AMI Configuration Commands Reference Manual

Part 2

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FCC CLASS A NOTICE

WARNING: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void this user's authority to operate this equipment.

NOTE: The TNX-210, TNX-1100, ASX-200WG, ASX-200BX, ASX-1000, ASX-4000, *ForeRunnerLE* 25, and *ForeRunnerLE* 155 have been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of the equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

DOC CLASS A NOTICE

This digital apparatus does not exceed Class A limits for radio noise emission for a digital device as set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la class A prescrites dans le reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada.

VCCI CLASS 1 NOTICE

この装置は、第一種情報処理装置（商工業地域において使用されるべき情報処理装置）で商工業地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会(VCCI)基準に適合しております。
従って、住宅地域またはその隣接した地域で使用すると、ラジオ、テレビジョン受信機等に受信障害を与えることがあります。
取扱説明書に従って正しい取り扱いをして下さい。

This equipment is in the Class 1 category (Information Technology Equipment to be used in commercial and/or industrial areas) and conforms to the standards set by the Voluntary Control Council For Interference by Information Technology Equipment aimed at preventing radio interference in commercial and/or industrial areas.Consequently, when used in a residential area or in an adjacent area thereto, radio interference may be caused to radios and TV receivers, etc. Read the instructions for correct handling.

FCC REQUIREMENTS (Notice to Users of DS1 Service)

The following instructions are provided to ensure compliance with the Federal Communications Commission (FCC) Rules, Part 68.

(1) This device must only be connected to the DS1 network connected behind an FCC Part 68 registered channel service unit. Direct connection is not allowed.

(2) Before connecting your unit, you must inform the telephone company of the following information:

Port ID	REN/SOC	FIC	USOC
NM-6/DS1C NM-2/DS1C NM-8/DS1D NM-4/DS1D	6.0N	04DU9-BN, 04DU9-DN, 04DU9-1ZN, and 04DU9-1SN	RJ48C

(3) If the unit appears to be malfunctioning, it should be disconnected from the telephone lines until you learn if your equipment or the telephone line is the source of the trouble. If your equipment needs repair, it should not be reconnected until it is repaired.

(4) If the telephone company finds that this equipment is exceeding tolerable parameters, the telephone company can temporarily disconnect service, although they will attempt to give you advance notice if possible.

(5) Under the FCC Rules, no customer is authorized to repair this equipment. This restriction applies regardless of whether the equipment is in or out of warranty.

(6) If the telephone company alters their equipment in a manner that will affect use of this device, they must give you advance warning so as to give you the opportunity for uninterrupted service. You will be advised of your right to file a complaint with the FCC.

CANADIAN IC CS-03 COMPLIANCE STATEMENT

NOTICE: The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Industry Canada label does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

E1 AND E3 NOTICE

The E1 (NM-6/E1C, NM-2/E1C, NM-8/E1D, and NM-4/E1D) and E3 (NM-4/E3C, NM-2/E3C, NM-4/E3D, and NM-2/E3D) network modules that are described in this manual are approved for use in FORE Systems' host systems providing that the instructions below are strictly observed. Failure to follow these instructions invalidates the approval.

Pan European Approval - CE Marking

Pan European approval of the E1 network module was issued by BABT following assessment against CTR12. This means that it can be connected to ONP and unstructured PTO-provided private circuits with 120 Ω interfaces in all European countries, according to Telecommunications Terminal Equipment (TTE) Directive 91/263/EEC. Thus, the following CE mark applies:

CE168X

The E1 and E3 network modules conform to safety standard EN60950: 1992 following the provisions of Low Voltage Product Safety Directive 73/23/EEC and CE Marking Directive 93/68/EEC, and can be marked accordingly with the CE symbol.

The E1 and E3 network modules conform to EN55022: 1994 and EN50082-1: 1992 following the provisions of the EMC Directive 89/336/EEC, and can be marked accordingly with the CE symbol.

National Approvals

UK

Network Module	Connects to	Approval Number
E1	PTO-provided private circuits with 75 Ω interfaces	AA60953
E3	PTO-provided private circuits with 75 Ω interfaces	NS/4387/1/T/605954
CEM E1	PTO-provided private circuits with 75 Ω or 120 Ω unstructured interfaces	AA607478

Required User Guide Statements - UK Installation

The network modules are designed for use only with FORE Systems ATM Switches. Use of the network modules in any product not listed in this manual may result in a hazard and will invalidate the regulatory approval. The network modules must be installed in accordance with the installation instructions provided.

The following table shows the available ports and their safety status:

Ports	Safety Status
E1 and E3 Ports	TNV operating at SELV
Bus Connector	SELV

CE NOTICE

Marking by the symbol **CE** indicates compliance of this system to the EMC (Electromagnetic Compatibility) directive of the European Community and compliance to the Low Voltage (Safety) Directive. Such marking is indicative that this system meets or exceeds the following technical standards:

- EN 55022 - "Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment."
- EN 50082-1 - "Electromagnetic compatibility - Generic immunity standard Part 1: Residential, commercial, and light industry."
- IEC 1000-4-2 - "Electromagnetic compatibility for industrial-process measurement and control equipment Part 2: Electrostatic discharge requirements."
- IEC 1000-4-3 - "Electromagnetic compatibility for industrial-process measurement and control equipment Part 3: Radiate electromagnetic field requirements."
- IEC 1000-4-4 - "Electromagnetic compatibility for industrial-process measurement and control equipment Part 4: Electrical fast transient/burst requirements."

SAFETY CERTIFICATIONS

ETL certified to meet Information Technology Equipment safety standards UL 1950, CSA 22.2 No. 950, and EN 60950.

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Preface

This manual provides the technical information needed to configure the ATM Management Interface (AMI) for the *ForeRunner*™ family of ATM Switches, TNX ATM Switches, and *ForeRunnerLE* Switches. This document was created for users with various levels of experience. If you have any questions or problems, please contact the FORE Systems' Technical Assistance Center (TAC).

Chapter Summaries

Chapter 1 - Introduction - Provides an overview of the AMI commands and menus that are described in this manual.

Chapter 2 - Port Configuration Commands - Describes the **`configuration port`** level AMI commands and menus.

Chapter 3 - Profile Configuration Commands - Describes the **`configuration profile`** level AMI commands and menus.

Chapter 4 - QOS Expansion Table Commands - Describes the **`configuration qos`** level AMI commands and menus.

Chapter 5 - QOS Extension Table Commands - Describes the **`configuration qosext`** level AMI commands and menus.

Chapter 6 - RS-232 Serial Port Commands - Describes the **`configuration rs232`** level AMI commands and menus.

Chapter 7 - Security Configuration Commands - Describes the **`configuration security`** level AMI commands and menus.

Chapter 8 - Signalling Commands - Describes the **`configuration signalling`** level AMI commands and menus.

Chapter 9 - SNMP Configuration Commands - Describes the **`configuration snmp`** level AMI commands and menus.

Chapter 10 - SPANS Configuration Commands - Describes the **`configuration spans`** level AMI commands and menus.

Chapter 11 - SPVX Configuration Commands - Describes the **`configuration spvx`** level AMI commands and menus.

Chapter 12 - Switch Configuration Commands - Describes the **`configuration switch`** level AMI commands and menus.

Chapter 13 - System Configuration Commands - Describes the **`configuration system`** level AMI commands and menus.

Chapter 14 - Timing Configuration Commands - Describes the **`configuration timing`** level AMI commands and menus.

Chapter 15 - UPC Configuration Commands - Describes the **`configuration upc`** level AMI commands and menus.

Chapter 16 - VCC Configuration Commands - Describes the **`configuration vcc`** level AMI commands and menus.

Chapter 17 - VPC Configuration Commands - Describes the **`configuration vpc`** level AMI commands and menus.

Chapter 18 - VPT Configuration Commands - Describes the **`configuration vpt`** level AMI commands and menus.

Related Manuals

References are made in this manual to the following manuals:

AMI Configuration Command Reference Manual, Part 1 - Describes the configuration level AMI commands and menus from **`configuration alarms>`** to **`configuration nsap>`**.

ATM Management Interface (AMI) Manual - Describes the root, display, operation, and statistics level AMI commands and menus.

ATM Switch Diagnostics and Troubleshooting Manual - Describes the debug level AMI commands and menus. Also, describes error messages, loopbacks, SCP diagnostics, and ATM Forum PNNI debugging information.

ATM Switch Network Configuration Manual - Discusses topics such as LAN Emulation, Classical IP, ATM Forum PNNI, and *ForeThought* PNNI.

These manuals can be found on the CD and can be read and printed using Acrobat Reader which is also included on the CD. If Acrobat Reader is installed locally, run Acrobat and open the manual from the `/DOCS` directory of the CD. If Acrobat Reader is not installed locally, run the Acrobat installer to load Acrobat Reader on your machine. Then run the `ACROREAD.EXE` file in the `/DOCS` directory of the CD.

Technical Support

In the U.S.A., customers can reach FORE Systems' Technical Assistance Center (TAC) using any one of the following methods:

1. Select the "Support" link from FORE's World Wide Web page:

   http://www.fore.com/

2. Send questions, via e-mail, to:

   support@fore.com

3. Telephone questions to "support" at:

   800-671-FORE (3673) or **724-742-6999**

4. FAX questions to "support" at:

   724-742-7900

Technical support for customers outside the United States should be handled through the local distributor or via telephone at the following number:

+1 724-742-6999

No matter which method is used to reach FORE Support, customers should be ready to provide the following:

- A support contract ID number
- The serial number of each product in question
- All relevant information describing the problem or question

Typographical Styles

Throughout this manual, all specific commands meant to be entered by the user appear on a separate line in bold typeface. In addition, use of the `Enter` or `Return` key is represented as `<ENTER>`. The following example demonstrates this convention:

`cd /usr <ENTER>`

File names that appear within the text of this manual are represented in the following style: "...the `fore_install` program installs this distribution."

Command names that appear within the text of this manual are represented in the following style: "...using the **`flush-cache`** command clears the bridge cache."

Subsystem names that appear within the text of this manual are represented in the following style: "...to access the **`bridge`** subsystem..."

Parameter names that appear within the text of this manual are represented in the following style: "...using *`<seg-list>`* allows you to specify the segments for which you want to display the specified bridge statistics."

Any messages that appear on the screen during software installation and network interface administration are shown in `Courier` font to distinguish them from the rest of the text as follows:

```
.... Are all four conditions true?
```

Important Information Indicators

To call your attention to safety and otherwise important information that must be reviewed to ensure correct and complete installation, as well as to avoid damage to the FORE Systems product or to your system, FORE Systems utilizes the following *WARNING/CAUTION/NOTE* indicators.

WARNING statements contain information that is critical to the safety of the operator and/or the system. Do not proceed beyond a ***WARNING*** statement until the indicated conditions are fully understood or met. This information could prevent serious injury to the operator, damage to the FORE Systems product, the system, or currently loaded software, and is indicated as follows:

WARNING!

Hazardous voltages are present. To reduce the risk of electrical shock and danger to personal health, follow the instructions carefully.

CAUTION statements contain information that is important for proper installation/operation. Compliance with **CAUTION** statements can prevent possible equipment damage and/or loss of data and are indicated as follows:

CAUTION

You risk damaging your equipment and/or software if you do not follow these instructions.

NOTE statements contain information that has been found important enough to be called to the special attention of the operator and is set off from the text as follows:

NOTE

If you change the value of the LECS control parameters while the LECS process is running, the new values do not take effect until the LECS process is stopped, and then restarted.

Laser Warning

Every FORE Systems network module having a single mode fiber optic interface contain a Class 1 laser.

Class 1 Laser Product:
This product conforms to applicable requirements of 21 CFR 1040 at the date of manufacture.

Class 1 lasers are defined as products which do not permit human access to laser radiation in excess of the accessible limits of Class 1 for applicable wavelengths and durations. These lasers are safe under reasonably foreseeable conditions of operation.

WARNING!

Do not stare into the beam or view the beam with optical instruments.

Safety Precautions

For your protection, observe the following safety precautions when setting up equipment:

- Follow all warnings and instructions marked on the equipment.
- Ensure that the voltage and frequency of your power source matches the voltage and frequency inscribed on the equipment's electrical rating label.
- Never push objects of any kind through openings in the equipment. Dangerous voltages may be present. Conductive foreign objects could produce a short circuit that could cause fire, electric shock, or damage to your equipment.

Modifications to Equipment

Do not make mechanical or electrical modifications to the equipment. FORE Systems, Inc., is not responsible for regulatory compliance of a modified FORE product.

CHAPTER 1 Introduction

This manual contains a detailed description of the AMI **configuration** commands. The main **configuration** menu can be found at the root level. There are several commands available under **configuration**. Commands that are submenus are immediately followed by a “>” symbol. Typing **configuration ?** at the prompt at the root level displays the **configuration** commands as follows:

```
myswitch::> configuration ?
  alarms>          atmarp>          atmroute>        board>
  cec>             ces>             fratm>           funi>
  http>            ilmiproxy>       ip>              lane>
  module>          nsap>            port>            profile>
  qos>             qosext>          rs232>           security>
  snmp>            spans>           spvx>            switch>
  system>          timing>          signalling>      upc>
  vcc>             vpc>             vpt>
```

Each of these commands has a submenu of commands. This manual describes the commands and menus from **configuration port>** to **configuration vpt>**. Please see Part 1 of the *AMI Configuration Commands Reference Manual* for descriptions of the commands and menus from **configuration alarms>** to **configuration nsap>**.

NOTE

Not all of the above commands are displayed on every platform. The **cec>** commands are only displayed on the platforms that can support a CEC-Plus. The **ces>** commands are only displayed on the platforms that can support CEM network modules. The **fratm>** and **funi>** commands are only displayed on the platforms that can support *FramePlus* network modules.

CHAPTER 2 Port Configuration Commands

These commands let you manage the configuration of the various ports. Type **`port ?`** at the **`configuration`** level to display the available subcommands.

```
myswitch::configuration> port ?
  aal5packetdiscard  admin          aisrdi        cac
  cdvt               cesds1>        cese1>        delay
  ds1>               ds3>           e1>           e3>
  gcrapolicing       iwf>           j2>           led>
  policing           pppolicing     show          sonet>
  taxi>              tp25>          traffic>      ubrtagging
  vbrbuffob          vbrob
```

NOTE

Not all of the above commands are displayed on every platform. The **`cese1>`** and **`cesds1>`** commands are only displayed on the platforms that can support CEM network modules. The **`iwf>`** commands are only displayed on the platforms that can support *FramePlus* network modules.

2.1 AAL5 Packet Discard Command

This command lets you configure EPD / PPD on a per-port / per-class basis for all CBR, VBR, and / or UBR SVCs and / or PVCs. Enter the following parameters:

NOTE Even though packet discard is disabled on a certain port, class, or connection, partial packet policing may still occur on that same port, class, or connection. This is because partial packet policing occurs on the input side of the switch and partial packet discard occurs on the output side of the switch in the network module queues.

NOTE This command does not apply to the *FramePlus* network modules.

```
myswitch::configuration port> aal5packetdiscard <port> (cbr | vbr | ubr)
(allOn | allOff | svcOn | svcOff)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which packet discard is being configured.
cbr | vbr | ubr	The class of service for which you are configuring packet discard.
allOn	**allOn** means all connections (SVCs and PVCs) of the specified class of service leaving on this port are subjected to packet discard.
allOff	**allOff** means no (SVCs and PVCs) connections of the specified class of service leaving on this port are subjected to packet discard.
svcOn	**svcOn** means all SVCs of the specified class of service leaving on this port are subjected to packet discard. PVCs are subjected to packet discard based on their UPC contract. This is the default.
svcOff	**svcOff** means no SVCs of the specified class of service leaving on this port are subjected to packet discard. PVCs are subjected to packet discard based on their UPC contract.

For example, to enable packet discard on all CBR SVCs and PVCs on port 2B4, enter the following parameters:

```
myswitch::configuration port> aal5packetdiscard 2b4 cbr allOn
```

2.2 Configuring the State of a Port

This command allows you to change the state of a port to be up (on-line) or down (off-line). When a port is down, all signalling and communication is disabled. This command is useful for taking a port out of service temporarily to perform diagnostics. Enter the following:

```
myswitch::configuration port> admin <port> (up | down)
```

These parameters are defined as follows:

Parameter	Description
port	The number of port to be managed.
up | down	**up** brings the designated port on-line. **down** takes the designated port off-line.

NOTE

This command has no effect on Circuit Emulation Services (CES) DS1 and E1 network modules or on *FramePlus* DS1 and E1 network modules. To administer a CES port up or down, you must use the **conf port cesds1 admin** or **conf port cese1 admin** command. To administer a *FramePlus* port up or down, you must use the **conf port iwf ds1 admin** or **conf port iwf e1 admin** command.

2.3 AISRDI Port Configuration Commands

When a physical layer fault (loss of carrier, loss of frame, etc.) is detected on a port that has AIS/RDI (Alarm Indication Signal)/(Remote Defect Indication) enabled, OAM cells are generated for all through paths, originating paths, PVCs, and PNNI SPVCs that originate on that port. If a virtual path AIS condition is indicated (by receipt of F4 AIS cells on a terminating path), OAM cells are generated for only that path and for channels (PVCs and PNNI SPVCs) that originate on that path. SVCs and SPANS SPVCs do not generate AIS cells.

RDI cells are generated upstream from a terminating path whenever an OAM condition exists on the receiving side of that port. An AIS is sent in the downstream direction (away from the failure). Receiving an AIS cell indicates that a physical layer failure condition is present upstream from the receiver. An RDI cell is sent toward the failure when a physical fault or AIS condition is detected on the virtual path and channel. Receiving an RDI cell means that a fault exists in the transit pathway of the virtual connection described by the RDI cell. This command lets you enable or disable ATM layer AIS/RDI OAM cell generation on a specific port. Enter the following:

NOTE Currently, AIS/RDI OAM cell generation is supported only for point-to-point connections.

```
myswitch::configuration port> aisrdi <port> (enable | disable)
```

These parameters are defined as follows:

Parameter	Description
enable | disable	**enable** means OAM cells are generated when AISs and RDIs are detected. **disable** means AISs and RDIs are ignored when they are detected. No OAM cells are generated. The default is **disable**.

NOTE If OAM cell generation is enabled on any ports using this command, that condition may be overridden using **conf switch oam disable**. In that case, the port level settings are still retained, but OAM cell generation ceases on all ports on the board. When **conf switch oam enable** is entered, all ports on the board use their last port level settings again, so OAM cell generation starts again only on the ports on which it was last enabled.

2.4 CAC Port Configuration Command

By disabling Connection Admission Control (CAC) on a particular port, you allow connections to be set up without restrictions on the available bandwidth. However, note that if CAC is disabled on a given port, care must be taken. The switch may not be able to guarantee the bandwidth that has been allocated on the port. To configure CAC on a particular port, enter the following parameters:

```
myswitch::configuration port> cac <port> (enable | disable)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which CAC is to be configured.
enable | disable	`enable` means CAC is active on this port. `disable` means CAC is not active on this port. The default is `enable`.

If you change the CAC state on a port, you will be asked to reset the network module. For example:

```
myswitch::configuration port> cac 1a3 disable

Changing the CAC state on a port must be followed by a
reset of the network module for the new CAC setting to
become effective.

Note that changing the CAC state from disabled to enabled
may result in the loss of previously provisioned connections.

Change the CAC state [n]? y

Reset the network module [n]? y
Network module 1A reset
```

NOTE

The CAC state is always enabled on the control port (CTL), and is always disabled on CEM network modules and on the backplane module (E) on an ASX-1000 and a TNX-1100. This command does not apply to the *FramePlus* network modules.

2.5 CDVT Port Configuration Command

This command lets you modify the input Cell Delay Variation Tolerance (CDVT) on a per-port basis. Enter the following parameters:

```
myswitch::configuration port> cdvt <port> <us>
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the CDVT is to be changed.
us	The new value for the CDVT setting, in microseconds.

NOTE This command does not apply to the *FramePlus* network modules.

2.6 DS1 CES Port Configuration Commands

These commands allow you to configure the ports on a DS1 CES network module. The following **cesds1** commands are valid only when a DS1 CES network module is installed in the switch fabric. You can display the list of subcommands by typing **cesds1 ?** at the **port** level.

```
myswitch::configuration port> cesds1 ?
  admin          framing        length         upstreamais
  linestatus     loopback       mode           show
```

NOTE These commands are not available locally on an ASX-200WG nor on an LE 155 nor on an LE 25.

2.6.1 Enabling/Disabling CES on a Port

This command lets you enable or disable CES on a DS1 CES port. Enter the following:

```
myswitch::configuration port cesds1> admin <port> (up | down)
```

These parameters are defined as follows:

Parameter	Description
port	The DS1 CES port on which CES is to be enabled or disabled.
up | down	Indicates whether CES is to be enabled or disabled on the selected port. **up** means that CES will be enabled. **down** means that CES will be disabled.

2.6.2 Configuring DS1 CES Port Framing

This command lets you change the framing mode on a DS1 CES port. Enter the following:

```
myswitch::configuration port cesds1> framing <port> (ESF|SF)
```

These parameters are defined as follows:

Parameter	Description
port	The DS1 CES port for which the framing mode is being set.
ESF | SF	The type of framing for this port. **ESF** indicates that ESF (Extended Super Frame) framing will be used. **SF** indicates that SF (Super Frame) framing will be used.

2.6.3 Configuring DS1 CES Port Line Length

This command lets you change the line length of a DS1 CES port to correspond to the physical cable attached to that port. This lets the DS1 CES port anticipate the strength of the received signal on the cable. Enter the following:

```
myswitch::configuration port cesds1> length <port>
(<130 | 130-260 | 260-390 | >390)
```

These parameters are defined as follows:

Parameter	Description
port	The DS1 CES port for which the line length is being set.
<130	The physical cable is shorter than 130 meters long
130 - 260	The physical cable is from 130 to 260 meters long.
260 - 390	The physical cable is from 260 to 390 meters long.
>390	The physical cable is greater than 390 meters long.

2.6.4 Enabling/Disabling Upstream AIS

This command lets you enable or disable sending AIS alarm signals to the upstream link when an LOS signal is detected. This command can be enabled or disabled on a per-port basis on a DS1 CES network module.

NOTE This command only applies to unstructured connections. If it is enabled on a port, the structured connections ignore this feature.

Enter the following:

```
myswitch::configuration port cesds1> upstreamais <port> (enabled | disabled)
```

These parameters are defined as follows:

Parameter	Description
port	The DS1 CES port on which AIS is being enabled or disabled.
enabled | disabled	**enabled** means that if an LOS signal is detected, an AIS signal is sent upstream on the unstructured connections of the specified port. **disabled** means that an AIS signal is not sent upstream if an LOS signal is detected on the specified port. The default is **disabled**.

If you have active connections on a port, and you enable this feature on that port, the connections will be disrupted. For example,

```
myswitch::configuration port cesds1> upstreamais 1a1 enabled

This port is currently active. If you proceed any connections will be
interrupted.
Proceed (y/n): y
```

2.6.5 Displaying DS1 CES Port Line Status

This command lets you display the current line status of each DS1 CES port. Enter the following:

```
myswitch::configuration port cesds1> linestatus
           Rx  Tx  Rx  Tx
Port Alarm LOF LOF AIS AIS LOF LOS Loopback
2A1  no    no  no  no  no  no  yes off
2A2  no    no  no  no  no  no  yes off
2A3  no    no  no  no  no  no  yes off
2A4  no    no  no  no  no  no  yes off
2A5  no    no  no  no  no  no  yes off
2A6  no    no  no  no  no  no  yes off
```

The fields in this display are defined as follows:

Field	Description
Port	The DS1 CES port number.
Alarm	Indicates whether or not the port is experiencing an alarm condition.
Rx LOF	Indicates whether or not the receiving port is experiencing a Loss of Frame (LOF).
Tx LOF	Indicates whether or not the transmit port is experiencing a Loss of Frame (LOF).
Rx AIS	Indicates whether or not the receiving port is experiencing an Alarm Indication Signal (AIS).
Tx AIS	Indicates whether or not the transmit port is experiencing an Alarm Indication Signal (AIS).
LOF	Indicates whether or not the DS1 CES connection is experiencing a Loss of Frame (LOF).
LOS	Indicates whether or not the DS1 CES connection is experiencing a Loss of Signal (LOS).
Loopback	Indicates whether or not the port is in loopback mode.

2.6.6 Configuring DS1 CES Port Loopback

This command lets you designate the type of loopback on a DS1 CES port. Enter the following:

```
myswitch::configuration port cesds1> loopback <port> (line | none)
```

These parameters are defined as follows:

Parameter	Description
port	The DS1 CES port on which the loopback mode is to be changed.
line	**line** loopback connects the transmitter to the receiver. The data stream received from the Rx line is retransmitted out to the Tx line. Cells that are switched to this port are not sent over the line.
none	**none** designates that no loopback will take place. This is the default setting.

2.6.7 Configuring the DS1 CES Port Line Coding

The mode command lets you configure the line coding for a particular DS1 CES port. Enter the following:

```
myswitch::configuration port cesds1> mode <port> (B8ZS|AMI)
```

These parameters are defined as follows:

Parameter	Description
port	The DS1 CES port on which the line coding is to be changed.
B8ZS | AMI	The type of coding to be used. **B8ZS** means that Binary 8-Zero Substitution will be used. **AMI** means that Alternate Mark Inversion will be used. (See the *Glossary*.)

2.6.8 Displaying the DS1 CES Port Configuration

This command lets you display the current configuration of each DS1 CES port. Enter the following parameters:

```
myswitch::configuration port cesds1> show
Port      Framing Carrier Line Loopback Port     Line    Line    UpStr
          Mode    State   Code State    Timing   Length  Status  AIS
2A1  down ESF     no      B8ZS none     internal <130    64      no
2A2  down ESF     no      B8ZS none     internal <130    64      no
2A3  down ESF     no      B8ZS none     internal <130    64      no
2A4  down ESF     no      B8ZS none     internal <130    64      no
2A5  down ESF     no      B8ZS none     internal <130    64      no
2A6  down ESF     no      B8ZS none     internal <130    64      no
```

The fields in this display are defined as follows:

Field	Description
Port	The DS1 CES port number and the state of the port (**up** or **down**).
Framing Mode	The type of framing used on the line.
Carrier State[1]	**yes** means a carrier has been detected on this port. **no** means a carrier has not been detected on this port.
Line Code	The type of line coding used on the port.
Loopback State	The loopback mode on the port.
Port Timing	The source of the timing on this port. The values are one of: <BNP> indicating the board/network module/port from which the timing is being extracted, `srts` indicating that srts is being used on this port, **fabric** *<X>* where *X* is 1, 2, 3, or 4 indicating that timing is being sourced from another switch fabric (only applicable to an ASX-1000 or TNX-1100), **network** indicating that the clock is being derived from the line itself, or **crystal** indicating that the crystal on the network module itself is being used.
Line Length	The length, in meters, of the physical cable attached to this port.
Line Status	The line status of the DS1 CES port.
UpStr AIS	**yes** means that if an LOS signal is detected, an AIS signal is sent upstream on the unstructured connections of the specified port. **no** means that an AIS signal is not sent upstream if an LOS signal is detected on the specified port.

1. A carrier is detected when a signal is applied to the receive side of the port, but it does not guarantee the signal is the proper frequency.

2.7 CESE1 Port Configuration Commands

These commands let you modify various aspects of the configuration of the ports on a E1 CES network module. The following **cese1** commands are available only when a E1 CES network module is installed in the switch fabric. To list the available subcommands, type **cese1 ?** at the **port** level.

```
myswitch::configuration port> cese1 ?
  admin              crc4               ts16               upstreamais
  linestatus         loopback           show
```

NOTE These commands are not available locally on an ASX-200WG nor on an LE 155 nor on an LE 25 switch.

2.7.1 Enabling/Disabling CES on a Port

This command lets you enable or disable Circuit Emulation Services (CES) on a particular E1 CES port. Enter the following:

```
myswitch::configuration port cese1> admin <port> (up | down)
```

These parameters are defined as follows:

Parameter	Description
port	The E1 CES port on which CES is to be enabled or disabled.
up | down	Indicates whether CES is to be enabled or disabled on the selected port. **up** means that CES will be enabled. **down** means that CES will be disabled.

2.7.2 Configuring CRC4 Framing on an E1 CES Port

This command lets you change the CRC4 framing type on a E1 CES port. This command lets you specify whether or not the E1 CES port performs a CRC4 error check. Enter the following:

```
myswitch::configuration port cese1> crc4 <port> (ON | OFF)
```

These parameters are defined as follows:

Parameter	Description
port	The E1 CES port on which the CRC4 framing type is being changed.
ON | OFF	**OFF** means that CRC4 error checking is disabled on this port. **OFF** is the default. **ON** means that CRC4 error checking is enabled on this port.

2.7.3 Reserving TS16 for Signalling on an E1 CES Port

This command lets you specify whether or not timeslot 16 (TS16) is reserved for signalling information on a E1 CES port. Enter the following:

```
myswitch::configuration port cese1> ts16 <port> (ON | OFF)
```

These parameters are defined as follows:

Parameter	Description
port	The E1 CES port on which TS16 is being changed.
ON | OFF	**OFF** means that timeslot 16 is used as another data channel on this port. **ON** means that timeslot 16 is reserved for signalling information. **ON** is the default.

2.7.4 Enabling/Disabling Upstream AIS

This command lets you enable or disable sending AIS alarm signals to the upstream link when an LOS signal is detected. This command can be enabled or disabled on a per-port basis on an E1 CES network module.

NOTE This command only applies to unstructured connections. If it is enabled on a port, the structured connections ignore this feature.

Enter the following:

```
myswitch::configuration port cese1> upstreamais <port> (enabled | disabled)
```

These parameters are defined as follows:

Parameter	Description
port	The E1 CES port on which AIS is being enabled or disabled.
enabled | disabled	**enabled** means that if an LOS signal is detected, an AIS signal is sent upstream on the unstructured connections of the specified port. **disabled** means that an AIS signal is not sent upstream if an LOS signal is detected on the specified port. The default is **disabled**.

If you have active connections on a port, and you enable this feature on that port, the connections will be disrupted. For example,

```
myswitch::configuration port cese1> upstreamais 1a1 enabled

This port is currently active. If you proceed any connections will be
interrupted.
Proceed (y/n):
```

2.7.5 Displaying E1 CES Port Line Status

This command lets you display the current line status of each E1 CES port. Enter the following:

```
myswitch::configuration port cese1> linestatus
           Rx   Tx   Rx   Tx                    TS16 FarEndTx  NearEndTx NearEnd
Port Alarm LOF  LOF  AIS  AIS  LOF  LOS  Loopback AIS  TS16LOMF  TS16LOMF  TestCode
3C1  no    no   no   no   no   no   no   off      no   no        no        No code
3C2  no    no   no   no   no   no   no   off      no   no        no        No code
3C3  no    no   no   no   no   no   no   off      no   no        no        No code
3C4  no    no   no   no   no   no   no   off      no   no        no        No code
3C5  no    no   no   no   no   no   no   off      no   no        no        No code
3C6  no    no   no   no   no   no   no   off      no   no        no        No code
```

The fields in this display are defined as follows:

Field	Description
Port	The E1 CES port.
Alarm	Indicates whether or not the port is experiencing an alarm condition.
Rx LOF	Indicates whether or not the port is receiving a Loss of Frame (LOF) signal from the far end.
Tx LOF	Indicates whether or not the port is transmitting a Loss of Frame (LOF) signal.
Rx AIS	Indicates whether or not the port is receiving an Alarm Indication Signal (AIS).
Tx AIS	Indicates whether or not the port is transmitting an Alarm Indication Signal (AIS).
LOF	Indicates whether or not the port is experiencing Loss of Frame (LOF).
LOS	Indicates whether or not the port is experiencing Loss of Signal (LOS).
Loopback	Indicates whether or not the port is in loopback mode.
TS16 AIS	Indicates whether AIS is being received in timeslot 16.
FarEndTx TS16LOMF	Indicates whether Loss Of Multiframe (LOMF) is occurring at the far end in timeslot 16.
NearEndTx TS16LOMF	Indicates that the port is experiencing a Loss Of Multiframe (LOMF) condition in timeslot 16.
NearEnd TestCode	Indicates that the port is currently transmitting a test pattern.

2.7.6 Configuring E1 CES Port Loopback

This command lets you designate the type of loopback on an E1 CES port. Enter the following:

```
myswitch::configuration port cese1> loopback <port> (line | none)
```

These parameters are defined as follows:

Parameter	Description
port	The E1 CES port on which the loopback mode is to be changed.
line	**line** loopback connects the transmitter to the receiver. The data stream received from the Rx line is retransmitted out to the Tx line. Cells that are switched to this port are not sent over the line.
none	**none** designates that no loopback will take place. This is the default setting.

2.7.7 Displaying the E1 CES Port Configuration

This command lets you display the current configuration of each E1 CES port. Enter the following:

```
myswitch::configuration port cese1> show
Port      Framing Carrier Line Loopback Port    Line  Line    UpStr
          Mode    State   Coding State  Timing  Imp.  Status  AIS
3C1  up   CRC     yes     HDB3 none     internal 120  1       no
3C2  up   CRC     yes     HDB3 none     internal 120  1       no
3C3  down CRC     yes     HDB3 none     internal 120  1       no
3C4  down CRC     yes     HDB3 none     internal 120  1       no
3C5  down CRC     yes     HDB3 none     internal 120  1       no
3C6  down CRC     yes     HDB3 none     internal 120  1       no
```

The fields in this display are defined as follows:

Field	Description
Port	The E1 CES port number and the state of the port (**up** or **down**).
Framing Mode	The type of framing used on the line.
Carrier State[1]	**yes** means a carrier has been detected on this port. **no** means a carrier has not been detected on this port.
Line Coding	The type of line coding used on the port.
Loopback State	The loopback mode on the port.
Port Timing	The source of the timing on this port. The values are one of: <BNP> indicating the board/network module/port from which the timing is being extracted, `srts` indicating that srts is being used on this port, **fabric** *<X>* where *X* is 1, 2, 3, or 4 indicating that timing is being sourced from another switch fabric (only applicable to an ASX-1000 or TNX-1100), **network** indicating that the clock is being derived from the line itself, or **crystal** indicating that the crystal on the network module itself is being used.
Line Imp.	The value of the line impedance (in ohms, either **75** or **120**).
Line Status	The line status of the E1 CES port.
UpStr AIS	**yes** means that if an LOS signal is detected, an AIS signal is sent upstream on the unstructured connections of the specified port. **no** means that an AIS signal is not sent upstream if an LOS signal is detected on the specified port.

1. A carrier is detected when a signal is applied to the receive side of the port, but it does not guarantee the signal is the proper frequency.

2.8 Configuring Port Delay

This command lets you specify the amount Cell Delay Variation and the maximum Cell Transfer Delay that is introduced by the hardware on the input or output side of a given port.

NOTE This command is only useful if you are running PNNI on your switch and if you want to specify how much delay will be introduced at a given port. The PNNI router can use this information in determining the best hop-by-hop route to take. However, the CDV and maximum CTD are automatically calculated for you by the switch, so if these conditions are not represented in your network, it is highly recommended that you leave these values at the default settings.

NOTE This command does not apply to the *FramePlus* network modules.

myswitch::configuration port> **delay** <*port*> <**input** | **output**> (**default** | <*cdv*> <*maxctd*>)

These parameters are defined as follows:

Parameter	Description
port	The port number on which the CDV and CTD are being set.
input | output	**input** means the modified values apply to the input side of the port. **output** means the modified values apply to the output side of the port.
default	Resets the CDV and CTD to the default values.
cdv	The new value for Cell Delay Variation on this port, in microseconds. The default is 1 microsecond.
maxctd	The new value for Cell Transfer Delay on this port, in microseconds. The default is 21 microseconds.

2.9 DS1 Port Configuration Commands

These commands allow you to modify various aspects of the configuration of the ports on a DS1 network module. The following DS1 commands are available only when a DS1 network module is installed in the switch fabric. To list the available subcommands, type **?** at the **ds1** level.

```
myswitch:: configuration port ds1> ?
  emptycells        length            loopback          mode
  prbs              scrambling        show              timing
```

2.9.1 Configuring DS1 Port Empty Cells

Empty cells are cells that are sent as “filler” or place holders when there is no real data to send. By sending these cells, network modules that are synchronous in nature can keep an even flow of traffic moving so that distributed timing can work properly. This command lets you change the type of cells sent as empty cells on a DS1 network module port. Enter the following parameters:

```
myswitch::configuration port ds1> emptycells <port> (idle | unassigned)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the type of empty cells is to be changed.
idle | unassigned[1]	The type of cells this port sends for filler when the port is not sending data. **Idle** cells set the CLP bit=1 and **unassigned** cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned. The default is **unassigned**.

1. Refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

2.9.2 Configuring DS1 Port Line Length

This command lets you change the line length of a DS1 port to correspond to the physical cable attached to that port. This lets the DS1 network module receive the signal on the cable.

Check the unit Series, Revision, and Part numbers. To check the Series and Revision numbers, use the **`conf mod show`** command and look under the `Series` and `Rev.` fields, respectively. To check the Part number (ACCA####), remove the network module from the switch, and look at either the right edge of the top of the printed circuit board, or the top of the rear connector.

NOTE

Series C, Revision 2, network modules with ACCA0055 part numbers should use ONLY the parameters that are appended with an A (e.g., Lt110A) in the table below.

To select the appropriate port line length, enter the following parameters:

`myswitch::configuration port ds1>` **`length`** *`<port>`* (**`Lt110`** | **`110-220`** | **`220-330`** | **`330-440`** | **`440-550`** | **`550-660`** |**`Gt655`** | **`Lt110A`** | **`110-220A`** | **`220-330A`** | **`330-440A`** | **`440-550A`** | **`550-660A`** | **`Gt655A`**)

These parameters are defined as follows:

Parameter	Description
port	The port number on which the line length is to be changed.
Lt110	Use if the physical cable is shorter than 110 ft.
110-220	Use if the physical cable is between 110 and 220 ft.
220-330	Use if the physical cable is between 220 and 330 ft.
330-440	Use if the physical cable is between 330 and 440 ft.
440-550	Use if the physical cable is between 440 and 550 ft.
550-660	Use if the physical cable is between 550 and 660 ft.
Gt655[1]	Use if the physical cable is greater than 655 ft.
Lt110A	Use if the physical cable is shorter than 110 ft.
110-220A	Use if the physical cable is between 110 and 220 ft.
220-330A	Use if the physical cable is between 220 and 330 ft.
330-440A	Use if the physical cable is between 330 and 440 ft.
440-550A	Use if the physical cable is between 440 and 550 ft.
550-660A	Use if the physical cable is between 550 and 660 ft.
Gt655A	Use if the physical cable is greater than 655 ft.

1. The DS1 network module is designed to meet all applicable requirements up to 655 feet of cable. Operation with cables greater than 655 feet in length is not guaranteed.

2.9.3 Configuring DS1 Port Loopback

This command lets you designate the type of loopback on a port on a DS1 network module. Enter the following parameters:

```
myswitch::configuration port ds1> loopback <port> (line | payload | diag | none)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the loopback mode is to be changed.
line | payload | diag | none	**Line** connects the transmitter to the receiver. The data stream received from the line is retransmitted out to the line. Cells that are switched to this port are not sent over the line. **Payload** means the DS1 stream received from the network has the DS1 overhead bits re-inserted and is retransmitted to the network. **Diagnostic** connects the receiver to the transmitter. The DS1 stream transmitted by the SCP to a port is looped back to the SCP. The stream is still transmitted over the cable, but the incoming stream is ignored. **none** means no loopback will take place on this port. The default is **none**.

2.9.4 Configuring DS1 Port Mode

This command allows you to change the mode of operation on a port on a DS1 network module. Enter the following parameters:

```
myswitch::configuration port ds1> mode <port> (plcp | hcs)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the framing type is to be changed.
plcp | hcs	**plcp** means that the port uses PLCP (Physical Layer Convergence Protocol) framing (G.751) for cell delineation. **hcs** means that the port uses HCS (Header Check Sequence) based framing (G.832) for cell delineation. The default is **hcs**.

2.9.5 Configuring Pseudo-Random Bit Sequence Generation

This command allows you to enable Pseudo-Random Bit Sequence (PRBS) generation on a port on a DS1 network module.

NOTE This command is only available on Series D DS1 network modules.

Enter the following parameters:

```
myswitch::configuration port ds1> prbs <port> (off | on)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the PRBS is to be changed.
on | off	**on** means that PRBS is enabled on this port and the Pseudo-Random Bit Sequence Generator (PRSG) will provide an unframed 2^15-1 test sequence as defined in Recommendation O.151 on this port. **off** means that PRBS is disabled on this port. The default is **off**.

2.9.6 Configuring DS1 Port Scrambling

This command allows you to change the scrambling mode on a port on the DS1 network module. Enter the following parameters:

```
myswitch::configuration port ds1> scrambling <port> (on | off)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the scrambling mode is to be changed.
on | off[1]	**on** indicates that cell payload scrambling is enabled on this port. **off** means that cell payload scrambling is disabled on this port. Only the payload of the ATM cells is scrambled. The default is **off**.

1. The scrambling mode should be set to the same status on both the transmitting side and the receiving side.

2.9.7 Showing the DS1 Port Configuration

This command allows you to display current information about all of the ports on a DS1 network module. Enter the following parameters:

```
myswitch::configuration port ds1> show
Port Carrier Stat  Mode Framing Loopback Timing   PRBS Scram Length   EmptyCells
1A1  no      0x124 hcs  ESF     none     internal N/A  off   Lt110    unassigned
1A2  no      0x124 hcs  ESF     none     internal N/A  off   Lt110    unassigned
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each E3 network module currently installed in the switch fabric.
Carrier[1]	**yes** means a carrier has been detected on this port. **no** means a carrier has not been detected.
Stat	The DS1 line status of the port.
Mode	**plcp** means that the port uses PLCP (Physical Layer Convergence Protocol) framing for cell delineation. **hcs** means the port uses HCS (Header Check Sequence) cell delineation.
Framing	The type of framing used for the port. The type of circuit affects the number of bits per second that the circuit can reasonably carry, as well as the interpretation of the usage and error statistics. This is a read-only field.
Loopback	The loopback mode on the port. Can be: **none**, **line**, **payload**, or **diagnostic**.
Timing	The transmit clock for this port. **network** means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. **internal** means that the internal clock is used to drive the transmit line of this port.
PRBS	**on** means that PRBS is enabled on this port and the Pseudo-Random Bit Sequence Generator (PRSG) will provide an unframed 2^15-1 test sequence as defined in Recommendation O.151. **off** means that PRBS is disabled on this port.
Scram	**on** means that payload scrambling is enabled on this port. **off** means that payload scrambling is disabled on this port.
Length	The length of the physical cable that is attached to this port.
EmptyCells[2]	The type of cells this port sends for filler when the port is not sending data. **Idle** cells set the CLP bit=1 and **unassigned** cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned.

1. A carrier is detected when a signal is applied to the receive side of the port. It does not guarantee that the signal is the proper frequency.
2. Please refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

2.9.8 Configuring DS1 Port Timing

This command lets you change the timing source on a port on a DS1 network module. Enter the following parameters:

```
myswitch::configuration port ds1> timing <port> (network | internal)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the line length is to be changed.
network | internal	The transmit clock for this port. **network** means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. **internal** means that the internal clock is used to drive the transmit line of this port.

2.10 DS3 Port Configuration Commands

These commands let you modify various aspects of the configuration of the ports on a DS3 network module. The following DS3 commands are available only when a DS3 network module is installed in the switch fabric. You can display the list of available subcommands by typing **?** at the **ds3** level.

```
myswitch::configuration port ds3> ?
  emptycells        framing           length            loopback
  mode              scrambling        show              timing
```

2.10.1 Configuring DS3 Port Empty Cells

Empty cells are cells that are sent as “filler” or place holders when there is no real data to send. By sending these cells, network modules that are synchronous in nature can keep an even flow of traffic moving so that distributed timing can work properly. This command lets you change the type of cells sent as empty cells on a DS3 network module port. Enter the following parameters:

```
myswitch::configuration port ds3> emptycells <port> (idle | unassigned)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the type of empty cells is to be changed.
idle | unassigned[1]	The type of cells this port sends for filler when the port is not sending data. **Idle** cells set the CLP bit=1 and **unassigned** cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned. The default is **unassigned**.

1. Refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

2.10.2 Configuring the DS3 Port Framing

This command allows you to designate the framing to be used on a port on a DS3 network module. Enter the following parameters:

```
myswitch::configuration port ds3> framing <port> (cchannel | cbit)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the framing is to be changed.
cchannel | cbit	The type of framing for the port. **cchannel** (clearchannel) means that standard M23 framing is used on this port. The default is **cbit** (cbitparity).

2.10.3 Configuring DS3 Port Line Length

This command lets you change the line length of a DS3 port to correspond to the physical cable attached to that port. Enter the following parameters:

```
myswitch::configuration port ds3> length <port> (Lt225 | Gt225)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the line length is to be changed.
Lt225	Use if the physical cable is shorter than 225 ft.
Gt225	Use if the physical cable is greater than 225 ft. This is the default.

2.10.4 Configuring the DS3 Port Loopback

This command lets you designate the type of loopback on a port on a DS3 network module. Enter the following parameters:

```
myswitch::configuration port ds3> loopback <port>
(cell | payload | diag | line | none)
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the loopback mode is to be changed.
cell	**cell** loopback means that the DS3 stream received from the network is unframed into ATM cells. The cells are reframed and transmitted back to the network.
payload	**payload** loopback mean the DS3 stream received from the network has the DS3 overhead bits re-inserted and is retransmitted to the network.
diag	**diagnostic** loopback connects the receiver to the transmitter. The DS3 stream transmitted by the switch to a port is looped back to the switch. The DS3 stream is still transmitted to the network, but the incoming DS3 stream is ignored.
line	**line** loopback connects the transmitter to the receiver. The data stream received from the line is retransmitted out to the line. Cells that are switched to this port are not sent over the line.
none	**none** designates that no loopback will take place on this port. This is the default setting.

2.10.5 Configuring the DS3 Port Mode

This command allows you to change the framing mode on a port on a DS3 network module. Enter the following parameters:

```
myswitch::configuration port ds3> mode <port> (plcp | hcs)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the framing mode is to be changed.
plcp | hcs	**plcp** means the port uses PLCP (Physical Layer Convergence Protocol) framing for cell delineation. **hcs** means the port uses HCS (Header Check Sequence) based framing for cell delineation. The default is **hcs**.

2.10.6 Configuring the DS3 Port Scrambling

This command lets you change the scrambling mode on a port on the DS3 network module. Enter the following parameters:

```
myswitch::configuration port ds3> scrambling <port> (on | off)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the scrambling mode is to be changed.
on[1] | off	**on** means that cell payload scrambling is enabled on this port. **off** means that cell payload scrambling is disabled on this port.

1. Only the payload of the ATM cells is scrambled.

2.10.7 Showing the DS3 Port Configuration

This command allows you to display current information about all of the ports on the DS3 network module. Enter the following parameters:

```
myswitch::configuration port ds3> show
Port Carrier Status Mode Framing  Loopback Timing   Scrambling EmptyCells Length
1A1  yes     0x1    plcp cbit     none     internal off        unassigned Gt225
1A2  yes     0x1    plcp cbit     none     internal off        unassigned Gt225
```

The fields in this display are defined as follows:

Field	Description
Port	The DS3 port number of the network module(s) currently installed in the switch.
Carrier[1]	**yes** means a carrier has been detected on this port. **no** means a carrier has not been detected on this port. A carrier is detected when a signal is applied to the receive side of the port, but it does not guarantee the signal is the proper frequency.
Status	The DS3 line status of the port.
Mode	**Plcp** means the port uses PLCP (Physical Layer Convergence Protocol) framing for cell delineation. **Hcs** means the port uses HCS (Header Check Sequence) based framing for cell delineation.
Framing	The type of framing used for the port. Can be **cchannel** or **cbit**.
Loopback	The loopback mode on the port. Can be **cell**, **payload**, **diagnostic**, **line**, or **none**.

Field	Description
Timing	The transmit clock for this port. **`network`** means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. **`internal`** means that the internal clock is used to drive the transmit line of this port.
Scrambling	**`On`** means payload scrambling is enabled on the port. **`Off`** means payload scrambling is disabled on the port.
EmptyCells[2]	The type of cells this port sends for filler when the port is not sending data. `Idle` cells set the CLP bit = 1 and `unassigned` cells set the CLP bit = 0. Idle = invalid cell pattern and unassigned = unassigned.

1. A carrier is detected when a signal is applied to the receive side of the port, but it does not guarantee the signal is the proper frequency.
2. Please refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

2.10.8 Configuring DS3 Port Timing

This command lets you change the timing source on a port on a DS3 network module. Enter the following parameters:

```
myswitch::configuration port ds3> timing <port> (network | internal)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the line length is to be changed.
network | internal	The transmit clock for this port. **`network`** means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. **`internal`** means that the internal clock is used to drive the transmit line of this port.

2.11 E1 Port Configuration Commands

These commands allow you to modify the configuration of the ports on an E1 network module. These commands are available only when an E1 network module is installed in the switch fabric. To display the list of available subcommands, type **?** at the **e1** level.

```
myswitch::configuration port> e1 ?
  emptycells        length            loopback          mode
  scrambling        show              timing
```

2.11.1 Configuring E1 Port Empty Cells

Empty cells are cells that are sent as “filler” or place holders when there is no real data to send. By sending these cells, network modules that are synchronous in nature can keep an even flow of traffic moving so that distributed timing can work properly. This command lets you change the type of cells sent as empty cells on an E1 network module port. Enter the following:

```
myswitch::configuration port e1> emptycells <port> (idle | unassigned)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the type of empty cells is to be changed.
idle | unassigned[1]	The type of cells this port sends for filler when the port is not sending data. **Idle** cells set the CLP bit=1 and **unassigned** cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned. The default is **idle**.

1. Refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

2.11.2 Configuring E1 Port Line Length

This command lets you change the line length of an E1 port to correspond to the physical cable attached to that port. This allows the E1 network module to receive the signal on the cable.

Check the unit Series, Revision, and Part numbers. To check the Series and Revision numbers, use the **`conf mod show`** command and look under the `Series` and `Rev.` fields, respectively. To check the Part number (ACCA####), remove the network module from the switch, and look at either the right edge of the top of the printed circuit board, or the top of the rear connector.

NOTE

Series C, Revision 2, network modules with ACCA0055 part numbers should use ONLY the parameters that are appended with an A (e.g., Lt110A) in the table below.

To select the appropriate port line length, enter the following parameters:

`myswitch::configuration port e1>` **`length`** *`<port>`* (**`Lt110`** | **`110-220`** | **`220-330`** | **`330-440`** | **`440-550`** | **`550-660`** |**`G703-75`** | **`G703-120`**| **`Lt110A`** | **`110-220A`** | **`220-330A`** | **`330-440A`** | **`440-550A`** | **`550-660A`** | **`G703-75A`** | **`G703-120A`**)

These parameters are defined as follows:

Parameter	Description
port	The port number on which the line length is to be changed.
Lt110	Use if the physical cable is shorter than 110 ft.
110-220	Use if the physical cable is between 110 and 220 ft.
220-330	Use if the physical cable is between 220 and 330 ft.
330-440	Use if the physical cable is between 330 and 440 ft.
440-550	Use if the physical cable is between 440 and 550 ft.
550-660	Use if the physical cable is between 550 and 660 ft.
G703-75	Use if the physical cable is a G703 standard 75 ohm coaxial line.
G703-120	Use if the physical cable is a G703 standard 120 ohm symmetrical line.
Lt110A	Use if the physical cable is shorter than 110 ft.
110-220A	Use if the physical cable is between 110 and 220 ft.
220-330A	Use if the physical cable is between 220 and 330 ft.
330-440A	Use if the physical cable is between 330 and 440 ft.
440-550A	Use if the physical cable is between 440 and 550 ft.
550-660A	Use if the physical cable is between 550 and 660 ft.
G703-75A	Use if the physical cable is a G703 standard 75 ohm coaxial line.
G703-120A	Use if the physical cable is a G703 standard 120 ohm symmetrical line.

2.11.3 Configuring E1 Port Loopback

This command lets you designate the type of loopback on a port on an E1 network module. Enter the following parameters:

```
myswitch::configuration port e1> loopback <port> (line | payload | diag | none)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the loopback mode is to be changed.
line | payload | diag | none	**Line** loopback connects the transmitter to the receiver. The data stream received from the line is retransmitted out to the line. Cells that are switched to this port are not sent over the line. **Payload** loopback means the stream received from the network has the E1 overhead bits re-inserted and is retransmitted to the network. **Diagnostic** loopback connects the receiver to the transmitter. The E1 stream transmitted by the SCP to a port is looped back to the SCP. The stream is still transmitted over the cable, but the incoming stream is ignored. **none** means that no loopback will take place on this port. The default is **none**.

2.11.4 Configuring E1 Port Mode

This command allows you to change the method used for cell delineation on an E1 network module port.

NOTE This command is only available on Series C E1 network modules.

Enter the following parameters:

```
myswitch::configuration port e1> mode <port> (plcp | hcs)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the framing type is to be changed.
plcp | hcs	**plcp** means that the port uses PLCP (Physical Layer Convergence Protocol) framing (G.751) for cell delineation. **hcs** means that the port uses HCS (Header Check Sequence) based framing (G.832) for cell delineation. The default is **hcs**.

2.11.5 Configuring E1 Port Scrambling

This command allows you to change the scrambling mode on a port on an E1 network module. Enter the following parameters:

```
myswitch::configuration port e1> scrambling <port> (on | off)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the scrambling mode is to be changed.
on | off[1]	**on** indicates that cell payload scrambling is enabled on this port. **off** means that cell payload scrambling is disabled on this port. Only the payload of the ATM cells is scrambled. The default is **on**.

1. The scrambling mode should be set to the same status on both the transmitting side and the receiving side.

2.11.6 Showing the E1 Port Configuration

This command lets you display information about all of the ports on E1 network modules. Enter the following parameters:

```
myswitch::configuration port e1> show
Port Carrier Stat  Mode   LineType Loopback Timing    Scram Length    EmptyCells
1C1  no      0x244 N/A    CRC      none     internal  on    Lt110     idle
1C2  no      0x244 N/A    CRC      none     internal  on    Lt110     idle
1C3  no      0x244 N/A    CRC      none     internal  on    Lt110     idle
1C4  no      0x244 N/A    CRC      none     internal  on    Lt110     idle
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each E1 network module currently installed in the switch fabric.
Carrier[1]	**yes** means a carrier has been detected on this port. **no** means a carrier has not been detected.
Stat	The E1 line status of the port.
Mode	**plcp** means that the port uses PLCP framing for cell delineation. **hcs** means that the port uses HCS cell delineation.

Field	Description
LineType	The variety of E1 line implementing this circuit. The type of circuit affects the number of bits per second that the circuit can reasonably carry, as well as the interpretation of the usage and error statistics. This parameter is read-only.
Loopback	The loopback mode on the port.
Timing	The transmit clock for this port. **network** means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. **internal** means that the internal clock is used to drive the transmit line of this port.
Scram	**on** means that payload scrambling is enabled on this port. **off** means that payload scrambling is disabled on this port.
Length	The length of the physical cable that is attached to this port.
EmptyCells[2]	The type of cells this port sends for filler when the port is not sending data. **Idle** cells set the CLP bit=1 and **unassigned** cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned.

1. A carrier is detected when a signal is applied to the receive side of the port. It does not guarantee that the signal is the proper frequency.
2. Please refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

2.11.7 Configuring E1 Port Timing

This command lets you change the timing source on a port on an E1 network module. Enter the following parameters:

```
myswitch::configuration port e1> timing <port> (network | internal)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the line length is to be changed.
network | internal	The transmit clock for this port. **network** means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. **internal** means that the internal clock is used to drive the transmit line of this port.

2.12 E3 Port Configuration Commands

These commands allow you to modify various aspects of the configuration of the ports on an E3 network module. These commands are available only when an E3 network module is installed in the switch fabric. To list the available subcommands, type **?** at the **e3** level.

```
myswitch::configuration port> e3 ?
  emptycells        loopback          mode              scrambling
  show              timing
```

2.12.1 Configuring E3 Port Empty Cells

Empty cells are cells that are sent as “filler” or place holders when there is no real data to send. By sending these cells, network modules that are synchronous in nature can keep an even flow of traffic moving so that distributed timing can work properly. This command lets you change the type of cells sent as empty cells on an E3 network module port. Enter the following:

```
myswitch::configuration port e3> emptycells <port> (idle | unassigned)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the type of empty cells is to be changed.
idle | unassigned[1]	The type of cells this port sends for filler when the port is not sending data. **Idle** cells set the CLP bit=1 and **unassigned** cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned. The default is **unassigned**.

1. Refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

2.12.1.1 Configuring the E3 Port Loopback

This subcommand allows you to designate the type of loopback on a port on an E3 network module. Enter the following parameters:

```
myswitch::configuration port e3> loopback <port>
(cell | payload | diag | line | none)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the loopback mode is to be changed.
cell | payload | diag | line| none	**cell** loopback means the E3 stream received from the network is unframed into ATM cells. The cells are then reframed and transmitted back to the network. **payload** loopback means the E3 stream received from the network has the E3 overhead bits re-inserted and is retransmitted to the network. **diagnostic** loopback connects the receiver to the transmitter. The E3 stream transmitted by the switch to a port is looped back to the switch. The E3 stream is still transmitted to the network, but the incoming E3 stream is ignored. **line** loopback connects the transmitter to the receiver. The data stream received from the line is retransmitted out to the line. Cells that are switched to this port are not sent over the line. **none** means that no loopback will take place on the port. The default is **none**.

2.12.2 Configuring E3 Port Mode

This command allows you to change the method used for cell delineation on an E3 network module port. Enter the following parameters:

```
myswitch::configuration port e3> mode <port> (plcp | hcs)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the framing type is to be changed.
plcp | hcs	**plcp** means that the port uses PLCP (Physical Layer Convergence Protocol) framing (G.751) for cell delineation. **hcs** means that the port uses HCS (Header Check Sequence) based framing (G.832) for cell delineation. The default is **hcs**.

2.12.3 Configuring E3 Port Scrambling

This command allows you to change the scrambling mode on a port on an E3 network module. Enter the following parameters:

```
myswitch::configuration port e3> scrambling <port> (on | off)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the scrambling mode is to be changed.
on | off[1]	**on** indicates that cell payload scrambling is enabled on this port. **off** means that cell payload scrambling is disabled on this port. Only the payload of the ATM cells is scrambled. The default is **on**.

1. The scrambling mode should be set to the same status on both the transmitting side and the receiving side.

2.12.4 Showing the E3 Port Configuration

This command allows you to display current information about an E3 network module. Enter the following parameters:

```
myswitch::configuration port e3> show
Port Carrier Status Mode Loopback Timing    Scrambling EmptyCells
1D1  no      0x58   hcs  none     internal  on         unassigned
1D2  no      0x58   hcs  none     internal  on         unassigned
1D3  no      0x58   hcs  none     internal  on         unassigned
1D4  no      0x58   hcs  none     internal  on         unassigned
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each E3 network module currently installed in the switch fabric.
Carrier[1]	**yes** means a carrier has been detected on this port. **no** means a carrier has not been detected.
Status	The E3 line status of the port.
Mode	**plcp** means that the port uses PLCP framing for cell delineation. **hcs** means that the port uses HCS cell delineation.
Loopback	The loopback mode on the port.

Field	Description
Timing	The transmit clock for this port. **network** means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. **internal** means that the internal clock is used to drive the transmit line of this port.
Scram	**on** means that payload scrambling is enabled on this port. **off** means that payload scrambling is disabled on this port.
EmptyCells[2]	The type of cells this port sends for filler when the port is not sending data. **Idle** cells set the CLP bit=1 and **unassigned** cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned.

1. A carrier is detected when a signal is applied to the receive side of the port. It does not guarantee that the signal is the proper frequency.
2. Please refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

2.12.5 Configuring E3 Port Timing

This command lets you change the timing source on a port on an E3 network module. Enter the following parameters:

```
myswitch::configuration port e3> timing <port> (network | internal)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the line length is to be changed.
network | internal	The transmit clock for this port. **network** means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. **internal** means that the internal clock is used to drive the transmit line of this port.

2.13 GCRA Policing Command

Generic Cell Rate Algorithm (GCRA) policing ensures that traffic is regulated at the ATM layer on the input side of the network. This command allows you to configure GCRA policing on a per-port / per-class basis for all CBR and / or VBR PVCs and / or SVCs. Enter the following:

```
myswitch::conf port> gcrapolicing <port> (cbr|vbr) (allOn|allOff|svcOn|svcOff)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which GCRA policing is being configured.
cbr | vbr	The class of service for which you are configuring GCRA policing.
allOn	**allOn** means all connections (SVCs and PVCs) of the specified class of service arriving on this port are subjected to GCRA policing.
allOff	**allOff** means no connections (SVCs and PVCs) of the specified class of service arriving on this port are subjected to GCRA policing.
svcOn	**svcOn** means all SVCs of the specified class of service arriving on this port are subjected to GCRA policing. PVCs are policed based on their UPC contract. This is the default.
svcOff	**svcOff** means no SVCs of the specified class of service arriving on this port are subjected to GCRA policing. PVCs are policed based on their UPC contract.

NOTE This command does not apply to the *FramePlus* network modules.

For example, if you want all CBR SVCs and PVCs to be policed on port 2B4, enter the following:

```
myswitch::conf port> gcrapolicing 2b4 cbr allOn
```

2.14 *FramePlus* Port Configuration Commands

These commands allow you to configure the ports on a *FramePlus* network module. To list the available subcommands, type **?** at the **iwf** level.

```
myswitch::configuration port iwf> ?
  ds1>                e1>
```

2.14.1 *FramePlus* DS1 Line Interface Configuration Commands

These commands allow you to configure the DS1 line interface on a *FramePlus* network module. To list the available subcommands, type **?** at the **ds1** level.

```
myswitch::configuration port iwf ds1> ?
  admin               framing             length              linestatus
  loopback            mode                show                tx_timing
```

2.14.1.1 Configuring the Status on a *FramePlus* DS1 Port

This command allows you to change the administrative state of a DS1 port on a *FramePlus* network module to be up (enabled) or down (disabled). When a port is down, all signalling and communication is disabled. This command is useful for taking a port out of service temporarily to perform diagnostics. Enter the following parameters:

```
myswitch::configuration port iwf ds1> admin <port> (up | down)
```

These parameters are defined as follows:

Parameter	Description
port	The number of the *FramePlus* DS1 port to be managed.
up | down	**up** enables the designated port. **down** disables the designated port.

2.14.1.2 Configuring the Framing Mode on a *FramePlus* DS1 Port

This command lets you change the framing mode on a *FramePlus* DS1 port. Enter the following:

```
myswitch::configuration port iwf ds1> framing <port> (ESF|SF)
```

These parameters are defined as follows:

Parameter	Description
port	The number of the *FramePlus* DS1 port to be configured.
ESF | SF	The type of framing for this port. **ESF** indicates that ESF (Extended Super Frame) framing will be used. **SF** indicates that SF (Super Frame) framing will be used.

2.14.1.3 Configuring the Line Length on a *FramePlus* DS1 Port

This command lets you change the line length of a *FramePlus* DS1 port to correspond to the physical cable attached to that port. This lets the network module receive the signal on the cable. Enter the following:

```
myswitch::configuration port iwf ds1> length <port>
(<130 | 130-260 | 260-390 | >390)
```

These parameters are defined as follows:

Parameter	Description
port	The number of the *FramePlus* DS1 port to be configured.
<130	Use if the physical cable is shorter than 130 meters.
130-260	Use if the physical cable is between 130 and 260 meters.
260-390	Use if the physical cable is between 260 and 390 meters.
>390	Use if the physical cable is shorter than 390 meters.

2.14.1.4 Displaying Line Status Information on a *FramePlus* DS1 Port

This command lets you display the current line status of each *FramePlus* DS1 port. Enter the following:

```
myswitch::configuration port iwf ds1> linestatus
           Rx  Tx  Rx  Tx
Port Alarm LOF LOF AIS AIS LOF LOS Loopback
4A1  yes   no  no  no  yes yes yes off
4A2  yes   no  no  no  yes yes yes off
4A3  yes   no  no  no  yes yes yes off
4A4  yes   no  no  no  yes yes yes off
```

These fields are defined as follows:

Field	Description
Port	The number of the *FramePlus* DS1 port.
Alarm	Indicates whether or not the port is experiencing an alarm condition.
Rx LOF	Indicates whether or not the port is receiving a Loss of Frame (LOF) signal from the far end.
Tx LOF	Indicates whether or not the port is transmitting a Loss of Frame (LOF) signal.
Rx AIS	Indicates whether or not the port is receiving an Alarm Indication Signal (AIS).
Tx AIS	Indicates whether or not the port is transmitting an Alarm Indication Signal (AIS).
LOF	Indicates whether or not the port is experiencing Loss of Frame (LOF).
LOS	Indicates whether or not the port is experiencing Loss of Signal (LOS).
Loopback	Indicates whether or not the port is in loopback mode.

2.14.1.5 Configuring the Loopback on a *FramePlus* DS1 Port

This command lets you designate the type of loopback on a port on a *FramePlus* DS1 network module. See the *ATM Switch Diagnostics and Troubleshooting Manual* for more information about loopbacks. Enter the following parameters:

```
myswitch::configuration port iwf ds1> loopback <port> (line | diag | none)
```

These parameters are defined as follows:

Parameter	Description
port	The number of the *FramePlus* DS1 port to be configured.
line | diag | none	**line** loopback connects the transmitter to the receiver. The data stream received from the Rx line is retransmitted out to the Tx line. Frames that are switched to this port are not sent over the line. **diag(nostic)** means traffic received off the internal fabric is looped back onto the fabric.This is equivalent to a diagnostic loopback. **none** means no loopback will take place on this port. The default is **none**.

2.14.1.6 Configuring the Line Coding on a *FramePlus* DS1 Port

This command lets you configure the line coding for a particular *FramePlus* DS1 port. Enter the following:

```
myswitch::configuration port iwf ds1> mode <port> (B8ZS|AMI)
```

These parameters are defined as follows:

Parameter	Description
port	The number of the *FramePlus* DS1 port to be configured.
up | down	The type of coding to be used. **B8ZS** means that Binary 8-Zero Substitution will be used. **AMI** means that Alternate Mark Inversion will be used. (See the *Glossary*.)

2.14.1.7 Displaying *FramePlus* DS1 Information

This command lets you display the current configuration of each *FramePlus* DS1 port. Enter the following:

```
myswitch::configuration port iwf ds1> show
Port Port   Framing Carrier Line Loop  Port       Line    Fdl     Signal Line
     Status Mode    State   Code Back  Timing     Length          Mode   Status
4A1  up     ESF     no      B8ZS none  fabric1    <130    off     none   112
4A2  up     ESF     no      B8ZS none  fabric1    <130    off     none   112
4A3  up     ESF     no      B8ZS none  fabric1    <130    off     none   112
4A4  up     ESF     no      B8ZS none  fabric1    <130    off     none   112
```

These fields are defined as follows:

Field	Description
Port	The port number of the *FramePlus* DS1 port.
Port Status[1]	The administrative state of the port (**up** or **down**).
Framing Mode	The type of framing used on the line.
Carrier State[2]	**yes** means a carrier has been detected on this port. **no** means a carrier has not been detected on this port.
Line Coding	The type of line coding used on the port.
Loopback	The loopback mode on the port.
Port Timing	The source of the timing on this port.
Line Length	The length, in meters, of the physical cable attached to this port.
Fdl	This is a read-only field. **off** indicates that the FDL state machine is turned off for performance reports.
Signal Mode	This is a read-only field. **none** indicates that no bits are reserved for signalling on this channel.
Line Status	The line status of the *FramePlus* DS1 port.

1. The admin state or status under the **conf port iwf ds1/e1**, **conf fratm**, **conf fratm pvc**, **conf funi** and **conf funi pvc** levels reflects the configured state of a port, service, or connection. The admin status is unique to a level. For example, if a connection under **conf fratm pvc** is administered down, the corresponding admin state under **conf fratm** is up, but the connection will not pass traffic. This is because the admin status of each of these entities has a direct effect on the operational status of all three entities. The operational status of these entities is currently not displayed in AMI.

2. A carrier is detected when a signal is applied to the receive side of the port, but it does not guarantee the signal is the proper frequency.

2.14.1.8 Configuring Timing on a *FramePlus* DS1 Port

This command lets you change the timing source on a port on a *FramePlus* DS1 network module. Enter the following parameters:

```
myswitch::configuration port iwf ds1> tx_timing <port> (network | system | internal)
```

These parameters are defined as follows:

Parameter	Description
port	The number of the *FramePlus* DS1 port to be configured.
network	The recovered receive clock is used as the transmit clock.
system	The recovered receive clock from another network module is used as the transmit clock. This is the default.
internal	The crystal oscillator on the network module is used as the transmit clock.

2.14.2 *FramePlus* E1 Line Interface Configuration Commands

These commands allow you to configure E1 line interface on a *FramePlus* network module. To list the available subcommands, type **?** at the **e1** level.

```
myswitch::configuration port iwf e1> ?
  admin              crc4               ts16               linestatus
  loopback           show               tx_timing
```

2.14.2.1 Configuring the Status on a *FramePlus* E1 Port

This command allows you to change the state of a E1 port on a *FramePlus* network module to be up (on-line) or down (off-line). When a port is down, all signalling and communication is disabled. This command is useful for taking a port out of service temporarily to perform diagnostics. Enter the following parameters:

```
myswitch::configuration port iwf e1> admin <port> (up | down)
```

These parameters are defined as follows:

Parameter	Description
port	The number of the *FramePlus* E1 port to be managed.
up | down	**up** enables the designated port. **down** disables the designated port.

2.14.2.2 Configuring CRC Checking on a *FramePlus* E1 Port

This command lets you change the CRC4 framing type on a *FramePlus* E1 port. This command lets you specify whether or not the port performs a CRC4 error check. Enter the following:

```
myswitch::configuration port iwf e1> crc4 <port> (ON|OFF)
```

These parameters are defined as follows:

Parameter	Description
port	The number of the *FramePlus* E1 port to be configured.
ON | OFF	**OFF** means that CRC4 error checking is disabled on this port. **OFF** is the default. **ON** means that CRC4 error checking is enabled on this port.

2.14.2.3 Reserving TS16 for Signalling on a *FramePlus* E1 Port

This command lets you specify whether or not timeslot 16 (TS16) is reserved for signalling information on a *FramePlus* E1 port.

NOTE Changing this value currently has no effect. The default state is OFF, which means that timeslot 16 is used as a data channel and cannot be reserved.

Enter the following:

```
myswitch::configuration port iwf e1> ts16 <port> (ON|OFF)
```

These parameters are defined as follows:

Parameter	Description
port	The number of the *FramePlus* E1 port to be configured.
ON | OFF	**OFF** means that timeslot 16 is used as another data channel on this port. **ON** means that timeslot 16 is reserved for signalling information. **OFF** is the default.

2.14.2.4 Displaying Line Status Information on a *FramePlus* E1 Port

This command lets you display the current line status of each *FramePlus* E1 port. Enter the following:

```
myswitch::configuration port iwf e1> linestatus
           Rx   Tx   Rx   Tx                    TS16 FarEndTx  NearEndTx NearEnd
Port Alarm LOF  LOF  AIS  AIS  LOF  LOS Loopback AIS  TS16LOMF  TS16LOMF  TestCode
1D1  yes   no   no   no   no   yes  yes off      no   no        no        No code
1D2  yes   no   no   no   no   yes  yes off      no   no        no        No code
1D3  yes   no   no   no   no   yes  yes off      no   no        no        No code
1D4  yes   no   no   no   no   yes  yes off      no   no        no        No code
```

These fields are defined as follows:

Field	Description
Port	The number of the *FramePlus* DS1 port.
Alarm	Indicates whether or not the port is experiencing an alarm condition.
Rx LOF	Indicates whether or not the port is receiving a Loss of Frame (LOF) signal from the far end.
Tx LOF	Indicates whether or not the port is transmitting a Loss of Frame (LOF) signal.
Rx AIS	Indicates whether or not the port is receiving an Alarm Indication Signal (AIS).
Tx AIS	Indicates whether or not the port is transmitting an Alarm Indication Signal (AIS).
LOF	Indicates whether or not the port is experiencing Loss of Frame (LOF).
LOS	Indicates whether or not the port is experiencing Loss of Signal (LOS).
Loopback	Indicates whether or not the port is in loopback mode.
TS16 AIS	Indicates whether AIS is being received in timeslot 16.
FarEndTx TS16LOMF	Indicates whether Loss Of Multiframe (LOMF) is occurring at the far end in timeslot 16.
NearEndTx TS16LOMF	Indicates that the port is experiencing a Loss Of Multiframe (LOMF) condition in timeslot 16.
NearEnd TestCode	Indicates that the port is currently transmitting a test pattern.

2.14.2.5 Configuring Loopback on a *FramePlus* E1 Port

This command lets you designate the type of loopback on a port on a *FramePlus* E1 network module. See the *ATM Switch Diagnostics and Troubleshooting Manual* for more information about loopbacks. Enter the following parameters:

```
myswitch::configuration port iwf e1> loopback <port> (line | diag | none)
```

These parameters are defined as follows:

Parameter	Description
port	The number of the *FramePlus* E1 port to be configured.
line | diag | none	**line** loopback connects the transmitter to the receiver. The data stream received from the Rx line is retransmitted out to the Tx line. Frames that are switched to this port are not sent over the line. **diag(nostic)** means traffic received off the internal fabric is looped back onto the fabric. This is equivalent to a diagnostic loopback. **none** means no loopback will take place on this port. The default is **none**.

2.14.2.6 Displaying *FramePlus* E1 Information

This command lets you display the current configuration of each *FramePlus* E1 port. Enter the following:

```
myswitch::configuration port iwf e1> show
Port Port   CRC4    TS16    Carrier Line    Loop  Port        Line Line
     Status Mode    Framing State   Coding  Back  Timing      Imp. Status
4D1  up     on      off     no      HDB3    none  4A crystal  120  4160
4D2  up     on      off     no      HDB3    none  4A crystal  120  4160
4D3  up     on      off     no      HDB3    none  4A crystal  120  4160
4D4  up     on      off     no      HDB3    none  4A crystal  120  4160
```

These fields are defined as follows:

Field	Description
Port	The number of the *FramePlus* E1 port.
Port Status[1]	The state of the port (**up** or **down**).
CRC4 Mode	**off** means that CRC4 error checking is disabled on this port. **on** means that CRC4 error checking is enabled on this port.
TS16 Framing	**off** means that timeslot 16 is used as another data channel on this port. **on** means that timeslot 16 is reserved for signalling information.

Field	Description
Carrier State[2]	**yes** means a carrier has been detected on this port. **no** means a carrier has not been detected on this port.
Line Coding	The type of line coding used on the port.
Loopback	The loopback mode on the port.
Port Timing	The source of the timing on this port.
Line Imp.	The value of the line impedance (in ohms, either **75** or **120**).
Line Status	The line status of the E1 CES port.

1. The admin state or status under the **conf port iwf ds1**/**e1**, **conf fratm**, **conf fratm pvc**, **conf funi** and **conf funi pvc** levels reflects the configured state of a port, service, or connection. The admin status is unique to a level. For example, if a connection under **conf fratm pvc** is administered down, the corresponding admin state under **conf fratm** is up, but the connection will not pass traffic. This is because the admin status of each of these entities has a direct effect on the operational status of all three entities. The operational status of these entities is currently not displayed in AMI.
2. A carrier is detected when a signal is applied to the receive side of the port, but it does not guarantee the signal is the proper frequency.

If there are no *FramePlus* E1 network modules installed in the switch, then the following is displayed:

```
myswitch::configuration port iwf e1> show
No DSX1-e1 port information is available
```

2.14.2.7 Configuring Timing on a *FramePlus* E1 Port

This command lets you change the timing source on a port on a *FramePlus* E1 network module. Enter the following parameters:

```
myswitch::configuration port iwf e1> tx_timing <port> (network | system | internal)
```

These parameters are defined as follows:

Parameter	Description
port	The number of the *FramePlus* E1 port to be configured.
network	The recovered receive clock is used as the transmit clock.
system	The recovered receive clock from another network module is used as the transmit clock. This is the default.
internal	The crystal oscillator on the network module is used as the transmit clock.

2.15 J2 Port Configuration Commands

These commands let you modify various aspects of the configuration of a J2 network module. The following J2 commands are available only when a J2 network module is installed in the switch fabric. To display the list of available subcommands, type **j2 ?** at the **port** level.

```
myswitch::configuration port> j2 ?
  emptycells        line          loopback          show
  timing
```

2.15.1 Configuring Empty Cells on a J2 Port

Empty cells are cells that are sent as “filler” or place holders when there is no real data to send. By sending these cells, network modules that are synchronous in nature can keep an even flow of traffic moving so that distributed timing can work properly. This command lets you change the type of cells sent as empty cells on a J2 network module port. Enter the following:

```
myswitch::configuration port j2> emptycells <port> (idle | unassigned)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the type of empty cells is to be changed.
idle | unassigned[1]	The type of cells this port sends for filler when the port is not sending data. **Idle** cells set the CLP bit=1 and **unassigned** cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned. The default is **unassigned**.

1. Refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

2.15.2 Configuring J2 Port Line Length

This command enables you to change the line length of a J2 network module port. Enter the following parameters:

```
myswitch::configuration port j2> line <port> (short | long)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the line length is to be changed.
short | long	The length of the physical cable attached to this port. If the line attached to the receive port has greater than 4 db of attenuation, then the line must be configured as **long**. If otherwise, then it must be configured as **short**. In general, if the cable is less than 20 feet, then configure the line as short.

2.15.3 Configuring J2 Port Loopback

This command lets you configure the loopback mode on a J2 port. Enter the following:

```
myswitch::configuration port j2> loopback <port> (line | diag | none)
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the loopback mode is to be changed.
line	**line** connects the transmitter to the receiver. The data stream received from the line is retransmitted out to the line. Cells that are switched to this port are not sent over the line.
diag	**diagnostic** loopback connects the receiver to the transmitter. The J2 stream transmitted by the switch to a port is looped back to the switch. The J2 stream is still transmitted to the network, but the incoming J2 stream is ignored.
none	**none** designates that no loopback will take place on this port. This is the default setting.

2.15.4 Showing J2 Port Configuration

This command allows you to display information about the configuration of the ports on a J2 network module. Enter the following parameters:

```
myswitch::configuration port j2> show
Port Carrier Status LineLength   Loopback     Timing       EmptyCells
1C1  no      0xc0   short        none         internal     idle
1C2  no      0xc0   short        none         internal     unassigned
1C3  no      0xc0   short        none         internal     unassigned
1C4  no      0xc0   short        none         internal     unassigned
```

The fields in this display are defined as follows:

Field	Description
Port	The J2 port number of the network module(s) currently installed in the switch.
Carrier[1]	**yes** means a carrier has been detected on this port. **no** means a carrier has not been detected on this port. A carrier is detected when a signal is applied to the receive side of the port, but it does not guarantee the signal is the proper frequency.
Status	The J2 line status of the port.
LineLength	The length of the physical cable that is attached to this port. Can be **short** or **long**.
Loopback	The loopback mode on the port. Can be **diagnostic**, **line**, or **none**.
Timing	The transmit clock for this port. **network** means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. **internal** means that the internal clock is used to drive the transmit line of this port.
EmptyCells	The type of cells this port sends for filler when the port is not sending data. **Idle** cells set the CLP bit=1 and **unassigned** cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned. Please refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting

1. A carrier is detected when a signal is applied to the receive side of the port, but it does not guarantee the signal is the proper frequency.

2.15.5 Configuring J2 Port Timing

This command lets you change the timing source on a port on a J2 network module. Enter the following parameters:

```
myswitch::configuration port j2> timing <port> (network | internal)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the line length is to be changed.
network | internal	The transmit clock for this port. **network** means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. **internal** means that the internal clock is used to drive the transmit line of this port.

2.16 LED Port Configuration Commands

These commands let you configure the a model for the front panel LEDs on a Series C, Series LC, or a Series D SONET network module. You can display the list of available subcommands by typing **led ?** at the **port** level.

```
myswitch::configuration port> led ?
  model            show
```

2.16.1 LED Model Configuration

This command lets you select an LED model to use for setting the LED colors on a per-port basis on a SONET Series C, Series LC, or a Series D network module. Typically, the LAN LEDs blink when transmitting or receiving data on a port. Typically, the WAN LEDs illuminate solid green, unless an error condition exists on a port. Enter the following parameters:

```
myswitch::configuration port led> model <port> (lan1 | wan1 | lan2 | wan2)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which you want to configure an LED model.
lan1 | wan1	For these models, RED means a fault in the receive direction, YELLOW means a fault in the transmit direction (Line Remote Defect Indication), AUTO/GREEN means no fault. Only the receive LED color is changed. These models show only three states and do not reflect the status of the Path Alarm Indications and Path Remote Defect Indications. **lan1** is the default value for all network modules.
lan2 | wan2[1]	For these models, RED means a line fault, YELLOW means a path fault, and AUTO/GREEN means no fault. The transmit LED shows faults in the transmit direction and the receive LED shows faults in the receive direction. These models provide a unique LED color pattern for all six fault states that can be detected by SONET signalling.

1. For the lan2 and wan2 models, faults in the receive direction may make it impossible to detect certain faults in the transmit direction.

2.16.2 Displaying the LED Model Configuration

This command lets you display the LED models used for each port of a SONET Series C, Series LC, or Series D network module. Enter the following parameters:

```
myswitch::configuration port led> show
Port  Type            rxLED   txLED   clkLED  Model
4D1   OC3             auto    auto    N/A     lan1
4D2   OC3             auto    auto    N/A     lan1
4D3   OC3             red     auto    N/A     lan1
4D4   OC3             red     auto    N/A     lan1
4E1   ASX-BP          N/A     N/A     N/A     N/A
4E2   ASX-BP          N/A     N/A     N/A     N/A
4E3   ASX-BP          N/A     N/A     N/A     N/A
4CTL  ASX-CTL         N/A     N/A     N/A     N/A
```

The fields in this display are defined as follows:

Field	Description
Port	The port number of the network module(s) currently installed in the switch (fabric).
Type	The type of network module it is. ASX-BP are the intra-fabric ports on an ASX-1000 or TNX-1100. ASX-CTL is the control port.
rxLED	The color of the receive LED for this port. Can be **off**, **green**, **red**, **yellow**, or **auto**. **auto** means that the LED is under hardware control. Typically, hardware control means that the LED is normally dark with green blinks to indicate data traffic.
txLED	The color of the transmit LED for this port. Can be **off**, **green**, **red**, **yellow**, or **auto**. **auto** means that the LED is under hardware control. Typically, hardware control means that the LED is normally dark with green blinks to indicate data traffic.
clkLED	This field only applies to the receive port LEDs on *FramePlus* network modules. **green** indicates that the port is providing the 8 KHz clock reference to the switch. **off** means that the port is not providing the 8 KHz clock reference to the switch.
Model	The LED models (**lan1**, **wan1**, **lan2**, or **wan2**) that has been assigned to this port.

You can also display the LED models for a single port. Enter the following:

```
myswitch::configuration port led> show [<port>]
myswitch::configuration port led> show 4d3
Port  Type            rxLED   txLED   clkLED  Model
4D3   OC3             red     auto    N/A     lan1
```

2.17 Port Policing Configuration Command

This command lets you decide whether or not incoming traffic is GCRA policed on a given port. Enter the following parameters:

```
myswitch::configuration port> policing <port> (enable | disable)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which GCRA traffic policing is to be enabled or disabled.
enable | disable	**enable** means that GCRA traffic policing will take place on all incoming traffic on this port (depending on what has been configured using **conf port gcrapolicing** and using the **noGCRA** option in the **conf upc new** command). **disable** means that traffic policing will not take place on incoming traffic on this port (depending on what has been configured using **conf port gcrapolicing** and using the **noGCRA** option in the **conf upc new** command). The default is **enable** on all network modules, except on *FramePlus* network modules.

NOTE

To enable or disable GCRA policing on incoming traffic on a per-port or on a per-class basis, it is recommended that you use the **conf port gcrapolicing** command instead of this command. To enable or disable GCRA policing on incoming traffic on a per-PVC basis for CBR and VBR connections, use the **noGCRA** option in the **conf upc new** command.

If you change the policing settings using this command, the switch issues a warning as shown in the following example:

```
myswitch::configuration port> policing 1b1 disable
This change will cause the GCRA policing state of all
connections on port 1b1, to be updated to allOff.
Are you sure you want to make this change? [n]?
```

2.18 Partial Packet Policing Command

When partial packet policing is enabled on a connection, the GCRA policer looks for AAL5 packet boundaries by checking for cells with an EOM indicator in their cell header. If the policer decides that a cell in the middle of the AAL5 packet is non-conforming, then all remaining cells in that AAL5 packet (up to, but not including the EOM cell) are considered non-conforming. This command lets you configure partial packet policing on a per-port / per-class basis for all CBR and / or VBR PVCs and / or SVCs. Enter the following parameters:

NOTE

GCRA policing must be used on any connection on which partial packet policing is being implemented.

This command applies only to AAL5 connections. This command does not apply to the *FramePlus* network modules.

The HDCOMP ASIC must be version 1 or greater to support AAL5 partial packet policing. To display the ASIC version, use the **display hdcomp** command.

```
myswitch::configuration port> pppolicing <port> (cbr|vbr) (allOn|allOff|svcOn|svcOff)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which partial packet policing is being configured.
cbr | vbr	The class of service for which you are configuring partial packet policing.
allOn	**allOn** means all connections (SVCs and PVCs) of the specified class of service on this port are subjected to partial packet policing.
allOff	**allOff** means no connections (SVCs and PVCs) of the specified class of service on this port are subjected to partial packet policing.
svcOn	**svcOn** means all SVCs of the specified class of service on this port are subjected to partial packet policing. PVCs are policed based on their UPC contract. This is the default.
svcOff	**svcOff** means no SVCs of the specified class of service on this port are subjected to partial packet policing. PVCs are policed based on their UPC contract.

For example, to enable partial packet policing on all VBR SVCs on port 2B4, enter the following parameters:

```
myswitch::configuration port> pppolicing 2b4 vbr svcOn
```

2.19 Showing the Port Configuration

This command lets you display general information about the ports on an individual switch fabric. To show general information about all of the ports, enter the following:

```
myswitch::configuration port> show
Port Carrier Admin  Mbps ATM-Rate   CDVT Policing VBROB BuffOB AIS/RDI  Model
1D1  yes     up    155.0   149.76    250 enabled    100    100 disabled OC3
1D2  yes     up    155.0   149.76    250 enabled    100    100 disabled OC3
1D3  no      up    155.0   149.76    250 enabled    100    100 disabled OC3
1D4  no      up    155.0   149.76    250 enabled    100    100 disabled OC3
1CTL yes     up     80.0  79.9961   5000 enabled    N/A    N/A disabled ASX-CTL
Note: ATM/OAM processing is disabled
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each network module currently installed in the switch fabric. The control port on an ASX-4000 is displayed as 5CTL since it does not belong to a specific fabric.
Carrier	**yes** means a carrier has been detected on this port. **no** means a carrier has not been detected. A carrier is detected when a signal is applied to the receive side of the port. It does not guarantee that the signal is the proper frequency
Admin	The current state of this port. Can be **up** (on-line) or **down** (off-line).
Mbps	The capacity of this port's link in Mbps
ATM-Rate	The actual ATM cell rate of this port in Mbps.
CDVT	The default value for the cell delay variation tolerance setting in microseconds.
Policing	Shows whether traffic policing is enabled or disabled for this port.
VBROB	The bandwidth overbooking level configured on this port, specified as a percentage. The default is `100`, which means that no overbooking has been defined. Values less than 100 cause underbooking. Values greater than 100 denote overbooking.
BuffOB	The buffer overbooking level configured on this port, specified as a percentage. The default is `100`, which means that no overbooking has been defined. Values less than 100 cause underbooking. Values greater than 100 denote overbooking.
AIS/RDI	**enabled** means that OAM cells are generated when AISs and RDIs are detected. This setting is overridden if the `ATM/OAM processing is disabled` message is shown at the bottom of the display. **disabled** means that OAM cells are not generated when AISs and RDIs are detected.
Model	The type of network module. For the control port, displays `ASX-CTL`.
ATM/OAM processing is disabled	Shows that OAM cell generation is disabled on all ports on this switch board, despite the **conf port aisrdi** settings. To return all ports on this board to their last port settings shown in the `AIS/RDI` field, use the **conf switch oam enable** command. See Section 12.6 in this manual for more information.

To list port information for just a specified port, (for example, port 1B1), enter the following parameters:

```
myswitch::configuration port> show 1d1
Port Carrier Admin  Mbps ATM-Rate   CDVT Policing VBROB BuffOB AIS/RDI  Model
1D1  yes     up    155.0   149.76    250 enabled    100    100 disabled OC3
Note: ATM/OAM processing is disabled
```

The fields in this display are defined in the same manner as those in the previous example.

This command also lets you display advanced information about all of the ports. Enter the following parameters:

```
myswitch::configuration port> show [<port>] [advanced|tm]
myswitch::configuration port> show advanced
            Input                Output
Port   CDV        maxCTD    CDV        maxCTD
1D1    1          21        computed   computed
1D2    1          21        computed   computed
1D3    1          21        computed   computed
1D4    1          21        computed   computed
1CTL   0          0         computed   computed
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each network module currently installed in the switch fabric. The control port on an ASX-4000 is displayed as 5CTL since it does not belong to a specific fabric.
Input CDV	The Cell Delay Variation on the input side of this port, in microseconds.
Input maxCTD	The Cell Transfer Delay on the input side of this port, in microseconds.
Output CDV	The Cell Delay Variation on the output side of this port, in microseconds. **computed** means that the switch has automatically determined this value.
Output maxCTD	The Cell Transfer Delay on the output side of this port, in microseconds. **computed** means that the switch has automatically determined this value.

This command also lets you display port traffic management information. Enter the following:

```
myswitch::configuration port> show [<port>] [advanced|tm]
myswitch::configuration port> show tm
                GCRA Policing  AAL5 PP Pol.   AAL5 Packet Discard   Tag All
Port  CAC       CBR    VBR     CBR    VBR     CBR    VBR    UBR     UBR
1D1   enabled   svcOn  svcOn   svcOff svcOff  svcOn  svcOn  svcOn   svcOff
1D2   enabled   svcOn  svcOn   svcOff svcOff  svcOn  svcOn  svcOn   svcOff
1D3   enabled   svcOn  svcOn   svcOff svcOff  svcOn  svcOn  svcOn   svcOff
1D4   enabled   svcOn  svcOn   svcOff svcOff  svcOn  svcOn  svcOn   svcOff
1CTL  enabled   svcOn  svcOn   svcOff svcOff  N/A    N/A    N/A     svcOff
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each network module currently installed in the switch fabric.
CAC	**enabled** means CAC is active on this port (the default state). **disabled** means CAC is not active on this port.
GCRA Policing CBR	**allOn** means all CBR connections arriving on this port are subjected to GCRA policing. **allOff** means no CBR connections arriving on this port are subjected to GCRA policing. **svcOn** means all CBR SVCs arriving on this port are subjected to GCRA policing. **svcOff** means no CBR SVCs arriving on this port are subjected to GCRA policing. CBR PVCs are policed based on the state of their UPC contract.
GCRA Policing VBR	**allOn** means all VBR connections arriving on this port are subjected to GCRA policing. **allOff** means no VBR connections arriving on this port are subjected to GCRA policing. **svcOn** means all VBR SVCs arriving on this port are subjected to GCRA policing. **svcOff** means no VBR SVCs arriving on this port are subjected to GCRA policing. VBR PVCs are policed based on the state of their UPC contract.
AAL5 PP Pol. CBR	**allOn** means all AAL5 CBR connections are subjected to partial packet policing. **allOff** means no AAL5 CBR connections are subjected to partial packet policing. **svcOn** means all AAL5 CBR SVCs are subjected to partial packet policing. For AAL5 CBR PVCs, partial packet policing is performed based on the UPC contract of the connection. **svcOff** means no AAL5 CBR SVCs are subjected to partial packet policing. For AAL5 CBR PVCs, partial packet policing is enabled based on the UPC contract of the connection.
AAL5 PP Pol. VBR	**allOn** means all AAL5 VBR connections are subjected to partial packet policing. **allOff** means no AAL5 VBR connections are subjected to partial packet policing. **svcOn** means all AAL5 VBR SVCs are subjected to partial packet policing. For AAL5 VBR PVCs, partial packet policing is performed based on the UPC contract of the connection. **svcOff** means no AAL5 VBR SVCs are are subjected to partial packet policing. For AAL5 VBR PVCs, partial packet policing is enabled based on the UPC contract of the connection.

Field	Description
AAL5 Packet Discard CBR	**`allOn`** means all AAL5 CBR connections are subjected to packet discard. **`allOff`** means no AAL5 CBR connections are subjected to packet discard. **`svcOn`** means all AAL5 CBR SVCs are subjected to packet discard. For CBR PVCs, AAL5 packet discard is enabled based on the UPC contract of the connection. **`svcOff`** means no AAL5 CBR SVCs are subjected to packet discard. For CBR PVCs, AAL5 packet discard is enabled based on the UPC contract of the connection.
AAL5 Packet Discard VBR	**`allOn`** means all AAL5 VBR connections are subjected to packet discard. **`allOff`** means no AAL5 VBR connections are subjected to packet discard. **`svcOn`** means all AAL5 VBR SVCs are subjected to packet discard. For VBR PVCs, AAL5 packet discard is enabled based on the UPC contract of the connection. **`svcOff`** means no AAL5 VBR SVCs are subjected to packet discard. For VBR PVCs, AAL5 packet discard is enabled based on the UPC contract of the connection.
AAL5 Packet Discard UBR	**`allOn`** means all AAL5 UBR connections are subjected to packet discard. **`allOff`** means no AAL5 UBR connections are subjected to packet discard. **`svcOn`** means all AAL5 UBR SVCs are subjected to packet discard. For UBR PVCs, AAL5 packet discard is enabled based on the UPC contract of the connection. **`svcOff`** means no AAL5 UBR SVCs are subjected to packet discard. For UBR PVCs, AAL5 packet discard is enabled based on the UPC contract of the connection.
Tag All UBR	**`allOn`** means all UBR connections are tagged as non-compliant (set to CLP=1). **`allOff`** means no UBR connections are tagged. **`svcOn`** means all UBR SVCs are tagged. UBR PVCs are tagged based on their UPC contract. **`svcOff`** means no UBR SVCs are tagged. UBR PVCs are tagged based on their UPC contract.

2.20 SONET Port Configuration Commands

These commands allow you to modify various aspects of the configuration of all of the ports on a SONET network module. The following SONET commands are available only when a SONET network module is installed in the switch fabric. You can display the list of available subcommands by typing **sonet ?** at the **port** level.

NOTE

All 155 Mbps and 622 Mbps network modules use this same set of commands, regardless of whether they are singlemode, multimode, OC-3, OC-12, or UTP network modules.

```
myswitch::configuration port> sonet ?
  emptycells        loopback          mode              scrambling
  show              timing
```

2.20.1 Configuring SONET Port Empty Cells

Empty cells are cells that are sent as “filler” or place holders when there is no real data to send. By sending these cells, network modules that are synchronous in nature can keep an even flow of traffic moving so that distributed timing can work properly. This command lets you change the type of cells sent as empty cells on a SONET network module port. Enter the following parameters:

```
myswitch::configuration port sonet> emptycells <port> (idle | unassigned)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the type of empty cells is to be changed.
idle | unassigned[1]	The type of cells this port sends for filler when the port is not sending data. **Idle** cells set the CLP bit=1 and **unassigned** cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned. The default is **unassigned**.

1. Refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

2.20.2 Configuring SONET Port Loopback

This command enables you to configure the type of loopback mode on a SONET port. Enter the following parameters:

```
myswitch::configuration port sonet> loopback <port> (line | diag | path | both | none)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the loopback mode is to be changed.
line	**Line** connects the transmitter to the receiver. The data stream received from the fiber is retransmitted out to the fiber. In line loopback, the port acts as if it were an optical repeater. Cells that are switched to this port are not sent over the fiber. This option is valid for all SONET network modules.
diag	**Diagnostic** connects the receiver to the transmitter. The SONET stream transmitted by the fiber to a port is looped back to the fiber. The stream is still transmitted over the fiber, but the incoming stream is ignored. This option is valid for all SONET network modules, except for Series C OC-12 network modules.
path	**path** means that the loopback point is between the TPOP and RPOP blocks and the transmit parallel stream is connected to the receive stream. This option is valid only for Series C OC-12 network modules.
both	**both** lets you perform both diagnostic and line loopback on a particular port. This option is valid only for Series 1 OC-48c port cards on an ASX-4000.
none	**none** means no loopback will take place on this port. The default is **none**.

2.20.3 Configuring SONET Port Mode

This command lets you designate the mode to be used on a SONET network module port. Enter the following parameters:

```
myswitch::configuration port sonet> mode <port> (sonet|sdh)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the mode is to be changed.
sonet | sdh	The mode of operation for this port. Can be **sonet** or **sdh**.

2.20.4 Configuring the SONET Port Scrambling

This command allows you to change the scrambling mode on a port on a SONET network module. Enter the following parameters:

```
myswitch::configuration port sonet> scrambling <port> (on | off)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the scrambling mode is to be changed.
on | off[1]	**on** indicates that cell payload scrambling is enabled on this port. **off** means that cell payload scrambling is disabled on this port. Only the payload of the ATM cells is scrambled. The default is **on**.

1. The scrambling mode should be set to the same status on both the transmitting side and the receiving side.

2.20.5 Showing the SONET Port Configuration

This command lets you display information about the configuration of all of the ports on a SONET network module. Enter the following parameters:

```
myswitch::configuration port sonet> show
Port Width  Line Mode  Loopback Timing   Scrambling EmptyCells
1C1  sts3c  MM   sonet none     internal on         unassigned
1C2  sts3c  MM   sonet none     internal on         unassigned
1C3  sts3c  MM   sonet none     internal on         unassigned
1C4  sts3c  MM   sonet none     internal on         unassigned
1D1  sts12c MM   sonet none     N/A      on         unassigned
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each SONET network module currently installed in the switch fabric.
Width	The type of the SONET path. `sts3c` is 155.52 Mbps and `sts12c` is 622.08 Mbps. The SDH transmission rate STM-1 is equivalent to SONET rate STS-3 and STM-4 is equivalent to STS-12. This is a read-only field.
Line	The line type for this interface. The line type for optical SONET signals may be **SMSR** (155 Mbps single-mode short reach), **SMIR** (622 Mbps single-mode intermediate reach), **other** (155 Mbps single-mode long reach), or **MM** (155 Mbps or 622 Mbps multi-mode) fiber. For electrical interfaces, the line type is `UTP` (155 Mbps Unshielded Twisted Pair).
Mode	The mode of operation for this port. Can be **sonet** or **sdh**.
Loopback	The loopback mode on the port. Can be one of the following: **line**, **diagnostic**, **path**, or **none**.
Timing[1]	The transmit clock for this port. **network** means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. **internal** means that the internal clock is used to drive the transmit line of this port.
Scrambling	**on** means that payload scrambling is enabled on this port. **off** means that payload scrambling is disabled on this port.
EmptyCells[2]	The type of cells this port sends for filler when the port is not sending data. **Idle** cells set the CLP bit=1 and **unassigned** cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned.

1. The timing option displays N/A on all OC-12 network modules because they always use internal timing.
2. Please refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

You can also display information about an individual port. Enter the following parameters:

```
myswitch::configuration port sonet> show 4c1
Port Width  Line Mode  Loopback Timing   Scrambling EmptyCells
4C1  sts3c  MM   sonet none     internal on         unassigned
```

The fields in this display are defined in the same manner as those in the previous example.

This command also lets you display information about the section, line, path, and ATM status of all of the ports on the SONET network modules. Enter the following parameters:

```
myswitch::configuration port sonet> show status
Port Carrier Section Line Path Atm
4C1  yes     0x1     0x1  0x1  0x1
4C2  no      0x6     0x2  0xc  0x2
4C3  no      0x6     0x2  0xc  0x2
4C4  no      0x6     0x2  0xc  0x2
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each SONET network module currently installed in the switch fabric.
Carrier	**yes** means a carrier has been detected on this port. **no** means a carrier has not been detected. A carrier is detected when a signal is applied to the receive side of the port. It does not guarantee that the signal is the proper frequency
Section	The Section Status of this interface. The variable is a bit map represented as a sum, so it can represent multiple defects simultaneously. The various bit positions are as follows: 1 - sonetSectionNoDefect 2 - sonetSectionLOS - Loss Of Signal was detected. LOS is declared when 20 +/- 3us of all zero patterns is detected. 4 - sonetSectionLOF - Loss Of Frame was detected. LOF is declared when an out-of-frame condition persists for 3ms.
Line	The Line Status of this interface. It is a bit map represented as a sum, so it can represent multiple defects simultaneously. The various bit positions are: 1 - sonetLineNoDefect 2 - sonetLineAIS - Line Alarm Indication Signal was detected. Line AIS is asserted when a 111 binary pattern is detected in bits 6, 7, 8 of the K2 byte for five consecutive frames. 4 - sonetLineRDI Line Remote Defect Indication was detected. RDI is asserted when a 110 binary pattern is detected in bits 6, 7, 8 of the K2 byte for five consecutive frames.

Field	Description
Path	Shows the Path Status of this interface. The variable is a bit map represented as a sum, so it can represent multiple defects simultaneously. The various bit positions are as follows: 1 - sonetPathNoDefect 2 - sonetPathLOP - Path Loss Of Pointer was detected. Path LOP is declared when a “normal pointer value” is not found for eight consecutive frames. 4 - sonetPathAIS - Path Alarm Indication Signal was detected. Path AIS is asserted when an all ones pattern is detected in the pointer bytes (H1 and H2) for three consecutive frames. 8 - sonetPathRDI - Path RDI alarm has been detected. RDI alarm is declared when bit 5 of the path status byte is high for ten consecutive frames. 16 - sonetPathUnequiped - Path is not provisioned (idle). PathSignalLabel = hex 00. 32 - sonetPathSignalLabelMismatch - A received Path Signal Label mismatch. A received Signal Label is considered mismatched if it does not equal either the standard value for an ATM payload (hex13) or the value for an “equipped non-specific”payload (1 hex).
Atm	The ATM Status of the interface. The variable is a bit map represented as a sum, so it can represent multiple defects simultaneously. The various bit positions areas follows: 1 - sonetAtmNoDefect 2 - sonetAtmLCD - Loss of Cell Delineation was detected. LCD is declared when a “normal pointer value” is not found for eight consecutive frames.

You can also display information about the status of an individual port on a SONET network module. Enter the following parameters:

```
myswitch::configuration port sonet> show 4c1 status
Port Carrier Section Line Path Atm
4C1  yes     0x1     0x1  0x1  0x1
```

The fields in this display are defined in the same manner as those in the previous example.

2.20.6 Configuring SONET Port Timing

This command lets you change the timing source on a port on a SONET network module. Enter the following parameters:

```
myswitch::configuration port sonet> timing <port> (network | internal)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the line length is to be changed.
network | internal	The transmit clock for this port. **network** means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. **internal** means that the internal clock is used to drive the transmit line of this port.

2.21 TAXI Port Configuration Commands

These commands let you modify the configuration of the ports on a TAXI network module. The following commands are available only when a TAXI network module is installed in the switch fabric. To list the available subcommands, type **taxi ?** at the **port** level.

```
myswitch::configuration port> taxi ?
loopback         show
```

2.21.1 Configuring TAXI Port Loopback

This command allows you to designate the type of loopback on a port on a TAXI network module. Enter the following parameters:

```
myswitch::configuration port taxi> loopback <port> (diag | none)
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the loopback mode is to be changed.
diag	**diagnostic** loopback connects the receiver to the transmitter. The TAXI stream transmitted by the switch to a port is looped back to the switch. The TAXI stream is still transmitted to the network, but the incoming TAXI stream is ignored.
none	**none** designates that no loopback will take place on this port. This is the default setting.

2.21.2 Showing the TAXI Port Configuration

This command enables you to display current information about all of the ports on a TAXI network module. Enter the following parameters:

```
myswitch::configuration port taxi> show
Port        Carrier     State       Loopback
2A1         yes         up          none
2A2         no          down        none
2A3         no          down        none
2A4         no          down        none
2A5         no          down        none
2A6         no          down        none
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each network module currently installed in the switch fabric.
Carrier[1]	**yes** means a carrier has been detected on this port. **no** means a carrier has not been detected.
State	The current state of this port. Can be **up** (on-line) or **down** (off-line).
Loopback	The loopback mode of this port. Can be either **none** or **diagnostic**.

1. A carrier is detected when a signal is applied to the receive side of the port. It does not guarantee that the signal is the proper frequency.

You can also display information about an individual port. Enter the following parameters:

```
myswitch::configuration port taxi> show [<port>]
myswitch::configuration port taxi> show 2a1
Port        Carrier     State       Loopback
2A1         yes         up          none
```

The fields in this display are defined in the same manner as those in the previous example.

2.22 TP25 Port Configuration Commands

These commands allow you to modify various aspects of the configuration of the ports on a TP25 network module. The following **tp25** commands are available only when a TP25 network module is installed in the switch fabric. You can display the list of available subcommands by typing **tp25 ?** at the **port** level.

```
myswitch::configuration port> tp25 ?
  loopback         show
```

2.22.1 Configuring the TP25 Port Loopback

This subcommand allows you to designate the type of loopback on a port on a TP25 network module. Enter the following parameters:

```
myswitch::configuration port tp25> loopback <port> (line | diag | none)
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the loopback mode is to be changed.
line	**line** loopback, also known as remote loopback, causes received data to be transferred to the upstream system as well as to be looped back to the transmitter on this port.
diag	**diagnostic** loopback connects the receiver to the transmitter. The stream transmitted by the switch to a port is looped back to the switch. The stream is still transmitted to the network, but the incoming stream is ignored.
none	**none** designates that no loopback will take place on this port. This is the default setting.

2.22.2 Showing the TP25 Port Configuration

This command allows you to display current information about a TP25 network module. Enter the following parameters:

```
myswitch::configuration port tp25> show
Port Carrier Media Loopback RxTiming
1B1  yes     UTP   none     Yes
1B2  yes     UTP   none     Yes
1B3  no      UTP   none     Yes
1B4  yes     UTP   none     Yes
1B5  no      UTP   none     Yes
1B6  yes     UTP   none     Yes
```

The fields in this display are defined as follows:

Field	Description
Port	The TP25 port number of the network module(s) currently installed in the switch.
Carrier[1]	**yes** means a carrier has been detected on this port. **no** means a carrier has not been detected on this port.
Media	The kind of physical medium connected to the TP25 interface. **UTP** means that it is Unshielded Twisted Pair.
Loopback	The loopback mode on the port. Can be either **line** or **none**.
RxTiming	Indicates whether or not the port is receiving an 8kHz timing sync marker. These markers can be used to derive an 8kHz signal that can be transmitted from all ports on the network module and back to the switch fabric (on switches that support timing features). **No** means the port is not receiving sync pulses. **Yes** means the port is receiving sync pulses.

1. A carrier is detected when a signal is applied to the receive side of the port, but it does not guarantee the signal is the proper frequency.

You can also display information about an individual port. Enter the following parameters:

```
myswitch::configuration port tp25> show [<port>]
myswitch::configuration port tp25> show 1b2
Port Carrier Media Loopback RxTiming
1B2  yes     UTP   none     Yes
```

The fields in this display are defined in the same manner as those in the previous example.

2.23 Port Traffic Configuration Commands

These commands enable you to configure various traffic management features on an individual port on a network module on the switch. You can display the list of available subcommands by typing **?** at the **traffic** level.

```
myswitch::configuration port traffic> ?
  c>                lc>               le>               pc1>
  d>
```

The following is displayed on an LE 155 or LE 25:

```
myswitch::configuration port traffic> ?
  le>
```

The following is displayed on an ASX-4000:

```
myswitch::configuration port traffic> ?
  pc1>
```

2.23.1 Configuring Port Traffic on Series C Network Modules

These commands enable you to configure various traffic management features on an individual port on a Series C network module on the switch. You can display the list of available subcommands by typing **?** at the **c** level.

```
myswitch::configuration port traffic c> ?
  cdv             clp1            efci            qsize
  show
```

2.23.1.1 Configuring Cell Delay Variation on a Series C Network Module

On a Series C network module, there are two output queues that are 256 cells deep, by default, one for Constant Bit Rate (CBR) and one for Variable Bit Rate (VBR). The Cell Delay Variation (CDV) for CBR is calculated as the CBR cell queue depth (256 cells by default) multiplied by 1 cell time. The CDV for VBR is calculated as the VBR cell queue depth (256 cells by default) multiplied by 1 cell time plus the CBR CDV. The CDV also varies depending on the physical interface on which the link is running (e.g., a 155 Mbps connection versus a 45 Mbps connection). This command lets you set the maximum CDV on a worst case basis that cells for a specified output port and priority (CBR or VBR) should incur. This number is used to determine the size of the buffers reserved for CBR and VBR traffic. Enter the following parameters:

```
myswitch::configuration port traffic c> cdv <port> (CBR | VBR) <CDV in microseconds>
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the CDV is to be set.
CBR | VBR	Specifies if the CDV is for output CBR traffic or for output VBR traffic.
CDV[1]	In microseconds, the cell delay variation that an output cell experiences under the worst conditions.

1. The network module must be reset for this command to take effect.

2.23.1.2 Setting the CLP Threshold on a Series C Network Module

This command allows you to designate the CLP=1 threshold at which cells that have been tagged as non-conforming are dropped for a given traffic type on a specified port on a Series C network module. Enter the following parameters:

```
myswitch::configuration port traffic c> clp1 <port> (CBR | VBR | ABR) <number of cells>
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the CLP threshold is to be set.
CBR | VBR | ABR[1]	Specifies for which type of traffic (CBR, VBR, or ABR/UBR) the CLP threshold is being set.
number of cells	The number of cells in the buffer at which the specified traffic type drops CLP=1 cells. The default is 256 cells.

1. The Series C network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.

2.23.1.3 Configuring EFCI on a Series C Network Module

This command allows you to designate the cell buffer threshold over which Unspecified Bit Rate (UBR) and Available Bit Rate (ABR) cells have their explicit forward congestion indicator (EFCI) code point set on a Series C network module. When the EFCI code point is set, this signals congestion to downstream switch fabrics and flow control mechanisms. Once this threshold is surpassed, EFCI continues to be set until the queue empties. Enter the following parameters:

```
myswitch::configuration port traffic c> efci <port> (on | off) <threshold>
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the EFCI threshold is to be set.
on | off	**on** means the EFCI is set when the threshold number is reached, signalling congestion. **off** means the EFCI is cleared when the threshold number is reached, indicating no congestion.
number of cells	The number of cells over which the UBR and ABR cells will have EFCI set. The default is 64 cells.

2.23.1.4 Configuring Port Queue Size on a Series C Network Module

This command enables you to designate the minimum queue size for a given type of traffic on a specified port on a Series C network module. Enter the following parameters:

```
myswitch::configuration port traffic c> qsize <port> (CBR | VBR | ABR) <number of cells>
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the minimum queue size is to be set.
CBR | VBR | ABR[1]	Specifies for which type of traffic (CBR, VBR, or ABR/UBR) to set the minimum queue size.
number of cells[2]	The queue size to be assigned to the traffic designated in the previous parameter. The default is 256 cells.

1. The Series C network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.
2. The network module must be reset for this command to take effect.

2.23.1.5 Displaying Port Traffic on a Series C Network Module

This command lets you display port and priority traffic information for all of the ports on all of the Series C network modules. Enter the following:

```
myswitch::configuration port traffic c> show
                  CLP   EFCI   EFCI
 Port  Prio     Thrsh     On    Off   QSize     CDV
 1C1   ABR-UBR    256     64      1     256     N/A
 1C1   VBR        256    N/A    N/A     256    1449
 1C1   CBR        256    N/A    N/A     256     724
 1C2   ABR-UBR    256     64      1     256     N/A
 1C2   VBR        256    N/A    N/A     256    1449
 1C2   CBR        256    N/A    N/A     256     724
 1C3   ABR-UBR    256     64      1     256     N/A
 1C3   VBR        256    N/A    N/A     256    1449
 1C3   CBR        256    N/A    N/A     256     724
 1C4   ABR-UBR    256     64      1     256     N/A
 1C4   VBR        256    N/A    N/A     256    1449
 1C4   CBR        256    N/A    N/A     256     724
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each Series C network module installed in the switch fabric.
Prio[1]	The traffic type for this port.
CLP Thrsh	The value at which cells that have been tagged as non-conforming (CLP=1) are dropped for this port and priority.
EFCI On	The value at which the EFCI is set (turned on) when the threshold number is reached, signalling congestion, for this port and priority.
EFCI Off	The value at which the EFCI is cleared (turned off) when the threshold number is reached, indicating no congestion, for port and priority.
Qsize	The reserved queue size for this port and priority.
CDV	The maximum cell delay variation for this port and priority, specified in microseconds.

1. The Series C network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.

This command also lets you display port and priority traffic information for an individual port on a Series C network module. Enter the following parameters:

```
myswitch::configuration port traffic> show [<port>]

myswitch::configuration port traffic> show 1A3
                  CLP   EFCI   EFCI
 Port  Prio     Thrsh     On    Off   QSize     CDV
 1A3   ABR-UBR     55     64      1      55     N/A
 1A3   VBR         55    N/A    N/A      55       4
 1A3   CBR         55    N/A    N/A      55       2
```

The fields in this display are defined in the same manner as those in the previous example.

2.23.2 Configuring Port Traffic on Series LC Network Modules

These commands enable you to configure various traffic management features on an individual port on a Series LC network module on the switch. You can display the list of available subcommands by typing **?** at the **lc** level.

```
myswitch::configuration port traffic lc> ?
  clp1            qsize            show
```

2.23.2.1 Setting the CLP Threshold on a Series LC Network Module

This command lets you designate the CLP=1 threshold at which cells that have been tagged as non-conforming are dropped for a given traffic type on a specified port on a Series LC network module. Enter the following parameters:

```
myswitch::config port traffic lc> clp1 <port> (CBR | VBR | ABR | UBR) <number of cells>
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the CLP threshold is to be set.
CBR | VBR | ABR[1] | UBR	Specifies for which type of traffic (CBR, VBR, ABR, or UBR) to set the CLP threshold.
number of cells	The number of cells in the buffer at which the specified traffic type drops CLP=1 cells. The default is 256 cells.

1. The Series LC network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.

2.23.2.2 Configuring Port Queue Size on a Series LC Network Module

This command enables you to designate the minimum queue size for a given type of traffic on a specified port on a Series LC network module. Enter the following parameters:

```
myswitch::config port traffic lc> qsize <port> (CBR | VBR | ABR| UBR) <number of cells>
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the minimum queue size is to be set.
CBR | VBR | ABR[1] | UBR	Specifies for which traffic type (CBR, VBR, ABR, or UBR) to set the minimum queue size.
number of cells[2]	The queue size to be assigned to the traffic type designated in the previous parameter. The default is 256 cells.

1. The Series LC network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.
2. The network module must be reset for this command to take effect.

2.23.2.3 Displaying Port Traffic on a Series LC Network Module

This command lets you display port and priority traffic information for all of the ports on all of the Series LC network modules. Enter the following:

```
myswitch::configuration port traffic lc> show
                CLP
 Port   Prio   Thrsh   QSize
 1D1    ABR     256     256
 1D1    VBR     256     256
 1D1    CBR     256     256
 1D1    UBR     256     256
 1D2    ABR     256     256
 1D2    VBR     256     256
 1D2    CBR     256     256
 1D2    UBR     256     256
 1D3    ABR     256     256
 1D3    VBR     256     256
 1D3    CBR     256     256
 1D3    UBR     256     256
 1D4    ABR     256     256
 1D4    VBR     256     256
 1D4    CBR     256     256
 1D4    UBR     256     256
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each Series LC network module installed in the switch fabric.
Prio[1]	The traffic type for this port.
CLP Thrsh	The value at which cells that have been tagged as non-conforming (CLP=1) are dropped for this port and priority.
Qsize	The reserved queue size for this port and priority, in cells.

1. The Series LC network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.

This command also lets you show port and priority traffic information for an individual port. Enter the following parameters:

```
myswitch::configuration port traffic lc> show [<port>]
myswitch::configuration port traffic lc> show 1d1
                CLP
 Port  Prio  Thrsh  QSize
 1D1   ABR     256    256
 1D1   VBR     256    256
 1D1   CBR     256    256
 1D1   UBR     256    256
```

The fields in this display are defined in the same manner as those listed above. If there are no Series LC network modules in the fabric, then the following is displayed:

```
myswitch::configuration port traffic lc> show
No Series-LC port traffic configuration information available
```

2.23.3 Configuring Port Traffic on Series LE Network Modules

These commands enable you to configure various traffic management features on an individual port on a Series LE network module on an LE 155 or an LE 25 switch. You can display the list of available subcommands by typing **?** at the **le** level.

```
myswitch::configuration port traffic le> ?
  clp1            qsize           show
```

NOTE The **conf port traffic le** commands are only valid on an LE 155 or an LE 25 switch.

2.23.3.1 Setting the CLP Threshold on a Series LE Network Module

This command lets you designate the CLP=1 threshold at which cells that have been tagged as non-conforming are dropped for a given traffic type on a specified port on a Series LE network module. Enter the following parameters:

```
myswitch::config port traffic le> clp1 <port> (CBR | VBR | ABR | UBR) <number of cells>
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the CLP threshold is to be set.
CBR | VBR | ABR[1] | UBR	Specifies for which type of traffic (CBR, VBR, ABR, or UBR) to set the CLP threshold.
number of cells	The number of cells in the buffer at which the specified traffic type drops CLP=1 cells. The default is 256 cells.

1. The Series LE network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.

2.23.3.2 Configuring Port Queue Size on a Series LE Network Module

This command enables you to designate the minimum queue size for a given type of traffic on a specified port on a Series LE network module. Enter the following parameters:

```
myswitch::configuration port traffic le> qsize <port> (CBR | VBR | ABR| UBR)
<number of cells>
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the minimum queue size is to be set.
CBR | VBR | ABR[1] | UBR	Specifies for which type of traffic (CBR, VBR, ABR, or UBR) to set the minimum queue size.
number of cells[2]	The queue size to be assigned to the traffic type designated in the previous parameter. The default is 256 cells.

1. The Series LE network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.
2. The network module must be reset for this command to take effect.

2.23.3.3 Displaying Port Traffic on a Series LE Network Module

This command lets you display port and priority traffic information for all of the ports on the Series LE network modules. The following is displayed on an LE 155:

```
myswitch::configuration port traffic le> show
              CLP
 Port  Prio  Thrsh  QSize
 1A1   ABR     256    256
 1A1   VBR     256    256
 1A1   CBR     256    256
 1A1   UBR     256    256
 1A2   ABR     256    256
 1A2   VBR     256    256
 1A2   CBR     256    256
 1A2   UBR     256    256
 1A3   ABR     256    256
 1A3   VBR     256    256
 1A3   CBR     256    256
 1A3   UBR     256    256
 1A4   ABR     256    256
 1A4   VBR     256    256
Press return for more, q to quit: q
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each Series LE network module installed in the switch fabric.
Prio[1]	The traffic type for this port.
CLP Thrsh	The value at which cells that have been tagged as non-conforming (CLP=1) are dropped for this port and priority.
Qsize	The reserved queue size for this port and priority, in cells.

1. The Series LE network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.

This command also lets you show port and priority traffic information for an individual port. Enter the following parameters:

```
myswitch::configuration port traffic le> show [<port>]
myswitch::configuration port traffic le> show 1a1
                CLP
 Port  Prio  Thrsh  QSize
 1A1   ABR     256    256
 1A1   VBR     256    256
 1A1   CBR     256    256
 1A1   UBR     256    256
```

The fields in this display are defined in the same manner as those listed above.

The following is displayed on an LE 25. In this example, the VBR traffic on module 1A has been placed in the high priority queue using **`conf module traffic le vbrqueue`** *`<module>`* **`rt`**. The VBR traffic on module 1B is in the low priority queue.

```
                    CLP
Port   Priority   Thrsh  QSize
1A1    CBR-VBR      256    256
1A1    ABR-UBR      256    256
1A2    CBR-VBR      256    256
1A2    ABR-UBR      256    256
1A3    CBR-VBR      256    256
1A3    ABR-UBR      256    256
1A4    CBR-VBR      256    256
1A4    ABR-UBR      256    256
1B1    CBR          256    256
1B1  VBR-ABR-UBR    256    256
1B2    CBR          256    256
1B2  VBR-ABR-UBR    256    256
1B3    CBR          256    256
1B3  VBR-ABR-UBR    256    256
1B4    CBR          256    256
1B4  VBR-ABR-UBR    256    256

Press return for more, q to quit: q
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each Series LE network module installed in the switch fabric.
Priority[1]	The traffic type for this port.
CLP Thrsh	The value at which cells that have been tagged as non-conforming (CLP=1) are dropped for this port and priority.
Qsize	The reserved queue size for this port and priority, in cells.

1. The Series LE network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.

If there are no Series LE network modules in the fabric (i.e., this is not an LE 155 or an LE 25 switch), then the following is displayed:

```
myswitch::configuration port traffic le> show
No Series-LE port traffic configuration information available
```

2.23.4 Configuring Port Traffic on Series 1 Port Cards

These commands enable you to configure various traffic management features on an individual port on a Series 1 port card on an ASX-4000 switch. You can display the list of available subcommands by typing **?** at the **pc1** level.

```
myswitch::configuration port traffic pc1> ?
  clp1                qsize               show
```

NOTE These commands are not available on Series 1 OC-48 port cards.

2.23.4.1 Setting the CLP Threshold on a Series 1 Port Card

This command lets you designate the CLP=1 threshold at which cells that have been tagged as non-conforming are dropped for a given traffic type on a specified port on a Series 1 port card. Enter the following parameters:

```
myswitch::configuration port traffic pc1> clp1 <port> (CBR | VBR | ABR | UBR)
<number of cells>
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the CLP threshold is to be set.
CBR | VBR | ABR[1] | UBR	Specifies for which type of traffic (CBR, VBR, ABR, or UBR) to set the CLP threshold.
number of cells	The number of cells in the buffer at which the specified traffic type drops CLP=1 cells. The default is 256 cells.

1. The Series 1 port cards offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.

2.23.4.2 Configuring Port Queue Size on a Series 1 Port Card

This command enables you to designate the minimum queue size for a given type of traffic on a specified port on a Series 1 port card. Enter the following parameters:

```
myswitch::configuration port traffic pc1> qsize <port> (CBR | VBR | ABR | UBR)
<number of cells>
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the minimum queue size is to be set. See the NOTE above.
CBR | VBR | ABR[1] | UBR	Specifies for which traffic type (CBR, VBR, ABR, or UBR) to set the minimum queue size.
number of cells[2]	The queue size to be assigned to the traffic type designated in the previous parameter. The default is 256 cells.

1. The Series 1 port cards offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.
2. The port card must be reset for this command to take effect.

2.23.4.3 Displaying Port Traffic on a Series 1 Port Card

This command lets you display port and priority traffic information for all of the ports on all of the Series 1 port cards. Enter the following:

```
myswitch::configuration port traffic pc1> show
                          CLP
 Port  Priority         Thrsh  QSize
 2A1   ABR                256    256
 2A1   VBR                256    256
 2A1   CBR                256    256
 2A1   UBR                256    256
 2A2   ABR                256    256
 2A2   VBR                256    256
 2A2   CBR                256    256
 2A2   UBR                256    256
 2A3   ABR                256    256
 2A3   VBR                256    256
 2A3   CBR                256    256
 2A3   UBR                256    256
 2A4   ABR                256    256
 2A4   VBR                256    256
 2A4   CBR                256    256
 2A4   UBR                256    256
Press return for more, q to quit: q
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each Series 1 port card installed in the switch fabric.
Priority[1]	The traffic type for this port.
CLP Thrsh	The value at which cells that have been tagged as non-conforming (CLP=1) are dropped for this port and priority.
Qsize	The reserved queue size for this port and priority, in cells.

1. The Series 1 port cards offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.

This command also lets you show port and priority traffic information for an individual port. Enter the following parameters:

```
myswitch::configuration port traffic pc1> show [<port>]
localhost::configuration port traffic pc1> show 2a4
                          CLP
 Port  Priority         Thrsh  QSize
 2A4   ABR                256    256
 2A4   VBR                256    256
 2A4   CBR                256    256
 2A4   UBR                256    256
```

The fields in this display are defined in the same manner as those listed above.

If there are no Series 1 port cards in the switch fabric, or if the switch is not an ASX-4000, then the following is displayed:

```
myswitch::configuration port traffic pc1> show
No Series-PC1 port traffic configuration information available
```

2.23.5 Configuring Port Traffic on Series D Network Modules

These commands enable you to configure various traffic management features on an individual port on a Series D network module on the switch. You can display the list of available subcommands by typing **?** at the **d** level.

```
myswitch::configuration port traffic d> ?
  altclpconfig     clpthresh        qsize            ratelimit
  scheduling       show
```

2.23.5.1 Configuring Alternate CLP Threshold on a Series D Network Module

This command lets you apply the alternate per-connection CLP=1 or CLP=0+1 threshold for various classes of service. The alternate threshold is configured using the **conf module traffic d altclpthresh** command. This alternate threshold can then be applied per port for some, all, or none of these connections using this command. Enter the following:

```
myswitch::configuration port traffic d> altclpconfig <port> (cbr | vbr | ubr)
(allOn | allOff | svcOn | svcOff)
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the alternate CLP thresholds are being applied.
cbr | vbr | ubr	Specifies for which type of traffic (CBR, VBR, or UBR) the alternate CLP=1 or CLP=0+1 thresholds are being applied. You cannot configure an alternate threshold for ABR.
allOn	**allOn** means all connections (SVCs and PVCs) of the specified class of service arriving on this port will use the alternate CLP thresholds.
allOff	**allOff** means no connections (SVCs and PVCs) of the specified class of service arriving on this port will use the alternate CLP thresholds.
svcOn	**svcOn** means all SVCs of the specified class of service arriving on this port will use the alternate CLP thresholds. PVCs are based on their UPC contract flags.
svcOff	**svcOff** means no SVCs of the specified class of service arriving on this port will use the alternate CLP thresholds. PVCs are based on their UPC contract flags. This is the default.

2.23.5.2 Configuring the CLP Threshold on a Series D Network Module

This command lets you apply the CLP=1 and CLP=0+1 thresholds for a given traffic type on a specified port on a Series D network module. Enter the following parameters:

```
myswitch::configuration port traffic d> clpthresh <port> (cbr | vbr | abr | ubr)
(clp1 | clp01) <threshold>
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the CLP threshold is being applied.
cbr | vbr | abr |ubr	Specifies for which type of traffic (CBR, VBR, ABR, or UBR) the CLP=1 or CLP=0+1 threshold is being applied.
clp1	The threshold is being set for CLP=1 cells. Applying a CLP=1 threshold means that when the current cell count for this port and class is greater than this threshold, cells that have a CLP=1 are dropped. This threshold must be less than the clp01 threshold.
clp01	The threshold is being set for CLP=0+1 cells. Applying a CLP=0+1 threshold means that when the current cell count for this port and class is greater than this threshold, cells are dropped, regardless of their CLP bit. This threshold must be greater than the clp1 threshold.
threshold	The number of cells in the buffer at which the specified traffic type drops CLP=1 or CLP=0+1 cells. This number must be entered in multiples of 8. The maximum value is the size of cell memory. The default is 256 cells for CLP=1 cells and the size of cell memory for CLP=0+1 cells.

2.23.5.3 Configuring Port Queue Size on a Series D Network Module

This command enables you to designate the minimum dedicated queue size for a given type of traffic on a specified port on a Series D network module. Enter the following parameters:

```
myswitch::configur port traffic d> qsize <port> (cbr | vbr | abr | ubr) <number of cells>
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the minimum dedicated queue size is to be set.
CBR | VBR | ABR | UBR	Specifies for which type of traffic (CBR, VBR, ABR, or UBR) to set the minimum dedicated queue size.
number of cells[1]	The queue size to be assigned to the traffic designated in the previous parameter. The default is 256 cells.

1. The network module must be reset for this command to take effect.

2.23.5.4 Configuring the Rate Limit on a Series D Network Module

This command lets you limit a given port to a specified amount of bandwidth, effectively setting a new logical line rate for the port. This command allocates that bandwidth to the rate controller. To free the allocated bandwidth, the option `disable` should be specified instead of the number of cells. Enter the following parameters:

```
myswitch::configuration port traffic d> ratelimit <port> (<cps> | disabled)
```

These parameters are defined as follows:

Parameter	Description
port	The port on which you want to change the rate limit.
cps	The new cell rate for the port, in cells per second.
disabled	Indicates you want to reset the bandwidth to the default value.

NOTE You should not modify the rate limit to a value lower than the following values: for OC12 network modules - 15,183 cells / sec per port; for OC3 network modules - 3,796 cells / sec per port; and for DS3, E3, DS1, and E1 network modules - 1,898 cells / sec per port.

When you change the rate limit, the software will ask you if you want to update the configuration database. To abort the command, type **n** or press **<ENTER>**. If you wish to change the rate limit, enter **y** at the prompt as follows:

```
myswitch::configuration port traffic d> ratelimit 1a1 1412830
Changes to the rate limiting state of a port are stored in the configuration
database and do not take effect until the network module is reset. Do you want
to proceed with a change to the configuration database rate limiting entry for
this port?

Proceed with database update [n]? y
```

The switch will then calculate the rate limit and give you the closest value to your requested value that it can. It then responds with the actual rate that it will give you.

```
Actual rate limit is 1412829
```

You must reset the network module for this command to take effect, so the switch will then prompt you to reset the network module. If you wish to reset the network module, enter **y** at the prompt as follows:

```
Reset the network module [n]? y
```

2.23.5.5 Scheduling Port Traffic on a Series D Network Module

This command lets you schedule the way that traffic is serviced on the output side of a Series D network module for SVCs and PVCs. Enter the following parameters:

```
myswitch::configuration port traffic d> scheduling <port> svc (cbr | vbr)
(roundrobin | smoothed | guaranteed)
OR
scheduling <port> pvc (cbr | vbr) (perupc | roundrobin | smoothed | guaranteed)
```

These parameters are defined as follows:

Parameter	Description
port	The port on which you want to change the scheduling mode.
svc cbr	Indicates that this scheduling mode will apply to all CBR SVCs output on this port.
svc vbr	Indicates that this scheduling mode will apply to all VBR SVCs output on this port.
pvc cbr	Indicates that this scheduling mode will apply to all CBR PVCs output on this port.
pvc vbr	Indicates that this scheduling mode will apply to all VBR PVCs output on this port.
perupc	Indicates that the PVCs output on this port will use the scheduling mode configured by the UPC contract that is applied to them. The UPC contract can be configured using the **-scheduling** parameter under the **conf upc new** command. This option only applies to PVCs.
roundrobin	All service for these connections comes from one of the round-robin queues in the network module. This is the default mode for both SVCs and PVCs.
smoothed	All service for these connections comes from the network module's rate controller, which ensures that cells for these connections are transmitted into the network at a fixed rate of R cells per second.
guaranteed	This is a combination of the round-robin and smoothed modes. Service for these connections are scheduled with both fixed rate R from the rate controller, and they have an entry in the appropriate round-robin queue.

NOTE Multicast connections cannot be shaped using the rate controller (all multicasts use the round robin queues).

NOTE When using the Series D memory models (under **conf module traffic d setmodel**), models 1 and 4 limit you to a maximum of 8K connections in the rate controller; models 2 and 5 limit you to a maximum of 12K connections in the rate controller; and models 3 and 6 limit you to a maximum of 10K connections in the rate controller.

2.23.5.6 Displaying Port Traffic on a Series D Network Module

This command lets you display port and priority traffic information for all of the ports on all of the Series D network modules. Enter the following:

```
myswitch::configuration port traffic d> show
                  Queue   Thresholds
 Port     Class    Size   CLP0+1   CLP1
 1C1        ABR     256    15000    256
 1C1        VBR     256    15000    256
 1C1        CBR     256    15000    256
 1C1        UBR     256    15000    256
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each Series D network module installed in the switch fabric.
Class	The traffic type for this port.
Queue Size	The reserved queue size for this port and priority, in cells.
CLP0+1 Threshold	The value at which cells are dropped for this port and priority, regardless of their CLP bit.
CLP1 Threshold	The value at which cells that have been tagged as non-conforming (CLP=1) are dropped for this port and priority.

This command also lets you show port and priority traffic information for an individual port. Enter the following parameters:

```
myswitch::configuration port traffic d> show [<port>]
myswitch::configuration port traffic d> show 1c1
                  Queue   Thresholds
 Port     Class    Size   CLP0+1   CLP1
 1C1        ABR     256    15000    256
 1C1        VBR     256    15000    256
 1C1        CBR     256    15000    256
 1C1        UBR     256    15000    256
```

The fields in this display are defined in the same manner as those listed above.

This command also lets you show advanced traffic information. Enter the following:

```
myswitch::configuration port traffic d> show [<port>] [advanced|scheduling]
myswitch::configuration port traffic d> show advanced
       Alt. CLP Thresh Config
 Port     CBR     VBR     UBR  RateLimit
 1C1   svcOff  svcOff  svcOff   disabled
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each Series D network module installed in the switch fabric.
Alt. CLP Thresh Config	Specifies for which type of traffic (CBR, VBR, or UBR) the alternate CLP=1 or CLP=0+1 threshold is set. **allOn** means all connections (SVCs and PVCs) of the specified class of service arriving on this port will use the alternate CLP threshold. **allOff** means no connections (SVCs and PVCs) of the specified class of service arriving on this port will use the alternate CLP threshold. **svcOn** means all SVCs of the specified class of service arriving on this port will use the alternate CLP threshold. All PVCs arriving on this port have the alternate threshold applied if their UPC contract specifies to do so. This is the default. **svcOff** means no SVCs of the specified class of service arriving on this port will use the alternate CLP threshold. All PVCs arriving on this port have the alternate threshold applied if their UPC contract specifies to do so.
RateLimit	Rate limit lets you limit a given port to a specified amount of bandwidth, effectively setting a new logical line rate for the port. If a number is displayed, this is the new cell rate for the port, in cells per second. If **disabled** is displayed, it means rate limit is not enabled on this port.

Additionally, you can show scheduling information. Enter the following parameters:

```
myswitch::configuration port traffic d> show scheduling
                SVC Scheduling              PVC Scheduling
 Port           CBR           VBR           CBR           VBR
 1C1     roundrobin    roundrobin        perupc        perupc
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each Series D network module installed in the switch fabric.
SVC CBR Scheduling	Indicates that this scheduling mode will apply to all CBR SVCs output on this port.
SVC VBR Scheduling	Indicates that this scheduling mode will apply to all VBR SVCs output on this port.
PVC CBR Scheduling	Indicates that this scheduling mode will apply to all CBR PVCs output on this port.
PVC VBR Scheduling	Indicates that this scheduling mode will apply to all VBR PVCs output on this port.
perupc	Indicates that the PVCs output on this port will use the scheduling mode configured by the UPC contract that is applied to them. The UPC contract can be configured using the **-scheduling** parameter under the **conf upc new** command. This option only applies to PVCs.
roundrobin	All service for these connections comes from one of the round-robin queues in the network module. This is the default mode for both SVCs and PVCs.
smoothed	All service for these connections comes from the network module's rate controller, which ensures that cells for these connections are transmitted into the network at a fixed rate of R cells per second.
guaranteed	This is a combination of the round-robin and smoothed modes. Service for these connections are scheduled with both fixed rate R from the rate controller, and they have an entry in the appropriate round-robin queue.

If there are no Series D network modules in the switch fabric, then the following is displayed:

```
myswitch::configuration port traffic d> show
No Series-D port traffic configuration information available
```

2.24 UBR Tagging Command

When UBR tagging is enabled on a connection, all cells on the connection are tagged by the policer so that they can be discarded using the CLP=1 threshold when congestion is experienced. This prevents UBR traffic on a given port from using an unfair amount of buffer resources on a network module. This command lets you tag cells on a per-port and per-connection basis for all UBR connections.

NOTE This command does not apply to the *FramePlus* network modules.

Enter the following parameters:

```
myswitch::configuration port> ubrtagging <port> (allOn|allOff|svcOn|svcOff)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which UBR tagging is being configured.
allOn	**allOn** means all UBR connections (SVCs and PVCs) arriving on this port are subjected to UBR tagging.
allOff	**allOff** means no UBR connections (SVCs and PVCs) arriving on this port are subjected to UBR tagging.
svcOn	**svcOn** means all UBR SVCs arriving on this port are subjected to UBR tagging. PVCs are tagged based on their UPC contract. This is the default.
svcOff	**svcOff** means no UBR SVCs arriving on this port are subjected to UBR tagging. PVCs are tagged based on their UPC contract.

For example, to enable tagging on all UBR SVCs and PVCs on port 2B4, enter the following parameters:

```
myswitch::configuration port> ubrtagging 2b4 allOn
```

2.25 VBRBuffOB Port Configuration Commands

This command is an advanced option that allows you to set an output buffer overbooking level for VBR traffic on a particular port. The overbooking factors affect the amount of bandwidth that is associated with VBR connections. When a VBR connection is created or destroyed, a quantity of bandwidth is allocated / de-allocated from the port for the connection.

NOTE

It is recommended that you reset the network module after making any modification to the port overbooking factors so that VBR bandwidth is accurately accounted for by the switch control software. (See Part 1 of the *AMI Configuration Commands Reference Manual* for more information about **`conf module reset`**.) A change to the overbooking factors that is not followed by a reset may result in an incorrect amount of bandwidth being de-allocated for any existing VBR connections when those connections are destroyed.

NOTE

This command does not apply to the *FramePlus* network modules.

Enter the following parameters to modify the overbooking factor:

```
myswitch::configuration port> vbrbuffob <port> <percent>
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the buffer overbooking level for VBR traffic is to be configured. Overbooking cannot be configured on the control (CTL) port.
percent	The buffer overbooking level assigned to this path, specified as a percentage. Enter an integer value greater than or equal to `1`. The default is `100`, which means that no overbooking has been defined. Values less than `100` cause underbooking. Values greater than `100` denote overbooking. The maximum value is 32,767.

2.26 VBROB Port Configuration Commands

This command is an advanced option that allows you to set an output bandwidth overbooking level for VBR traffic on a particular port. The overbooking factors affect the amount of bandwidth that is associated with VBR connections. When a VBR connection is created or destroyed, a quantity of bandwidth is allocated / de-allocated from the port for the connection.

NOTE

It is recommended that you reset the network module after making any modification to the port overbooking factors so that VBR bandwidth is accurately accounted for by the switch control software. (See Part 1 of the *AMI Configuration Commands Reference Manual* for more information about **`conf module reset`**.) A change to the overbooking factors that is not followed by a reset may result in an incorrect amount of bandwidth being de-allocated for any existing VBR connections when those connections are destroyed.

NOTE

This command does not apply to the *FramePlus* network modules.

Enter the following parameters to modify the overbooking factor:

```
myswitch::configuration port> vbrob <port> <percent>
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the bandwidth overbooking level for VBR traffic is to be configured. Overbooking cannot be configured on the control (CTL) port.
percent	The bandwidth overbooking level assigned to this port, specified as a percentage. Enter an integer value from `1` to 32,767. The default is `100`, which indicates that no overbooking will occur. Values less than `100` cause underbooking. Values greater than `100` denote overbooking.

CHAPTER 3 Profile Configuration Commands

These commands let you delete, create, or display profiles that can be used in the definition of a number of Frame Relay and FUNI services and connections. A profile is similar to a UPC contract such that you can define a profile and then assign it to a particular connection or service during the creation of the connection or service.

For most profile types, several default profiles are provided for your convenience. Only one default is provided for the epdppd profile and the funi profile. These default profiles reflect what typical networks may need. You cannot delete the default profiles. If a service or connection is created without specifying any profile, the first default profile in the list (index 0) is used.

You can also create new profiles and delete profiles that you create, but you cannot modify existing ones. Each profile has an associated reference count, which identifies the number of services or connections that are currently using that profile. You cannot delete any profile that is currently in use (has a non-zero reference count). For more information about profiles, see Appendix D in the *ATM Switch Network Configuration Manual*. You can display the list of available subcommands by typing **?** at the **profile** level.

```
myswitch::configuration profile> ?
  epdppd>            frf8>              frrate>            funi>
  lmi>               service>
```

3.1 EPD/PPD Profile Configuration Commands

These commands let you delete, create, or display EPD/PPD profiles. These profiles let you determine how selective cell discard is performed. These profiles then can be applied on a per-VC basis to a Frame Relay PVC using the **-epdppd** *<index>* option under **conf fratm pvc new** or to a FUNI PVC using the **-epdppd** *<index>* option under **conf funi pvc new**. You can display the list of available subcommands by typing **?** at the **epdppd** level.

```
myswitch::configuration profile epdppd> ?
  delete            new               show
```

3.1.1 Deleting a EPD/PPD Profile

This command lets you delete an EPD/PPD profile. Enter the following parameters:

```
myswitch::configuration profile epdppd> delete <index>
```

NOTE You cannot delete a profile that is in use (has a non-zero value in the `Ref` field under **conf profile epdppd show**.) You cannot delete a default profile.

3.1.2 Creating a EPD/PPD Profile

This command lets you create an EPD/PPD profile. Enter the following parameters:

```
myswitch::configuration profile epdppd> new <index> [-prio (high|low)]
[-clp0epd (enabled|disabled)]
[-clp1ppd (enabled|disabled)] [-clp1epd (enabled|disabled)]
[-name <name>]
```

NOTE CLP0PPD is always enabled; therefore, it is not configurable in AMI. This means that all Frame Relay and FUNI PVCs are subjected to CLP0PPD.

These parameters for delete and new are defined as follows:

Parameter	Description
index	The index number that uniquely identifies each EPD/PPD profile. The default profile's index is **0**. This number must be a positive integer.
prio (high | low)	The priority buffer used to handle the traffic of a connection. The default is **low**.
clp0epd (enabled | disabled)	**enabled** means the designated buffer discards traffic once the specified CLP=0 threshold has been surpassed. **disabled** means the designated buffer does not discard traffic once the specified CLP=0 threshold has been surpassed. The high priority threshold is specified using **conf module fram highthresholds** and the low priority threshold is specified using **conf module fram lowthresholds**. The default is **enabled**.
clp1ppd (enabled | disabled)	**enabled** means the designated buffer discards traffic once the specified CLP=1 threshold has been surpassed. **disabled** means the designated buffer does not discard traffic once the specified CLP=1 threshold has been surpassed. The high priority threshold is specified using **conf module fram highthresholds** and the low priority threshold is specified using **conf module fram lowthresholds**. The default is **enabled**.
clp1epd (enabled | disabled)	**enabled** means the designated buffer discards traffic once the specified CLP=1 threshold has been surpassed. **disabled** means the designated buffer does not discard traffic once the specified CLP=1 threshold has been surpassed. The high priority threshold is specified using **conf module fram highthresholds** and the low priority threshold is specified using **conf module fram lowthresholds**. The default is **enabled**.
name <name>	The optional, user-defined name that uniquely identifies each EPD/PPD profile. The name of the default EPD/PPD profiles are **default1** and **default2**.

3.1.3 Displaying EPD/PPD Profile Information

These commands let you display the information for EPD / PPD profiles. Enter the following:

```
myswitch::configuration profile epdppd> show
 Index Prio   Clp0epd   Clp1ppd   Clp1epd    Ref Name
 0     low    enabled   enabled   enabled      0 default1
 1     high   disabled  disabled  disabled     0 default2
```

The fields in this display are defined as follows:

Field	Description
Index	The index number that identifies a given EPD / PPD profile.
Prio	The priority queue that should handle the traffic of a connection.
Clp0epd	**enabled** means the designated buffer discards traffic once the specified CLP=0 threshold has been surpassed. **disabled** means the designated buffer does not discard traffic once the specified CLP=0 threshold has been surpassed.
Clp1ppd	**enabled** means the designated buffer discards traffic once the specified CLP=1 threshold has been surpassed. **disabled** means the designated buffer does not discard traffic once the specified CLP=1 threshold has been surpassed.
Clp1epd	**enabled** means the designated buffer discards traffic once the specified CLP=1 threshold has been surpassed. **disabled** means the designated buffer does not discard traffic once the specified CLP=1 threshold has been surpassed.
Ref	The reference count for this EPD / PPD profile. Shows how many connections are using this profile. A profile cannot be deleted if it is in use.
Name	The optional, user-defined name associated with this EPD / PPD profile.

3.2 FRF.8 Profile Configuration Commands

These commands let you delete, create, or display FRF.8 profiles to be used with Frame Relay PVCs. These profiles let you define the interworking mappings between Frame Relay and ATM. These profiles then can be applied on a per-VC basis using the **-frf8** *<index>* option under **conf fratm pvc new**. You can display the list of available subcommands by typing **?** at the **frf8** level.

```
myswitch::configuration profile frf8> ?
  delete            new               protocols         show
```

3.2.1 Deleting a FRF.8 Profile

This command lets you delete an FRF.8 profile. Enter the following parameters:

```
myswitch::configuration profile frf8> delete <index>
```

NOTE You cannot delete a profile that is in use (has a non-zero value in the Ref field under **conf profile frf8 show**.) You cannot delete a default profile.

3.2.2 Creating a FRF.8 Profile

This command lets you create an FRF.8 profile. Enter the following:

```
myswitch::configuration profile frf8> new <index> [-DeToClp (mapped|ignored)]
       [-ClpValue (0|1)]
       [-ClpToDe (mapped|ignored)] [-DeValue (0|1)] [-Fecn (mapped|ignored)]
       [-protocols (all|ethernet|ethernetFcs|tokenRing|tokenRingFcs|ip|arp)]
       [-name <name>]
```

These parameters for delete and new are defined as follows:

Parameter	Description
index	The index number that uniquely identifies each FRF.8 profile. The default profile's index is **0**. This number must be a positive integer.
DeToClp (mapped | ignored)	**mapped** means the Discard Eligibility (DE) field in the Q922 core frame is mapped to the ATM CLP field of every cell generated by the segmentation process of the AAL5 PDU containing the information of that frame. When using **mapped**, the **-clpValue** option is set to **N/A**. **ignored** means the ATM CLP of every ATM cell generated by the segmentation process of the AAL5 PDU containing the information of that frame is set to a constant value specified by the **-clpValue** option. The default value is **mapped**.
clpValue (0 | 1)	The CLP bit value of all generated Frame Relay frame headers if the **-DeToClp** option is set to **ignored**. The default value is **N/A**.
ClpToDe (mapped | ignored)	**mapped** means the FR/ATM service interworking function sets the DE field of the Q922 core frame, provided that one or more cells belonging to this frame has its CLP field set. When using **mapped**, the **-deValue** option is set to **N/A**. **ignored** means the DE field of the Q922 core frame is set to a constant value specified by the the **-deValue** option. The default value is **mapped**.
deValue (0 | 1)	The DE bit value of all generated Frame Relay frame headers if the **-ClpToDe** option is set to **ignored**. The default value is **N/A**.
Fecn (mapped | ignored)	**mapped** means the FECN field in the Q922 core frame is mapped to the ATM EFCI field of every cell generated by the segmentation process of the AAL5 PDU containing the information of that frame. This mode provides congestion indication to the endpoints where higher layer protocol entities might be involved in traffic control. **ignored** means the EFCI field of cells generated by the segmentation process of the AAL5 PDU containing the information of the frame is always set to congestion-not-experienced. The default is **mapped**.
protocols (all | ethernet | ethernetFcs | tokenRing | tokenRingFcs | ip | arp)	The possible encapsulation translation protocols that can occur over this FRF.8 IWF instance. Any combination of these protocols is supported. When specifying more than one protocol, use a period to separate them; e.g., ethernet.ip.arp. The default value is **all**, which is displayed as **transparent**.
name <name>	The optional, user-defined name that uniquely identifies each FRF.8 profile. The name of the default FRF.8 profiles are **transparent**, **brouter**, **bridgedEth**, **routedIP**, and **bridgeTok**.

3.2.3 Displaying FRF.8 Protocol Information

These commands let you display protocol information for FRF.8 profiles. Enter the following:

```
myswitch::configuration profile frf8> protocols
 Index  Protocols ProtocolString
 0      0         transparent mode
 1      17        ethernet. ip.
 2      3         ethernet. ethernetFcs.
 3      16        ip.
 4      12        tokenRing. tokenRingFcs.
```

The fields in this display are defined as follows:

Field	Description
Index	The index number that identifies a given FRF.8 profile.
Protocols	A binary map number which lists all of the possible encapsulation translation protocols that can occur over this FRF.8 IWF instance. The binary values are: ethernet (000001) ethernetFcs (000010) tokenRing (000100) tokenRingFcs (001000) ipRouted (010000) arp (100000) or any combinations of the binary values. The possible range of values is from 0 to 63.
ProtocolString	A translation of the list of protocols that is represented by the value in the `Protocol` field.

3.2.4 Displaying FRF.8 Profile Information

This commands lets you display information for FRF.8 profiles. Enter the following:

```
myswitch::configuration profile frf8> show
            FR->ATM            ATM->FR
 Index DeToClp ClpValue  ClpToDe DeValue    Fecn    Protocols  Ref        Name
   0    mapped    N/A     mapped  N/A     mapped  transparent    0 transparent
   1    mapped    N/A     mapped  N/A     mapped           17    0     brouter
   2    mapped    N/A     mapped  N/A     mapped            3    0  bridgedEth
   3    mapped    N/A     mapped  N/A     mapped           16    0    routedIP
   4    mapped    N/A     mapped  N/A     mapped           12    0   bridgeTok
```

The fields in this display are defined as follows:

Field	Description
Index	The index number that identifies a given FRF.8 profile.
De/Clp	**mapped** means the DE field in the Q922 core frame is mapped to the ATM CLP filled of every cell generated by the segmentation process of the AAL5 PDU containing the information of that frame. **ignored** means the ATM CLP of every ATM cell generated by the segmentation process of the AAL5 PDU containing the information of that frame is set to a constant value specified by the **-deValue** option.
Clp/De	**mapped** means the FR/ATM service interworking function sets the DE field of the Q922 core frame, provided that one or more cells belonging to this frame has its CLP field set. **ignored** means the DE field of the Q922 core frame is set to a constant value specified by the the **-clpValue** option.
Fecn	**mapped** means the FECN field in the Q922 core frame is mapped to the ATM EFCI field of every cell generated by the segmentation process of the AAL5 PDU containing the information of that frame. This mode provides congestion indication to the end-points where higher layer protocol entities might be involved in traffic control mechanisms. **ignored** means the EFCI field of cells generated by the segmentation process of the AAL5 PDU containing the information of the frame is always set to congestion-not-experienced.
DeValue	The DE bit value of all generated Frame Relay frame headers if the **-ClpToDe** option is set to **ignored**.
ClpValue	The CLP bit value of all generated Frame Relay frame headers if the **-DeToClp** option is set to **ignored**.
Protocols	The possible encapsulation translation protocols that can occur over this FRF.8 IWF instance.
Ref	The reference count for this FRF.8 profile. Shows how many connections and/or services are using this profile. A profile cannot be deleted if it is in use.
Name	The optional, user-defined name associated with this FRF.8 profile.

3.3 Frame Relay Rate Configuration Commands

These commands let you delete, create, or display Frame Relay rate profiles. These profiles allow you to manage and define rate enforcement characteristics that can be applied on a per-VC basis using the **-frrate** *<index>* option under **conf fratm pvc new**. You can display the list of available subcommands by typing **?** at the **frrate** level.

```
myswitch::configuration profile frrate> ?
  delete            new               show
```

3.3.1 Deleting a Frame Relay Rate Profile

This command let you delete a Frame Relay rate profile. Enter the following parameters:

```
myswitch::configuration profile frrate> delete <index>
```

NOTE

You cannot delete a profile that is in use (has a non-zero value in the Ref field under **conf profile frrate show**.) You cannot delete a default profile.

3.3.2 Creating a Frame Relay Rate Profile

This command let you create a Frame Relay rate profile. Enter the following parameters:

```
myswitch::configuration profile frrate> new <index>
        [-inBc <bits>] [-inBe <bits>] [-inCir <kbps>]
        [-outBc <bits>] [-outBe <bits>] [-outCir <kbps>] [-name <name>]
```

The acceptable combinations are as follows:

- cir+eir profile: cir > 0, bc > 0, be > 0
- cir profile: cir > 0, bc > 0, be = 0
- zero-cir profile: cir = 0, bc = 0, be > 0

These parameters for delete and new are defined as follows:

Parameter	Description
index	The index number that uniquely identifies each Frame Relay rate profile. The default profile's index is **0**. This number must be a positive integer.
inBc	The committed burst size, in bits, in the ingress direction of a connection. The default value is **0**.
inBe	The excess burst size, in bits, in the ingress direction of a connection. The default value is **64000**.
inCir	The committed information rate, in kbps, in the ingress direction of a connection. The default value is **0**.
outBc	The committed burst size, in bits, in the egress direction of a connection. The default value is **0**.
outBe	The excess burst size, in bits, in the egress direction of a connection. The default value is **64000**.
outCir	The committed information rate, in kbps, in the egress direction of a connection. The default value is **0**.
name	The optional, user-defined name that uniquely identifies each Frame Relay rate profile. The name of the default Frame Relay rate profiles are **default0**, **default1**, **default2**, **default3**, and **default4**.

3.3.3 Displaying Frame Relay Rate Profile Information

These commands let you display Frame Relay rate profile information. Enter the following:

```
myswitch::configuration profile frrate> show
 Index   InBc   InBe  InCir  OutBc  OutBe OutCir  Ref Name
       (bits) (bits) (kbps) (bits) (bits) (kbps)
 0          0  64000      0      0  64000      0    0 default0
 1      64000  64000     64  64000  64000     64    0 default1
 2      64000      0     64  64000      0     64    0 default2
 3      56000  56000     56  56000  56000     56    0 default3
 4      56000      0     56  56000      0     56    0 default4
```

The fields in this display are defined as follows:

Field	Description
Index	The index number that identifies a given Frame Relay rate profile.
InBc	The committed burst size, in bits, in the ingress direction of a connection.
InBe	The excess burst size, in bits, in the ingress direction of a connection.
InCir	The committed information rate, in kbps, in the ingress direction of a connection.
OutBc	The committed burst size, in bits, in the egress direction of a connection.
OutBe	The excess burst size, in bits, in the egress direction of a connection.
OutCir	The committed information rate, in kbps, in the egress direction of a connection.
Ref	The reference count for this Frame Relay rate profile. Shows how many connections and/or services are using this profile. A profile cannot be deleted if it is in use.
Name	The optional, user-defined name associated with this Frame Relay rate profile.

3.4 FUNI Configuration Commands

These commands let you delete, create, or display Frame-based UNI (FUNI) profiles. These profiles then can be applied on a per-service basis using the **-funi** *<index>* option under **conf funi new**. To display the list of available subcommands, type **?** at the **funi** level.

```
myswitch::configuration profile funi> ?
  delete            new               show
```

3.4.1 Deleting a FUNI Profile

This command let you delete a FUNI profile. Enter the following parameters:

```
myswitch::configuration profile funi> delete <index>
```

NOTE

You cannot delete a profile that is in use (has a non-zero value in the `Ref` field under **conf profile funi show**.) You cannot delete a default profile.

3.4.2 Creating a FUNI Profile

This command let you create a FUNI profile. Enter the following parameters:

```
myswitch::configuration profile funi> new <index>
[-minVci <vci>] [-maxVci <vci>]
[-vpiBits <bits>] [-name <name>]
```

These parameters for delete and new are defined as follows:

Parameter	Description
index	The index number that uniquely identifies each FUNI profile. The default profile's index is **0**. This number must be a positive integer.
minVci <vci>	The minimum numerical value allowed to be used as a VCI on any PVC over this FUNI service. When you create a FUNI PVC on a service that is using this profile, the VCI that you choose for *<fvci>* cannot be smaller than this number. The default is **32**.
maxVci <vci>	The maximum numerical value allowed to be used as a VCI on any PVC over this FUNI service. When you create a FUNI PVC on a service that is using this profile, the VCI that you choose for *<fvci>* cannot be larger than this number. The default is **63**.
vpiBits <bits>	The maximum number of VPI bits configured for use on a FUNI interface. At the ATM FUNI, this value is smaller than or equal to 4 when the FUNI header size is two bytes. The default is **0**.
name <name>	The optional, user-defined name that uniquely identifies each FUNI profile. The name of the default FUNI profile is **default**.

3.4.3 Displaying FUNI Profile Information

These commands let you display FUNI profile information. Enter the following:

```
myswitch::configuration profile funi> show
                    vci     #bits
 Index   Mode  Oam  Min:Max Vpi:Vci  Ref Name
 0     mode1a  on   32 : 63 0 : 6      0 default
```

The fields in this display are defined as follows:

Field	Description
Index	The index number that identifies a given FUNI profile.
Mode	The FUNI operational mode supported by this profile. This is currently a read-only field.
Oam	**on** (enabled) means that OAM cells and frames are sent on this FUNI service. This is a read-only field.
vci Min	The minimum numerical value that can be used as a VCI on any PVC over this FUNI service.
vci Max	The maximum numerical value that can be used as a VCI on any PVC over this FUNI service.
#bits Vpi	The maximum number of VPI bits configured for use on this FUNI interface.
#bits Vci	The maximum number of VCI bits configured for use on this FUNI interface.
Ref	The reference count for this FUNI profile. Shows how many connections and/or services are using this profile. A profile cannot be deleted if it is in use.
Name	The optional, user-defined name associated with this FUNI profile.

These commands let you display advanced FUNI profile information. These are all read-only fields. Enter the following:

```
myswitch::configuration profile funi> show [<index>] advanced
myswitch::configuration profile funi> show advanced
 Indx aal34      fcsBits    hdrBytes
 0    disabled   fcsBits16  hdrBytes2
```

The fields in this display are defined as follows:

Field	Description
Indx	The index number that identifies a given FUNI profile.
aal34	Indicates that AAL3/4 is not supported, but AAL5 is supported.
fcsBits	Indicates that a 16-bit FCS is used in each FUNI frame header over this FUNI interface.
hdrBytes	Indicates that the FUNI frame header size is 2 bytes.

3.5 LMI Configuration Commands

These commands let you delete, create, or display a Link Management Interface (LMI) profile. These profiles let you define the version of LMI that is supported by a particular Frame Relay service. These profiles then can be applied on a per-service basis using the **-lmi** *<index>* option under **conf fratm new**. You can display the list of available subcommands by typing **?** at the **lmi** level.

```
myswitch::configuration profile lmi> ?
  delete            new               show
```

3.5.1 Deleting an LMI Profile

This command let you delete an LMI profile. Enter the following parameters:

```
myswitch::configuration profile lmi> delete <index>
```

NOTE You cannot delete a profile that is in use (has a non-zero value in the `Ref` field under **conf profile lmi show**.) You cannot delete a default profile.

3.5.2 Creating an LMI Profile

This command let you create an LMI profile. Enter the following parameters:

```
myswitch::configuration profile lmi> new <index>
[-flavor (q933a|t1617d|none)]
[-role (user|network)] [-direction (uni|bi)]
[-t391 <sec>] [-t392 <sec>]
[-n391 <integer>] [-n392 <integer>] [-n393 <integer>]
[-name <name>]
```

NOTE If you do not want to use LMI, then you need to use the **none** option under **-flavor** and use this profile when creating your services.

The parameters for delete and new are defined as follows:

Parameter	Description
index	The index number that uniquely identifies each LMI profile. The default profile's index is **0**. This number must be a positive integer.
flavor (q933a | t1617d | none)	The type of LMI protocol used. **none** means that LMI is not used on the service. The default value is **q933a**.
role (user | network)	The role of operation of this Frame Relay service. Can be either **user** (DTE) or **network** (DCE). The default value is **network**.
direction (uni | bi)	**uni** means the signalling should be unidirectional. **bi** means the signalling should be bidirectional. The default value is **bi**.
t391 <sec>	The user-side T391 link integrity verification polling timer value, in seconds, for this UNI/NNI logical port. If the logical port is not performing user-side procedures, then this value is equal to noSuchName. This value must always be less than the value of t392. The possible range is 5 - 30 seconds. The default value is **10**.
t392 <sec>	The network-side T392 polling verification timer value, in seconds, for this UNI/NNI logical port. If the logical port is not performing network-side procedures, then this value is equal to noSuchName. This value must always be greater than the value of t391. The possible range is 5 - 30 seconds. The default value is **15**.
n391 <integer>	The user-side N391 full status (status of all PVCs) polling cycle value for this UNI/NNI logical port. If the logical port is not performing user-side procedures, this value is equal to noSuchName. The possible range is 1 - 255. The default value is **6**.
n392 <integer>	The network-side N392 error threshold value for this UNI/NNI logical port. If the logical port is not performing network-side procedures, then this value is equal to noSuchName. This value must always be less than or equal to the value of n393. The possible range is from 1 - 10. The default value is **3**.
n393 <integer>[1]	The network-side N393 monitored events count value for this UNI/NNI logical port. If the logical port is not performing network-side procedures, then this value is equal to noSuchName. This value must always be greater than or equal to the value of n392. The possible range is 1 - 10. The default value is **4**.
name <name>	The optional, user-defined name that uniquely identifies each LMI profile. The name of the default LMI profiles are **qnet+user**, **default2**, **default3**, **default4**, **default5**, and **tnet+user**.

1. If n393 is set to a value much less than n391, then the link could go in and out of an error condition without the user equipment or network being notified.

3.5.3 Displaying LMI Profile Information

These commands let you display LMI profile information. Enter the following:

```
myswitch::configuration profile lmi> show
 Index Flavor  Role    Dtn   T391 T392 N391 N392 N393 Ref Name
 0     q933a   network bi      10   15    6    3    4   0 qnet+user
 1     q933a   network uni     10   15    6    3    4   0 default2
 2     q933a   user    uni     10   15    6    3    4   0 default3
 3     t1617d  network uni     10   15    6    3    4   0 default4
 4     t1617d  user    uni     10   15    6    3    4   0 default5
 5     t1617d  network bi      10   15    6    3    4   0 tnet+user
```

The fields in this display are defined as follows:

Field	Description
Index	The index number that identifies a given LMI profile.
Flavor	The type of LMI protocol used.
Role	The role of operation of this Frame Relay service, either **user** (DTE) or **network** (DCE).
Dtn	**uni** means the signalling is unidirectional. **bi** means the signalling is bidirectional.
T391	The user-side T391 link integrity verification polling timer value, in seconds, for this UNI/NNI logical port. If the logical port is not performing user-side procedures, then this value is equal to noSuchName.
T392	The network-side T392 polling verification timer value, in seconds, for this UNI/NNI logical port. If the logical port is not performing network-side procedures, then this value is equal to noSuchName.
N391	The user-side N391 full status polling cycle value for this UNI/NNI logical port. If the logical port is not performing user-side procedures, this value is equal to noSuchName.
N392	The network-side N392 error threshold value for this UNI/NNI logical port. If the logical port is not performing network-side procedures, then this value is equal to noSuchName.
N393	The network-side N393 monitored events count value for this UNI/NNI logical port. If the logical port is not performing network-side procedures, then this value is equal to noSuchName.
Ref	The reference count for this LMI profile. Shows how many connections and/or services are using this profile. A profile cannot be deleted if it is in use.
Name	The optional, user-defined name associated with this LMI profile.

3.6 Generic Service Profile Configuration Commands

These commands let you delete, create, or display generic service profiles. These profiles let you define service attributes that are common to Frame Relay interworking services and FUNI services. These profiles then can be applied on a per-service basis to a Frame Relay service using the **-service** *<index>* option under **conf fratm new** or to a FUNI service using the **-service** *<index>* option under **conf funi new**. You can display the list of available sub-commands by typing **?** at the **service** level.

```
myswitch::configuration profile service> ?
  delete             new                show
```

3.6.1 Deleting a Generic Service Profile

This command let you delete a generic service profile. Enter the following parameters:

```
myswitch::configuration profile service> delete <index>
```

NOTE

You cannot delete a profile that is in use (has a non-zero value in the `Ref` field under **conf profile service show**.) You cannot delete a default profile.

3.6.2 Creating a Generic Service Profile

This command let you create a generic service profile. Enter the following parameters:

```
myswitch::configuration profile service> new <index> <accRate in kbps>
[-maxInfoSize <bytes>]
[-maxVccs <integer>] [-inBwOb <%>] [-outBwOb <%>] [-name <name>]
```

The parameters for delete and new are defined as follows:

Parameter	Description
index	The index number that uniquely identifies each generic service profile. The default profile's index is **0**. This number must be a positive integer.
accRate in kbps	The access rate of this service, in Kbps. The default value is **64**. If you wish to use multiple timeslots, you must modify this value accordingly. The access rate for one timeslot is 64 Kbps, and the access rate for two timeslots is 128 Kbps, etc. The access rate for 24 timeslots (max. for DS1) is 1536 Kbps and the access rate for 31 timeslots (max. for E1) is 1984 Kbps.
maxInfoSize <bytes>	The maximum payload size, in bytes, supported by this service. This value must not exceed 4092. The default value is **4092**.
maxVccs <integer>	The maximum number of virtual circuits supported by this service. The maximum value is 256. The default value is **5**.
inBwOb <%>	The bandwidth CIR overbooking (percentage) of this Frame Relay service in the incoming direction. If the percentage is greater than 100%, it is overbooking; otherwise, it is underbooking. This option does not apply to FUNI services. The default value is **100**.
outBwOb <%>	The bandwidth CIR overbooking (percentage) of this Frame Relay service in the outgoing direction. If the percentage is greater than 100%, it is overbooking; otherwise, it is underbooking. This option does not apply to FUNI services. The default value is **100**.
name <name>	The optional, user-defined name that uniquely identifies each generic service profile. The name of the default generic service profiles are **mini**, **midi**, **average**, **fullDS1**, and **fullE1**.

3.6.3 Displaying Generic Service Profile Information

These commands let you display generic service profile information. Enter the following:

```
myswitch::configuration profile service> show
 Index   AccRate MaxInfoSize   MaxVccs    InBwOb   outBwOb  Ref Name
          (kbps)     (bytes)                 (%)       (%)
 0           64        4092         5       100       100  124 mini
 1          128        4092        10       100       100    0 midi
 2          256        4092        10       100       100    0 average
 3         1536        4092       256       100       100    0 fullDS1
 4         1984        4092       256       100       100    0 fullE1
```

The fields in this display are defined as follows:

Field	Description
Index	The index number that identifies a given generic service profile.
AccRate	The access rate of this service, in Kbps.
MaxInfoSize	The maximum payload size, in bytes, supported by this service.
MaxVccs	The maximum number of virtual circuits supported by this service.
InBwOb	The bandwidth CIR overbooking (percentage) of this service in the incoming direction. If the percentage is greater than 100%, it is overbooking; otherwise, it is underbooking. This field does not apply to FUNI services.
OutBwOb	The bandwidth CIR overbooking (percentage) of this service in the outgoing direction. If the percentage is greater than 100%, it is overbooking; otherwise, it is underbooking. This field does not apply to FUNI services.
Ref	The reference count for this generic service profile. Shows how many connections and/or services are using this profile. A profile cannot be deleted if it is in use.
Name	The optional, user-defined name associated with this generic service profile.

CHAPTER 4 QOS Expansion Table Commands

These commands let you delete, create, or display information about Quality of Service (QOS) entries in the QOS expansion table. The QOS expansion table is used for translating the QOS class in an incoming connection setup request into parameterized QOS values for Cell Transfer Delay (CTD), Cell Delay Variation (CDV), and Cell Loss Ratio (CLR). Please refer to Section 6.5.2.3.5 of the ATM Forum PNNI Specification for more information.

Each entry in the expansion table is indexed by an index and a QOS class. The index is used for associating entries in the expansion table with signalling interfaces. The table contains 5 default entries with an index of 0. When a new signalling interface is created, an expansion table index will be associated with it. If no index is specified while creating the signalling interface, the default entries with index 0 will be used to associate this signalling interface with the QOS expansion table entries.

You can display the list of available subcommands by typing **?** at the **qos** level.

```
myswitch::configuration qos> ?
  delete          new             show
```

4.1 Deleting a QOS Expansion Table Entry

These commands let you delete an entry from the QOS expansion table. If a QOS expansion table is currently being used by one or more signalling interfaces or originating SPVCs, then the expansion entries in that table cannot be deleted. Also, the entries in the default QOS expansion table (index 0) cannot be deleted. Enter the following parameters:

```
myswitch::configuration qos> delete <QoSExpIndex> <QoSclass>
```

These parameters are defined as follows:

Parameter	Description
QosExpIndex	The index into the QOS expansion table that is used to associate signalling interfaces with expansion table entries.
QoSclass	Specifies the QOS class that is to be expanded into parameterized QOS IEs. Can have a value of 0 through 4.

4.2 Creating a QOS Expansion Table Entry

These commands let you add an entry to the QOS expansion table. If an expansion entry is created without some of the values specified for some of the QOS classes, then it is assumed that any value is acceptable for all the parameters. If such a partially specified QOS expansion table is used to create a signalling interface or originating SPVC, then no new expansion entries can be added to this table. You will be able to add the unspecified expansion entries once all of the signalling interfaces and originating SPVCs referencing the partially specified table are deleted. Enter the following:

```
myswitch::configuration qos> new <QoSExpIndex> <QoSclass> [-name <name>]\
        [-fwdCtd <ctd(us) | any_value>]
         [-fwdCdv <cdv(us) | any_value>] [-backCdv <cdv(us) | any_value>]
         [-fwdClr <clr | any_value>] [-backClr <clr | any_value>]
```

These parameters are defined as follows:

Parameter	Description
QosExpIndex	The index into the QOS expansion table that is used to associate signalling interfaces with expansion table entries.
QoSclass	Specifies the QOS class that is to be expanded into parameterized QOS IEs. Can have a value of 0 to 4.
-name <name>	An optional text string associated with this entry to help you identify it.
-fwdCtd <ctd(us) | any_value>	The maximum acceptable forward CTD value to be used for this expansion. Can range from 0 to 16777215 microseconds. Specifying **any_value** or **16777215** means that you are willing to accept any amount of cell transfer delay. The default is **any_value**.
-fwdCdv <cdv(us)| any_value>	The maximum acceptable forward CDV value to be used for this expansion. Can range from 0 to 16777215 microseconds. Specifying **any_value** or **16777215** means that you are willing to accept any amount of cell delay variation. The default is **any_value**.
-backCdv <cdv(us)| any_value>	The maximum acceptable backward CDV value to be used for this expansion. Can range from 0 to 16777215 microseconds. Specifying **any_value** or **16777215** means that you are willing to accept any amount of cell delay variation. The default is **any_value**.
-fwdClr <clr| any_value>	The maximum acceptable forward CLR value to be used for this expansion. Can range from 1 to 15. **any_value** means that you are specifying that you are willing to accept any amount of cell loss. A CLR value of x means that you are specifying 10^{-x}; e.g., 5 means 10^{-5}. The default is **any_value**.
-backClr <clr| any_value>	The maximum acceptable backward CLR value to be used for this expansion. Can range from 1 to 15. **any_value** means that you are specifying that you are willing to accept any amount of cell loss. A CLR value of x means that you are specifying 10^{-x}; e.g., 5 means 10^{-5}. The default is **any_value**.

4.3 Displaying the QOS Expansion Table

These commands let you display the entries in the QOS expansion table. Enter the following:

```
myswitch::configuration qos> show
QoSExp QoS
Index Class  fCtd(us)  fCdv(us)  bCdv(us)     fClr     bClr Name
  0     0     ANY_VAL   ANY_VAL   ANY_VAL  ANY_VAL  ANY_VAL def_class_0_expn
  0     1     ANY_VAL   ANY_VAL   ANY_VAL  ANY_VAL  ANY_VAL def_class_1_expn
  0     2     ANY_VAL   ANY_VAL   ANY_VAL  ANY_VAL  ANY_VAL def_class_2_expn
  0     3     ANY_VAL   ANY_VAL   ANY_VAL  ANY_VAL  ANY_VAL def_class_3_expn
  0     4     ANY_VAL   ANY_VAL   ANY_VAL  ANY_VAL  ANY_VAL def_class_4_expn
```

The fields in this display are defined as follows:

Field	Description
QoSExpIndex	The index into the QOS expansion table that is used to associate signalling interfaces with expansion table entries.
QoSClass	Specifies the QOS class that is to be expanded into parameterized QOS IEs. Can have a value of 0 to 4.
fCtd(us)	The maximum acceptable forward CTD value to be used for this expansion. Can range from 0 to 16777215 microseconds. **any_value** means that any amount of cell transfer delay is acceptable.
fCdv(us)	The maximum acceptable forward CDV value to be used for this expansion. Can range from 0 to 16777215 microseconds. **any_value** means that any amount of cell delay variation is acceptable.
bCdv(us)	The maximum acceptable backward CDV value to be used for this expansion. Can range from 0 to 16777215 microseconds. **any_value** means any amount of cell delay variation is acceptable.
fClr	The maximum acceptable forward CLR value to be used for this expansion. Can range from 1 to 15. A CLR value of x means 10^{-x}; e.g., 5 means 10^{-5}. **any_value** means that any amount of cell loss is acceptable.
bClr	The maximum acceptable backward CLR value to be used for this expansion. Can range from 1 to 15. A CLR value of x means 10^{-x}; e.g., 5 means 10^{-5}. **any_value** means that any amount of cell loss is acceptable.
Name	An optional text string associated with this entry to help you identify it.

You can also display information for a specific index or QOS class. Enter the following:

```
myswitch::configuration qos> show [<QoSExpIndex> [<QoSclass>]]
myswitch::configuration qos> show 0 3
QoSExp QoS
Index Class  fCtd(us)  fCdv(us)  bCdv(us)     fClr     bClr Name
  0     3     ANY_VAL   ANY_VAL   ANY_VAL  ANY_VAL  ANY_VAL def_class_3_expn
```

The fields in this display are defined in the same manner as those in the previous example.

CHAPTER 5 QOS Extension Table Commands

These commands let you delete, create, or display information about Quality of Service (QOS) extension table entries. The QOS extension table is used to hold a set of QOS parameters of maxctd, maxcdv, and maxclr. When creating a VPT using the **conf vpt new** command, the external QOS contribution of an originating/terminating path for a certain traffic type can be specified by an index pointing to this table. You can display the list of available subcommands by typing **?** at the **qosext** level.

```
myswitch::configuration qosext> ?
  delete          modify          new             show
```

5.1 Deleting a QOS Extension Table Entry

This command allows you to delete a QOS extension table entry. Enter the following:

```
myswitch::configuration qosext> delete <QoSExtIndex>
```

5.2 Modifying a QOS Extension Table Entry

This command allows you to modify a set of QOS extension table entry. Enter the following:

```
myswitch::configuration qosext> modify <QoSExtIndex> [-maxctd <maxctd>]\
[-maxcdv <maxcdv>] [-maxclr <maxclr>]
```

5.3 Creating a QOS Extension Table Entry

This command lets you create a set of QOS extension table entry. Enter the following:

```
myswitch::configuration qosext> new <QoSExtIndex> <maxctd> <maxcdv> <maxclr>
```

The parameters for delete, modify, and new are defined as follows:

Parameter	Description
QoSExtIndex	The index number of the set of QOS extension parameters.
maxctd	The maximum cell transfer delay, in microseconds.
maxcdv	The maximum cell delay variation, in microseconds.
maxclr	The maximum cell loss ratio.

5.4 Displaying the QOS Extension Table

This command allows you to display the QOS extension table. Enter the following parameters:

```
myswitch::configuration qosext> show
 QoSExtIndex MaxCtd MaxCdv MaxClr
             (usec) (usec)
 1               10     10     10
 2               10     10     10
 3               10     10     10
 4               10     10     10
 5               10     10     10
 6               10     10     10
 7               10     10     10
 8               10     10     10
 9               10     10     10
```

The fields in this display are defined as follows:

Field	Description
QoSExtIndex	The index number of the set of QOS extension parameters.
MaxCtd	The maximum cell transfer delay, in microseconds.
MaxCdv	The maximum cell delay variation, in microseconds.
MaxClr	The maximum cell loss ratio.

You can also display QOS information about a specific index by entering the following parameters:

```
myswitch::configuration qosext> show [<QoSExtIndex>]
myswitch::configuration qosext> show 1
QoSExtIndex MaxCtd MaxCdv MaxClr
            (usec) (usec)
 1               10     10     10
```

If no QOS extension table has been created, then the following is displayed:

```
myswitch::configuration qosext> show
No Qos Extension information is available
```

CHAPTER 6 RS-232 Serial Port Commands

These commands let you manage the RS-232 serial port. You can display the list of available subcommands by typing **`rs232 ?`** at the **`configuration`** level.

```
myswitch::configuration> rs232 ?
  show              speed
```

6.1 Displaying Serial Port Information

This command allows you to show information about the configuration of the RS-232 serial port on the SCP. Type **show** at the **rs232 configuration** level to list the settings for the serial port. Enter the following parameters:

```
myswitch::configuration rs232> show [(A|B)]
```

These parameters are defined as follows:

Parameter	Description
A | B	The port letter of the serial port to be displayed. Port B is not available.

```
myswitch::configuration rs232> show
Port     Type        Speed   Flow     Bits   Stops      Parity
A        rs232        9600   none        8   one        none
```

The fields in this display are defined as follows:

Field[1]	Description
Port;	The physical port designation
Type	The signalling standard used.
Speed	The receive/transmit rate.
Flow	The type of flow control implemented on the given port.
Bits	The number of bit times in a single character.
Stops	The number of stop bits in a character frame.
Parity	The parity setting for the ports.

1. All of these fields are read-only.

CHAPTER 7 Security Configuration Commands

These commands let you configure various security methods on a switch. You can display the list of available subcommands by typing **?** at the **security** level.

```
myswitch::configuration security> ?
  ipaccess>          login>           nsapfiltering>
```

7.1 IP Access Configuration Commands

These commands let you configure IP filtering at the control port of the switch to prevent unauthorized access to the switch. You can display the list of available subcommands by typing **?** at the **ipaccess** level.

```
myswitch::configuration security ipaccess> ?
accept          delete            ssr            lsr
all             show
```

NOTE These commands are only available to users who have `admin` privileges. See Section 7.2.5 for more information about `admin` privileges.

7.1.1 Configuring an Authorized IP Address

This command lets you create an entry in the table of authorized IP addresses from which IP packets will be accepted. The switch performs inbound filtering by determining if there is a match between the header source address and the table of authorized incoming IP addresses. If the addresses match, the packets are accepted, provided that they meet the requirements set up by the **conf security ipaccess ssr**, **lsr**, and **all** commands; otherwise, they are rejected. The table of authorized IP addresses, which can contain a maximum of 32 entries, will persist across a reboot. Enter the following parameters:

```
myswitch::configuration security ipaccess> accept <ipaddr> <mask>
```

By applying a mask to an IP address entry, you can specify a wild card range of allowable addresses. For example, an IP address of 163.26.54.6 with a mask of 255.255.255.255 means only address 163.26.54.6 is accepted against that entry. However, an IP address of 163.26.54.6 with a mask of 255.255.0.0 means addresses 163.26.*.* are accepted against that entry.

7.1.2 Deleting an Authorized IP Address

This command lets you delete an entry in the list of authorized IP addresses from which IP packets will be accepted. Enter the following parameters:

```
myswitch::configuration security ipaccess> delete <ipaddr> <mask>
```

These parameters for accept and delete are defined as follows:

Parameter	Description
ipaddr	The authorized incoming IP address.
mask	The mask that indicates the significant part of the incoming IP address to be used to find a matching address in the table of authorized addresses. A mask of 0.0.0.0 is a wild card that matches all addresses. A mask must have contiguous higher order 1 bits set to be valid; e.g., mask 255.255.0.128 is not valid, but 255.255.128.0 is valid.

CAUTION

If you delete all entries from the table of authorized IP addresses, be sure that the last entry you delete is the one that matches the address of the machine at which you are sitting. Otherwise, you will be locked out of the switch.

7.1.3 Rejecting/Accepting Strict Source Routed Packets

This command lets you configure an IP filtering flag to specify whether the switch should accept or reject all strict source routed packets. Enter the following parameters:

```
myswitch::configuration security ipaccess> ssr (allow | disallow)
```

7.1.4 Rejecting/Accepting Loose Source Routed Packets

This command lets you configure an IP filtering flag to specify whether the switch should accept or reject all loose source routed packets. Enter the following parameters:

```
myswitch::configuration security ipaccess> lsr (allow | disallow)
```

7.1.5 Rejecting/Accepting All Packets

This command lets you configure an IP filtering flag to specify whether the switch should accept or reject all IP packets. Enter the following parameters:

```
myswitch::configuration security ipaccess> all (allow | disallow)
```

The parameters for ssr, lsr, and all are defined as follows:

Parameter	Description
allow	Setting **ssr** to **allow** means that all incoming IP packets that are strict source routed are accepted, provided that they match an IP address in the table of authorized addresses. Setting **lsr** to **allow** means that all incoming IP packets that are loose source routed are accepted, provided that they match an IP address in the table of authorized addresses. Setting **all** to **allow** means that all incoming IP packets are accepted, provided that they match an IP address in the table of authorized addresses. Setting **all** to **allow** is the default setting.
disallow	Setting **ssr** to **disallow** means that all incoming IP packets that are strict source routed are rejected, even if they match an IP address in the table of authorized addresses. Setting **lsr** to **disallow** means that all incoming IP packets that are loose source routed are rejected, even if they match an IP address in the table of authorized addresses. Setting **all** to **disallow** means that all incoming IP packets are rejected, even if they match an IP address in the table of authorized addresses.

CAUTION

When the **`all`** flag is set to **`disallow`**, the only way you can access the switch is via the serial port.

NOTE

Information about all rejected packets (except for rejected broadcast packets) can be sent to syslog by using the **`debug trace filtering ipfilter on`** command.

7.1.6 Displaying IP Access Information

This command lets you display information about the IP filters that have been configured.

```
myswitch::configuration security ipaccess> show
Accepting IP traffic from the following addresses:
IpAddress          Mask
198.24.65.2        255.255.255.255
204.19.95.89       255.255.255.0

Configuration Flags:
Flag               State
all                allow
ssr                allow
lsr                allow
```

The fields in this display are defined as follows:

Field	Description
IpAddress / Mask	The table of authorized incoming IP addresses and their corresponding masks, if applicable. The mask indicates the significant part of the incoming IP address to be used in finding a matching address in this table. A mask of 0.0.0.0 is a wild card that matches all addresses. The addresses in the table are accepted, unless specifically rejected by a policy set by one of the configuration flags. The table can contain a maximum of 32 entries.
Flag / State	If **ssr** is **allowed**, all incoming IP packets that are strict source routed are accepted, provided that they match an IP address in the table of authorized addresses. If **ssr** is **disallowed**, all incoming IP packets that are strict source routed are rejected, even if they match an IP address in the table of authorized addresses. If **lsr** is **allowed**, all incoming IP packets that are loose source routed are accepted, provided that they match an IP address in the table of authorized addresses. If **lsr** is **disallowed**, all incoming IP packets that are loose source routed are rejected, even if they match an IP address in the table of authorized addresses. If **all** is **allowed**, all incoming IP packets are accepted, provided that they match an IP address in the table of authorized addresses. If **all** is **disallowed**, all incoming IP packets are rejected, even if they match an IP address in the table of authorized addresses.

If an entry in the table is preceded by an asterisk (*), this means that the entry has been created via SNMP, but is not active yet. The switch will not change its filtering policy based on that entry until the entry has become active.

If no addresses have been configured in the table and no flags have been set to disallow packets, then something similar to the following is displayed:

```
myswitch::configuration security ipaccess> show
Accepting IP traffic from the following addresses:
 All IP source addresses are being accepted

Configuration Flags:
 Flag                State
 all                 allow
 ssr                 allow
 lsr                 allow
```

CAUTION

When the IP address table is empty, all addresses are accepted. This is the default state. Therefore, it is recommended that at least one address be entered into the table. Otherwise, anyone may access the switch via the control port. The address you enter must be the address of the machine you are using. Otherwise, you will lock yourself out of the switch.

You can also display information about a specific IP address as follows:

```
myswitch::configuration security ipaccess> show [<ipaddr> [<mask>]]
myswitch::configuration security ipaccess> show 198.67.0.3

Table information for 198.67.0.3:
IpAddress           Mask
198.67.0.3          255.255.255.255
```

If that address is not in the table, then the following message is displayed:

```
No table information for 198.67.0.3 is available.
```

7.2 Login Userid Configuration Commands

These commands allow you to configure various login userids, to assign privilege levels to the userids, and to display information about the userids. To display the list of available subcommands, type **?** at the **login** level.

```
myswitch::configuration security login> ?
  backup            delete            finger            modify
  new               password          restore           securid>
  show              upriv             whoami
```

NOTE More information about userids and other methods of security can be found in Chapter 8 of the *ATM Switch Network Configuration Manual*.

7.2.1 Backing Up the Login Userid File

This command lets you make a backup of the file that contains all of the login IDs and information. This command is only available to users with `admin` privileges. Enter the following:

```
myswitch::configuration security login> backup [<host>:]<full path to backup file>
```

These parameters are defined as follows:

Parameter	Description
host	The IP address of the host to which the login file will be backed up.
full path to backup file	The full path name of the file to which the login file will be backed up.

If you have configured the transfer protocol to be FTP using **conf system protocol**, you only need to enter the command shown above to perform the file backup. After you enter the command shown above, you are prompted for the remote userid and password of the remote host to which you are backing up the file.

If you have configured the transfer protocol to be TFTP (this is the default) using **conf system protocol**, the remote host to which the file will be backed up must be running the TFTP server code. If you are unsure of how to do this, see the *ATM Switch Installation and Maintenance Manual*.

If you are using TFTP to perform the login file backup, you must first create an empty file in the `/tftpboot` directory on the remote host to receive the file. Use the **`touch`** command to do this. Then, use the **`chmod`** command to change the permissions of that file so that it will let the switch write the backup login file to that file.

Perform the following steps to back up your login file:

1. First, telnet to your remote host and log in.
2. Enter the following commands in sequence:

```
cd  /tftpboot
touch <backup file name>
chmod 777 <backup file name>
```

3. Then exit from the telnet session.
4. Telnet to the switch and log into AMI.
5. Enter the following command:

```
conf security login backup <host>:/tftpboot/<backup file name>
```

You will receive a confirmation message that the backup was successful.

7.2.2 Deleting a Userid

This command lets you delete a current userid. This command is only available to users with `admin` privileges. Enter the following parameters:

```
myswitch::configuration security login> delete <userid>
```

These parameters are defined as follows:

Parameter	Description
userid	The userid that you want to delete. Use **`conf security login show`** to display a list of the current userids.

7.2.3 Enabling or Disabling Fingering

This command lets you enable or disable the finger mechanism which displays information about the user who is currently logged into the switch. This information includes: the userid of the person who is currently logged in, how long the person has been logged on, the IP address of the machine on which the person logged in, the amount of time the system has been idle, the current percentage of processor utilization, the minimum percentage of processor utilization, and the maximum percentage of processor utilization. Enter the following parameters:

```
myswitch::configuration security login> finger [(enable | disable)]
```

These parameters are defined as follows:

Parameter	Description
enable	Enables the finger mechanism. This allows you to view information about the user who is currently logged into the switch. To view this information, log in to a host that is attached to the switch. Then, run the finger command on the host using either the switch's IP address or name. For example: finger `169.144.21.8`.
disable	Disables the finger mechanism so that no information is displayed about the user who is currently logged into the switch. This is the default.

If you enter the **`finger`** command with no parameter specified, the current state of the finger mechanism is displayed as follows:

```
myswitch::configuration security login> finger
The finger port is disabled.
```

7.2.4 Modifying a Userid

This command lets you modify the authentication method, privileges, and/or login access of the current userids. This command fails if the specified userid does not exist. This command is only available to users with `admin` privileges. A user with `admin` privileges can change his own authentication method or login access; however, the change will not take effect until that user logs in again. A user with `admin` privileges can also change his own password and privilege level; these changes take effect immediately. Enter the following:

```
myswitch::configuration security login> modify <userid>
        [-auth (local | securid)]
        [-priv (admin | user)]
        [-access (all | network | serial | none)]
```

7.2.5 Creating a Userid

This command lets you create a userid. This command is only available to users with `admin` privileges. Enter the following parameters:

```
myswitch::configuration security login> new <userid> [-auth (local | securid)
        [-priv (admin | user)]
        [-access (all | network | serial | none)]
```

This command fails if the specified userid already exists. The switch software prompts you to assign a password to the userid, regardless of the authentication method used. Null local passwords are accepted. The switch does not echo your keystrokes when you enter the password. For example:

```
myswitch::configuration security login> new mktg -auth local -priv user -access
network

New local password: <new local password>
Retype new local password: <new local password>

New userid mktg created with local authentication, user privileges and network
login access.
```

The parameters for modify and new are defined as follows:

Parameter	Description
userid	The name of the userid that you want to create/modify. The maximum size of a userid is 16 characters. Any characters are allowed, except the colon (:) character and a blank return.
-auth (local | securid)	The authentication method for this userid. **local** means that the correct local password for this userid must be supplied to log in to a switch. **securid** means that the correct SecurID passcode must be supplied to log into a switch. There are some exceptions. See the *ATM Switch Network Configuration Manual* for more information about these authentication methods and the exceptions. The default is **local**.
-priv (admin | user)	The privilege level for this userid. **admin** means a person with this userid is allowed to use all AMI commands. **user** means a person with this userid can use all AMI commands, except the following: **conf security login backup**, **conf security login delete**, **conf security login modify**, **conf security login new**, **conf security login password** (to modify passwords other than your own), **conf security login restore**, **conf security login show**, all **conf security login securid** commands, all **conf security ipaccess** commands, all **conf security nsapfiltering** commands, **conf snmp sets**, and all **debug** commands. The default is **admin**.
-access (all | network | serial | none)	A person with the userid **serial** is allowed to login only via the serial port. A person with the userid **network** is allowed to login only via telnet. A person with the userid **all** is allowed to login via the serial port and via telnet. A person with the userid **none** is not allowed to log in to the switch at all. The default is **all**.

7.2.6 Setting or Changing a Password for a Userid

This command lets you set or change the local password for a userid. This command replaces the **oper password** command. The password can be up to 512 characters long. Enter the following parameters:

```
myswitch::configuration security login> password [<userid>]
```

When the password is changed, the old password must be entered correctly before a new password can be entered. However, a user logged in with admin privileges can change any userid password without first entering the old local password, except their own. For example:

```
myswitch::configuration security login> password mktg
  Old local password: <old local password>
  New local password: <new local password>
  Retype new local password: <new local password>
```

These parameters are defined as follows:

Parameter	Description
userid	The userid for which you want to set or change the local login password. If no userid is entered, the local userid is assumed to be the one for which you are setting or changing the password.

7.2.7 Restoring the Login File

This command allows you to restore the login file after you have backed it up. This command is only available to users with admin privileges. Enter the following parameters:

```
myswitch::configuration security login> restore [<host>:]<full path to restore file>
```

These parameters are defined as follows:

Parameter	Description
host	The IP address of the host on which the login file that is to be restored resides.
full path to backup file	The full path name of the login file that is to be restored.

If you have configured the transfer protocol to be FTP using **conf system protocol**, you only need to enter the command shown above to perform the login file restore. After you enter the command shown above, you are prompted for the remote userid and password of the remote host from which you are retrieving the file.

If you have configured the transfer protocol to be TFTP (this is the default) using **conf system protocol**, the remote host from which the file will be retrieved must be running the TFTP server code. If you are unsure of how to do this, see the *ATM Switch Installation and Maintenance Manual*.

7.2.8 Configuring SecurID

These commands let you configure SecurID on a switch. This means that all users who have their authentication method configured as `securid` will be validated by the SecurID server when they attempt to log in to that switch. You must have a SecurID server running in order to use these commands. For more information about SecurID, see the *ATM Switch Network Configuration Manual*. To display the list of commands, type **`securid ?`** at the **`login`** level.

```
myswitch::configuration security login> securid ?
  getconf          delete           showconf
```

7.2.8.1 Getting the SecurId Configuration File

If you have SecurID enabled on a switch, this command lets you retrieve the SecurID configuration file which contains information that the SecurID server and the switch need to communicate with each other. Enter the following parameters:

```
myswitch::configuration security login securid> getconf
<host>:<full path to sdconf.rec file>
```

These parameters are defined as follows:

Parameter	Description
host	The IP address of the host on which the SecurID file resides.
full path to sdconf.rec file	The full path name of the SecurID file that is to be restored.

If you have configured the transfer protocol to be FTP using **`conf system protocol`**, you only need to enter the command shown above to retrieve the configuration file. After you enter the command shown above, you are prompted for the remote userid and password of the remote host from which you are retrieving the file.

If you have configured the transfer protocol to be TFTP (this is the default) using **`conf system protocol`**, the remote host from which the file will be retrieved must be running the TFTP server code. If you are unsure of how to do this, see the *ATM Switch Installation and Maintenance Manual*.

7.2.8.2 Deleting the SecurID File

This command lets you delete either the SecurID configuration file (sdconf.rec) or the node secret file. The configuration file contains information that the SecurID server and the switch need to communicate with each other. The node secret file is a string of about 16 bytes that the switch receives the first time it contacts the server. This string, which is known only to the server and this switch, is used in encrypting messages between the server and the switch. Both of these files are stored in the FLASH. This command is only available to users with `admin` privileges. Enter the following parameters:

```
myswitch::configuration security login securid> delete (conf | secret)
```

These parameters are defined as follows:

Parameter	Description
conf	Indicates the SecurID configuration file (sdconf.rec) is to be deleted from FLASH.
secret	Indicates the node secret file is to be deleted from FLASH.

7.2.8.3 Displaying the SecurID File

This command lets you display the contents of the SecurID configuration file. However, if you wish to edit the file, you must do so on the server machine. Then you must use the **`conf security login securid get`** command to retrieve the new file. When you use this command, it overwrites the existing file. Enter the following parameters:

```
myswitch::configuration security login securid> showconf
SecurID Client Configuration

ACE/Server VERSION: v 2.1.104
CLIENT RETRY: 5 times
CLIENT TIMEOUT: 5 sec
BAD PASSCODES: 3
DES ENCRYPTION: allowed and enabled
DURESS MODE: not allowed
MASTER SERVER: linus
MASTER SERVER ADDRESS: 204.95.89.107
PORT NUMBER: 1024
AUTHENTICATION SERVICE: securid
```

If there is no file or if the file is damaged, the following is displayed:

```
myswitch::configuration security login securid> showconf
Securid configuration file does not exist or is corrupted.
```

7.2.8.4 Displaying Userid Information

This command lets you display all of the current userids and their assigned authentication methods, privilege levels, and login access levels. This command is only available to users with `admin` privileges. Enter the following parameters:

```
myswitch::configuration security login> show
                 Authentication                    Login
Userid           Method           Privileges       Access
-------------------------------------------------------
1234567890123456 local            user             all
ami              local            admin            all
is&s             local            admin            all
marketing        securid          user             network
```

The fields in this display are defined as follows:

Field	Description
Userid	The userids currently available on this switch. On a new switch, there are two separate default userids: **ami** and **asx**. Both are configured with the **local** authentication method, with **admin** privileges (meaning you may use all AMI commands), and **all** access (meaning you are allowed to login to the switch using all the possible methods). Both userids are assigned a null password. On switches that are upgraded to *ForeThought* 5.0.x or greater, if a password file already existed, both userids are assigned that same password.
Authentication Method	The authentication method for this userid. **local** means that the correct local password for this userid must be supplied to log in to a switch. **securid** means that the correct SecurID passcode must be supplied to log into a switch. There are some exceptions. See the *ATM Switch Network Configuration Manual* for more information about these authentication methods and the exceptions. The default is **local**.
Privileges	The privilege level for this userid. **admin** means a person with this userid is allowed to use all AMI commands. **user** means a person with this userid can use all AMI commands, except the following: **conf security login backup**, **conf security login delete**, **conf security login modify**, **conf security login new**, **conf security login password** (to modify passwords other than your own), **conf security login restore**, **conf security login show**, all **conf security login securid** commands, all **conf security ipaccess** commands, all **conf security nsapfiltering** commands, **conf snmp sets**, and all **debug** commands. The default is **admin**.
Login Access	A person with the userid **serial** is allowed to login only via the serial port. A person with the userid **network** is allowed to login only via telnet. A person with the userid **all** is allowed to login via the serial port and via telnet. A person with the userid **none** is not allowed to log in to the switch at all.

7.2.9 Displaying and Changing Unlisted User Privileges

This command allows you to display the privileges on the switch. To display this information, enter **upriv** at the **login** level.

```
myswitch::configuration security login> upriv
Unlisted users' privileges set to “admin”
```

This command also lets you change the privileges of any users who are not listed on the switch. To set or change this information, enter the following parameters:

```
myswitch::configuration security login> upriv [<admin|user>]
```

The fields in this display are defined as follows:

Parameter	Description
admin|user	If a user is not listed on the switch, but is authenticated by the SecurID server, then the user is assigned the privilege level that is configured here. **user** means all unlisted users logging to this switch are given user level privileges (the ability to access only a certain subset of the AMI commands). **admin** means all unlisted users logging to this switch are given admin level privileges (the ability to access all of the AMI commands). The default is **admin**.

7.2.10 Displaying the Current Userid

This command shows the userid of the user who is currently logged into the switch. Enter the following parameters:

```
myswitch::configuration security login> whoami
ami
```

7.3 Configuring NSAP Filtering

These commands provide a mechanism for filtering calls based on a combination of the calling (source) and called (destination) addresses, as well as the source ports, VPIs, NSAP addresses, and NSAP address masks, and the destination ports, VPIs, NSAP addresses, and NSAP address masks. More information about NSAP filtering and other methods of security can be found in the *ATM Switch Network Configuration Manual*. To display the list of available subcommands, type **?** at the **nsapfiltering** level.

```
myswitch::configuration security nsapfiltering> ?
  filters>         templates>       interfaces>
```

NOTE SPVCs SPVPs, PVPs, and PVCs are not supported by NSAP filtering.

7.3.1 Configuring NSAP Filters

These commands allow you to configure NSAP filters. To display the list of available subcommands, type **?** at the **filters** level.

```
myswitch::configuration security nsapfiltering filters> ?
  add              delete           lookup           new
  show
```

7.3.1.1 Adding a Template to an NSAP Filter

This command lets you add a new template to a filter that already exists. It creates the filter, if the filter does not already exist. (To create a new filter, you can also use the **conf security nsapfiltering filters new** command.) Enter the following parameters:

```
myswitch::configuration security nsapfiltering filters> add <filter-id>
<template-id or template-name> [-before <template-id or template-name>]
```

The parameters for add are defined as follows:

Parameter	Description
filter-id	The unique, user-assigned identifier for this filter. A filter-id can be either a positive, decimal integer (index) or a string name. A template-name may be up to 20 characters. Zero is not a valid index.
template-id or template-name	The unique, user-assigned identifier or name for this template. A template-id can be either a positive, decimal integer (index) or a string name. A template-name may be up to 20 characters. Zero is not a valid index.
-before <template-id or template-name>	When adding a template to a filter, indicates that the template you are adding will be placed before the specified <*template-id or template-name*> in the filter's ordering scheme.[1] If this parameter is not specified, then the template is added to the end of the list in the filter.

1. When you specify **-before** <*template-id or template-name*>, the order in which the templates are listed in the filter will change as you add or delete more templates.

7.3.1.2 Deleting an NSAP Filter

This command lets you delete a template from a filter or delete an entire filter. Enter the following parameters:

```
myswitch::configuration security nsapfiltering filters> delete <filter-id>
(<template-id or template-name> | -all )
```

The parameters for delete are defined as follows:

Parameter	Description
filter-id	The unique, user-assigned identifier for this filter. A filter-id can be either a positive, decimal integer (index) or a string name. A template-name may be up to 20 characters. Zero is not a valid index.
template-id or template-name | -all	The unique, user-assigned identifier for this template. A template-id can be either a positive, decimal integer (index) or a string name. A template-name may be up to 20 characters. Zero is not a valid index. If <*template-id or template-name*> is specified, then only that template is deleted from the filter. If **-all** is specified, the entire filter is deleted.

7.3.1.3 Testing Against an NSAP Filter

This command allows the user to enter components of a call setup message to test whether a call setup attempt with the supplied addresses and ports would be accepted or rejected by a specific filter. Enter the following parameters:

```
myswitch::configuration security nsapfiltering filters> lookup <filter-id>
        [ -srcport <port> ] [ -srcvpi <vpi> ] -srcnsap <nsap>
        [ -dstport <port> ] [ -dstvpi <vpi> ] -dstnsap <nsap>
```

These parameters are defined as follows:

Parameter	Description
lookup <filter-id>	The filter against which you are testing the call setup message.
-srcport <port>	The source port of the call setup message.
-srcvpi <vpi>	The source virtual path number of the call setup message.
-srcnsap <nsap>	The source NSAP address of the call setup message.
-dstport <port>	The destination port of the call setup message.
-dstvpi <vpi>	The destination virtual path number of the call setup message.
-dstnsap <nsap>	The destination NSAP address of the call setup message.

The switch returns an answer of either `accepted` or `rejected`, and the template-id of the specific template that accepted or rejected the tested call setup message. If the message does not match any of the templates in the filter, the switch returns an answer of `rejected` and `address unknown`.

NOTE

This command is simply a test. Therefore, if a message is rejected, it does not increment the address validation counters, enter the result in the table that shows the last failure, nor send a trap.

7.3.1.4 Creating an NSAP Filter

This command lets you create a new filter that contains the templates you specify in the order in which you specify them.

```
myswitch::configuration security nsapfiltering filters> new <filter-id>
<template-id or template-name> [<template-id or template-name>]*
```

The parameters for new are defined as follows:

Parameter	Description
filter-id	The unique, user-assigned identifier for this filter. A filter-id can be either a positive, decimal integer (index) or a string name. A template-name may be up to 20 characters. Zero is not a valid index. If the filter already exists, you receive an error message. If a template-name is specified without a numeric index, an index is assigned to the filter and shown to you.
template-id or template-name	The unique, user-assigned identifier for this template. A template-id can be either a positive, decimal integer (index) or a string name. A template-name may be up to 20 characters. Zero is not a valid index. The * in this command means that you can add as many template-ids to this filter as you wish.

7.3.1.5 Displaying NSAP Filter Information

This command lets you display all of the NSAP filters that have been configured on the switch. Enter the following parameters:

```
myswitch::configuration security nsapfiltering filters> show
Index Name                  Template IDs
  1                        1  2  48
  2                        3  256
  5   okay                let_these_in 15
```

The fields in this display are defined as follows:

Field	Description
Index	The unique index number that identifies this filter.
Name	An optional, user-assigned name that identifies this filter.
Template IDs	The template-name or index number of each template in this filter. The templates are applied in the order in which they are listed in the filter.

You can also display an individual NSAP filter. If you specify **-templates**, then the templates in that filter are displayed as well. Enter the following parameters:

```
myswitch::configuration security nsapfiltering filters> show [<filter-id>]
[-templates]
myswitch::configuration security nsapfiltering filters> show 2 -templates
Index Name                  Template IDs
  2                        3  256
```

The fields in this display are defined in the same manner as those in the previous example.

If no NSAP filters have been configured, then the following message is displayed:

```
myswitch::configuration security nsapfiltering filters> show
No Address Filters are present
```

7.3.2 Configuring Templates

These commands allow you to configure the templates that are used in NSAP filters. To display the list of available subcommands, type **?** at the **templates** level.

```
myswitch::configuration security nsapfiltering templates> ?
  delete          new             modify          show
```

7.3.2.1 Deleting a Template

This command lets you delete a template that has not been added to any filter yet. If the template has already been added to one or more filters, then it must be deleted from each filter list using the **conf sec nsapfilter filters delete** *<template-id or template-name>* command. Enter the following parameters:

```
myswitch::configuration security nsapfiltering templates> delete
<template-id or template-name>
```

7.3.2.2 Creating a Template

This command lets you create a template. Enter the following parameters:

```
myswitch::configuration security nsapfiltering templates> new <template-id or
        template-name>
        [-name <New name string>]
        [-srcport <port>] [-srcvpi <vpi>]
        [-srcnsap <nsap>] [-srcmask <mask>]
        [-dstport <port>] [-dstvpi <vpi>]
        [-dstnsap <nsap>] [-dstmask <mask>]
        -action (accept | reject)
```

7.3.2.3 Modifying a Template

This command lets you modify individual items in a template. If the template is currently in use by a filter, then the changes take effect immediately. Enter the following parameters:

```
myswitch::configuration security nsapfiltering templates> modify <template-id or
        template-name>
        [-name <New name string>]
        [-srcport <port>] [-srcvpi <vpi>]
        [-srcnsap <nsap>] [-srcmask <mask>]
        [-dstport <port>] [-dstvpi <vpi>]
        [-dstnsap <nsap>] [-dstmask <mask>]
        -action (accept | reject)
```

NOTE

If you apply an NSAP filter to a port connected to a LANE client, the client may still receive traffic from the blocked source indirectly, through the LANE BUS.

The parameters for delete, new, and modify are defined as follows:

Parameter	Description
template-id or template-name	The unique, user-assigned identifier for this template. A template-id or template-name can be either a positive, decimal integer (index) or a string name. If it is specified as a numerical index, then the `Name` field is left blank. Zero is not a valid index. A template-name may be up to 20 characters. If a template-name is specified without an index, the switch assigns a numerical index and shows it to you.
-name <New name string>	An optional, user-assigned name that helps to identify this template.
-srcport <port>	The source port of the call setup message. An asterisk (*) is a wild card that matches all ports.
-srcvpi <vpi>	The source virtual path number of the call setup message. An asterisk (*) is a wild card that matches all VPIs.
-srcnsap <nsap>	The source NSAP address of the call setup message.
-srcmask <mask>	The mask that indicates the significant part of the source NSAP address to be used to find a matching address in the templates of authorized addresses. A mask of 0 is a wild card that matches all addresses.
-dstport <port>	The destination port of the call setup message. An asterisk (*) is a wild card that matches all ports.
-dstvpi <vpi>	The destination virtual path number of the call setup message. An asterisk (*) is a wild card that matches all VPIs.
-dstnsap <nsap>	The destination NSAP address of the call setup message.
-dstmask <mask>	The mask that indicates the significant part of the destination NSAP address to be used to find a matching address in the templates of authorized addresses. A mask of 0 is a wild card that matches all addresses.
-action <accept | reject>	The action to take with addresses that match this template. **`accept`** means that the call will be allowed and **`reject`** means that the call will not be allowed.
-name <string>	An optional, user-assigned name that helps to identify this template.

7.3.2.4 Displaying Template Information

This command lets you display all of the templates that have been configured on the switch. Enter the following parameters:

```
myswitch::configuration security nsapfiltering templates> show
                                      Source              Destination
Index  Action  Name                   Port   VPI  Mask   Port   VPI  Mask
    1  accept  let_these_in           1A1      5   128   *        *  152
Source NSAP:      0x47.0005.80.ffe100.0000.f21a.3596.0020481a3596.f0
Destination NSAP: 0x47.0005.80.ffe100.0000.f21a.2a1d.0020481a2a17.00

    3  reject                         *        *   104   1CTL     *  152
Source NSAP:      0x47.0005.80.ffe100.0000.f215.11f2.0020487a3751.00
Destination NSAP: 0x47.0005.80.ffe100.0000.f215.11f2.00204825c418.00

    4  reject  keep_these_out         1A1      *   104   1CTL     *    0
Source NSAP:      0x47.0005.80.ffe100.0000.f215.11f2.002048100464.00
Destination NSAP: *
```

The fields in this display are defined as follows:

Field	Description
Index	The unique index number that identifies this template.
Action	The action to take with addresses that match this template. **accept** means that the call is allowed and **reject** means that the call is not allowed.
Name	An optional, user-assigned name that identifies this template.
Source Port	The source port of the call setup message. An asterisk (*) is a wild card that matches all ports.
Source VPI	The source virtual path number of the call setup message. An asterisk (*) is a wild card that matches all VPIs.
Source Mask	The mask that indicates the significant part of the source NSAP address to be used to find a matching address in the templates of authorized addresses. A mask of 0 is a wild card that matches all addresses.
Destination Port	The destination port of the call setup message. An asterisk (*) is a wild card that matches all ports.
Destination VPI	The destination virtual path number of the call setup message. An asterisk (*) is a wild card that matches all VPIs.
Destination Mask	The mask that indicates the significant part of the destination NSAP address to be used to find a matching address in the templates of authorized addresses. A mask of 0 is a wild card that matches all addresses.

Field	Description
Source NSAP	The source NSAP address of the call setup message. An asterisk (*) is a wild card that matches all NSAP addresses.
Destination NSAP	The destination NSAP address of the call setup message. An asterisk (*) is a wild card that matches all NSAP addresses.

You can also display an individual template. Enter the following parameters:

```
myswitch::configuration security nsapfiltering templates> show [<template-id or
template-name>]
myswitch::configuration security nsapfiltering templates> show 3
                                        Source             Destination
Index  Action  Name                     Port   VPI  Mask   Port   VPI  Mask
    3  reject  keep_these_out           1A1      *   104   1CTL     *    0
Source NSAP:      0x47.0005.80.ffe100.0000.f215.11f2.002048100464.00
Destination NSAP: *
```

If no templates exist, then the following message is displayed:

```
myswitch::configuration security nsapfiltering templates> show
No Address Filtering Templates are present
```

7.3.3 Configuring NSAP Filter for Interfaces

These commands let you configure filters for incoming call setup requests and for outgoing call setup requests for ATM Forum signalling interfaces, such as UNI, NNI, IISP, etc. To display the list of available subcommands, type **?** at the **interfaces** level.

```
myswitch::configuration security nsapfiltering interfaces> ?
  delete          set             show
```

7.3.3.1 Deleting an NSAP Filter from an Interface

This command lets you delete an NSAP filter from an interface. Enter the following parameters:

```
myswitch::configuration security nsapfiltering interfaces> delete <port> <vpi>
(incoming | outgoing)
```

7.3.3.2 Configuring an NSAP Filter on an Interface

This command lets you configure an NSAP filter on an interface. You can only configure one incoming and one outgoing filter per interface. Enter the following parameters:

```
myswitch::configuration security nsapfiltering interfaces> set <port> <vpi>
<filter-id> (incoming | outgoing)
```

The parameters for delete and set are defined as follows:

Parameter	Description
port	The port number of the interface to which the filter applies.
vpi	The virtual path number of the interface to which the filter applies.
filter-id	The unique name or index number that identifies this filter.
incoming | outgoing[1]	**incoming** means that the filter applies to the incoming side of the interface. **outgoing** means that the filter applies to the outgoing side of the interface. If no incoming filter is specified for an interface, then all incoming calls are accepted on that interface. If no outgoing filter is specified for an interface, then all outgoing calls are accepted on that interface.

1. Calls to the switch itself (SNMP connections, telnet over ATM, etc.) can be filtered by setting an outgoing filter on the control port.

7.3.3.3 Displaying NSAP Filter Interface Information

This command lets you display all of the incoming and outgoing filters that have been configured on a specific interface. Enter the following parameters:

```
myswitch::configuration security nsapfiltering interfaces> show
Port  VPI  Incoming Filter ID          Outgoing Filter ID
----  ---  ------------------          ------------------
1A1     0      21                           0
1A2     0     459 keep_them_out            94
1A3     0       0                           0
1A4     0       0                           36 filter_36
1D1     0       0                           0
1D2     0       0                           0
1D3     0       0                           0l
1D4     0       0                           0
1CTL    0       0                           37 ctlport
```

The fields in this display are defined as follows:

Field	Description
Port	The port number of the interface to which the filter applies.
VPI	The virtual path number of the interface to which the filter applies.
Incoming Filter ID	The unique index number or name that identifies this incoming filter.
Outgoing Filter ID	The unique index number or name that identifies this outgoing filter.

You can also display the filters for a specific port and/or VPI; or the actual filters themselves, which shows all of the templates in each filter; or the actual templates themselves.

```
myswitch::configuration security nsapfiltering interfaces> show [<port> [<vpi>]]
[-filters] [-templates]
```

For example, to display the filters, enter the following parameters:

```
myswitch::configuration security nsapfiltering interfaces> show -filters
Port  VPI Direction Filter Name                Template IDs
----  --- --------- ------ ----                ------------
 1A1    0  Incoming     21                      10 12 40
 1A2    0  Incoming    459 keep_them_out        45 46 47 48
 1A2    0  Outgoing     94                      49 50
 1A4    0  Outgoing     36 filter_36            3984
1CTL    0  Outgoing     37 ctlport              625
```

CHAPTER 8 Signalling Commands

These commands let you configure ATM Forum (UNI/PNNI) signalling channels. You can display the list of available subcommands by typing **?** at the **signalling** level.

```
myswitch::configuration> signalling> ?
  delete          modify          new             show
```

8.1 Deleting a Signalling Channel

This command allows you to delete an existing signalling channel. Enter the following:

```
myswitch::configuration signalling> delete <port> <vpi>
```

8.2 Modifying a Signalling Channel

This command allows you to modify an existing signalling channel. Enter the following:

```
myswitch::configuration signalling> modify <port> <vpi>
        [-incomingfilter <filter-id> | -none ]
        [-outgoingfilter <filter-id> | -none ]
        [-defaultcpn (<NSAPaddress> | enable | disable) ]
        [-iefilter (one or more of: [cg,cgs,cds,blli,blli23,bhli,aal]
                        | enable | disable)]
        [-iepass   (one or more of: [cg,cgs,cds,blli,blli23,bhli,aal])]
```

8.3 Creating a Signalling Channel

This command lets you create a signalling channel. Enter the following parameters:

NOTE

Before a signalling channel can be created on a given VPI, an originating and a terminating path must exist for that same VPI.

```
myswitch::configuration signalling> new <port> <vpi>
        [-version (auto | uni30 | uni31 | pnni10 | uni40)]
        [-ilmi (up | down)] [-side (user | network)]
        [-type (auto | publicUNI | IISP | privateNNI | privateUNI)]
  atm layer options:
        [-sigvci <vci>] [-ilmivci <vci>]
        [-insigupc <upc-index>] [-outsigupc <upc-index>]
        [-minvci <vci>] [-maxvci <vci>] [-maxvpi <vpi>]
  protocol options:
        [-sig_alloc (vp | link | auto)]
        [-sig_mode (nonAssoc | vpAssoc | auto)]
        [-qos_exp <QoSExpIndex>]
        [-carrier_loss_action (clearCalls | noClear)]
  atmroute options:
        [-cost <cost>] [-domain <domain>]
  timer options:
        [-sscopnoresp_timer <sec>]
  public options:
        [-ilmireg (disable | ignore)]
        [-addressformat (private | e164)]
        [-e164address <e164Address>]
        [-e164mapping (enable | disable)]
        [-plantype (international | national | subscriber)]
  iefilter (Information Element filtering) options:
        [-iefilter (one or more of: [cg,cgs,cds,blli,blli23,bhli,aal])]
        [-defaultcpn <NSAPAddress>]
  NSAP Address Filtering options:
        [-incomingfilter <filter-id>]
        [-outgoingfilter <filter-id>]
```

These parameters for delete, modify, and new are defined as follows:

Parameter	Description
port	The port number of the signalling channel.
vpi	The virtual path number of the signalling channel.
version	The version of the UNI protocol to use at initialization. **auto** means the UNI attempts to determine automatically which version of the UNI protocol to use. **auto** is the default. **uni30** means this link uses version 3.0 of the UNI protocol. **uni31** means this link uses version 3.1 of the UNI protocol. **pnni10** means this link is an ATM Forum PNNI link. **uni40** means this link uses version 4.0 of the UNI protocol. You must specify both the version and the type if you want one of them to be something other than **auto**. For a list of the allowable combinations and more information, see the *ATM Switch Network Configuration Manual.*
ilmi	Enables ILMI for this interface (only when a host is connected). However, this parameter must be set to **down** if you set the interface type parameter to **IISP**. The default is **up**.
side	The switch user side or network side. If the connection is to a host, choose **network**. If the connection is to another switch, one switch must be **user** and the other switch must be **network** when configuring the interface `type` as **IISP** or as **publicUNI**. If the `type` is not **IISP** or **publicUNI**, then you do not need to specify this value; it is determined automatically.
type	The interface type to use for this signalling channel. **auto** means the interface type is determined dynamically. **publicUNI** means this signalling channel is used between this switch and a public switch. **IISP** is used for switch-to-switch signalling. **privateNNI** means this signalling channel is using the PNNI protocol. **privateUNI** means this signalling channel is used between this switch and a host. The default is **auto**. You must specify both the version and the type if you want one of them to be something other than **auto**. For a list of the allowable combinations and more information, see the *ATM Switch Network Configuration Manual*.
sigvci	The VCI to use for signalling messages.
ilmivci	The VCI to use for ILMI messages.
insigupc	The index number of the UPC traffic contract to be applied to the input signalling channel. Use **conf upc show** and look at the `Index` field to find this number. You cannot apply an ABR UPC contract to the input signalling channel.
outsigupc	The index number of the UPC traffic contract to be applied to the output signalling channel. Use **conf upc show** and look at the `Index` field to find this number. To prevent the outbound signalling channel from being policed, you must use the **noGCRA** option when creating the UPC contract. You cannot apply an ABR UPC contract to the output signalling channel.
minvci	The bottom number for the range of VCIs to be reserved for UNI SVCs on this path (and other paths created dynamically if the `-sig_alloc` flag is `link`). You can change this range to limit the number of SVCs on this path, limit the number of SPANS SVCs with respect to UNI SVCs, or divide the VCI range into a region reserved for SPANS SVCs and a region reserved for UNI SVCs. The default is **32**.

Parameter	Description
maxvci	The top number for the range of VCIs to be reserved for UNI SVCs on this path (and other paths created dynamically if the `-sig_alloc` flag is `link`). You can change this range to limit the number of SVCs on this path, limit the number of SPANS SVCs with respect to UNI SVCs, or divide the VCI range into a region reserved for SPANS SVCs and a region reserved for UNI SVCs. The default is the maximum number of VCIs on the containing path.
maxvpi	The maximum VPI value that is allocated for a Switched Virtual Paths (SVP) and for the switched portion of Smart Permanent Virtual Path Connections (SPVPs). The default is the maximum VPI value allowed by the switch fabric or network module.
sig_alloc	The allocation policy for the network side of a signalling channel. **`vp`** means the network side allocates connections in its containing VP only. **`link`** means the signalling channel allocates connections in its containing VP and may allocate connections in other VPs in the VPI range 0 to 255 that are available to it. The **`link`** option is only available for signalling channels on VP 0. The **`link`** option cannot be specified when **`-sig_mode`** is specified as **`vpAssoc`**. The default is **`vp`** for FT-PNNI and **`link`** for PNNI. You must specify both the sig_alloc and the sig_mode if you want one of them to be something other than **`auto`**. For a list of the allowable combinations and more information, see the *ATM Switch Network Configuration Manual.*
sig_mode	The mode to be used for signalling. **`nonAssoc`** (Non-associated signalling) means the signalling channel encodes the connection identifier with Non-associated signalling bits. **`vpAssoc`** (VP-associated signalling) means the signalling channel encodes the connection identifier with the VP-associated signalling bits. The default is **`nonAssoc`** for FT-PNNI and **`vpAssoc`** for PNNI, except VP 0 which must be **`nonAssoc`**. You must specify both the sig_alloc and the sig_mode if you want one of them to be something other than **`auto`**. For a list of the allowable combinations and more information, see the *ATM Switch Network Configuration Manual.*
qos_exp <QoSExpIndex>	The index number in the QoS expansion table that is used to do QoS class-to-parameter expansion when calls originating on this interface are routed through a PNNI network. See the `QoSExpIndex` field under **`conf qos show`** for this number.
carrier_loss_action	The action to be taken on this signalling channel upon sensing a carrier loss. **`clearCalls`** means that, upon sensing a carrier loss, the switch immediately tears down all the connections (both active calls and calls in the establishment phase) on this signalling channel. **`noClear`** means that, upon sensing a carrier loss, the switch waits until the SSCOP timer expires and then clears the calls in the establishment phase on this signalling channel. The active calls on this signalling channel take even longer to be cleared. The default is **`noClear`**.
cost	The cost (administrative weight) of this link that is used for determining the best route for this signalling channel in FT-PNNI.
domain	The index number of the PNNI domain to which this signalling channel belongs. To find this number, look in the `ID` field under **`conf atmroute domain show`**.
sscopnoresp_timer	The value to be set for the duration of the SSCOP no response timer. This is the time in seconds to wait before bringing the SSCOP connection down. This parameter can be set to a value higher than the default when the remote host is experiencing a heavy load and cannot process a signalling request in time. The default is **`10`** seconds for UNI 3.0 and **`7`** seconds for UNI 3.1.

Parameter	Description
ilmireg	**disable** means no prefix registration messages are sent by the network-side, and no address registration messages are generated by the user-side. **ignore** means the network-side performs as it normally would, except that addresses registered are not published into the routing database. This is not recommended except in public network situations in which CPE2 equipment needs ILMI address registration in order to function correctly. The default is **disable**. This option may be used for signalling channels other than public UNIs (i.e., specifying automode or IISP above). However, for those signalling channels, ILMI registration is enabled by default (even though it is not an option to be specified here.) This means that ILMI address and prefix registration will occur across those signalling channels.
addressformat	Indicates whether to use the native E.164 address format (used by public UNI) across this signalling channel or to use the private address format. If you specify **e164**, you can also specify a plantype. If you specify **e164**, the **-type** must be **publicUNI**. (If you specify **private**, the switch automatically uses the correct corresponding plantype.) For a list of the allowable combinations and more information, see the *ATM Switch Network Configuration Manual.*
e164address	The native e164 address used by public UNI across this signalling channel.
e164mapping	Indicates whether or not to resolve private NSAP addresses into native E.164 addresses. Enable means NSAP address-to-E.164 address mapping occurs. Disable means NSAP address-to-E.164 address mapping will not occur. However, if you use disable, but you are also using the native E.164 address format, then the only address conversion performed at this signalling channel is for private NSAP addresses in E.164 format.
plantype (international | national | subscriber)	The plan type to be used in the calling party number and called party number information elements in the signalling messages. You can set this variable if the address format is specified as **e164**. You cannot set it if the address format is specified as **private**. By default, **international** is used with the **e164** address format. By default, **unknown** is used with the **private** address format.
iefilter (enable | disable)	The information element (IE) filter which controls the filtering of signalling elements of the UNI 3.x signalling channels. Filters can be applied to the following UNI 3.x IEs: **cg**, **cgs**, **cds**, **blli**, **blli23**, **bhli**, **aal**. **enable** means that the listed elements will not be passed to the called party (they are filtered). Any IEs that are not listed here will be passed to the called party. When using this parameter with **conf signalling new**, filtering is enabled for any IEs that you specify. You can then later use this parameter with **conf signalling modify** to disable filtering of the specified IEs without changing the list.
iepass	Allows the specified IEs to be passed to the called party. Can use the following UNI 3.x IEs: **cg**, **cgs**, **cds**, **blli**, **blli23**, **bhli**, **aal**.
cg	Filters the address of the calling party on calls going out on this interface.
cgs	Filters the subaddress of the calling party on calls coming in on this interface.
cds	Filters the subaddress of the called party on calls coming in on this interface.
blli	Filters all (first, second, and third) Broadband Low Layer Information (BLLI) IEs, which provides compatibility checking by an addressed entity on calls coming in on this interface. This information is transferred transparently between the calling and the called party.

Parameter	Description
blli23	Filters only the second and third Broadband Low Layer Information (BLLI) IEs on calls coming in and going out on this interface.
bhli	Filters the Broadband High Layer Information (BHLI), which provides compatibility checking by an addressed entity (e.g., a recipient of a call) on calls coming in on this interface.
aal	Filters the AAL (ATM Adaptation Layer) information on calls coming in and going out on this interface.
defaultcpn (<NSAPaddress> | enable | disable)	The default calling party number (CPN) to be inserted in an incoming call setup message, if the originator does not provide an address in the call setup request. Specifying an <*NSAPaddress*> and **enable** means that this address will be used as the default CPN for incoming call setup messages without a CPN. Specifying an <*NSAPaddress*> address and **disable** means that an incoming call setup message without a CPN will be treated as if it has a CPN of all zeros. A template can be created to check for this condition.
incomingfilter <filter-id> | -none	`<filter-id>` indicates the NSAP filter (from **conf security nsapfilter filters show**) to be applied to calls arriving at this signalling channel. You can remove this filter later by using **conf signalling modify incomingfilter -none**.
outgoingfilter <filter-id> | -none	`<filter-id>` indicates the NSAP filter (from **conf security nsapfilter filters show**) to be applied to calls leaving on this signalling channel. You can remove this filter later by using **conf signalling modify outgoingfilter -none**.

8.4 Displaying Signalling Channels

This command allows you to list an individual switch fabric's current signalling channel information. Enter the following parameters:

```
myswitch::configuration signalling> show
 Port VPI Interface      SigVersion State ILMI Side    RemoteAddress
 1A1    0 privateUNI(a)  uni40(a)   down  down network
*1A2    0 privateUNI(a)  uni31(a)   up    up   network 172.19.12.141
 1A3    0 privateUNI(a)  uni31(a)   down  down network
 1A4    0 privateUNI(a)  uni30(a)   down  down network
 1B1    0 FT-PNNI(a)     uni31(a)   up    up   user    169.144.64.59
 1B2    0 privateUNI(a)  uni30(a)   down  down network
 1B3    0 FT-PNNI(a)     uni40(a)   up    up   network 172.19.12.58
 1B4    0 privateUNI     uni30      up    down network 172.19.12.139
 1C1    0 privateUNI     uni40      up    up   network 172.19.12.142
 1C2    0 privateUNI     uni31      up    up   network 172.19.12.140
 1C3    0 PNNI(a)        pnni10(a)  up    up   network 172.19.12.57
 1C4    0 PNNI           pnni10     up    up   network 169.144.64.58
 1CTL   0 privateUNI(a)  uni30(a)   up    down network
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers that currently have a signalling interface enabled. An asterisk (*) to the left of the port number means that signalling channel is still being created and is not active yet. The control port on an ASX-4000 is displayed as 5CTL since it does not belong to a specific fabric.
VPI	The number of the virtual path that contains the signalling channel.
Interface	The operational type of the interface on this signalling channel. **publicUNI** means that this signalling channel is operating between this switch and a public switch. **privateUNI** means this signalling channel is operating between the switch and a host. **IISP** (Interim Inter-Switch Signalling Protocol) means this signalling channel is used between two switches. **FT-PNNI** is used between two switches using SPANS mapping messages for dynamic routing. **PNNI** means this signalling channel is using the PNNI protocol. **(a)** means that the switch is trying to automatically determine the appropriate interface type.
SigVersion	The version of the UNI or PNNI protocol being used at initialization. **uni30** means that this link uses version 3.0 of the UNI protocol. **uni31** means that this link uses version 3.1 of the UNI protocol. **auto** means that this link attempts to determine automatically which version of the UNI protocol to use. **pnni10** means this link is an ATM Forum PNNI link. **uni40** means that this link uses version 4.0 of the UNI protocol. **(a)** means that the switch is trying to automatically determine the protocol and version of that protocol that its peers are using.

Field	Description
State	The current state of the interface. If the state is **up**, this interface is operational. This is the normal state for a interface that is connected to another FORE Systems' ATM switch or host. If the state is **down**, this interface is not operational. This can be due to a lack of a physical connection or due to a software problem.
ILMI	**Up** means that ILMI is operational for this interface. **Down** means that ILMI is not operational for this interface.
Side	Shows if the switch is the user side or the network side on a given signalling channel. If the connection is to a host, **network** is displayed. If the connection is to another switch, one switch must be **user** and the other switch must be **network**.
RemoteAddress	The IP address of the remote endstation, if it is available.

To display information for all of the signalling channels on a specific port, (for example, port 1B1), enter the following parameters:

```
myswitch::configuration signalling> show 1b1
 Port VPI Interface      SigVersion State ILMI Side    RemoteAddress
 1B1    0 ftPNNI         uni31(a)   up    up   network
```

The fields in this display are defined in the same manner as those in the previous example.

To display information for all of the signalling channels on a specific port and path, (for example, port 1B1 and VPI 0), enter the following parameters:

```
myswitch::configuration signalling> show 1b1 0
 Port VPI Interface      SigVersion State ILMI Side    RemoteAddress
 1B1    0 ftPNNI         uni31(a)   up    up   network
```

The fields in this display are defined in the same manner as those in the previous example.

Additionally, there are several options you can use to show different types of information about the signalling channels.

```
myswitch::configuration signalling> show [<port> [<vpi>]]
[atm | atmranges | protocol | atmroute | timers | public | iefilter | nsapfilter ]
```

These options are described in the following subsections.

8.4.1 Displaying ATM Layer Information for Signalling Channels

To show ATM layer information about all of the signalling channels on a switch fabric, enter the following parameters:

```
myswitch::configuration signalling> show atm
 Port VPI SigVCI ILMIVCI InSigUpc OutSigUpc
 4D1    0      5      16        0       N/A
 4D2    0      5      16        0       N/A
 4D3    0      5      16        0       N/A
 4D4    0      5      16        0       N/A
 4E1    0      5      16        0       N/A
 4E2    0      5      16        0       N/A
 4E3    0      5      16        0       N/A
 4CTL   0      5      16        0       N/A
```

The fields in the ATM display are defined as follows:

Field	Description
Port	The port numbers that currently have a signalling interface enabled.
VPI	The number of the virtual path that contains the signalling channel.
SigVCI	The VCI on the signalling channel. The default reserved VCI is **5**.
ILMIVCI	The VCI to be used for ILMI signalling messages. The default reserved VCI is **16**.
InSigUpc	The index number of the UPC traffic contract that is applied to the input signalling channel. UPC contracts can be displayed using **conf upc show**.
OutSigUpc	The index number of the UPC traffic contract that is applied to the output signalling channel. UPC contracts can be displayed using **conf upc show**. N/A indicates that the output signalling channel is not tied to any UPC index.

To list ATM information for all of the signalling channels on a specific port and path, (for example, port 4D3 and VPI 0), enter the following parameters:

```
myswitch::configuration signalling> show 4d3 0 atm
 Port VPI SigVCI ILMIVCI InSigUpc OutSigUpc
 4D3    0      5      16        0       N/A
```

The fields in this display are defined in the same manner as those in the previous example.

8.4.2 Displaying ATM Range Information for Signalling Channels

To show ATM range information about all of the signalling channels on a switch fabric, enter the following parameters:

```
myswitch::configuration signalling> show atmranges
          Admin  Admin   Oper   Oper  Admin      Oper     Oper
 Port VPI MinVCI MaxVCI MinVCI MaxVCI MaxVPI MaxSvccVPI MaxSvpcVPI SvpCapable
 4D1    0     32    511     32    511   1022        N/A        N/A        N/A
 4D2    0     32    511     32    511   1022        N/A        N/A        N/A
 4D3    0     32    511     32    511   1022        N/A        N/A        N/A
 4D4    0     32    511     32    511   1022        N/A        N/A        N/A
 4E1    0     32   7168     32   7167   1023        N/A       1023       TRUE
 4E2    0     32   7168     32   7167   1023        N/A       1023       TRUE
 4E3    0     32   7168     32   7167   1023        N/A       1023       TRUE
 4CTL   0     32   1023     32   1023      0        N/A        N/A        N/A
```

The fields in the ATM display are defined as follows:

Field	Description
Port	The port numbers that currently have a signalling interface enabled.
VPI	The number of the virtual path that contains the signalling channel.
Admin MinVCI	The user-requested bottom number for the range of VCIs to be reserved for UNI SVCs on this path. If no value is entered, the default is **32**.
Admin MaxVCI	The user-requested top number for the range of VCIs to be reserved for UNI SVCs on this path. If no value is entered, the default is the maximum number of VCIs on the containing path.
Oper MinVCI	The actual (operational) bottom number for the range of VCIs to be reserved for UNI SVCs on this path. A value that is displayed in brackets indicates that negotiation of this value with the UNI peer via ILMI is not complete because either ILMI is not up, or if ILMI is up, the negotiation is still in progress. A value that is displayed without brackets indicates the value has been successfully negotiated (if ILMI is enabled and up) or negotiation did not need to take place (if ILMI is disabled). For more information, see the *ATM Switch Network Configuration Manual*.
Oper MaxVCI	The actual (operational) top number for the range of VCIs to be reserved for UNI SVCs on this path. A value that is displayed in brackets indicates that negotiation of this value with the UNI peer via ILMI is not complete because either ILMI is not up, or if ILMI is up, the negotiation is still in progress. A value that is displayed without brackets indicates the value has been successfully negotiated (if ILMI is enabled and up) or negotiation did not need to take place (if ILMI is disabled). For more information, see the *ATM Switch Network Configuration Manual.*
Admin MaxVPI	The user-requested maximum VPI value that is allocated for a Switched Virtual Paths (SVP) and for the switched portion of Smart Permanent Virtual Path Connections (SPVPs).

Field	Description
Oper MaxSvccVPI	The actual (operational) maximum VPI value to be used for dynamic paths that are created for setting up SVCs. The VPI range used for allocating SVCs is from 1 to this number.
Oper MaxSvpcVPI	The actual (operational) maximum VPI value to be used for dynamic paths that are created for setting up SVPs. The VPI range used for allocating SVPs is from 1 to this number.
SvpCapable	TRUE indicates that SVPs are supported on this signalling interface. N/A indicates that SVPs are not supported on this signalling interface.

To list ATM range information for all of the signalling channels on a specific port and path, (for example, port 4D3 and VPI 0), enter the following parameters:

```
myswitch::configuration signalling> show 4d3 0 atmranges
          Admin  Admin   Oper   Oper  Admin      Oper     Oper
 Port VPI MinVCI MaxVCI MinVCI MaxVCI MaxVPI MaxSvccVPI MaxSvpcVPI SvpCapable
 4D3    0     32    511     32    511   1022        N/A        N/A        N/A
```

The fields in this display are defined in the same manner as those in the previous example.

8.4.3 Displaying Protocol Information for Signalling Channels

To show protocol information about all of the signalling channels on a switch fabric, enter the following parameters:

```
myswitch::configuration signalling> show protocol
          Allocation
 Port VPI  Scope       Mode              QoSExpIndex CarrierLossAction
 4B1    0  VP(a)       Non-Associated(a)           0 noClear
 4B3    0  Link(a)     Non-Associated(a)           0 noClear
 4B3    1  VP(a)       VP-Associated(a)            0 noClear
 4B3    2  VP(a)       VP-Associated(a)            0 noClear
 4B3    3  VP(a)       VP-Associated(a)            0 noClear
 4B3    4  VP(a)       VP-Associated(a)            0 noClear
 4B4    0  Link(a)     Non-Associated(a)           0 noClear
 4E1    0  VP(a)       VP-Associated(a)            0 noClear
 4E2    0  VP(a)       Non-Associated(a)           0 noClear
 4E3    0  VP(a)       Non-Associated(a)           0 noClear
 4CTL   0  VP(a)       Non-Associated(a)           0 noClear
```

The fields in the protocol display are defined as follows:

Field	Description
Port	The port numbers that currently have a signalling interface enabled.
VPI	The number of the virtual path that contains the signalling channel.
Allocation Scope	The allocation policy for a network side signalling channel. If set to **vp**, the network side signalling channel allocates connections in its containing VP only. If set to **link**, the signalling channel allocates connections in its containing VP and may allocate connections in other VPs in the range 0 to 255 that are available to it. The **link** option is only available for UNIs on VP 0. The default is **vp** for FT-PNNI and **link** for PNNI.
Mode	The mode to be used for signalling. If set to **nonAssoc** (Non-associated signalling), the signalling channel encodes the connection identifier with Non-associated signalling bits. If set to **vpAssoc** (VP-associated signalling), the signalling channel encodes the connection identifier with the VP-associated signalling bits. The default is **nonAssoc** for FT-PNNI and **vpAssoc** for PNNI, except VP 0 which must be **nonAssoc**.
QosExpIndex	The index number of the set of QoS expansion entries. See the `QosExpIndex` field under **conf qos show** for this number. For call set-up messages that originate on this signalling channel and are routed through a PNNI network, these entries are used to perform the QoS expansion procedures. For more information, see the ATM Forum PNNI Specification. A value of `0` means that the default QoS expansion entries will be used.
CarrierLossAction	The action to be taken on this signalling channel upon sensing a carrier loss. **clearCalls** means that, upon sensing a carrier loss, the switch will immediately tear down all the connections (both those in-progress, as well as the established ones) on this signalling channel. **noClear** means that, upon sensing a carrier loss, the switch will wait for the SSCOP timers to expire before the in-progress connections on that signalling channel are torn down. The established connections on that signalling channel will take even longer to be torn down. The default is **noClear**.

To display protocol information for all of the signalling channels on a specific port and path, (for example, port 4B3 and VPI 2), enter the following parameters:

```
myswitch::configuration signalling> show 3a1 0 protocol
           Allocation
 Port VPI  Scope       Mode              QoSExpIndex CarrierLossAction
 4B3    2  VP(a)       VP-Associated(a)            0 noClear
```

The fields in this display are defined in the same manner as those in the previous example.

8.4.4 Displaying ATM Routing Information for Signalling Channels

To show ATM routing information about all of the signalling channels on a switch fabric, enter the following parameters:

```
myswitch::configuration signalling> show atmroute
 Port VPI OrigCost TermCost  Domain   Node
 1A1    0      100        0       1    N/A
 1A2    0      100        0       1    N/A
 1A3    0      100        0       1    N/A
 1A4    0      100        0       1    N/A
 1A5    0      100        0       1    N/A
 1A6    0      100        0       1    N/A
 1C1    0      100        0       1    N/A
 1C2    0      100        0       1    N/A
 1C3    0      100        0       1    N/A
 1C4    0      100        0       1    N/A
 1CTL   0      100        0       1    N/A
```

The fields in the routing display are defined as follows:

Field	Description
Port	The port numbers that currently have a signalling interface enabled.
VPI	The number of the virtual path that contains the signalling channel.
OrigCost	The cost of each FT-PNNI link configured at the originating end of the signalling channel.
TermCost	The cost of each FT-PNNI link configured at the terminating end of the signalling channel.
Domain	The index number of the PNNI domain to which this signalling channel belongs.
Node	The operational node index number to which this signalling channel belongs. This field only applies to PNNI interfaces.

To display ATM routing information for all of the signalling channels on a specific port and path, (for example, port 1A4 and VPI 0), enter the following parameters:

```
myswitch::configuration signalling> show 1a4 0 atmroute
 Port VPI OrigCost TermCost  Domain   Node
 1A4    0      100        0       1    N/A
```

The fields in this display are defined in the same manner as those in the previous example.

8.4.5 Displaying Timer Information for Signalling Channels

To show timer information about all of the signalling channels on a switch fabric, enter the following parameters:

```
myswitch::configuration signalling> show timers
 Port VPI SscopNoResponse
 1A1    0              10
 1A2    0              10
 1A3    0               7
 1A4    0              10
 1B1    0               7
 1B2    0              10
 1B3    0              10
 1B4    0               7
 1CTL   0              10
```

The fields in the timer display are defined as follows:

Field	Description
Port	The port numbers that currently have a signalling interface enabled.
VPI	The number of the virtual path that contains the signalling channel.
SScopNoResponse	The value that has been set for the duration of the SSCOP no response timer. This is the time in seconds to wait before bringing the SSCOP connection down. The default value is 10 seconds for UNI 3.0 and 7 seconds for UNI 3.1.

To display timer information for all of the signalling channels on a specific port and path, (for example, port 1A3 and VPI 0), enter the following parameters:

```
myswitch::configuration signalling> show 1A3 0 timers
 Port VPI SscopNoResponse
 1A3    0               7
```

The fields in this display are defined in the same manner as those in the previous example.

8.4.6 Displaying Public UNI Information for Signalling Channels

To show public UNI information about all of the signalling channels on a switch fabric, enter the following parameters:

```
myswitch::configuration signalling> show public
                                                E164Address
 Port  VPI ILMIReg AddressFmt E164Address       Resolution      PlanType
 1B1     0 disable E.164                        enable          international
 1B2     0 disable E.164                        enable          national
 1B3     0 enable  private                      disable         unknown
 1B4     0 disable E.164                        enable          subscriber
 1CTL    0 enable  private                      disable         unknown
```

The fields in the public display are defined as follows:

Field	Description
Port	The port numbers that currently have a signalling interface enabled.
VPI	The number of the virtual path that contains the signalling channel.
ILMIReg	Shows whether ILMI address and prefix registration occur across this signalling channel. `Enable` means that ILMI address and prefix registration occur across this signalling channel. If **`enable`** is displayed, then this is not a public UNI. **`Disable`** means that no prefix registration messages are sent by the network-side, and no address registration messages are generated by the user-side. **`Ignore`** means that the network-side performs as it normally would, except that addresses registered are not published into the routing database. This setting is not recommended except in public network situations in which CPE equipment needs ILMI address registration in order to function correctly.
AddressFmt	Shows if the native `e164` (used by public UNI) address format or if the `private` address format is being used across this link.
E164 Address	Shows the native `e164` address assigned to this link.
E164 Address Resolution	Shows whether or not to resolve private NSAP addresses into native E.164 addresses. `Enable` means that NSAP address-to-E.164 address mapping occurs. `Disable` means that NSAP address-to-E.164 address mapping does not occur. However, if you use `disable`, but you are also using the native E.164 address format, then the only address conversion performed at this signalling channel is for private NSAP addresses in E.164 format.
PlanType	Shows the plan type used in the calling party number and called party number information elements in the signalling messages. By default, **`international`** is used with the **`e164`** address format. This value can be specified for **`e164`**. By default, **`unknown`** is used with the **`private`** address format. This value cannot be modified for **`private`**.

To display public information for all of the signalling channels on a specific port and path, (for example, port 1b2 and VPI 0), enter the following parameters:

```
myswitch::configuration signalling> show 1b2 0 public
                                                E164Address
 Port  VPI ILMIReg AddressFmt E164Address       Resolution      PlanType
 1B2     0 disable E.164                        enable          national
```

The fields in this display are defined in the same manner as those in the previous example.

8.4.7 Displaying IE Filter Information for Signalling Channels

To show IE filter (information element filter) information about all of the signalling channels on a switch fabric, enter the following parameters:

```
myswitch::configuration signalling> show iefilter
Port  VPI  IEFilter CG CGS CDS BHLI BLLI BLLI23 AAL Default Calling Address
1A1     0  enabled  -  -   +   -    -    +      +                  enabled
                        0x47.0005.80.ffe100.9999.a0145.7623.131415161718.ee
1A2     1  disabled -  +   +   +    +    +      +                 disabled
                        0x47.0005.80.ffe100.9999.c01d.c552.131415161718.00
1B4     0  enabled  +  -   -   +    -    +      -                 disabled
                                  00000000000000000000000000000000000000000
```

The fields in the iefilter display are defined as follows:

Field	Description
Port	The port number of the signalling channel to which the IE filters apply.
VPI	The virtual path number that contains the signalling channel to which the IE filters apply.
IEFilter	Shows whether or not the information element (IE) filter has been enabled. Filters can be applied to the following IEs: **cg**, **cgs**, **cds**, **blli**, **blli23**, **bhli**, **aal**. **enabled** means that the IEs listed with a - will not be passed to the called party (they are filtered) and the IEs listed with a + will be passed to the called party. **disabled** means that no IEs are filtered (all are passed), despite the + or -; i.e., the filtering feature is turned off.
CG	Filters on the address of the call originating entity.
CGS	Filters on the subaddress of the call originating entity.
CDS	Filters on the subaddress of the called party.
BHLI	Filters on the Broadband High Layer Information (BHLI), which provides compatibility checking by an addressed entity (e.g., a recipient of a call).
BLLI	Filters on all (first, second, and third) Broadband Low Layer Information (BLLI) IEs, which provides compatibility checking by an addressed entity. This information is normally transferred transparently between the call originator and the call recipient.
BLLI23	Filters on only the second and third Broadband Low Layer Information (BLLI) IEs.
AAL	Filters on the AAL (ATM Adaptation Layer) information.
Default Calling Address	**enabled** means that the default calling party number (CPN) shown in the display is inserted if one has not been provided. **disabled** means that no default CPN is inserted if one has not been provided. If a default CPN is not supplied, an incoming call setup message without a CPN is treated as if it has a CPN of all zeros.

To display iefilter information for all of the signalling channels on a specific port and path, (for example, port 1B3 and VPI 0), enter the following parameters:

```
myswitch::configuration signalling> show 1b3 0 iefilter
 1B3     0  disabled -  +   +   +    +    +      +                  disabled
                                    00000000000000000000000000000000000000000
```

The fields in this display are defined in the same manner as those in the previous example.

8.4.8 Displaying NSAP Filter Information for Signalling Channels

To show NSAP filter information about all of the signalling channels on a switch fabric, enter the following parameters:

```
myswitch::configuration signalling> show nsapfilter
Port VPI  Incoming Filter ID    Outgoing Filter ID
1A1    0  21
1A2    0  625                   49
1B4    0  keep_them_out         68
1CTL   0                        42
```

The fields in the nsapfilter display are defined as follows:

Field	Description
Port	The port number of the signalling channel to which the filter applies.
VPI	The virtual path number of the signalling channel to which the filter applies.
Incoming Filter ID	The unique index number or name that identifies this incoming filter. See the Index and Name fields under **conf security nsapfilter show**.
Outgoing Filter ID	The unique index number or name that identifies this outgoing filter. See the Index and Name fields under **conf security nsapfilter show**.

To display NSAP filter information for all of the signalling channels on a specific port and path, (for example, port 1B4 and VPI 0), enter the following parameters:

```
myswitch::configuration signalling> show 1B4 0 nsapfilter
Port VPI  Incoming Filter ID    Outgoing Filter ID
1B4    0  keep_them_out         68
```

The fields in this display are defined in the same manner as those in the previous example.

CHAPTER 9 SNMP Configuration Commands

These commands enable you to manage the SNMP communities and traps. You can display the list of available subcommands by typing **?** at the **snmp** level.

```
myswitch::configuration snmp> ?
  community        sets             show             trap>
```

9.1 Configuring the SNMP Community Access

This command lets you modify the SNMP community access to the switch. Enter the following:

```
myswitch::configuration snmp> community (read | write) <community>
```

These parameters are defined as follows:

Parameter	Description
read | write	**read** sets the community string for SNMP read operations (get and getnext requests). **write** sets the community string for SNMP write operations (set requests).
community	The community string associated with **read** or with **write**. The default string associated with **read** is **public**. The default string associated with **write** is **private**.

NOTE Even if you are not using SNMP management, it is highly recommended that you change the default community strings for security purposes.

9.2 Enabling or Disabling SNMP SETs

This command lets you enable or disable SNMP SET operations from the network. Enter the following parameters:

```
myswitch::configuration snmp> sets (enable | disable)
```

These parameters are defined as follows:

Parameter	Description
enable	SNMP set requests from remote management stations are accepted. This is the default. This variable can be set only by a user with **admin** privileges.
disable	SNMP set requests from remote management stations are ignored.

9.3 Displaying SNMP SET Information

This command shows you if SNMP SETs from the network are currently enabled or disabled. Enter the following parameters:

```
myswitch::configuration snmp> show
SET operations from network are enabled
```

9.4 Configuring SNMP Traps

These commands help you to manage SNMP traps. You can display the list of available subcommands by typing **?** at the **trap** level.

```
myswitch::configuration snmp trap> ?
  destinations>    log>
```

9.4.1 Configuring Trap Destinations

These commands help you to configure SNMP trap destinations. You can display the list of available subcommands by typing **?** at the **destinations** level.

```
myswitch::configuration snmp trap> destinations> ?
  delete           new              show
```

9.4.1.1 Deleting a Trap Destination

This command lets you delete an SNMP trap destination. Enter the following parameters:

```
myswitch::configuration snmp trap destinations> delete <trap>
```

This parameter is defined as follows:

Parameter	Description
trap	Indicates the index number of the trap that you want to delete. Use the **conf snmp trap destinations show** command and look at the `Trap` field to find this number.

9.4.1.2 Creating a Trap Destination

This command lets you add an SNMP trap destination. Enter the following parameters:

```
myswitch::configuration snmp trap destinations> new <ipaddress>
```

This parameter is defined as follows:

Parameter	Description
ipaddress	The IP address of the SNMP trap destination that you want to add.

9.4.1.3 Displaying Trap Destination Information

This command lets you display all of the existing SNMP trap destinations. Enter the following parameters:

```
myswitch::configuration snmp trap destinations> show
Trap    Destination
1       169.144.28.33
2       169.129.45.90
```

If no trap destinations have been configured, then the following is displayed:

```
myswitch::configuration snmp trap destinations> show
No trap information is available
```

9.4.2 Configuring the SNMP Trap Log

These commands let you configure the SNMP trap log. You can display the list of available subcommands by typing **?** at the **log** level.

```
myswitch::configuration snmp trap log> ?
  show             threshold>
```

9.4.2.1 Displaying the SNMP Trap Log

This command lets you display the log of the SNMP traps that occurred. Enter the following parameters:

```
myswitch::configuration snmp trap log> show
Index Trap                              Xmits LastXmit       Events LastEvent
                                              (time elapsed)        (time elapsed)
-----------------------------------------------------------------------------
1     trap_warmStart                    1     2 days 20:59   1      2 days 20:59
2     asxLinkDown                       1     2 days 20:59   1      2 days 20:59
3     asxSonetLOSDetected               1     2 days 20:59   1      2 days 20:59
4     asxLinkDown                       1     2 days 20:59   1      2 days 20:59
5     asxSonetLOFDetected               1     2 days 20:59   1      2 days 20:59
6     asxLinkDown                       1     2 days 20:59   1      2 days 20:59
7     asxDS3LOSDetected                 1     2 days 20:59   1      2 days 20:59
8     asxLinkDown                       1     2 days 20:59   1      2 days 20:59
9     asxDS3LOSDetected                 1     2 days 20:59   1      2 days 20:59
10    asxHostLinkUp                     1     2 days 20:59   1      2 days 20:59
11    asxSpansUp                        1     2 days 20:59   1      2 days 20:59
12    asxHostLinkUp                     1     2 days 20:59   1      2 days 20:59
13    asxSpansUp                        1     2 days 20:59   1      2 days 20:59
14    asxHostLinkUp                     1     2 days 20:59   1      2 days 20:59
15    asxSpansUp                        1     2 days 20:59   1      2 days 20:59
16    asxTempSensorRegularTemp          1     2 days 20:59   1      2 days 20:59
17    asxPsOutputUp                     1     2 days 20:59   1      2 days 20:59
18    asxPsInputUp                      1     2 days 20:59   1      2 days 20:59
19    asxSwitchLoginDetected            5     0 days 00:00   5      0 days 00:00
```

The fields in this display are defined as follows:

Field	Description
Index	Shows the index number of this trap.
Trap	Shows the name of this trap.
Xmits	Shows how many times this trap was transmitted to the trap destination.
LastXmit	Shows when this trap was last transmitted; i.e., how long ago it was transmitted.
Events	Shows how many times this trap actually occurred on the switch.
LastEvent	Shows how long ago this trap last occurred. (The first occurrence is always transmitted. After that, transmissions are determined by the threshold and time period.)

You can also display information about an individual trap as follows:

```
myswitch::configuration snmp trap log> show [<index>] [variables]
myswitch::configuration snmp trap log> show 11
Index Trap                            Xmits LastXmit       Events LastEvent
-------------------------------------------------------------------------------
11    asxSpansUp                      1     2 days 20:59   1      2 days 20:59
```

To display even more details about a trap occurrence, including the specific port number on which these traps occurred, use the **variables** option as follows:

```
myswitch::configuration snmp trap log> show variables
No Trap Variables for LogIndex: 1 Trap: trap_warmStart
LogIndex: 2 Trap: asxLinkDown
Variable                        Value
-----------------------------------------------------------------
hwPortName                      1B3
hwPortBoard                     0
hwPortModule                    1
hwPortNumber                    2
LogIndex: 3 Trap: asxSonetLOSDetected
Variable                        Value
-----------------------------------------------------------------
hwPortName                      1B3
hwPortBoard                     0
hwPortModule                    1
hwPortNumber                    2
LogIndex: 4 Trap: asxLinkDown
Variable                        Value
-----------------------------------------------------------------
Press return for more, q to quit: q
```

9.4.2.2 Configuring the Trap Log Threshold

These commands let you configure the SNMP trap log threshold. You can display the list of available subcommands by typing **?** at the **threshold** level.

```
myswitch::configuration snmp trap log threshold> ?
  modify          reset           show
```

9.4.2.2.1 Modifying the Trap Log Threshold

This command lets you specify the threshold and time period for sending traps to the trap destination or to a management station. The first occurrence of a trap is always transmitted. After that, if the number of occurrences of that trap exceeds the specified threshold, or if the time lag between two occurrences of that trap is greater than the specified time period, the latest trap gets transmitted out to the trap destination. Enter the following parameters:

```
myswitch::configuration snmp trap log threshold> modify <index>
[-thresh <value>] [-time <seconds>]
```

These parameters are defined as follows:

Parameter	Description
index	The index number of the trap whose threshold you want to modify.
-thresh <value>	If the number of occurrences of a given trap since the first occurrence of the trap exceeds this number, then the latest trap is sent to the trap destination or management station. Otherwise, no trap is sent. The default is 1. The lowest acceptable value is 1. The upper limit is the size of an integer.
-time <seconds>	If the amount of time between two consecutive occurrences of a given trap exceeds this number, then the latest trap is sent to the trap destination or management station. Otherwise, no trap is sent. The default is 1 second. The lowest acceptable value is 1 second. There is no upper limit.

9.4.2.2.2 Resetting the Trap Log Threshold

This command lets you reset the threshold and time period for sending traps to the trap destination or to a management station. Enter the following parameters:

```
myswitch::configuration snmp trap log threshold> reset
Reset all trap thresholds to defaults [n]? n
```

Entering **n** or pressing **<ENTER>** aborts the command. Entering **y** resets the threshold and time period.

9.4.2.2.3 Displaying the Trap Log Threshold

This command lets you display the threshold and time period for sending traps to the trap destination or to a management station. Enter the following parameters:

```
myswitch::configuration snmp trap log threshold> show
Index Trap                              Threshold     TimePeriod
-----------------------------------------------------------------------
1     asxSwLinkDown                     1             1
2     asxSwLinkUp                       1             1
3     asxHostLinkDown                   1             1
4     asxHostLinkUp                     1             1
5     asxNetModuleDown                  1             1
6     asxNetModuleUp                    1             1
7     asxPsInputDown                    1             1
8     asxPsInputUp                      1             1
9     asxPsOutputDown                   1             1
10    asxPsOutputUp                     1             1
11    asxFanBankDown                    1             1
12    asxFanBankUp                      1             1
Press return for more, q to quit: q
```

The fields in this display are defined as follows:

Field	Description
Index	The index number of the trap.
Trap	The name of the trap.
Threshold	If the number of occurrences of a given trap exceeds the threshold number shown, then the latest trap is sent to the trap destination or management station. Otherwise, no trap is sent.
TimePeriod	If the amount of time between two consecutive occurrences of a given trap exceeds the time period number shown, then the latest trap is sent to the trap destination or management station. Otherwise, no trap is sent.

You can also display the threshold and time period for a specific trap as follows:

```
myswitch::configuration snmp trap log threshold> show [<index>]
myswitch::configuration snmp trap log threshold> show 10
Index Trap                              Threshold     TimePeriod
-----------------------------------------------------------------------
10    asxPsOutputUp                     1             1
```

CHAPTER 10 SPANS Configuration Commands

These commands allow you to manage SPANS (Simple Protocol for ATM Network Signalling), FORE Systems' pre-standard signalling protocol. You can display the list of available subcommands by typing **?** at the **spans** level.

```
myswitch::configuration spans> ?
  delete          new             show
```

10.1 Deleting a SPANS Signalling Path

This command lets you delete an existing SPANS signalling path. Enter the following:

```
myswitch::configuration spans> delete <port> <vpi>
```

ForeThought PNNI (FT-PNNI) uses the SPANS reserved signalling channel (VCI 15) for exchanging its routing information. In the previous releases of *ForeThought* software, when SPANS was deleted on a path, the SPANS signalling channel (VCI 15) was also deleted. This resulted in FT-PNNI routing going down. In *ForeThought* 5.0.x software, the SPANS signalling channel (VCI 15) is deleted on a path only when both SPANS and FT-PNNI are deleted on it.

Therefore, even if SPANS is deleted, as long as FT-PNNI is active, the SPANS signalling channel is kept alive by sending and receiving SPANS status messages on it. So, FT-PNNI could remain active even if SPANS is deleted. The SPANS module on the other side of the link is not aware of SPANS going down on the link (because it still keeps receiving status messages on it).

NOTE

The SPANS topology will have only one unidirectional link from the switch on which SPANS is deleted to the switch on which SPANS is active. The other unidirectional link does not exist. Therefore, no one will be able to ping the switch on which SPANS is deleted.

10.2 Creating a SPANS Signalling Path

This command allows you to create a SPANS signalling path.

NOTE Before a SPANS signalling path can be created on a given VPI, an originating and a terminating path must exist for that same VPI.

Enter the following parameters:

```
myswitch::configuration spans> new <port> <vpi> [-cdvt <cdvt>] [(tag | drop)]
advanced options:
    [-sig <vci>] [-cls <vci>] [-aal (4 | 5 | auto)]
    [-sigbw <Kbps>] [-clsupc <index>]
    [-minvci <vci>] [-maxvci <vci>]
    [-opentimeout <msec>] [-closetimeout <msec>]
```

The parameters for delete and new are defined as follows:

Parameter	Description
port	The port number on which the SPANS signalling path exists.
vpi	The number of the SPANS path.
cdvt	The Cell Delay Variation Tolerance (CDVT) associated with the peak cell rates, in microseconds.
tag | drop	**tag** means that non-compliant cells are tagged. **drop** means that non-compliant cells are dropped.
-sig <vci>	The VCI to use for SPANS signalling messages. The default is 15.
-cls <vci>	The VCI to use for connectionless messages. The default is 14.
-aal	The AAL type to use for this SPANS signalling path. Can be 4, 5, or auto. The default is 4.
sigbw	The amount of bandwidth, in Kbps, to be reserved on the VCI for SPANS signalling messages. The default is 385 Kbps.
-clsupc <index>	The integer index that refers to a specific traffic contract that is used to police the connectionless VCI. If no index is specified, no traffic policing will take place on this VCI. It is assigned a UPC index of 0, and all traffic on this VCI is treated as UBR traffic. This is the default.

Parameter	Description
-minvci <vci>	The bottom number for the range of VCIs to be reserved for SPANS SVCs on this path. The default is 32. You can change this range if you want to limit the number of SVCs on this path, limit the number of SPANS SVCs with respect to UNI SVCs, or divide the VCI range into a region reserved for SPANS SVCs and a region reserved for UNI SVCs.
-maxvci <vci>	The top number for the range of VCIs to be reserved for SPANS SVCs on this path. The default is the maximum number of VCIs that the path supports. You can change this range if you want to limit the number of SVCs on this path, limit the number of SPANS SVCs with respect to UNI SVCs, or divide the VCI range into a region reserved for SPANS SVCs and a region reserved for UNI SVCs.
-opentimeout	The timeout for SPANS open requests. This option should be used on links that have a high propagation delay, such as satellite links. The default is 300 msec.
-closetimeout	The timeout for SPANS close requests. This option should be used on links that have a high propagation delay, such as satellite links. The default is 500 msec.

The following is an example of how to configure SPANS to use only VCIs 32-100 on port 1A1, VPI 0:

```
configuration spans> new 1a1 0 -minvci 32 -maxvci 100
```

10.3 Showing the SPANS Signalling Path Configuration

This command lets you list an individual switch fabric's current SPANS signalling path information. Enter the following parameters:

```
myswitch::configuration spans> show
 Port  VPI  State Type   CDVT  Action RemoteAddress
 4D1     0  up    uni     250  drop   172.19.8.134
 4D2     0  up    uni     250  drop   172.19.8.142
 4D3     0  down  uni     250  drop
 4D4     0  down  uni     250  drop
 4E1     0  up    nni     100  drop
 4E2     0  up    nni     100  drop
 4E3     0  up    nni     100  drop
 4CTL    0  up    uni       0  drop   172.19.8.29
```

The fields in this display are defined as follows:

Field	Description
Port	The port number of the SPANS signalling path.
VPI	The virtual path number of the SPANS signalling path.
State	The current state of the SPANS path. If the state is **up**, this path is operational. If the state is **down**, this interface is not operational.
Type	The type of connection on this SPANS path. If the type listed is **uni**, this is a SPANS user-to-network interface connection to a SPANS host. If the type listed is **nni**, then this is a SPANS network-to-network interface connection to another switch.
CDVT	The Cell Delay Variation Tolerance (CDVT), in microseconds.
Action	**Tag** means that non-compliant cells are tagged. **Drop** means that non-compliant cells are discarded.
Remote Address	The IP address of the remote endstation, if it is available.

To show advanced SPANS signalling path information about all of the ports, enter the following parameters:

```
myswitch::configuration spans> show advanced
 Port  VPI SigVCI CLSVCI AAL MinVCI MaxVCI SigBW CLSUPC OpenT/O CloseT/O OutServ
 4D1     0     15     14 4      32    511   385      0     300      500     vbr
 4D2     0     15     14 4      32    511   385      0     300      500     vbr
 4D3     0     15     14 4      32    511   385      0     300      500     vbr
 4D4     0     15     14 4      32    511   385      0     300      500     vbr
 4E1     0     15     14 4      32   7168   385      0     300      500     vbr
 4E2     0     15     14 4      32   7168   385      0     300      500     vbr
 4E3     0     15     14 4      32   7168   385      0     300      500     vbr
 4CTL    0     15     14 4      32   1023   385      0     300      500     vbr
```

The fields in this display are defined as follows:

Field	Description
Port	The port number of the SPANS signalling path.
VPI	The virtual path number of the SPANS signalling path.
SigVCI	The virtual channel number used for SPANS messages on the SPANS path.
CLSVCI	The VCI used for connectionless messages.
AAL	The AAL type used for SPANS messages.
MinVCI	The bottom number for the range of VCIs to be reserved for SPANS SVCs on this path.
MaxVCI	The top number for the range of VCIs to be reserved for SPANS SVCs on this path.
SigBW	The amount of bandwidth reserved on the VCI for SPANS signalling messages.
CLSUPC	The integer index that refers to a specific UPC contract used to police the connectionless VCI.
OpenT/O	The timeout, in msec, for SPANS open requests.
CloseT/O	The timeout, in msec, for SPANS close requests.
OutServ	Shows that the output SPANS VCC resides in the VBR service queue. This is a read-only field.

To list SPANS information for a specific port, (for example, port 4D1), enter the following parameters:

```
myswitch::configuration spans> show 4d1
 Port  VPI  State Type   CDVT  Action RemoteAddress
 4D1     0  up    uni     250  drop   172.19.8.134
```

The fields in this display are defined in the same manner as those in the previous example.

To list SPANS information for a specific port and path, (for example, port 4D1 and VPI 0), enter the following parameters:

```
myswitch::configuration spans> show 4d1 0
 Port  VPI  State Type   CDVT  Action RemoteAddress
 4D1     0  up    uni     250  drop   172.19.8.134
```

The fields in this display are defined in the same manner as those in the previous example.

To list advanced SPANS information for a specific port and path, (for example, port 4D1 and VPI 0), enter the following parameters:

```
myswitch::configuration spans> show 4d1 0 advanced
 Port  VPI SigVCI CLSVCI AAL MinVCI MaxVCI SigBW CLSUPC OpenT/O CloseT/O OutServ
 4D1     0     15     14 4       32    511   385      0     300      500     vbr
```

The fields in this display are defined in the same manner as those in the previous example.

CHAPTER 11 SPVX Configuration Commands

These commands allow you to configure SPVCCs and SPVPCs. To display the list of available subcommands, type **spvx ?** at the **configuration** level.

```
myswitch::configuration spvx> ?
  spvcc>            spvpc>
```


11.1 SPVCC Configuration Commands

These commands allow you to configure Smart Permanent Virtual Circuit Connections (SPVCCs, hereafter referred to as SPVCs). An SPVC is a connection that goes across multiple switch fabrics. An SPVC looks like a PVC at the local and remote endpoints with an SVC in the middle. SPVCs are more robust than PVCs. If a link carrying a PVC goes down, then the PVC goes down. If a link carrying an SPVC goes down and there is an alternate route, then the end switch fabrics of the SPVC automatically reroute the SPVC around the failed link. To display the list of available subcommands, type **?** at the **spvcc** level.

```
myswitch::configuration spvx spvcc> ?
  spans>            pnni>
```

11.1.1 SPANS SPVCC Configuration Commands

These commands allow you to configure SPANS SPVCs. To create a SPANS SPVC, you must configure the two ends concurrently on the two switch fabrics. Therefore, you must have an AMI session open on both the local switch fabric and the destination switch fabric. To display the list of available subcommands, type **?** at the **spans** level.

```
myswitch::configuration spvx spvcc spans> ?
  delete            new               show
```

11.1.1.1 Deleting a SPANS SPVC

This command allows you to delete an existing SPANS SPVC. There are two different ways to delete an SPVC. Enter the following parameters:

```
myswitch::configuration spvx spvcc spans> delete <Local SPVC ID>
[(source | destination | bidirectional)]

or:

myswitch::configuration spvx spvcc spans> delete <port> <vpi> <vci> \
        <dest-session> <dest-port> <dest-vpi> <dest-vci> \
        [(source | destination | bidirectional)]

Note: The default direction is bidirectional.
```

11.1.1.2 Creating a SPANS SPVC

This command allows you to create a new SPANS SPVC. Enter the following parameters:

```
myswitch::configuration spvx spvcc spans> new <port> <vpi> <vci> <dest-session>
<dest-port> <dest-vpi> <dest-vci> \
[-peak <Kb/sec>] [(source | destination | bidirectional)]

Note: <dest-session> is the name of the open session to the peer switch.
The peer session must be opened with the SNMP read-write community.
```

The parameters for delete and new are defined as follows:

Parameter	Description
Local SPVC ID	Used only with the **delete** command. The unique number that the SCP assigned to this SPANS SPVC when it was created.
port	The port number on the local switch fabric.
vpi	The virtual path number on the local switch fabric.
vci	The virtual channel number on the local switch fabric.
dest-session	The IP address of the remote switch.
dest-port	The port number on the remote switch fabric.
dest-vpi	The virtual path number on the remote switch fabric.
dest-vci	The virtual channel number on the remote switch fabric.

Parameter	Description
-peak <Kb/sec>	The amount of peak bandwidth allocated for this SPANS SPVC, specified in kilobits per second. The default is **0**.
source | destination | bidirectional	**source** means a unidirectional SPANS SPVC going from the local switch fabric to the remote switch fabric will be created. **destination** means a unidirectional SPANS SPVC going from the remote switch fabric to the local switch fabric will be created. **bidirectional** means the pair of unidirectional SPANS SPVCs will be created. The default direction, if you do not specify one, is **bidirectional**.

NOTE

To create a bidirectional SPANS SPVC, you must either specify bidirectional, or you must set up two unidirectional SPANS SPVCs with one going in each direction.

To create a SPANS SPVC, you need to configure the two ends concurrently on the two switch fabrics. Therefore, you first need to open an AMI session to the destination switch fabric by using the SCP's IP address, along with the SNMP read-write community string. The following example depicts how to create a bidirectional SPVC from the local switch fabric (myswitch) to a remote switch fabric (198.29.22.46 named fishtank). The asterisk (*) in front of the prompt indicates that it is a remote session. To return to the local session, you must type **localhost** (instead of the prompt name).

```
myswitch::> open 198.29.22.46 private

Opening a session for "198.29.22.46", please wait...
Connected to "198.29.22.46" (asx200bx).
*fishtank::> localhost

myswitch::configuration spvx spvcc spans new <port> <vpi> <vci> <dest-session>
<dest-port> <dest-vpi> <dest-vci> \
[-peak <Kb/sec>] [(source | destination | bidirectional)]

myswitch::configuration spvx spvcc spans new 1c1 0 49 198.29.22.46 1b1 0 50
```

11.1.1.3 Displaying SPANS SPVC Information

This command allows you to display all of the SPANS SPVCs on an individual switch fabric. Enter the following parameters:

```
myswitch::configuration spvx spvcc spans> show
Local                                    Remote
ID    Port VPI VCI     BW Direction      ID    Port VPI VCI Switch
35664 1C1    0  51    0.0 bidirectional  10427 1B1    0  52 198.29.22.46
65364 1C1    0  49    0.0 bidirectional  42591 1B1    0  50 198.29.22.46
```

The fields in this display are defined as follows:

Field	Description
Local ID	The unique number that the local switch fabric's SCP assigned to this SPANS SPVC when it was created.
Local Port	The port number on the local switch fabric.
Local VPI	The virtual path number on the local switch fabric.
Local VCI	The virtual channel number on the local switch fabric.
Local BW	The amount of peak bandwidth allocated for this SPANS SPVC, specified in Kbps.
Direction	**source** means this is a unidirectional SPANS SPVC going from the local switch fabric to the remote switch fabric. **destination** means this is a unidirectional SPANS SPVC going from the remote switch fabric to the local switch fabric. **bidirectional** this is a pair of unidirectional SPANS SPVCs, with one going in each direction.
Remote ID	The unique number that the remote switch fabric's SCP assigned to this SPANS SPVC when it was created.
Remote Port	The port number on the remote switch fabric.
Remote VPI	The virtual path number on the remote switch fabric.
Remote VCI	The virtual channel number on the remote switch fabric.
Switch	The IP address or name of the remote switch fabric's SCP.

The following is displayed if no SPANS SPVCS have been configured:

```
myswitch::configuration spvx spvcc spans> show
No SPVC information is available
```

11.1.2 PNNI SPVCC Configuration Commands

These commands allow you to configure PNNI SPVCs. Unlike the SPANS SPVCs, PNNI SPVCs are inherently bidirectional, which means that a single signalling call establishes the circuits in both directions. Although PNNI SPVCs are bidirectional, the endpoint that initiates the call setup is the source (originating) and the other endpoint is the destination (terminating). You can display the list of available subcommands by typing **pnni ?** at the **spvcc** level.

```
myswitch::configuration spvx spvcc> pnni ?
  batch              delete             destnsap           new
  modify             parameters>        porttobnp          show
```


11.1.2.1 Batch Command for PNNI SPVCs

This command lets you create or delete a large number of PVCs and/or SPVCs by executing an AMI command script that resides on the FLASH. This same command also exists under **conf vcc** and **conf spvx spvpc pnni**. To use this command, do the following:

1. Create an ASCII text script file on a host. This file should list all of the **new** commands or **delete** commands in the order in which you wish to create or delete the connections.

   NOTE When creating the script, the syntax cannot be abbreviated in the commands; e.g., you must enter **configuration** instead of just **conf**.

2. Compress the script file with the gzip utility.
3. Load the script file on to the switch using the command **oper flash get** *<host:remotefile> <localfile>*.
4. Use the command **conf spvx spvcc batch** *<file>* [**-delay** *<seconds>*] to execute the script on the switch. This command sequentially executes every PVC and SPVC command in the file.

The script executes each command before proceeding to the next command. Some commands may be rejected; e.g., an attempt to create a second PVC with a particular VCI. The number of commands that succeed and fail are totalled separately and are displayed on the AMI console once all of the commands are complete.

The commands and specific options for these commands that are supported in the script include the following:

- **configuration upc new** *<index>* **ubr** [**aal5** [**noPktDisc**]] [**ubrTagging**] [**-name** *<name>*]
- **configuration upc delete** *<index>*
- **configuration vpt new** *<port>* *<vpi>* [(**term** | **orig**)] [**-minvci** *<vci>*] [**-maxvci** *<vci>*]
- **configuration vpt delete** *<port>* *<vpi>* [(**term** | **orig**)]
- **configuration vcc new** *<iport>* *<ivpi>* *<ivci>* *<oport>* *<ovpi>* *<ovci>* [**-upc** *<index>*] [**-name** *<name>*]
- **configuration vcc delete** *<iport>* *<ivpi>* *<ivci>* *<oport>* *<ovpi>* *<ovci>*
- **configuration spvx spvcc pnni new** *<port>* *<vpi>* *<vci>* *<destnsap>*

  [**-priority** *<priority>*]
  -spvcid *<index>* [**-name** *<name>*]
  [**-destvpi** *<vpi>* **-destvci** *<vci>*]
  [**-reroute** (**enable**|**disable**)]
  [**-ftpnniDtlIndex1** *<index1>* [**-ftpnniDtlWeight1** *<weight1>*]]
  [**-ftpnniDtlIndex2** *<index2>* [**-ftpnniDtlWeight2** *<weight2>*]]
  [**-ftpnniDtlIndex3** *<index3>* [**-ftpnniDtlWeight3** *<weight3>*]]
  [**-ftpnniDtlIndex4** <index4> [**-ftpnniDtlWeight4** *<weight4>*]]
  [**-backoff** (**enable** | **disable**)]
- **configuration spvx spvcc pnni delete** *<SPVC ID>*
- **configuration spvx spvpc new** *<port>* *<vpi>* *<destnsap>*

  [**-priority** *<priority>*]
  -spvpcid *<index>*
  [**-name** *<name>*] [**-destvpi** *<vpi>*]
  [**-reroute** (**enable**|**disable**)]
  [**-fupc** *<index>*] [**-bupc** *<index>*]
- **configuration spvx spvpc delete** *<SPVPC ID>*

To use this command, enter the following parameters:

myswitch::configuration spvx spvcc pnni> **batch** *<file.gz>* [**-delay** *<seconds>*]

These parameters are defined as follows:

Parameter	Description
file.gz	The name of the script file that you want to run on the switch. This file must be compressed using the gzip utility.
delay	An optional delay, in seconds, that the switch waits before executing the script file.

11.1.2.2 Deleting a PNNI SPVC

This command allows you to delete an existing PNNI SPVC from the source end. Enter the following parameters:

```
myswitch::configuration spvx spvcc pnni> delete <SPVC ID | SPVC ID range (x-y)>
```

The following is an example of how to delete a PNNI SPVC:

```
myswitch::configuration spvx spvcc pnni> delete 3428
```

If a range is specified, all of the SPVCs that have an SPVC ID within that range are deleted. The total number of SPVCs that are deleted is displayed as follows:

```
myswitch::configuration spvx spvcc pnni> delete 3-10
Total number of SPVCCs deleted : 3
```

If you enter an SPVC ID that does not exist, the following error message is returned:

```
myswitch::configuration spvx spvcc pnni> delete 16451
?ERROR: SPVCC does not exist
```

These parameters are defined as follows:

Parameter	Description
SPVC ID	The index number assigned to this SPVC to identify it uniquely. The SPVC ID is found in the `INDEX` field under **`conf spvx spvcc pnni show`**.
SPVC ID range (x-y)	Enter the range of index numbers of the SPVCs that you want to delete, separated by a hyphen; e.g., 150-300.

11.1.2.3 Obtaining a Destination NSAP for a PNNI SPVC

This command is used at the destination switch to obtain the NSAP address to be used as the *<destnsap>* option under the **conf spvx spvcc pnni new** command at the source switch. Enter the following parameters:

```
myswitch::configuration spvx spvcc pnni> destnsap <domainid> <port>
```

These parameters are defined as follows:

Parameter	Description
<domainid>	The PNNI domain ID number on the destination switch fabric. The prefix corresponding to that routing domain is used to compute the destination NSAP address. For a list of valid domain identifiers use the **conf atmr domain show** command.
<port>	The port on which the permanent portion of the SPVC needs to terminate on the destination switch.

For example:

```
myswitch::configuration spvx spvcc pnni> destnsap 1 1d1
Destination Nsap : 0x47.000580ffe1000000f21a2ec0.0020480d0211.00
```

11.1.2.4 Creating a PNNI SPVC

This command lets you create a PNNI SPVC. Enter the following parameters:

NOTE You do not need to open a session to the destination switch to create a PNNI SPVC because all PNNI SPVCs are bidirectional.

```
myswitch::configuration spvx spvcc pnni> new <port> <vpi> <vci> <destnsap>\
        [-priority <priority>] \
        [-spvcid <index>] \
        [-domainid <id>] \
        [-name <name>] [-destvpi <vpi> -destvci <vci>] \
        [-reroute (enable|disable)] \
        [-fupc <index>] [-bupc <index>]
advanced options:
        [-ftpnniDtlIndex1 <index1> [-ftpnniDtlWeight1 <weight1>]] \
        [-ftpnniDtlIndex2 <index2> [-ftpnniDtlWeight2 <weight2>]] \
        [-ftpnniDtlIndex3 <index3> [-ftpnniDtlWeight3 <weight3>]] \
        [-ftpnniDtlIndex4 <index4> [-ftpnniDtlWeight4 <weight4>]] \
        [-backoff (enable | disable)] \
        [-bearerClass (X | A | C)] [-clip <no|yes>] \
        [-QoSExpIndex <index>]\
        [-fqos (class0 | class1 | class2 | class3 | class4)] \
        [-bqos (class0 | class1 | class2 | class3 | class4)]
```

The parameters for new and modify are defined as follows:

Parameter	Description
SPVC ID or <spvcid> or -spvcid <index>	The index number assigned to this SPVC to identify it uniquely. For PNNI SPVCs, the index number may be assigned either by AMI or by the user. Valid values are integers between 1 and 65535.
port	The port number where the permanent portion of the SPVC resides on the source (local) switch fabric.
vpi	The virtual path number for the permanent portion of the SPVC on the source (local) switch fabric.
vci	The virtual channel number for the permanent portion of the SPVC on the source (local) switch fabric.
destnsap	The ATM NSAP address of the destination (remote) switch for this SPVC. Use the **conf spvx spvcc pnni destnsap** command on the destination switch to obtain this address. See Section 11.1.2.3 for more information.

Parameter	Description
-priority <priority>	The order in which and the frequency with which you want this SPVC to be tried for a connection. Higher priority SPVCs are tried more often than lower priority ones. The value of **`lowestpriority`** determines the number of times each SPVC is tried before attempting a lower priority SPVC. Valid values are from **`1`** to **`lowestpriority`**, with 1 being the highest priority (the first and the most often tried) and with **`lowestpriority`** being the value configured under **`conf spvx spvcc pnni parameters priority lowestpriority`**. The default value is half of the value of **`lowestpriority`**, rounded off to the lowest integer. The value for **`lowestpriority`** is defaulted to 10.
-domainid <id>	The PNNI domain ID number on the source (local) switch fabric. The default is 1, which is the ID of the default routing domain.
-name <name>	An optional name for the user to assign to this PNNI SPVC to help uniquely identify it.
-destvpi <vpi>	The virtual path number on the destination switch fabric for this PNNI SPVC. When using this option, both the `-destvpi` and `-destvci` must be specified. If this option is not used, the destination switch uses any available value.
-destvci <vci>	The virtual channel number on the destination switch fabric for this PNNI SPVC. When using this option, both the `-destvpi` and `-destvci` must be specified. If this option is not used, the destination switch uses any available value.
-reroute (enable | disable)	`enable` indicates that this SPVC will be examined periodically to see if it is using a sub-optimal route. If it is, it will be rerouted according to the parameters in **`conf spvx spvcc pnni parameters reroute`**. `disable` indicates that this SPVC will not be examined periodically to see if it is using a sub-optimal route. The default state for PNNI SPVCs is `disabled`.
-fupc <index>[1]	The forward (going from the local switch fabric to the remote switch fabric) UPC contract index assigned to this SPVC. To find the index you want, use the **`conf upc show`** command. If no index is specified, the default index of `0` (UBR best effort) is used.
-bupc <index>	The backward (going from the remote switch fabric to the local switch fabric) UPC contract index assigned to this SPVC. To find the index you want, use the **`conf upc show`** command. If no index is specified, the default index of `0` (UBR best effort) is used.
-ftpnniDtlIndex1 <index>[2] -ftpnniDtlIndex2 <index> -ftpnniDtlIndex3 <index> -ftpnniDtlIndex4 <index>	A Designated Transit List (DTL) index assigned to this SPVC. Up to four different indices may be assigned to a given SPVC. The DTL specifies the preferred call routing for the SVC portion of the SPVC. The DTL must already exist. To create the DTL, use **`conf atmr ftpnni dtl new`**. To find the DTL index, look in the `Index` field under **`conf atmr ftpnni dtl show`**. See Section 4.3.3 in Part 1 of the *AMI Configuration Commands Reference Manual* for more information about creating DTLs. The associated weight determines the order in which the DTLs are tried. See Section 11.1.2.5 in this manual for more information.
-ftpnniDtlWeight1 <weight> -ftpnniDtlWeight2 <weight> -ftpnniDtlWeight3 <weight> -ftpnniDtlWeight4 <weight>	The weight (priority) assigned to the corresponding DTL index. The weight must be a positive integer and cannot be specified without an index. The default weight is 0. When multiple DTLs are assigned to an SPVC, the DTL with the highest weight is tried first. If it is unusable, the one with the next highest weight is tried. See Section 11.1.2.5 for more information.

Parameter	Description
-priority <priority>	The order in which and the frequency with which you want this SPVC to be tried for a connection. Higher priority SPVCs are tried more often than lower priority ones. The value of **lowestpriority** determines the number of times each SPVC is tried before attempting a lower priority SPVC. Valid values are from **1** to **lowestpriority**, with 1 being the highest priority (the first and the most often tried) and with **lowestpriority** being the value configured under **conf spvx spvcc pnni parameters priority lowestpriority**. The default value is half of the value of **lowestpriority**, rounded off to the lowest integer. The value for **lowestpriority** is defaulted to 10.
-domainid <id>	The PNNI domain ID number on the source (local) switch fabric. The default is 1, which is the ID of the default routing domain.
-name <name>	An optional name for the user to assign to this PNNI SPVC to help uniquely identify it.
-destvpi <vpi>	The virtual path number on the destination switch fabric for this PNNI SPVC. When using this option, both the `-destvpi` and `-destvci` must be specified. If this option is not used, the destination switch uses any available value.
-destvci <vci>	The virtual channel number on the destination switch fabric for this PNNI SPVC. When using this option, both the `-destvpi` and `-destvci` must be specified. If this option is not used, the destination switch uses any available value.
-reroute (enable | disable)	`enable` indicates that this SPVC will be examined periodically to see if it is using a sub-optimal route. If it is, it will be rerouted according to the parameters in **conf spvx spvcc pnni parameters reroute**. `disable` indicates that this SPVC will not be examined periodically to see if it is using a sub-optimal route. The default state for PNNI SPVCs is `disabled`.
-fupc <index>[1]	The forward (going from the local switch fabric to the remote switch fabric) UPC contract index assigned to this SPVC. To find the index you want, use the **conf upc show** command. If no index is specified, the default index of `0` (UBR best effort) is used.
-bupc <index>	The backward (going from the remote switch fabric to the local switch fabric) UPC contract index assigned to this SPVC. To find the index you want, use the **conf upc show** command. If no index is specified, the default index of `0` (UBR best effort) is used.
-ftpnniDtlIndex1 <index>[2] -ftpnniDtlIndex2 <index> -ftpnniDtlIndex3 <index> -ftpnniDtlIndex4 <index>	A Designated Transit List (DTL) index assigned to this SPVC. Up to four different indices may be assigned to a given SPVC. The DTL specifies the preferred call routing for the SVC portion of the SPVC. The DTL must already exist. To create the DTL, use **conf atmr ftpnni dtl new**. To find the DTL index, look in the `Index` field under **conf atmr ftpnni dtl show**. See Section 4.3.3 in Part 1 of the *AMI Configuration Commands Reference Manual* for more information about creating DTLs. The associated weight determines the order in which the DTLs are tried. See Section 11.1.2.5 in this manual for more information.
-ftpnniDtlWeight1 <weight> -ftpnniDtlWeight2 <weight> -ftpnniDtlWeight3 <weight> -ftpnniDtlWeight4 <weight>	The weight (priority) assigned to the corresponding DTL index. The weight must be a positive integer and cannot be specified without an index. The default weight is 0. When multiple DTLs are assigned to an SPVC, the DTL with the highest weight is tried first. If it is unusable, the one with the next highest weight is tried. See Section 11.1.2.5 for more information.

Parameter	Description
-backoff (enable | disable)	`enable` means the backoff mechanism will be used for this SPVC. Directed DTLs that are configured for this SPVC will not be retried for 30 minutes upon a failure. This allows old information to age out. `disable` means the backoff mechanism will not be used for this SPVC. Directed DTLs that are configured for this SPVC will be retried continually upon a failure. The default is `enable`. See Section 11.1.2.5 for more information.
-bearerClass (X | A | C)	The requested broadband bearer class for this SPVC. `X` is for all types of ATM media. `A` is for non-ATM CBR media. `C` is for non-ATM VBR, UBR, and ABR media. The default is `X`.
-clip <no | yes>	During speech transmission, clipping is the loss of a brief interval at the beginning of a speech spurt. `no` indicates this SPVC is not susceptible to clipping. `yes` indicates this SPVC is susceptible to clipping. The default is `no`.
-QoSExpIndex <index>	The index number in the QoS expansion table that is used to do QoS class-to-parameter expansion when sending the SPVC call set-up message across a PNNI link. See the `QoSExpIndex` field under **`conf qos show`** for this number. The qosindex that is specified for this SPVC must already be present in the switch. The default is `0`.
-fqos (class0 | class1 | class2 | class3 | class4)	The requested QoS class for this SPVC in the forward (calling to called) direction. The `-fqos` and `-bqos` options must be either both class0 or both a non-zero class. The default is `class0`.
-bqos (class0 | class1 | class2 | class3 | class4)	The requested QoS class for this SPVC in the backward (called to calling) direction. The `-fqos` and `-bqos` options must be either both class0 or both a non-zero class. The default is `class0`.

1. The forward and backward UPC contracts that you specify must be compatible with the `bearerClass` parameter for the SPVC (e.g., all parameters are for VBR traffic or CBR traffic).
2. If you configure an SPVC to use a specific FT-PNNI DTL that you have created, the SVC portion of the SPVC always uses that path as long as it is available, even if there is another path that has a lesser link cost.

NOTE

When creating an SPVC, the `-fqos` and `-bqos` options must be either both `class0` or both a non-zero class. For example, the `-fqos` cannot be `class0` and the `-bqos` be `class1`. This combination is invalid. Having an `-fqos` of `class0` and a `-bqos` of `class0` is a valid combination, and having an `-fqos` of `class1` and a `-bqos` of `class4` is a valid combination, but having an `-fqos` of `class2` and a `-bqos` of `class0` is not valid.

NOTE

The *<destprefix:destport>* option has been removed. You must use the *<destnsap>* option of specifying the destination. You can use the **conf spvx spvcc pnni destnsap** command, on the destination switch to get the NSAP address to be used with the **conf spvx spvcc pnni new** command at the source switch.

The following is an example of how to create a simple PNNI SPVC.

1. Open a session to the destination switch as follows:

```
myswitch::> open 198.29.22.46 private
Opening a session for “198.29.22.46”, please wait...
Connected to “198.29.22.46” (asx200bx).
*fishtank::>
```

2. Run the following command on the destination switch to obtain that switch’s NSAP address:

```
*fishtank::>conf spvx spvcc pnni destnsap 1 1d1
Destination Nsap : 0x47.000580ffe1000000f21a2ec0.0020480d0211.00
```

3. Go back to the source switch and create a new PNNI SPVC. Copy the NSAP address into the command for the *<destnsap>* parameter:

```
*fishtank::> localhost
myswitch::>conf spvx spvcc pnni new 1a1 0 100
0x47.000580ffe1000000f21a2ec0.0020480d0211.00
```

The following is an example of how to create a PNNI SPVC that uses DTLs.

1. Perform steps 1 and 2 above.
2. Go back to the source switch and create a new PNNI SPVC. Copy the NSAP address into the command for the *<destnsap>* parameter. Indicate the indices and weights that you want to use for the DTLs.

```
*fishtank::> localhost
myswitch::>conf spvx spvcc pnni new 1a1 0 100
0x47.000580ffe1000000f21a2ec0.0020480d0211.00 -reroute enable -ftpnniDtlIndex1
1 -ftpnniDTLWeight1 300 -ftpnniDtlIndex2 2 -ftpnniDTLWeight2 250
-ftpnniDtlIndex3 3 -ftpnniDTLWeight3 200
```

11.1.2.5 Using DTLs with PNNI SPVCs

Designated Transit Lists (DTLs) are created using the **`conf atmroute ftpnni dtl new`** command. A DTL is a source route which specifies the preferred call routing for the SVC portion of a directed SPVC. A DTL is a source route (index) and each entry (row) in the DTL represents a single hop in the source route. See Section 4.3.3 of Part 1 of the *AMI Configuration Commands Reference Manual* for more information and for a description of how to create a DTL.

Once you have created the DTLs, you can apply up to four of them to be used on a particular PNNI SPVC using the **`-ftpnniDtlIndex`** and **`-ftpnniDtlWeight`** options. The DTL weight indicates the priority in which the DTLs are tried, with the highest weight being the first one tried. The weights are arbitrary (e.g., 10, 20, 30, and 40). You can even assign two or more DTLs with the same weight.

When an SPVC is created with DTLs assigned to it, the DTL with the highest weight is tried first. If this DTL is unusable, the DTL with the next highest weight is tried. This process is repeated until a specified DTL is found that provides a route to the destination which satisfies the QoS requirements.

If none of the user-specified DTLs can be used, and if the **`-reroute`** option under **`conf spvx spvcc pnni new`** (or **`modify`**) is set to **`enable`**, then the call is dynamically routed. If that option is set to **`disable`**, then the call setup fails, but the DTLs are retried periodically.

If any of the DTLs fail, an entry is made in the syslog, which indicates that the attempt failed, which DTL was tried, and the time at which the failure occurred. Also, when a DTL fails, a back-off mechanism is used to determine when to retry that particular DTL. The DTL is not attempted for 30 minutes in order to allow any old information to age out. However, you can enable or disable this back-off mechanism on a per-SPVC basis using the **`-backoff`** option under **`conf spvx spvcc pnni new`** (or **`modify`**). The default setting is **`enable`**. If you disable this mechanism, then instead of waiting for 30 minutes after a failure, the DTLs are retried continually. If the **`-backoff`** option is changed using the **`modify`** command on an existing SPVC, the remaining waiting period for any failed DTLs is cleared and the DTLs are attempted again.

Once an SPVC is established, the SPVC is checked periodically to see that the most preferred route is being used. If the most preferred route is not being used, an attempt is made to re-establish the circuit using a DTL with a higher weight. If this succeeds, but not with the designated most preferred route, then this process is continued until the SPVC is using the designated most preferred route. DTLs with equal weights are ignored on a retry once an SPVC is established with a given weight.

11.1.2.6 Modifying a PNNI SPVC

This command lets you modify an existing PNNI SPVC from the source end. Enter the following:

```
myswitch::configuration spvx spvcc pnni> modify <spvcid> \
 [-priority <priority>]\
 [-reroute (enable|disable)] \
 [-backoff (enable|disable) \
 [-ftpnniDtlIndex1 <index1>] [-ftpnniDtlWeight1 <weight1>] \
 [-ftpnniDtlIndex2 <index2>] [-ftpnniDtlWeight2 <weight2>] \
 [-ftpnniDtlIndex3 <index3>] [-ftpnniDtlWeight3 <weight3>] \
 [-ftpnniDtlIndex4 <index4>] [-ftpnniDtlWeight4 <weight4>]
```

These parameters are defined in Section 11.1.2.4.

If you want to use the modify command to remove an existing DTL from your list, you only need to enter the index number as 0. For example, you have two DTLs as follows:

```
myswitch::configuration spvx spvcc pnni> show advanced
Originating PNNI SPVCs:
       Source             Destination
 INDEX PORT VPI  VCI  UPC PORT VPI  VCI  UPC VPVC-SEL  PRIORITY  STATE
 402   1B4  0    402  0   3A1  0    402  0   require   1         up
       Destination: 0x47.0005.80.ffe100.0000.f21c.28c8.0020480d0072.00
 BearerClass=classX,ForwardQos=class0,BackwardQos=class0,Clip=no
 Cost = 200, Reroute = enabled, Backoff = enabled, Name = N/A
#FtPnniDtlIndex1 = 1, FtPnniDtlWeight1 = 300
FtPnniDtlIndex2 = 2, FtPnniDtlWeight2 = 250
FtPnniDtlIndex3 = none, FtPnniDtlWeight3 = none
FtPnniDtlIndex4 = none, FtPnniDtlWeight4 = none
```

To delete FtPnniDtlIndex2 from the list, enter the following:

```
myswitch::configuration spvx spvcc pnni> modify -ftpnniDtlIndex2 0
myswitch::configuration spvx spvcc pnni> show advanced
Originating PNNI SPVCs:
       Source             Destination
 INDEX PORT VPI  VCI  UPC PORT VPI  VCI  UPC VPVC-SEL  PRIORITY  STATE
 402   1B4  0    402  0   3A1  0    402  0   require   1         up
       Destination: 0x47.0005.80.ffe100.0000.f21c.28c8.0020480d0072.00
 BearerClass=classX,ForwardQos=class0,BackwardQos=class0,Clip=no
 Cost = 200, Reroute = enabled, Backoff = enabled, Name = N/A
#FtPnniDtlIndex1 = 1, FtPnniDtlWeight1 = 300
FtPnniDtlIndex2 = none, FtPnniDtlWeight2 = none
FtPnniDtlIndex3 = none, FtPnniDtlWeight3 = none
FtPnniDtlIndex4 = none, FtPnniDtlWeight4 = none
```

11.1.2.7 Configuring PNNI SPVC Parameters

The pacing parameters under **conf spvx spvcc pnni parameters pacing** regulate the call setup cycle for SPVCs that are "down" (established, but currently not active). The pacing cycle is as follows:

1. For all SPVCs in the down state, attempt the *<number>* of SPVC call setups.
2. Pause for *<interval>* seconds between attempts.
3. If unsuccessful, go to step 1.

Rerouting parameters regulate whether or not to evaluate periodically the efficiency of the routes used by the PNNI SPVCs that are up (established and currently active). If enabled, the rerouting cycle is as follows:

1. Check the current call routing cost for all PNNI SPVCs that are up. (The call routing cost is the sum of all the link costs over the call route (for *ForeThought* PNNI) or the sum of the administrative weight over the call route (for PNNI). The current cost for a particular SPVC can be displayed using **conf spvx spvcc pnni show advanced**.)
2. Check to see if better (new call routing cost is less by *<threshold>* percentage) routes are available. If not, go to step 3. If so, release the SPVC and reroute (attempting to reconnect using the pacing cycle) those that can be improved and then go to step 3.
3. Pause for *<interval>* seconds.
4. Go to step 1.

Type **parameters ?** at the **pnni** level to display the available subcommands.

```
myswitch::configuration spvx spvcc pnni> parameters ?
  pacing>            priority>          reroute>           lbubr>
```

11.1.2.7.1 Configuring Pacing for PNNI SPVCs

If a switch has a large number of SPVCs configured in the CDB, it tries to open the SPVCs all at once when it reboots. Therefore, it is advantageous to pace the number of SPVCs that are opened at once, so that each is serviced properly. This command lets you set the SPVC controller to open only the configured number of SPVCs and to schedule itself for callback after the specified time interval if there are more SPVCs to be opened, both at start up and at the retry callback. To display the available subcommands, type **?** at the **pacing** level.

```
myswitch::configuration spvx spvcc pnni parameters pacing> ?
  interval         number           show
```

11.1.2.7.1.1 Setting the PNNI SPVC Pacing Interval

This command allows you to change the interval between call setup attempts for SPVCs that are down. Enter the following parameters:

```
myswitch::configuration spvx spvcc pnni parameters pacing> interval <seconds>
```

This parameter is defined as follows:

Parameter	Description
interval <seconds>	The interval, in seconds, between call setup attempts. Values can be from **1** to **300** seconds. The default is **2** seconds.

11.1.2.7.1.2 Setting the Number of PNNI SPVC Calls

This command lets you configure the number of SPVCs that can be set up at one time during an attempt. Enter the following parameters:

```
myswitch::configuration spvx spvcc pnni parameters pacing> number <count>
```

This parameter is defined as follows:

Parameter	Description
number <count>	The number of SPVCs which can be set up at one time during an attempt. Values can be from **1** to **1000**. The default is **20** calls.

11.1.2.7.1.3 Displaying the PNNI SPVC Pacing Parameters

This command lets you display the parameters that have been set for attempting call setups between PNNI SPVCs that are down. Enter the following parameters:

```
myswitch::configuration spvx spvcc pnni parameters pacing> show
Pacing will setup 20 calls per cycle with 2 seconds between cycles.
```

11.1.2.7.2 Configuring the Priority for PNNI SPVCs

These commands let you configure and display the value of the lowest priority for the **-priority** *<priority>* option under **conf spvx spvcc pnni new** and **modify**. To display the available subcommands, type **?** at the **priority** level.

```
myswitch::configuration spvx spvcc pnni parameters priority> ?
  lowestpriority     show
```

11.1.2.7.2.1 Configuring the Lowest Priority Value for PNNI SPVCs

This command lets you configure the value of **lowestpriority** for the **-priority** *<priority>* option under **conf spvx spvcc pnni new** and **modify**. Enter the following:

```
myswitch::configuration spvx spvcc pnni parameters priority> lowestpriority
<priority>
```

This parameter is defined as follows:

Parameter	Description
lowestpriority <priority>	The value that you want to be the lowest value (last tried and least often tried) when determining the order in which and the frequency with which SPVCs are tried for a connection. This value cannot be less than the priority of an existing SPVC and it cannot be greater than 100. The default is **10**.

11.1.2.7.2.2 Displaying the Lowest Priority Value for PNNI SPVCs

This command lets you display the value of **lowestpriority** for the **-priority** *<priority>* option under **conf spvx spvcc pnni new** and **modify**. Enter the following:

```
myswitch::configuration spvx spvcc pnni parameters priority> show
The lowest priority is 10
```

11.1.2.7.3 Configuring Rerouting for PNNI SPVCs

Sometimes SPVCs are forced to use a less than optimal route because of temporary link failures or because of an inconsistent routing database. This command lets you configure the SPVC controller to check for SPVCs that are using less than optimal routes and reroute them if a better route becomes available. For PNNI, a path is considered "better" than another path if its administrative weight is lower by a specified percentage. For *ForeThought* PNNI, a path is considered "better" than another path if it has a lower link cost. You can display the list of available subcommands by typing **?** at the **reroute** level.

```
myswitch::configuration spvx spvcc pnni parameters reroute> ?
  interval         number           show             threshold
```


11.1.2.7.3.1 Setting the Interval between the Rerouting of PNNI SPVCs

This command lets you indicate the number of seconds between callbacks to the SPVC controller to reroute PNNI SPVCs. Enter the following parameters:

```
myswitch::configuration spvx spvcc pnni parameters reroute> interval <seconds>
```

This parameter is defined as follows:

Parameter	Description
interval <seconds>	The time interval, in seconds, between successive callbacks to the SPVC controller to check for and reroute existing SPVC connections if a better path becomes available. The default is **10** seconds. The range of valid values is **1** to **3600**, inclusive.

11.1.2.7.3.2 Setting the Number of PNNI SPVCs to be Rerouted per Interval

At each interval between reroutes, you can check a certain number of the active SPVCs to see if they are using optimal routes. This command lets you determine the number of SPVCs that are analyzed at each interval.

```
myswitch::configuration spvx spvcc pnni parameters reroute> number <count>
```

This parameter is defined as follows:

Parameter	Description
number <count>	Indicates how many SPVCs that are up, per interval, will be analyzed to determine whether or not those SPVCs need to be rerouted. The default is **20** SPVCs. The range of valid values is **1** to **1000**, inclusive.

11.1.2.7.3.3 Displaying PNNI SPVC Reroute Information

This command lets you display information about PNNI SPVC rerouting. Enter the following parameters:

```
myswitch::configuration spvx spvcc pnni parameters reroute> show

Rerouting analyzes 20 calls per cycle with 10 seconds between cycles.

The new call routing cost must show a 50 percent improvement over
the current call routing cost before the call is rerouted.
```

11.1.2.7.3.4 Setting the Improvement Threshold for Rerouting

This command lets you configure the routing cost improvement percentage against which the SPVCs are analyzed to see if there is a better route available. Enter the following parameters:

```
myswitch::configuration spvx spvcc pnni parameters reroute> threshold <percent>
```

This parameter is defined as follows:

Parameter	Description
threshold <percent>	The minimum percentage improvement in the cost that the new SPVC path must have over the current SPVC path before a reroute is performed. The default value is **50** percent. The range of valid values is **1** to **99**, inclusive.

11.1.2.7.4 Configuring the Default Load-balanced UBR Bandwidth for SPVCs

These commands let you configure the default estimated bandwidth value, in cells per second, for individual UBR SPVCs. You can display the list of available subcommands by typing **?** at the **lbubr** level.

```
myswitch::configuration spvx spvcc pnni parameters lbubr> ?
  defaultbandwidth      show
```

11.1.2.7.4.1 Assigning the Default Load-balanced UBR Bandwidth for SPVCs

This command lets you assign a default estimated bandwidth value, in kilocells per second, for individual UBR SPVCs. This value is used by the load-balanced UBR routing feature under **`conf atmr ftpnni lbubr`**. See Section 4.3.1 in Part 1 of this manual for more information about load-balanced UBR routing. Enter the following parameters:

```
myswitch::configuration spvx spvcc pnni parameters lbubr> defaultbandwidth <kcps>
```

This parameter is defined as follows:

Parameter	Description
<kcps>	The default estimated bandwidth value, in kilocells per second, to be used when calculating load-balanced UBR routing. The value must be an integer from 0 to 65534. The default is **1** kcps (0.424 Mbps).

11.1.2.7.4.2 Displaying the Default Load-balanced UBR Bandwidth for SPVCs

This command lets you display the default estimated bandwidth value for individual UBR SPVCs. This value is used by the load-balanced UBR routing feature under **`conf atmr ftpnni lbubr`**. See Section 4.3.1 in Part 1 of this manual for more information about load-balanced UBR routing. Enter the following:

```
myswitch::configuration spvx spvcc pnni parameters lbubr> show
The default Estimated UBR Bandwidth is 1 Kilo Cells/Sec
```

11.1.2.8 Displaying the BNP Notation for a Port Identifier

The destination port of originating SPVCs and SPVPs and the source port of terminating SPVCs and SPVPs is displayed as a port identifier (e.g., 0). If the destination port for an originating SPVC is displayed as the port identifier x, you can convert this to BNP form by entering this command at the destination switch with x as the *<portidentifier>*. For a terminating SPVC, enter this command on the originating switch to convert the source port identifier to its BNP format. Enter the following:

```
myswitch::configuration spvx spvcc pnni> porttobnp <portidentifier>
```

This parameter is defined as follows:

Parameter	Description
<portidentifier>	The port identifier that you want to convert to BNP notation.

For example, suppose you have an SPVC that originates on an ASX-1000 named shark and terminates on an ASX-4000 named fishtank. If you enter **conf spvx spvcc pnni show** on shark, a value of 0 might be displayed for the port on the destination end (fishtank) as follows:

```
shark::>conf spvx spvcc pnni show
Originating PNNI SPVCCs:
       Source             Destination
 INDEX PORT VPI  VCI  UPC PORT VPI  VCI  UPC VPVC-SEL PRIORITY  STATE
 402   1C1  0    402  0   0    0    402  0   require  1         up
       Destination: 0x47.0005.80.ffe100.0000.f21c.28c8.0020480d0072.00

Terminating PNNI SPVCCs:
       Source         Destination
 INDEX PORT VPI  VCI  PORT VPI  VCI  STATE
 2     2    0    401  1B4    0  401  up
       Source: 0x47.0005.80.ffe100.0000.f21c.28d8.0020480d00b4.00
```

To convert the destination port value of 0 to BNP, log into fishtank and enter the **conf spvx spvcc pnni porttobnp** command with 0 as the parameter.

```
fishtank::>conf spvx spvcc pnni porttobnp 0
Port identifier 0 is port 1A1
```

The output indicates that the BNP value is 1A1. This command can also be used in the same way for terminating SPVCs.

11.1.2.9 Displaying PNNI SPVC Information

This command allows you to display all of the PNNI SPVCs that originate and terminate on an individual switch fabric. By entering **show ?**, you can list the various ways of displaying PNNI SPVC information as follows:

```
myswitch::configuration spvx spvcc pnni> show ?
usage: show [<spvcid>] [(orig | term)] [(advanced | summary)]
```

These parameters are defined as follows:

Parameter	Description
show	By entering **show** with no arguments, basic information is displayed for all originating and terminating PNNI SPVCs associated with this switch.
spvcid	By entering **show** with a specific *<spvcid>*, lists basic information for only that PNNI SPVC.
orig	By entering **show** with **orig**, basic information is displayed for all originating PNNI SPVCs associated with this switch.
term	By entering **show** with **term**, basic information is displayed for all terminating PNNI SPVCs associated with this switch.
advanced	By entering **show** with **advanced**, both basic and advanced information is displayed for the PNNI SPVCs specified in the option.
summary	By entering **show** with **summary**, only the first line of basic information is displayed for each PNNI SPVC. This option is useful for quickly finding out information such as which PNNI SPVCs are up and which are down, or the priority of the PNNI SPVCs.

11.1.2.9.1 Displaying Basic PNNI SPVC Information

To display basic information about all PNNI SPVCs on this switch, enter the following:

```
myswitch::configuration spvx spvcc pnni> show
Originating PNNI SPVCCs:
       Source              Destination
 INDEX PORT VPI  VCI  UPC PORT VPI  VCI  UPC VPVC-SEL PRIORITY  STATE
 402   1C1  0    402  0   18   0    402  0   require  1         down
       Destination: 0x47.0005.80.ffe100.0000.f21c.28c8.0020480d0072.00

Terminating PNNI SPVCCs:
       Source         Destination
 INDEX PORT VPI  VCI  PORT VPI  VCI  STATE
 2     2    0    401  1B4  0    401  up
       Source: 0x47.0005.80.ffe100.0000.f21c.28d8.0020480d00b4.00
```

The fields in this display are defined as follows:

Field	Description
Source INDEX	The index number assigned to this PNNI SPVC by AMI to identify it uniquely from other PNNI SPVCs that have this switch fabric as their source.
Source PORT	The port identifier on the originating switch fabric that contains the permanent portion for this PNNI SPVC.
Source VPI	The virtual path number used in the permanent portion of this PNNI SPVC on the originating switch fabric.
Source VCI	The virtual channel number in the permanent portion of this PNNI SPVC on the originating switch fabric.
Source UPC	The forward (going from the local switch fabric to the remote switch fabric) UPC contract index associated with this PNNI SPVC.
Source	The NSAP ATM address for the originating side of the PNNI SPVC.
Destination PORT	The port identifier on the terminating switch fabric that contains the permanent portion for this PNNI SPVC, if the destination end is a FORE switch. If the port at the destination switch cannot be determined, a question mark (`?`) is displayed.
Destination VPI	The virtual path number used in the permanent portion of this PNNI SPVC on the destination switch fabric. **`any`** means the user did not specify the VPI to be used at the destination.
Destination VCI	The virtual channel number used in the permanent portion of this PNNI SPVC on the destination switch fabric. **`any`** means the user did not specify the VCI to be used at the destination.
Destination UPC	The backward (going from the remote switch fabric to the local switch fabric) UPC contract index associated with this PNNI SPVC.
Destination VPVC-SEL	**`NoPref`** means that you did not specify which VPI/VCI combination that the destination switch should use for the permanent portion when this PNNI SPVC was created. If the destination switch is a FORE switch, the values are displayed in the `Destination VPI` and `Destination VCI` fields. If the destination switch is not a FORE switch, a `?` is displayed in the `Destination VPI` and `Destination VCI` fields. `Require` means that the destination switch must use the VPI/VCI combination given for the permanent portion when the PNNI SPVC was created.
PRIORITY	The order in which this SPVC is tried for a connection. Values are from **`1`** to **`lowestpriority`**, with 1 being the highest priority (the first tried and the most often tried) and with **`lowestpriority`** being the value configured under **`conf spvx spvcc pnni parameters priority lowestpriority`**. This option is independent of the **`ftpnniDtlIndex`** options. This option only applies to the source switch.
STATE	The state of this SPVC. Can be **`up`** or **`down`**.
Destination	The NSAP ATM address for the terminating side of the PNNI SPVC.

11.1.2.9.2 Displaying Advanced PNNI SPVC Information

To display advanced information about PNNI SPVCs on this switch, enter the following:

```
myswitch::configuration spvx spvcc pnni> show advanced
Originating PNNI SPVCCs:
       Source             Destination
 INDEX PORT VPI  VCI  UPC PORT VPI  VCI  UPC VPVC-SEL PRIORITY STATE
 402   1C1  0    402  0   18   0    402  0   require  1        down
       Destination: 0x47.0005.80.ffe100.0000.f21c.28c8.0020480d0072.00
 BearerClass = classX, ForwardQos = class0, BackwardQos = class0, Clip = no
 Cost = 200, Reroute = disabled, Backoff = enabled, Name = N/A
 #FtPnniDtlIndex1 = 1, FtPnniDtlWeight1 = 30
 FtPnniDtlIndex2 = 2, FtPnniDtlWeight2 = 20
 FtPnniDtlIndex3 = 3, FtPnniDtlWeight3 = 10
 FtPnniDtlIndex4 = none, FtPnniDtlWeight4 = none
 Domainid = 1, QoSExpIndex = 0
 Last Failure Cause = resource-unavailable-or-unspecified-Cause47
 Downtime = 0 days 05:46, Retry Count = 1851

Terminating PNNI SPVCCs:
       Source         Destination
 INDEX PORT VPI  VCI  PORT VPI  VCI  STATE
 2     2    0    401  1B4  0    401  up
       Source: 0x47.0005.80.ffe100.0000.f21c.28d8.0020480d00b4.00
 BearerClass = classX, ForwardQos = class0, BackwardQos = class0, Clip = no
 Uptime = 0 days 05:46
The # denotes the DTL currently being used to route the SPVCC
```

The basic information fields in this display are defined as listed previously for **`conf spvx spvc pnni show`**. The advanced information fields in this display are defined as follows:

Field	Description
BearerClass	The broadband bearer class specified for this PNNI SPVC. Can be `classA`, `classC`, or `classX`.
ForwardQos	The requested quality of service for this SPVC in the forward (calling to called) direction.
BackwardQos	The requested quality of service for this SPVC in the backward (called to calling) direction.
Clip	`no` means this PNNI SPVC is not susceptible to clipping and `yes` means it is susceptible to clipping.
Cost	The current call routing cost for this originating PNNI SPVC. If the SPVC is down, shows `N/A`..

Field	Description
Reroute	`enable` means this SPVC is examined to see if it is using a sub-optimal route. If it is, it is rerouted according to the parameters in **`conf spvx spvcc pnni parameters reroute`**. `disable` means this SPVC is not examined to see if it is using a sub-optimal route.
Backoff	`enabled` means the backoff mechanism is used for this SPVC, so DTLs that are configured for this SPVC are not retried for 30 minutes upon a failure. This allows old information to age out. `disabled` means the backoff mechanism is not used for this SPVC, so DTLs that are configured for this SPVC are retried continually upon a failure.
Name	The optional name assigned to this PNNI SPVC to help identify it. If no name is assigned, `N/A` is displayed.
FtPnniDtl Index	The Designated Transit List (DTL) indices assigned to this SPVC. The DTL specifies the preferred call routing for the SVC portion of the SPVC. Up to four indices may be assigned to a given SPVC. If an index has not been specified for a particular SPVC, its value is displayed as `none`. The associated weight determines the order in which the DTLs are tried. A hash mark (#) before the DTL index shows which DTL is currently being used to route the SPVC.
FtPnniDtl Weight	The weight (priority) assigned to the corresponding DTL index. When multiple DTLs are assigned to an SPVC, the DTL with the highest weight is tried first. If it is unusable, the one with the next highest weight is tried. If a weight has not been specified for a particular SPVC, its value is displayed as `none`.
Domainid	The PNNI domain ID number on the source (local) switch fabric.
QoSExpIndex	The index number in the QoS expansion table that is used to do QoS class-to-parameter expansion when sending the SPVC call set-up message across a PNNI link. See the `QoSExpIndex` field under **`conf qos show`** for this number.
Last Failure Cause	The reason for the last call setup failure for this PNNI SPVC. This field is only displayed for originating SPVCs that are down.
Uptime	If applicable, shows, in hundredths of a second, the time since this PNNI SPVC was created or the time since the last successful call setup occurred. The `STATE` shows `up`.
Downtime	If applicable, shows, in hundredths of a second, the time that this PNNI SPVC has been down. The `STATE` shows `down`.
Retry Count	Displays the number of times the call setup has been attempted since the PNNI SPVC was created or since the last successful call setup occurred. This is only displayed when the `STATE` is **`down`**.

NOTE

If you create an SPVC with a specific FT-PNNI DTL index; e.g., index 2, and the SPVC is routed on that DTL, then at a later time, you delete the DTL entry with DTL index 2 from the table of DTLs using **conf atmr ftpnni dtl delete**, the SPVC stays up and continues to follow the route it was set up with, namely, that specified by DTL index 2. Any new SPVCs that are created will not use DTL index 2. However, any other existing SPVCs that were specified with index 2 will continue to use this route. To have the SPVC stop using that route, you can either delete and recreate the SPVC, or give the new path a different index (e.g., 3 from **conf atmr ftpnni show**) and use the **conf spvx spvcc pnni modify** command on the SPVC to replace DTL index 2 with DTL index 3.

11.1.2.9.3 Displaying Summary PNNI SPVC Information

When the **summary** option is specified, only the first line of basic information is displayed for each SPVC. This option is useful for quickly finding out information such as which SPVCs are up and which are down, or the priority of the SPVCs. To display summary information about PNNI SPVCs on a switch, enter the following:

```
myswitch::configuration spvx spvcc pnni> show summary
Originating PNNI SPVCCs:
       Source                Destination
 INDEX PORT  VPI  VCI  UPC   PORT  VPI  VCI  UPC   VPVC-SEL PRIORITY  STATE
 2172  4B1   0    103  0     0     any  any  0     noPref   10        up
 20184 4B1   0    102  0     0     0    32   0     noPref   10        up
 23880 4B1   0    104  0     0     any  any  0     noPref   10        up
 24108 4B1   0    101  0     0     0    33   0     noPref   10        up

Terminating PNNI SPVCCs:
       Source          Destination
 INDEX PORT  VPI  VCI  PORT  VPI  VCI  STATE
 1     0     0    100  4B2   0    32   up
 2     0     0    101  4B2   0    33   up
```

You can also display summary information for just the originating or just the terminating SPVCs as follows:

```
myswitch::configuration spvx spvcc pnni> show orig summary
Originating PNNI SPVCCs:
       Source                Destination
 INDEX PORT  VPI  VCI  UPC   PORT  VPI  VCI  UPC   VPVC-SEL PRIORITY  STATE
 2172  4B1   0    103  0     0     any  any  0     noPref   10        up
 20184 4B1   0    102  0     0     0    32   0     noPref   10        up
 23880 4B1   0    104  0     0     any  any  0     noPref   10        up
 24108 4B1   0    101  0     0     0    33   0     noPref   10        up

myswitch::configuration spvx spvcc pnni> show term summary
Terminating PNNI SPVCCs:
       Source          Destination
 INDEX PORT  VPI  VCI  PORT  VPI  VCI  STATE
 1     0     0    100  4B2   0    32   up
 2     0     0    101  4B2   0    33   up
```

You can also display summary information for an individual SPVC as follows:

```
myswitch::configuration spvx spvcc pnni> show 1 term summary
Terminating PNNI SPVCC:
       Source           Destination
 INDEX PORT  VPI  VCI   PORT  VPI  VCI  STATE
 1     0     0    100  4B2   0    32   up
```

The fields in all of these displays are defined as listed previously for **`conf spvx spvc pnni show`**.

If no PNNI SPVCs have been configured, you receive the following message:

```
myswitch::configuration spvx spvcc pnni> show
Originating PNNI SPVCCs:
 No originating PNNI SPVCC information is available

Terminating PNNI SPVCCs:
 No terminating PNNI SPVCC information is available
```

11.2 SPVPC Configuration Commands

These commands allow you to configure Smart Permanent Virtual Path Connections (SPVPCs, hereafter to referred to as SPVPs). An SPVP is a path that goes across multiple switch fabrics. An SPVP looks like a PVP at the local and remote endpoints with a Switched Virtual Path (SVP) in the middle. SPVPs are more robust than PVPs. If an SPVP goes down and there is an alternate route, then the end switch fabrics of the SPVP automatically reroute the SPVP around the failed link.

NOTE

SVPs and SPVPs are supported in ATM Forum PNNI networks, but are not supported in *ForeThought* PNNI networks. Also, point-to-multipoint SVPs and SPVPs are not supported.

To display the list of available subcommands, type **?** at the **spvpc** level.

```
myswitch::configuration spvx spvpc> ?
  batch              delete             destnsap           new
  modify             parameters>        porttobnp          show
```

11.2.1 Batch Command for SPVPCs

This command lets you create or delete a large number of SPVPs by executing an AMI command script that resides on the FLASH. This same command also exists under **conf vcc** and **conf spvx spvcc pnni**. To use this command, do the following:

1. Create an ASCII text script file on a host. This file should list all of the **new** commands or **delete** commands in the order in which you wish to create or delete the paths.

   NOTE

   When creating the script, the syntax cannot be abbreviated in the commands; e.g., you must enter **configuration** instead of just **conf**.

2. Compress the script file with the gzip utility.
3. Load the script file on to the switch using the command **oper flash get** *<host:remotefile> <localfile>*.
4. Use the command **conf spvx spvpc batch** *<file>* [**-delay** *<seconds>*] to execute the script on the switch. This command sequentially executes every SPVP command in the file.

The script executes each command before proceeding to the next command. Some commands may be rejected; e.g., an attempt to create a second SPVP with a particular VPI. The number of commands that succeed and fail are totalled separately and are displayed on the AMI console once all of the commands are complete.

The commands and specific options for these commands that are supported in the script include the following:

- **configuration upc new** *<index>* **ubr** [**aal5** [**noPktDisc**]] [**ubrTagging**] [**-name** *<name>*]
- **configuration upc delete** *<index>*
- **configuration vpt new** *<port>* *<vpi>* [(**term** | **orig**)] [**-minvci** *<vci>*] [**-maxvci** *<vci>*]
- **configuration vpt delete** *<port>* *<vpi>* [(**term** | **orig**)]
- **configuration vcc new** *<iport>* *<ivpi>* *<ivci>* *<oport>* *<ovpi>* *<ovci>* [**-upc** *<index>*] [**-name** *<name>*]
- **configuration vcc delete** *<iport>* *<ivpi>* *<ivci>* *<oport>* *<ovpi>* *<ovci>*
- **configuration spvx spvcc pnni new** *<port>* *<vpi>* *<vci>* *<destnsap >*

  [**-priority** *<priority>*]
  -spvcid *<index>* [**-name** *<name>*]
  [**-destvpi** *<vpi>* **-destvci** *<vci>*]
  [**-reroute** (**enable**|**disable**)]
  [**-ftpnniDtlIndex1** *<index1>* [**-ftpnniDtlWeight1** *<weight1>*]]
  [**-ftpnniDtlIndex2** *<index2>* [**-ftpnniDtlWeight2** *<weight2>*]]
  [**-ftpnniDtlIndex3** *<index3>* [**-ftpnniDtlWeight3** *<weight3>*]]
  [**-ftpnniDtlIndex4** <index4> [**-ftpnniDtlWeight4** *<weight4>*]]
  [**-backoff** (**enable** | **disable**)]
- **configuration spvx spvcc pnni delete** *<SPVC ID>*
- **configuration spvx spvpc new** *<port>* *<vpi>* *<destnsap>*

  [**-priority** *<priority>*]
  -spvpcid *<index>*
  [**-name** *<name>*] [**-destvpi** *<vpi>*]
  [**-reroute** (**enable**|**disable**)]
  [**-fupc** *<index>*] [**-bupc** *<index>*]
- **configuration spvx spvpc delete** *<SPVPC ID>*

To use this command, enter the following parameters:

```
myswitch::configuration spvx spvpc> batch <file.gz> [-delay <seconds>]
```

These parameters are defined as follows:

Parameter	Description
file.gz	The name of the script file that you want to run on the switch. This file must be compressed using the gzip utility.
delay	An optional delay, in seconds, that the switch waits before executing the script file.

11.2.2 Deleting an SPVPC

This command allows you to delete an existing SPVP from the source end. Enter the following parameters:

```
myswitch::configuration spvx spvpc> delete <SPVPC ID | SPVPC ID range (x-y)>
```

The following is an example of how to delete a SPVP:

```
myswitch::configuration spvx spvpc> delete 3428
```

If a range is specified, all of the SPVPs that have an SPVPC ID within that range are deleted. The total number of SPVPs that are deleted is displayed as follows:

```
myswitch::configuration spvx spvpc> delete 5-25
Total number of SPVPCs deleted : 6
```

If you enter an SPVPC ID that does not exist, the following error message is returned:

```
myswitch::configuration spvx spvpc> delete 16451
?ERROR: PNNI SPVPC 16451 does not exist
```

The parameters for delete are defined as follows:

Parameter	Description
SPVPC ID	The index number assigned to this SPVPC to identify it uniquely. The SPVPC ID is found in the `INDEX` field under **`conf spvx spvpc pnni show`**.
SPVPC ID range (x-y)	Enter the range of index numbers of the SPVPCs that you want to delete, separated by a hyphen; e.g., 150-300.

11.2.3 Obtaining a Destination NSAP for an SPVPC

This command is used at the destination switch to obtain the NSAP address to be used as the *<destnsap>* option under the **conf spvx spvpc new** command at the source switch. Enter the following parameters:

```
myswitch::configuration spvx spvpc> destnsap <domainid> <port>
```

These parameters are defined as follows:

Parameter	Description
<domainid>	The PNNI domain ID number on the destination switch fabric. The prefix corresponding to that routing domain is used to compute the destination NSAP address. For a list of valid domain identifiers use the **conf atmr domain show** command.
<port>	The port on which the permanent portion of the SPVPC needs to terminate on the destination switch.

For example:

```
myswitch::configuration spvx spvpc pnni> destnsap 1 1d1
Destination Nsap : 0x47.000580ffe1000000f21a2ec0.0020480d0211.00
```

11.2.4 Creating an SPVPC

This command lets you create an SPVP. Enter the following parameters:

NOTE You do not need to open a session to the destination switch to create an SPVP because all SPVPs are bidirectional.

```
myswitch::configuration spvx spvpc> new <port> <vpi> <destnsap> \
        [-priority <priority>]\
        [-spvpcid <index>] \
        [-domainid <id>] \
        [-name <name>] [-destvpi <vpi>] \
        [-reroute (enable|disable)] \
        [-fupc <index>] [-bupc <index>]

advanced options:
        [-clip <no|yes>] \
        [-QoSExpIndex <index>] \
        [-fqos (class0|class1|class2|class3|class4)] \
        [-bqos (class0|class1|class2|class3|class4)]
```

These parameters are defined as follows:

Parameter	Description
SPVPC ID or <spvpcid> or -spvpcid <index>	The index number assigned to this SPVP to identify it uniquely. For SPVPs, the index number may be assigned either by AMI or by the user. Valid values are integers between 1 and 65535.
port	The port number where the permanent portion of the SPVP resides on the source (local) switch fabric.
vpi	The virtual path number for the permanent portion of the SPVP on the source (local) switch fabric.
destnsap	The ATM NSAP address of the destination (remote) switch for this SPVP.
-priority <priority>	The order in which and the frequency with which you want this SPVP to be tried for a connection. Higher priority SPVPs are tried more often than lower priority ones. The value of **lowestpriority** determines the number of times each SPVP is tried before attempting a lower priority SPVP. Valid values are from **1** to **lowestpriority**, with 1 being the highest priority (the first tried) and with **lowestpriority** being the value configured under **conf spvx spvpc parameters priority lowestpriority**. The default value is half of the value of **lowestpriority**, rounded off to the lowest integer. The value for **lowestpriority** is defaulted to 10.
-domainid <id>	The PNNI domain ID number on the source (local) switch fabric. The default is 1, which is the ID of the default routing domain.
-name <name>	An optional name for the user to assign to this SPVP to help uniquely identify it.

Parameter	Description
-destvpi <vpi>	The virtual path number on the destination switch fabric for this SPVP. If this option is not used, the destination switch uses any available value.
-reroute (enable | disable)	`enable` indicates that this SPVP will be examined periodically to see if it is using a sub-optimal route. If it is, it will be rerouted according to the parameters in **`conf spvx spvpc parameters reroute`**. `disable` indicates that this SPVP will not be examined periodically to see if it is using a sub-optimal route. The default state for SPVPs is `disabled`.
-fupc <index>	The forward (going from the local switch fabric to the remote switch fabric) UPC contract index assigned to this SPVP. To find the index you want, use the **`conf upc show`** command. If no index is specified, the default index of `0` (UBR best effort) is used.
-bupc <index>[1]	The backward (going from the remote switch fabric to the local switch fabric) UPC contract index assigned to this SPVP. To find the index you want, use the **`conf upc show`** command. If no index is specified, the default index of `0` (UBR best effort) is used.
-clip <no | yes>	During speech transmission, clipping is the loss of a brief interval at the beginning of a speech spurt. `no` indicates this SPVP is not susceptible to clipping. `yes` indicates this SPVP is susceptible to clipping. The default is `no`.
-QoSExpIndex <index>	The index number in the QoS expansion table that is used to do QoS class-to-parameter expansion when sending the SPVP call set-up message across a PNNI link. See the `QoSExpIndex` field under **`conf qos show`** for this number. The qosindex that is specified for this SPVP must already be present in the switch. The default is `0`.
-fqos (class0 | class1 | class2 | class3 | class4)	The requested QoS class for this SPVP in the forward (calling to called) direction. The `-fqos` and `-bqos` options must be either both class0 or both a non-zero class. The default is `class0`.
-bqos (class0 | class1 | class2 | class3 | class4)	The requested QoS class for this SPVP in the backward (called to calling) direction. The `-fqos` and `-bqos` options must be either both class0 or both a non-zero class. The default is `class0`.

1. Packet discard and partial packet policing are not supported on SPVPs. Therefore, even if the forward and/or backward UPC specifies one or both of these options, the options are considered disabled.

NOTE

When creating an SPVP, the `-fqos` and `-bqos` options must be either both `class0` or both a non-zero class. For example, the `-fqos` cannot be `class0` and the `-bqos` be `class1`. This combination is invalid. Having an `-fqos` of `class0` and a `-bqos` of `class0` is a valid combination, and having an `-fqos` of `class1` and a `-bqos` of `class4` is a valid combination, but having an `-fqos` of `class2` and a `-bqos` of `class0` is not valid.

NOTE

SPVPs can only be set up over PNNI links. They cannot be set up over FT-PNNI links.

The following is an example of how to create a simple PNNI SPVP.

1. Open a session to the destination switch as follows:

```
myswitch::> open 198.29.22.46 private
Opening a session for “198.29.22.46”, please wait...
Connected to “198.29.22.46” (asx200bx).
*fishtank::>
```

2. Run the following command on the destination switch to obtain that switch’s NSAP address:

```
*fishtank::>conf spvx spvpc destnsap 1 1d1
Destination Nsap : 0x47.000580ffe1000000f21a2ec0.0020480d0211.00
```

3. Go back to the source switch and create a new PNNI SPVP. Copy the NSAP address into the command for the *<destnsap>* parameter:

```
*fishtank::> localhost
myswitch::>conf spvx spvpc new 1a1 0 100
0x47.000580ffe1000000f21a2ec0.0020480d0211.00
```

11.2.5 Modifying an SPVPC

This command lets you modify the priority of an existing SPVP from the source end. Enter the following:

```
myswitch::configuration spvx spvpc pnni> modify <spvpcid> \
 [-priority <priority>]
```

These parameters are defined as follows:

Parameter	Description
<spvpcid>	The index number assigned to this SPVP to identify it uniquely. For SPVPs, the index number may be assigned either by AMI or by the user. Valid values are integers between 1 and 65535.
-priority <priority>	The order in which and the frequency with which you want this SPVP to be tried for a connection. Higher priority SPVPs are tried more often than lower priority ones. The value of **lowestpriority** determines the number of times each SPVP is tried before attempting a lower priority SPVP. Valid values are from **1** to **lowestpriority**, with 1 being the highest priority (the first tried) and with **lowestpriority** being the value configured under **conf spvx spvpc parameters priority lowestpriority**. The default value is half of the value of **lowestpriority**, rounded off to the lowest integer. The value for **lowestpriority** is defaulted to 10.

11.2.5.1 Configuring SPVPC Parameters

The pacing parameters under **conf spvx spvpc parameters pacing** regulate the call setup cycle for SPVPs that are "down" (established, but currently not active). The pacing cycle is as follows:

1. For all SPVPs in the down state, attempt the *<number>* of SPVP call setups.
2. Pause for *<interval>* seconds between attempts.
3. If unsuccessful, go to step 1.

Rerouting parameters regulate whether or not to evaluate periodically the efficiency of the routes used by the SPVPs that are up (established and currently active). If enabled, the rerouting cycle is as follows:

1. Check the current call routing cost for all SPVPs that are up. (The call routing cost is the sum of all the link costs over the sum of the administrative weight over the call route (for PNNI). The current cost for a particular SPVP can be displayed using **conf spvx spvpc show advanced**.)
2. Check to see if better (new call routing cost is less by *<threshold>* percentage) routes are available. If not, go to step 3. If so, release the SPVP and reroute (attempting to reconnect using the pacing cycle) those that can be improved and then go to step 3.
3. Pause for *<interval>* seconds.
4. Go to step 1.

Type **parameters ?** at the **spvpc** level to display the available subcommands.

```
myswitch::configuration spvx spvpc pnni> parameters ?
  pacing>            priority>          reroute>
```

11.2.5.1.1 Configuring Pacing for SPVPCs

If a switch has a large number of SPVPs configured in the CDB, it tries to open the SPVPs all at once when it reboots. Therefore, it is advantageous to pace the number of SPVPs that are opened at once, so that each is serviced properly. This command lets you set the SPVP controller to open only the configured number of SPVPs and to schedule itself for callback after the specified time interval if there are more SPVPs to be opened, both at start up and at the retry callback. To display the available subcommands, type **?** at the **pacing** level.

```
myswitch::configuration spvx spvpc parameters pacing> ?
  interval          number            show
```

11.2.5.1.2 Setting the SPVPC Pacing Interval

This command allows you to change the interval between call setup attempts for SPVPs that are down. Enter the following parameters:

```
myswitch::configuration spvx spvpc parameters pacing> interval <seconds>
```

This parameter is defined as follows:

Parameter	Description
interval <seconds>	The interval, in seconds, between call setup attempts. Values can be from **1** to **300** seconds. The default is **2** seconds.

11.2.5.1.3 Setting the Number of SPVPC Calls

This command lets you configure the number of SPVPs that can be set up at one time during an attempt. Enter the following parameters:

```
myswitch::configuration spvx spvpc parameters pacing> number <count>
```

This parameter is defined as follows:

Parameter	Description
number <count>	The number of SPVPs which can be set up at one time during an attempt. Values can be from **1** to **1000**. The default is **20** calls.

11.2.5.1.4 Displaying the SPVP Pacing Parameters

This command lets you display the parameters that have been set for attempting call setups between SPVPs that are down. Enter the following parameters:

```
myswitch::configuration spvx spvpc parameters pacing> show
Pacing will setup 20 calls per cycle with 2 seconds between cycles.
```

11.2.5.2 Configuring the Priority for SPVPCs

These commands let you configure and display the value of the lowest priority for the **-priority** *<priority>* option under **conf spvx spvpc new** and **modify**. To display the available subcommands, type **?** at the **priority** level.

```
myswitch::configuration spvx spvpc parameters priority> ?
  lowestpriority     show
```

11.2.5.2.1 Configuring the Lowest Priority Value for PNNI SPVCs

This command lets you configure the value of **lowestpriority** for the **-priority** *<priority>* option under **conf spvx spvpc new** and **modify**. Enter the following:

```
myswitch::configuration spvx spvpc parameters priority> lowestpriority
<priority>
```

This parameter is defined as follows:

Parameter	Description
lowestpriority <priority>	The value that you want to be the lowest value (last tried and least often tried) when determining the order in which and the frequency with which SPVPs are tried for a connection. This value cannot be less than the priority of an existing SPVP and it cannot be greater than 100. The default is **10**.

11.2.5.2.2 Displaying the Lowest Priority Value for PNNI SPVCs

This command lets you display the value of **lowestpriority** for the **-priority** *<priority>* option under **conf spvx spvpc new** and **modify**. Enter the following:

```
myswitch::configuration spvx spvpc parameters priority> show
The lowest priority is 10
```

11.2.5.3 Configuring Rerouting for SPVPCs

Sometimes SPVPs are forced to use a less than optimal route because of temporary link failures or because of an inconsistent routing database. This command lets you configure the SPVP controller to check for SPVPs that are using less than optimal routes and reroute them if a better route becomes available. For PNNI, a path is considered "better" than another path if its administrative weight is lower by a specified percentage. You can display the list of available subcommands by typing **?** at the **reroute** level.

```
myswitch::configuration spvx spvpc parameters reroute> ?
  interval         number           show             threshold
```

11.2.5.3.1 Setting the Interval between the Rerouting of SPVPCs

This command lets you indicate the number of seconds between callbacks to the SPVP controller to reroute SPVPs. Enter the following parameters:

```
myswitch::configuration spvx spvpc parameters reroute> interval <seconds>
```

This parameter is defined as follows:

Parameter	Description
interval <seconds>	The time interval, in seconds, between successive callbacks to the SPVP controller to check for and reroute existing SPVPs if a better route becomes available. The default is **15** seconds.

11.2.5.3.2 Setting the Number of SPVPCs to be Rerouted per Interval

At each interval between reroutes, you can check a certain number of the active SPVPs to see if they are using optimal routes. This command lets you determine the number of SPVPs that are analyzed at each interval.

```
myswitch::configuration spvx spvpc parameters reroute> number <count>
```

This parameter is defined as follows:

Parameter	Description
number <count>	Indicates how many up SPVPs, per interval, will be analyzed to determine whether or not those SPVPs need to be rerouted. The default is **15** SPVPs.

11.2.5.3.3 Displaying PNNI SPVPC Reroute Information

This command lets you display information about SPVP rerouting. Enter the following parameters:

```
myswitch::configuration spvx spvpc parameters reroute> show

Rerouting analyzes 15 calls per cycle with 15 seconds between cycles.

The new call routing cost must show a 75 percent improvement over
the current call routing cost before the call is rerouted.
```

11.2.5.3.4 Setting the Improvement Threshold for Rerouting

This command lets you configure the routing cost improvement percentage against which the SPVPs are analyzed to see if there is a better route available. Enter the following parameters:

```
myswitch::configuration spvx spvpc parameters reroute> threshold <percent>
```

This parameter is defined as follows:

Parameter	Description
threshold <percent>	The minimum percentage improvement in the cost that the new SPVP must have over the current SPVP before a reroute is performed. The default value is **75** percent. The range of valid values is **1** to **99**, inclusive.

11.2.6 Displaying the BNP Notation for a Port Identifier

The destination port of originating SPVCs and SPVPs and the source port of terminating SPVCs and SPVPs is displayed as a port identifier (e.g., 0). If the destination port for an originating SPVP is displayed as the port identifier x, you can convert this to BNP form by entering this command at the destination switch with x as the *<portidentifier>*. For a terminating SPVP, enter this command on the originating switch to convert the source port identifier to its BNP format. Enter the following:

```
myswitch::configuration spvx spvpc> porttobnp <portidentifier>
```

This parameter is defined as follows:

Parameter	Description
<portidentifier>	The port identifier that you want to convert to BNP notation.

For example, suppose you have an SPVP that originates on an ASX-1000 named shark and terminates on an ASX-4000 named fishtank. If you enter **conf spvx spvpc show** on shark, a value of 0 might be displayed for the port on the destination end (fishtank) as follows:

```
shark::>conf spvx spvpc show
Originating PNNI SPVPCs:
       Source              Destination
 INDEX PORT VPI  UPC PORT VPI  UPC VPVC-SEL PRIORITY STATE
 402   1C1  6    0   0    8    0   require  1        down
       Destination: 0x47.0005.80.ffe100.0000.f21c.28c8.0020480d0072.00
Terminating PNNI SPVPCs:
       Source         Destination
 INDEX PORT VPI  PORT VPI  STATE
 2     2    12   1B4  30   up
       Source: 0x47.0005.80.ffe100.0000.f21c.28d8.0020480d00b4.00
```

To convert the destination port value of 0 to BNP, log into fishtank and enter the **conf spvx spvpc porttobnp** command with 0 as the parameter.

```
fishtank::>conf spvx spvpc porttobnp 0
Port identifier 0 is port 1A1
```

The output indicates that the BNP value is 1A1. This command can also be used in the same way for terminating SPVPs.

11.2.7 Displaying SPVP Information

This command allows you to display all of the SPVPs that originate and terminate on an individual switch fabric. By entering **show ?**, you can list the various ways of displaying SPVP information as follows:

```
myswitch::configuration spvx spvpc> show ?
usage: show [<spvpcid>] [(orig | term)] [(advanced | summary)]
```

These parameters are defined as follows:

Parameter	Description
show	By entering **show** with no arguments, basic information is displayed for all originating and terminating SPVPs associated with this switch.
spvpcid	By entering **show** with a specific *<spvpcid>*, lists basic information for only that SPVP.
orig	By entering **show** with **orig**, basic information is displayed for all originating SPVPs associated with this switch.
term	By entering **show** with **term**, basic information is displayed for all terminating SPVPs associated with this switch.
advanced	By entering **show** with **advanced**, both basic and advanced information is displayed for the SPVPs specified in the option.
summary	By entering **show** with **summary**, only the first line of basic information is displayed for each SPVP. This option is useful for quickly finding out information such as which SPVPs are up and which are down, or the priority of the SPVPs.

11.2.7.1 Displaying Basic SPVP Information

To display basic information about all SPVPs on this switch, enter the following:

```
myswitch::configuration spvx spvpc> show
Originating PNNI SPVPCs:
       Source             Destination
 INDEX PORT VPI  UPC PORT VPI  UPC VPVC-SEL PRIORITY STATE
 402   1C1  6    0   18   8    0   require  1        down
       Destination: 0x47.0005.80.ffe100.0000.f21c.28c8.0020480d0072.00
Terminating PNNI SPVPCs:
       Source         Destination
 INDEX PORT VPI  PORT VPI  STATE
 2     2    12   1B4  30   up
       Source: 0x47.0005.80.ffe100.0000.f21c.28d8.0020480d00b4.00
```

The fields in this display are defined as follows:

Field	Description
Source INDEX	The index number assigned to this SPVP by AMI to identify it uniquely from other SPVPs that have this switch fabric as their source.
Source PORT	The port identifier on the originating switch fabric that contains the permanent portion for this SPVP.
Source VPI	The virtual path number used for the through path in the permanent portion of this SPVP on the originating switch fabric.
Source UPC	The forward (going from the local switch fabric to the remote switch fabric) UPC contract index associated with this SPVP.
Source	The NSAP ATM address for the originating side of the SPVP.
Destination PORT	The port identifier on the terminating switch fabric that contains the permanent portion for this SPVP, if the destination end is a FORE switch. If the port at the destination switch cannot be determined, a question mark (`?`) is displayed.
Destination VPI	The virtual path number on the destination switch fabric that contains the permanent portion for this SPVP. **`any`** means the user did not specify the VPI to be used at the destination.
Destination UPC	The backward (going from the remote switch fabric to the local switch fabric) UPC contract index associated with this SPVP.
Destination VPVC-SEL	**`NoPref`** means that you did not specify which VPI that the destination switch should use for the permanent portion of the through path when this SPVP was created. If the destination switch is a FORE switch, the value is displayed in the `Destination VPI` field. If the destination switch is not a FORE switch, a `?` is displayed in the `Destination VPI` field. `Require` means that the destination switch must use the VPI given when the SPVP was created for the permanent portion of the through path.
PRIORITY	The order in which this SPVP is tried for a connection. Values are from **`1`** to **`lowestpriority`**, with 1 being the highest priority (the first tried and the most often tried) and with **`lowestpriority`** being the value configured under **`conf spvx spvpc parameters priority lowestpriority`**. This option only applies to the source switch.
STATE	The state of this SPVP. Can be **`up`** or **`down`**.
Destination	The NSAP ATM address for the terminating side of the SPVP.

11.2.7.2 Displaying Advanced SPVP Information

To display advanced information about SPVPs on this switch, enter the following:

```
myswitch::configuration spvx spvpc> show advanced
Originating PNNI SPVPCs:
       Source             Destination
 INDEX PORT VPI  UPC PORT VPI  UPC VPVC-SEL PRIORITY STATE
 402   1C1  40   0   18   38   0   require  1        down
       Destination: 0x47.0005.80.ffe100.0000.f21c.28c8.0020480d0072.00
 ForwardQos = class0,BackwardQos = class0,Clip = no
 Cost = 5040, Reroute = disabled, Name = N/A
 Domainid = 1, QoSExpIndex = 0
 Last Failure Cause = resource-unavailable-or-unspecified-Cause47
 Downtime = 0 days 05:46, Retry Count = 25

Terminating PNNI SPVPCs:
       Source         Destination
 INDEX PORT VPI  PORT VPI  STATE
 2     2    18   1B4  12   up
       Source: 0x47.0005.80.ffe100.0000.f21c.28d8.0020480d00b4.00
 ForwardQos = class0,BackwardQos = class0,Clip = no
 Uptime = 0 days 05:46
```

The basic information fields in this display are defined as listed previously for **`conf spvx spvpc show`**. The advanced information fields in this display are defined as follows:

Field	Description
ForwardQos	The requested quality of service for this SPVP in the forward (calling to called) direction.
BackwardQos	The requested quality of service for this SPVP in the backward (called to calling) direction.
Clip	`no` means this SPVP is not susceptible to clipping and `yes` means it is susceptible to clipping.
Cost	The current call routing cost for this originating SPVP. If the SPVP is down, shows `N/A`.
Reroute	`enable` means this SPVP is examined to see if it is using a sub-optimal route. If it is, it is rerouted according to the parameters in **`conf spvx spvpc parameters reroute`**. `disable` means this SPVP is not examined to see if it is using a sub-optimal route.
Name	The optional name assigned to this SPVP to help identify it. If no name is assigned, `N/A` is displayed.
Domainid	The PNNI domain ID number on the source (local) switch fabric.

Field	Description
QoSExpIndex	The index number in the QoS expansion table that is used to do QoS class-to-parameter expansion when sending the SPVP call set-up message across a PNNI link. See the `QoSExpIndex` field under **`conf qos show`** for this number.
Last Failure Cause	The reason for the last call setup failure for this SPVP. This field is only displayed for originating SPVPs that are down.
Uptime	If applicable, shows, in hundredths of a second, the time since this SPVP was created or the time since the last successful call setup occurred. The `STATE` shows `up`.
Downtime	If applicable, shows, in hundredths of a second, the time that this SPVP has been down. The `STATE` shows `down`.
Retry Count	Displays the number of times the call setup has been attempted since the SPVP was created or since the last successful call setup occurred. This is only displayed when the `STATE` is **`down`**.

11.2.7.3 Displaying Summary SPVP Information

When the **`summary`** option is specified, only the first line of basic information is displayed for each SPVP. This option is useful for quickly finding out information such as which SPVPs are up and which are down, or the priority of the SPVPs. To display summary information about SPVPs on a switch, enter the following:

```
myswitch::configuration spvx spvpc> show summary
Originating PNNI SPVPCs:
       Source           Destination
 INDEX PORT  VPI  UPC   PORT  VPI  UPC   VPVC-SEL PRIORITY STATE
 1     4B1   10   0     179   any  0     noPref   10       up
 2     4B1   11   0     179   any  0     noPref   10       up

Terminating PNNI SPVPCs:
       Source     Destination
 INDEX PORT  VPI  PORT  VPI  STATE
 1     0     100  4B1   1    up
 2     0     102  4B1   2    up
```

You can also display summary information for just the originating or just the terminating SPVPs as follows:

```
myswitch::configuration spvx spvpc> show orig summary
Originating PNNI SPVPCs:
       Source           Destination
 INDEX PORT  VPI  UPC   PORT  VPI  UPC   VPVC-SEL PRIORITY STATE
 1     4B1   10   0     179   any  0     noPref   10       up
 2     4B1   11   0     179   any  0     noPref   10       up

myswitch::configuration spvx spvpc> show term summary
Terminating PNNI SPVPCs:
       Source     Destination
 INDEX PORT  VPI  PORT  VPI  STATE
 1     0     100  4B1   1    up
 2     0     102  4B1   2    up
```

You can also display summary information for an individual SPVP as follows:

```
myswitch::configuration spvx spvpc> show 1 orig summary
Originating PNNI SPVPC:
       Source           Destination
 INDEX PORT  VPI  UPC   PORT  VPI  UPC   VPVC-SEL PRIORITY STATE
 1     4B1   10   0     179   any  0     noPref   10       up
```

The fields in all of these displays are defined as listed previously for **`conf spvx spvpc show`**.

If no SPVPs have been configured, you receive the following message:

```
Originating PNNI SPVPCs:
 No originating PNNI SPVPC information is available

Terminating PNNI SPVPCs:
 No terminating PNNI SPVPC information is available
```

CHAPTER 12 Switch Configuration Commands

These commands allow you to configure default settings for the switch. You can display the list of available subcommands by typing **`switch ?`** at the **`configuration`** level.

```
myswitch::configuration> switch ?
  callrecord>        clockscale         cp                 fabric_id
  name               oam                pmpmaxvci          pmpminvci
  pools>             show               timezone
```

12.1 Call Records and Performance Monitoring

These commands let you configure call records that are used for billing purposes and configure performance monitoring for system performance. You can display the list of available subcommands by typing **`callrecord ?`** at the **`switch`** level.

```
myswitch::configuration switch> callrecord ?
  new              modify           enable           disable
  delete           password         show
```

12.1.1 Creating Call Record or Performance Monitoring Variables

This command lets you configure new call record or performance monitoring transfer variables. Enter the following parameters:

```
myswitch::configuration switch callrecord> new (cr|perf) <primary-URL>
        <secondary-URL> <userid>\
        [-interval <recording-interval-in-minutes>]
Note: <primary-URL> and <secondary-URL> are of the form
      //<ip-address>[:port][<pathname>[<filename>]]
```

The following is an example of how to set up the variables for a call record transfer:

```
myswitch::configuration switch callrecord> new cr //169.14.149.90/us/bob/info/
cr/switcha/ //169.14.0.90/us/bob/info/cr/switcha/ bob -interval 1
```

12.1.2 Modifying Call Record or Performance Monitoring Variables

This command lets you modify the call record or performance monitoring transfer variables. Enter the following parameters:

```
myswitch::configuration switch callrecord> modify (cr|perf)
        [-primary <primary-URL>]\
        [-secondary <secondary-URL>] \
        [-userid <userid>] [-interval <recording-interval-in-minutes>]
Advanced options for cr:
        [-memory <percentage>] [-action <rejectCall|noRecord>]
Note: <primary-URL> and <secondary-URL> are of the form
        //<ip-address>[:port][<pathname>[<filename>]]
```

The following is an example of how to modify the variables for a call record transfer:

```
myswitch::configuration switch callrecord> modify cr -action noRecord
```

These parameters for new and modify are defined as follows:

Parameter	Description
cr	Indicates a call record transfer variable is being configured.
perf	Indicates a performance monitoring transfer variable is being configured.
primary-URL	The primary URL for call record or performance monitoring transfers in the form: `//<ip-address>[:port][<pathname>[<filename>]]` If the `Admin status` is `on` and this URL is changed, the change takes effect at the next recording interval.
ip-address	The IP address of the host to contact.
port	The port number on the host to contact.
pathname	The directory on the host into which the call record or performance monitoring files should be saved.
filename	The filename on the host into which the call record or performance monitoring files should be saved.
The pathname and filename are each strings of characters consisting of the following special tokens:	
%T	The type of switch.
%N	The “SerialNumber” for an ASX-200BX or TNX-210, or the “EnclosureNumber.Serial-Number” for an ASX-1000, ASX-4000, or TNX-1100.
%I	The switch’s IP address (e.g., 169.144.1.90).

Parameter	Description
%D	The date and time formatted as follows: YYYYMMDDhhmm.
%R	The interval between recordings, in minutes.
%C	The contents of the call record file; **`account`** is for call record data and **`stats`** is for performance monitoring data.
%F	The status of the file; **`co`** is for the file to which the switch fabric is currently writing, `cc` is for the file to which the switch fabric has completed writing. If the pathname is not specified, the default file is transferred to the login directory specified in *<userid>*. The following string is used as the default filename in the case where the URL ends with a "/" (i.e., without any filename): `%T_%C.%D.%R.%N.%F` If multiple switches are to write to the same location, the pathname or filename should contain either a `%I` or a `%N` token. A `%D` token in the filename portion separates each recording interval worth of data into a different file with the name being the time that the file was created. The following example would record every switch type and switch IP into a separate directory with a file at each recording interval: **`//169.144.1.5/usr/auditlog/%T/%I/%D`** Given an ASX-200BX switch with an IP address of 169.44.4.4, this would produce files in the following directory tree structure: **`/usr/auditlog/ASX200BX/169.44.4.4/9608252355`** If the filename specified is not made up of the above tokens, then it is used as a prefix to the default filename. If the file transfer attempt fails, the switch generates a trap and attempts a transfer to the `secondary-URL`. If the `Admin status` is `secondary-URL` and this URL is changed, the change takes effect at the next recording interval.
secondary-URL	The URL is to be used in the event that the transfer to the primary URL is not successful. If the file transfer attempt to this URL fails as well, the switch generates a trap. If the `Admin status` is `on` and this URL is changed, the change takes effect at the next recording interval.
userid	The userid to be used for the data transfer sessions to the primary and secondary data servers. If the `Admin status` is `on` and this URL is changed, the change takes effect at the next recording interval.
recording-interval-in-minutes	The interval (in minutes) at which the data is transferred to the host. If the `Admin status` is `on` and this value is changed, the change takes effect at the next recording interval. Valid values are integers greater than or equal to 1. The default is 5 minutes.
memory	Specifies what portion of the processor DRAM is to be reserved for call records. Changing this value affects the amount of memory available for signalling and routing, and may result in increased call blocking. A change in this value takes effect only after the next call record initialization (i.e., when the `Admin status` changes from `off` to `on` or when the switch (fabric) is rebooted). Valid values are from 1 - 50%. The default is 15%.
action	The action that the switch (fabric) should take if the memory allocated for call records runs out. **`rejectCall`** means that the call should be rejected. **`noRecord`** means that the call should be allowed, but no call record should be generated for that call. If this value is changed, it takes effect immediately. The default is **`rejectCall`**.

12.1.3 Enabling Call Record or Performance Monitoring Transfers

This command lets you enable (turn on) call recording or performance monitoring transfers for the switch (fabric). The password must be set using **conf switch callrecord password** before you can enable call recording or performance monitoring transfers. Enter the following:

```
myswitch::configuration switch callrecord> enable perf
or   enable cr [-memory <percentage>] [-action <rejectCall|noRecord>]
```

The following is an example of how to enable a call record transfer:

```
myswitch::configuration switch callrecord> enable cr -memory 20 -action noRecord
```

12.1.4 Disabling Call Record or Performance Monitoring Transfers

This command allows you to disable (turn off) call recording or performance monitoring transfers for the switch (fabric). Enter the following parameters:

```
myswitch::configuration switch callrecord> disable (cr|perf)
```

The following is an example of how to disable a call record transfer:

```
myswitch::configuration switch callrecord> disable cr
Are you sure you want to disable Callrecords [n]? y
Callrecords disabled
```

These parameters for enable and disable are defined as follows:

Parameter	Description
perf	The performance monitoring functionality is to be enabled[1] / disabled[2].
cr	The call recording functionality is to be enabled / disabled.
memory	Specifies what portion of the processor DRAM is to be reserved for call records. Changing this value affects the amount of memory available for signalling and routing, and may result in increased call blocking. A change in this value takes effect only after the next call record initialization (i.e., when the `Admin status` changes from `off` to `on` or when the switch (fabric) is rebooted). Valid values are from 1 - 50%. The default is 15%.
action	The action that the switch (fabric) should take if the memory allocated for call records runs out. **rejectCall** means that the call is rejected. **noRecord** means that the call is allowed, but no call record is generated for that call. If this value is changed, it takes effect immediately. The default is **rejectCall**.

1. Ensure that the switch time and date are set correctly using **oper date** before enabling the call recording feature using **conf switch callrecord enable cr**. Otherwise, your call records will not be accurate.
2. Disabling call records or performance monitoring means this information is not recorded or transferred, but the configuration information for the transfer variables (i.e., the primary URL, secondary URL, recording interval) is still present.

12.1.5 Deleting Call Record or Performance Monitoring Variables

This command allows you to delete call record transfer variables or performance monitoring transfer variables. Enter the following parameters:

```
myswitch::configuration switch callrecord> delete (cr|perf)
```

These parameters are defined as follows:

Parameter	Description
perf	The performance monitoring feature is to be deleted.
cr	The call record feature is to be deleted.

The following is an example of how to delete call record transfer variables:

```
myswitch::configuration switch callrecord> delete cr
Are you sure you want to disable and delete Callrecords configuration [n]? y
Callrecords configuration deleted.
myswitch::configuration switch callrecord> show
Callrecords has not been configured.
```

12.1.6 Setting the Data Server Password

This command allows you to change the data server password for call records or for performance monitoring. Enter the following parameters:

```
myswitch::configuration switch callrecord> password (cr|perf)
```

These parameters for enable and disable are defined as follows:

Parameter	Description
password	The password[1] to be used for the data transfer sessions to the primary and secondary data servers.[2]
perf	The password is being set for performance monitoring.
cr	The password is being set for call recording.

1. If the `Admin status` is `on` and the password is changed, the change takes effect at the next recording interval.
2. For security reasons, the switch will not echo your password, but will ask you to confirm the password by retyping it.

```
myswitch::configuration switch callrecord> password cr
Enter password:
Retype new password:
```

12.1.7 Showing Call Record or Performance Monitoring Information

This command allows you to display call records or performance monitoring information for the entire switch fabric. Enter the following parameters:

```
myswitch::configuration switch callrecord> show (cr|perf)[advanced]
myswitch::configuration switch callrecord> show cr
   Admin status                      = on
   Primary URL                       = //169.14.149.90/us/bob/info/cr/switcha/
   Secondary URL                     = //169.14.0.90/us/bob/info/cr/switcha/
   Recording interval                = 1
   Data server userid                = bob
```

To display advanced information, enter the following parameters:

```
myswitch::configuration switch callrecord> show cr advanced
   Admin status                      = on
   Primary URL                       = //169.14.149.90/us/bob/info/cr/switcha/
   Secondary URL                     = //169.14.0.90/us/bob/info/cr/switcha/
   Recording interval                = 1
   Data server userid                = bob
   Memory allocated                  = 20 percent
   Memory overflow action            = dontRecordCall
   Failed primary data transfers     = 0
   Failed secondary data transfers   = 0
   File transfer status              = primaryInProgress
   File transfer error message       = No errors found.
   Primary trap status               = crXfrNoError
   Secondary trap status             = crXfrNoError
```

The fields in these displays are defined as follows:

Field	Description
Admin status	Shows if call recording is **on** (enabled) or **off** (disabled). The default is **off**.
Primary URL	The primary URL for call record or performance monitoring record file transfers.
Secondary URL	The URL is to be used in the event that the transfer to the primary URL is not successful.
Recording interval	The interval at which the the relevant information is transferred to the host. The default is 5 minutes.
Data server userid	The userid to be used for the data transfer sessions to the primary and secondary data servers.
Memory allocated	Specifies what portion of the processor DRAM is to be reserved for call records. The default is 15%. Valid values are from 1 - 50%.

Field	Description
Memory overflow action	The action that the switch (fabric) takes if the memory allocated for call records runs out. **`rejectCall`** means that the call is rejected. **`noRecord`** means that the call is allowed, but no call record is generated for that call. The default is **`rejectCall`**.
Failed primary data transfers	The number of failed data transfers to the primary data server.
Failed secondary data transfers	The number of failed data transfers to the secondary data server.
File transfer status	One of the following messages describing the status of the current file transfer: `primaryInProgress`, `secondaryInProgress`, `primarySucceeded`, `secondarySucceeded`, `bothFailed`. If the data transfer is not successful, refer to the message in the `Primary trap status` or `Secondary trap status` field.
File transfer error message	A text message describing the status of the last failed file transfer.
Primary trap status	The trap status of the file transfer to the primary URL. The trap status is `crXfrNoError` at the start of the data transfer process. If an error condition occurs, a trap is generated and this field is updated to reflect one of the following error conditions: `crXfrOtherError`, `crXfrDiskFullorAllocationExceeded`, `crXfrAccessViolation`, `crXfrNoResponseFromServer`.
Secondary trap status	The trap status of the file transfer to the secondary URL. The trap status is `crXfrNoError` at the start of the data transfer process. If an error condition occurs, a trap is generated and this field is updated to reflect one of the error conditions listed above.

If call records have not been configured, you receive the following message:

```
myswitch::configuration switch callrecord> show cr
Callrecords not configured.
```

If performance monitoring has not been configured, you receive the following message:

```
myswitch::configuration switch callrecord> show perf
Performance monitoring not configured.
```

NOTE

Currently, the only utilities that are available to aid in post-processing for call records and performance monitoring data are through *ForeView*. These utilities convert the call record and performance record file data from binary to ASCII format so that the information can be imported into databases or spreadsheet programs. For more information about these utilities, please refer to the *ForeView Network Management User's Manual*.

12.2 Configuring the Clock Scaling Factor

This is an advanced command that lets you set the clock scaling factor for traffic policing on a switch board (fabric). The switch board represents units of time (i.e., burst tolerances) in internal units of clock ticks. Because of the 40 MHz clock used on the switch fabric, the maximum unit of time that can be used by the traffic policing hardware is 0.838 seconds. However, the burst tolerance of some VBR connections is larger than 0.838 seconds, so they can not be correctly policed by the switch. To accommodate these cases, it is possible to scale the clock to represent larger amounts of time with the same number of ticks. Enter the following:

```
myswitch::configuration switch> clockscale <board> <factor>
```

These parameters are defined as follows:

Parameter	Description
board[1]	The number of the board (1 - 4) on which the clockscale is being configured.
factor[2]	The factor by which you want to scale the clock. The scaling factor multiplied by 0.838 seconds should be greater than the burst tolerance of the connection. The default is 1.

1. The HDCOMP ASIC must be version 1 or greater to support changing the clockscale. To display the ASIC version, use the **display hdcomp** command.
2. This command is only useful when performing traffic policing on VBR traffic with an extremely large burst tolerance that is destined for a very low speed (DS1) link. If these conditions are not represented in your network, it is recommended that you leave this value at the default setting.

If you change the clockscale setting, the following warning is displayed:

```
myswitch::configuration board> clockscale 1 2
  ***** WARNING *****
Changing the Clock Scale Factor will have undesired effects on
existing policed connections until the switch software is restarted.
Restart the switch software [n]?
```

Entering **n** or pressing <**ENTER**> aborts the command. Entering **y** causes the switch to restart and use the new clockscale setting.

12.3 Configuring PVC/PVP Connection Preservation

When connection preservation is enabled, all PVCs and PVPs that are listed in the CDB (and found to be intact in the hardware) are maintained without disruption of cell flow whenever an SCP fails over or is rebooted. Call recording for these connections continues without losing counts or generating a connection start/termination message. However, any PVCs or PVPs that are listed in the CDB and not found to be intact in the hardware are torn down. SPVCs and SPVPs are torn down and recreated. Call recording for connections that are torn down is terminated without a termination record.

When connection preservation is disabled, all connections are torn down and PVCs, PVPs, SPVCs, and SPVPs that are listed in the CDB are recreated. Call recording for these connections is terminated without a termination record.

NOTE The generation of OAM cells is disrupted during an SCP failover or reboot, even if connection preservation is enabled.

This command lets you configure whether connection preservation for PVCs and PVPs is enabled or disabled on a switch. Enter the following parameters:

```
myswitch::configuration switch> cp (enable | disable)
```

These parameters are defined as follows:

Parameter	Description
enable	**enable** means connection preservation will occur for all PVCs and PVPs in this switch. The default is **enable** for ASX-4000, ASX-1000, and TNX-1100 switches. The default is **disable** for ASX-200BX and TNX-210 switches.
disable	**disable** means connection preservation will not occur on this switch.

NOTE

Currently, connection preservation is not supported on the LE 155 and LE 25 switches, nor on *FramePlus* network modules.

Connection preservation should be enabled on ASX-200BXs and TNX-210s only if the switch is on an Uninterruptable Power Supply (UPS).

If you change the configuration of a network module using a command that normally requires a reset of the network module, but you do not reset it, the PVCs and PVPs are torn down and recreated the next time that the switch reboots or fails over.

When using an i960-based processor, connection preservation is not supported on port 1A1 because the boot PROM overwrites the data that corresponds to that port.

12.4 Configuring the Switch Fabric ID

This command lets you change the fabric ID of the switch. The fabric ID is a unique, six-byte MAC address. Switch software uses the fabric ID as the MAC address of the switch Ethernet port, and as the End System Identifier (ESI) portion (bytes 14-19) of the switch NSAP address. Some bytes of the fabric ID are used in forming the SPANS address and PNNI and FT-PNNI domain prefixes. If you moved an SCP from one fabric to another, this six-byte fabric ID changed. Consequently, the SCP had a different MAC address, a different NSAP address, and a different domain prefix. If LANE or CLIP services were configured on the switch, some manual reconfiguration was required for all of the clients to learn the new server NSAP addresses. Any static routes also had to be reconfigured.

Instead, this command lets you configure the SCP with the fabric ID of the original switch fabric, thus overriding the default (factory-configured) fabric ID of the destination switch. This operation saves you from performing lots of manual reconfiguration to reflect the hardware change. The user-configured fabric ID is saved in the CDB and persists across reboots. This command can also be used to reset the user-configured fabric ID of a switch and have the SCP default back to the factory-configured fabric ID.

```
myswitch::configuration switch> fabric_id (<fabric ID> | reset)
```

These parameters are defined as follows:

Parameter	Description
fabric ID	The new six-byte MAC address for this switch. The address must be unique in your network.
reset	Entering **reset** indicates you want to delete the user-configured fabric ID from the CDB and go back to the factory-configured fabric ID for this switch fabric.

If you change the fabric ID, the switch verifies that you want to make the change:

```
myswitch::configuration switch> fabric_id 1020569c84bb

********** W A R N I N G **********
This operation sets the Fabric ID for this switch. Fabric ID must
be a unique MAC address in your network. Changing the Fabric ID
will change the MAC address, domain prefix and SPANS address of
this switch. The switch software will be restarted. You will
lose connectivity with the switch while this operation is progressing.

Are you sure you want to configure a new Fabric ID [n]? y

The switch will restart momentarily.
```

Entering **n** or pressing **<ENTER>** aborts the command. Entering **y** changes the fabric ID in the CDB and restarts the switch.

CAUTION

Since the fabric ID is used as the MAC address of the Ethernet port, the new fabric ID must be a unique, six-byte address in your entire network (and not just among the ATM switches). If you use an address that already exists, it can cause routing problems.

If you want to reset the fabric ID to the original factory-configured ID, the switch verifies that you want to make the change:

```
myswitch::configuration switch> fabric_id reset

********** W A R N I N G **********

This operation resets the user configured Fabric ID back to the
original factory Fabric ID. Switch software will be restarted.
You will lose connectivity with the switch while this operation
is progressing.

Are you sure you want to reset the Fabric ID [n]? y

The switch will restart momentarily.
```

12.5 Setting or Changing the Switch Name

This command enables you to set or change the name of the switch. The switch name is shown on the front panel display LED. Enter the following parameters:

```
myswitch::configuration switch> name <name>
```

This parameter is defined as follows:

Parameter	Description
name	The new name for the switch. If no name has been set using this command, then `ATM SWITCH` is displayed on the front panel of the switch and as the prompt name.

When the switch name is changed using this command, the new switch name is stored in the CDB and persists across reboots. Also, the prompt name changes immediately[1] to match new switch name, as long as the prompt name has not been changed explicitly using the *<new-prompt>* option under **conf system prompt**. For example:

```
myswitch::configuration switch> name fishtank
fishtank::configuration switch>
```


1. If the switch name is changed using SNMP, you must log out and then log in again for the prompt name to change over to match the new switch name.

12.6 Configuring OAM Cell Processing on a Switch

If you have enabled OAM cell processing on some ports on a switch fabric using the **conf port aisrdi enable** command, this command lets you override OAM cell transmission and reception on all ports on that switch fabric. (See Section 2.3 of this manual for more information about the **conf port aisrdi** command.) This command is useful if an errant node that is attached to one of the ports on your switch fabric is flooding your fabric with too many OAM cells.

When **conf switch oam disable** is entered, the port level settings are still retained, but OAM cell processing ceases on all ports on that fabric. When **conf switch oam enable** is entered, all ports on that fabric use their last port level settings again, so OAM cell processing starts again only on the ports on which it was last enabled.

```
myswitch::configuration switch> oam (enable | disable)
```

These parameters are defined as follows:

Parameter	Description
enable | disable	Entering **enable** returns all ports on this fabric to their last port level settings for OAM cell processing before this functionality was disabled. Entering **disable** causes OAM cell processing to stop on all ports on this fabric, despite the **conf port aisrdi** settings. These settings are still retained. The default is **disable**.

All switches respond to OAM end-to-end loopback requests for originating/terminating VPTs. All switches also pass through OAM end-to-end loopback requests and responses that are received for VPCs and VCCs transparently.

ASX-1000s and TNX-1100s respond to all OAM segment loopback requests, while ASX-200BXs, ASX-200WGs, LE 155s, LE 25s, and TNX-210s only respond to OAM segment loopback requests received for originating/terminating VPTs. OAM segment loopback requests received for VPCs and VCCs are dropped by these types of switches. Also, the insertion of OAM loopback request cells is not supported.

NOTE

This command does not override the OAM settings for *FramePlus* network modules that are configured using **conf module fram oamf5**.

12.7 Setting the Maximum Number of Reserved VCIs for PMPs

This command lets you change the upper end of the range of the block of VCIs that are reserved for point-to-multipoint (PMP) SVCs on all paths and all ports on this switch fabric. This range defaults to 155-255, which ensures that 101 PMP SVCs can always be created regardless of the number of point-to-point (PP) SVCs. PVCs can be created on these VCIs, but no PP SVCs may use these VCIs. PMP SVCs attempt to allocate a VCI outside this range only if all of the VCIs in the range have already been allocated.

You should change the default range only if the number of PMP SVCs that the switch must always be able to set up is greater than 101. Each LANE 1.0 ELAN requires two or three PMP SVCs, so if you are using more than 33 ELANs, you should increase the PMP reserved VCI range. However, since older versions of software only support up to 255 VCIs and since all output paths must support the entire range, it is better to lower the minimum reserved PMP VCI instead of increasing the maximum.

Enter the following parameters:

```
myswitch::configuration switch> pmpmaxvci <vci>
```

This parameter is defined as follows:

Parameter	Description
vci	The top number for the range of VCIs to be reserved for PMP SVCs. The default is **255**.

12.8 Setting the Minimum Number of Reserved VCIs for PMPs

This command lets you change the lower end of the range of the block of VCIs that are reserved for point-to-multipoint (PMP) SVCs on all paths and all ports on this switch fabric. This range defaults to 155-255, which ensures that 101 PMP SVCs can always be created regardless of the number of point-to-point (PP) SVCs. PVCs can be created on these VCIs, but no PP SVCs may use these VCIs. PMP SVCs attempt to allocate a VCI outside this range only if all of the VCIs in the range have already been allocated.

You should change the default range only if the number of PMP SVCs that the switch must always be able to set up is greater than 101. Each LANE 1.0 ELAN requires two or three PMP SVCs, so if you are using more than 33 ELANs, you should increase the PMP reserved VCI range. However, since older versions of software only support up to 255 VCIs and since all output paths must support the entire range, it is better to lower the minimum reserved PMP VCI instead of increasing the maximum.

Enter the following parameters:

```
myswitch::configuration switch> pmpminvci <vci>
```

This parameter is defined as follows:

Parameter	Description
vci	The bottom number for the range of VCIs to be reserved for PMP SVCs. The default is **155**.

For example, to set the minimum reserved VCI to 100, which effectively increases the PMP reserved VCI range to support the creation of 156 PMP SVCs, enter the following parameters:

```
myswitch::configuration switch> pmpminvci 100
```

12.9 Configuring Memory Pools

These commands let you allocate memory pools of various data structures that are involved in call setups. These pools are considered to be the minimum numbers required for each type of connection. As a parameter's value is increased, the pools become larger and increase memory requirements. Similarly, as a parameter's value is decreased, the pools shrink and memory is freed. Any increases to these pools take effect immediately and are maintained over switch reboots. However, decreases may be slightly delayed if the parameters are changed and the data structures that are needed to change the pool size are already in use. For example, if you decrease the number of point-to-point calls from 500 to 300 and all of the calls are in use, that pool will not shrink until 200 calls have been released.

Typical values for these pools depend greatly on the requirements of your particular network. There is no specific maximum value for the pool sizes; they are only limited by the amount of memory available at the time of configuration. However, a pool configuration fails when there is not enough memory, or when there is memory available, but it is not available in the required block sizes (due to memory fragmentation). It is possible to allocate all of the memory to a pool by setting the pool to a very large value. Similarly, you can release all of the memory from a pool by setting the value to 0.

CAUTION

You should adjust these values only after careful consideration of your network's needs. It is important not to allocate more connections than you can possibly use when setting these pool sizes. When pools are configured, the memory in those pools is not available to any other operations such as the creation of static entities (PVCs, SPVCs, static routes, UPC contracts, etc.), call recording, and performance monitoring. Improper configuration can have an adverse effect on your network's operation.

You can configure the amount of memory allocated for call processing. The default memory pools setting is 2.0 MB on a 16 MB SCP and 2.8 MB on a 32 MB SCP. If you have too many PVCs, you can change the default configuration for point-to-point calls, or point-to-multipoint calls, or both to 0.

You can display the list of available subcommands by typing **?** at the **pools** level.

```
myswitch::configuration switch pools> ?
  pp                pmp               show
```

12.9.1 Configuring the Pool for Point-to-Point Calls

This command lets you reserve memory for a specific number of total point-to-point calls for this switch. Enter the following parameters:

```
myswitch::configuration switch pools> pp <no-of-point-to-point-calls>
```

This parameter is defined as follows:

Parameter	Description
no-of-point-to-point calls	The number of point-to-point calls you want to pre-allocate for this switch. The default is 256 calls for an SCP that has 16 MB of DRAM. The default is 512 calls for an SCP that has 32 MB of DRAM. The default is 1,024 calls for an SCP that has 64 MB of DRAM.

NOTE The SVC part of SPVC connections uses the pool resources for point-to-point calls.

12.9.2 Configuring the Pool for Point-to-Multipoint Calls

This command lets you reserve memory for a specific number of total point-to-multipoint calls for this switch. Enter the following parameters:

```
myswitch::configuration switch pools> pmp <no-of-point-to-multipoint-calls>
```

This parameter is defined as follows:

Parameter	Description
no-of-point-to-multipoint calls	The number of point-to-multipoint calls you want to pre-allocate for this switch. The default is 8 calls for an SCP that has 16 MB of DRAM. The default is 32 calls for an SCP that has 32 MB of DRAM. The default is 64 calls for an SCP that has 64 MB of DRAM.

12.9.3 Displaying Configured Pools

This command lets you display the pools that are configured on this switch. The default values will vary depending on the type of SCP installed in the switch. Enter the following:

```
myswitch::configuration switch pools> show
 Switch is configured for a TYPICAL load of:
          1024  Point-to-Point Calls
           64  Point-to-Multipoint Calls
```

The fields in this display are defined as follows:

Field	Description
Point-to-point Calls	Shows how many point-to-point calls you have reserved memory for on this switch.
Point-to-Multipoint Calls	Shows how many point-to-multipoint calls you have reserved memory for on this switch.

12.10 Displaying the Switch Configuration

This command lets you display switch configuration information. Enter the following:

```
Switch 'fishtank', Type asx200bx, up 0 days 08:26
Hardware version 0, Software version S_ForeThought_5.3.0 Alpha (1.25816)

Maximum Virtual Path Connections        32768
Maximum Virtual Channels                16384
Fabric ID (MAC Address)                 00:20:48:1c:1f:4e  (Default)
SPANS address                           00000038f21c1f4e
PMP Minimum Reserved VCI                155
PMP Maximum Reserved VCI                255
Switch TimeZone                         N/A
PVC/PVP Connection Preservation         enable
ATM Layer OAM Processing                disabled
Clock Scaling Factor                    1
```

The fields in this display are defined as follows:

Field	Description
Switch	The user-configured switch name. If this field reads `ATM Switch`, then the switch name has not been set. Use **`conf switch name`** to assign a name.
Type	Shows what kind of switch this is.
up	The amount of time, in days, hours, and minutes, since this switch has been rebooted.
Hardware version	The hardware version of the switch.
Software version	The version of software running on the switch.
Maximum Virtual Path Connections	The maximum number of virtual paths that can be configured.
Maximum Virtual Channels	The maximum number of virtual channels that can be configured.
Fabric ID (MAC address)	The unique, six-byte MAC address for this switch. `(Default)` means that the switch is using the default factory-configured fabric ID for this switch. `(Configured)` means that the switch is using the user-configured fabric ID for this switch.
SPANS address	The unique, factory-configured SPANS address for this switch.
PMP Minimum Reserved VCI	The bottom number for the range of VCIs to be reserved for point-to-multipoint (PMP) SVCs.
PMP Maximum Reserved VCI	The top number for the range of VCIs to be reserved for point-to-multipoint (PMP) SVCs.

Field	Description
Switch TimeZone	The time zone configured for this ATM switch. If this field reads `N/A`, then the switch time zone has not been set. Use **`conf switch timezone`** to assign a time zone.
PVC/PVP Connection Preservation	**`enable`** means connection preservation will occur for all PVCs and PVPs in this switch. **`disable`** means connection preservation will not occur on this switch.
ATM Layer OAM Processing	Shows if OAM cell processing is enabled or disabled on this switch board. **`disabled`** means OAM cell processing is stopped on all ports on this board, despite the **`conf port aisrdi`** settings. **`enabled`** returns all ports on this board to their last **`conf port aisrdi`** settings before this functionality was disabled.
Clock Scaling Factor	The factor by which the clock is scaled for traffic policing.

12.11 Setting the Time Zone

This command lets you set the time zone for your switch. You should set this before you set the time and date on the switch using the **oper date** command. Enter the following:

```
myswitch::configuration switch> timezone (none | timezone)
```

This parameter is defined as follows:

Parameter	Description
none	Allows you to disable the time zone setting that has been previously configured. This is useful if you entered a time zone incorrectly or if you no longer want a time zone set.
timezone	The time zone configured for this ATM switch. The switch supports and automatically converts from Standard to Daylight Savings time for the following time zones: **EST5EDT** (Eastern Standard Time), **CST6CDT** (Central Standard Time), **MST7MDT** (Mountain Standard Time), **PST8PDT** (Pacific Standard Time), **AKST9AKDT** (Alaska Standard Time).

Locations outside of the time zones listed above must supply the following POSIX standard 1003.1-1988 formula for switching between Daylight Savings Time and Standard Time:

stdoffset [dst[offset][, start[/time], end[/time]]]

These parameters are defined as follows:

Parameter	Description
std and dst	Indicates 3 or more bytes that designate standard (`std`) or Daylight Savings Time (`dst`). Only `std` is required; if `dst` is omitted, then it does not apply in this location. You can use uppercase or lowercase letters and any characters, except a leading colon(:), digits, comma (,), minus (-), plus (+), and ACSII NUL.
offset	The value to add to local time to equal Greenwich Mean Time. `offset` is of the form: **hh[:mm[:ss]]** Hour (`hh`) is required and can be a single digit between 0 and 24. Minutes (`mm`) and seconds (`ss`) are optional and are between 0 and 59. If no offset follows dst, it is assumed to be one hour ahead of std. If preceded by a “-”, the time zone is east of the Prime Meridian; otherwise it is west (with an optional “+”).

Parameter	Description
start[/time], end[/time]	`start` indicates the date when the change occurs from std to dst. `end` indicates the date when you change back. Both start and end are of the form: **`Mm.n.d`** `d` is the d-th day ($0 \le d \le 6$) of week `n` of month `m` of the year ($1 \le n \le 5$, $1 \le m \le 12$), where week 5 is the last d day in month m, which can occur in either the fourth or the fifth week). Week 1 is the first week in which the d-th day occurs. Day 0 is Sunday. time is of the same format as offset, except that no leading "-" or "+" is allowed. If time is not entered, the default of 02:00:00 is used.

This example shows how to configure a switch in the eastern time zone using the standard default of 1 hour for the difference between std and dst. In this example, dst starts on the first Sunday in April at 2:00AM and ends on the last Sunday in October at 2:00AM.

```
myswitch::configuration switch> timezone EST5EDT,M4.1.0/02:00,M10.5.0/02:00
```

This example shows how to configure a switch that sets the time zone with a deviation of exactly 1 hour from GMT for std time and 2 hours from GMT for dst. In this example, dst starts on the first Sunday in April at 2:00AM and ends on the last Sunday in October at 2:00AM.

```
myswitch::configuration switch> timezone std01:00:00dst02:00:00,M4.1.0/
02:00,M10.5.0/02:00
```

This example shows that no offset time follows dst, which assumes dst is one hour ahead of std.

```
myswitch::configuration switch> timezone std01:00:00dst,M4.1.0/02:00,M10.5.0/
02:00
```

CHAPTER 13 System Configuration Commands

These commands let you configure dual SCP functionality, configure the transfer protocol to be used when transferring files, configure system message log features, configure the amount of time of non-activity after which an AMI session times out, and change the units for designating UPC contracts. You can display the list of available subcommands by typing **?** at the **system** level.

```
myswitch::configuration system> ?
  show              dualscp>          prompt            protocol
  syslog>           timeout           units
```

13.1 Displaying System Information

This command lets you display the amount of time of non-activity after which an AMI session will time out and display what type of units will be used when designating UPC contracts. You can get to this level by entering **show** at the **system** level. Enter the following parameters:

```
myswitch::configuration system> show
AMI Session Timeout                                    off
File transfer protocol                                 tftp
UPC Units                                              cps
```

The fields in this display are defined as follows:

Field	Description
AMI Session Timeout	The number of minutes of no activity after which an AMI session will time out and exit you out of the session. The default is **5** minutes. A value of **off** means that the AMI session will not time out.
File transfer protocol	**ftp** means that FTP is the transfer protocol that is being used when performing file transfers on this SCP and **tftp** means that TFTP is being used.
UPC Units	**cps** indicates that UPC contracts are being configured and displayed in cells per second. **kbps** means that UPC contracts are being configured and displayed in kilobits per second. The default is **cps**.

13.2 Dual SCP Configuration Commands

These commands let you configure failover support in the ASX-200BX, ASX-1000, TNX-210, or TNX-1100 when two SCPs are installed in a single switch fabric.

NOTE

Only HA-based SCPs or Pentium-based SCPs support dual SCP configuration. Using an earlier version SCP in a redundant configuration can cause irreparable damage to your switch fabric.

These commands are not available locally on an ASX-200WG, an LE 155, an LE 25, nor an ASX-4000.

For proper synchronization of information between SCPs, ensure that the amount of free space on both SCPs is roughly equal before performing these commands.

```
myswitch::configuration system> dualscp ?
  autoremove       autosync         failover         primary
  reset            show             switchover       synchronize
  threshold
```

13.2.1 Configuring Dual SCP Automatic File Removal

You can configure the standby SCP to automatically delete unused files (i.e., old versions of switch software), if necessary, when files are being synchronized by the controlling SCP. Enter the following to enable or disable the `autoremove` feature:

```
myswitch::configuration system dualscp> autoremove (enable | disable)
```

These parameters are defined as follows:

Parameter	Description
enable	Indicates that **autoremove** is enabled on the standby SCP. When enabled, the SCP automatically deletes unused files and directories as needed.
disable	Indicates that **autoremove** is disabled on the standby SCP. If disabled, you are not prompted and synchronization attempts fail in the event that there is not enough free space in FLASH. This is the default.

This feature removes old copies of the OS if no space is available during the synchronization process. When the OS is being synchronized, this feature also removes the CURRENT copy of the OS if that is the only file that can be deleted to make room for the new OS.

NOTE

When synchronizing the FLASH, the controlling SCP first instructs the standby SCP to delete any files in its FLASH that are not on the controlling SCP's FLASH. This could remove older copies or the CURRENT copy of the OS, if those versions of the OS are not already present on the controlling SCPs FLASH.

13.2.2 Configuring Dual SCP Automatic Synchronization

When in dual SCP mode, you can configure the controlling SCP to perform file automatic synchronization with the **autosync** command. If autosync is enabled, the CDB is saved to the standby SCP every time the CDB is written to FLASH on the controlling SCP. The standby SCP then rereads the CDB once it has been completely received. In addition, you can configure the controlling SCP to automatically copy the password file to the standby SCP if changes are made to it.

NOTE

The automatic synchronization of the CDB and password file can be disabled, but you must remember to manually update these files to the standby SCP when they are modified on the controlling SCP.

To configure automatic synchronization, enter the following at the prompt:

```
myswitch::configuration system dualscp> autosync (enable | disable)
```

These parameters are defined as follows:

Parameter	Description
enable	Indicates that automatic synchronization will be enabled on the SCP. This is the default.
disable	Indicates that automatic synchronization will not be enabled on the SCP.

CAUTION

Enabling autosync does not cause the automatic synchronization of switch software; only the CDB, password file, and other system configuration files are synchronized.

13.2.3 Configuring SCP Failover

This command lets you enable or disable failover to a second SCP in the event of a hardware failure on the controlling SCP.

CAUTION

If failover is disabled, the standby SCP will not take control of the switch fabric if the controlling SCP fails, regardless of how other `dualscp` parameters are set.

To configure failover, enter the following at the prompt:

```
myswitch::configuration system dualscp> failover (enable | disable)
```

These parameters are defined as follows:

Parameter	Description
enable	Indicates that SCP failover will be enabled. This is the default.
disable	Indicates that SCP failover will be disabled.

13.2.4 Configuring the Controlling SCP

This command lets you designate which SCP is to control the switch at start-up. To designate the primary SCP, enter the following at the prompt:

```
myswitch::configuration system dualscp> primary (X | Y)
```

These parameters are defined as follows:

Parameter	Description
X	Indicates that the SCP in the left slot of the ASX-200BX or TNX-210 switch fabric (the top slot in an ASX-1000 or TNX-1100) is the primary SCP. This is the default.
Y	Indicates that the SCP in the right slot of the ASX-200BX or TNX-210 switch fabric (the bottom slot in an ASX-1000 or TNX-1100) is the primary SCP.

NOTE

The primary SCP and the controlling are not necessarily the same. “Primary” refers to the SCP that is supposed to control the switch after it boots. “Controlling” refers to the SCP that actually controls the switch. For example, if the SCP in slot X fails at start-up, the SCP in slot Y controls the switch even though it is not designated as the primary SCP.

13.2.5 Resetting the Standby SCP

This command lets you force the standby SCP to reboot. To do this, enter the following at the prompt:

```
myswitch::configuration system dualscp> reset
```

You are asked to confirm this command. Type **y** at the prompt to reset the standby SCP. Type **n** or press <**Enter**> at the prompt to cancel the command.

```
myswitch::configuration system dualscp> reset
Reset the standby processor [n]? y

Dual SCP synchronization pending or in progress.
Aborting the synchronization can leave the standby SCP
in a bad state when FLASH or the OS is being synchronized.

Reset the standby anyway [n]? n
```

CAUTION

If you receive the above message that dual SCP synchronization is pending or in progress, you should always say no (type **n**). If you reset at this point, you could lose data or corrupt the standby SCP. Wait a minute or two for the synchronization to complete and try the reset again.

13.2.6 Displaying Dual SCP Information

This command lets you display the settings for dual SCP mode. To view these settings, enter the following at the prompt:

```
myswitch::configuration system dualscp> show
                                          Auto    CDB       Sync     Sync
SCP State      Primary Failover Threshold Remove  SyncMode  Requests Failures
3X  standalone X       enable   2 secs    disable automatic        0        0
Synchronization queue: empty
Synchronization state: Suspended
```

The fields in this display are defined as follows:

Field	Description
SCP	The SCP for which the information is being displayed. For example, 3X indicates that information for the SCP in slot X of switch fabric 3 is being displayed.
State	The state of the SCP. **standalone** means that there is only one SCP in the switch fabric. **dual** means that there are two SCPs installed in the switch fabric, and the SCPs are communicating with one another. **other** means that there are two SCPs installed in the switch fabric, but they are not communicating with one another.
Primary	Shows which SCP (X or Y) is the primary SCP. The SCP in slot X is set to primary by default.
Failover	Shows if failover is enabled on the switch fabric. failover is enabled by default.
Threshold	The amount of time, in seconds, that the standby SCP waits to receive a heartbeat from the controlling SCP before taking control of the switch. The minimum and default threshold value is 2 seconds.
Auto Remove	Shows if autoremove is enabled on the standby SCP. autoremove is disabled by default.
CDB SyncMode	**automatic** means that CDB synchronization occurs automatically (**autosync** is enabled on the controlling SCP). **manual** means that CDB synchronization does not occur automatically (**autosync** is disabled on the controlling SCP). The default is **automatic.**
Sync Requests	The number of synchronization requests that have been made between the controlling and standby SCP.
Sync Failures	The number of synchronizations requests that have failed between SCPs.
Synchronization queue	The number of synchronization requests waiting to be processed.
Synchronization state[1]	The state of the current synchronization attempt between the controlling and standby SCP. **Suspended** means either that the switch is not in dual SCP mode, or that the SCPs are running different versions of switch software. **Idle** means that synchronization is not taking place between SCPs. **Manual** means that a manual synchronization is taking place between SCPs. **Automatic** means an automatic synchronization is taking place between SCPs.

1. When manual or automatic synchronization is taking place between SCPs, the name of the file being synchronized is also displayed.

13.2.7 Switching over to the Standby SCP

If you wish to force the standby SCP to take control of the switch, this command provides the ability to force a switchover from the controlling to the standby SCP. To force the standby SCP to take control of the switch, enter the following at the prompt:

```
myswitch::configuration system dualscp> switchover
```

You will be asked to confirm this command. Type **y** at the prompt to reset the backup SCP. Type **n** or press **<Enter>** at the prompt to cancel the command.

```
myswitch::configuration system dualscp> switchover
Switch over to the standby processor [n]? n
```

If you answer **y** to the above question, you will be prompted with the following question only if the standby SCP is in the process of synchronizing with the controlling SCP:

```
Dual SCP synchronization pending. continue anyway [n]? n
```

CAUTION

If this question is displayed, you should always answer **n**. Wait until the synchronization process is complete, then try the switch over again. If you switch over during the synchronization process, you will lose your configuration information.

13.2.8 Synchronizing Files Manually

To ensure a reliable failover mechanism, the information contained on both SCPs should be synchronized. Synchronizing the FLASH between SCPs is requested manually by the user via AMI. The CDB, password file, LECS configuration, and switch software version can also be synchronized between SCPs.

The **`conf system dualscp autoremove`** feature deletes old copies of the OS if no space is available during the synchronization process. When the OS is being synchronized, that feature also deletes the CURRENT copy of the OS if that is the only file that can be deleted to make room for the new OS.

NOTE

When synchronizing the FLASH, the controlling SCP first instructs the standby SCP to delete any files in its FLASH that are not on the controlling SCP's FLASH. This could remove older copies or the CURRENT copy of the OS, if those versions of the OS are not already present on the controlling SCPs FLASH.

To synchronize information between SCPs, enter the following:

```
myswitch::configuration system dualscp> synchronize (Flash | CDB | LECS | OS |
Password | Securid | Secret |Init | Loader)
```

These parameters are defined as follows:

Parameter	Description
Flash	Indicates that all directories and files in FLASH on the controlling SCP will be copied to the standby SCP.
CDB	Indicates that the Configuration Database (CDB) will be copied from the controlling to the standby SCP.
LECS	Indicates that the LAN Emulation Configuration Services (LECS) configuration database file will be copied from the controlling to the standby SCP.
OS[1]	Indicates the switch software will be copied from the controlling SCP to the standby SCP.
Password	Indicates that the password file will be copied from the controlling SCP to the standby SCP. The password file contains all of the userid information.
Securid	Indicates that the SecurID `sdconf.rec` configuration file will be copied from the controlling SCP to the standby SCP.

Parameter	Description
Secret	Indicates that the SecurID `node secret` file will be copied from the controlling SCP to the standby SCP.
Init	Indicates that the FLASH on the standby SCP will be re-initialized.
Loader	Indicates that the Mini Loader will be copied from the controlling to the standby SCP.

[1] Only the version of switch software to which `CURRENT` is pointing is copied to the standby SCP.

NOTE

When synchronizing the FLASH, the **`conf system dualscp autoremove`** command is ignored.

CAUTION

Using the **`Init`** option formats the FLASH on the standby SCP. This removes all information from the FLASH.

13.2.9 Setting the Failover Threshold

This command lets you set the threshold time, in seconds, that the standby SCP will wait to receive a heartbeat from the controlling SCP before taking control of the switch. Enter the following at the prompt:

```
myswitch::configuration system dualscp> threshold <seconds>
```

This parameter is defined as follows:

Parameter	Description
seconds	The threshold time, in seconds, that the standby SCP waits for a heartbeat from the controlling SCP. The minimum and default value is 2 seconds.

13.3 Displaying or Changing the Prompt

This command allows you to display the prompt name on the switch. Enter **prompt** at the **system** level as follows:

```
myswitch::configuration system> prompt
Current prompt is : myswitch
```

This command also lets you change the prompt name on the switch. Enter the following:

```
myswitch::configuration system> prompt ?
myswitch::configuration system> prompt [-default | <new-prompt>]
```

These parameters are defined as follows:

Parameter	Description
default	Changes the prompt name to match the switch name that was set using **conf switch name**. If the name was null, changes the prompt to ATM SWITCH::>. After an **oper cdb init**, changes the prompt to ATM SWITCH::>.
new-prompt	Allows you to change the prompt name to something other than the switch name that was set using **conf switch name**.

Changing the prompt name using the *<new-prompt>* option overrides the default prompt (which matches the switch name that has been set using **conf switch name**). The new prompt is stored in the CDB and persists across reboots.

When the switch name is changed using **conf switch name**, the prompt name changes immediately to match it, as long as the prompt name has not been changed explicitly using the *<new-prompt>* option. (If the switch name is changed using SNMP, you must log out and then log in again for the prompt name to change over to match the new switch name.) If you want to change the prompt name back to the default (switch name) prompt, use the `-default` option.

NOTE

This command is useful for shortening the prompt name if the switch name is very long. However, if you change the switch name after you have changed the prompt name, ensure that you go back and update the prompt name.

If you open a remote AMI session using the **open** command, an asterisk (*) is displayed in front of the remote switch's prompt to designate which one is the local switch and which is the remote one. Remote switches always use the remote switch's name as the prompt.

13.4 Changing the System Protocol

This command lets you configure which transfer protocol is used when performing file transfers for the following AMI commands: **conf lane lecs get**, **conf security login backup**, and **conf security login restore**, **oper upgrade**, **oper cdb backup**, **oper cdb restore**, **oper flash get**, and **oper flash put**. To change the protocol that is used, enter the following parameters:

```
myswitch::configuration system> protocol [(ftp | tftp)]
```

This parameter is defined as follows:

Parameter	Description
ftp | tftp	**ftp** means that FTP is the transfer protocol to be used when performing file transfers on this SCP and **tftp** means that TFTP is to be used. The default value is **tftp**.

To display the protocol that is currently being used, enter **protocol** at the **system** level:

```
myswitch::configuration system> protocol
Default transfer protocol : tftp
```

This field is defined as follows:

Parameter	Description
Default Transfer Protocol	**ftp** means that FTP is the transfer protocol that is being used when performing file transfers on this SCP and **tftp** means that TFTP is being used.

When the transfer protocol is set to FTP, each time that you use a command that requires the use of FTP, you are prompted for the remote userid and password of the remote host to which you are transferring a file or from which you are retrieving a file. For example:

```
myswitch::operation> upgrade <remotehost>:<full path to remotefile>
  Will upgrade directly to flash
  remote userid: <remote userid>
  remote password: <remote password>
```

13.5 System Log Configuration Commands

Syslog is a tool that can send system messages to be logged to a user-specified remote host. These commands let you configure the address of the remote syslog host and whether or not these messages are sent to the console. Enter **syslog ?** at the **system** level to show the list of available **syslog** commands.

```
myswitch::configuration system> syslog ?
  show            set             delete          console
  audit>
```

13.5.1 Displaying the Address of the System Log Host

This command allows you to display the address of the host to which the switch's system messages are logged. Enter the following parameters:

NOTE This command is only available on the local switch.

```
myswitch::configuration system syslog> show
Remote Syslog Host: 169.144.1.216
Syslog Facility: daemon
Console: enabled
```

If the host's address has never been set, or if it has been deleted and not set again, the following is shown:

```
myswitch::configuration system syslog> show
No remote syslog host set. Syslog messages will not be sent.
Syslog Facility: daemon
Console: enabled
```

13.5.2 Setting the Address of the System Log Host

This command sets the address of the host to which the switch's system messages are being logged. You may also opt to assign a specific facility name so that the remote syslog can automatically differentiate between switches with different facilities. Enter the following:

NOTE This command is only available on the local switch.

```
myswitch::configuration system syslog> set <address> [<facility>]
```

These parameters are defined as follows:

Parameter	Description
address	The IP address of the remote host to which the switch's system message logs are sent.
facility	The user-assigned name that identifies the facility this switch sends syslogs on. The default is **daemon**. Other valid values are **local0** through **local7**. The names may be assigned in any order.

For example, to have a host with the address 192.88.243.118 be the recipient of the system log messages and to designate this switch's facility name as `local2`, enter the following:

```
myswitch::configuration system syslog> set 192.88.243.118 local2
Remote Syslog Host: 192.88.243.118
Syslog Facility is now local2
```

To assign the facility for other switches in your network, you must log in to each one locally and set the facility. You must keep track of which facility was assigned to each switch. Then, when you view the contents of the syslog file, they can be separated according to facility when messages from different facilities are logged on the same remote host.

NOTE If the switch panics, the panic file is automatically written to the syslog, provided that a syslog host had been set prior to the panic. This is especially useful if multiple panics occur, so that each is recorded.

13.5.3 Deleting the Address of the System Log Host

This command allows you to delete the address of the host to which the switch's system messages are being logged. Enter the following parameters:

NOTE This command is only available on the local switch.

```
myswitch::configuration system syslog> delete

Remove 192.88.243.118 as remote syslog host [n]? y
Remote syslog host removed. Syslog messages will not be sent.
Syslog Facility: local7
```

The switch prompts you to confirm that the address should be deleted. Entering **y** causes the switch to delete the address, as shown above. If you do not want the address to be deleted, enter **n** or press **<RETURN>** and you will be sent back to the **syslog** prompt.

Once the host's address has been deleted, the switch's system messages are no longer logged until a new host address is set. However, if a facility has been assigned to the switch, that facility assignment remains intact. So if you assign another host without changing the facility, the new host will list this switch's syslog messages under the same facility. For example,

```
myswitch::configuration system syslog> show
Remote Syslog Host: 169.144.48.41
Syslog Facility: local7

myswitch::configuration system syslog> delete
Remove 169.144.48.41 as remote syslog host [n]? y
Remote syslog host removed. Syslog messages will not be sent.

myswitch::configuration system syslog> show
No remote syslog host set. Syslog messages will not be sent.
Syslog Facility: local7

myswitch::configuration system syslog> set 204.95.89.84
Remote Syslog Host: 204.95.89.84

myswitch::configuration system syslog> show
Remote Syslog Host: 204.95.89.84
Syslog Facility: local7
```

13.5.4 Turning On/Off System Log Messages to the Console

On a switch, the system log messages may be directed to three places: to syslog, to the console, and to a remote host. These types of switches are defaulted to send log messages to both the console and to syslog. The **console** command can be used in different ways.

To display whether or not log messages are being output to the console, enter **console** without any arguments as follows:

```
myswitch::configuration system syslog> console
```

If the messages are being sent to the console, the following message is shown:

```
Syslog console output is enabled.
```

If the messages are not being directed to the console, the following message is displayed:

```
Syslog console output is disabled.
```

To enable log messages to be sent to the console, or to stop log messages from being output to the console, enter **console** with the appropriate argument as follows:

```
myswitch::configuration system syslog> console [(enable|disable)]
```

These parameters are defined as follows:

Parameter	Description
enable	Indicates that all log messages will be written to the console.
disable	Indicates that no log messages will be written to the console.

13.5.5 Enabling or Disabling the Logging of Changes

This command allows you to enable or disable the logging of all changes that occur on a switch via AMI, via SNMP, or via ILMI. Enter **?** at the **audit** level to show the list of available commands.

```
myswitch::configuration system syslog audit> ?
  show            ami             snmp          ilmi
```

13.5.5.1 Displaying the Auditing State

This command allows you to display whether the changes that occur on a switch via AMI, via SNMP, or via ILMI will be logged to syslog, and at what priority level those changes will be logged. Enter the following parameters:

```
myswitch::configuration system syslog audit> show
 Facility    Priority
 ami         debug
 snmp        notice
 ilmi        off
```

The fields in this display are defined as follows:

Field	Description
Facility	Shows for which facility the changes will be logged.
Priority	Shows with which priority level tag the changes will be logged.

You can also display the auditing state for a specific facility as follows:

```
myswitch::configuration system syslog audit> show [ami | snmp | ilmi]
myswitch::configuration system syslog audit> show ami
 Facility    Priority
 ami         debug
```

The fields in this display are defined in the same manner as those in the previous example.

13.5.5.2 Changing and Displaying the AMI Auditing State

This command allows you to enable or disable the logging of all of the changes that occur on a switch via AMI. You can also configure with which priority level tag all of those changes will be logged. Enter the following parameters:

```
myswitch::configuration system syslog audit> ami ?
usage:[emerg | alert | crit | err | warning | notice | info | debug | off]
```

These parameters are defined as follows:

Parameter	Description
emerg	Indicates you are enabling the logging of all AMI changes to syslog with a priority level tag of emerg.
alert	Indicates you are enabling the logging of all AMI changes to syslog with a priority level tag of alert.
crit	Indicates you are enabling the logging of all AMI changes to syslog with a priority level tag of crit.
err	Indicates you are enabling the logging of all AMI changes to syslog with a priority level tag of err.
warning	Indicates you are enabling the logging of all AMI changes to syslog with a priority level tag of warning.
notice	Indicates you are enabling the logging of all AMI changes to syslog with a priority level tag of notice.
info	Indicates you are enabling the logging of all AMI changes to syslog with a priority level tag of info.
debug	Indicates you are enabling the logging of all AMI changes to syslog with a priority level tag of debug.
off	Indicates you are disabling the logging of all AMI changes to syslog. This is the default state.

NOTE

In order for the actual logging to begin, you must first have a remote syslog host configured to receive the messages. Use the command **`conf system syslog set`** to do this.

NOTE

Because the logging of each change can generate a lot of extra traffic, it is recommended that you enable this feature only after you have reached your initial desired configuration. This tool is most useful as a security feature for logging any minor modifications which occur after that.

The AMI syslog messages generally come in pairs with the result of the first message saying `Pending`, and the second message giving the outcome. There are some exceptions, such as any change that makes it impossible to send the result to syslog (such as rebooting the switch).

The AMI syslog messages are output in a format that is similar to the following:

```
date time IP address or switch name :: AMI :: userid :: IP address or serial port (where
the user logged in) :: AMI command string :: result of command
```

For example, the output will be something similar to the following:

```
AUG 28 12:36:40 fishtank AMI :: ami :: 169.144.87.22 :: snmp off :: Pending
AUG 28 12:36:41 fishtank AMI :: ami :: 169.144.87.22 :: snmp off :: Success
```

You can also display the auditing state for AMI by entering **`ami`** without a ? as follows:

```
myswitch::configuration system syslog audit> ami
 Facility    Priority
 ami         debug
```

13.5.5.3 Changing and Displaying the SNMP Auditing State

This command allows you to enable or disable the logging of all of the changes that occur on a switch via SNMP SETs. You can also configure with which priority level tag all of those changes will be logged. Enter the following parameters:

```
myswitch::configuration system syslog audit> snmp ?
usage:[emerg | alert | crit | err | warning | notice | info | debug | off]
```

These parameters are defined as follows:

Parameter	Description
emerg	Indicates you are enabling the logging of all SNMP changes to syslog with a priority level tag of emerg.
alert	Indicates you are enabling the logging of all SNMP changes to syslog with a priority level tag of alert.
crit	Indicates you are enabling the logging of all SNMP changes to syslog with a priority level tag of crit.
err	Indicates you are enabling the logging of all SNMP changes to syslog with a priority level tag of err.
warning	Indicates you are enabling the logging of all SNMP changes to syslog with a priority level tag of warning.
notice	Indicates you are enabling the logging of all SNMP changes to syslog with a priority level tag of notice.
info	Indicates you are enabling the logging of all SNMP changes to syslog with a priority level tag of info.
debug	Indicates you are enabling the logging of all SNMP changes to syslog with a priority level tag of debug.
off	Indicates you are disabling the logging of all SNMP changes to syslog. This is the default state.

NOTE

In order for the actual logging to begin, you must first have a remote syslog host configured to receive the messages. Use the command **`conf system syslog set`** to do this.

NOTE

Because the logging of each change can generate a lot of extra traffic, it is recommended that you enable this feature only after you have reached your initial desired configuration. This tool is most useful for logging any minor modifications which occur after that.

The SNMP syslog messages generally come in pairs with the result of the first message saying `Pending`, and the second message giving the outcome. There are some exceptions, such as the SNMP bad community message, or any change that makes it impossible to send the result to syslog (such as rebooting the switch).

The SNMP syslog messages are output in a format that is similar to the following:

```
date time IP address or switch name :: SNMP :: IP address :: SNMP request ID :: index
of this varbind within the SNMP packet :: result of the command; either pending, success,
error number, no change, or bad community :: object ID for this varbind :: value
```

For example, the output will be something similar to the following:

```
AUG 28 11:09:50 fishtank SNMP :: 127.0.0.1 :: 7d92 :: 1 :: pending   ::
.1.3.6.1.4.1.326.2.2.2.2.2.4.0 :: 2
AUG 28 11:09:50 fishtank SNMP :: 127.0.0.1 :: 7d92 :: 1 :: success   ::
.1.3.6.1.4.1.326.2.2.2.2.2.4.0 :: 2
AUG 28 10:59:21 fishtank SNMP :: 169.144.87.21 :: 289d98ca :: 1 :: bad community ::
.1.3.6.1.2.1.2.2.1.7.3 :: 2
```

You can also display the auditing state for SNMP by entering **`snmp`** without a ? as follows:

```
myswitch::configuration system syslog audit> snmp
 Facility    Priority
 snmp        off
```

13.5.5.4 Changing and Displaying the ILMI Auditing State

This command allows you to enable or disable the logging of all of the changes that occur on a switch via ILMI. You can also configure with which priority level tag all of those changes will be logged. Enter the following parameters:

```
myswitch::configuration system syslog audit> ilmi ?
usage:[emerg | alert | crit | err | warning | notice | info | debug | off]
```

These parameters are defined as follows:

Parameter	Description
emerg	Indicates you are enabling the logging of all ILMI changes to syslog with a priority level tag of emerg.
alert	Indicates you are enabling the logging of all ILMI changes to syslog with a priority level tag of alert.
crit	Indicates you are enabling the logging of all ILMI changes to syslog with a priority level tag of crit.
err	Indicates you are enabling the logging of all ILMI changes to syslog with a priority level tag of err.
warning	Indicates you are enabling the logging of all ILMI changes to syslog with a priority level tag of warning.
notice	Indicates you are enabling the logging of all ILMI changes to syslog with a priority level tag of notice.
info	Indicates you are enabling the logging of all ILMI changes to syslog with a priority level tag of info.
debug	Indicates you are enabling the logging of all ILMI changes to syslog with a priority level tag of debug.
off	Indicates you are disabling the logging of all ILMI changes to syslog. This is the default state.

NOTE

In order for the actual logging to begin, you must first have a remote syslog host configured to receive the messages. Use the command **conf system syslog set** to do this.

NOTE

Because the logging of each change can generate a lot of extra traffic, it is recommended that you enable this feature only after you have reached your initial desired configuration. This tool is most useful for logging any minor modifications which occur after that.

The ILMI syslog messages generally come in pairs with the result of the first message saying `Pending`, and the second message giving the outcome. There are some exceptions, such as any change that makes it impossible to send the result to syslog (such as rebooting the switch).

The ILMI syslog messages are output in a format that is similar to the following:

```
date time IP address or switch name :: ILMI :: port VPI VCI on which the request arrived
for ILMI :: SNMP request ID :: index of this varbind within the SNMP packet :: result
of the command; either pending, success, error number, no change, or bad community ::
object ID for this varbind :: value
```

For example, the output will be something similar to the following:

```
AUG 28 11:10:54 fishtank ILMI :: 1A2 0 16 :: 432b :: 1 :: pending   ::
.1.3.6.1.4.1.353.2.7.1.1.3.0.13.71.0.5.128.255.225.0.0.0.242.26.41.212 :: 1
AUG 28 11:10:54 fishtank ILMI :: 1A2 0 16 :: 432b :: 1 :: success   ::
.1.3.6.1.4.1.353.2.7.1.1.3.0.13.71.0.5.128.255.225.0.0.0.242.26.41.212 :: 1
AUG 28 11:10:54 fishtank ILMI :: 1A1 0 16 :: 4330 :: 1 :: pending   ::
.1.3.6.1.4.1.353.2.7.1.1.3.0.13.71.0.5.128.255.225.0.0.0.242.26.41.212 :: 1
AUG 28 11:10:54 fishtank ILMI :: 1A1 0 16 :: 4330 :: 1 :: success   ::
.1.3.6.1.4.1.353.2.7.1.1.3.0.13.71.0.5.128.255.225.0.0.0.242.26.41.212 :: 1
```

You can also display the auditing state for ILMI by entering **`ilmi`** without a ? as follows:

```
myswitch::configuration system syslog audit> ilmi
 Facility    Priority
 ilmi        notice
```

13.6 AMI Timeout Configuration Command

This command lets you set the amount of time of non-activity after which an AMI session will time out. You can get to this level by entering **timeout** at the **system** level. Enter the following parameters:

```
myswitch::configuration system> timeout <minutes>
```

This parameter is defined as follows:

Parameter	Description
minutes	The number of minutes of non-activity after which an AMI session will time out and exit you out of the session. The default is 5 minutes. To configure the switch so that an AMI session does not time out, enter 0. It is displayed as off when you use **conf system show**.[1]

1. If you disable the timeout and then lose connectivity to your telnet session, and you are not able to access the serial port, you may have to wait up to 20 minutes before you can re-establish the connection.

13.7 Configuring the Units for UPC Contracts

This command allows you to change the type of units that are being used when configuring and displaying UPC contracts. You can get to this level by entering **units** at the **system** level. Enter the following parameters:

```
myswitch::configuration system> units (cps | kbps)
```

This parameter is defined as follows:

Parameter	Description
units	Using **cps** indicates that UPC contracts are being configured and displayed in cells per second. Using **kbps** means that UPC contracts are being configured and displayed in kilobits per second. The default is **cps**.

CHAPTER 14 Timing Configuration Commands

These commands let you configure distributed timing on a switch. You can display the list of available subcommands by typing **?** at the **timing** level.

```
myswitch::configuration timing> ?
  mode                show                switchclock
```

14.1 Configuring the Timing Mode

This command lets you configure the method of timing operation used on the switch. Enter the following parameters:

```
myswitch::configuration timing> mode (switch | tcm)
```

These parameters are defined as follows:

Parameter	Description
switch	All network modules that support distributed timing import their clock source from the port designated under **conf timing switchclock**. This is the default mode.
tcm	All network modules that support distributed timing import their clock source from the Timing Control Module (TCM). If either of the primary or secondary clocks (set under **conf timing switchclock**) are on this switch, they are exported as the board primary and secondary clocks. The TCM must also be configured either to use these clocks (under **conf cec timing**), or to provide a BITS or the on-board oscillator as a timing source for the switch fabrics. You must have a TCM installed in your switch to use this mode.

NOTE

For more information about configuring timing using the `switch` mode, see the *ATM Switch Network Configuration Manual*. For more information about configuring timing using the `tcm` mode, see the *CEC-Plus Installation and User's Manual* that came with your TCM.

14.2 Displaying Timing Information

This command lets you show the timing configuration on a switch fabric. Enter the following:

```
myswitch::configuration timing> show
Mode    Primary  Secondary  Current
switch  N/A      N/A        crystalC
```

The fields in this display are defined as follows:

Field	Description
Mode	The method of timing being used by the switch. **switch** means all network modules that support distributed timing import their clock source from the port designated under **conf timing switchclock**. **tcm** means all network modules that support distributed timing import their clock source from the TCM.
Primary	The port that has been configured as the primary switchclock for all of the network modules on all of the boards in this switch. These are the sources that this board is offering as primary timing sources. Any further behavior is dependent on the current mode.
Secondary	The port that has been configured as the secondary switchclock for all of the network modules on all of the boards in this switch. These are the sources that this board is offering as secondary timing sources. Any further behavior is dependent on the current mode.
Current	The current switchclock source for all of the network modules on all of the boards in this switch. If neither the primary nor secondary clocks are available, the switch fabric uses the crystal of the first available timing network module as the switchclock, going from A to D. For example, if network module A supports distributed timing, then the crystal from A is used as the switchclock. As another example, if network module A is not installed, and network modules B and C do not support distributed timing, but network module D does support distributed timing, then the crystal from D is used as the switchclock.

14.3 Configuring the Switchclock

This command lets you configure the primary or secondary switchclock on a switch fabric. Enter the following parameters:

```
myswitch::configuration timing> switchclock (primary | secondary) (<bnp> | none)
```

These parameters are defined as follows:

Parameter	Description
primary	The specified port will be designated as the primary switchclock.
secondary	The specified port will be designated as the secondary switchclock.
bnp	The number of the port that will be designated as the primary or secondary switchclock.
none	Resets the switchclock to the default values.

CHAPTER 15 UPC Configuration Commands

These commands let you create, delete, or display usage parameter control (UPC) traffic contracts. These contracts can then be applied to PVCs using the **conf vcc new** or the **conf vpc new** command. You can display the list of available subcommands by typing **upc ?** at the **configuration** level.

```
myswitch::configuration> upc ?
delete          new             show
```

15.1 Deleting a UPC Traffic Contract

This command allows you to delete an existing UPC contract. Enter the following parameters:

```
myswitch::configuration upc> delete <index>
```

15.2 Creating a UPC Traffic Contract

This command lets you create a UPC contract. Enter the following parameters:

```
myswitch::configuration upc> new <index> ubr [aal5 [noPktDisc]] [ubrTagging] [AltCLP]
        [-estbw <kcps>] [-name <name>]
 OR
new <index> abr <pcr01> <mcr> [-cdvt <us>] [noGCRA] [aal5 [noPktDisc] [PPPol]]
        [-name <name>]
 OR
new <index> <UPC> [-cdvt <us>] [noGCRA] [aal5 [noPktDisc] [PPPol]]
        [AltCLP] [-scheduling (roundrobin | smoothed | guaranteed)] [-name <name>]

Where UPC is one of the following combinations of traffic parameters:
        cbr  <pcr01>
        cbr0 <pcr0>  <pcr01> [tag]
        vbr  <pcr01> <scr01> <mbs01>
        vbr0 <pcr01> <scr0>  <mbs0>  [tag]
Advanced options (to generate UPC contract from Frame Relay parameters):
 [[-bc <bits>][-be <bits>][-cir <kbps>][-ar <kbps>][-frsize <bytes>]]
```

The parameters for delete and new are defined as follows:

Parameter	Description
index	The integer index that refers to this specific traffic contract. Valid index numbers are from 0 to 32,767.
UPC	One of the types of traffic contracts shown above. The parameters in these contracts are defined as follows:
ubr	Indicates UBR traffic.
cbr	Indicates CBR traffic.
cbr0	Indicates CBR0 traffic.
vbr	Indicates VBR traffic.
vbr0	Indicates VBR0 traffic.
pcr0	Indicates the peak cell rate for cells with CLP = 0.
pcr01	Indicates the peak cell rate for all cells.
scr0	Indicates the sustainable cell rate for cells with CLP = 0.
scr01	Indicates the sustainable cell rate for all cells.
mbs0	Indicates the maximum burst size for cells with CLP = 0.
mbs01	Indicates the maximum burst size for all cells.
tag	**`tag`** means that non-conforming CLP = 0 cells are tagged. Otherwise, they are dropped. The default is that they are dropped. This option only applies to the PCR0 parameter of the CBR0 contract and to the SCR0 and MBS0 parameters of the VBR0 contract.
abr	Indicates ABR traffic. Currently, ABR UPC contracts are supported only on Series D network modules.
mcr	Indicates the minimum cell rate for all cells. ABR connections with an MCR equal to 0 use the roundrobin scheduling discipline. ABR connections with an MCR greater than 0 use the guaranteed scheduling discipline. However, if there are no suitable rate groups in the rate controller, the ABR connections with an MCR greater than 0 are rejected. Currently, ABR UPC contracts are supported only on Series D network modules.
-cdvt us	The Cell Delay Variation Tolerance (CDVT) associated with the peak cell rates, in microseconds. If the CDVT is not specified here, the default CDVT value associated with the port will be used. (See **`conf port show`** and **`conf port cdvt`** for more information).
noGCRA	**`noGCRA`** means that GCRA policing is disabled on CBR or VBR (depending on what is configured) connections using this contract. If **`noGCRA`** is not entered, then GCRA policing is enabled on CBR or VBR (depending on what is configured) connections using this contract. By default, **`noGCRA`** is not entered (GCRA policing is enabled). You must use the **`noGCRA`** option when applying a UPC contract to the outbound signalling channel using the **`-outsigupc`** *`<upc-index>`* variable under **`conf signalling new`** to prevent the outbound signalling channel from being policed.
aal5	The connection is using the AAL5 Adaptation Layer.

Parameter	Description
noPktDisc	This parameter can only be used if the connection is AAL5 (i.e., the **aal5** parameter is present). This parameter suppresses EPD/PPD (AAL5 packet discard) on the connection. The default is for this parameter not to be present (EPD/PPD is enabled).
ubrTagging	**ubrTagging** means that all UBR traffic is tagged (set to CLP=1) on this connection. If **ubrTagging** is not entered, then UBR traffic is not tagged on this connection. This command only applies to UBR traffic. By default, UBR traffic is not tagged.
PPPol	Can only be used if the connection is AAL5 (i.e., the **aal5** parameter is present). Indicates that Partial Packet Policing is going to be performed on this connection. The default is for this parameter not to be present, which leaves Partial Packet Policing disabled. The HDCOMP ASIC must be version 1 or greater to support AAL5 partial packet policing. To display the ASIC version, use the **stats hdcomp** command.
AltCLP	Applies to connections on Series D network modules. It indicates that the alternate CLP threshold (configured using **conf module traffic d altclpthresh**) should be used for all connections created with this UPC contract. The default is for this parameter not to be present, which means the connections do not use the alternate CLP threshold.
-estbw <kcps>	Applies only to UBR SPVCs. Lets you assign an estimated bandwidth value, in kilocells per second, for individual UBR SPVCs. The value must be an integer from 0 to 65534. This value is used by the load-balanced UBR routing feature. See Part 1 of this manual for more information about load-balanced UBR routing.
-scheduling (roundrobin | smoothed | guaranteed)	The scheduling mode to be used for servicing traffic on the output side of a Series D network module. **roundrobin** means that all service for these connections comes from one of the round-robin queues in the network module. This is the default mode for both SVCs and PVCs. **smoothed** means that all service for these connections comes from the network module's rate controller, which ensures that cells for these connections are transmitted into the network at a fixed rate of R cells per second. **guaranteed** is a combination of the round-robin and smoothed modes. Service for these connections are scheduled with both fixed rate R from the rate controller, and they have an entry in the appropriate round-robin queue. The **-scheduling** option has an effect only on connections with outputs on Series D network modules. All other network module platforms only use **roundrobin** scheduling.
-name <name>	The user-defined name associated with this UPC traffic contract. This helps you remember for what traffic type this specific contract is used. If you do not specify a name, a default name that relates to this type of traffic contract is assigned automatically.
-bc <bits>	The committed burst size of a connection, in bits. Can only be used on a Frame Relay connection. The **bc** + **be** must be less than or equal to the **ar**.
-be <bits>	The excess burst size of a connection, in bits. Can only be used on a Frame Relay connection. The **bc** + **be** must be less than or equal to the **ar**.
-cir <kbps>	The committed information rate of a connection, in kbps. Can only be used on a Frame Relay connection. The **cir** must be less than or equal to the **ar**. Entering 0 for this option means the traffic is treated as best-effort.

Parameter	Description
-ar <kbps>	The access rate of a Frame Relay UNI, in kbps. Can only be used on a Frame Relay connection. The default value is **64**. If you multiple timeslots are used, you must modify this value accordingly. The access rate for one timeslot is 64 Kbps, and the access rate for two timeslots is 128 Kbps, etc. The access rate for 24 timeslots (max. for DS1) is 1536 Kbps and the access rate for 31 timeslots (max. for E1) is 1984 Kbps.
-frsize <bytes>	The maximum payload frame size, in bytes. Can only be used on a Frame Relay connection. This value must not exceed 4,092. The default value is **4092**.

NOTE

The units for **pcr0**, **pcr01**, **scr0**, **scr01**, **mbs0**, and **mbs01** are specified either in cells per second or in kilobits per second, depending on what you used for **conf system units**. To display the current setting, use **conf system show**. The default is **cps** (cells per second).

The following is an example of how to create a UPC contract:

```
myswitch::configuration upc> new 5 vbr0 500 200 250 -cdvt 1000 aal5 PPPol
-name vbr0_upc
```

This example specifies a contract named “vbr0_upc”, which is a VBR0 contract with an index of 5, a pcr01 of 500 cells / sec (or kbps), an scr0 of 200 cells / sec (or kbps), an mbs0 of 250 cells (or kilobits), a CDVT of 1,000 microseconds, and partial packet policing enabled.

NOTE

For more information about traffic contracts, please refer to Table 5-7 in the ATM Forum UNI 3.0 Specification.

NOTE

PVCs that use UPC contracts that contain any of the `[noGCRA]`, `[aal5 [noPktDisc] [PPPol]]`, and `[ubrTagging]` parameters are valid only when the **conf port gcrapolicing**, **conf port aal5packetdiscard**, **conf port pppolicing**, and **conf port ubrtagging** parameters are set to `svcOn` or `svcOff`. Use **conf port show tm** to check these settings.

15.2.1 Configuring Advanced Options on UPC Contracts

The advanced options are only used on VBR Frame Relay PVCs that are output on Series D network modules. The **-scheduling smoothed** option must be used.

The following is an example of how to create a UPC contract for use on a Frame Relay PVC:

```
myswitch::configuration upc> new 3 vbr -bc 40 -be 10 -cir 40 -ar 64 -frsize 4092
-scheduling smoothed -name fratm_vbr
```

You can then apply any UPC contract that uses advanced options to a Frame Relay PVC using the **-faupc** *<index>* and **-afupc** *<index>* options under **conf fratm pvc new**.

NOTE

When the advanced options are used, they are converted to ATM UPC parameters and are displayed as ATM parameters.

15.3 Displaying the UPC Traffic Contracts

This command lets you display all of the UPC contracts. Enter the following parameters:

```
myswitch::configuration upc> show
 Index  PCR01  SCR01  MBS01   PCR0   SCR0   MBS0    MCR   CDVT  UBRBW   TAG   Name
 0                                                                            default_ubr
 1                                                              40000         ubr
 2      10000                                          3000                   abr
```

The fields in this display are defined as follows:

Field	Description
Index	The UPC contracts listed by index number.
PCR01[1]	The peak cell rate for all cells for this contract.
SCR01	The sustainable cell rate for all cells in this contract.
MBS01	The maximum burst size for all cells in this contract.
PCR0	The peak cell rate for cells with CLP=0 for this contract.
SCR0	The sustainable cell rate for cells with CLP=0 for this contract.
MBS0	The maximum burst size for cells with CLP=0 for this contract.
MCR	The minimum cell rate for all cells in this ABR contract.
CDVT	The Cell Delay Variation Tolerance (CDVT) associated with the peak cell rates, in microseconds.
UBRBW	The estimated bandwidth value, in kilocells per second, for individual UBR SPVCs. This value is used by the load-balanced UBR routing feature. See Part 1 of this manual for more information about load-balanced UBR routing.
TAG	**Tag** means that non-compliant CLP=0 cells are tagged. No entry means that non-compliant cells are dropped. This option only applies to cells measured by the PCR0 parameter of the CBR0 contract and to cells measured by the SCR0 and MBS0 parameters of the VBR0 contract.
Name	The user-defined name associated with this UPC traffic contract.

1. The units for PCR01, SCR01, MBS01, PCR0, SCR0, MBS0, and MCR are shown either in cps or in kbps, depending on what you used for **conf system units**. To display the current setting, use **conf system show**. The default is **cps**.

This command also lets you display all of the traffic management flags for the UPC contracts. Enter the following parameters:

```
myswitch::configuration upc> show [<index>] [flags]
myswitch::configuration upc> show flags
 Index GCRApol PPpol AAL5 PktDisc UBRtag AltCLP Scheduling Name
 0                                              roundrobin default_ubr
 1     GCRApol                                  guaranteed abr
 2     GCRApol                                  roundrobin abr
```

The fields in this display are defined as follows:

Field	Description
Index	The UPC contracts listed by index number.
GCRApol	**GCRApol** means that GCRA policing is enabled on connections that use this contract. If **GCRApol** is not displayed, then GCRA policing is disabled on all connections that use this contract.
PPpol	**PPpol** means that partial packet policing is enabled on connections that use this contract. If **PPpol** is not displayed, then partial packet policing is disabled on all connections that use this contract.
AAL5	**AAL5** means that this is an AAL5 connection. If **AAL5** is not displayed, then this is not an AAL5 connection.
PktDisc	**PktDisc** means that packet discard is enabled on connections that use this contract. If **PktDisc** is not displayed, then packet discard is disabled on all connections that use this contract.
UBRtag	**UBRtag** means that all UBR traffic is tagged (set to CLP=1) as non-compliant on connections that use this contract. If **UBRtag** is not displayed, then UBR traffic is not tagged on connections that use this contract.
AltCLP	This field only applies to connections on Series D network modules. It indicates that the alternate CLP threshold (configured using **conf module traffic d altclpthresh**) should be used for all connections created with this UPC contract. The default is for the connections not to use the alternate CLP threshold.
Scheduling	The scheduling mode that dictates the way traffic is serviced on the output side of a Series D network module. **roundrobin** means that all service for these connections comes from one of the round-robin queues in the network module. This is the default mode for both SVCs and PVCs. **smoothed** means that all service for these connections comes from the network module's rate controller, which ensures that cells for these connections are transmitted into the network at a fixed rate of R cells per second. **guaranteed** is a combination of the round-robin and smoothed modes. Service for these connections are scheduled with both fixed rate R from the rate controller, and they have an entry in the appropriate round-robin queue.
Name	The user-defined name associated with this UPC traffic contract.

CHAPTER 16 VCC Configuration Commands

These commands let you configure Permanent Virtual Channels (PVCs) which are also called Virtual Channel Connections (VCCs). You can display the list of available subcommands by typing **vcc ?** at the **configuration** level.

```
myswitch::configuration> vcc ?
  batch              delete             new                show
```


16.1 Batch Command for PVCs

This command lets you create or delete a large number of PVCs and/or SPVCs by executing an AMI command script that resides on the FLASH. This same command also exists under **conf spvc pnni**. To use this command, do the following:

1. Create an ASCII text script file on a host. This file should list all of the **new** commands or **delete** commands in the order in which you wish to create or delete the connections.

   NOTE When creating the script, the syntax cannot be abbreviated in the commands; e.g., you must enter **configuration** instead of just **conf**.

2. Compress the script file with the gzip utility.
3. Load the script file on to the switch using the command **oper flash get** *<host:remotefile> <localfile>*.
4. Use the command **conf vcc batch** *<file>* [**-delay** *<seconds>*] to execute the script on the switch. This command sequentially executes every PVC and SPVC command in the file.

The script executes each command before proceeding to the next command. Some commands may be rejected; e.g., an attempt to create a second PVC with a particular VCI. The number of commands that succeed and fail are totalled separately and are displayed on the AMI console once all of the commands are complete.

The commands and specific options for these commands that are supported in the script include the following:

- **configuration upc new** *<index>* **ubr** [**aal5** [**noPktDisc**]] [**ubrTagging**] [**-name** *<name>*]
- **configuration upc delete** *<index>*
- **configuration vpt new** *<port>* *<vpi>* [(**term** | **orig**)] [**-minvci** *<vci>*] [**-maxvci** *<vci>*]
- **configuration vpt delete** *<port>* *<vpi>* [(**term** | **orig**)]
- **configuration vcc new** *<iport>* *<ivpi>* *<ivci>* *<oport>* *<ovpi>* *<ovci>* [-upc *<index>*] [**-name** *<name>*]
- **configuration vcc delete** *<iport>* *<ivpi>* *<ivci>* *<oport>* *<ovpi>* *<ovci>*
- **configuration spvx spvcc pnni new** *<port>* *<vpi>* *<vci>* *<destnsap >*

  [**-priority** *<priority>*]
  -spvcid *<index>* [**-name** *<name>*]
  [**-destvpi** *<vpi>* **-destvci** *<vci>*]
  [**-reroute** (**enable**|**disable**)]
  [**-ftpnniDtlIndex1** *<index1>* [**-ftpnniDtlWeight1** *<weight1>*]]
  [**-ftpnniDtlIndex2** *<index2>* [**-ftpnniDtlWeight2** *<weight2>*]]
  [**-ftpnniDtlIndex3** *<index3>* [**-ftpnniDtlWeight3** *<weight3>*]]
  [**-ftpnniDtlIndex4** <index4> [**-ftpnniDtlWeight4** *<weight4>*]]
  [**-backoff** (**enable** | **disable**)]
- **configuration spvx spvcc pnni delete** *<SPVC ID>*
- **configuration spvx spvpc new** *<port>* *<vpi>* *<destnsap>*

  [**-priority** *<priority>*]
  -spvpcid *<index>*
  [**-name** *<name>*] [**-destvpi** *<vpi>*]
  [**-reroute** (**enable**|**disable**)]
  [**-fupc** *<index>*] [**-bupc** *<index>*]
- **configuration spvx spvpc delete** *<SPVPC ID>*

To use this command, enter the following parameters:

myswitch::configuration vcc> **batch** *<file.gz>* [**-delay** *<seconds>*]

These parameters are defined as follows:

Parameter	Description
file	The name of the script file that you want to run on the switch. This file must be compressed using the gzip utility.
delay	An optional delay, in seconds, that the switch waits before executing the script file.

16.2 Deleting a PVC

This command allows you to delete an existing PVC. Enter the following parameters:

```
myswitch::configuration vcc> delete <iport> <ivpi> <ivci> <oport> <ovpi> <ovci>
```

16.3 Creating a PVC

This command lets you create a new PVC. Enter the following parameters:

```
myswitch::configuration vcc> new <iport> <ivpi> <ivci> <oport> <ovpi> <ovci>\
[-upc <index>] [-name <name>]
advanced options:
[-inctype (orig | tran | term) -outctype (orig | tran | term) [pmp|mpp|mpmp]]
```

The parameters for delete and new are defined as follows:

Parameter	Description
iport	The incoming port number.
ivpi	The incoming virtual path number.
ivci	The incoming virtual channel number.
oport	The outgoing port number.
ovpi	The outgoing virtual path number.
ovci	The outgoing virtual channel number.
-upc <index>	The integer index that refers to a specific UPC traffic contract. If no index is specified, then no traffic policing will take place on this VCI. It is assigned a UPC index of 0, and all traffic on this VCI is treated as UBR traffic. This is the default.
name	The name you want to assign to this PVC to identify it uniquely. It is useful for billing purposes so you can identify which PVCs are being used by which customers. Can be up to 32 ASCII characters long.
inctype	The channel connection type for the incoming channel. For billing purposes, it denotes on which switch this PVC is arriving. **Orig** (originating) means that the ingress endpoint of the channel is connected to the source node which is outside the network, **tran** (transit) means that the ingress endpoint of the channel is connected to a node within the network, and **term** (terminating) means that the ingress endpoint of the channel is connected to the destination node which is outside the network.
outctype	The channel connection type for the outgoing channel. For billing purposes, it denotes on which switch this PVC is leaving. **Orig** (originating) means that the egress endpoint of the channel is connected to the source node which is outside the network, **tran** (transit) means that the egress endpoint of the channel is connected to a node within the network, and **term** (terminating) means that the egress endpoint of the channel is connected to the destination node which is outside the network.

Parameter	Description
pmp[1]	Indicates this is a point-to-multipoint PVC.
mpp	Indicates this is a multipoint-to-point PVC.
mpmp	Indicates this is a multipoint-to-multipoint PVC.

1. By indicating pmp, mpp, or mpmp, you are only assigning a label for record keeping purposes. The switch does not necessarily create the type of PVC you have specified. If you assign a connection type, but do not assign a pmp, mpp, or mpmp label, the switch assigns a label of pp (point-to-point).

The following is an example of how to create a PVC which specifies the connection type:

```
myswitch::configuration vcc> new 3b1 0 100 3b4 0 100 -inctype tran -outctype tran
```

The following is an example of how to create a PVC which has a name assigned to it:

```
myswitch::configuration vcc> new 3b2 0 145 3b3 0 145 -name customer_a
```

The following is an example of how to create a simple PVC on an ASX-1000 or TNX-1100. To create a vcc going in port 2A1, vpi 0, vci 100 on the switch board installed in slot 2 and going out port 4B1, vpi 0, vci 100 on the switch board installed in slot 4, enter the following:

```
myswitch::configuration vcc> new 2a1 0 100 2e4 0 100
myswitch::configuration vcc> new 2e4 0 100 2a1 0 100

myswitch::configuration vcc> new 4b1 0 100 4e2 0 100
myswitch::configuration vcc> new 4e2 0 100 4b1 0 100
```

In the first line in the first pair, notice that the output port is 2E4. This is the inter-fabric port. The 2 means the connection is coming out of the switch board in slot 2 through the inter-fabric port. The E represents the inter-fabric port. The 4 means the connection is destined for switch board in slot 4. 2E4 then becomes the input port in the second line.

In the first line in the second pair, notice that the output port is 4E2. This is the inter-fabric port. The 4 means the connection is coming out of the switch board in slot 4 through the inter-fabric port. The E represents the inter-fabric port. The 2 means the connection is destined for switch board in slot 2. 4E2 then becomes the input port in the second line.

16.4 Displaying PVCs

This command allows you to display existing PVCs. You can display either all of the existing PVCs on an individual switch fabric or all of the existing PVCs on a specific port. To list all of the existing PVCs on an individual switch fabric, enter the following parameters:

```
myswitch::configuration vcc> show
 Input        Output
 Port  VPI  VCI  Port  VPI  VCI  UPC  Protocol  Name
 3B1     0    5  3CTL    0   49    0  fsig      N/A
 3B1     0   14  3CTL    0   48    0  spans     N/A
 3B1     0   15  3CTL    0   47       spans     N/A
 3B1     0   16  3CTL    0   50       fsig      N/A
 3B1     0  100  3B4     0  100    0  pvc       N/A
 3B2     0    5  3CTL    0   53    0  fsig      N/A
 3B2     0   14  3CTL    0   52    0  spans     N/A
 3B2     0   15  3CTL    0   51       spans     N/A
 3B2     0   16  3CTL    0   54       fsig      N/A
 3B2     0  145  3B3     0  145    0  pvc       customer_a
 3B3     0    5  3CTL    0   57    0  fsig      N/A
Press return for more, q to quit: q
```

The fields in this display are defined as follows:

Field	Description
Input Port	The incoming port number of the virtual channel.
Input VPI	The incoming virtual path number.
Input VCI	The incoming virtual channel number.
Output Port	The outgoing port number of the virtual channel.
Output VPI	The outgoing virtual path number.
Output VCI	The outgoing virtual channel number.
UPC	The integer index that refers to the specific UPC traffic contract assigned to this VCI.
Protocol	Indicates what type of channel this is. Can be `spans`, `pvc`, `fsig`, `spvc`, or `rcc`. rcc is the routing control channel (0, 18) on PNNI links over which PNNI exchanges routing information. `fsig` stands for ATM Forum signalling.
Name	The unique, user-assigned name for this PVC. If no name is assigned, shows `N/A`.

To list all of the existing PVCs on a specific port, (for example, port 3B1), enter the following parameters:

```
myswitch::configuration vcc> show 3B1
 Input        Output
 Port  VPI  VCI  Port  VPI  VCI  UPC  Protocol  Name
 3B1     0    5  3CTL    0   49    0  fsig      N/A
 3B1     0   14  3CTL    0   48    0  spans     N/A
 3B1     0   15  3CTL    0   47       spans     N/A
 3B1     0   16  3CTL    0   50       fsig      N/A
 3B1     0  100  3B4     0  100    0  pvc       N/A
```

The fields in this display are defined in the same manner as those in the previous example.

To list all of the existing PVCs on a specific port and path, (for example, port 3B1 and VPI 0), enter the following parameters:

```
myswitch::configuration vcc> show 3b1 0
 Input        Output
 Port  VPI  VCI  Port  VPI  VCI  UPC  Protocol  Name
 3B1     0    5  3CTL    0   49    0  fsig      N/A
 3B1     0   14  3CTL    0   48    0  spans     N/A
 3B1     0   15  3CTL    0   47       spans     N/A
 3B1     0   16  3CTL    0   50       fsig      N/A
 3B1     0  100  3B4     0  100    0  pvc       N/A
```

The fields in this display are defined in the same manner as those in the previous example.

To list a specific PVC, enter the specific port, path, and channel (e.g., port 3B1, VPI 0, and VCI 100) as follows:

```
myswitch::configuration vcc> show 3B1 0 100
 Input        Output
 Port  VPI  VCI  Port  VPI  VCI  UPC  Protocol  Name
 3B1     0  100  3B4     0  100    0  pvc       N/A
```

The fields in this display are defined in the same manner as those in the previous example.

To list advanced information about all of the existing PVCs on a switch board, enter the following parameters:

```
myswitch::configuration vcc> show advanced
 Input        Output
 Port  VPI  VCI  Port  VPI  VCI  Protocol  ConType
 3B1     0    5  3CTL    0   49  fsig      N/A
 3B1     0   14  3CTL    0   48  spans     N/A
 3B1     0   15  3CTL    0   47  spans     N/A
 3B1     0   16  3CTL    0   50  fsig      N/A
 3B1     0  100  3B4     0  100  pvc       tran-tran-pp
 3B2     0    5  3CTL    0   53  fsig      N/A
 3B2     0   14  3CTL    0   52  spans     N/A
 3B2     0   15  3CTL    0   51  spans     N/A
 3B2     0   16  3CTL    0   54  fsig      N/A
Press return for more, q to quit: q
```

The fields in the advanced display are defined as follows:

Field	Description
Input Port	The incoming port number of the virtual channel.
Input VPI	The incoming virtual path number.
Input VCI	The incoming virtual channel number.
Output Port	The outgoing port number of the virtual channel.
Output VPI	The outgoing virtual path number.
Output VCI	The outgoing virtual channel number.
Protocol	Indicates what type of channel this is. Can be `spans`, `pvc`, `fsig`, `spvc`, or `rcc`. rcc is the routing control channel (0, 18) on PNNI links over which PNNI exchanges routing information. `fsig` stands for ATM Forum signalling.
ConType	The connection type for the endpoints of this PVC with respect to a particular network. **`Orig`** (originating) means that the ingress/egress endpoint of the channel is connected to the source node which is outside the network, **`tran`** (transit) means that the ingress/egress endpoint of the PVC is connected to a node within the network, and **`term`** (terminating) means that the ingress/egress endpoint of the PVC is connected to the destination node which is outside the network. **`pp`** means this is labelled as a point-to-point PVC, **`pmp`** means this is labelled as a point-to-multipoint PVC, **`mpp`** means this is labelled as a multipoint-to-point PVC. **`mpmp`** means this is labelled as a multipoint-to-multipoint PVC.

To list advanced information about all of the existing PVCs on a specific port, (e.g., port 3B1), enter the following parameters:

```
myswitch::configuration vcc> show 3b1 advanced
 Input        Output
 Port  VPI  VCI  Port  VPI  VCI  Protocol  ConType
 3B1     0    5  3CTL    0   49  fsig      N/A
 3B1     0   14  3CTL    0   48  spans     N/A
 3B1     0   15  3CTL    0   47  spans     N/A
 3B1     0   16  3CTL    0   50  fsig      N/A
 3B1     0  100  3B4     0  100  pvc       tran-tran-pp
```

The fields in this display are defined in the same manner as those in the previous example.

To list advanced information about a specific PVC, enter the specific port, path, and channel (e.g., port 3B1, VPI 0, and VCI 100) as follows:

```
myswitch::configuration vcc> show 3B1 0 100 advanced
 Input        Output
 Port  VPI  VCI  Port  VPI  VCI Protocol  ConType
 3B1     0  100  3B4     0  100  pvc       tran-tran-pp
```

The fields in this display are defined in the same manner as those in the previous example.

CHAPTER 17 VPC Configuration Commands

These commands let you configure Permanent Virtual Paths (PVPs) which are also called Virtual Path Connections (VPCs). You can display the list of available subcommands by typing **vpc ?** at the **configuration** level.

NOTE

In *ForeThought* 4.1 and greater, these commands are only used to configure through paths. To configure originating or terminating paths you must use the **conf vpt** commands.

```
myswitch::configuration> vpc ?
  delete          new             show
```

17.1 Deleting a PVP

This command lets you delete an existing virtual (through) path. Enter the following:

```
myswitch::configuration vpc> delete <iport> <ivpi> <oport> <ovpi>
```

17.2 Creating a PVP

This command lets you add a virtual (through) path. There are advanced options which may be used in combination with the required parameters. Enter the following:

```
myswitch::configuration vpc> new <iport> <ivpi> <oport> <ovpi> [-upc <index>]
        [-name <name>]
advanced options:
        [-inctype (orig|tran|term) -outctype (orig|tran|term) [pmp|mpp|mpmp]]\
        [-loopvpi <vpi>]
```

The parameters for delete and new are defined as follows:

Parameter	Description
iport	The incoming port number.
ivpi	The incoming virtual path number.[1]
oport	The outgoing port number.
ovpi	The outgoing virtual path number.
-upc <index>	The integer index that refers to a specific UPC traffic contract. If no index is specified, then no traffic policing will take place on this VPI. It is assigned a UPC index of 0, and all traffic on this VPI is treated as UBR traffic. This is the default.
-name <name>	The name you want to assign to this through path to help identify it uniquely. It is most useful for billing purposes so you can identify which paths are being used by which customers. Can be up to 32 ASCII characters long.
-inctype (orig | tran |term)	The path connection type for the incoming path. For billing purposes, it denotes on which switch this path is arriving. **Orig** (originating) means that the ingress endpoint of the path is connected to the source node which is outside the network, **tran** (transit) means that the ingress endpoint of the path is connected to a node within the network, and **term** (terminating) means that the ingress endpoint of the path is connected to the destination node which is outside the network.
-outctype(orig | tran |term)	The path connection type for the outgoing path. For billing purposes, it denotes on which switch this path is leaving. **Orig** (originating) means that the egress endpoint of the path is connected to the source node which is outside the network, **tran** (transit) means that the egress endpoint of the path is connected to a node within the network, and **term** (terminating) means that the egress endpoint of the path is connected to the destination node which is outside the network.
pmp[2]	Indicates this is a point-to-multipoint path.
mpp	Indicates this is a multipoint-to-point path.
mpmp	Indicates this is a multipoint-to-multipoint path.
-loopvpi <vpi>	This option is used to perform shaping. The originating vpi will be shaped by a through path going to a Series D network module. You should enter the receive vpi of the through path that goes from the looping port to the WAN port. This option is also used when creating the through path that connects from the WAN port to the looping port. The through path loopvpi should be the same vpi as the terminating path on the looping port. See Chapter 1 of the *ATM Switch Network Configuration Manual* for an example of this feature.

1. The valid range of incoming and outgoing VPIs is 0 - 1022 (1023 is used for multicast). However, Series D E3 and DS3 network modules can only use VPIs 0 - 510 (511 is used for multicast).
2. By indicating **pmp**, **mpp**, or **mpmp**, you are only assigning a label for record keeping purposes. The switch does not necessarily create the type of path you have specified. If you assign a connection type, but do not assign a **pmp**, **mpp**, or **mpmp** label, the switch assigns a label of **pp** (point-to-point).

The following is an example of how to create a virtual path which specifies a name:

```
myswitch::configuration vpc> new 3b1 75 3b5 75 -name customer_b
```

The following is an example of how to create a virtual path which specifies a name and a connection type:

```
myswitch::configuration vpc> new 3b6 62 3b2 62 -name customer_c -inctype tran
-outctype tran
```

NOTE Terminating and originating paths cannot be created across the inter-fabric ports on an ASX-1000 or TNX-1100; only through paths can be created across the inter-fabric ports as shown in the following example.

The following is an example of how to create a simple virtual path on an ASX-1000 or TNX-1100. To create a through path going in port 2A1, vpi 1 on the switch board installed in slot 2 and going out port 4B1, vpi 1 on the switch board installed in slot 4, enter the following:

```
myswitch::configuration vpc> new 2a1 1 2e4 1
myswitch::configuration vpc> new 2e4 1 2a1 1

myswitch::configuration vpc> new 4b1 1 4e2 1
myswitch::configuration vpc> new 4e2 1 4b1 1
```

In the first line in the first pair, notice that the output port is 2E4. This is the inter-fabric port. The 2 means the connection is coming out of the switch board in slot 2 through the inter-fabric port. The E represents the inter-fabric port. The 4 means the connection is destined for switch board in slot 4. 2E4 then becomes the input port in the second line.

In the first line in the second pair, notice that the output port is 4E2. This is the inter-fabric port. The 4 means the connection is coming out of the switch board in slot 4 through the inter-fabric port. The E represents the inter-fabric port. The 2 means the connection is destined for switch board in slot 2. 4E2 then becomes the input port in the second line.

NOTE Through paths cannot use VPI 0 on the inter-fabric port connections on an ASX-1000 or TNX-1100.

17.3 Displaying PVPs

This command lets you display existing virtual (through) paths. You can show either all of the existing virtual paths on an individual switch fabric or all of the existing virtual paths on a specific port. Enter the following parameters:

```
myswitch::configuration vpc> show
Input      Output
Port  VPI  Port  VPI  UPC  Prot  Name
3B1    40  3B4    40    0  pvc   customer_a
3B1    75  3B5    75    0  pvc   customer_b
3B2    95  3B3    95    0  pvc   customer_e
3B6    62  3B2    62    0  pvc   customer_c
3B6    68  3B3    68    0  pvc   customer_d
```

The fields in this display are defined as follows:

Field	Description
Input Port	The incoming port number of the through path.
Input VPI	The incoming virtual path number.
Output Port	The outgoing port number of the through path.
Output VPI	The outgoing virtual path number.
UPC	The integer index that refers to a specific traffic contract assigned to this through path. UPC contracts can be displayed using **conf upc show**.
Prot	The type of protocol running on this channel.
Name	The user-assigned name which helps to identify this through path uniquely.

To list advanced options about all of the existing virtual (through) paths, enter the following parameters:

```
myswitch::configuration vpc> show advanced
 Input      Output
 Port  VPI  Port  VPI  Shape  ConType
 3B1    40  3B4    40         N/A
 3B1    75  3B5    75         N/A
 3B2    95  3B3    95         tran-tran-pmp
 3B6    62  3B2    62         tran-tran-pp
 3B6    68  3B3    68         N/A
```

The fields in the advanced display are defined as follows:

Field	Description
Input Port	The incoming port number of the through path.
Input VPI	The incoming virtual path number.
Output Port	The outgoing port number of the through path.
Output VPI	The outgoing virtual path number.
Shape	Indicates whether or not traffic shaping has been enabled for this path.
ConType	The connection type for the endpoints of this path with respect to a particular network. **Orig** (originating) means that the ingress/egress endpoint of the path is connected to the source node which is outside the network, **tran** (transit) means that the ingress/egress endpoint of the path is connected to a node within the network, and **term** (terminating) means that the ingress/egress endpoint of the path is connected to the destination node which is outside the network. **pp** means this is labelled as a point-to-point path, **pmp** means this is labelled as a point-to-multipoint path, **mpp** means this is labelled as a multi-point-to-point path. **mpmp** means this is labelled as a multipoint-to-multipoint path.

If you have not configured any virtual (through) paths, then the following is displayed:

```
myswitch::configuration vpc> show
No virtual path information is available
```

CHAPTER 18 VPT Configuration Commands

These commands let you configure virtual path terminators. You can display the list of available subcommands by typing **vpt ?** at the **configuration** level.

NOTE

These commands are only used to configure originating or terminating paths. To configure through paths, you must use the **conf vpc** commands.

```
myswitch::configuration> vpt ?
  delete          modify          new             show
```

18.1 Deleting a Virtual Path Terminator

This command lets you delete a virtual path terminator. Enter the following parameters:

```
myswitch::configuration vpt> delete <port> <vpi> [(term | orig)]
```

NOTE

Virtual Path 0 cannot be deleted on any of the connections to the inter-fabric ports on an ASX-1000 or TNX-1100.

Virtual Path 0 cannot be deleted on any of the connections on a Circuit Emulation Services (CES) network module.

Virtual Path 0 cannot be deleted on the control port (CTL) on any switch.

The following is an example of how to delete a terminating path:

```
myswitch::configuration vpt> del 3b4 88 term
Would you like to delete the originating side also [y]? y
```

The following is an example of how to delete an originating path:

```
myswitch::configuration vpt> del 3b3 99 orig
Would you like to delete the terminating side also [y]? y
```

If you do not specify **term** or **orig**, the switch automatically deletes both sides of the path:

```
myswitch::configuration vpt> del 3b4 88
```

NOTE

Before deleting a virtual path, you must first delete all VCCs which use that path.

18.2 Modifying a Virtual Path Terminator

This command lets you modify an existing virtual path terminator. Enter the following:

```
myswitch::configuration vpt> modify <port> <vpi> [(term|orig)] -reserved <Kbps>
        [-cbr (none | default | <QoSExtIndex>)]
        [-rtvbr (none | default | <QoSExtIndex>)]
        [-nrtvbr (none | default | <QoSExtIndex>)]
        [-ubr (none | default | <QoSExtIndex>)]
        [-abr (none | default | <QoSExtIndex>)]
```

18.3 Creating a Virtual Path Terminator

This command lets you create a new virtual path terminator. Enter the following parameters:

```
myswitch::configuration vpt> new <port> <vpi> [(term | orig)] [-reserved <Kbs>] \
        [-minvci <vci>] [-maxvci <vci>]
advanced options for orig paths:
        [-shapeovpi <vpi>] [-loopvpi <vpi>]
        [-vbrob <percent>] [-vbrbuffob <percent>]
extended qos options for orig/term paths:
        [-cbr (none | default | <QoSExtIndex>]
        [-rtvbr (none | default | <QoSExtIndex>)]
        [-nrtvbr (none | default | <QoSExtIndex>)]
        [-ubr (none | default | <QoSExtIndex>)]
        [-abr (none | default | <QoSExtIndex>)]
```

The following is an example of how to create a terminating path:

```
myswitch::configuration vpt> new 3b3 99 term
Would you like to create the originating side also [y]? y
```

The following is an example of how to create a originating path:

```
myswitch::configuration vpt> new 3b4 88 orig
Would you like to create the terminating side also [y]? y
```

If you do not specify **term** or **orig**, the switch automatically creates both sides of the path:

```
myswitch::configuration vpt> new 3b4 88
```

The parameters for new, modify, and delete are defined as follows:

Parameter	Description
port	The port number for this vpt.
vpi	The path number for this vpt.
term	Specifies that the vpt to be created is a terminating path.
orig	Specifies that the vpt to be created is an originating path.

Parameter	Description
reserved	The amount of bandwidth, in Kbps, that you want to reserve on this vpt. If this option is not used, an elastic path is created. Elastic paths allocate and de-allocate bandwidth for their channels from the link.
minvci	The bottom number for the range of VCIs to be reserved for VCCs on this vpt. The default is **1**.
maxvci	The top number for the range of VCIs to be reserved for VCCs on this vpt. The default is **511**.
shapeovpi[1]	The output port of a traffic shaping originating vpt. Setting this value configures traffic shaping on the originating path. Cells bound for the network leave the traffic shaping port with this VPI. When the traffic shaping port is the WAN port, this value equals the input VPI of the originating path. If the traffic shaping port is not the WAN port, this value equals the input VPI of the through path from the shaping port to the WAN port. This parameter only applies to the Series C network modules.
loopvpi	The originating vpi will be shaped by a through path going to a Series D network module. You should enter the input vpi of the through path that goes from the looping port to the WAN port. This option is also used when creating the through path that connects from the WAN port to the looping port. The through path loopvpi should be the same vpi as the terminating path on the looping port. See Chapter 1 of the *ATM Switch Network Configuration Manual* for an example of this feature.
vbrob	The bandwidth overbooking level for this vpt, specified as a percentage. Valid values are integers from 1 to 32,767. **100** means that no overbooking has been defined. Values less than **100** cause underbooking. Values greater than **100** cause overbooking. Overbooking cannot be specified on an elastic path. Therefore, you can only specify an overbooking factor for an originating path when you also have reserved bandwidth for the path (i.e., specified the **-reserved** <*Kbs*> parameter).
vbrbuffob	The buffer overbooking level for this vpt, specified as a percentage. Valid values are integers greater than or equal to 1. **100** means that no overbooking has been defined. Values less than **100** cause underbooking. Values greater than **100** cause overbooking. Overbooking cannot be specified on an elastic path. Therefore, you can only specify an overbooking factor for an originating path when you also have reserved bandwidth for the path (i.e., specified the **-reserved** <*Kbs*> parameter).
none	The specified class of service (CBR, real-time VBR, non real-time VBR, UBR, or ABR) is not supported.
default	The default parameters of 0 CTD, 0 CDV, and 0 CLR are to be used for the CBR class of service.
QoSExtIndex	The index number of the set of QoS extension parameters. See the `QoSExtIndex` field under **conf qosext show** for this number. The `QoSExtIndex` must exist before it can be applied to a vpt.

1. If you want to shape traffic on more than two ports on a given network module, it is recommended that you set the traffic memory model to model number 5 for Series C network modules, using **conf module traffic c setmodel**.

18.4 Displaying Virtual Path Terminators

This command lets you display virtual path terminators for all of the ports on a switch board. Enter the following parameters:

```
myswitch::configuration vpt> show
 Input       Output
 Port   VPI  Port   VPI    ResBW  CurBW MinVCI MaxVCI  VCs  Protocol
 1C1      0  terminate      N/A   0.8K      1    511    6  pvc
 1C2      0  terminate      N/A   0.8K      1    511    7  pvc
 1C3      0  terminate      N/A   0.8K      1    511    6  pvc
 1C4      0  terminate      N/A   0.8K      1    511    5  pvc
 1CTL     0  terminate      N/A   0.0K      1   1023   19  pvc
 originate  1C1     0      N/A   0.8K      1    511    6  pvc
 originate  1C2     0      N/A   0.8K      1    511    7  pvc
 originate  1C3     0      N/A   0.8K      1    511    6  pvc
 originate  1C4     0      N/A   0.8K      1    511    5  pvc
 originate  1CTL    0      N/A   0.0K      1   1023   22  pvc
```

The fields in this display are defined as follows:

Field	Description
Input Port	The incoming port number of the vpt. Shows **originate** if it is an originating path.
Input VPI	The incoming virtual path number.
Output Port	The outgoing port number of the vpt. Shows the number of the output port of the vpt. Shows **terminate** if it is a terminating path.
Output VPI	The outgoing virtual path number.
ResBW	The maximum amount of bandwidth, in Kbps, that is reserved for the virtual channels using this vpt. A value of **N/A** indicates that this path is an elastic path. Elastic paths allocate and de-allocate bandwidth for their channels from the link.
CurBW	The amount of bandwidth, in Kbps, that is being used by the virtual channels using this vpt.
MinVCI	The bottom number for the range of VCIs that are reserved for VCCs on this virtual path terminator. The default is **1**.
MaxVCI	The top number for the range of VCIs that are reserved for VCCs on this virtual path terminator. The default is **511**.
VCs	The number of virtual channels that are currently using this vpt.
Protocol	The type of protocol running on this channel.

18.4.1 Displaying Advanced VPT Information

You can also display advanced or QoS extension parameter information about VPTs.

```
myswitch::configuration vpt> show [<port> [<vpi>]] [advanced] [qosext]
```

To list all of the advanced options about all of the existing virtual path terminators, enter the following parameters:

```
myswitch::configuration vpt> show advanced
Input       Output
 Port  VPI  Port  VPI  ShapeVPI LoopVPI VBROB BuffOB
 1B1     0  terminate       N/A     N/A   N/A    N/A
 1B1     1  terminate       N/A     N/A   N/A    N/A
 originate  1B1     0                    port   port
 originate  1B1     1                 10 port   port
```

The fields in the advanced display are defined as follows:

Field	Description
Input Port	The incoming port number of the vpt. Shows **originate** if it is an originating path.
Input VPI	The incoming virtual path number.
Output Port	The outgoing port number of the vpt. Shows **terminate** if it is a terminating path.
Output VPI	The outgoing virtual path number.
ShapeVPI	Shows the output port on which traffic shaping has been enabled for this originating vpt. This only applies to Series C network modules. **N/A** means that shaping has not been configured on this port.
LoopVPI	Shows the looping port that has been configured to loop traffic on that port for shaping on a Series D port. **N/A** means that looping has not been configured on this port.
VBROB	The bandwidth overbooking level assigned to this vpt, specified as a percentage. The default is 100, which means that no overbooking has been defined. Values less than 100 cause underbooking. Values greater than 100 denote overbooking. port means this is an elastic path. Since elastic paths derive their overbooking factors from their parent ports, use **conf port show** to display the overbooking value.
BuffOB	The buffer overbooking level assigned to this vpt, specified as a percentage. The default is 100, which means that no overbooking has been defined. Values less than 100 cause underbooking. Values greater than 100 denote overbooking. port means this is an elastic path. Since elastic paths derive their overbooking factors from their parent ports, use **conf port show** to display the overbooking value.

18.4.2 Displaying QoS Extension Information for VPTs

To display QoS extension parameter information about VPTs, enter the following parameters:

```
myswitch::configuration vpt> show qosext
 Type Port  VPI     Cbr   RtVbr  NrtVbr     Abr     Ubr
 term 1C1     0       1       1       1       9       9
 term 1C3     0       5       5       5       9       9
 term 1C4     0       3       3       3       9       9
 orig 1C1     0       1       1       1       1       1
 orig 1C3     0       4       4       4       4       4
 orig 1C4     0       2       2       2       2       2
```

The fields in the qosext display are defined as follows:

Field	Description
Type	Shows if this is an originating or a terminating path.
Port	The port number.
VPI	The virtual path number.
Cbr	Shows the path QoS metric information for CBR service.
RtVbr	Shows the path QoS metric information for RtVBR service.
NrtVbr	Shows the path QoS metric information for NrtVBR service.
Abr	Shows the path QoS metric information for ABR service.
Ubr	Shows the path QoS metric information for UBR service.

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