf/slot/spe</i> .
3	firmware location {system flash};filename	Specify the location from which you will be downloading your firmware. If the firmware to be used is bundled with the IOS image, specify the path (<i>/ucode/filename</i>) instead of only the <i>filename</i> .

Note The **spe** command is a configuration command—save it by using the **write memory** command; otherwise, the configuration is not saved and the specified firmware will not download after the next reboot.

spe Command Firmware Download for the Cisco AS5200 and AS5300

The **copy {flash | system | tftp} modem** command will no longer be available for MICA portware and 56K Microcom modem firmware download beginning with Cisco IOS Release 12.0(4)XI1 and later releases. An error message appears if you enter this command—the system displays a prompt for you to use the new **spe** command.

Step 1 Enter the **spe** command and subcommands, one configuration command per line.

The following output shows an SPE download for Slot 1 SPE 5 with firmware—*mica_port_firmware*—that was bundled with the IOS image.

```
Router# configure terminal
Router(config)# spe 1/5 1/5
Router(config-spe)# firmware location system:/ucode/mica_port_firmware
Router(config-spe)# ^Z
```

Step 2 Copy the configuration from NVRAM into running RAM:

```
Router# copy running-config startup-config
```

Download occurs when the modems become available and according to the SPE firmware upgrade option defined (default: busyout). The **spe** command generates NVRAM modem download and configuration file entries as well.

Note Microcom V.34 modems and AS5200 V.110 terminal adapter modules must continue using the **copy {flash | system | tftp} modem** command. Entering the **spe** command displays a message of it not being supported. On boot up, because these modems do not require download, the command displays the location of the firmware as “feature_card_flash”. For example:

```
spe 1/0 2/23
firmware location feature_card_flash
```

Microcom spe Command Firmware Download for the Cisco AS5200 and AS5300

For 56K systems running Cisco IOS Release 12.0(4)XI1, 12.0(5)T, and later releases, the new **spe** command is available for firmware download.

Note If you enter the **copy {flash | system | tftp} modem** command on a 56K system, an error message appears, and the system displays a prompt for you to use the new **spe** command.

To download modem firmware by using the **spe** command, do the following steps:

Step 1 Enter the **spe** command and subcommands, one configuration command per line.

The following example shows an SPE download for Slot 1 (that is, all modems on the feature card). The modem code resides on the Flash memory, and the modem code filename is *mcom-modem-code.5.2.30.bin*.

```
Router# configure terminal
Router(config)# spe 1/0 1/23
Router(config-spe)# firmware location flash:mcom-modem-code.5.2.30.bin
Router(config-spe)# ^Z
```

Step 2 Copy the configuration from NVRAM into running RAM:

```
Router# copy running-config startup-config
```

Download occurs when the modems become available and according to the SPE firmware upgrade option defined (default: busyout). The **spe** command generates NVRAM modem download and configuration file entries as well.

SPE Range Description

- SPE ranges cannot span across the following parameters:
 - Empty slots.
 - Empty SPE units.
 - SPEs of different firmware attributes in adjacent slots.

Note The typical T1 system for the Cisco AS5300 uses only 8 MICA modules, so even adjacent slots having MICA modems appear with a 2 SPE range entry (they typically have 8 modules; slots 9 and 10 are empty).

- SPE ranges must represent the same hardware.
- New SPEs inserted in place of old ones with higher SPE capacity:
 - Break the SPE range if the original SPE is non-default.
 - Expand the range if the original SPE is the default.
- New SPEs inserted in place of old ones with lower SPE capacity shrink the SPE range.
- Entering “no firmware location” triggers a download of the default firmware.

Troubleshooting

To troubleshoot the SPE function, use the following information:

V.34 modems can only use the **copy** command and will not support the **spe** commands:

```
Router(config)# spe 2/12 2/14
Router(config-spe)# firmware location flash:mcom-fw-dsp.5.1.9_47.22.bin
Please use 'copy' command, firmware download not supported for this type of SPE 2/12
Please use 'copy' command, firmware download not supported for this type of SPE 2/13
Please use 'copy' command, firmware download not supported for this type of SPE 2/14
```

The following two examples illustrate the **copy** command showing an error message:

```
Router# copy system:ucode/mica_port_firmware modem:
Modem Numbers (<slot>/<port> | group <number> | all)? 1/0 1/5
'Copy' command is no longer valid for this type of port hardware, please use SPE
configuration command
```

```
Router# copy flash modem
Source filename [portware.2620.ios]? flash:mcom-fw-dsp.5.1.9_47.22.bin
Modem Numbers (<slot>/<port> | group <number> | all)? 2/7
'Copy' command is no longer valid for this type of port hardware, please use SPE
configuration command
```

Command Reference

This section documents new and modified commands. All other commands used with this feature are documented in the Cisco IOS Release 12.0 command references.

- **firmware location**
- **firmware upgrade**
- **show modem version**
- **show spe version**
- **spe**

firmware location

Use the **firmware location** SPE configuration command to download firmware into the modems. The **no** form of the command reverts the router back to the system embedded image default.

firmware location {system | flash}: *filename*

no firmware location {system | flash}: *filename*

Syntax Description

system	If system is specified, the router loads the firmware from a built-in file within the Cisco IOS image.
flash	If flash is specified, the router loads the firmware from the Flash NVRAM located within the router.
<i>filename</i>	The name of the desired firmware file. If system is specified, enter the path to the filename you want to download.

Default

None.

Command Mode

SPE configuration

Command History

Release	Modification
12.0(4)XI1	This command was introduced.

Usage Guidelines

Use the **firmware location** SPE configuration command to download firmware into your modems. The **no** form of the command reverts the router back to the system embedded default. When the access server is booted, the **firmware location** command displays the location for the firmware that is embedded in the IOS image. If the **firmware location** command was given to download a firmware image from flash and then the **no** version of the exact command is subsequently given, then the **firmware location** command will download the embedded firmware in the IOS.

The **firmware location** command was first supported in Cisco IOS Release 12.0(4)XI1 along with the Resource Pool Management feature (although it can be used independently). For earlier images, use the **copy** command. For the Cisco IOS Release 12.0(4)XI1 images, the **copy {flash | system | tftp} modem** command will be disabled for MICA modems and newer versions of Microcom modems (i.e., 56Kbps). Old V.34 Microcom modems still use the **copy** command for downloading in Cisco IOS Release 12.0(4)XI1 images.

Note This command should be used when traffic is low because the **firmware location** download will not begin until the modems have no active calls. Otherwise, use the **firmware upgrade** command to customize the scheduling of modem downloads for your needs.

Note The **firmware location** command is a configuration command—if you do not save it using the **write memory** command, then the configuration will not be saved; hence, the downloading of the specified firmware will not occur after the next reboot.

Examples

Examples of **firmware location** SPE configuration commands:

The following examples show downloads of firmware that was not bundled with the IOS image:

```
spe 1/2 1/4
  firmware location flash:portware.2620.ios
spe 2/2 2/8
  firmware location flash:mcom-fw-dsp.5.1.9_47.22.bin
spe 2/12 2/23
  firmware location feature_card_flash
```

The following examples show downloads of firmware that was bundled with the IOS image:

```
spe 2/9 2/9
  firmware location system:/ucode/microcom_firmware
spe 1/5 1/7
  firmware location system:/ucode/mica_port_firmware
```

Related Commands

Command	Description
firmware upgrade	Specifies the method in which the SPE will be downloaded.

firmware upgrade

Use the **firmware upgrade** SPE configuration command to modify the way in which the SPE will be downloaded. The **no** form of the command reverts the SPE back to the default SPE firmware upgrade option: busyout.

firmware upgrade { **busyout** | **recovery** | **reboot** }

no firmware upgrade

Syntax Description

busyout	Starts firmware upgrade immediately. (Default)
reboot	Delays firmware upgrade until reboot.
recovery	Delays firmware upgrade until recovery maintenance time.

Default

busyout

Command Mode

SPE configuration

Command History

Release	Modification
12.0(6)T	This command introduced.

Usage Guidelines

This command is for SPEs that contain more than 1 modem.

The SPE **firmware location** command is designed to integrate all continuous SPE ranges containing the same firmware location. However, the **firmware upgrade** command will not affect the SPE ranges. As such, all SPEs within the SPE range must have the same firmware upgrade mode or the router will default the upgrade mode to busyout. As such, if you want to upgrade a single SPE within an existing SPE range with a different upgrade mode than is currently configured, you must first change the upgrade mode for the entire SPE range and then change the firmware location for the specific SPE being upgraded.

Furthermore, each time you merge SPE ranges due to configuration changes, verify that the configuration of the SPE firmware upgrade remains effective to what is desired.

Examples

If busyout upgrade is specified, or if no upgrade mode is specified, the SPE modems are set into a “pending download” state when you use the **firmware location** command on the specified SPE. The “pending download” state prevents any modem in that state to be allocated for new calls until the state is cleared. Modems with active calls remain active for their call durations, but enter the “pending download” state when they terminate. This “pending download” state can only be cleared

when the SPE is finally downloaded. When all modems within the SPE are in the “pending download” and no active calls remain on the SPE, the SPE is reloaded. The busyout option is the fastest way to upgrade modems on an active router but can severely impact the router's capacity during the upgrade. This is the default option for the firmware upgrade process:

```
Router#
Router(config-spe)# firmware upgrade busyout
```

If reboot upgrade is specified, the SPE modems are not reloaded to the new firmware location until the router is rebooted. The reboot upgrade option is useful for routers which need to have their SPE upgraded and are also going to be rebooted for maintenance. The new firmware can be configured, but will not take affect until the reboot takes place:

```
Router#
Router(config-spe)# firmware upgrade reboot
```

If recovery upgrade is specified, the SPE modem are reloaded based on the modem recovery algorithm. The SPE modems are all set into a “pending upgrade” state when you use the **firmware location** command on this SPE. The “pending upgrade” state continues to allow modems to be allocated to modems for as long as there are active calls on the SPE. Only when no active calls exist on the SPE will the firmware download take place. Furthermore, at the configured “modem recovery maintenance time” (3:00 am), the modem recovery maintenance process will, in a controller fashion, attempt to reload the modems by busying out the modems for a window duration of time to make the download take place. Consult the modem recovery documentation for further details. The recovery upgrade option is the least impacting way to upgrade modems on an active router. Capacity is kept at a maximum. However, this option may take a few days for all modems to be reloaded to the new firmware location:

```
Router#
Router(config-spe)# firmware upgrade recovery
```

Related Commands

Command	Description
firmware location	Downloads firmware into the modems from this file location.
modem recovery maintenance time	Specifies the modem maintenance recovery behavior, time of day for the scheduled modem recovery.
modem recovery maintenance window	Specifies the modem maintenance recovery behavior, amount of time for normal recovery to take place.
modem recovery maintenance action	Specifies the modem maintenance recovery behavior, mode of recovery.

show modem version

To display version information about the modem firmware, controller, and DSP code (for 56K modems only), and boot code, enter the **show modem version** EXEC command. There is no **no** version of this command.

show modem version

Syntax

There are no keywords or variables for this command.

Command Mode

EXEC

Default

This function is disabled as default.

Command History

Release	Modification
11.2	This command was introduced.
12.0(4)XI1	This command was modified to show SPE features. The “-/-” in the DSP REV field indicates that the spe configuration commands for firmware download are unavailable on that modem.

Usage Guidelines

This command is useful for verifying the version of modem firmware running on the system before or after a modem firmware upgrade. If there is a “-/-” in the DSP REV field, you cannot use the **spe** configuration commands for firmware download on that modem.

Examples

The following example displays information for modem firmware, which includes modem firmware version, boot code version, controller and DSP code version (56K modem modules only), modem board hardware version, and carrier card information. This particular example displays information for Microcom 56K modem cards (modules 0/0, 2/0, and 2/1) and V.34 cards (module 0/1) installed in a Cisco AS5200.

If the version number is displayed as 0.0.0, verify that out-of-band status polling is functioning.

```
router# show modem version
```

Mdm	Modem module Number	Firmware Rev	Boot Rev	DSP Rev
0/0	0	3.1(21)	3.0(4)	1.1(0)/1.1(0)
0/1	0	3.1(21)	3.0(4)	1.1(0)/1.1(0)
.				
.				
0/11	0	3.1(21)	3.0(4)	1.1(0)/1.1(0)
0/12	1	2.2(8)	1.0(5)	
0/13	1	2.2(8)	1.0(5)	
.				
.				
0/23	1	2.2(8)	1.0(5)	
2/0	0	3.1(21)	3.0(4)	1.1(0)/1.1(0)
2/1	0	3.1(21)	3.0(4)	1.1(0)/1.1(0)
2/2	0	3.1(21)	3.0(4)	1.1(0)/1.1(0)
.				
.				
2/21	1	3.1(21)	3.0(4)	1.1(0)/1.1(0)
2/22	1	3.1(21)	3.0(4)	1.1(0)/1.1(0)
2/23	1	3.1(21)	3.0(4)	1.1(0)/1.1(0)

Modem board HW version info:

Slot 0:

Carrier card:

hw version= 8, number_of_ports= 24, max_modules= 2, max_oob_ports= 2

Modem Module 0:

number_of_modems= 12, option_bits= 1,
rev_num= 02.00, vendor_model_number= 02,
vendor_banner= Microcom MNP10 K56 Modem

Modem Module 1:

number_of_modems= 12, option_bits= 1,
rev_num= 03.00, vendor_model_number= 01,
vendor_banner= Microcom MNP10 V34 Modem

Slot 2:

Carrier card:

hw version= 7, number_of_ports= 24, max_modules= 2, max_oob_ports= 2

Modem Module 0:

number_of_modems= 12, option_bits= 1,
rev_num= 02.00, vendor_model_number= 02,
vendor_banner= Microcom MNP10 K56 Modem

Modem Module 1:

number_of_modems= 12, option_bits= 1,
rev_num= 02.00, vendor_model_number= 02,
vendor_banner= Microcom MNP10 K56 Modem

show modem version

The following example displays modem version information for V.110 terminal adapter modules:

```
router# show modem version
      Modem module      Firmware      Boot
      Mdm              Number      Rev          Rev
0/0              0          Unmanaged    Unmanaged
0/1              0          Unmanaged    Unmanaged
0/2              0          Unmanaged    Unmanaged
.
.
.
0/11             0          Unmanaged    Unmanaged
1/0              0          Unmanaged    Unmanaged
.
.
.
1/11             0          Unmanaged    Unmanaged
1/12             1          Unmanaged    Unmanaged
.
.
.
1/22             1          Unmanaged    Unmanaged
1/23             1          Unmanaged    Unmanaged
2/0              0          Unmanaged    Unmanaged
.
.
.
2/11             0          Unmanaged    Unmanaged
2/12             1          Unmanaged    Unmanaged
.
.
.
2/22             1          Unmanaged    Unmanaged
Modem board HW version info:

Slot 0:
Carrier card:
  hw version= 3, number_of_ports= 12, max_modules= 1, max_oob_ports= 1
Modem Module 0:
  number_of_modems= 12, option_bits= 1,
  rev_num= 03.01, vendor_model_number= 01,
  vendor_banner= V.110 Terminal Adaptor

Slot 1:
Carrier card:
  hw version= 8, number_of_ports= 24, max_modules= 2, max_oob_ports= 2
Modem Module 0:
  number_of_modems= 12, option_bits= 1,
  rev_num= 03.01, vendor_model_number= 01,
  vendor_banner= V.110 Terminal Adaptor
Modem Module 1:
  number_of_modems= 12, option_bits= 1,
  rev_num= 03.01, vendor_model_number= 01,
  vendor_banner= V.110 Terminal Adaptor

Slot 2:
Carrier card:
  hw version= 8, number_of_ports= 24, max_modules= 2, max_oob_ports= 2
Modem Module 0:
  number_of_modems= 12, option_bits= 1,
  rev_num= 03.00, vendor_model_number= 01,
  vendor_banner= V.110 Terminal Adaptor
Modem Module 1:
  number_of_modems= 12, option_bits= 1,
  rev_num= 03.00, vendor_model_number= 01,
```

```
vendor_banner= V.110 Terminal Adaptor
```

The following example shows the display from an AS5300:

Note If there is a “-/-” in the DSP REV field, you cannot use the **spe** configuration commands for firmware download on that modem.

```
Router# show modem version
```

Mdm	Modem module Number	Firmware Rev	Boot Rev	DSP Rev
1/0	0	2.6.1.0		
1/1	0	2.6.1.0		
1/2	0	2.6.1.0		
1/3	0	2.6.1.0		
1/4	0	2.6.1.0		
1/5	0	2.6.1.0		
1/6	1	2.6.1.0		
.				
.				
.				
1/41	6	2.6.1.0		
1/42	7	2.6.1.0		
1/43	7	2.6.1.0		
1/44	7	2.6.1.0		
1/45	7	2.6.1.0		
1/46	7	2.6.1.0		
1/47	7	2.6.1.0		
2/0	0	5.0(40)	3.0(4)	22.0/47.0
2/1	0	5.0(40)	3.0(4)	22.0/47.0
2/2	0	5.1(9)	3.0(4)	22.0/47.0
.				
.				
.				
2/8	0	5.1(9)	3.0(4)	22.0/47.0
2/9	0	5.0(40)	3.0(4)	22.0/47.0
2/10	0	5.1(9)	3.0(4)	22.0/47.0
2/11	0	5.1(9)	3.0(4)	22.0/47.0
2/12	1	2.3(6)	1.0(5)	-/-
2/13	1	2.3(6)	1.0(5)	-/-
.				
.				
.				

Modem board HW version info:

Slot 1:

Carrier card:

```
number_of_ports= 48, max_modules= 10
```

Manufacture Cookie Info:

```
EEPROM Type 0x0001, EEPROM Version 0x01, Board ID 0x47,  
Board Hardware Version 1.0, Item Number 73-2393-3,  
Board Revision A0, Serial Number 09361116,  
PLD/ISP Version 5.9, Manufacture Date 20-Jun-1998.
```

Modem Module 0

Manufacture Cookie Info:

```
EEPROM Type 0x0101, EEPROM Version 0x01, Board ID 0x06,  
Board Hardware Version 1.0, Item Number 73-2522-2,  
Board Revision B48, Serial Number 06542204,  
PLD/ISP Version 255.255, Manufacture Date 23-Jun-1998.
```

show modem version

```
Modem Module 1
Manufacture Cookie Info:
  EEPROM Type 0x0101, EEPROM Version 0x01, Board ID 0x06,
  Board Hardware Version 1.0, Item Number 73-2522-2,
  Board Revision B48, Serial Number 06478113,
  PLD/ISP Version 255.255, Manufacture Date 23-Jun-1998.
.
.
.
Modem Module 7
Manufacture Cookie Info:
  EEPROM Type 0x0101, EEPROM Version 0x01, Board ID 0x06,
  Board Hardware Version 1.0, Item Number 73-2522-2,
  Board Revision B48, Serial Number 06478929,
  PLD/ISP Version 255.255, Manufacture Date 23-Jun-1998.

Modem Module 8

Modem Module 9

Slot 2:
  Carrier card:
    hw version= 2, pld= 0, number_of_ports= 24,
    max_modules= 2, max_oob_ports= 2
  Manufacture Cookie Info:
    EEPROM Type 0x0001, EEPROM Version 0x01, Board ID 0x47,
    Board Hardware Version 1.0, Item Number 73-2522-2,
    Board Revision ^@2, Serial Number 05433763,
    PLD/ISP Version 255.255, Invalid Date code.

    Modem Module 0:
      number_of_modems= 12, option_bits= 1,
      rev_num= 03.30, vendor_model_number= 02,
      vendor_banner= Microcom MNP10 K56 Modem
    Modem Module 1:
      number_of_modems= 12, option_bits= 1,
      rev_num= 03.00, vendor_model_number= 01,
      vendor_banner= Microcom MNP10 V34 Modem
Router#

Router# wr t
Building configuration...

Current configuration:
!
version 12.0
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
service internal
!
hostname Router
!
aaa new-model
aaa group server radius aaa-server
  server 1.2.3.4
!
spe 1/0 1/7
  firmware location system:/ucode/mica_port_firmware
spe 2/0 2/1
  firmware location system:/ucode/microcom_firmware
spe 2/2 2/8
  firmware location flash:mcom-fw-dsp.5.1.9_47.22.bin
spe 2/9 2/9
```

```

firmware location system:/ucode/microcom_firmware
spe 2/10 2/11
firmware location flash:mcom-fw-dsp.5.1.9_47.22.bin
spe 2/12 2/23
firmware location feature_card_flash
!

Router# termination length 0

```

Table 1 describes the fields shown in the previous displays of the **show modem version** command.

Table 1 show modem version Field Descriptions

Fields	Descriptions
Mdm	Slot and port number for the specified modem.
Modem module Number	Card number associated with the carrier card.
Firmware Rev	Modem firmware version, or one of the following: <ul style="list-style-type: none"> Unknown—Indicates that the retrieved version is 0.0.0. Unknown (F)—Indicates that the modem's out-of-band feature has failed. Unknown (NP)—Indicates that the user has disabled the status polling for this modem using the no modem status-polling command.
Boot Rev	Modem boot version, or one of the following: <ul style="list-style-type: none"> Unknown—Indicates that the retrieved version is 0.0.0. Unknown (F)—Indicates that the modem's out-of-band feature has failed. Unknown (NP)—Indicates that the user has disabled the status polling for this modem using the no modem status-polling command.
DSP Rev	Controller and DSP version, which is displayed for the 56K modems only. The first column of numbers correspond to the controller version. The second column of numbers, which begin with a forward slash (/), correspond to the DSP version.
Modem board HW version info:	Modem hardware board information.
Slot	Slot number used for the carrier card.
Carrier card	Modem carrier card.
hw version	Modem carrier card hardware version.
number_of_ports	Maximum number of modem ports that can be installed in the carrier card.
max_modules	Maximum number of modem cards that can be installed in a carrier card.
max_oob_ports	Maximum out-of-band ports used in the carrier card.
Modem Module	Modem card.
number_of_modems	Number of modems installed in the modem card.
option_bits	Signal level of the modem A-law and the U-law.

show modem version

Fields	Descriptions
rev_num	Modem card version number.
vendor_model_number	Vendor modem model number.
vendor_banner	Type of banner displayed by the modem vendor.

Related Commands

None

show spe version

Enter the **show spe version** global show command to display the SPE download information such as the version and filename. There is no **no** version of this command.

show spe version [x/y/z] [x/y/z]

Syntax Description

x/y/z First shelf/slot/spe. (Optional)
 x/y/z Last shelf/slot/spe. (Optional)

Default

none

Command Mode

global

Command History

Release	Modification
12.0(6)T	This command introduced.

Usage Guidelines

To view SPE download information such as version and file names, enter the **show spe version** global show command.

Examples

The following examples show various implementations of the **show spe version** command to display information about the available SPE sources and modem resources:

```
Router#
Router# show spe version

IOS-Bundled Default Firmware-Filename          Version  Firmware-Type
=====
system:/ucode/mica_board_firmware             2.0.2.0  Mica Boardware
system:/ucode/mica_port_firmware              2.6.2.0  Mica Portware
system:/ucode/microcom_firmware               5.1.2.0  Microcom F/W and DSP

On-Flash Firmware-Filename                     Version  Firmware-Type
=====
flash:portware.2620.ios                       2.6.2.0  Mica Portware
flash:mcom-modem-firmware.3.1.30.bin          3.1.30   Microcom Firmware
flash:mcom-fw-dsp.5.1.9_47.22.bin            5.1.9    Microcom F/W and DSP
flash:R0620.ios                               0.6.2.0  Mica Portware
flash:pw2710.ios                             2.7.1.0  Mica Portware
flash:mica-modem-pw_2_7_1_0.bin              2.7.1.0  Mica Portware

SPE-#  SPE-Type  SPE-Range  Version  Upgrade Firmware-Filename
```

show spe version

```

1/0 MICA-HMM 1/0 - 1/5 2.7.1.0 N/A flash:mica-modem-pw_2_7_1_0.bin
1/1 MICA-HMM 1/6 - 1/11 2.7.1.0 N/A flash:mica-modem-pw_2_7_1_0.bin
1/2 MICA-HMM 1/12 - 1/17 2.7.1.0 N/A flash:mica-modem-pw_2_7_1_0.bin
1/3 MICA-HMM 1/18 - 1/23 2.7.1.0 N/A flash:mica-modem-pw_2_7_1_0.bin
1/5 MICA-HMM 1/30 - 1/35 2.7.1.0 N/A system:/ucode/mica_port_firmware
1/6 MICA-HMM 1/36 - 1/41 2.7.1.0 N/A system:/ucode/mica_port_firmware
1/7 MICA-HMM 1/42 - 1/47 2.7.1.0 N/A system:/ucode/mica_port_firmware
1/9 MICA-HMM 1/54 - 1/59 2.7.1.0 N/A flash:/pw2710.ios

2/0 MCOM-V90 2/0 5.1(20) N/A system:/ucode/microcom_firmware
2/1 MCOM-V90 2/1 5.1(20) N/A system:/ucode/microcom_firmware
2/2 MCOM-V90 2/2 5.1(20) N/A system:/ucode/microcom_firmware
2/3 MCOM-V90 2/3 5.1(20) N/A system:/ucode/microcom_firmware
2/4 MCOM-V90 2/4 5.1(9) N/A flash:/mcom-fw-dsp.5.1.9_47.22.bin
2/5 MCOM-V90 2/5 5.1(9) N/A flash:/mcom-fw-dsp.5.1.9_47.22.bin
2/6 MCOM-V90 2/6 5.1(9) N/A flash:/mcom-fw-dsp.5.1.9_47.22.bin
2/7 MCOM-V90 2/7 5.1(9) N/A flash:/mcom-fw-dsp.5.1.9_47.22.bin
2/8 MCOM-V90 2/8 5.1(9) N/A flash:/mcom-fw-dsp.5.1.9_47.22.bin
2/9 MCOM-V90 2/9 5.1(9) N/A flash:/mcom-fw-dsp.5.1.9_47.22.bin
2/10 MCOM-V90 2/10 5.1(9) N/A flash:/mcom-fw-dsp.5.1.9_47.22.bin
2/11 MCOM-V90 2/11 5.1(9) N/A flash:/mcom-fw-dsp.5.1.9_47.22.bin
2/12 MCOM-V34 2/12 2.3(6) N/A feature_card_flash
2/13 MCOM-V34 2/13 2.3(6) N/A feature_card_flash
2/14 MCOM-V34 2/14 2.3(6) N/A feature_card_flash
2/15 MCOM-V34 2/15 2.3(6) N/A feature_card_flash
2/16 MCOM-V34 2/16 2.3(6) N/A feature_card_flash
2/17 MCOM-V34 2/17 2.3(6) N/A feature_card_flash
2/18 MCOM-V34 2/18 2.3(6) N/A feature_card_flash
2/19 MCOM-V34 2/19 2.3(6) N/A feature_card_flash
2/20 MCOM-V34 2/20 2.3(6) N/A feature_card_flash
2/21 MCOM-V34 2/21 2.3(6) N/A feature_card_flash
2/22 MCOM-V34 2/22 2.3(6) N/A feature_card_flash
2/23 MCOM-V34 2/23 2.3(6) N/A feature_card_flash

Router# show spe version 1
SPE-# SPE-Type SPE-Range Version Upgrade Firmware-Filename
1/0 MICA-HMM 1/0 - 1/5 2.7.1.0 N/A flash:mica-modem-pw_2_7_1_0.bin
1/1 MICA-HMM 1/6 - 1/11 2.7.1.0 N/A flash:mica-modem-pw_2_7_1_0.bin
1/2 MICA-HMM 1/12 - 1/17 2.7.1.0 N/A flash:mica-modem-pw_2_7_1_0.bin
1/3 MICA-HMM 1/18 - 1/23 2.7.1.0 N/A flash:mica-modem-pw_2_7_1_0.bin
1/5 MICA-HMM 1/30 - 1/35 2.7.1.0 N/A system:/ucode/mica_port_firmware
1/6 MICA-HMM 1/36 - 1/41 2.7.1.0 N/A system:/ucode/mica_port_firmware
1/7 MICA-HMM 1/42 - 1/47 2.7.1.0 N/A system:/ucode/mica_port_firmware
1/9 MICA-HMM 1/54 - 1/59 2.7.1.0 N/A flash:/pw2710.ios

Router# show spe version 1/2
SPE-# SPE-Type SPE-Range Version Upgrade Firmware-Filename
1/2 MICA-HMM 1/12 - 1/17 2.7.1.0 N/A flash:mica-modem-pw_2_7_1_0.bin

Router# show spe version 1/2 2
SPE-# SPE-Type SPE-Range Version Upgrade Firmware-Filename
1/2 MICA-HMM 1/12 - 1/17 2.7.1.0 N/A flash:mica-modem-pw_2_7_1_0.bin
1/3 MICA-HMM 1/18 - 1/23 2.7.1.0 N/A flash:mica-modem-pw_2_7_1_0.bin
1/5 MICA-HMM 1/30 - 1/35 2.7.1.0 N/A system:/ucode/mica_port_firmware
1/6 MICA-HMM 1/36 - 1/41 2.7.1.0 N/A system:/ucode/mica_port_firmware
1/7 MICA-HMM 1/42 - 1/47 2.7.1.0 N/A system:/ucode/mica_port_firmware
1/9 MICA-HMM 1/54 - 1/59 2.7.1.0 N/A flash:/pw2710.ios

2/0 MCOM-V90 2/0 5.1(20) N/A system:/ucode/microcom_firmware
2/1 MCOM-V90 2/1 5.1(20) N/A system:/ucode/microcom_firmware
2/2 MCOM-V90 2/2 5.1(20) N/A system:/ucode/microcom_firmware
2/3 MCOM-V90 2/3 5.1(20) N/A system:/ucode/microcom_firmware
2/4 MCOM-V90 2/4 5.1(9) N/A flash:/mcom-fw-dsp.5.1.9_47.22.bin
2/5 MCOM-V90 2/5 5.1(9) N/A flash:/mcom-fw-dsp.5.1.9_47.22.bin
2/6 MCOM-V90 2/6 5.1(9) N/A flash:/mcom-fw-dsp.5.1.9_47.22.bin
2/7 MCOM-V90 2/7 5.1(9) N/A flash:/mcom-fw-dsp.5.1.9_47.22.bin
2/8 MCOM-V90 2/8 5.1(9) N/A flash:/mcom-fw-dsp.5.1.9_47.22.bin
2/9 MCOM-V90 2/9 5.1(9) N/A flash:/mcom-fw-dsp.5.1.9_47.22.bin

```

```

2/10 MCOM-V90 2/10 5.1(9) N/A flash:/mcom-fw-dsp.5.1.9_47.22.bin
2/11 MCOM-V90 2/11 5.1(9) N/A flash:/mcom-fw-dsp.5.1.9_47.22.bin
2/12 MCOM-V34 2/12 2.3(6) N/A feature_card_flash
2/13 MCOM-V34 2/13 2.3(6) N/A feature_card_flash
2/14 MCOM-V34 2/14 2.3(6) N/A feature_card_flash
2/15 MCOM-V34 2/15 2.3(6) N/A feature_card_flash
2/16 MCOM-V34 2/16 2.3(6) N/A feature_card_flash
2/17 MCOM-V34 2/17 2.3(6) N/A feature_card_flash
2/18 MCOM-V34 2/18 2.3(6) N/A feature_card_flash
2/19 MCOM-V34 2/19 2.3(6) N/A feature_card_flash
2/20 MCOM-V34 2/20 2.3(6) N/A feature_card_flash
2/21 MCOM-V34 2/21 2.3(6) N/A feature_card_flash
2/22 MCOM-V34 2/22 2.3(6) N/A feature_card_flash
2/23 MCOM-V34 2/23 2.3(6) N/A feature_card_flash

```

Router# show spe version 1/2 2/6

```

SPE-# SPE-Type SPE-Range Version Upgrade Firmware-Filename
1/2 MICA-HMM 1/12 - 1/17 2.7.1.0 N/A flash:mica-modem-pw_2_7_1_0.bin
1/3 MICA-HMM 1/18 - 1/23 2.7.1.0 N/A flash:mica-modem-pw_2_7_1_0.bin
1/5 MICA-HMM 1/30 - 1/35 2.7.1.0 N/A system:/ucode/mica_port_firmware
1/6 MICA-HMM 1/36 - 1/41 2.7.1.0 N/A system:/ucode/mica_port_firmware
1/7 MICA-HMM 1/42 - 1/47 2.7.1.0 N/A system:/ucode/mica_port_firmware
1/9 MICA-HMM 1/54 - 1/59 2.7.1.0 N/A flash:/pw2710.ios

2/0 MCOM-V90 2/0 5.1(20) N/A system:/ucode/microcom_firmware
2/1 MCOM-V90 2/1 5.1(20) N/A system:/ucode/microcom_firmware
2/2 MCOM-V90 2/2 5.1(20) N/A system:/ucode/microcom_firmware
2/3 MCOM-V90 2/3 5.1(20) N/A system:/ucode/microcom_firmware
2/4 MCOM-V90 2/4 5.1(9) N/A flash:/mcom-fw-dsp.5.1.9_47.22.bin
2/5 MCOM-V90 2/5 5.1(9) N/A flash:/mcom-fw-dsp.5.1.9_47.22.bin
2/6 MCOM-V90 2/6 5.1(9) N/A flash:/mcom-fw-dsp.5.1.9_47.22.bin

```

5300-1#show spe version

```

IOS-Bundled Default Firmware-Filename Version Firmware-Type
=====
system:/ucode/mica_board_firmware 2.0.2.0 Mica Boardware
system:/ucode/mica_port_firmware 2.6.2.0 Mica Portware
system:/ucode/microcom_firmware 5.1.20 Microcom F/W and DSP

```

```

On-Flash Firmware-Filename Version Firmware-Type
=====
flash:portware.2620.ios 2.6.2.0 Mica Portware
flash:mcom-modem-firmware.3.1.30.bin 3.1.30 Microcom Firmware
flash:mcom-fw-dsp.5.1.9_47.22.bin 5.1.9 Microcom F/W and DSP
flash:R0620.ios 0.6.2.0 Mica Portware
flash:pw2710.ios 2.7.1.0 Mica Portware
flash:mica-modem-pw_2_7_1_0.bin 2.7.1.0 Mica Portware

```

```

SPE-# SPE-Type SPE-Range Version Upgrade Firmware-Filename
1/0 MICA-HMM 1/0 - 1/5 2.7.1.0 N/A flash:mica-modem-pw_2_7_1_0.bin
1/1 MICA-HMM 1/6 - 1/11 2.7.1.0 N/A flash:mica-modem-pw_2_7_1_0.bin
1/2 MICA-HMM 1/12 - 1/17 2.7.1.0 N/A flash:mica-modem-pw_2_7_1_0.bin
1/3 MICA-HMM 1/18 - 1/23 2.7.1.0 N/A flash:mica-modem-pw_2_7_1_0.bin

```

show spe version

For the Cisco AS5800, the **show spe version** command display will be different. Note that the SPE-Port-Range field indicates the shelf/slot/port of the SPE.

```
5800# show spe version
Firmware-Filename          Version  Firmware-Type
=====
IOS-Bundled Default       2.6.2.0  Mica Portware
slot0:/pw2710.ios        2.7.1.0  Mica Portware
slot0:/pw3102.ios        3.1.0.2  Mica Portware
slot0:/pw3101.ios        3.1.0.1  Mica Portware

SPE-#  SPE-Type  SPE-Port-Range  Version  Upgrade  Firmware-Filename
3/0    MICA-DMM  1/3/00 - 1/3/11  2.7.1.0  N/A      slot0:/pw2710.ios
3/1    MICA-DMM  1/3/12 - 1/3/23  2.7.1.0  N/A      slot0:/pw2710.ios
3/2    MICA-DMM  1/3/24 - 1/3/35  2.7.1.0  N/A      slot0:/pw2710.ios
3/3    MICA-DMM  1/3/36 - 1/3/47  2.7.1.0  N/A      slot0:/pw2710.ios
3/4    MICA-DMM  1/3/48 - 1/3/59  2.7.1.0  N/A      slot0:/pw2710.ios
3/5    MICA-DMM  1/3/60 - 1/3/71  2.7.1.0  N/A      slot0:/pw2710.ios
3/6    MICA-DMM  1/3/72 - 1/3/83  2.7.1.0  N/A      slot0:/pw2710.ios
3/7    MICA-DMM  1/3/84 - 1/3/95  2.7.1.0  N/A      slot0:/pw2710.ios
3/8    MICA-DMM  1/3/96 - 1/3/107 2.7.1.0  N/A      slot0:/pw2710.ios
```

Table 2 show spe version Field Descriptions

Fields	Descriptions
SPE-#	The slot and port number of the SPE.
SPE-Type	The type of the SPE.
SPE-Port-Range	The range of ports within the specific SPE.
Version	The version of firmware loaded on the SPE.
Upgrade	The method used to reboot the SPE—choices are: busyout (default), reboot, or recover.
Firmware-Filename	This is the name of the firmware. You can use the dir command at the prompt to see what firmware filenames are available.
Firmware-Type	This describes which type of modem is associated with the firmware version.
IOS-Bundled Default Firmware-Filename	This shows which firmware filenames are bundled with the Cisco IOS (system:/uicode)
On-Flash Firmware-Filename	This shows which firmware filenames are on the Flash (flash:)

Related Commands

Command	Description
show modem version	Displays version information about the modem firmware, controller, and DSP code (for 56K modems only), and boot code.

spe

Use the **spe** configuration command to access the SPE configuration mode and control the downloading of firmware into the modems. There is no **no** version of this command.

```
spe {shelf/slot/module} {shelf/slot/module}
```

Syntax Description

shelf/slot/module Enter the shelf number, slot number, and module number separated by slashes as shown. For Cisco AS5200 and AS5300, enter only the slot/module. To specify a range of modems and if this option is selected as a start point, then use the following variable as an endpoint.

shelf/slot/module Enter the shelf number, slot number, and module number separated by slashes as shown. For Cisco AS5200 and AS5300, enter only the slot/module.

Default

None.

Command Mode

Global configuration

Command History

Release	Modification
12.0(4)XI1	This command was introduced.
12.0(5)T	This document changed to reflect new information on the command.

Usage Guidelines

The **spe** global configuration command enables the SPE configuration mode. Configure your SPE by specifying a slot and an SPE associated with the slot; or, you can configure a range of SPEs by specifying the first and last SPE in the range. On AS5800 platforms, you must also specify the shelf associated with the slot and SPE.

When the access server is booted, the **spe** global configuration command specifies the location from where the firmware image is downloaded to the SPE. If the **spe** configuration command is used to download the firmware from flash memory and then subsequently the **no** version of the exact command is entered, then the **spe** command downloads the embedded firmware.

The **spe** command was first supported in Cisco IOS Release 12.0(4)XI1 along with the Resource Pool Management feature (although it can be used independently). For earlier images, use the **copy** command on the Cisco AS5200 and Cisco AS5300, and the **modem-pool** command on the Cisco AS5800. For the Cisco IOS Release 12.0(5)T images, the **copy {flash | system | tftp} modem** command will be disabled for firmware and newer version of Microcom modems (i.e., 56Kbps). Old V.34 Microcom modems still use the **copy** command for downloading in Cisco IOS Release 12.0(5)T images. For Cisco AS5800, downloading firmware through the **modem-pool** command is disabled.

Note Use this command when traffic is low since the **spe** download does not begin until the modems have no active calls.

Note The **spe** command is a configuration command—save it using the **write memory** command, otherwise the configuration will not be saved. If the configuration is not saved, the downloading of the specified firmware will not occur after the next reboot.

Examples

The following example shows the **spe** command being used from global configuration mode to access the SPE configuration mode for the SPE range from 1/2 to 1/4:

```
Router#  
Router# configuration terminal  
Enter configuration commands, one per line. End with CNTL/Z.  
Router(config)# spe 1/2 1/4  
Router(config-spe)#
```

Related Commands

Command	Description
request dialin	Specifies a dial-in L2F or L2TP tunnel to a remote peer if a dial-in request is received for a specified domain or Dialed Number Information Service (DNIS).
firmware location	Specifies the location the firmware is to be downloaded from.

Glossary

NAS—Network access server, such as a Cisco AS5200, AS5300, or AS5800.

SPE—Service Processing Element.

Note For a list of other internetworking terms, see the Internetworking Terms and Acronyms document available on the Documentation CD-ROM and Cisco Connection Online (CCO) at the following URL: <http://www.cisco.com/univercd/cc/td/doc/cisintwk/ita/index.htm>.
