Provisioning Frame Relay Services

This chapter describes how to provision Frame Relay services on the MSPM-T3E3-155 card, and provides procedures for adding Frame Relay ports and connections to the physical lines and paths. The types of links and connections are described in Table 4-1.

Note Before you perform the procedures in this section you must set up the MPSM-T3E3-155 cards and lines from the PXM controller as described in Chapter 2, "Preparing MPSM-T3E3-155 Cards and Lines for Communication." Make sure that you select the appropriate card SCT for the controller that you are using.

Soft permanent virtual circuits (SPVCs) are permanent connections that can be rerouted in the event of a link failure. An MSPM-T3E3-155 SPVC establishes a connection between two ports. Such ports can be on the same card, on different cards in the same switch, or on different cards in different switches.

The following services are supported on Frame Relay connections:

- High priority
- VBR-RT
- VBR-NRT
- ABR-STD
- UBR

The following types of channels are supported on the MPSM-T3E3-155 when it is in Frame Relay mode:

- NIW
- NIW-Replace
- SIW-T
- SIW-X
- Frame Forwarding

Table 4-1 MSPM-T3E3-155 Supported Frame Relay SPVCs

MSPM-T3E3-155 Link and Connection Type	Description
MSPM-T3E3-155 Frame Relay port to MSPM-T3E3-155 Frame Relay port SPVCs	Use the "MPSM-T3E3-155-to-MPSM-T3E3-155 Frame Relay SPVC Configuration Quickstart" to configure an SPVC between two MPSM-T3E3-155 Frame Relay ports.
MSPM-T3E3-155 to FRSM12 SPVCs	Use the "MPSM-to-Non-MPSM SPVC Configuration Quickstart" to configure an SPVC between an MPSM-T3E3-155 Frame Relay port and a FRSM12 port.
MSPM-T3E3-155 Frame Relay port to MSPM-T3E3-155 ATM port SPVCs	Use the "MPSM-T3E3-155-to-MPSM-T3E3-155 Frame Relay SPVC Configuration Quickstart" to configure an SPVC between two MPSM-T3E3-155 Frame Relay ports. **Note** MPSM-T3E3-155 cards do not support NIW or NIW-Replace SPVCs between ATM and Frame Relay ports.
MSPM-T3E3-155 to AXSM SPVCs	Use the "MPSM (Frame Relay)-to-MPSM (ATM) SPVC Configuration Quickstart" to configure an SPVC between an MPSM-T3E3-155 Frame relay port and an MPSM-T3E3-155 ATM port. **Note** NIW and NIW-Replace SPVCs are not supported on any AXSM cards, and AXSM/A and AXSM/B cards do not support ABR-STC SPVCs.
MSPM-T3E3-155 to RPM SPVCs	An MPSM-T3E3-155 Frame Relay port can connect to an RPM-PR, RPM-B, or and RPM-XF. Use the "MPSM-to-Non-MPSM SPVC Configuration Quickstart" to configure an SPVC between an MPSM-T3E3-155 Frame Relay port and an RPM port. **Note** RPM cards do not support NIW or NIW-Replace SPVCs. See the "MPSM-to-Non-MPSM SPVC Configuration Quickstart"
MSPM-T3E3-155 to FRSM cell bus service module (CBSM) SPVCs	An MPSM-T3E3-155 Frame Relay port can connect to the following FRSM CBSMs: • FRSM-2CT3 • FRSM 2T3E3 • FRSM-8T1E1 • FRSM-HS2/B Use the "MPSM-to-Non-MPSM SPVC Configuration Quickstart" to configure an SPVC between an MPSM-T3E3-155 Frame relay port and an FRSM CBSM port.
MSPM-T3E3-155 to AUSM-8T1E1 SPVCs	Use the "MPSM-to-Non-MPSM SPVC Configuration Quickstart" to configure an SPVC between an MPSM-T3E3-155 Frame relay port and an AUSM-8T1E1 port. **Note** AUSM-8T1E1 cards do not support NIW or NIW-Replace SPVCs.

Table 4-1 MSPM-T3E3-155 Supported Frame Relay SPVCs (continued)

MSPM-T3E3-155 Link and Connection Type	Description
MSPM-T3E3-155 to MPSM-8T1E1 SPVCs	Building an SPVC from Frame Relay port on MSPM-T3E3-155 to the Frame Relay port on MPSM-8T1E1 for NIW is supported. • Configure the channel type for MSPM-T3E3-155 as **frNIWReplace**. • Configure the channel type for MPSM-8T1E1 as **NIW**. **Note** If both sides are configured as NIW, the SPVC will not pass traffic.
MSPM-T3E3-155 to PXM1E SPVCs	Use the "MPSM-to-Non-MPSM SPVC Configuration Quickstart" to configure an SPVC between an MPSM-T3E3-155 Frame relay port and a PXM1E port. **Note** PXM1E cards do not support NIW or NIW-Replace SPVCs.
MSPM-T3E3-155 to PXM1 SPVCs	Use the "MPSM-to-Non-MPSM SPVC Configuration Quickstart" to configure an SPVC between an MPSM-T3E3-155 Frame relay port and a PXM1 port. **Note** PXM1 cards do not support NIW or NIW-Replace SPVCs.
MSPM-T3E3-155 to BXM SPVCs	An MPSM-T3E3-155 Frame Relay port can connect to the following BXM cards: • BXM • BXM-1E • BXM-EX Use the "MPSM-to-Non-MPSM SPVC Configuration Quickstart" to configure an SPVC between an MPSM-T3E3-155 Frame relay port and a BXM port.

To do the procedures in this section you must start a CLI session on the appropriate MPSM-T3E3-155 card by logging in with the appropriate username and password. For detailed information about user names, passwords, and logging into the CLI, refer to the *Cisco MGX 8850 (PXM1E/PXM45), Cisco MGX 8950, Cisco MGX 8830, and Cisco MGX 8880 Configuration Guide, Release 5*.

Note To do the procedures in this section, you must log in as a user with GROUP1 privileges or higher.

A new CLI command, or a simple change to an existing CLI command argument, is used to differentiate the line and connection types from each other.

To eliminate redundancy and help experienced users complete configuration tasks quickly and efficiently, this chapter provides configuration quickstart procedures.

The first time you configure a connection type, use the applicable quickstart procedure to get an overview of the tasks to be performed. Then, for more detailed instructions, consult the appropriate section(s) elsewhere in the document that are called out in the quickstart procedure. As you gain experience in configuring MSPM-T3E3-155 card connections, referring to a quickstart procedure may suffice for performing a particular configuration task.

Tip You can get information about most CLI commands by entering the command without arguments. Ordinarily, experienced users can configure MSPM-T3E3-155 card connections using just the quickstart procedures and the online help facilities.

Note For a detailed description of the commands used in this chapter, refer to Chapter 6, "MPSM-T3E3-155 Command Reference."

Note Before you attempt to configure Frame Relay connections, complete the general switch configuration tasks described in the *Cisco MGX 8850 (PXM1E/PXM45), Cisco MGX 8950, Cisco MGX 8830, and Cisco MGX 8880 Configuration Guide, Release 5*. Some of the procedures described in this chapter will not work if the MGX 8850 or Cisco MGX 8830 switch has not been configured properly.

Quickstart Provisioning Procedures

This section contains abbreviated procedures for provisioning the communications capabilities of MSPM-T3E3-155 cards installed in Cisco MGX 8850/8830 Release 5 switches. These procedures provide a high level overview and summary for users who may already be experienced in configuring Cisco MGX 8850/8830 switches:

- "MPSM-T3E3-155-to-MPSM-T3E3-155 Frame Relay SPVC Configuration Quickstart"
- "MPSM (Frame Relay)-to-MPSM (ATM) SPVC Configuration Quickstart"
- "MPSM-to-Non-MPSM SPVC Configuration Quickstart"

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

Before you can configure an MSPM-T3E3-155 port, you must set up lines and/or paths as described in Chapter 2, "Preparing MPSM-T3E3-155 Cards and Lines for Communication."

Note The equipment at both ends of a Frame Relay line must be configured with compatible settings in order for the link to be logically completed.

MPSM-T3E3-155-to-MPSM-T3E3-155 Frame Relay SPVC Configuration Quickstart

A soft permanent virtual circuit (SPVC), a variant of a permanent virtual circuit (PVC), can be rerouted using the Private Network-to-Network Interface (PNNI) Version 1.0 protocol.

Both PVCs and SPVCs are full-time connections. A PVC uses a predefined circuit path that fails if the path is interrupted for any reason. In contrast to a PVC, if a link along an SPVC path fails, or if that link cannot provide the required bandwidth, the PNNI protocol reroutes that link to maintain the connection and supply the necessary bandwidth for the connection.

Note The procedures in this section apply to the MPSM-T3E3-155 in Frame Relay mode only. To establish a connection between and MPSM-T3E3-155 in Frame Relay mode and an MPSM-T3E3-155 in ATM mode, refer to the "MPSM (Frame Relay)-to-MPSM (ATM) SPVC Configuration Quickstart".

You can configure an SPVC between two MSPM-T3E3-155 card Frame Relay ports in any of the following instances:

- Any two Frame Relay ports on a single MSPM-T3E3-155 card in a Cisco MGX 8850 (PXM1E/PXM45) or Cisco 8830 switch.
- Any two Frame Relay ports on different MSPM-T3E3-155 cards in the same Cisco MGX 8850 (PXM1E/PXM45) or Cisco 8830 switch.
- Any two Frame Relay ports on different MSPM-T3E3-155 cards in different Cisco MGX 8850/8830 switches

To configure an SPVC between two MSPM-T3E3-155 card ports, perform the following steps:

	Command	Comments
Step 1	Establish a connection between the MGX switches that hold the MPSM-T3E3-155 cards to be connected.	Configure the trunks that link the switch(es) that host(s) the MPSM-T3E3-155 Frame Relay card ports. Verify PNNI connectivity between the nodes that host the SPVC endpoints. See the *Cisco MGX 8850 (PXM1E/PXM45), Cisco MGX 8950, Cisco MGX 8830, and Cisco MGX 8880 Configuration Guide, Release 5*.
Step 2	*username* <*password*>	Start a configuration session. To perform all the steps in this quickstart procedure, you must log in as a user with GROUP1 privileges or higher.
Step 3	**cc**	Change to the MPSM-T3E3-155 card.
Step 4	**setctx fr**	If the current CLI context is ATM, use the **setctx fr** command to ensure you are using the Frame Relay CLI.
Step 5	**upln** <*bay.line*>	Bring up (activate) the physical lines at each end of the SPVC you are creating. See the "Setting Up Lines" section in Chapter 2, "Preparing MPSM-T3E3-155 Cards and Lines for Communication." Remember to select the appropriate service class template (SCT) for the controller, or controllers, that you are using.

	Command	Comments
Step 6	If you are configuring a T3 line: **cnfln** <*bay.line*> <*arguments*> or, if you are configuring a SONET line: **uppath** [*-path_filter*] <*path_num*>	If you are configuring a T3 card, configure the MSPM-T3E3-155 card lines for T3 communications. See the "Setting Up Lines" section in Chapter 2, "Preparing MPSM-T3E3-155 Cards and Lines for Communication." If you are configuring a SONET line, bring up (activate) the MSPM-T3E3-155 paths so that they can be configured. See the "Channelizing SONET, SDH, and DS3 (T3) Lines into Paths" section in Chapter 2, "Preparing MPSM-T3E3-155 Cards and Lines for Communication."
Step 7	**addport** Related commands: **dspports**	Add and configure Frame Relay ports at each end of the SPVC you are creating. This step establishes Frame Relay communications between two Frame Relay devices. For standard port configuration, see the "Adding Frame Relay Ports" section in this chapter.
Step 8	**addcon** Related commands: **dspcon** **dspcons**	Add and configure the slave side of the SPVC.
Step 9	**cc** or *username* <*password*> **cc**	If the port that will host the master end of the SPVC is on an MPSM-T3E3-155 card in another slot, change to the MPSM-T3E3-155 card that will host the master end of the SPVC. If the port that will host the master end of the SPVC is on an MPSM-T3E3-155 in a remote node, log in to the remote node and change to the MPSM-T3E3-155 card that will host the master end of the SPVC. If you want to configure master end of the SPVC on a different port on the same MPSM-T3E3-155, then you can skip this step and proceed with Step 12.
Step 10	**addcon** Related commands: **dspcon** **dspcons**	Add and configure the master side of the SPVC.

MPSM (Frame Relay)-to-MPSM (ATM) SPVC Configuration Quickstart

To configure an SPVC between a local MSPM-T3E3-155 Frame Relay port and a remote ATM port on another MPSM-T3E3-155 in the same switch or in another switch, perform the following steps:

	Command	Comments
Step 1	Establish a connection between the MGX switches that hold the MPSM-T3E3-155 cards to be connected.	Configure the trunks that link the switch(es) that host(s) the MPSM-T3E3-155 Frame Relay card ports. Verify PNNI connectivity between the nodes that host the SPVC endpoints. See the *Cisco MGX 8850 (PXM1E/PXM45), Cisco MGX 8950, Cisco MGX 8830, and Cisco MGX 8880 Configuration Guide, Release 5*.
Step 2	*username* <*password*>	Start a configuration session. To perform all the steps in this quickstart procedure, you must log in as a user with GROUP1 privileges or higher.
Step 3	**cc**	Change to the MPSM-T3E3-155 card that will host the slave side of the SPVC (if you are configuring a double-ended SPVC).
Step 4	**setctx** [**atm** | **fr**]	Set the current CLI context as appropriate for the slave end of the SPVC you are configuring. If the slave end of the SPVC is on a Frame Relay port, set the CLI context to **fr**. If the slave end of the connection is on an ATM port, set the CLI context to **atm**.
Step 5	**upln** <*bay.line*>	Bring up (activate) the physical lines at each end of the SPVC you are creating. See the "Setting Up Lines" section in Chapter 2, "Preparing MPSM-T3E3-155 Cards and Lines for Communication." Remember to select the appropriate service class template (SCT) for the controller, or controllers, that you are using.
Step 6	If you are configuring a T3 or E3 line: **cnfln** <*bay.line*> <*arguments*> or, if you are configuring a SONET line: **uppath** [*-path_filter*] <*path_num*>	If you are configuring a T3 or E3 card, configure the MSPM-T3E3-155 card lines for T3 or E3 communications. See the "Setting Up Lines" section in Chapter 2, "Preparing MPSM-T3E3-155 Cards and Lines for Communication." If you are configuring a SONET line, bring up (activate) the MSPM-T3E3-155 paths so that they can be configured. See the "Channelizing SONET, SDH, and DS3 (T3) Lines into Paths" section in Chapter 2, "Preparing MPSM-T3E3-155 Cards and Lines for Communication."
Step 7	**addport** Related commands: **dspports**	Add a Frame Relay port on the MPSM-T3E3-155 card. For standard port configuration, see the "Adding Frame Relay Ports" section in this chapter.

	Command	Comments
Step 8	**cnfpart** Related commands: **dspparts** **dsppart**	Optional: Configure trunk resources on the PNNI controller. This step can assign all the trunk bandwidth to a single controller, or it can assign portions of the trunk bandwidth to each controller. **Note** On the MPSM-T3E3-155, a partition is automatically added when you add a port. Use the **cnfpart** command to change the configuration of a resource partition. See the "Partitioning Port Resources Between Controllers" section in this chapter.
Step 9	**cc**	Change to the PXM card.
Step 10	**dnpnport** **cnfpnportsig** **uppnport** Related commands: **dsppnports** **dsppnport** **dsppnportsig**	Define the signaling protocol used on the trunk. The default signaling protocol is UNI Version 3.1. Specify pnni10 for PNNI trunks. See the "Selecting the Port Signaling Protocol" section in this chapter.
Step 11	**cc**	Change to the MPSM-T3E3-155 card that will host the slave end of the SPVC.
Step 12	**setctx** [**atm** | **fr**]	Set the current CLI context as appropriate for the slave end of the SPVC you are configuring. If the slave end of the SPVC is on a Frame Relay port, set the CLI context to **fr**. If the slave end of the connection is on an ATM port, set the CLI context to **atm**.
Step 13	**addcon** Related commands: **dspcon** **dspcons**	Add and configure the slave side of an SPVC (if you are configuring a double-ended SPVC).
Step 14	**cc** or *username* <*password*> **cc**	If the port that will host the master end of the SPVC is on an MPSM-T3E3-155 card in another slot, change to the MPSM-T3E3-155 card that will host the master end of the SPVC. If the port that will host the master end of the SPVC is on an MPSM-T3E3-155 in a remote node, log in to the remote node and change to the MPSM-T3E3-155 card that will host the master end of the SPVC. If you will configure master end of the SPVC on a different port on the same MPSM-T3E3-155, then you can skip this step and proceed with Step 15.
Step 15	**addcon** Related commands: **dspcon** **dspcons**	Add and configure the master side of an SPVC on the remote card.

MPSM-to-Non-MPSM SPVC Configuration Quickstart

To configure an SPVC between a local MSPM-T3E3-155 port and a remote port on another card in the same switch or in another switch, perform the following steps:

	Command	Comments
Step 1	Establish a connection between the two switches that hold the cards to be connected.	Configure the trunks that link the switch(es) that host(s) the MPSM and non-MPSM card ports. Verify PNNI connectivity between the nodes that host the SPVC endpoints. See the *Cisco MGX 8850 (PXM1E/PXM45), Cisco MGX 8950, Cisco MGX 8830, and Cisco MGX 8880 Configuration Guide, Release 5*.
Step 2	*username* *<password>*	Start a configuration session with the switch hosting the RPM card that will link to the MPSM-T3E3-155. **Note** To perform all the steps in this quickstart procedure, you must log in as a user with GROUP1 privileges or higher.
Step 3	**cc**	Change to the MPSMT3E3 155 card.
Step 4	**setctx fr**	If the service context is ATM, use the **setctx fr** command to ensure you are using the Frame Relay CLI.
Step 5	**upln** <*bay.line*>	Bring up (activate) a MSPM-T3E3-155 line so that it can be configured. See the "Setting Up Lines" section in Chapter 2, "Preparing MPSM-T3E3-155 Cards and Lines for Communication." Remember to select the appropriate service class template (SCT) for the controller, or controllers, that you are using.
Step 6	If you are configuring a T3 or E3 line: **cnfln** <*bay.line*> <*arguments*> or, if you are configuring a SONET line: **uppath** [*-path_filter*] <*path_num*>	If you are configuring a T3 or E3 card, configure the MSPM-T3E3-155 card lines for T3 or E3 communications. See the "Setting Up Lines" section in Chapter 2, "Preparing MPSM-T3E3-155 Cards and Lines for Communication." If you are configuring a SONET line, bring up (activate) an MSPM-T3E3-155 path so that it can be configured. See the "Channelizing SONET, SDH, and DS3 (T3) Lines into Paths" section in Chapter 2, "Preparing MPSM-T3E3-155 Cards and Lines for Communication."
Step 7	**addport** Related commands: **dspports**	Add a Frame Relay port on the MPSM-T3E3-155 card. For standard port configuration, see the "Adding Frame Relay Ports" section in this chapter.

	Command	Comments
Step 8	**cnfpart** Related commands: **dspparts** **dsppart**	Optional: Configure trunk resources on the PNNI controller. This step can assign all the trunk bandwidth to a single controller, or it can assign portions of the trunk bandwidth to each controller. **Note** On the MPSM-T3E3-155, a partition is automatically added when you add a port. Use the **cnfpart** command to change the configuration of a resource partition. See the "Partitioning Port Resources Between Controllers" section in this chapter.
Step 9	**cc**	Change to the PXM card.
Step 10	**dnpnport** **cnfpnportsig** **uppnport** Related commands: **dsppnports** **dsppnport** **dsppnportsig**	Define the signaling protocol used on the trunk. The default signaling protocol is UNI Version 3.1. Specify pnni10 for PNNI trunks. See the "Selecting the Port Signaling Protocol" section in this chapter.
Step 11	**cc**	Change to the MPSM-T3E3-155 card.
Step 12	**addcon** Related commands: **dspcon** **dspcons**	Add and configure the slave side of an SPVC (if you are configuring a double-ended SPVC). If the slave side of the connection is on the MPSM card, see the "Configuring the Slave Side of SPVCs" section that appears later in this chapter. If the slave side of the connection is on a non- MPSM card, refer to the documentation for that card.
Step 13	**getpcrfromcir** Related commands: **dspcon**	If you are adding a connection to an ATM card (such as an AXSM card), you need to obtain the peak cell rate. You can obtain the peak cell rate (*PCR value*) from the CIR you set with the **addcon** command's <*cir*> parameter in Step 12. **Note** Enter the **dspcon** <*ifNum*> <*dlci*> command to view a connection's CIR.

	Command	Comments
Step 14	**cc**	Change to the remote card that will host the master side of the SPVC.
Step 15	**addcon** Related commands: **dspcon** **dspcons**	Add and configure the master side of an SPVC on the remote card. If the master side of the connection is on the MPSM card, see the "Configuring the Master Side of SPVCs" section that appears later in this chapter. If the master side of the connection is on a non- MPSM card, refer to the documentation for that card. **Note** You can obtain the peak cell rate (*PCR value*) from the CIR you set with the **addcon** command's <*cir*> parameter in Step 12.

- For additional details about configuring SPVCs on AXSM cards, see the *Cisco ATM Services (AXSM) Configuration Guide and Command Reference for MGX Switches, Release 5.*
- For additional details about configuring SPVCs on PXM1E cards, see the *Cisco MGX 8850 (PXM1E/PXM45), Cisco MGX 8950, Cisco MGX 8830, and Cisco MGX 8880 Configuration Guide, Release 5.*
- For additional details about configuring SPVCs on PXM1 cards, see the *Cisco MGX 8850 Edge Concentrator Installation and Configuration, Release 1.1.3.*
- For additional details about configuring SPVCs on BXM cards, see the *BPX 8600 Series Installation and Configuration* documentation.
- For additional details about configuring SPVCs on RPM cards, see the *Cisco MGX Route Processor Module (RPM-XF) Installation and Configuration Guide, Release 4* or the *Cisco MGX Route Processor Module (RPM-PR) Installation and Configuration Guide, Release 2.1.*

MSPM-T3E3-155 Frame Relay Configuration Procedures

This section describes the following MSPM-T3E3-155 Frame Relay concepts and general procedures:

- Adding Frame Relay Ports
- Partitioning Port Resources Between Controllers
- Selecting the Port Signaling Protocol
- Provisioning and Managing SPVCs

The descriptions and procedures in this section use Frame Relay service context commands. See Chapter 6, "MPSM-T3E3-155 Command Reference" for detailed descriptions of the MPSM-T3E3-155 Frame Relay service commands and parameters.

See Table 1-1 in Chapter 1, "Introduction" for a list of the MPSM-T3E3-155 model numbers, back cards, and the number of possible connections.

Some of the procedures in this section use PXM commands and PNNI commands. Refer to the *Cisco MGX 8850 (PXM45/PXM1E), Cisco MGX 8950, Cisco MGX 8830, and Cisco MGX 8880 Command Reference, Release 5* for descriptions of the PXM and PNNI commands and parameters.

For more information on port signaling, refer to the *Cisco MGX 8850 (PXM1E/PXM45), Cisco MGX 8950, Cisco MGX 8830, and Cisco MGX 8880 Configuration Guide, Release 5.*

Adding Frame Relay Ports

On an MPSM-T3E3-155 card, a logical port is also called a virtual interface and is represented by the *ifNum* variable. The MPSM-T3E3-155 cards can have the following types of Frame Relay interfaces:

- Frame Relay —This is a port that sends and receives standard Frame Relay frames as defined by ITU-T Q.922. Multiple virtual circuits (VCs) can terminate on a single Frame Relay port and are differentiated by their data-link connection identifiers (DLCIs).
- FrameForwarding—This is a port that sends and receives frame-based traffic that is similar to Frame Relay frames such as HDLC, SDLC, and X.25 over Frame Relay interfaces. You can transport any protocol across an ATM network, as long as it supports the HDLC, SDLC, or X.25 format. Application examples include routers interconnected via PPP, mainframes or hosts connected by X.25/HDLC, SNA/SDLC links, and video CODECs that use a frame-based protocol. Frame Forwarding is often used for the aggregation of point-to-point (PPP) traffic into an ATM network, then exiting the ATM network via an ATM interface over multiple VCs into routers supporting PPP over ATM. Frame Forwarding features include:
  - No translation or mapping is attempted between the frame header bits and ATM layer EFCI and CLP bits. Because the port is unable to read the address and control information in the frame, all traffic must be forwarded to a single destination frame forwarding port.
  - Only one frame forwarding VC is allowed per port.
  - If a connection is set up, all frames are routed to and from that connection, otherwise the frame is discarded.
  - A single set of Frame Relay traffic access parameters (for example, CIR) is configured for the logical port in frame forwarding mode. All arriving frames are treated as if they arrived without a set DE bit. If the frame is determined to exceed committed rate (exceeding CIR), the CLP of all cells associated with that frame is set to indicate low priority. If the frame exceeds the total rate allowed for committed and uncommitted traffic, the frame is discarded.
  - Support for PPP encapsulation over AAL5 and frame is based on RFC 1483 and RFC 1490.

Note The range for the number of logical broadband Frame Relay ports (*ifNum*) on the MPSM-T3E3-155 card is 1–1003. The range for the number of logical narrowband Frame Relay ports (*ifNum*) on the MPSM-T3E3-155 card is 4–1003.

The "Setting Up Lines" section in Chapter 2, "Preparing MPSM-T3E3-155 Cards and Lines for Communication," describes how to bring up physical lines by specifying the correct line port number. The "Channelizing SONET, SDH, and DS3 (T3) Lines into Paths" in Chapter 2, "Preparing MPSM-T3E3-155 Cards and Lines for Communication," describes how to bring up paths on SONET lines. Line ports correspond to the line connectors on the back cards of a Cisco MGX 8850/8830 switch.

Bringing up a line establishes physical layer connectivity between two network devices. When you add a Frame Relay port to a line, you enable Frame Relay communications by means of that line.

To add a Frame Relay port to a line, perform the following steps:

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

Step 2 Enter the **cc** command to change to the active MPSM-T3E3-155 card on which you want to add a port.

Step 3 Get the line or path number on which you will add the port.

If you are adding a port to a line, enter the **dsplns** command to determine the line number on which you intend to add the Frame Relay port, as shown in the following example.

```
                M8850_NY.13.MPSM155[FR].a> dsplns
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     96    Clear Disable   Yes
   1.2          Down   sonetSts3c NoLoop   Enable    NRZ    Other      0    Clear Disable    No
```

This command displays a list of the lines and line numbers configured for the MSPM-T3E3-155 card.

Tip You cannot configure a line until you have brought it up, as described in the "Setting Up Lines" section in Chapter 2, "Preparing MPSM-T3E3-155 Cards and Lines for Communication."

If you are adding a port to a path, enter the **dsppaths -all** command to determine the path number on which you intend to add the Frame Relay port.

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

  Path     Path    Admin       Path        Path     Alarm    Oper
           Type    Status      Payload     Width    Status   State
 -------- -------- -------- ------------- ------- --------- ------
   1.1.1      sts       Up        hdlcFr       1  Critical   Down
   1.1.2      sts       Up           atm       1  Critical   Down
   1.1.3      sts       Up        hdlcFr       1  Critical   Down
    Shelf Database table empty.SonetVTsTable
    Shelf Database table empty.Ds3PathsTable
    Shelf Database table empty.Ds1PathsTable
```

Note You cannot add a port directly on a SONET line. Before you can configure a SONET connection, you must enter the **uppath** command to activate a path on the specified line.

Step 4 Verify that the line/path and port number you want to use is not configured.

To display a list of the configured ports on the MSPM-T3E3-155 card, enter the **dspports** command as follows:

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

The **dspports** command shows all configured ports in the *ifNum* (interface number) column. Note the port numbers that already in use. When you add a port, you must specify a unique port number on the MSPM-T3E3-155 card. For example, if port number 2 is assigned to line 1.1 (bay 1, line 1), you cannot use port 2 on any other line on that MSPM-T3E3-155 card.

Note The MSPM-T3E3-155 cards support one port per line.

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

Step 5 Enter the **addport** command as follows to add a Frame Relay port to an active line or path.

```
M8850_NY.13.MPSM155[FR].a> addport <ifNum> <path> <portType> <sctId> [-dlciLen <dlciLen>]
[-flags <portFlagsBetweenFrames>] [-rat <PortEqueueServiceRatio>] [-csum <checksum>]
[-oversub <overSubscribeEnable>] [-lmiSig <lmiSigType>] [-asynUpdt <updateType>] [-elmi <elmiState>]
[-segLmi <segLmiStatus>] [-t391 <t391Value>] [-t392 <t392Value>] [-n391 <n391Value>] [-n392 <n392Value>]
[-n393 <n393Value>] [-ds0speed <ds0speed> -ds0beg <ds0beg> -ds0num <ds0num>]
[-fragEnable <fragEnable>] [-fragSize <fragSize>] [-hdlcinv <hdlcinv>]
```

Table 4-2 lists and describes the keywords and arguments for adding a logical port to a physical line by means of the **addport** command.

Table 4-2 Configuration Parameters for the addport Command on the MPSM-T3E3-155 Card (Frame Relay Mode)

ifNum	Specifies a number that identifies the logical port (interface) you are adding. The in interface (or port) number can be in the range from 4 through 1003. **Note** Port numbers 1 through 3 are reserved for broadband Frame Relay ports.
path	Identifies the line or path on which to add the port. **Note** Use the **dsppaths** command to see the path numbers for all available paths on the current MPSM-T3E3-155. Use the dsplns command to see line numbers for all available lines on the current MPSM-T3E3-155. **Note** On a BNC-3-T3 or BNC-3-E3 back card, you can add a port on a physical line, or on a path. On an SFP-2-155 and the SMB-2-155-EL OC3 back card, you can add a port on a path only.
portType	Type of logical interface (port): • **1** = Frame Relay UNI or NNI service • **3** = Frame Forward (no translation or mapping of header contents, CRC evaluated)
sctId	ID of the Service class template (SCT) for the port: Range: 0–255 Default: 0
-dlciLen *<dlciLen>*	DLCI header length: • **1** = Two-byte DLCI header • **2** = Four-byte DLC header

Table 4-2 Configuration Parameters for the addport Command on the MPSM-T3E3-155 Card (Frame Relay Mode) (continued)

-flags <*portFlagsBetweenFrames*>	Flags between frames: • **1** = 1 flag • **2** = 2 flags • **3** = 4 flags • **4** = 8 flags • **5** = 16 flags • **6** = 32 flags • **7** = 64 flags • **8** = 128 flags
-rat <*PortEqueueServiceRatio*>	This keyword and argument define the egress service ratio between the high priority and the low priority queues. Enter the keyword followed by a number in the range from 0 to 15. 0 = No service ratio is configured. In this case, bandwidth is allocated to both the high priority and the low priority queues on demand, which means that traffic is dynamically allocated on a first-come, first-serve basis. 1 = Default setting. In this case, the traffic of the CBR and rt-VBR service categories is allocated to the high priority queue, while the traffic of the nrt-VBR, ABR, and UBR service categories is allocated to the low priority queue.
-csum <*checksum*>	Checksum type indicator: • **1** = crc16 • **2** = crc32
-oversub <*overSubscribeEnable*>	Oversubscription indicator: • **1** = Enable • **2** = Disable
-lmiSig <*lmiSigType*>	LMI signaling type indicator. Enter a number to indicate the LMI signaling type, as follows: • **2** = No Signaling • **3** = StrataLMI • **4** = AnnexAUNI • **5**= AnnexDUNI • **6** = AnnexANNI • **7** = AnnexDNNI

Table 4-2 Configuration Parameters for the addport Command on the MPSM-T3E3-155 Card (Frame Relay Mode) (continued)

-asynUpdt <*updateType*>	Asynchronous update indicator. Enter a number to enable/disable different types of asynchronous updates, as follows: • **1** = Disable both Asynchronous Status Updates and Unsolicited Full Status • **2** = Enable Asynchronous Status Updates • **3** = Enable Unsolicited Full Status • **4** = Enable Asynchronous Status Updates and Unsolicited Full Status
-elmi <*elmiState*>	Enhanced LMI indicator. Enter a number to enable/disable enhanced LMI on the port. • **1** = Enable • **2** = Disable
-segLmi <*segLmiStatus*>	Segmented LMI indicator. Enter a number to enable/disable segmented LMI on the port: • **1** = Enable • **2** = Disable
-t391 <*t391Value*>	Interval in seconds for NNI to perform status polling. Enter a number in the range from 5 through 30.
-t392 <*t392Value*>	Interval in seconds for UNI to expect status polling. Enter a number in the range from 5 through 30. The value of this parameter should be greater than that for the **-t391** parameter above.
-n391 <*n391Value*>]	Number of UNI/NNI Polling cycles. Enter a number in the range from 1 through 255.
-n392 <*n392Value*>	UNI/NNI Error threshold. Enter a number in the range from 1 through 10.
-n393 <*n393Value*>	Monitored UNI/NNI Event count. The value of this parameter should be greater than that for the **-n392** parameter above.
-ds0speed <*ds0speed*>	Determines the speed of the line. Enter the number to indicate the line speed, as follows: • **1** = 56 Kbps • **2**= 64 Kbps.
-ds0beg <*ds0beg*>	Determines the beginning line number. Enter a number in one of the following ranges: • T1 paths = 1 through 24 • E1MF and E1CRCMF paths = 2 through 16, 18 through 32 (17 is reserved) • other E1 paths = 2 through 32

Table 4-2 Configuration Parameters for the addport Command on the MPSM-T3E3-155 Card (Frame Relay Mode) (continued)

-ds0num <*ds0num*>	Determines the line number. Enter a number in one of the following ranges: • T1 paths = 1 through 24 • E1MF and E1CRCMF paths = 1 through 30 • other E1 paths = 1 through 31
-fragEnable <*fragEnable*>	Enables/disables fragmentation on the port. • **1** = Enable • **2** = Disable
-fragSize <*fragSize*>	Determines the size of the fragments in bytes. Enter one of the following fragment sizes: • **40** • **64** • **128** • **256** • **512**
-hdlcinv <*hdlcinv*>	Enables/disables HDLCI NV on the port. • **1** = enable • **2** = disable

In the following example, the user defines a Frame Relay port that uses SCT 4 and the default values for all arguments:

```
M8850_NY.13.MPSM155[FR].a> addport 1 1.1 1 4
```

Step 6 Enter the **dspports** command as follows to verify that the port you added in Step 5 appears in the *ifNum* (interface number) column.

```
M8850_NY.13.MPSM155[FR].a> dspports
ifNum   Line/Path     Admin        Oper           ifType         SCT id          FRF 12
                      State        State                      Conf./InUse    Fragmentation
-----   -----------   -----   ---------------    ------------  -----------    -------------
    2         1.1.1    Down             Down      Frame Relay    0/  0 =Def     Disabled
   50     1.1.3:1.1      Up               Up      Frame Relay    0/  0 =Def     Disabled
```

If you want to view the configuration information for a particular port, note the number of that port and proceed to Step 7.

Step 7 Enter the **dspport** command to display the configuration information for a specific port.

```
mpsm_node.5.MPSM155[FR].a > dspport <ifNum>
```

Replace the <*ifNum*> argument with the number assigned to the port during port configuration. In the following example, the user displays the configuration information for logical port number *2*:

```
M8850_NY.13.MPSM155[FR].a> dspport 2
  Interface Number                 : 2
  Line Number                      : 1.1.1
  DS0 Speed                        : unused
  DS0 Configuration Bit Map        : N/A
  Admin State                      : Down
  Operational State                : Down
  Port State                       : Inactive
  Port Signaling State             : No Signaling Failure
  Interface Type                   : Frame Relay
  SCT Id                           : 0/0 =Def
  Frame Header Length              : Two Bytes
  Flags Between Frames             : 1
  Equeue Service Ratio             : 1
  Port Speed                       : 44209 kbps
  Checksum type                    : crc16
  Over-subscription                : Disabled
  Over-subscribed                  : False
  Signaling Protocol Type          : No Signaling
  Enhanced LMI                     : Disabled
  FRF 1.2 Support                  : Disabled
  Asynchronous Updates             : Disabled
  T391 Link Integrity Timer        : 10 secs

Type <CR> to continue, Q<CR> to stop:
  T392 Polling Verification Timer  : 15 secs
  N391 Full Status Polling Counter : 6
  N392 Error Threshold             : 3
  N393 Monitored Event Count       : 4
  FRF.12 Fragmentation             : Disabled
  FRF.12 Fragment Size             : 64 Bytes
  Port HDLC Frame Inversion        : Disabled
  Number of Partitions             : 1
  Number of SPVC                   : 0
```

Tip To change the port configuration, enter the **cnfport** command. To delete the port configuration, enter the **delport** command. You can also activate or deactivate a port using the **upport** and **dnport** commands. For more information about these commands, refer to Chapter 6, "MPSM-T3E3-155 Command Reference."

Partitioning Port Resources Between Controllers

After you add a Frame Relay port, you can define how the port resources are to be used by the PNNI controller. Although the Cisco MGX 8850/8830 software allows you to distribute port resources to multiple controllers, the PNNI controller is the only controller supported on Frame Relay ports in Release 5 of the MPSM-T3E3-155. Therefore, you can assign all resources to the PNNI controller. These resources include the following:

- Range of DLCI values
- Maximum percent of bandwidth in the ingress and egress directions
- Maximum number of connections
- Minimum and Maximum DLCI values

Note You can and should use the partition definition to control how available connections are distributed within the Cisco MGX 8850/8830 switch. Each switch, card, and port supports a maximum number of connections. Although it is possible to enable the maximum number of connections on all ports, if two or three ports are very busy, all the available connections could be consumed on these ports, thus disabling communications on all other ports.

A partition is automatically added when you add a port. You can change the resource partition configuration with the **cnfpart** command.

Note You can use the **addpart** command to create additional resource partitions for a port. The partition ID you use when you create the resource partition can be any number in the range from 1 to 255. Once you assign a partition ID to any resource partition on the MSPM-T3E3-155 card, you must use the same partition ID for all other resource partitions on that card. Consider using *2* for the partition ID so that it matches the controller ID. If you do likewise on the other cards in your switch, there will be less confusion in managing partitions on different types of cards.

To configure a port resource partition, use the following procedure:

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

Step 2 Enter the **dspports** command as shown in the following example to display a list of all the logical ports on the MSPM-T3E3-155. Determine the port number to which you want to assign the resource partition.

Note All port numbers appear in the *ifNum* (interface number) column.

```
mgx8850a.10.MSPM-155[FR].a > dspports
ifNum   Line/Path     Admin        Oper           ifType         SCT id          FRF 12
                      State        State                      Conf./InUse
Fragmentation
-----   -----------   -----   ---------------    ------------  -----------
-------------
    1         1.1.1      Up   LowerLayerDown     Frame Forward    0/  0 =Def     Disabled
    2         1.1.3      Up   LowerLayerDown     Frame Forward    0/  0 =Def     Disabled
```

Step 3 Enter the **cnfpart** command as follows to create a resource partition.

```
M8850_NY.13.MPSM155[FR].a> cnfpart <ifNum> <ctrlrNum> [-lcn <lcn>] [-dlcilow <dlcilow>]
[-dlcihigh <dlcihigh>] [-ibw <ibw>] [-ebw <ebw>]
```

Table 4-3 lists and describes the arguments for the **cnfpart** command.

Table 4-3 Arguments for the cnfpart Command

Argument	Description
<*ifNum*>	Logical interface (port) number. Enter the interface number assigned to the port when it was configured. **Note** Enter the **dspparts** command to see a list of all port numbers and their associated partitions.
<*ctrlrNum*>	Controller number. Enter the number 2 to specify the PNNI controller. For information on adding the PNNI controller, refer to the document entitled *Cisco MGX 8850 (PXM1E/PXM45), Cisco MGX 8950, Cisco MGX 8830, and Cisco MGX 8880 Configuration Guide, Release 5*. **Note** Enter the **dspparts** command to see a list of all port numbers and their associated partitions.
-lcn <*lcn*>	Maximum number of simultaneous connections allowed on the port in the range from 0 to 4000.
-dlcilow <*dlcilow*>	Minimum DLCI value. • For a 2-byte header—This argument is a number ranging from 0 to 1023. • For a 4-byte header—This argument is a number representing a multiple of 32768. Therefore, the allowable range for this argument is any number from 0 through 8355840, provided that the specified number is divisible by 32768. For example, you can enter one of the following numbers as the minimum DLCI value, or any other number that is a multiple of 32768: 0 = (0 x 32768) 163840 = (5 x 32768) 8355840 = (255 x 32768) Unless your provisioning plan calls for a specific range of DLCI values on a port or card, specify the minimum DLCI value as 0.
-dlcihigh <*dlcihigh*>	Maximum DLCI value. • For a 2-byte header—This argument is a number ranging from 0 to 1023. • For a 4-byte header—This argument is a number representing a multiple of 32768 minus 1. Therefore, the allowable range for this argument is any number from 32767 (32768 * 1)-1 through 8388607 (32768 * 256)-1. For example, you can enter one of the following numbers as the maximum DLCI value, or any other number that is a multiple of 32768 minus l: 32767 = (32768 * 1)-1 163839 = (32768 * 5)-1 6520831 = (32768 * 199)-1 Unless your provisioning plan calls for a specific range of DLCI value on a port or card, specify the maximum DLCI value as 8388607.

Table 4-3 Arguments for the cnfpart Command (continued)

Argument	Description
-ibw <*ibw*>	Maximum ingress port bandwidth percentage for the controller type specified with the *ctrlrNum* argument. Enter a number in the range from 0 to 100.
-ebw <*ebw*>	Maximum egress port bandwidth percentage for the controller type specified with the *ctrlrNum* argument. Enter a number in the range from 0 to 100.

Step 4 Enter the **dspparts** command to display the resource partitions that you have configured on the current card. In the following example, the **dspparts** command indicates that two partitions have been configured.

```
M8850_NY.13.MPSM155[FR].a> dspparts
if      Ctlr   Ctlr  available   min      max     ingr     egr
Num     Num     ID      LCNs     DLCI     DLCI    PctBw   PctBw
-------------------------------------------------------------
   2    pnni      2     4000        0     1023     100     100
  50    pnni      2     2000        0     1023     100     100
```

Step 5 Enter the **dsppart** <*ifNum*> <*ctrlrNum*> command to display the configuration of a particular partition. Replace <*ifNum*> with the interface number, and replace <*ctrlrNum*> with the controller number, as shown in the following example:

```
M8850_NY.13.MPSM155[FR].a> dsppart 1 2
```

The following example shows the output from a **dsppart** command:

```
M8850_NY.13.MPSM155[FR].a> dsppart 2 2
  Interface Number               : 2
  Partition Id                   : pnni        Number of SPVC: 0
  Controller Id                  : 2
  Available LCNs                 : 4000
  Min DLCI                       : 0
  Max DLCI                       : 1023
  Ingress Percentage Bandwidth   : 100
  Egress Percentage Bandwidth    : 100
mpsm_node.5.MPSM155[FR].a >
```

Selecting the Port Signaling Protocol

The default signaling protocol for new Frame Relay ports is *none*.

To change the signaling protocol from the default setting, perform the following steps:

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

Step 2 Enter the **dsppnports** command as follows to display a list of PNNI ports available for configuration.

```
M8850_NY.7.PXM45.a > dsppnports
Summary of total connections
(p2p=point to point,p2mp=point to multipoint,SpvcD=DAX spvc,SpvcR=Routed spvc)
Type   #Svcc:   #Svpc:   #SpvcD:  #SpvpD:  #SpvcR:  #SpvpR:  #Ctrl #Total:
p2p:   0        0        30       0        0        0        0        30
p2mp:  0        0        0        0        0        0        0        0

    Total(User cons) =      30/50000,   Total(Ctrl cons) = 0
            Total=30

Summary of total SPVC endpoints
(P=Persistent, NP=Non-Persistent)
Type   #SpvcR-P  #SpvcR-NP #SpvpR-P  #SpvpR-NP #SpvcD   #SpvpD   Total
p2p:   0         0         0         0         60        0         60
p2mp:  0         0         0         0         0         0         0
                         Total=60

Summary of total active SVC/SPVC intermediate endpoints
Type   #Svcc    #Svpc     #SpvcR   #SpvpR   Total
p2p:   0         0         0         0         0
p2mp:  0         0         0         0         0
                         Total=0


Type <CR> to continue, Q<CR> to stop:
DSPPNPORTS          EndPoint Grand Total =     60/100000
Per-port status summary

PortId      LogicalId    IF status      Admin status  ILMI state        #Conns

7.35         17251107    up             up            NotApplicable     0

7.36         17251108    up             up            NotApplicable     0

7.37         17251109    up             up            NotApplicable     0

7.38         17251110    up             up            NotApplicable     0

11:1.1:1     17504257    provisioning   up            NotApplicable     5

11:1.2:2     17504258    provisioning   up            NotApplicable     5

11:1.3:3     17504259    provisioning   up            NotApplicable     5

11:1.4:4     17504260    provisioning   up            NotApplicable     5

11:1.5:5     17504261    provisioning   up            NotApplicable     5

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

PortId      LogicalId    IF status      Admin status  ILMI state        #Conns
```

```
11:1.6:6     17504262    provisioning   up           NotApplicable     5

11:2.1:7     17504263    provisioning   up           NotApplicable     5

11:2.2:8     17504264    provisioning   up           NotApplicable     5

11:2.3:9     17504265    provisioning   up           NotApplicable     5

11:2.4:10    17504266    provisioning   up           NotApplicable     5

11:2.5:11    17504267    provisioning   up           NotApplicable     5

11:2.6:12    17504268    provisioning   up           NotApplicable     5

M8850_NY.7.PXM45.a >
```

Step 3 Enter the **dnpnport** <*portid*> command to bring down the port you want to configure. Replace the <*portid*> argument in the **dnpnport** command using the format *slot*[:*bay*].*line*[:*ifNum*]. The port identification arguments are listed and described in Table 4-4.

Note A port is automatically brought up when you add it. Therefore, you must bring down the port before you can change the signaling protocol for that port.

Table 4-4 Port Identification Arguments

Argument	Description
slot	Enter the slot number for the card that hosts the port you are configuring.
bay	Replace the <*bay*> argument with the value 1 if the line is connected to a back card in the upper bay; replace the <*bay*> argument with the value 2 if the line is connected to a back card in the lower bay. Note that the bay number is always 1 for a MSPM-T3E3-155 -1-2488 card.
line	Replace the <*line*> argument with the number that corresponds to the back card port to which the line is connected.
ifNum	An ATM port is also called an interface. Enter a number from 1 to 60 to identify this interface. The interface number must be unique on the card to which it is assigned. An ATM port is defined by its slot, bay, line, and interface number. You need not enter a slot number during port configuration because you identify the slot number when you select the card.

In the following example, the user brings down port 13.5:

```
M8850_NY.7.PXM.a > dnpnport 13.5
```

Step 4 Enter the **dsppnports** command as shown in the following example to confirm that the specified port is down.

```
M8850_NY.7.PXM45.a > dsppnports
Summary of total connections
(p2p=point to point,p2mp=point to multipoint,SpvcD=DAX spvc,SpvcR=Routed spvc)
Type    #Svcc:    #Svpc:    #SpvcD:   #SpvpD:   #SpvcR:   #SpvpR:   #Total:
p2p:    0         0         17        0         0         0         17
p2mp:   0         0         0         0         0         0         0

                            Total=     17/50000

Summary of total SPVC endpoints
(P=Persistent, NP=Non-Persistent)
Type    #SpvcR-P   #SpvcR-NP #SpvpR-P   #SpvpR-NP #SpvcD    #SpvpD    Total
p2p:    1          0          0          0          34         0          35
p2mp:   0          0          0          0          0          0          0
                            Total=35

Summary of total active SVC/SPVC intermediate endpoints
Type    #Svcc     #Svpc      #SpvcR    #SpvpR    Total
p2p:    0          0          0          0          0
p2mp:   0          0          0          0          0
                            Total=0

          EndPoint Grand Total =     35/100000

Type <CR> to continue, Q<CR> to stop:
DSPPNPORTSPer-port status summary

PortId      LogicalId    IF status      Admin status  ILMI state        #Conns

7.35         17251107    up             up            NotApplicable     0

7.36         17251108    up             up            NotApplicable     0

7.37         17251109    up             up            NotApplicable     0

7.38         17251110    up             up            NotApplicable     0

4:1.1:1      17045505    down           up            NotApplicable     11

4:1.2:1      17045505    provisioning   up            NotApplicable     0

4:1.2:2      17045506    up             up            NotApplicable     11
```

Step 5 Enter the **cnfpnportsig** command as follows to define the signaling protocol for the specified port.

```
M8850_NY.7.PXM45.a > cnfpnportsig <portid> -univer none
```

Table 4-4 describes the elements of the <*portid*> argument.

Tip With some CLI commands, you can refer to a port using only the interface number. Other commands require that you enter a complete port identification number, which includes the slot, bay, line, and interface numbers. When entering commands at the PXM card prompt, you always need to specify the complete port identification number. When entering commands at the MSPM-T3E3-155 card prompt, you need enter only the interface number, because the interface number on the MSPM-T3E3-155 card is unique.

In the following example, the user configures an NNI port to use the PNNI Version 1.0 signaling protocol.

```
M8850_NY.7.PXM45.a > cnfpnportsig 4:1.1:1 -univer none
```

Step 6 Enter the **uppnport** command as follows to bring up the port you just configured.

```
M8850_NY.7.PXM45.a > uppnport <portid>
```

Replace the <*portid*> argument using the format *slot*:*bay.line*:*ifNum*.

Table 4-4 describes the elements of the <*portid*> argument.

Step 7 Enter the **dsppnports** command to verify that the port you brought up in Step 6 is in the "up" state in the *Admin_st* column.

Step 8 Enter the **dsppnport** <*portid*> command as follows to display the configuration of a specific PNNI port. Replace the <*portid*> argument using the format *slot*:*bay.line*:*ifNum*.

Note Table 4-4 describes the elements of the <*portid*> argument.

```
M8850_NY.7.PXM45.a > dsppnport 4:1.2:2

Port:               4:1.2:2          Logical ID:       17045506
IF status:          up               Admin Status:     up
UCSM:               disable          SVC Routing Pri:  8
Auto-config:        disable          Addrs-reg:        disable
IF-side:            network          IF-type:          uni
UniType:            private          Version:          none
PassAlongCapab:     n/a
Input filter:       0                Output filter:    0
minSvccVpi:         0                maxSvccVpi:       0
minSvccVci:         100              maxSvccVci:       32867
minSvpcVpi:         1                maxSvpcVpi:       0

       (P=Configured Persistent Pep, NP=Non-Persistent Pep, Act=Active)
       #Spvc-P:  #Spvc-NP:  #SpvcAct:  #Spvp-P:  #Spvp-NP:  #SpvpAct:
p2p :  11        0          11         0         0          0
p2mp:  0         0          0          0         0          0
       #Svcc:     #Svpc:        Total:
p2p :  0          0             11
p2mp:  0          0             0
                                 Total:     11
```

Provisioning and Managing SPVCs

SPVCs are created between two Frame Relay ports, and each SPVC has two endpoints. The master endpoint of the SPVC is responsible for routing and rerouting functions. The slave endpoint of the SPVC is responsible for responding to requests from the master endpoint during connection setup and rerouting. Both endpoints are configured on the switch or switches to which the Frame Relay CPE connects. Such endpoints can be in the same switch or in different switches.

The master/slave relationship exists for each SPVC and applies only to that SPVC. For example, you can have one SPVC with a master on Node A and a slave on Node B, and then create another SPVC with the master on Node B and the slave on Node A. It is good practice to distribute the master side of SPVCs among network nodes to distribute route processing functions.

Before you can add an SPVC, the following tasks must have been completed:

1. The switch must have a network controller (see the **addcontroller** command in the *Cisco MGX 8850 (PXM45/PXM1E), Cisco MGX 8950, Cisco MGX 8830, and Cisco MGX 8880 Command Reference, Release 5*.
2. A physical line must be active. Use the **upln** command or the CiscoView application to bring up a line.
3. A path must be active. Use the **uppath** command or the CiscoView application to bring up a path.
4. At least one logical port must exist on the active path. Use the **addport** command or the CiscoView application to create the port. If necessary, modify the port through **cnfport**.
5. At least one resource partition must exist on the logical port. A resource partition is automatically added when you add a port. Use **cnfpart** command to modify the configuration for the existing resource partition, or delete the existing partition and enter the **addpart** command to create a new resource partition on the port. The resource partition should be associated with the controller added in Step 1.

You can create two types of SPVCs:

- Single-ended SPVCs
- Double-ended SPVCs

Single-ended SPVCs are defined at the master endpoint and do not require configuration of a slave endpoint. The primary benefit of single-ended SPVCs is that they are easier to configure. After configuration, the master endpoint configures and brings up the slave endpoint. In order for this feature to work correctly, the destination endpoint must support single-ended SPVCs.

Note In this software release for the Cisco MGX 8850/8830, the MSPM-T3E3-155 card supports only the origination of single-ended SPVCs. This means that you can configure master endpoints for single-ended SPVCs that terminate on another card.

Double-ended SPVCs require separate configuration of the master and slave endpoints. The slave endpoint must be configured first because this step generates a slave address that must be entered during master endpoint configuration.

The following sections describe how to configure slave and master SPVC connections.

Configuring the Slave Side of SPVCs

If you wish to configure a double-ended SPVC, you must first configure the slave endpoint for the connection. If you are configuring a single-ended SPVC, you need not configure a slave endpoint.

To configure the slave side of a double-ended SPVC, perform the following steps:

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

Step 2 Enter the **cc** <*slotnumber*> command as follows to change to the MSPM-T3E3-155 card that hosts the slave side of the SPVC connection.

```
mgx8850a.7.PXM45.a > cc <slotnumber>
```

Replace <*slotnumber*> with the number of the slot in which the MSPM-T3E3-155 card is installed.

Step 3 Enter the **addcon** command as follows to define the slave side of the SPVC:

```
mgx8850a.10.MSPM-155[FR] .a > addcon <ifNum> <dlci> <chanType> <serviceType> <mastership>
<cir> [-slave <value> ] [-slavespersflag <slavepers> ]
[-eir <zeroCirEir>] [-bc <Burst Commit>] [-be <Burst Excess>] [-detag <DE Tagging Enable>]
[-igde <Ignore Incoming DE>] [-fecnmap <FECN map>] [-demap <DE to CLP map>]
[-clpmap <CLP to DE map>] [-eqsel <Egress Q Select>] [-ingut <Ingress Perc Util>]
[-egut <Egress Perc Util>] [-egrat <Egress Service Rate>] [-rtngprio <Routing Priority>]
[-upc <UPC Cnfg>] [-lpcr <cellrate>] [-rpcr <cellrate>] [-lscr <cellrate>]
[-rscr <cellrate>] [-lmcr <cellrate>] [-rmcr <cellrate>] [-prefrte <routeId>]
[-directrte {yes|no}
```

Table 4-5 lists and describes the keywords and arguments for the **addcon** command. The local and remote terms used in this table refer to settings for the local port you are configuring and the remote port at the other end of the connection. If you omit an optional argument, a default value for that argument is used for SPVC configuration.

Caution Once you create an SPVC connection, you cannot change the SPVC prefix until all SPVC connections have been deleted. The procedure for changing the SPVC prefix is described in the document entitled *Cisco MGX 8850 (PXM1E/PXM45), Cisco MGX 8950, Cisco MGX 8830, and Cisco MGX 8880 Configuration Guide, Release 5*.

Table 4-5 Keywords and Arguments for the addcon Command

Keyword and Argument	Description
ifNum	Logical interface (port) number. **Note** Enter the **dspports** command to see a list of all ports on the current card.
dlci	Defines the Data-link connection identifier (DLCI) for the SPVC endpoint. Range for 2-byte header: 1—1006, and 1008—1022; range for 4-byte header: 1–8257534, and 8257536—8388607.

Table 4-5 Keywords and Arguments for the addcon Command (continued)

Keyword and Argument	Description
chanType	This argument defines the channel type for this SPVC connection: • frNIW(1) • frSIWtransparent(2) • frSIWtranslate(3) • frForward(5) • frNIWReplace(6)
serviceType	Requested service type for the connection. The number designating the requested service type for this SPVC must be identical on both the master and slave ends of the connection. The service types are as follows: • 1 = high priority • 2 = rtVBR • 3 = nrtVBR • 5 = uBR • 9 = stdABR
mastership	Mastership indicator. Enter the value 2 if the port is to serve as the slave side of the SPVC connection. Enter the value 1 if the port is to serve as the master side of the SPVC connection.
cir	This argument defines the committed information rate (CIR) for the connection. Enter a number in the range from 0 through 27804801.
-slave <*value*>	This keyword and argument constitute the slave identifier (in the form nsap_address.vpi.vci). You use this argument only when defining the master side of a connection. If you are creating a double-ended SPVC, the slave identifier, atmAddr.vpi.vci, is produced when the slave end of the connection is created. The slave identifier consists of an ATM address, VPI, and VCI that the switch generates to represent the Frame Relay port. The slave identifier is based on the switch ATM address and the DLCI for the port. **Note** The easiest way to enter the slave identifier is to copy it from the CLI command for the slave connection and paste it into the CLI command for the master connection. Note that the periods between atmAddr and vpi and between vpi and vci are part of the required syntax. If you are creating a single-ended SPVC, you must specify the ATM address of the switch that will host the slave endpoint (the switches will configure the VPI and VCI for you). You can display the slave ATM address using the **dsppnni**-node command and then perform a CLI Copy and Paste operation to transfer the address to the master endpoint.

Table 4-5 Keywords and Arguments for the addcon Command (continued)

Keyword and Argument	Description
-slavepersflag <*slavepers*>	This keyword and argument, used only when defining the master side of an SPVC, define the persistency flag of the endpoint, as follows: 0 = Persistent 1 = Nonpersistent To create a master endpoint for a double-ended or persistent SPVC connection, enter the value 0 or omit it altogether (the default). To create a master endpoint for a single ended or nonpersistent SPVC connection, enter the value 1as the argument.
-eir <*zeroCirEir*>	This keyword and argument define the ZeroCirEir range. This keyword and argument are used instead of the cir argument (see above) when cir is set to a value of 0. ZeroCirEir Range:0–27804800 bps.
-bc <*Burst Commit*>	This keyword and argument define the burst commit rate range. Burst Commit Range: 0–2097151 The default Frame Relay value is 5100, and the default FF value is 10300.
-be <*Burst Excess*>	This keyword and argument define the burst excess rate range. Burst Excess Range: 0–2097151 The default Frame Relay value is 5100, and the default FF value is 10300.
-detag <*DE Tagging Enable*>	This keyword and argument define the discard eligible (DE) flag setting, as follows: • 1 = enable • 2 = disable disable (2) is the default setting
-igde <*Ignore Incoming DE*>	This keyword and argument define the DE flag setting. To ignore incoming DE, enter the value 1 as the argument. Otherwise, enter the value 2, which disables DE tagging (see the -detag argument above).
-fecnmap <*FECN Map*>	This keyword and argument define the forward error congestion notification (FECN) flag setting. Permissible values for this argument are: • 1 = mapEFCI • 2 = setEFCIzero (default)

Table 4-5 Keywords and Arguments for the addcon Command (continued)

Keyword and Argument	Description
-demap <*DE To CLP Map*>	This keyword and option define the discard eligible (DE) to cell loss priority (CLP) map setting. Permissible values for this argument are: • 1 = mapCLP (default) • 2 = setCLPzero • 3 = setCLPone
-clpmap <*CLP To DE Map*>	This keyword and argument define the CLP to DE map setting. Permissible values for this argument are: • 1 = mapDE (default) • 2 = setDEzero • 3 = setDEone • 4 = ignoreCLP mapDE(1) is the default setting
-eqsel <*Egress queue Select*>	This keyword and argument define the Egress Q flag setting. Permissible values for this argument are: • 1 = highPriority (default for high priority (CBR) and rtVBR service types) • 2 = lowPriority (default for nrtVBR, UBR, and stdABR service types) • 3 = notSupported
-ingut <*Ingress Perc Util*>	This keyword and argument define the ingress percentage utilization rate. The argument ranges from 1 to 100 percent. The default value is 100. 100 percent is the default setting
-egut <*Egress Perc Util*>	This keyword and argument define the egress percentage utilization rate. The argument ranges from 1 to 100 percent. The default value is 100. 100 percent is the default setting
-egrat <*Egress Service Rate*>	This keyword and argument define the egress service rate in bits per second) bps). The argument ranges from 2400 to 27804800.
-rtngprio <*Routing Priority*>	This keyword and argument define the routing priority range. The argument ranges from 1 to 15. The default value is 8.
-upc <*UPC Cnfg*>	This keyword and argument define the usage parameter control (UPC) flag setting. Permissible values for this argument are: 1 = Enable (default) 2 = Disable

Table 4-5 Keywords and Arguments for the addcon Command (continued)

Keyword and Argument	Description
-lpcr <*local -> remote PCR*> **-rpcr** <*remote -> PCR*>	These keywords and arguments specify the local-to-remote (**-lpcr**) and remote-to-local (**-rpcr**) peak cell rate (PCR) range, in cells per second, for the SPVC connection. The arguments range from 10 to 104268 cells per second. The values defined at one end of the SPVC connection must correspond to the values set at the other end of the connection. Thus, the PCR defined for the local-to-remote direction at one end must match the value set for the remote-to-local direction at the other end.
-lscr <*local -> remote SCR*> **-rscr** <*remote -> local SCR*>	These keywords and arguments specify the local-to-remote (**-lscr**) and remote-to-local (**-rscr**) sustained cell rate (SCR) range, in cells per second, for rtVBR and nrtVBR connections. The arguments do not apply to other service types. The arguments range from 10 to 104268 cells per second. The values defined at one end of the connection must correspond to the values set at the other end of the connection. Thus, the SCR defined for the local-to-remote direction at one end must match the value set for the remote-to-local direction at the other end.
-lmcr <*local -> remote MCR*> **-rmcr** <*remote -> local MCR*>	These keywords and arguments specify the local-to-remote (**-lmcr**) and remote-to-local (**-rmcr**) minimum cell rate (MCR) range, in cells per second, for stdABR connections. The arguments do not apply to other service types. The arguments range from 10 to 104268 cells per second. The values defined at one end of the connection must correspond to the values set at the other end of the connection. Thus, the MCR defined for the local-to-remote direction at one end must match the value set for the remote-to-local direction at the other end.
-prefrte <*routeId*>]	Preferred route ID, in the range from 0—65535.
-**directrte** {*yes|no*}	Enter a number to indicate whether or not this connection follows a preferred direct route, as follows: **1** = yes (this connection follows a direct route) **2** = no (this connection does not follow a direct route)

Tip If you omit one or more of the configuration arguments when entering the **addcon** command, the SPVC connection uses the default values listed in Table 4-5, as appropriate. To override the default value for a given argument, enter the argument with a desired value.

Note Enter the **cnfchanstdabr** command to configure additional ABR arguments. For more information about the **cnfchanstdabr** command, refer to Chapter 6, "MPSM-T3E3-155 Command Reference."

In the following example, the **addcon** command defines a port as the slave side of an SPVC connection. Note the slave endpoint ID shown at the end of the display.

```
mgx8850a.10.MSPM-155[FR] .a > addcon 1 100 1 1 2 36000

slave endpoint added successfully
slave endpoint id : 4700918100000000036B5E309C00000104180100.0.655
```

Step 4 Write down the NSAP address displayed when the **addcon** command output is completed. You will need the NSAP address to configure the master side of the SPVC connection.

Tip When you set up the master side of the SPVC, you will need to enter the slave ATM address reported by the **addcon** command. If you maintain the current session or use the CLI **copy** command to copy the ATM address now, you can use the CLI **paste** command to complete the **addcon** command on the switch that hosts the master side of the SPVC.

Step 5 Enter the **dspcons** command as follows to verify the addition of the slave side of the SPVC connection. The **dspcons** command displays all information for the SPVCs.

```
mpsm_node.5.MPSM155[FR].a > dspcons
record  Identifier     SrvcType    M/S     Upld    Admn         Alarm
------  ----------     --------    ---     ----    ----  ---------------------
    0   02 0001000  High Priority   S    0000000b   UP        Multiple
    1   50 0001000  High Priority   S    0000000c   UP   Condn(A bit from n/w)
```

Configuring the Master Side of SPVCs

To configure the master side of an SPVC, perform the following steps:

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

Tip During this procedure, you will have to enter the ATM address for the slave end of the connection. If you establish this session from the same workstation you used to create the slave connection, you can use the CLI Copy and Paste commands to avoid data entry errors.

Step 2 Enter the **cc** <*slotnumber*> command as follows to change to the MSPM-T3E3-155 card that hosts the master side of the SPVC connection.

```
mgx8850a.7.PXM45.a > cc <slotnumber>
```

Replace <*slotnumber*> with the number of the slot in which the MSPM-T3E3-155 card is installed.

Step 3 Enter the **addcon** command as follows to define the master side of the SPVC connection.

```
mgx8850a.10.MSPM-155[FR] .a > addcon <ifNum> <dlci> <chanType> <serviceType> <mastership>
<cir> [-slave <value> ] [-slavespersflag <slavepers> ]
[-eir <zeroCirEir>] [-bc <Burst Commit>] [-be <Burst Excess>] [-detag <DE Tagging Enable>]
[-igde <Ignore Incoming DE>] [-fecnmap <FECN map>] [-demap <DE to CLP map>]
[-clpmap <CLP to DE map>] [-eqsel <Egress Q Select>] [-ingut <Ingress Perc Util>]
[-egut <Egress Perc Util>] [-egrat <Egress Service Rate>] [-rtngprio <Routing Priority>]
[-upc <UPC Cnfg>] [-lpcr <cellrate>] [-rpcr <cellrate>] [-lscr <cellrate>] [-rscr
<cellrate>] [-lmcr <cellrate>] [-rmcr <cellrate>]
```

Table 4-5 lists and describes the keywords and arguments for the **addcon** command.

Tip If you omit one or more of the optional arguments when entering the **addcon** command, the connection uses the default values listed in Table 4-5. To override the default value for a given argument, enter the argument with the desired value.

In the following example, the user defines a port as the master side of a double-ended SPVC. Note the master endpoint ID shown in the last line of command output.

```
M8850_NY.13.MPSM155[FR].a> addcon 2 555 1 1 1 36000 -slave
47009181000000000036B5E309C00000104180100.0.655

master endpoint added successfully
master endpoint id : 47009181000000000036B5E309C00000104180200.0.655
```

Step 4 Enter the **dspcons** command as follows to verify the master-side of the new SPVC connection.

```
M8850_NY.13.MPSM155[FR].a> dspcons
record  Identifier     SrvcType    M/S     Upld    Admn         Alarm
------  ----------     --------    ---     ----    ----  --------------------
    0   02 0001000  High Priority   S    0000000b   UP        Multiple
    1   50 0001000  High Priority   S    0000000c   UP   Condn(A bit from n/w)
```

The **dspcons** command displays all the connections for the MSPM-T3E3-155 card.

Step 5 Enter the **dspcon** command as follows to display the configuration information for a specific SPVC.

```
M8850_NY.13.MPSM155[FR].a> dspcon <ifNum> <dlci>
```

Replace the <*ifNum*> argument with the interface or port number of the MSPM-T3E3-155 card. The <*dlci*> argument (see Table 4-5) establishes the DLCI for the SPVC endpoint.

The following is sample output from the **dspcon** command.

```
M8850_NY.13.MPSM155[FR].a> dspcon 50 100
-------------------------------------------------------------------------
Local    :               NSAP  Address                    vpi       vci
(S)       47009181000000000164436C3D000001051FFF00          98       100
Remote   :               NSAP  Address                    vpi       vci
(M)       00000000000000000000000000000000000000000000      0         0
-------------------------------------------------------------------------
Port Number       : 50                  DLCI             : 100
Conn. Type        : frNIW               Chan Service Type: High Priority
Conn Service Type : cbr1                Egress Queue Type: highPriority
Admn Status       : UP                  Oper Status      : FAILED
Slave Persist     : N/A                 Max Cost         : N/A
CIR (bps)         : 1000                BC (bytes)       : 5100
BE (bytes)        : 5100                FECN Config      : setEFCIzero
ChanDEtoCLPmap    : mapCLP              ChanCLPtoDEmap   : mapDE
IngrPercentUtil   : 100                 EgrPercentUtil   : 100
EgrSrvRate (bps)  : 1000                ZeroCirEir (bps) : N/A
DE Tagging        : DISABLED            IgnoreIncomingDE : DISABLED
```

```
Pref Rte Id       : 0                    Directed Route   : NO
Upload            : 0000001a             Routing Priority : 0
OAM CC Config     : DISABLED             Statistics       : DISABLED
Local Loopback    : ENABLED              UPC              : ENABLED
--------------------------------------------------------------------------

Type <CR> to continue, Q<CR> to stop:
Local PCR (cps)   : 10                   Remote PCR (cps) : 10
Local SCR (cps)   : N/A                  Remote SCR (cps) : N/A
Local MCR (cps)   : N/A                  Remote MCR (cps) : N/A
                  :                      Remote MBS (cps) : N/A
--------------------------------------------------------------------------
Xmt Abit State    : OFF                  Rcv Abit State   : OFF
Xmt ATM State     : Not Sending          Rcv ATM  State   : Not Recving
--------------------------------------------------------------------------
E-AIS/RDI   CONDITIONED   CCFAIL   IfFail   Mismatch  LMI-ABIT
   NO           NO          NO       NO       YES        NO
--------------------------------------------------------------------------
M8850_NY.13.MPSM155[FR].a>
```

Step 6 Enter the **cc** command to change to the active PXM card.

```
M8850_NY.13.MPSM155[FR].a> cc 7
(session redirected)
pop20two.7.PXM45.a >
```

Step 7 Enter the **dspcons** command as follows to display all connections for the PXM card. the connection you added appears in the *Local Port* column.

```
M8850_NY.7.PXM.a > dspcons

Local Port   Vpi.Vci    Remote Port  Vpi.Vci     State     Owner  Pri Persistency
---------------------+-----------------------+---------+-------+---+-----------
13.5         100 100    Routed       100 100     FAIL      MASTER 8   Persistent
Local  Addr: 47.00918100000000036b5e31b3.0000010d1805.00
Remote Addr: 47.00918100000000001a538943.0000010c1805.00
Preferred Route ID:-    Cast Type: P2P
13.65535    2048 100    Routed         0 0       FAIL      SLAVE  -   Persistent
Local  Addr: 47.00918100000000036b5e31b3.0000010d1fff.00
Remote Addr: 00.000000000000000000000000.000000000000.00
Preferred Route ID:-   Cast Type: P2P
6:1.8:18     100 100    Routed       100 100     OK        MASTER 8   Persistent
Local  Addr: 47.00918100000000036b5e31b3.000001061812.00
Remote Addr: 47.00918100000000036b5e2bb2.00000106180d.00
Preferred Route ID:-    Cast Type: P2P
```