Maintaining and Administering the RSM

This chapter describes how to perform maintenance and administrative tasks on the Catalyst 5000 series Route Switch Module (RSM). The RSM is a router module that runs Cisco IOS software, The module is based on the Cisco Route/Switch Processor 2 (RSP2) and provides inter-virtual LAN (VLAN) routing support for the Catalyst 5000 series switches.

Note For complete information on installing the Catalyst 5000 series RSM, refer to the *Catalyst 5000 Series Module Installation Guide*.

Note For information on configuring interVLAN routing on the RSM, see Chapter 39, "Configuring InterVLAN Routing."

Note For complete syntax and usage information for the IOS commands used in this chapter, refer to the Cisco IOS Software Configuration Guides and Command References. For complete syntax and usage information for the switch commands used in this chapter, refer to the *Command Reference* for your switch.

These sections describe how to maintain and administer the RSM:

Understanding How the RSM Works

The RSM (WS-X5302) provides Multilayer Switching and interVLAN routing services between switched VLANs, emulated LANs (ELANs) within an ATM fabric, or across mixed media using an optional Versatile Interface Processor 2 (VIP2) and port adapters.With the RSM, the Catalyst 5000 allows you to deploy cost-effective distributed Layer 3 services from the wiring closet to the data center.

From the perspective of the Catalyst 5000 series switch, the RSM appears as a module with a single trunk port and one Media Access Control (MAC) address. This port is not like other Catalyst module ports because it has no external attributes such as media type or speed.

The RSM interface to the Catalyst 5000 series switch backplane is through two Cisco SAGE ASICs, SAGE 0 and SAGE 1. SAGE 0 corresponds to channel 0 and SAGE 1 to channel 1. Channel 0 and channel 1 are used to transfer data packets between VLANs on the Catalyst 5000 series switch backplane.

VLAN 0 is mapped to channel 0 and VLAN 1 is mapped to channel 1. VLAN 0 is used for communication between the RSM and the Catalyst 5000 series switch and is not accessible to the user. VLAN 1 is the Catalyst 5000 series switch default VLAN. Additional VLANs are toggled between the two channels as they are created. A VLAN can be mapped to a specific channel to balance the load of each channel.

The MAC addresses available to the RSM are assigned as follows:

- VLAN 0 (channel 0) is assigned the MAC address of a programmable ROM (PROM) on the RSM line communication processor (LCP). This MAC address is used for diagnostics and identification of the RSM physical slot. VLAN 0 is not accessible to the user.
- VLAN 1 and additional VLANs are assigned the base MAC address from a MAC address PROM on the RSM that contains 512 MAC addresses. All routing interfaces (except VLAN 0) use the base MAC address. You can override the base MAC address and use one of the other block addresses by using the **interface mac-address** command or the **mac-address** configuration command. The other block addresses are determined as follows: base MAC address + 1, base MAC address + 2, and so on. Typically, you will not need to override the default MAC address.

To configure VLANs (other than VLANs 0 and 1), use the VLAN number as the VLAN interface number. The interface number you configure on the router corresponds to the VLAN number configured on the Catalyst 5000 series switch (for example, interface VLAN 10 corresponds to VLAN 10 on the Catalyst 5000 series switch).

Each VLAN that the RSM is routing appears as a separate virtual interface. Therefore, the configuration file of the RSM has an interface description for each VLAN. The most common configuration is one IP subnet per VLAN interface.

Note The RSM supports interVLAN routing for up to 256 VLANs.

System Software Description

The RSM supports downloadable system software and microcode for most Cisco IOS and microcode upgrades, enabling you to remotely download, store, and boot from a new image. Flash memory contains the default system software.

NVRAM

The system configuration and software configuration register settings are stored in the 128-kilobyte (KB) nonvolatile random-access memory (NVRAM).

Flash Memory

The RSM uses two types of Flash memory: boot Flash (consisting of a single inline memory module [SIMM]) and Flash PC cards (PCMCIA).

Note Throughout this publication, the term *Flash PC card* is used in place of the term *PCMCIA card*.

Flash memory allows you to remotely load and store multiple Cisco IOS software and microcode images. You can download a new image over the network or from a local server and then add the new image to Flash or replace an existing file. You can boot the RSM either manually or automatically from any of the stored images. Flash memory also functions as a Trivial File Transfer Protocol (TFTP) server to allow other servers to remotely boot from stored images or to copy them into their own Flash memory. For information see the "Specifying the Startup System Image" section on page 40-14.

Flash PC cards must either be formatted on the RSM or on a Route Switch Processor (RSP)-based Cisco 7500 series router running software at the same level, or greater, as the RSM. Flash PC cards previously formatted on a Route Processor (RP)-based Cisco 7000 series router cannot be used on the RSM. Flash PC cards formatted on the RSM can be used on RSP-based 7500 series routers (but not on RP-based 7000 series routers).

Boot ROM

A 256-KB erasable programmable ROM (EPROM) stores the ROM monitor program. In the event of both network and Flash memory corruption, specifying a system image to be loaded from Boot ROM provides a final backup boot method.

Note System images stored in ROM are not always as complete as those stored in Flash memory or on network servers.

Boot Process

Note The RSM software configuration register is set at the factory to 0x2102 to boot from Flash PC card (PCMCIA) socket **slot0**. When you insert the RSM into the switch with this setting, the RSM boots automatically. If the software configuration register setting was changed to specify a different boot source, the RSM might not automatically boot when you insert it into the switch. For more information on changing the configuration register, see the "Modifying the Configuration Register Boot Field" section on page 40-12.

When you attempt to boot the RSM, there are three possible end results:

1. A system image running on the RSM (normal case)
2. An rxboot image running on the RSM in boot mode
3. The ROM monitor prompt—the system waits for instructions

The following main processes are involved in booting the system. (For additional information on images discussed here, see the "Image Descriptions" section on page 40-4.)

- ROM monitor process—The ROM monitor looks for the rxboot image in the BOOTLDR variable in NVRAM (set using the **boot bootldr** *device***:***filename* command). If the ROM monitor finds the rxboot image, the ROM monitor loads that image and then proceeds to the Rxboot images process.

  If the ROM monitor does not find the rxboot image, it looks for the BOOT variable (set using the **boot system flash** *device***:***filename* commands), which is a list of image names. If the ROM monitor finds and successfully loads one of these images, the boot process is complete.

  If the ROM monitor does not find any of the images specified by the BOOT variable, it loads the first image on the Flash PC card in slot 0. If it does not find an image on the Flash PC card in slot 0, it loads the first image in boot Flash. If it does not find an image in boot Flash, it goes to the ROM monitor prompt.

- Rxboot image process—The rxboot image runs and parses the configuration file looking for **boot system** commands. The **boot system** [**rcp** | **tftp**] *filename* [*ip-address*] commands specify which image to boot when netbooting. The **boot system flash** *device***:***filename* commands specify what to boot when booting from Flash. The commands are attempted in the order that they appear in the configuration file. If any command succeeds, the boot process is complete. If none of the commands succeed, the system remains at the rxboot image.

Image Descriptions

The router supports the following image types:

- ROM Monitor—This image gains control at reset, power up, or after a nonrecoverable event (such as a bus error). It contains the user interface of the current Cisco ROM monitor, disassembler, memory display, and so on. It has console drivers and trap handlers for parity and bus errors. It does not have any network interface code. The ROM monitor is able to read the flash devices. This image is run from ROM.
- Rxboot Image (Boot Image)—This limited function system image has network interface code and end-host protocol code. This image is used as a backup in case the RSM goes down while programming Flash for the main Cisco IOS image. This image is run from RAM.
- System image—This is the main Cisco IOS image.

DRAM

DRAM stores routing tables, protocols, and network accounting applications. The standard RSM configuration is 32-MB DRAM, with up to 128 MB available through SIMM upgrades.

Default RSM Configuration

The RSM is configured at the factory to load a Cisco IOS image (router operating system software) automatically the first time you power it on. The RSM software configuration register, which determines where the RSM loads the image from, is set at the factory to load the image from PCMCIA Flash slot 0 (configuration register setting 0x2102).

Table 40-1 shows the RSM default configuration.

Table 40-1 RSM Default Configuration

Feature	Default Value
Host name	Router
VLAN configuration	None
Password Encryption	Disabled

After the RSM goes through power-on self-test diagnostics, and the front panel status LED turns green, enter the **session** *mod/num* command at the Cat5000> prompt. The Router> prompt appears, allowing you to access the RSM.

Note This chapter uses the following conventions for the prompts: Cat5000> is the switch prompt, and Router> is the router prompt.

The RSM ships with no interfaces configured. After booting the RSM for the first time, you need to configure the RSM virtual interfaces (VLANs) and then save the configuration to a file in NVRAM. For information on configuring the RSM, see Chapter 39, “Configuring InterVLAN Routing.”

Note After booting the RSM for the first time, you can specify a different boot source by changing the software configuration register settings and resetting the RSM (for detailed information, refer to the “Modifying the Configuration Register Boot Field” section on page 40-12).

RSM Software Requirements

These software versions are required to use the RSM on the Catalyst 5000 series switches:

- Catalyst 5000 series supervisor engine software version 2.3(1) or later on the supervisor engine module
- Cisco IOS version 11.2(9)P or later on the RSM

Maintaining and Administrating the RSM

Note Review this section before starting the RSM configuration procedures if you are not familiar with Cisco IOS software or Cisco router fundamentals,

These sections describe how to maintain and administer the RSM:

Using the ping Command

Before you attempt to upload or retrieve a file from a remote host, ensure that there is connectivity between the RSM and the remote server. Use the **ping** command to send a series of echo request packets to the remote device and wait for a reply. If the connection is good, the remote device returns echo response packets back to the local device.

The console terminal displays the results of each message sent. An exclamation point (!) indicates that the local device received an echo, and a period (.) indicates that the server timed out while awaiting the reply. If the connection between the two devices is good, the system displays a series of exclamation points (!!!) or (ok). If the connection fails, the system displays a series of periods (...) or (timed out) or (failed).

To verify the connection between the RSM and a remote host, enter the **ping** command followed by the name or IP address of the remote server, and press **Return**. Although the **ping** command supports configurable options, the defaults, including IP as the protocol, are enabled when you enter a host name or address on the same line as the **ping** command. For a description of the configurable options, refer to the appropriate software documentation.

The following example shows a successful ping:

```
Router#ping 1.1.1.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 1.1.1.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 12/12/12 ms
Router#
```

The following example shows the results of a failed ping:

```
Sending 5, 100-byte ICMP Echos to 1.1.1.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
Router#
```

If the connection fails, check the physical connection to the remote file server and verify that you are using the correct address or name. Then ping the server again. If you are unable to establish a good connection, contact your network administrator.

Managing the System Configuration File

This section provides procedures for saving, uploading, and downloading the system configuration. Configuration information resides in two places when the RSM is operating: the default (permanent) configuration in NVRAM and the running (temporary) memory in RAM. The default configuration always remains available; NVRAM retains the information even when the power is shut down. The current information is lost if the system power is shut down. The current configuration contains all nondefault configuration information that you added by using the **configure** command, the **setup** command facility, or by editing the configuration file.

The **copy running-config startup-config** command saves the current configuration to NVRAM so that it is saved if power is shut down. Whenever you make changes to the system configuration, enter the **copy running-config startup-config** command to ensure that the new configuration is saved.

If you replace the RSM, you need to replace the entire configuration (NVRAM resides in socket U21 on the RSM). If you upload (copy) the configuration file to a remote server before removing the RSM, you can retrieve it later and write it into NVRAM on the new RSM. If you do not upload the configuration file, you need to use the **configure** command or the **setup** command facility to reenter the configuration information after you install the new RSM.

Saving and retrieving the configuration file is not necessary if you are temporarily removing an RSM that you are going to reinstall; the lithium batteries retain the configuration in memory. This procedure requires privileged-level access to the EXEC command interpreter, which usually requires a password.

Uploading the Configuration File

Before you upload the running configuration to the TFTP file server, ensure the following:

- You have a connection to the RSM either with a console terminal or remotely through a Telnet session.
- The RSM is connected to a network supporting a file server (remote host).
- The remote host supports the TFTP application.
- You have the IP address or name of the remote host available.

To store information on a remote host, enter the privileged EXEC command **copy running-config tftp**. The command prompts you for the destination host address and a filename, and then displays the instructions for confirmation. When you confirm the instructions, the RSM sends a copy of the currently running configuration to the remote host. The system default is to store the configuration in a file called by the host name of the RSM with *-confg* appended. You can either accept the default filename by pressing **Return** at the prompt, or enter a different name before pressing **Return**.

To upload the currently running configuration to a remote host, follow these steps:

Note Note that the system prompt should display a pound sign (#) to indicate the privileged level of the EXEC command interpreter.

Step 1 Enter the **ping** command to check the connection between the RSM and the remote host. For information on using the **ping** command, see the "Using the ping Command" section on page 40-6.

Step 2 Enter the **show running-config** command to display the currently running configuration on the terminal, and ensure that the configuration information is complete and correct. If it is not, enter the **configure** command to add or modify the existing configuration.

Refer to the appropriate software documentation for the configuration options available for the system and individual interfaces and for specific configuration instructions.

Step 3 Enter the **copy running-config tftp** command.

The system prompts you for the name or IP address of the remote host that is to receive the configuration file.

The prompt might include the name or address of a default file server.

Step 4 Enter the name or IP address of the remote host.

Step 5 The system prompts you to specify a name for the file that is to hold the configuration. By default, the system appends *-confg* to the RSM host name to create the new filename. Press **Return** to accept the default filename, or enter a different name for the file before pressing **Return**.

Step 6 Before the RSM executes the copy process, it displays the instructions you entered for confirmation. If the instructions are not correct, enter **n** (no) and then press **Return** to abort the process. To accept the instructions, press **Return**, or press **y** and then press **Return**. The system begins the copy process.

While the RSM copies the configuration to the remote host, it displays a series of exclamation points (!!!) or periods (...). The !!! and [ok] indicate that the operation is successful. A display of . . . [timed out] or [failed] indicates a failure, which is probably due to a network fault or the lack of a writable, readable file on the remote file server.

If the display indicates that the process was successful (with the series of !!! and [ok]), the upload process is complete. The configuration is safely stored in a file on the remote file server.

Your configuration was not saved if the display indicates that the process failed with the series of . . . as shown in the following example:

```
Writing Router-confg .....
```

Repeat the preceding steps, or select a different remote file server and repeat the preceding steps.

This completes the procedure for uploading the configuration file.

Note If you are unable to copy the configuration to a remote host successfully, contact your network administrator.

Downloading the Configuration File

After you install the new RSM, you can retrieve a saved configuration and copy it to NVRAM. Enter configuration mode and specify that you want to configure the RSM from the network. The system prompts you for a host name and address, the name of the configuration file stored on the host, and confirmation to reboot using the remote file.

To download the currently running configuration from a remote host, follow these steps:

Note Note that on the console terminal, the system prompt should display a pound sign (#) to indicate the privileged level of the EXEC command interpreter.

Note Until you retrieve the previous configuration, the RSM runs from the default configuration in NVRAM. Therefore, any passwords that were configured on the previous system are not valid until you retrieve the configuration.

Step 1 Enter the **ping** command to verify the connection between the router and the remote host. For information on using the **ping** command, see the "Using the ping Command" section on page 40-6.

Step 2 At the system prompt, enter the **configure network** command and press **Return** to enter configuration mode. Specify that you want to configure the system from a network device (instead of from the console terminal, which is the default).

```
Router#configure network
```

Step 3 When the system prompts you to select a host or network configuration file, press **Return** to accept the default value (host).

```
Host or network configuration file [host]?
```

Step 4 When the system prompts you for the IP address of the host, enter the IP address or name of the remote host (the remote file server to which you uploaded the configuration file).

```
IP address of remote host [255.255.255.255]? 1.1.1.1
```

Step 5 The system prompts you for the name of the configuration file. When uploading the file, the default is to use the name of the RSM with the suffix *-confg* (*router-confg* in the following example). If you specified a different filename when you uploaded the configuration, enter the filename; otherwise, press **Return** to accept the default.

```
Name of configuration file [router-confg]?
```

Step 6 Before the system reboots with the new configuration, it displays the instructions you entered for confirmation. If the instructions are not correct, enter **n** (no), and then press **Return** to cancel the process. To accept the instructions, press **Return**, or press **y** and then press **Return**.

```
Configure using router-confg from 1.1.1.1? [confirm]
Booting router-confg from 1.1.1.1: ! ! [OK - 874/16000 bytes]
```

While the RSM retrieves and boots from the configuration on the remote host, the console display indicates if the operation was successful. A series of !!! and [OK] (as shown in the preceding example) indicate that the operation was successful. A series of . . . and [timed out] or [failed] indicate a failure (which would probably be due to a network fault or an incorrect server name, address, or filename). The following is an example of a failed attempt to boot from a remote server:

```
Booting Router-confg ..... [timed out]
```

Step 7 If the display indicates that the process was successful, proceed to the next step.

If the display indicates that the process failed, verify the name or address of the remote server and the filename, and repeat the preceding steps.

Step 8 Enter the **write terminal** command to display the currently running configuration on the terminal. Review the display and ensure that the configuration information is complete and correct. If it is not, verify the filename and repeat the preceding steps to retrieve the correct file, or enter the **configure** command to add or modify the existing configuration.

Refer to the appropriate software documentation for the configuration options available for the system and individual interfaces and specific configuration instructions.

Step 9 When you have verified that the currently running configuration is correct, enter the **copy running-config startup-config** command to save the retrieved configuration in NVRAM. Otherwise, you will lose the new configuration if you restart the system.

This completes the procedure for downloading (retrieving) the configuration file.

Entering Configuration Mode and Selecting a Configuration Source

To enter configuration mode, enter the **configure** command at the privileged EXEC prompt. The RSM responds with the following prompt asking you to specify the terminal, memory, or a file stored on a network server (network) as the source of configuration commands:

```
Configuring from terminal, memory, or network [terminal]?
```

These methods are described in the following sections:

- Configuring the RSM from the Terminal on page 40-11
- Configuring the RSM from Memory on page 40-11
- Configuring the RSM from the Network on page 40-12
- Copying a Configuration File Directly to the Startup Configuration on page 40-12

The RSM accepts one configuration command per line. You can enter as many configuration commands as you want.

You can add comments to a configuration file describing the commands you have entered. Precede a comment with an exclamation point (!). Because comments are *not* stored in NVRAM or in the active copy of the configuration file, comments do not appear when you list the active configuration with the **show running-config** EXEC command. Also, when the startup configuration is NVRAM, comments do not show up when you list the startup configuration with the **show startup-config** EXEC command. Comments are stripped out of the configuration file when it is loaded onto the RSM. However, you can list the comments in configuration files stored on a TFTP or rcp server.

Configuring the RSM from the Terminal

When you configure the RSM from the terminal, the RSM executes the commands you enter at the system prompts. To configure the RSM from the terminal, perform this task:

Task		Command
Step 1	Enter configuration mode and select the terminal option.	**configure terminal**
Step 2	Enter the necessary configuration commands.	See Chapter 39, "Configuring InterVLAN Routing."
Step 3	Exit configuration mode.	**Ctrl-Z**
Step 4	Save the configuration file to your startup configuration. This step saves the configuration to the location specified by the CONFIG_FILE environment variable.	**copy running-config startup-config**

This example shows how to configure the RSM from the terminal. The **hostname** command changes the RSM name from *router1* to *router2*. Press **Ctrl-Z** (**^Z**) to quit configuration mode. The **copy running-config startup-config** command saves the current configuration to the startup configuration.

```
Router#configure terminal
Router(config)#hostname router2
^Z
Router#copy running-config startup-config
```

The RSM startup software uses the configuration pointed to by the CONFIG_FILE environment variable to start up. When the CONFIG_FILE environment variable does not exist or is null (such as a first-time startup), the RSM uses NVRAM as the default startup device. For more information on environment variables, see the "RSM Environment Variables" section on page 40-23.

Configuring the RSM from Memory

The following command configures the RSM to execute the configuration specified by the CONFIG_FILE environment variable.

To configure the RSM to execute the configuration specified by the CONFIG_FILE environment variable, perform this task in privileged EXEC mode:

Task	Command
Configure the RSM to execute the configuration specified by the CONFIG_FILE environment variable.	**copy startup-config running-config**

Configuring the RSM from the Network

You can configure the RSM by retrieving and modifying a configuration file stored on one of your network servers. To do so, perform this task:

Task		Command
Step 1	Enter configuration mode with the network option.	**copy rcp running-config** or **copy tftp running-config**
Step 2	At the system prompt, select a network or host configuration file. The network configuration file contains commands that apply to all network servers and terminal servers on the network. The host configuration file contains commands that apply to one network server in particular.	**host** or **network**
Step 3	At the system prompt, enter the optional IP address of the remote host from which you are retrieving the configuration file.	*ip-address*
Step 4	At the system prompt, enter the name of the configuration file or accept the default name.	*filename*
Step 5	Confirm the configuration filename that the system supplies.	**y**

In the following example, the RSM is configured from the file *tokyo-config* at IP address 131.108.2.155:

```
Router1#copy tftp running-config
Host or network configuration file [host]?
IP address of remote host [255.255.255.255]? 131.108.2.155
Name of configuration file [tokyo-confg]?
Configure using tokyo-confg from 131.108.2.155? [confirm] y
Booting tokyo-confg from 131.108.2.155:!! [OK - 874/16000 bytes]
```

Copying a Configuration File Directly to the Startup Configuration

This task loads a configuration file directly into the location specified by the CONFIG_FILE environment variable without affecting the running configuration.

To copy a configuration file directly to the startup configuration, perform this task in EXEC mode:

Task	Command
Load a configuration file directly into the location specified by the CONFIG_FILE environment variable.	**copy rcp startup-config** or **copy tftp startup-config**

Modifying the Configuration Register Boot Field

The configuration register boot field determines whether or not the RSM loads an operating system image, and if so, where it obtains this system image. The following sections describe the RSM's process for using the configuration register boot field, your process for setting this field, and the tasks you must perform to modify the configuration register boot field.

How the RSM Uses the Boot Field

The lowest four bits of the 16-bit configuration register (bits 3, 2, 1, and 0) form the boot field. The following boot field values determine if the RSM loads an operating system and where the RSM obtains the system image:

- When the entire boot field equals 0-0-0-0, the RSM does not load a system image. Instead, the RSM enters ROM-monitor (or maintenance) mode from which you can enter ROM monitor commands to manually load a system image.
- When the entire boot field equals 0-0-0-1, the RSM loads the system image found in boot Flash.
- When the entire boot field equals a value between 0-0-1-0 and 1-1-1-1, the RSM loads the system image specified by **boot system** commands in the startup configuration file. When the startup configuration file does not contain **boot system** commands, the RSM loads a default system image stored on a network server.

When loading a default system image from a network server, the RSM uses the configuration register settings to determine the default system image filename for booting from a network server. The RSM forms the default boot filename by starting with the word *cisco* and then appending the octal equivalent of the boot field number in the configuration register, followed by a hyphen (-) and the processor type name (cisco*nn-cpu*).

Setting the Boot Field

Use the procedure in this section to modify the current configuration register setting to reflect the way in which you want the RSM to boot a system image. In the procedure you are asked to change the least significant hexadecimal digit to one of the following:

- 0 to load the system image manually using the **boot** command in ROM monitor mode.
- 1 to load the system image from boot Flash. This setting configures the system to load the system image from bootflash automatically.
- 2–F to load the system image from **boot system** commands in the startup configuration file or from a default system image stored on a network server.

For example, if the current configuration register setting is 0x101 and you want to load a system image from **boot system** commands in the startup configuration file, you would change the configuration register setting to 0x102.

To modify the software configuration register boot field, perform this task:

Task		Command
Step 1	Obtain the current configuration register setting.	**show version**
Step 2	Enter configuration mode, selecting the terminal option.	**configure terminal**
Step 3	Modify the existing configuration register setting to reflect how you want the router to load a system image.	**config-register** *value*
Step 4	Exit configuration mode.	**Ctrl-Z**
Step 5	Reboot the RSM to make your changes take effect.	**reload**

Use the **show version** EXEC command to display the current configuration register setting. In ROM-monitor mode, use the **o** command to list the value of the configuration register boot field.

In the following example, the **show version** command indicates that the current configuration register is set so that the RSM does not automatically load an operating system image (configuration register is 0x0). Instead, it enters ROM-monitor mode and waits for user-entered ROM monitor commands. The new setting instructs the RSM to load a system image from commands in the startup configuration file or from a default system image stored on a network server.

```
Router1#show version
Cisco Internetwork Operating System Software
IOS (tm) C5RSM Software (C5RSM-JSV-M), Version 11.2(9)P
Copyright (c) 1986-1997 by cisco Systems, Inc.
Compiled Tue 24-Jun-97 17:09 by shj
Image text-base: 0x600108E0, data-base: 0x6095E000

ROM: System Bootstrap, Version 11.2(15707)
BOOTFLASH: C5RSM Software (C5RSM-JSV-M), Version 11.2

yosemite_3 uptime is 17 hours, 17 minutes
System restarted by reload
System image file is "dirt/yosemite/c5rsm-jsv-mz.7P", booted via tftp from 223.2
55.254.254

cisco RSP2 (R4700) processor with 16384K bytes of memory.
R4700 processor, Implementation 33, Revision 1.0
Last reset from power-on
G.703/E1 software, Version 1.0.
SuperLAT software copyright 1990 by Meridian Technology Corp).
Bridging software.
X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
TN3270 Emulation software (copyright 1994 by TGV Inc).
1 C5IP controller (2 Vlan).
2 Virtual Ethernet/IEEE 802.3 interface(s)
123K bytes of non-volatile configuration memory.

8192K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
8192K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x0

Router1#configure terminal
Router1(config)#config-register 0xF
^Z

Router1#reload
```

Specifying the Startup System Image

Note For descriptions of the various images and the RSM boot process, see the "Boot Process" section on page 40-4.

You can enter multiple **boot** commands in the startup configuration file or in the BOOT environment variable to provide backup methods for loading a system image onto the RSM. The two ways to load a system image follow:

- From Flash memory—Flash memory allows you to copy new system images without changing EPROMs. Information stored in Flash memory is not vulnerable to network failures that might occur when loading system images from servers.
- From a network server—You can specify a bootstrap image to be loaded from a network server using TFTP or rcp.

You can enter the different types of **boot** commands in any order in the startup configuration file or in the BOOT environment variable. If you enter multiple **boot** commands, the RSM tries them in the order they are entered.

Loading from Flash Memory

Flash memory is located on the onboard Flash SIMM or on a Flash PC card inserted in one of the PCMCIA slots (slot 0 or slot 1). You can store or boot software images in Flash memory as necessary. Flash memory can reduce the effects of network failure by reducing dependency on files that can only be accessed over the network.

Flash Memory Configuration Process

When you receive your RSM from the factory, bootflash contains the rxboot image. You can change the location of this image to a Flash PC card inserted in a PCMCIA slot. To specify the rxboot image Flash device, set the BOOTLDR environment variable. For more information, see the "RSM Environment Variables" section on page 40-23.

Note When no BOOTLDR environment variable exists, the default rxboot image is the first image file in bootflash (for more information on the rxboot image, see the "System Software Description" section on page 40-3).

The configuration process is as follows:

Step 1 Set the BOOTLDR environment variable if you want to change the location of the rxboot image that ROM uses for booting.

Step 2 Optionally, use rcp or TFTP to update the system image that resides in bootflash or on one of the Flash PC cards inserted in a PCMCIA slot. Performing this step allows you to update a degraded system image with one that is not degraded.

Step 3 Configure your system to boot automatically from the desired file in Flash memory. You might need to change the configuration register value. For more information, see the "Modifying the Configuration Register Boot Field" section on page 40-12.

Step 4 Save the configurations.

Step 5 Power cycle and reboot your system to ensure that all is working as expected.

Perform Flash Memory Configuration Tasks

Flash memory configuration tasks discussed in this section include the following:

Set the BOOTLDR Environment Variable (optional)

To set the BOOTLDR environment variable on your RSM, perform this task beginning in privileged EXEC mode:

Task		Command
Step 1	Verify that bootflash contains the rxboot image.	**dir** [**/all** | **/deleted**] [**/long**] [*device***:**][*filename*]
Step 2	Enter the configuration mode from the terminal.	**configure terminal**
Step 3	Set the BOOTLDR environment variable to specify the Flash device and filename of the rxboot image. This step modifies the runtime BOOTLDR environment variable.	**boot bootldr** *device***:***filename*
Step 4	Exit configuration mode.	**Ctrl-Z**
Step 5	Save this runtime BOOTLDR environment variable to your startup configuration.	**copy running-config startup-config**
Step 6	Optionally, verify the contents of the BOOTLDR environment variable.	**show boot**

This example sets the BOOTLDR environment to change the location of the rxboot image from bootflash to slot 0:

```
Router#dir bootflash:
-#- -length- -----date/time------ name
1   620      May 04 1995 26:22:04 rsp-boot-m
2   620      May 24 1995 21:38:14 config2

7993896 bytes available (1496 bytes used)
Router#configure terminal
Router (config)#boot bootldr slot0:rsp-boot-m
^Z
Router#copy running-config startup-config
[ok]
Router#show boot
BOOT variable = slot0:rsp-boot-m
CONFIG_FILE variable = nvram:
Current CONFIG_FILE variable = slot0:router-config

Configuration register is 0x0

Router#
```

Configure the RSM to Boot Automatically from an Image in Flash Memory

To configure the RSM to automatically boot from an image in Flash memory, perform this task:

Task		Command
Step 1	Enter configuration mode from the terminal.	**configure terminal**
Step 2	Enter the filename of an image stored in Flash memory.	**boot system flash bootflash:**[*filename*] **boot system flash slot0:**[*filename*] **boot system flash slot1:**[*filename*]
Step 3	Set the configuration register to enable loading of the system image from Flash memory.	**config-register** *value*[1]
Step 4	Exit configuration mode.	**Ctrl-Z**
Step 5	Save the configuration file to NVRAM.	**copy running-config startup-config**

Task		Command
Step 6	Optionally, verify the contents of the startup configuration.	**show startup-config**
Step 7	Power cycle and reboot the system to ensure that it works as expected.	**reload**

1 For information on using this command to modify the software configuration register, see the "Modifying the Configuration Register Boot Field" section on page 40-12.

If you enter more than one image filename, the RSM tries them in the order entered. If a filename already appears in the configuration file and you want to specify a new filename, remove the existing filename with the **no boot system flash** *filename* command.

Note The **no boot system** configuration command disables all **boot system** configuration commands regardless of argument. Specifying the **flash** keyword or the *filename* argument with the **no boot system** command disables only the commands specified by these arguments.

The following example shows how to configure the RSM to boot automatically from an image in Flash memory:

```
Router#configure terminal
Router (config)#boot system flash bootflash:gsnew-image
Router (config)#config-register 0x010F
^Z
Router#copy running-config startup-config
[ok]
Router#reload
[confirm]

%SYS-5-RELOAD: Reload requested
System Bootstrap, Version 4.6(0.16), BETA SOFTWARE
Copyright (c) 1986-1995 by cisco Systems
RP1 processor with 16384 Kbytes of memory
F3: 1871404+45476+167028 at 0x1000

Booting gsnew-image from flash memory RRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR [OK - 1916912/13767448 bytes]
F3: 1871404+45476+167028 at 0x1000

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cisco Systems, Inc.
              170 West Tasman Drive
              San Jose, California 95134

GS Software (GS7), Version 10.2,
Copyright (c) 1986-1995 by cisco Systems, Inc.
Compiled Thu 05-Nov-94 14:16 by mlw
```

After you successfully configure Flash memory, you might want to configure the system with the **no boot system flash** command to revert to booting from bootflash. You might want to revert to booting from bootflash if you do not yet need this functionality, or if you do not have the proper image in Flash memory.

Loading from a Network Server

You can configure the RSM to load a system image from a network server using TFTP or rcp to copy the system image file. To do so, you must set the configuration register boot field to the correct value. For more information, see the "Modifying the Configuration Register Boot Field" section on page 40-12.

If you do not specify either TFTP or rcp, by default the system image that you specify is booted from a network server using TFTP.

Note If you are using a Sun workstation as a network server and TFTP to transfer the file, set up the workstation to enable verification and generation of User Datagram Protocol (UDP) checksums. See the Sun documentation for details.

For increased performance and reliability, use rcp to boot a system image from a network server. The rcp implementation uses the Transmission Control Protocol (TCP), which ensures reliable delivery of data.

You cannot explicitly specify a remote username when you issue the **boot** command. Instead, the RSM host name is used. If the remote server has a directory structure (UNIX systems have one) and you boot the RSM from a network server using rcp, the Cisco IOS software searches for the system image on the server relative to the home directory of the remote username used to log in.

If there is not enough room in memory to boot a regular image from a network server, you can produce a compressed software image on any UNIX platform using the **compress** command. Refer to your UNIX platform's documentation for the exact usage of the **compress** command.

To specify the loading of a system image from a network server, perform this task:

Task		Command
Step 1	Enter configuration mode from the terminal.	**configure terminal**
Step 2	Specify the system image file to be booted from a network server using rcp or TFTP.	**boot system** [**rcp** | **tftp**] *filename* [*ip-address*]
Step 3	Set the configuration register to enable loading of the system image from a network server.	**config-register** *value*[1]
Step 4	Exit configuration mode.	**Ctrl-Z**
Step 5	Save the configuration to the location specified by the CONFIG_FILE environment variable.	**copy running-config startup-config**

1 Refer to "Modifying the Configuration Register Boot Field" section on page 40-12.

In the following example, the RSM uses rcp to boot from the testme5.tester system image file on a network server at IP address 172.20.52.3:

```
Router1#configure terminal
Router1(config)#boot system rcp testme5.tester 172.20.52.3
Router (config)#config-register 0x010F
^Z
Router1#copy running-config startup-config
```

Using a Fault-Tolerant Booting Strategy

Occasionally network failures make booting from a network server impossible. To lessen the effects of network failure, consider the following booting strategy. After you install and configure Flash, you might want to configure the RSM to boot in the following order:

1. Boot an image from Flash.
2. Boot an image from a system file on a network server.

This boot order provides the most fault-tolerant booting strategy. To allow the RSM to boot first from Flash, and then from a system file from a network server, perform this task:

Task		Command
Step 1	Enter configuration mode from the terminal.	**configure terminal**
Step 2	Configure the RSM to boot from Flash memory.	**boot system flash bootflash:**[*filename*] **boot system flash slot0:**[*filename*] **boot system flash slot1:**[*filename*]
Step 3	Configure the RSM to boot from a system filename.	**boot system** [**rcp** | **tftp**] *filename* [*ip-address*]
Step 4	Set the configuration register to enable loading of the system image from a network server or Flash.	**config-register** *value* [1]
Step 5	Exit configuration mode.	**Ctrl-Z**
Step 6	Save the configuration to the location specified by the CONFIG_FILE environment variable.	**copy running-config startup-config**

1 Refer to "Modifying the Configuration Register Boot Field" section on page 40-12.

This example shows how to implement a fault-tolerant booting strategy. In the example, the RSM is configured to first boot an internal Flash image called gsxx. If that image fails, the RSM boots the configuration file gsxx from a network server.

```
Router#configure terminal
Router(config)#boot system flash gsxx
Router(config)#boot system gsxx 172.20.52.3
Router(config)#config-register 0x010F
^Z
Router#copy running-config startup-config
[ok]
```

Specifying the Startup Configuration File

Configuration files can be stored on network servers. You can configure the RSM to request and receive two configuration files from the network server automatically at startup:

- Network configuration file
- Host configuration file

The first file the server attempts to load is the network configuration file. This file contains information that is shared among several routers. For example, you can use this file to provide mapping between IP addresses and host names.

The second file the server attempts to load is the host configuration file. This file contains commands that apply to one router in particular. Both the network and host configuration files must reside on a network server reachable via TFTP or rcp.

You can specify an ordered list of network configuration and host configuration filenames. The RSM scans this list until it successfully loads the appropriate network or host configuration file.

In addition to storing configuration files on network servers, you can store configuration files in NVRAM and on Flash PC cards. The CONFIG_FILE environment variable specifies the device and filename of the configuration file to use during initialization. For more information on environment variables, see the "RSM Environment Variables" section on page 40-23.

You can set the CONFIG_FILE environment variable to specify the startup configuration.

Specifying the Startup Configuration File

To specify a startup configuration file, perform *either* the first two tasks *or* the third task:

- Downloading the Network Configuration File on page 40-20
- Downloading the Host Configuration File on page 40-21
- Downloading the CONFIG_FILE Environment Variable Configuration on page 40-22

Downloading the Network Configuration File

To configure the RSM to download a network configuration file from a server at startup, perform this task:

Task		Command
Step 1	Enter configuration mode from the terminal.	**configure terminal**
Step 2	Enter the network configuration filename to download a file using TFTP or rcp.	**boot network** [**tftp** | **rcp**] *filename* [*ip-address*]
Step 3	Enable the RSM to automatically load the network file upon restart.	**service config**
Step 4	Exit configuration mode.	**Ctrl-Z**
Step 5	Save the configuration to the location specified by the CONFIG_FILE environment variable.	**copy running-config startup-config**

In Step 2, if you do not specify a network configuration filename, the RSM uses the default filename network-confg. If you omit both the **tftp** and the **rcp** keywords, the RSM assumes that you are using TFTP to transfer the file and that the server whose IP address you specify supports TFTP.

If you configure the RSM to download the network configuration file from a network server using rcp and the server has a directory structure (UNIX systems have one), the RSM software searches for the system image on the server relative to the home directory of the remote username used to log in. The RSM host name is used as the remote username.

You can specify more than one network configuration file. The RSM tries them in order until it loads one successfully. This procedure can be useful for keeping files with different configuration information loaded on a network server.

Downloading the Host Configuration File

You can configure the RSM to download a host configuration file from a server at startup. If you do not specify a host configuration filename, the RSM uses its own name to form a host configuration filename by converting the RSM name to all lowercase letters, removing all domain information, and appending *-confg*. If no host name information is available, the RSM uses the default host configuration filename *router-confg*.

To configure the RSM to download a host configuration file from a server at startup, perform this task:

Task		Command
Step 1	Enter configuration mode from the terminal.	**configure terminal**
Step 2	(Optional) Enter the host configuration filename to be downloaded using rcp or TFTP.	**boot host** [**tftp** | **rcp**] *filename* [*ip-address*]
Step 3	Enable the RSM to automatically load the host file upon restart.	**service config**
Step 4	Exit configuration mode.	**Ctrl-Z**
Step 5	Save the configuration to the location specified by the CONFIG_FILE environment variable.	**copy running-config startup-config**
Step 6	Reset the RSM with the new configuration information.	**reload**

You can specify more than one host configuration file. The RSM tries them in order until it loads one successfully. This procedure can be useful for keeping files with different configuration information loaded on a network server.

In the following example, the RSM is configured to boot from the host configuration file hostfile1 and from the network configuration file networkfile1:

```
Router1#configure terminal
Router1(config)#boot host hostfile1
Router1(config)#boot network networkfile1
Router1(config)#service config
^Z
Router1#copy running-config startup-config
```

If the network server fails to load a configuration file during startup, it tries again every ten minutes (the default setting) until a host provides the requested files. With each failed attempt, the network server displays a message on the console terminal. If the network server is unable to load the specified file, it displays the following message:

```
Booting host-confg... [timed out]
```

Downloading the CONFIG_FILE Environment Variable Configuration

In addition to loading startup configuration files from a server, you can configure the RSM to load a startup configuration file specified by the CONFIG_FILE environment variable. To do so, perform this task, beginning in EXEC mode:

Task		Command
Step 1	Copy the configuration file to the device from which the RSM will load the file upon restart.	**copy** **copy flash** **copy rcp** **copy running-config** **copy startup-config** **copy tftp**
Step 2	Enter configuration mode from the terminal.	**configure terminal**
Step 3	Set the CONFIG_FILE environment variable. This step modifies the runtime CONFIG_FILE environment variable.	**boot config** *device:filename*
Step 4	Exit configuration mode.	**Ctrl-Z**
Step 5	Save this runtime CONFIG_FILE environment variable to your startup configuration.	**copy running-config startup-config**
Step 6	Optionally, verify the contents of the CONFIG_FILE environment variable.	**show boot**

When saving the runtime CONFIG_FILE environment variable to the startup configuration, the RSM saves a complete version of the configuration file to the location specified by the CONFIG_FILE environment variable and a distilled version to NVRAM. (A distilled version does not contain access list information.) If NVRAM contains a complete configuration file, the RSM prompts you to confirm your overwrite of the complete version with the distilled version. If NVRAM contains a distilled configuration, the RSM does not prompt you for confirmation and proceeds with overwriting the existing distilled configuration file in NVRAM.

The following example copies the running configuration file to the first Flash PC card slot (**slot0**). This configuration is then used as the startup configuration when you restart the system.

```
Router#copy running-config slot0:config2
Router#configure terminal
Router (config)#boot config slot0:config2
^Z
Router#copy running-config startup-config
[ok]
Router#show boot
BOOT variable = slot0:rsp-boot-m
CONFIG_FILE variable = nvram:
Current CONFIG_FILE variable = slot0:config2

Configuration register is 0x010F

Router#
```

RSM Environment Variables

The Flash PC card slots on your RSM can store executable images and configuration files. The RSM can boot images and load configuration files from Flash PC cards as well as from internal Flash (bootflash), NVRAM, and the network.

Because the RSM can boot images and load configuration files from several locations, it uses ROM monitor environment variables to specify the location and filename of images and configuration files. These special environment variables are as follows:

- BOOT
- BOOTLDR
- CONFIG_FILE

Note For a description of the RSM boot process, see the "Boot Process" section on page 40-4.

BOOT Environment Variable

The BOOT environment variable specifies a list of bootable images on various devices. The valid devices are internal Flash (**bootflash:**), the first Flash PC card slot (**slot0:**), the second Flash PC card slot (**slot1:**), and **tftp**. After you save the BOOT environment variable to your startup configuration, the RSM checks the variable upon startup to determine the device and filename of the image to boot.

The RSM tries to boot the first image in the BOOT environment variable list. If the RSM is unsuccessful at booting that image, it tries to boot the next image specified in the list. The RSM tries each image in the list until it successfully boots. If the RSM cannot boot any image in the BOOT environment variable list, it then attempts to boot the rxboot image.

If an entry in the BOOT environment variable list does not specify a device, the RSM assumes the device is **tftp**. If an entry in the BOOT environment variable list specifies an invalid device, the RSM skips that entry.

BOOTLDR Environment Variable

The BOOTLDR environment specifies the Flash device and filename containing the rxboot image that the ROM monitor uses. The valid devices are **bootflash:**, **slot0:**, and **slot1:**.

This environment variable allows you to have several rxboot images. You can instruct the ROM monitor to use a specific rxboot image without having to switch out ROMs. After you save the BOOTLDR environment variable to your startup configuration, the RSM checks the variable upon startup to determine which rxboot image to use.

CONFIG_FILE Environment Variable

The CONFIG_FILE environment variable specifies the device and filename of the configuration file to use for initialization (startup). The valid devices are **bootflash:**, **nvram:**, **slot0:**, and **slot1:**. After you save the CONFIG_FILE environment variable to your startup configuration, the RSM checks the variable upon startup to determine the location and filename of the configuration file to use for initialization.

The RSM uses the NVRAM configuration during initialization when the CONFIG_FILE environment variable does not exist or when it is null (such as at first-time startup).

Creating and Modifying Environment Variables

Although the ROM monitor controls environment variables, you can create, modify, or view them with certain system image commands. To create or modify the BOOT, BOOTLDR, and CONFIG_FILE environment variables, use the **boot system**, **boot bootldr**, and **boot config** system image commands, respectively.

Note When you use these three global configuration commands, you affect only the running configuration. You must save the environment variable settings to your startup configuration to place the information under ROM monitor control and to ensure the environment variables function as expected. Use the **copy running-config startup-config** command to save the environment variables from your running configuration to your startup configuration.

You can view the contents of the BOOT, BOOTLDR, and the CONFIG_FILE environment variables by entering the **show boot** command. This command displays the settings for these variables as they exist in the startup configuration as well as in the running configuration if a running configuration setting differs from a startup configuration setting.

Enter the **show startup-config** command to display the contents of the configuration file pointed to by the CONFIG_FILE environment variable.

For complete information on the commands presented in this section, refer to the *Access and Communication Servers Command Reference* publication.

Recovering a Lost Password

To recover a lost password, complete these steps:

Step 1 Attach an ASCII terminal to the RSM console port.

Step 2 Configure the terminal to operate at 9600 baud, 8 data bits, no parity, 2 stop bits (or to the existing RSM settings).

Step 3 Enter the **show version** command to display the existing configuration register value. Note this value for later use in Step 13.

Step 4 If Break is disabled, power cycle the RSM. (To power cycle, remove the RSM from the switch backplane, wait five seconds, and then reinsert the RSM.) If Break is enabled on the RSM, press the **Break** key or send a break (^[) and then proceed to Step 5.

Step 5 Within 60 seconds of turning on the RSM, press the **Break** key. This action causes the terminal to display the bootstrap program prompt:

```
rommon 1 >
```

Step 6 Set the configuration register to ignore the configuration file information as follows:

```
rommon 1 > confreg

Configuration Summary
enabled are:
console baud: 9600
boot: image specified by the boot system command
or default to: cisco2-RSP

do you wish to change the configuration? y/n [n]: y
enable "diagnostic mode"? y/n [n]:
enable "use net in IP bcast address"? y/n [n]:
enable "load rom after netbootfails"? y/n [n]:
enable "use all zero broadcast"? y/n [n]:
enable "break/abort has effect?" y/n [n]:
enable "ignore system config info?" [n]: y
change console baud rate? y/n [n]:
change boot characteristics? y/n [n]
Configuration Summary
enabled are:
console baud: 9600
boot: image specified by the boot system command
or default to: cisco2-RSP

do you wish to change the configuration? y/n [n]

You must reset or power cycle for the new config to take effect
```

Step 7 Initialize the RSM by entering the **i** command as follows:

```
rommon 1 > i
```

The RSM will power cycle, the configuration register will be set to ignore the configuration file, and the RSM will boot the boot system image and prompt you with the system configuration dialog as follows:

```
--- System Configuration Dialog ---
```

Step 8 Enter **no** in response to the system configuration dialog prompts until the following system message is displayed:

```
Press RETURN to get started!
```

Step 9 Press **Return**. After some interface information, the prompt appears as follows:

```
Router>
```

Step 10 Enter the **enable** command to enter the enabled mode. The prompt changes to the following:

```
Router#
```

Step 11 Enter the **show configuration** EXEC command to display the enable password in the configuration file.

Step 12 Enter the **configure terminal** command at the EXEC prompt. You are prompted as follows:

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

Step 13 Using the **config-register** 0x<*value*> command, change the configuration register value back to its original value (noted from Step 3) or change it to a value of 0x2102 (factory default).

Step 14 Exit configuration mode by entering **Ctrl-Z**.

Step 15 Reboot the RSM and enable it using the recovered password.

Using Catalyst 5000 Series Switch Commands with the RSM

This section describes how the more commonly used Catalyst 5000 series switch commands work with the RSM.

Note Not all of the commands listed work with the RSM in the same manner as with other trunking ports.

show Commands

Screen displays that show ports in <*module*>/<*port*> format, such as **show vlan**, show the RSM port as <*module*>*/1*.

show cam

All Enhanced Address Recognition Logic (EARL) entries that refer to an RSM show *m/1*, where *m* is the slot number of the RSM. For example, **show cam** <*mac*>**,** where <*mac*> is an RSM MAC address, displays:

```
Cat5000> show cam 00-11-22-33-44-55
* = Static Entry. + = Permanent Entry. # = System Entry.

VLAN  Destination MAC      Destination Ports or VCs
----  ------------------   -----------------------------------------------------
2     00-11-22-33-44-55    4/1
```

show cdp

The **show cdp neighbor** command shows information received on an RSM port. Since the RSM port connects only to the RSM, only information about the RSM is displayed. Any information received by the RSM on its external port is visible only from the RSM.

show cdp port functions the same on an RSM port as on other trunking ports.

```
Cat5000> show cdp port
Port      CDP Status  Message-Interval
--------  ----------  ----------------
 1/1      enabled     60
 1/2      enabled     60
 3/1-8    enabled     60
 3/9-16   enabled     60
 3/17-24  enabled     60
 4/1      enabled     60
 5/1-2    enabled     60
```

show flash

The RSM LCP firmware is specific to the RSM. The LCP firmware version is displayed on the `lcp c5ip` line below.

```
Cat5000> show flash
File             Version            Size (bytes)
---------------  -----------------  -------------
c5000 nmp        2.3(1)             1191663
      smcp       2.3                  38800
      lcp        2.3                  27650
      atm/fddi   2.3                  24477
      lcp 64k    2.3                  54218
      lcp 360    2.3(1)              115716
      lcp c5ip   2.3                  24632
fddi (Module 5)  2.1(2)                   -
```

show mac

Displays the following message for the RSM switch slot:

```
Use 'session' command to see ATM and router counters.
```

show module

Displays module information:

```
Cat5000> show module
Mod Module-Name          Ports Module-Type           Model   Serial-Num Status
--- -------------------- ----- --------------------- -------- ---------- -------
1                        2     100BaseTX Supervisor  WS-X5509 001905891 ok
3                        24    3 Segment 100BaseTX E ws-x5223 000000021 ok
4                        1     Route Switch          WS-X5302 003629954 ok
5                        2     MM MIC FDDI           WS-X5101 002774545 ok

Mod MAC-Address(es)                             Hw     Fw      Sw
--- ------------------------------------------  ------ ------- ----------------
1   00-60-09-79-33-00 thru 00-60-09-79-36-ff  0.213  2.2(181 2.3(1)
3   00-60-83-42-e4-4b thru 00-60-83-42-e4-4d  0.1    2.2(4)  2.2(4)
4   00-e0-14-c6-db-00 thru 00-e0-14-c6-db-01  1.0    201.78  11.2(7)P:
5   00-60-3e-cd-42-95                         1.0    1.1     2.3(1)

Mod Sub-Type
--- --------
1   EARL 1

Mod SMT User-Data              T-Notify CF-St    ECM-St    Bypass
--- -------------------------- -------- -------- --------- -------
5   WorkGroup Stack            30       isolated in        absent
```

Fw is the RSM Catalyst 5000 series switch interface processor version, and Sw is the Cisco IOS version.

show multicast router

Functions the same on an RSM port as on other trunking ports.

show port

Displays port information:

```
Cat5000> show port 4
Port  Name                 Status     Vlan       Level  Duplex Speed Type
----- -------------------- ---------- ---------- ------ ------ ----- -----------
 4/1                       connected  trunk      normal   half   400 Route Switch

Port   Trap
-----  --------
 4/1   disabled

Use 'session' command to see router counters.

Last-Time-Cleared
--------------------------
Wed Mar 19 1997, 12:26:52
```

show port (cdp | spantree | status | trunk)

Functions the same on an RSM port as on other trunking ports.

show port (broadcast | fddi | security | trap)

Does not provide information on the RSM port.

show port (counters | mac)

Displays the following message:

```
Use ‘session’ command to see ATM and router counters.
```

show port (security | trap)

Displays the following message:

```
Use ‘session’ command to see router counters.
```

show test

Displays the power-up diagnostic results:

```
Cat5000> show test
Environmental Status (. = Pass, F = Fail, U = Unknown)
  PS (3.3V):   N   PS (12V): .   PS (24V):   .   PS1: .     PS2: .
  PS1 Fan:     .   PS2 Fan : .   Clock(A/B): A
  Temperature: .   Fan:      .

Module 1 : 2-port 100BaseTX Supervisor
Network Management Processor (NMP) Status: (. = Pass, F = Fail, U = Unknown)
  ROM:  .   Flash-EEPROM: .   Ser-EEPROM: .   NVRAM: .   MCP Comm: .

  EARL Status :
        NewLearnTest:         .
        IndexLearnTest:       .
        DontForwardTest:      .
        MonitorTest           .
        DontLearn:            .
        FlushPacket:          .
        ConditionalLearn:     .
```

```
        EarlLearnDiscard:     .
        EarlTrapTest:         .


LCP Diag Status for Module 1  (. = Pass, F = Fail, N = N/A)
 CPU          : .    Sprom    : .    Bootcsum : .    Archsum  : N
 RAM          : .    LTL      : .    CBL      : .    DPRAM    : .   SAMBA : .
 Saints       : .    Pkt Bufs : .    Repeater : N

 SAINT/SAGE Status :
  Ports 1  2  3
  --------------
        .  .  .

 Packet Buffer Status :
  Ports 1  2  3
  --------------
        .  .  .

 Loopback Status :
  Ports  1  2  3
  --------------
         .  .  .
```

show trunk

The RSM port displays as a port that is always trunking, with allowed and active VLANs for each VLAN configured on the RSM. The following example shows an RSM with VLAN interfaces 2 and 3 configured:

```
Cat5000> show trunk
Port     Mode       Status
-------  ---------  ------------
4/1      on         trunking

Port     Vlans allowed on trunk
-------  ---------------------------------------------------------------------
4/1      1-1000

Port      Vlans allowed and active in management domain
--------  --------------------------------------------------------------------
4/1      2-3

Port     Vlans supported on trunk after pruning
-------  ---------------------------------------------------------------------
4/1      2-3
```

show version

Displays the current hardware and software versions:

```
Cat5000> show version
WS-C5500 Software, Version McpSW: 2.3(1) NmpSW: 2.3(1)
Copyright (c) 1995-1997 by Cisco Systems
NMP S/W compiled on Jul 10 1997, 11:30:44
MCP S/W compiled on Jul 10 1997, 11:50:20

System Bootstrap Version: 2.2(1)
```

```
Hardware Version: 1.2  Model: WS-C5500  Serial #: 002261212
Module Ports Model      Serial #  Hw     Fw      Fw1     Sw
------ ----- ---------- --------- ------ ------- ------- --------------------
1      2     WS-X5509   001905891 0.213  2.2(181 2.2(181 2.3(1)
3      24    ws-x5223   000000021 0.1    2.2(4)          2.3(1)
4      1     WS-X5302   003629954 1.0    201.78          11.2(19970206:
5      2     WS-X5101   002774545 1.0    1.1     1.3     2.1(2)

Module DRAM    FLASH   NVRAM   Used    Available
------ ------- ------- ------- ------- ---------
1       16384K   4096K    256K     58K      198K

Uptime is 0 day, 2 hours, 34 minutes
```

Fw is the RSM Catalyst 5000 series switch interface processor version, Sw is the Cisco IOS version, and Fw1 is the RSM LCP boot code version.

show vlan

Displays VLAN information about the RSM port. Using **show** with no parameters does not list the RSM port as part of the VLANs, but **show** *n* includes the RSM port if the RSM is active on port *n*.

set/clear Commands

set cdp

Functions the same on an RSM port as on other trunking ports.

set cam

Displays the following message:

```
Feature not supported on module n.
```

set|clear (multicast router)

Functions the same on an RSM port as on other trunking ports.

set module (name)

Sets the module name for the RSM. All other **set module** commands display the following message:

```
Feature not supported on module n.
```

set port (name)

Sets the port name for the RSM. All other **set port** commands display the following message:

```
Feature not supported on module n.
```

set span

Specifying an RSM port as a *source port* in **set span** is allowed, but specifying an RSM port as the *destination port* displays the following message:

```
Route switch port cannot be a Monitor Port.
```

set spantree

set spantree (portcost | portmode | portpri) functions the same on an RSM port as on other trunking ports.

set spantree (portfast | portvlanpri) displays the following message:

```
Feature not supported on module n.
```

set trunk

The default for the trunk port on the RSM is always **on**. The trunk port always allows VLANs for 1–1000. You cannot change the set of VLANs allowed on the RSM port. Any use of the **set trunk** command displays the following message:

```
Feature not supported on module n.
```

set vlan

Specifying an RSM port in **set vlan** displays the following message:

```
Use 'session' command to configure Vlan router.
```

clear config

Clears the portion of the RSM configuration kept by the Catalyst 5000 series switch supervisor engine. You must clear the portion of the configuration kept by the RSM at the router level (Router> prompt).

```
This command will clear module 4 configuration.
Do you want to continue (y/n) [n]? y
.....
Module 4 configuration cleared.
Use 'session' command to clear Router specific configurations.
```

Additional Commands

session *mod/num*

Use the **session** command to toggle between the router and switch sessions (*mod/num* is the RSM slot number).

reset *n*

Where *n* is the RSM, causes a complete reset of the RSM hardware and software.

download/upload

Displays the following message:

```
Use 'session' command to download to or upload from Route Switch.
```