Preparing AXSM Cards and Lines for Communication

This chapter describes how to prepare AXSM cards and lines for physical connectivity to other switches. Chapter 6, "Provisioning AXSM Communication Links," describes how to add ports and connections that support ATM communications across the cards and lines configured in this chapter.

This chapter provides a quickstart procedure for configuring AXSM cards and lines and describes the following procedures:

- Managing Firmware Version Levels for AXSM Cards
- Establishing Redundancy Between Two AXSM Cards
- Selecting and Viewing Service Class Templates
- Setting Up Lines
- Establishing Redundancy Between Two Lines with APS

Note For the purposes of this document, the term "AXSM" refers to all types of AXSM cards. In this document, the term AXSM/A distinguishes the first release of AXSM from AXSM/B cards.

Configuration Quickstart

The quickstart procedure in this section provides a summary of the tasks required to prepare AXSM cards and lines for configuration as ATM trunks and lines. This procedure is provided as an overview and as a quick reference for those who already have configured Cisco MGX 8850 and Cisco MGX 8950 switches.

	Command	Purpose
Step 1	*username* *<password>*	Start a configuration session. **Note** To perform all the procedures in this quickstart procedure, you must log in as a user with GROUP1 privileges or higher.
Step 2	**setrev** *<slot> <version>* Related commands: **dspcds**	Initialize AXSM cards by setting the firmware version level for each AXSM card. See the "Managing Firmware Version Levels for AXSM Cards" section, which appears later in this chapter.
Step 3	**addred** *<options>*	Define which AXSM cards are operating as redundant cards. See the "Establishing Redundancy Between Two AXSM Cards" section, which appears later in this chapter.
Step 4	**cnfcdsct** *<sctid>* Related commands: **dspcd** **dspsctchksum <path name>**	Applies ATM communications parameters from a preconfigured Service Class Template (SCT) file to all communications between the card you are configuring and the other AXSM cards in the switch. For PNNI communications, use SCT ID 2 or 4 for policing applications and use SCT ID 3 or 5 for non-policing applications. If MPLS will be used on any card link, use SCT ID 4 for policing applications and use SCT ID 5 for non-policing applications. See the "Selecting and Viewing Service Class Templates" section, which appears later in this chapter.
Step 5	**upln** *<bay.line>* Related commands: **dsplns** **dspln** *-type <bay.line>*	Bring up and configure lines. This step establishes physical layer connectivity between two switches. See the "Setting Up Lines" section, which appears later in this chapter.
Step 6	**cnfln** *<options>* Related commands: **dsplns** **dspln** *-type <bay.line>*	Configure lines. See the "Configuring SONET Lines" section, which appears later in this chapter.
Step 7	**addapsln** *<workingIndex> <protectIndex> <archmode>*	Configure a redundant relationship between two AXSM lines. See the "Establishing Redundancy Between Two Lines with APS" section, which appears later in this chapter.

Managing Firmware Version Levels for AXSM Cards

The AXSM cards within the switch run two types of firmware: boot firmware and runtime firmware. The boot firmware provides the startup information the card needs. The boot firmware is installed on the board at the factory. The runtime firmware controls the operation of the card after startup. The runtime firmware file is stored on the PXM45 hard disk.

After the AXSM cards are installed in the switch, you must specify the correct runtime firmware version for each card before the switch can begin using the card. The following sections explain how to

- Locate the cards that need to have the firmware version level set
- Set the firmware version levels for cards in the switch
- Verify the firmware version levels being used by cards

Locating Cards that Need the Firmware Version Set

When an AXSM card is installed and the firmware version needs to be set, the System Status LED on the front of the card blinks red. The **dspcds** command shows that the card status is Failed. Other events can display these symptoms, but if the AXSM card is new, the problem is probably that the firmware version number has not been set. To locate the cards that need to have the firmware version set, use the following procedure.

Step 1 Establish a CLI management session at any access level.

Step 2 To display a list of all the cards in the switch, enter the **dspcds** command.

```
8850_NY.7.PXM.a > dspcds
```

The following example shows the display for this command. The card state for the card in slot 3 is listed as Failed/Active. This is how a card appears when the runtime firmware version has not been selected.

```
M8850_LA.7.PXM.a > dspcds
M8850_LA                          System Rev: 02.01   Sep. 27, 2001 20:33:09 PST
Chassis Serial No:   SAA03230375 Chassis Rev: B0     GMT Offset: -8
                                                     Node Alarm: NONE
Card  Front/Back          Card           Alarm      Redundant   Redundancy
Slot  Card State          Type           Status     Slot        Type
---   ----------          --------       --------   -------     -----

01    Active/Active       AXSM_4OC12     NONE       NA          NO REDUNDANCY
02    Empty               ---            ---        ---         ---
03    Failed/Active       AXSM_16T3E3    NONE       NA          NO REDUNDANCY
04    Empty               ---            ---        ---         ---
05    Active/Active       AXSME_2OC12    NONE       NA          NO REDUNDANCY
06    Active/Active       AXSM_16OC3_B   NONE       NA          NO REDUNDANCY
07    Active/Active       PXM45          NONE       08          PRIMARY SLOT
08    Standby/Active      PXM45          NONE       07          SECONDARY SLOT
09    Active/Active       RPM_PR         NONE       NA          NO REDUNDANCY
10    Empty               ---            ---        ---         ---
11    Empty               ---            ---        ---         ---
12    Empty Reserved              ---           ---        ---         ---
13    Empty Reserved              ---           ---        ---         ---
14    Empty               ---            ---        ---         ---
```

Note the slot number, card type, and redundancy type for each card that needs to have the firmware version set. You will need this information to activate these cards as described in the next section, "Initializing AXSM Cards."

Note If any AXSM card displays the Active/Active card state, you do not have to set the runtime firmware version for that card. Also, the Front/Back Card State for slots 12 and 13 show Empty Reserved. These slots will support service modules in a future release.

Initializing AXSM Cards

Before an AXSM card can operate, it must be initialized in a switch slot. The initialization process defines the AXSM runtime software version that will run on the card and identifies the slot in which the card operates. To initialize an AXSM card, use the following procedure.

Note The PXM45 card supports a maximum of 99 lines on the switch. As you add AXSM cards, verify that the line count for all AXSM cards does not exceed this number.

Step 1 If you have not already done so, determine the software version number for the card by referring to the *Release Notes for Cisco MGX 8850 and MGX 8830 Software Version 3 (PXM45/B and PXM1E)* or the *Release Notes for Cisco MGX 8950 Software Version 3*.

Tip If you have trouble locating the runtime firmware version level, use the filenames on the PXM45 hard disk to determine the level. For more information, see the "Determining the Software Version Number from Filenames" section in Chapter 7, "Switch Operating Procedures."

Step 2 Establish a configuration session using a user name with SERVICE_GP privileges or higher.

Step 3 To set the firmware revision level for a card, enter the **setrev** command.

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

Note Each card should be initialized only once with the **setrev** command. The only other time you should enter the **setrev** command is to initialize cards after the configuration has been cleared with the **clrallcnf** command.

Replace <*slot*> with the card slot number and replace <*version*> with the software version number. For example,

```
mgx8850a.7.PXM.a > setrev 1 2.1(60)
```

After you enter the **setrev** command, the System status LED blinks red until the firmware load is complete, and then it changes to non-blinking green.

Step 4 To verify the activation of a card for which the status was previously listed as Failed/Empty, enter the **dspcds** command. The status should change to Active/Active.

Verifying Card Firmware Version Levels

When you are having problems with your switch, or when you have taken delivery of a new switch but delayed installation, it is wise to verify the firmware versions installed on the switch. If newer versions of this firmware are available, installing the updated firmware can prevent switch problems.

To verify the firmware versions in use on your switch, use the following procedure.

Step 1 To display the software revision status of all the cards in a switch, enter the **dsprevs** command as follows:

```
M8850_LA.7.PXM.a > dsprevs
M8850_LA                          System Rev: 02.01   Sep. 27, 2001 20:36:15 PST
MGX8850                                               Node Alarm: NONE
Physical  Logical   Inserted       Cur Sw              Boot FW
Slot      Slot      Card           Revision            Revision
--------  -------   --------       --------            --------

01        01        AXSM_4OC12     2.1(60)             2.1(60)
02        02        ---            ---                 ---
03        03        AXSM_16T3E3    2.1(60)             2.1(60)
04        04        ---            ---                 ---
05        05        AXSME_2OC12    2.1(60)             2.1(60)
06        06        AXSM_16OC3_B   2.1(60)             2.1(60)
07        07        PXM45          2.1(60)             2.1(60)
08        07        PXM45          2.1(60)             2.1(60)
09        09        RPM_PR         ---                 ---
10        10        ---            ---                 ---
11        11        ---            ---                 ---
12        12        ---            ---                 ---
13        13        ---            ---                 ---
14        14        ---            ---                 ---
```

Step 2 To see the software revision levels for a single card, enter the **dspversion** command as follows:

```
8850_NY.1.AXSM.a > dspversion

  Image Type   Shelf Type    Card Type         Version   Built On
  ----------   ----------   ----------    ------------   ------------
     Runtime          MGX         AXSM     2.1(0)        Feb 13 2001, 07:47:35
        Boot          MGX         AXSM     2.1(0)        -
```

Step 3 Another way to see the software revision levels for a single card is to enter the **dspcd** command as follows:

```
M8850_LA.7.PXM.a > dspcd 1
M8850_LA                          System Rev: 02.01   Sep. 27, 2001 20:38:48 PST
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(60)             ---                 ---
Sec SW Rev:         2.1(60)             ---                 ---
Cur SW Rev:         2.1(60)             ---                 ---
Boot FW Rev:        2.1(60)             ---                 ---
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:
```

Step 4 Using the **dsprevs** and **dspcd** commands, complete the hardware and software configuration worksheet in Table 2-10.

Step 5 Compare the versions you noted in Table 2-10 with the latest versions listed in the *Release Notes for Cisco MGX 8850 and MGX 8830 Software Version 3 (PXM45/B and PXM1E)* or the *Release Notes for Cisco MGX 8950 Software Version 3*.

Step 6 If the switch requires software updates, upgrade the software using the instructions in Appendix A, "Downloading and Installing Software Upgrades."

Establishing Redundancy Between Two AXSM Cards

To establish redundancy between two AXSM cards, 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, set the firmware version for both cards, as described in the "Initializing AXSM Cards" section.

Step 3 Enter the **dspcds** command to verify that both AXSM cards are in the Active state.

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

```
pop20one.7.PXM.a > addred <redPrimarySlotNum> <redSecondarySlotNum> <redType>
```

Replace <*redPrimarySlotNum*> with the slot number of the AXSM card that will be the primary card, and replace <*redSecondarySlotNum*> with the slot number of the secondary AXSM card. Replace <*redType*> with the number 1, which selects 1:1 Y cable redundancy. Although the online help lists other redundancy types, 1:1 Y cable redundancy is the only type supported on AXSM cards in this release.

Note One of the two cards can be configured before redundancy is established. If this is the case, the configured card should be specified as the primary card. Redundancy cannot be established if the secondary card has active lines. If the secondary card has active lines, you must delete all ports and down all lines before it can be specified as a secondary card.

Tip If the switch displays the message, `ERR: Secondary cd is already reserved`, then lines are already in use on the specified secondary card. Enter the **dnln** command to bring down these lines before re-entering the **addred** command.

Step 5 To verify that the redundancy relationship is established, enter the **dspred** command as shown in the following example:

```
pop20two.7.PXM.a > dspred
pop20two                          System Rev: 02.01   Feb. 06, 2001 11:24:53 PST
MGX8850                                               Node Alarm: NONE
Primary  Primary   Primary    Secondary  Secondary  Secondary    Redundancy
SlotNum   Type      State      SlotNum     Type       State         Type
-------  -------  ---------   ---------  ---------  ---------    ----------
  1      AXSM     Active        2        AXSM       Standby        1-1

  7      PXM45    Active        8        PXM45      Standby        1-1

  15     SRM-3T3  Empty Res     16       SRM-3T3    Empty Resvd    1-1

  31     SRM-3T3  Empty Res     32       SRM-3T3    Empty Resvd    1-1
```

The secondary state for the card in the secondary slot changes to *Standby* only when the secondary card is ready to take over as active card. After you enter the **addred** command, the switch resets the secondary card. When you first view the redundancy status, the state may be *Empty Resvd* or *Init*. The secondary card may require one or two minutes to transition to standby.

Note The **dspcds** command also shows the redundancy relationship between two cards.

For information on managing redundant cards, see the "Managing Redundant Cards" section in Chapter 7, "Switch Operating Procedures."

Selecting and Viewing Service Class Templates

A Service Class Template (SCT) is a configuration file that defines the traffic characteristics of the various class of service queues in a service module. When applied to a port, SCTs also serve in defining the policing characteristics on that port. There are two types of SCTs: the port SCT and the card SCT. Port SCTs are associated with logical ports on the switch. They define the flow of traffic on a port based on service categories. Card SCTs serve the same purpose as the port SCTs, except that they control the destination slot based cell queues towards the backplane.

Without SCTs, you need to perform a lot of detailed manual configuration on each and every port on the switch. This is time consuming and error prone. Typically, traffic profiles are defined by a handful of traffic engineering experts who understand the service level agreements and expected traffic pattern on the ports. These experts define the SCTs for each port in the system. Once the SCT is applied on the port,

you do not need to (re)configure the switch. The parameters in the SCTs define generic thresholds and priorities of queues that can be understood without having to go through the programming details of Queuing engines, such as QE48 (in AXSMs) or QE1210 (in AXSME).

SCT files include the following types of configuration data:

- general link parameters
- COSB parameters
- virtual circuit threshold parameters
- COSB threshold parameters

SCT files are applicable to AXSM, AXSME, FRSM12, and PXM1E cards. Each card-type has its own unique port SCT and card SCT. Card SCTs define traffic parameters between a specified card and other like cards in the switch. Port SCTs define traffic parameters on a single line or port. You can apply the same SCT to multiple cards or ports.

Port SCTs are classified as policing or non-policing. Typically, policing SCTs are used on UNI ports at the edge of the ATM network and control traffic entering the network. Non-policing SCTs are typically on trunk ports that interconnect switches within the network. Cisco provides default port SCT files with and without policing capability.

Note The policing parameters in a card SCT are ignored.

Note If traffic is properly controlled at the edges of an ATM network, there should be no need for policing within the network.

Each SCT is uniquely identified by its name, which is in the following format: <*service_module_name*>_<PORT|CARD>.<*SCT_ID*>.V<*major_version*>

For example, an AXSME SCT file name might look as follows: AXSME_SCT.CARD.5.V1

Table 3-1 describes the parameters used in the SCT naming convention.

Table 3-1 SCT Naming Conventions

Parameter	Description
service_module_name	The name of the service module on which the SCT will be applied. The possible service modules are AXSM, AXSME, PXM1E, and FRSM12.
PORT|CARD	Specifies whether this is a port SCT or a card SCT.
SCT_ID	A 16-bit number uniquely identifying the SCT.
V<*major_version*>	A 16-bit number which identifies the major version of the SCT. The major version of the SCT changes whenever a new object is added or deprecated in the SCT MIB.

To enable ATM communications, you must assign a card SCT to every AXSM, PXM1E, and/or FRSM card in your network, and you must assign a port SCT to every port you use. The SCT files are stored in the F:\SCT\<*card type*> directory. For example, AXSM SCTs will be stored in the F:\SCT\AXSM directory.

Note Users do not have write access to the F:SCT /<*card_type*> directory. The only way to download SCT files to the F: directory is to download them to your C:/SCT/Temp directory first. For instructions on downloading and installing SCT files to your switch, see the "Installing SCT Files" section in Appendix A, "Downloading and Installing Software Upgrades."

Before you can assign an SCT to a card or port, you must first download the latest SCT files onto your switch. To find the location of the latest SCT files and verify that you need to update them, see the Release Notes for Cisco MGX 8850 and MGX 8830 Software Version 3 (PXM45/B and PXM1E). SCT files can be manually downloaded onto each node in your network through the CLI, or you can also use Cisco WAN Manager (CWM). The preferable way of downloading a SCT is by using CWM. To create additional SCT files or change the configuration of existing SCT files, you need to use (CWM).

You can not create or modify SCT files using the CLI.

Note Port SCTs can be changed with connections provisioned on the port. However, the port needs to be administratively downed to effect this change. Hence this is service affecting.

After you create a SCT file with CWM, you must use FTP to transfer that file to the switch before you can use it. For guidelines on transferring files to the switch, see the "Copying Software Files to the Switch" section in Appendix A, "Downloading and Installing Software Upgrades." Be sure to copy SCT filestotheC:\SCT\AXSM directoryontheeswitch.

The following sections describe how to select SCTs for cards and ports.

Selecting a Card SCT

A card SCT defines the queue parameters for the destination slot based cell queues towards the backplane. The same card SCT may be used for multiple cards of the same card type.

Note An SCT must reside in your switch F:/SCT directory before you can select it for a card or port. For instructions on manually downloading and installing SCTs to your switch, see "Installing SCT Files" in Appendix A, "Downloading and Installing Software Upgrades."

To select an SCT for a card, use the following procedure.

Step 1 Establish a configuration session using a user name with GROUP1 privileges or higher.

Step 2 Enter the **cc** command to change to an active AXSM card for which you will select an SCT.

```
M8850_LA.8.PXM.a > cc 1

(session redirected)

M8850_LA.2.AXSM.a >
```

Note In a redundant pair, you must specify the SCT on the active card.

Step 3 All ports on the card must be down before you can configure the card SCT. To verify the status of the ports on the card, enter the **dspports** command.

```
M8850_LA.2.AXSM.a > dspports
ifNum Line Admin Oper. Guaranteed Maximum   SCT Id ifType  VPI   minVPI maxVPI
           State State Rate       Rate     (D:dflt        (VNNI, (EVNNI,EVUNI)
                                            used)          VUNI)
----- ---- ----- ----- ---------- --------- ------ ------ ------ ------ ------
    1  2.1    Up  Down    1412830   1412830   5       NNI       0      0      0
    2  2.2    Up  Down    1412830   1412830   5       NNI       0      0      0
    3  1.1    Up    Up    1412830   1412830   5       NNI       0      0      0
```

Enter the **dnport** command to bring down any ports that are in the Admin State “Up”.

```
M8850_LA.2.AXSM.a > dnport 2
dnport/dnallports can disrupt traffic on existing connections.
Use this command only to modify partition parameters or change SCT
Do you want to proceed (Yes/No) ? y
```

Step 4 Enter the **cnfcdsct** command.

```
pop20two.1.AXSM.a > cnfcdsct <sctID>
```

Replace *sctID* with the number of the SCT that you want to assign to the card. Table 3-2 describes the SCTID options.

Table 3-2 sctID Options

SCT ID	Description
1	Non-policing applications on PNNI-only networks.
2	Policing applications for PNNI-only networks.
3	Non-policing for combined MPLS/PNNI networks.
4	Non-policing applications for combined MPLS/PNNI networks.

Note When an AXSM card is powered up for the first time, the default card SCT file is used. You must run this command in order to use another SCT file. The default SCT file s 0.

Step 5 To display the SCT assigned to a card, enter the following command:

```
pop20two.1.AXSM.a > dspcd
```

The display card report displays a row labeled “Card SCT Id,” which identifies the SCT assigned to the card.

```
M8850_LA.1.AXSM.a > dspcd
                    Front Card          Upper Card          Lower Card
                    ----------          ----------        ------------

Card Type:          AXSM-4-622          SMFIR-2-622         SMFIR-2-622
State:              Active              Present             Present
Serial Number:      SAK0350007N         SAK0346003F         SBK043902FE
Boot FW Rev:        3.0(0.171)P2        ---                 ---
SW Rev:             3.0(0.171)P2        ---                 ---
800-level Rev:      09                  13                  A1
Orderable Part#:    800-5774-5          800-5383-1          800-5383-1
PCA Part#:          73-4504-2           73-4125-1           73-4125-1
CLEI Code:          BAA1BADAAA          0000000000          BAI9ADTAAA
```

```
Reset Reason:       Power ON Reset

Card Operating Mode: AXSM-A

SCT File Configured Version: 1

SCT File Operational Version: 1

Card SCT Id: 5


Type <CR> to continue, Q<CR> to stop:
```

Step 6 Enter the **upport** <*if*> command to bring up any ports you brought down in Step 3. Replace <*if*> with the interface number of the downed port.

```
M8850_LA.1.AXSM.a > upport 1
```

Step 7 Enter the **dspports** command to verify that all ports on the card are up.

```
M8850_LA.1.AXSM.a > dspports
ifNum Line Admin Oper. Guaranteed Maximum   SCT Id ifType  VPI   minVPI maxVPI
           State State Rate       Rate     (D:dflt        (VNNI, (EVNNI,EVUNI)
                                            used)          VUNI)
----- ---- ----- ----- ---------- --------- ------ ------ ------ ------ ------
    1  2.1    Up    Up    1412830   1412830   5       NNI       0      0      0
    2  2.2    Up    Up    1412830   1412830   5       NNI       0      0      0
    3  1.1    Up    Up    1412830   1412830   5       NNI       0      0      0
```

Selecting a Port SCT

A port SCT defines queue parameters that apply to egress queues on a port. You can use the same port SCT for multiple ports. To select an SCT for a port, enter the **addport** command as described in the "Adding ATM Ports" section in Chapter 6, "Provisioning AXSM Communication Links."

Note An SCT must reside in your switch F:/SCT directory before you can select it for a card or port. For instructions on manually downloading and installing SCTs to your switch, see "Installing SCT Files" in Appendix A, "Downloading and Installing Software Upgrades."

Setting Up Lines

The first step in configuring AXSM lines is to define the physical lines that are connected to the switch. The following sections describe how to do the following tasks:

- Bring up lines
- Configure lines
- Verify the configuration of lines

Bringing Up Lines

Installing an AXSM card can add from 1 to 16 lines to your switch. You must bring up a line before you can configure the line or provision services on the line.

Before a line is brought up, or after it is brought down, the switch does not monitor the line. The AXSM port status light for the line is unlit, and all line alarms are cleared.

When you bring up a line, the switch starts monitoring the line. The AXSM port status light is green when physical layer communications are established with a remote switch. If physical layer communications problems are detected, the port status light turns red, and alarms are reported.

Note APS protection lines for intracard redundancy should be left down. APS automatically brings up each line at the appropriate time. For general information on APS line redundancy, see the "Planning for Card and Line Redundancy" section in Chapter 1, "Preparing for Configuration." For information on configuring APS lines, see the "Establishing Redundancy Between Two Lines with APS" section later in this chapter.

Tip To minimize the number of alarms and failed port status lamps (which display red), keep lines down until they are ready for operation.

To bring up a line on the switch, use the following procedure.

Step 1 Establish a configuration session using a user name with GROUP1 privileges or higher.

Step 2 Select the card on which you want to bring up a line with the **cc** command.

```
mgx8850a.7.PXM.a > cc <slotnumber>
```

Replace <*slotnumber*> with the number of the slot in which the AXSM card is installed. Valid slot numbers are from 1 to 6 and 9 to 14. Verify your card selection by viewing the switch prompt, which should list the slot number and the AXSM card type.

Step 3 Enter the **upln** command after the switch prompt.

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

Replace <*bay*> with 1 if the line is connected to a back card in the upper bay, or replace it with 2 if the line is connected to a back card in the lower bay. Replace <*line*> with the number that corresponds to the back card port to which the line is connected. Table 3-3 lists the valid bay numbers and line numbers for each AXSM card. Figure 3-1 illustrates the bay and line numbers used on the Cisco MGX 8850 and Cisco MGX 8950 switches.

Table 3-3 AXSM Card Types

Front Card	Valid Line Numbers	Valid Bay Numbers
AXSM-16-T1E1-E	1 to 16	1, 2
AXSM-16-T3E3 AXSM-16-T3E3/B	1 to 8	1, 2
AXSM-16-T3E3-E	1 to 8	1, 2
AXSM-8-155-E	1 to 4	1, 2

Table 3-3 AXSM Card Types (continued)

Front Card	Valid Line Numbers	Valid Bay Numbers
AXSM-16-155 AXSM-16-155/B	1 to 8	1, 2
AXSM-2-622-E	1 to 1	1, 2
AXSM-4-622 AXSM-4-622/B	1 to 4	1, 2
AXSM-1-2488 AXSM-1-2488/B	1	1
AXSM-32-E	1 to 32	1, 2

Step 4 Enter the following command:

```
8850_NY.7.PXM.a > dsplns
```

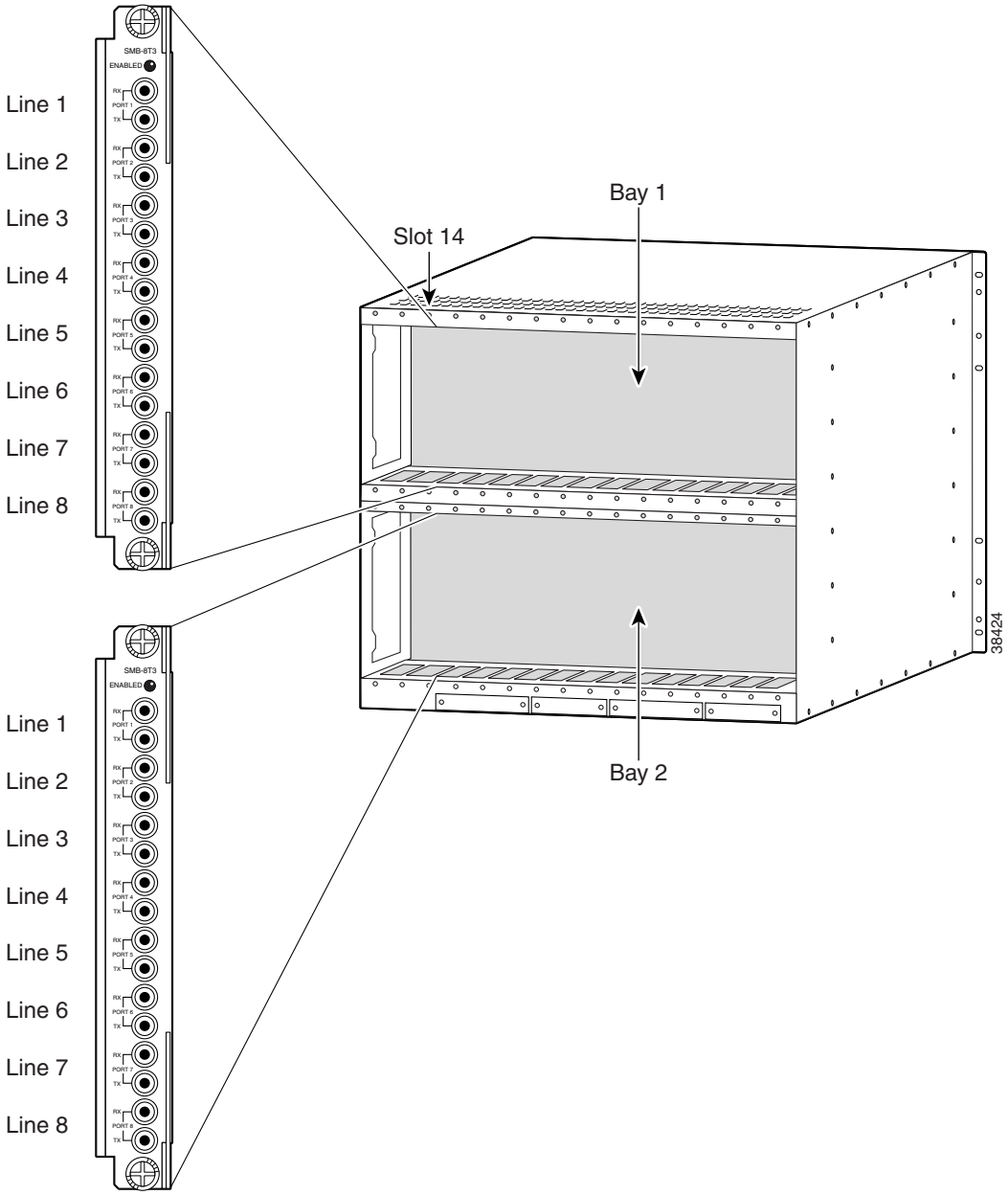
The line state column shows whether each line is up or down as shown in the following example:

```
8850_NY.7.PXM.a > dsplns
                                          Medium Medium
  Sonet  Line     Line     Line    Frame   Line   Line     Alarm   APS
  Line  State     Type     Lpbk   Scramble Coding Type     State   Enabled
  ----- ----- ------------ ------ -------- ------ -------  -----   --------
   1.1     Up sonetSts12c NoLoop   Enable  Other ShortSMF    Clear Disable
   1.2     Up sonetSts12c NoLoop   Enable  Other ShortSMF    Clear Disable
   2.1     Up sonetSts12c NoLoop   Enable  Other ShortSMF    Clear Disable
   2.2     Up sonetSts12c NoLoop   Enable  Other ShortSMF    Clear Disable
```

The line state, which is either Up or Down, represents the administrative intent for the line. For example, a line is reported as Down until an administrator brings up the line. Once the administrator brings up the line, the line state remains Up until the administrator brings the line down with the **dnln** command).

The alarm state indicates whether the line is communicating with a remote switch. When the alarm state is reported as Clear, the physical devices at each end of the line have established physical layer communications. ATM connectivity is established later when interfaces or ports are configured on the line.

Figure 3-1 Bay and Line Numbers



Configuring SONET Lines

All line types are brought up with a default configuration. When configuring trunks between two MGX 8850 or MGX 8950 switches, you may be able to accept the defaults for each switch and thus minimize configuration time. When configuring a line to another type of device, ensure that both devices are using the same configuration parameters on the shared line.

At the physical communications level, you can configure the following options for SONET lines:

- Line type
- Line clock source

The following procedure describes how to configure SONET lines.

Step 1 Establish a configuration session using a user name with GROUP1 privileges or higher.

Step 2 If you do not know the line number you want to configure, enter the **dsplns** command to display a list of the lines.

```
8850_NY.1.AXSM.a > dsplns
```

Remember that you cannot configure a line until you have brought it up as described in the previous section, "Bringing Up Lines."

Step 3 To display the configuration for a line, enter the **dspln** command. For example:

```
8850_NY.1.AXSM.a > dspln -sonet 1.2
  Line Number            : 1.2
  Admin Status           : Up                Alarm Status        : Critical
  Loopback               : NoLoop            APS enabled         : Disable
  Frame Scrambling       : Enable            Number of ports     : 1
  Xmt Clock source       : localTiming       Number of partitions: 1
  Line Type              : sonetSts12c       Number of SPVC      : 1
  Medium Type(SONET/SDH) : SONET             Number of SPVP      : 0
  Medium Time Elapsed    : 528464            Number of SVC       : 0
  Medium Valid Intervals : 96
  Medium Line Type       : ShortSMF
```

For more information, see the "Verifying Line Configuration" section later in this chapter.

Step 4 To configure a SONET line, enter the following commands:

```
8850_NY.1.AXSM.a > cnfln -sonet <bay.line> -slt <LineType> -clk <clockSource>
```

Table 3-4 lists the parameter descriptions for configuring SONET, DS3 and E3 lines. Be sure to use only the parameters listed for SONET lines.

Table 3-4 Parameters for cnfln Command

Parameter	Line Types Supported	Description
AIScBitsCheck	T3	The **-cb** option defines C-bit checking. Set <*AIScBitsCheck*> to **1** to enable C-bit checking. Set it to **2** to ignore the C-bit.
bay.line	T3 E3 SONET	Replace *bay* with **1** if the line is connected to a back card in the upper bay, or replace it with **2** if the line is connected to a back card in the lower bay. Replace *line* with the number that corresponds to the back card port to which the line is connected. Table 3-3 lists the valid line numbers for each AXSM card.
clockSource	T3 E3 SONET	The **-clk** option selects the source timing for transmitting messages over the line. Replace <*clockSource*> with **1** to use the clock signal received over this line from a remote node, or specify **2** to use the local timing defined for the local switch. For information on defining the clock source for the local switch, see the "Managing Network Clock Sources" section in Chapter 7, "Switch Operating Procedures."
LineLength	T3 E3	The **-len** option specifies the length of a T3 line from the local node to a remote node in meters. Enter a value from 0 to 64000 meters.
LineType	SONET	Enter **-slt 1** for SONET or **-slt 2** for SDH.
LineType	T3	Enter **-lt 1** for ds3cbitadm or **-lt 2** for ds3cbitplcp.
OOFCriteria	T3	Out-of-Frame (OoF) alarm criteria. Replace <*OOFCriteria*> with **1** to select 3 out of 8 and **2** to select 3 out of 16.
RcvFEACValidation	T3	Replace <*RcvFEACValidation*> with **1** to select 4 out of 5 and **2** to select 8 out of 10.

Step 5 To verify your configuration changes, enter the **dspln** command.

Configuring T3 Lines

All line types are brought up with a default configuration. When configuring trunks between two MGX 8850 or MGX 8950 switches, you may be able to accept the defaults for each switch and thus minimize configuration time. When configuring a line to another type of device, ensure that both devices are using the same configuration parameters on the shared line.

At the physical communications level, you can configure the following options for DS3 lines:

- Line type
- Line length (distance in meters)
- C-bit checking
- Line clock source
- Out of Frame alarm criteria
- RcvFEACValidation

The following procedure describes how to configure T3 lines.

Step 1 Establish a configuration session using a user name with GROUP1 privileges or higher.

Step 2 If you do not know the line number you want to configure, enter the **dsplns** command to display a list of the lines.

```
8850_LA.3.AXSM.a > dsplns
```

Remember that you cannot configure a line until you have brought it up as described in the previous section, "Bringing Up Lines."

Step 3 To display the configuration for a line, enter the **dspln** command. For example:

```
8850_LA.3.AXSM.a > dspln -ds3 1.1
  Line Number          : 1.1
  Admin Status         : Up                 Alarm Status         : Clear
  Line Type            : ds3cbitadm         Number of ports      : 1
  Line Coding          : ds3B3ZS            Number of partitions: 0
  Line Length(meters)  : 0                  Number of SPVC       : 0
  OOFCriteria          : 3Of8Bits           Number of SPVP       : 0
  AIS c-Bits Check     : Check              Number of SVC        : 0
  Loopback             : NoLoop
  Xmt. Clock source    : localTiming
  Rcv FEAC Validation : 4 out of 5 FEAC codes
```

For more information, see "Verifying Line Configuration," which appears later in this chapter.

Step 4 To configure a T3 line, enter the **cnfln** command, as shown in the following example.

```
8850_LA.3.AXSM.a > cnfln -ds3 <bay.line> -len <LineLength> -clk <clockSource>
-lt <LineType> -oof <OOFCriteria> -cb <AIScBitsCheck> -rfeac <RcvFEACValidation>
```

Table 3-4 lists the parameter descriptions for configuring SONET, T3 and E3 lines. Be sure to use only the parameters listed for T3 lines.

Step 5 To verify your configuration changes, enter the **dspln** command.

Configuring E3 Lines

All line types are brought up with a default configuration. When configuring trunks between two MGX 8850 or MGX 8950 switches, you may be able to accept the defaults for each switch and thus minimize configuration time. When configuring a line to another type of device, ensure that both devices are using the same configuration parameters on the shared line.

At the physical communications level, you can configure the following options for E3 lines:

- Line length (distance in meters)
- Line clock source

The following procedure describes how to configure E3 lines.

Step 1 Establish a configuration session using a user name with GROUP1 privileges or higher.

Step 2 If you do not know the line number you want to configure, enter the **dsplns** command to display a list of the lines:

Step 3 To verify your configuration changes, enter the **dspln** command.

```
8850_LA.4.AXSM.a > dspln
```

Remember that you cannot configure a line until you have brought it up as described in the previous section, "Bringing Up Lines."

Step 4 To configure an E3 line, enter the following command:

```
8850_LA.4.AXSM.a > cnfln -ds3 <bay.line> -len <LineLength> -clk <clockSource>
```

Table 3-4 lists the parameter descriptions for configuring SONET, DS3 and E3 lines. Be sure to use only the parameters listed for E3 lines.

Step 5 To verify your configuration changes, enter the **dspln** command.

Verifying Line Configuration

To display the configuration of a line, use the following procedure.

Step 1 Establish a CLI management session at any user access level.

Step 2 If you do not know the line number you want to view, display a list of the lines by entering the following command:

```
mgx8850a.10.AXSM.a > dsplns
```

Step 3 To display the configuration of a single line, enter the following command:

```
mgx8850a.10.AXSM.a > dspln -type <bay.line>
```

Table 3-5 describes the command parameters. The line configuration appears as follows:

```
pop2one.10.AXSM.a > dspln -sonet 2.1
  Line Number             : 2.1
  Admin Status            : Up                Alarm Status         : Clear
  Loopback                : NoLoop            APS enabled          : Disable
  Frame Scrambling        : Enable            Number of ports      : 1
  Xmt Clock source        : localTiming       Number of partitions: 1
```

```
Line Type              : sonetSts12c       Number of SPVC      : 0
Medium Type(SONET/SDH) : SONET             Number of SVC       : 4
Medium Time Elapsed    : 248198
Medium Valid Intervals : 96
Medium Line Type       : ShortSMF
```

Table 3-5 dspln Command Parameters

Parameter	Description
type	The parameter specifies the type of line that is connected to the switch. Replace <*type*> with **-sonet** or **-ds3**. The **-ds3** option works for DS3 and E3 lines.
bay	Replace <*bay*> with **1** if the line is connected to a back card in the upper bay, or replace it with **2** if the line is connected to a back card in the lower bay.
line	Replace <*line*> with the number that corresponds to the back card port to which the line is connected. Table 3-3 lists the valid line numbers for each AXSM card.

Establishing Redundancy Between Two Lines with APS

The switch supports two types of line redundancy:

- Intracard redundancy, where the working and protection lines are connected to the same card
- Intercard redundancy, where the working line is connected to the primary card, and the protection line is connected to the secondary card

The following sections describe how to add redundancy for these types of APS lines.

Adding Intracard APS Lines

To establish redundancy between two lines on the same card, use the following procedure.

Step 1 Establish a configuration session using a user name with GROUP1_GP privileges or higher.

Step 2 If you have not done so already, bring up the working line as described in the "Bringing Up Lines" section, which appears earlier in this chapter.

Step 3 Enter the **addapsln** command as follows:

```
pop20two.1.AXSM.a > addapsln <workingIndex> <protectIndex> <archmode>
```

Replace <*workingIndex*> with the location of the working line using the format "slot.bay.line." For example, to specify the line on card 2, bay 1, line 2, enter 2.1.2.

Replace <*protectIndex*> with the location of the protection line, using the same format used for the working line.

Note For intracard redundancy, the working index and protection index must specify ports on the same card, so the slot number will always match.

Replace <*archmode*> with the option number that selects the automatic protection switching (APS) architecture mode you want to use. Table 3-6 shows the option numbers and the architecture modes they select.

Table 3-6 APS Line Architecture Modes

Option	Description
1	Selects 1+1 signaling (transmission on both working and protect lines) for intracard APS.
2	Selects 1:1 signaling (transmission on either the working line or the protect line) for intracard APS. **Note** Intracard APS 1:1 is not supported on AXSM-8-155/B, AXSM-4-622/B, and AXSM-1-2488/B cards.
3	Selects G.783, Annex B 1+1 signaling. This option is not supported in this release.
4	Selects y cable 1+1 signaling without k1 and k2.
5	Selects y cable 1+1 signaling without k1 and k2.

In the following example, 1+1 APS redundancy is assigned to two lines on the same card:

```
pop20one.9.AXSM.a > addapsln 9.2.1 9.2.2 1
```

Step 4 To display a list of all the APS lines on an AXSM card, enter the **dspapslns** command on the active AXSM card.

Step 5 To display information on a specific APS line, enter the **dspapsln** <*slot.bay.line*> command on the active AXSM card.

For information on managing redundant APS lines, see the "Managing Redundant APS Lines" section in Chapter 7, "Switch Operating Procedures."

Adding Intercard APS Lines

To establish redundancy between two lines on different cards, use the following procedure.

Note For intercard APS to operate properly, an APS connector must be installed between the two cards. For more information in the APS connector and how to install it, refer to either the *Cisco MGX 8850 Hardware Installation Guide (PXM45/B and PXM1E)* or the *Cisco MGX 8950 Hardware Installation Guide.*

Note APS is not supported on AXSM-1-2488/B cards. For the AXSM-16-155/B and AXSM-4-622/B front cards, you must use /B version back cards. You can use an AXSM front card and back card in one slot and configure redundancy with an AXSM/B front card and AXSM/B back card in another slot. The switch supports APS when the front and back cards are the same revision.

Step 1 Establish a configuration session using a user name with GROUP1_GP privileges or higher.

Step 2 If you have not done so already, add card redundancy as described in the "Establishing Redundancy Between Two AXSM Cards" section.

Step 3 If you have not done so already, bring up the working and protection lines as described in "Bringing Up Lines."

Step 4 Verify that an APS connector is installed between the cards that host the working and protection lines by entering the **dspapsbkplane** command.

Step 5 Enter the **addapsln** command as follows:

```
pop20one.7.PXM.a > addapsln <workingIndex> <protectIndex> <archmode>
```

Replace <*workingIndex*> with the location of the working line using the format slot.bay.line. For example, to specify the line on card 2, bay 1, line 2, enter 2.1.2.

Replace <*protectIndex*> with the location of the protection line, using the same format used for the working line.

Note For intercard redundancy, the working index and protection index must specify ports on different cards. Also, the working line index must identify a line on the primary card.

Replace <*archmode*> with an option number that defines the type of line redundancy you want to use. Table 3-6 shows the option numbers and the types of redundancy they select.

In the following example, 1+1 APS redundancy is assigned to lines on two different cards:

```
pop20one.1.AXSM.a > addapsln 1.1.2 2.1.2 1
```

Step 6 Enter the **dspapsbkplane** command on both the standby and active cards to verify that the APS connector is installed properly.

Note This command can show different values for each of the two cards, which indicates the APS connector is seated properly on one card, but not on the other.

Step 7 To display the a list of all the APS lines on an AXSM card, enter the **dspapslns** command.

For information on managing redundant APS lines, see the "Managing Redundant APS Lines" section in Chapter 7, "Switch Operating Procedures."