Lucent Technologies
Bell Labs Innovations

PacketStar® PSAX
1-Port Unchannelized DS3 Frame Relay Module User Guide

for the *PacketStar*® PSAX Multiservice Media Gateways

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System Software Release 7.0

AQueView® EMS Software Release 5.0

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Copyright and Legal Notices

Copyright

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Trademarks

Warranty Information

Software and Hardware Limited Warranties

Lucent Technologies provides a 90-day limited software warranty, and a one-year limited hardware warranty on this product. Refer to the *Software License and Limited Warranty Agreement* and the *Lucent Technologies InterNetworking Systems Global Warranty* that accompanied your package for more information.

Every effort has been made to ensure that this document is complete and accurate at the time of release, but information is subject to change. Lucent Technologies assumes no responsibility or liability for errors or inaccuracies that may appear in this guide.

Warranty Warnings

CAUTION:
Modifying or tampering with PSAX chassis components may void your warranty. Any modification to this equipment not expressly authorized by Lucent Technologies may void your granted authority to operate such equipment.

CAUTION:
When inserting modules into the chassis, slide them gently, not forcefully. Excessive force may cause the modules to be seated improperly in the chassis, and result in possible damage to the module or the chassis. Install or remove modules one at a time. Doing this aids in preventing the PSAX system from indicating any erroneous failure messages, and allows the PSAX system to reinitialize and display the accurate configuration of the module that is inserted.

CAUTION:
Shipping the chassis with removable modules installed may cause damage to the chassis and the modules. Damage to any of the components in the system resulting from shipping the chassis with removable modules installed could void your warranty. Only Lucent-authorized personnel should ship the PSAX chassis with a module installed.

Regulatory Standards Compliance

Safety and Electromagnetic Compatibility (EMC)

The 1-Port Unchannelized DS3 Frame Relay module (model 20N03) is compliant with applicable safety and EMC standards when configured with the following *PacketStar*® PSAX systems:

- PSAX 20 base system, 110 V ac (models 02S00 and 02S01)
- PSAX AC 60 base systems:
  - PSAX AC 60 system, 110 V ac (models 50S01 and 51S01)
  - PSAX AC 60 system, 220 V ac (models 50S02 and 51S02)
  - PSAX AC 60 system, -48 V dc (models 50S48 and 51S48)
- PSAX 1000 chassis (model 10S00)
- PSAX 1250 chassis (models 20S00 and 20S10)
- PSAX 2300 chassis (model 23S00)
- PSAX 4500 chassis (model 45S00)

Please refer to the appropriate *PacketStar*® PSAX Multiservice Media Gateway user guide or installation guide for additional information.

Safety Warnings and Information

When installing and operating the *PacketStar*® PSAX Multiservice Media Gateways, follow the safety guidelines provided below to help prevent serious personal injury and damage to the PSAX equipment. Please read all warnings and instructions supplied before beginning installation or configuration of the PSAX equipment. In addition to the general safety information provided below, you should also refer to the text in the user and installation guides for other important safety information and procedures.

DANGER:
Read all installation instructions before connecting the system to a power source.

WARNING:
Be sure to use the ejector handles during installation and removal of I/O and server modules.

WARNING:
Electrostatic discharge (ESD) can damage module and chassis components. All personnel should be grounded and follow proper ESD procedures before installing, removing, or handling hardware components.

CAUTION:
Ultimate disposal of this product should be handled according to all laws and regulations in your specific geographic region.

CAUTION:
Do not make electrical or mechanical modifications to any of the components in the PSAX system. Lucent Technologies is not responsible for the safety or the performance of a modified Lucent product. Do not attempt to repair any failed Power Supply module, Stratum 3–4 module, CPU module, I/O, or server module.

Contents

1 Getting Started

Purpose of This Guide

The *PacketStar® 1-Port Unchannelized DS3 Frame Relay Module User Guide* provides information about the following:

- Configuring the ports, channels, and interfaces for the 1-Port Unchannelized DS3 Frame Relay module
- Provisioning connections for permanent virtual circuits (PVCs), switched virtual circuits (SVCs), and soft permanent virtual circuits (SPVCs)

Note: If you are using this module to provision connections for the first time, you should read through this guide before beginning the provisioning process.

Audience for This Guide

The information in this guide is intended for users who will configure ports and channels for the 1-Port Unchannelized DS3 Frame Relay module, configure the interface types, and provision connections for the PSAX Multiservice Media Gateway system, whether using the console or the *AQueView®* element management software system.

What You Should Know

Before you use this document or operate a *PacketStar®* PSAX device, you should already understand and have experience with the following:

- ATM Forum and Frame Relay Forum specifications
- Ethernet network capabilities
- Internet Protocol capabilities
- Data network design
- Telephony network design

Related Reading

Lucent Technologies Information Products

Product Information Library

To install and configure your PSAX system and I/O or server modules, read the PSAX publications provided on your Lucent Technologies *PacketStar* PSAX Multiservice Media Gateways Central Office (CO) Products, Product Information Library CD-ROM.

Printed Documents

For your convenience, many of the documents included on the *PacketStar* Multiservice Media Gateway Central Office (CO) Products Product Information Library CD-ROM are also available in printed form. You can order these documents through the Lucent Technologies Customer Information Center Web site at: www.lucentdocs.com.

Other Publications

Numerous books are currently available on the subject of basic telecommunications technology and specific protocols. In addition to such general reading, you should also be familiar with the specifications identified in the appendix entitled Reference Tables at the back of the guide.

About Lucent Technologies

History

Lucent Technologies is the communications systems and technology company formed through the restructuring of AT&T. We bring with us a tradition of more than 125 years of experience and a dedication to superior customer service.

Lucent Technologies manufactures, sells, and services a complete line of customer premises communications units, and commercial and multimedia communications and messaging systems designed and supported by our research and development unit, Bell Laboratories.

Our legacy and our spirit of innovation allow Lucent to provide our customers with the tools needed to communicate effectively, any time and anywhere, and to integrate the latest technologies into real-life solutions that help make business work.

For More Information

To learn more about the *PacketStar*® PSAX family of ATM Multiservice Media Gateways and the complete line of Lucent Technologies products, visit our Web site at *www.lucent.com*.

About the *PacketStar*® PSAX Product Family

Lucent Technologies provides a complete range of PSAX Multiservice Media Gateways in the *PacketStar*® PSAX family, as described in Table 1-1.

Table 1-1. *PacketStar*® PSAX Product Family

Target Market	Device Name	Application/Description
Small Customer Premises	PSAX 20	The *PacketStar*® PSAX 20 Multiservice Media Gateway is the most scalable and flexible multiservice access product in its class. This scalability enables service providers to meet the demands of a growing enterprise customer with a single-edge solution. The PSAX 20 system is nonredundant. Supporting two slots for I/O and server modules and two factory-installed components (Enhanced DS1 and DSP2C Voice Server) and a 600 Mbps ATM cell bus architecture, this system optimizes wide area network (WAN) bandwidth with toll-quality voice compression, traffic optimization, and port scalability from T1/E1 to OC-3c/STM-1c connections. It also supports a full range of interfaces such as DS1, DS3, 10/100Base-T Ethernet, and serial.
Small Customer Premises	PSAX AC 60	The *PacketStar*® PSAX AC 60 Multiservice Media Gateway is ideal for enterprise networks seeking to consolidate branch office voice, video, and data traffic onto a single ATM network. The PSAX AC 60 system is nonredundant. Supporting four slots for I/O and server modules, this system offers high port-density in a small footprint for mid- to large-sized customer premises applications. The PSAX AC 60 chassis has a 650 Mbps backplane and supports a full range of interfaces such as DS1/E1, DS3/E3, OC-12c/STM-4c, 10/100Base-T Ethernet, and serial.
Carrier-Class Office	PSAX 1250	The *PacketStar*® PSAX 1250 Multiservice Media Gateway is designed to provide a full range of central office-based multiservice ATM access functions. Ideal for the central office or a large enterprise's multiservice media gateway, the *PacketStar*® PSAX 1250 system provides highly reliable network access for time-division multiplex voice, frame relay, and ATM data applications. Supporting ten slots (19-inch chassis) or 14 slots (23-inch chassis) for I/O and server modules, a 1.2 Gbps ATM cell bus architecture, carrier-class reliability, full redundancy, and a full range of interfaces such as DS1/E1, DS3/E3, OC-12c/STM-4c, 10/100Base-T Ethernet, and serial, the PSAX 1250 system is a cost-effective access switch solution for bridging to legacy equipment.

Table 1-1. *PacketStar*® PSAX Product Family

Target Market	Device Name	Application/Description
Carrier-Class Office	PSAX 2300	The *PacketStar*® PSAX 2300 Multiservice Media Gateway offers carrier-grade, high-density multiservice ATM access functions. Designed as the multiservice media gateway for the central office or for a large enterprise customer, the *PacketStar*® PSAX 2300 system provides network access for time-division multiplex voice, frame relay, and ATM data applications. Supporting 15 slots for I/O and server modules, a 3.9 Gbps ATM cell bus architecture, carrier-class reliability, full redundancy, provisions for OC-12c/STM-4c interfaces, N x T1/E1 module protection switching, and a full range of interfaces such as DS1/E1, DS3/E3, 10/100Base-T Ethernet, and serial the PSAX 2300 system solves many demanding and diverse network design challenges with ease.
Carrier-Class Office	PSAX 4500	The *PacketStar*® PSAX 4500 Multiservice Media Gateway offers up to 10 Gbps of switching capacity, the highest in the *PacketStar*® family, and carrier-class reliability. The PSAX 4500 system offers an unmatched range of service capabilities, end-to-end traffic prioritization, “any-service, any-channel” flexibility, and breakthrough voice technology. The new high-performance backplane design supports 15 interface slots. In four segments, the unique PSAX 4500 backplane allows each segment to be scaled independently to provide nonblocking, redundant chassis bandwidths beyond 10 Gbps. Protection for two groups of four multiport DS3, STS-1e, and E3 modules is provided via an N:1 protection scheme using rear access line interface modules. The protection module can fill in so that on the failure of any one of the four modules, traffic is maintained. Using the latest voice-compression technology, the DSP2*x* Voice Server modules deliver service providers eight times the capacity of traditional time division multiplex circuits while maintaining toll quality and reducing costs by nearly 30 percent per channel. A single PSAX 4500 system at the edge of the carrier network can transition traffic from a large number of network customers over high-speed OC-12c/STM-4c trunks into the ATM core, managing the whole quickly and efficiently, down to the individual permanent virtual circuit.

Text Conventions

Text Types Used in This Document

This book uses a different kind of type for each kind of text you will see on screens and equipment. In general, text you see in the book will closely

resemble what you see on the screens and equipment. The following table shows how each typographical convention is used.

Appearance	How it is used
SANS SERIF BOLD, ALL CAPS	Labels on module panels, chassis face-plates, or other hardware
`Fixed-width normal`	Message text displayed on the user interface window
Serif bold	• Button name (GUI interface) or command name (console interface) on the user interface window • Literal text for values that the user types in fields or selects from pre-defined sets of values for fields • Command keywords or literal argument values
`Fixed-width bold`	System prompt displayed on the user interface window
Serif italics	• A variable name or string for which you will substitute your own information • An argument or parameter on a command line for which you will substitute your own information

Icons and Symbols

Standard icons and symbols to alert you to dangers and cautions are listed below.

⚠ DANGER:
Warnings for a personal injury hazard are identified by this format.

⚠ WARNING:
Warnings relating to risk of equipment damage or failure are identified by this format.

⚠ CAUTION:
Warnings relating to risk of data loss or other general precautionary notes are identified by this format.

Note: Identifies additional information pertinent to the text preceding this note.

Electrostatic Discharge Precautions

The room where the PSAX system is located must have built-in precautions to provide protection from electrostatic discharge damage to electronic components. The following sections provide details on these necessary precautions.

Grounding Wrist Straps

Attach at least one grounding wrist strap to a common ground for each chassis/electronic rack to be handled. Follow these guidelines for wrist straps:

- Make sure the wrist straps or wrist strap cords have built-in 1-megaohm (minimum) resistance.
- Make sure the wrist straps and wrist strap cords are UL listed.
- Ensure the wrist strap cord is long enough so it can be worn while working either at the front or the back of the rack.
- Always discharge any static charge by touching your wrist strap before you touch the PSAX chassis.

Floor Covering

Be sure the room has an antistatic floor covering (conductive mat, tiles, or carpeting) to minimize static charge buildup as you walk across the room. Follow these guidelines for installing and maintaining proper floor coverings:

- Using foot grounding straps (attached to the heels of your shoes) is recommended, even if you are walking in rooms with antistatic floor covering. These straps provide additional protection against electrostatic discharge. The straps should have built-in 1-megaohm (minimum) resistance.
- Wool carpet is not an acceptable floor covering.
- Other types of carpet must be sprayed daily with a topical antistatic chemical before you perform any work in the room. Paying constant attention to carpet maintenance is time-consuming but required, if used.

Temperature and Humidity

Establishing the proper temperature and humidity in the room where the PSAX system is located helps control many static discharge problems. Maintaining proper room climate is especially important when heat is turned on during the cold weather. To avoid damage to the PSAX system, do not allow the humidity to increase to the level where water droplets appear on surfaces.

Clothing

When working with the PSAX system, avoid wearing clothing made from wool or synthetic materials. Try to minimize contact between clothing and electronic components.

Handling PSAX System Components

Follow these guidelines for proper handling of the PSAX hardware to minimize electrostatic discharge damage:

- Do not remove the chassis, modules, and other items from their protective packaging until you are ready to install them.
- When installing modules and components, use a grounding wrist strap connected to a common electrical ground to prevent electrostatic discharge damage. (A common electrical ground is a complete circuit between a person or an electrical/electronic device and the earth.)
- Store components in electrostatic-discharge-protective bags when they are not in use.

Technical Support

If you experience a problem with your PSAX system, refer to the *Lucent Technologies InterNetworking Systems Global Warranty*, which accompanied your shipment, for instructions on obtaining support in your area.

Comments on This Guide

To comment on the *PacketStar® 1-Port Unchannelized DS3 Frame Relay Module User Guide*, please complete the comment card that accompanied your shipment and mail it to the following address:

Manager, Information Design and Development Team
Lucent Technologies
PacketStar PSAX Products
8301 Professional Place
Landover, MD 20785
USA

You can also fax the comment card to us at: 301-809-4540.

Before You Begin

Before you start setting up, configuring, and using your new PSAX system, be sure you complete the following:

- Carefully read the safety cautions listed in the section, “Safety Information,” at the beginning of this guide.
- Record your site-specific specifications such as the IP addresses you will use, and the connections and interfaces you will need. Decide which user names and passwords you will assign.
- Make sure you have IP connectivity to all PSAX devices to be managed.
- Determine the numbering scheme for the in-band connections you will be using.

2 Module Description

Overview of the Module

The 1-Port Unchannelized DS3 Frame Relay module provides an unchannelized, high-speed frame relay network interface at digital signal level 3 (DS3), with a line rate of 44.736 Mbps. Typically, this module is used to connect the PSAX system to an ATM edge switch. Three light-emitting diode (LED) status indicators provide the operational status of the module.

The 1-Port Unchannelized DS3 Frame Relay module is illustrated in Figure 2-1.

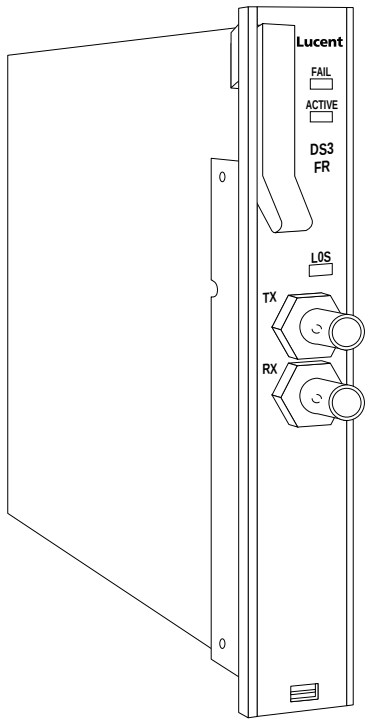


Figure 2-1. 1-Port Unchannelized DS3 Frame Relay Module

Software Features

- Multiservices:
  - ~ Frame relay UNI and NNI (FRF.1, FRF.2, FRF.5, and FRF.8)
  - ~ ITU-T I.370 (frame relay policing)
  - ~ Congestion management

- ~ Traffic policing
- ~ HDLC pass-through

Frame Relay

The 1-Port Unchannelized DS3 Frame Relay module has interfaces for frame-relay network-level interworking (FRF.5) and service-level interworking (FRF.8). A maximum of 350 permanent virtual circuits (PVCs) can be assigned on each frame relay user-network interface (UNI) port. These features enable the PSAX system to act as a gateway between routers, remote dial-access servers, IBM SNA equipment, and other devices configured for frame-relay operation.

Frame relay policing, and user-selected point-to-point SVCs are supported on the 1-Port Unchannelized DS3 Frame Relay module. Frame relay policing enables the user to manage traffic at the user-network interface (UNI) or network-network interface (NNI) by setting performance parameters such as the committed information rate (CIR), excess burst size (Be), and committed burst size (Bc).

HDLC Pass-through

Each port on the 1-Port Unchannelized DS3 Frame Relay module can be configured to perform adaptation for high-level data link control (HDLC) pass-through. Without this feature, AAL1 adaptation would be required for data from HDLC devices connected to a port on the 1-Port Unchannelized DS3 Frame Relay module. With this feature, AAL5 adaptation can be used to allow HDLC data to be handled as if it were VBR rather than CBR. Since ATM cells are only generated when HDLC is present, optimal bandwidth is used.

Hardware Features

The 1-Port Unchannelized DS3 Frame Relay module has the following hardware features:

- Number of ports: 1
- Connector type: two BNC connectors, one receive connector and one transmit connector
- Line rate: 44.736 Mbps (typical)
- Line encoding mode: B3ZS
- Line type: C-bit parity
- Line build-out: short, long
- Bandwidth: 44,736 Kpbs
- Loopback capabilities: local loop, line loop

Hardware Specifications

Table 2-1 shows the general physical and environmental hardware specifications for the PSAX Multiservice Media Gateway I/O and server modules.

Table 2-1. Physical Hardware Specifications for the I/O and the Server Modules

Specification	Description
Dimensions:	
• Height:	15.74 cm (6.2 in.)
• Width:	2.41 cm (0.95 in.)
• Depth:	24.13 cm (9.5 in.)
Weight:	0.45 kg (1.0 lb.)
Operating temperature:	0° to 50° C (32° to 122° F)
Operating relative humidity:	40 to 60%, optimum; up to 95%, noncondensing
Storage temperature:	-20° to 70° C (-4° to 158° F)

Chassis Speed, Power Consumption, and Memory Allocation

Chassis speed, power consumption, and memory allocation specifications for the 1-Port Unchannelized DS3 Frame Relay module are described in Table 2-2.

Table 2-2. Chassis Speed, Power Consumption, and Memory Allocation Specifications

Module	Total Amount of SDRAM	Module Program and Data Space	Maximum Input Buffer [1]	Output Buffer	Chassis Speed [2]	Power Consumption
1-Port Unchannelized DS3 Frame Relay (**DS3 FR**)	8–64 MB	4 MB	1 MB	Total minus 4 MB	Low Speed	13 W

[1] The I/O buffers carry 16,384 cells per megabyte.

[2] This column relates only to the performance of the module in the PSAX 4500 chassis. All modules operate in a low-speed mode in all other PSAX chassis. The speed relates to the performance of the data being passed through the midplane of the chassis.

LED Status Indicators

Table 2-3 describes how the light-emitting diode (LED) indicators on the 1-Port Unchannelized DS3 Frame Relay module faceplates respond to different module conditions. These LEDs indicate if the module has been installed properly.

Table 2-3. LED Indicators for the 1-Port Unchannelized DS3 Frame Relay Module

Module Status / LED	Initial Power-On	No Configured Ports	One or More Configured Ports	No Cable on Port	Cable on Port
FAIL (red)	Lights briefly[1]	Not lit	Lights only when the module is not functioning	Not Applicable	Not Applicable
ACTIVE (green)	Lights briefly[1]	Not lit	Lights only when the module is functioning properly	Not Applicable	Not Applicable
LOS[2] (Loss of Signal) (yellow)	Lights briefly[3]	Not Applicable	Not Applicable	Lights	• Does not light if signal is being received • Lights if signal is missing

[1]Note: After power is initially applied to the system and the system boot is complete, the FAIL and ACTIVE LEDs indicate whether the module has no configured ports (red), or one or more configured ports (green).

[2]Note: This module does not have this label next to the LED indicator on the faceplate.

[3]Note: After power is initially applied to the system and the system boot is complete, the LOS LED indicates whether the port has a cable connected to it.

3 Configuring Ports and Channels Using the Console Interface

Overview of This Chapter

This chapter describes how to:

- Set the values for the port configuration
- View the port statistics
- Save the configuration values

Before You Begin

Be sure you have done the following *first* before beginning configuration of the 1-Port Unchannelized DS3 Frame Relay module:

- Set the values to configure your basic system (see "Configuring the System for Your Site" in the appropriate *PacketStar*® PSAX Multiservice Media Gateway user guide)
- Set the values to configure the Stratum 3–4 module (see "Configuring the Stratum 3–4 Module" in the appropriate *PacketStar*® PSAX Multiservice Media Gateway user guide)

Configuring the Ports

To configure the 1-Port Unchannelized DS3 Frame Relay module, you configure the ports. You must first configure the this module before you can set up connection provisioning.

To configure the ports on the 1-Port Unchannelized DS3 Frame Relay module, perform the steps in the following procedure.

Configuring the Ports

Begin

1 On the Console Interface Main Menu window (see Figure 3-1), select the **Equipment Configuration** option and press Enter.

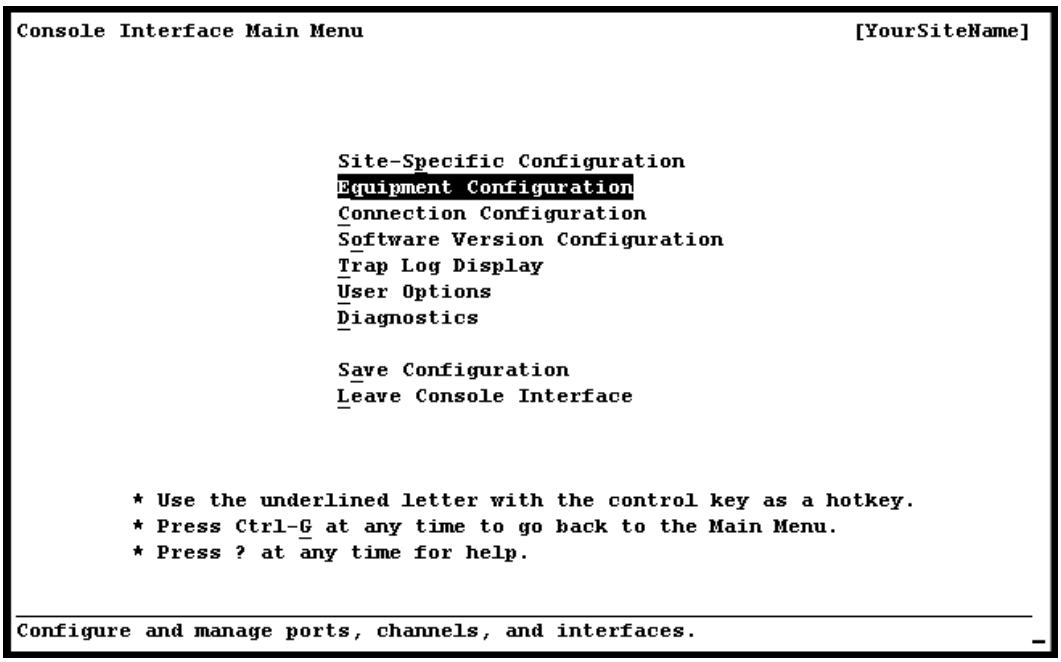


Figure 3-1. Console Interface Main Menu (Equipment Configuration Selected)

The Equipment Configuration window (see Figure 3-2 and Figure 3-3) is displayed.

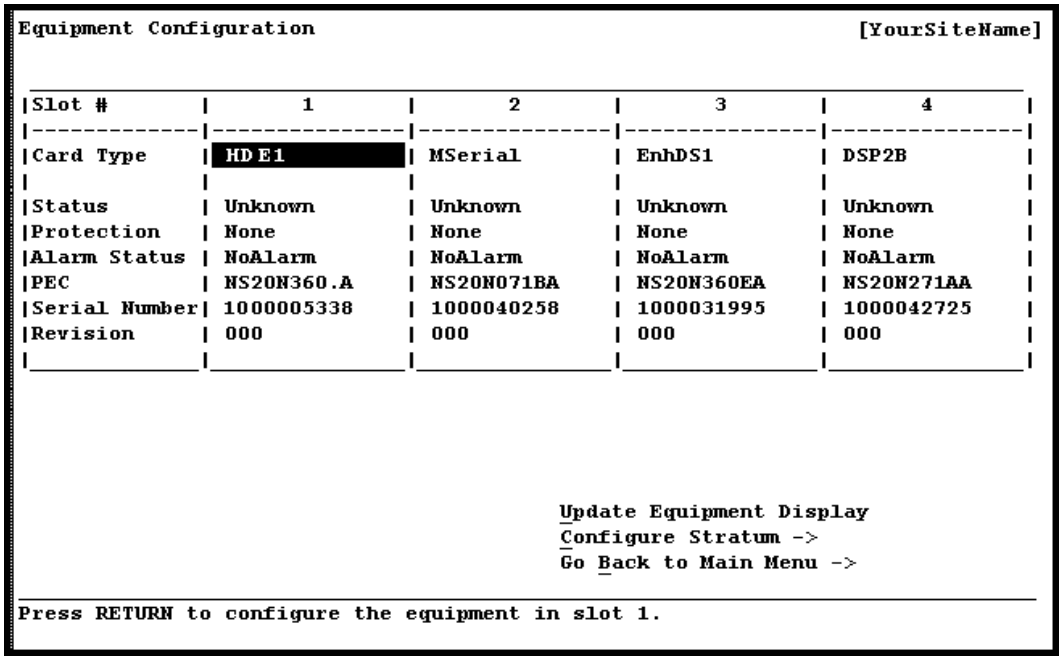


Figure 3-2. Equipment Configuration Window (As Displayed on the PSAX 20, and AC 60 Console Interface)

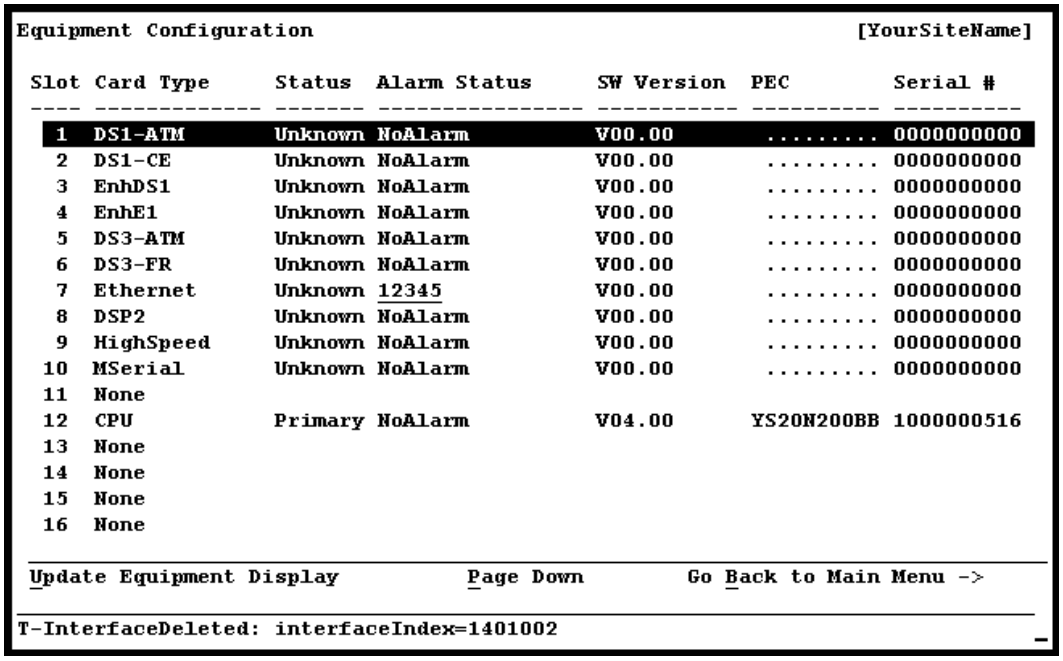


Figure 3-3. Equipment Configuration Window (As Displayed on the PSAX 1250 and PSAX 2300 Console Interface)

2 On the Equipment Configuration window, select an 1-Port Unchannelized DS3 Frame Relay module in the list and press Enter.

The DS3 Frame Relay Port and Channel Configuration window (see Figure 3-4) is displayed.

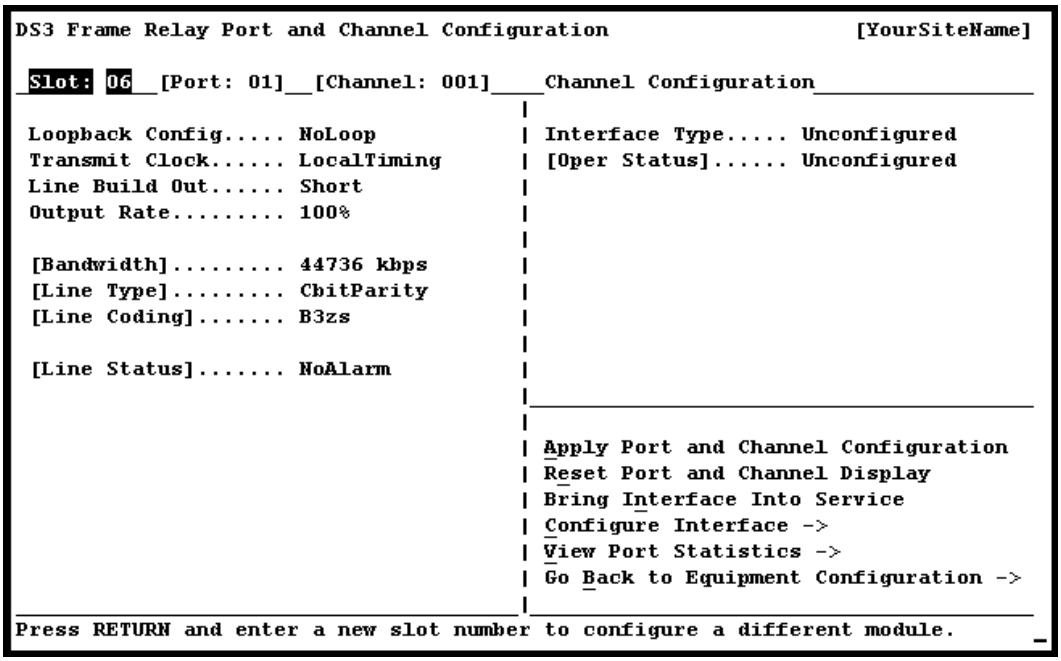


Figure 3-4. DS3 Frame Relay Port and Channel Configuration Window

Commands

The commands in this window have the following functions:

Command	Function
• Apply Port and Channel Configuration	For a specified port number value, applies the configuration field values you set.
• Reset Port and Channel Display	Resets the fields to the last set of saved values.
• Bring Interface Into Service (displayed when the [Oper Status] field is **OutOfService**)	Brings an out-of-service configured interface to in-service status. The value **InService** is displayed in the [Oper Status] field.
• Take Interface Out of Service (displayed when the[Oper Status] field is **InService**)	Takes an in-service configured interface to out-of-service status. The value **OutOfService** is displayed in the [Oper Status] field.
• Configure Interface	Displays the Frame Relay Interface Configuration window.

Command	Function
• View Port Statistics	Displays the DS3 Frame Relay Port Statistics window.
• Go Back to Equipment Configuration	Redisplays the Equipment Configuration window.

Field Descriptions

Select the values for the fields on this window from the values given in Table 3-1.

Table 3-1. Field Descriptions for the DS3 Frame Relay Port and Channel Configuration Window

Field Name	Values	Description
Loopback Config	Default: NoLoop	The port is not in the loopback state.
	LocalLoop	The signal is received from another module in the chassis, sent through the module circuitry, including the segmentation and reassembly (SAR) function, and the chassis backplane to the originating module.
	LineLoop	The received signal is sent through the receiver and the line driver, and then back out to the originating point.
Transmit Clock	Default: LocalTiming	Indicates that a local clock source is used as the transmit clock.
	CardFreeRun	Indicates local oscillator on the I/O module is used as the transmit clock.
	LoopTiming	Indicates that the recovered receive clock is used as the transmit clock.
	Adaptive Timing	Monitors the port buffers to increase or decrease the transmission rate.
Line Build Out	Default: Long	Indicates that the cable from the DS3 port is more than 225 feet away from the next node.
	Short	Indicates that the cable from the DS3 port is less than 225 feet away from the next node.xx
Output Rate	Default: 100 Range: 1-100	To control the amount of data being sent out. This is determined by the rate that the data can be received at the other end (100is a practical value).

Table 3-1. Field Descriptions for the DS3 Frame Relay Port and Channel Configuration Window

Field Name	Values	Description
[Bandwidth] (display only)	44736 kbps	The amount of data that a given channel can transmit in a given period of time measured in bits per second (not bytes per second) on digital seconds, or in Hertz (cycles per second) on analog networks.
[Line Type] (display only)	CbitParity	A framing configuration that uses an M-bit and F-bit to convey a block error and a P-bit to convey parity errors between two nodes or systems.
[Line Coding] (display only) (display only)	B3ZS	An encoding/decoding pattern that utilizes bipolar three-zero substitution to detect line code violations.
[Line Status] (display only) (display only)		Indicates the line status of the interface: loopback, failure, received and transmitted alarm information. See the bit map tables for the 1-Port Unchannelized DS3 Frame Relay module under the MIB object lineStatus in Appendix A, "SNMP Trap Messages" in the appropriate *PacketStar*® Multiservice Media Gateway user guide.
	NoAlarm (default)	No alarm is present.
	RcvFarEndLOF	Far-end loss of frame.
	FarEndLOF	Near-end sending loss of frame indication.
	RcvAIS	Far-end sending alarm indication signal.
	AIS	Near-end sending alarm indication signal.
	LossOfFrame	Near-end loss of frame.
	LossOfSignal	Near-end loss of signal.
	LoopbackState	Near-end is looped.
	T16AIS	E1 TS16 AIS.
	Rcv FarEndLOMF	Far-end sending TS16 LOMF.
	FarEndLOMF	Near-end sending TS16 LOMF.
	RcvTestCode	Near-end detects a test code.
	OtherFailure	Any line status not defined here.
	RmtLoopback	Far-end loopback.

Table 3-1. Field Descriptions for the DS3 Frame Relay Port and Channel Configuration Window

Field Name	Values	Description
Interface Type	Default: Unconfigured	The interface for this channel is not configured.
	FrameRelayUni	The interface is configured for the frame relay user-to-network interface.
	FrameRelayNni	The interface is configured for the frame relay network-to-network interface.

3 To apply the values for the fields, select the **Apply Port and Channel Configuration** command and press Enter.

4 Select the **Configure Interface** command and press Enter.

The Frame Relay Interface Configuration window is displayed. To configure the interface, see Chapter 5 for instructions.

Note: Whenever needed, use the commands in the DS3 Frame Relay Port and Channel Configuration window (see Figure 3-4) to manage the interfaces.

Viewing Port Statistics

To view statistics for this port, perform the following procedure.

On the DS3 Frame Relay Port and Channel Configuration window (see Figure 3-4), select the **View Port Statistics** command and press Enter.

The DS3 Frame Relay Port Statistics window (see Figure 3-5) is displayed.

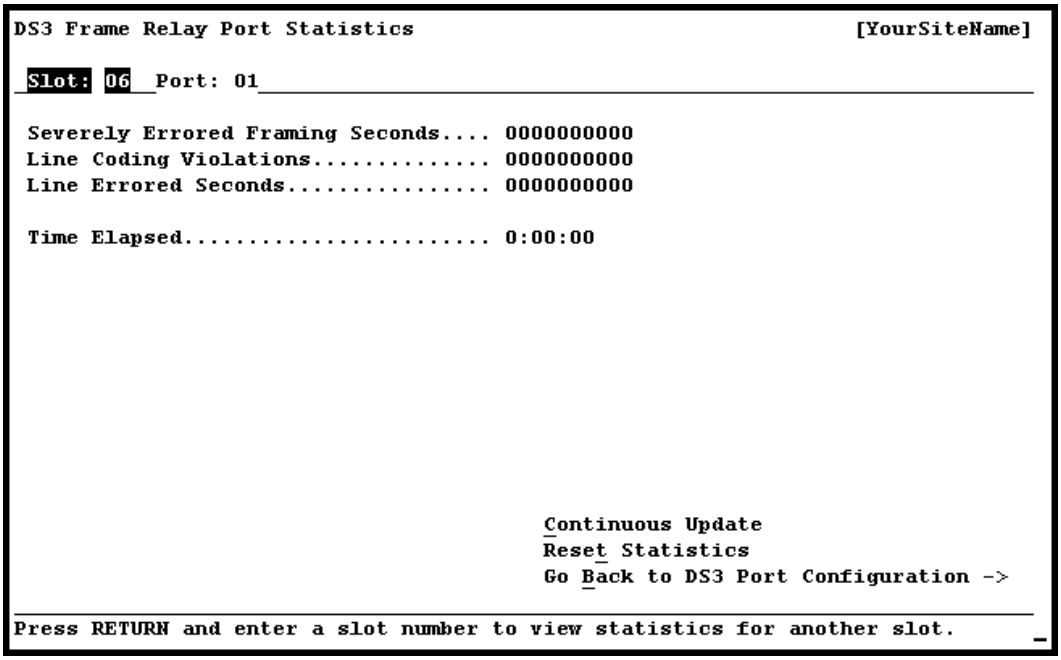


Figure 3-5. DS3 Frame Relay Port Statistics Window

Commands

The commands in this window have the following functions:

Command	Function
• Continuous Update	Updates the values in the fields every second.
• Reset Statistics	Sets all field values to zero.
• Go Back to DS3 Port Configuration	Redisplays the DS3 Frame Relay Port and Channel Configuration window.

Field Descriptions

Descriptions of the display-only fields for the DS3 Frame Relay Port Statistics window are given in Table 3-2.

Table 3-2. Field Descriptions for the DS3 Frame Relay Port Statistics Window

Field Names	Description
Severely Errored Framing Seconds	An errored second that occurs when a receiver improperly interprets the set of bits within a frame, with at least one of the following: • Out of Frame defects • A detected incoming AIS
Line Coding Violations	A Bipolar Violation or Excessive Zeroes Error Event has occurred.
Line Errored Seconds	An errored second with some type of protocol code violation, or at least one of the following: • CVs occurred • LOS defects
Time Elapsed	Time elapsed since last reset.

Saving the Equipment Configuration and Logging Off

After configuring the module ports and channels, the interface types for each port and channel, and the connections, you must save the configuration permanently, before you exit the current session for the PSAX system console interface. It is recommended that you save your configuration frequently, after you configure each module, and then again after configuring the connections of each type you will have in your system. Finally, before you exit your current session, be sure you save your configuration for the last time by performing the steps in the following procedure.

▲ CAUTION:
If your system or location loses power or your current session ends abnormally while you are in the process of configuring the system, and you have not yet saved the values permanently, you will lose all unsaved values you have applied on the various windows.

Saving the PSAX System Values

Begin

1. Press Ctrl+G while on any window to display the Console Interface Main Menu window.
2. Select the **Save Configuration** command and press Enter (or press Ctrl+A).

Wait a few seconds while the system writes the values permanently to the Multiservice Media Gateway system database. The system displays the following message while it is executing this command:

```
Saving the equipment and connection information
```

When the command is completed, the system displays the following message:

```
T-SaveConfiguration: saveConfigurationReasonCode=All-
OK
```

You can now safely exit the current session.

Note: In PSAX systems with redundant CPU2 modules, the backup CPU2 module reboots every time you save the configuration on the primary CPU2 module. This event is a function of the SVC retention feature and the result of saving the configuration changes you have made.

3 Select the **Leave Console Interface** command and press Enter.

You are now logged off the PSAX Multiservice Media Gateway system console interface.

End

4 Configuring Ports and Channels Using the *AQueView*® System

Overview of This Chapter

This chapter describes how to set the values for the port and channel configuration for the 1-Port Unchannelized DS3 Frame Relay module using the *AQueView*® Element Management System (EMS).

Before You Begin

Be sure to complete the following actions *first* before configuring the 1-Port Unchannelized DS3 Frame Relay module:

- Set the values to configure your basic system (see the appropriate *AQueView*® *Element Management System User Guide*)
- Set the values to configure the Stratum 3–4 module (see the appropriate *AQueView*® *Element Management System User Guide*)

When configuring the 1-Port Unchannelized DS3 Frame Relay module using the *AQueView*® EMS, display-only fields are gray.

Using the Right-Click Menu

You can perform various functions in the *AQueView* system by clicking the right mouse button. This section describes the right-click menu options you can use in the various windows in the *AQueView* system when configuring ports and channels.

Configuring Ports and Channels

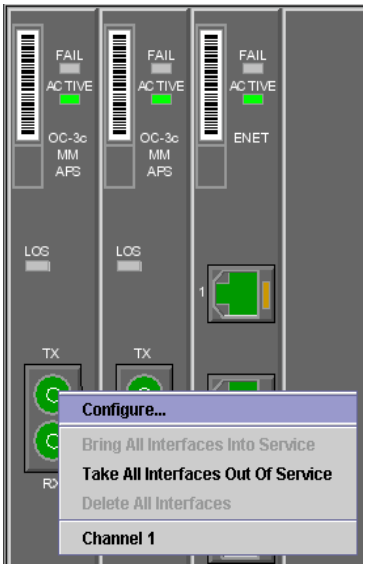


Figure 4-1. Sample Port Configuration (Displaying Right-Click Menu)

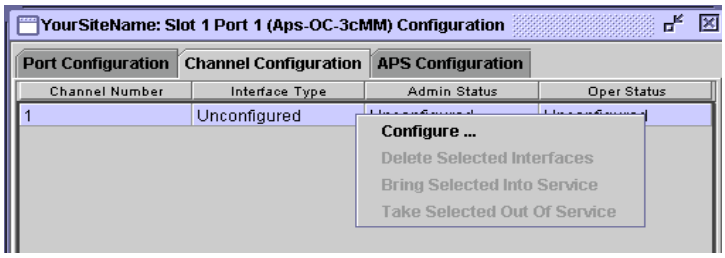


Figure 4-2. Sample Channel Configuration (Displaying Right-Click Menu)

Table 4-1. Descriptions of the Port and Channel Configuration Right-Click Menu Options

Option	Function
Configure	Opens the port and channel configuration window of a module.
Bring All Interfaces Into Service	Sets all interfaces on a port administratively into service.
Take All Interfaces Out of Service	Takes all interfaces on a port administratively out of service.

Table 4-1. Descriptions of the Port and Channel Configuration Right-Click Menu Options

Option	Function
Delete All Interfaces	Deletes all interfaces. All interfaces to be deleted must be administratively out of service first.
Channel Selection	Opens the appropriate channel configuration window for the selected channel.

Context-Sensitive Help

If you right-click on a field in a port and channel configuration window, a description of that field appears (see Figure 4-3):

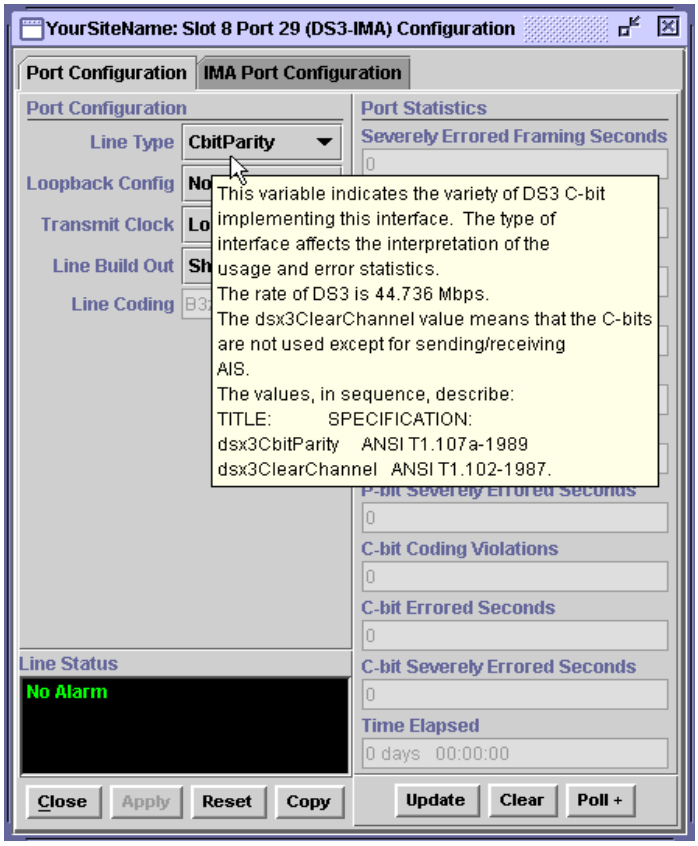


Figure 4-3. Sample of Context-Sensitive Help (Displayed on a Port and Channel Configuration Window)

Configuring the DS3 Frame Relay Module

You must first configure the 1-Port Unchannelized DS3 Frame Relay module before you can set up connection provisioning.

To access the port and channel configuration functions in the *AQueView* system, do the following:

1. Log in to the *AQueView* system as a user with Administrator or Configurator access privileges.

2. From the Device List or the Open Device window (press Ctrl+D or Ctrl+O), open the PSAX device that contains the module on which you want to configure a port or channel. The Front Panel view and Device Tree for that PSAX device will appear (see Figure 4-4).

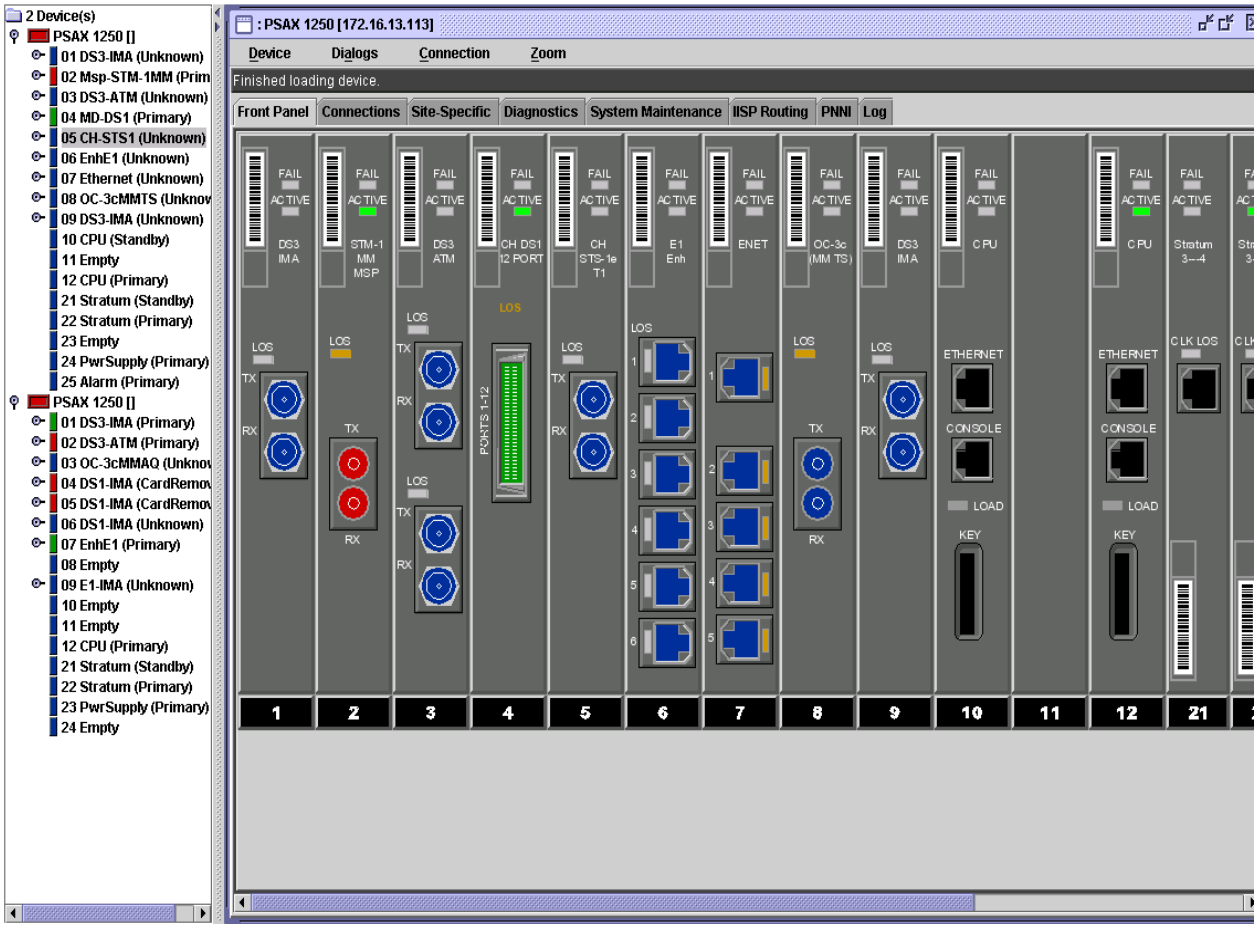


Figure 4-4. Provisioning Window (Displaying a Typical Setup)

Configuring the Module

Port Configuration

Perform the steps in the following procedure to configure the ports on the 1-Port Unchannelized DS3 Frame Relay module.

Configuring the Ports

Begin

1 Do one of the following to open the Port and Channel Configuration window:

- In the Front Panel, click the left button twice on the port to be configured or displayed (see Figure 4-5).
- In the Front Panel, double-click the right button on the port and a menu appears. Click **Configure** in the menu that appears.
- In the Device Tree, double-click the desired port symbol or identifier with the left mouse button.
- In the Device Tree, select a port then click the right mouse button on the Device Tree and a menu appears. Click **Configure.**

Figure 4-5. Front Panel View of the DS3 Frame Relay Module

The DS3 Frame Relay Port Configuration window appears (see Figure 4-6).

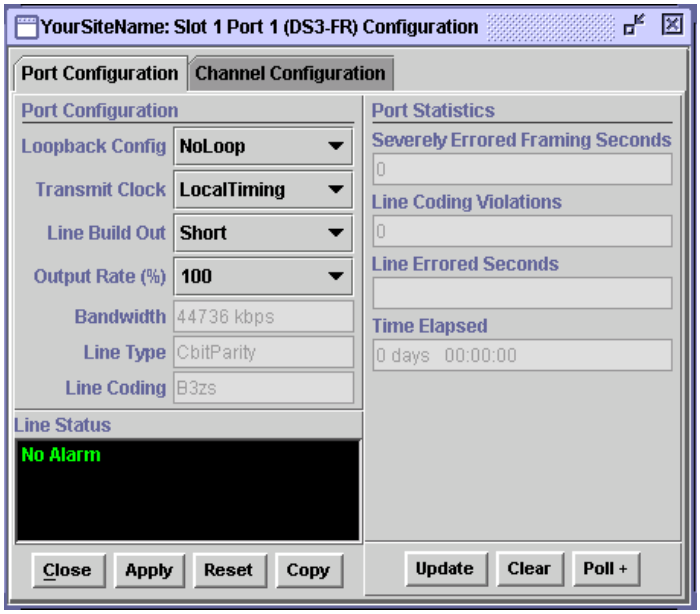


Figure 4-6. DS3 Frame Relay Port and Channel Configuration Window

The window contains:

~ The Port Configuration page, which lets you do the following tasks:

- Select and apply port settings
- View port statistics, which display line errors and coding violations

~ The Channel Configuration page, which lets you do the following tasks:

- Select and apply an interface
- Open the Interface Configuration window to configure the interface

Note: All interfaces must be out of service before changes can be made to the port settings; otherwise, the **Apply** button will appear to be ghosted.

Buttons

The buttons in this window have the following functions:

Command	Function
• Close	Closes this window.
• Apply	Applies the configuration field value you set.
• Reset	Resets the fields to the last set of applied values.

Command	Function
• Update	Updates the information in the fields.
• Clear	Removes the values in the **Port Statistics** panel and resets them to 0.
• Poll+ or Poll-	**Poll+** initiates the continuous update of statistics. **Poll-** suspends polling.

Field Descriptions

2 Select the values for the fields in this window as described in Table 4-2.

Table 4-2. Field Descriptions for the DS3 Frame Relay Port and Channel Configuration Window

Field Name	Values	Description
Loopback Config	Default: NoLoop	The port is not in the loopback state.
	LocalLoop	The signal is received from another module in the chassis, sent through the module circuitry, including the segmentation and reassembly (SAR) function, and the chassis backplane to the originating module.
	LineLoop	The received signal is sent through the receiver and the line driver, and then back out to the originating point.
Transmit Clock	Default: LocalTiming	Indicates that a local clock source is used as the transmit clock.
	CardFreeRun	Indicates local oscillator on the I/O module is used as the transmit clock.
	LoopTiming	Indicates that the recovered receive clock is used as the transmit clock.
	Adaptive Timing	Monitors the port buffers to increase or decrease the transmission rate.
Line Build Out	Default: Short	Indicates that the cable from the DS3 port is less than 225 feet away from the next node.
	Long	Indicates that the cable from the DS3 port is more than 225 feet away from the next node.xx
Output Rate (%)	Default: 100% Range: 1-100%	To control the amount of data being sent out. This is determined by the rate that the data can be received at the other end (100% is a practical value).

Table 4-2. Field Descriptions for the DS3 Frame Relay Port and Channel Configuration Window

Field Name	Values	Description
Bandwidth (display only)	44736 kbps	The amount of data that a given channel can transmit in a given period of time measured in bits per second (not bytes per second) on digital seconds, or in Hertz (cycles per second) on analog networks.
Line Type (display only)	CbitParity	A framing configuration that uses an M-bit and F-bit to convey a block error and a P-bit to convey parity errors between two nodes or systems.
Line Coding (display only)	B3ZS	An encoding/decoding pattern that utilizes bipolar three-zero substitution to detect line code violations.
Line Status (display only)		Indicates the line status of the interface: loopback, failure, received and transmitted alarm information. See the bit map tables for the 1-Port Unchannelized DS3 Frame Relay module under the MIB object lineStatus in Appendix A, "SNMP Trap Messages" in the appropriate *PacketStar*® Multiservice Media Gateway user guide.
	NoAlarm (default)	No alarm is present.
	RcvFarEndLOF	Far-end loss of frame.
	FarEndLOF	Near-end sending loss of frame indication.
	RcvAIS	Far-end sending alarm indication signal.
	AIS	Near-end sending alarm indication signal.
	LossOfFrame	Near-end loss of frame.
	LossOfSignal	Near-end loss of signal.
	LoopbackState	Near-end is looped.
	T16AIS	E1 TS16 AIS.
	Rcv FarEndLOMF	Far-end sending TS16 LOMF.
	FarEndLOMF	Near-end sending TS16 LOMF.
	RcvTestCode	Near-end detects a test code.
	OtherFailure	Any line status not defined here.
	RmtLoopback	Far-end loopback.

Table 4-2. Field Descriptions for the DS3 Frame Relay Port and Channel Configuration Window

Field Name	Values	Description
Interface Type	Default: Unconfigured	The interface for this channel is not configured.
	FrameRelayUni	The interface is configured for the frame relay user-to-network interface.
	FrameRelayNni	The interface is configured for the frame relay network-to-network interface.

3 Click **Apply**.

End

Copying a Port Configuration

The **Copy** button on the Port and Channel Configuration window of each I/O module enables you to copy a port configuration to a range of ports. To copy a port configuration to a range of ports, perform the steps in the following procedure from the appropriate Port and Channel Configuration window.

Copying a Port Configuration to Multiple Ports

Begin

1 On the Port Configuration page, click **Copy.**

The Copy Port Configuration window appears with the slot and port of the module you selected in the Start At: and Stop At: panels (see Figure 4-7).

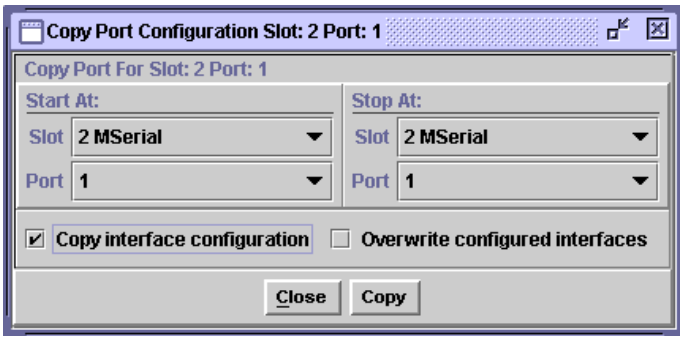


Figure 4-7. Sample Copy Port Configuration Window

Buttons

The buttons in this window have the following functions:

Button	Function
• Close	Closes this window.
• Copy	Copies this interface to a range of channels.

2 Select the range of slots and ports to which you wish the port configuration to be copied.

3 To copy the interface configuration of this module, click the box beside Copy interface configuration.

4 To overwrite the existing interface configuration of the destination ports, click the box beside Overwrite configured interfaces (this option is only available if Copy interface configuration is selected).

Note: The **Overwrite configured interfaces** option is ghosted until you click the box beside Copy interface configuration.

5 Click **Copy.**

The port configuration is copied to the range of ports you selected.

End

Channel Configuration

Perform the steps in the following procedure to configure the channels on the 1-Port Unchannelized DS3 Frame Relay module.

Configuring the Channels

Begin

1 Click the **Channel Configuration** tab.

The Channel Configuration window appears (see Figure 4-8).

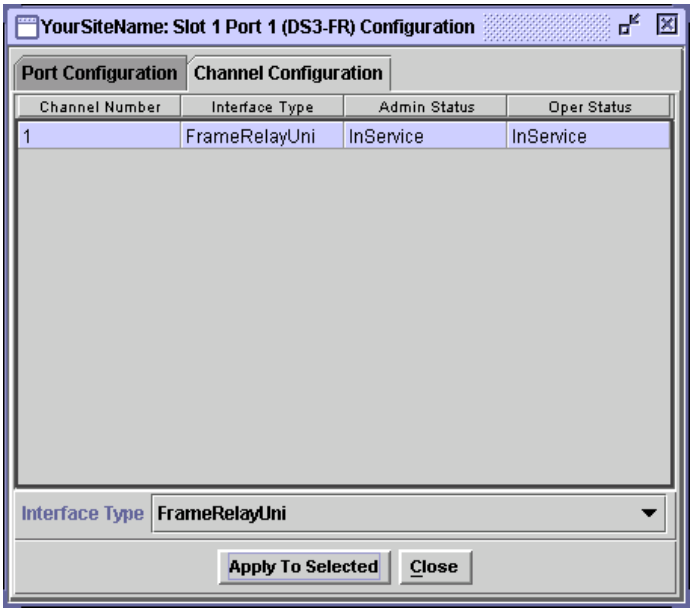


Figure 4-8. Channel Configuration Page

Buttons

The buttons in this window have the following functions:

Command	Function
• Apply to Selected	Applies the configuration field value you set.
• Close	Closes this window.

2 In the Channel Configuration page, either click the arrow in the **Interface Type** field (in the middle of the window), or double-click the channel in the **Interface Type** field, and select a Frame Relay interface from the list. Click **Apply to Selected**.

Note: You can double-click in the channel in the **Interface Type** field to select a new interface only when an interface is not currently selected for that channel. If an interface is applied for a channel and you double-click on it in the **Interface Type** field, the Interface Configuration window appears.

3 Click the right mouse button in the list in the Channel Configuration window. A menu appears. Click **Bring Into Service.**

4 If you want to configure the interface, do one of the following:

~ Double-click the left mouse button on the channel for which you want to configure the interface.

~ Click the right mouse button on the channel for which you want to configure the interface and a menu appears. Select **Configure** in the menu.

The Frame Relay Interface Configuration window appears. For information on configuring this interface, see Chapter 6.

5 Repeat this procedure to configure more channels.

6 In the Channel Configuration window, click **Close**.

End

Viewing Port Statistics

You can view the DS3 Frame Relay port statistics from the Port Statistics panel on the DS3 Frame Relay Port Configuration window (see Figure 4-6).

Field Descriptions

Descriptions of the data fields for the DS3 Frame Relay Port Statistics panel are given in Table 4-3.

Table 4-3. Field Descriptions for the DS3 Frame Relay Port Statistics Panel

Field Names	Description
Severely Errored Framing Seconds	An errored second that occurs when a receiver improperly interprets the set of bits within a frame, with at least one of the following: • Out of Frame defects • A detected incoming AIS
Line Coding Violations	A Bipolar Violation or Excessive Zeroes Error Event has occurred.
Line Errored Seconds	An errored second with some type of protocol code violation, or at least one of the following: • CVs occurred • LOS defects
Time Elapsed	Time elapsed since last reset.

5 Configuring the Interfaces Using the Console Interface

Overview of This Chapter

This chapter provides instructions for configuring the following interface types for the 1-Port Unchannelized DS3 Frame Relay module:

- Frame relay user-network interface (UNI)
- Frame relay network-network interface (NNI)

Before you can set interface configuration values, you must select an interface type value other than **Unconfigured** in the **Interface Type** field on the DS3 Frame Relay Port and Channel Configuration window.

Interface Types by Module Type

For a matrix of interface types by PSAX I/O module types, see the "Interface Types by I/O Module Types Table" in the Reference Table appendix of this user guide.

Configuring the Frame Relay Interface

This section provides instructions for configuring a PSAX I/O module for the frame relay user or network interface. Use the same window to configure either interface. You can use the following I/O modules for the frame relay user or network interface:

- 6-Port Enhanced DS1/T1 Multiservice module
- 6-Port Enhanced E1 Multiservice module
- 12-Port Medium-Density DS1 Multiservice module
- 21-Port High-Density E1 Multiservice module
- 1-Port Channelized DS3 Multiservice module
- 1-Port Channelized STS-1e, T1 Format module
- 1-Port Unchannelized DS3 Frame Relay module
- 6-Port Multiserial module
- Quadserial module

To set the values for the frame relay interface, perform the steps in the following procedure.

Setting the Values for the Frame Relay Interface

Begin

When you select the value **FrameRelayUni** or **FrameRelayNni** as the interface type on a channel configuration window associated with one of the modules above, the Frame Relay Interface Configuration window (see Figure 5-1) is displayed.

```
Frame Relay Interface Configuration                          [YourSiteName]

 Slot: 01  Port: 01  Channel: 001
 [Admin Status]..... OutOfService    |
 [LMI Oper Status].... OutOfService  |
 [Oper Status]..... OutOfService     |
 [DLCI Length]..... TwoOctets10Bits  |
 DLCMI State..... NoLmi              |
 Over Subscription.... 10            |
 LMI Protocol..... Ccitt             |
 LMI Asynchronous..... Enabled       |
 Interworking Type.... Frf8          |
 Throughput..... K64                 |
                                     |
 N391..... 006   T391..... 10        |
 N392..... 03    T392..... 15        | View FR Interface Statistics ->
 N393..... 04    NT3..... 10         |
                                     | View Frame Relay LMI Statistics ->
 Apply Interface Configuration       | View FR LMI DLCI Status ->
 Reset Interface Display             |
 Bring Interface Into Service        |
 Delete Interface and Return ->      | Go Back to Port Configuration ->
 ____________________________________|_____________________________________
Press RETURN and enter a new slot number to configure a different interface.
```

Figure 5-1. Frame Relay Interface Configuration Window

Commands

The commands in this window have the following functions:

Command	Function
• **Apply Interface Configuration**	Applies the configuration field value you set.
• **Reset Interface Display**	Resets the fields to the last set of applied values.
• **Bring Interface Into Service** (displayed when the [Admin Status] field is **OutOfService**)	Brings an out-of-service configured interface to in-service status. The value **InService** is displayed in the [Admin Status] field. You must first configure the interface before you can use this command.

Command	Function
• **Take Interface Out of Service** (displayed when the [Admin Status] field is **InService**)	Takes an in-service configured interface to out-of-service status. The value **OutOfService** is displayed in the [Admin Status] field. **Note:** You must use this command first before using the **Delete Interface and Return** command.
• **Delete Interface and Return**	Deletes an out-of-service interface and redisplays the port and channel configuration window for the module you are configuring. **Note:** You must first take interface out of service (using the **Take Interface Out of Service** command) before you can use this command.
• **Continuous Update**	Continuously updates the information in the fields every second. Select this command and press return to turn the continuous updating on and off as needed (similar to a toggle switch).
• **Reset Statistics**	Removes the values in the Interface Statistics fields and sets them to the value **0**.
• **View Frame Relay LMI Statistics**	Displays the LMI statistics for this interface.
• **View FR LMI DLCI Status**	Displays the LMI DLCI status of this interface.
• **Go Back to Port Configuration**	Redisplays the port and channel configuration window of the module you are configuring.

1 Select the values for the fields on this window from the values given in Table 5-1.

Field Descriptions

Table 5-1. Field Descriptions for the Frame Relay Interface Configuration Window

Field Name	Values	Description
[Admin Status] (display only)	InService	Indicates that the interface is in service.
	OutOfService	Indicates that the interface is not in service.

Table 5-1. Field Descriptions for the Frame Relay Interface Configuration Window

Field Name	Values	Description
[LMI Oper Status] (display only)	Default: OutOfService	Indicates that the local management interface (LMI) is not operational.
	InService	Indicates that the local management interface is operational.
[Oper Status] (display only)	OutOfService	Indicates that the interface is not operational.
	InService	Indicates that the interface is operational.
[DLCI Length] (display only)	TwoOctets10Bits	Type of data link connection identifier (DLCI) format used.
DLCMI State (display only)	Default: NoLmi (for frame relay UNI only)	No local management interface (LMI).
	LmiDte (for frame relay UNI only)	LMI is a DTE device.
	LmiDce (for frame relay UNI only)	LMI is a DCE device.
	LmiNni (for frame relay NNI only)	Local management interface is used with network-to-network interface.
Over Subscription	Default: 10 Range: 1–10	The connection admission control takes into account the oversubscription factor when determining if a connection can be made.
LMI Protocol	Default: Ccitt	Protocol uses Annex A (ITU Q.933, reference RFR.1).
	Ansi	Protocol uses Annex D (ANSI T2.617).
	ATT	LMI protocol.
	None	Use of local management interface is disabled.
LMI Asynchronous	Enabled	This mode sends LMI message whenever there is a status change.
	Disabled	This mode waits for regular LMI polling cycle.
Interworking Type	Default: Frf8	FRF.8 (Frame Relay Forum Implementation Agreement)—frame relay to ATM PVC service interworking.
	Frf5	FRF.5 (Frame Relay Forum Implementation Agreement)—frame relay to ATM PVC service interworking.

Table 5-1. Field Descriptions for the Frame Relay Interface Configuration Window

Field Name	Values	Description
Throughput	Default: K64 K56	The throughput bandwidth of the interface, in kb.
N391	Default: 006 Range: 1–255	System parameter counter for full status (status of all PVCs) polling, used with user and network. This parameter always applies to the user equipment. It applies to the user and network if the optional bidirectional network procedures are invoked.
N392	Default: 03 Range: 1–10	System parameter counter for error threshold, used with user and network. The value of parameter N392 should be less than or equal to N393.
N393	Default: 04 Range: 1–10	System parameter counter for counting of monitored events, used with user and network. If the value of parameter N393 is set to one much less than N391, then the link could go in and out of error-condition without the user equipment or network being notified.
T391	Default: 10 Range: 5–30	System parameter timer for link integrity verification polling, measured in seconds. When the time expires, status enquiry is transmitted and error is recorded if status message is not received. Parameter T391 always applies to the user. It applies to the user and network if the optional bidirectional network procedures are invoked.

Table 5-1. Field Descriptions for the Frame Relay Interface Configuration Window

Field Name	Values	Description
T392	Default: 15 Range: 5–30	System parameter timer for polling verification, measured in seconds. When the time expires, error is recorded by incrementing the value for parameter counter N392, and the timer is restarted. Parameter T392 always applies to the network. It applies to the network and user equipment if the optional bedirectional network procedures are invoked. The value of parameter T392 should be greater than the one for T391.
NT3	Default: 10 Range: 5–30	Message frequency timer, relevant for ATT LMI only.

2 To apply the interface configuration values, select the **Apply Interface Configuration** command and press Enter.

3 To activate the interface after you have applied the configuration values, select the **Bring Interface Into Service** command and press Enter.

The value **InService** is displayed in the [Operational Status] field.

4 To display the current frame relay interface data link connection identifiers (DLCIs), select the **View FR LMI DLCI Status** command and press Enter.

The Frame Relay LMI DLCI Status Table window is displayed (see Figure 5-2).

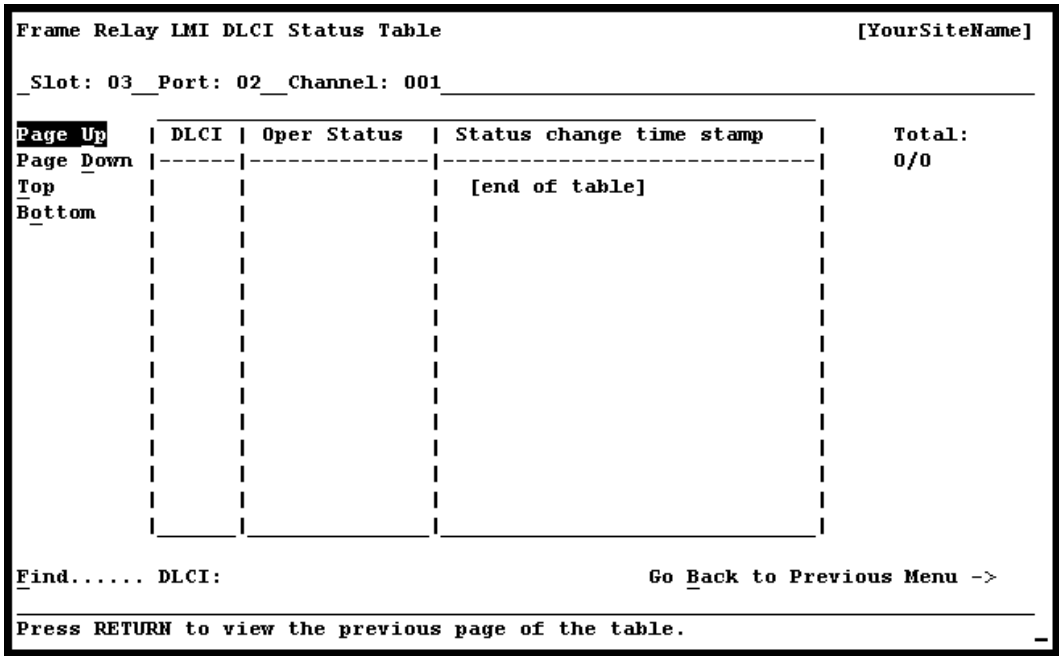


Figure 5-2. Frame Relay LMI DLCI Status Window

Commands

The commands on this window have the following functions:

Command	Function
• **Find DLCI:**	Searches this table by the value you enter in the DLCI field.
• **Go Back to Previous Menu**	Displays the Frame Relay Interface Configuration window.

Field Descriptions

The field descriptions for the display-only fields on this window are given in Table 5-2.

Table 5-2. Field Descriptions for the Frame Relay LMI DLCI Status Table Window

Field	Description
• DLCI	This column displays the data link connection identifiers (DLCIs) for all the frame relay interfaces in the PSAX system.
• Oper Status	This column displays the operational status of all frame relay interfaces in the PSAX system.

Table 5-2. Field Descriptions for the Frame Relay LMI DLCI Status Table Window

Field	Description
• Status change time stamp	This column displays the dates/times for the last time the operational status of frame relay interfaces was changed.
• Total: 0/0	The first number in this field indicates the number of the DLCI entry on the first line of the currently displayed window. The second number indicates the total number of DLCI entries for this connection type.

End

Viewing Frame Relay Statistics

You can view two types of frame relay statistics:

- Interface statistics—see the procedure "Viewing Interface Statistics"
- Link management interface (LMI) statistics—see the procedure "Viewing Frame Relay LMI Statistics"

Viewing Interface Statistics

Begin

On the Frame Relay Interface Configuration window (see Figure 5-1), select the **View FR Interface Statistics** command and press Enter.

The Frame Relay LMI Statistics window is displayed (see Figure 5-3).

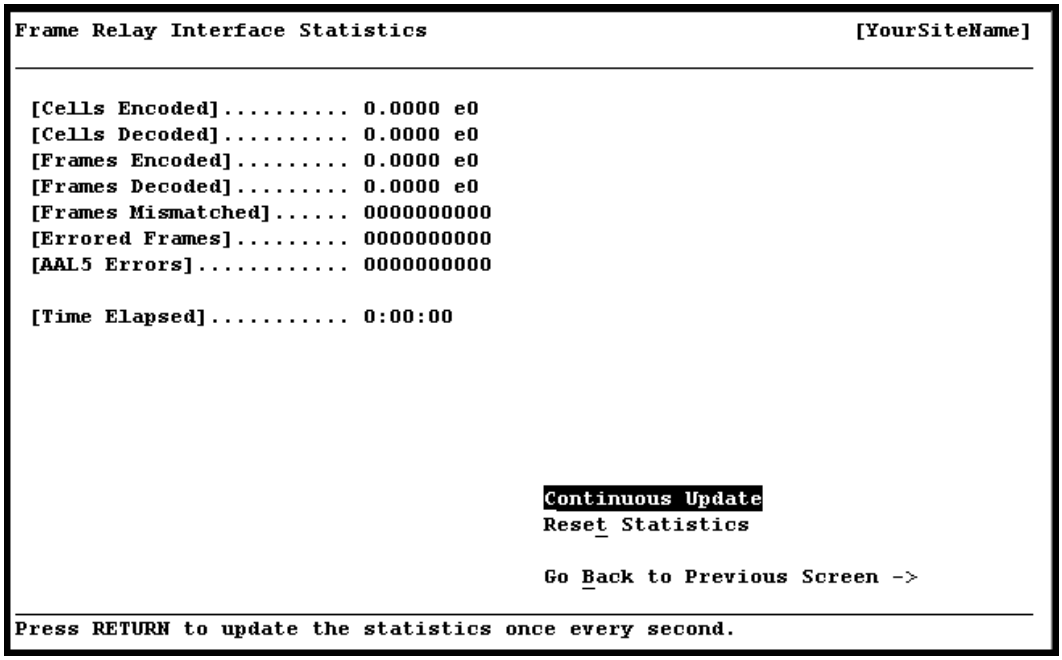


Figure 5-3. Frame Relay Interface Statistics Window

Commands

The commands in this window have the following functions:

Command	Function
• **Continuous Update**	Continuously updates the information in the fields every second. Select this command and press return to turn the continuous updating on and off as needed (similar to a toggle switch).
• **Reset Statistics**	Removes the values in the fields and sets them to the value **0**.
• **Go Back to Previous Screen**	Redisplays the Frame Relay InterfaceConfiguration window.

Field Descriptions

Descriptions of the statistics fields on the Frame Relay Interface Statistics window are given in Table 5-3.

Table 5-3. Field Descriptions for the Frame Relay Interface Statistics Window

Field Name	Description
[Cells Encoded] (display only)	Number of cells encoded going into interface side A during the amount of time shown in Time Elapsed field.
[Cells Decoded] (display only)	Number of cells decoded going out of interface side B during the amount of time shown in Time Elapsed field.
[Frames Encoded] (display only)	Number of frames encoded going into interface side A during the amount of time shown in Time Elapsed field.
[Frames Decoded] (display only)	Number of frames decoded going out of interface side B during the amount of time shown in Time Elapsed field.
[Frames Mismatched] (display only)	Number of mismatched cells received into interface side A during the amount of time shown in Time Elapsed field.
[Errored Frames] (display only)	Number of errored frames received during the amount of time shown in Time Elapsed field.
[AAL5 Errors] (display only)	Number of ATM adaptation layer 5 (AAL5) errors going into interface side A during the amount of time shown in Time Elapsed field.
[Time Elapsed] (display only)	Time in hours, minutes and seconds, since the last time the **Reset Statistics** command was entered. The format is *HH:MM:SS*.

Viewing Frame Relay LMI Statistics

On the Frame Relay Interface Configuration window (see Figure 5-1), select the **View Frame Relay LMI Statistics** command and press Enter.

The Frame Relay LMI Statistics window is displayed (see Figure 5-4).

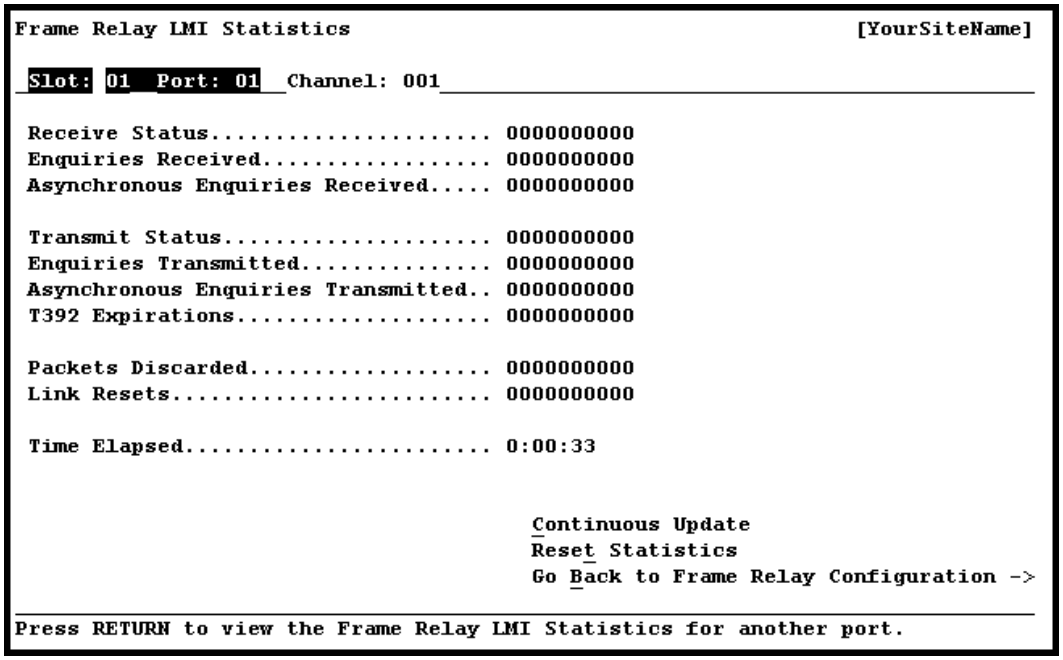


Figure 5-4. Frame Relay LMI Statistics Window

Commands

The commands in this window have the following functions:

Command	Function
• **Continuous Update**	Continuously updates the information in the fields every second. Select this command and press return to turn the continuous updating on and off as needed (similar to a toggle switch).
• **Reset Statistics**	Removes the values in the fields and sets them to the value **0**.
• **Go Back to Frame Relay Configuration**	Redisplays the Frame Relay InterfaceConfiguration window.

Field Descriptions

Descriptions of the statistics fields on this window are given in Table 5-4.

Table 5-4. Field Descriptions for the Frame Relay LMI Statistics Window

Field Name	Description
[Receive Status] (display only)	Number of status messages received.
[Enquiries Received] (display only)	Number of status enquiry messages received.
[Asynchronous Enquiries Received] (display only)	Number of asynchronous status messages received.
Transmit Status (display only)	Number of status messages transmitted.
[Enquiries Transmitted] (display only)	Number of status enquiry messages transmitted.
[Asynchronous Enquiries Transmitted] (display only)	Number of asynchronous status messages transmitted.
[T392 Expirations] (display only)	Polling verification timer expires.
[Packets Discarded] (display only)	Number of LMI messages discarded due to invalid length, receive sequence numbers, or other error.
[Link Resets] (display only)	Number of times interface operational status was in service after the system startup.
[Time Elapsed] (display only)	Time elapsed since last reset.

Changing Interface Field Values

To change values on the Frame Relay Interface Configuration window (see Figure 5-1), you must first take the interface out of service. You can change the values only in the following fields without first deleting the interface:

- DLCMI State
- LMI Protocol
- LMI Asynchronous
- N393
- T391
- T392

- N391
- N392
- NT3

Note: To change any other fields on the Frame Relay Interface Configuration window, you must first delete the interface. To delete an interface, follow the instructions in "Deleting an Interface" below.

To change field values, perform the steps the following procedure.

Changing Field Values

Begin

1. To take an interface out of service, on the Frame Relay Interface Configuration window (see Figure 5-1), select the **Take Interface Out Of Service** command and press Enter.
2. Change the values in the fields as needed (see Table 5-1).
3. Select the **Apply Interface Configuration** command and press Enter.
4. To bring the interface back into service, select the **Bring Interface Into Service** command and press Enter.

End

Deleting an Interface

To delete an interface, perform the steps in the following procedure.

Deleting an Interface

Begin

1. To take an interface out of service, on the Frame Relay Interface Configuration window (see Figure 5-1), select the **Take Interface Out Of Service** command and press Enter.
2. Select the **Delete Interface and Return** command and press Enter.

   The system redisplays the port and channel configuration window for the module you are configuring.

End

6 Configuring the Interfaces Using the *AQueView*® System

Overview of This Chapter

This chapter provides instructions for configuring the following interface types for the 1-Port Unchannelized DS3 Frame Relay module:

- Frame relay user-network interface (UNI)
- Frame relay network-network interface (NNI)

Before you can set interface configuration values, you must select an interface type value other than **Unconfigured** in the Interface Type field on the DS3 Frame Relay Channel Configuration window.

Errors Applying Interface Ports

An error can occur when you apply an interface to a port or channel. (See the appendix, "SNMP Trap Messages," for more information about the SNMP traps related to interface errors).

- Entering values into fields that are outside of the configurable range of values
- Attempting to configure an interface for a port or channel that has already been configured
- Attempting to configure an interface that is already in service (must be out of service to be configured or change field values)

Configuring the Frame Relay User/Network Interface

This section provides instructions for configuring an I/O module for the Frame Relay user or Frame Relay network interface.

Setting Up the Interface

When you select the value **FrameRelayNni** or **FrameRelayUni** as the interface type on a Channel Configuration page, the Frame Relay Interface Configuration window is displayed (see Figure 6-1 and Figure 6-2).

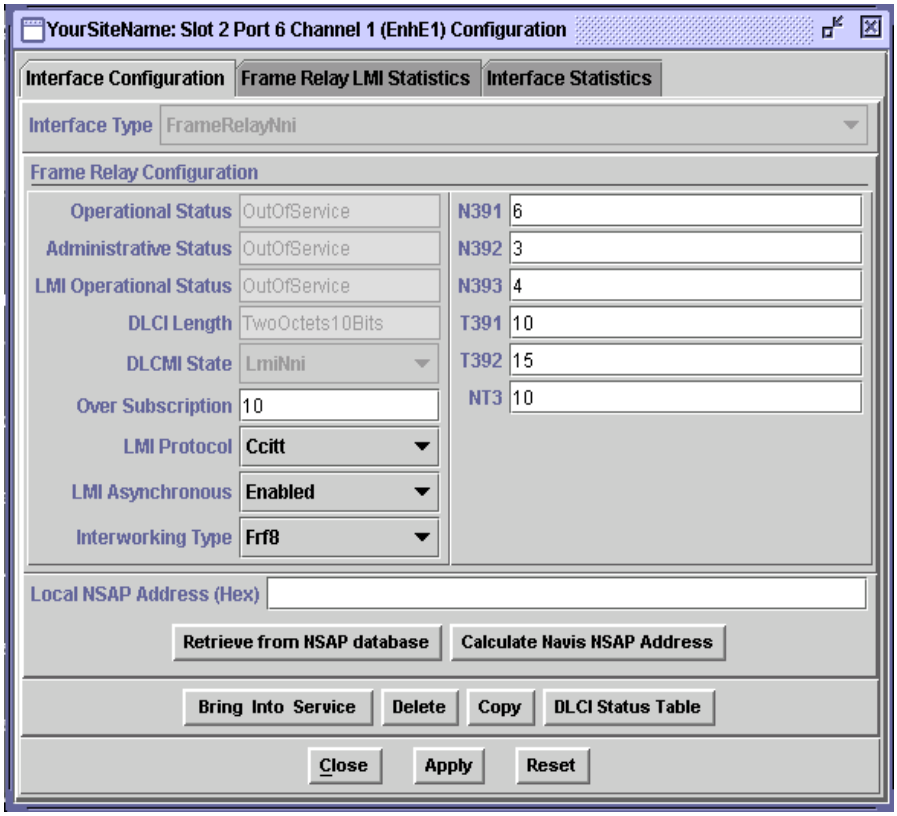


Figure 6-1. Frame Relay Interface Window (NNI)

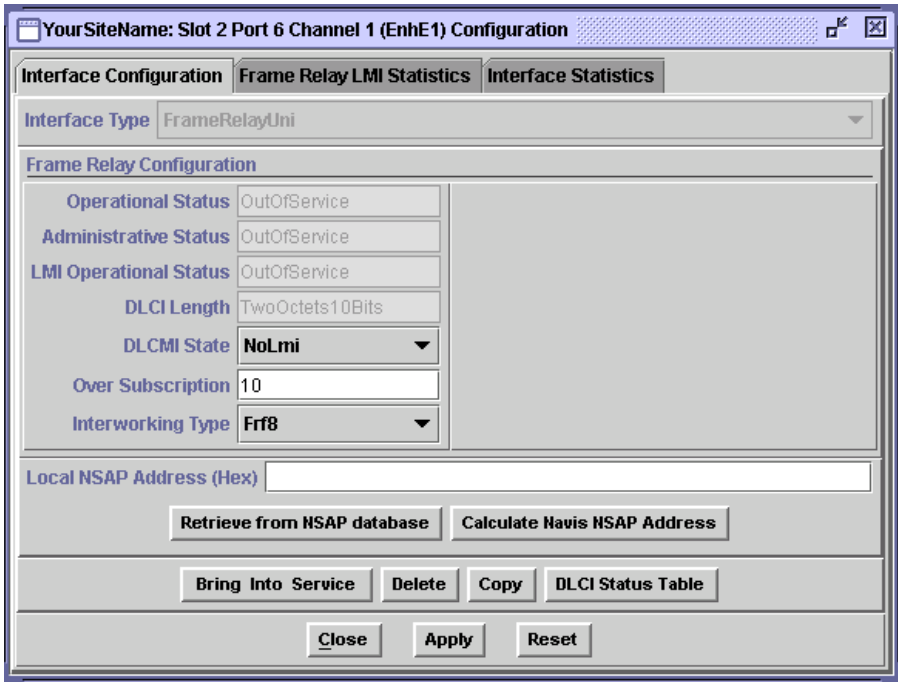


Figure 6-2. Frame Relay Interface Window (UNI)

Buttons

The buttons in this window have the following functions:

Button	Function
• Retrieve from NSAP database	If you have previously established an NSAP address database, click this button to retrieve an entry from this list to populate the **Local NSAP Address (Hex)** field.
• Calculate Navis NSAP Address	Automatically calculates the local NSAP address, and populates the NSAP address in the NSAP Address (Hex) field using the Navis algorithm for the slot, port, and channel selected in the fields on the bottom right panel. **Note:** This button is displayed only when you configure user properties to include the Navis NSAP format. For more information, see the appropriate *PacketStar® AQueView® Element Management System User Guide*.
• Bring Into Service (displayed when the **Administrative Status** field is **OutOfService**)	Brings an out-of-service configured interface to in-service status. The value **InService** is displayed in the **Administrative Status** field. **Note:** You must first configure the interface before you can use this command.

Button	Function
• Take Out of Service (displayed when the **Administrative Status** field is **InService**)	Takes an in-service configured interface to out-of-service status. The value **OutOfService** is displayed in the **Administrative Status** field. **Note:** You must use this command first before using the **Delete** command.
• Delete	Deletes an out-of-service interface and is redisplayed the Port and Channel Configuration window for the module you are configuring. **Note:** You must first take interface out of service (using the **Take Interface Out of Service** command) before you can use this command.
• Copy	Copies this interface to a range of slots, ports, and channels.
• Close	Displays the LMI DLCI status of this interface.
• Apply	Applies the configuration field value you set (see step 1).
• Reset	Resets the fields to the last set of applied values.

Frame Relay Interface Values

To set values for the Frame Relay interface, perform the steps in the following procedure.

Setting the Values for the Frame Relay Interface

Begin

1 Select the values for the fields on this window from the values given in Table 6-1.

Table 6-1. Field Descriptions for the Frame Relay Interface Configuration Window

Field Name	Values	Description
Interface Type	FrameRelayUni	Indicates that the UNI format for the cell headers will be used (frame relay user-network interface).
	FrameRelayNni	Indicates that the NNI format for the cell headers will be used (frame relay network-network interface).
Operational Status (display only)	OutOfService	Indicates that the interface is not operational.
	InService	Indicates that the interface is operational.

Table 6-1. Field Descriptions for the Frame Relay Interface Configuration Window

Field Name	Values	Description
Administrative Status (display only)	InService	Indicates that the interface is in service.
	OutOfService	Indicates that the interface is not in service.
LMI Operational Status (display only)	Default: OutOfService	Indicates that the local management interface (LMI) is not operational.
	InService	Indicates that the local management interface is operational.
DLCI Length (display only)	TwoOctets10Bits	Type of data link connection identifier (DLCI) format used.
DLCMI State (display only)	Default: NoLmi (for frame relay UNI only)	No local management interface (LMI).
	LmiDte (for frame relay UNI only)	LMI is a DTE device.
	LmiDce (for frame relay UNI only)	LMI is a DCE device.
	LmiNni (for frame relay NNI only)	Local management interface is used with network-to-network interface.
Over Subscription	Default: 10 Range: 1–10	The connection admission control takes into account the oversubscription factor when determining if a connection can be made.
LMI Protocol	Default: Ccitt	Protocol uses Annex A (ITU Q.933, reference RFR.1).
	Ansi	Protocol uses Annex D (ANSI T2.617).
	ATT	LMI protocol.
	None	Use of local management interface is disabled.
LMI Asynchronous	Enabled	This mode sends LMI message whenever there is a status change.
	Disabled	This mode waits for regular LMI polling cycle.
Interworking Type	Default: Frf8	FRF.8 (Frame Relay Forum Implementation Agreement)—frame relay to ATM PVC service interworking.
	Frf5	FRF.5 (Frame Relay Forum Implementation Agreement)—frame relay to ATM PVC service interworking.

Table 6-1. Field Descriptions for the Frame Relay Interface Configuration Window

Field Name	Values	Description
Throughput	Default: K64 K56	The throughput bandwidth of the interface, in kb.
N391	Default: 6 Range: 1–255	System parameter counter for full status (status of all PVCs) polling, used with user and network. This parameter always applies to the user equipment. It applies to the user and network if the optional bidirectional network procedures are invoked.
N392	Default: 3 Range: 1–10	System parameter counter for error threshold, used with user and network. The value of parameter N392 should be less than or equal to N393.
N393	Default: 4 Range: 1–10	System parameter counter for counting of monitored events, used with user and network. If the value of parameter N393 is set to one much less than N391, then the link could go in and out of error-condition without the user equipment or network being notified.
T391	Default: 10 Range: 5–30	System parameter timer for link integrity verification polling, measured in seconds. When the time expires, status enquiry is transmitted and error is recorded if status message is not received. Parameter T391 always applies to the user. It applies to the user and network if the optional bidirectional network procedures are invoked.
T392	Default: 15 Range: 5–30	System parameter timer for polling verification, measured in seconds. When the time expires, error is recorded by incrementing the value for parameter counter N392, and the timer is restarted. Parameter T392 always applies to the network. It applies to the network and user equipment if the optional bedirectional network procedures are invoked. The value of parameter T392 should be greater than the one for T391.

Table 6-1. Field Descriptions for the Frame Relay Interface Configuration Window

Field Name	Values	Description
NT3	Default: 10 Range: 5–30	Message frequency timer, relevant for ATT LMI only.
Local NSAP Address (Hex)		The ATM NSAP address of the local end of the connection, in hexidecimal notation. Enter the NSAP address of the local ATM interface (optional step).

Adding NSAP Addresses

Note: Step 2 through Step 4 are optional. If you do not want to add or retrieve an NSAP address, skip to Step 5.

If an NSAP address exists in the NSAP address database for a given device, the local NSAP address automatically retrieved and displayed on the Interface Configuration window. You may choose to add an NSAP address for a slot, port, and channel in the NSAP address database and retrieve it by clicking **Retrieve from NSAP database**.

2 To add or retrieve an NSAP address, enter a valid NSAP address in the Local NSAP Address (Hex) field and click **Retrieve from NSAP database**.

If the value entered in the Local NSAP Address (Hex) field is valid, the field becomes ghosted. The Select NSAP window appears (see the following figure).

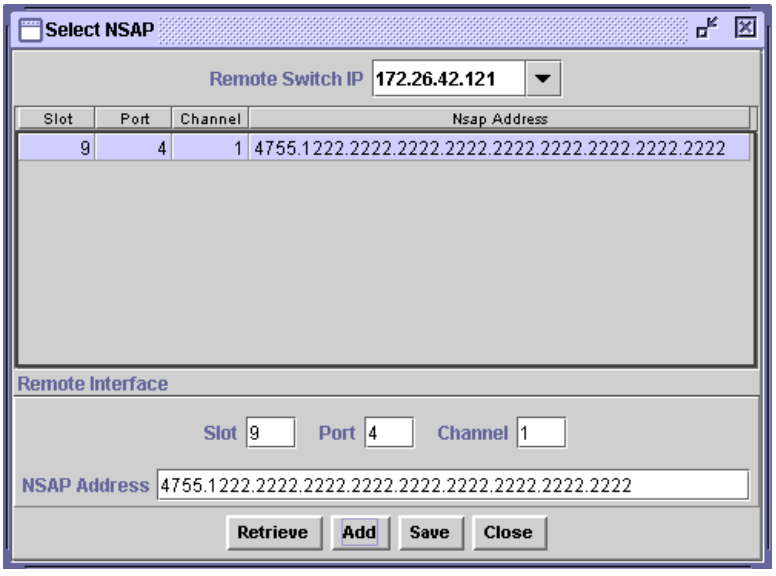


Figure 6-3. Select NSAP Window

Buttons

The buttons in this window have the following functions:

Button	Function
• Retrieve	Enters the NSAP address for a device that is selected on the Select Remote NSAP window into the **Remote NSAP Address** field of the Interface Configuration window.
• Add	Adds a new slot, port, channel, NSAP address mapping entry for the specified device.
• Save	Stores any modifications to the NSAP address database.
• Close	Closes this window.

You can populate the Slot, Port, Channel, and NSAP Address fields for an existing device, or add a new entry, and click **Add**.

3 To display the NSAP addresses previously configured for a PSAX device, either select a remote device from the pull-down menu, or type the IP address of the remote device in the Remote Switch IP field.

The list of NSAP addresses previously configured for that PSAX device is displayed in the table.

4 Select the desired entry (slot, port, channel, and NSAP address) and click **Retrieve**.

The Local NSAP Address (Hex) field becomes populated in the window.

Note: If the desired remote device does not appear in the Remote Switch IP pull-down menu, do the following:

a. Highlight the Remote Switch IP field and enter the IP address that corresponds to the PSAX device you want to include.

b. Type the desired values into the Slot, Port, and Channel fields and

c. Click **Add**.

The *AQueView®* system adds this information to the database file.

Note: If you want to include a new entry for an existing device already in the database, select the device from the pull-down menu in the Remote Switch IP field, and type the desired values into the Slot, Port, and Channel fields and click **Add**. The *AQueView®* system adds this entry to the database file.

Note: If you add database entries through the *AQueView®* system, save these database changes to the text editor file by using the main AQueView Menu Bar. Click View > NSAP Database > Save.

5 To apply the interface configuration values, click **Apply**.

6 To activate the interface after you have applied the configuration values, click **Bring Into Service**.

7 Click **DLCI Status Table**.

The Frame Relay LMI DLCI Status Table window is displayed (see Figure 6-4).

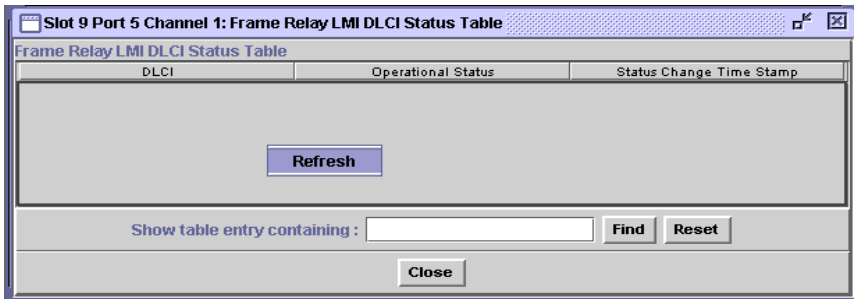


Figure 6-4. Frame Relay LMI DLCI Status Table Window (Displaying Menu)

Buttons

The buttons on this window have the following functions:

Button	Function
• Find	Searches the table and displays a matching text string entered in the **Show table entry containing:** field.
• Reset	Removes text entered in the **Show table entry containing:** field and de-selects any selected entries.
• Close	Closes this window.

In the Frame Relay LMI DLCI Status Table window, you can view the DLCI, operational status, and status change time stamp of each frame relay interface in the PSAX device.

To update the information in the Frame Relay LMI DLCI Status Table window, click the right mouse button and a menu is displayed. Click Refresh.

End

Copying an Interface Configuration

The **Copy** button on each Interface Configuration window enables you to copy an interface configuration to a range of channels. To copy an interface configuration to a range of channels, perform the steps in the following procedure from the appropriate Interface Configuration window.

Copying an Interface Configuration to Multiple Channels

Begin

1 In the Interface Configuration window, click **Copy.**

The Copy Interface Configuration window appears with the slot, port, and channel of the interface you selected in the Start At: and Stop At: panels (see figure below).

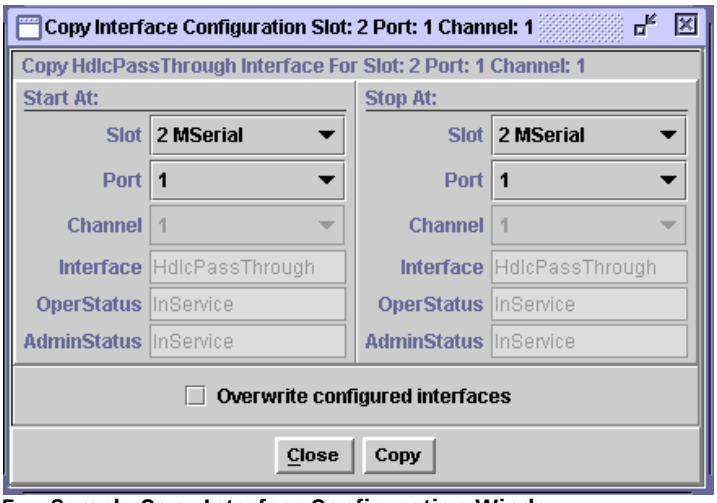


Figure 6-5. Sample Copy Interface Configuration Window

Buttons

The buttons in this window have the following functions:

Button	Function
• Close	Closes this window.
• Copy	Copies this interface to a range of slots, ports, and channels.

2 Select the range of channels to which you wish the interface configuration to be copied in the Slot, Port, and Channel fields.

3 To overwrite the pre-existing interface configuration, click the box beside Overwrite configured interfaces.

4 Click **Copy**.

The interface configuration is copied to the range of channels you selected.

5 Click **Close.**

End

Viewing Frame Relay Statistics

You can view frame relay interface statistics by clicking the **Interface Statistics** tab.

The Interface Statistics page is displayed (see Figure 6-6).

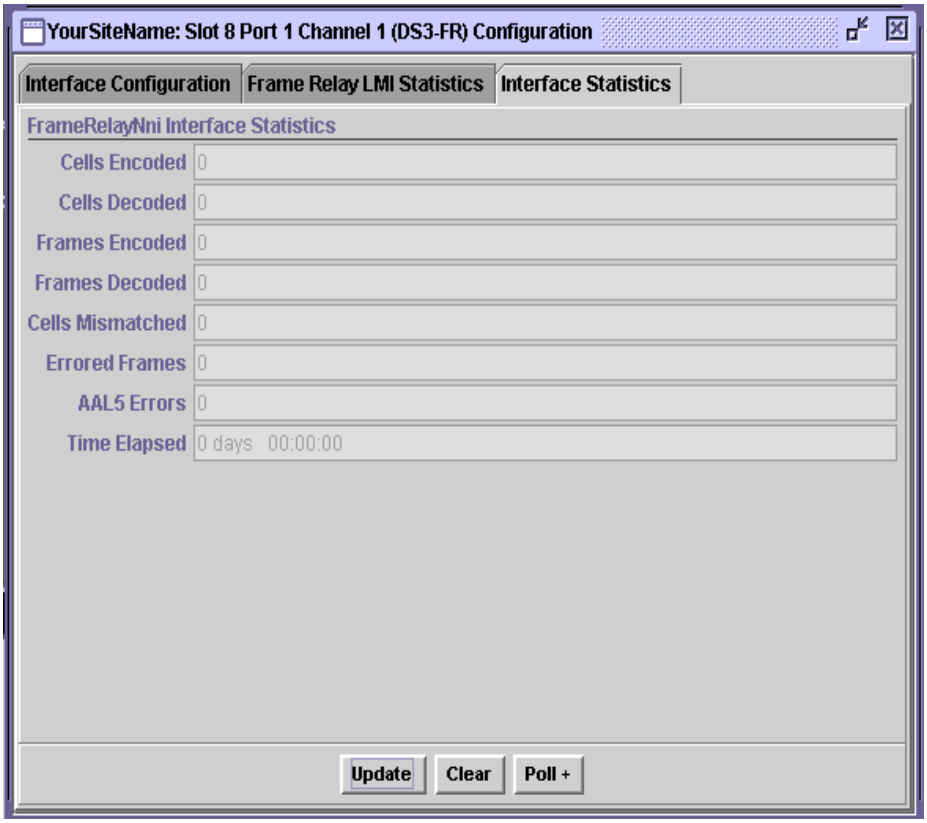


Figure 6-6. Frame Relay Interface Statistics Window

Buttons

The buttons in this window have the following functions:

Button	Function
• Update	Updates the information in the fields.
• Clear	Removes the values in the **Interface Statistics** panel and resets them to 0.
• Poll	**Poll+** initiates the continuous update of statistics. **Poll-** suspends polling.

Field Descriptions

The values for these fields are described in Table 6-2.

Table 6-2. Field Descriptions for the Frame Relay Interface Statistics Page

Field Name	Description
Cells Encoded (display only)	Number of cells encoded going into interface side A during the amount of time shown in Time Elapsed field.
Cells Decoded (display only)	Number of cells decoded going out of interface side B during the amount of time shown in Time Elapsed field.
Frames Encoded (display only)	Number of frames encoded going into interface side A during the amount of time shown in Time Elapsed field.
Frames Decoded (display only)	Number of frames decoded going out of interface side B during the amount of time shown in Time Elapsed field.
Frames Mismatched (display only)	Number of mismatched cells received into interface side A during the amount of time shown in Time Elapsed field.
Errored Frames (display only)	Number of errored frames received during the amount of time shown in Time Elapsed field.
AAL5 Errors (display only)	Number of ATM adaptation layer 5 (AAL5) errors going into interface side A during the amount of time shown in Time Elapsed field.
Time Elapsed (display only)	Time in hours, minutes and seconds, since the last time the **Reset Statistics** command was entered. The format is *HH:MM:SS*.

Viewing LMI Frame Relay Statistics

You can view frame relay LMI statistics by clicking the **Frame Relay LMI Statistics** tab

The Frame Relay LMI Statistics page is displayed (see Figure 6-7).

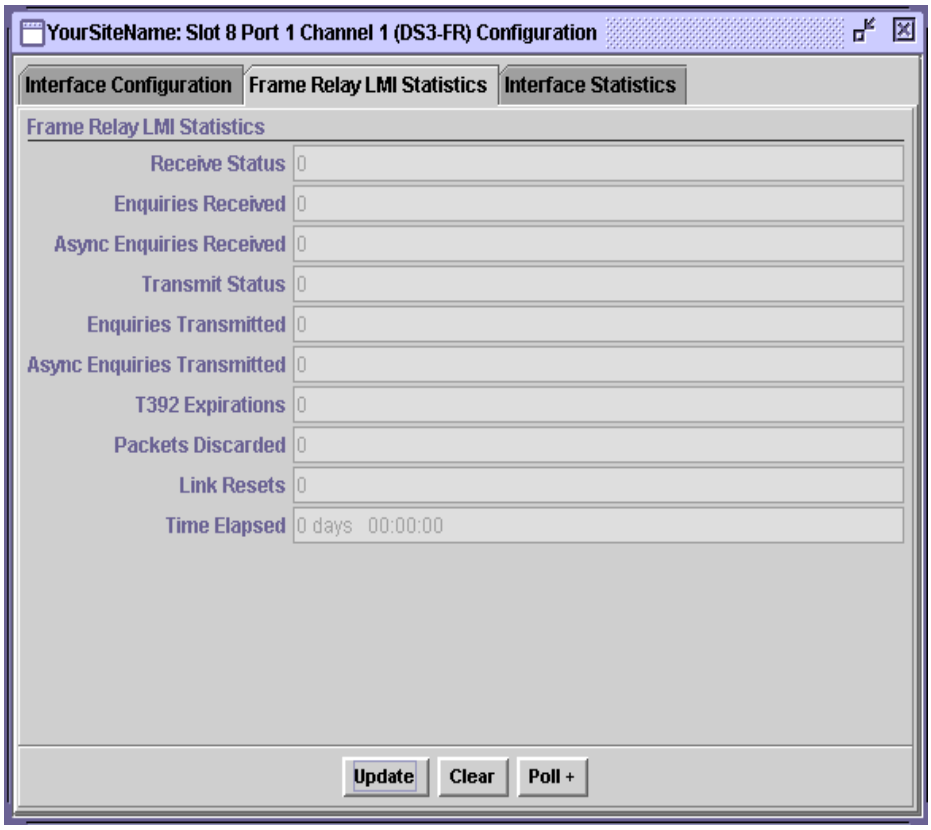


Figure 6-7. Frame Relay LMI Statistics Window

Buttons

The buttons in this window have the following functions:

Button	Function
• Update	Updates the information in the fields.
• Clear	Removes the values in the **Interface Statistics** panel and resets them to 0.
• Poll- or Poll+	**Poll+** initiates the continuous update of statistics and changes the button label to **Poll-**. **Poll-** suspends polling and changes the button label to **Poll+**.

Field Descriptions

The values for these fields are described in Table 6-3.

Table 6-3. Field Descriptions for the Frame Relay LMI Statistics Page

Field Name	Description
Receive Status (display only)	Number of status messages received.
Enquiries Received (display only)	Number of status enquiry messages received.
Async Enquiries Received (display only)	Number of asynchronous status messages received.
Transmit Status (display only)	Number of status messages transmitted.
Enquiries Transmitted (display only)	Number of status enquiry messages transmitted.
Async Enquiries Transmitted (display only)	Number of asynchronous status messages transmitted.
T392 Expirations (display only)	Polling verification timer expires.
Packets Discarded (display only)	Number of LMI messages discarded due to invalid length, receive sequence numbers, or other error.
Link Resets (display only)	Number of times interface operational status was in service after the system startup.
Time Elapsed (display only)	Time elapsed since last reset.

Changing Field Values Without Deleting the Interface

The following values can be changed without deleting the interface after it has been brought into service:

- DLCMI State
- LMI Protocol
- LMI Asynchronous
- N391
- N392
- N393
- T391
- T392
- NT3

You must take the interface out of service before changing these field values. To change any other fields in the Frame Relay Interface Configuration window, you must delete the interface. Follow the instructions in “Changing Interface Values” to delete the interfaces.

7 Provisioning Connections Using the Console Interface

Overview of This Chapter

This chapter describes how to set up permanent virtual circuit (PVC), connections in the PSAX Multiservice Media Gateway systems for service provisioning and how to view statistics data for billing and performance monitoring. Before you provision connections for the modules, you must have first completed the following tasks:

- Setting the configuration values for one or more ports on the 1-Port Unchannelized DS3 Frame Relay module
- Setting the configuration values for the various types of interfaces on the 1-Port Unchannelized DS3 Frame Relay module

This chapter contains instructions for making the following types of PVC and SPVC connections (on the frame relay side of the connection):

- Frame relay-to-ATM virtual channel connection (VCC) PVC connection
- Frame relay-to-frame relay VCC PVC connection
- Frame relay-to-ATM VCC soft permanent virtual circuit (SPVC) connection

PVCs consist of connections between ports on the various PSAX I/O modules. When setting up some types of connections, you can set up data traffic to flow in several ways, depending on the type of connection as follows:

- Duplex

  Data flows in two directions between the two connection points (interface side A and interface side B).

- Simplex

  Data flows in only one direction, from side A to side B, or from side B to side A.

- Point-to-Multipoint

  Data flows in only one direction, from one point on side A to several points on side B, or from one point on side B to several points on side A.

Before you can provision connections, you must select an interface type value other than **Unconfigured** in the Interface Type field on the DS3 Frame Relay Port and Channel Configuration window.

Provisioning PVC Connections

Accessing the Connection Configuration Menu

Begin

1 Log onto the PSAX system (see the appropriate *PacketStar*® PSAX Multiservice Media Gateway user guide for instructions).

The Console Interface Main Menu window (see Figure 7-1) is displayed.

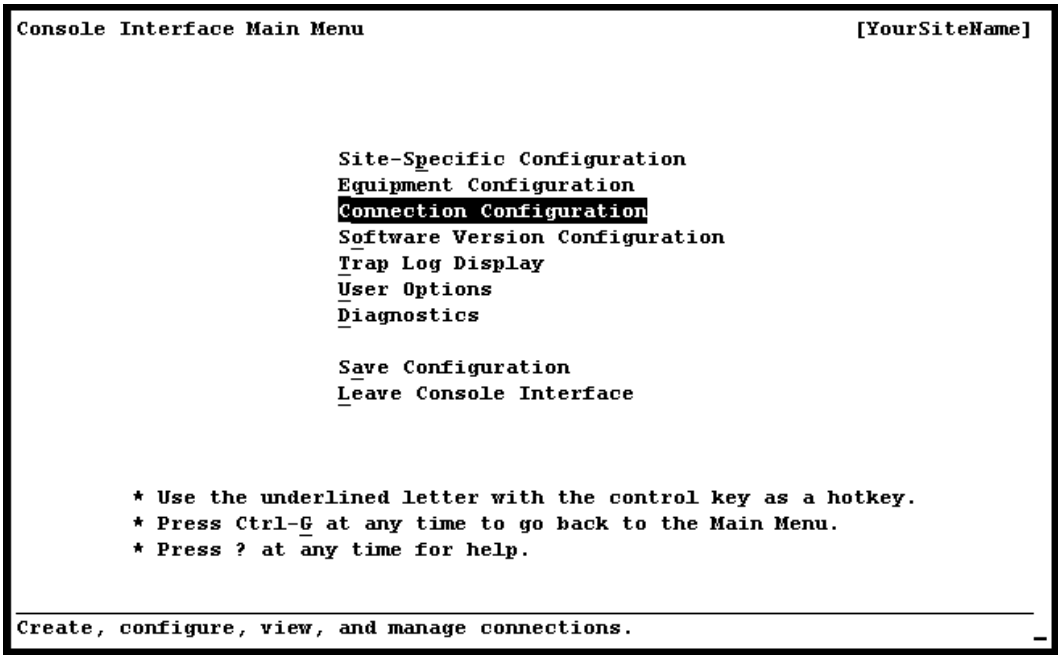


Figure 7-1. Console Interface Main Menu Window (Connection Configuration Selected)

2 Select the **Connection Configuration** command and press Enter.

The Connection Configuration Menu window (see Figure 7-2) is displayed.

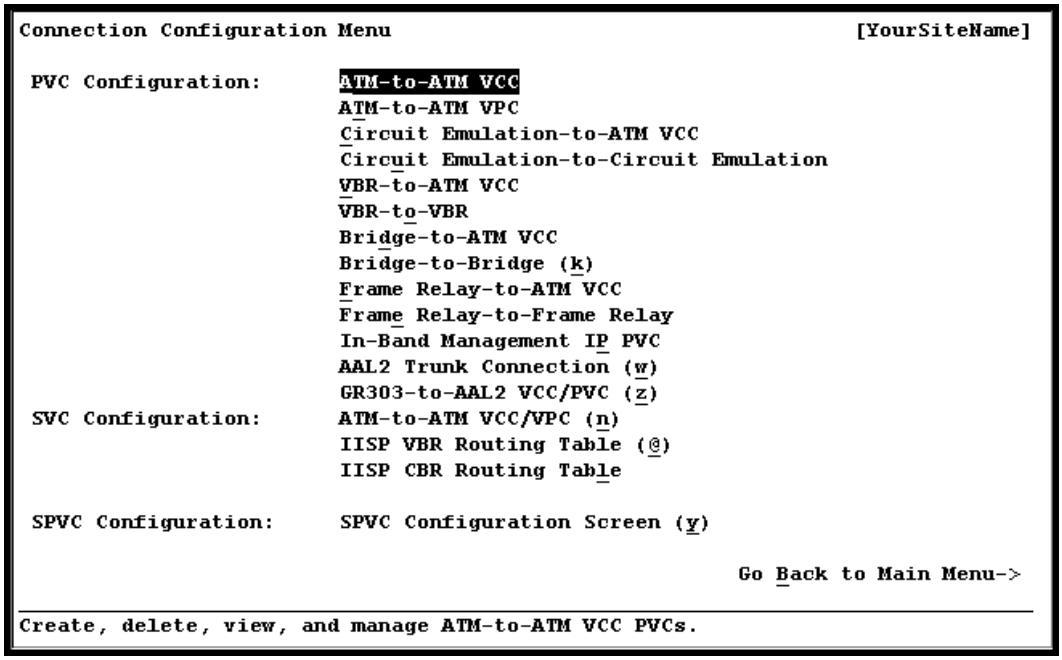


Figure 7-2. Connection Configuration Menu Window (ATM-to-ATM VCC Option Selected)

Follow the appropriate procedures in the sections of this chapter for the types of connections you want to configure.

End

Adding Frame Relay-to-ATM VCC PVC Connections

Creating a Frame Relay-to-ATM VCC PVC Connection

Perform the steps in the following procedure to create a frame relay-to-ATM VCC PVC connection, starting at the Connection Configuration Menu window.

Steps to Create a Frame Relay-to-ATM VCC PVC Connection

Begin

Note: The Operations Administration and Maintenance (OAM) feature is enabled on this screen. Statistical OAM information is provided on the related statistics screen, while additional OAM functionality can be enabled from the Diagnostics Menu.

1 On the Connection Configuration Menu window, select **Frame Relay-to-ATM VCC** and press Enter.

The Frame Relay-to-ATM VCC PVC Table window (see Figure 7-3) is displayed.

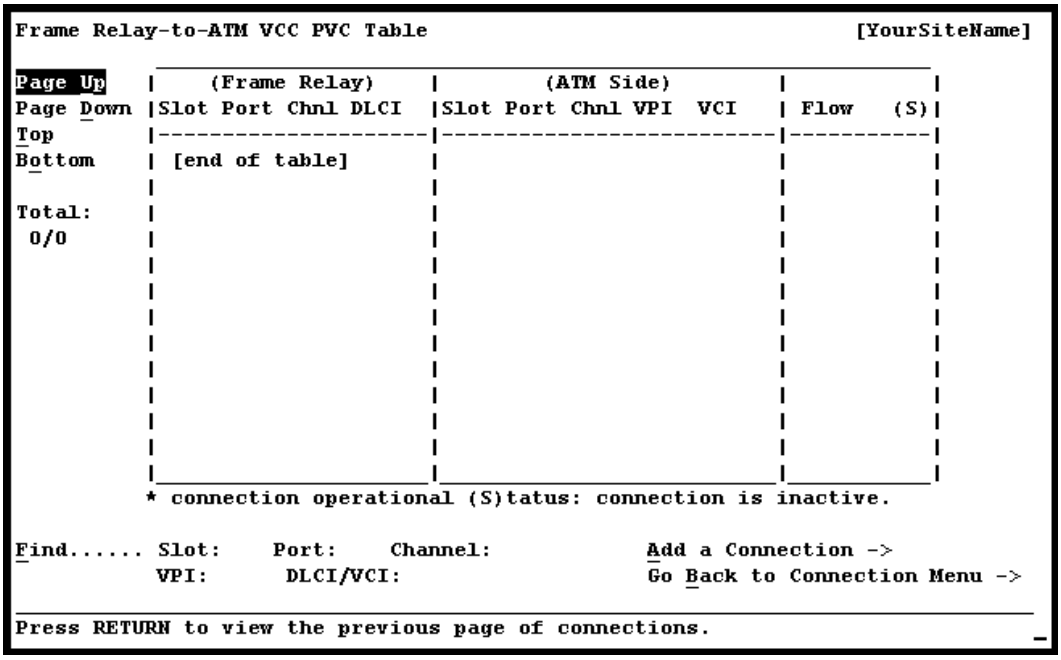


Figure 7-3. Frame Relay-to-ATM VCC PVC Table Window

Note: At the time of initial installation, the Frame Relay-to-ATM VCC PVC Table window is empty. After you have set up connections, this window displays all the connections of this type in the system.

Commands

The commands on this window have the following functions:

Command	Function
• Find . . .	To find a particular connection, enter values in the **Slot, Port, Chnl, VPI**, and **DLCI/VCI** fields. If the connection exists, it is displayed on the first line of the table.
• Add a Connection→	Displays the Frame Relay-to-ATM VCC PVC window.
• Go Back to Connection Menu→	Redisplays the Connection Configuration Menu window.

Field Descriptions

The display-only fields on this window provide the following information about all the frame relay-to-ATM PVC connections in the PSAX system:

Display Field	Description
• Frame Relay Interface	This panel displays the information for all interface A sides of the connections. The connection entries are displayed in ascending numerical order by slot, then by port, channel, and DLCI or VPI.
• ATM Interface	This panel displays the information for all interface B sides of the connections.
• Flow	This panel displays the direction of the data traffic flow for the connections.
• Total: 0/0	The first number in this field indicates the number of the connection table entry on the first line of the currently displayed window. The second number indicates the total number of connection table entries for this connection type.

2 Select the **Add a Connection** command and press Enter.

The Frame Relay-to-ATM VCC PVC Connection window (see Figure 7-4) is displayed.

```
Frame Relay-to-ATM VCC PVC Connection                        [Your Site Name]

_Frame Relay Interface_____________________ATM Interface_____________________
                                          |
 Slot....... 0     DLCI...... 0         | Slot....... 0     VPI....... 0
 Port....... 1                          | Port....... 1     VCI....... 0
 Channel.... 1                          | Channel.... 1     VI........ 0
                                          |
__________________________________________|_____________________________________

 Service Type..... Ubr                    [Connection Status].. Inactive
 Cnfrmnce Type.... Best-effort            [Backup PVC]......... No
 Flow............. Duplex
 OAM Status....... Unsupp

_____________________________________________________________________________

                                          Configure Traffic Parameters ->
                                          View Connection Statistics ->
 Display Next Connection                  Add/View Backup PVC->
 Delete Connection                        Go Back to Connection Table ->
_____________________________________________________________________________
Press RETURN to edit the slot number for side A.
```

Figure 7-4. Frame Relay-to-ATM VCC PVC Connection Window

Commands

The commands on this window have the following functions:

Command	Function
• Display Next Connection	Displays the next connection of this type in the table.
• Delete Connection	Deletes the connection having the values currently displayed on the window.
• Configure Traffic Parameters	Displays the Frame Relay-to-ATM VCC PVC Traffic Parameters window.
• View Connection Statistics→	Displays the Frame Relay-to-ATM VCC PVC Statistics window.
• Add/View Backup PVC	Displays backup PVC or option to add backup PVC.
• Go Back to Connection Table→	Redisplays the Frame Relay-to-ATM VCC PVC Table window.

Field Descriptions

3 Select the values for the fields on this window from the values in Table 7-1.

Table 7-1. Field Descriptions for the Frame Relay-to-ATM VCC Connection Window

Field Names	Values	Description
Frame Relay Interface		The frame relay side of the connection.
ATM Interface		The ATM side of the connection.
Slot	Number of slots varies with chassis type	Enter the slot number containing the module for both sides of the connection.
Port	Range: 1–28, depending on module selected	Enter the port number on the module for both sides of the connection.
Channel	Range: ATM side: 1 FR side: 1–32	The channel on which you are creating a connection. On the ATM Interface side, do not change the value **1** in this field. On the Frame Relay Interface side, enter the channel number of the port on the module for which you are creating a connection.
DLCI	Range: 16–1007	Data link connection identifier. DLCI is used when the remote end point is frame relay.
VPI	Range: 0–225 (ATM UNI); 0-4095 (NNI)	Virtual path identifier.
VCI	Range: 0–65535	Virtual channel identifier.
VI	0 (default) Range: 0–255	Virtual interface, which provides bandwidth allocation restrictions. Currently available only on the OC-3c APS, and STM-1 MSP modules. When disabled, default is 0.
Service Type	Ubr (default), Vbr-nrt2, Vbr-nrt1, Vbr-rt2, Vbr-rt1, Vbr-express	Multiservice Media Gateway-supported quality of service (QoS) class. See the appendix for a detailed description of the values for this field, including representative examples.

Table 7-1. Field Descriptions for the Frame Relay-to-ATM VCC Connection Window

Field Names	Values	Description
Cnfrmnce Type		The type of traffic control option used for ATM cells. The traffic descriptor combination specifies which traffic parameters are used for traffic control, determines the number and type of cells that are admitted into a congested queue, and determines whether high-priority cells are tagged as low-priority cells when traffic exceeds the traffic parameter thresholds. See the appendix for a detailed description of the values for this field, including representative examples.
	Default: Best-effort	This traffic descriptor allows the system to attempt to send all cells in a "best effort" fashion, without specifying traffic parameters, similar to the AQueMan algorithm.
	1B-NT-0+1	This traffic descriptor uses the parameters one bucket, no tagging, cell loss priority (CLP)=0+1 cells (high and low priority).
	2B-NT-0+1-0+1	This traffic descriptor uses the parameters two buckets, no tagging, CLP=0+1 cells (high and low priority) for bucket 1, and CLP=0+1 cells (high and low priority) for bucket 2.
	2B-NT-0+1-0	This traffic descriptor uses the parameters two buckets, no tagging, CLP=0+1 cells (high and low priority) for bucket 1, and CLP=0 cells (high priority) for bucket 2.
	2B-T-0+1-0	This traffic descriptor uses the parameters two buckets, CLP=0+1 cells (high and low priority) for bucket 1, and tagging for CLP=0 cells (high priority) in bucket 2.
	Best-effort-tag	This traffic descriptor allows the system to tag all CLP=0 (high priority) cells to change them to CLP=1 (low priority) cells during congestion, and then attempt to send all cells in a "best effort" fashion, without specifying any other traffic parameters, similar to the AQueMan algorithm.

Table 7-1. Field Descriptions for the Frame Relay-to-ATM VCC Connection Window

Field Names	Values	Description
Flow	Duplex, SimplexA2B, SimplexB2A, Point-to-point-Multi-point A2B	Direction of the flow of data traffic in this connection. **Note:** Only Duplex and Simplex are applicable for DS3 IMA. **Note:** When you select **SimplexA2B** and **Configure Traffic Parameters**, only fields in the **Traffic Parameters In** side are displayed; when you select **SimplexB2A** and **Configure Traffic Parameters**, only fields in the **Traffic Parameters Out** side are displayed.
OAM Status	Unsupp (default)	OAM is not in use.
	End-Pt	The Multiservice Media Gateway is used as a termination point for ATM traffic, and will process AIS/RDI cells. **Note:** The OAM loopback test is supported for end-to-end connections only.
	End-Seg-Pt	Has the characteristics of both an end point and a segment point.
[Backup PVC] (display only)	Default: No, Yes	This field displays the backup PVC, if configured.
[Conn Status] (display only)	Inactive, Active	This field displays the current status of the connection. The value indicates whether the connection is passing traffic.

End

Configuring Traffic Parameters

To configure the traffic parameters for this connection, perform the steps in the following procedure.

Steps to Configure Traffic Parameters

Begin

1 On the Frame Relay-to-ATM VCC PVC Connection window (see Figure 7-4), select **Configure Traffic Parameters** and press Enter.

The Frame Relay-to-ATM VCC PVC Traffic Parameters window is displayed (see Figure 7-5).

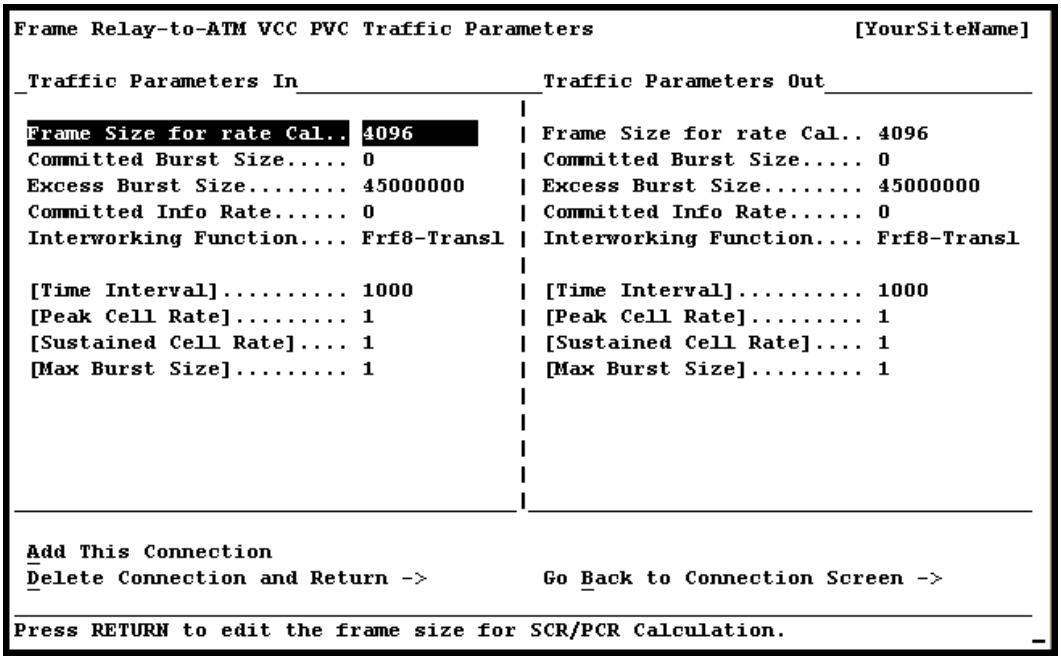


Figure 7-5. Frame Relay-to-ATM PVC Traffic Parameters Window

Commands

The commands on this window have the following functions:

Command	Function
• Add This Connection	Adds a connection having the values currently displayed on the window.
• Delete Connection and Return	Deletes the connection having the values currently displayed on the window.
• Go Back to Connection Table→	Redisplays the Frame Relay-to-ATM VCC PVC Connection Table window.

Field Descriptions

2 Select the values for the traffic parameter fields on this window from the values given in Table 7-2.

Table 7-2. Field Descriptions for the Frame Relay-to-ATM VCC PVC Traffic Parameters Window

Field Name	Values	Description
Frame Size for Rate Cal.	Default: 4096	Measured in bytes.
Committed Burst Size	Default: 0	Use the default value.

Table 7-2. Field Descriptions for the Frame Relay-to-ATM VCC PVC Traffic Parameters Window

Field Name	Values	Description
Excess Burst Size	Default: 45000000	Measured in bits per second.
Committed Info Rate	Default: 0	Committed information rate is the rate of traffic (measured in bits per second) for a given connection that the system will attempt to provide guaranteed delivery. **Note:**
Interworking Function	Default: Frf8-Transl, Frf8-Pass, Frf5	FRF.8 (Frame Relay Forum Implementation Agreement)—frame relay to ATM PVC service interworking. FRF.5 (Frame Relay Forum Implementation Agreement)—frame relay to ATM PVC service interworking.
[Time Interval] (display only)	Default: 1000	Time, in seconds, since the last reset.
[Peak Cell Rate] (display only)	Default: 1	Refer to the ATM UNI 3.0 specifications for more information. When setting this value, take into account the line rate for the module and the amount of bandwidth you are setting up for each interface for the module.
[Sustained Cell Rate] (display only)	Default: 1	Sustained cell rate. Refer to the ATM UNI 3.0 specifications for more information. When setting this value, take into account the line rate for the module and the amount of bandwidth you are setting up for each interface for the module.
[Max Burst Size] (display only)	Default: 1	Maximum burst size. Refer to the ATM UNI 3.0 specifications for more information. When setting this value, take into account the line rate for the module and the amount of bandwidth you are setting up for each interface for the module.

3 To add (apply) the connection configuration, select the **Add This Connection** command and press Enter.

4 To review this connection, select the **Go Back to Connection Table** command and press Enter (or press **Ctrl+B**).

The Frame Relay-to-ATM VCC PVC Table window returns, displaying the values you just applied.

5 To add more connections of this type, repeat steps 2 through 5 for more connections as needed.

End

Viewing the Statistics Window

From the Frame Relay-to-ATM PVC window, select the **View Statistics** command.

The Frame Relay-to-ATM PVC Statistics window is displayed (see Figure 7-6).

```
Frame Relay-to-ATM VCC PVC Statistics                          [YourSiteName]

__Frame Relay Interface_____________________ATM Interface_____________________
                                           |
  Slot....... 4     DLCI....... 25        |  Slot....... 6     VPI........ 1
  Port....... 1                           |  Port....... 1     VCI........ 100
  Channel.... 1                           |  Channel.... 1
_____________________________________________|_____________________________________
                                           |
  Cells Encoded......... 0.0000 e0         |  AIS Rx/Tx...... 0          /0
  Cells Decoded......... 3.4200 e2         |  RDI Rx/Tx...... 0          /0
  Frames Dropped........ 0                 |  cell Drop/Tag.. 0          /0
  Encoded Odometer...... 0.0000 e0         |  Cells Received...... 3.4200 e2
  Decoded Odometer...... 3.4200 e2         |  Cells Transmitted... 3.4200 e2
  AAL5 Errored Frames... 0                 |  In Odometer......... 3.4200 e2
  Frames Tagged......... 0                 |  Out Odometer........ 3.4200 e2
_____________________________________________|_____________________________________
                                           |
  Time Elapsed........ 00:08:49            |  Reset Odometers
                                           |  Continuous Update
  Time Since Reset.... 00:08:49            |  Display Stats for Next Connection
                                           |  Go Back to Connection Display ->
_____________________________________________|_____________________________________
Press any key to stop the continuous update.
```

Figure 7-6. Frame Relay-to-ATM PVC Statistics Window

Commands

The commands on this window have the following functions:

Command	Function
• Reset Odometers	Resets the **Encoded Odometer, Decoded Odometer, In Odometer**, and **Out Odometer** fields to zero. **Note:** If a call is disconnected, all odometers are reset to zero.
• Continuous Update	Updates the values in the fields every second.

Command	Function
• Display Stats for Next Connection	Displays the statistics for the next connection of this type.
• Go Back to Connection Display	Redisplays the Frame Relay-to-ATM VCC PVC Connection window.

Field Descriptions

The fields on this window have the following values:

Table 7-3. Field Descriptions for the Frame Relay-to-ATM VCC Connection Statistics Window

Field Name	Description
Cells Encoded	Number of cells encoded going into Frame Relay Interface side A during the amount of time shown in **Time Elapsed** field since the circuit was established.
Cells Decoded	Number of cells decoded going out of Frame Relay Interface side A during the amount of time shown in **Time Elapsed** field since the circuit was established.
Frames Dropped	Number of frames going out of Frame Relay Interface side A during the amount of time shown in **Time Elapsed** field since the circuit was established.
Encoded Odometer	Total number of cells encoded going into Frame Relay Interface side A since this counter was reset.
Decoded Odometer	Total number of cells decoded going out of Frame Relay Interface side A since this counter was reset.
AAL5 Error Frames	Number of AAL5 errored frames which are not dropped due to UPC in A2B direction. Only applicable to input side.
Frames Tagged	Number of frames tagged due to UPC in A2B direction. Only applicable to input side.
Time Elapsed	Time elapsed since the circuit was established.
Time Since Reset	Time elapsed since the last time the **Clear** or **Reset Statistics** command was used. **Note:** The **Reset** command on the statistics window resets only the odometer fields and the corresponding clock. Other counters increment for the life of the circuit.
AIS Rx/Tx	Number of alarm indication signal (AIS) cells received and transmitted.
RDI Rx/Tx	Number of remote defect indicator (RDI) cells received and transmitted.
cell Drop/Tag	Number of cells dropped and tagged on incoming side of ATM interface B.

Table 7-3. Field Descriptions for the Frame Relay-to-ATM VCC Connection Statistics Window

Field Name	Description
Cells Received	Number of cells Received into ATM Interface side B during the amount of time shown in **Time Elapsed** field since the circuit was established.
Cells Transmitted	Number of cells Transmitted out of ATM Interface side B during the amount of time shown in **Time Elapsed** field since the circuit was established.
In Odometer	Total number of cells encoded going into ATM Interface side B since this counter was last reset.
Out Odometer	Total number of cells decoded going out of ATM Interface side B since ince this counter was last reset.

Adding Frame Relay-to-Frame Relay PVC Connections

Creating a Frame Relay-to-Frame PVC Relay Connection

Perform the steps in the following procedure to add a frame relay-to-frame relay PVC connection, starting at the Connection Configuration Menu window.

Steps to Create a Frame Relay-to-Frame Relay PVC Connection

Begin

1 On the Connection Configuration Menu window, select **Frame Relay-to-Frame Relay** and press Enter.

The Frame Relay-to-Frame Relay PVC Table window (see Figure 7-7) is displayed.

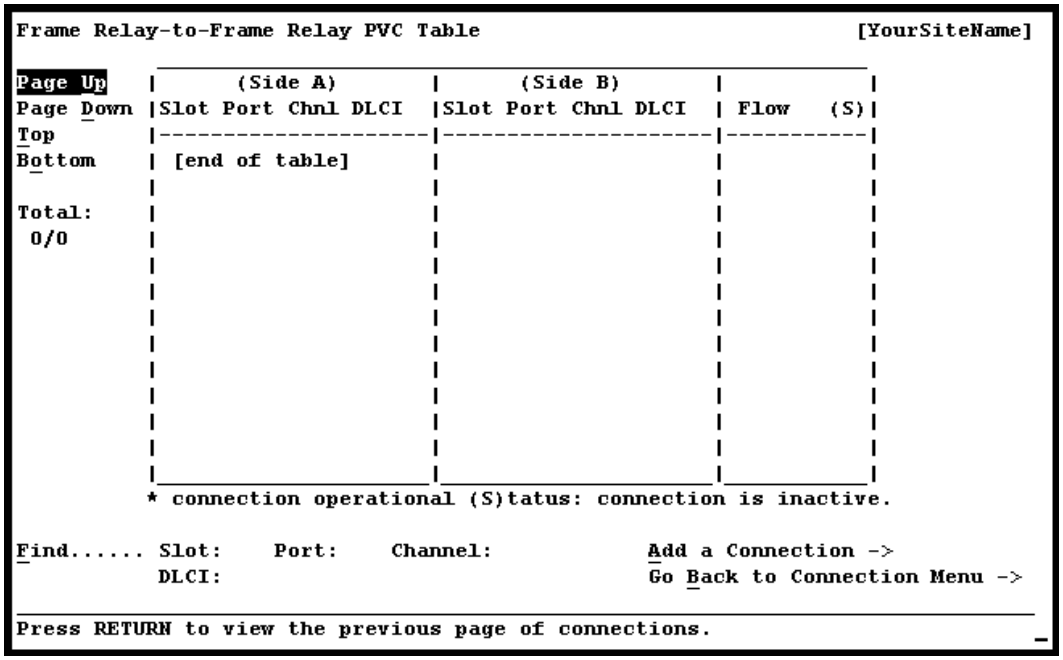


Figure 7-7. Frame Relay-to-Frame Relay PVC Table Window

Note: At the time of initial installation, the Frame Relay-to-Frame Relay PVC Table window is empty. After you have set up connections, this window displays all the connections of this type in the system.

Commands

The commands on this window have the following functions.

Command	Function
• Find . . .	To find a particular connection, enter values in the **Slot, Port, Channel**, and **DLCI** fields. If the connection exists, it is displayed on the first line of the table.
• Add a Connection	Displays the Frame Relay-to-Frame Relay PVC window.
• Go Back to Connection Menu	Redisplays the Connection Configuration Menu window.

Display Fields

The display fields on this window provide the following information about all the frame relay-to-frame relay PVC connections in the PSAX system:

Display Field	Description
• Frame Relay Side A	This panel displays the information for all interface A sides of the connections. The connection entries are displayed in ascending numerical order by slot, then by port, channel, and DLCI or VPI.
• Frame Relay Side B	This panel displays the information for all interface B sides of the connections.
• Flow	This panel displays the direction of the data traffic flow for the connections.
• Total: 0/0	The first number in this field indicates the number of the connection table entry on the first line of the currently displayed window. The second number indicates the total number of connection table entries for this connection type.

2 Select the **Add a Connection** command and press Enter.

The Frame Relay-to-Frame Relay PVC Connection window (see Figure 7-8) is displayed.

```
Frame Relay-to-Frame Relay PVC Connection                    [YourSiteName]

_Frame Relay Interface A_____________|_Frame Relay Interface B_____________
                                     |
 Slot....... 0    DLCI...... 0       | Slot....... 0     DLCI...... 0
 Port....... 1                       | Port....... 1
 Channel.... 1                       | Channel.... 1
                                     |
_____________________________________|_____________________________________

 Service Type..... Ubr                 [Connection Status].. Inactive
 Flow............. Duplex

_____________________________________________________________________________


                                       Configure Traffic Parameters ->
 Display Next Connection               View Connection Statistics ->
 Delete Connection                     Go Back to Connection Table ->
_____________________________________________________________________________
Press RETURN to edit the slot number for side A.
```

Figure 7-8. Frame Relay-to-Frame Relay PVC Connection Window

Commands

The commands on this window have the following functions:

Command	Function
• Display Next Connection	Displays the next connection of this type in the table.
• Add This Connection	Adds a connection having the values currently displayed on the window.
• Delete Connection	Deletes the connection having the values currently displayed on the window.
• Configure Traffic Parameters	Displays the Frame Relay-to-Frame Relay PVC Traffic Parameters window.
• View Connection Statistics	Displays the Frame Relay-to-Frame Relay window.
• Go Back to Connection Table	Redisplays the Frame Relay-to-Frame Relay PVC Statistics window.

Field Descriptions

3 Select the values for the fields on this window from the values given in Table 7-4.

Table 7-4. Field Values for the Frame Relay-to-Frame Relay PVC Connection Window

Field Names	Values	Description
Frame Relay Interface A		The side of the connection that will send signals.
Frame Relay Interface B		The side of the connection that will receive signals.
Slot	Range: 1–14	Enter the slot number containing the module for which you are creating a connection. Enter slot numbers for both sides of the connection.
Port	Range: 1–6	Enter the port number on the module for which you are creating a connection. Enter port numbers for both sides of the connection.

Table 7-4. Field Values for the Frame Relay-to-Frame Relay PVC Connection Window

Field Names	Values	Description
Channel	Range: 1–32 1–24 for DS1/T1 1–31 for E1	Enter the channel number of the port on the module for which you are creating a connection. Enter channel numbers for both sides of the connection.
DLCI	Default: 0 Range: 16–1007	Data link connection identifier.
Service Type	Ubr (default), Vbr-nrt2, Vbr-nrt1, Vbr-rt2, Vbr-rt1, Vbr-express, Cbr-4, Cbr-3, Cbr-2, Cbr-1	PSAX system-supported quality of service (QoS) class.
Flow	Duplex, SimplexA2B	Direction of the flow of data traffic in this connection. When you select **SimplexA2B**, only fields in the **Traffic Parameters A to B** side display.
[Connection Status] (display only)	Inactive, Active	This field displays the current status of the connection. The value indicates whether the connection is passing traffic.

End

Configuring Traffic Parameters

To configure the traffic parameters for this connection, perform the steps in the following procedure.

Steps to Configure Traffic Parameters

Begin

1 On the Frame Relay-to-Frame Relay PVC Connection window (see Figure 7-8), select **Configure Traffic Parameters** and press Enter.

The Frame Relay-to-Frame Relay PVC Traffic Parameters window is displayed (see Figure 7-9).

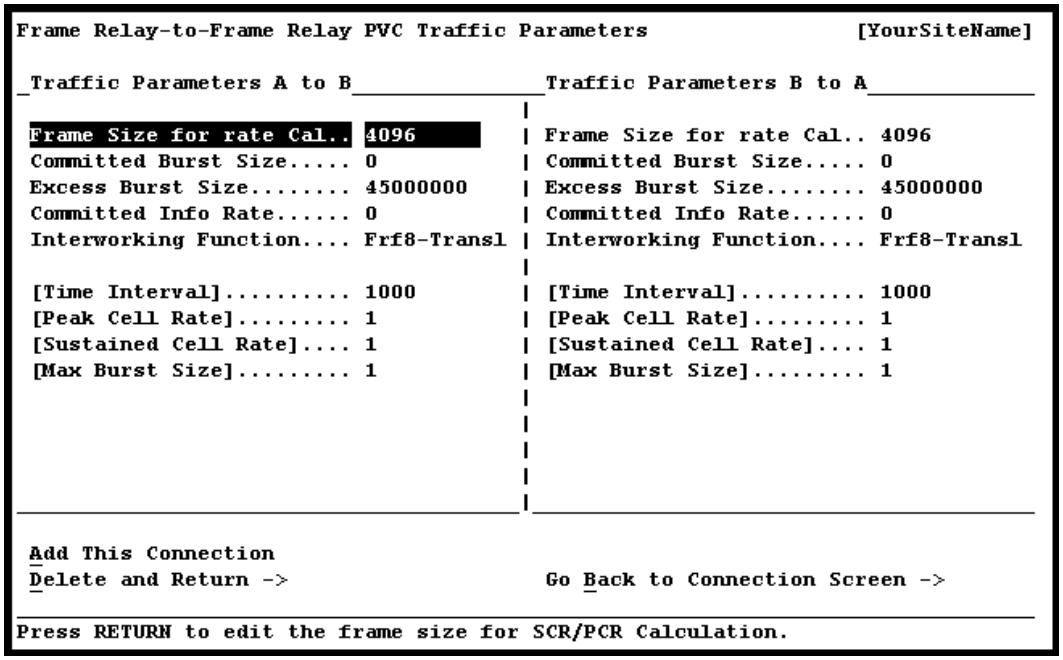


Figure 7-9. Frame Relay-to-Frame Relay PVC Traffic Parameters Window

Commands

The commands on this window have the following functions:

Command	Function
• Add This Connection	Adds a connection having the values currently displayed on the window.
• Delete and Return	Deletes the connection having the values currently displayed on the window.
• Go Back to Connection Screen	Redisplays the Frame Relay-to-Frame Relay VCC PVC Connection Table window.

Traffic Parameter Field Descriptions

2 Select the values for the traffic parameter fields on this window from the values given in Table 7-5.

Table 7-5. Field Values for the Frame Relay-to-Frame Relay PVC Traffic Parameters Window

Field Name	Values	Description
Frame Size for Rate Cal.	Default: 4096	Measured in bytes.
Committed Burst Size	Default: 0	Use the default value.
Excess Burst Size	Default: 45000000	Measured in bits per second.
Committed Info Rate	Default: 0	Committed information rate is the rate of traffic (measured in bits per second) for a given connection that the system will attempt to provide guaranteed delivery.
[Time Interval] (display only)	Default: 1000	Time, in seconds, since last reset.
[Peak Cell Rate] (display only)	Default: 1	Refer to the ATM UNI 3.0 specifications for more information. When setting this value, take into account the line rate for the module and the amount of bandwidth you are setting up for each interface for the module.
[Sustained Cell Rate] (display only)	Default: 1	Sustained cell rate. Refer to the ATM UNI 3.0 specifications for more information. When setting this value, take into account the line rate for the module and the amount of bandwidth you are setting up for each interface for the module.
[Max Burst Size] (display only)	Default: 1	Maximum burst size. Refer to the ATM UNI 3.0 specifications for more information. When setting this value, take into account the line rate for the module and the amount of bandwidth you are setting up for each interface for the module.

3 To add (apply) the connection configuration, select the **Add This Connection** command and press Enter.

4 To review this connection, select the **Go Back to Connection Table** command and press Enter (or press **Ctrl + b**).

The Frame Relay-to-Frame Relay PVC Table window returns, displaying the values you just applied.

5 To add more connections of this type, repeat steps 2 through 5 for more connections as needed.

End

Viewing the Statistics Window

From the Frame Relay-to-Frame Relay PVC window, select the View Statistics command.

The Frame Relay-to-Frame Relay PVC Statistics window is displayed (see Figure 7-10).

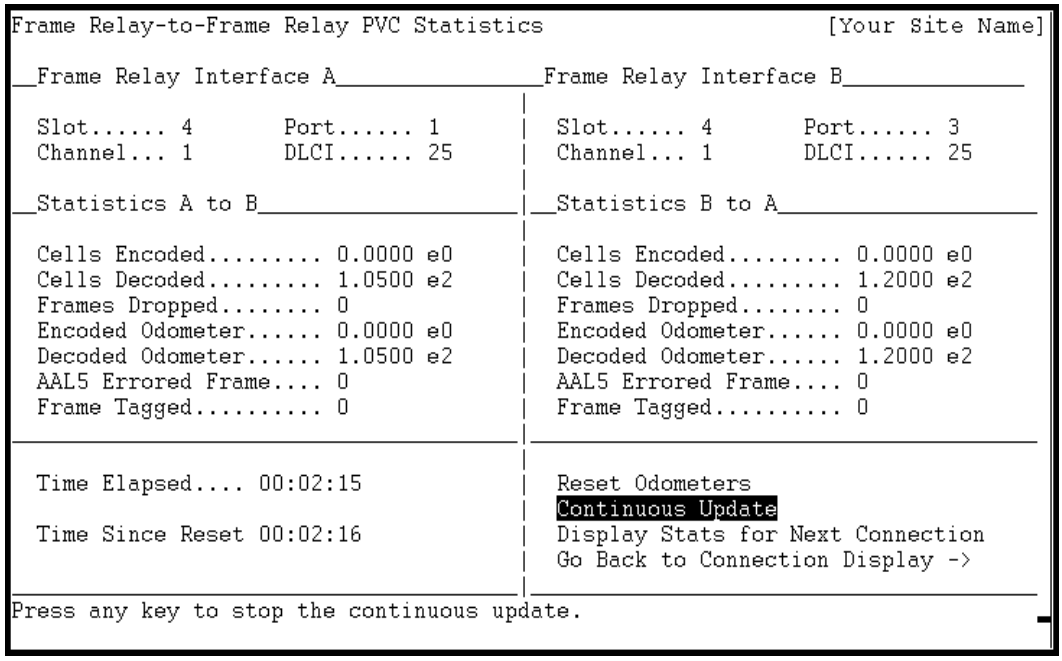


Figure 7-10. Frame Relay-to-Frame Relay PVC Statistics Window

Commands

The commands on this window have the following functions:

Command	Function
• Reset Odometers	Returns all statistics odometers to zero.
• Continuous Update	Updates the values in the fields every second.
• Display Stats for Next Connection	Displays the statistics for the next selected connection.
• Go Back to Connection Display	Redisplays the connection window.

Field Descriptions

The fields on this window have the following values:

Table 7-6. Field Values for the Frame Relay-to-Frame Relay PVC Connection Statistics Window

Field Name	Description
Cells Encoded	On the **Interface A Statistics** panel, the number of cells encoded going into interface side A during the amount of time shown in **Time Elapsed** field since the circuit was established. On the **Interface B Statistics** panel, the number of cells encoded going into interface side B during the amount of time shown in **Time Elapsed** field since the circuit was established.
Cells Decoded	On the **Interface A Statistics** panel, the number of cells decoded going out of interface side A during the amount of time shown in **Time Elapsed** field since the circuit was established. On the **Interface B Statistics** panel, the number of cells decoded going out of interface side B during the amount of time shown in **Time Elapsed** field since the circuit was established.
Frames Dropped	On the **Interface A Statistics** panel, the number of frames dropped going out of interface side A during the amount of time shown in **Time Elapsed** field since the circuit was established. On the **Interface B Statistics** panel, the number of frames dropped going out of interface side B during the amount of time shown in **Time Elapsed** field since the circuit was established.
Encoded Odometer	On the **Interface A Statistics** panel, the number of cells encoded going into interface side A since this counter was reset. On the **Interface B Statistics** panel, the number of cells encoded going into interface side B since this counter was reset.
Decoded Odometer	On the **Interface A Statistics** panel, the number of cells decoded going out of interface side A since this counter was reset. On the **Interface B Statistics** panel, the number of cells decoded going out of interface side B since this counter was reset.
AAL5 Errored Frame	On the **Interface A Statistics** panel, the number of AAL5 errored frames which are not dropped due to UPC in the A-to-B direction. Only applicable to input side. On the **Interface B Statistics** panel, the number of AAL5 errored frames which are not dropped due to UPC in the B-to-A direction. Only applicable to input side.

Table 7-6. Field Values for the Frame Relay-to-Frame Relay PVC Connection Statistics Window

Field Name	Description
Frame Tagged	On the **Interface A Statistics** panel, the number of frames tagged due to UPC in the A-to-B direction. Only applicable to input side. On the **Interface B Statistics** panel, the number of frames tagged due to UPC in the B-to-A direction. Only applicable to input side.
Time Elapsed	Time elapsed since the circuit was established.
Time Since Reset	Time elapsed since the last time the **Reset Odometers** command was used. **Note:** The **Reset** command on the statistics window resets only the odometer fields and the corresponding clock. Other counters increment for the life of the circuit.

Provisioning SPVC Connections

Configuring Local Addresses

An illustration of an SPVC connection is illustrated in Figure 7-11.

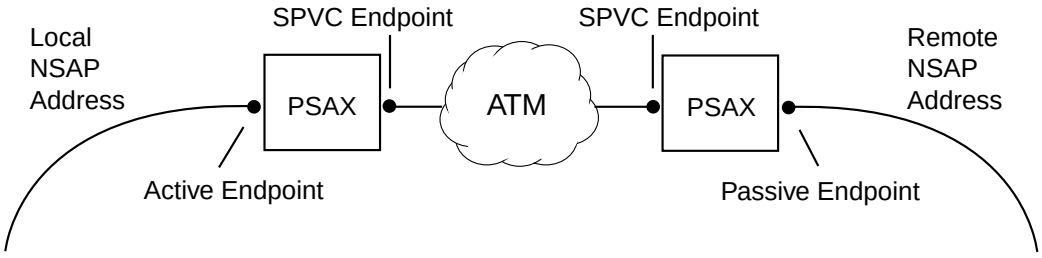


Figure 7-11. Example of SPVC Configuration

Perform the steps in the following procedure to configure your local SPVC address.

To set up SPVCs, start at the Console Interface Main Menu window (see Figure 7-12).

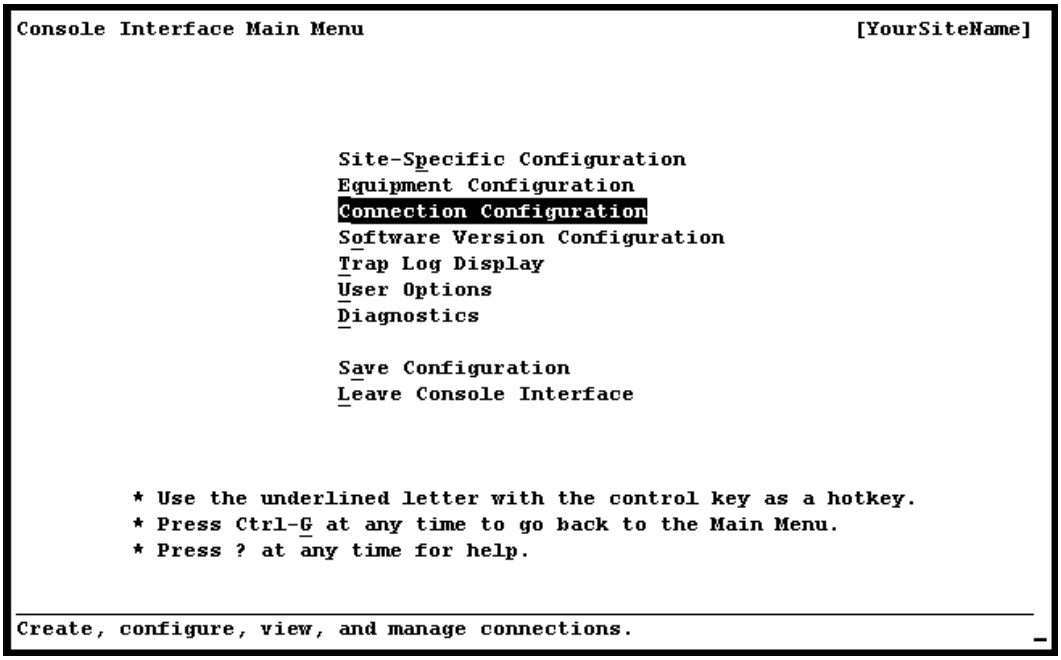


Figure 7-12. Console Interface Main Menu Window (Connection Configuration Selected)

Setting Up SPVCs and Configuring Local NSAP Addresses

Begin

1 Select **Connection Configuration** and press Enter.

The Connection Configuration Menu window (see Figure 7-13) is displayed.

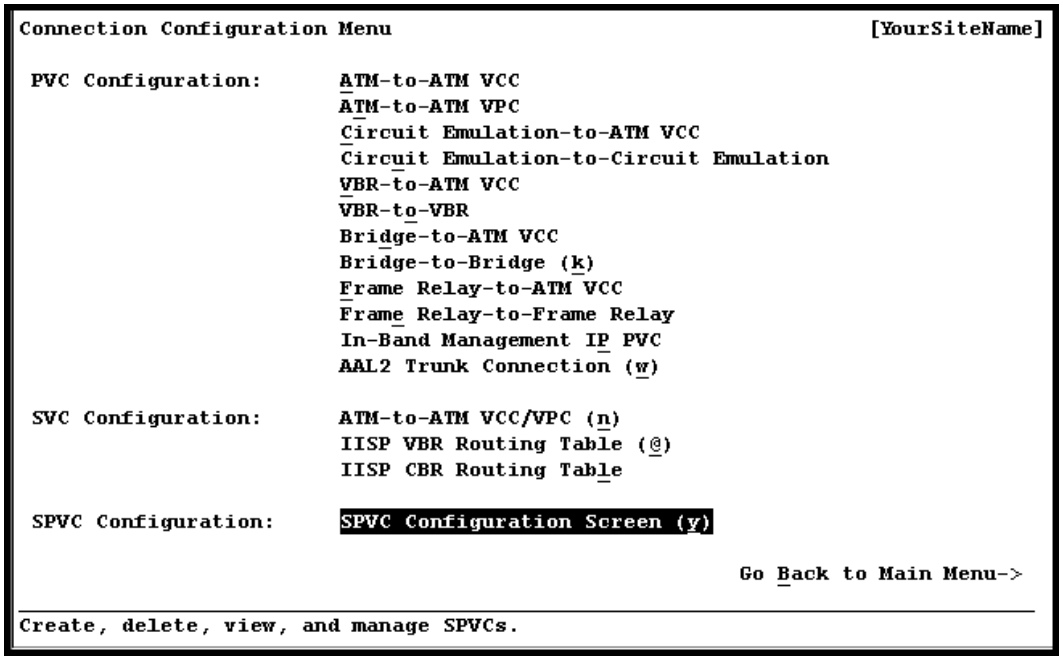


Figure 7-13. Connection Configuration Menu Window (SPVC Configuration Screen Selected)

2 Select **SPVC Configuration Screen (y)** and press Enter.

The SPVC Configuration Menu (see Figure 7-14) is displayed.

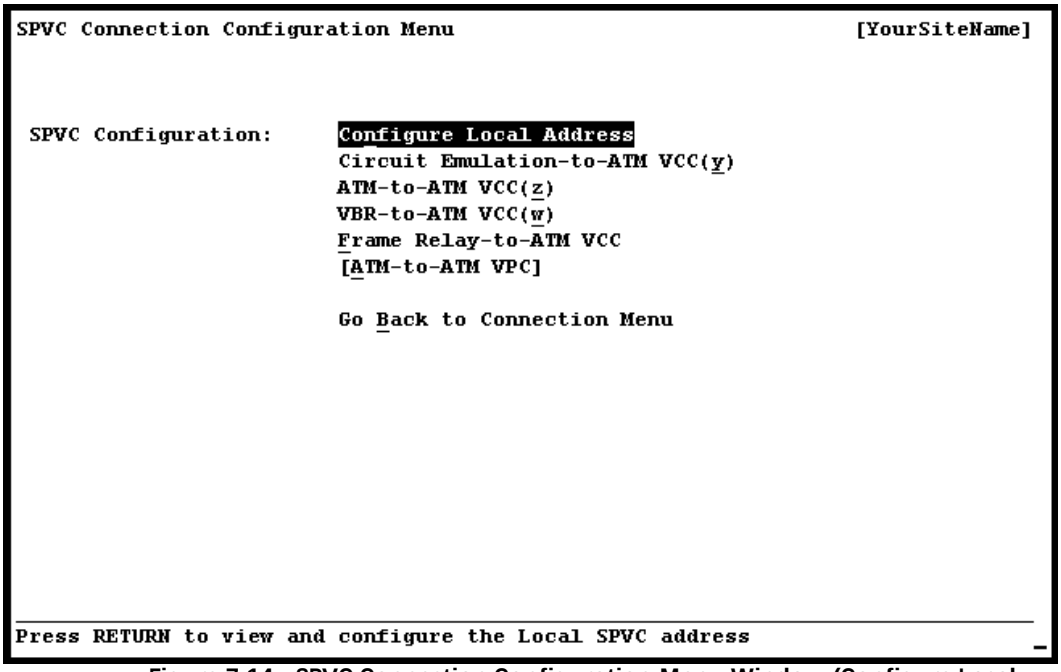


Figure 7-14. SPVC Connection Configuration Menu Window (Configure Local Address Option Selected)

3 To configure a local SPVC address, select the **Configure Local Address** option and press Enter.

The SPVC Address Table window (see Figure 7-15) is displayed.

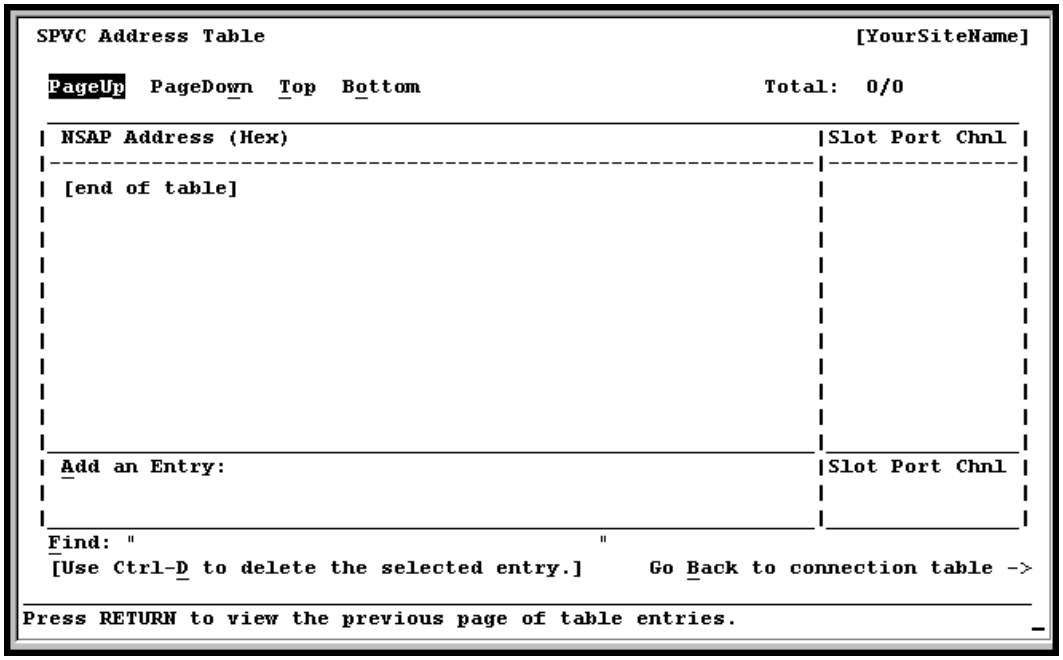


Figure 7-15. SPVC Address Table Window

Note: At the time of initial installation, the SPVC Address Table window is empty.

Commands

The commands on this window have the following functions:

Command	Function
• Find: " "	To find a particular SPVC address, enter the address values after the **Find** field. If the address exists, it is displayed on the first line of the table.
• Add an Entry:	Highlights the line under the **Add an Entry** field. Press Enter to activate edit mode, then enter your address in the field.
• Go Back to connection table→	Redisplays the Connection Configuration Menu window.

4 Select the **Add an Entry** field, and press Enter.

a. Type a network service access point (NSAP) address up to 20 bytes (160 bits) long (10 groups of 4 characters each), and press the Tab key.

b. In the **Slot Port Chnl** field, type the slot, port, and channel values for the endpoint ATM cell-bearing I/O module that has a configured ATM IISP (User or Network), ATM UNI 3.0 or 3.1, or ATM PNNI 1.0 interface.

c. Press Enter to add the entry to the table.

5 Repeat step 2 as many times as needed to add NSAP addresses.

6 To permanently save these connections, press **Ctrl + G** to return to the Console Interface Main Menu window.

7 Select **Save Configuration**, and press Enter to store the values in the Multiservice Media Gateway system database.

End

Viewing Local NSAP Addresses

To view NSAP addresses, select the **Configure Local Address** command on the SPVC Connection Configuration Menu window (see Figure 7-14 on page 7-26) and press Enter.

The SPVC Address Table window is displayed (see Figure 7-16).

```
SPVC Address Table                                                   [YourSiteName]

 PageUp  PageDown  Top  Bottom                                  Total:  0/0
 ____________________________________________________________________________
| NSAP Address (Hex)                                           |Slot Port Chnl |
|--------------------------------------------------------------|---------------|
| [end of table]                                               |               |
|                                                              |               |
|                                                              |               |
|                                                              |               |
|                                                              |               |
|                                                              |               |
|                                                              |               |
|                                                              |               |
|                                                              |               |
|                                                              |               |
|______________________________________________________________|_______________|
| Add an Entry:                                                |Slot Port Chnl |
|                                                              |               |
|______________________________________________________________|_______________|
 Find: "                                    "
 [Use Ctrl-D to delete the selected entry.]     Go Back to connection table ->
______________________________________________________________________________
Press RETURN to view the previous page of table entries.                     _
```

Figure 7-16. SPVC Address Table Window

Adding Frame Relay-to-ATM VCC SPVC Connections

Creating a Frame Relay-to-ATM VCC SPVC Connection

Follow the steps below to create a frame relay-to-ATM VCC SPVC connection.

Steps to Create a Frame Relay-to-ATM VCC SPVC Connection

Begin

Use the steps in the following procedure to add a Frame Relay-to-ATM VCC SPVC connection, starting at the Connection Configuration Menu window.

1 On the Connection Configuration Menu window, select **SPVC Configuration Screen(y)**, and press Enter.

The SPVC Connection Configuration Menu window is displayed (see Figure 7-17).

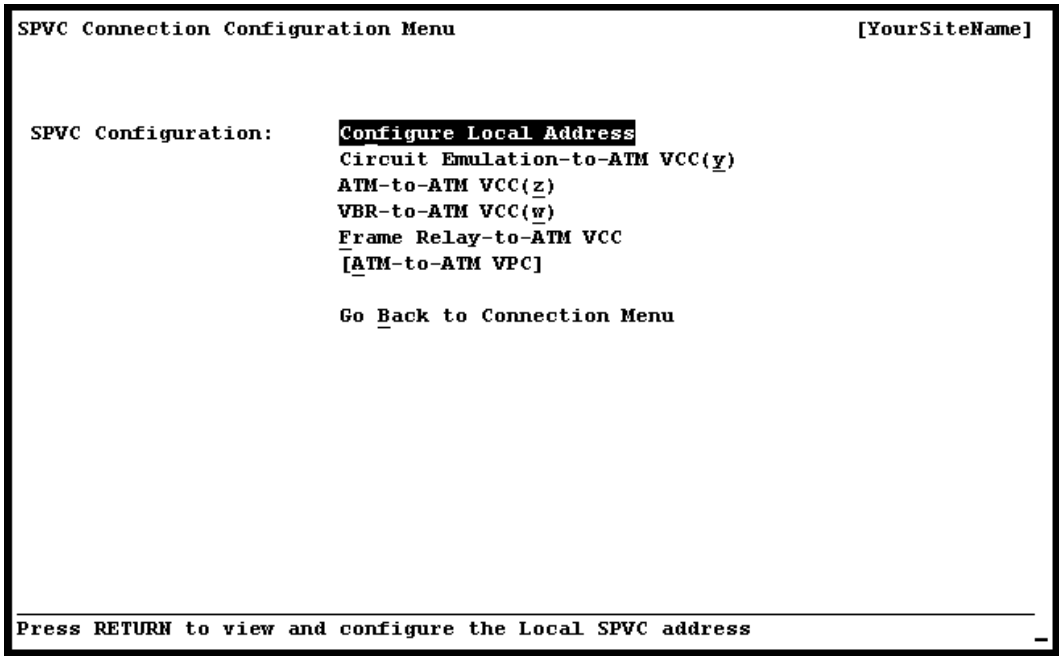


Figure 7-17. SPVC Connection Configuration Menu Window

2 Select **Frame Relay-to-ATM VCC** and press Enter.

The Frame Relay-to-ATM VCC SPVC Table window is displayed (see Figure 7-18).

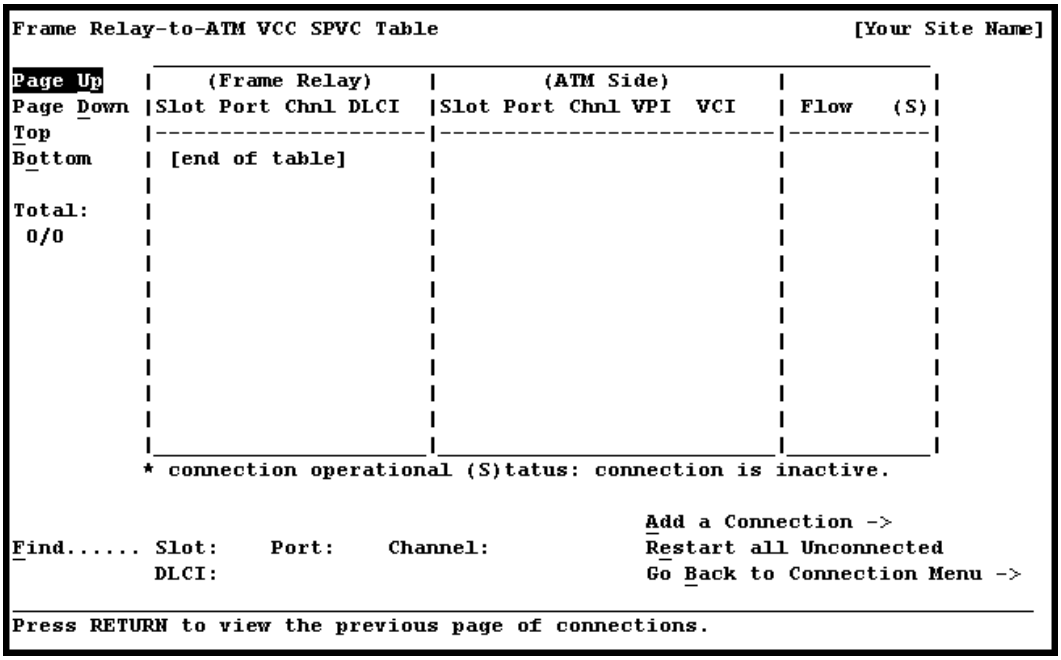


Figure 7-18. Frame Relay-to-ATM VCC SPVC Table Window

Note: At the time of initial installation, the Frame Relay-to-ATM VCC SPVC Table window is empty. After you have set up connections, this window displays all the connections of this type in the system.

Commands

The commands on this window have the following functions:

Command	Function
• Find . . .	To find a particular connection, enter values in the **Slot, Port, Channel,** and **DLCI** fields. If the connection exists, it will display on the first line of the table.
• Add a Connection	Displays the Frame Relay-to ATM VCC SPVC Connection window.
• Restart all unconnected	Restarts connection establishment procedure for all active Frame Relay-to ATM VCC SPVCs which are not previously set up.
• Go Back to Connection Menu	Redisplays the Connection Configuration Menu window.

Display Fields

The display fields on this window provide the following information about all the Frame Relay-to-ATM VCC SPVC connections in the Access Concentrator system:

Display Field	Description
• (Frame Relay)	This column displays the information for all interface A (PVC) sides of the connections. The connection entries are displayed in ascending numerical order by slot, then by port, channel, and DLCI.
• (ATM Side)	This column displays the information for all interface B (SVC) sides of the connections.
• Flow (S)	This column displays the data traffic flow for the connections.
• Total: 0/0	The first number in this field indicates the number of the connection table entry on the first line of the currently displayed window. The second number indicates the total number of connection table entries for this connection type.

3 Select the **Add a Connection** command and press Enter.

The Frame Relay-to-ATM VCC SPVC Connection window is displayed (see Figure 7-19).

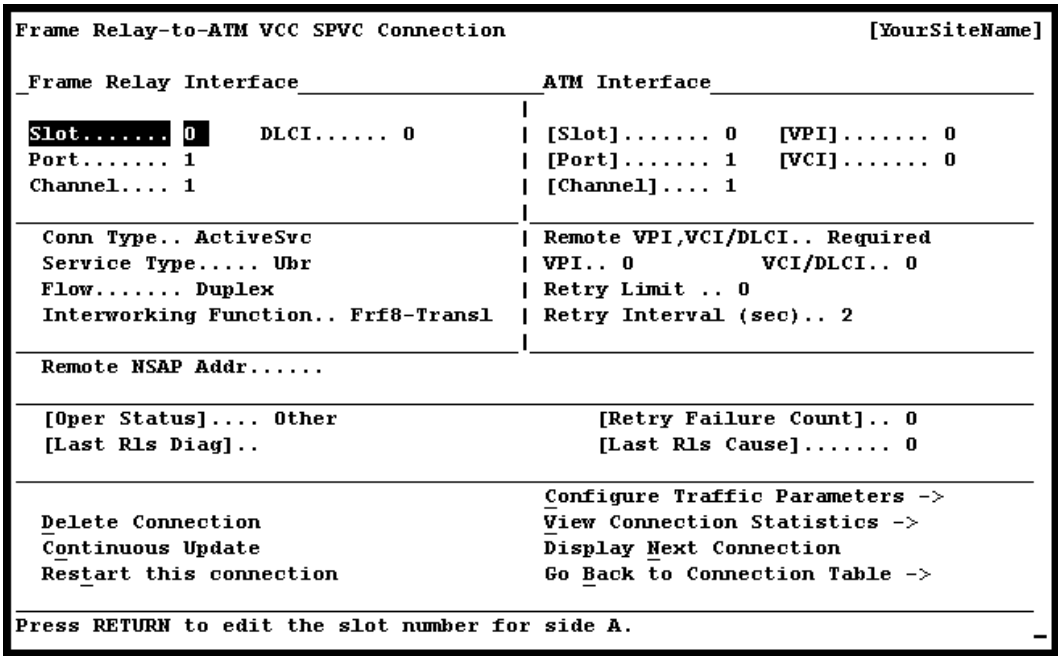


Figure 7-19. Frame Relay-to-ATM VCC SPVC Connection Window

Commands

The commands on this window have the following functions:

Command	Function
• Delete Connection	Deletes the connection having the values currently displayed on the window.
• Continuous Update	Updates the values in the fields every second.
• Restart this Connection	Restarts connection establishment procedure for this Frame Relay-to-ATM VCC SPVC.
• Configure Traffic Parameters	Displays the Frame Relay-to-ATM VCC SPVC Traffic Parameters window.
• View Connection Statistics	Displays the Frame Relay-to-ATM VCC SPVC Statistics window.
• Display Next Connection	Displays the next connection of this type in the Frame Relay-to-ATM VCC SPVC Table window.
• Go Back to Connection Table	Redisplays the Frame Relay-to-ATM VCC SPVC Connection Table window.

Field Descriptions

4 Select the values for the fields on this window from the values given in Table 7-7.

Table 7-7. Field Values for the Frame Relay-to-ATM SPVC Connection Window

Field Names	Values	Description
Frame Relay Interface		Frame relay side (PVC side) of the connection.
ATM Interface (**[Slot], [Port], [Channel], [VPI],** and **[VCI]** fields are display only)		ATM side (SVC side) of the connection.
Slot	Varies depending on chassis type	Enter the slot number containing the module for which you are creating a connection. Enter slot numbers for both sides of the connection.
Port		Enter the port number on the module for which you are creating a connection. Enter port numbers for both sides of the connection.
Channel	1	The channel number on the module for which you are creating a connection. This is the channel where the call originates. For example, on a port of the Enhanced DS1 module, you can configure more than one channel in a port.
DLCI	Range: 16–1007	Data link connection identifier. DLCI is used when the remote end point is frame relay.
Conn Type	Default: ActiveSvc PassiveSvc	The type of connection. **ActiveSvc** attempts calls. **PassiveSvc** accepts calls.
Service Type	Default: Ubr Vbr-nrt2, Vbr-nrt1, Vbr-rt2, Vbr-rt1, Vbr-express	Multiservice Media Gateway system-supported quality of service (QoS) class.

Table 7-7. Field Values for the Frame Relay-to-ATM SPVC Connection Window

Field Names	Values	Description
Flow	Default: Duplex SimplexA2B, Simplex B2A	Direction of flow of data traffic in this connection. • Duplex Data flows in two directions between the two connection points (interface side A and interface side B). • Simplex Data flows in only one direction, from side A to side B, or from side B to side A.
Interworking Function	Default: Frf8-Transl Frf8-Pass; Frf5	FRF.8 (Frame Relay Forum Implementation Agreement)—frame relay to ATM PVC service interworking. FRF.5 (Frame Relay Forum Implementation Agreement)—frame relay to ATM PVC service interworking. **Note:** No matter which value you select in this field, you can set values for the **Remote Remote VPI,VCI/DLCI** field.
Remote VPI,VCI/DLCI (shown when **ActiveSvc** is selected as the connection type)	Default: Required	This field indicates whether the remote VPI, VCI, and DLCI values are to be used at the destination. The destination device uses the values specified at this end.
	Any	The destination device selects the VPI/VCI values.
	VPI Range: 0–4095	Virtual path identifier. **Note:** If you want to use DLCI, set VPI to **0**.
	VCI Range: 32–65535	Virtual channel identifier.
	DLCI Range: 16–1007	Data link connection identifier. DLCI is used when the remote end point is frame relay. **Note:** If you want to use DLCI, set VPI to **0**.

Table 7-7. Field Values for the Frame Relay-to-ATM SPVC Connection Window

Field Names	Values	Description
Retry Limit (shown when **ActiveSvc** is selected as the connection type)	Default: 0	Maximum limit on how many consecutive unsuccessful call setup attempts can be made before stopping the attempts to set up the connection. A value of zero indicates no limits. See the *ATM UNI Specification, Version 3.1 Cause Code* table in the Reference Table appendix of this guide for causes that will prompt a retry as reported by the far end.
Retry Interval (sec) (shown when **ActiveSvc** is selected as the connection type)	Default: 2	The waiting period before attempting to establish the SPVC after one call attempt has failed.
Remote NSAP Addr (shown when **ActiveSvc** is selected as the connection type)		The ATM NSAP address of the remote end of the connection, in hexidecimal notation. Enter the NSAP address of the remote frame relay or ATM interface in hexadecimal notation.
[Oper Status] (display only)	Default: Other	None of the types specified below.
	EstablishmentInProgress	Connection is not operational, but call attempts are ongoing.
	Connected	Connection is currently operational.
	RetriesExhausted	Retry limit has been reached and call attempts have ceased.
	NoAddressSupplied	No remote address has been configured, so no call attempts are initiated.
	LowerLayerDown	PVC endpoint is out of service.
	WaitingForCall	Passive endpoint of a SPVC connection, waiting for call from an active side.
	WaitingForRetryTimer	Active endpoint of a SPVC connection, waiting for the retry timer to expire so that it can retry the call.
[Last Rls Diag] (display only)		Last release diagnosis. Explains how the connection was released and reported by the far end of the connection.

Table 7-7. Field Values for the Frame Relay-to-ATM SPVC Connection Window

Field Names	Values	Description
[Retry Failure Count] (display only)		Displays how many times the call retry failed since the last successful call setup. When a call is released, the Multiservice Media Gateway will continue to retry up to the retry limit that is specified in the **Retry Limit** field. See the ATM UNI 3.0 specification for more information.
[Last Rls Cause] (display only)	Default: 0	Last release cause. Release cause for a failed call attempt. See the ATM UNI 3.1 specification for more information.

End

Configuring Traffic Parameters

To configure the traffic parameters for this connection, perform the steps in the following procedure.

Steps to Configure Traffic Parameters

Begin

1 On the Frame Relay-to-ATM VCC SPVC Connection window (see Figure 7-17), select **Configure Traffic Parameters** and press Enter.

The Frame Relay-to-ATM VCC SPVC Traffic Parameters window is displayed (see Figure 7-20).

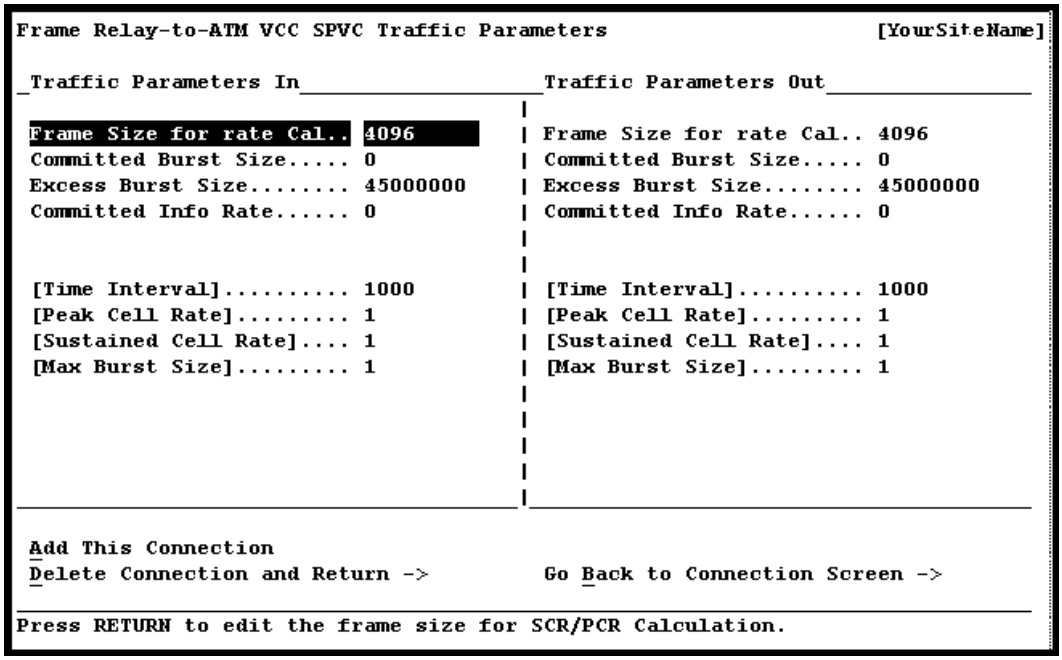


Figure 7-20. Frame Relay-to-ATM SPVC Traffic Parameters Window

Commands

The commands on this window have the following functions:

Command	Function
• Add This Connection	Adds a connection having the values currently displayed on the window.
• Delete Connection and Return	Deletes the connection having the values currently displayed on the window.
• Go Back to Connection Screen	Redisplays the Frame Relay-to-ATM VCC SPVC Connection Table window.

Field Descriptions

2 Select the values for the traffic parameter fields on this window from the values given in Table 7-8.

Table 7-8. Field Values for the Frame Relay-to-ATM VCC SPVC Traffic Parameters Window

Field Name	Values	Description
Frame Size for Rate Cal.	Default: 4096	Measured in bytes.
Committed Burst Size	Default: 0	Use the default value.

Table 7-8. Field Values for the Frame Relay-to-ATM VCC SPVC Traffic Parameters Window

Field Name	Values	Description
Excess Burst Size	Default: 45000000	Measured in bits per second.
Committed Info Rate	Default: 0	Committed information rate is the rate of traffic (measured in bits per second) for a given connection that the system will attempt to provide guaranteed delivery. **Note:**
[Time Interval] (display only)	Default: 1000	Time, in seconds, since the last reset.
[Peak Cell Rate] (display only)	Default: 1	Refer to the ATM UNI 3.0 specifications for more information. When setting this value, take into account the line rate for the module and the amount of bandwidth you are setting up for each interface for the module.
[Sustained Cell Rate] (display only)	Default: 1	Sustained cell rate. Refer to the ATM UNI 3.0 specifications for more information. When setting this value, take into account the line rate for the module and the amount of bandwidth you are setting up for each interface for the module.
[Max Burst Size] (display only)	Default: 1	Maximum burst size. Refer to the ATM UNI 3.0 specifications for more information. When setting this value, take into account the line rate for the module and the amount of bandwidth you are setting up for each interface for the module.

3 To add (apply) the connection configuration, select the **Add This Connection** command and press Enter.

4 To review this connection, select the **Go Back to Connection Table** command and press Enter (or press **Ctrl+B**).

The Frame Relay-to-ATM VCC SPVC Table window returns, displaying the values you just applied.

5 To add more connections of this type, repeat steps 2 through 5 for more connections as needed.

End

Viewing Connection Statistics

To view the statistics for this connection, perform the steps in the following procedure.

On the Frame Relay-to-ATM VCC SPVC Connection window (see Figure 7-19), select **View Connection Statistics** and press Enter.

The Frame Relay-to-ATM VCC SPVC Statistics window is displayed.

```
Frame Relay-to-ATM VCC SPVC Statistics                          [YourSiteName]

  Frame Relay Interface                 ATM Interface

  Slot....... 8     DLCI....... 100     Slot....... 9     VPI........ 0
  Port....... 6                         Port....... 1     VCI........ 76
  Channel.... 4                         Channel.... 1

  Cells Encoded....... 0.0000 e0
  Cells Decoded....... 0.0000 e0        Cells Received...... 0.0000 e0
  Frames Dropped...... 0                Cells Transmitted... 0.0000 e0
  Encoded Odometer.... 0.0000 e0        In Odometer......... 0.0000 e0
  Decoded Odometer.... 0.0000 e0        Out Odometer........ 0.0000 e0

  Time Elapsed........ 02:33:05         Reset Odometers
                                        Continuous Update
  Time Since Reset.... 02:33:05         Display Stats for Next Connection
                                        Go Back to Connection Display ->

T-CirAtmSpvcVccSetUp: 802014..901001.0.131
```

Figure 7-21. Frame Relay-to-ATM VCC SPVC Statistics Window

Commands

The commands on this window have the following functions:

Command	Function
• Reset Odometers	Resets the **Encoded Odometer, Decoded Odometer, In Odometer**, and **Out Odometer** fields to zero. **Note:** If a call is disconnected, all odometers are reset to zero.
• Continuous Update	Updates the values in the fields every second.
• Display Stats for Next Connection	Displays the statistics for the next connection of this type.
• Go Back to Connection Display→	Redisplays the Frame Relay-to-ATM VCC SPVC Connection window.

Field Descriptions

The connection statistics on this window as described in Table 7-9.

Table 7-9. Field Descriptions for the Frame Relay-to-ATM VCC SPVC Connection Statistics Window

Field Name	Description
Slot	Slot identifier of the frame relay interface (Interface A).
Port	Port identifier of the frame relay interface (Interface A).
Channel	Channel identifier of the frame relay interface (Interface A).
DLCI	Data link control identifier of the frame relay interface in which the call is configured.
VPI	Virtual path identifier of the ATM side (SVC side) of the connection.
VCI	Virtual channel identifier of the ATM side (SVC side) of the connection.
Cells Encoded	Number of cells encoded going into interface side A during the amount of time shown in **Time Elapsed** field.
Cells Decoded	Number of cells decoded going out of interface side B during the amount of time shown in **Time Elapsed** field.
Frames Dropped	Number of frames dropped for a given DLCI in the A2B direction. This field is only applicable to the input side.
Encoded Odometer	Total number of cells encoded going into interface side A since the connection was created or statistics were reset.
Decoded Odometer	Total number of cells decoded going out of interface side B since the connection was created or statistics were reset.
Time Elapsed	Time, in hours, minutes, and seconds, since last reset.
Time Since Reset	Time, in hours, minutes, and seconds, since the **Reset Odometer** command was used.
Cells Received	Number of cells received into interface side A during the amount of time shown in **Time Elapsed** field.
Cells Transmitted	Number of cells transmitted out of interface side B during the amount of time shown in **Time Elapsed** field.
In Odometer	Total number of cells encoded going into interface side B since the connection statistics were reset.
Out Odometer	Total number of cells decoded going out of interface side A since the connection statistics were reset.

8 Provisioning Connections Using the *AQueView®* System

Overview of This Chapter

This chapter describes how to set up permanent virtual circuit (PVC), connections in the *AQueView®* system for service provisioning and how to view statistics data for billing and performance monitoring. Before you provision connections for the modules, you must have first completed the following tasks:

- Setting the configuration values for one or more ports on the 1-Port Unchannelized DS3 Frame Relay module
- Setting the configuration values for the various types of interfaces on the 1-Port Unchannelized DS3 Frame Relay module

This chapter contains instructions for making the following types of PVC and SPVC connections (on the frame relay side of the connection):

- Frame relay-to-ATM virtual channel connection (VCC) PVC connection
- Frame relay-to-frame relay VCC PVC connection
- Frame relay-to-ATM VCC soft permanent virtual circuit (SPVC) connection

PVCs consist of connections between ports on the various PSAX I/O modules. When setting up some types of connections, you can set up data traffic to flow in several ways, depending on the type of connection as follows:

- Duplex

  Data flows in two directions between the two connection points (interface side A and interface side B).

- Simplex

  Data flows in only one direction, from side A to side B, or from side B to side A.

- Point-to-Multipoint

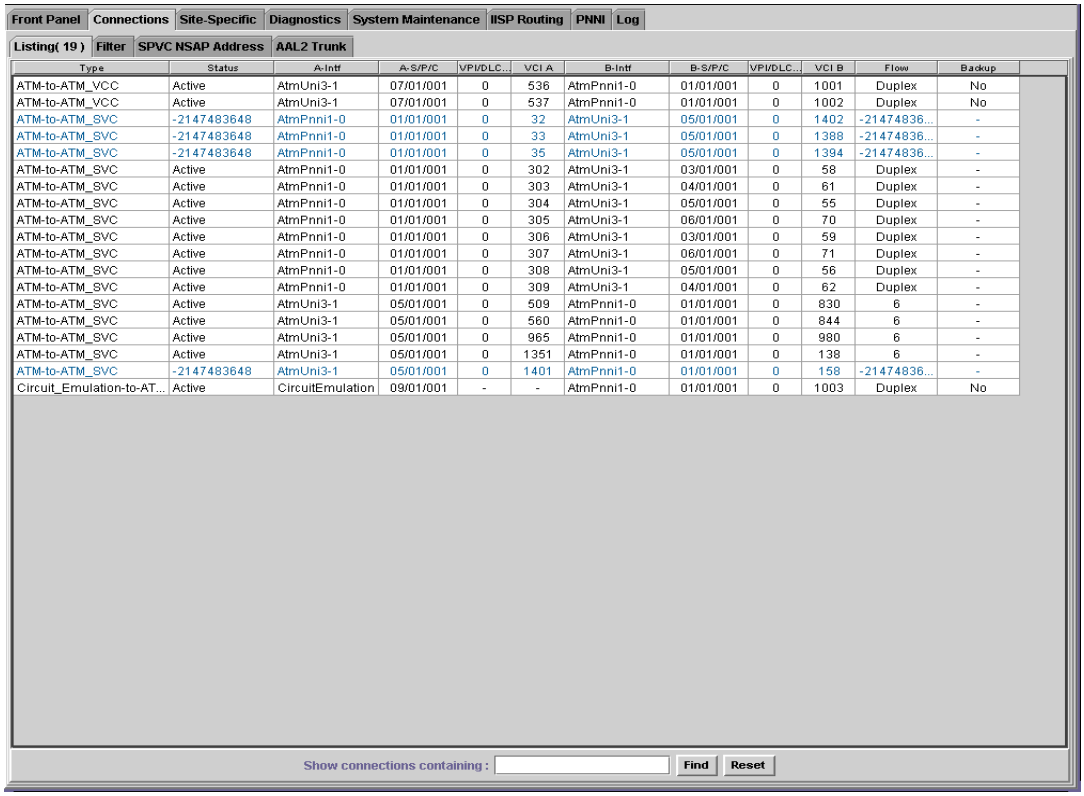
  Data flows in only one direction, from one point on side A to several points on side B, or from one point on side B to several points on side A.

Before you can provision connections, you must select an interface type value other than **Unconfigured** in the **Interface Type** field on the DS3 Frame Relay Port and Channel Configuration window.

Managing Connections

Within the **Connections** tab are four tabs that open the following pages:

- By default, the **Listing** page appears when you click the **Connections** tab (see Figure 8-1). The **Listing** page displays all existing connections established on the device by default, that you can filter (see ”Filtering Connections in the List” on page 8-9). Connections can be created from this window by clicking the right mouse button to display the connections menu. The number in parentheses on the tab is the number of connections in the list.
- The **Filter** page enables you to sort and view connection types listed on the **Listing** page by connection type, slot, port, and channel (see ”Filtering Connections in the List” on page 8-9)
- The **SPVC NSAP Address** page enables you to enter new SPVC NSAP addresses and to view a list of existing SPVC NSAP addresses (see ”SPVC NSAP Addresses” on page 8-12)
- The **AAL2 Trunk** page allows you to add AAL2 trunk entries (see ”AAL2 Trunk Configuration” on page 8-13)



Type	Status	A-Intf	A-S/P/C	VPI/DLC...	VCI A	B-Intf	B-S/P/C	VPI/DLC...	VCI B	Flow	Backup
ATM-to-ATM_VCC	Active	AtmUni3-1	07/01/001	0	536	AtmPnni1-0	01/01/001	0	1001	Duplex	No
ATM-to-ATM_VCC	Active	AtmUni3-1	07/01/001	0	537	AtmPnni1-0	01/01/001	0	1002	Duplex	No
ATM-to-ATM_SVC	-2147483648	AtmPnni1-0	01/01/001	0	32	AtmUni3-1	05/01/001	0	1402	-21474836...	-
ATM-to-ATM_SVC	-2147483648	AtmPnni1-0	01/01/001	0	33	AtmUni3-1	05/01/001	0	1388	-21474836...	-
ATM-to-ATM_SVC	-2147483648	AtmPnni1-0	01/01/001	0	35	AtmUni3-1	05/01/001	0	1394	-21474836...	-
ATM-to-ATM_SVC	Active	AtmPnni1-0	01/01/001	0	302	AtmUni3-1	03/01/001	0	58	Duplex	-
ATM-to-ATM_SVC	Active	AtmPnni1-0	01/01/001	0	303	AtmUni3-1	04/01/001	0	61	Duplex	-
ATM-to-ATM_SVC	Active	AtmPnni1-0	01/01/001	0	304	AtmUni3-1	05/01/001	0	55	Duplex	-
ATM-to-ATM_SVC	Active	AtmPnni1-0	01/01/001	0	305	AtmUni3-1	06/01/001	0	70	Duplex	-
ATM-to-ATM_SVC	Active	AtmPnni1-0	01/01/001	0	306	AtmUni3-1	03/01/001	0	59	Duplex	-
ATM-to-ATM_SVC	Active	AtmPnni1-0	01/01/001	0	307	AtmUni3-1	06/01/001	0	71	Duplex	-
ATM-to-ATM_SVC	Active	AtmPnni1-0	01/01/001	0	308	AtmUni3-1	05/01/001	0	56	Duplex	-
ATM-to-ATM_SVC	Active	AtmPnni1-0	01/01/001	0	309	AtmUni3-1	04/01/001	0	62	Duplex	-
ATM-to-ATM_SVC	Active	AtmUni3-1	05/01/001	0	509	AtmPnni1-0	01/01/001	0	830	6	-
ATM-to-ATM_SVC	Active	AtmUni3-1	05/01/001	0	560	AtmPnni1-0	01/01/001	0	844	6	-
ATM-to-ATM_SVC	Active	AtmUni3-1	05/01/001	0	965	AtmPnni1-0	01/01/001	0	980	6	-
ATM-to-ATM_SVC	Active	AtmUni3-1	05/01/001	0	1351	AtmPnni1-0	01/01/001	0	138	6	-
ATM-to-ATM_SVC	-2147483648	AtmUni3-1	05/01/001	0	1401	AtmPnni1-0	01/01/001	0	158	-21474836...	-
Circuit_Emulation-to-AT...	Active	CircuitEmulation	09/01/001	-	-	AtmPnni1-0	01/01/001	0	1003	Duplex	No

Figure 8-1. Connections Tab (Displaying Listing Page)

Buttons

The buttons in the **Listing** page have the following functions:

Button	Function
• Find	Searches the table and displays a matching text string entered in the **Show connections containing:** field.
• Reset	Removes text entered in the **Show connections containing:** field.

Searching for Specific Connection Entries

In the **Listing** and the **SPVC NSAP Address** pages, you can search for any combination of letters or numbers (a text string), and the page will change its display to show only the entries that contain the text string you enter.

For example, the **Listing** page shown in Figure 8-2 has hundreds of connection entries. It is quicker to search this page based on a text string than to scroll up and down the page looking for a specific entry.

Perform the steps in the following procedure to search for entries using a text string.

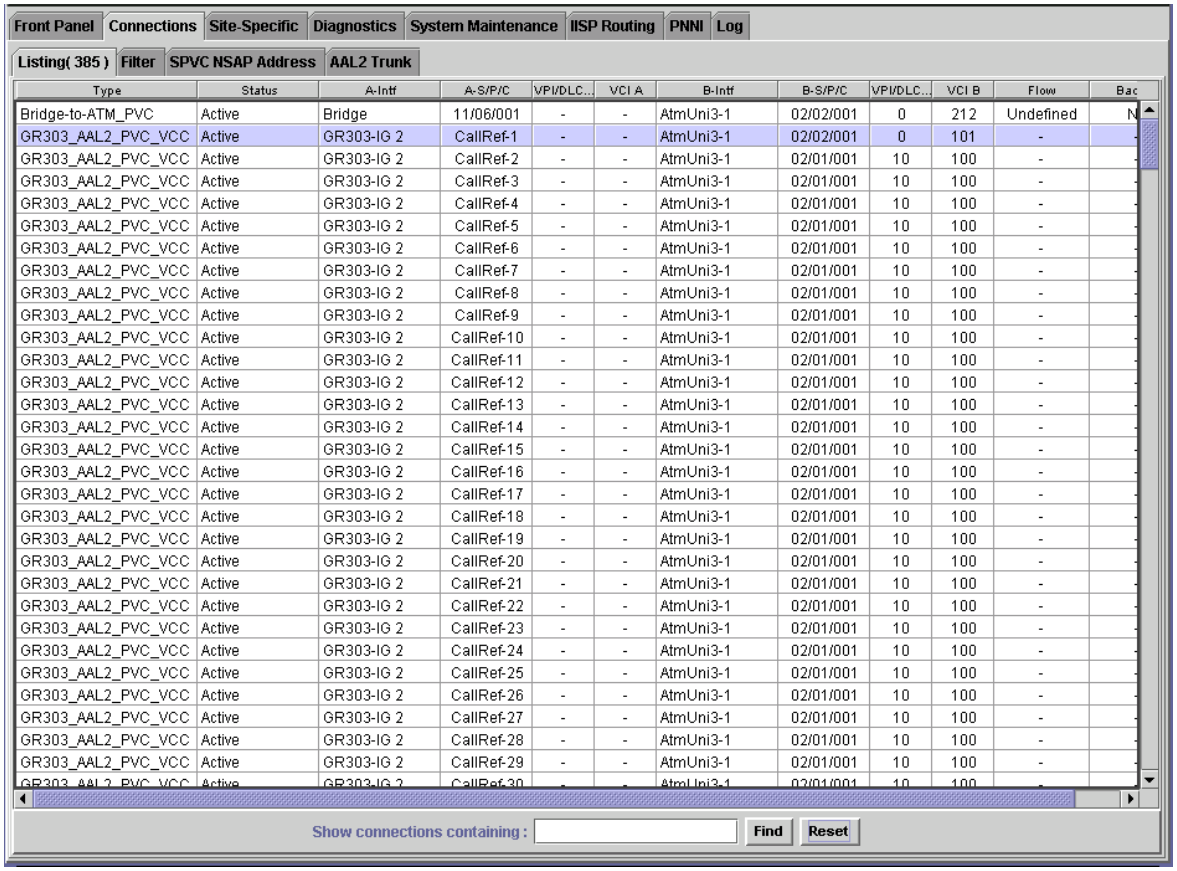
Note: This procedure uses the **Listing** page, but the procedure is the same for the **SPVC NSAP Address** page (see Figure 8-9).

Searching Connection Entries Using a Text String

Begin

1 Click the **Connections** tab.

The **Listing** page appears (see Figure 8-2).



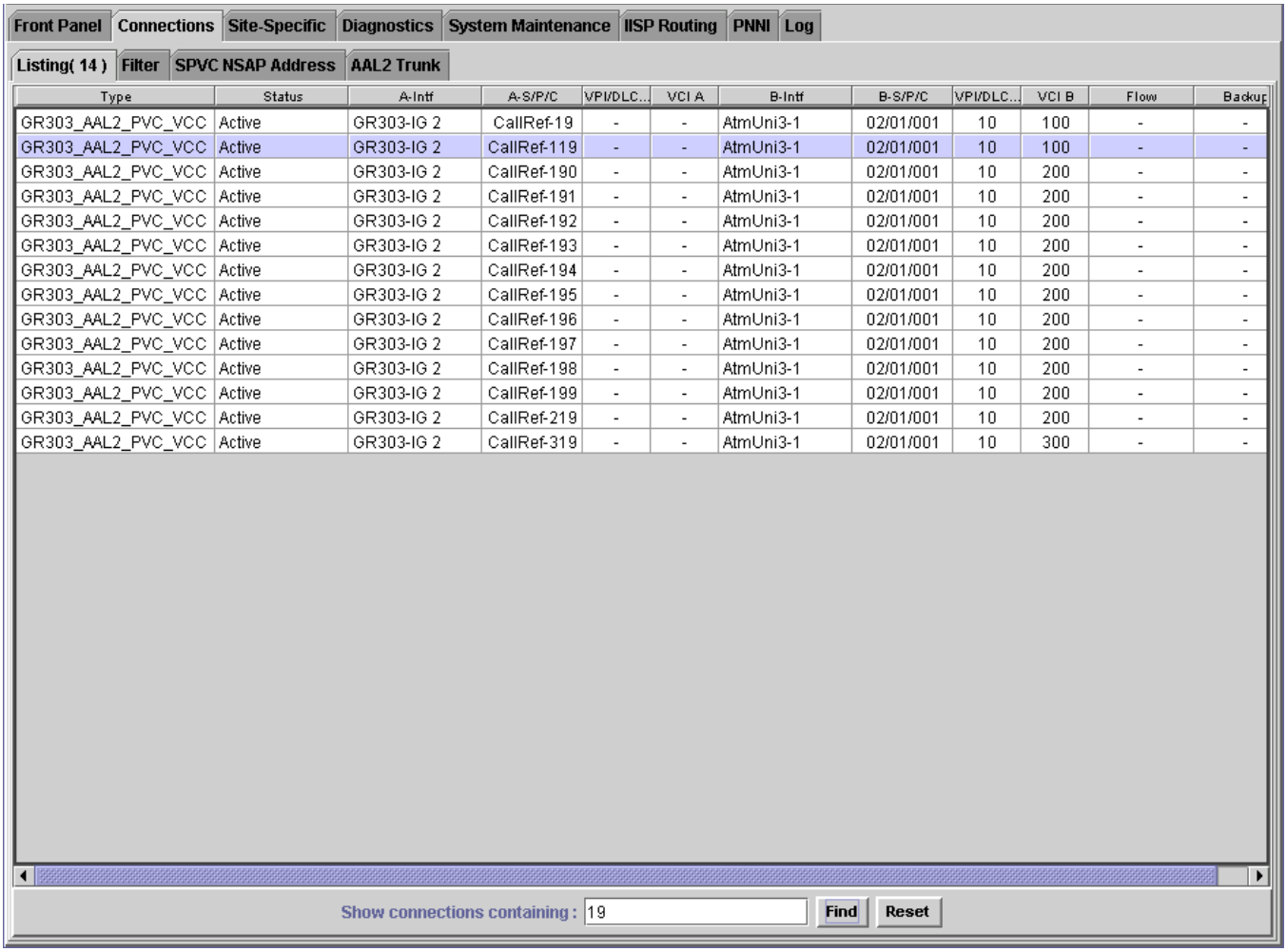
Type	Status	A-Intf	A-S/P/C	VPI/DLC...	VCI A	B-Intf	B-S/P/C	VPI/DLC...	VCI B	Flow	Bac
Bridge-to-ATM_PVC	Active	Bridge	11/06/001	-	-	AtmUni3-1	02/02/001	0	212	Undefined	N
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-1	-	-	AtmUni3-1	02/02/001	0	101	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-2	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-3	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-4	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-5	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-6	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-7	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-8	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-9	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-10	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-11	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-12	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-13	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-14	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-15	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-16	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-17	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-18	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-19	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-20	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-21	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-22	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-23	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-24	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-25	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-26	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-27	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-28	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-29	-	-	AtmUni3-1	02/01/001	10	100	-	
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-30	-	-	AtmUni3-1	02/01/001	10	100	-	

Figure 8-2. Listing Page (Displaying Multiple Entries)

2 In the **Show connections containing:** field (at the bottom of the **Listing** page) or **Show table entries containing:** field (in the middle of the **SPVC NSAP Address** page), enter a string of letters and/or numbers that you want to find. (In this example, **19** is used.)

3 Click **Find**.

The page displays the entries that contain the text string you entered (see Figure 8-3).



Type	Status	A-Intf	A-S/P/C	VPI/DLC...	VCI A	B-Intf	B-S/P/C	VPI/DLC...	VCI B	Flow	Backup
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-19	-	-	AtmUni3-1	02/01/001	10	100	-	-
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-119	-	-	AtmUni3-1	02/01/001	10	100	-	-
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-190	-	-	AtmUni3-1	02/01/001	10	200	-	-
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-191	-	-	AtmUni3-1	02/01/001	10	200	-	-
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-192	-	-	AtmUni3-1	02/01/001	10	200	-	-
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-193	-	-	AtmUni3-1	02/01/001	10	200	-	-
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-194	-	-	AtmUni3-1	02/01/001	10	200	-	-
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-195	-	-	AtmUni3-1	02/01/001	10	200	-	-
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-196	-	-	AtmUni3-1	02/01/001	10	200	-	-
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-197	-	-	AtmUni3-1	02/01/001	10	200	-	-
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-198	-	-	AtmUni3-1	02/01/001	10	200	-	-
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-199	-	-	AtmUni3-1	02/01/001	10	200	-	-
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-219	-	-	AtmUni3-1	02/01/001	10	200	-	-
GR303_AAL2_PVC_VCC	Active	GR303-IG 2	CallRef-319	-	-	AtmUni3-1	02/01/001	10	300	-	-

Figure 8-3. Listing Page (Displaying Search Results)

4 To perform another search, repeat Step 2 and Step 3 as often as needed.

5 To return the page to its original display, click **Reset**.

End

Viewing Connection Details

To view the connections for a specific PSAX device, view the **Listing** page in the **Connections** tab for that PSAX device. To view the detailed information for a specific connection, double-click the connection in the Connections page.

Displaying and Updating Connection Information

You can do either of the following to view the Display Connection window:

- ~ Click on any entry in the **Listing** page, right-click the mouse, and select **Display** from the right-click menu
- ~ Create a connection, and the Display Connection window will appear for the selected connection

Up to four tabs may be displayed within the Display Connection window: **Primary, Statistics, Backup**, and **Utilization**.

Display Connection Tabs

Clicking the **Primary** tab displays the **Primary** page, which contains the same information as the Create Connection window for the selected connection.

Clicking the **Statistics** tab displays the **Statistics** page, which contains statistical information for the selected connection.

Clicking the **Backup** tab displays the **Backup** page, which can be displayed for all PVC and SPVC connection types. You can use the **Backup** page to establish a backup PVC or SPVC connection. Backup connections can be created at any time after the primary connection has been established.

Clicking the **Utilization** tab displays the **Utilization** page, which can be displayed for all PVC and SPVC connection types. You can use the **Utilization** page to calculate and display the average number of cells per second, the average number of bits per second for a given PVC or SPVC and for a given time interval (from 20 seconds to 5 minutes).

Copying a Connection Configuration

The **Copy** button on the Create Connection window and the **Primary** page of each Display Connection window enables you to copy an interface configuration to a range of channels.

Copying a Connection Configuration to Multiple Interfaces

Begin

1. To copy a connection configuration to a range of channels, begin by opening the Create Connection window or Display Connection window with the connection configuration you wish to copy.
2. Click **Copy.**

   One of the following **Copy Connection Configuration** windows appears; the appropriate interface types will appear in the **Start At:** and **Stop At:** panels (see Figure 8-4 through Figure 8-7).

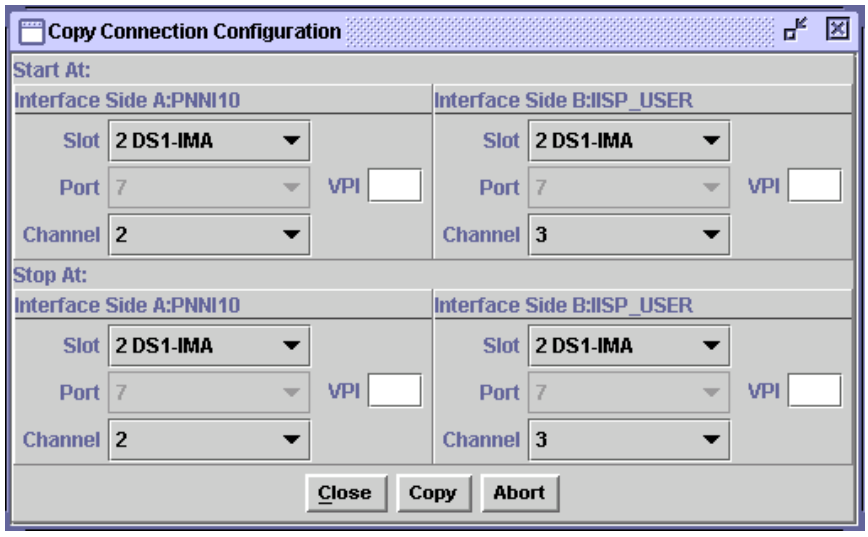


Figure 8-4. Copy Connection Configuration Window (ATM)

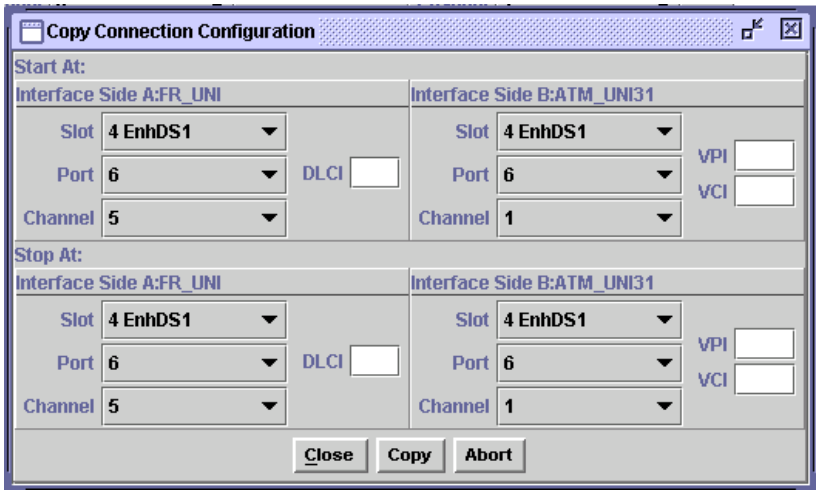


Figure 8-5. Copy Connection Configuration Window (Frame Relay)

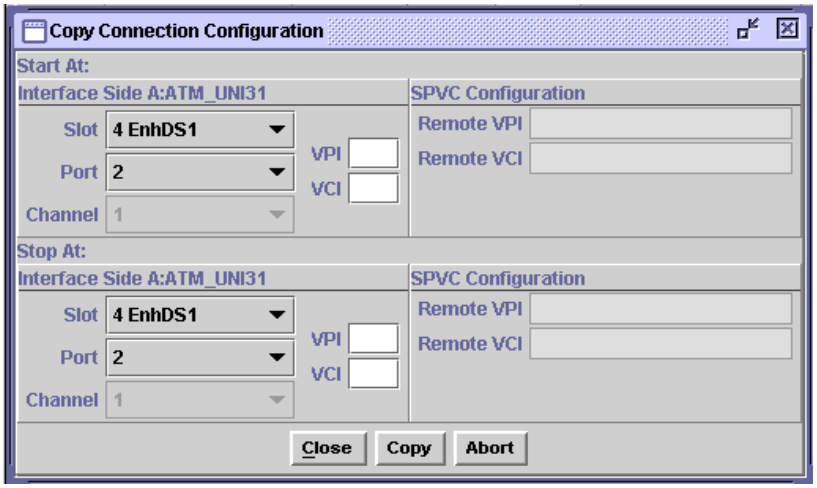


Figure 8-6. Copy Connection Configuration Window (SPVC Connection Types)

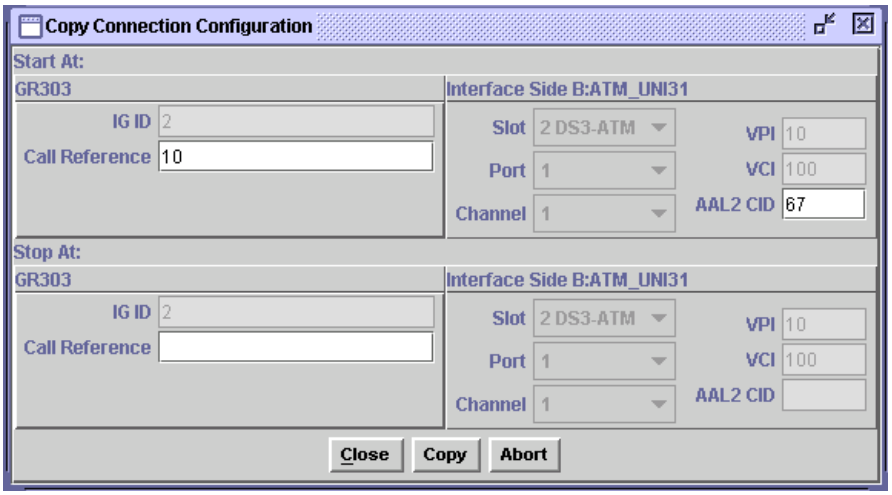


Figure 8-7. Copy Connection Configuration Window (GR-303 Connection Type)

Buttons

The buttons in these windows have the following functions:

Button	Function
• Close	Closes this window.
• Copy	Copies this interface to a range of channels.
• Abort	Terminates the copy process.

3 Select the range of channels which you wish the connection configuration to be copied in the **Slot, Port**, and **Channel** fields

4 Enter values in the **VPI, VCI**, **DLCI, Remote VPI, Remote VCI** fields as necessary. Valid ranges are 0–4095 for VPI and Remote VPI, 0-65535 for VCI and Remote VCI, and 16–1007 for DLCI.

Note: The **VPI** and **VCI** fields appear for ATM interface types. The **DLCI** fields appear for the frame relay interface types, and the **Remote VPI** and **Remote VCI** fields appear for the SPVC connection types.

5 Click **Copy.**

The connection configuration is copied to the range of channels you selected.

End

Filtering Connections in the List

You can determine which connection types appear in the **Listing** page of the **Connections** tab (see Figure 8-1). This is accomplished by making selections in the **Filter By Connection Type** and **Filter By Interface** panels in the **Filter** page of the **Connections** tab (see Figure 8-8).

Filtering the Listing Page by Connection Type

This section describes how to filter the **Listing** page in the **Connections** tab by choosing the types of connections that should be displayed.

Perform the steps in the following procedure to filter the **Listing** page by the types of connections you select in the **Filter** page.

Filtering the Listing Page by Connection Type

Begin

1 In the Provisioning window, click the **Connections** tab.

The **Listing** page appears (see Figure 8-1).

2 Click the **Filter** tab and the **Filter** page appears (see Figure 8-8).

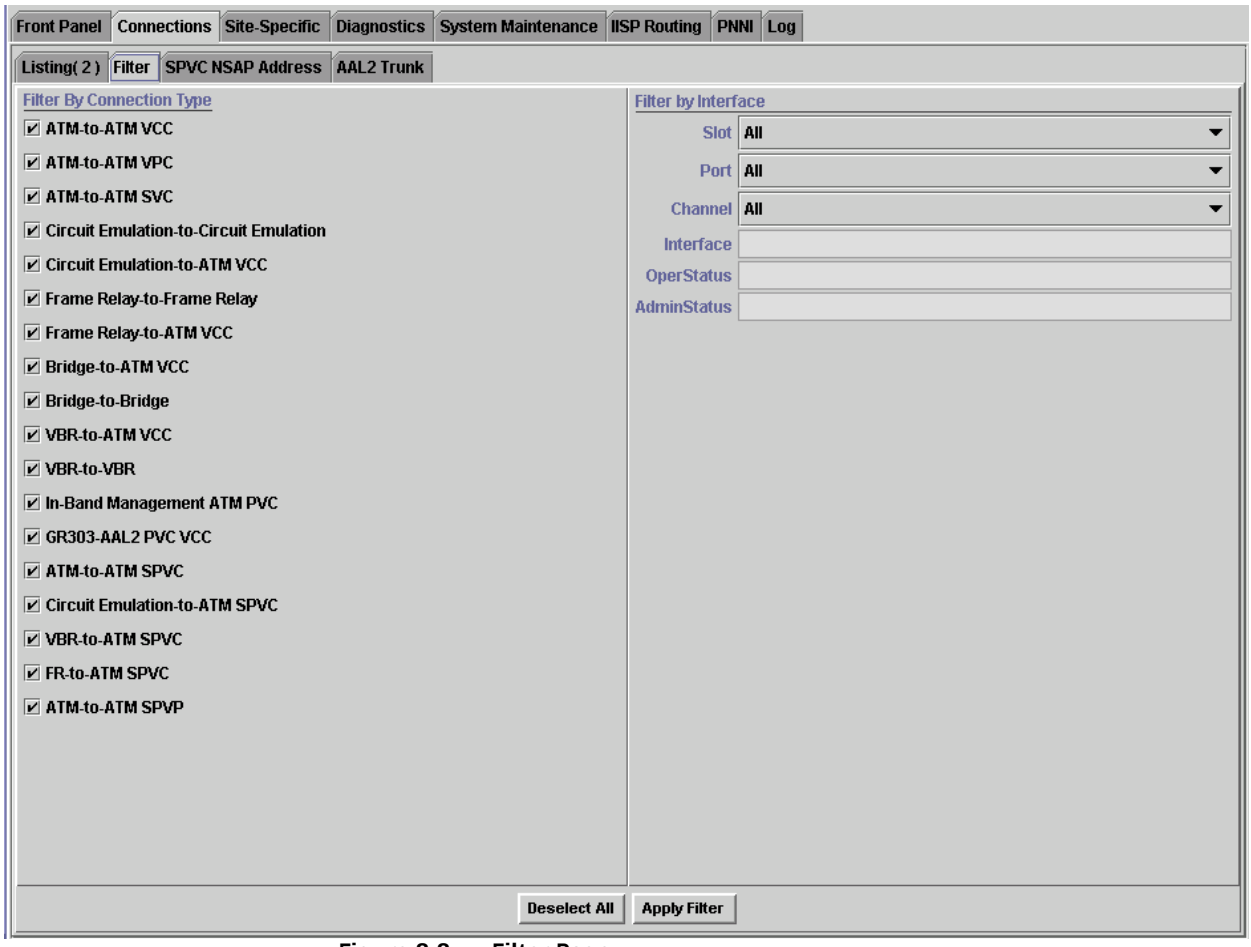


Figure 8-8. Filter Page

The **Filter** page contains the **Connection Type** and **Filter By Interface** panels.

Buttons

The buttons in this window have the following functions:

Button	Function
• De-select All	Removes check marks from all connection types and changes the button label to **Select All**.
• Select All	Places check marks in all connection types and changes the button label to **De-select All**.
• Apply Filter	Filters the connection types that you checked, or that you selected on the **Filter By Interface** panel (see "Filtering the Listing Page by PSAX Locations").

3 Remove the check mark next to any connection type that you do not wish to view in the **Listing** page.

4 If you want to filter the Listing page further, make selections in the **Filter By Interface** panel (see "Filtering the Listing Page by PSAX Locations").

5 When finished selecting all the desired filters, click **Apply Filter**.

Note: Only the connection types you selected will appear in the **Listing** page.

End

Filtering the Listing Page by PSAX Locations

The **Filter By Interface** panel in the **Filter** page lets you select specific locations on the PSAX device by which to filter the list of connections. This panel contains the following user-selectable options:

- **Slot**—Allows you to view only connections from a specific module or from all modules.
- **Port**—Allows you to view only connections from a specific port or from all ports
- **Channel—**Allows you to view only connections from a specific channel or from all channels

Perform the steps in the following procedure to filter the Connection List by PSAX hardware.

Viewing Connections by PSAX Location

Begin

1 In the Provisioning window, click the **Connections** tab.

The **Listing** page appears.

2 Click the **Filter** tab and the **Filter** page appears.

3 In the **Filter by Interface** panel (see Figure 8-8), select the following values:

a. A module in the **Slot** field to remove any connection that does not begin or end at the module from the **Connection** page.

b. A port number in the **Port** field to remove any connection that does not begin or end at a port with that number from the **Connection** page.

c. A channel number in the **Channel** field to remove any connection that doesn't begin or end at a port with that channel from the **Connection** page.

4 If you want to filter the **Listing** page further, make selections in the **Filter By Connection Type** panel (see "Filtering the Listing Page by Connection Type").

5 When finished selecting all the needed filters, click **Apply Filter**.

Note: Only the types of connections you selected will appear in the **Listing** page.

End

SPVC NSAP Addresses

You can enter new SPVC NSAP addresses and view a list of existing SPVC NSAP addresses on the **SPVC NSAP Address** page (see Figure 8-9).

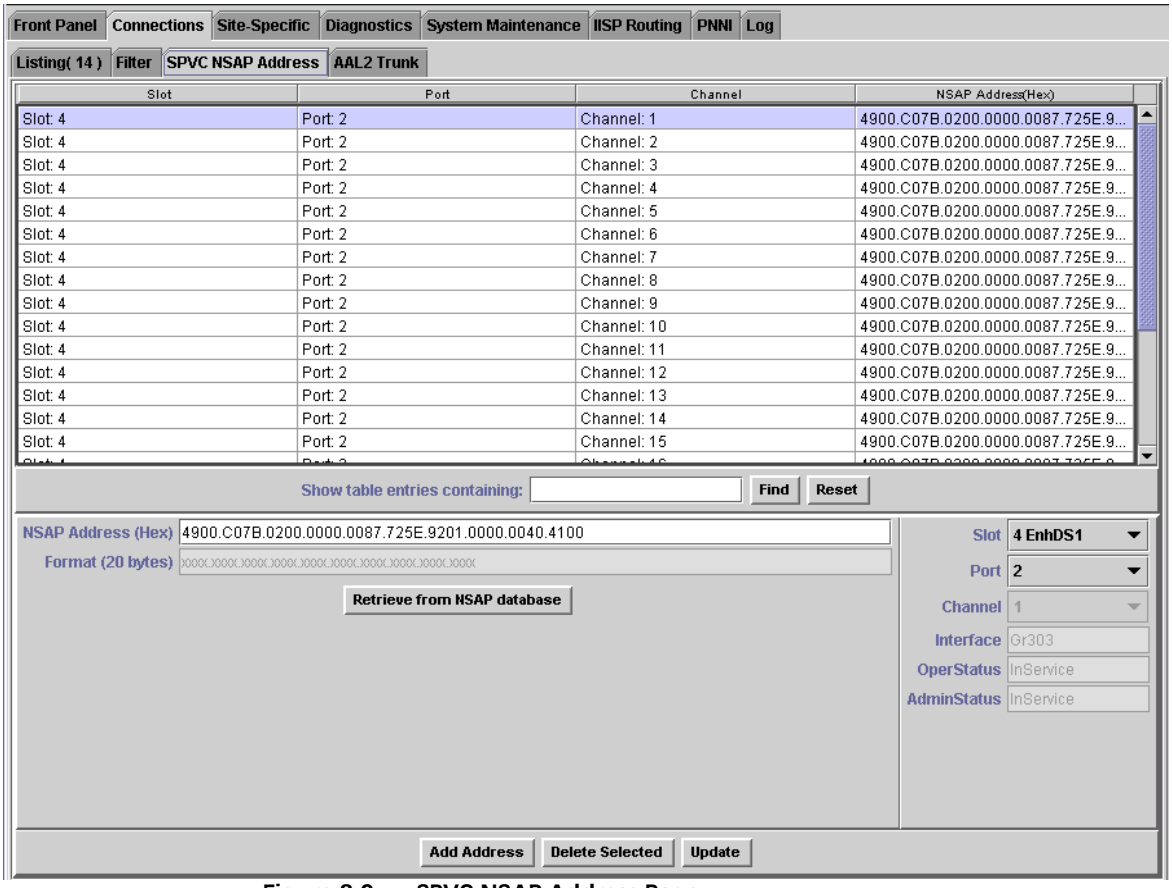


Figure 8-9. SPVC NSAP Address Page

Buttons The buttons on this window have the following functions:

Button	Function
• Find	Searches the table and displays a matching text string entered in the **Show table entry containing:** field.
• Reset	Removes text entered in the **Show table entry containing:** field and de-selects any selected entries.
• Retrieve from NSAP database	Searches the entries listed on this page for the NSAP address entered in the **NSAP Address (Hex)** field.
• Add Address	Adds the information you entered in the fields on the bottom right panel to the **SPVC NSAP Address** page.
• Delete Selected	Removes the selected entry from the **SPVC NSAP Address** page.
• Update	Refreshes the **SPVC NSAP Address** page manually.

For information about using the NSAP address database, see the appropriate *PacketStar® AQueView® Element Management System User Guide*.

AAL2 Trunk Configuration

You can add an AAL2 trunk entry using the slot, port, and channel of an I/O module that supports ATM and circuit emulation on the **AAL2 Trunk** page.

Note: The 1-Port Unchannelized DS3 Frame Relay module module does not support AAL2 trunking. For information on AAL2 trunking, see the appropriate *PacketStar® Module User Guide*.

Configuring AAL2 Trunking with DSP Processing

Creating Connections

This section provides instructions on how to create connections and describes the errors that can occur when you are creating them.

If an error occurs while creating a connection, the *AQueView* system displays an error message. There are many causes for these errors, but the errors that occur the most frequently are described below:

- Using an out-of-range VPI, VCI, or DCLI
- Selecting an interface that does not support flow settings that are entered
- Selecting out-of-range transmission parameters

- Attempting to create a connection on an unconfigured interface or an interface that has never been brought into service
- Exceeding the maximum bandwidth available for a VBR and CBR connection
- Attempting to create a connection that already exists
- Attempting to use a VCI, VPI, DCLI, or channel that is already allocated elsewhere

For more information about these SNMP trap messages, see the appendix "SNMP Trap Messages" in the appropriate *PacketStar® PSAX Multiservice Media Gateway User Guide*.

Note: An interface for the appropriate port and channels must be applied and the interfaces must be brought into service at least once before creating a connection.

Note: To create a non-UBR connection type, the committed rates and burst sizes must be adjusted to match a portion of the available bandwidth.

Using the Right-Click Menu

You can perform various functions in the *AQueView* system by clicking the right mouse button. This section describes the right-click menu options you can use in the various windows in the *AQueView* system when creating connections.

Connection Provisioning

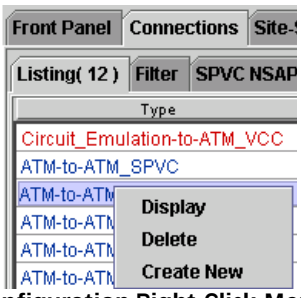


Figure 8-10. Connection Configuration Right-Click Menu Options

Table 8-1. Descriptions of the Connection Provisioning Right-Click Menu Options

Option	Description
Display	Displays the Display Connection window for the specified connection
Delete	Eliminates all selected connections You can select multiple connections to delete simultaneously by holding the Ctrl key while highlighting the connections with the mouse.
Create New	Makes a new connection on any existing interfaces

Context-Sensitive Help

When you right-click on a field in a connection configuration window, a description of that field appears (see Figure 8-11):

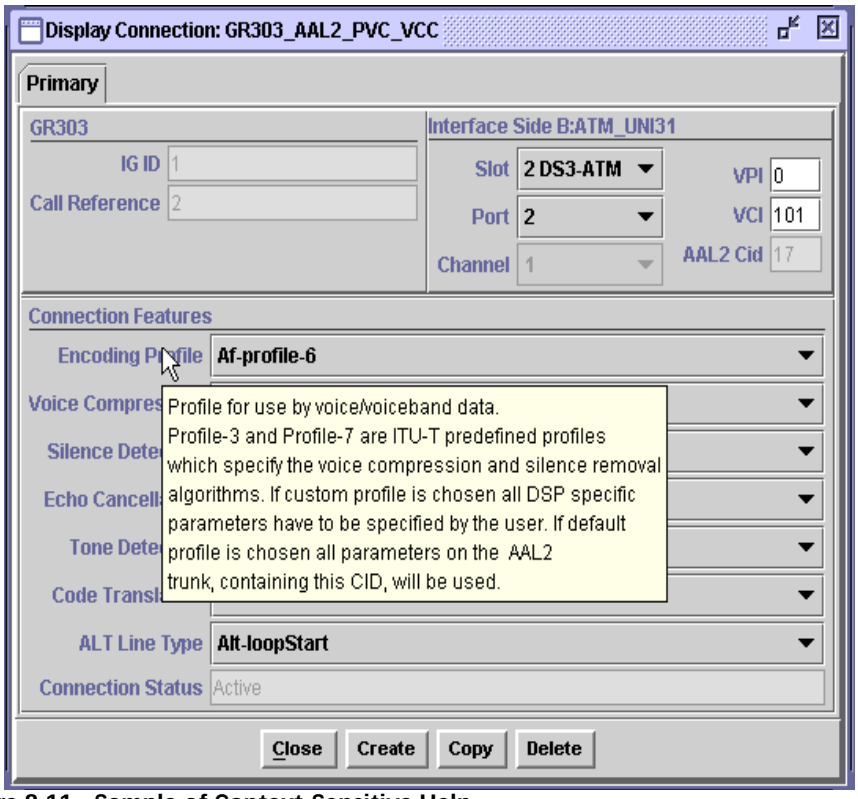


Figure 8-11. Sample of Context-Sensitive Help (As Displayed on a Display Connection Window)

Provisioning PVC Connections

Adding Frame Relay-to-ATM Connections

Creating a Frame Relay-to-ATM Connection

Perform the steps in the following procedure to create a frame relay-to-ATM VCC connection.

Creating a Frame Relay-to-ATM Virtual Circuit Connection

Begin

1. Click the **Connections** tab.

   The **Listing** page appears.

2. Click the right mouse button and a menu appears. Click **Create New.**

   The Create Connection window appears (see Figure 8-12).

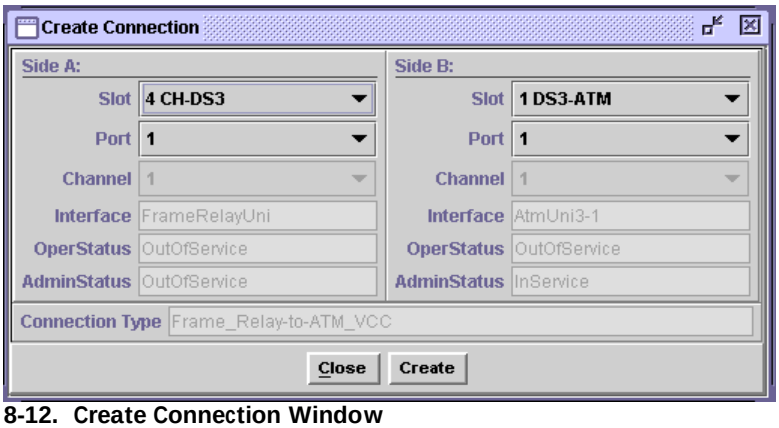


Figure 8-12. Create Connection Window

3. On the **Side A** and **Side B** panels, select the desired slot, port, and channel to identify the connection endpoints within the PSAX system.

   Based on these parameters, the corresponding connection type appears in the **Connection Type** field at the bottom of the window. If the A-side and B-side parameters do not correspond to a valid type of connection, or if one of the selected channels is unconfigured, **None** appears in the **Connection Type** field.

4. Click **Create**.

   The Create Frame_Relay-to-ATM_VCC Connection window appears (see Figure 8-13).

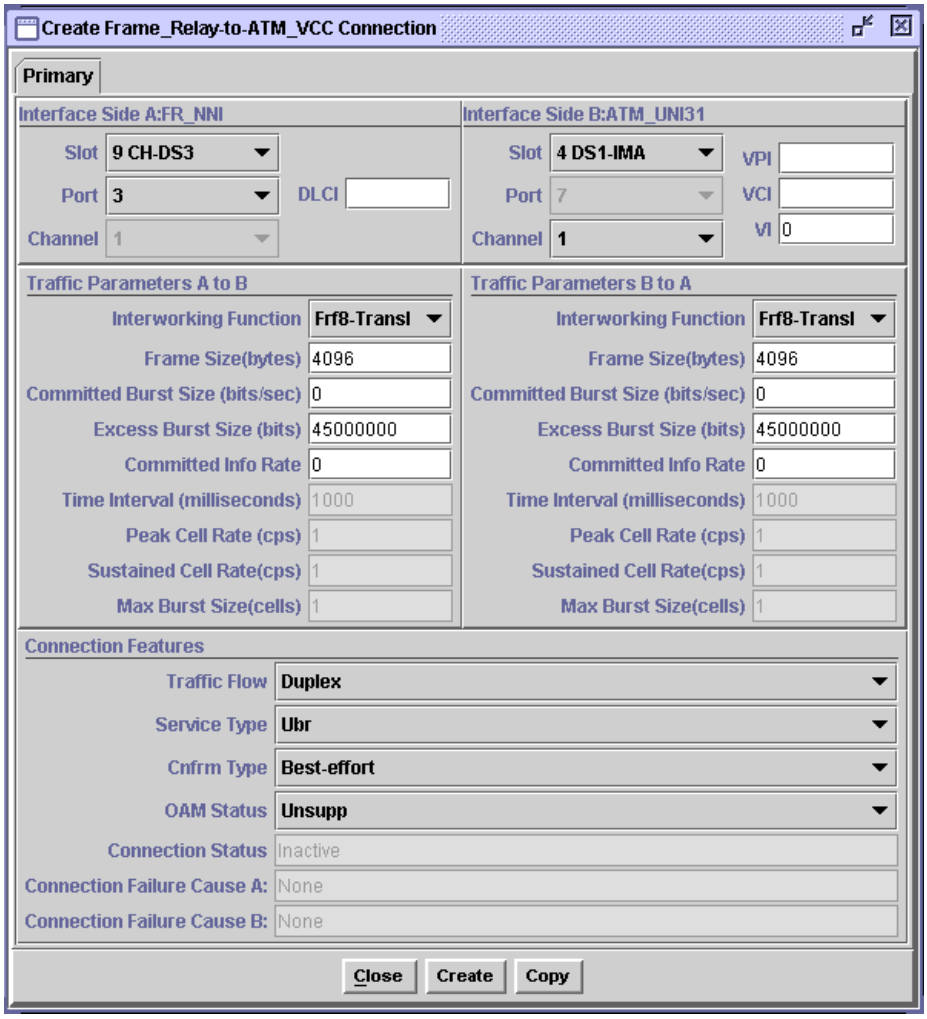


Figure 8-13. Create Frame_Relay_to_ATM_VCC Connection Window

Buttons

The buttons on this window have the following functions:

Button	Function
• Close	Closes this window.
• Create	Establishes the connection you configured.
• Copy	Copies this configuration information to a range of interfaces.

Field Descriptions

5 Select the values for the fields on this window from the values in Table 8-2.

Table 8-2. Field Descriptions for the Frame_Relay-to-ATM_VCC Connection Window

Field Names	Values	Description
Interface Side A:FR_UNI or FR_NNI		The frame relay side of the connection.
Interface Side B:ATM_UNI30, ATM_UNI31, ATM_UNI40, IISP_USER, IISP_NETWORK		The ATM side of the connection.
Slot	Number of slots varies with chassis type	Select the slot number containing the module for both sides of the connection.
Port		Select the port number containing the module for both sides of the connection.
Channel (display only)		The channel on which you are creating a connection.
DLCI	Range: 16–1007	Data link connection identifier. DLCI is used when the remote end point is frame relay.
VPI	Range: 0–225 (ATM UNI); 0-4095 (NNI)	Virtual path identifier.
VCI	Range: 0–65535	Virtual channel identifier.
VI	Range: 0–255	Virtual interface, which provides bandwidth allocation restrictions. Currently available only on the OC-3c APS, and STM-1 MSP modules. .
Interworking Function	Default: Frf8-Transl; Frf8-Pass; Frf5	FRF.8 (Frame Relay Forum Implementation Agreement)—frame relay to ATM PVC service interworking. FRF.5 (Frame Relay Forum Implementation Agreement)—frame relay to ATM PVC service interworking.
Frame Size (bytes)	Default: 4096	Measured in bytes.
Committed Burst Size (bits/second)	Default: 0	Use the default value.
Excess Burst Size (bits)	Default: 45000000	Measured in bits per second.

Table 8-2. Field Descriptions for the Frame_Relay-to-ATM_VCC Connection Window

Field Names	Values	Description
Committed Info Rate	Default: 0	Committed information rate is the rate of traffic (measured in bits per second) for a given connection that the system will attempt to provide guaranteed delivery.
Time Interval (milliseconds) (display only)	Default: 1000	Time, in milliseconds, since the last reset.
Peak Cell Rate (display only)	Default: 1	Refer to the ATM UNI 3.0 specifications for more information. When setting this value, take into account the line rate for the module and the amount of bandwidth you are setting up for each interface for the module.
Sustained Cell Rate (display only)	Default: 1	Sustained cell rate. Refer to the ATM UNI 3.0 specifications for more information. When setting this value, take into account the line rate for the module and the amount of bandwidth you are setting up for each interface for the module.
Max Burst Size (display only)	Default: 1	Maximum burst size. Refer to the ATM UNI 3.0 specifications for more information. When setting this value, take into account the line rate for the module and the amount of bandwidth you are setting up for each interface for the module.
Traffic Flow	Duplex, SimplexA2B, SimplexB2A	Direction of the flow of data traffic in this connection. **Note:** Only Duplex and Simplex are applicable for the 1-Port DS3 IMA module. **Note:** When you select **SimplexA2B** and **Configure Traffic Parameters**, only fields in the **Traffic Parameters In** side are displayed; when you select **SimplexB2A** and **Configure Traffic Parameters**, only fields in the **Traffic Parameters Out** side are displayed.

Table 8-2. Field Descriptions for the Frame_Relay-to-ATM_VCC Connection Window

Field Names	Values	Description
Service Type	Ubr (default), Vbr-nrt2, Vbr-nrt1, Vbr-rt2, Vbr-rt1, Vbr-express	Multiservice Media Gateway-supported quality of service (QoS) class. See the appendix for a detailed description of the values for this field, including representative examples.
Cnfrm Type		The type of traffic control option used for ATM cells. The traffic descriptor combination specifies which traffic parameters are used for traffic control, determines the number and type of cells that are admitted into a congested queue, and determines whether high-priority cells are tagged as low-priority cells when traffic exceeds the traffic parameter thresholds. See the appendix for a detailed description of the values for this field, including representative examples.
	Default: Best-effort	This traffic descriptor allows the system to attempt to send all cells in a "best effort" fashion, without specifying traffic parameters, similar to the AQueMan algorithm.
	One-bucket-notag-0plus1	This traffic descriptor uses the parameters one bucket, no tagging, cell loss priority (CLP)=0+1 cells (high and low priority).
	Two-bucket-notag-0plus1-0plus1	This traffic descriptor uses the parameters two buckets, no tagging, CLP=0+1 cells (high and low priority) for bucket 1, and CLP=0+1 cells (high and low priority) for bucket 2.
	Two-bucket-notag-0plus1-0	This traffic descriptor uses the parameters two buckets, no tagging, CLP=0+1 cells (high and low priority) for bucket 1, and CLP=0 cells (high priority) for bucket 2.
	Two-bucket-tag-0plus1-0	This traffic descriptor uses the parameters two buckets, CLP=0+1 cells (high and low priority) for bucket 1, and tagging for CLP=0 cells (high priority) in bucket 2.

Table 8-2. Field Descriptions for the Frame_Relay-to-ATM_VCC Connection Window

Field Names	Values	Description
	Best-effort-tag	This traffic descriptor allows the system to tag all CLP=0 (high priority) cells to change them to CLP=1 (low priority) cells during congestion, and then attempt to send all cells in a "best effort" fashion, without specifying any other traffic parameters, similar to the AQueMan algorithm.
OAM Status	Unsupp (default)	OAM is not in use.
	End-Pt	The Multiservice Media Gateway is used as a termination point for ATM traffic, and will process AIS/RDI cells. **Note:** The OAM loopback test is supported for end-to-end connections only.
	End-Seg-Pt	Has the characteristics of both an end point and a segment point.
Connection Status (display only)	Inactive, Active	This field displays the current status of the connection. The value indicates whether the connection is passing traffic.
Connection Failure Cause A (display only)	None (default) Physical, LMI, DLCI	Frame Relay connection failure cause.
Connection Failure Cause B (display only)	None (default) Physical, LMI, DLCI	Frame Relay connection failure cause.

If the parameters are valid, the Connections window appears with the new connection in the **Listing** page, and the Display Connection window appears with tabs that contain details about the connection (see Figure 8-14): **Primary, Statistics,** and **Utilization**.

If a parameter is invalid, a **Connection Creation Failed** message appears, stating the reason for the failure.

Primary Page

The **Primary** page displays the information used to create the connection. See Table 8-2 for field descriptions.

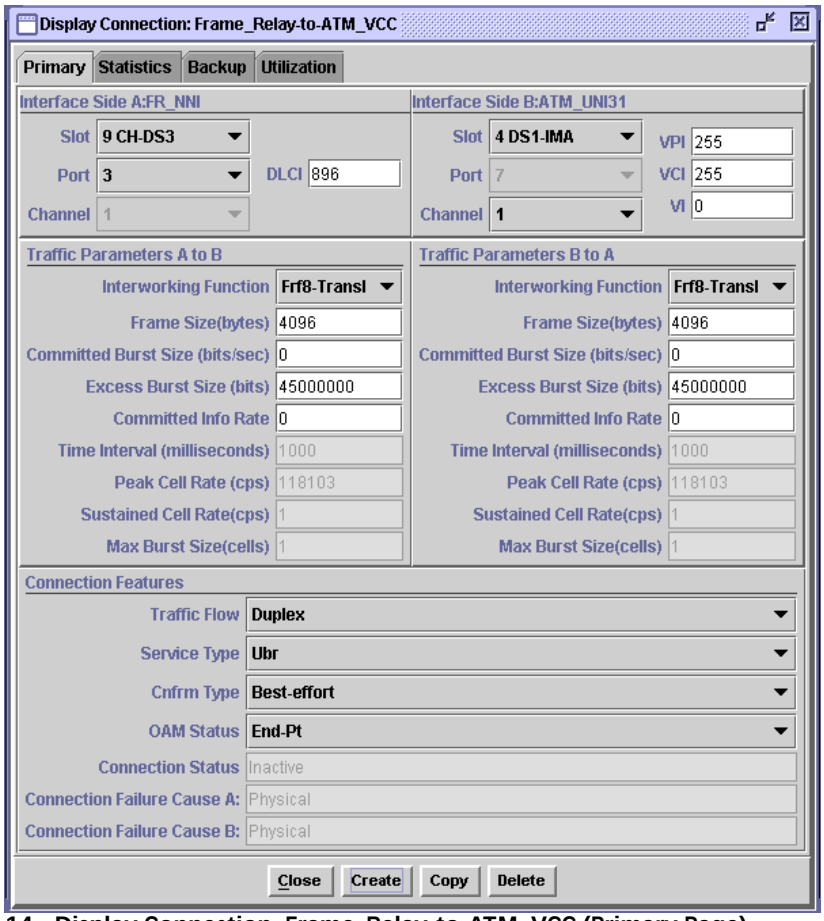


Figure 8-14. Display Connection: Frame_Relay-to-ATM_VCC (Primary Page)

Primary Page Buttons The buttons on the **Primary** page have the following functions:

Button	Function
• Close	Closes this window.
• Create	Establishes the connection youconfigured.
• Copy	Copies this configuration information to to a range of interfaces.
• Delete	Deletes the connection.

Statistics Page The **Statistics** page displays the statistics for this connection (see Figure 8-15).

Figure 8-15. Display Connection: Frame_Relay-to-ATM_VCC Window (Statistics Page)

Statistics Page Buttons

The buttons on the **Statistics** page have the following functions:

Button	Function
• Update	Refreshes the statistics manually.
• Clear	Resets the resetable statistics to zero.
• Poll	**Poll +** continuously update the statistics and changes the button label to **Poll-**. **Poll-** terminates polling and changes the button label to **Poll+**.

Button	Function
• Odometer (Only on the ATM-to-ATM VCC PVC and ATM-to-ATM VPC PVC Statistics pages)	Restarts counting in the **Cells Transmitted** and **Cells Received** fields in the **Interface Side A** and **Interface Side B** panels, and to view the transmitted cells and received cells in the **Interface Side A** and **Interface Side B** panels.
• Close	Closes this window.
• Restart	Restarts connection establishment procedure for the connections that were not previously set up.

Field Descriptions

The values for the fields in this page are described in Table 8-3.

Table 8-3. Field Descriptions for the Frame Relay-to-ATM VCC Connection Statistics Page

Field Name	Description
Cells Encoded	Number of cells encoded going into Frame Relay Interface side A during the amount of time shown in **Time Elapsed** field since the circuit was established.
Cells Decoded	Number of cells decoded going out of Frame Relay Interface side A during the amount of time shown in **Time Elapsed** field since the circuit was established.
Frames Dropped	Number of frames going out of Frame Relay Interface side A during the amount of time shown in **Time Elapsed** field since the circuit was established.
Encoded Odometer	Total number of cells encoded going into Frame Relay Interface side A since this counter was reset.
Decoded Odometer	Total number of cells decoded going out of Frame Relay Interface side A since this counter was reset.
AAL5 Error Frames	Number of AAL5 errored frames which are not dropped due to UPC in A2B direction. Only applicable to input side.
Frames Tagged	Number of frames tagged due to UPC in A2B direction. Only applicable to input side.
Time Elapsed	Time elapsed since the circuit was established.
Time Since Reset	Time elapsed since the last time the **Clear** or **Reset Statistics** command was used. **Note:** The **Clear** button on the statistics page resets only the odometer fields and the corresponding clock. Other counters increment for the life of the circuit.
AIS Rx/Tx	Number of alarm indication signal (AIS) cells received and transmitted.

Table 8-3. Field Descriptions for the Frame Relay-to-ATM VCC Connection Statistics Page

Field Name	Description
RDI Rx/Tx	Number of remote defect indicator (RDI) cells received and transmitted.
cell Drop/Tag	Number of cells dropped and tagged on incoming side of ATM interface B.
Cells Received	Number of cells Received into ATM Interface side B during the amount of time shown in **Time Elapsed** field since the circuit was established.
Cells Transmitted	Number of cells Transmitted out of ATM Interface side B during the amount of time shown in **Time Elapsed** field since the circuit was established.
In Odometer	Total number of cells encoded going into ATM Interface side B since this counter was last reset.
Out Odometer	Total number of cells decoded going out of ATM Interface side B since ince this counter was last reset.

Backup Page

The **Backup** page displays the information used to create a backup connection (see Figure 8-16). Creating a backup connection is optional.

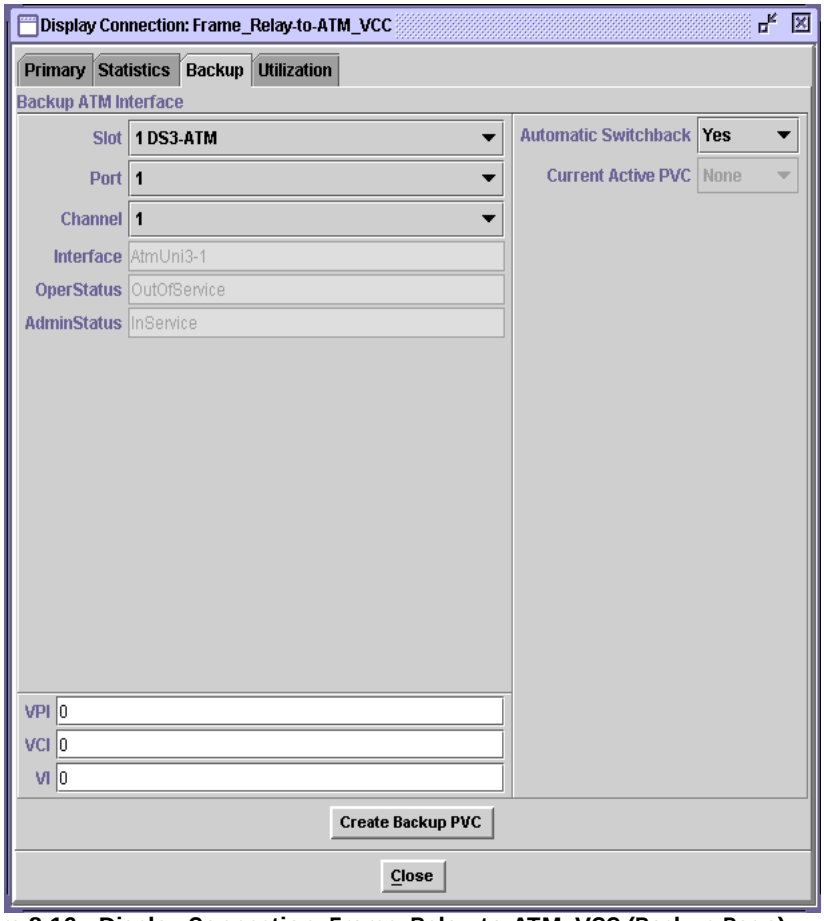


Figure 8-16. Display Connection: Frame_Relay-to-ATM_VCC (Backup Page)

Backup Page Buttons The buttons on the Backup page have the following functions:

Button	Function
• Create Backup PVC	Establishes the backup PVC connection you configured. **Note:** You cannot create a backup PVC connection without selecting an ATM interface type in the **Backup ATM Interface** panel. Therefore, this button is active when the **Slot, Port**, and **Channel** fields correspond to an ATM interface type in the **Interface** field. Otherwise, the button will be ghosted.
• Close	Closes this window.

Field Descriptions

6 Select the values from the fields on this page as described in Table 8-4.

Table 8-4. Field Descriptions for the Display Connection: Frame Relay_to_ATM_VCC Backup Page

Field Name	Values	Description
Slot (display only for Frame Relay Interface)	Listed as available from the PSAX device	Select the slot containing the module for which you are creating a backup connection.
Port (display only for Frame Relay Interface)	Determined by the number of ports available on the module selected in the **Slot** field	Select the port number on the module for which you are creating a backup connection.
Channel (display only for Frame Relay Interface)	Determined by the number of channels available on the port selected in the **Port** field	Select the channel number of the port on the module for which you are creating a backup connection.
Interface (display only)	AtmUni3-0 AtmUni3-1 IispUser IispNetwork CircuitEmulation DbCirEm FrameRelayUni FrameRelayNni Pri_Isdn_Network Pri_Isdn_User Hldc-PassThrough AtmPnni1-0	The interface type that is configured on the slot, port, and channel (selected in the **Slot**, **Port**, and **Channel** fields).
OperStatus (display only)	InService	Indicates that the interface is operational.
	OutOfService	Indicates that the interface is not operational.

Table 8-4. Field Descriptions for the Display Connection: Frame Relay_to_ATM_VCC Backup Page

Field Name	Values	Description
AdminStatus (display only)	InService	Indicates that no conditions are preventing the port from being fully operational.
	OutOfService	Indicates that some condition is preventing the port from being configured with an interface.
VPI	Default: 0 Range: 0–255	The virtual path identifier assigned to this interface.
VCI	Default: 32 Range: 32–4000	The virtual channel identifier assigned to this interface.
VI	Default: 0 Range: 0–255	Virtual interface, which provides bandwidth allocation restrictions. Currently available only on the OC-3c APS and STM-1 MSP modules.
Automatic Switchback	Yes (default)	CPU monitors primary connection. If primary connection becomes available, backup will switch back connection to primary.
	No	Not currently supported. Once active, the backup connection will not switch back to primary connection automatically if primary becomes available.
Current Active PVC	None	Indicates that the connection is inactive.
	Primary	Indicates that the primary connection is active (carrying user traffic).
	Backup	Indicates that the backup connection is active (carrying user traffic).

Utilization Page

The **Utilization** page measures the amount of traffic running through this connection.

Figure 8-17. Display Connection: Frame_Relay-to-ATM_VCC (Utilization Page)

Utilization Page Buttons

The buttons on the **Utilization** page have the following functions:

Button	Function
• 60 sec	Time, in seconds or minutes, to poll the PSAX device. Select a time interval from the pull-down menu: • 5 sec • 10 sec • 20 sec • 30 sec • 60 sec (default) • 90 sec • 2 min • 3 min • 4 min • 5 min
• Clear	Resets all statistics to zero.
• Poll	**Poll+** continuously updates the statistics and changes the button label to **Poll-**. **Poll-** terminates polling and changes the button label to **Poll+**.
• Show Cells/Sec	Calculates and displays the average number of cells per second for a given PVC or SPVC for a given time interval specified in the pull-down menu (see above). Changes button label to **Show Bits/Sec**.
• Show Bits/Sec	Calculates and displays the average number of bits per second for a given PVC or SPVC for a given time interval specified in the pull-down menu (see above). Changes button label to **Show Cells/Sec**.
• Close	Closes this window.
• Restart	Restarts connection establishment procedure for this SPVC.

Utilization Page Description

The Average Bits/Sec and Average Cells/Sec panels display the percentage of traffic that is passing through the channel.

The Time column displays the time in hours, minutes and seconds, when the traffic was polled.

The Out A or Decoded A column displays cells or bits transmitted from side B to side A (also displayed on the Statistics page in the Cells Transmitted field on the Interface A Statistics panel).

The Out B or Decoded B column displays cells or bits transmitted from side A to side B (also displayed on the Statistics page in the Cells Transmitted field on the Interface B Statistics panel).

7 Select a time interval from the pull-down menu.

8 Average bits per second is displayed by default. If you want to display utilization by average cells per second, click **Average Cells/Sec**.

9 Click **Poll+** and the polling begins. Click **Poll-** to terminate polling.

10 To refresh this window, click **Clear**.

11 To close the Display Connection window, click **Close**.

12 To save this connection to the PSAX configuration database, click **Device > Save PSAX Configuration** in the Provisioning Menu Bar.

▲ CAUTION:
Click Device > Save PSAX Configuration to permanently save the configuration.

Applied, but unsaved configuration data will not be lost unless the PSAX system is restarted, or if power to the PSAX system is lost. Terminating the *AQueView* EMS will not cause the applied values to be lost because the configuration data is stored on the PSAX system, not in the *AQueView* EMS.

End

Adding Frame Relay-to-Frame Relay Connections

Creating a Frame Relay-to-Frame Relay Connection

Perform the steps in the following procedure to create a frame relay-to-frame relay connection.

Creating a Frame Relay-to-Frame Relay Connection

Begin

1 Click the **Connections** tab.

The **Listing** page appears.

2 Click the right mouse button and a menu appears. Click **Create New.**

The Create Connection window appears (see Figure 8-18).

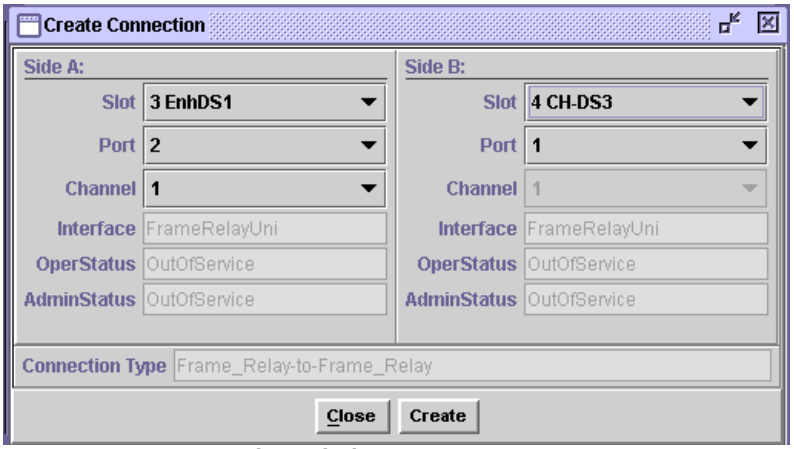


Figure 8-18. Create Connection Window

3 On the **Side A** and **Side B** panels, select the desired slot, port, and channel to identify the connection endpoints within the PSAX system.

Based on these parameters, the corresponding connection type appears in the **Connection Type** field at the bottom of the window. If the A-side and B-side parameters do not correspond to a valid type of connection, or if one of the selected channels is unconfigured, **None** appears in the **Connection Type** field.

4 Click **Create**.

The Create Frame Relay-to-Frame Relay Connection window appears (see Figure 8-19).

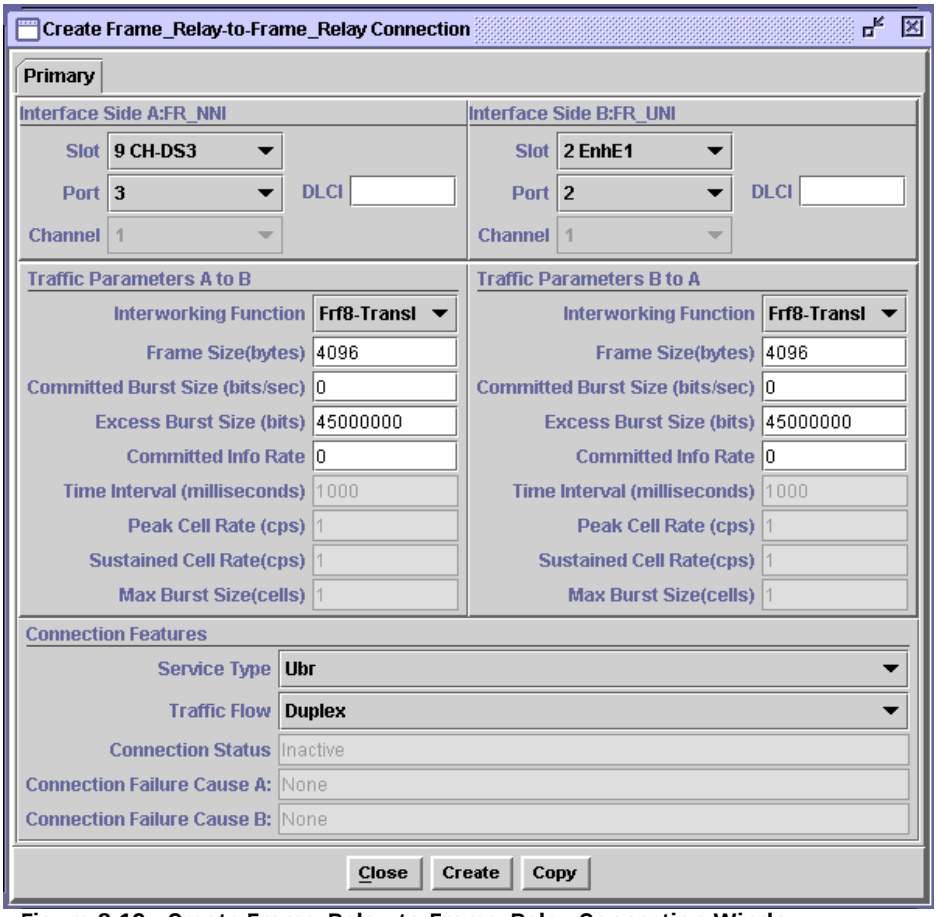


Figure 8-19. Create Frame_Relay-to-Frame_Relay Connection Window

Buttons

The buttons on this window have the following functions:

Button	Function
• Close	Closes this window.
• Create	Establishes the connection you configured.
• Copy	Copies this configuration information to a range of interfaces.

Field Descriptions

5 Select the values for the fields on this window from the values given in Table 8-5.

Table 8-5. Field Values for the Frame_Relay-to-Frame_Relay Connection Window

Field Names	Values	Description
Interface Side A: FR_UNI or FR_NNI		The side of the connection that will send signals.
Interface Side B: FR_UNI or FR_NNI		The side of the connection that will receive signals.
Slot	Range: 1–14	Select the slot number containing the module for both sides of the connection.
Port	Range: 1–6	Select the port number containing the module for both sides of the connection.
Channel	Range: 1–32 1–24 for DS1/T1 1–31 for E1	Select the channel number containing the module for which you are creating the connection.
DLCI	Default: 0 Range: 16–1007	Data link connection identifier.
Interworking Function	Default: Frf8-Transl; Frf8-Pass; Frf5	FRF.8 (Frame Relay Forum Implementation Agreement)—frame relay to ATM PVC service interworking. FRF.5 (Frame Relay Forum Implementation Agreement)—frame relay to ATM PVC service interworking.
Frame Size (bytes)	Default: 4096	Measured in bytes.
Committed Burst Size (bits/sec)	Default: 0	Use the default value.
Excess Burst Size (bits)	Default: 45000000	Excess burst size, measured in bits per second.
Committed Info Rate	Default: 0	Committed information rate is the rate of traffic (measured in bits per second) for a given connection that the system will attempt to provide guaranteed delivery.
Time Interval (milliseconds) (display only)	Default: 1000	Time, in milliseconds, since the last reset.

Table 8-5. Field Values for the Frame_Relay-to-Frame_Relay Connection Window

Field Names	Values	Description
Peak Cell Rate (display only)	Default: 1	Refer to the ATM UNI 3.0 specifications for more information. When setting this value, take into account the line rate for the module and the amount of bandwidth you are setting up for each interface for the module.
Sustained Cell Rate (display only)	Default: 1	Sustained cell rate. Refer to the ATM UNI 3.0 specifications for more information. When setting this value, take into account the line rate for the module and the amount of bandwidth you are setting up for each interface for the module.
Max Burst Size (display only)	Default: 1	Maximum burst size. Refer to the ATM UNI 3.0 specifications for more information. When setting this value, take into account the line rate for the module and the amount of bandwidth you are setting up for each interface for the module.
Service Type	Ubr (default), Vbr-nrt2, Vbr-nrt1, Vbr-rt2, Vbr-rt1, Vbr-express	PSAX system-supported quality of service (QoS) class.
Traffic Flow	Duplex, SimplexA2B	Direction of the flow of data traffic in this connection. When you select **SimplexA2B**, only fields in the **Traffic Parameters A to B** side display.
Connection Status (display only)	Inactive, Active	This field displays the current status of the connection. The value indicates whether the connection is passing traffic.

If the parameters are valid, the Connections window appears with the new connection in the **Listing** page, and the Display Connection window appears with tabs that contain details about the connection (see Figure 8-20): **Primary, Statistics, Backup,** and **Utilization**.

If a parameter is invalid, a **Connection Creation Failed** message appears, stating the reason for the failure.

Primary Page

The **Primary** page displays the information used to create the connection. See Table 8-5 for field descriptions.

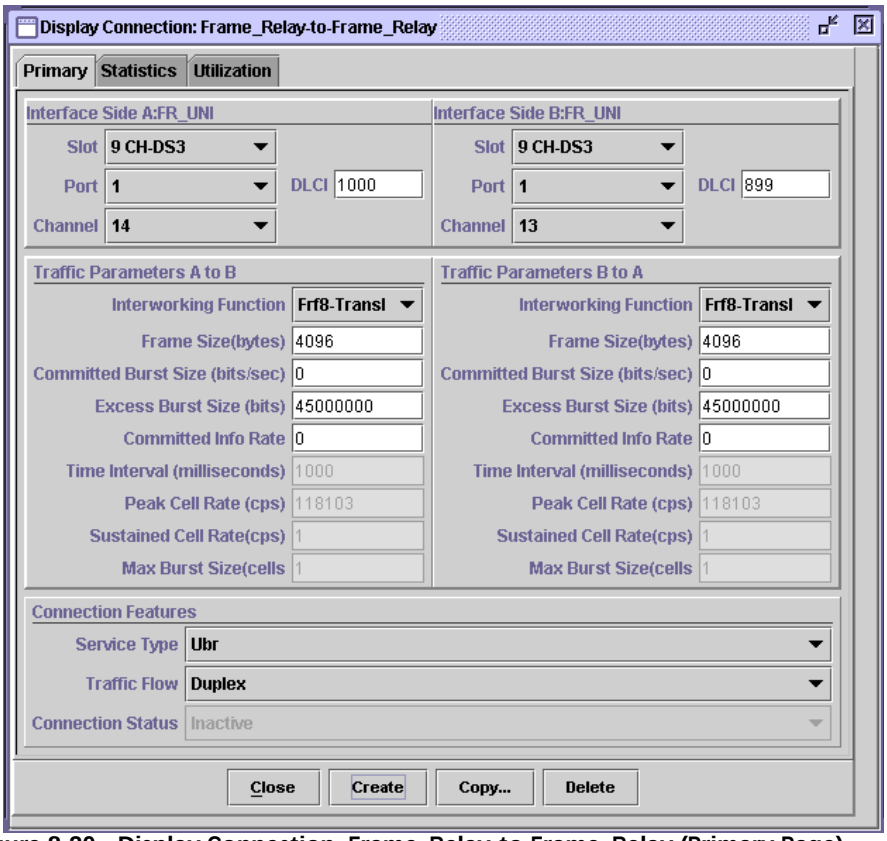


Figure 8-20. Display Connection: Frame_Relay-to-Frame_Relay (Primary Page)

Primary Page Buttons The buttons on the **Primary** page have the following functions:

Button	Function
• Close	Closes this window.
• Create	Establishes the connection youconfigured.
• Copy	Copies this configuration information to to a range of interfaces.
• Delete	Deletes the connection.

Statistics Page The **Statistics** page displays the statistics for this connection (see Figure 8-21).

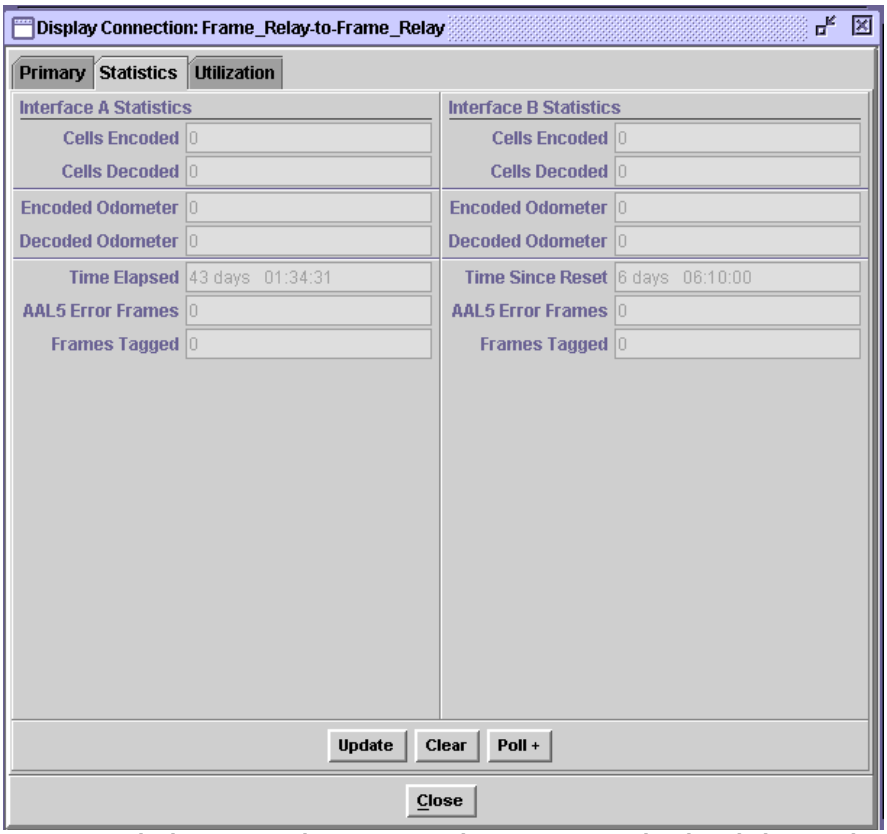


Figure 8-21. Display Connection: Frame_Relay-to-Frame_Relay (Statistics Page)

Statistics Page Buttons

The buttons on the **Statistics** page have the following functions:

Button	Function
• Update	Refreshes the statistics manually.
• Clear	Resets the resetable statistics to zero.
• Poll	**Poll +** continuously update the statistics and changes the button label to **Poll-**. **Poll-** terminates polling and changes the button label to **Poll+**.
• Odometer (Only on the ATM-to-ATM VCC PVC and ATM-to-ATM VPC PVC Statistics pages)	Restarts counting in the **Cells Transmitted** and **Cells Received** fields in the **Interface Side A** and **Interface Side B** panels, and to view the transmitted cells and received cells in the **Interface Side A** and **Interface Side B** panels.

Button	Function
• Close	Closes this window.
• Restart	Restarts connection establishment procedure for the connections that were not previously set up.

Field Descriptions

The fields on this window are described in Table 8-6.

Table 8-6. Field Values for the Frame Relay-to-Frame Relay PVC Connection Statistics Page

Field Name	Description
Cells Encoded	On the **Interface A Statistics** panel, the number of cells encoded going into interface side A during the amount of time shown in **Time Elapsed** field since the circuit was established. On the **Interface B Statistics** panel, the number of cells encoded going into interface side B during the amount of time shown in **Time Elapsed** field since the circuit was established.
Cells Decoded	On the **Interface A Statistics** panel, the number of cells decoded going out of interface side A during the amount of time shown in **Time Elapsed** field since the circuit was established. On the **Interface B Statistics** panel, the number of cells decoded going out of interface side B during the amount of time shown in **Time Elapsed** field since the circuit was established.
Encoded Odometer	On the **Interface A Statistics** panel, the number of cells encoded going into interface side A since this counter was reset. On the **Interface B Statistics** panel, the number of cells encoded going into interface side B since this counter was reset.
Decoded Odometer	On the **Interface A Statistics** panel, the number of cells decoded going out of interface side A since this counter was reset. On the **Interface B Statistics** panel, the number of cells decoded going out of interface side B since this counter was reset.
Time Elapsed	Time elapsed since the circuit was established.

Table 8-6. Field Values for the Frame Relay-to-Frame Relay PVC Connection Statistics Page

Field Name	Description
AAL5 Error Frames	On the **Interface A Statistics** panel, the number of AAL5 errored frames which are not dropped due to UPC in the A-to-B direction. Only applicable to input side. On the **Interface B Statistics** panel, the number of AAL5 errored frames which are not dropped due to UPC in the B-to-A direction. Only applicable to input side.
Frames Tagged	On the **Interface A Statistics** panel, the number of frames tagged due to UPC in the A-to-B direction. Only applicable to input side. On the **Interface B Statistics** panel, the number of frames tagged due to UPC in the B-to-A direction. Only applicable to input side.
Time Since Reset	Time elapsed since the last time the **Clear** button command was used. **Note:** The **Clear** button on the statistics page resets only the odometer fields (labelled as **Odometer**) and the corresponding clock.

Utilization Page

The **Utilization** page measures the amount of traffic running through this connection (see Figure 8-22).

Figure 8-22. Display Connection: Frame_Relay-to-Frame_Relay (Utilization Page)

Utilization Page Buttons

The buttons on the **Utilization** page have the following functions:

Button	Function
• 60 sec	Time, in seconds or minutes, to poll the PSAX device. Select a time interval from the pull-down menu: • 5 sec • 10 sec • 20 sec • 30 sec • 60 sec (default) • 90 sec • 2 min • 3 min • 4 min • 5 min
• Clear	Resets all statistics to zero.

Button	Function
• Poll	**Poll+** continuously updates the statistics and changes the button label to **Poll-**. **Poll-** terminates polling and changes the button label to **Poll+**.
• Show Cells/Sec	Calculates and displays the average number of cells per second for a given PVC or SPVC for a given time interval specified in the pull-down menu (see above). Changes button label to **Show Bits/Sec**.
• Show Bits/Sec	Calculates and displays the average number of bits per second for a given PVC or SPVC for a given time interval specified in the pull-down menu (see above). Changes button label to **Show Cells/Sec**.
• Close	Closes this window.
• Restart	Restarts connection establishment procedure for this SPVC.

Utilization Page Description

The Average Bits/Sec and Average Cells/Sec panels display the percentage of traffic that is passing through the channel.

The Time column displays the time in hours, minutes and seconds, when the traffic was polled.

The Out A or Decoded A column displays cells or bits transmitted from side B to side A (also displayed on the Statistics page in the Cells Transmitted field on the Interface A Statistics panel).

The Out B or Decoded B column displays cells or bits transmitted from side A to side B (also displayed on the Statistics page in the Cells Transmitted field on the Interface B Statistics panel).

6. Select a time interval from the pull-down menu.
7. Average bits per second is displayed by default. If you want to display utilization by average cells per second, click **Average Cells/Sec**.
8. Click **Poll+** and the polling begins. Click **Poll-** to terminate polling.
9. To refresh this window, click **Clear**.
10. To close the Display Connection window, click **Close**.
11. To save this connection to the PSAX configuration database, click **Device > Save PSAX Configuration** in the Provisioning Menu Bar.

▲ CAUTION:
Click Device > Save PSAX Configuration to permanently save the configuration.

Applied, but unsaved configuration data will not be lost unless the PSAX system is restarted, or if power to the PSAX system is lost. Terminating the *AQueView* EMS will not cause the applied values to be lost because the configuration data is stored on the PSAX system, not in the *AQueView* EMS.

End

Provisioning SPVC Connections

Adding Frame Relay-to-ATM Connections

Creating a Frame Relay-to-ATM Connection

Perform the steps in the following procedure to create a frame relay-to-ATM VCC SPVC connection.

Creating a Frame Relay-to-ATM VCC SPVC Connection

Begin

1. Click the **Connections** tab.

   The **Listing** page appears.

2. Click the right mouse button and a menu appears. Click **Create New.**

   The Create Connection window appears (see Figure 8-23).

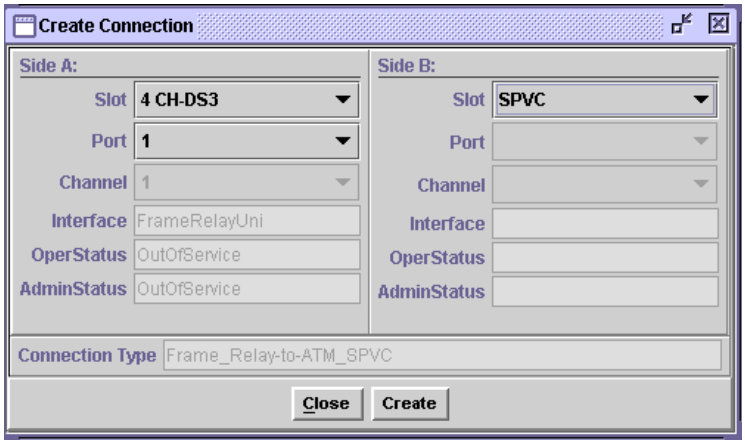


Figure 8-23. Create Connection Window

3. Select the appropriate slot, port, and channel for a module that is configured with a frame relay interface interface on the **Side A** panel. The interface name is displayed in the **Interface** field.
4. On the **Side B** panel, select **SPVC.**
5. Click **Create**.

The Create Frame Relay-to-ATM_SPVC Connection window is displayed (see Figure 8-24).

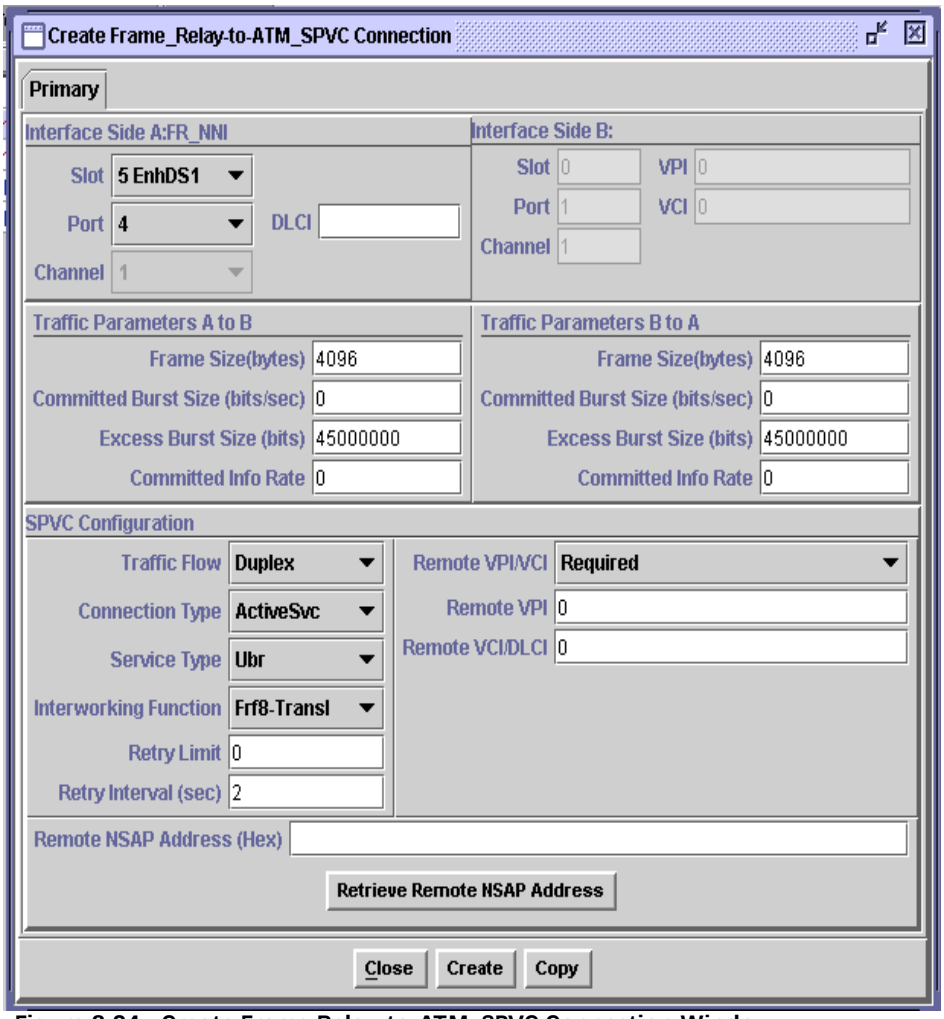


Figure 8-24. Create Frame Relay-to-ATM_SPVC Connection Window

6 Click **Create**.

Buttons

The buttons on this window have the following functions:

Button	Function
• Retrieve Remote NSAP Address	If you have previously established an NSAP address database, click this button to retrieve an entry from this list to populate the **Remote NSAP Address (Hex)** field.
• Close	Closes this window.

Button	Function
• Create	Establishes the connection you configured.
• Copy	Copies this configuration information to to a range of interfaces.

Field Descriptions

7 Select the values for the fields on this window from the values given in the following table.

Table 8-7. Field Values for the Frame Relay-to-ATM SPVC Connection Window

Field Names	Values	Description
Interface Side A:FR_UNI or FR_NNI		Frame relay side (PVC side) of the connection.
Slot (display only)	Varies depending on chassis type	The slot number on the module for which you are creating a connection.
Port (display only)		The port number on the module for which you are creating a connection.
Channel (display only)	1	The channel number on the module for which you are creating a connection. This is the channel where the call originates. For example, on a port of the Enhanced DS1 module, you can configure more than one channel in a port.
DLCI	Range: 16–1007	Data link connection identifier. DLCI is used when the remote end point is frame relay.
Frame Size(bytes)	Default: 4096	Measured in bytes.
Committed Burst Size (bits/sec)	Default: 0	Use the default value.
Excess Burst Size (bits)	Default: 45000000	Excess burst size, measured in bits per second.
Committed Info Rate	Default: 0	Committed information rate is the rate of traffic (measured in bits per second) for a given connection that the system will attempt to provide guaranteed delivery.

Table 8-7. Field Values for the Frame Relay-to-ATM SPVC Connection Window

Field Names	Values	Description
Traffic Flow	Default: Duplex SimplexA2B, Simplex B2A	Direction of flow of data traffic in this connection. • Duplex Data flows in two directions between the two connection points (interface side A and interface side B). • Simplex Data flows in only one direction, from side A to side B, or from side B to side A.
Connection Type	Default: ActiveSvc PassiveSvc	The type of connection. **ActiveSvc** attempts calls. **PassiveSvc** accepts calls.
Service Type	Default: Ubr Vbr-nrt2, Vbr-nrt1, Vbr-rt2, Vbr-rt1, Vbr-express	Multiservice Media Gateway system-supported quality of service (QoS) class.
Interworking Function	Default: Frf8-Transl Frf8-Pass; Frf5	FRF.8 (Frame Relay Forum Implementation Agreement)—frame relay to ATM PVC service interworking. FRF.5 (Frame Relay Forum Implementation Agreement)—frame relay to ATM PVC service interworking. **Note:** No matter which value you select in this field, you can set values for the **Remote Remote VPI,VCI/DLCI** field.
Retry Limit (shown when **ActiveSvc** is selected as the connection type)	Default: 0	Maximum limit on how many consecutive unsuccessful call setup attempts can be made before stopping the attempts to set up the connection. A value of zero indicates no limits. See the *ATM UNI Specification, Version 3.1 Cause Code* table in the Reference Table appendix of this guide for causes that will prompt a retry as reported by the far end.
Retry Interval (sec) (shown when **ActiveSvc** is selected as the connection type)	Default: 12	The waiting period before attempting to establish the SPVC after one call attempt has failed.

Table 8-7. Field Values for the Frame Relay-to-ATM SPVC Connection Window

Field Names	Values	Description
Remote NSAP Address (Hex) (shown when **ActiveSvc** is selected as the connection type)		The ATM NSAP address of the remote end of the connection, in hexidecimal notation. Enter the NSAP address of the remote frame relay or ATM interface in hexadecimal notation.
Remote VPI,VCI (shown when **ActiveSvc** is selected as the connection type)	Default: Required	This field indicates whether the remote VPI and VCI values are to be used at the destination. The destination device uses the values specified at this end.
	Any	The destination device selects the VPI/VCI values.
	VPI Range: 0–4095	Virtual path identifier. **Note:** If you want to use DLCI, set VPI to **0**.
	VCI Range: 32–65535	Virtual channel identifier.
Operational Status (displayed on the Display Connection window for this connection, not on the Create Connection window)	Default: Other	None of the types specified below.
	EstablishmentInProgress	Connection is not operational, but call attempts are ongoing.
	Connected	Connection is currently operational.
	RetriesExhausted	Retry limit has been reached and call attempts have ceased.
	NoAddressSupplied	No remote address has been configured, so no call attempts are initiated.
	LowerLayerDown	PVC endpoint is out of service.
	WaitingForCall	Passive endpoint of a SPVC connection, waiting for call from an active side.
	WaitingForRetryTimer	Active endpoint of a SPVC connection, waiting for the retry timer to expire so that it can retry the call.

Table 8-7. Field Values for the Frame Relay-to-ATM SPVC Connection Window

Field Names	Values	Description
Last Releases Diagnostic (displayed on the Display Connection window for this connection, not on the Create Connection window)		Last release diagnosis. Explains how the connection was released and reported by the far end of the connection.
Retry Failure Count (displayed on the Display Connection window for this connection, not on the Create Connection window)		Displays how many times the call retry failed since the last successful call setup. When a call is released, the Multiservice Media Gateway will continue to retry up to the retry limit that is specified in the **Retry Limit** field. See the ATM UNI 3.0 specification for more information.
Last Release Cause (displayed on the Display Connection window for this connection, not on the Create Connection window)	Default: 0	Last release cause. Release cause for a failed call attempt. See the ATM UNI 3.1 specification for more information.

If the parameters are valid, the Connections window appears with the new connection in the **Listing** page, and the Display Connection window appears with tabs that contain details about the connection (see Figure 8-25): **Primary, Statistics,** and **Utilization**.

If a parameter is invalid, a **Connection Creation Failed** message appears, stating the reason for the failure.

The Display Connection window appears (see Figure 8-25) with tabs that contain details about the SPVC connection: **Primary, Statistics** and **Utilization.**

Primary Page

The **Primary** tab displays the information used to create the connection. See Table 8-7 on page 8-44 for field descriptions.

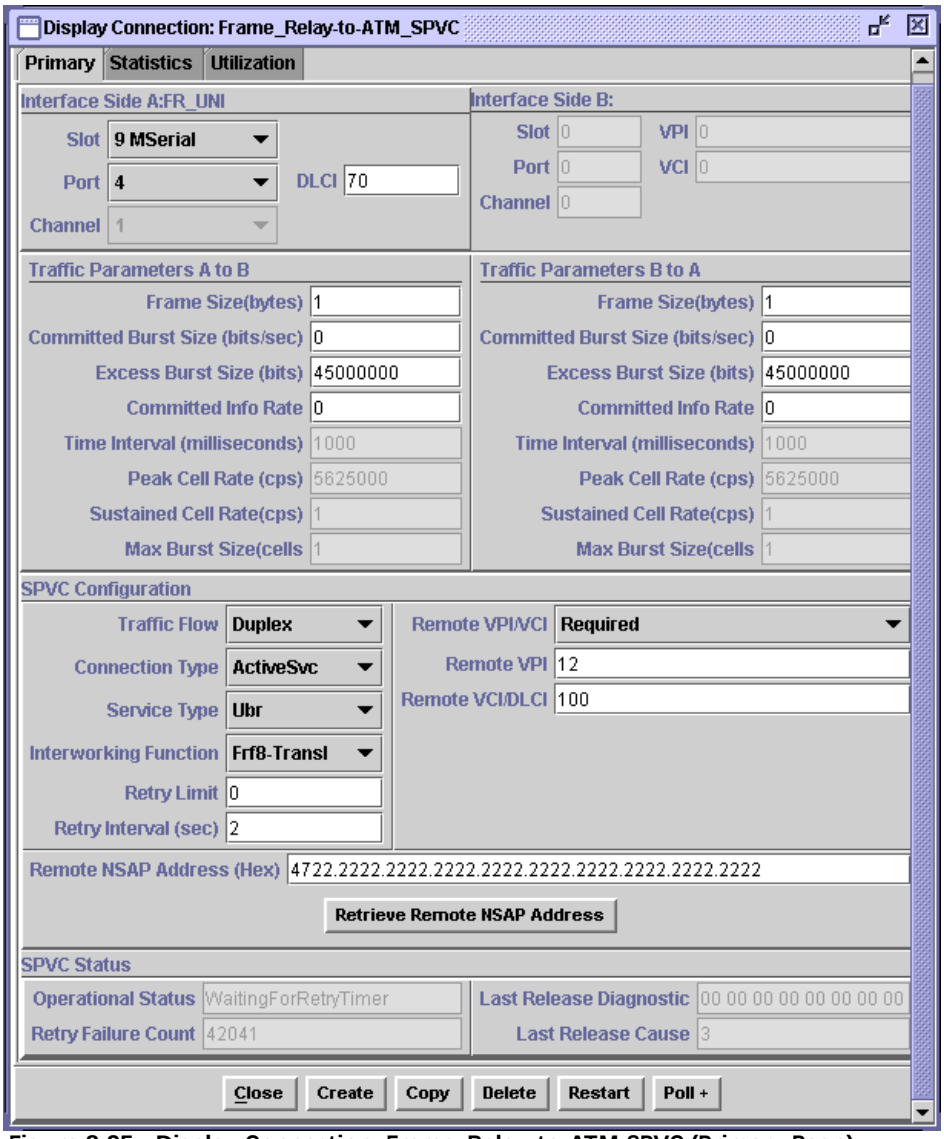


Figure 8-25. Display Connection: Frame_Relay-to-ATM SPVC (Primary Page)

Primary Page Buttons The buttons at the bottom of the window have the following functions:

Button	Function
• Retrieve Remote NSAP Address	If you have previously established an NSAP address database, click this button to retrieve an entry from this list to populate the **Remote NSAP Address (Hex)** field.
• Close	Closes this window.

Button	Function
• Create	Establishes the connection you configured.
• Copy	Copies this configuration information to to a range of interfaces.
• Delete	Deletes the connection.
• Restart	Restarts the connection.
• Poll	Continuously update the statistics and changes the button label to **Poll-**.
	Terminates polling. Changes the button label to **Poll+**.

Statistics Page The **Statistics** tab displays the statistics for this connection.

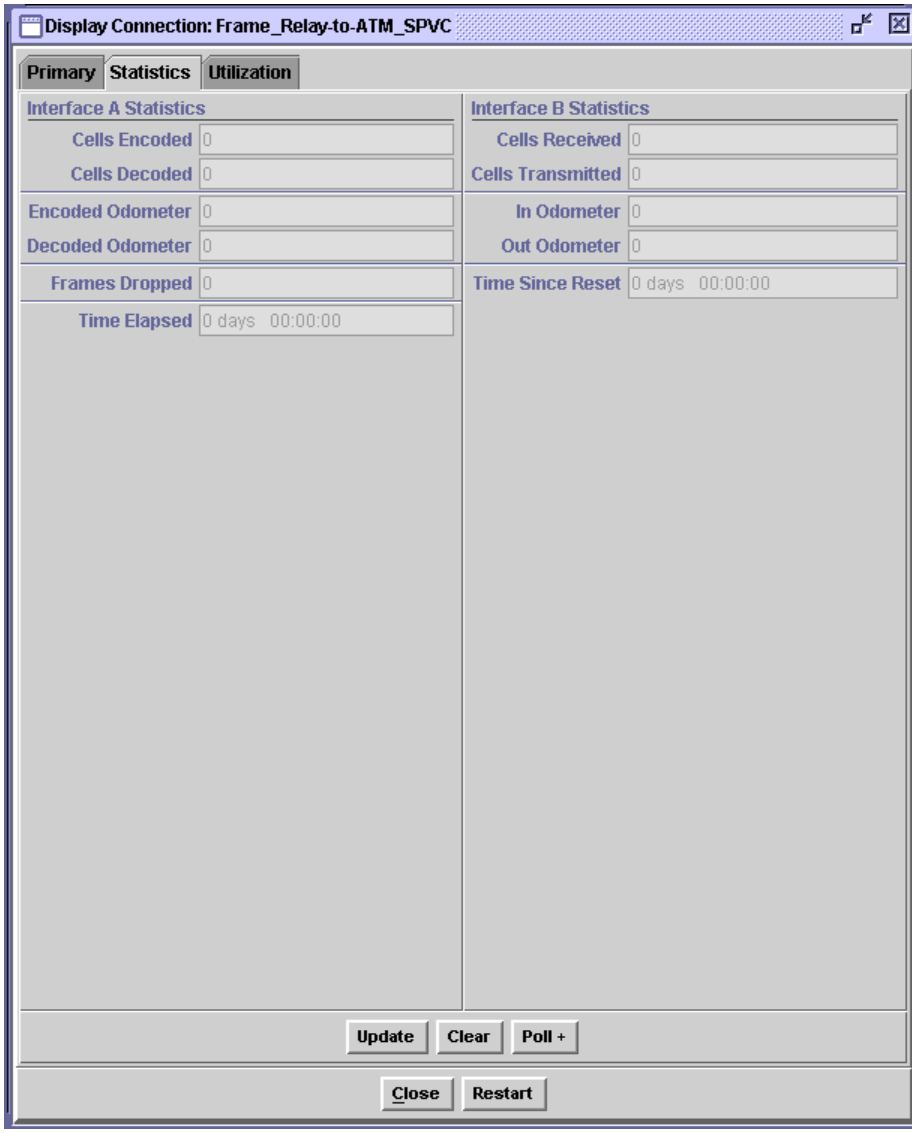


Figure 8-26. Display Connection: Frame_Relay-to-ATM SPVC (Statistics Page)

Statistics Page Buttons

The buttons on the **Statistics** page have the following functions:

Button	Function
• Update	Refreshes the statistics manually.
• Clear	Resets the resetable statistics to zero.
• Poll	**Poll +** continuously update the statistics and changes the button label to **Poll-**. **Poll-** terminates polling and changes the button label to **Poll+**.

Button	Function
• Odometer (Only on the ATM-to-ATM VCC PVC and ATM-to-ATM VPC PVC Statistics pages)	Restarts counting in the **Cells Transmitted** and **Cells Received** fields in the **Interface Side A** and **Interface Side B** panels, and to view the transmitted cells and received cells in the **Interface Side A** and **Interface Side B** panels.
• Close	Closes this window.
• Restart	Restarts connection establishment procedure for the connections that were not previously set up.

Field Descriptions

8 Select the values from the fields as described in Table 8-8.

Table 8-8. Field Descriptions for the Frame Relay-to-ATM VCC SPVC Connection Statistics Page

Field Name	Description
Cells Encoded	Number of cells encoded going into interface side A during the amount of time shown in **Time Elapsed** field.
Cells Decoded	Number of cells decoded going out of interface side B during the amount of time shown in **Time Elapsed** field.
Frames Dropped	Number of frames dropped for a given DLCI in the A2B direction. This field is only applicable to the input side.
Encoded Odometer	Total number of cells encoded going into interface side A since the connection was created or statistics were reset.
Decoded Odometer	Total number of cells decoded going out of interface side B since the connection was created or statistics were reset.
Time Elapsed	Time, in hours, minutes, and seconds, since last reset.
Cells Received	Number of cells received into interface side A during the amount of time shown in **Time Elapsed** field.
Cells Transmitted	Number of cells transmitted out of interface side B during the amount of time shown in **Time Elapsed** field.
In Odometer	Total number of cells encoded going into interface side B since the connection statistics were reset.
Out Odometer	Total number of cells decoded going out of interface side A since the connection statistics were reset.
Time Since Reset	Time elapsed since the last time the **Clear** button was used. The **Clear** button on the statistics page resets only the odometer fields (labelled as **Odometer**) and the corresponding clock. Other counters increment for the life of the circuit.

Utilization Page

The **Utilization** tab measures the amount of traffic running through this connection (see Figure 8-27).

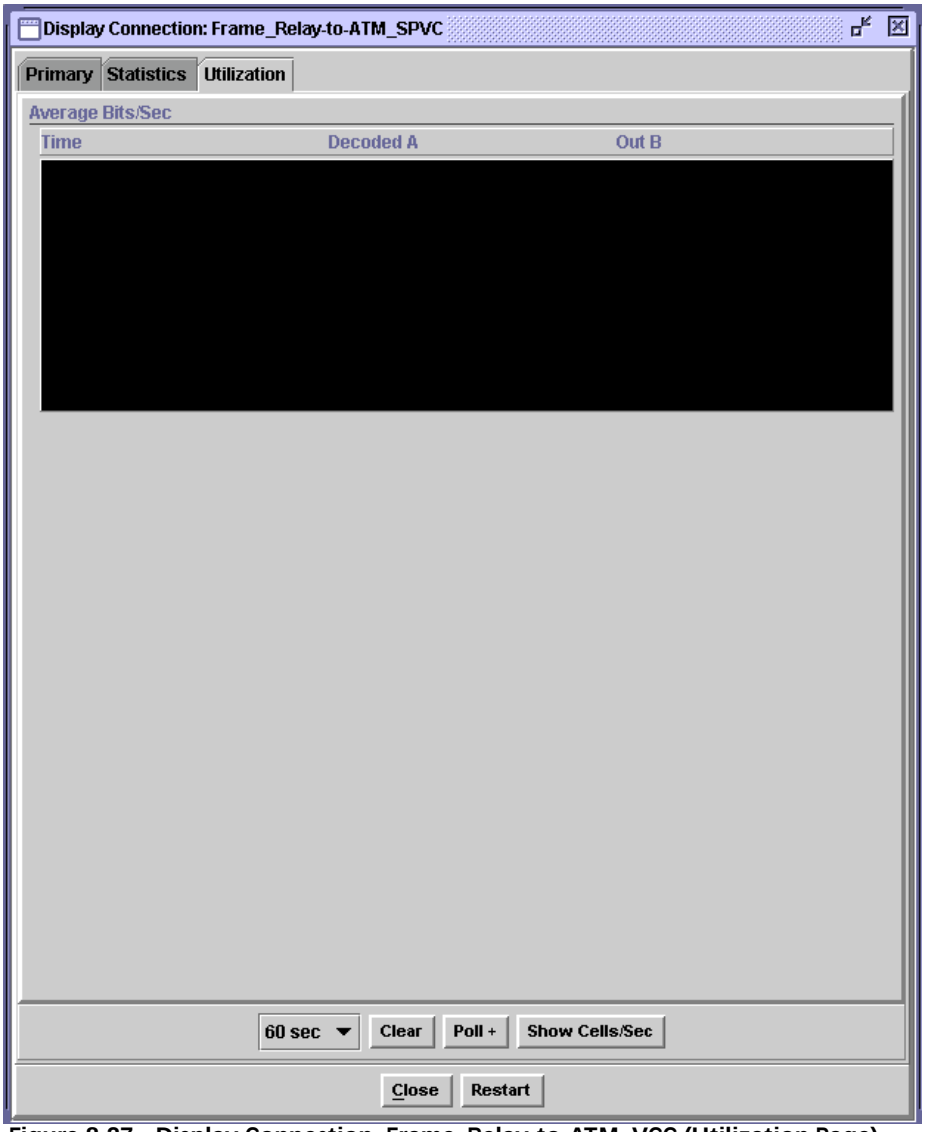


Figure 8-27. Display Connection: Frame_Relay-to-ATM_VCC (Utilization Page)

Utilization Page Buttons

The buttons on the **Utilization** page have the following functions:

Button	Function
• 60 sec	Time, in seconds or minutes, to poll the PSAX device. Select a time interval from the pull-down menu: • 5 sec • 10 sec • 20 sec • 30 sec • 60 sec (default) • 90 sec • 2 min • 3 min • 4 min • 5 min
• Clear	Resets all statistics to zero.
• Poll	**Poll+** continuously updates the statistics and changes the button label to **Poll-**. **Poll-** terminates polling and changes the button label to **Poll+**.
• Show Cells/Sec	Calculates and displays the average number of cells per second for a given PVC or SPVC for a given time interval specified in the pull-down menu (see above). Changes button label to **Show Bits/Sec**.
• Show Bits/Sec	Calculates and displays the average number of bits per second for a given PVC or SPVC for a given time interval specified in the pull-down menu (see above). Changes button label to **Show Cells/Sec**.
• Close	Closes this window.
• Restart	Restarts connection establishment procedure for this SPVC.

Utilization Page Description

The Average Bits/Sec and Average Cells/Sec panels display the percentage of traffic that is passing through the channel.

The Time column displays the time in hours, minutes and seconds, when the traffic was polled.

The Out A or Decoded A column displays cells or bits transmitted from side B to side A (also displayed on the Statistics page in the Cells Transmitted field on the Interface A Statistics panel).

The Out B or Decoded B column displays cells or bits transmitted from side A to side B (also displayed on the Statistics page in the Cells Transmitted field on the Interface B Statistics panel).

9 Select a time interval from the pull-down menu.

10 Average bits per second is displayed by default. If you want to display utilization by average cells per second, click **Average Cells/Sec**.

11 Click **Poll+** and the polling begins. Click **Poll-** to terminate polling.

12 To refresh this window, click **Clear**.

13 To close the Display Connection window, click **Close**.

14 To save this connection to the PSAX configuration database, click **Device > Save PSAX Configuration** in the Provisioning Menu Bar.

▲ CAUTION:
Click Device > Save PSAX Configuration to permanently save the configuration.

Applied, but unsaved configuration data will not be lost unless the PSAX system is restarted, or if power to the PSAX system is lost. Terminating the *AQueView* EMS will not cause the applied values to be lost because the configuration data is stored on the PSAX system, not in the *AQueView* EMS.

End

Perform the steps in the following procedure to delete a connection.

Deleting a Connection

Begin

1 In the Provisioning window, click the Connections tab.

The Listing page appears.

2 Do one of the following:

~ Double-click the connection to be deleted in the Connections List. The Display Connection window appears. Click **Delete**.

~ Right-click the entry of the connection you wish to delete. A menu appears. Select Delete.

A window appears, prompting you to confirm the deletion (see Figure 8-28).

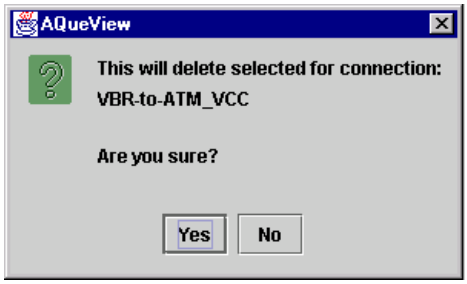


Figure 8-28. Sample Delete Connection Confirmation Window

3 Click **Yes** to delete the connection.

End

A Reference Tables

Overview of This Appendix

This appendix contains reference tables that are helpful while configuring your PSAX Multiservice Media Gateway system. The following types of information are provided:

- ATM Traffic Descriptors
- ATM User-Network Interface Specification Cause Codes Table, Version 3.1(for Connection Retry)
- DSP Tone Detection Modes Table
- DSP2C Module Channel Reduction When Using Fax Relay Mode Table
- Industry Compliance Specifications Table
- Connection Types by Interfaces Type Table
- Interface Types by I/O Module Types Table
- Minimum AAL2 Trunk Size Requirements Tables
- Module Alarm Status Table
- Quality of Service (QoS) Information Tables
- Rate Shaping Table

ATM Traffic Descriptors

Connections Supporting Traffic Descriptors

When you create a PVC, you can select one of several traffic descriptors. The traffic descriptor specifies which traffic parameters are used for traffic control. It also determines the number and type of cells that are admitted into a congested queue, and whether high-priority cells are tagged as low-priority cells when traffic exceeds the traffic parameter thresholds. The traffic descriptors used in the *PacketStar*® Multiservice Media Gateway system software are selected on the user interface windows for the following types of connections:

- ATM-to-ATM VCC PVC connection
- ATM-to-ATM VPC PVC connection
- Bridge-to-ATM VCC PVC connection
- Circuit Emulation-to-ATM VCC PVC connection

- Frame Relay-to-ATM VCC PVC connection
- In-band ATM PVC connection
- VBR-to-ATM VCC PVC connection

Traffic Descriptors Supported

The traffic descriptors available for these connections types are as follows (the values as they appear on the window are shown in parentheses):

- Best effort (Best-effort)

  This traffic descriptor allows the system to attempt to send all cells in a "best effort" fashion, without specifying traffic parameters, similar to the AQueMan algorithm. The Multiservice Media Gateway might drop some or all cells during congestion.

- Best effort with tagging (Best-effort-tag)

  This traffic descriptor allows the system to tag all CLP=0 (high priority) cells to change them to CLP=1 (low priority) cells, and then attempt to send all cells in a "best effort" fashion, without specifying any other traffic parameters, similar to the AQueMan algorithm. The network might drop some or all cells during congestion.

- One bucket, with no tagging for cells with both CLP bit=0 and CLP bit=1 (1B-NT-0+1)

  This traffic descriptor uses the parameters one bucket, no tagging, cell loss priority (CLP)=0+1 cells (high and low priority). The Multiservice Media Gateway ignores the CLP bit value and drops all cells violating the value set for the peak cell rate (PCR).

- Two buckets, with no tagging for cells with both CLP bit=0 and CLP bit=1 (2B-NT-0+1-0+1)

  This traffic descriptor uses the parameters two buckets, no tagging, CLP=0+1 cells (high and low priority) for bucket 1, and CLP=0+1 cells (high and low priority) for bucket 2. The Multiservice Media Gateway ignores the CLP bit value for cells passing into bucket 1 and drops all cells violating the value set for the PCR. The remainder of the cells are passed to bucket 2. The Multiservice Media Gateway ignores the CLP bit value for cells passing into bucket 2, and drops all cells violating the value set for the sustainable cell rate (SCR).

- Two buckets, with no tagging for cells with both CLP bit=0+1 and CLP bit=0 (2B-NT-0+1-0)

  This traffic descriptor uses the parameters two buckets, no tagging, CLP=0+1 cells (high and low priority) for bucket 1, and CLP=0 cells (high priority) for bucket 2. For bucket 1, the Multiservice Media Gateway ignores the CLP bit value for cells passing into bucket 1 and drops all cells violating the value set for the PCR. For bucket 2, the system takes one of the following actions:

- ~ When the connection is configured for variable bit rate (VBR) traffic, the Multiservice Media Gateway drops all CLP=0 cells violating the value set for the SCR in bucket 2.
- ~ When the connection is configured for constant bit rate (CBR) traffic, the Multiservice Media Gateway drops all CLP=0 cells violating the value set for the PCR in bucket 2.

• Two buckets, for cells with CLP bit=0 and CLP bit=0 (2B-NT-0+1-0)

This traffic descriptor uses the parameters two buckets, tagging, CLP=0+1 cells (high and low priority) for bucket 1, and CLP=0 cells (high priority) for bucket 2. For bucket 1, the Multiservice Media Gateway ignores the CLP bit value for cells passing into bucket 1 and drops all cells violating the value set for the PCR. For bucket 2, the system takes one of the following actions:

- ~ When the connection is configured for variable bit rate (VBR) traffic, the Multiservice Media Gateway tags all CLP=0 cells violating the value set for the SCR to CLP=1 in bucket 2.
- ~ When the connection is configured for constant bit rate (CBR) traffic, the Multiservice Media Gateway tags all CLP=0 cells violating the value set for the PCR to CLP=1 in bucket 2.

The network then might drop some or all cells during congestion.

ATM UNI Specification Cause Codes Table for Connection Retry

Connection Retry Table

The indicator **X** in the column, Prompts a Retry, in Table A-1 means that if this code is reported by the far end, the PSAX system will retry the connection for up to the number of retries specified by the **Retry Limit Field** on all SPVC Connection Configuration windows.

Table A-1. ATM User-Network Interface Specification, Version 3.1, Cause Codes

Number	Meaning	Prompts a Retry
1	unallocated (unassigned) number	
2	no route to specified transit network	
3	no route to destination	X
16	normal call clearing	
17	user busy	X
18	no user responding	
21	call rejected	
22	number changed	
23	user rejects all calls with calling line identification restriction (CLIR)	

Table A-1. ATM User-Network Interface Specification, Version 3.1, Cause Codes

Number	Meaning	Prompts a Retry
27	destination out of order	X
28	invalid number format (address incomplete)	
30	response to STATUS ENQUIRY	X
31	normal, unspecified	
35	requested VPCI/VCI not available	X
36	VPCI/VCI assignment failure	X
37	user cell rate not available	X
38	network out of order (not used in this implementation agreement)	X
41	temporary failure	X
43	access information discarded	X
45	no VPCI/VCI available	X
47	resource unavailable, unspecified	X
49	Quality of Service unavailable	
57	bearer capability not authorized	
58	bearer capability not presently available	
63	service or option not available, unspecified	
65	bearer capability not implemented	
73	unsupported combination of traffic parameters	
78	AAL parameters cannot be supported	
81	invalid call reference value	
82	identified channel does not exist	
88	incompatible destination	
89	invalid endpoint reference	
91	invalid transit network selection	
92	too many pending add party requests	
96	mandatory information element is missing	
97	message type non-existent or not implemented	
99	information element non-existent or not implemented	
100	invalid information element contents	
101	message not compatible with call state	X
102	recovery on timer expiry	X
104	incorrect message length	
111	protocol error, unspecified	

DSP Tone Detection Modes Table

Table A-2. DSP Tone Detection Modes[1] and Associated Processing Performed

Tone Mode	Processing Performed
Disabled	Ignores fax tones and modem tones
Bypass	If a fax tone or modem tone is received, the firmware switches to G.711 mode (64 Kbps) and bypasses echo cancellation, if enough bandwidth is available.
Fax Relay	If a fax tone is received, the firmware switches to a channel configured for FaxRelayMode and performs fax demodulation / remodulation. If a modem tone is received, the firmware ignores it
Fax Relay/ Modem Bypass	If a fax tone is received, the firmware switches to a channel configured for FaxRelayMode and performs fax demodulation / remodulation. If a modem tone is received, the firmware switches to G.711 mode (64 Kbps) and bypasses echo cancellation, if enough bandwidth is available.

[1] Modes selected on the CE-to-ATM VCC PVC connection window

DSP2C Module Channel Reduction When Using Fax Relay Mode

Table A-3. Channel Reduction Availability Caused by Fax Relay Connections vs. Voice Processing Connections on a DSP2C Module

Number of DSPs for Fax Relay	Total Connections Assigned for Fax Relay	Percent of All DSP Connections Assigned for Fax Relay	Remaining Voice Processing Available Channels[1]
1	4	3%	124
2	8	6%	120
3	12	9%	116
4	16	13%	112
5	20	16%	108
6	24	19%	104
7	28	22%	100
8	32	25% [2]	96
9	36	28%	92
10	40	31%	88
11	44	34%	84

Table A-3. Channel Reduction Availability Caused by Fax Relay Connections vs. Voice Processing Connections on a DSP2C Module

Number of DSPs for Fax Relay	Total Connections Assigned for Fax Relay	Percent of All DSP Connections Assigned for Fax Relay	Remaining Voice Processing Available Channels[1]
12	48	38%	80
13	52	41%	76
14	56	44%	72
15	60	47%	68
16	64	50%	64

[1] For every fax transmission call, both the originally assigned DSP resource, plus the fax relay DSP resource, are consumed for the duration of the call. Thus, the total remaining DSP connections is reduced by twice the number of connections using fax mode service.

[2] Utilization of DSP resources for fax relay above 25% is not considered realistic for most service provider environments. If this value exceeds 25%, then the number of available DSP connections for pure voice mode calls is reduced to less than 50% of connections available on the DSP2C module.

Industry Compliance Specifications Table

Table A-4 contains compliance specifications for the Multiservice Media Gateway systems, and the I/O and server modules.

Table A-4. Industry Compliance Specifications

Feature Name/ Product Name	Specification Title	Notes
Integrated Local Management Interface (ILMI) ILMI over PNNI Channelized DS3, Channelized STS-1e, DS1 IMA, DS3 IMA, E1 IMA, DS3 ATM, E3 ATM, Enhanced DS1, Enhanced E1, High-Density E1, High Speed, Medium-Density DS1, Multi-Serial, OC-3c Single-Mode/Multi-Mode/APS, STM-1 Single-Mode/Multi-Mode/MSP, OC-12c/STM-4c, and Quadserial modules	af-ilmi-0065.000 Integrated Local Management Interface (ILMI)	
DS1 IMA and DS3 IMA modules	af-phy-0016.000 DS1 Physical Layer Specification	

Table A-4. Industry Compliance Specifications

Feature Name/ Product Name	Specification Title	Notes
Channelized DS3 module	af-phy-0054.000 DS3 Physical Interface Specification	
E1 IMA module	af-phy-0064.000 E1 Physical Layer Specification	
DS1 IMA, DS3 IMA, and E1 IMA modules	af-phy-0086.000 Inverse Multiplexing over ATM (IMA), Version 1.0	
DS1 IMA, DS3 IMA, and E1 IMA modules	af-phy-0086.001 Inverse Multiplexing over ATM (IMA), Version 1.1	Obsoletes af-phy-0086.000 but PSAX is compatible with both versions
Channelized DS3, Channelized STS-1e, DS1 IMA, DS3 IMA, E1 IMA, DS3 ATM, E3 ATM, Enhanced DS1, Enhanced E1,High-Density E1, High Speed, Medium-Density DS1, OC-3c Single-Mode/Multi-Mode/APS, STM-1 Single-Mode/Multi-Mode/MSP, OC-12c/STM-4c, and Quadserial modules	af-pnni-0026.000 Interim Inter-Switch Signaling Protocol (IISP)	
ATM Maintenance Mode ATM PNNI 1.0 interface ETSI ISDN Support In-band Management SVC Soft Permanent Virtual Circuits (SPVCs) SPVC Support for CES with DSP2 Modules Channelized DS3, Channelized STS-1e, DS1 IMA, DS3 IMA, E1 IMA, DS3 ATM, E3 ATM, DSP2A/B/C/D Voice Server, Enhanced DS1, High-Density E1, Medium-Density DS1, OC-3c Single-Mode/Multi-Mode/APS, STM-1 Single-Mode/Multi-Mode/MSP, OC-12c/STM-4c, and Quadserial modules	af-pnni-0055.000 Private Network-Network Interface (PNNI)	SPVCs- Annex C: Soft PVC Procedures for circuit emulation, frame relay, and terminal emulation Annex G, mandatory requirements

Table A-4. Industry Compliance Specifications

Feature Name/ Product Name	Specification Title	Notes
ATM Maintenance Mode In-band Management SVC	af-pnni-0066000 Private Network-Network Interface (PNNI) Addendum (Soft PVC)	
Channelized DS3, Channelized STS-1e, DS1 IMA, DS3 IMA, E1 IMA, DS3 ATM, E3 ATM, Enhanced DS1, Enhanced E1, High-Density E1, High Speed, Medium-Density DS1, Multi-Serial, OC-3c Single-Mode/Multi-Mode/APS, STM-1 Single-Mode/Multi-Mode/MSP, OC-12c/STM-4c, and Quadserial modules	af-sig-0061.000 User-Network Interface (UNI) 4.0	
Traffic Management (UPC Support)	af-tm-0121.000 Traffic Management, Usage Parameter Control	
Channelized DS3, Channelized STS-1e, DS1 IMA, DS3 IMA, E1 IMA, DS3 ATM, E3 ATM, Enhanced DS1, Enhanced E1,High-Density E1, High Speed, Medium-Density DS1, Multi-Serial, OC-3c Single-Mode/Multi-Mode/APS, STM-1 Single-Mode/Multi-Mode/MSP, OC-12c/STM-4c, and Quadserial modules	af-uni-0010.001 User-Network Interface (UNI) 3.0	
Channelized DS3, Channelized STS-1e, DS1 IMA, DS3 IMA, E1 IMA, DS3 ATM, E3 ATM, Enhanced DS1, Enhanced E1, High-Density E1, High Speed, Medium-Density DS1, Multi-Serial, OC-3c Single-Mode/Multi-Mode/APS, STM-1 Single-Mode/Multi-Mode/MSP, OC-12c/STM-4c, and Quadserial modules	af-uni-0010.002 User-Network Interface (UNI) 3.1 44.736 Mbps Ds3 Layer	
GR-303 DLC Services VTOA AAL2 Trunking Narrowband Services	af-vmoa-0145.000 Voice and Multimedia Over ATM–Loop Emulation Service Using AAL2	

Table A-4. Industry Compliance Specifications

Feature Name/ Product Name	Specification Title	Notes
Carrier Group AIS Alarm I.610 OAM F4/F5 Processing (remote defect indication [RDI] and alarm indication signal [AIS]) Channelized DS3, Channelized STS-1e, Channelized DS3/STS-1e CES, DS1 IMA, DS3 IMA, E1 IMA, Enhanced DS1, Enhanced E1, High-Density E1, Medium-Density DS1, Multi-Serial, Quadserial and Unstructured DS3/E3 CES modules	af-vtoa-0078.000 Circuit Emulation Service 2.0	Includes 56 (DS1), Nx64 (DS1, E1)
Channelized DS3, Channelized STS-1e, and Enhanced DS1 modules	af-vtoa-0085.000 (DBCES) Dynamic Bandwith Utilization in 64 Kbps Time Slot Trunking Over ATM—Using Circuit Emulation Service (CES) • AAL1 Trunking CCS (Q.931) • AAL1 Trunking CCS (Q.931/QSIG), AAL1 Trunking CAS	
AAL2 Trunking	af-vtoa-0089.000 ATM Trunking Using AAL1 for Narrow Band Services V1.0	
I.610 OAM F4/F5 Processing (remote defect indication [RDI] and alarm indication signal [AIS])	af-vtoa-0098.000 VTOA AAL1 Trunking Services	
Quadserial	af-vtoa-0113.000 ATM Trunking Using AAL2	
	af-vtoa-0119.000 Low Speed Circuit Emulation Service	
Stratum 3–4 module synchronization	ANSI T1.101 Telecommunications - Synchronization Interface Standard	Does not include the (ITU-G. 703 -compliant Stratum 3–4 module, COMCODE 407850601)

Table A-4. Industry Compliance Specifications

Feature Name/ Product Name	Specification Title	Notes
Unstructured DS3/E3 CES module	ANSI T1.102 DS3 Electrical Interface Characteristics	
CSU/DSU loopback Enhanced DS1, DS3 ATM, OC-3c Single-Mode/Multi-Mode/APS modules	ANSI T1.105 Synchronous Optical Network-Basic Description	
DS1 IMA and E1 IMA modules	ANSI T1.107 T1.107a–DS1 and DS3 Format Specifications	
DS1 IMA, DSP2C Voice Server, and E1 IMA modules	ANSI T1.231 DS1/DS3 Performance Monitoring Characteristics	
GR-303 DLC Services	ANSI T1.401 Interface Between Carriers and Customer Installations- Analog Voice Grade Switched Access Lines Using Loops-start and Ground-start Signaling	
CSU/DSU loopback Facsimile Demodulation/ Remodulation VTOA AAL2 Trunking Narrowband Services DS1 IMA, E1 IMA, Enhanced DS1, DS3 ATM, DSP2C Voice Server, and OC-3c Single-Mode or Multi-Mode modules	ANSI T1.403 Network-to-Customer Installation-DS1 Metallic Interface	
CSU/DSU loopback Enhanced DS1, DS3 ATM, OC-3c Single-Mode or Multi-Mode modules	ANSI T1.404 Network-to-Customer Installation-DS3 Metallic Interface	
GR-303 DLC Services	ANSI T1.405 Network-to-customer Installation Interfaces- Direct-inward Dialing Analog Voice Grade Switched Access Using Loop-reverse Battery Signaling	

Table A-4. Industry Compliance Specifications

Feature Name/ Product Name	Specification Title	Notes
GR-303 DLC Services	ANSI T1.409 Network-to-Customer Installation Interfaces- Analog Voice Grade Special Access Lines Using E&M Signaling	
GR-303 DLC Services VTOA AAL2 Trunking Narrowband Services	ANSI T1.602 Integrated Services Digital Network (ISDN)- Data-link Layer Signaling Specification for Application at the User-Network Interface	
GR-303 DLC Services VTOA AAL2 Trunking Narrowband Services	ANSI T1.607; T1.607a Digital Subscriber Signaling System Number 1 (DSS1)-Layer 3 Signaling Specification for Circuit-switched Bearer Services	T1.607a is for GR-303 DLC Services
DS3 Frame Relay module	CCITT G.703 Physical/Electrical Characteristics of Hierarchical DIgital Interfaces	
DS3 Frame Relay module	CCITT G.704 Synchronous Frame Structures Used at Primary and Secondary Hierarchical Levels	
	DSL Forum TR 017 ATM over ADSL Recommendations	
Multi-serial and Quadserial module	EIA-232 Electrical, mechanical, and functional standards for communication between computers, terminals and modems	
High Speed, Multi-serial, and Quadserial modules	EIA-449 Faster version of RS-232-C; capable of longer cable runs	
GR-303 DLC Services VTOA AAL2 Trunking Narrowband Services	EIA-464-B Requirements for Private Branch Exchange (PBX) Switching Equipment	

Table A-4. Industry Compliance Specifications

Feature Name/ Product Name	Specification Title	Notes
High Speed, Multi-serial module, and Quadserial modules	EIA-530 Defines mechanical/electrical interfaces between DTEs and DCEs that transmit serial binary data	
	ETSI 300 012-1 Integrated Services Digital Network (ISDN); Basic User-Network Interface; Layer 1 Specification and Test Principles	
ETSI ISDN Support	ETSI 300 125	Annex C: Soft PVC Procedures
	ETSI 300 324-1 V5.1 Interface for the Support of Access Network (AN) Part 1: V5.1 Interface Specification	ITU-T G. 964 and G.965 are functionally equivalent to ETSI EN 300 324-1 and ETSI EN 300 347-1 respectively. In cases where detail differences exist between the ITU-T and ETSI versions of the specifications, the ETSI versions of the specifications should apply.
	ETSI 300 347-1 V5.2 Interface for the Support of Access Network (AN) Part 1: V5.2 Interface Specification	ITU-T G. 964 and G.965 are functionally equivalent to ETSI EN 300 324-1 and ETSI EN 300 347-1 respectively. In cases where detail differences exist between the ITU-T and ETSI versions of the specifications, the ETSI versions of the specifications should apply.
	ETSI 300 402-1 Integrated Services Digital Network (ISDN), Digital Subscriber Signaling System No. 1 (DSS1) Protocol; Data Link Layer, Part 1: General Aspects	
	ETSI 300 402-2 Integrated Services Digital Network (ISDN); Digital Subscriber System No. 1 (DSS1) protocol; Data Link Layer, Part 2: General Protocol Specification	

Table A-4. Industry Compliance Specifications

Feature Name/ Product Name	Specification Title	Notes
Channelized DS3, Channelized STS-1e, DS3 Frame Relay, Enhanced DS1, Enhanced E1, High-Density E1, Medium-Density DS1, Multi-Serial and Quadserial modules	FRF.1.1 User-to-Network (UNI) Implementation Agreement	
Channelized DS3, Channelized STS-1e, DS3 Frame Relay, Enhanced DS1, Enhanced E1, High-Density E1, Medium-Density DS1, Multi-Serial and Quadserial modules link management interface (LMI) services between two network-network interface (NNI) services	FRF.2.1 Frame Relay Network-to-Network (NNI) Implementation Agreement LMI services between two NNI services	
Channelized DS3, Channelized STS-1e, DS3 Frame Relay, Enhanced DS1, Enhanced E1, High-Density E1, Medium-Density DS1, Quadserial, and Route Server modules	FRF.5 Frame Relay ATM/PVC Network Internetworking Implementation Agreement	
In-band Management Channelized DS3, Channelized STS-1e, DS3 Frame Relay, Enhanced DS1, Enhanced E1, High-Density E1, Medium-Density DS1, Multi-Serial, Quadserial, and Route Server modules	FRF.8 Frame Relay ATM/PVC Service Internetworking Implementation Agreement	
AC 60, PSAX 20, PSAX 1250, PSAX 2300, PSAX 4500	GR-63-CORE Network Equipment Building Standards (NEBS): Physical Protection	
Tones and Announcements Server module	GR-246-CORE	for test capability
Channelized STS-1e, Channelized DS3/STS-1e CES OC-3c APS, OC-12c/STM-4c 1+1 APS/MSP MMSM modules	GR-253-CORE SONET Transport Systems Revision 1, Dec 1997: Common Generic Criteria	
GR-303 DLC Services Channelized DS3/STS1-e CES module	GR-303-CORE Integrated Digital Loop Carrier System Generic Requirements, Objectives, and Interface	

Table A-4. Industry Compliance Specifications

Feature Name/ Product Name	Specification Title	Notes
D4 Support Stratum DS1 BITS Interfaces Stratum 3–4 modules	GR-436-CORE Digital Network Synchronization Plan	Does not include the (ANSI T1.101-compliant Stratum 3–4 module, COMCODE 108484890)
OC-3c APS modules	GR-474-CORE Alarm and Control for Network Elements	Section 8.3.1, Trouble Notifications for Protection Switches
OC-3c APS and OC-12c/STM-4c 1+1 APS/MSP MM/SM modules	GR-499-CORE Common Requirements	
D4 Support Stratum DS1 BITS Interfaces Stratum 3–4 modules	GR-518-CORE LSSGR: Synchronization, Section 18	Does not include the (ANSI T1.101-compliant Stratum 3–4 module, COMCODE 108484890)
	GR-820-CORE OTGR Section 5.1 Generic Transmission Surveillance	
Channelized DS3, Channelized STS-1e, Enhanced DS1, Medium Density DS1, and Tones and Announcements Server modules	GR-822-CORE	For milliwatt test refer to Section 5.2.1.2 T1.207a For type 105 termination test, refer to Section 5.2.5 T1.207a and Section 6.1.2.3 For type 108 termination test, refer to Section 5.3.1 T1.207a and Section 6.1.2.4
AC 60, PSAX 20, PSAX 1250, PSAX 2300, PSAX 4500	GR-1089-CORE (NEBS) Electromagnetic Compatibility and Electrical Safety—Generic Criteria for Network Telecommunications Equipment	
D4 Support Stratum DS1 BITS Interfaces Stratum 3–4 modules	GR-1244-CORE Clocks for Synchronized Networks: Common Generic Criteria	Does not include the (ANSI T1.101-compliant Stratum 3–4 module, COMCODE 108484890)
I.610 OAM F4/F5 Processing (remote defect indication [RDI] and alarm indication signal [AIS]) OC-3c APS modules	GR-1248-CORE Generic Requirements for operations of ATM Network Elements	For OAM, refer to Table 4-1 OAM Type/Function For OC-3c APS modules, refer to Section 6.3 ATM APS Protection Switching

Table A-4. Industry Compliance Specifications

Feature Name/ Product Name	Specification Title	Notes
I.610 OAM F4/F5 Processing (remote defect indication [RDI] and alarm indication signal [AIS]) OC-3c APS modules	GR-2980-CORE General Criteria for ATM Layer Protection Switching Mechanism	Coordination protocol cell is used for automatic protection switching (APS)
I.610 OAM F4/F5 Processing (remote defect indication [RDI] and alarm indication signal [AIS])	TR-NWT-00170 Bellcore Digital Cross-Connect System Generic Requirements and Objectives	
Spanning Tree Protocol Ethernet module	IEEE 802.1D Media Access Control (MAC) Bridges	
Ethernet module	IEEE 802.3 Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications	
Route Server module	IETF RFC 792 Internet Control Message Protocol	
Route Server module	IETF RFC 1058 Routing Information Protocol	
	IETF RFC 1157 Simple Network Management Protocol (SNMP) Version 1.0	
DS1 IMA, E1 IMA, Enhanced DS1, and Enhanced E1 modules	IETF RFC 1406 Definitions of Managed Objects for the DS1 and E1 Interface Types	
DS3 IMA, DS3 ATM, and E3 ATM modules	IETF RFC 1407 Definitions of Managed Objects for the DS3 and E3 Interface Types	
Ethernet Bridging In-band Management Ethernet and Route Server modules	IETF RFC 1483 Multi-Protocol Encapsulation and Layer 2 Bridging Service	Inverse ARP not supported
Route Server module	IETF RFC 1490 Multiprotocol Interconnect over Frame Relay	

Table A-4. Industry Compliance Specifications

Feature Name/ Product Name	Specification Title	Notes
	IETF RFC 1595 Definitions of Managed Objects for the SONET/SDH Interface Types	
	IETF RFC 1661 Point-to-Point Protocol	
	IETF RFC 1662 PPP in HDLC-like Framing	
	IETF RFC 1700 Assigned Numbers	
Route Server module	IETF RFC 1783 Trivial File Transfer Protocol Blocksize Option	Section 3.1 (authentication) and 3.5 (multicasting)only
Route Server module	IETF RFC 1972 A Method for the Transmission of IPv6 Packets over Ethernet Networks	
	IETF RFC 2364 PPP Over AAL5	
Route Server module	IETF RFC 2427 Multiprotocol Interconnect over Frame Relay	Obsoletes RFC 1490
Route Server module	IETF RFC 2464 Transmission of IPv6 Packets over Ethernet Networks	Obsoletes RFC 1972
Ethernet Bridging Ethernet and Route Server modules	IETF RFC 2684 Multiprotocol Encapsulation over ATM Adaptation Layer 5	Obsoletes RFC 1483 RFC 2685 (VPN identification) not supported
	ITU-T E.164 Overall Network Operation, telephone service, service operation, and human factors: Operation, numbering, routing and mobile services International operation- Numbering plan of the international telephone service	

Table A-4. Industry Compliance Specifications

Feature Name/ Product Name	Specification Title	Notes
DSP2C/D Voice Server modules Fax/modem detection	ITU-T G.164 Transmission Systems and Media Apparatus Associated with Long-Distances Telephone Circuits and Other Terminal Equipment: Echo Suppressors	
DSP2A, B, C, D Voice Server modules Echo cancellation (general)	ITU-T G.165 General Characteristics of International Telephone Connections and International Telephone Circuits: Echo Cancellers	
	ITU-T G.702 General Aspects of Digital Transmission Systems— Terminal Equipment: Digital Hierarchy Bit Rates	
	ITU-T G.703 Physical/Electrical Characteristics of Hierarchical Digital Interfaces	
1.544 Mbps, 2.048 Mbps, 44.736 Mbps; includes channel-associated signaling (CAS) ABCD in-band signaling	ITU-T G.704 Synchronous frame structures used at 1544, 6312, 2048, 8488 and 44 736 Kbps hierarchical levels	
	ITU-T G.706 Frame alignment and cyclic redundancy check (CGC) procedures relating to basic frame structures defined in Recommendation G.704	
	ITU-T G.707 Transmission Systems and Media—Digital transmission systems— Terminal equipment— General: Network node interface for the synchronous digital hierarchy (SDH)	

Table A-4. Industry Compliance Specifications

Feature Name/ Product Name	Specification Title	Notes
DSP2A, B, C, D Voice Server modules 64 Kbps fax encoding	ITU-T G.711 General Aspects of Digital Transmission Systems Terminal Equipment: Pulse Code Modulation (PCM) of Voice Frequencies	
DSP2A, B, C, D Voice Server modules Voice compression (16, 24, 32, 40 Kbps) and tandem encoding	ITU-T G.726 General Aspects of Digital Transmission Systems Terminal Equipment: 40, 32, 24, 16 Kbps Adaptive Differential Pulse Code Modulation (ADPCM)	
Annex A: Voice compression (8 Kbps) Annex B: Silence suppression	ITU-T G.729 General Aspects of Digital Transmission Systems: Coding of Speech at 8 Kbps Using Conjugate-Structure Algebraic-Code-Excited Linear-Prediction (CS-ACELP)	
	ITU-T G.732 General Aspects of Digital Transmission Systems Terminal Equipments: Characteristics of Primary PCM Multiplex Equipment Operating at 2048 Kbit/s	
	ITU-T G.736 General Aspects of Digital Transmission: Characteristics of a Synchronous Digital Multiplex Equipment Operating at 2048 kbits/sec	
	ITU-T G.751 Digital multiplex equipments operating at the third order bit rate of 34 368 kbit/s and the fourth order bit rate of 139 264 Kbps and using positive justification	

Table A-4. Industry Compliance Specifications

Feature Name/ Product Name	Specification Title	Notes
OC-3c APS modules	ITU-T G.783 Transmission Systems and Media, Digital Systems and Networks— Digital Transmission Systems—Terminal Equipment—Principal Characteristics of Multiplexing Equipment for the Synchronous Digital Hierarchy: Characteristics of Synchronous Digital Hierarchy (SDH) Equipment Functional Blocks	
DS3 ATM, Enhanced DS1, and Enhanced E1 modules	ITU-T G.804 ATM cell mapping into Plesiochronous Digital Hierarchy (PDH)	
	ITU-T G.823 The control of jitter and wander within digital networks which are based on the 2048 Kbps hierarchy	
Includes Multiplex Section Protection (MSP)	ITU-T G.832 Transmission Systems and Media, Digital Systems and Networks— Digital transmission systems—Digital networks—Network capabilities and functions: Transport of SDH Elements on PDH Networks—Frame and Multiplexing Structures	
STM-4c module	ITU-T G.837	
STM-4c module	ITU-T G.841, Annex A Types and Characteristics of SDH Network Protection Architecture Issue 10/98	
Intra-office and short haul	ITU-T G.957 Optical interfaces for equipment and systems relating to the synchronous digital hierarchy	Long haul not supported

Table A-4. Industry Compliance Specifications

Feature Name/ Product Name	Specification Title	Notes
	ITU-T G.964 V-Interfaces at the Digital Local Exchange (LE)- V5.1 Interface (based on 2048 Kbps) for the Support of Access Network (AN)	ITU-T G. 964 and G.965 are functionally equivalent to ETSI EN 300 324-1 and ETSI EN 300 347-1 respectively. In cases where detail differences exist between the ITU-T and ETSI versions of the specifications, the ETSI versions of the specifications should apply.
	ITU-T G.965 V-Interfaces at the Digital Local Exchange (LE) - V5.1 Interface (based on 2048 Kbps) for the Support Of Access Network (AN)	ITU-T G. 964 and G.965 are functionally equivalent to ETSI EN 300 324-1 and ETSI EN 300 347-1 respectively. In cases where detail differences exist between the ITU-T and ETSI versions of the specifications, the ETSI versions of the specifications should apply.
	ITU-T G.991.2 Draft: Single-pair high speed digital subscriber line (SHDSL) transceivers	
	ITU-T G.992.1 Asymmetric Digital Subscriber Line (ADSL) transceivers	
	ITU-T G.992.2 Splitterless Asymmetric Digital Subscriber Line (ADSL) transceivers	
	ITU-T I.121 Integrated Services Digital Network (ISDN) General Structure and Service Capabilities: Broadband Aspects of ISDN	
	ITU-T I.150 B-ISDN ATM Functional characteristics	
Enhanced DS1 and Enhanced E1 modules	ITU-T I.233 Frame Mode Bearer Services	

Table A-4. Industry Compliance Specifications

Feature Name/ Product Name	Specification Title	Notes
	ITU-T I.321 Integrated Services Digital Network (ISDN) Overall Network Aspects and Functions, ISDN User-Network Interfaces: B-ISDN Protocol Reference Model and its Application	
	ITU-T I.356 B-ISDN ATM layer cell transfer performance	ABR not supported
I.610 OAM F4/F5 Processing (remote defect indication [RDI] and alarm indication signal [AIS])	ITU-T I.361 B-ISDN ATM Layer Specification	
	ITU-T I.363 B-ISDN ATM Adaptation Layer specification	Only AAL1, AAL2, and AAL5 are supported
	ITU-T I.363.1 B-ISDN ATM Adaptation Layer specification: Type 1 AAL	
Multiplexing support	ITU-T I.363.2 B-ISDN ATM Adaptation Layer specification: Type 2 AAL	
	ITU-T I.363.5 B-ISDN ATM Adaptation Layer specification: Type 5 AAL	
VTOA AAL2 Trunking Narrow-band Services	ITU-T I.366.1 Segmentation and Reassembly Service Specific Convergence Sublayer for the AAL type 2	
Facsimile Demodulation/ Remodulation VTOA AAL2 Trunking Narrow-band Services DSP2C and DSP2D Voice Server modules	ITU-T I.366.2 AAL Type 2 Specification on Convergence Sublayer for Narrow-band Services.	Annex M
Channelized DS3, Channelized STS-1e, DS3 Frame Relay, Enhanced DS1, Enhanced E1, High-Density E1,Medium-Density DS1, Multi-Serial, and Quadserial modules	ITU-T I.370 Congestion Management for ISDN Frame Relay Bearing Service	

Table A-4. Industry Compliance Specifications

Feature Name/ Product Name	Specification Title	Notes
Channelized DS3, Channelized STS-1e, DS3 Frame Relay, High-Density E1, Medium-Density DS1, Multi-Serial and Quadserial modules	ITU-T I.371 Traffic control and congestion control in B-ISDN	ABR not supported
	ITU-T I.372 Integrated Services Digital Network (ISDN) Overall Network Aspects and Functions: Frame Relaying Bearer Service Network-to-Network Interface Requirements	
	ITU-T I.413 Integrated Services Digital Network (ISDN) User-Network Interfaces: B-ISDN User-Network Interface	
	ITU-T I.430 Basic User-Network Interface - Layer 1 Specification	
Channelized DS3, Channelized STS-1e, Channelized DS3/STS-1e CES, DS3 Frame Relay, Enhanced DS1, Enhanced E1, High-Density E1, Medium-Density DS1, Multi-Serial, and Quadserial modules	ITU-T I.431 Integrated Services Digital Network (ISDN) User-Network Interfaces: Primary Rate User-Network Interface—Layer 1 Specification	
Scrambling, header error control (HEC) processing, cell delineation	ITU-T I.432 B-ISDN User-Network Interface—Physical layer Specification	
	ITU-T I.432.1 B-ISDN User-Network Interface: Physical Layer Specification-General Characteristics	
	ITU-T I.432.2 B-ISDN User-Network- Physical Layer Specification: 155 520 Kbps and 622 080 Kbps operation	

Table A-4. Industry Compliance Specifications

Feature Name/ Product Name	Specification Title	Notes
	ITU-T I.432.3 B-ISDN User-Network Interface: Physical Layer Specification for 1.544 Mbps and 2.048 Mbps	
	ITU-T I.432.4 B-ISDN User-Network- Physical Layer Specification: 51 840 Kbps Operation	
Carrier Group AIS Alarm Dual-homed PVCs I.610 OAM F4/F5 Processing (remote defect indication [RDI] and alarm indication signal [AIS]) Channelized DS3, Channelized STS-1e, Channelized DS3/STS-1e CES, DS3 ATM, E3 ATM, DS1 IMA, DS3 IMA, E1 IMA, Enhanced DS1, Enhanced E1, DSP2A/B/C/D Voice Server, High-Density E1, High Speed, Medium-Density DS1, Multi-Serial, Quadserial OC-3c Single-Mode/Multi-Mode/APS, STM-1 Single-Mode/Multi-Mode/MSP, OC-12c/STM-4c modules and Unstructured DS3/E3 CES modules	ITU-T I.610 B-ISDN operation and maintenance principles and functions	
	ITU-T Q.922 Digital Subscriber Signaling System No.1 (DSS 1) Data Link Layer: ISDN Data Link Layer Specification for Frame Mode Bearer Services	Annex A
	ITU-T Q.921 Digital Subscriber Signaling system No. 1, ISDN User-Network interface- Data Link Layer Specification	

Table A-4. Industry Compliance Specifications

Feature Name/ Product Name	Specification Title	Notes
• AAL1 Trunking CCS (Q.931) • AAL1 Trunking CCS (Q.931/QSIG), AAL1 Trunking CAS • AAL2 Trunking CCS (Q.931)	ITU-T Q.931 Switching and Signaling - Digital subscriber Signalling System No. 1 - Network layer: Digital Subscriber Signaling System No. 1 (DSS 1) - ISDN User-Network Interface Layer 3 Specification for Basic Call Control	
	ITU-T Q.933 Annex A Digital Subscriber Signaling System No. 1—Integrated Services Digital Network (ISDN) Digital Subscriber Signaling System No. 1 (DSS 1)—Signaling Specifications for Frame Mode Switched and Permanent Virtual Connection Control and Status Monitoring	
ATM UNI interfaces (3.0, 3.1, 4.0)	ITU-T Q.2110 B-ISDN SAAL Service Specific Connection Oriented Protocol (SSCOP)	
ATM UNI interfaces (3.0, 3.1, 4.0)	ITU-T Q.2130 B-ISDN SAAL Service Specific Coordination Function (SSCF) for Support of Signaling at the User-Network Interface	
	ITU-T Q.2931 B-ISDN Application protocols for access signalling—Broadband Integrated Services Digital Network (B-ISDN)— Digital Subscriber Signalling System No. 2 (DSS 2)—User Network Interface (UNI) Layer 3 Specification For Basic Call/Connection Control	
	ITU-T Q.2941.2 Draft: Broadband Integrated Services Digital Network (B-ISDN)- Digital Subscriber Signaling System No. 2 (DSS2): Generic identifier transport (	

Table A-4. Industry Compliance Specifications

Feature Name/ Product Name	Specification Title	Notes
	ITU-T Q.2971 B-ISDN—DSS 2—User-network interface layer 3 specification for point-to-multipoint call/connection control	
	ITU-T V.8 Procedures For Starting Sessions of Data Transmission Over the General Switched Telephone Network	
	ITU-T V.25 Automatic Answering Equipment and General Procedures for Automatic Calling Equipment on the General Switched Telephone Network Including Procedures for Disabling of Echo Control Devices for Both Manually and Automatically Established Calls	
Enhanced DS1 and Enhanced E1 modules	TR-TSU-001369 Generic Requirement for Frame Relay PVC Exchange Services	
Multi-Serial module	V.35 Defines signaling for data rates greater than 19.2 Kbps for a trunk interface between network access device and a packet network	
Multi-Serial module	X.21 bis CCITT Interface Between Data Terminal Equipment and Data Circuit-Terminating Equipment for Synchronous Operation of Public Data Networks, Recommendation X.21	Interface between data terminal equipment (DTE) and data circuit-terminating equipment for synchronous operation on public data networks
	X.144 User information transfer performance parameters for data networks providing international frame relay PVC service	

Interface Type by Connection Type Table

Table A-5. Interface Type by Connection Type Table

Interface / Connection	ATM IISP (Network/User)	ATM PNNI 1.0	ATM UNI 3.0/3.1/4.0	Bridge	CAS TrunkLine	Circuit Emulation	Dynamic Bandwidth Circuit Emulation	Frame Relay (UNI, NNI)	GR-303	HDLC Pass-through	Terminal Emulation	Virtual Interface APS/MSP Only: OC-3, STM-1 [1]
AAL2 Trunking	X	X	X									X
ATM-to-ATM virtual channel connection (VCC) PVC	X	X	X									X
ATM-to-ATM virtual path connection (VPC) PVC	X	X	X									
Bridge-to-ATM VCC PVC	X	X	X	X								X
Bridge-to-bridge PVC				X								
Circuit emulation-to ATM VCC PVC	X	X	X			X	X					X
Circuit emulation-to circuit emulation PVC						X	X					
Frame relay-to-ATM VCC PVC	X	X	X					X				X
Frame relay-to-frame relay PVC								X				
In-band management ATM PVC	X	X	X									
Variable bit rate (VBR)-to-ATM VCC PVC	X	X	X							X	X	X
VBR-to-VBR PVC										X	X	
ATM-to-ATM IISP constant bit rate (CBR) SVC	X	X	X									

Table A-5. Interface Type by Connection Type Table

Interface / Connection	ATM IISP (Network/User)	ATM PNNI 1.0	ATM UNI 3.0/3.1/4.0	Bridge	CAS TrunkLine	Circuit Emulation	Dynamic Bandwidth Circuit Emulation	Frame Relay (UNI, NNI)	GR-303	HDLC Pass-through	Terminal Emulation	Virtual Interface APS/MSP Only: OC-3, STM-1 [1]
ATM-to-ATM IISP VBR SVC	X	X	X									
ATM-to-ATM VCC SPVC	X	X	X									
Circuit emulation-to-ATM VCC SPVC	X	X	X			X	X					X
Frame relay-ATM VCC SPVC	X	X	X					X				
VBR-to-ATM VCC SPVC	X	X	X	X						X	X	

[1] Indicators in this column apply only to the OC-3c APS 1+1 MM/SM modules and the STM-1 MSP 1+1 MM/SM modules

Interface Type by I/O Module Type Table

Table A-6 shows the available interface types for each *PacketStar* PSAX I/O module used in the PSAX Multiservice Media Gateway systems. This table does not include other PSAX modules that are not I/O modules, which include: the Alarm module, the DSP2*x* Voice Server modules, the Route Server module, and the Tones and Announcements Server module.

Table A-6. Interface Types by I/O Module Types

Interface / Module	ATM IISP (Network/User)	ATM IMA	ATM PNNI 1.0	ATM UNI 4.0	ATM UNI 3.0/3.1	Bridge	CAS TrunkLine	Circuit Emulation	Dynamic Bandwidth Circuit Emulation	Frame Relay (UNI, NNI)	GR-303	HDLC Pass-through	PRI ISDN (Network/User)	Routing	Terminal Emulation
DS1/T1 Interface Modules															
6-Port DS1 IMA (**IMA DS1**)	X	X	X	X	X										

Table A-6. Interface Types by I/O Module Types

Module \ Interface	ATM IISP (Network/User)	ATM IMA	ATM PNNI 1.0	ATM UNI 4.0	ATM UNI 3.0/3.1	Bridge	CAS TrunkLine	Circuit Emulation	Dynamic Bandwidth Circuit Emulation	Frame Relay (UNI, NNI)	GR-303	HDLC Pass-through	PRI ISDN (Network/User)	Routing	Terminal Emulation
6-Port Enhanced DS1/T1 Multiservice (**DS1/T1 ENH**)	X		X		X		X	X	X	X	X	X	X		
12-Port Medium-Density DS1 Multiservice (**MD DS1**)	X		X	X	X			X		X	X	X	X		
E1 Interface Modules															
6-Port E1 IMA (**IMA E1**)	X	X	X	X	X										
6-Port Enhanced E1 Multiservice (**E1 ENH**)	X		X	X	X		X	X		X		X	X		
21-Port High-Density E1 Multiservice (**HD E1**)	X		X	X	X			X		X		X	X		
DS3 and E3 Interface Modules															
1-Port Channelized DS3 Multiservice (**CH DS3**)	X		X	X	X			X		X	X	X	X		
1-Port DS3 IMA (**DS3 IMA**)	X	X	X	X	X										
1-Port Unchannelized DS3 Frame Relay (**DS3 FR**)										X					
2-Port DS3 ATM (**DS3 ATM**)	X		X		X										
2-Port E3 ATM (**E3 ATM**)	X		X	X	X										

Table A-6. Interface Types by I/O Module Types

Interface / Module	ATM IISP (Network/User)	ATM IMA	ATM PNNI 1.0	ATM UNI 4.0	ATM UNI 3.0/3.1	Bridge	CAS TrunkLine	Circuit Emulation	Dynamic Bandwidth Circuit Emulation	Frame Relay (UNI, NNI)	GR-303	HDLC Pass-through	PRI ISDN (Network/User)	Routing	Terminal Emulation
3-Port Channelized DS3/STS-1e CES (**CH DS3/STS-1E**)								X							
3-Port Unstructured DS3/E3 CES (**UNSTR DS3/E3 CES**)								X							
STS-1e Interface Modules															
1-Port Channelized STS-1e, T1 Format (**CH STS-1E T1**)	X		X		X			X		X	X	X	X		
OC-3c Interface Modules															
1-Port OC-3c Multimode with AQueMan (**OC-3C (MM AQ)**)	X		X	X	X										
1-Port OC-3c Single-Mode with AQueMan (**OC-3C (SM AQ)**)	X		X	X	X										
1-Port OC-3c Multimode with Traffic Shaping (**OC-3C (MM TS)**)	X		X	X	X										
1-Port OC-3c Single-Mode with Traffic Shaping (**OC-3C (SM TS)**)	X		X	X	X										
1-Port OC-3c 1+1 APS Multimode (**OC-3C MM APS**)	X		X	X	X										

Table A-6. Interface Types by I/O Module Types

Module \ Interface	ATM IISP (Network/User)	ATM IMA	ATM PNNI 1.0	ATM UNI 4.0	ATM UNI 3.0/3.1	Bridge	CAS TrunkLine	Circuit Emulation	Dynamic Bandwidth Circuit Emulation	Frame Relay (UNI, NNI)	GR-303	HDLC Pass-through	PRI ISDN (Network/User)	Routing	Terminal Emulation
1-Port OC-3c 1+1 APS Single-Mode (**OC-3C SM APS**)	X		X	X	X										
STM-1 Interface Modules															
1-Port STM-1 Multimode with AQueMan (**STM-1 (MM AQ)**)	X		X	X	X										
1-Port STM-1 Single-Mode with AQueMan (**STM-1 (SM AQ)**)	X		X	X	X										
1-Port STM-1 Multimode with Traffic Shaping (**STM-1 (MM TS)**)	X		X	X	X										
1-Port STM-1 Single-Mode with Traffic Shaping (**STM-1 (SM TS)**)	X		X	X	X										
1-Port STM-1 1+1 MSP Multimode (**STM-1 MM MSP**)	X		X	X	X										
1-Port STM-1 1+1 MSP Single-Mode (**STM-1 SM MSP**)	X		X	X	X										
OC-12c/STM-4c Interface Modules															
1-Port OC-12c/STM-4c 1+1 APS/MSP Multimode (**OC-12C/STM-4C MM**)	X		X	X	X										

Table A-6. Interface Types by I/O Module Types

Interface / Module	ATM IISP (Network/User)	ATM IMA	ATM PNNI 1.0	ATM UNI 4.0	ATM UNI 3.0/3.1	Bridge	CAS TrunkLine	Circuit Emulation	Dynamic Bandwidth Circuit Emulation	Frame Relay (UNI, NNI)	GR-303	HDLC Pass-through	PRI ISDN (Network/User)	Routing	Terminal Emulation
1-Port OC-12c/STM-4c 1+1 APS/MSP Single-Mode (**OC-12C/STM-4C SM**)	X		X	X	X										
Voice 2-Wire Interface Modules															
4-Port Voice 2-Wire Office (**VOICE 2WO**)								X							
8-Port Voice 2-Wire Station (**VOICE 2WS**)								X							
Serial Interface Modules															
2-Port High Speed (**HIGH SPEED**)	X			X	X			X [1]							
Quadserial (**QUAD SERIAL**)	X		X		X			X		X		X			
6-Port Multiserial (**SERIAL**)					X			X		X		X			X
Ethernet Interface Module															
Ethernet (**ENET**)						X								X	

[1] Port 2 only.

Minimum AAL2 Trunk Size Requirements Tables

Setting up channels with multiplex structure helps reduce delay of traffic. If a trunk is configured to have at least one active channel, one cell must be sent out every 20 ms; thus, the minimum trunk size is 50 cps. At 8 Kbps, Lucent recommends two channels with multiplex structure. On the DSP2C module, you can configure up to 64 AAL2 trunk groups, so that if you want to use all 128 channels (or 224 for echo cancel mode), you must set up the multiplex structure.

Table A-7 summarizes bandwidth savings at different compression rates.

Table A-7. Standard AAL2 Bandwidth Calculation[1]

Compression Rate (in Kbps)	Data Bytes /sec	Data + Overhead Calculation	Data + Overhead /sec	Cells/sec calculation	Cells /sec	Average Expected cells/sec with silence enabled
64	8000	8000/40*43	8600	8600/47	183	92
40	5000	5000/25*28	5600	5600/47	120	60
32	4000	4000/20*23	4600	4600/47	98	49
24	3000	3000/15*18	3600	3600/47	77	39
16	2000	2000/10*13	2600	2600/47	56	28
8	1000	1000/5/2*13	1300	1300/47	28	14

[1] If a trunk has at least one active channel, a cell must be sent out every 20 msec; therefore, the minimum AAL2 trunk size is 50 cps.

Example Using Table A-7 Data for 32 Kbps

At 32 Kbps compression rate (from Table A-7): For sending 4,000 voice samples (bytes) per second, including the AAL2 header in cells per second (cps) in the calculation:

4,000 samples / 20 samples received from DSP x 23 bytes to be packed into an AAL2 cell, where 23 bytes = 20 bytes of data in the cps packet and 3 bytes for the cps-header.

With 47 data bytes in the AAL2 cell, the cell rate = 4600/47 ~= 98

The expected cell rate with silence is: 98/2 = 49.

The cell rates for Lucent nonmultiplexed AAL2 remain unchanged, as shown in Table A-8.

Table A-8. AAL2 Non-Mutiplexed Transmission Rates

Compression Rate (in Kbps)	Cell/sec
64	200
40	200
32	100
24	100
16	50
8	25

Table A-9 shows the Standard AAL2 Bandwidth Calculation for ATM Forum Profile 6.

Table A-9. Standard AAL2 Bandwidth Calculation for ATM Forum Profile 6[1]

Compression Rate (in Kbps)	Data Bytes /sec	Data + Overhead Calculation	Data + Overhead /sec	Cells/sec calculation	Cells /sec	Average Expected cells/sec with silence enabled
32	4000	4000/40*43	4300	4300/47	92	46
64[2]	8000	8000/40*43	8600	8600/47	183	92

[1] If a trunk has at least one active channel, a cell must be sent out every 20 msec; therefore, the minimum AAL2 trunk size is 50 cps.

[2] This rate is the same as the ITU Standard.

Fax Relay Using AAL2 Requirements

Table A-10 shows the cell rate for fax relay modulation/demodulation. Changing rates of 8 Kbps to 14.4 Kbps fax requires an additional 14 cells/sec. Changing rates of 8 Kbps to 12.0 Kbps fax requires an additional 8 cells/sec. Changing rates of 8 Kbps to 9.6 Kbps fax requires an additional 1 cell/sec. Fax relay mode contains 20 msec of data for every CPS packet, so the cell rate is more efficient than for voice codec.

The change in bandwidth is controlled by the DSP host code. If insufficient bandwidth is available on the AAL2 trunk, the fax will be forced to a lower rate. DSP resources must be available or the fax will fail. In addition, fax modem bypass or fax relay/modem bypass is supported if enough bandwidth is available on the AAL2 trunk.

Table A-10. Standard AAL2 Bandwidth Calculation for Fax Relay Mode on the DSP2C Module

Compression Rate (in Kbps)	Data Bytes /sec	Data + Overhead Calculation	Data + Overhead /sec	Cells/sec calculation	Cells /sec	Average Expected cells/sec with silence enabled
14.4	1800	1800/(36*39)	1950	1950/47	42	N/A
12.0	1500	1500/(30*33)	1650	1850/47	36	N/A
9.6	1200	1200/(24*27)	1350	1350	29	N/A

Module Alarm Status Table

The Alarm Status field on the Equipment Configuration window displays the current status of all *PacketStar* I/O, server, and common equipment modules

in the PSAX system. The alarm status descriptions are provided in Table A-11.

Table A-11. Alarm Status Descriptions for PSAX Modules

Number	Alarm Status	Module Type Affected	Description
1	NoAlarm/CardPresent	I/O	No module is inserted in the chassis.
2	WrongCardType	I/O	One type of module was configured in this slot in the chassis, but a different module now occupies this slot.
3	LineFailed	All	The line has failed.
4	CardRemoved	All	A module has been configured and then removed.
5	ReferenceClockFailed	Stratum	The timing reference clock has failed.
6	CompositeClockFailed	Stratum	The timing composite clock has failed.
7	Overload	Power Supply	The Power Supply is operating under an overload condition.
8	Plus5vFailed	Power Supply	The 5 V Power Supply has failed.
9	Plus120vFailed	Power Supply	The 120 V ac Power Supply has failed.
10	Minus48vFailed	Power Supply	The -48 V dc Power Supply has failed.
11	UnknownAlarm	I/O	The reason for failure is not known.
12	CompleteClockFailed	Stratum	The timing complete clock has failed.
13	BackplaneCircuitryFailed	All	The chassis backplane circuit board is not operating.
14	PowerFailed	Power Supply	Power failed

Quality of Service (QoS) Table

Table A-12 details the PSAX system support of defined ATM quality of service (QoS) classes.

Table A-12. PSAX System-Supported Service Classes

ATM Service Class	Description
Constant Bit Rate (CBR)	This service operates on a connection basis and offers consistent delay predictability. CBR is used for applications such as circuit emulation, voice, and video.
Variable Bit Rate—Real Time (VBR-RT)	This service operates on a connection basis and offers very low delay variance but requires access to a variable amount of network bandwidth. VBR-RT is used for such applications as packet video and voice.
Variable Bit Rate—Non-real Time (VBR-NRT)	This service operates on both a connection and connectionless basis and allows delay variance between the delivery of cells. VBR-NRT is used for data applications that have potentially bursty traffic characteristics, including LAN interconnections, CAD/CAM, and multimedia. This class can be used to support switched multimegabit data service (SMDS).
Unspecified Bit Rate (UBR)	This service operates on a connection basis and allows for raw cell or best-effort transport by the network. In UBR service, cells are transported by the network whenever bandwidth is available and traffic is presented by the user. Data using UBR service is more apt to be discarded during peak traffic times in deference to data using other classes of service.

Table A-13 illustrates the attributes of the classes of service supported by the Multiservice Media Gateway system software.

Table A-13. Class of Service Descriptions

	Constant Bit Rate (CBR)	Variable Bit Rate Real Time (VBR-RT)	Variable Bit Rate Non-real Time (VBR-NRT)	Unspecified Bit Rate (UBR)
QoS Class	Class 1	Class 2	Classes 3, 4	Class 5
Applications	Voice and video	Packet video and voice	Data	
Bit Rate	Constant	Variable		

Table A-13. Class of Service Descriptions

	Constant Bit Rate (CBR)	Variable Bit Rate Real Time (VBR-RT)	Variable Bit Rate Non-real Time (VBR-NRT)	Unspecified Bit Rate (UBR)
Timing Required at Source or Destination	Required		Not required	
Service Examples	Private line	Com-pressed voice	Frame relay, switched multimedia data service	Raw cell, Ethernet
AAL	1	2	3/4 and 5	3/4 and 5

The following two tables illustrate how ATM classes of service correspond to internal priority levels as the AQueMan algorithm functions. Table A-14 identifies the cell loss and cell delay tolerance of each service class, with internal priorities. Table A-15 lists the class-of-service choices available when configuring PVC connections on a Multiservice Media Gateway system and shows service examples for each PVC connection type.

The examples are intended simply as illustrations and will need fine-tuning based on the network applications supported by the Multiservice Media Gateway system. The flexibility of the Multiservice Media Gateway system allows you to tailor the system based on the required service applications by selecting the appropriate priority levels.

Table A-14. Cell Loss and Cell Delay Characteristics of ATM Service Classes

ATM Classes of Service	QoS Classes Supported by PSAX Systems	Cell Loss Tolerance	Cell Delay Tolerance	Internal Priority
Constant Bit Rate (CBR)	Class 1	High	Very Low	CBR-1
	Class 1	High	Very Low	CBR-2
	Class 1	High	Low	CBR-3
	Class 1	High	Low	CBR-4
Variable Bit Rate (VBR)	Class 2	Very Low	Very Low	VBR-1
	Class 2	Low	Low	VBR-2
Variable Bit Rate, Real Time (VBR-RT)	Class 2	Low	Low	VBR-3
Variable Bit Rate, Non-real Time (VBR-NRT)	Classes 3, 4	Low	Medium	VBR-4
	Classes 3, 4	Low	High	VBR-5
Unspecified Bit Rate (UBR)	Class 5	Very High	Very High	VBR-6

Table A-15. Mapping ATM Service Classes to Multiservice Media Gateway System Priority Levels

ATM Classes of Service	Internal Priority	PVC Connection Configuration Selections	Service Examples
Constant Bit Rate (CBR)	CBR-1	CBR1	911 calls
	CBR-2	CBR2	Preferred customers
	CBR-3	CBR3	Standard
	CBR-4	CBR4	Cellular
Variable Bit Rate (VBR)	VBR-1	VBR-express	Network management
Variable Bit Rate Real Time (VBR-RT)	VBR-2	VBR-RT1	Real-time videos
	VBR-3	VBR-RT2	MPEG 1-2/JPEG
Variable Bit Rate Nonreal Time (VBR-NRT)	VBR-4	VBR-NRT1	Frame relay data
	VBR-5	VBR-NRT2	FTP/e-mail transfer
Unspecified Bit Rate (UBR)	VBR-6	UBR	Internet Protocol data

Glossary

Numeric

1+1 APS (automatic protection switching)	In a North American SONET, 1+1 protection switching is commonly referred to as automatic protection switching (APS). See APS for additional information.
1+1 MSP (multiplex section protection)	In a European synchronous digital hierarchy (SDH) network, 1+1 protection switching is commonly referred to as multiplex section protection (MSP). See MSP for additional information.
100Base-T	This IEEE standard specifies the transmission of data at 100 Mbps on Ethernet networks.
10Base-T	This IEEE standard (802.3) specifies the transmission of data at 10 Mbps on Ethernet networks with twisted-pair cabling and a wiring hub, referred to as a 10Base-T hub.
10-nibble header space	In a protocol data unit (PDU), the 40 bits of protocol control information located at the beginning of the PDU.
5ESS switch	A digital central office electronic switching system made by Lucent, typically used at an end office, which serves local subscribers.

A

AAL	ATM adaptation layer. The protocol layer that allows multiple applications to have data converted to and from the ATM cell. AAL also refers to a protocol that is used to translate higher layer services into the size and format of an ATM cell.
AAL1	ATM adaptation layer type 1. This layer supports Class A traffic (uncompressed, digitized voice and video).
AAL2	ATM adaptation layer type 2. This layer supports Class B traffic (variable bit rate compressed voice and video).

AAL2 trunking	A communication line established between two switching systems that supports Class B traffic (AAL2).
AAL3/4	ATM adaption layer 3/4. This layer supports Class C and D traffic (variable bit rate compressed voice and video).
AAL5	ATM adaptation layer type 5. This layer supports Class C traffic (connection-oriented variable bit rate [VBR] data traffic and signaling messages, used predominantly for classical IP [CLIP] over ATM and LAN Emulation [LANE] traffic)
ABCD signaling bits	Bits robbed from bytes in each DS0 or T1 channel in particular subframes, which are then used to carry in-band all status information.
ABR	available bit rate. ABR changes after a connection is established, and allows the receiving device to accept data from a variety of transmitting devices which are operating at different speeds, without the need to set up data rates in advance.
ACELP	algebraic code excited linear prediction. This voice-coding algorithm standardized by the ITU-T in G.729 provides voice compression. ACELP is specified by the Frame Relay Forum as one of the minimum voice compression algorithms required for network-to-network interoperability.
active/standby mode	Alternate terms for working/protection. See Automatic protection switching.
adaption service permanent virtual circuit	See AS-PVC.
adaptive differential pulse code modulation	See ADPCM.
address	A data structure or logical convention used to identify a device on a network.
address mask	A bit combination used to describe which portion of an address refers to the network or subnet, and which portion refers to the host.
address resolution protocol	See ARP.

administrative weight	See AW.
administrator	A user who has full read-write capabilities on all PSAX devices managed by the *AQueView*® Element Management System.
ADPCM	adaptive differential pulse code modulation. This type of audio encoding is a reduced bit rate variant of PCM audio encoding, which uses fewer bits by determining the difference between consecutive speech samples.
advertising	In the context of packet switching, a reference to routing or service updates that are sent at specified intervals. This method allows other routers on the network to maintain lists of usable routes.
aggregation	A reference to an instance when the border nodes at the ends of an outside link assign a token number to the outside link, and the same number is associated with all uplinks associated with the outside link (an aggregation token). In the parent and all higher-level peer groups, all uplinks with the same aggregation token are aggregated.
AIS	alarm indication signal. This signal is used in-band maintenance to ensure that a line is working properly.
alarm	An message that warns an administrator about a network problem.
alarm indication signal	See AIS.
A-Law	This ITU-T companding standard used in PCM systems for conversion between analog and digital signals. The A-Law standard is primarily used in European telephone networks.
algebraic code excited linear prediction	See ACELP.
alterable mark inversion	See AMI.
alternating current	See AC.
American National Standards Institute	See ANSI.

American Standard Code for Information Exchange	See ASCII.
AMI	alterable mark inversion. The signaling format used for T1 lines. This format allows the “one” pulses to have an alternating priority.
analog	Voice vibrations converted to electrical signals which have frequencies with varying amplitudes. An analog signal implies continuous operation, in contrast to a digital signal, which is broken up into individual bits of data.
ANSI	American National Standards Institute. This organization is a U.S. standards body that accredits standards for programming languages, communications, and networking. It is also the U.S. representative to the International Organization for Standardization.
API	application program (or programming) interface. A software routine which uses a specialized language and message format to communicate between an application program and another program, or operating system, that provides services to it. Standard software interrupts, calls, and data formats are used to initiate contact with network services, mainframe communications programs, telephone equipment, or program-to-program applications.
application program interface (also application programming interface)	See API.
APS	automatic protection switching. This feature provides network resiliency by automatically switching to a secondary line when the primary line fails or is operating on an unacceptably high error rate. SONET allows either 1+1 or 1:N architecture. The 1+1 architecture has permanent electrical bridging at both ends of the serviced equipment. At the transmit end, identical signals are transmitted over primary and secondary circuits and then tested at the receive end. The 1:N protection switch architecture is one in which any of the “N” (any number of) service channels (primary circuits) can be bridged to a single optical protection channel (secondary circuit).

AQueMan algorithm	A traffic management system that also supports ATM Forum classes of service. This adaptive algorithm allocates bandwidth by statistically multiplexing traffic within two sets of queues according to weighted priorities. One set of queues addresses the avoidance of cell loss, which is normally a concern for data traffic, while the other manages cell transfer delay, which is critical to voice and some video traffic. Within each set of queues, the AQueMan algorithm assigns internal priorities even more specialized than the ATM Forum class definitions. Generally, the lower the assigned priority number, the greater the access to bandwidth and the less likelihood of loss.
AQueView® Element Management System	This *PacketStar* software product is a graphical user interface (GUI)-based element management tool that is used to provision the *PacketStar* PSAX Multiservice Media Gateway systems. The *AQueView* system enables a network of PSAX products to be managed and provisioned with easy-to-use windows from a single location.
architecture	The design of the hardware and software components of a system that controls how all the various components interoperate with each other and with other devices or systems.
ARP	address resolution protocol. This low-level protocol maps IP addresses, or other non-ATM addresses to the target ATM device. Once the ATM device has been identified, an ARP server can send it data, as long as the session is maintained.
ASCII	American Standard Code for Information Exchange. This coding standard specifies the representation of characters in a binary format.
AS-PVC	adaption service permanent virtual circuit. This type of circuit allows ATM adaptation services to be connected by ATM switched virtual circuits. AS-PVC specifies parameters (such as circuit emulation) for the sending device, specifying the receiving device.
asynchronous transfer mode	See ATM.

ATM	asynchronous transfer mode. This cell-switching technology converts multiple incoming streams of information into fixed-length cells of 53 bytes, that are composed of a 48-byte information field and a five-byte address header. ATM enables high-speed transmission of data, voice, and video over the same lines, at speeds up to 13.22 Gbps.
ATM adaptation layer	See AAL.
ATM addressing	This addressing scheme enables an operating system to find a specific piece of ATM information in the application memory. Every memory location has an address. ATM addressing provides user-specific virtual path identifier/virtual channel identifier (VPI/VCI) coding, bandwidth allocation, and quality of service (Qos) information.
ATM edge switch	A device that resides at the edge of a carrier network and provides access from the end user to a carrier's ATM network backbone.
ATM Forum	This organization is a consortium of corporations who develop hardware and software products using ATM to facilitate the development, deployment, and standardization of ATM protocols and specifications.
ATM Forum Implementation Agreements	The formal documents use for the implementation of the standards for ATM specifications agreed on by the ATM Forum.
ATM interface management entities	See IME.
ATM terminal emulation interface	Terminal emulation is an application that follows an intelligent computing device to mimic the operation of a nonprogrammable terminal for communication with a mainframe computer or a minicomputer. This communication is made possible by inserting special printed circuit boards into the systemboard of the emulating device, and/or special software. The *PacketStar* PSAX 6-Port Multiserial module supports this interface.
ATM traffic policing	This software feature provides basic data on the amount and type of ATM traffic handled by the network.

ATM UNI	ATM user-network interface. The interface between a user's equipment and an ATM public network service or into an ATM switch on a private enterprise network.
ATM virtual channel	This type of channel provides a virtual connection that uses all the addressing bits of the cell header to move traffic from one link to another.
authentication	A procedure that establishes the legitimacy of users and defines the parameters of the sessions they establish. Authentication can be thought of as a security measure that controls and defines network access. It is always the first task performed when a session is started. The range of authentication parameters that can be set depend upon the specific authentication system employed.
automatic protection switching	See APS.
automatic switchback	An automatic return from the backup CPU module to the primary CPU module is performed by the system, after a fault line has been cleared.
available bit rate	See ABR.
AW	administrative weight. This parameter allows network architects to indicate relative link preference when deciding between alternate routes.

B

B channel	A channel that carries 56-Kbps or 64-Kbps of user data on a line using ISDN D-channel signaling.
B8ZS	bipolar 8-zero substitution. This encoding scheme is used for transmitting data bits over T1 transmission systems. This scheme is “smarter” than the B7ZS scheme, because it transparently adds a one-bit as needed to ensure that no more than seven zero-bits are ever transmitted in a row. However, unlike the B7ZS scheme, the B8ZS scheme provides a “clear channel” capability, which allows each of the 24 channels to carry 64 Kbps of data.

backbone	The portion of a communications network that carries the heaviest traffic and employs high-speed transmission pathways. In a wide area network (WAN), the backbone is that portion that links all the individual local area networks (LANs) together.
backhauling	A technique in which data traffic is transmitted beyond where it is needed and back. In fiber-optic data transmission, backhauling is a traffic management technique used to diminish the cost of multiplexing and demultiplexing.
backplane	A circuit board in a chassis in which various modules or components are connected to the central processing unit. Typically, a backplane runs at a very high capacity bandwidth, and carries a high number of connections, addressing information, and signaling. A backplane is also sometimes called the backplane bus.
backward direction rate	This rate is the rate of speed data transmissions take as they move toward the head-end of a broadband LAN.
bandwidth	The amount of data a channel can transmit in a given period of time. Bandwidth is measured in bits (not bytes) per second on digital networks, while on analog networks, it is measured in Hertz (cycles per second).
bandwidth classification	The types of bandwidth are narrowband, wideband, and broadband, and are used to describe the capacity of a communications channel. Narrowband generally refers to some number of 64 Kbps channels (Nx64) and provides aggregate bandwidth less than 1.544 Mbps (24x64 Kbps, or T1 rate). Wideband is 1.544 Mbps to 45 Mbps (T1 to T3 rate), while broadband operates at 45 Mbps (T3 rate) or higher.
basic rate interface	See BRI.
Bc	committed burst size. This parameter is used in frame relay, and is the maximum number of bits transferred during time interval “T.” Time interval “T” is the time interval over which the number of bits used to average the number of bits transmitted is averaged. The formula to calculate “T” is:Bc/CIR = T.
Be	excess burst size. This parameter is used in frame relay, and is the maximum number of uncommitted bits transferred during time interval “T”. The formula to calculate “T” is: Bc/CIR = T.

bearer channel	This basic communication channel has no enhanced or value-added services other than bandwidth transmission capability.
Bellcore (this organization is now known as Telcordia Technologies)	The research and development arm formed by the Regional Bell Operating Companies (RBOCs). Bellcore, now Telcordia Technologies, focused on developing standards and procedures for the RBOCs. A prime example is the Bellcore standard NEBS, Network Equipment Building Standards. Network carriers who interoperate with RBOCs typically are required to obtain Level 3 NEBS compliance on their telecommunications equipment.
BER	bit error rate. This parameter is the ratio of error bits to the total number of bits transmitted, usually expressed as a number to the power of 10.
binaries	Software programs written in binary, machine-readable code that has been compiled or assembled.
bipolar 8 Zero substitution	See B8ZS.
B-ISDN	Broadband Integrated Services Digital Network. This type of communications channel has the capability to integrate any type of communications signals (voice, data, image, or multimedia) and carry them over a single broadband channel at 150 Mbps, and higher.
bit	The term indicating a binary digit, which represents the value high or low, or yes or no. A bit is written as either the value zero or the value 1.
bit error rate	See BER.
bit stuffing	The technique of inserting a zero-bit into a string of one-bits to prevent the receiver from interpreting the series of one-bits as something else, such as a flag control character. The sender inserts the zero-bit automatically, and the receiver automatically deletes it.
BITS	building integrated timing supply. A single-building master timing that provides and distributes timing to a wireline network's lower levels.
bits per second	See bps.

block-error correction scheme	This scheme provides a method for accomplishing forward error correction (FEC) to compensate for error bursts created in data transmission. This method is done by specifying a polynominal that plots, or statistically samples, a large number of points in a data block.
bps	bits per second. This unit of measure indicates the number of bits transmitted every second during data transmission.
BRI	basic rate interface. This interface is composed of two B-channels (bearer channels) at 64 Kbps and a data D-channel (data channel) at 16 Kbps. The bearer B-channels are designed for PCM voice, slow-scan video conferencing, Group 4 facsimile data, or other types of data that can fit into a full-duplex 64,000 bps channel. The D-channel used to receive information about incoming calls and to transmit information about outgoing calls. It is also used for accessing slow-speed data networks, such as packet-switched networks.
bridge	A link that connects several LANs, but provides no routing. Each bit of information is transferred to all other bridges on the LANs, which creates the potential for a bridge to clog a network. Routers have generally replaced bridges.
bridging	A link across a circuit that is made by placing one test lead from a test set or a conductor from another circuit and placing it on one conductor of another circuit, and then doing the same thing to the second conductor.
broadband	In a WAN environment, a description of a transmission capability greater than 45 Mbps (T3 rate), that frequently operates on a fiber- optic transmission line.
Broadband Integrated Services Digital Network	See B-ISDN.
bucket	A discrete sample of data.
building integrated timing supply	See BITS.
burst errors	Transmission errors that occur when data is transmitted in short spurts.
bursty	A reference to data that is transmitted in short spurts. Traffic over a local area network is usually bursty.

bus	1. An electrical connection allowing two or more wires or lines to be connected together. Common in electrical and computer use. 2. Broadcast and Unknown Server (an ATM term), working in conjunction with a LAN emulation server, the bus automatically registers and resolves differences between LAN MAC addresses and ATM addresses by labeling each device transmission with both addresses.
byte	A series of consecutive binary digits operated upon as a unit.

C

CAC	connection admission control. The set of actions a network takes during a call setup or renegotiation phase that determine whether to accept or reject a connection request.
CAD/CAM	Computer Aid Design/ Computer Aided Manufacturing. A computer and its related software and terminals that is used to design and manufacture things. CAD terminals are often run over LANs and/or WANs.
call control	A term used by the telephone companies to describe the setting up, monitoring, and tearing down of telephone calls. First Person Call Control is done by a person or a computer via a desktop telephone, or a computer attached to that telephone, or the computer attached to the desktop phone line. Third-party call control controls the call through a connection directly to the switch (PBX).
call controller	A device that sets up, monitors, and tears down telephone calls.
call establishing procedure	See CEP.
call multiplexing	When a Multiservice Media Gateway switches back and forth between a number of instruction sequences so rapidly it seems like several tasks are being executed simultaneously. This rapid switching means that no one transaction can overload the Multiservice Media Gateway while other transactions have their service requests neglected.

call states	A condition that exists on both the user side and the network side of the transaction. They define which messages can be accepted by the user or the network entity, and how they are expected to react to those messages. As the user or network entity moves from call state to call state, the call switching process is accomplished.
caller ID	A service, offered by local telephone companies, that displays the calling party's number on a special display device.
CAPs	Competitive Access Providers. Businesses that compete with the local telephone networks.
carrier-grade	The classification for a device that has passed safety and environmental compliance certifications and has "4-9s" or "5-9s" reliability (i.e., 99.99% online during 1 year, or 99.999% online during 1 year). Reliability is obtained by having redundant power supplies, clocks, CPUs, etc., as well as protected trunk lines. For example, if a fiber gets cut by a backhoe, the traffic automatically switches to a different fiber.
CAS	channel-associated signaling. Signaling in which the signals necessary to switch a given circuit are transmitted via the circuit itself, or via a signaling channel permanently associated with it.
CBR	constant bit rate. An ATM service that supports a constant or guaranteed rate to transport services such as video or voice, as well as circuit emulation. CBR requires rigorous timing control and performance parameters.
CCITT	Consultive Committee for International Telephony and Telegraphy, formerly known as the United National International Telecommunications Union, or ITU. This organization establishes technical recommendations for telephone and data transmission.
CCS	common-channel signaling. A high-speed, packet-switched communications network, distinctive from public packet switched and message networks. CCS is used to carry addressed signaling messages for individual trunk circuits and/or database-related services between signaling points in the CCS network.
CD-ROM	Compact Disk, Read-Only Memory. A disk on which large amounts of digitized read-only data can be stored.

CE	1. circuit emulation. A connection over a virtual channel-based network which provides service that is indistinguishable from a real, point-to-point, fixed bandwidth circuit. 2. Communities European. See EC for additional information. 3. connection end point. An ATM term.
cell	The fixed-length packet used to carry data across an ATM network. A cell consists of 53 bytes, five of which carry header information.
cell delineation	An instance when an idle cell with header error correction is transmitted when there are no real cells to send. Indicator bits 14 or 15 are used to indicate Loss of Cell Delineation to a Central Office. The receiver will then drop both idle and unassigned cells.
cell encoding	Based on a user-selected encoding rate for the connection, cell encoding occurs when source-data cell payloads are divided into six blocks and fed into a Reed Solomon encoder. The encoded cells are then executed by the CPU module on the cell payload data destined for noisy interfaces.
cell extraction	The removal of a cell from a data stream.
cell header	A cell header precedes payload data (user information) in an ATM cell. The header contains various control data specific to the cell switching protocol.
cell loss margin	See CLM.
cell loss priority	See CLP.
cell payload	A cell data field, block, or stream being processed or transported. Also, sometimes a reference to the part of a cell that represents information useful to the user, as opposed to system overhead information. A cell payload includes user information and may include such additional information as user-requested network management and accounting information.
cell scrambling	A function that moves the first three bytes of the cell header (GFC, VPI, and VCI fields) into the payload and spreads them out to protect against burst errors. This action increases the burst error tolerance of the header from 5 bits to 54 bits with no cell loss.

cell-aging	A capability that prevents the lowest-priority data (for example, IP data) from being buffered in the PSAX system indefinitely. The AQueMan algorithm keeps track of how long each cell stays in the buffer. The lower the priority of the traffic, the longer its cell-aging timer; that is, UBR traffic has a longer cell-aging period than VBR-RT traffic. This capability allows the PSAX system to periodically send low-priority cells through the network, which prevents retransmission of IP data traffic while increasing the time-out window for the TCP/IP sessions. The cell-aging mechanism allows for orderly decongestion of the network without resorting to traffic rerouting and other complicated protocols and procedures.
cell-bearing	Cell information moved over a communications channel.
central office	See CO.
Central Processing Unit	See CPU.
CEP	call establishing procedure. A procedure that defines how the bits of a PCM carrier system of the 32 channel European type T1/E1 will be used, and in what sequence. In order to correctly receive the transmitted information, the receiving end equipment must know exactly what each bit is used for.
CES	circuit mmulation service. An ATM Forum interoperability specification which supports CBR (constant bit rate) over ATM networks and complies with other ATM specifications. This specification also supports the emulation of existing time division multiplexing (TDM) circuits over ATM networks.
channel	A voice-grade transmission facility with defined frequency response, gain, and bandwidth (i.e., a DSPx voice processing module hardware chip).
channel-associated signaling	See CAS.
channel service unit	See CSU.
channel suppression	The inhibition of a portion of a line's bandwidth.
channel tunneling	A way of overcoming protocol restrictions on a network by encapsulating channels that use one protocol inside channels that use a protocol supported by the network.

channelization	A process that subdivides the bandwidth of a circuit into smaller increments called channels. Typically, each channel would carry a single transmission, such as voice only or data only. Channelization requires either a frequency division multiplexer or a time division multiplexer.
channelized circuit emulation service	A virtual DS1 port that is subdivided into 24 DS0 channels that provides a connection over a virtual channel-based network, providing service to the end use that is indistinguishable from a real, point-to-point, fixed bandwidth circuit.
channelized digital signals	Subdivided digital signals.
characters per second	See cps.
chassis	A reference to the physical hardware, frame, and motherboard into which are inserted the power supply, stratum, CPU, and I/O modules. The supporting legs and brackets are not considered to be part of the chassis.
checksum	The sum of a group of data items used for checking errors.
chip	Short for microchip, an very complex, yet tiny module that stores computer memory or provide logic circuitry for microprocessors. A chip is manufactured from a silicon (or, in some special cases, a sapphire) wafer, which is first cut to size and then etched with circuits and electronic devices. A chip is also sometimes called an IC or integrated circuit.
chipset	A group of microchips designed to work and be sold as a unit that performs one or more related functions.
CIR	committed information rate. The speed at which a frame relay network agrees to transfer information under normal conditions, averaged over a minimal increment of time. CIR is measured in bits per second.
circuit emulation	See CE.
circuit emulation service	See CES.
circuit mode data	Data that travels across a fixed bandwidth circuit established from point-to-point through a network, and is held for the duration of a telephone call.

circuit-switched network	A network that sets up and maintains a connection for the exclusive use of two or more communicating parties for the duration of their call. The familiar, voice telephone network is circuit-switched.
clear channel	A digital circuit where no framing or control bits are required, thus making the full bandwidth available for communications.
CLEC	Competitive Local Exchange Carrier. A type of business permitted by the Telecommunications Act of 1996. CLECs offer local exchange service, long distance, internal, Internet access and such entertainment as video on demand. These carriers include cellular/PCS providers, ISPs, IXCs, CATV providers, CAPs, LMDS operators, and power utilities. They compete with ILECs.
CLI	command line interface. The visual appearance and command input conventions that enable system administrators and system operators to configure, monitor, and manage the connected nodes in a data network.
CLM	cell-loss margin. A negotiated Quality of Service parameter in an ATM network. This parameter indicates the margin of error of lost cells to total transmitted cells.
CLP	cell loss priority. A bit in the ATM cell header set to 0 or 1. CLP=1 cells may be discarded in congested transmission to preserve the cell loss ratio of CLP=0 cells. Some service categories generate traffic flows with cell loss priority markings, CLP=0 (higher priority) and CLP=1 (lower priority). The network may follow models which treat this marking as transparent or significant. If the marker is significant, the network may selectively discard cells marked with low priority to protect the QoS of cells with high priority
CO	Central Office. The building that houses the switching equipment to which circuits of business and residence phones are connected.
coding translation	A means of transmitting the same data to a variety of different end-user devices. For example, voice messages that can be relayed on a telephone, or on a PC.

colocation	Typically, equipment housed at the same site.
comfort noise	A very low-level synthesized white noise deliberately added to a digital line to give a comforting "hiss" to the connection, which assures the consumer the connection is active.
command line interface	See CLI.
committed burst size	See Bc.
committed information rate	See CIR.
common-channel signaling	See CCS.
community name	The name given to an SNMP community for identification purposes. A member has associated access rights (read-only or read/write).
competitive access providers	See CAPS.
competitive local exchange carrier	See CLEC.
composite clock	A timing reference for multiplexer output that includes all data from multiplexed channels that is based on an oscillator-generated signal.
compressed voice	The act of reducing a voice signal to use less bandwidth during transmission. This is done when a voice analog signal is sampled through the use of an algorithm, and converted to a digital signal.
compression	The act of reformatting information so fewer bits are necessary to represent it.
configurator	A user that has read-write capabilities on PSAX devices when using the AQueMan system, but the capabilities are subordinate to the Administrator.

conformance type	The type of traffic control option used for ATM cells. A traffic descriptor combination that specifies which traffic parameters are used for traffic control; determines the number and type of cells that are admitted into a congested queue; and determines whether high-priority cells are tagged as low-priority cells when traffic exceeds the traffic parameter thresholds.
congestion	The point where devices in a network operate at the highest utilization.
congestion control parameters	Techniques used in a network to prevent and react to temporary excessive demands for resources.
congestion management	The ability of a network to effectively deal with heavy traffic volumes.
Conjugated Structure- Algebraic Code Excited Linear Predictive Voice Coding	See CS-ACLEP.
connection admission control	See CAC.
connection gateway	Software that allows an external device to interconnect to the *PacketStar* Multiservice Media Gateway systems and act as an adjunct processor to handle IDSN, SS7 signaling, and other call control.
connectivity	The degree to which any given computer or application can cooperate with other network components in a shared-resource network environment.
connector	A device connecting wires or fibers in cable either to equipment or to other wires or fibers.
connector pin	The contacts protruding from a male connector.
constant bit rate	See CBR.
Consultive Committee for International Telephony and Telegraphy	See CCITT.

continuity check	A test to determine whether electrical current flows continuously throughout the length of a single wire which is grouped with other individual wires in a cable.
continuity check tone	A single frequency of 2000 Hz which is transmitted by the sending exchange, and looped back by the receiving exchange. The reception of the returned signal indicates the channel is working.
control outputs	Devices that route the input control signal to the selected output.
core events	Specific data received (events) on any of the core switches.
core switch	A Broadband Switching System (BSS) which is located in the core of the network. Conceptually equivalent to a Tandem Office in the voice world, a core switch serves to interconnect "edge switches," which provide user access to the broadband network much as Central Offices do in the circuit switched voice world.
core switch trap	The notification of a problem within a core switch.
CPE	Customer Premises Equipment. In Lucent's line, the PSAX 15 through the PSAX 600, versus the PSAX 1250 and 2300 which are designed for central office use (although customers could use them in home offices).
cps	characters per second. Note: Formerly, this was the abbreviation for cycles per second, the unit used to express frequency. However, hertz is the proper unit for frequency.
CPU	Central Processing Unit. The computing part of a computer which manipulates data and processes instructions coming from software or a user.
crankback	A mechanism which partially releases an ATM connection setup in progress, but has encountered a failure. The use of this mechanism allows PNNI to perform alternate routing.

CRC	cyclic redundancy check. A method of error detection using cyclic redundancy code. Based on the contents of the message transmitted, a CRC value is generated at the transmitting terminal. An identical CRC generation is performed at the receiving terminal, and any mismatch indicates the message was received incorrectly.
CRC error	A condition that occurs when the CRC in a frame does not agree with the CRC frame received from a network.
CRC-MF	cyclic redundancy check-multifrequency. A process used to check the integrity of a block of data.
crosstalk	This phenomena is occuring when you hear someone you did not call talking on your telephone line to another person you did not call. It can be the result of faulty wire placement, shielding, or transmission techniques.
CS-ACELP	conjugated structure - algebraic code excited linear predictive voice coding, (ITU-T G.7290). A voice compression standard that uses algebraic expressions instead of numbers for each set of voice samples. This technique results in better than 2:1 compression at 8 Kbps. It is used on packet switched data networks.
CSU	channel service unit. Along with a Data Service Unit (DSU), a CSU is a component of Data Circuit-terminating Equipment (DCE). A CSU connects a digital telephone line to a customer's network-access equipment. It can be built into the network interface of the network-access equipment, or it can be a separate device. The CSU terminates the connection at the user's end and processes digital signals. It also prevents a faulty DSU from interfering with data transmissions on the digital line.
CTR	current transfer ratio. The ratio of output collector current to the forward LED input current, times 100.
current transfer ratio	See CTR.
customer premises equipment	See CPE.
cyclic redundancy check	See CRC.

Cyclic redundancy check-multifrequency	See CRC-MF.

D

D Channel	In an ISDN interface, the D channel is the data channel that carries control signals and customer call data in a packet switched mode. The B Channel is used for voice.
D4 framing	A common framing format in the T-1 environment. The name stems from the way framing is performed in the D-series of channel banks from AT&T. There are 12 separate 193-bit frames in a super-frame. A D-4 framing bit is used to identify both the channel and the signaling frame. In D-4 framing, signaling for voice channels is carried in-band by every channel, along with the encoded voice.
data bits	In asynchronous transmission, the bits that contain the data being sent (also known as payload).
data communications equipment	See DCE.
data link	Any serial data communications transmission path, without any intermediate nodes, that is generally between two nodes or devices.
data link connection identifier	See DLCI.
data link control	A standard method for sending data over a single communications link.
data service unit	See DSU.
data service unit/channel service unit	See DSU/CSU.
data terminal equipment	See DTE.
datagram	A logical grouping of information which is sent as a network layer unit over a transmission medium prior to establishing a virtual circuit.

DB-25	The standard 25-pin connector used for RS-232 serial data communications. This connector has 13 pins in one row, and 12 in the next.
DBCES	dynamic bandwidth circuit emulation service. This feature is used with voice PVC connections to best utilize the available network bandwidth. Based on ABCD signaling-bit information, it allows channels to be dynamically allocated as needed. The implementation of DBCES is Lucent proprietary. The firmware supports 1x56 kbps time-slot trunking with channel-associated signaling (CAS) detection used, based on ATM Forum Specification af-vtoa-0085.000. It should be noted this feature is not fully compliant with the specification and does not interoperate with other devices that are fully compliant.
DBS	Direct Broadcast Satellite. A satellite that sends relatively powerful signals to small (generally 18-inch) dishes installed at homes.
DC	Direct Current. A flow of electricity always in the same direction.
DCE	Data Communications Equipment. An interface standard between computers and printers. DCE works like data terminal equipment, except pins 2 and 3 are reversed.
debouncing	*Bouncing* is the tendency of any two metal contacts in an electronic device to generate multiple signals as the contacts close or open; *debouncing* is any kind of hardware device or software that ensures that only a single signal will be acted upon for a single opening or closing of a contact.
demodulate	To recover a signal from a modulated carrier that has essentially the same characteristics as the original modulating signal.
designated transit lists	See DTL.
destination address	The address portion of the packet that identifies the destination node.
device tree	The left pane in the main *AQueView*® window, which allows a user to access configuration and provisioning menus for all open PSAX devices.

DHPVC	Dual-Homed Permanent Virtual Circuit. A virtual circuit that is connected to the network through two independent access points.
digital loop carrier	See DLC.
digital loop carrier system	A system that concentrates analog local loop lines, digitized, and multiplexed calls for transmission to the central office.
digital service interface	An interface that enables the implementation of digital service circuits with the network interface. It is defined at a point where the signal has not yet been reshaped into a standard digital signal.
digital signal processor	See DSP.
digital signal, level 1	See DS1.
digital signal, level 3	See DS3.
digital signal, level zero	See DS0.
digital subscriber line access multiplexer	See DSLAM.
digital subscriber lines	See DSL.
DIP switch	Dual In-line Position switch. A small switch used to select the operating mode of a device.
direct broadcast satellite	See DBS.
direct current	See DC.
direct serial connection	A direct connection through a serial port to another computer.
DLC	Digital Loop Carrier. Network transmission equipment used to provide pair gain on a local loop, by deriving multiple channels, typically 64 Kb, from a single 4-wire distribution cable running from the central office to a remote site.

DLCI	Data Link Connection Identifier. A frame relay term which defines a 10-bit field within the address field that includes committed information rate, committed burst size, committed rate measurement interval, and excess burst size.
DMA interface	Direct Memory Access Interface. A fast method of moving RAM which in turn, speeds processing.
downstream node	A reference to the relative position of two nodes in a LAN topology. A node is downstream if it receives data signals after the previous node.
DS0	digital signal, level zero. The North American Digital Hierarchy signaling standard for transmission at 64,000 bits per second. DS0 is the basic building block of the DS hierarchy, equal to one voice conversation digitized over PCM. There are 24 DS0 channels in a DS1.
DS1	digital signal, level 1. The North American Digital Hierarchy signaling standard for transmission at 1.544 million bits per second. Based on an old Bell System standard, DS1 is the equivalent of T1, which supports 24 voice conversations, each encoded at 64 Kbps, or 1.544 million. Outside the US, E1 designations are used which start at 2.048 million bits per second.
DS1 circuit-emulation service	A configuration that interfaces with TDM channelized DS1 circuits by converting the channelized digital signals (usually voice data) to ATM virtual channels.
DS3	digital Signal, level 3. The North American Digital Hierarchy signaling standard transmission at 44.736 Mbps that is used by a T3 carrier. DS3 supports 28 DS1s plus overhead. In a channel application, it supports 672 channels, each at 64 kbps.
DSL	Digital Subscriber Lines. A family of evolving services local telephone companies provide their local subscribers. DSL is also synonymous with a ISDN BRI channel which offers up to 8 million bits per second downstream to the customer, and somewhat slower service from the customer back to the telephone company.

DSLAM	Digital Subscriber Line Access Multiplexer. Technology installed in the telephone company's central office that links through the line to a box in the customer's home or office. When a PC and telephone are plugged into the box, the DSLAM provides both telephone service and high-speed Internet service.
DSP	Digital Signal Processor. A specialized digital microprocessor that performs calculations on digitized signals that were originally analog (for example, voice) and then sends the results on. DSPs are used extensively in telecommunications for tasks such as echo cancellation, call process monitoring, voice processing and for the compression of voice and video signals.
DSU	Data (or digital) Service Unit. A device designed to connect data terminal equipment to a digital phone line, thus allowing fully digital communications.
DSU/CSU	Data Service Unit/Channel Service Unit. Devices that are used to access digital data channels.
DTE	Data Terminal Equipment. Equipment to which DCE (Data Communications Equipment) is connected, such as personal computers or data terminals. As defined in the RS-232 specification, DTE refers to application equipment, such as a video-conference terminal or LAN bridge or router, while DCE refers to equipment such as network access equipment.
DTL	Designated Transit List. A list of nodes and optional link IDs that completely specify a path across a single PNNI peer group.
DTMF	dual-tone multi-frequency. Also known as “touchtone”, a specification for the double audio signals generated through touch-tone telephones and auto-dial modems.
dual in-line position switch	See DIP switch.
dual-bus	A pair of parallel buses arranged so the direction of data flow in one bus is opposite to the direction of data flow in the other bus.
dual-homed permanent virtual circuit	See DHPVC.

dual-tone multi-frequency	See DTMF.
duplex	Simultaneous two-way transmission in both directions.
dynamic bandwidth circuit emulation service	See DBCES.

E

E1	The European equivalent of the North American 1,544 Mbps T1, except that E1 carries information at the rate of 2.048 Mbps. This rate is used by the European Conference of European Postal and Telecommunication Administrations (CEPT) carriers to transmit 3064 Kbps digital signals for voice or data calls, plus a 64 Kbps channel for signaling, and a 64 Kbps channel for framing and maintenance.
E3	A CEPT signal which carries 16 CEPT E1 circuits and overhead at an effective data rate of 34,368 Mbps or 512 simultaneous voice conversations.
E4	A signal which carries four E3 channels, or 139,264 million bits per second, or 1920 simultaneous voice conversations.
EC	European Community, also known as the Common Market. Member nations are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom.
echo cancellation	A method of controlling speaker echo on long haul digital trunks. An echo cancellation system monitors the transmitted signal, digitally predicts the echo, then cancels it by subtracting the prediction from the received signal.
echo canceller	Equipment that removes the echo introduced into a voice call by telephone handsets and is further handicapped by network delay.
EDGE	enhanced data rates for global evolution. A final stage in the devolution of data communications within the existing GSM standards, supporting data transmission rates up to 384 Kbps. EDGE is also anticipated to be used with IS-136 TDMA networks in the US.

edge node	The closest node to the perimeter of the customer's network, but still inside the customer's network. After a transmission leaves this node, it is in the ATM cloud and has to make its own way through switches and nodes not under the control of the originating network.
edge switch	A Broadband Switching System located at the edge of the network; the first point of user access and the final point of exit.
EEPS	End-to-End Provisioning Server. A server that provides service-level provisioning, and allows a network management system to issue commands that will set up connections to go throughout the network without needing to set up connections on each individual switching device.
egress	The direction of traffic leaving a device (for example, sent out of the line card).
electromagnetic interference	See EMI.
electrostatic discharge	See ESD.
Element Management System	See EMS.
embedded operations channel	See EOC.
EMI	electromagnetic interference. Any electrical or electromagnetic phenomenon, synthetic or natural, that results in unintentional and undesirable responses from, or performance degradation or malfunction of,electronic equipment.
EMS	Element Management System. A system that manages, or controls, a network element. EMS is in the layer below NMS.
encapsulation	The process of wrapping information into another protocol for transport across a network.
end point	A network element at the end of the network.
end-to-end provisioning	Service-level provisioning that allows a network management systems (NMS) to issue commands that will set up connections to go throughout the network, without setting up connections on each individual switching device.

end-to-end provisioning server	See EEPS.
enhanced data rates for global evolution	See EDGE.
enterprise provider	A business that provides network services such as colocation, high speed Internet access and network management services.
EOC	Embedded Operations Channel, a dedicated communications channel, similar to TMC, which allows remote OAM control. The EOC is frequently found in timeslot 12 of the first and second DS1 circuits (for redundancy).
error rate	The ratio between the number of bits received incorrectly and the total number of bits in the transmission.
errored	The state of having a value or condition that is inconsistent with the true, specified, or expected value or condition.
errored path	A faulty link between two nodes in a network.
error-tolerant addressing scheme	A way to protect the cell header by establishing multiple virtual circuits to the same destination. The addresses for the circuits are within the error space of the principal address used for actual transmission. Thus, the most probable error patterns occurring in the address field simply changes the address to another valid one.
ESD	electrostatic discharge. The release of a built-up electrical charge from an electronic component such as a printed circuit board.
ESF	extended superframe format. A T1 framing standard used in wide area networks grouping 24 (rather than 12) frames together.
Ethernet	A local area network that connects computers, printers, terminals, workstations, and servers within the same building or campus. Operating over twisted wire or coaxial cable, it is capable of carrying over ten million Bps.

Ethernet address	A 48-bit number physical address. Each Ethernet address is unique to a specific network module or PC on a LAN which forms the basis of a network-addressing scheme.
Ethernet bridge	A device that controls data packets within a subnet in an attempt to cut down the amount of traffic. A bridge is usually placed between two separate groups of computers that talk within themselves, and occasionally to computers in another group.
ETSI	European Telecommunications Standards Institute. Equivalent to ANSI. ETSI is creating a single European telecommunications system as part of the single European market program.
European Telecommunications Standards Institute	See ETSI.
events browser	The events browser is a view of the received events contained in *AQueView's* ® $OV_LOG/trapd.log and $OV_LOG/trapd.log.old.
events log	The HP OpenView Events Log is a central repository for all incoming events received by the NNM ovtapd background process.
excess burst size	See Be.
extended superframe format	See ESF.

F

facility interface code	A numerical code designating a facility interface.
fault monitoring	In network management, the set of functions that (a) detect, isolate, and correct malfunctions in a telecommunications network, (b) compensate for environmental changes, and (c) include maintaining and examining error logs, accepting and acting on error detection notifications, tracing and identifying faults, carrying out sequences of diagnostics tests, correcting faults, reporting error conditions, and localizing and tracing faults by examining and manipulating database information.

fax demodulation/remodulation	A technique for taking a Group III fax signal and converting it from, or back to, its original 9.6 Kbps. For example, when a sheet of paper is inserted into a fax machine, the fax machine scans that paper into digital bits -- a stream of 9600 bps. Then, for transmission over phone lines, that 9.6 Kbps is converted into an analog signal. But if you wish to transmit the fax signal over a digital line, then it makes sense to convert it back to it's original 9.6 Kbps. In essence, this mean you can put several fax transmissions on one 56 Kbps or 64 Kbps line -- the capacity you'd normally need if you transmitted one voice conversation, or one analog fax transmission.
FEC	forward error correction. A combination of functions designed to protect data transmission in a noisy communications environment, such as traffic transmitted across satellite and line-of-sight radio-frequency circuits. Most of these types of circuits transmit at the rate of 2.048 Mbps or slower. The three stages of FEC are multiple redundancy addressing, cell encoding, and cell scrambling.
fiber optic cable	Fiber made of extremely pure glass. To date, the best option for voice/data/video communications, being faster and less resistant than metal.
FIFO	First In, First Out. A buffering scheme in which the first byte of data that enters the buffer is also the first byte received by the CPU.
file transfer protocol	See FTP.
firmware	Software which is kept in semipermanent memory, and is usually stored in PROMS (programmable read-only memory) or EPROMS (electrical PROMS). Firmware is used in conjunction with hardware and software and shares the characteristics of both. It contains software which is so constantly called upon by a computer or phone system that it is written into a chip electrically, at higher-than-usual voltage, causing the bits to retain the pattern as it is "burned in."
fixed-rate connection	A connection whose QoS is determined by a consistent monthly rate.

flash	A type of nonvolatile memory. Flash memory is functionally similar to EPROM memory, but it must be erased in blocks, whereas EPROM can be erased one byte at a time. Because of its block-oriented nature, flash memory is commonly used as a supplement to, or a replacement fork in, hard disks in personal computers.
flash hook	The button which is depressed when you put the telephone receiver back in the cradle. Also called a switch hook, it releases the line to receive another call.
flash signaling	Signaling transitions from off-hook to on-hook, where the on-hook state lasts between 300 msec and 1000 msec.
flash-capable trunk	A means of switching between one phone line and another by depressing a telephone's flash button.
flow control	The buffering that turns a device on and off in order to stop or reduce data loss during transmission.
flow-through provisioning	This method is similar to end-to-end provisioning, except that the commands originate at a higher-level order management system, which sends commands, or orders, to flow through the network. To use flow-through provisioning, an interface such as an API must be present below the NMS.
foreign exchange office	See FXO.
foreign exchange service	See FX.
foreign exchange station	See FXS.
forward direction	The direction of data away from the head-end of a broadband LAN.
forward error correction	See FEC.
FR	frame relay. A form of packet switching, which uses smaller packets and less error checking than traditional forms of packet switching (such as X.25). This international standard is used for efficiently transmitting high-speed, bursty data over wide area networks (WANs).
frame relay	See FR.

Frame Relay Forum	Based in Foster City, CA, this organization of frame-relay equipment vendors, carriers, and users was formed in 1991 to speed the development and deployment of frame relay products and interfaces with other broadband technologies such as ATM.
Frame Relay Implementation Agreement	See FRF.
frame relay policing	The prevention of frame relay traffic congestion through the discard of packets that exceed specified traffic parameters.
Frame Relay/ATM Network Interworking Implementation Agreement	See FRF.5.
Frame Relay/ATM PVC Service Interworking Implementation Agreement	See FRF.8.
framing	The data-formatting conventions that allow a receiver to synchronize with the transmitting end of a circuit. For example, T-1 frames contain an 8-bit sample from each of the 24 channels on the interface (192 bits total) plus a framing bit (for a total of 193 bits). Each framing bit marks the end of a timed sample the input at the transmission end.
framing-bit	A bit used for frame synchronization purposes. A bit at a specific interval in a bit stream is used to determine the beginning or end of a frame. Framing bits are non-information-carrying bits used to make possible the separation of characters in a bit stream into lines, paragraphs, pages, channels, etc. The framing in a digital signal is usually repetitive.
frequency shift keying	See FSK.
FRF.*x*	A reference to a voice over Frame Relay Implementation Agreement, which specifies how frames are relayed.
FRF.1.1	User-to-network (UNI) Implementation Agreement. The interoperability standard adopted by the ATM Forum to define connections between users or end stations and a local switch.

FRF.2.1	Network-to-network (NNI) Implementation Agreement. The interoperability standard adopted by the ATM Forum which describes the transfer of C-Plane and U-Plane information between two network nodes belonging to two different frame relay networks.
FRF.5	Frame Relay/ATM Network Interworking Implementation Agreement. The interoperability standard adopted by the ATM Forum which defines a standard way to carry out frame relay traffic across an ATM backbone. This specification is dependent on the encapsulation of frames carried by the frame relay network.
FRF.8	Frame Relay/ATM PVC Service Interworking Implementation Agreement. The interoperability standard adopted by the ATM Forum which defines a standard way for a frame relay site to communicate with an ATM site; it depends on conversion of the frames into ATM cells.
FSK	frequency shift keying. A modulation technique for translating 1's and 0's into something that can be carried over telephone lines, such as sounds.
FTP	file transfer protocol. A program that allows users to quickly transfer text and binary files to and from a distant or local PC, list directories, delete and rename files on the foreign host, and perform wildcard transfers between hosts.
FX	foreign exchange service. A service that provides local telephone service from a central office which outside (foreign to) the subscriber's exchange area.
FXO	foreign exchange office. A service provided by the local telephone company from a central office outside the subscriber's exchange area, that is provided by a foreign exchange (FX) trunk line.
FXS	foreign exchange station. The connection configuration between an FXO and a POTS.

G

gateway	A shared connection between a LAN and a larger system, or a large packet-switched network whose communication protocols differ.

Gb	gigabit, 10^9 bits
GB	gigabyte, a unit of physical data storage equal to 1,073,741,824 bytes.
Gbps	gigabits per second
GBR	guaranteed bit rate
GCAC	generic connection admission control. A process that determines if a link has enough resources to support a connection.
generic connection admission control	See GCAC.
generic flow control	See GFC.
GFC	generic flow control. A field in the ATM header which can be used to provide local functions (e.g., flow control). It has local significance only and the value encoded in the field is not carried end-to-end.
GFR	guaranteed frame rate. A service that provides minimum cell rate guarantees and fair access to excess bandwidth left over from higher-priority services.
GMT	Greenwich Mean Time. The former name for mean solar time at the original site of the Royal Observatory in Greenwich, England, which is located on the prime meridian. GMT is now called Coordinated Universal Time.
GR-303	The Telcordia Technologies General Requirements 303 (GR-303) standard provides for both an open interface network architecture and a digital loop carrier system that operates on T1 circuits. This standard allows a remote terminal such as a central office *PacketStar* PSAX Multiservice Media Gateway to interface with a central office voice switch, such as the Lucent Technologies 5ESS switch.
graphical user interface	See GUI.
Greenwich Mean Time	See GMT.

guaranteed bit rate	See GBR.
guaranteed frame rate	See GFR.
GUI	graphical user interface. This type of user interface uses graphics such as windows, icons, pull-down menus, and a pointer icon; for example, the Windows, Macintosh, and UNIX operating systems use this interface.
GX 550	A member of the Lucent Multiservice WAN switch family that offers a wide array of core and access capabilities such as native frame relay, IP and MPLS multi-protocol label switching (MPLS).

H

handshake	An exchange of predetermined control signals for establishing a session between a computer and a modem.
HDLC	high-level data link control. An ITU-TSS link layer protocol standard for point-to-point and multipoint communication. In HDLC, the control information is always placed in the same position, and it uses specified bit patterns dramatically different from the data, thus reducing the likelihood of confusion.
header	The initial part of a data block, packet, or frame, which provides basic information about how to handle the rest of the block, packet, or frame.
header error correction	See HEC.
heartbeat	An Ethernet-defined signal quality error (SQE) signal quality test function, as defined in IEEE 802.3. Heartbeat is created by a circuit (normally part of the transceiver) that generates a collision signal at the end of a transmission. This signal is used by the controller interface for self-testing.
HEC	header error control (or correction). A code located in the last byte of an ATM header. It is used to check the integrity of the cell header at the various cell switches.
HELLO	A routing protocol that allows trusting packet switches to discover minimal delay routes.

hertz	See Hz.
hexadecimal	A numbering system using any of the following 16 characters: 0 to 9 and A to F.
high-level data link control	See HDLC.
horizontal link	A link between two logical ATM nodes belonging to the same peer group.
hot-swappable	A feature that allows the user to install, or remove I/O and server modules in the PSAX system without interrupting its operations.
HP OpenView	A Hewlett-Packard application often referred to in Release Notes with the *AQueView*® system.
hub	A wiring device that has multiple connections of network and internetworking modules. Active hubs amplify or repeat signals to extend a LAN's distance, while passive hubs split up the transmission signal, allowing the administrator to add users to a LAN.
hybrid connection configuration	A configuration that connects the "main router" Multiservice Media Gateway system directly to the "end system" Multiservice Media Gateway systems through ATM connections. These ATM connections can be tunneled through a number of switches to reach the "end system" Multiservice Media Gateway system. The "main router" of the Multiservice Media Gateway system is connected to the NMS machine through an Ethernet connection.
Hz	Hertz. A unit of measure of frequency in cycles per second.

I

I/O	input/output. The interrelated tasks computers do (in addition to processing) that provide information to the computer, perhaps by keyboard (input) and get the results of processing to the user, perhaps by a printer (output).
IBM SNA equipment	International Business Machines Systems Network Architecture. Computer network architecture equipment created by IBM.

IC	integrated circuit. A chip that contains electrical components -- such as transistors, resistors, and capacitors -- connected by wiring, to form a circuit designed to perform a specific task (or tasks).
ICMP	Internet Control Message Protocol, the IP portion of the TCP that provides the functions used for network layer management and control.
ICP - IMA communication (control) protocol	A rule or format for the transfer of cells within inverse multiplexing for ATM (IMA) groups.
IDT	Inter-machine Digital Trunk. A high-speed circuit between switches.
IEEE	Institute of Electrical and Electronic Engineers. A worldwide engineering publishing and standards-making body for the electronics industry.
IETF	Internet Engineering Task Force. The organization that coordinates the standards and specification development for Transmission Protocol/Internet Protocol (TCP/IP) networking.
IISP	Interim Inter-Switch Signaling Protocol. An ATM Forum defined protocol employing UNI-based signaling for switch-to-switch communication in private networks. Unlike PNNI, IISP relies on static routing tables and makes support for QoS an alternate routing option.
ILEC	Incumbent Local Exchange Carrier. One of the Baby Bell companies, for example.
ILMI	Integrated Local (or Link) Management Interface. A specification for network-management functions for the link between a public network and a private network, or between a user and a network.
IMA	Inverse Multiplexing over ATM. An access specification of the ATM Forum, used to link several low-speed transmission links, allowing a high-speed data stream to pass through the system.
IMA Communication protocol	See ICP.

IME	Interface Management Entity, two entities; either an end user and a public or private network, or a public network and a private network.
in-band management	A network management application that configures and manages an interface based on simple network management protocol (SNMP).
in-band signaling	Signals made of tones that pass through the voice frequency band and are carried by the same circuit as the talk path. These include requests for service, dialing, and disconnecting information.
incumbent local exchange carrier	See ILEC.
ingress	The incoming direction.
input/output	See I/O.
Input/output (I/O) module	A circuit pack which provides the electrical/optical ports into which incoming/outgoing facilities are connected; the network interface module.
Institute of Electrical and Electronic Engineers	See IEEE.
integrated circuit	See IC.
integrated local management interface	See ILMI.
integrated services digital network	See ISDN.
Integrated services digital network with primary rate interface service	See PRI ISDN.
interface	1. Hardware microprocessor (chip) on a DSPx voice processing module. Also see channel. 2. An end-to-end connection protocol that governs the transmission parameters of a configured port or channel interface. Examples: ATM UNI 4.0, PNNI, IISP.
Interface management entity	See IME.

intergrated services digital network user part	See ISUP.
interim inter-switch protocol	See IISP.
inter-machine digital trunk	See IDT.
intermediary node	Any device connected to a network that data must pass through in order to go from one end to another.
International Standards Organization	See ISO.
International Telecommunication Union	See ITU.
Internet	Originally developed by the U.S. Defense Department, the Internet has become the world's largest computer network. It is a packet-switched network, running on the TCP/IP protocol.
internet control message protocol	See ICMP.
Internet Engineering Task Force	See IETF.
Internet Protocol	See IP.
Internet service provider	See ISP.
intervening switch	If the call has to go through multiple switches to get to a destination, each of these switches is referred to as an intervening switch.
interworking	The ability to communicate between devices supporting dissimilar protocols, (such as between frame relay and ATM), by using translation between protocols rather than encapsulation. Many carriers are planning to add the equipment and conversion algorithms so networks can transparently convert frame relay to ATM and vice versa.
interworking function	See IWF.

intranet	A private network that uses Internet software and Internet standards.
Inverse multiplexing over ATM	See IMA.
IP	internet protocol. The most significant protocol on which the Internet is based. This software operates at the network level (Layer 3) of the OSI model and keeps track of the Internet's addresses for different nodes, routes outgoing messages, and recognizes incoming messages.
IP Address	A unique numerical identifier that is assigned by a system administrator to any station or other device that uses IP. Each address is a 32-bit string expressed in four octets in decimal notation, such as 323.34.45.67, with one portion for the network number and another the host address. The administrator sets the subnet mask to identify how much of the address applies to the network and how much applies to the host.
IP Mask	A range of IP addresses defined so that only machines with IP addresses within the range are allowed access to an Internet service.
IPO - internet PRI offload	The Lucent Softswitch Internet Primary Rate Interface (PRI) Offload (IPO) solution relieves traditional switch port congestion by offloading calls onto ATM networks. It serves as an intelligent bridge between network elements that speak different signaling protocols, and simplifyies the interworking between circuit-switched and data networks. With seamless connectivity and migration, the Lucent Softswitch IPO provides CLECs and ISPs with a true, carrier-class, high-availability platform with the scalability and performance of traditional circuit switches.
ISDN	Integrated Services Digital Network. A network that offers either a basic rate interface (BRI) at 144,000 bits per second, or a primary rate interface (PRI) at 1,544,000 bits per second. ISDN provides standard digital service capability that features one or more circuit-switched communication channels that are capable of carrying digital voice, data, or image signals over copper loop.
ISO	International Standards Organization. A group based in Switzerland that defines and/or adopts protocols widely used in the computer and telecommunications industries.

ISP	Internet Service Provider. A vendor who gives individuals and companies access to the Internet and the World Wide Web.
ISUP	Integrated Services digital Network User Part. The call control part of the SS7 protocol. It determines the procedures for setting up, coordinating, and taking down trunk calls on the SS7 network.
ITU	International TelecommunicationsUnion, the principal international telecommunications standards organization, a United Nations agency based in Geneva, Switzerland.
ITU-T	The Telecommunications Standardization Sector of the ITU.
IWF	InterWorking Function. A mechanism that mask differences in physical, link, and network technologies by converting (or mapping) states and protocols into consistent network and user services.

K

Kb	A kilobit, as defined as 1024 bits.
KB	A kilobyte, defined as 1024 bytes.
Kbps	Kilobits per second, the amount of data transferred in a second between two end points. For example, 1 Kbps is 1024 bits per second.
keep alive/heartbeat timer	A polling method a PSAX chassis uses to ensure connections are up; if not, it generates a system error message.
kilobit	See Kb.
kilobyte	See KB.

L

LAN	Local Area Network. A geographically localized network that includes both hardware and software and typically links personal computers, printers, file servers, and other peripherals.

LANET	Limitless ATM Network Protocol. The LANET protocol, couples with a simple error-tolerant addressing scheme, addresses the fundamental problem of noise in adapting ATM to low-speed environments. LANET permits application-dependent payload protection, that allows selective implementation of bandwidth-costly, forward-error-correction techniques. It is designed to identify and extract ATM cells at bit error rates as high as 10^{-2}.
LAPD	Link Access Procedure-D. A link level protocol devised for ISDN connections.
latency	The time it takes to get information through a network.
layer 2 bridging service	A way of moving LAN traffic at near wire speed through the use of an ATM which uses MAC addresses between the LAN segments on each side.
leaf	The receiving end of a connection.
LED	Light-Emitting Diode. A small solid-state light that shows hardware or firmware status.
LGN	logical group node. A peer group leader that represents and summarizes topology information needed to reach lower-level switches in a PNNI hierarchy.
light-emitting diode	See LED.
limitless ATM network protocol	See LANET.
line coding	The data format that lets either end of a communications channel correctly interpret messages from the other. Line coding systems specify the voltage levels and patterns that represent binary digits (1s and 0s), based on the requirements of the transmission network,
line loop	When the received signal is sent through the receiver and the line driver, and then back out to the originating point.

link	Another name for a communications channel or circuit. The ATM Forum defines a link as an entity that defines a topological relationship (including available transport capacity) between two nodes in different subnetworks. Synonymous with logical link.
link access procedure-D	See LAPD.
local exchange carrier	See LEC.
link jitter	A type of distortion found on analog communication lines, that results in data transmission errors. Also, a variation in the time it takes for a voice packet to traverse the link between the sending and receiving end points.
link management interface	See LMI.
link out of delay synchronization	See LODS.
LMI	Link Management Interface. A synchronous polling scheme used for the link management of a frame relay channel. It provides the user with dynamic notification of the addition and deletion of PVCs, and monitors each network connection through a periodic heartbeat keepalive polling process.
load balancing	The practice of splitting communication into two (or more) routes. By balancing traffic on each route, communication is faster and more reliable.
load sharing	The technique of using two computers to balance the processing normally assigned to one of them. In local area networking, load sharing is performed by token ring routers when connecting remote LANs. It allows a combination of Ethernet and Token Ring traffic over a common WAN link such as a T-1 or 56 Kbps circuit. Load sharing eliminates the need for duplicate WAN links (and bridges or routers), each serving a different type of LAN.
local area network	See LAN.
local loop	A telephone line that runs from the local telephone company to the end user's premises; it can be fiber, copper, or wireless media. Also known as a subscriber line.

local node	A network's local server.
LODS	Link Out of Delay Synchronization. A link event that indicates a link is not synchronized with the other links within the IMA group.
logical group node	See LGN.
logical link	See link.
logical port	A configured circuit that defines protocol interaction between a Frame Relay or ATM switch and user equipment, a switch, or a network.
loop emulation	This service uses the ATM AAL-2 network to essentially create an extension cord between voice ports on the CPE and the corresponding voice ports on the class 5 switch, that terminates on the GR-303-based voice gateway. The interface between the CPE and the first ATM-based edge switch or DSLAM may be T1 or xDSL. In either case, the use of AAL-2 allows multiple voice circuits to be carried simultaneously.
loop start interface	A type of interface in which the CPE signals an off-hook condition by closing a relay at the CO.
loopback	A test pattern sent and returned to the sending device to diagnose problems.
LOS	loss of signal. A condition at the receiver or a maintenance signal which is transmitted in the physical overhead and indicates the receiving equipment has lost the received signal. LOS is used to monitor the performance of the physical layer.
loss of signal	See LOS.

M

MAC	media-specific access control. A protocol that determines how devices will share resources on a local area network
MAC address	The built-in hardware address of a device connected to shared media.

management information base	See MIB.
mask	A field comprised of letters or numbers and wildcard characters, used to filter data. For example, a mask 800xxxxxxx may be applied to the dialed digits field of a call record to identify toll-free calls.
max PD parameter	Located on the remote end peer, the Max PD parameter is the maximum possible number of SSCOP transmitted since the last PSAX chassis polling of the peer.
maximum burst size	See MBS.
maximum input buffer	The maximum amount of bytes that should be retrieved.
maximum transmission unit	See MTU.
Mb	A megabit, defined as 1,048,576 bits.
MB	A megabyte, defined as 1,048,576 bytes.
Mbps	Megabits per second, a unit for measuring data rates.
MBS	maximum burst size. In an ATM transmission, MBS is the maximum number of cells that can be received at the peak cell rate (PCR). If the burst is larger than anticipated, the additional cells are either tagged or dropped. MBS applies only to variable bit rate (VBR) traffic. It does not apply to constant bit rate (CBR) or unspecified bit rate (UBR) traffic.
media access control (MAC) layer	See MAC.
megabit	See Mb.
megabits per second	See Mbps
megabyte	See MB.
megaohm	A resistance of 1,000,000 ohms.
MIB	Management Information Base. A database of network performance information.

millisecond	See msec.
mixed circuit emulation	Mixed voice/data traffic on a single private access line.
MMAQ	A Multi-Mode module which uses the AQueMan algorithm
MMTS	A Multi-Mode module which uses traffic shaping for flow control.
modulate	To merge information an signal containing voice, data, or images with an electrical carrier wave in order to transmit the information over a network
monitor	A user that has read-only capabilities on PSAX devices when using the *AQueView*® system.
Moving Pictures Experts Group	See MPEG.
MPEG	Moving Pictures Experts Group. A joint committee of the International Standards Organization and the Electrotechnical Commission. A series of hardware and software standards designed to reduce the storage requirements of digital video, especially a compression scheme for full-motion video. Its compression is greater than the comparable JPEG.
msec	Millisecond, one-thousandth of a second.
MSP	multiplex section protection. In a European synchronous digital hierarchy (SDH) network, the 1+1 protection switching is commonly referred to as multiplex section protection. See APS for additional information.
MTU	maximum transmission unit. The largest number of bytes of "payload" data a frame can carry, not counting the frame's header and trailer.
Mu-Law	The companding standard for conversion between analog and digital signals in PCM systems in Japan and North America.
multicast	Broadcasting messages simultaneously to a selected group of workstations on a LAN, a WAN, or on the Internet.

multimedia	Communication through various forms of media simultaneously, such as voice (voice encoding, speech recognition, speaker verification, and text-to-speech), audio processing (music synthesis, CD-ROMs), data communications, image processing, and telecommunications.
multimode fiber	By having a much larger core than single-mode fiber, this broadband fiber allows many modes of light to propagate down the fiber-optic path.
multiple redundancy addressing	The act of establishing multiple virtual circuits to the same destination. The addresses for the circuits are within the error space of the principle one used for actual transmission. Thus, the most probable error patterns that occur in the address field cause the address to be changed to another valid one.
multiple repeaters	A series of opto-electronic devices inserted at intervals along a circuit to boost and amplify an analog signal being transmitted. Repeaters are needed because the quality and strength of a signal decays over distance.
multiplex section protection	See MSP.
multiplexer	A device that merges several lower-speed transmission channels into one high-speed channel at one end of the link. A *demultiplexer* reverses this process at the opposite end.
multiplexing	The process of transmitting several signals over a single communications channel.
multi-protocol encapsulation	As defined in IETF RFC 1483, multi-protocol encapsulation allows multiple higher-layer protocols, such as IP to be routed over a single ATM VCC using the MAC header.
Multiservice Media Gateway	A Lucent Technologies ATM access concentrator/switch that efficiently forwards data, handling incoming calls for a network point of presence (POP). In general, a Multiservice Media Gateway system supports dial-in modem calls, ISDN connections, nailed-up links, frame relay traffic, and multi-protocol routing. Formerly this product was named the PSAX Access Concentrator system.
Multiservice Media Gateway systems or MMG systems	Refers to the whole "box" functioning as an entity, including the chassis, modules, and CPU loaded with system software.

N

narrowband	In communications technology, digital communication at the rate of 64,000 bits per second or lower.
NavisCore	An application that operates in conjunction with HP OpenView to provide multiservice IP, frame relay, asynchronous transfer mode (ATM) switched multimegabit data service (SMDS) configuration, and management of Lucent core switches from a single platform.
NE	Network Elements. 1. Any basic part of the network, such as a modem, a multiplexer, a switch. 2. Processor-controlled parts of the telecommunications network that primarily provides switching and transporting functions and contains network operating functions. In SONET, the five network elements are: add/drop multiplexer, broadband digital cross-connect, wideband digital cross-connect, digital loop carrier, and switch interface.
near-end echo cancellation	The isolation and filtering of unwanted signals caused by echoes from the main transmitted signal at the originating end of a trunk circuit or connecting path.
NEBS	Network Equipment Building Standard. A standard that defines a rigid, extensive set of performance, quality, environmental, and safety standards. They range from fire spreading and extinguishability tests to earthquake tests, thermal shock measures, cyclic temperature, mechanical shock, and electrostatic discharge standards.
neighbor peer	The relationship a node in the PSAX system has with a neighboring node within the same peer group.
network	A network consists of one or more management stations and network elements, which are individual nodes on the network that can communicate with one another. These nodes are individual machines on the network and can be PSAX systems, routers, computers, or other communications equipment.
network elements	See NE.
network equipment building standard	See NEBS.

network interface card	See NIC.
network management system	See NMS.
network mask	A 32-bit number that distinguishes the portion of an IP address referring to the network or subnet from the portion referring to the host.
network service access point	See NSAP.
network-network interface	See NNI.
network-to-network (NNI) Implementation Agreement	See FRF2.1
nibble	Four bits. Usually described as one hexadecimal digit.
NIC	Network Interface Card. The device that connects a computer or other device to a LAN.
NMS	Network Management System. A comprehensive set of equipment used in monitoring, controlling, and managing a data communications network. Typically, it includes testing devices, CRT displays and printers, patch panels, and circuitry for diagnosing and reconfiguring channels, generally all housed in the same central console.
NNI	network to network interface. A Frame Relay Forum/ATM Forum protocol governing how ATM switches establish connections and how ATM signals get routed.
node	An abstract representation of a peer group or a switching system as a single point.
node index	An index that identifies a logical PNNI entity in the PSAX system.
non-native ATM networking protocols	Communications protocols such as ISDN, SS7, and CAS.
nonscrambled	An undistorted or scrambled voice or data communication type.

non-switched mode	The setting fused to establish a point-to-point line.
NRTL	Nationally Recognized Testing Laboratory
NSAP	network service access point. The Open Systems Interconnection (OSI) generic standard for a network address consisting of 20 octets.

O

OAM	Operations, Administration, and Maintenance. These cells typically provide network fault indications, performance information, and data diagnosis functions.
OC-3	Optical carrier 3. A SONET channel equal to three DS3s, which is equal to 155.52 million bits per second. (Three times OC-1.)
OC-3c	Optical carrier 3, concatenated payload.
OC-12	Optical carrier 12. A SONET channel that transmits at 622 Mbps.
octet	A term for eight bits that is sometimes used interchangeably with byte.
off-hook, on-hook queuing	In off-hook queuing, the dialer has to hold the receiver to his ear and continually dial until he gets an open line. In off-hook queuing, he dials and on getting a busy number, the switch informs him and automatically redials, informing him when a connection is ready.
offset time	The length of time it takes in a generic filter, for the number of bytes from the start of a frame to the data, to be tested against the filter.
Ohm	The resistance that allows one ampere of current to pass at the electrical potential of one volt. Amperes are volts divided by Ohms; Volts are the product of Amperes and Ohms; Ohms are Volts divided by Amperes.

online	Available through the computer, either on the hard disk (online documentation, online help) or, by using a modem, from another computer.
open systems interconnection	See OSI.
operations, administration, and maintenance	See OAM.
originating node	The first point of connection into a network.
OSI	open systems interconnection. The only internationally accepted framework of standards for communicating between different systems made by different vendors, developed by the International Standards Organization. The OSI model organizes the communication process into seven different categories and places these categories in a layered sequence based on their relation to the user. Layers 7 through 4 deal with end to end communications between the message source and the message destination, while layers 3 through 1 deal with network access.
out of frame	A T1 error condition where two or three framing bits of any consecutive frames are in error.
out-of-service	The condition, or state, of an interface that is operating but not ready to accept or place calls.
outside link	A link to an outside node.

P

PABX	Private Automatic Branch Exchange, see PBX.
packet	Also referred to as a Level 3 Protocol Data Unit (L3-PDU). A packet is a group of bits that is transmitted as a unit through a network. It usually includes data and control information such as addressing, identification, and error control fields.
packet internet groper	See ping.

packet video	When a video camera feeds the signal into a coder/decoder, which then converts the native analog signal into a digital format, and segments the data into data packets. The packets are sent across a packet network as a packet stream for reassembly by a coder/decoder on the receiving end of the transmission before presentation on the monitor.
PacketStar® PSAX family of products	The Lucent Technologies *PacketStar*® PSAX Multiservice Media Gateways are a product line of scalable, flexible multiservice ATM access devices offered to service providers' central offices, and small to large enterprises.
pass-through	Gaining access to one network through another element.
payload	The portion of a frame that contains the actual data.
payload length	The length of a data field, block or stream being processed or transported. The payload includes user information and may include such additional information such as user-requested network management and accounting information.
payload loop	When a received signal is sent through the framing chip on the module, but not the SAR circuitry, and then back out to the originating point.
payload protection	A process that identifies and extracts ATM cells at bit error rates as high as 10^{-2}.
payload scrambling	The removal of long strings of 1s and 0s that could be mistaken as error conditions.
payload type indicator	See PTI.
PBX	private branch exchange. Originally a switch inside a private business, part of a manual device that requires an operator to complete the call. Now those calls are automatic (at one time there was the need to differentiate the manual private automatic branch exchange [PABX] from the automatic PBX).

PCM	pulse code modulation. The most common method of encoding an analog voice signal into a digital bit stream. The most common PCM method samples a voice conversation at 8,000 times a second, twice the highest frequency in a voice line, 4,000 Hz.
PCM coding translation	There are two different PCM coding schemes in G.711, A-law and µ-law. In the US and Canada, µ-law is used. In many other parts of the world, A-law is used. When calls are placed between countries that use different coding laws, a code translation is performed in the network.
PCR	peak cell rate. An ATM term for cell-rate-per-second limit the transmitting source can never exceed.
PDU	protocol data unit. A packet created at any one of the OSI layers. It contains control information and a payload, and passes through the interfaces between one protocol layer and another.
peak cell rate	See PCR.
peer	In data networking, a router that operates on the same protocol layer as another router.
peer group	A set of logical nodes, grouped to create a routing hierarchy. All members of the group exchange PNNI topology state elements (PTSEs).
peer group identifier	A string of bits that unambiguously identifies a peer group.
peer group leader	See PGL.
permanent virtual circuit	See PVC.
PGL	peer group leader. In networks that use a PNNI hierarchy, the switches at each level elect one switch that concurrently belongs to its own level, and the next highest level. This switch is referred to as the peer group leader.
physical layer convergence control	See PLCP.
physical media access layer	This handles functions specific to each physical interface, and connects each user port to other users, or network elements.

pin configuration	The physical arrangement of prongs on a connector.
PING	packet internet groper. A utility program, originally used in the Internet, to test whether a destination can be reached by sending it an Internet Control Message Protocol (ICMP) echo request and waiting for a reply; it also tests for delay.
PING server	A utility serving PINGs; a signal also called the Internet Control Message Protocol (ICMP) Special Request Packet, to a specific address to test the connection. If the PING does not return a response, the address is either down or unreachable. If only a portion of the PING returns, it indicates trouble with the connection and warns that communications may be slow or unreliable.
pinout	A description or diagram of the pins of a chip or connector.
plain old telephone service	See POTS.
PLAR	private line, automatic ringdown. A leased voice circuit connecting two telephones. When either handset is lifted, the other telephone rings automatically.
PLCP	Physical Layer Convergence Protocol. Part of the physical layer that adapts the transmission facility to handle Distributed Queue Dual Bus (DQDB) functions, used for DC-3 transmission of ATM. ATM cells are encapsulated in a 125-microsecond frame defined by the PLCP, which is defined within the DS3 M-frame.
PNNI	Private Network-to-Network Interface. A routing information protocol that enables extremely scalable, full function, dynamic multivendor ATM switches to be integrated in the same network.
PNNI topology state packets	See PTSP.
point-to-multipoint	A circuit by which a single signal goes from one origination point to many destination points.

point-to-point protocol	A protocol that connects two nodes (for example, router-to-router and host-to-network) over both synchronous and asynchronous circuits. PPP replaces Serial Line Interface Protocol (SLIP), an older protocol.
polling	An access control method in which one master device, such as a NMS, queries other network devices, and requests they transmit one at a time.
POTS	Plain Old Telephone Service. The basic service supplying standard, single-line telephones (with no features like call waiting or call forwarding).
PRI	Primary Rate Interface. The ISDN equivalent of a T1 circuit. Delivered to the customer's premises, it delivers 23 B+D at 1.544 Mbps. PRI enables IP connectivity to the PSTN.
PRI ISDN	Integrated Services Digital Network with Primary Rate Interface service. A network with 24 B (bearer) channels, each of which is a full 64,000 bits per second. One of these channels is typically used to carry signaling information for other 23 channels. In Europe, PRI ISDN is 30 bearer channels of 64 Kbps and two signaling channels, each of 64 Kbps.
primary rate interface	See PRI.
private automatic branch exchange	See PBX.
private branch exchange	See PBX.
private line automatic ring-down service	See PLAR.
private network-to-network interface	See PNNI.
programable read-only memory	See PROM.

PROM	Programable Read-Only Memory. A programmable semiconductor device whose contents are not intended to be altered during normal operations. An autoboot PROM on a LAN network board can allow network servers to boot up workstations, which works particularly well with diskless workstations.
protocol	A set of rules governing communication between two entities or systems to provide interoperability between services and vendors.
protocol data unit	See PDU.
protocol stack	A collection of software modules that combine to produce the software that enables the protocol to work, i.e., allowing communications between dissimilar computer devices. It is called a stack because the software modules are piled on top of each other. The process of communicating typically starts at the bottom of the pile and works its way up. Each software module typically (not always) needs the one below it. A protocol stack is also called a protocol family or protocol suite.
provisioning	In National Security and Emergency Preparedness (NS/EP) telecommunication services, provisioning is synonymous with initiation, and also includes altering the state of an existing priority service or capability. Lucent has two additions used specifically in *AQueView®*. *End-to-end provisioning* means controlling the entire building's telecommunications by software at a central location. *Flow-through provisioning* is a step up from that, that allows a central location to control a network across several locations, such as a college campus.
PTI	payload type indicator. This field value distinguishes the various management cells and user cells. Example: Resource Management cells has PTI=110, end-to-end OAM F5 Flow cell has PTI=101.
PTSP	PNNI Topology State Packet. The PNNI routing packet used to exchange reachability and resource information between ATM switches. It is also designed to ensure that a connection request is routed on a path with high probability of meeting quality of service standards. Typical, PTSP includes bidirectional information about the transit behavior of particular nodes (based on entry and exit ports) and current internal states.

pulse code modulation	See PCM.
PVC	Permanent Virtual Circuit. A virtual circuit that provides the equivalent of a dedicated private line service over a packet switching network between two DTEs. Virtual circuits and SDNs are other types of virtual networks.

Q

QoS	quality of service. An ATM Forum Protocol that is defined in terms of an end-to-end ATM connection under ITU-T Recommendation 1.350. QoS measures cell error ratio, severely errored cell block ratio, cell loss ratio and cell misinsertion rate, cell transfer delay, mean cell transfer delay, and cell delay variability.
Quadserial	A Lucent module, superseding multiserial and high-speed modules.
quality of service	See QoS.
queuing	Stacking or holding calls to be handled by a trunk, or trunk group, when there are insufficient trunks to handle the amount of traffic.

R

R1	ITU name for a particular North American digital trunk protocol that uses multi-frequency (MF) pulsing.
R2	A series of ITU-T specs for European analog and digital trunk signaling, which uses compelled handshaking on every MF (multi-frequency) signaling digit.
radio frequency	A group of electromagnetic energy whose wavelengths are between the audio and the light range. The electromagnetic waves transmitted usually are between 500 KHz and 300 GHz.
RAI	remote alarm indication. This alarm indicates that a device on the T1 line, DS3 line, or DS2 stream is detecting framing-error conditions in the signal it receives. An RAI is also called a yellow alarm signal.

RAS	remote access service. A network unit that enables branch offices, telecommuters, and traveling computer users to gain access to the corporate LAN backbone over dedicated or dialed, digital, or analog lines.
rate shaping	The transmission of ATM cells onto the ATM network at a peak cell rate, based on an algorithm. For frame relay traffic, the PSAX system software automatically calculates egress peak cell rate based on frame relay traffic parameters. For Ethernet traffic, the user must configure the egress peak cell rate. Connections employing the rate shaping feature have BRnrt and UBR connections.
RDI	remote defect indication. An alert to a failure at the far end of an ATM network. Unlike FERF (far-end remote failure), the RDI alarm doesn't indicate the specific circuit with failure.
ready to receive	See RR.
ready to send	See RTS.
recommended standard	See RS.
redundancy	The duplication of hardware or software within a network to endure fault-tolerant or back-up operation.
Reed Solomon (RS) coding	An algorithm that performs forward error correction (FEC) in order to compensate for error bursts in data transmission.
remote access service	See RAS.
remote alarm indication	See RAI.
remote defect indication	See RDI.
remote dial-access server	See RAS.
remote input status	A reference to how a user defines the external alarm condition (input) at their site, such as a temperature sensor, that results in an action (output) such as a fan. When the STATUS/CONTROL connectors on the Alarm module are connected to an external device that is triggered remotely, a signal is sent, indicating a fault condition, which is displayed by either **Closed** or **Open** on the **Remote Input Status** field.

repeater	A device that receives data on one communication link and transmits it, bit by bit, on another link as fast as it is received without buffering.
RFC	request for comment. Draft RFCs on particular topics are circulated through the Internet community to gain feedback from engineers and programmers on proposed TCP/IP standards about the Internet. The Internet Engineering Task Force meets three times a year and either adopts what becomes a standard RFC, or discards it.
right mouse button	The right button on a computer mouse. Clicking the right mouse button on many computer screens brings up a menu different from the drop-down options, or is more comfortable for some users.
RIP	routing information protocol. A set of rules based on distance-vector algorithms that measure the shortest path between points on a network. Each router maintains a routing table or database with this information and periodically broadcasts it to neighboring routers.
RJ-11, RJ-45	registered jacks. An RJ-11 is a six-conductor modular jack typically wired for four conductors, the most common telephone jack in the world. The male connects a telephone, modem, or fax machine to a female RJ-11 jack in the wall or floor. The RJ-45 is an eight-pin connector used for transmitting data from a data PBX, a modem, a printer, or a print buffer over telephone wire.
robbed-bit signaling	A popular signaling mechanism used in T1 connections. Robbed-bit signaling typically uses bits known as A and B bits. These bits are sent by each side of a T1 termination and are buried in the voice data of each voice channel in the T1 circuit, hence the term "robbed bit" as the bits are stolen from the voice data.
rounding error	A cumulative calculation error caused by omission of preselected values. The omitted values can be the ones, tens, and/or hundreds decimal places. A typical rounding algorithm increases the value to the left by one if the value to the right is over 5. The value to the right is then dropped. The more aggressive the algorithm used, the greater the rounding error.

router	A physical device, connected to two or more networks, that receives Internet Protocol (IP) packets through one network interface and forwards them out another interface, based on network layer information.
routing	The process of directing data from a source node to the correct interface.
routing entry	The NSAP address on a routing table.
routing information protocol	See RIP.
routing protocol	Rules that determine a path between two nodes, that often occurs in an environment in which two nodes in different networks interwork with routers and bridges.
routing table	A database that contains entries, each of which includes a destination address and a pointer to the destination.
RR	ready to receive
RSRS-232RS-449RS-530	recommended standard. Standards often set by the EIA (Electronic Industries Association), the TIA (Telecommunications Industry Association), or both (EIA/TIA). RS-232 is a set of standards specifying three sets of interfaces (electrical, functional, and mechanical) for communicating between computers, terminals, and modems. Once only available on a 25-pin connector, they now come in a variety of configurations that aren't always compatible to other devices without add-ons. The RS-449 is essentially a faster version of RS-232, and typically has 37 pins. Each RS-449 pin has its own signal return instead the common ground available on the RS-449 pin. RS-530 supersedes RS-449 and complements RS-232. Based on a 25-pin connection, it works in conjunction with either electrical interface RS-422 (balanced electrical circuits) or RS-423 (unbalanced electrical circuits).
RTS	request to send

S

SAM	Service Access Multiplexer. A device that determines how to map ATM cells into SONET rings.
SAP	Service Access Point. The point at which the services of an OSI layer are made available to the next highest layer. A SAP is used for the following purposes: 1. When the application initiates an outgoing call to a remote ATM device, a destination_SAP specifies the ATM address of the remote device, and also specifies further addressing that identifies the target software entity within the remote device. 2. When the application prepares to respond to incoming calls from remote ATM devices, a local_SAP specifies the ATM address of the device housing the application, and also specifies further addressing that identifies the application within the local device.
Sapphire	Another term for Connection Gateway API..
SAR	segmentation and reassembly. A process of segmenting relatively large data packets into smaller packets compatible with SAR. It often works in conjunction with ATM, SMDS, and X.25 networks.
scope number	Similar to an IP subnet mask, the scope number specifies how much of the 13-byte network part is common to the switch addresses at a particular level in the hierarchy.
SCR	sustained cell rate. A parameter defined by the ATM forum for ATM traffic management. The SCR is an upper bound on the conforming average rate of an ATM connection over time scales which are long enough relative to those for which the peak cell rate (PCR) is defined. The enforcement of this boundary by the UPC can allow the network to allocate sufficient resources, but less than those based on the PCR, while at the same time, ensuring that the network's performance objectives can still be achieved.
SCSI	Small Computer System Interface. A standard high-speed parallel interface defined by ANSI. A SCSI interface is used to connect CPUs to SCSI peripheral devices.
SDH	Synchronous Digital Hierarchy, a set of fiber-optics-based standards planned for use with SONET and ATM in Europe, standardized by the ITU-T. Some of the SDH and SONET standards are identical.

SDRAM	Synchronized Dynamic Random Access Memory. An emerging replacement for DRAM because SDRAM's memory access cycles are synchronized with the CPU clock, thus eliminating the wait time associated with memory fetches between RAM and the CPU.
segment	A single ATM link, or group of interconnected links, of an ATM connection.
segmentation and reassembly	See SAR.
SEL	selector. A subfield in the SETUP message part of an ATM endpoint address domain specific part (DSP), defined by ISO 10589. This is not used for ATM network routing, but by ATM end systems only.
semipermanent virtual circuit	See SPVC.
serial	A transmission method that sends each data bit sequentially on a single channel.
server	Any system that maintains and administers files that are used by independent, client applications.
service access multiplexer	See SAM.
service access point	See SAP.
service level interworking	See FRF.8
service protocol translation	A process that performs segmentation and reassembly (SAR) to adapt non-native ATM services to ATM-based services and back again. It ensures that the data stream is mapped to standard ATM Adaption Layer (AAL) protocols.
service provider	A company that offers voice, video, or data access to a network or to another service; for example, to the Internet.
service types	A category of data transmission provided by a public data network in which the data signaling rate, the terminal operating mode, and the code structure, are standardized. Note: Class of service (service types) are defined in CCITT Recommendation X.1.

service-specific connection-oriented protocol	See SSCOP.
service-specific convergence sub-layer	See SSCS.
SF	superframe. A DS1 framing format is which 24 DSO timeslots plus a coded framing bit are organized into a frame. This frame is then repeated 12 times to form the superframe.
SG	signaling gateway. A devise that initiates and manages call setup and release, and then executes call routing in a Signaling System 7 (SS7) configuration. A signaling gateway uses an Access SS7 Gateway Control Protocol-Q.931+ (ASGCP-Q.931+) license, and Internet Protocol Device Control (IPDC) license, or a Q.931+ license. It uses a TCP/IP protocol to carry control messages back and forth between a Multiservice Media Gateway.
Signaling System 7	See SS7.
signaling	The control of information a network uses to set up and maintain connections. On-hook and off-hook are, for instance, the familiar voice-telephone signals that tell the central office that you have picked up the telephone handset or hung up at the end of a call. *In-channel signaling* reserves part of the available data-communication bandwidth for control information. *Out-of-channel signaling* schemes use a separate channel for signals, so data transmissions can use all available bandwidth.
signaling gateway	See SG.
silence detection	The identification of unwanted periods of silence caused by corrupt sound data or certain system failures.
silence suppression	The removal of pauses in speech before transporting voice traffic over a network.

SIMM	Single In-line Memory Module. A form of chip packaging found in PCs and Macs where the pins are arranged in a single row protruding from the chip. It can be inserted into a slot like an expansion adapter.
simple mail transfer protocol	See SMTP.
simple network management protocol	See SNMP.
simplex	The operation of a channel in only one direction with no ability to operate in the other direction.
single in-line memory module	See SIMM.
single-mode	See SM.
single-mode fiber	A fiber that allows only a single mode of light to propagate.
SM	single mode. A reference to the single mode fiber which is used in Lucent's optical modules.
small computer system interface	See SCSI.
SMDS	Switched Multimegabit Data Service. A connectionless, high-speed data transmission service intended for applications in a metropolitan area network (MAN) environment, primarily for LAN-to-LAN connections. SMDS converts data into cells before presenting it to the network. Frame relay and ATM overshadow this service.
SMTP	Simple Mail Transfer Protocol. An application-level protocol which runs over TCP/IP, supporting text-oriented email between devices supporting Message Handling Service.
SMTS	A single-mode module which uses traffic shaping for flow control.

SNA	Systems Network Architecture. A successful computer network architecture from IBM. A mainframe host computer controls the network, with boundaries including the host computer, front-end processors, cluster controllers, and terminals (the network's domain) establishes logical paths between network nodes, and uses routing information contained in a protocol which uses 7 layers.
SNMP	Simple Network Management Protocol. A standard way for computers to share networking information. In SNMP, two types of communicating devices exist: agents and managers. An agent provides networking information to a manager application running on another computer. The agents and managers share a database of information, called the Management Information Base (MIB). An agent can use a message called a traps-PDU to send unsolicited information to the manager.
SNMP agent	The interface that enables a device to communicate with other SNMP devices. The agent for a PSAX system can be configured to send SNMP messages to a management station without a specific request. These messages are called traps. To retrieve and modify MIB information through an agent, the software loaded on the CPU of the PSAX system itself must be directly accessed, either through the console user interface or an SNMP-based manager, such as the *AQueView® element Management System*.
soft permanent virtual circuit	See SPVC.
software release distribution	See SRD.
SONET	Synchronous Optical Network. An optical multiplexing interface for wideband, high-speed transmission (up to 13.22 Gbps), used mainly in carrier and telecommunications networks.
source routing	See SR.

SPVC	SemiPermanent Virtual Circuit. A PVC-type connection in which SVCs are used for call setup and (automatic) rerouting. Once either a PVC connection or a permanent virtual path connection has been configured, an SPVC can be established between the two network interfaces serving the PVC connection through the use of signaling procedures. Consequently, this type of connection has attributes of both a switched virtual connection and a permanent virtual connection.
SR	source routing. A bridging method whereby the source at a data exchange determines the route subsequent frames use.
SRAM	Static Random Access Memory. A form of RAM that retains its data without constantly refreshing, as DRAM must. SRAM is commonly used to cache data traveling between the CPU and a RAM subsystem populated with DRAM.
SRD	software release distribution. The way by which a user upgrades the PSAX Multiservice Media Gateway system software.
SS7	Signaling System 7. A signaling method, separate from voice or data channel, that allows intelligent network elements exchange information among themselves.
SSCOP	Service-Specific Connection-Oriented Protocol. This protocol provides mechanisms for establishing, releasing, and monitoring signaling information exchanged between peer signaling entities.
SSCS	Service Specific Convergence Sublayer. The portion of the convergence sublayer that is dependent upon the type of traffic that is being converted.
standalone	A monolithic application for *AQueView*®that binds the client and the server into a single process, without HP OpenView or NNM.
static random access memory	See SRAM.
static route	A route that is manually entered into a routing table. Static routes take precedence over routes chosen by all dynamic routing protocols.

STM-1	synchronous transport. A SHD standard for transmitting over an OC-3 optical fiber at 155.52 Mbps. An STM-1 module is equivalent to a SONET STS-3c module.
STM-4c	The “c” stands for concatentated, which means the whole STM-4 is seen as one link.
Stratum3–4 timing, Stratum 3–4 module	These terms refer to the stratum level, the clock that lets a digital network transmission know where it begins and ends. These levels were established by ANSI/TI.101.1987, “Synchronization Interface Standards for Digital Networks.” Level one is best, and is usually based on atomic clock or reference oscillator. Stratum 2 tracks on input and in an emergency, holds to the last, best estimate of that input reference frequency. Level 3 also tracks an input but over a wider range. Stratum 4 also tracks an input, but has a wider adjustment and drift range. It has no holdover capability, and runs freely within the adjustment range limits if the external reference fails. Therefore, it is typically written as either Stratum 3, or Stratum 4, not 3–4. However, the Stratum in the *PacketStar* line qualifies for both Stratum 3 and Stratum 4, so 3–4 is appropriate.
structured	A type of bandwidth that offers framing which indicates where a channel begins and ends, while an unstructured bandwidth has no framing. While unstructured bandwidth can only be unchannelized (because it does not have framing), structured bandwidth can either be channelized or unchannelized.
structured circuit emulation service	See channelized circuit emulation service.
subchannel connection	The associations between IP network interfaces and their traffic-bearing connections.
subnet	A portion of a network, possibly a physically independent network, which shares a network address with other portions of the network and is distinguished by a subnet number. A subnet is to a network what a network is to the Internet.

subnet mask	A bit pattern that lets a network administrator define a "subnet" by using the host-machine portion of the IP address. A subnet mask has binary ones in positions which correspond to the network and subnet parts of the address, and zeros in the remaining, host-address positions. During IP address resolution, zero fields in the mask hide corresponding host-address field in the address, causing the router to ignore them. The router resolves only the networking part of the address, leaving the host part for the local subnet to resolve. This increases speed and makes multicasting more efficient. Subnet mass are usually written in the decimal notation used for IP address, **255** represents a binary one and **0** represents a zero.
subtree	Any node within a tree, along with any selection of connected, descendant nodes.
superframe	See SF.
sustained cell rate	See SCR.
SVC	Switched Virtual Circuit. A network connection that is created only as needed, and lasts only the duration of the message transfer. Used extensively in X.25 and frame relay networks, SVCs are far more complex than permanent virtual circuits, as they automatically consider the level of network congestion, including at both end points, and dynamically balance the network, by transmitting on a route specifically designed for the least possible delay in transmitting data.
SVCC	Switched Virtual Channel Connection, a switched connection is one that is established and taken down dynamically through control signaling. A virtual channel connection is an ATM connection where switching is performed on the VPI/VCI fields of each cell.
switch	A computer that maintains circuits by matching an input port to an output port for each connection. The switch contains switching tables to track this information.
switched multimegabit data service	See SMDS.
switched virtual channel connection	See SVCC.
switched virtual circuit	See SVC.

symmetric operation	A connection with the same bandwidth in both directions.
synchronization	The timing of separate elements or events to occur simultaneously. Hardware and software must be synchronized so file transfers can occur.
synchronized dynamic random access memory	See SDRAM.
synchronous digital hierarchy	See SDH.
synchronous optical network	See SONET.
systems network architecture	See SNA.

T

T1	A digital transmission link with a capacity of 1.544 Mbit/s, used in North America. Typically channelized into 24 DS0s, each link is capable of carrying a single voice conversation or data stream. T1 links use two pairs of twisted pair wires.
T3	A digital transmission link with a capacity of 45 Mbps, or 28 T1 lines.
tails	An echo cancellation term. The tail, measured in milliseconds, is the amount of your conversation which returns to you in echo, as measured in milliseconds.
TCP/IP	Transmission Control Protocol/Internet Protocol. A networking protocol allowing communication over interconnected networks between computers with diverse hardware architectures and various operating systems.
TDM	time-division multiplex. A method of transmitting a number of separate voice, data, and/or video signals simultaneously over one communications medium by interleaving a piece of each signal, one after another.

TDMA	time-division multiplex access. One of several technologies used to separate multiple conversation transmissions over a finite allocation of bandwidth. TDMA allocates a set amount of frequency bandwidth and a specific timeslot to each user. Cellular telephones send bursts of information during those timeslots. The receiving equipment then reassembles the packets of information into the original voice components. This allows multiple simultaneous conversations over the same equipment.
telco	The local telephone company. (The industry derives the word "telco" from the word "telecommunications.")
telco frame, telco rack	A metal framework on which equipment is mounted.
Telcordia Technologies	See Bellcore.
telecommunications management network	See TMN.
telnet	Terminal/remote host protocol developed for ARPAnet to allow a computer user to log onto a computer in a remote location and communicate between the two. Mostly superseded by GUI browsers such as Netscape and Internet Explorer.
terminating node	The last point of connection from a network.
throughput	The measure of the rate at which data flows through a device.
Time-division multiplex	See TDM.
time-division multiplex access	See TDMA.
timeslot management channel	See TMC.
TMC	Timeslot Management Channel. A dedicated channel for sending control messages to set up and tear down calls in a T1 frame. In a GR-303 interface group, the primary TMC is usually in channel 24 of the first DS1, while the redundant TMC if used, is in a different DS1.

TMN	Telecommunications Management Network. A framework for describing and managing network resources. TMN specifies a set of standard functions with standard interfaces, and makes use of a management network which is separate and distinct from the information transmission network.
toll quality	A description of the standard, TDM, 56kbps telephone quality usually available in the U.S. A MOS (Mean Opinion Score) test is conducted by asking people their opinion on the quality of voice calls on specific equipment. The standard, high-quality TDM voice equates to 4.0 on the grading scale. Lucent achieves a MOS score of 3.9 with our 8:1 compression.
toll routing	The intra-switching of long distance telephone calls.
tone detection	A signal provided by a network or modem. When a CO detects this signal, it is sent through the network to an active call center.
topology	The configuration of a communication network. The physical topology is the way the network looks. LAN physical topologies includes the bus, ring and star. WAN physical topology may be meshed, with each network node directly connected to every other network node, or partially meshed. Logical topology describes the way the network works.
ToS	Type of Service. A feature that enables an Internet device to select the Quality of Service (QoS) for an application. The ToS is specified by precedence, delay, throughput, reliability, and cost. You can configure a Multiservice Media Gateway chassis to set priority bits and TOS classes of service on behalf of customer applications. The Multiservice Media Gateway chassis does not implement priority queuing, but it does set information that can be used by upstream routers to prioritize and select links for particular data streams.
ToS mask	A field made up of letters of numbers and wildcard characters, that is used to filter data based on a subscriber's type of service.
ToS Value	An indicator that denotes a better quality of service on a user's line. For example, voice data would be set with a ToS value for minimum delay.
traffic descriptor	Generic traffic parameters that capture the intrinsic traffic characteristics of a requested ATM connection.

traffic management	An ATM term for network actions taken to prevent system congestion of layer traffic
traffic shaping	A method for controlling the flow of data traffic. It is implemented on modules that are offered with traffic-shaping variations: the OC-3c Multimode, OC-3c Single-Mode, STM-1 Multimode, and STM-1 Single-Mode modules. Traffic shaping ensures that the variable bit-rate (VBR) traffic entering the PSAX system (via the OC-3c and STM-1 modules) complies with the parameters of the established service contracts.
Transmission control protocol/Internet protocol	See TCP/IP.
trap	A Simple Network Management Protocol (SNMP) mechanism for transferring data in an unsolicited manner to the network management system. Traps indicate when a significant event, such as a threshold, has been reached.
tree	A data structure containing zero or more nodes that are linked together in a hierarchical fashion. If there are any nodes, one node is the root; each node except the root is the child or one and only one other node; and each node has zero or more nodes as children.
tree structure	Any structure that has the essential organizational properties of a tree. See tree.
trunk alarming	A type of fault detection on ATM trunks. Trunk alarms fall into two categories. *Logical trunk alarms* provide statistical alarming on dropped cells and are separately maintained for the virtual trunks on the same port. *Physical alarm trunks* are used when a virtual trunk also has trunk port alarms that are shared with all other virtual trunks on the port. These alarms are cleared and set together for all the virtual trunks sharing the same port.
trunk group	A collection of trunks that all terminate at the same public switch, PBX, or server.
trunk line	1. A direct line between two telephone switchboards. 2. The main line of a communications system.

trunking	The establishment of a communications line between two switching systems.
Type 102, 105, 108 milliwatt termination tests	For the 102, 105 108 milliwatt termination tests, calls are defined for a responder, a director, and a remote office test line (ROTL). The PSAX behaves as the ROTL, as it makes more logical sense for the 5E or PBX to be the responder (initiator of the test). The initiator of the tests sends an inband MF tone to stimulate the PSAX to generate the tone.
Type of Service	See ToS.

U

UBR	undefined (or unspecified) bit rate. An ATM service class that handles bursty LAN traffic and data that is tolerant of delays and cell loss. UBR is a best-effort service that does not specify bit-rate or traffic values, and offers no QoS guarantees.
undefined (or unspecified) bit rate	See UBR.
UNI	User Network Interface. The physical, electrical, and functional demarcation between the user and the network service provider. A UNI sets the specifications for procedures and protocols between the user's equipment and an ATM or frame relay network.
unidirectional	The transmission of information in one direction only.
universal time coordinate	See UTC.
unshielded twisted pair	See UTP.
unspecified bit rate	See UBR.
UPC	usage parameter control. Network actions used to monitor and control traffic at the end system. UPS detects negotiated parameters violations, and it can take appropriate action to protect against malicious or unintentional misbehavior. Its actions include cell tagging and cell discarding.

uplink	The connectivity between an ATM border node and an upnode.
upnode	In ATM, the border node's outside neighbor in the common peer group. The upnode must be a neighboring peer of one of the border node's ancestors.
usage parameter control	See UPC.
user network interface	See UNI.
user-to-network (UNI) Implementation Agreement	See FRF.1
UTC	Universal Time Coordinate. The new term for Greenwich Mean Time. See GMT.
UTP	unshielded twisted pair. A pair of wires that is twisted so as to minimize the crosstalk with other pairs of wires in the same cable (which are twisted at a slightly different rate) but not shielded.

V

V ac	volt, alternating current
V dc	volt, direct current
V.35	A standard module used for communication between a network access device and a packet network. It provides clocking 19.2 Kbps to 4.0966 Mbps.
validation	The checking of data for correctness or for compliance with applicable standards, rules, and conventions.
variable bit rate	See VBR.
variable bit rate - real time	See VBR-RT
variable bit rate- non-real time	See VBR-NRT.

VBR	variable bit rate. A voice service over an ATM switch which provides only as much bandwidth as voice conversations need at any moment (making bandwidth “elastic”). The remaining bandwidth is dynamically allocated to other services. VBR be divided into VBRnrt (variable bit rate, nonreal time) and VBRrt (variable bit rate, real time). See also VBR-NRT, and VBR-RT.
VBR-NRT	variable bit rate-non-real time. A voice service that operates on both a connection and connectionless basis and allows delay variance between the delivery of cell. VBR-NRT is used for data applications that have potentially bursty traffic characteristics, including LAN interconnect, CAD/CAM, and multimedia. This class can be used to support SMDS (switched multimegabit data service).
VBR-RT	variable bit rate - real time. A voice service that operates on a connection basis and offers very low delay variance but requires access to a variable amount of network bandwidth. It is used for such applications as packet video and voice.
VC	virtual channel. A logical circuit set up to ensure reliable communication between two network devices. virtual circuit. The pre-arranged route through the ATM network that all cells in an ATM transmission follow.
VCC	virtual channel connection,. An ATM term describing unidirectional virtual channel links that extends beyond where the ATM service users access the ATM layer. The VCC end is where the cell load is passed to, or received from, the users of the ATM layer.
VCI	virtual channel identifier. An ATM term for the 16-bit field in the ATM cell header that indicates which virtual channel the ATM should use in routing the stream of cells.
verification	The act of determining whether an operation has been accomplished correctly.

VI	Virtual Interface. Connections made to a module's physical ports that allow virtual channels (VCs) to be assigned to virtual trunks, each with its own priority queue. By using VIs instead of physical connections, it is possible to achieve advanced bandwidth management capability that allows for fully flexible service provisioning. Working in conjunction with AQueMan software and Usage Parameter Control (UPC), VIs give service providers a way to maximize revenue by oversubscribing their bandwidth without violating their QoS agreements.
virtual access line	A communications link that appears to the end user to be dedicated point-to-point circuit. For IMA, the virtual access line would be the link between IMA groups.
virtual channel	See VC.
virtual channel indentifier	See VCI.
virtual circuit	See VC.
virtual circuit connection	See VCC.
virtual interface	See VI.
virtual network navigator	See VNN.
virtual path	See VP.
virtual path identifier	See VPI.
virtual private network	See VPN.
virtual router	A virtual router is a grouping of IP interfaces. Each virtual router with IP interfaces has its own associated IP routing table, IP ARP table, IP route cache, and IP address pools, and maintains it's own routing and packet statistics.

VNN	Virtual Network Navigator™. Lucent's, open shortest path first network routing technology embedded as firmware in switches such as the Lucent GX 550™. multiservice WAN switch. VNN builds seamless networks where data and OAM functions flow seamlessly across service and technology (ATM, frame relay and IP) boundaries to build end-to-end multiservice networks.
voice compression	The process of reducing a voice signal to use less bandwidth during transmission to obtain a channel of 32 Kbps or fewer, currently to under 10 Kbps.
voice traffic over ATM	See VoTA.
VP	virtual path. A group of VCs carried between two points that provide a way to bundle traffic headed in the same direction.
VPC	virtual path connections. Unidirectional virtual path links between virtual path terminators.
VPI	Virtual Path Identifier. An ATM term for the 8-bit field in the ATM cell header that indicates which virtual path the ATM should use in routing the cell.
VPN	Virtual Private Network, a restricted network that uses public wires to connect nodes. A VPN provides a way to encapsulate, or "tunnel," private data cheaply, reliably, and securely through a public network, usually the Internet.
VToA	voice traffic over ATM. A single integrated infrastructure, that is able to manage and deliver all subscriber signals (audio, data, voice, and video) and switched and dedicated services reliably and efficiently.

W

WAN	Wide Area Network. A computer and voice network geographically larger than a metropolitan area network (MAN). Telephone companies treat WANs different from MANs because of speed of light-timing considerations, and because regional Bell operating companies are prohibited from carrying traffic across Local Access Transport Areas (LATAS).
wide area network	See WAN.

wideband	Originally, any line allowing more than voice transmission. It has come to be interpreted as any facility allowing more than narrowband transmission (T1 at 1.544 megabits per second).
workstation	A powerful, stand-alone computer.

X

xDSL	A generic term standing for a variety of digital subscriber line services (the lowercase x standing for generic): ADSL, HDSL, IDSL, SDSL, and VDSL. This family of services provides extremely high bandwidth over the telephone company unshielded twisted-pair lines. Telephone companies are offering these services to compete with the cable TV industry's high speed access via modem as a way to provide high speed Internet services to consumers.

Z

ZBTSI	Zero Byte Timeslot Interchange. A technique used with the T carrier extended superframe (ESF) in which an area in the ESF frame carries information about the location of all-zero bytes (eight consecutive "0"s) within the data stream.
ZCS	zero code suppression. This type of line coding substitutes a 1 for the second least-significant bit of every all-zero byte in AMI-encoded data. ZCS encoding has no effect on voice communications, but corrupts digital data.
Zero Bit Timeslot Interchange	See ZBTSI.
zero code suppression	See ZCS.

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