CHAPTER 2

Preparing MPSM-T3E3-155 Cards and Lines for Communication

This chapter describes how to prepare MPSM-T3E3-155 cards and lines for physical connectivity to other switches. Chapter 3, "Provisioning ATM Services," describes how to add ports and connections that support ATM communications across the cards and lines configured in this chapter. Chapter 4, "Provisioning Frame Relay Services," describes how to add ports and connections that support Frame Relay communications across the cards and lines configured in this chapter.

This chapter provides quickstart procedures for configuring MPSM-T3E3-155 cards and lines, and then describes the following procedures in detail:

- Managing Firmware Version Levels for MPSM-T3E3-155 Cards
- Establishing Redundancy Between Two MPSM-T3E3-155 Cards
- Selecting and Viewing Service Class Templates
- Setting Up Lines
- Establishing Redundancy Between Two Lines with APS
- Channelizing SONET, SDH, and DS3 (T3) Lines into Paths
- Setting the Service Context on MPSM-T3E3-155 Cards

Caution Before you can bring up lines and configure connections, you must complete the general switch configuration procedures described in the *Cisco MGX 8850 (PXM1E/PXM45), Cisco MGX 8950, Cisco MGX 8830, and Cisco MGX 8880 Configuration Guide, Release 5*.

Configuration Quickstarts

The quickstart procedures in this section provide a summary of the tasks required to prepare MPSM-T3E3-155 cards and lines for physical connectivity to other switches. These procedures are provided as an overview and as a quick reference for those who already have configured Cisco MGX 8850 or Cisco MGX 8830 switches.

Preparing Cards and Lines for Configuration Quickstart

This procedure describes the minimum configuration required to prepare MPSM-T3E3-155 cards and lines for connectivity.

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	Command	Purpose
Step 1	*username* *<password>*	Start a configuration session with the active PXM card. **Note** To perform all the steps in this quickstart procedure, you must log in as a user with GROUP1 privileges or higher.
Step 2	**setrev** Related commands: **dspcds**	From the active PXM card, initialize MPSM-T3E3-155 cards by setting the firmware version level for each MPSM-T3E3-155 card. See the "Managing Firmware Version Levels for MPSM-T3E3-155 Cards" section, which appears later in this chapter.
Step 3	**addred** *<options>*	Define which MPSM-T3E3-155 cards are operating as redundant cards. See the "Establishing Redundancy Between Two MPSM-T3E3-155 Cards" section, which appears later in this chapter.
Step 4	**cc** *<options>*	Change to an active MPSM-T3E3-155 card for which you will select an SCT.
Step 5	**cnfcdsct** *<sctid>* Related commands: **dspcd** **dspsctchksum <path name>**	Apply ATM or Frame Relay communications parameters from a preconfigured Service Class Template (SCT) file to all communications between the card you are configuring and the other MPSM-T3E3-155 cards in the switch. For PNNI communications, use SCT ID 2 or 4 for policing applications and use SCT ID 3 for non-policing applications. See the "Selecting and Viewing Service Class Templates" section, which appears later in this chapter.
Step 6	**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.

	Command	Purpose
Step 7	**cnfln** <*options*> Related commands: **dsplns** **dspln** -*type* <*bay.line*>	Configure lines. To configure SONET/SDH lines, see the "Configuring SONET/SDH Lines" section, which appears later in this chapter. To configure T3 lines, see the "Configuring T3 Lines" section, which appears later in this chapter. To configure E3 lines, see the "Configuring E3 Lines" section, which appears later in this chapter.
Step 8	**addapsln** <*workingIndex*> <*protectIndex*> <*archmode*>	If you are using APS redundancy on the current MPSM-T3E3-155 card, configure a redundant relationship between two redundant MPSM-T3E3-155 lines. See the "Establishing Redundancy Between Two Lines with APS" section, which appears later in this chapter.

Channelizing DS3 (T3) Lines Configuration Quickstart

This procedure describes how to create channelized DS3 (T3) paths on the MPSM-T3E3-155 card.

Note The MPSM-T3E3-155 card requires a license for channelization. Without a channelization license, you cannot channelize DS3(T3) lines. Enter the **dspliccd** command to view the feature licenses that have been assigned to or are needed by the MPSM-T3E3-155 card.

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	Command	Purpose
Step 1	*username* <*password*>	Start a configuration session with the active PXM card. **Note** To perform all the steps in this quickstart procedure, you must log in as a user with GROUP1 privileges or higher.
Step 2	**cc** <*options*>	Change to an active MPSM-T3E3-155 card on which you will configure a path.
Step 3	**upln** <*bay.line*>	Bring up a line. See the "Setting Up Lines" section, which appears later in this chapter.
Step 4	**cnfln** <*bay.line*> **-lt** <*LineType*> **-chan 2** Related commands: **dsplns** **dspln** -*type* <*bay.line*>	Configure the DS3 (T3) line with a valid line type for channelization, and enable channelization on the line. See the "Configuring T3 Lines" section, which appears later in this chapter.

	Command	Purpose
Step 5	**uppath** [**-pathfilter**] <*pathid*>	Bring up the DS1 sub-paths that were created in Step 4. See the "Bringing Up and Configuring DS1(T1) and E1 Paths" section, which appears later in this chapter.
Step 6	**cnfpath** <*options*> Related commands: **dsppath** **dsppaths**	Configure the DS1 sub-paths. See the "Bringing Up and Configuring DS1(T1) and E1 Paths" section, which appears later in this chapter.

Channelizing Sonet Lines Configuration Quickstart

This procedure describes how to create channelized SONET paths on the MPSM-T3E3-155 card.

Note The MPSM-T3E3-155 requires a license for channelization. Without a channelization license, you cannot channelize SONET lines. Enter the **dspliccd** command to view the feature licenses that have been assigned to or are needed by the MPSM-T3E3-155 card.

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	Command	Purpose
Step 1	*username* <*password*>	Start a configuration session with the active PXM card. **Note** To perform all the steps in this quickstart procedure, you must log in as a user with GROUP1 privileges or higher.
Step 2	**cc** <*options*>	Change to an active MPSM-T3E3-155 card on which you will configure a path.
Step 3	**upln** <*bay.line*>	Bring up a line. When you bring up a line, the corresponding SONET path has a width of 3. See the "Setting Up Lines" section, which appears later in this chapter.
Step 4	**cnfpath -sts** <*pathid*> **-width** <*width spec*> Related commands: **dsppath** **dsppaths**	Configure the SONET/SDH path width. See the "Channelizing a SONET Line" section, which appears later in this chapter.
Step 5	**uppath -sts** <*pathid*> Related commands: **dsppath** **dsppaths**	Bring up the SONET/SDH path. See the "Bringing Up and Configuring SONET Paths" section, which appears later in this chapter.
Step 6	**cnfpath -sts** <*pathid*> -payload <*sts_au_payload_type*> Related commands: **dsppath** **dsppaths**	Configure the payload type for the STS path you are channelizing. See the "Bringing Up and Configuring SONET Paths" section, which appears later in this chapter.

	Command	Purpose
Step 7	**uppath** [**-pathfilter**] <*pathid*>	Bring up the sub-paths that were created in Step 6. To bring up DS3 (T3) sub-paths, see the "Bringing Up and Configuring a DS3 (T3) Path" section, which appears later in this chapter. To bring up E3 sub-paths, see the "Bringing Up and Configuring E3 Paths" section, which appears later in this chapter. To bring up DS1 sub-paths, see the "Bringing Up and Configuring DS1(T1) and E1 Paths" section, which appears later in this chapter.
Step 8	**cnfpath** <*options*> Related commands: **dsppath** **dsppaths**	Configure the sub-paths. To configure DS3 (T3) sub-paths, see the "Bringing Up and Configuring a DS3 (T3) Path" section, which appears later in this chapter. To configure E3 sub-paths, see the "Bringing Up and Configuring E3 Paths" section, which appears later in this chapter. To configure DS1 sub-paths, see the "Bringing Up and Configuring DS1(T1) and E1 Paths" section, which appears later in this chapter. To configure TUG-3s, see the "Bringing Up and Configuring TUG-3s" section, which appears later in this chapter.

Channelizing SDH Lines Configuration Quickstart

This procedure describes how to create channelized SDH paths on the MPSM-T3E3-155 card.

Note The MPSM-T3E3-155 requires a license for channelization. Without a channelization license, you cannot channelize SDH lines. Enter the **dspliccd** command to view the feature licenses that have been assigned to or are needed by the MPSM-T3E3-155 card.

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	Command	Purpose
Step 1	*username* <*password*>	Start a configuration session with the active PXM card. **Note** To perform all the steps in this quickstart procedure, you must log in as a user with GROUP1 privileges or higher.
Step 2	**cc** <*options*>	Change to an active MPSM-T3E3-155 card on which you will configure a path.
Step 3	**upln** <*bay.line*>	Bring up a line. When you bring up a line, the corresponding SDH path has a width of 3. See the "Setting Up Lines" section, which appears later in this chapter.

	Command	Purpose
Step 4	**cnfln** -<*bay.line*> **-slt 2 -clk** <*clockSource*>	Configure the line you brought up in Step 3 to be an SDH line. See the "Configuring SONET/SDH Lines" section, which appears later in this chapter.
Step 5	**cnfpath -sts** <*pathid*> **-width** <*width spec*> Related commands: **dsppath** **dsppaths**	Configure the SDH path width. See the "Channelizing an SDH Line" section, which appears later in this chapter.
Step 6	**uppath -sts** <*pathid*> Related commands: **dsppath** **dsppaths**	Bring up the SDH path. See the "Bringing Up and Configuring SDH Paths" section, which appears later in this chapter.
Step 7	**cnfpath -sts** <*pathid*> -payload <*sts_au_payload_type*> Related commands: **dsppath** **dsppaths**	Configure the payload type for the STS path you are channelizing. See the "Bringing Up and Configuring SDH Paths" section, which appears later in this chapter.
Step 8	**uppath** [**-pathfilter**] <*pathid*>	Bring up the sub-paths that were created in Step 7. To bring up DS3 (T3) sub-paths, see the "Bringing Up and Configuring a DS3 (T3) Path" section, which appears later in this chapter. To bring up E3 sub-paths, see the "Bringing Up and Configuring E3 Paths" section, which appears later in this chapter. To bring up DS1 sub-paths, see the "Bringing Up and Configuring DS1(T1) and E1 Paths" section, which appears later in this chapter.
Step 9	**cnfpath** <*options*> Related commands: **dsppath** **dsppaths**	Configure the sub-paths. To configure DS3 (T3) sub-paths, see the "Bringing Up and Configuring a DS3 (T3) Path" section, which appears later in this chapter. To configure E3 sub-paths, see the "Bringing Up and Configuring E3 Paths" section, which appears later in this chapter. To configure DS1 sub-paths, see the "Bringing Up and Configuring DS1(T1) and E1 Paths" section, which appears later in this chapter. To configure TUG-3s, see the "Bringing Up and Configuring TUG-3s" section, which appears later in this chapter.

Managing Firmware Version Levels for MPSM-T3E3-155 Cards

The MPSM-T3E3-155 cards 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 PXM hard disk.

After the MPSM-T3E3-155 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. This section describes the following tasks:

- Locating Cards that Need the Firmware Version Set
- Initializing MPSM-T3E3-155 Cards
- Verifying Card Firmware Version Levels

Locating Cards that Need the Firmware Version Set

When an MPSM-T3E3-155 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 MPSM-T3E3-155 card is new, the problem is probably that the firmware version number has not been set. Use the following procedure to locate the cards that need to have the firmware version set.

Step 1 Establish a command-line interface (CLI) management session at any access level with the active PXM card.

Step 2 Enter the **dspcds** command as follows to display a list of all the cards in the switch.

```
M8850_NY.7.PXM.a > dspcds
```

The following example shows the display for the **dspcds** command. The card state for the MPSM-T3E3-155 card in slot 13 is listed as Failed/Active. This is how a card appears when the runtime firmware version has not been selected:

```
M8850_NY.7.PXM.a > dspcds
M8850_NY                          System Rev: 04.09   Dec. 03, 2003 21:24:35 GMT
Chassis Serial No:   SAA03211181 Chassis Rev: B0     GMT Offset: 0
                                                     Node Alarm: CRITICAL
Card  Front/Back          Card           Alarm      Redundant   Redundancy
Slot  Card State          Type           Status     Slot        Type
---   ----------          --------       --------   -------     -----

01    Active/Active       MPSM-T3E3-155  NONE       02          PRIMARY SLOT
02    Standby/Active      MPSM-T3E3-155  NONE       02          SECONDARY SLOT
03    Active/Active       AXSM_4OC12     NONE       NA          NO REDUNDANCY
04    Active/Active       AXSME_16T3E3   NONE       NA          NO REDUNDANCY
05    Active/Active       AXSM_4OC12     NONE       NA          NO REDUNDANCY
06    Active/Active       AXSM_16OC3_B   MINOR      NA          NO REDUNDANCY
07    Active/Active       PXM45C         NONE       08          PRIMARY SLOT
08    Empty Resvd/Empty   ---            MAJOR      07          SECONDARY SLOT
09    Active/Empty        RPM_PR         NONE       NA          NO REDUNDANCY
10    Active/Active       AXSME_2OC12    NONE       NA          NO REDUNDANCY
11    Active/Active       AXSME_8OC3     NONE       NA          NO REDUNDANCY
12    Active/Active       AXSM_1OC48     NONE       NA          NO REDUNDANCY
13    Failed/Active       MPSM-T3E3-155  NONE       NA          NO REDUNDANCY
14    Empty               ---            ---        ---         ---
15    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 MPSM-T3E3-155 Cards."

Note If any MPSM-T3E3-155 card displays the Active/Active card state, you do not have to set the runtime firmware version for that card.

Initializing MPSM-T3E3-155 Cards

Before an MPSM-T3E3-155 card can operate, it must be initialized in a switch slot. The initialization process defines the MPSM-T3E3-155 runtime software version that will run on the card and identifies the slot in which the card operates. Use the following procedure to initialize an MPSM-T3E3-155 card.

Note The PXM45 card supports a maximum of 99 lines on the switch. As you add MPSM-T3E3-155 cards, verify that the line count for all MPSM-T3E3-155 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 (PXM1E/PXM45), Cisco MGX 8950, and Cisco MGX 8830 Switches, Release 5.0.00*.

Tip If you have trouble locating the runtime firmware version level, use the filenames on the PXM hard disk to determine the version level. For more information, refer to Chapter 10, "Switch Operating Procedures," in the *Cisco MGX 8850 (PXM1E/PXM45), Cisco MGX 8950, Cisco MGX 8830, and Cisco MGX 8880 Configuration Guide, Release 5*.

Step 2 Establish a configuration session with the active PXM card, using a user name with SERVICE_GP privileges or higher.

Step 3 Enter the **setrev** command as follows to set the firmware revision level for the appropriate MPSM-T3E3-155 card:

```
M8850_NY.7.PXM.a > setrev <slot> <version>
```

Note Each card must be initialized only once with the **setrev** command. The only other time you need to 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, as shown in the following example:

```
M8850_NY.7.PXM.a > setrev 1 4.9(22.14)A
```

After you enter the **setrev** command, the System status LED on the front of the MPSM-T3E3-155 card 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 changes 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, we recommend verifying the firmware versions installed on the switch. If newer versions of this firmware are available, installing the updated firmware can prevent switch problems.

Use the following procedure to verify the firmware versions in use on your switch.

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

```
M8850_NY.7.PXM.a > dsprevs
M8850_NY                          System Rev: 04.09   Dec. 03, 2003 21:35:58 GMT
MGX8850                                               Node Alarm: CRITICAL
Phy. Log. Inserted       Cur Sw              Boot FW
Slot Slot Card           Revision            Revision
---- ---- --------       --------            --------

01   01   MPSM-T3E3-155  4.9(22.14)A         4.9(22.14)A
02   01   MPSM-T3E3-155  4.9(22.14)A         4.9(22.14)A
03   03   MPSM-T3E3-155  4.9(22.14)A         4.9(22.14)A
04   04   MPSM-T3E3-155  4.9(22.14)A         4.9(22.14)A
05   05   AXSM_4OC12     4.9(22.14)A         4.9(22.14)A
06   06   AXSM_16OC3_B   4.9(22.14)A         4.9(22.14)A
07   07   PXM45C         4.9(22.14)A         4.9(22.14)A
08   07   ---            ---                 ---
09   09   RPM_PR         ---                 ---
10   10   MPSM-T3E3-155  4.9(22.14)A         4.9(22.14)A
11   11   MPSM-T3E3-155  4.9(22.14)A         4.9(22.14)A
12   12   MPSM-T3E3-155  4.9(22.14)A         4.9(22.14)A
13   13   MPSM-T3E3-155  4.9(22.14)A         4.9(22.14)A
14   14   ---            ---                 ---
15   15   ---            ---                 ---
16   15   ---            ---                 ---

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

Step 2 To see the software revision levels for a single card, enter the **cc** command to change to the appropriate card, and then enter the **dspversion** command as follows:

```
M8850_NY.7.PXM.a > cc 13

(session redirected)

M8850_NY.13.MPSM155[ATM].a > dspversion

  Image Type   Shelf Type    Card Type          Version   Built On
  ----------   ----------   ----------    ------------   ------------
     Runtime          MGX MPSM-T3E3-155     4.9(22.14)A   Nov  9 2003, 03:13:46
        Boot          MGX MPSM-T3E3-155     4.9(22.14)A   -
```

Step 3 Another way to see the software revision levels for a single MPSM-T3E3-155 card is to enter the **dspcd** command at the active PXM card as follows:

```
M8850_NY.7.PXM.a > dspcd 13
M8850_NY                          System Rev: 04.09   Dec. 03, 2003 21:44:07 GMT
MGX8850                                               Node Alarm: CRITICAL
Slot Number:   13   Redundant Slot: NONE

                   Front Card           Back Card
                   ----------           ---------
Inserted Card:      MPSM-T3E3-155       SFP-2-155
Reserved Card:      MPSM-T3E3-155       SFP-2-155
State:              Active              Active
Serial Number:      SAD073504D9         SAD0732038K
Prim SW Rev:        4.9(22.14)A         ---
Sec SW Rev:         4.9(22.14)A         ---
Cur SW Rev:         4.9(22.14)A         ---
Boot FW Rev:        4.9(22.14)A         ---
800-level Rev:      02                  04
800-level Part#:    800-23005-04        800-23170-02
CLEI Code:          0                   0
Reset Reason:       On Reset from PXM
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 worksheets in Appendix E of the *Cisco MGX 8850 (PXM1E/PXM45), Cisco MGX 8950, Cisco MGX 8830, and Cisco MGX 8880 Configuration Guide, Release 5.*

Step 5 Compare the versions you noted in Appendix E of the *Cisco MGX 8850 (PXM1E/PXM45), Cisco MGX 8950, Cisco MGX 8830, and Cisco MGX 8880 Configuration Guide, Release 5* with the latest versions listed in the *Release Notes for Cisco MGX 8850 (PXM1E/PXM45), Cisco MGX 8950, and Cisco MGX 8830 Switches, Release 5.0.00*.

Step 6 If the switch requires software updates, upgrade the software using the instructions in Appendix A of the *Cisco MGX 8850 (PXM1E/PXM45), Cisco MGX 8950, Cisco MGX 8830, and Cisco MGX 8880 Configuration Guide, Release 5.*

Establishing Redundancy Between Two MPSM-T3E3-155 Cards

Use the following procedure to establish redundancy between two MPSM-T3E3-155 cards.

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 MPSM-T3E3-155 Cards" section.

Step 3 Enter the **dspcds** command to verify that both MPSM-T3E3-155 cards are in the Active state.

Step 4 Enter the **addred** command as follows to establish redundancy between two MPSM-T3E3-155 cards:

```
M8850_NY.7.PXM.a > addred <redPrimarySlotNum> <redSecondarySlotNum> <redType>
```

Replace <*redPrimarySlotNum*> with the slot number of the MPSM-T3E3-155 card that will be the primary card, and replace <*redSecondarySlotNum*> with the slot number of the secondary MPSM-T3E3-155 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 MPSM-T3E3-155 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 must 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 on that card 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 Enter the **dspred** command to verify that the redundancy relationship is established, as shown in the following example:

```
M8850_NY.7.PXM.a > dspred
M8850_NY                          System Rev: 04.09   Dec. 03, 2003 21:55:59 GMT
MGX8850                                               Node Alarm: CRITICAL
Logical   Primary          Secondary            Card     Redundancy
Slot   Slot     Card     Slot       Red         Type        Type
                State              State
-----  -----  ----------- ----  ------------ ------------ ----------
  1      1    Active       2     Standby      MPSM-T3E3-155    1:1
  7      7    Active       8     Empty Resvd  PXM45            1:1
  15     15   Empty        16    Empty        SRM              1:1
  31     31   Empty        32    Empty        SRM              1:1
```

The state for the card in the secondary slot changes to *Standby* only when the 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, refer to Chapter 10, "Switch Operating Procedures," in the *Cisco MGX 8850 (PXM1E/PXM45), Cisco MGX 8950, Cisco MGX 8830, and Cisco MGX 8880 Configuration Guide, Release 5*.

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 define 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 QE1210.

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 MPSM-T3E3-155 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 used on trunk ports that interconnect switches within the network. Cisco provides default port SCT files with and without policing capability.

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

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

For example, an MPSM-T3E3-155 SCT file name might look as follows: MPSM_SCT.CARD.5.V1

Table 2-1 describes the parameters used in the SCT naming convention.

Table 2-1 SCT Naming Conventions

Parameter	Description
service_module_name	The name of the service module on which the SCT will be applied. In this case, the service module name is MPSM.
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.

When an MPSM-T3E3-155 card is powered up for the first time, the default card SCT file is used. You must run the **cnfcdsct** command in order to use another SCT file. The default SCT file is 0. The MPSM-T3E3-155 SCT files are stored in the F:\SCT 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, refer to Appendix A of the *Cisco MGX 8850 (PXM1E/PXM45), Cisco MGX 8950, Cisco MGX 8830, and Cisco MGX 8880 Configuration Guide, Release 5.*

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 (PXM1E/PXM45), Cisco MGX 8950, and Cisco MGX 8830 Switches, Release 5.0.00*. 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 must use CWM. You cannot create or modify SCT files using the CLI.

Note Port SCTs can be changed while connections are provisioned on the port. However, the port needs to be administratively downed to effect this change. This means that changes to port SCTs are service affecting.

After you create an 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, refer to Appendix A in the *Cisco MGX 8850 (PXM1E/PXM45), Cisco MGX 8950, Cisco MGX 8830, and Cisco MGX 8880 Configuration Guide, Release 5*. Be sure to copy SCT files to the C:\SCT\TEMP directory on the switch.

The sections that follow 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 Chapter 8, "Managing Service Class Templates," in the *Cisco MGX 8850 (PXM1E/PXM45), Cisco MGX 8950, Cisco MGX 8830, and Cisco MGX 8880 Configuration Guide, Release 5.*

Use the following procedure to select an SCT for a card.

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

Step 2 Enter the **cc** command as follows to change to an active MPSM-T3E3-155 card for which you will select an SCT:

```
M8850_NY.7.PXM.a > cc 13

(session redirected)

M8850_NY.13.MPSM155[ATM].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 as follows:

```
mpsm_node.4.MPSM155[ATM].a > dspports
ifNum     Line/    Admin    Oper      Guaranteed Maximum    sctID     ifType  VPI    MINVPI  MAXVPI  IMA
          Path     State    State        Rate      Rate    Cnf/InUse          (VNNI, (EVUNI, (EVUNI, GRP
                                                                              VUNI)  EVNNI)  EVNNI)
----- ----------- ----- ---------- ---------- --------  ----------- ------ ------ ------- ------- ---
   12       1.1.2    Down       Up          50       50   0/  0 =Def     UNI       0       0       0 N/A
   13       1.1.3    Up         Up          50       50   0/  0 =Def     UNI       0       0       0 N/A
```

Enter the **dnport** <*if*> command to bring down any ports that display "Up" under the Admin State, as shown in the following example:

```
mpsm_node.4.MPSM155[ATM].a > dnport 13
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 as follows to assign an SCT to the MPSM-T3E3-155 card:

```
mpsm_node.4.MPSM155[ATM].a > cnfcdsct <sctID>
```

Replace *sctID* with the number of the SCT that you want to assign to the MPSM-T3E3-155 card. Table 2-2 describes the SCTID options.

Table 2-2 sctID Options

SCT ID	Description
1	Policing applications for high bandwidth ports in PNNI networks.
2	Non-policing applications for high bandwidth ports in PNNI networks.
3	Policing applications for low bandwidth ports in PNNI networks.
4	Non-policing applications for low bandwidth ports in PNNI networks.

Note When an MPSM-T3E3-155 card is powered up for the first time, the default card SCT file is used. You must run **cnfcdsct** command in order to use another SCT file. The default SCT file is 0.

Step 5 Enter the **dspcd** command as follows to display the SCT assigned to a card:

```
M8850_NY.13.MPSM155[ATM].a > dspcd
```

The **dspcd** command output displays a row labeled "Card SCT Id," which identifies the SCT assigned to the card. In the following example, the current Card SCT Id is 1:

```
mpsm_node.4.MPSM155[ATM].a > dspcd

                    Front Card          Back Card
                    ----------          ---------
Card Type:          MPSM-T3E3-155       SFP-2-155
State:              Active              Present
Serial Number:      SAD073504D9         SAD0732038K
Boot FW Rev:        4.9(23.90)A         ---
SW Rev:             4.9(23.90)A         ---
HW Rev:             02                  04
Orderable Part#:    800-23005-04        800-23170-02
PCA Part#:          73-8597-04          73-8684-02
CLEI Code:          0                   0

SFP Information:
Line FRU Type          Vendor Name      Part #           Rev  Serial #
---- ----------------- ---------------- ---------------- ---- ----------------
1.1  SMFSR-1-155-SFP   OCP              TRP-03L3I1BCS         2109347
1.2  ---               ---              ---              ---  ---

Product ID:
Version ID:
Reset Reason: Reset from PXM
Card Summary:

Type <CR> to continue, Q<CR> to stop:
Card SCT Id: 1
Features Enabled: ATM, FRAME RELAY
#Max ATM Conns #ATM Ports #ATM Partitions #ATM SPVCs #ATM SPVPs #ATM SVCs
-------------- ---------- --------------- ---------- ---------- ---------
          4000          0               0          0          0         0
#Max FR Conns #FR Ports #FR Partitions #FR SPVCs
------------- --------- -------------- ---------
         4000         0              0         0
#IMA Groups #IMA Links
```

```
----------- ----------
          0          0

FC Operation Mode:  CARD_OPER_MODE_155

mpsm_node.4.MPSM155[ATM].a >
```

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

```
M8850_NY.13.MPSM155[ATM].a > upport 13
```

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

```
mpsm_node.4.MPSM155[ATM].a > dspports
ifNum     Line/    Admin    Oper      Guaranteed Maximum    sctID     ifType  VPI    MINVPI  MAXVPI  IMA
          Path     State    State        Rate      Rate    Cnf/InUse          (VNNI, (EVUNI, (EVUNI, GRP
                                                                              VUNI)  EVNNI)  EVNNI)
----- ----------- ----- ---------- ---------- --------  ----------- ------ ------ -------- ------- ---
   12       1.1.2    Down       Up          50       50   0/  0 =Def    UNI       0        0       0 N/A
   13       1.1.3    Up         Up          50       50   0/  0 =Def    UNI       0        0       0 N/A
```

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 an ATM port, enter the **addport** command as described in the "Adding ATM Ports" section of Chapter 3, "Provisioning ATM Services."

Note An SCT must be installed on your switch before you can assign it to a port. For instructions on manually downloading and installing SCTs to your switch, see Chapter 8, "Managing Service Class Templates," in the *Cisco MGX 8850 (PXM1E/PXM45), Cisco MGX 8950, Cisco MGX 8830, and Cisco MGX 8880 Configuration Guide, Release 5*.

Setting Up Lines

The first step in configuring MPSM-T3E3-155 lines is to bring up and configure the physical lines that are connected to the switch. This section describes the following tasks:

- Bringing Up Lines
- Configuring SONET/SDH Lines
- Configuring T3 Lines
- Configuring E3 Lines
- Verifying Line Configuration

Bringing Up Lines

Installing an MPSM-T3E3-155 card can add from 2 to 3 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 MPSM-T3E3-155 port status light for the line flashes green, and all line alarms are cleared. The flashing green light means the line is unprovisioned.

When you bring up a line, the switch starts monitoring the line. The MPSM-T3E3-155 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 must be left down. APS automatically brings up each line at the appropriate time. For general information on APS line redundancy, refer to Chapter 2 in the *Cisco MGX 8850 (PXM1E/PXM45), Cisco MGX 8950, Cisco MGX 8830, and Cisco MGX 8880 Configuration Guide, Release 5*. For information on configuring APS lines, see the "Establishing Redundancy Between Two Lines with APS" section later in this chapter.

Note On the OC3 back cards (the SFP-2-155 and the SMB-2-155-EL), line 2 is always reserved for APS.

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

Use the following procedure to bring up a line on the switch.

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

Step 2 Enter the **cc** command as follows to select the card on which you want to bring up a line:

```
M8850_NY.7.PXM.a > cc <slotnumber>
```

Replace <*slotnumber*> with the number of the slot in which the MPSM-T3E3-155 card is installed. Valid slot numbers are as follows:

- Cisco MGX 8850 (PXM1E/PXM45) — slots 1 through 6 and 9 through 14
- Cisco MGX 8830 — slots 3 through 14

Verify your card selection by viewing the switch prompt, which lists the slot number and the MPSM-T3E3-155 card type.

Step 3 Enter the **upln** command as follows to bring up a line:

```
M8850_NY.13.MPSM155[ATM].a > upln <bay.line>
```

Replace <*bay*> with 1, and replace <*line*> with the number that corresponds to the back card port to which the line is connected, as shown in the following example:

```
M8850_NY.13.MPSM155[ATM].a > upln 1.1
```

Note On an MPSM-T3E3-155 card, the bay number is always 1.

Step 4 Enter the **dsplns** command to ensure the appropriate line is in the "Up" state, as shown in the following example:

```
M8850_NY.13.MPSM155[ATM].a > dsplns
                                                 Medium  Medium
  Sonet          Line     Line       Line    Frame   Line    Line    Valid   Alarm   APS     Channe-
  Line           State    Type       Lpbk    Scramble Coding  Type    Intvls  State   Enabled lized
  -------------- ----- ------------ ------ -------- ------ -------- ------ -------- ------- -------
   1.1             Up   sonetSts3c NoLoop    Enable    NRZ ShortSMF      2    Clear Disable    No
   1.2           Down   sonetSts3c NoLoop    Enable    NRZ    Other      0    Clear Disable    No
```

The line state column shows whether each line is up or down. The line state is 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 or Frame Relay connectivity is established later when interfaces or ports are configured on the line.

Configuring SONET/SDH Lines

All line types are brought up with a default configuration. When configuring trunks between two Cisco MGX 8850 or Cisco MGX 8830switches, 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/SDH lines:

- Line type
- Line clock source

Use the following procedure to configure SONET/SDH 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, as shown in the following example:

```
M8850_NY.13.MPSM155[ATM].a > dsplns
                                                 Medium  Medium
  Sonet          Line     Line       Line    Frame   Line    Line    Valid   Alarm   APS     Channe-
  Line           State    Type       Lpbk    Scramble Coding  Type    Intvls  State   Enabled lized
  -------------- ----- ------------ ------ -------- ------ -------- ------ -------- ------- -------
   1.1             Up   sonetSts3c NoLoop    Enable    NRZ ShortSMF      2    Clear Disable    No
   1.2           Down   sonetSts3c NoLoop    Enable    NRZ    Other      0    Clear Disable    No
```

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

Step 3 Enter the **dspln** *<bay.line>* command to display the configuration for a line, as shown in the following example:

```
M8850_NY.13.MPSM155[ATM].a > dspln 1.1
  Line Number             : 1.1
  Admin Status            : Up              Alarm Status              : Clear
  Loopback                : NoLoop          APS enabled               : Disable
  Frame Scrambling        : Enable          Number of ATM ports       : 0
  Xmt Clock source        : localTiming     Number of ATM partitions  : 0
  Line Type               : sonetSts3c      Number of ATM SPVC        : 0
  Medium Type(SONET/SDH)  : SONET           Number of ATM SPVP        : 0
  Medium Time Elapsed     : 823             Number of ATM SVC         : 0
  Medium Valid Intervals  : 2               Number of ATM Sig VC      : 0
  Medium Line Type        : ShortSMF        Number of FR ports        : 0
  Channelized             : No              Number of FR Connections  : 0
  Num of STS-Paths/AUs    : 1               Number of IMA Links       : 0
  Provisioned Paths/AUs   : 0
```

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

Step 4 Enter the **cnfln** command as follows to configure a SONET/SDH line:

```
M8850_NY.13.MPSM155[ATM].a > cnfln <bay.line> -slt <LineType> -clk <clockSource>
```

Table 2-3 lists the parameter descriptions for configuring SONET/SDH lines.

Table 2-3 Parameters for Configuring SONET/SDH Lines with the cnfln Command

Parameter	Description
bay.line	Identifies the line you want to configure. Replace *bay* with **1**, and replace *line* with the number that corresponds to the back card port to which the line is connected (in the range from 1 through 3). On an MPSM-T3E3-155, the bay number is always 1.
-slt *<LineType>*	Specifies the type of line you want to configure. Enter the keyword (**-slt**) followed by the *<LineType>* identifier. For example, **-slt 2**. The possible values for *<LineType>* are: • **1** = SONET • **2** = SDH
-clk *<clockSource>*	Specifies the clock source for this line. Enter the keyword (**-clk**) followed by the *<clockSource>* identifier. For example, **-clk 1**. • **1** = Selects a loopTiming source, where the receive clock on the back card is redirected to become the transmit clock source. • **2** = Selects a localTiming source, where the clock source from the backplane functions as the transmit clock source. The default is **-clk 2 (**localTiming).

Step 5 Enter the **dspln** command to verify your configuration changes.

Configuring T3 Lines

All line types are brought up with a default configuration. When configuring trunks between two Cisco MGX 8850 or Cisco MGX 8830 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 (T3) lines:

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

Use the following procedure 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 as follows to display a list of the lines.

```
M8850_NY.13.MPSM155[ATM].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 Enter the **dspln** command as follows to display the configuration for a line:

```
M8850_NY.13.MPSM155[ATM].a > dspln <bay.line>
```

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

Step 4 Enter the **cnfln** command as follows to configure a T3 line:

```
M8850_NY.13.MPSM155[ATM].a > cnfln <bay.line> -lt <LineType> -len <Length>
-oof <OOFCriteria> -cb <AIScBitsCheck> -rfeac <RcvFEACValidation> -sc <sendCode>
-clk <clockSource> -chan <channelization>
```

Table 2-4 lists the parameter descriptions for configuring T3 lines.

Table 2-4 Parameters for Configuring T3 Lines with the cnfln Command

Parameter	Description
bay.line	Identifies the line you want to configure. Replace *bay* with **1**, and replace *line* with the number that corresponds to the back card port to which the line is connected (in the range from 1 through 3). On an MPSM-T3E3-155, the bay number is always 1.
-lt <*LineType*>	Specifies the type of line you want to configure. Enter the keyword (**-lt**) followed by the <*LineType*> identifier. For example, **-lt 2**. The possible values for <*LineType*> are: • **1** = SONET • **2** = SDH
-len <*Length*>	Specifies the length of the line in meters, in the range from 0 through 64000 meters. Enter the keyword (**-len**) followed by the <*Length*> in meters. For example, **-len 2**. **Note** On a T3 line, you must set the line length to match the physical length of the cable. Setting this value to a value higher than the actual length of the cable may cause a higher output drive from the card. However, this will not impact the overall power consumption or heat dissipation of the card.
-oof <*OOFCriteria*>	Specifies the threshold for triggering an out-of-frame condition. Enter the keyword (**-oof**) followed by the <*OOFCriteria*> identifier. For example, **-oof 1**. The possible values for <*OOFCriteria*> are: • **1** = 3 out of 8. An out-of-frame condition is declared if at least 3 out of 8 framing bits are in error. • **2** = 3 out of 16. An out-of-frame condition is declared if at least 3 out of 16 framing bits are in error.
-cb <*AIScBitsCheck*>	Determines whether the node checks the C-bit in response to AIS. Enter the keyword (**-cb**) followed by the <*AIScBitsCheck*> identifier. For example, **-cb 2**. The possible values for <*AIScBitsCheck*> are: • **1** = check the C-bit • **2** = ignore the C-bit
-rfeac <*RcvFEACValidation*>	Sets FEAC (far-end alarm and control) code validation criteria. Enter the keyword (**-rfeac**) followed by the <*RcvFEACValidation*> identifier. For example, **-rfeac 1**. The possible values for <*RcvFEACValidation*> are: • **1** = 4 out of 5*:* a valid FEAC code is declared if 4 of 5 codes match. • **2** = 8 out of 10: a valid FEAC code is declared when 8 of 10 codes match.
-sc <*sendCode*>	Identifies the current line send code. Enter the keyword (**-sc**) followed by the <*sendCode*> identifier. For example, **-sc 2**.

Table 2-4 Parameters for Configuring T3 Lines with the cnfln Command (continued)

Parameter	Description
-clk <*clockSource*>	Specifies the clock source for this line. Enter the keyword (**-clk**) followed by the <*clockSource*> identifier. For example, **-clk 1**. The possible values for <*clockSource*> are: • **1** = Selects a loopTiming source, where the receive clock on the back card is redirected to become the transmit clock source. • **2** = Selects a localTiming source, where the clock source from the backplane functions as the transmit clock source. The default is **2** (localTiming).
-chan <*channelization*>	Enables/disables channelization on the current line. Enter the keyword (**-chan**) followed by the <*channelization*> identifier. For example, **-chan 2**. The possible values for <*channelization*> are: • **1** = Disabled • **2** = Enabled

Step 5 Enter the **dspln** command to verify your configuration changes.

Configuring E3 Lines

All line types are brought up with a default configuration. When configuring trunks between two Cisco MGX 8850 or Cisco MGX 8830 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
- Transmit trace string

Use the following procedure 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 as follows to display a list of the lines:

```
M8850_NY.13.MPSM155[ATM].a > dsplns
```

Step 3 Enter the **dspln** command as follows to verify your configuration changes:

```
M8850_NY.13.MPSM155[ATM].a > dspln <bay.line>
```

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

Step 4 Enter the **cnfln** command as follows to configure an E3 line:

```
M8850_NY.13.MPSM155[ATM].a > cnfln <bay.line> -lt <lineType> -clk <clockSource> -txtrace
<TraceString>
```

Table 2-5 lists the parameter descriptions for configuring E3 lines.

Table 2-5 Parameters for Configuring E3 Lines with the cnfln Command

Parameter	Description
bay.line	Identifies the line you want to configure. Replace *bay* with **1**, and replace *line* with the number that corresponds to the back card port to which the line is connected (in the range from 1 through 3). On an MPSM-T3E3-155, the bay number is always 1. **Note** Use the **dsplns** command to see all line numbers on the current MPSM-T3E3-155.
-lt <*LineType*>	Specifies the types of E1 line. Enter the keyword (**-lt**) followed by the <*LineType*> identifier. For example, **-lt 17**. The possible values for <*LineType*> are: • **17** = e3g832frmronly • **18** = e3g751frmronly
-clk <*clockSource*>	Specifies the clock source for this line. Enter the keyword (**-clk**) followed by the <*clockSource*> identifier. For example, **-clk 1**. The possible values for <*clockSource*> are: • **1** = Selects a loopTiming source, where the receive clock on the back card is redirected to become the transmit clock source. • **2** = Selects a localTiming source, where the clock source from the backplane functions as the transmit clock source. The default is **2** (localTiming).
-txtrace <*TraceString*>	Specifies a transmit trace string for this line. This option allows you to transmit and display trail trace bytes. To test a line, use the **cnfln -txtrace** command to transmit a group of numbers, and then use the **dspln** command to verify that the numbers displayed in the command output are the same. Enter the keyword (**-txtrace**) followed by the <*TraceString*> number. For example, **-txtrace 17362**. The trace string number can be a maximum of 15 bytes. In Release 5, the MPSM-T3E3-155 supports only the transmit trace. The receive trace is not supported in Release 5.

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

Verifying Line Configuration

Use the following procedure to display the configuration of a line.

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

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

```
M8850_NY.13.MPSM155[ATM].a > dsplns
```

Step 3 Enter the **dspln** command as follows to display the configuration of a single line:

```
M8850_NY.13.MPSM155[ATM].a > dspln <bay.line>
```

Replace *bay* with 1, and replace *line* with a number in the range from 1 through 3.

Note On an MPSM-T3E3-155, the bay number is always 1.

The line configuration appears as shown in the following example:

```
M8850_NY.13.MPSM155[ATM].a > dspln 1.2
  Line Number             : 1.2
  Admin Status            : Down          Alarm Status              : Clear
  Loopback                : NoLoop        APS enabled               : Disable
  Frame Scrambling        : Enable        Number of ATM ports       : 0
  Xmt Clock source        : localTiming   Number of ATM partitions  : 0
  Line Type               : sonetSts3c    Number of ATM SPVC        : 0
  Medium Type(SONET/SDH)  : SONET         Number of ATM SPVP        : 0
  Medium Time Elapsed     : 0             Number of ATM SVC         : 0
  Medium Valid Intervals  : 0             Number of ATM Sig VC      : 0
  Medium Line Type        : Other         Number of FR ports        : 0
  Channelized             : No            Number of FR Connections  : 0
  Num of STS-Paths/AUs    : 0             Number of IMA Links       : 0
  Provisioned Paths/AUs   : 0

M8850_NY.13.MPSM155[ATM].a >
```

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

This section describes the following tasks:

- Adding Intracard APS Lines
- Adding Intercard APS Lines

Adding Intracard APS Lines

Use the following procedure to establish redundancy between two lines on the same card.

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 to establish redundancy between two lines:

```
M8850_NY.13.MPSM155[ATM].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, line 2, enter 2.1.2.

Note On an MPSM-T3E3-155, the bay number is always 1.

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 always matches.

Replace <*archmode*> with the option number that selects the automatic protection switching (APS) architecture mode (or protocol) you want to use. Table 2-6 shows the option numbers and the architecture modes they select, and whether that mode is revertive.

Table 2-6 APS Line Architecture Modes

Option	Description	Revertive
1	Selects 1+1 signaling (transmission on both working and protect lines) for intracard APS.	Yes
2	Selects 1:1 signaling (transmission on either the working line or the protect line) for intracard APS.	Yes
3	Selects G.783, Annex B 1+1 signaling.	No.

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

```
M8850_NY.13.MPSM155[ATM].a > addapsln 1.1.1 1.1.2 1
```

Step 4 To display a list of all the APS lines on an MPSM-T3E3-155 card, enter the **dspapslns** command on the active MPSM-T3E3-155 card.

Step 5 To display information on a specific APS line, enter the **dspapsln** <*slot.bay.line*> command on the active MPSM-T3E3-155 card.

Note For information on managing redundant APS lines, refer to Chapter 10, "Switch Operating Procedures," in the *Cisco MGX 8850 (PXM1E/PXM45), Cisco MGX 8950, Cisco MGX 8830, and Cisco MGX 8880 Configuration Guide, Release 5*

Adding Intercard APS Lines

Use the following procedure to establish redundancy between two lines on different cards.

Note For intercard APS to operate properly, an APS connector must be installed between the two cards. For more information about the APS connector and how to install it, refer to the *Cisco MGX 8850 (PXM1E/PXM45), Cisco MGX 8950, Cisco MGX 8830, and Cisco MGX 8880 Hardware Installation Guide, Releases 2 Through 5*.

Step 1 Establish a configuration session with the appropriate MPSM-T3E3-155 card 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 MPSM-T3E3-155 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 Enter the **dspapsbkplane** command to verify that an APS connector is installed between the cards that host the working and protection lines.

Step 5 Enter the **addapsln** command as follows to establish redundancy between two lines:

```
M8850_NY.13.MPSM155[ATM].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 2-7 shows the option numbers and the architecture modes (or protocols) they select, and whether that mode is revertive. Note that option 2 (1:1 signaling) is not available for intercard APS.

Table 2-7 APS Line Architecture Modes

Option	Description	Modes	Revertive
1	Selects 1+1 signaling (transmission on both working and protect lines) for intracard APS.	UNI and Bi-directional	Yes
3	Selects G.783, Annex B 1+1 signaling.	UNI and Bi-directional	No

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

```
M8850_NY.13.MPSM155[ATM].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 If the **dspapsbkplane** command output shows different values for each of the two cards, 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 MPSM-T3E3-155 card, enter the **dspapslns** command.

Note For information on managing redundant APS lines, refer to Chapter 10, "Switch Operating Procedures," in the *Cisco MGX 8850 (PXM1E/PXM45), Cisco MGX 8950, Cisco MGX 8830, and Cisco MGX 8880 Configuration Guide, Release 5*

Channelizing SONET, SDH, and DS3 (T3) Lines into Paths

The MPSM-T3E3-155 supports clear channel services and channelized lines.

Note The MPSM-T3E3-155 requires a license for channelization. Without a channelization license, you cannot channelize SONET or SDH lines. Enter the **dspliccd** command to view the feature licenses that have been assigned to or are needed by the MPSM-T3E3-155 card.

If a line is not channelized, it is said to be a *clear channel* line, and the full bandwidth of that line is dedicated to a single channel or *path* that carries broadband services.

When a line is channelized, it is logically divided into smaller bandwidth channels called paths. These paths can carry an ATM or Frame Relay payload by themselves, or they can be channelized into smaller bandwidth paths that carry the ATM or Frame Relay payload. The sum of the bandwidth on all paths cannot exceed the line bandwidth. Channelized OC3 lines carry broadband and narrowband services, and channelized DS3 (T3) lines carry narrowband services only.

If you are already familiar with configuring Cisco MGX 8850 switches, you know that most cards provision services (such as ATM or Frame Relay) when assigning ports to a line. When a Synchronous Optical Network (SONET) or Synchronous Digital Hierarchy (SDH) line is channelized, these services are provisioned when assigning a port to a path. Channelized paths are simply a logical layer between the port and the line.

The channelization feature in this release allows the following types of channelization:

- single Optical Carrier-3 (OC-3) line into any combination of STS-3 or STM-1/AU-4 sub-paths, for a total path size of 155.52 Mbps.
- single DS3 (T3) line into DS1 sub-paths, for a total path size of 736 Mbps.

A SONET synchronous transport signal (STS) is an electrical signal that gets combined with other electrical signals before being transported over an optical line. An STS-3 path has the same bandwidth as an OC-3 line, but it is not labeled with the OC rating if it is merely a path within a higher bandwidth line. For example, you can configure up to 3 STS-1 width paths in an OC-3 line.

A synchronous transport module (STM) signal is the SDH equivalent of the SONET STS, but the numbers are different for each bandwidth. In this guide, the STM term refers to both path widths and optical line rates. The paths within an STM signal are called Administrative Units (AUs).

Channelizing a line is a two-step process:

- Channelize the line into paths
- Bring up the individual paths and configure them as required

Because paths support ATM and Frame Relay on different payloads, you need to specify which payload type will travel over each path, and you may want to configure additional options for each payload and path type. The sections that follow describe how to channelize lines, bring up paths, and configure paths.

When a line is brought up initially, there is one path with a width of **3**. On a SONET line, a path width of **3** indicates that the line contains one clear channel STS-3 path. On an SDH line, a path width of **3** indicates that the line contains one clear channel STM-1/AU-4. To implement channelization, you need to set the path to the width **1**. On SONET lines, a width of **3** results in one path only. On SDH lines, a width **3** path can be channelized into structured Virtual Tributaries (VTs).

The following sections provide an overview of channelization features and concepts that are specific to the MPSM-T3E3 155.

- "MPSM-T3E3-155 Line Channelization"
- "Channelization in SDH Networks Versus SONET Networks"
- "VTG and TUG-3 Configuration Elements"
- "Channelized Line Examples"

For step-by-step instructions on channelizing lines and configuring paths on an MPSM-T3E3-155 card, refer to the following sections as appropriate to the line/path you want to configure:

- "Channelizing a DS3 (T3) Line"
- "Channelizing a SONET Line"
- "Channelizing an SDH Line"
- "Bringing Up and Configuring a DS3 (T3) Path"
- "Bringing Up and Configuring E3 Paths"
- "Bringing Up and Configuring DS1(T1) and E1 Paths"
- "Bringing Up and Configuring TUG-3s"

MPSM-T3E3-155 Line Channelization

The channelization feature allows you to create a simple or complex combination of paths for each line on your MPSM-T3E3-155 back card. The simplest approach assigns the same bandwidth to each path. For an OC-3/STM-1 line, the simplest approach is to configure one STS-3/STM-1 path.

A more complex approach creates different path widths within the same SONET/SDH/T3 line. Depending on the type of line being channelized and the channelization scheme used, different types of paths are created.

Table 2-8 lists the SONET, SDH, and T3 path types that are supported in Release 5 of the MPSM-T3E3-155 card.

Table 2-8 Supported Paths

SONET	SDH	T3 (DS3)
STS-1	AU-3	—
STS-3	AU-4	—
DS3 (T3)	DS3 (T3)	—
E3	E3	—
DS1	DS1	DS1
E1	E1	—
VT 1.5	VC-11/TU-11	—
VT 2	VC-12/TU-12	—
—	TUG-3	—
DS0 (Frame Relay only)	DS0 (Frame Relay only)	DS0 (Frame Relay only)

Note The Release 5 CLI shows SONET naming conventions in place of their equivalent SDH terms. For example, the display for SDH AU paths shows “STS,” the display for VC/TU paths shows “VT,” and so forth. Refer to Table 2-11 for a comparison of equivalent SONET and SDH terms.

Table 2-9 shows the channel payloads that are supported by each interface type.

Table 2-9 Channlized Interface Mapping

Path/Interface Type	Possible Channel Payloads
STS-1	• DS3 (T3) • E3 • VT 1.5/DS1 • VT 2.0/E1
AU-4	• clear channel DS3 • clear channel E3 • VC- 11/DS1 • VC-12/E1 • VT-structured
AU-3	• DS3 • E3 • VT 1.5/DS1 • VT 2.0/E1
DS3	DS1
VT 1.5	DS1

Table 2-9 Channlized Interface Mapping (continued)

Path/Interface Type	Possible Channel Payloads
VC-11	DS1
VT 2.0	E1
VC-12	E1

You can assign ATM service to any level path down to DS1, and you can assign Frame Relay service to any level path down to DS0. For example, an STS-1 path can be channelized into two individual DS1 paths, so that one DS1 path carries ATM service, and the other DS1 path carries DS0s with Frame Relay service.

Note ATM service is carried on an STS-3 down to DS1 or *n*xDS1 (IMA), where *n* is the number of configured DS1s. See the "Adding ATM Ports" section in Chapter 3, "Provisioning ATM Services," to configure ATM service on DS1 lines. Frame Relay is carried on STS-3 down to DS1 or *n*xDS0, where *n* is the number of configured DS0s. See the "Adding Frame Relay Ports" section in Chapter 4, "Provisioning Frame Relay Services," to configure Frame Relay DS1s/DS0s on a line.

Keep the following in mind when configuring paths on a channelized line:

- You cannot configure channelization on a line that is already carrying active paths. Before you can configure a previously channelized line, you must bring down all previously configured paths on that line with the **dnpath** command.
- You cannot configure a channelized line to be in clear channel mode if it is carrying active paths. Before you can configure a channelized line to be clear channel, you must bring down all previously configured paths on that line with the **dnpath** command.
- The sum of the bandwidths on the provisioned interfaces cannot exceed the total bandwidth of the physical line (OC3 or DS3).
- A single STS-1 or AU-3 can carry one E3 or one DS3 (T3).
- A single STS-1 or AU-3 can carry either twenty-eight DS1s or twenty-one E1s. You cannot map DS1s (T1s) and E1s into the same STS-1.
- All tributaries within an AU-3 (or TUG-3 within an AU-4) must be the same size: either VC-11/TU-11 or VC-12/TU-12.
- A single TUG-3 in an AU-4 can carry twenty-one E1s, twenty-eight T1s, one E3, or one T3.
- A single AU-4 can carry eighty-four T1s, sixty-three E1s, three T3s, or three E3s.
- You cannot map channelized DS3 (T3) lines or paths into VC3/TU-3s, TUG-3s, or AU-4s.
- ATM service can be selected at any rate down to DS1/E1 for OC-3/STM-1/T3 interfaces.
- Frame Relay service can be selected at any rate down to DS0 for OC-3/STM-1/T3 interfaces.
- A single STS-1 carries one E3 or one T3.
- A single SDH VC-11/TU-11s carries a single DS1.

- A single SDH TU-12/VC-12 carries a single E1.
- Once a line is configured to be channelized, all the paths that it supports come into existence in non-provisioned (down) mode. You must enter the **uppath** command to bring up the paths you want to configure, and then enter the **cnfpath** command to configure the paths. The **cnfpath** command parameters are different, depending on the type of path you are configuring. Table 2-10 describes the possible **cnfpath** command parameters for all path types. When entering the **cnfpath** command, take care to use only the parameters that are valid for the path type you are configuring.

Table 2-10 cnfpath Command Parameters

Parameter	Description
-<*path filter*>	Specifies the type of path you are configuring. The possible path types are as follows: • **-sts**: STS/AU path • **-ds3**: DS3 path • **-e3**: E3 path • **-vt**: VT/TU path • **-ds1**: DS1 path • **-e1**: E1 path
<*path_id*>	Identifies the path you are configuring. **Note** Enter the **dsppaths -all** command to see the path numbers for all paths on the current MPSM-T3E3-155 card. **Note** Only bay 1 is supported for MPSM-T3E3-155 cards.
-payload <*sts_au_payload_type*>	Specifies the payload type. Enter the keyword (**-payload**) followed by the appropriate number that corresponds with the payload type you want to set. For example, **-payload 8**. The possible values for <*sts_au_payload_type*> are: • **2** = unspecified. Use this option to concatenate channelized paths into a single path. • **3** = DS3 • **4** = VT15VC11 • **5** = VT2VC12 • **8** = E3 • **9** = VT structured. This option is available only for SDH lines that are configured for a single path (width 3). **Note** You can assign DS3 payloads to STS-1/STM-0 paths only.

Table 2-10 cnfpath Command Parameters (continued)

Parameter	Description
-width <*width_spec*>	Specifies the width of the path. Enter the keyword (**-width**) followed by the <*width_spec*> identifier. For example, **-width 1**. The possible values for <*width_spec*> are: • **1** = OC3 is channelized into three STS-1/STM-0 (AU-3) paths. • **3** = OC3 contains one STS-3/STM-1 (AU-4) path. This is the default setting. **Note** This parameter is available only for SONET/SDH lines that are in a down state.
-txtrace <*trace-string*>	Specifies a transmit trace string for this line. This option allows you to transmit and display trail trace bytes. To test a line, use the **cnfln -txtrace** command to transmit a group of numbers, and then use the **dspln** command to verify that the numbers displayed in the command output are the same. Enter the keyword (**-txtrace**) followed by the <*trace-string*> number. For example, **-txtrace 1736297**. On SDH and E3 lines, the <*trace-string*> is a number that can be a maximum of 15 bytes. ON SONET lines, the <*trace-string*> is a number that can be a maximum of 62 bytes. In Release 5, the MPSM-T3E3-155 supports only the transmit trace. The receive trace is not supported in Release 5.
-cb <*AIScBitsCheck*>	For DS3 (T3) paths, this option specifies whether to ignore or check the AIS C-bit. Enter the keyword (**-cb**) followed by the <*AIScBitsCheck*> identifier. For example, **-cb 1**. The possible values for <*AIScBitsCheck*> are: • **1** = Chk C-bit • **2** = Ignore C-bit
-oof <*OOF Criteria*>	For DS3 (T3) paths, this option specifies the threshold for triggering an out-of-frame condition. Enter the keyword (**-oof**) followed by the <*OOF Criteria*> identifier. For example, **-oof 1**. The possible values for <*OOF Criteria*> are: • **1** = 3 out of 8. An out-of-frame condition is declared if at least 3 out of 8 framing bits are in error. • **2** = 3 out of 16. An out-of-frame condition is declared if at least 3 out of 16 framing bits are in error.

Table 2-10 cnfpath Command Parameters (continued)

Parameter	Description
-lt <*Line Type*>	For DS3 (T3), E3, DS1, and E1 paths, this option specifies the line type you are configuring. Enter the keyword (**-lt**) followed by the <*Line Type*> identifier. For example, **-lt 2**. The possible values for this parameter are as follows: DS3 (T3): • **1** = ds3cbitadm • **2** = ds3cbitplcp • **9** = dsx3M23 • **11** = dsx3CbitParity E3: • **17** = e3g832frmronly • **18** = e3g751frmronly DS1: • **2** = dsx1ESF • **3** = dsx1SF E1: • **4** = dsx1E1 • **5** = dsx1E1CRC • **6** = dsx1E1MF • **7** = dsx1E1CRCMF
-clk <*Clock Source*>	For DS3 (T3), E3, DS1, and E1 paths, this option determines whether the transmit clock comes from the backplane (local timing) or the receive clock on the line (looped timing). Enter the keyword (**-clk**) followed by the <*Clock Source*> identifier. For example, **-clk 2**. The possible values for <*Clock Source*> are as follows: • **1** = loopTiming source—The receive clock on the back card is redirected to become the transmit clock source. • **2** = localTiming source (default)—The clock source from the backplane functions as the transmit clock source.
-feac <*RcvFEAC*>	For DS3 (T3) and E3 paths, this option specifies the threshold for triggering an FEAC condition. Enter the keyword (**-feac**) followed by the <*RcvFEAC*> identifier. For example, **-feac 1**. The possible values for <*RcvFEAC*> are as follows: • **1** = Four out of five • **2** = Eight out of ten • **3** = disable

Table 2-10 cnfpath Command Parameters (continued)

Parameter	Description
-lpb <*Loopback*>	For DS3 (T3), E3, DS1, and E1 paths, this option specifies the loopback type for the line type. Enter the keyword (**-lpb**) followed by the <*Loopback*> identifier. The possible values for <*Loopback*> are as follows: • **1** = No loopback • **2** = Local loopback • **3** = Remote loopback The entry for no loopback (**1**) removes any existing loopback.
-chan <*Channelization*>	For DS3 (T3) paths, this option enables or disables channelization on the current line. Enter the keyword (**-chan**) followed by the <*Channelization*> identifier. For example, **-chan 2**. The possible values for <*Channelization*> are as follows: • **1** = Disabled • **2** = Enabled

Channelization in SDH Networks Versus SONET Networks

SONET networks and SDH networks use different terminology to describe the same elements in a channelized line. Table 2-11 lists the SONET terms and their equivalent SDH terms.

Table 2-11 SONET Terminology versus SDH Terminology

SONET term	Equivalent SDH Term
STS-3	STM-1/AU-4
STS-1	STM-0/AU-3
VT	Tributary Unit (TU) or Virtual Containers (VC).
VTG	TUG
VT 1.5	TU-11
VT 2.0	TU-12

SONET path and interface numbering is different from SDH path and interface numbering. Table 2-12 defines the interface and path numbering for SONET and T3 lines, and Table 2-13 defines the interface and path numbering for SDH lines.

Table 2-12 Interface Numbering in SONET Networks

SONET Path Type	Path Number
STS paths	*bay.line.sts*
DS3(T3)/E3 paths	*bay.line.ds3*
VT paths	*bay.line.sts:vtg.vt*
DS1(T1)/E1 paths	*bay.line.sts:ds1*

Table 2-13 Interface Numbering in SDH Networks

SDH Path Type	Path Number
AU paths	*bay.line.AU*
DS3(T3)/E3 paths	*bay.line.ds3*
TU paths	*bay.line.au:tug3.tu*
DS1(T1)/E1 paths	*bay.line.au:tug3.ds1*

Note In the Release 5 CLI output, the term "DS3" is used for both T3 and E3 lines, and the term "DS1" is used for both T1 and E1 lines.

Note On the MPSM-T3E3-155, the *bay* is always 1.

Tip Enter the **dsppaths -all** command to see the path identifies for all paths on the current MPSM-T3E3-155.

VTG and TUG-3 Configuration Elements

When OC3/STM-1 lines are channelized to carry tributaries, the tributaries are grouped together in a logical entity called a tributary group. In SONET networks, the tributary groups are called virtual tributary groups (VTGs). In SDH networks, the tributary groups are called Tributary Unit Groups (TUGs). Each individual VTG or TUG is a manageable path with a defined rate and format.

Note TUGs and VTGs are not interfaces, and cannot be monitored for faults and performance.

In SONET networks, a single STS-1 line carries seven separate VTGs. Each individual VTG can be configured independently from the other VTGs in that same STS-1, and can carry VTs of any size.

In SDH networks, a single STM-1 (AU-4) line carries three separate TUG-3s. Each individual TUG can be configured independently from the other TUGs in that same STM-0, and can carry TUs of any size.

Table 2-14 summarizes the elements of tributary group configuration.

Table 2-14 Tributary Group Configuration Elements

Interface Configured	Payload Type	Tributary Groups Created	Interfaces Created
STS-1/AU-3	DS3/E3	—	One DS3/E3 is created
STS-1/AU-3	VT 1.5	Seven VTGs created	Twenty-eight VT 1.5/TU-11s and twenty-eight DS1s are created
STS-1/AU-3	VT 2	Seven VTGs created	Twenty-one VT 2/TU-12s and twenty-one E1s are created

Table 2-14 Tributary Group Configuration Elements (continued)

Interface Configured	Payload Type	Tributary Groups Created	Interfaces Created
AU-4	DS3/E3	Three TUG-3s are created	Three TU-3s and three DS3/E3s are created
AU-4	VC-11/TU-11	Three TUG-3s are created	Eighty-four TU-11s and eighty-four DS1s are created
AU-4	VC-12/TU-12	Three TUG-3s are created	Sixty-three TU-12s and sixty-three E1s are created
AU-4	VT Structured	Three TUG-3s are created	—
VTG	VT 1.5 or VC-11/TU-11	—	Four VT 1.5s and four DS1s are created (for SONET) or Four VC-11//TU-11s and four DS1s are created (for SDH)
VTG	VT 2 or VC-12/TU-12	—	Three VT 2 and three E1s are created (for SONET) or Three VC-12/TU-12s and three E1s are created (for SDH)
TUG-3	TU-11	—	Twenty-eight VC-11/TU-11s and twenty-eight DS1s are created (SDH only)
TUG-3	TU-12	—	Twenty-one VC-12/TU-12s and twenty-one E1s are created (SDH only)

Note The configuration of a tributary group can be changed as long as the interfaces mapped into that tributary group are not configured.

Channelized Line Examples

The sections that follow provide examples of channelized DS3 (T3), SONET, and SDH lines.

Note There are several options for channelizing lines, depending on your network needs, as long as the total path size remains within the total bandwidth limit of the physical line. The examples that follow provide a basic idea of how channelization is configured for different MPSM-T3E3-155 lines.

Example of a Channelized DS3 (T3) Line

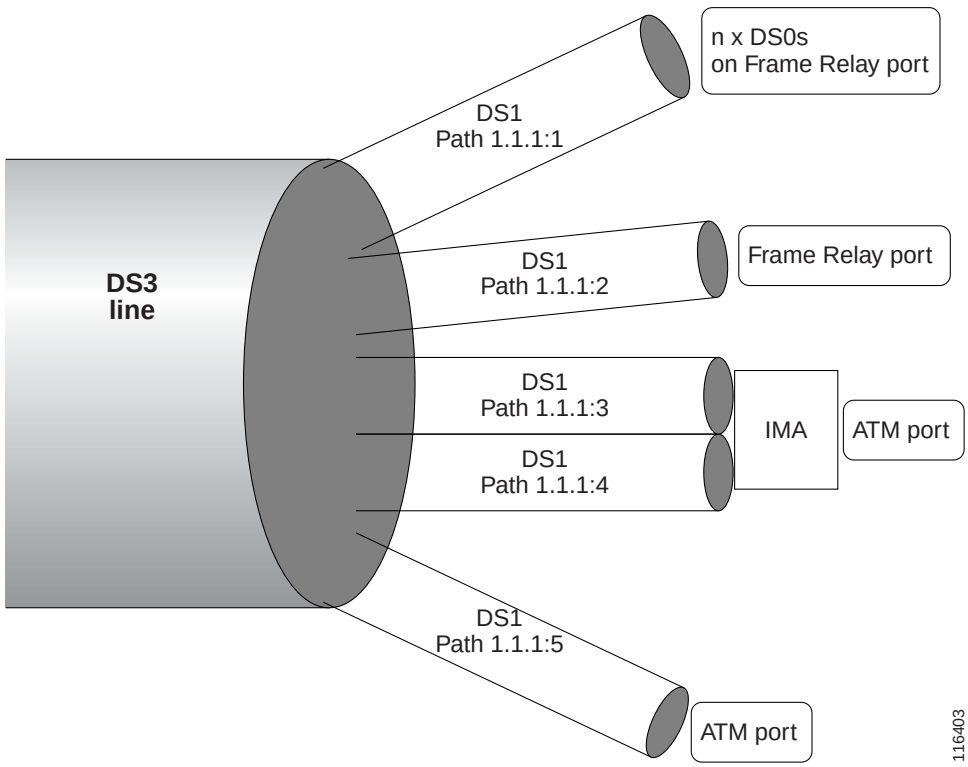
Figure 2-1 shows one possible way to channelize a DS3 (T3) line down to DS1 paths. In this example, the DS3 (T3) line is mapped into three AU-3 (STM-0) paths. The paths are mapped as follows:

- The DS3 (T3) line is channelized into twenty-eight individual DS1 paths.

Note This example provides a basic idea of how channelization is configured on a DS3 (T3) line. Therefore, Figure 2-1 shows the configuration for only five of the twenty-eight DS1 paths. Note that when you enable channelization on a DS3 (T3) line, twenty-eight DS1 paths are created and put in a *Down* state.

- DS1 path 1.1.1:1 is channelized into DS0s on a Frame Relay port.
- DS1 path 1.1.1:2 ends at a Frame Relay port.
- DS1 paths 1.1.1:3 and 1.1.4 are grouped into a single IMA group on an ATM port.
- DS1 path 1.1.1:5 ends on an ATM port.

Figure 2-1 Example of a Channelized DS3 (T3) line



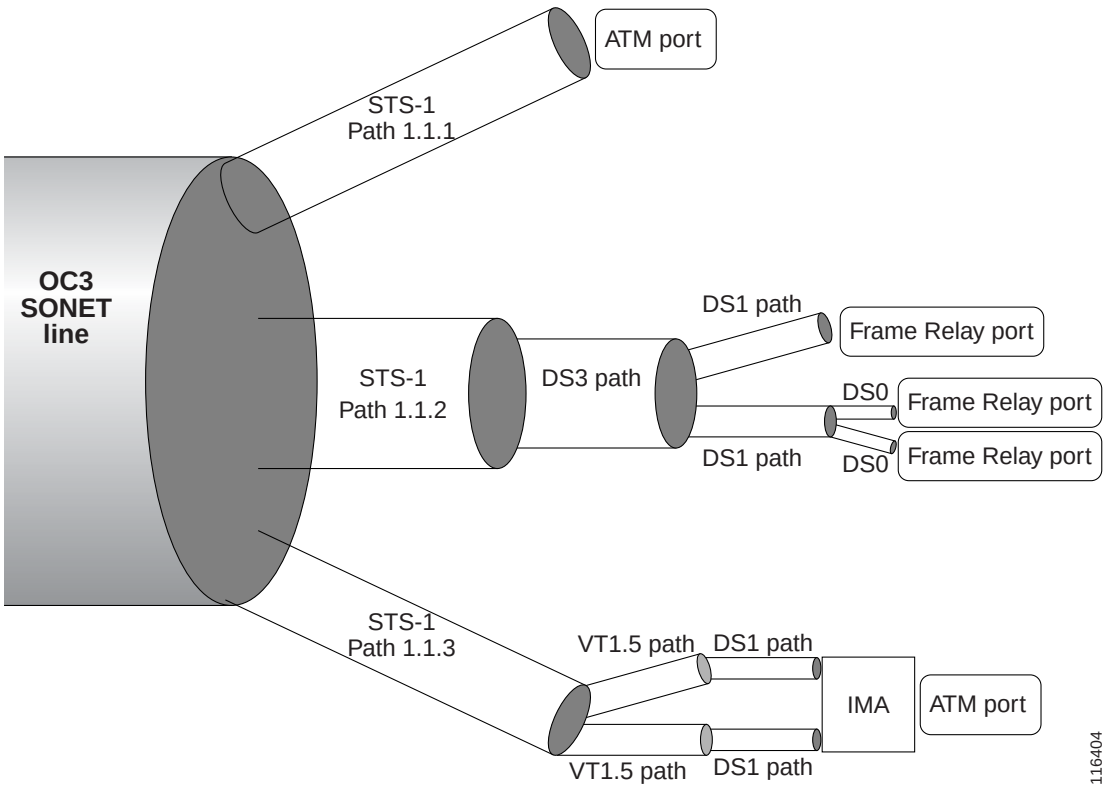
Example of a Channelized OC3 SONET Line

Figure 2-2 shows one possible way to channelize an OC3 line down to DS0s. In this example, the OC3 is channelized into three STS-1 paths. The paths are mapped as follows:

- The OC3 SONET line is channelized into three individual STS-1 paths.
- STS-1 path 1.1.1 provides direct ATM service over a single path.
- STS-1 path 1.1.2 provides Frame Relay service to three ports. In this case, the STS-1 path is channelized into a single DS3 (T3) path, which is then channelized into two separate DS1 paths. One DS1 path connects directly to a Frame Relay port, while the other DS1 path is channelized into two separate DS0s that connect to Frame Relay ports.
- STS-1 path 1.1.3 provides ATM IMA service to an ATM Port. STS-1 path 1.1.3 is channelized into twenty-eight VT 1.5 paths. Each VT 1.5 path carries a DS1 path. The DS1 paths are bundled into an IMA group that ends at an ATM port.

Note This example provides a basic idea of how channelization is configured on a SONET line. Therefore, Figure 2-2 shows the configuration for only two of the twenty-eight DS1 and VT 1.5 paths in each instance.

Figure 2-2 Example of a Channelized SONET Line



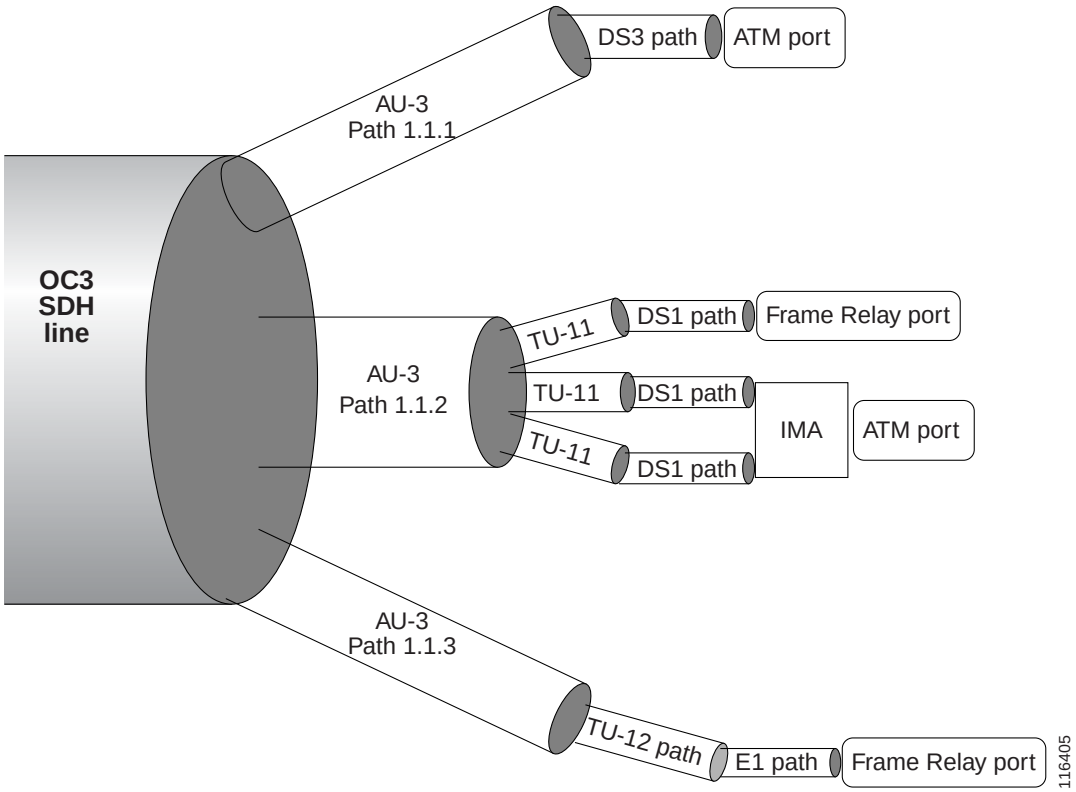
Example of a Channelized OC3 SDH Line

Figure 2-3 shows one possible way to channelize an OC3 line down to DS3, DS1, and E1 paths. In this example, the OC3 is channelized into three AU-3 (STM-0) paths. The paths are mapped as follows:

- The OC3 SONET line is channelized into three individual AU-3 (STM-0) paths.
- AU-3 (STM-0) path 1.1.1 carries a DS3 (T3) path that ends at an ATM port.
- AU-3 (STM-0) path 1.1.2 is channelized into twenty-eight individual TU-11s. Each TU-11 carries a single DS1 path. Two of DS1 paths are combined into an IMA group that ends at an ATM port. The other DS1 path ends at a Frame Relay port.
- AU-3 (STM-0) path 1.1.3 is channelized into a single TU-12 path, which is further channelized into twenty-one E1 paths that end at a Frame Relay port.

Note This example provides a basic idea of how channelization is configured on an SDH line. Therefore, Figure 2-3 shows the configuration for only three of the twenty-eight TU-11s and DS1s on the AU-3 path 1.1.2, and path 1.1.3 shows only one E1 path.

Figure 2-3 Example of a Channelized SDH OC3 Line



Channelizing a DS3 (T3) Line

When a DS3 (T3) line is in clear channel mode, it carries a single DS3 (T3) path. You can channelize the DS3 (T3) line so that it contains three separate DS1 paths.

Note Use this procedure to channelize and configure a physical DS3 (T3) line on a BNC-3-T3 back card only. If you want to further channelize a SONET or SDH DS3 (T3) path, follow the procedures in the "Bringing Up and Configuring a DS3 (T3) Path" section later in this chapter.

Use the following procedure to channelize a DS3 (T3) line into twenty-eight DS1 paths.

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

Step 2 Enter the **cc** command to change to the MPSM-T3E3-155 card you want to configure.

Step 3 If you have not done so already, bring up the line to be configured as described in the "Bringing Up Lines" section, which appears earlier in this chapter.

Step 4 Enter the **dsplns** command to ensure that the line you want to channelize is up, and to obtain the line number, as shown in the following example:

```
M8830_CH.12.MPSM155[ATM].a > dsplns
  Line Line      Line          Line      Length   OOF          AIS         Valid   Alarm
  Num  State     Type          Lpbk      (meters) Criteria     cBitsCheck Intvls  State
  ---- ----- --------------- ---------- -------- ----------- ---------- ------ ----------
  1.1    Up  dsx3CbitParity     NoLoop         0   3Of16Bits     Check        96    Clear
  1.2    Up  dsx3CbitParity     NoLoop         0   3Of16Bits     Check        25    Clear
  1.3  Down  dsx3CbitParity     NoLoop         0   3Of16Bits     Check         0    Clear
```

Step 5 Enter the **cnfln** <*bay.line*> **-chan 2** command to configure a valid line type for channelization. Replace *bay.line* with the DS3 (T3) line number in the format 1.*n*, where *n* is the number of the line you want to channelize. The **-chan 2** option channelizes the line into twenty-eight individual DS1 sub-paths.

Note On an MPSM-T3E3-155 card, the bay number is always 1.

Note **9** and **11** are the only valid line types for channelized DS3 (T3) lines.

In the following example, the user configures line 1.2 with the line type *dsx3CbitParity:*

```
M8830_CH.12.MPSM155[ATM].a > cnfln 1.2 -lt 11 -chan 2
```

Step 6 Enter the **dsppaths -all** or **dsppaths -ds1** command to ensure that the DS3 (T3) line has been channelized into twenty-eight individual DS1 sub-paths. The DS1 lines have path numbers in the following format: *bay.line.ds1*, where *bay.line* is the number of the DS3 (T3) line you channelized in Step 5, and *ds1* identifies the individual DS1 path.

In the following example, the user enters the **dsppaths -all** command to display all paths on the current MPSM-T3E3-155 card:

```
M8830_CH.12.MPSM155[ATM].a > dsppaths -all

   Path       Path   Admin     DS1         Path    Alarm    Oper     Path
              Type   Status    Type        Lpbk    Status   State    Service
 ----------- ----- -------- ----------- -------- -------- -------- ------------
      1.2:1   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid
      1.2:2   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid
      1.2:3   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid
      1.2:4   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid
      1.2:5   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid
      1.2:6   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid
      1.2:7   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid
      1.2:8   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid
      1.2:9   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid
     1.2:10   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid
     1.2:11   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid
     1.2:12   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid
     1.2:13   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid
     1.2:14   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid
     1.2:15   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid
     1.2:16   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid
     1.2:17   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid
     1.2:18   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid

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

   Path       Path   Admin     DS1         Path    Alarm    Oper     Path
              Type   Status    Type        Lpbk    Status   State    Service
 ----------- ----- -------- ----------- -------- -------- -------- ------------
     1.2:19   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid
     1.2:20   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid
     1.2:21   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid
     1.2:22   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid
     1.2:23   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid
     1.2:24   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid
     1.2:25   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid
     1.2:26   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid
     1.2:27   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid
     1.2:28   ds1     Down      dsx1ESF   NoLoop  Unknown     Down      invalid
```

Step 7 Bring up and configure the individual DS1 paths as described in the "Bringing Up and Configuring DS1(T1) and E1 Paths" section later in this chapter.

Channelizing a SONET Line

When a SONET line is in clear channel mode, it carries a single STS-3 path. You can channelize the SONET line so that it contains three separate STS-1 paths.

Use the following procedure to channelize a SONET line into three STS-1 paths.

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

Step 2 Enter the **cc** command to change to the MPSM-T3E3-155 card you want to configure.

Step 3 If you have not done so already, bring up the line to be configured as described in the "Bringing Up Lines" section, which appears earlier in this chapter.

Step 4 Enter the **dsppaths -sts** command to see the path ID numbers for all STS-1 paths on the current card, and obtain the path ID for the path you want to channelize.

Step 5 Enter the **cnfpath -sts** <*path_id*> **-width 1** command to set the path width. Although this command has many options, you must channelize the line before you bring up and configure individual paths. The command format that channelizes the line is as follows:

```
M8850_NY.13.MPSM155[ATM].a > cnfpath -sts <path_id> -width 1
```

Replace the *path_id* variable with the complete path number in the format *bay.line.sts*, as shown in Table 2-10.

Note The MPSM-T3E3-155 card supports two widths: STS-1/STM-0 and STS-3/STM-1. To channelize the line, you must select STS-1/STM-0. For more information about the **-width** <*width_spec*> parameter, see Table 2-10.

The following example channelizes line 1.1.1 into three individual STS-1 paths:

```
M8850_NY.13.MPSM155[ATM].a > cnfpath 1.1.1 -width 1
```

Step 6 Enter the **dsppaths -sts** command to verify that the line has been channelized into three separate STS paths, as shown in the following example:

```
M8850_NY.13.MPSM155[ATM].a > dsppaths -sts

  Path     Path    Admin       Path        Path     Alarm    Oper
           Type    Status      Payload     Width    Status   State
 -------- -------- -------- ------------- ------- --------- ------
   1.1.1      sts     Down    unequipped        1   Unknown   Down
   1.1.2      sts     Down    unequipped        1   Unknown   Down
   1.1.3      sts     Down    unequipped        1   Unknown   Down

M8850_NY.13.MPSM155[ATM].a >
```

Note The software supports only the path widths described in Table 2-10. When you create a path by dividing a larger path or combining smaller paths, the software automatically creates additional paths to assure that all the available bandwidth is assigned to one of the available path sizes.

Note To change the path width on a line that has already been configured to support a path width of 1, enter the **dnpath -sts** <*path_id*> command to bring down the path, and then enter the **cnfpath -sts** <*path_id*> **-width 3** command. Note that all sub-paths must be in a down state before you can bring down a parent path.

Bringing Up and Configuring SONET Paths

After you split a SONET line into multiple paths, you are ready to bring up the individual paths. You must bring up the individual path or paths before you can assign a payload to that path and proceed with further channelization. Once you assign a payload to a path, the path is channelized into separate paths.

The following procedure describes how to bring up and configure a path for one of the following payload types:

- DS3 (T3)—If you choose a DS3 payload, then a single DS3 (T3) path is created and put in a DOWN state.
- E3—If you choose an E3 payload, then a single E3 path is created and put in a DOWN state.
- VT 1.5—If you choose a VT 1.5 payload, then twenty-eight VT 1.5 paths and twenty-eight DS1 paths are created and put in a DOWN state.
- VT 2—If you choose a VT 2 payload, then twenty-one VT 2 paths and twenty-one E1 paths are created and put in a DOWN state.
- Structured VT (SDH and width 3)—This option is not supported on SONET lines.

Use the following procedure to bring up and configure a SONET path.

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

Step 2 Enter the **cc** command to change to the MPSM-T3E3-155 card you want to configure.

Step 3 If you have not done so already, channelize the line as described in the previous section, "Channelizing a SONET Line."

Step 4 Enter the **dsppaths -sts** command to see the path ID numbers for all STS-1 paths on the current card, and obtain the path ID for the path you want to channelize.

Step 5 Bring up the path with the **uppath -sts** <*path num*> command, as shown in the following example:

```
M8850_NY.13.MPSM155[ATM].a > uppath -sts 1.1.1
```

Step 6 Enter the **cnfpath -sts** <*path_id*> **-payload** <*sts_au_payload_type*> command to set the payload type for the path. The possible payload types for the paths you can create are described in Table 2-10. Be sure to set the payload to a type that is appropriate for the type of path you are channelizing.

Note Table 2-10 describes the <*path_id*> variable, which must be entered in the format *bay.line.sts*. The **-payload** option specifies the payload type as DS3 (T3), E3, VT 1.5, VT 2.0, or *unspecified*.

The following example shows how to configure a path for a DS3 (T3) payload:

```
M8830_CH.12.MPSM155[ATM].a > cnfpath -sts 1.4.47 -payload 3
```

Step 7 Enter the **dsppath** command to verify the status of a path you have brought up, as shown in the following example:

```
M8830_CH.12.MPSM155[ATM].a > dsppath 1.4.47
  Path Number             : 1.4.47              Path Type            : sts
  Payload                 : ds3                 Width                : 1
  Admin Status            : Up                  Alarm Status         : Clear
  Path Operational State  : lowLayerDn
  Number of ports         : 0                   Number of partitions: 0
  Number of SPVC          : 0                   Number of SPVP       : 0
  Number of SVC           : 0
  Xmt.Trace               :
```

When the path is up, the Admin Status row displays *Up*. The Payload row displays the payload type.

Step 8 Bring up and configure the paths you created in Step 6. Refer to the section that is appropriate to the payload you configured, as follows:

- If you configured a DS3 (T3) payload, see the "Channelizing a DS3 (T3) Line" section later in this chapter for instructions on bringing up and configuring DS3 (T3) paths.
- If you configured an E3 payload, see the "Bringing Up and Configuring E3 Paths" section later in this chapter for instructions on bringing up and configuring E3 paths.
- If you configured a VT 1.5 or VT 2.0 payload, see the "Bringing Up and Configuring TUG-3s" section later in this chapter for instructions on bringing up and configuring VT paths. To bring up and configure the twenty-eight DS1s that were also created when you set the payload as VT 1.5, see the "Bringing Up and Configuring DS1(T1) and E1 Paths" section later in this chapter.
- If you configured a VT 2 payload, see the "Bringing Up and Configuring TUG-3s" section later in this chapter for instructions on bringing up and configuring VT paths. To configure the twenty-one DS1s that were also created when you set the payload as VT 2, see the "Bringing Up and Configuring DS1(T1) and E1 Paths" section later in this chapter.

Channelizing an SDH Line

When an SDH line is in clear channel mode, it carries a single AU-4 path. You can channelize the AU-4 path into three separate AU-3 paths.

Note STM/AU paths on SDH lines are equivalent to STS paths on SONET lines. The Release 5 CLI shows SONET naming conventions in the place of their equivalent SDH terms. Note that in the channelization CLI, the STM/AU paths are called "STS" paths.

Use the following procedure to channelize an SDH line into three separate STM-0/AU-3 paths.

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

Step 2 Enter the **cc** command to change to the MPSM-T3E3-155 card you want to configure.

Step 3 If you have not done so already, bring up the line to be configured as described in the "Bringing Up Lines" section, which appears earlier in this chapter. Once a line is brought up, a single AU-4 path is created and put in a down state.

Step 4 Enter the **dsppaths -all** command to ensure that an AU path has been created, and to obtain the *path_id* for the path, as shown in the following example:

```
M8850_NY.13.MPSM155[ATM].a > dsppaths -all

  Path      Path     Admin       Path        Path      Alarm     Oper
            Type     Status      Payload     Width     Status    State
 -------- -------- -------- ------------- ------- --------- ------
   1.1.0       sts      Down    unequipped       3   Unknown    Down
    Shelf Database table empty.SonetVTsTable
    Shelf Database table empty.Ds3PathsTable
    Shelf Database table empty.Ds1PathsTable
```

If you want to channelize the AU-4 path into three smaller AU-3 paths, proceed to Step 5. If you want to channelize the AU-4 path into clear channel DS3 (T3) or clear channel E3 paths, skip the rest of the steps in this section and follow the procedure in the "Bringing Up and Configuring SDH Paths" section that follows.

Step 5 Enter the **cnfpath -sts** <*path_id*> **-width 1** command to set the path width. Although this command has many options, you must channelize the line before you bring up and configure individual paths. The command format that channelizes the line is as follows:

```
M8850_NY.13.MPSM155[ATM].a > cnfpath -sts <path_id> -width 1
```

Replace the *path_id* variable with the complete path number in the format *bay.line.sts*, as shown in Table 2-10. The correct path number for the unchannelized SDH line 1 on an MPSM-T3E3-155 card is 1.1.0.

The MPSM-T3E3-155 card supports two path widths:

- STS-3/STM-1 (otherwise known as AU-4 in SDH terminology) uses the full bandwidth of the line in a single AU-4 path (**-width 3**). This is the default path width.
- STS-1/STM-0 divides the line into three separate AU-3 paths (**-width 1**).

You must enter **-width 1 (**STS-1/STM-0) to channelize an SDH path into three separate AU-3 paths. For more information about the *width_spec* parameter, see Table 2-10.

When you channelize a clear channel line, the **cnfpath** command channelizes the entire line into paths equal to the path width you specify. The following example channelizes line 1.1.1 into 3 AU-3 paths:

```
M8850_NY.13.MPSM155[ATM].a > cnfpath -sts 1.1.0 -width 1
```

Step 6 Enter the **dsppaths -sts** command to verify that the line has been channelized into three separate SDH paths, as shown in the following example:

```
M8850_NY.13.MPSM155[ATM].a > dsppaths -sts

  Path      Path     Admin       Path        Path      Alarm     Oper
            Type     Status      Payload     Width     Status    State
 -------- -------- -------- ------------- ------- --------- ------
   1.1.1       sts      Down    unequipped       1   Unknown    Down
   1.1.2       sts      Down    unequipped       1   Unknown    Down
   1.1.3       sts      Down    unequipped       1   Unknown    Down

M8850_NY.13.MPSM155[ATM].a >
```

Note The software supports only the path widths described in Table 2-10. When you create a path by dividing a larger path or combining smaller paths, the software may automatically create additional paths to assure that all the available bandwidth is assigned to one of the available path sizes.

Note To change the path width on a line that has already been configured to support a path width of 1, enter the **dnpath -sts** <*path_id*> command to bring down the path, and then enter the **cnfpath -sts** <*path_id*> **-width 3** command. Note that all sub-paths must be in a down state before you can bring down a parent path.

Bringing Up and Configuring SDH Paths

After you split an SDH line into multiple paths, you are ready to bring up the individual paths. You must bring up the individual path or paths before you can assign a payload to that path and proceed with further channelization. Once you assign a payload to a path, the path is channelized into separate paths.

SDH STM-0/AU-3 paths support following payload types:

- DS3 (T3)—If you choose a DS3 payload, then a single DS3 (T3) path is created and put in a DOWN state.
- E3—If you choose an E3 payload, then a single E3 path is created and put in a DOWN state.
- TU-11 (VT 1.5)—If you choose a VT 1.5 payload, then twenty-eight VT 1.5 paths and twenty-eight DS1 paths are created and put in a DOWN state.
- TU-12 (VT 2)—If you choose a VT 2 payload, then twenty-one VT 2 paths and twenty-one E1 paths are created and put in a DOWN state.

SDH STM-1/AU-4 paths support following payload types:

- DS3 (T3)—If you choose a DS3 payload, then a three DS3 (T3) paths are created and put in a DOWN state.
- E3—If you choose an E3 payload, then three E3 paths are created and put in a DOWN state.
- TU-11 (VT 1.5)—If you choose a VT 1.5 payload, then eighty-four TU-11 paths and eighty-four DS1 paths are created and put in a DOWN state.
- TU-12 (VT 2)—If you choose a VT 2 payload, then sixty-three TU-12 paths and sixty-three E1 paths are created and put in a DOWN state.
- Structured VT— If you choose a structured VT payload, then three TUG-3s are created and put in a down state. This payload is available only for SDH AU-4 Paths.

Use the following procedure to bring up and configure an SDH path.

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

Step 2 Enter the **cc** command to change to the MPSM-T3E3-155 card you want to configure.

Step 3 If you have not done so already, channelize the line as described in the previous section, "Channelizing an SDH Line."

Step 4 Enter the **dsppaths -sts** command to see the path ID numbers for all STS-1/STM-0 paths on the current card, and obtain the path ID for the path you want to channelize.

Step 5 Enter the **uppath -sts** <*path_id*> command to bring up the path, as shown in the following example:

```
M8850_NY.13.MPSM155[ATM].a > uppath -sts 1.1.1
```

Step 6 Enter the **cnfpath -sts** <*path_id*> **-payload** <*sts_au_payload_type*> command to set the payload type for the path. The possible payload types for the paths you can create are described in Table 2-10. Be sure to set the payload to a type that is appropriate to the type of path you are channelizing.

Note Table 2-10 describes the *path_id* variable, which must be entered in the format *bay.line.sts*. The **-payload** <*sts_au_payload_type*> option specifies the payload type as DS3 (T3), E3, VT 1.5, VT 2.0, VT structured, or *unspecified*.

The following example shows how to configure a path for a DS3 (T3) payload:

```
M8830_CH.12.MPSM155[ATM].a > cnfpath -sts 1.4.47 -payload 3
```

Step 7 To display the status of a path you have brought up, enter the **dsppath** command, as shown in the following example:

```
M8830_CH.12.MPSM155[ATM].a > dsppath 1.4.47
  Path Number             : 1.4.47              Path Type           : sts
  Payload                 : ds3                 Width               : 1
  Admin Status            : Up                  Alarm Status        : Clear
  Path Operational State  : lowLayerDn
  Number of ports         : 0                   Number of partitions: 0
  Number of SPVC          : 0                   Number of SPVP      : 0
  Number of SVC           : 0
  Xmt.Trace               :
```

When the path is up, the Admin Status row displays *Up*. The Payload row displays the payload type, which is either DS3 (T3), E3, VT 1.5, VT 2.0, VT structured or *unspecified*.

Step 8 Bring up and configure the paths you created in Step 6. Refer to the section that is appropriate to the payload you configured, as follows:

- If you configured a DS3 (T3) payload, see the "Channelizing a DS3 (T3) Line" section later in this chapter for instructions on bringing up and configuring DS3 (T3) paths.
- If you configured an E3 payload, see the "Bringing Up and Configuring E3 Paths" section later in this chapter for instructions on bringing up and configuring E3 paths.
- If you configured a VC-12/TU-12 (VT 1.5) payload, see the "Bringing Up and Configuring TUG-3s" section later in this chapter for instructions on bringing up and configuring VT paths. To bring up and configure the twenty-eight DS1s that were also created when you set the payload as VT 1.5, see the "Bringing Up and Configuring DS1(T1) and E1 Paths" section later in this chapter.
- If you configured a VC-12/TU-12 (VT 2) payload, see the "Bringing Up and Configuring TUG-3s" section later in this chapter for instructions on bringing up and configuring VT paths. To configure the twenty-one DS1s that were also created when you set the payload as VT 2, see the "Bringing Up and Configuring DS1(T1) and E1 Paths" section later in this chapter.

Bringing Up and Configuring a DS3 (T3) Path

Use the following procedure to bring up, configure, and channelize a DS3 (T3) path into twenty-eight individual DS1 paths.

Note Use this procedure to configure a DS3 (T3) path within a channelized SONET or SDH OC3 line only. To channelize and configure a physical DS3 (T3) line on a BNC-3-T3 back card, follow the procedures in the "Channelizing a DS3 (T3) Line" section earlier in this chapter.

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

Step 2 Enter the **cc** command to change to the MPSM-T3E3-155 card you want to configure.

Step 3 If you have not done so already, bring up the line to be configured as described in the "Bringing Up Lines" section, which appears earlier in this chapter.

Step 4 Enter the **dsppaths -ds3** command to see the path ID numbers for all DS3 (T3) paths on the current card, and obtain the path ID for the path you want to bring up and channelize.

Step 5 If you are configuring a DS3 (T3) path on a channelized SONET or SDH line, bring up the DS3 path with the **uppath -ds3** <*path_num*> command, as shown in the following example:

```
M8830_CH.12.MPSM155[ATM].a > uppath -ds3 1.1.1
```

If you are configuring a physical DS3 (T3) line that is attached to a BNC-3-T3 back card, you do not need to bring the DS3 (T3) path up, and you can skip this step and move on to Step 6.

Step 6 Enter the **cnfpath** command as follows to channelize the DS3 (T3) line into twenty-eight DS1 lines:

cnfpath -ds3 <path*_id*>[**-cb** <*AIScBitsCheck*>] [**-oof** <*OOF Criteria*>] [**-lt** <*Line Type*>] [**-clk** <*Clock Source*>] [**-feac** <*RcvFEAC*>] [**-lpb** <*Loopback*>] **-chan 2**

The **cnfpath** command parameters are described in Table 2-10.

Note You must include the optional **-chan 2** parameter with the **cnfpath** command if you want to channelize the DS3 (T3) line.

Note Enter the **dsppaths -ds3** command to see the path numbers for all T3 (DS3) paths on the current card.

In the example that follows, the user enables channelization on the DS3 (T3) line 1.1.1:

```
M8830_CH.12.MPSM155[ATM].a > cnfpath -ds3 1.1.1 -chan 2
```

Step 7 Enter the **dsppath** command to verify the status of a path you brought up.

Step 8 Bring up and configure the individual DS1 paths, as described in the "Bringing Up and Configuring DS1(T1) and E1 Paths" section, later in this chapter.

Bringing Up and Configuring E3 Paths

You must bring up an E3 path before you can provision services on that path.

Note You cannot channelize E3 paths.

Use the following procedure to bring up and configure an E3 path.

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

Step 2 Enter the **cc** command to change to the MPSM-T3E3-155 card you want to configure.

Step 3 If you have not done so already, channelize the line as required. For more information, see the "MPSM-T3E3-155 Line Channelization" section, which appears earlier in this chapter.

Step 4 Enter the **dsppaths -e3** command to see the path ID numbers for all E3 paths on the current card, and obtain the path ID for the path you want to bring up.

Note In Release 5 of the MPSM-T3E3-155 card, the **dsppaths** and **dsppath** command output shows E3 paths as *DS3* paths.

Step 5 Enter the **uppath** command as follows to bring up the E3 path:

```
M8830_CH.12.MPSM155[ATM].a > uppath -e3 <path_num>
```

Step 6 Enter the **cnfpath -e3** command as follows to configure the E3 path parameters:

cnfpath -e3 <*path_id*> [**-lt** <*Line Type*>] [**-clk** <*Clock Source*>] [**-lpb** <*Loopback*>] [**-txtrace** <*traceString*>]

The **cnfpath** command parameters are described in Table 2-10.

Note Enter the **dsppaths -e3** command to see the path numbers for all E3 paths on the current card. Note that, in the Release 5 CLI display, the term "DS3" refers to both E3 and T3 (DS3) lines.

In the following example, the user configures the E3 path 1.1.2 so that it has the line type *e3g832frmronly*, a local clock source, and no loopback:

```
M8850_NY.13.MPSM155[ATM].a > cnfpath -e3 1.1.2 -lt 17 -clk 2 -lpb 1
```

Step 7 Enter the **dsppath -ds3** <*path_id*> command as follows to display the status of a path you have brought up:

```
M8830_CH.12.MPSM155[ATM].a > dsppath -e3 1.4.4
```

Bringing Up and Configuring DS1(T1) and E1 Paths

You must bring up a DS1/E1 path before you can provision services on that path. Use the following procedure to bring up a path and configure channelized DS1/E1 paths.

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

Step 2 Enter the **cc** command to change to the MPSM-T3E3-155 card you want to configure.

Step 3 If you have not done so already, channelize the line as required. For more information, see the "MPSM-T3E3-155 Line Channelization" section, which appears earlier in this chapter.

Step 4 Enter the **dsppaths -ds1** or **dsppaths -e1** command to see the path ID numbers for all T1 (DS1) and E1 paths on the current card, and to obtain the path ID for the path you want to bring up and channelize.

Note In Release 5 of the MPSM-T3E3-155 card, the **dsppaths** and **dsppath** command output shows E1 paths as *DS1* paths.

Step 5 Enter the **uppath** command as follows to bring up the DS1 or E1 path:

```
M8830_CH.12.MPSM155[ATM].a > uppath [-ds1|-e1] <path_num>
```

Step 6 Enter the **cnfpath** command as follows to configure the DS1 or E1 path parameters:

cnfpath [**-ds1**|**-e1**] <*path_id*> [**-lpb** <*Loopback*>] [**-lt** <*Line Type*>] [**-clk** <*Clock Source*>]

The **cnfpath** command parameters are described in Table 2-10.

Note The **cnfpath** command parameters are the same for DS1 and E1 paths.

In the following example, the user configures the DS1 path 1.1.1:1 so that it has local loopback enabled, a *dsx1ESF* line type, and a local clock source:

```
M8850_NY.13.MPSM155[ATM].a > cnfpath -ds1 1.1.1:1 -lpb 2 -lt 2 -clk 2
```

Step 7 Enter the **dsppath** [**-ds1**|**e1**] <*path_id*> command as follows to verify the status of a path you have brought up:

```
M8850_NY.13.MPSM155[ATM].a > dsppath -ds1 1.1.1:1
  Path Number          : 1.1.1:1            Path Type                : ds1
  Admin Status         : Up                 Alarm Status             : Clear
  Operational State    : lowLayerDn         Number of ATM ports      : 0
  DS1 Line Type        : dsx1ESF            Number of ATM partitions : 0
  Loopback             : Local              Number of ATM SPVC       : 0
  Xmt. Clock Source    : localTiming        Number of ATM SPVP       : 0
  Path Service         : unspecified        Number of ATM SVC        : 0
  Send Code            : No                 Number of ATM Sig VC     : 0
  DS0 inuse Bitmap     : 0x0                Number of FR ports       : 0
                                            Number of FR connections : 0
                                            Number of IMA Links      : 0
```

Bringing Up and Configuring TUG-3s

When you configure the payload for an SDH AU-4/STM-1 path, three TUG-3s are created. All three of these TUG-3s carry the same payload you assigned to the AU-4/STM-1 path, unless you assigned a VT-structured payload to the AU-4/STM-1 path. In the case of VT-structured paths, the three TUG-3s have unspecified payloads. You can assign any payload to the TUG-3s, and each TUG-3 can carry a different payload.

Note You cannot configure or modify the payload for paths other than VT-structure paths.

Use the following procedure to assign a payload to a TUG-3.

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

Step 2 Enter the **cc** command to change to the MPSM-T3E3-155 card you want to configure.

Step 3 Enter the **dsppaths -all** command to ensure the SDH path is not already channelized. The *Path* column reports the path number 1.1.0, and the *Path Width* column reports 3, as shown in the following example:

```
M8850_NY.13.MPSM155[FR].a > dsppaths -all

  Path     Path    Admin       Path        Path     Alarm    Oper
           Type    Status      Payload     Width    Status   State
 -------- -------- -------- ------------- ------- --------- ------
   1.1.0      sts     Down    unequipped       3   Unknown   Down
    Shelf Database table empty.SonetVTsTable
    Shelf Database table empty.Ds3PathsTable
    Shelf Database table empty.Ds1PathsTable
```

Step 4 Bring up the path with the **uppath -sts 1.1.0** command, as shown in the following example:

```
M8850_NY.13.MPSM155[FR].a > uppath -sts 1.1.0
```

Step 5 Enter the **cnfpath -sts 1.1.0 -payload 9** command to set the payload type for the path to be VT-structured, and to channelize the AU-4/STM-1 path into three TUG-3s, as shown in the following example:

```
8850_NY.13.MPSM155[FR].a > cnfpath -sts 1.1.0 -payload 9
```

Step 6 Enter the **dsptug3s** command to display the TUG-3s you created in Step 5, as shown in the following example:

```
M8850_NY.13.MPSM155[FR].a > dsptug3s

    Tug3Id      payload
 ----------   -----------
 1.1.0: 1     unspecified
 1.1.0: 2     unspecified
 1.1.0: 3     unspecified
```

Step 7 Enter the **cnftug3** <*Path Number:Tug3*> **-payload** <*tug3Payload*> command to configure the payload for the specified TUG-3. The **cnftug3** command parameters are described in Table 2-15.

Table 2-15 cnftug3 Command Parameters

Parameter	Description
Path Number:Tug3	Identifies the path for the TUG-3, in the format *bay.line.AU4*:*Tug3*.
-payload <*tug3Payload*>	Indicates the payload type for the specified path. Enter the keyword (**-payload**) followed by the appropriate number that corresponds with the payload type you want to set. For example, **-payload 5**. The possible payload types are: • **2** = VC-11. Select this payload to create twenty-eight DS1s and twenty-eight VC-11/TU-11(VT 1.5) paths within the specified TUG-3. • **3** = VC-12. Select this payload to create twenty-one DS1s and twenty-one VC-12/TU-12 (VT 2.0) paths within the specified TUG-3. • **4** = TUG-3 and DS3. Select this parameter to create one DS3 (T3) and one TU (VT) path within the specified TUG-3. • **5** = TU-3 and E3. Select this parameter to create one E3 and one TU (VT) path within the specified TUG-3.

In the following example, the user configures a TU-3/DS3 payload on TUG-3 1.1.0:1.

```
M8850_NY.13.MPSM155[FR].a > cnftug3 1.1.0:1 -payload 4
```

Step 8 To display the status of the TUG-3 you have brought up and configured, enter the **dsptug3cnf** <*Path Number:Tug3*> command, as shown in the following example. Replace <*Path Number:Tug3*> with the path number for the TUG-3, in the format *bay.line.AU4*:*Tug3*:

```
M8850_NY.13.MPSM155[FR].a > dsptug3cnf 1.1.0:1
 Path Number          : 1.1.0
 Tug3 Id              : 1                 Payload Type        : tu3ds3
```

Step 9 Enter the **dsppaths -all** command to view all configurable sub-paths that were created in Step 7, as shown in the following example:

```
M8850_NY.13.MPSM155[FR].a > dsppaths -all

  Path     Path    Admin       Path       Path     Alarm    Oper
           Type    Status      Payload    Width    Status   State
 -------- -------- -------- ------------- ------- --------- ------
   1.1.0      sts       Up  vtStructured       3     Clear lowLayerDn

    Path       Path    Admin       Path      Alarm     Oper
               Type    Status      Width     Status    State
 ------------ ------- ---------- ---------- --------- ---------
     1.1.0:1      vt       Down      5-tu3   Unknown      Down

   Path   Path   Admin      DS3          Path     Alarm    Oper        Path
          Type   Status     Type         Lpbk     Status   State      Service
 -------- ----- -------- --------------- -------- -------- --------- -----------
  1.1.0:1   ds3     Down  dsx3CbitParity   NoLoop  Unknown      Down     invalid
    Shelf Database table empty.Ds1PathsTable
```

Step 10 Use the appropriate procedure to bring up and configure TUG-3 sub-paths:

- To bring up and configure VT paths, see the "Bringing Up and Configuring TUG-3s" procedure earlier in this chapter.
- To bring up and configure DS1 paths, see the "Bringing Up and Configuring DS1(T1) and E1 Paths" procedure earlier in this chapter.
- To bring up, further channelize, and configure DS3 (T3) paths, see the "Bringing Up and Configuring a DS3 (T3) Path" procedure earlier in this chapter.

Setting the Service Context on MPSM-T3E3-155 Cards

The MPSM-T3E3-155 card supports both ATM and Frame Relay services simultaneously. In order to support these individual services, each MPSM-T3E3-155 card maintains the following service contexts:

- ATM — provides ATM service management commands
- Frame Relay — provides Frame Relay service management commands.

This service context information is stored as a part of the card configuration for that logical slot on the hard disk of the controller card. You can switch to either service (ATM of Frame Relay) at any time by entering the **setctx** command. You must switch to the appropriate service each time you want to manage Frame Relay or ATM services.

You can change the default service context of the logical slot with the **cnfclictx** command. The default service context is the context that is used when you first **cc** to the MPSM-T3E3-155 card. For example, if you are only using ATM on a card, it would be best to set the default context to ATM. However, if half of the ports are configured for ATM and the other half are configured for Frame Relay, the default context may not matter to you, and you can set it any way you want to.

Before you can provision Frame Relay or ATM services on the MPSM-T3E3-155 card, you must ensure that the MPSM-T3E3-155 is in the proper service context. Before you can provision ATM services as described in Chapter 3, "Provisioning ATM Services," the MPSM-T3E3-155 card must be in the ATM service context. Before you can provision Frame Relay services as described in Chapter 4, "Provisioning Frame Relay Services," the MPSM-T3E3155 card must be in the Frame Relay service context.

Setting the Default Service Context

The default service context is the service that is available when you first **cc** to the MPSM-T3E3-155. For example, if the card's default service context is set to Frame Relay, then that card will always be in the Frame Relay service context when you first **cc** to the MPSM-T3E3-155. In other words, only the Frame Relay CLI is available until you change to the ATM CLI context with the **setctx atm** command, or until you change the default service context to ATM with the **cnfclictx atm** command. Use the following procedure to set the default service context.

Step 1 Enter the **dspclictx** command to display the default CLI service context that is currently configured in the database for the logical slot. In the following example, the default service context is FR (Frame Relay):

```
M8850_NY.13.MPSM155[FR].a > dspclictx
This card's default service context is: FR
```

Step 2 Enter the **cnfclictx** <*service context*> command to change the default service context for the current MPSM-T3E3155. Replace <*service context*> with **atm** to change the default service context to be ATM, or replace it with **fr** to change the default service context to be Frame Relay. In the following example, the user changes the service context to be ATM:

```
M8850_NY.13.MPSM155[FR].a > cnfclictx atm
```

Step 3 Enter the **dspclictx** command to verify that the default service context has been changed to be ATM, as shown in the following example:

```
M8850_NY.13.MPSM155[FR].a > dspclictx

M8850_NY.13.MPSM155[FR].a > This card's default service context is: ATM
```

Note that the command prompt does not change to reflect the default service context that was set with the **cnfclictx** command. In the example, the command prompt shows [FR] (Frame Relay), even though the user just set the default CLI context to be ATM. This is because the current CLI context for the MPSM-T3E3-155 in slot 13 has been set to Frame Relay with the **setctx** command. The switch prompt shows [FR] (Frame Relay) until the user changes the CLI context to be ATM with the **setctx** command, or until the user logs out of the current session.

Switching from one CLI Context to Another

The current CLI context for the MPSM-T3E3-155 is reflected in the switch prompt. If the current CLI context for the MPSM-T3E3-155 is ATM, the switch prompt includes [ATM] with the card name, as shown in the following example:

```
M8830_CH.12.MPSM155[ATM].a >
```

If the current CLI context for the MPSM-T3E3-155 is Frame Relay, the switch prompt includes [FR] with the card name, as shown in the following example:

```
M8830_CH.12.MPSM155[FR].a >
```

To switch from one CLI context to another, enter the **setctx** <*service context*> command. Replace <*service context*> with **atm** to set the current CLI context to be ATM, or replace it with **fr** to set the current CLI context to be Frame Relay.

In the following example, the user sets the CLI context to be Frame Relay:

```
M8850_NY.13.MPSM155[ATM].a > setctx fr

M8830_CH.12.MPSM155[FR].a >
```

Note that the switch prompt reflects the CLI context change to Frame Relay. Only the commands specific to the Frame Relay service context are visible and available in that CLI session until the CLI context is changed to ATM with the **setctx atm** command, or until the user ends the current session (if the default CLI context was set to ATM with the **cnfclictx atm** command.)