



Preparing RPM Cards for Operation

This chapter describes how to do the following tasks:

- Determine which slots host the RPM cards
- Initialize RPM cards that are installed in the switch
- Verify the software version used on the RPM cards
- Configure backup cards for RPM cards
- Where to find additional information on configuring RPM cards



Note

Some of the procedures in this chapter require you to enter Cisco IOS commands that run on the RPM cards. The procedures in this chapter do not describe how to use Cisco IOS, but they do include examples that list all the Cisco IOS commands needed to complete the procedure. For more information on any Cisco IOS command, refer to the Cisco IOS documentation.

Configuration Quickstart

The quickstart procedure in this section provides a summary of the tasks required to prepare RPM cards for operation. This procedure is provided as an overview and as a quick reference for those who have already configured Cisco MGX switches.

	Command	Purpose
Step 1	<code>username</code> <code><password></code>	Start a configuration session. Note To perform all the procedures in this quickstart procedure, you must log in as a user with SUPER_GP privileges or higher.
Step 2	<code>dspcds</code> <code>dspcd</code> <code>cc <slotnumber></code>	Locate RPM cards that need to be configured. See the “ Locating RPM Cards in the Switch ” section later in this chapter.

	Command	Purpose
Step 3	boot system <i>x:<filename></i> boot config <i>e:auto_config_slot</i> copy run start cc 7 resetcd <i>slot</i> Related commands: dspcds	Initialize RPM cards by identifying a runtime software file and storing the configuration on the PXM hard disk. See the “ Initializing RPM Cards ” later in this chapter.
Step 4	show version	Verify the software version for each RPM card. See the “ Verifying the Software Version in Use ” later in this chapter.
Step 5	addred <i><options></i>	Define RPM secondary cards that will operate as backup cards for RPM primary cards. See the “ Establishing Redundancy Between RPM Cards ” later in this chapter.

Locating RPM Cards in the Switch

You already have the location of the RPM cards if you have completed the appropriate hardware survey worksheet (See “[Verifying the Hardware Configuration](#)” in [Chapter 2](#), “[Configuring General Switch Features](#)”). That section describes how to locate the RPM cards, as well as other switch cards, and how to determine if the RPM front and back cards are installed in the correct slots.

Understanding dspcds and dspcd Displays for RPM

The **dspcds** and **dspcd** displays for RPM cards are similar to those for other cards, but they contain the following differences:

- RPM-PR cards are identified as RPM_PR cards.
- RPM-XF cards are identified as RPM_XF cards
- If one or more RPM back cards are installed for an RPM card, the status for the appropriate bay changes from Empty to Active. The switch does not detect and display the card type or software revision status.
- The Standby status for the front card indicates that the card is either operating in boot mode, or that the card is operating as a standby card for another RPM card.

The following example shows the **dspcd** command display for an RPM-PR card:

```

M8850_LA.8.PXM.a > dspcd 9
M8850_LA                      System Rev: 04.09      Jul. 17, 2003 22:48:11 GMT
MGX8850                      Node Alarm: CRITICAL
Slot Number:    9      Redundant Slot: NONE

                                Front Card      Upper Card      Lower Card
                                -----
Inserted Card:    RPM_PR          4E_B_RJ45          FE_RJ45
Reserved Card:    RPM_PR          UnReserved         UnReserved
State:            Active          Active             Active
Serial Number:    SAK0419001H     SBK051700VX        SBK0512013X
Prim SW Rev:      ---             ---               ---
Sec SW Rev:       ---             ---               ---
Cur SW Rev:      12.3(1.7)T1      ---               ---
Boot FW Rev:      12.2(7.4)T      ---               ---
800-level Rev:    10              B0                B1
800-level Part#:  800-07178-01     800-12134-01      800-02735-02
CLEI Code:        BAA6PT0CAA       BAEIABGAAA        BAEIAAAAAA
Reset Reason:     On Reset From Shell
Card Alarm:       NONE
Failed Reason:    None
Miscellaneous Information:

Type <CR> to continue, Q<CR> to stop:
M8850_LA                      System Rev: 04.09      Jul. 17, 2003 22:48:11 GMT
MGX8850                      Node Alarm: CRITICAL

Crossbar Slot Status:      No Crossbar

Alarm Causes
-----
      NO ALARMS

Backcard Mismatch Reasons
-----

Upper Card
-----
      NO MISMATCH

Lower Card
-----
      NO MISMATCH

```

The next example shows the **dspcd** command display for an RPM-XF:

```
M8850_SF.7.PXM.a > dspcd 1
M8850_SF                      System Rev: 04.00    Apr. 23, 2003 05:27:37 GMT
MGX8850                      Node Alarm: CRITICAL
Slot Number: 1      Redundant Slot: NONE

                Front Card      Upper Card      Lower Card
                -----
Inserted Card:   RPM_XF          MGX-XF-POS-2-OC12  MGX-XF-UI
Reserved Card:   RPM_XF          UnReserved         UnReserved
State:           Active          Active              Active
Serial Number:   SAG054578LL     SAG06300JUC        SAG06493Q64
Prim SW Rev:     ---             ---                ---
Sec SW Rev:      ---             ---                ---
Cur SW Rev:     12.2(20021123:000514)  ---                ---
Boot FW Rev:     12.2(8)YP        ---                ---
800-level Rev:   14              01                 A0
800-level Part#: 800-09307-02     800-21300-02       800-09492-02
CLEI Code:       CLEI2POS10      BA5ASRYFAA
Reset Reason:    On Reset from PXM
Card Alarm:      NONE
Failed Reason:   None
Miscellaneous Information:
```

Initializing RPM Cards

RPM cards are shipped with the latest software installed on the card, and they will operate as soon as the card is installed. After you install the card, you must initialize the card. Initializing the card prepares the card as follows:

- Configures the card to use the runtime RPM software image stored on the PXM hard disk.
- Configures the card to store the configuration file on the PXM hard disk.

Storing the configuration on the hard disk is essential for the following reasons:

- If an active RPM card fails and the configuration is not stored on the disk, the standby RPM card cannot become active.
- The switch **saveallcnf** command cannot store configuration information that is not on the PXM hard disk.

When the RPM card starts or reboots, it searches for the configuration file in the following sequence:

- If there is a configuration file only on the PXM hard disk, the RPM card uses the configuration stored on the hard disk.
- If there is no configuration file on the hard disk, then the NVRAM version is used.
- If configuration files exist on both the hard drive and bootflash, the switch examines a timestamp tag in each file. If the timestamp tag is the same in both files, the RPM card uses the configuration file stored in bootflash. If the timestamp tag is different, the RPM card uses the configuration file stored on the hard drive.

To initialize an RPM card, use the following procedure.

- Step 1** Establish a configuration session with the switch using a user name at any access level.



Note Access to the RPM configuration is secured by the Cisco IOS software running on the card.

- Step 2** To display the files that can be used to start RPM cards, enter the **cd** command to select the C:FW directory, and enter the **ll** command to display the directory contents. For example:

```
M8850_LA.8.PXM.a > cd FW
```

```
M8850_LA.8.PXM.a > ll
```

```
Listing Directory .:
```

```
drwxrwxrwx 1 0 0 13312 May 11 15:47 ./
drwxrwxrwx 1 0 0 13312 May 11 17:10 ../
-rwxrwxrwx 1 0 0 2253552 May 11 15:47 mpsm_t1e1_030.000.004.016-P2.fw
-rwxrwxrwx 1 0 0 10655280 Apr 2 08:46 rpm-js-mz.123-2.T5
-rwxrwxrwx 1 0 0 3350304 Apr 2 08:46 rpm-boot-mz.123-2.T5
-rwxrwxrwx 1 0 0 1431512 May 11 15:47 mpsm_t1e1_030.000.004.016-P1_bt.fw
-rwxrwxrwx 1 0 0 1030532 May 11 15:46 frsm_vhs_022.000.005.019-A.fw
-rwxrwxrwx 1 0 0 891552 May 11 15:46 frsm_8t1e1_022.000.005.019-A.fw
-rwxrwxrwx 1 0 0 303936 May 11 15:46 cesm_t3e3_CE8_BT_1.0.02.fw
-rwxrwxrwx 1 0 0 641312 May 11 15:46 cesm_t3e3_022.000.005.019-A.fw
-rwxrwxrwx 1 0 0 743136 May 11 15:46 cesm_8t1e1_022.000.005.019-A.fw
-rwxrwxrwx 1 0 0 826392 May 11 15:38 vxsm_005.000.004.034-A_bt.fw
-rwxrwxrwx 1 0 0 10528336 May 11 15:38 vxsm_005.000.004.034-A.fw
-rwxrwxrwx 1 0 0 7939476 May 11 15:38 pxm45_005.000.004.034-A_mgx.fw
-rwxrwxrwx 1 0 0 1160328 May 11 15:37 pxm45_005.000.004.034-A_bt.fw
-rwxrwxrwx 1 0 0 468388 May 11 15:46 frsm_vhs_VHS_BT_1.0.06.fw
-rwxrwxrwx 1 0 0 1245112 May 11 15:37 mpsm155_005.000.004.034-P1_bt.fw
-rwxrwxrwx 1 0 0 4069552 May 11 15:37 mpsm155_005.000.004.034-P1.fw
-rwxrwxrwx 1 0 0 737896 May 11 15:37 frsm12_005.000.004.034-A_bt.fw
-rwxrwxrwx 1 0 0 2490064 May 11 15:37 frsm12_005.000.004.034-A.fw
-rwxrwxrwx 1 0 0 3674368 May 11 15:36 axsmxg_005.000.004.034-P1.fw
-rwxrwxrwx 1 0 0 838840 May 11 15:36 axsmxg_005.000.004.034-A_bt.fw
-rwxrwxrwx 1 0 0 742168 May 11 15:36 axsme_005.000.004.034-A_bt.fw
-rwxrwxrwx 1 0 0 297988 May 11 15:46 frsm_8t1e1_FR8_BT_1.0.02.fw
-rwxrwxrwx 1 0 0 264592 May 11 15:46 cesm_8t1e1_CE8_BT_1.0.02.fw
-rwxrwxrwx 1 0 0 3111904 May 11 15:36 axsme_005.000.004.034-A.fw
-rwxrwxrwx 1 0 0 744600 May 11 15:36 axsm_005.000.004.034-A_bt.fw
-rwxrwxrwx 1 0 0 3267520 May 11 15:36 axsm_005.000.004.034-A.fw
-rwxrwxrwx 1 0 0 248686 May 11 15:32 vism_8t1e1_VI8_BT_3.2.00.fw
-rwxrwxrwx 1 0 0 4135448 May 11 15:32 vism_8t1e1_003.053.103.007-I.fw
-rwxrwxrwx 1 0 0 4135000 May 11 15:32 vism_8t1e1_003.003.103.007-I.fw
```

```
In the file system :
```

```
total space : 818961 K bytes
free space : 704028 K bytes
```

The file that contains the text *rpm-boot* is for booting the card when the regular runtime image, *rpm-js-mz_123-2.T5* in this example, cannot load. The boot file is stored in bootflash on the card and loaded from that location. The switch never loads the boot code from the PXM hard disk. However, it is common practice to store the boot code on the hard disk in preparation for a bootflash upgrade.

Write down the filename for the runtime image. You will have to enter this filename later in this procedure.

**Note**

If the runtime file is missing, you can transfer the correct file to the switch. This procedure is described in [Appendix A, “Downloading and Installing Software Upgrades.”](#)

- Step 3** Enter the **cc** command to select the card slot in which the RPM card is installed. For example:

```
mgx8850a.7.PXM.a> cc 9

(session redirected)

Router>
```

As shown in the example, the switch displays the prompt for the Cisco IOS software on the RPM card.

- Step 4** Verify the configuration status of the RPM card by entering the **show bootflash:** command. For example:

```
Router>show bootflash:
-#- ED --type-- --crc--- -seek-- nlen -length- -----date/time----- name
1  .. image    BAC7D50E  2B80EC   27  2588780 Jul 12 2001 23:05:26 rpm-boot-mz_122-4.T
2  .. config   0EC2C678  2B84F0   18      898 Jul 12 2001 16:04:41 auto_config_slot09

30178064 bytes available (2589936 bytes used)
```

The bootflash contents should contain only the boot file and no configuration files. The example above contains a configuration file (auto_config_slot09), which must be deleted before you initialize the card. Instructions for deleting files appear later in this procedure.

- Step 5** Enter enable mode. For example:

```
Router>enable
Password:
Router#
```

**Note**

The default password for enable mode is supplied with your switch. To secure access to your RPM cards, change this password. For information on changing the Enable password, refer to the Cisco IOS documentation.

- Step 6** If the bootflash contains any configuration files, use the **delete** command to mark them for deletion. For example:

```
Router#delete bootflash:auto_config_slot09
Delete filename [auto_config_slot09]?
Delete bootflash:auto_config_slot09? [confirm]y
```

This command marks files for deletion, but it does not delete them. The next step removes any files marked for deletion.

- Step 7** If the bootflash contains configuration files marked for deletion, remove these files by entering the **squeeze** command. For example:

```
Router#squeeze bootflash:
All deleted files will be removed. Continue? [confirm]y
Squeeze operation may take a while. Continue? [confirm]y
Squeeze of bootflash complete
```

To verify the current bootflash contents, enter the **show bootflash:** command.

Step 8 Enter global configuration mode. For example:

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

Step 9 Enter the **boot system** command using the format:

```
Router(config)# boot system x:<filename>
```

For example:

```
Router(config)#boot system x:rpm-js-mz.122-4.T
```

Step 10 To configure the RPM card to store its configuration on the PXM hard disk, enter the **boot config** command as follows:

```
RPM-PR_mgx8850a_9(config)#boot config e:auto_config_slot
```

The RPM configuration file is named: *auto_config_slot*. The *slot* portion of the name must match the slot number that corresponds to the RPM card.



Note The configuration is also stored in NVRAM using the name *startup-config*.



Tip The RPM software and the configuration files are intentionally stored in different directories. The E:RPM directory on the PXM, which can be accessed by referencing e: in IOS, is backed up whenever the **saveallcnf** command is entered. The C:FW directory, which can be referenced from IOS by entering x:, is not backed up when the switch configuration is saved. When you keep the software files in the C:FW directory, you reduce the size of saved configuration files, and you reduce the time required to save the configuration.

Step 11 Exit global configuration mode and save your changes with the **copy run start** command. For example:

```
Router(config)#^Z
Router#copy run start
Building configuration...
[OK]
Router#
```



Note The **copy run start** command performs the same function as the older **write mem** command.

This step ensures that your configuration change will not be lost when the router restarts. It also saves the configuration to the PXM hard disk. The following directory listing shows the configuration file that is saved:

```
mgx8850a.7.PXM.a> cd E:RPM
```

```
mgx8850a.7.PXM.a> ll
      size      date      time      name
-----
      512      NOV-17-2000  20:01:10  .          <DIR>
      512      NOV-17-2000  20:01:10  ..         <DIR>
      553      DEC-16-2000  20:40:24  auto_config_slot09
```

```
In the file system :
total space : 102400 K bytes
free space : 92334 K bytes
```

**Caution**

If you do not save the configuration changes, you will have to repeat this procedure.

Step 12 To begin using the new configuration, reset the card from the active PXM card. For example:

```
Router#cc 7

(session redirected)

mgx8850a.7.PXM.a> resetcd 9
The card in slot number 9, will be reset. Please confirm action
resetcd: Do you want to proceed (Yes/No)? y
```

When the **dspcds** command display shows that the RPM card is active, the initialization is complete.

Verifying the Software Version in Use

To verify which version of software an RPM card is using, you can use the **dspcd** command or use IOS commands at the router prompt for the RPM card. The following example shows how to display software version information with the IOS **show version** command:

```
Router#show version
Cisco Internetwork Operating System Software
IOS (tm) RPM Software (RPM-JS-M), Experimental Version 12.1(20001205:224609)
[swtools-rpm21a 242]
Copyright (c) 1986-2001 by cisco Systems, Inc.
Compiled Fri 09-Feb-01 01:17 by
Image text-base: 0x60008960, data-base: 0x61326000

ROM: System Bootstrap, Version 12.1(20001003:080040) [swtools-rommon400 102], DEVELOPMENT
SOFTWARE
BOOTFLASH: RPM Software (RPM-BOOT-M), Experimental Version 12.1(20001010:121621)
[swtools-rpm21.nightly 323]

Router uptime is 0 minutes
System returned to ROM by reload
System image file is "x:rpm-js-mz.122-4.T"

cisco RPM (NPE400) processor with 229376K/32768K bytes of memory.
R7000 CPU at 300Mhz, Implementation 39, Rev 2.1, 256KB L2, 4096KB L3 Cache
Last reset from s/w peripheral
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
TN3270 Emulation software.
1 FastEthernet/IEEE 802.3 interface(s)
1 ATM network interface(s)
125K bytes of non-volatile configuration memory.

32768K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x2
```

The following line in the example above is most important:

```
System image file is "x:rpm-js-mz.122-4.T"
```

The system image file line indicates which file was used to load the software currently in use. In this example, the software was loaded from the x: drive, which corresponds to C:FW on the switch. The filename shown identifies the source file for the running image. This filename is configured in Cisco IOS global configuration mode with the **boot system** command.

Establishing Redundancy Between RPM Cards

RPM cards support one-to-n (1:n) card redundancy. With 1:n redundancy, one RPM card can serve as a secondary or backup card for multiple RPM cards.



Note

Primary and secondary cards can run on incompatible software images. However, the software image on the secondary card must be at the same level or higher than the software image on the primary card.

To establish a backup card for an RPM card, use the following procedure.

- Step 1** Establish a configuration session using a user name with SUPER_GP privileges or higher.
- Step 2** If you have not done so already, initialize both cards as described earlier in the “[Initializing RPM Cards](#)” section.
- Step 3** Enter the **dspcds** command to verify that both RPM cards are in the “Active” state.



Note

The secondary RPM card must not have any configured connections when it is configured for redundancy.

- Step 4** Enter the **addred** command as follows:

```
mgx8850a.7.PXM.a> addred <redPrimarySlotNum> <redSecondarySlotNum> <redType>
```

Replace *<redPrimarySlotNum>* with the slot number of the primary RPM card, and replace *<redSecondarySlotNum>* with the slot number of the secondary RPM card. Replace *<redType>* with the number 2 for 1:n redundancy.

After you enter the **addred** command, the switch resets the secondary card; thus, the secondary card will be unavailable for a couple of minutes. When the reset is complete, a **dspcds** command will show the primary and secondary cards in the active and standby states, respectively.



Note

The switch only supports RPM-PR and RPM-XF cards. If you insert another card type, such as the RPM/B, the **addred** command will not work.

- Step 5** Enter the **cc** command to select the card slot in which the primary RPM-PR card is installed. For example:

```
mgx8850a.7.PXM.a> cc 9
```

- Step 6** Enter global configuration mode. For example:

```
Router>enable
Password:
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
```

- Step 7** Configure the RPM card to store its configuration on the PXM hard disk by entering the **boot config** command as follows:

```
Router>boot config e:auto_config_slot#
```



Note This step is required. When switchover occurs, the secondary RPM card must be able to load the configuration from the auto_config file on the PXM hard disk. If this command is already configured in the startup configuration file, you do not need to repeat this command.

- Step 8** Enter the **copy run start** command on the primary RPM card to save the configuration changes.

```
Router> copy run start
```

- Step 9** To display the redundancy relationship between all cards in the switch, enter the **dsprec** command. For information on managing redundant cards, see the “[Managing Redundant Cards](#)” section in [Chapter 9, “Switch Operating Procedures.”](#)

Configuring SNMP on the RPM Card

To configure the SNMP community string on an RPM card, you need to use IOS commands at the router prompt for the RPM card. The following example shows how to do this.

- Step 1** Log in to the RPM card to determine whether the switch interface is active.

```
Router# enable
Router>(enable):show interfaces
```

- Step 2** If the switch interface is not active, enter the **config terminal** command to activate it. The following example shows you how to do this.

```
Router# config terminal
Router(config)#int switch 1
Router(config)#no shut
end
```

- Step 3** Enter the **show run** command to display the running configuration and verify SNMP information.

```
Router# show run
....
....
snmp-server community public RW
snmp-server community private RW
....
....
```

- Step 4** To change the read-write community string, enter the **config terminal** command. The following example shows you how to do this.

```
Router#config terminal
Router(config) snmp-server community POPEYE RW
```

- Step 5** Enter the **exit** command to get out of config terminal mode.

```
Router(config)#exit
```

Step 6 Enter the **copy run start** command to save the configuration for use at startup.

```
RPM-PR_mgx8850a_9#copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
RPM-PR_LA_9#
```

Where to Go Next

After the RPM card is initialized and any required redundancy is established, you can configure the RPM card to operate in either of the following roles:

- Label Switch Controller (LSC)
- Label Edge Router (LER)



Note

RPM operation as an LSC is supported only on MGX 8850 (PXM45) and MGX 8950 switches. If you are configuring a MGX 8850 (PXM1E) or a MGX 8830 switch, the RPM card can only operate as an LER.

When operating in the LER role, the RPM card can use Ethernet connections on the RPM back cards to connect to IP networks. The LSC and LER roles, and the RPM Ethernet connections, are all defined using Cisco IOS commands, which run on the RPM card. To start using Cisco IOS from a switch CLI session, enter the **cc** command to change cards to the RPM slot.

For instructions on configuring the RPM-PR card with Cisco IOS commands, refer to the *Cisco MGX Route Processor Module (RPM-PR) Installation and Configuration Guide, Release 2.1*. For instructions on configuring the RPM-XF card with Cisco IOS commands, refer to the *Cisco MGX Route Processor Module (RPM-XF) Installation and Configuration Guide, Release 5.1*.

