CHAPTER 8

Switch Maintenance Procedures

This chapter describes the configuration changes that are needed after a switch has been initialized, started, and configured, and you want to do any of the following:

- Add cards
- Replace cards
- Upgrade cards
- Decommission an AXSM slot
- Decommission an RPM slot

AXSM and RPM slots must be decommissioned when you want to change the type of card that runs in the slot.

Adding Cards

After the initial installation and configuration of an MGX 8850 or MGX 8950 switch, you can add additional cards to empty slots in the chassis. When you add a card, as opposed to replacing a card, you must configure the switch to recognize the new card. The following sections describe how to configure the switch to recognize new PXM45 cards and AXSM cards.

Adding a Standby PXM45 Card

During installation, single or redundant PXM45 cards can be installed in the switch. The procedure for initializing cards after installation is described in "Initializing the Switch" in Chapter 2, "Configuring General Switch Features."

When you add a PXM45 card to the switch, you are adding a standby PXM45 card to a switch with a single active PXM45 card.

Note If you are replacing a PXM45 card that previously operated as either an active or standby card in this switch, refer to "Replacing Cards with the Same Card Type," later in this chapter.

When adding a standby PXM45 card to your switch, you need to physically install the PXM45 card and the back cards in the following order:

1. PXM Hard Drive card (PXM-HD)
2. PXM45-UI-S3 card
3. PXM45 front card

After the new standby PXM45 front and back cards are installed, the active PXM45 card will initialize the standby card set. The initialization procedure takes some time. You can verify that initialization is complete by entering the **dspcd** command with the standby slot number, for example, **dspcd 8**. If the front card state is "Standby," initialization is complete.

Adding AXSM Cards

When you add an AXSM card to a switch, you are adding new front and back cards to a slot that is not configured for an AXSM card. The following procedure describes how to add AXSM cards to unconfigured slots.

Note If the slot has been previously configured for an AXSM card, you can either replace that card with a card of the same type or you can decommission the slot. If you are replacing an AXSM card that previously operated in this switch, see "Replacing AXSM Cards," which appears later in this chapter. For instructions on decommissioning a slot, see "Decommissioning an AXSM Slot," later in this chapter.

Step 1 Before installing the hardware, use the **dspcd** command to verify that the slot in which you want to add the card has not been configured. In the following example, the **dspcd** report shows that slot 14 is not configured.

```
pop20one.7.PXM.a > dspcd 14
ERR: The slot specified, has no card configured in it.
ERR: Syntax: dspcd ["slot_number"]
        slot number -- optional;
```

Step 2 Install the ASXM card and the appropriate back cards in an unconfigured slot as described in the *Cisco MGX 8850 Routing Switch Hardware Installation Guide* or the *Cisco MGX 8950 Routing Switch Hardware Installation Guide.*

After the new AXSM front and back cards are installed, the Fail LED on the front card flashes and none of the LEDs on the back cards are lit. If you enter the **dspcds** command, the card state in the display appears as Failed.

Step 3 To initialize the slot for the AXSM card, enter the following command:

```
mgx8850a.7.PXM.a > setrev <slot> <revision>
```

Replace <*slot*> with the card slot number for the new AXSM card. Replace <*revision*> with the software version number for the runtime firmware the card will use. You can find the software version number in the *Release Notes for Cisco MGX 8850 Software Version 2.1.60* or the *Release Notes for Cisco MGX 8950 Software Version 2.1.60.* To determine the version number from the runtime firmware filename, see "Determining the Software Version Number from Filenames," which appears in Chapter 7, "Switch Operating Procedures."

Note After installation, each card should be initialized with the **setrev** command only once. For instructions on upgrading the software on a card, refer to Appendix A, "Downloading and Installing Software Upgrades."

Step 4 When prompted to confirm the command and reset the card, type **y** and press **Return**.

After you confirm the command, the slot initializes, the runtime firmware loads on the AXSM card, and the card resets. Be patient: the card reset takes a couple of minutes. While the card is resetting, you can use the **dspcds** command to display the status of the AXSM card. If you enter the command frequently, you will see the card state change from Empty to Boot/Empty to Empty to Init/Empty and finally to Active/Active.

Step 5 To verify that the new card is running the correct firmware, enter the **dspcd** command with the correct slot number. The following example shows that the AXSM card in slot 1 is running firmware version 2.1(0).

```
8850_LA.7.PXM.a > dspcd 1
8850_LA                          System Rev: 02.01   Mar. 05, 2001 00:03:23 GMT
MGX8850                                              Node Alarm: NONE
Slot Number:   1    Redundant Slot: NONE

                    Front Card          Upper Card          Lower Card
                    ----------          ----------          ----------

Inserted Card:      AXSM_4OC12          SMFIR_2_OC12        SMFIR_2_OC12
Reserved Card:      AXSM_4OC12          SMFIR_2_OC12        SMFIR_2_OC12
State:              Active              Active              Active
Serial Number:      SAK0350007N         SAK0346003F         SBK0406001V
Prim SW Rev:        2.1(0)              ---                 ---
Sec SW Rev:         2.1(0)              ---                 ---
Cur SW Rev:         2.1(0)              ---                 ---
Boot FW Rev:        2.1(0)              ---                 ---
800-level Rev:
800-level Part#:    800-05774-05        800-05383-01        800-05383-01
CLEI Code:          BAA1BADAAA          0000000000          BAI9ADTAAA
Reset Reason:       On Power up
Card Alarm:         NONE
Failed Reason:      None
Miscellaneous Information:

Type <CR> to continue, Q<CR> to stop:
8850_LA                          System Rev: 02.01   Mar. 05, 2001 00:03:23 GMT
MGX8850                                              Node Alarm: MAJOR

Crossbar Slot Status:      Present

Alarm Causes
------------
    NO ALARMS
```

After you confirm that the AXSM card has been added and is running the correct software, you can start bringing up lines as described in n Chapter 3, "Preparing AXSM Cards and Lines for Communication."

Adding RPM Cards

When you add an RPM card to a switch, you are adding new front and back cards to a slot that is not configured for an RPM card. The following procedure describes how to add RPM cards to unconfigured slots.

Note If the slot has been previously configured for an RPM card, you can either replace that card with a card of the same type or you can decommission the slot. If you are replacing an RPM card that previously operated in this switch, see "Replacing RPM Cards," which appears later in this chapter. For instructions on decommissioning a slot, see "Decommissioning an RPM Slot," which also appears later in this chapter.

Step 1 Before installing the hardware, use the **dspcd** command to verify that the slot in which you want to add the card has not been configured. In the following example, the **dspcd** report shows that slot 14 is not configured.

```
pop20one.7.PXM.a > dspcd 14
ERR: The slot specified, has no card configured in it.
ERR: Syntax: dspcd ["slot_number"]
        slot number -- optional;
```

Step 2 Install the RPM card and the appropriate back cards in an unconfigured slot as described in the *Cisco MGX 8850 Routing Switch Hardware Installation Guide* or the *Cisco MGX 8950 Routing Switch Hardware Installation Guide*.

Step 3 Initialize the RPM card as described in "Initializing RPM-PR Cards" in Chapter 2, "Configuring General Switch Features."

Step 4 Verify the RPM software version level as described in "Verifying the Software Version in Use" in Chapter 2, "Configuring General Switch Features."

Step 5 Establish card redundancy as described in "Establishing Redundancy Between Two RPM-PR Cards" in Chapter 2, "Configuring General Switch Features."

Step 6 Configure RPM communications as described in the *Cisco MGX 8850 Route Processor Module Installation and Configuration Guide*.

Replacing Cards with the Same Card Type

This section describes how to replace cards with another card of the same type. The following sections describe how to replace the following types of cards:

- PXM45 cards
- AXSM cards
- RPM cards

Note For information on replacing a card with a newer hardware version, see "Upgrading Cards," which appears later in this chapter.

Replacing PXM45 and PXM45/B Cards

PXM45 front and back cards can be replaced when the switch is operating. If a PXM45 is operating in standalone mode, all calls are interrupted until the PXM45 is replaced and operating correctly. If the switch is using redundant PXM45s, use the **switchcc** command, if necessary, to ensure that the card you want to replace is operating in standby mode.

Because the PXM45 front and hard disk cards store configuration information that controls switch operation, a nativity check is performed each time a PXM45 front card or hard disk card is added or replaced. If a PXM45 has been configured in an MGX 8850 switch, the backplane serial number is stored on the PXM45 front card and on the PXM45 hard disk card. If a PXM45 card is inserted into a chassis or the card is reset with a command such as **resetsys**, the nativity check is run to determine if the PXM45 cards are native to the chassis. If the chassis serial numbers configured on all PXM45 cards match the switch chassis serial number, the cards are all native and no special action is required.

The purpose of the nativity check is to resolve configuration differences between PXM45 cards. Some configuration is stored on the PXM45 front card, and some information is stored on the PXM45 hard disk card. This information includes the runtime software version to be used. The actual runtime software is stored on the PXM45 hard disk.

Note When you replace a PXM45 or PXM45/B card, the replacement card uses the boot software stored on the replacement card and the runtime software configured for slots 7 and 8. If the boot software stored on the replacement card is not the correct version, you should upgrade it while the card is operating in standby mode. For instructions on upgrading boot software, refer to Appendix A, "Downloading and Installing Software Upgrades."

If one or more cards are replaced, the nativity check identifies which cards are new to the switch chassis and uses the nativity check results to determine which cards hold the valid configuration. This feature can automatically respond to most configuration mismatches, but some mismatches do require a manual response.

When a switch cannot automatically resolve a nativity check conflict, establish a console port session through the corresponding PXM-UI-S3 card and issue the **shmRecoverIgRbldDisk** command. This command ignores the nativity check and configures the entire switch according to the configuration on the hard disk.

The following sections describe how the automatic response feature works for standalone and redundant PXM45 installations, and how to respond when the system cannot automatically resolve conflicts.

Automatic Response for Standalone PXM45 Installations

For standalone installations, the nativity check feature detects and responds to PXM45 cards as shown in Table 8-1.

Table 8-1 Automatic Response to Nativity Checks in Standalone Installations

Event	Nativity Check Results	Response
PXM45 front card and hard disk card have not changed.	Both PXM45 cards are configured with the correct chassis serial number.	No action is required.
PXM45 front card has been replaced with an unconfigured card.	PXM45 front card is not configured and the hard disk card is configured with correct chassis serial number.	The switch builds the PXM45 front card configuration from the configuration on the hard disk.

Table 8-1 Automatic Response to Nativity Checks in Standalone Installations (continued)

Event	Nativity Check Results	Response
PXM45 front card has been replaced with a previously configured front card.	PXM45 front card is not configured with the correct chassis serial number. The hard disk card is configured with correct chassis serial number.	The switch rebuilds the PXM45 front card configuration from the configuration on the hard disk.
The hard disk card has been replaced with an unconfigured card.	PXM45 front card is configured with the correct chassis serial number, but the hard disk card is not configured.	The hard disk configuration cannot be completely built from the configuration on the front card. You must manually resolve the configuration conflict as described in "Manually Responding to Nativity Checks," which appears later in this chapter.
The hard disk card has been replaced with a previously configured hard disk card.	PXM45 front card is configured with the correct chassis serial number, but the hard disk card is not configured with correct chassis serial number.	The hard disk configuration cannot be completely rebuilt from the configuration on the front card. You must manually resolve the configuration conflict as described in "Manually Responding to Nativity Checks," which appears later in this chapter.
PXM45 front card and hard disk card are replaced with unconfigured cards.	No configuration exists on either card.	There is no existing configuration to use. You must configure the switch or restore a saved configuration.
PXM45 front card and hard disk card are replaced with a set that was configured in another switch.	PXM45 front card and hard disk card are configured with matching chassis serial numbers, but the configured serial number does not match the chassis serial number.	The switch uses the configuration on the matched set.
Both PXM45 front card and hard disk card are replaced with cards that were configured in different switches.	The PXM45 front and hard disk cards are configured with chassis serial numbers that do not match each other or the backplane serial number for the switch in which they are installed.	In this scenario, you can clear the configuration stored on the PXM45 cards, restore a configuration from a saved file, or you can use the configuration stored on the hard disk. You must manually resolve the configuration conflict as described in "Manually Responding to Nativity Checks," which appears later in this chapter.

Automatic Response for Redundant PXM45 Installations

For redundant PXM45 installations, the nativity check is performed only on the active PXM45 card set. If an active PXM45 card set is operating correctly, you can replace any card in the standby or non-active card set, and the active card set will attempt to configure the replacement card and bring it up in standby mode.

When the entire switch is reset, the nativity check is used to determine which card set gains mastership. The card set that gains mastership will attempt to go active and will resolve nativity conflicts as described in Table 8-1. Table 8-2 shows how the nativity check is used to assign mastership to a PXM45 card set.

Table 8-2 Mastership Assignment to PXM45 Card Sets after Nativity Check

Slot 7	Slot 8				
Nativity Status	**Both cards non-native**	**Front card non-native**	**Both cards non-native, matched serial numbers**	**Hard disk card non-native**	**Both cards non-native, mismatched serial numbers**
Both cards non-native	Slot 7	Slot 7	Slot 7	Slot 7	Slot 7
Front card non-native	Slot 8	Slot 7	Slot 7	Slot 7	Slot 7
Both cards non-native, matched serial numbers	Slot 8	Slot 8	Slot 7	Slot 7	Slot 7
Hard disk card non-native	Slot 8	Slot 8	Slot 8	No active card set.	No active card set.
Both cards non-native, mismatched serial numbers	Slot 8	Slot 8	Slot 8	No active card set.	No active card set.

Manually Responding to Nativity Checks

When the nativity check discovers conflicts that cannot be automatically corrected, you can resolve the conflict by doing one of the following:

- If you have saved a configuration with the **saveallcnf** command, you can restore the configuration with the **restoreallcnf** command.
- If there is no configuration available, you can issue a **clrallcnf** command to establish the PXM45 card sets as new, unconfigured cards in the chassis.
- If a configuration exists on a hard drive, you can use that configuration to configure the front card and establish nativity for the card set.

If the switch cannot resolve a nativity check conflict and all the cards are operating properly, the PXM45 cards enter stage 1 CLI mode, which offers a reduced set of commands that you can use to resolve the conflict.

When operating in stage 1 CLI mode, you can FTP files to the switch in preparation for a new configuration or a configuration restore. You can FTP files to the switch using the procedures described for copying files to the switch in Appendix A, "Downloading and Installing Software Upgrades."

To rebuild the configuration from a configured hard disk in the switch, do the following:

- Clear the configuration (**clrallcnf**) on the PXM45 front card using a PXM45 hard disk card for which the configuration can be erased. (Do not use the PXM45 hard disk that hosts the configuration you want to use.)
- Install the unconfigured PXM45 front card and the configured PXM45 hard disk card in a chassis without a redundant card set.

The switch will build the PXM45 front card configuration from the configuration on the hard disk.

Replacing AXSM Cards

If an AXSM front or back card fails, remove the old card and insert a new card of the same type in the same slot. If the card is a standalone AXSM, all communications are interrupted. It the card is part of a redundant AXSM card set, you can replace the standby AXSM without disrupting traffic through the active card.

The configuration for AXSM cards is stored on the PXM45. The switch will automatically configure a replacement card and start it up. If the card is a standalone card, the card will start up as an active card. If the card is part of a redundant pair, the card will start up in standby mode.

After the replacement AXSM card starts, use the **dspcd** or **dsprev** command to verify that the AXSM card is using the correct boot software version.

Note The switch automatically selects and loads the correct runtime software for the AXSM based on the configuration for that slot. The switch does not automatically burn boot code for an AXSM. For instructions on upgrading boot code, see Appendix A, "Downloading and Installing Software Upgrades."

Note To replace one type of AXSM front card with another type, you must delete all connections, partitions, ports and down lines. If an AXSM card fails, the same type of AXSM card must be installed in its slot.

Replacing RPM Cards

If you have properly initialized an RPM card as described in "Initializing RPM-PR Cards" in Chapter 4, "Preparing RPM-PR Cards for Operation," the configuration for the RPM card is stored on the PXM45 hard disk.

To replace a standalone RPM card, remove the old card and insert a new card of the same type in the same slot. The switch will automatically configure the card and start it up.

Note RPM-PR and RPM-B cards are not interchangeable. When replacing an RPM-PR card, you must replace it with another RPM-PR card. If you want to change types of cards, you must first decommission the slot as describe in "Decommissioning an RPM Slot," which appears later in this chapter.

To replace an RPM card that is configured for redundancy, first switch control to the standby card, then replace the card while it is operating in standby mode. If the card you are replacing has failed, there is no reason to switch cards, as the failure should have triggered a switch to the standby card. If you need to switch cards, enter the **softswitch** command as described in "Switching Between Redundant RPM-PR Cards" in Chapter 7, "Switch Operating Procedures."

Note After you replace a card that is configured for redundancy, it starts up in standby mode. If the active card is configured to operate as a standby card for multiple RPM cards, issue a **softswitch** command so that the active card returns to its normal standby state.

Upgrading Cards

When you upgrade a card, you are replacing an existing card with a newer version of that card. The following sections describe how to:

- Replace PXM45 cards with PXM45/B cards
- Replace AXSM cards with AXSM/B cards

Note If you plan to upgrade PXM45 cards and AXSM cards, upgrade the PXM45 cards first. Wait until the PXM45/B cards are operating in active and standby modes with the correct software before upgrading AXSM cards. The software version used by the PXM45/B cards should be equal to or later than the version used on the AXSM, AXSM/B, and AXSM-E cards.

Replacing PXM45 Cards with PXM45/B Cards

PXM45 front cards can be replaced with PXM45/B cards while the switch is operating. If a PXM45 is operating in standalone mode, all calls are interrupted until the PXM45 is replaced and the PXM45/B card is operating correctly. If the switch is using redundant PXM45s, use the **switchcc** command, if necessary, to ensure that the card you want to replace is operating in standby mode. For redundant PXM45 cards, you are ready to replace the standby card as soon as the other card becomes active. You do not need to wait for the standby card to reach standby mode.

After you replace the PXM45 card, use the **dspcd** or **dsprev** command to view the boot software version. If the boot software version is not correct for your switch, upgrade it as described in Appendix A, "Downloading and Installing Software Upgrades."

Note When replacing PXM45 cards with PXM45/B cards, the switch performs the same nativity check described earlier in this chapter.

Replacing AXSM Cards with AXSM/B Cards

You can replace AXSM cards with AXSM/B cards of the same type. For example, you can replace an AXSM-4-622 with and AXSM-4-622/B. If the card is a standalone AXSM, all communications are interrupted. It the card is part of a redundant AXSM card set, you can replace the standby AXSM without disrupting traffic through the active card.

The configuration for AXSM cards is stored on the PXM45. The switch will automatically configure a replacement AXSM/B card and start it up. If the card is a standalone card, the card will start up as an active card. If the card is part of a redundant pair, the card will start up in standby mode.

After the replacement AXSM/B card starts, use the **dspcd** or **dsprev** command to verify that the AXSM/B card is using the correct boot software version.

Note The switch automatically selects and loads the correct runtime software for the AXSM based on the configuration for that slot. The switch does not automatically burn boot code for an AXSM. For instructions on upgrading boot code, see Appendix A, "Downloading and Installing Software Upgrades."

Note To replace one type of AXSM front card with another type of AXSM/B card, you must delete all connections, partitions, and ports, and then down all lines. This is called "decommissioning the slot," and is required, for example, when replacing an AXSM-16-T3E3 with an AXSM-8-155/B. For more information on decommissioning an AXSM slot, see the next section.

Decommissioning an AXSM Slot

When an AXSM card is installed and configured, the configuration is associated with a specific slot number and stored on the PXM45 card. If you replace the AXSM with another card of the same type, the new card will start operating with the established configuration. Any configuration which has been used previously on that card will be discarded, because the configuration is assigned to the slot, not the physical card.

If you want to use a previously configured AXSM slot for a different type of AXSM card, you must first decommission the slot to remove the existing configuration. Otherwise, the switch will attempt to run the old configuration on the new card, and the new card will not operate correctly.

Note If you use the **cnfpnportsig** command to change default port values, you must run the **delpnport** command to delete the port from the PXM45. If you do not run **delpnport** on the PXM45, the port will remain in a provisioning state on the PXM45.

To decommission a slot, you need to remove the existing connections, partitions, and ports as described below.

Step 1 Establish a configuration session using a user name with CISCO_GP privileges.

Step 2 Use the **cc** command to select the AXSM slot you want to decommission.

Note The AXSM card installed in the slot you are decommissioning must be the same type of card for which the slot was configured. You cannot decommission a slot with an AXSM card type that does not match the configured card type.

Step 3 To display the connections you need to delete, enter the following command:

```
mgx8850a.10.AXSM.a > dspcons
```

The following is a sample **dspcons** display.

```
pop20one.7.PXM.a > dspcons

Local Port          Vpi.Vci   Remote Port         Vpi.Vci    State   Owner
--------------------------+-----------------------------+-------+------
10:2.2:2           100 100    Routed             100 100     FAIL        MASTER
Local  Addr: 47.00918100000000107b65f33c.0000010a1802.00
Remote Addr: 47.009181000000002a123f213f.000001011802.00\\
```

Step 4 Write down the interface, VPI, and VCI numbers for each connection. You need these numbers to complete the next step.

Step 5 Delete all connections by entering the following command for each connection:

```
mgx8850a.10.AXSM.a > delcon <ifNum> <VPI> <VCI>
```

Step 6 When all connections are deleted, bring down the interface by entering the following command:

```
mgx8850a.10.AXSM.a > dnport <ifNum>
```

Step 7 To display a list showing the partitions for this card, enter the **dspparts** command.

Step 8 Write down the interface number and partition number for each partition on the card. You will need this information to complete the next step.

Step 9 Delete all resource partitions by entering the following command for each resource partition:

```
mgx8850a.10.AXSM.a > delpart <ifNum> <partId>
```

Replace *ifnum* with the interface number of the port, and replace *partitionID* with the partition number assigned to the port.

Step 10 To verify that the partitions have been deleted, enter the **dspparts** command.

Step 11 To display a list showing the ports configured for this card, enter the **dspports** command.

Step 12 Write down the interface number for each port on the card. You need this information to complete the next step.

Step 13 Delete all ports by entering the following command for each port:

```
mgx8850a.10.AXSM.a > delport <ifNum> <partId>
```

Replace *ifnum* with the interface number of the port.

Step 14 To verify that the ports have been deleted, enter the **dspports** command.

Step 15 To display a list showing the lines that are administratively up, enter the **dsplns** command.

Step 16 Write down the line number for each line that is up. You need will this information to complete the next step.

Step 17 Bring down all lines by entering the following command for each line:

```
mgx8850a.10.AXSM.a > dnln <bay.line>
```

Step 18 To verify that the lines have been brought down, enter the **dsplns** command.

When all lines have been brought down, the slot is decommissioned and you can add an AXSM card of a different type in that slot as described in "Adding AXSM Cards," which appears earlier in this chapter.

Decommissioning an RPM Slot

To decommission an RPM slot, you must remove all configuration items you configured for that card. You can do this by entering each command in the startup-config file with the key word **no** in front of it. These configuration items are described in the *Cisco MGX 8850 Route Processor Module Installation and Configuration Guide*.