Chapter 18

Configuring ATM

This chapter describes how to configure Asynchronous Transfer Mode (ATM) on the following modules:

- OC3-ATM, OC12-ATM
- T3-ATM, E3-ATM

This chapter contains the following sections:

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- Creating a VP Tunnel on page 217
- Creating an NBMA Interface on page 218
- Creating an ATM Subinterface on page 222
- Creating an ATM Circuit on page 225
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- Pinging from an ATM Circuit or OAM F4 Circuit on page 229
- Viewing ATM Statistics on page 231

Overview

ATM is a high-speed networking technology that handles data in fixed-size units called cells. It enables high-speed communication between edge routers and core routers in an ATM network.

An ATM port can have a major interface and one or more subinterfaces. An ATM subinterface is a mechanism that allows a single physical ATM interface to support multiple logical interfaces. Several logical interfaces can be associated with a single physical interface.

When you create an ATM 1483 subinterface, you must configure a permanent virtual circuit (PVC). Protocols such as ATM require one or more virtual circuits over which data traffic is transmitted to higher layers in the protocol stack. Some ATM features depend on the capabilities of individual line modules.

ATM CAC

You may set the optional connection admission control (CAC) parameters when creating and modifying ATM interfaces. When CAC is enabled, the NMC-RX application calculates the required bandwidth and compares it to the available bandwidth based on the most recent system update. You are warned if there is not sufficient bandwidth to honor the request. This calculation is executed when stacking exists and on creation and modification of VP tunnels and ATM circuits.

NBMA Interfaces

The NMC-RX software supports nonbroadcast multiaccess (NBMA) networks on E-series routers. These types of networks interconnect more than two routers and have no broadcast capabilities.

NOTE: The NBMA feature is supported only on OC3-4 and OC12 line modules.

NBMA provides a nonbroadcast point-to-point connection consisting of a single IP address atop several circuits. Each circuit terminates at a different physical device. For example, you can use NBMA to connect a system to multiple stations.

You can add map lists and map list entries to the NMC-RX database and statically assign destination IP addresses to ATM circuits. You can use Inverse Address Resolution Protocol (InARP) to dynamically assign IP addresses to circuits, or you can use a combination of InARP and map lists. Map lists can be empty and may exist independently of any ATM interfaces, but have no function until they contain map list entries and are associated with an ATM interface.

References

For more detailed information, see *JUNOSe Link Layer Configuration Guide, Chapter 1, Configuring ATM*.

Configuration Tasks

To configure ATM objects on a module:

1. Configure an ATM interface.
2. (Optional) Configure a VP Tunnel.
3. (Optional) Create an NBMA Interface.
4. Configure an ATM subinterface.

5. Configure an ATM circuit (virtual circuit).

6. (Optional) Configure an OAM F4 circuit.

Creating an ATM Interface

Before you attempt to create an ATM interface on your system, create the physical line interface over which ATM traffic flows. See the following chapters:

- *Chapter 12, Configuring Channelized OC Modules*
- *Chapter 13, Configuring Unchannelized OC Modules*
- *Chapter 16, Configuring T3/E3 and T1/E1 Modules*

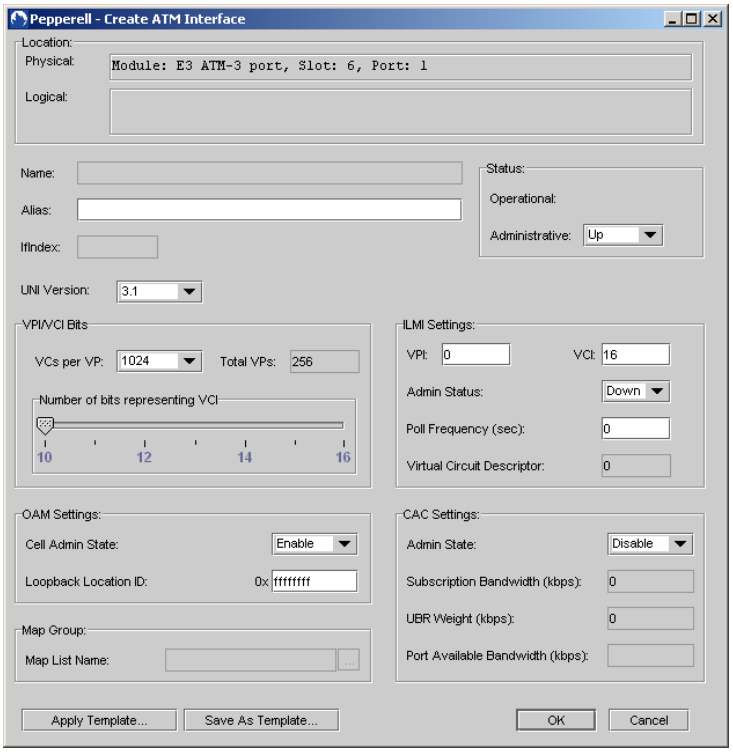
To begin creating ATM, you must navigate to the module's line interface level to create an ATM interface for the module.

To create an ATM interface on a module:

1. In the Instance Explorer, select the module for which you want to create an ATM interface.

2. Right-click the line interface on which you want to configure ATM, select Create, and click ATM Interface.

   The Create ATM Interface dialog box appears.



3. Set the ATM interface's parameters (Table 59).

Table 59: ATM Interface Parameters

Parameter	Description
Name	Identifies the interface; generated automatically
Alias	Description of the interface; 0–32 characters; default: blank
IfIndex	Identifies the interface on the particular line interface; generated automatically
UNI Version	User Network Interface. You can select the version on a per-port basis; available versions are auto-config, 3.0, 3.1, and 4.0.
Status	
Operational	Current operational status of the interface
Administrative	Desired status of the interface: Up/Down; default: Up
VCI/VPI Bits	
VCs per VP	Total number of virtual circuits per virtual paths
Total VPs	Total number of virtual paths
Number of bits representing VCI	Sliding the toggle changes the number of bits. Toggle automatically changes the VCs per VP and Total VPs fields.

Table 59: ATM Interface Parameters (continued)

Parameter	Description
ILMI Settings	
VPI	Virtual path identifier for ILMI. A number ranging from zero to one lower than the value selected in the VCI/VPI Bits group box. The recommended VPI value for the ILMI PVC is 0. It must match the value on the ATM switch. **NOTE:** The VPI and VCI values cannot both be set to 0.
VCI	Virtual circuit identifier for ILMI. A number ranging from zero to one lower than the value selected in the VCI/VPI Bits group box. The VCI value is unique on a single link, not throughout the ATM network. The recommended VCI value for the ILMI PVC is 16. **NOTE:** The VCI and VPI values cannot both be set to 0.
Admin Status	■ Up—Interface is enabled by the administrator ■ Down—Interface is disabled by the administrator
Poll Frequency (sec)	You can enable polling on a per-port basis. This is the interval in seconds between poll PDU transmissions if there are no pending sequence data PDUs.
Virtual Circuit Descriptor	Identifies a virtual circuit descriptor number **NOTE:** The VCD value has no relationship to the VPI and VCI values. It has meaning only to the E-series router.
OAM Settings	
Cell Admin State	When enabled, the E-series router ignores all operation, administration, and maintenance (OAM) cells received on the interface; default: enabled
Loopback Location ID	Identifier that allows other network entities to specifically send OAM loopback cells to the interface; range 0x0–0xffffffff; default: 0xffffffff
CAC Settings	
Admin State	Admin status of CAC on the ATM interface
	NOTE: Selecting Enabled activates the Subscription Bandwidth and UBR Weight fields. You can enter a value in these fields or click OK/Save to have the software enter the default settings retrieved from the line module. You can edit these fields later by selecting the ATM interface, right-clicking, and selecting Configure.

Subscription Bandwidth (kbps)	■ The subscribed bandwidth of the ATM interface; range 0-2147483647
	■ Leaving the field empty (0) makes the device calculate the available bandwidth for ATM UBR and UBRPCR circuits using the effective bandwidth defined by the hardware:
	  ■ OC3—149760
	  ■ T3—40704
	  ■ OC12—599040

Table 59: ATM Interface Parameters (continued)

Parameter	Description
UBR Weight (kbps)	■ The bandwidth associated with every UBR connection (that is not part of a VP tunnel) and UBR with PCR connection configured on the ATM interface. The weight will not apply to those UBR circuits that are part of a VP tunnel; range 0-2147483647 ■ Leaving the field empty (0) makes the device calculate the available bandwidth for ATM ubr and ubrPcr Circuits using the effective bandwidth defined by the hardware: ■ OC3—149760 ■ T3—40704 ■ OC12—599040
Port Available Bandwidth (kbps)	Available bandwidth of the ATM interface as calculated by the device; cannot edit
Map Group	
Map List Name	Associates a map list with the current ATM interface on OCx/STMx modules only; range 32 alphanumeric characters See *Creating an NBMA Interface* on page 218.

4. Click OK.

NOTE: If there is an applicable template, you can use that template to configure the non-unique parameters for ATM. The non-unique parameters in a template are displayed in blue. See *Chapter 10, Using Templates*.

Creating a VP Tunnel

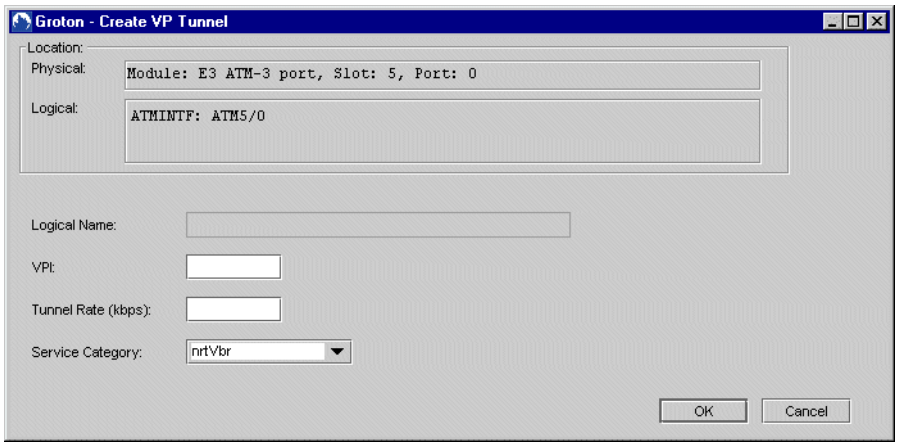
As an option, you can create VP tunnels for the ATM major interface you just created. Each tunnel can contain multiple subinterfaces and circuits.

To create a VP tunnel:

1. Either from the Instance Explorer or from the list area, navigate to the ATM interface for which you want to create a VP tunnel.

2. Right-click the ATM interface for which you want to create a VP tunnel, select Create, and click VP Tunnel.

   The Create VP Tunnel dialog box appears.



3. Set the VP tunnel parameters (Table 60).

Table 60: ATM VP Tunnel Parameters

Parameter	Description
Logical Name	Identifies the VP tunnel
VPI	■ Indicates with which VPI this tunnel is associated. ■ Number ranging from zero to one lower than the value selected in the VCI/VPI Bits group box. ■ Number corresponds with the maximum number of VPIs. There is no default.
Tunnel Rate (kbps)	PCR of tunnel in kilobits per second. The correct number depends on the physical interface type and the framing type of the line interface. If CAC is enabled on this interface, the software will check if the total used bandwidth exceeds the subscription bandwidth.
Service Category	Type of traffic management; nrt-VBR (non-real-time variable bit rate) is the default and only choice.

4. Click OK.

Creating an NBMA Interface

The NMC-RX software supports nonbroadcast multiaccess (NBMA) networks only on E-series OC3-4 and OC12 line modules.

Six general steps are involved in creating an NBMA interface:

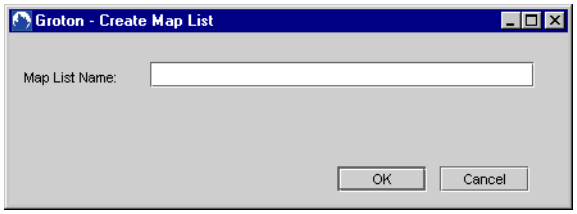
- Create a map list.
- Create map list entries.
- Assign a map list to the ATM interface.
- Create an NBMA interface.
- Create ATM circuits on the NBMA interface.
- Create an IP address on the NBMA interface (see *NMC-RX User Guide, Vol. 2, Chapter 6, Configuring IP*).

Creating a Map List

To create a map list:

1. From the Device-wide Explorer, click the System folder.
2. Right-click, select Create, and click Map List.

   The Create Map List dialog box appears.



3. Type a map list name (1-32 characters), and click OK.

   The map list is created.

NOTE: Map lists cannot be modified or viewed. A map list cannot be deleted if it is associated with an ATM interface.

Creating a Map List Entry

After you create a map list, you can add map list entries to it. Map list entries are used to route traffic for an IP address through a circuit by specifying the virtual circuit descriptor (VCD).

To create map list entries:

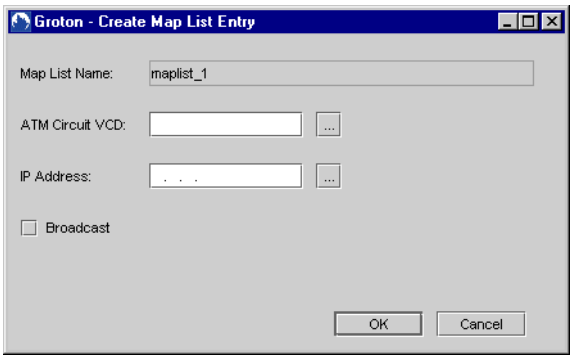
1. In the Device-wide Explorer, select Map List from the System folder, right-click, and select List.

   Map lists are displayed in the list area.

2. In the list area, select a map list to which you want to add a map list entry.

3. Right-click, select Create, and click Map List Entry.

   The Create Map List Entry dialog box appears.



4. Set the map list entry parameters (Table 61).

Table 61: Map List Entry Parameters

Parameter	Description
ATM Circuit VCD	Circuit identifier. Must be unique within the map list. Identifies a VC configured on an ATM interface. Enter a value in the range of 1–4294967295, or click ... to view and select an existing VCD from the Selected VCD Address dialog box (see *Related Dialog Boxes* on page 220).
IP Address	Destination IP address associated with the VCD. Enter a valid address, or click ... to search for and select an IP address in the Select IP Address dialog box (see *Related Dialog Boxes* on page 224).
Broadcast	Enables broadcast support

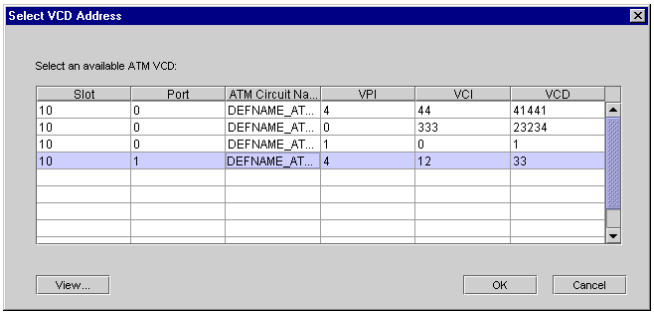
5. Click OK.

6. (Optional) Assign the map list to an ATM interface. See Table 59 on page 214.

Related Dialog Boxes

ATM Circuit VCD

The Select VCD Address dialog box appears when you click ... next to the ATM Circuit VCD field in the Create Map List Entry dialog box. Use it to view and select an existing VCD.

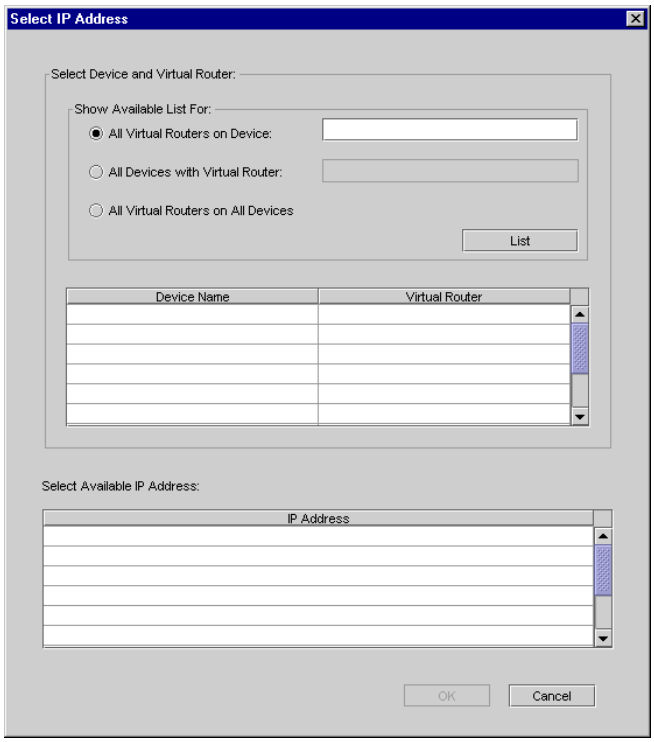


1. Click an available ATM VCD.
2. (Optional) Click View to display the circuit's full configuration.
3. Click OK.

   The information is entered in the Create Map List Entry dialog box.

IP Address

The Select IP Address dialog box appears when you click ... next to the ATM Circuit VCD field in the Create Map List Entry dialog box. Use it to search for and select an IP address.



1. Select a search option, and click List.
2. Select a virtual router from the list. If the virtual router has been assigned IP addresses, the addresses are displayed below.
3. Select an IP address.
4. Click OK.

   The information is entered in the Create Map List Entry dialog box.

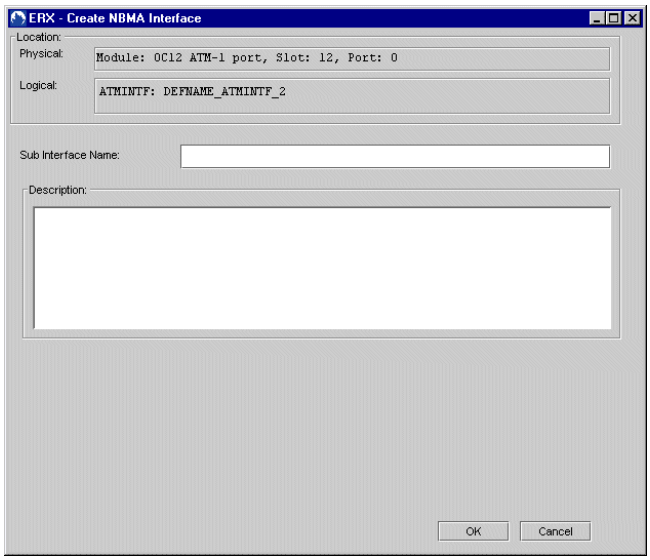
Creating an NBMA Interface

NOTE: The NMC-RX software supports NBMA only on E-series OC3-4 and OC12 line modules.

To create an NBMA interface:

1. Navigate to the ATM interface for which you want to create an NBMA subinterface.
2. With the ATM interface selected, right-click, select Create, and click NBMA Interface.

   The Create NBMA Interface dialog box appears.



3. Enter a name in the Sub Interface Name text box, and include a description, if needed.

4. Click OK.

NOTE: You can create multiple ATM circuits (see page 225) and IP addresses (see *NMC-RX User Guide, Vol. 2, Chapter 6, Configuring IP*) on the NBMA interface.

Creating an ATM Subinterface

You can create an ATM subinterface from the interface or from a VP tunnel.

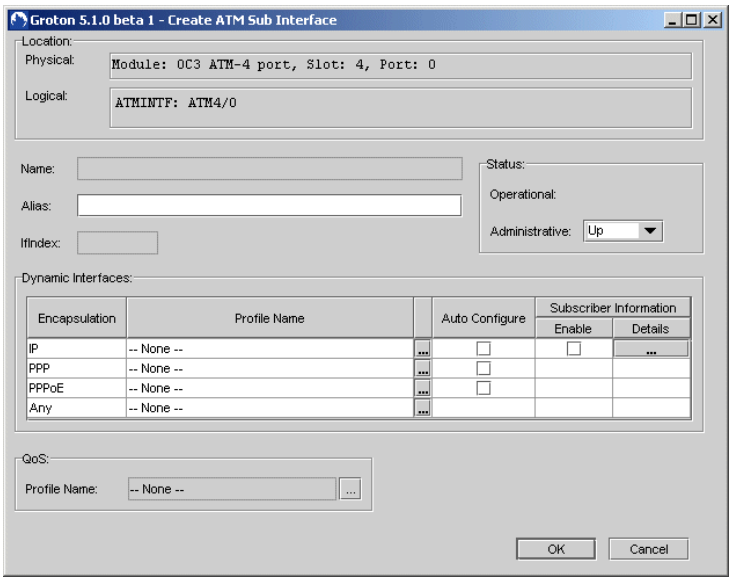
NOTE: Although these steps describe creating an ATM subinterface on an ATM interface, they can be used to create subinterfaces on a VP tunnel.

To create an ATM subinterface:

1. Navigate to the ATM interface in the list area.

2. Select a subinterface, right-click, select Create, and click ATM Sub Interface.

   The Create ATM Sub Interface dialog box appears.



3. Set the ATM subinterface parameters (Table 62).

NOTE: For information about dynamic interfaces, see *NMC-RX User Guide, Vol. 2, Chapter 7, Configuring Profiles*.

Table 62: ATM Subinterface Parameters

Parameter	Description
Name	Identifies the interface; generated automatically
Alias	Description of the interface; 0–15 characters; default: blank
IfIndex	Identifies the interface on the particular line interface; generated automatically
Operational	Current operational status of the interface
Administrative	Desired status of the interface: Up/Down; default: Up
Dynamic Interfaces	
Encapsulation	Specifies the type of dynamic encapsulation that will accept and detect the ATM 1483 subinterface
Profile Name	Click ... to choose a profile from the Associate Profile dialog box. See *Related Dialog Boxes* on page 224.
Auto Configure	Enables autoconfiguration, which causes the ATM subinterface to support a dynamic interface
Enable	Select to append subscriber information
Details	When Enable is checked, this field becomes active. Click ... to display the Subscriber Details dialog box. See *Related Dialog Boxes* on page 224. Then configure a local subscriber on the E-series device to support authentication and configuration from RADIUS for a dynamic IPoA interface.

Table 62: ATM Subinterface Parameters (continued)

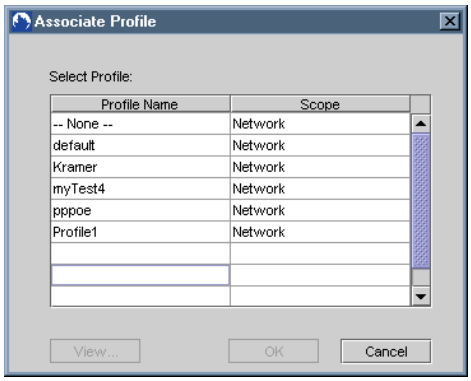
Parameter	Description
QoS	
Profile Name	■ Name of the attached QoS profile (a collection of QoS commands that specify queue profiles and scheduler profiles in combination with interface types) ■ Enabled only on OC3 ATM-4 port, OC12 ATM-1 port, T3 ATM-4 port line modules ■ Set value by clicking ... and selecting a QoS profile from the Associate QoS Profile dialog box.

4. Click OK.

Related Dialog Boxes

Profile Name

The Associate Profile dialog box appears when you click ... in the column next to Profile Name in the Create ATM Sub Interface dialog box. Use it to select a profile.

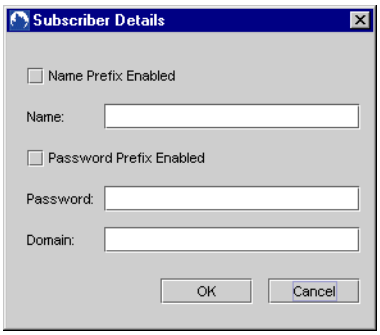


1. Click a profile.
2. (Optional) Click View to display the profile's full configuration.
3. Click OK.

   The information is entered in the Create ATM Sub Interface dialog box.

Details

The Subscriber Details dialog box appears when you click ... in the Details column in the Create ATM Sub Interface dialog box. Use it to configure a local subscriber (when one cannot be obtained externally) on the E-series device to support authentication and configuration.



1. Complete each field.

   - Name Prefix Enabled—Specifies how the supplied username is used for authentication purposes. Select to add the username to the beginning of the interface physical location identifier.

   - Password Prefix Enabled—Specifies how the supplied password is used for authentication purposes. Select to add the password to the beginning of the interface physical location identifier. Password usage is optional.

2. Click OK when done.

   The information is entered in the Create ATM Subinterface dialog box.

Creating an ATM Circuit

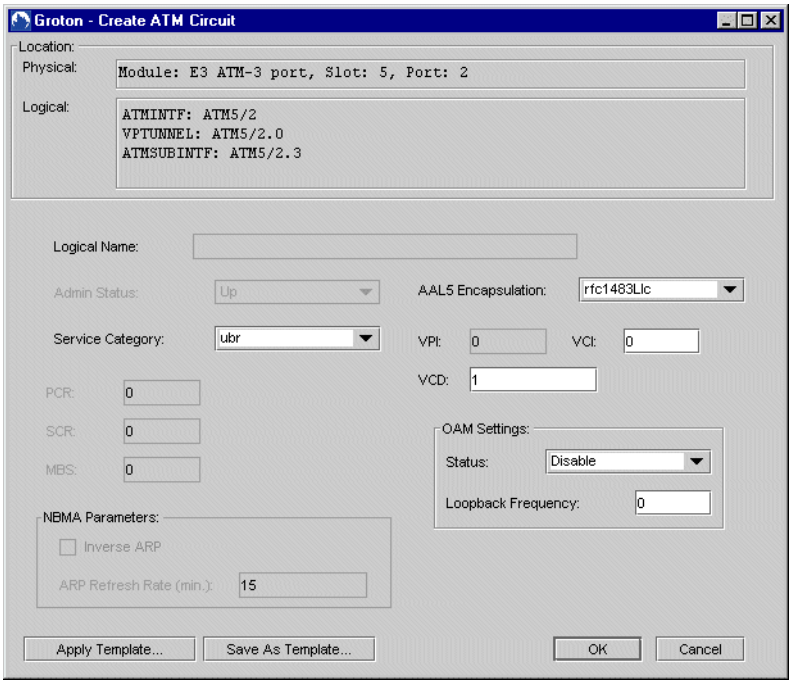
In the NMC-RX application, you need to navigate to the ATM subinterface level to create an ATM circuit for the module.

To create an ATM circuit:

1. Navigate to the ATM subinterface in the list area.

2. In the list area, click a subinterface, right-click, select Create, and click ATM Circuit.

   The Create ATM Circuit dialog box appears.



3. Set the ATM circuit parameters (Table 63).

Table 63: ATM Circuit Parameters

Parameter	Description
Logical Name	Identifies the particular instance; generated automatically
Admin Status	■ Up—Interface is enabled by the administrator ■ Down—Interface is disabled by the administrator
AAL5 Encapsulation	■ rfc1483VcMux—aal5muxip ■ rfc1483Llc—aal5snap
Service Category	Service category for traffic management: ■ ubr—Unspecified bit rate traffic management; select if no VCs require traffic shaping ■ ubrPcr—Unspecified bit rate peak cell rate; select for PCR only ■ nrtVbr—Non-real-time variable bit rate; can select for PCR, SCR, or MBS
VPI	Virtual path identifier; dependent on values set on ATM interface; range 0– 55 **NOTE:** The VPI and VCI values cannot both be set to 0.
VCI	Virtual circuit identifier; dependent on values set on ATM interface; range 0–65535 **NOTE:** The VCI and VPI values cannot both be set to 0.
VCD	Virtual circuit descriptor; dependent on values set on ATM interface; range 1–4294967295
PCR	Peak cell rate; value must be greater than or equal to SCR ■ OC3, OC3-ATM, OC12-ATM: range 1–99999 ■ E3: range 64–30528 ■ T3: range 64–44209

Table 63: ATM Circuit Parameters (continued)

Parameter	Description
SCR	Sustained cell rate ■ OC3, OC3-ATM, OC12-ATM: range 1–99999 ■ E3: range 64–30528 ■ T3: range 64–44209
MBS	Maximum burst size ■ OC3, OC3-ATM, OC12-ATM: range 1–99999 ■ E3: range 64–30528 ■ T3: range 64–44209
NBMA Parameters	
Inverse ARP	Enables InARP on the circuit
ARP Refresh Rate (Min.)	Specifies refresh rate for ARP in minutes; range 1–60
OAM Settings	
Status	Enables OAM F5 loopback cell generation on the circuit; enables VC integrity features that have an effect on the operational state of the ATM PVC
Loopback Frequency	Time interval in seconds between transmissions of OAM F5 loopback cells; range 0–600. If this option is not specified, OAM F5 loopback cells are generated once every 10 seconds.

4. Click OK.

Creating an OAM F4 Circuit

ATM interfaces support OAM (operations, administration, and management) standards. OAM provides VC/VP integrity and fault and performance management.

E-series routers support F4 and F5 ATM OAM fault management, loopback, and continuity check (CC) cells. These cells perform fault detection and notification, loopback testing, and link integrity.

You can create two types of OAM F4 circuits:

- Segment—End of a connection segment
- End-to-end—End of a VC/VP connection where the ATM cells are terminated

Within these two types of OAM F4 circuits, you can set how cells are sent:

- Continuity check—CC cells provide continual monitoring of a connection on a segment or end-to-end basis. The CC cell source generates the CC cells, and the sink receives and processes the cells. You can configure a VP or VC as the source, the sink, or both the source and the sink. If you enable a VP or VC as a CC cell source, it generates CC cells.
- Loopback—Use loopback cells to verify connectivity between VP/VC endpoints, as well as segment endpoints within the VP/VC. You can use these tests to perform fault isolation over the VP/VC.

The ATM interface also supports ATM ping, which lets you check whether a connection endpoint or segment point can be reached on a VC or VP. See *Pinging from an ATM Circuit or OAM F4 Circuit* on page 229.

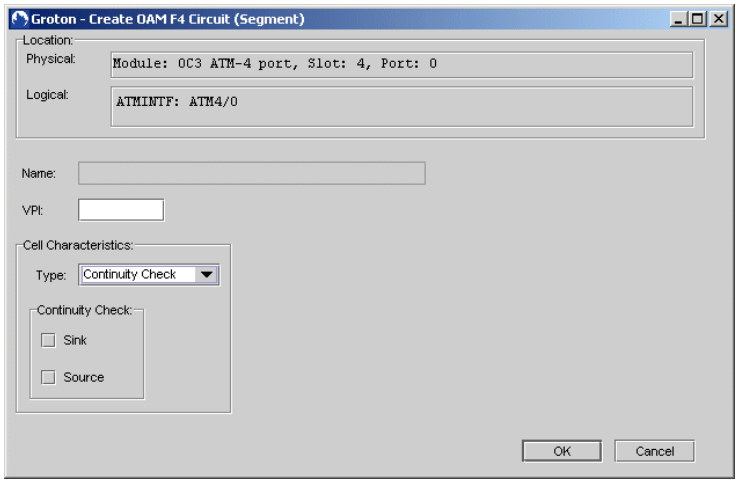
For more detailed information about OAM F4 circuits, see *JUNOSe Link Layer Configuration Guide, Chapter 1, Configuring ATM*.

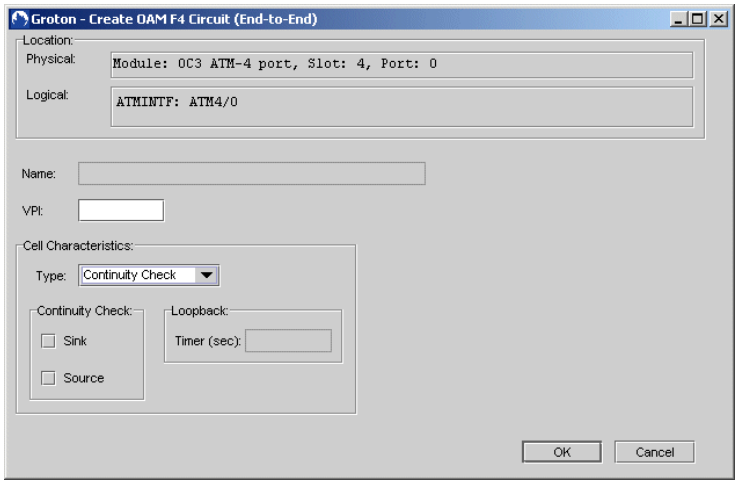
To create an OAM F4 circuit:

1. Navigate to the ATM interface in the list area.

2. Select an interface, right-click, select create, and click the type of OAM F4 circuit you want to create (end-to-end or segment).

   Depending on your choice, either the Create OAM F4 Circuit (Segment) or Create OAM F4 Circuit (End-to-End) dialog box appears.





3. Set the OAM F4 circuit parameters (Table 64).

Table 64: OAM F4 Circuit Parameters

Parameter	Description
Name	Identification of OAM F4 circuit; generated automatically
VPI	Virtual path identifier of the selected circuit; can edit during creation only; range depends on VCS per VPS setting on ATM interface Must be unique across all OAM F4 circuits of the same type on a single ATM interface
Cell Characteristics	
Type	Determines type of cells sent: ■ Default ■ Continuity Check—Sends and receives CC cells. No more than 12 OAM F4 circuits are allowed on a single ATM interface when this type is selected. ■ Loopback—Sends loopback cells (available only for end-to-end circuits)
Continuity Check	
Sink	Select to receive CC cells
Source	Select to send CC cells
Loopback	
Timer (sec)	Set frequency at which loopback cells are sent; 1-600 seconds

4. Click OK.

Pinging from an ATM Circuit or OAM F4 Circuit

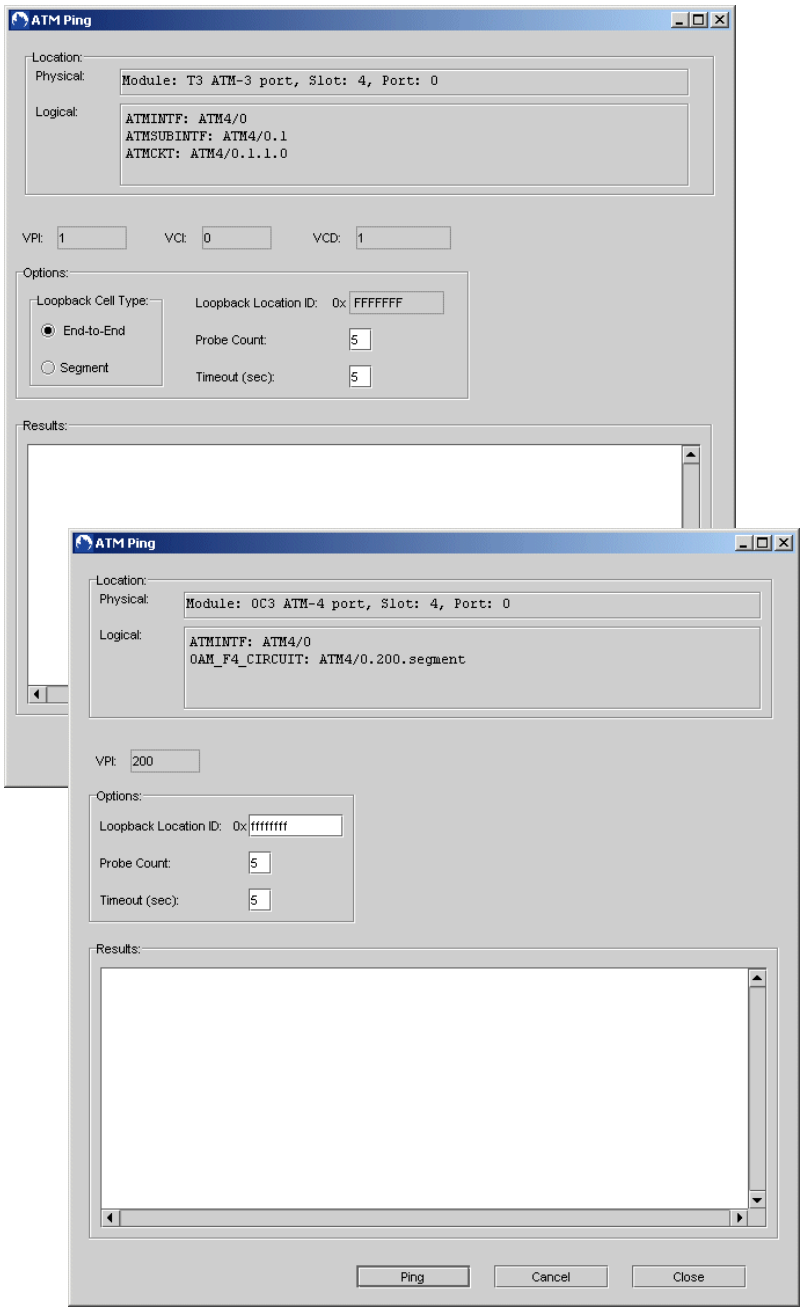
You can ping from an ATM circuit or OAM F4 circuit by using the ATM ping command. Only one ping can be executed at a time on a selected ATM circuit, but up to 12 pings can be executed at the same time across the ATM interface. For the ping to work, the OAM admin status on the ATM interface must be enabled, and the line interface status must be up.

An ATM ping may abort if the line interface goes down, if the OAM admin status is disabled, or if the circuit is deleted. Error messages appear in either the Results field or in pop-up messages.

To ping an ATM circuit or OAM F4 circuit:

1. Select an ATM circuit or OAM F4 circuit in the list area, right-click, and select ATM Ping.

   The ATM Ping dialog box appears. Depending on the type of circuit being pinged, additional fields are displayed in the dialog box. See the following figures. Note that the circuit's VPI, VCI, and VCD values are automatically entered.



2. Set the ping parameters (Table 65).

Table 65: ATM Ping Parameters

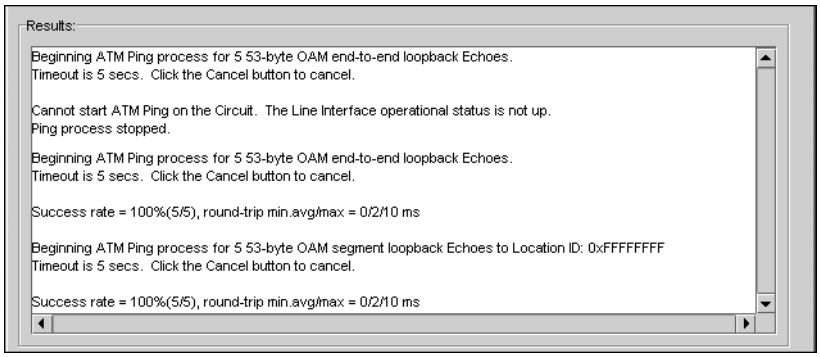
Parameter	Description
VPI	Virtual path identifier of the selected circuit; cannot edit
VCI	Virtual circuit identifier of the selected circuit; cannot edit
VCD	Virtual circuit descriptor of the selected circuit; cannot edit

Table 65: ATM Ping Parameters (continued)

Parameter	Description
Loopback Cell Type	Specifies type of OAM loopback cells to use for the ping request ■ End-to-End—Use end-to-end loopback cells ■ Segment—Use segment OAM loopback cells
Loopback Location ID (0x)	■ Loopback location ID for the destination ■ Should correspond to a loopback location ID previously established on a network component ■ Applicable only when Segment is selected as the loopback cell type ■ Hexadecimal value; range 0–ffffffff; default ffffffff
Probe Count	Number of ping probes (OAM cells) to be sent to complete the test; range 1–30; default 5
Timeout (sec)	Specifies the timeout value for a remote ping operation; range 1–5 seconds; default 5
Results	Contains the ping results or ping error messages

3. Click Ping.

   Results are displayed in the Results field.



Viewing ATM Statistics

The NMC-RX application allows you to view and monitor information about ATM major interfaces, subinterfaces, circuits, and OAM F4 circuits. Once you select a configured device, you simply list the objects and request statistics, and a Statistics tab is displayed.

To view statistics:

1. From the Device-wide Explorer, select ATM, and click either Interfaces, Sub Interfaces, Circuits, or OAM F4 Circuits.

2. Right-click, and select List All.

   A list of all objects of the type you selected, which are configured on the device, appears in the list area.

3. From the list, select the interface, subinterface, circuit, or OAM F4 circuits for which you want to view statistics, right-click, and select Statistics. The appropriate Statistics tab appears. Refer to the following sections for descriptions.

ATM Interface and Subinterface Statistics

The ATM interface and subinterface Statistics tab is shown below. Table 66 describes the attributes.

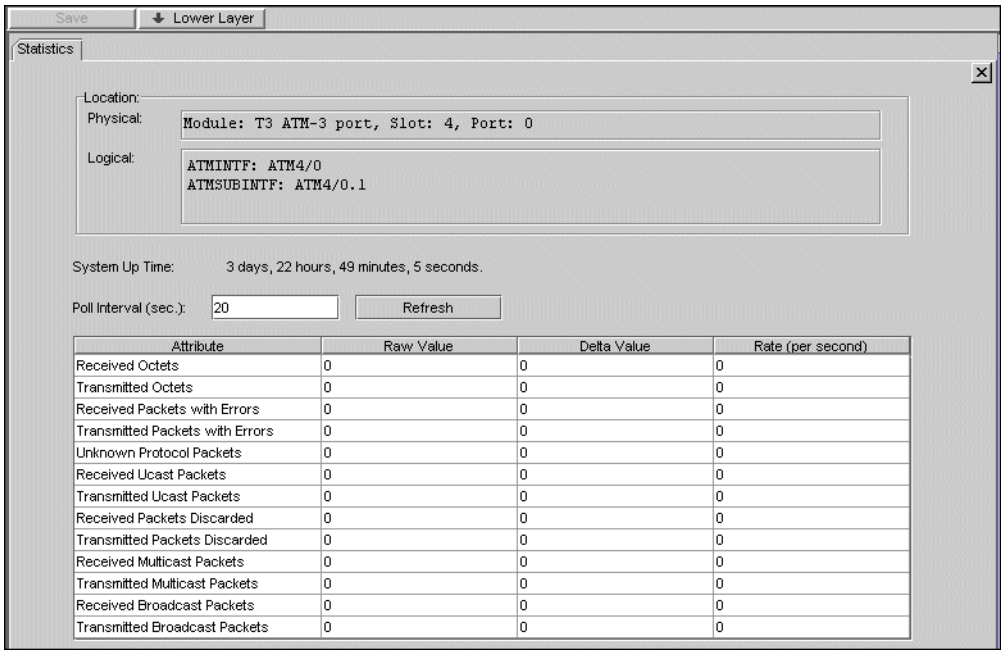


Table 66: ATM Interface Statistics Attributes

Attribute	Description
System Up Time	Time since last reported change to the operational status
Poll Interval (sec)	Interval in seconds between poll PDU transmissions
Refresh	When button is clicked, the statistics are refreshed
Received Octets	Number of incoming octets received on this interface or subinterface
Transmitted Octets	Number of outgoing octets transmitted on this interface or subinterface
Received Packets with Errors	Number of incoming errors received on this interface or subinterface
Transmitted Packets with Errors	Number of outgoing packets with errors on this interface or subinterface
Unknown Protocol Packets	Number of packets discarded because of an unknown or unsupported protocol
Received Ucast Packets	Number of packets received that were not addressed to a multicast or broadcast address

Table 66: ATM Interface Statistics Attributes (continued)

Attribute	Description
Transmitted Ucast Packets	Number of packets transmitted that were not addressed to a multicast or broadcast address
Received Packets Discarded	Number of received packets without errors discarded
Transmitted Packets Discarded	Number of transmitted packets without errors discarded
Received Multicast Packets	Number of packets received that were addressed to a multicast address
Transmitted Multicast Packets	Number of packets transmitted that were addressed to a multicast address
Received Broadcast Packets	Number of packets received that were addressed to a broadcast address
Transmitted Broadcast Packets	Number of packets transmitted that were addressed to a broadcast address

ATM Circuit Statistics

The ATM circuit Statistics tab is shown below. Table 67 describes the attributes.

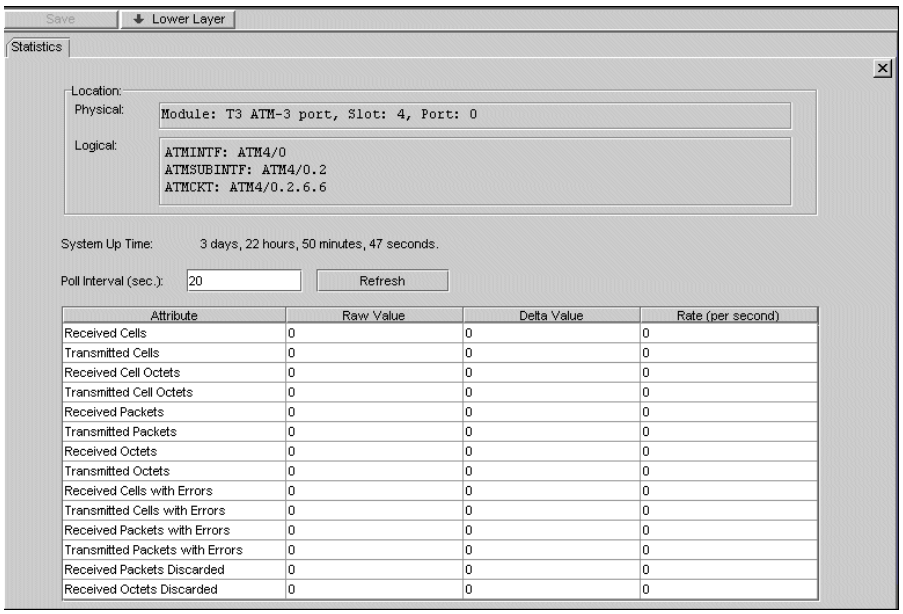


Table 67: ATM Circuit Statistics Attributes

Attribute	Description
System Up Time	Time since last reported change to the operational status
Poll Interval (sec)	Interval in seconds between POLL PDU transmissions
Refresh	When button is clicked, the statistics are refreshed
Received Cells	Number of cells received
Transmitted Cells	Number of cells transmitted

Table 67: ATM Circuit Statistics Attributes (continued)

Attribute	Description
Received Cell Octets	Number of cell octets received
Transmitted Cell Octets	Number of cell octets transmitted
Received Packets	Number of AAL PDUs received
Transmitted Packets	Number of AAL PDUs transmitted
Received Octets	Number of AAL PDU octets received
Transmitted Octets	Number of AAL PDU octets transmitted
Received Cells with Errors	Number of received cells dropped due to error
Transmitted Cells with Errors	Number of transmitted cells dropped due to error
Received Packets with Errors	Number of received packets dropped due to error
Transmitted Packets with Errors	Number of transmitted packets dropped due to error
Received Packets Discarded	Number of received packets without errors discarded
Received Octets Discarded	Number of transmitted octets without errors discarded

OAM F4 Circuit Statistics

The OAM F4 circuit Statistics tab is shown below. Table 68 describes the attributes.

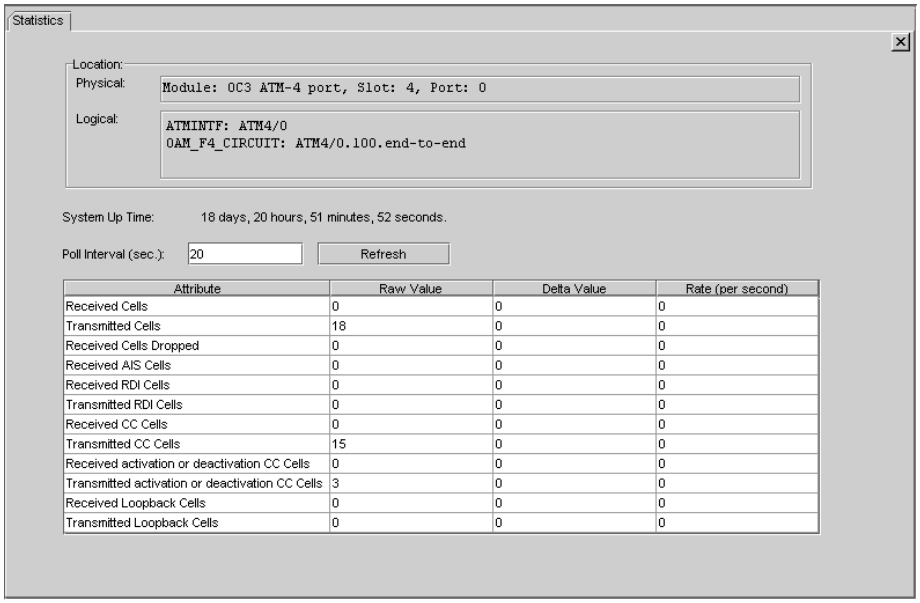


Table 68: OAM F4 Circuit Statistics Attributes

Attribute	Description
System Up Time	Time since last reported change to the operational status
Poll Interval (sec)	Interval in seconds between POLL PDU transmissions
Refresh	When button is clicked, the statistics are refreshed
Received Cells	Number of cells received

Table 68: OAM F4 Circuit Statistics Attributes (continued)

Attribute	Description
Transmitted Cells	Number of cells transmitted
Received Cells Dropped	Incoming F4 end-to-end or segment cells that were dropped
Received AIS Cells	F4 end-to-end or segment AIS cells received
Received RDI Cells	F4 end-to-end or segment RDI cells received
Transmitted RDI Cells	F4 end-to-end or segment RDI cells sent
Received CC Cells	F4 end-to-end or segment CC cells received
Transmitted CC Cells	F4 end-to-end or segment CC cells sent
Received activation or deactivation CC Cells	F4 end-to-end or segment activation or deactivation CC cells received
Transmitted activation or deactivation CC Cells	F4 end-to-end or segment activation or deactivation CC cells sent
Received Loopback Cells	F4 end-to-end or segment loopback cells received
Transmitted Loopback Cells	F4 end-to-end or segment loopback cells sent