



***PacketStar*[®] PSAX**
6-Port E1 IMA Module User Guide
for *PacketStar*[®] PSAX Multiservice Media Gateways

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System Software Release 8.0

AQueView[®] EMS Software Release 6.0

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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.

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 I/O, server, or CPU 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 will void your warranty. Only Lucent-authorized personnel should ship the PSAX chassis with a module installed.

Safety Warnings and Information

When installing and operating the 6-Port E1 IMA module, follow the safety guidelines provided in the printed *PacketStar® PSAX Safety Guidelines*, which accompanies this product, to help prevent serious personal injury and damage to the 6-Port E1 IMA module. Please read all warnings and instructions supplied before beginning installation or configuration of this module. In addition to the general safety information provided, you should also refer to the text in the *PacketStar PSAX* user and installation guides for other important safety information and procedures.

Regulatory Standards Compliance

Safety and Electromagnetic Compatibility (EMC)

The following *PacketStar* PSAX systems are compliant with applicable safety and EMC standards when configured with the 6-Port E1 IMA module (model 20N34):

- PSAX 1000 system
- PSAX 1250 system
- PSAX 2300 system
- PSAX 4500 system

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

Telecommunications

- FCC Part 68 (USA)
- CS-03 Issue 8 (Canada)
- JATE (Japan)
-

Regulatory Statements

USA Regulatory Statements

FCC Part 68

This equipment complies with Part 68 of the FCC rules. On the back of the PSAX chassis is a label that contains the FCC registration number, in addition to other information. You must provide this information to the telephone company, if they request it. The FCC requires Lucent Technologies to provide you with the following information:

1. This equipment has digital service interface capabilities using RJ-48C and RJ-48H connectors. The facility interface codes with which this equipment complies for digital services are as follows: 04DU9-BN, 04DU9-DN, 04DU9-1KN, and 04DU9-1SN. This equipment has loop start interface capabilities using an RJ-11C connector. The facility interface code with which this equipment complies for service is 02LS2. The service order codes for this equipment are 6.0F for the T1 interface and 9.0Y for the loop start interface.
2. An FCC-compliant telephone network interface jack is built into this equipment and is compatible with interconnections that are Part 68 compliant.
3. The REN for the Voice 2-Wire Office module when used in this equipment is 0.7B.
4. If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service might be required. But if advance notice is not practical, the tele-

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phone company will notify you as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe this is necessary.

5. The telephone company might make changes in its facilities, equipment, operations, or procedures that could affect the operation of this equipment. If this happens, the telephone company will provide advance notice for you to make necessary modifications to maintain uninterrupted service.
6. If you experience trouble with this equipment, or need repairs or warranty information, please refer to the *Lucent Technologies InterNetworking Systems Global Warranty* that accompanied your PSAX product shipment for instructions on obtaining technical support in your area.

If this equipment is causing harm to the telephone network, the telephone company might request that you disconnect the equipment until the problem is resolved.

7. This equipment has no user-serviceable parts.

This equipment cannot be used on public coin telephone service provided by the telephone company. Connection to party line service is subject to state tariffs. Contact your state public utility commission, public service commission, or corporation commission for information.

Canadian Regulatory Statements

CS-03 Issue 8

NOTICE: This equipment meets applicable Industry Canada Terminal Equipment Technical Specifications. This is confirmed by the registration number. The abbreviation, IC, before the registration number signifies that registration was performed based on a Declaration of Conformity indicating that Industry Canada technical specifications were met. It does not imply that Industry Canada approved the equipment.

The Ringer Equivalence Number (REN) assigned to the Voice 2-Wire Office module denotes the percentage of the total load to be connected to a telephone loop, which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that the total of the REN of all devices does not exceed 5.

The REN for the Voice 2-Wire Office module when used in the PSAX system is 0.7B.

SH-03 Version 8

AVIS: Le présent matériel est conforme aux spécifications techniques d'Industrie Canada applicables au matériel terminal. Cette conformité est confirmée par le numéro d'enregistrement. Le sigle, IC, placé devant le numéro d'enregistrement, signifie que l'enregistrement s'est effectué conformément à une déclaration de conformité et indique que les spécifications techniques d'Industrie Canada ont été respectées. Il n'implique pas qu'Industrie Canada a approuvé le matériel.

Le nombre équivalent de sonnerie (REN) attribué au module central bifilaire (Voice 2-Wire Office) correspond au pourcentage de la charge totale à connecter à un circuit téléphonique bifilaire; il est utilisé par l'appareil pour prévenir la surcharge. Le circuit peut être terminé par n'importe quelle combinaison d'appareils, à la seule condition que le total des REN de ces derniers ne dépasse pas cinq.

Lorsqu'il est utilisé dans le système PSAX, le module central bifilaire possède un REN de 0,7 B.

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Part 1: General

1 Getting Started



Purpose of This Guide

The *PacketStar® PSAX 6-Port E1 IMA Module User Guide* provides a description of the 6-Port E1 IMA module. It also provides the following information:

- *PacketStar* I/O module configuration overview
- Using the PSAX system to configure ports and channels
- Using the PSAX system to configure interfaces

For information on provisioning connections, see the *PacketStar® PSAX System Provisioning Connections User Guide for PacketStar® PSAX Multiservice Media Gateways*.

Note: If you are using this module for the first time, you should read through this guide in its entirety before beginning the configuration process. The chapters in this guide are arranged in the logical order of normal configuration and should be performed in that order to achieve optimum performance of the module(s).

Audience for This Guide

The information in this guide is intended for users who will configure ports and channels for the 6-Port E1 IMA module, and configure the interface types for the PSAX Multiservice Media Gateway system, whether using the console interface or the *AQueView* Element Management System (EMS).

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, Frame Relay Forum, and other telecommunications specifications
- Ethernet network capabilities
- Internet Protocol capabilities
- Data network design
- Telephony network design

Related Reading

Lucent Technologies Information Products

Product Information Library

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

Printed Documents

For your convenience, many of the documents included on the *PacketStar* PSAX Multiservice Media Gateways 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

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.

About the *PacketStar* PSAX Product Family

Lucent Technologies provides a complete range of PSAX Multiservice Media Gateways in the *PacketStar* PSAX family.

PSAX 1000 Multiservice Media Gateway

The *PacketStar* PSAX 1000 Multiservice Media Gateway is designed to provide a full range of central office-based multiservice media gateway functions in a small, competitively-priced package suitable for customer premise deployment. Ideal for central office, large enterprise, or wireless cell site multiservice media gateway applications, the PSAX 1000 system provides highly reliable network access for time-division multiplex voice, Frame Relay, 10/100Base-T Ethernet, and ATM data applications.

When it is functioning in a redundant operating mode and after it has experienced a single-point failure, the PSAX 1000 system provides up to 630 Mbps of ATM cell bus capacity. The total ATM cell bus capacity of the system may also be scaled to provide nonblocking, nonredundant chassis bandwidths beyond 630 Mbps.

Supporting four slots (19-inch chassis) for I/O and server modules—with a full range of interfaces such as DS0A, DS1/E1, DS3/E3, OC-3, OC-3c/STM-1, OC-12c/STM-4c, 10/100Base-T Ethernet, and serial—the PSAX 1000 system is a cost-effective access switch solution for connecting to legacy equipment.

PSAX 1250 Multiservice Media Gateway

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 PSAX 1250 system provides highly reliable network access for time-division multiplex voice, frame relay, 10/100Base-T Ethernet, and ATM data applications.

When it is functioning in a redundant operating mode and after it has experienced a single-point failure, the PSAX 1250 system provides up to 600 Mbps of ATM cell bus capacity. The total ATM cell bus capacity of the system may also be scaled to provide nonblocking, nonredundant chassis bandwidths beyond 600 Mbps.

Supporting 10 slots (19-inch chassis) or 14 slots (23-inch chassis) for I/O and server modules—with a full range of interfaces such as DS0A, DS1/E1, DS3/E3, OC-3, OC-3c/STM-1, OC-12c/STM-4c, 10/100Base-T Ethernet, and serial—the PSAX 1250 system is a cost-effective access switch solution for interworking with legacy equipment.

PSAX 2300 Multiservice Media Gateway

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 PSAX 2300 system provides network access for time-division multiplex voice, frame relay, 10/100Base-T Ethernet, and ATM data applications.

Chapter 1 Getting Started

About the PacketStar PSAX Product Family

When it is functioning in a redundant operating mode and after it has experienced a single-point failure, the PSAX 2300 system provides up to 1.9 Gbps of ATM cell bus capacity. The total ATM cell bus capacity of the system may also be scaled to provide nonblocking, nonredundant chassis bandwidths beyond 1.9 Gbps.

Supporting 15 slots for I/O and server modules—with provisions for OC-3, OC-3c/STM-1, and OC-12c/STM-4c interfaces, N x T1/E1 module protection switching, and a full range of interfaces such as DS0A, DS1/E1, DS3/E3, 10/100Base-T Ethernet, and serial—the PSAX 2300 system solves demanding and diverse network design challenges with ease.

PSAX 4500 Multiservice Media Gateway

The *PacketStar* PSAX 4500 Multiservice Media Gateway provides carrier-class reliability, with an unmatched range of service capabilities, end-to-end traffic prioritization, “any-service, any-channel” flexibility, and breakthrough voice technology. Ideal for the central office or a large enterprise multiservice media gateway, the PSAX 4500 system provides highly reliable network access for time-division multiplex voice, frame relay, 10/100Base-T Ethernet, and ATM data applications.

When it is functioning in a redundant operating mode and after it has experienced a single-point failure, the PSAX 4500 system provides up to 4.2 Gbps of ATM cell bus capacity. The total ATM cell bus capacity of the system may also be scaled to provide nonblocking, nonredundant chassis bandwidths beyond 4.2 Gbps.

The high-performance midplane design supports 15 interface slots. Module protection for two groups of four or six multiport DS3, STS-1e, or E3 modules is provided via an N:1 protection scheme using rear access line interface modules. The protection module provides backup so that on the failure of any one of the modules in a group, traffic is maintained. 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 DS1/E1 IMA, DS3/E3, OC-3, OC-3c/STM-4c, and OC-12c/STM-4c trunks into the ATM core, managing the whole quickly and efficiently, down to the individual permanent virtual circuit.

Through the use of the latest DSP voice technology, the PSAX 4500 system supports advanced voice traffic over ATM (VToA) services for up to 6048 DS0 channels. As a multiservice media gateway—with H.248 call control, CAS, PRI, GR-303, and V5.2 protocols, 3-Port DS3/STS-1e, 1-Port OC-3/STM-1 CES, and Tones and Announcements modules—the PSAX 4500 system provides packet solutions for voice over xDSL, trunking, tandem, and PRI offload switching.

Conventions

Text Types Used in This Document

This guide uses a different typeface to denote text displayed on console interface windows and equipment, as well as data you enter. Table 1-1 shows how each typographical convention is used.

Table 1-1. Text Conventions

| Appearance | How it is used |
|----------------------------------|---|
| SANS SERIF BOLD, ALL CAPS | Labels on module panels, chassis faceplates, or other hardware |
| <code>Fixed-width normal</code> | Message text displayed on the user interface window |
| Serif bold | <ul style="list-style-type: none"> • Button name (GUI interface) or command name (console interface) on the user interface window • Literal text for values that the user types or selects from predefined sets of values for fields • Commands or literal argument values |
| Fixed-width bold | System prompts displayed on the user interface window |
| <i>Serif italics</i> | <ul style="list-style-type: none"> • 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

Refer to the procedures within this module user guide for important safety information and proper procedures.

Standard icons and symbols to alert you to dangers, warnings, cautions, and notes are described as follows:



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.

Use of Command Description Tables

All configuration screen illustrations (windows) in this guide for both the console interface and for the *AQueView* EMS, are followed by a display or command description table describing the window display-only, command, or button functions displayed on the window. You are urged to read all the information in the command description table, especially upon first use, as commands may have special instructions or configuration constraints called out in the Function column cells by use of the **Note:** text convention (see Table 1-2).

Table 1-2. Command Description Table Example

| Command | Function |
|--|--|
| Bring All Interfaces Into Service | Brings the out-of-service configured interfaces to in-service status. Note: In GR-303 configuration, it is critical to bring into service only those channels actively configured with DS1 ports. |

Use of Field Description Tables

Field description tables usually follow the command description tables. Field description tables define the fields, their functions, configuration choices, and constraints, if applicable. As in command description tables, the **Note:** text convention is also used, where appropriate, in the field description tables to alert the user to special instructions or configuration constraints (see Table 1-3).

Identifies editable fields or display-only fields on screens

Identifies initial field value default

Describes the function of the field and special instructions for configuring modules

Table 1-3. Field Description Table Example

| Field Name | Field Value | Description |
|----------------|---|--|
| Interface Type | Default: 0 Range: 0-22 Format: Numeric | The end-to-end connection protocol used. For MD DS1 module configuration, select the X value. Note: DBCES is only available when channelization and signalling are enabled on the X window. |

Identifies available range for field value when applicable

Identifies field value format as Numeric, Predefined, Hexadecimal, Alphanumeric

Describes special instructions or configuration constraints

General Navigational Guidelines

Selecting Options, Fields, and Commands Using the Console Interface

Follow these guidelines to select an option, field, or command on the PSAX console interface windows and to navigate through the windows:

- **To select an option, field, or command**, do one of the following:
 - ~ Press the Up, Down, Left, or Right Arrow to highlight (reverse video image) the option name, field name, or command you want to select and press Enter.
 - ~ Use the alternate keys, K=UP, H=LEFT, L=RIGHT to highlight (reverse video image) the option name, field name, or command you want to select and press Enter. (You can optionally redefine these alternate keys from the User Options window, which is accessible from the Console Interface Main Menu window.)
 - ~ To quickly select a command, you can also simultaneously press Ctrl and the letter underlined in the command.

Once an option name, field, or command is selected, the system responds as described in Table 1-4.

Table 1-4. System Responses to Selecting Options, Fields, or Commands

| For a selected... | the following occurs: |
|-------------------|---|
| option name | The window corresponding to the option name is displayed. |
| field | <p>The following variations occur:</p> <ul style="list-style-type: none"> • The field entry area is blank or contains the default or previously entered value. Press Enter to enter or change data in this field. Press Enter again to exit edit mode. • The field entry area, like the field name, is displayed in reverse video image and contains a predefined set of values, which you can view or select by pressing Enter to navigate forward through these values. To navigate backward through these field values, press Ctrl+H or the Backspace key. <p>Read-only fields, which you cannot change, are enclosed in square brackets (example: [LineStyle]).</p> |
| command | <p>The following variations occur:</p> <ul style="list-style-type: none"> • A message in the information line indicating an error or successful completion of the command is displayed. • The next higher level or previous window (<i>window name</i>) is displayed. • The next lower level or succeeding window (<i>window name</i>) is displayed. |
| | |

- **To navigate through the Console windows**, use the shortcuts listed in Table 1-5.

Table 1-5. Shortcut Keys for Navigating Console Interface Windows

| If you want to... | press... |
|--|-----------------------|
| redisplay the previous window | Ctrl+B on the window. |
| redisplay the Console Interface Main Menu window | Ctrl+G on the window. |
| refresh the window | Ctrl+R on the window. |
| | |

On all the PSAX system windows, each command or menu option has an underlined letter. The control key plus an underlined letter is a shortcut to that command or menu option. You can use the navigation keys and hotkeys with the Caps Lock key on or off. Always observe the status line at the bottom of the window for instructions and information.

Selecting Menu Options and Fields in the *AQueView* GUI

Follow these guidelines to select a menu option or field in the *AQueView* GUI windows and to navigate through the windows:

- For *AQueView* procedures, instructions using the term “click” mean to press the left mouse button. The term “right-click” means to press the right mouse button.

Note: If you have a mouse with three buttons, you will not need to use the middle mouse button to navigate the *AQueView* GUI.

- When multiple menu options are displayed in a procedural step, select the menu options or click the appropriate buttons in succession as described in Table 1-6.

Table 1-6. Selecting Multiple Menu Options or Buttons in Succession

| If you encounter a step in a procedure to select multiple... | then do this.. |
|--|---|
| menu options in succession, such as the step “Select Start > Programs > AQueView.” | Using the left mouse button: a Click the Start menu option b Click the Programs menu option c Click the AQueView menu option |
| buttons in succession, such as the step, “Click Apply > Close .” | Using the left mouse button: a Click the Apply button. b Click the Close button. |
| | |

- Field values are displayed in three ways. To select a field, do one of the following methods to enter the desired values into the fields on a window in the *AQueView* GUI as described in Table 1-7.

Table 1-7. How Fields Are Displayed in the *AQueView* GUI

| For a field displayed as... | do this... |
|---|---|
| a combo box (it displays with a small triangle pointing downward) | select the displayed value and a drop-down list will appear with additional values. |
| a blank box | enter a valid value in the field by typing it. |
| grey | view the information, which is read-only. You cannot edit values that display as grey in the <i>AQueView</i> GUI. |
| | |

- To quickly select menu options from the *AQueView* Menu Bar, you can also simultaneously press keyboard combinations as described in Table 1-5.

Table 1-8. Shortcut Keys for Navigating the *AQueView* GUI

| If you want to... | press... |
|---|------------------|
| display the File menu on the <i>AQueView</i> Menu Bar | Alt+F |
| display the View menu on the <i>AQueView</i> Menu Bar | Alt+V |
| display the Help menu on the <i>AQueView</i> Menu Bar | Alt+H |
| display the Open Device window | Ctrl+O |
| display the Run Script window | Ctrl+C |
| display the User List window | Ctrl+U |
| display the Device List window | Ctrl+D |
| display the User Properties window | Ctrl+P |
| terminate the <i>AQueView</i> session | Alt+X and Alt+F4 |
| | |

Help Information

The Help windows are accessible from any window in the PSAX system console interface. To access the Help windows, press the ? (Question Mark) key on any window. In addition to the Help windows, the Console Interface windows display contextual help in the information line at the bottom of each window. Contextual help provides information about the command or field currently highlighted on that window. The information line also displays error codes and responses to commands. All responses and notifications are recorded in a trap log. See Appendix A in the appropriate *PacketStar* PSAX Multiservice Media Gateway user guide for details on displaying the trap log and explanations of the trap messages.

To view the Help windows from the Console Interface Main Menu window, perform the following procedure.

Viewing and Navigating the Help Windows

Begin

- 1 On the window for which help is desired, press the ? (question mark) key.

The Help window for the current console window is displayed (see Figure 1-1).

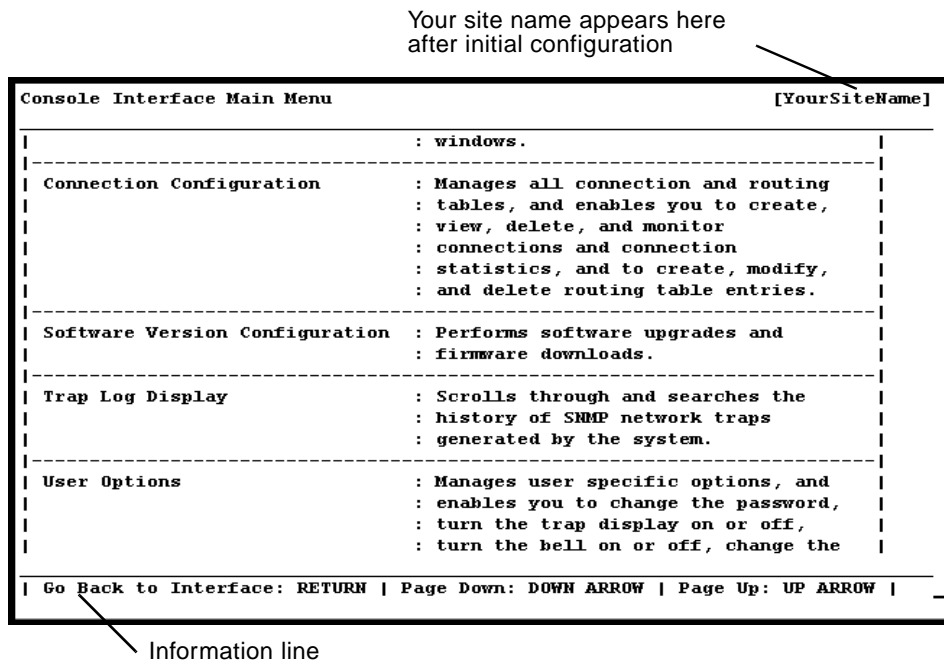


Figure 1-1. Main Menu Help Window

- 2 To display the remaining Help windows for the current console window, press the Down Arrow key.
- 3 To scroll backward through the Help windows for the current console window, press the Up Arrow key.
- 4 To exit Help and return to the current console window, press the Enter key.

End

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. If you experience a problem with the 6-Port E1 IMA module, refer to the *Lucent Technologies InterNetworking Systems Global Warranty*, which accompanied your shipment, for instructions on obtaining support in your area.

Before You Begin

Before you start configuring and using your new 6-Port E1 IMA module, be sure you:

- 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

Comments on This Guide

To comment on the *PacketStar® PSAX 6-Port E1 IMA Module User Guide*, please complete the comment card that accompanied your shipment and mail it to the following address:

Senior 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.

Chapter 1 Getting Started

Comments on This Guide

2 Module Description



Overview of This Module

The 6-Port E1 IMA module (see Figure 2-1) has six physical RJ-45 ports. The inverse multiplexing for ATM capabilities of this module permit a user to strap two to six of the physical ports together to create ATM interfaces that support 4 to 12 Mbps of bandwidth. A maximum of three IMA groups may be configured per module.

Source data enters the module from the backplane and is divided between the ports within the IMA group specified in the virtual circuit connection. The data leaves the front of the module and is transported across individual E1 lines. At the destination IMA module, the E1 streams are merged back together in correct order and passed on to other modules as directed by virtual circuit connections. IMA dynamically handles conditions when E1s within an IMA group become unavailable: the IMA "pipe" shrinks in bandwidth to the remaining E1s and continues to pass traffic. When a problem E1 comes back online, the IMA "pipe" will enlarge to take full advantage of the restored bandwidth.

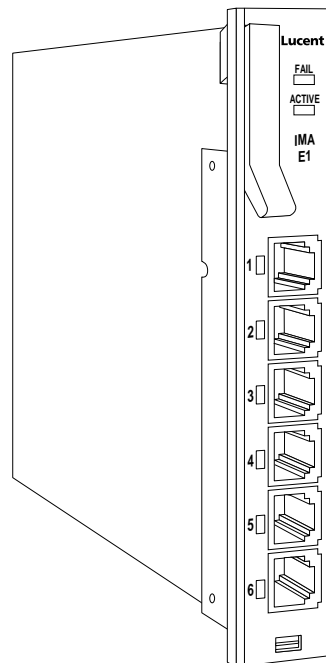


Figure 2-1. E1 IMA Module

Software Features

The 6-Port E1 IMA module offers ATM IMA services, including permanent virtual circuits, soft permanent virtual circuits, and switched virtual circuits. The module supports ATM UNI v3.a, IISP, PNNI, and ILMI. This functionality enables service providers to offer multiple E1 IMA group services using a single module.

Hardware Features

The 6-Port E1 IMA module provides the following hardware features:

- Number of ports: 6
- Connector type: RJ-45 (120-Ohm symmetrical pair [4 wire + Frame Ground] interface)
- Line rate: 2.048 Mbps
- Line encoding mode: HDB3
- Loopback capabilities: local loopback, line loopback
- Line buildout: N/A
- Framing mode: cyclic redundancy check multiframe (CRC-mf)

Hardware Specifications

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

Table 2-1. Physical Hardware Specifications

| Specification | Description |
|--|--|
| Dimensions | 17.3 cm H x 2.41 cm W x 23.2 cm D (6.8 in. H x 0.95 in. W x 9.13 in. D) |
| Weight | 0.45 kg (1.0 lb.) |
| Operating temperature range for AC-powered PSAX 1000 and all PSAX 1250, PSAX 2300, and PSAX 4500 systems | 0° to 50° C (32° to 122° F) |
| Operating temperature range for DC-powered PSAX 1000 systems | -20° to 60° C (-4° to 140° F) with a cold start minimum of 0° C (32° F) |
| Operating humidity range | 5% to 85% relative humidity |
| Operating altitude range | 197 feet below sea level to 13,123 feet above sea level |
| Storage temperature range | -40° to 70° C (-40° to 158° F) |
| Storage humidity range | 0 to 90% noncondensing |

Additional information can be found in the appropriate *PacketStar* PSAX module user guides.

Performance and Power Specifications

Table 2-2 describes the chassis speed, power consumption, and memory allocation specifications for this module.

Table 2-2. Performance and Power Specifications for the 6-Port E1 IMA Module

| Module | Total Amount of SDRAM | Module Program and Data Space | Maximum Input Buffer ¹ | Output Buffer ² | Chassis Speed ³ | Power Consumption |
|------------------------|-----------------------|-------------------------------|-----------------------------------|----------------------------|----------------------------|-------------------|
| 6-Port E1 IMA (IMA E1) | 16 MB | 8 MB | 1 MB | 7 MB (114,688) | Low Speed | 18 W |

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

² Indicates the size of the output buffer followed by the maximum number of 64-byte cells in the output buffer.

³ This column relates only to the speed at which the modules communicate within the chassis. A high-speed module will communicate at high speed (1.23 Gbps) in a chassis that has a high-speed bus (PSAX 4500 chassis). High-speed modules will communicate at 650 Mbps in any other chassis. Low-speed modules will always communicate at 650 Mbps in any chassis.

LED Indicators

Table 2-3 describes how the light-emitting diode (LED) indicators on the 6-Port E1 IMA module faceplate respond to different module conditions. These LEDs indicate if the module has been installed properly.

Chapter 2 Module Description

Hardware Features

Table 2-3. LED Indicators for the 6-Port E1 IMA 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 | N/A | N/A |
| ACTIVE (green) | Lights briefly ¹ | Not lit | Lights only when the module is functioning properly | N/A | N/A |
| LOS [Loss of Signal] 1 (yellow) 2 (yellow) 3 (yellow) 4 (yellow) 5 (yellow) 6 (yellow) | Lights briefly ² | N/A | N/A | Lights | <ul style="list-style-type: none"> • Does not light if signal is being received • Lights if signal is missing |
| <p>¹Note: 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).</p> <p>²Note: After power is initially applied to the system and the system boot is complete, this loss of signal LED indicates whether the port has a cable connected to it.</p> | | | | | |

Part 2: Console Operation

3 Configuring Ports and Channels Using the Console Interface



Overview of This Chapter

This chapter describes how to use the console interface to perform the following tasks:

- Setting the values for the port and channel configuration of the 6-Port E1 IMA module
- Creating IMA groups
- Viewing the port statistics
- Saving the module configuration and logging off

Before You Begin

Be sure to complete the following tasks first before configuring the 6-Port E1 IMA module:

- Configure your basic system (see “Configuring the System for Your Site” in the appropriate *PacketStar* PSAX Multiservice Media Gateway user guide).
- Configure the Stratum 3-4 module (see “Configuring the Stratum 3-4 Module” in the appropriate *PacketStar* PSAX Multiservice Media Gateway user guide).

When configuring the 6-Port E1 IMA module using the console interface, display-only fields are displayed in square brackets ([]).

Loopback Configuration Options

To aid network troubleshooting and testing, loopback capability is provided for the 6-Port E1 IMA module. The loopback option on the module port and channel configuration window enables you to verify the integrity of a port by transmitting a received signal back to the source. Selecting a loopback option is described in the module configuration procedure provided in this chapter.

Figure 3-1 illustrates the line loop and local loop options.

Chapter 3 Configuring Ports and Channels Using the Console Interface

Obtaining General Module Data and Accessing Ports and Channels

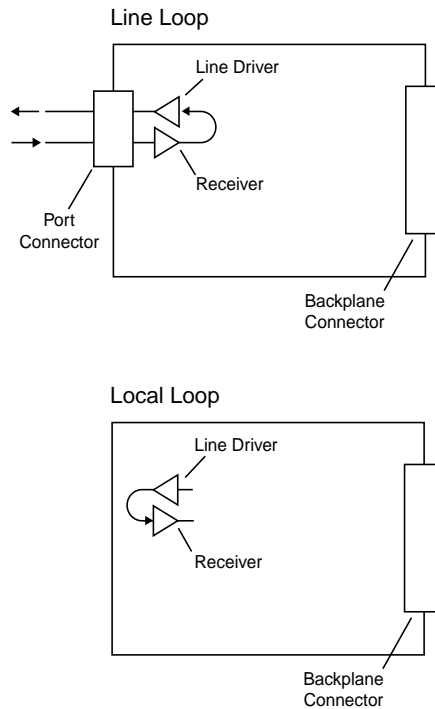


Figure 3-1. Loopback Configuration Options

Obtaining General Module Data and Accessing Ports and Channels

This section describes how to obtain product, model, version, and serial number data about a module from the Equipment Configuration window. You also use this window to access the port and channel configuration windows for the PSAX modules.

Accessing the Equipment Configuration Window

Begin

- 1 On the Console Interface Main Menu window, select the Equipment Configuration option.

The Equipment Configuration window is displayed (see Figure 3-2 through Figure 3-6). The commands and fields on this window are described in the tables following the figures.
- 2 View the module status, software version, PEC, and serial number data.
- 3 When you are ready to begin configuring the ports and channels of the module, select the line displaying the name of the module you want to configure.
- 4 Proceed to the section, "Configuring the Ports," for module configuration procedures.

Chapter 3 Configuring Ports and Channels Using the Console Interface

Obtaining General Module Data and Accessing Ports and Channels

Note: The sample Equipment Configuration windows in the following figures may not show the actual module you are configuring. These figures illustrate the variations of slot configurations for the different PSAX chassis displayed on the Equipment Configuration window.

End

| Equipment Configuration | | | | | | [YourSiteName] |
|-------------------------|---------------|---------|--------------|------------|------------|----------------|
| Slot | Card Type | Status | Alarm Status | SW Version | PEC | Serial # |
| 1 | CH-DS3 | Unknown | NoAlarm | V07.00 | NS23N610CB | 001000178772 |
| 2 | CH-STS1 | Unknown | NoAlarm | V07.00 | NS23N620BC | 001000158839 |
| 3 | OC-3cMMAQ | Primary | 1 | V08.00 | YS20N120BC | 001000011644 |
| 4 | OC12c-STM4-SM | Unknown | CardRemoved | V08.00 | NS23N732AB | 061000049831 |
| 5 | None | | | | | |
| 6 | None | | | | | |
| 7 | None | | | | | |
| 8 | None | | | | | |
| 9 | None | | | | | |
| 10 | None | | | | | |
| 11 | None | | | | | |
| 12 | None | | | | | |
| 13 | None | | | | | |
| 14 | None | | | | | |
| 15 | CPU 2 | Primary | NoAlarm | V08.00 | NS20N201EA | 061000125395 |
| 16 | CPU 2 | Standby | NoAlarm | V08.00 | NS20N201EA | 061000125422 |
| 17 | None | | | | | |

Update Equipment Display Page Down Go Back to Main Menu ->

Press RETURN to configure the equipment in slot 2.

Figure 3-2. Sample Equipment Configuration Window on a PSAX 1000 System (Page 1)

Chapter 3 Configuring Ports and Channels Using the Console Interface
 Obtaining General Module Data and Accessing Ports and Channels

| Equipment Configuration | | | | | | [YourSiteName] |
|-------------------------|------------------|----------------|----------------|---------------|-------------------|---------------------|
| Slot | Card Type | Status | Alarm Status | SW Version | PEC | Serial # |
| 1 | UnstDS3E3-3P | Unknown | NoAlarm | V07.00 | NS23N020AB | 001002003004 |
| 2 | None | | | | | |
| 3 | MSerial | Unknown | NoAlarm | V06.00 | NS20N071DA | 001000017181 |
| 4 | None | | | | | |
| 5 | HD-E1 | Primary | NoAlarm | V08.00 | NS23N660AA | 001000212424 |
| 6 | HD-E1 | Primary | NoAlarm | V08.00 | NS23N660AA | 001000212290 |
| 7 | EnhE1 | Unknown | NoAlarm | V06.00 | NS20N560HD | 001000045364 |
| 8 | None | | | | | |
| 9 | HD-E1-IMA | Primary | NoAlarm | V07.01 | NS23N340AB | 001000333730 |
| 10 | E1-IMA | Primary | NoAlarm | V06.00 | NS20N340CB | 001000045344 |
| 11 | CPU 2 | Primary | NoAlarm | V08.00 | NS20N201EA | 061000125395 |
| 12 | CPU 2 | Standby | NoAlarm | V08.00 | NS20N201EA | 061000125395 |
| 13 | None | | | | | |
| 14 | None | | | | | |
| 15 | None | | | | | |
| 16 | None | | | | | |
| 17 | None | | | | | |

Update Equipment Display Page Down Go Back to Main Menu ->

Press RETURN to configure the equipment in slot 9.

Figure 3-3. Sample Equipment Configuration Window on a PSAX 1250 System (Page 1)

| Equipment Configuration | | | | | | [YourSiteName] |
|-------------------------|---------------|----------------|----------------|---------------|-------------------|---------------------|
| Slot | Card Type | Status | Alarm Status | SW Version | PEC | Serial # |
| 1 | None | | | | | |
| 2 | DSP2D | Primary | NoAlarm | V07.01 | NS23N290AA | 345678901234 |
| 3 | ChDS3STS1-3P | Primary | NoAlarm | V07.01 | NS23N123AA | 123456789012 |
| 4 | ChDS3STS1-3P | Primary | NoAlarm | V07.01 | NS23N123AA | 123456789013 |
| 5 | DSP2D | Primary | NoAlarm | V07.01 | NS23N290AA | 345678901235 |
| 6 | DSP2D | Primary | NoAlarm | V07.01 | NS23N290AA | 345678901236 |
| 7 | 0C12c-STM4-SM | Primary | NoAlarm | V07.01 | NS23N730AA | 567890123456 |
| 8 | 0C12c-STM4-SM | Primary | NoAlarm | V07.01 | NS23N730AA | 567890123457 |
| 9 | DSP2D | Primary | NoAlarm | V07.01 | NS23N290AA | 345678901237 |
| 10 | DSP2D | Primary | NoAlarm | V07.01 | NS23N290AA | 345678901238 |
| 11 | DSP2D | Primary | NoAlarm | V07.01 | NS23N290AA | 345678901239 |
| 12 | DSP2D | Primary | NoAlarm | V07.01 | NS23N290AA | 345678901230 |
| 13 | Tasm | Primary | NoAlarm | V07.01 | NS23N280AA | 890123456789 |
| 14 | Tasm | Primary | NoAlarm | V07.01 | NS23N280AA | 890123456780 |
| 15 | ChDS3STS1-3P | Primary | NoAlarm | V07.01 | NS23N123AA | 123456789014 |
| 16 | CPU 2 | Primary | NoAlarm | V08.00 | NS20N201EA | 061000125395 |
| 17 | CPU 2 | Primary | NoAlarm | V08.00 | NS20N201EA | 061000125396 |

Update Equipment Display Page Down Go Back to Main Menu ->

Press RETURN to configure the equipment in slot 6.

Figure 3-4. Sample Equipment Configuration Window on a PSAX 2300 or PSAX 4500 System (Page 1)

Chapter 3 Configuring Ports and Channels Using the Console Interface

Obtaining General Module Data and Accessing Ports and Channels

| Equipment Configuration | | | | | | [YourSiteName] |
|-------------------------|-----------|---------|--------------|------------|------------|----------------|
| Slot | Card Type | Status | Alarm Status | SW Version | PEC | Serial # |
| 21A | Stratum | Primary | NoAlarm | V08.00 | NS23N050CA | 001000322180 |
| 22B | Stratum | Standby | NoAlarm | V08.00 | NS23N050CA | 001000986514 |
| 23 | PwrSupply | Primary | NoAlarm | | NS23N110AC | 004801000164 |
| 24 | PwrSupply | Primary | NoAlarm | | NS23N110AC | 004801000194 |
| 25 | Alarm | Primary | NoAlarm | | NS20N790AC | 013605000623 |

Update Equipment Display **Page Up** Go Back to Main Menu ->

Press RETURN to view the second equipment configuration page.

Figure 3-5. Sample Equipment Configuration Window on a PSAX 1000, PSAX 2300, or PSAX 4500 System (Page 2)

| Equipment Configuration | | | | | | [YourSiteName] |
|-------------------------|-----------|---------|--------------|------------|------------|----------------|
| Slot | Card Type | Status | Alarm Status | SW Version | PEC | Serial # |
| 21 | Stratum | Standby | NoAlarm | | NS20N051AA | 1000046076 |
| 22 | Stratum | Primary | NoAlarm | | NS20N051AA | 1000046065 |
| 23 | PwrSupply | Primary | NoAlarm | | IS20N040AB | 1000002457 |
| 24 | PwrSupply | Primary | NoAlarm | | IS20N040AB | 1000002302 |
| 25 | None | | | | | |

Update Equipment Display Page Up Go Back to Main Menu ->

Press RETURN to configure the equipment in slot 22.

Figure 3-6. Sample Equipment Configuration Window on a PSAX 1250 System (Page 2)

Commands

The commands on this window have the following functions.

Chapter 3 Configuring Ports and Channels Using the Console Interface

Obtaining General Module Data and Accessing Ports and Channels

| Command | Function |
|---------------------------------|---|
| Update Equipment Display | Refreshes the current status of the modules in the PSAX chassis |
| Page Down | Displays the second page of the Equipment Configuration window. |
| Page Up | Displays the first page of the Equipment Configuration window. |
| Go Back to Main Menu | Redisplays the Console Interface Main Menu window. |

The display-only fields on this window are described in Table 3-1.

Table 3-1. Field Descriptions for the Equipment Configuration Window

| Field Name | Field Values | Description |
|------------|---|--|
| Slot | Default: N/A Range: 1–25, depending on chassis type Format: Numeric | Indicates the slot number in the PSAX chassis. |
| Card Type | Default: N/A Range: from PSAX system database Format: Predefined alphanumeric alphanumeric | Indicates the type of the module in the slot. When a module is inserted into the chassis, its name is displayed in the Card Type field next to the slot number. When the module is removed from the chassis, its name is no longer displayed in the Card Type field and is replaced with None . |
| Status | Default: Unknown Range: N/A Format: Predefined alphanumeric | Displays the operational status of the module. |
| | Unknown | Indicates that the module has not been configured. |
| | Primary | For an I/O or server module, indicates that at least one port or channel on the module has been configured. For a CPU module, indicates that this module is the primary CPU module. |
| | Standby | Indicates that the module, in redundant systems, is operating as the standby (backup) module to the primary module. Indicates, for the CPU module in redundant systems, that this module is the standby (backup) CPU module. |

Table 3-1. Field Descriptions for the Equipment Configuration Window (Continued)

| Field Name | Field Values | Description |
|--------------|---|--|
| Alarm Status | Default: No Alarm Range: N/A Format: Predefined alphanumeric | Displays the present alarm condition of the module. For the alarm status conditions, see the table “Alarm Status Descriptions” following these field descriptions. |
| SW Version | Default: N/A Range: (from module firmware) Format: Predefined alphanumeric | Displays the version of PSAX system software with which the modules’ firmware was released. The software version is encoded in the module firmware. Because not all modules require firmware upgrades with every new PSAX system software release, the software version that is displayed in this window may be lower than the CPU system software that is currently running on the PSAX system. See the most recent Release Note document for the latest software and firmware lineup information. |
| PEC | Default: N/A Range: from module firmware Format: Predefined alphanumeric | Displays the product element code (PEC) used to identify and order this type of module. The PEC is encoded in the module firmware. |
| Serial # | Default: N/A Range: (from module firmware) Format: Predefined alphanumeric | Displays the unique serial number of the individual module. The product serial number is encoded in the module firmware. The format of this field is the following: PSAX System Rel. 6.5.0 and later: 12-digit number in the format: <i>YYVVDDnnnnnn</i> , where <i>YY</i> = year of manufacture <i>VV</i> = vendor ID code (manufacturer and location) <i>DD</i> = date code of manufacture (either month or week depending on vendor’s preference) <i>nnnnnn</i> = sequential number, which in conjunction with <i>YY</i> , <i>VV</i> , and <i>DD</i> , creates a unique number for each hardware component in the PSAX product line For existing products with the 10-digit serial number used in Rel. 6.5.0 or later systems, this number is displayed with two preceding zeros. PSAX Rel. 6.3.0 and earlier: 10-digit number. For products with 12-digit serial numbers used in Rel. 6.3.0 or earlier systems, the first two digits (<i>YY</i>) are not displayed. |

The alarm status descriptions for the Alarm Status field on the Equipment Configuration window are provided in Table 3-2. When underscored numbers are displayed in this field, they represent one or more ports on the module that currently have a loss of signal.

Table 3-2. Alarm Status Descriptions for Modules on the Equipment Configuration Window

| Number | Alarm Status | Module Type Affected | Description |
|--------|----------------------|----------------------|---|
| 1 | NoAlarm | I/O | NoAlarm indicates that the module is inserted in the chassis slot and not configured. |
| 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 dc Power Supply output has failed. |
| 9 | Plus120vFailed | Power Supply | The 120 V ac Power Supply input has failed. |
| 10 | Minus48vFailed | Power Supply | The -48 V dc Power Supply output has failed. |
| 11 | UnknownAlarm | I/O | The reason for failure is not known. |
| 12 | CompleteClockFailed | Stratum | The backplane has detected a clock error. |
| 14 | PowerFailed | Power Supply | Power failed |

Configuring the Module

The 6-Port E1 IMA module has 6 physical E1 ports that may be used for ATM IMA groups. You must first configure the 6-Port E1 IMA module before you can set up connection provisioning.

Configuring the 6-Port E1 IMA Module Ports

To configure the 6-Port E1 IMA module ports, perform the steps in the following procedure.

Configuring the Ports

Begin

- 1 On the Console Interface Main Menu window, select the Equipment Configuration option and press Enter.

```

Console Interface Main Menu                                     [YourSiteName]

Site-Specific Configuration
Equipment Configuration
Connection Configuration
Software Version Configuration
Trap Log Display
User Options
Diagnostics
Remote Database Operation

Save Configuration
Leave Console Interface

* Use the underlined letter with the control key as a hotkey.
* Press Ctrl-G at any time to go back to the Main Menu.
* Press ? at any time for help.

Configure the site name, IP address, and date and time for this system.

```

Figure 3-7. Console Interface Main Menu Window (Equipment Configuration Selected)

The Equipment Configuration window (see Figure 3-8) is displayed.

| Equipment Configuration | | | | | | [YourSiteName] |
|-------------------------|---------------|----------------|----------------|---------------|-------------------|---------------------|
| Slot | Card Type | Status | Alarm Status | SW Version | PEC | Serial # |
| 1 | OC12c-STMA-SM | Primary | NoAlarm | V08.00 | NS45N030AA | 001000336927 |
| 2 | OC12c-STMA-SM | Primary | NoAlarm | V08.00 | NS45N030AA | 001000336928 |
| 3 | E1-IMA | Primary | NoAlarm | V08.00 | NS20N340AA | 024804003409 |
| 4 | E1-IMA | Primary | NoAlarm | V08.00 | NS20N340AA | 024804003410 |
| 5 | E1-IMA | Primary | NoAlarm | V08.00 | NS20N340AA | 024804003411 |
| 6 | E1-IMA | Primary | NoAlarm | V08.00 | NS20N340AA | 024804003412 |
| 7 | E1-IMA | Primary | NoAlarm | V08.00 | NS20N340AA | 024804003413 |
| 8 | E1-IMA | Primary | NoAlarm | V08.00 | NS20N340AA | 024804003414 |
| 9 | E1-IMA | Primary | NoAlarm | V08.00 | NS20N340AA | 024804003415 |
| 10 | E1-IMA | Primary | NoAlarm | V08.00 | NS20N340AA | 024804003416 |
| 11 | E1-IMA | Primary | NoAlarm | V08.00 | NS20N340AA | 024804003417 |
| 12 | E1-IMA | Primary | NoAlarm | V08.00 | NS20N340AA | 024804003418 |
| 13 | E1-IMA | Primary | NoAlarm | V08.00 | NS20N340AA | 024804003419 |
| 14 | Alarm | Primary | NoAlarm | V08.00 | YS20N790AA | 001000001010 |
| 15 | E1-IMA | Primary | NoAlarm | V08.00 | NS20N340AA | 024804003420 |
| 16 | CPU2 | Primary | NoAlarm | V08.00 | NS20N201EA | 061000123732 |
| 17 | CPU2 | Primary | NoAlarm | V08.00 | NS20N201EA | 061000123733 |

Update Equipment Display Page Up Go Back to Main Menu ->

Press RETURN to configure the equipment in slot 3.

Figure 3-8. Equipment Configuration Window (As Displayed on the PSAX 2300 and PSAX 4500 Console)

Chapter 3 Configuring Ports and Channels Using the Console Interface

Configuring the Module

- 2 On the Equipment Configuration window, select an E1 IMA module in the list and press Enter. The E1 IMA Card Configuration window is displayed (see Figure 3-9).

```
E1 IMA Card Configuration [YourSiteName]
Slot: 11
-----
Port  Interface Type  Admin Status  Oper Status  Line Status
-----
  1  Unconfigured    Unconfigured  Unconfigured  NoAlarm
  2  Unconfigured    Unconfigured  Unconfigured  NoAlarm
  3  Unconfigured    Unconfigured  Unconfigured  NoAlarm
  4  Unconfigured    Unconfigured  Unconfigured  NoAlarm
  5  Unconfigured    Unconfigured  Unconfigured  NoAlarm
  6  Unconfigured    Unconfigured  Unconfigured  NoAlarm

IMA Group Configuration

 7 Channels Configured: 0 Channels In Service: 0

-----
Update Display          Bring All Interfaces Into Service
Delete All Interfaces  Take All Interfaces Out Of Service
                       Go Back to Equipment Configuration ->

Press RETURN and enter a new slot number to configure a different module.
```

Figure 3-9. E1 IMA Card Configuration Window

Commands

The commands in these windows have the following functions:

| Command | Function |
|------------------------------|---|
| Update Display | Updates the values in the fields to show the most current configuration. Use this command mostly to display the most current information in the Line Status field. |
| Delete All Interfaces | Deletes the configured interfaces for all the ports. The value 0 is displayed in the Channels Configured field. You must first take all group interfaces out of service and delete them (see “Setting Up E1 IMA Groups”), then take all interfaces out of service (using the Take All Interfaces Out Of Service command) before you can use this command to delete all the configured interfaces. |

Chapter 3 Configuring Ports and Channels Using the Console Interface

Configuring the Module

| Command | Function |
|--------------------------------------|--|
| Apply Port Configuration | For a specified port number value, applies the port configuration field values you set |
| Reset Display | Resets the port configuration fields to the last set of saved values. |
| View Port Statistics | Displays the IMA Port Statistics window. |
| Bring Interface Into Service | Brings the out-of-service configured interface for the channel to in-service status. You must first configure the interface using the Apply Port Configuration command before you can use this command. |
| Take Interface Out Of Service | Takes the in-service configured interface to out-of-service status. The displayed asterisk is removed from all configured channels indicating that they are out of service. |
| Go Back to Card Configuration | Redisplays the IMA Card Configuration window. |

Configuring IMA Ports and Channels

To set values for the E1 IMA Port and Channel Configuration window, perform the steps in the following procedure.

Setting the Values for the E1 IMA Port and Channel Configuration Window

Begin

- 1 Enter values in the fields on this window according to the information provided in Table 3-3.

Table 3-3. Field Descriptions for the E1 IMA Port and Channel Configuration Window

| Field Name | Values | Description |
|---------------------------------|---------------------|---|
| [Line Type] (display only) | CRC-MF (default) | Indicates the framing mode is cyclic redundancy multi-frame format. |
| [Line Coding] (display only) | Hdb3 (default) | High-density bipolar of order 3. A bipolar coding method that does not allow more than 3 consecutive zeros. |
| | Ami | Alternate mark inversion. Indicates zero code suppression. |

Table 3-3. Field Descriptions for the E1 IMA Port and Channel Configuration Window

| Field Name | Values | Description |
|----------------|----------------------|--|
| Loopback | Default: NoLoop | The port is not in 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 | Local clock source is used as the timing source. |
| | LoopTiming | Recovered receive clock is used as the transmit clock |
| | Adaptive Timing | Monitors the port buffers to increase or decrease the transmission rate. |

Chapter 3 Configuring Ports and Channels Using the Console Interface

Configuring the Module

Table 3-3. Field Descriptions for the E1 IMA Port and Channel Configuration Window

| Field Name | Values | Description |
|----------------------------------|-------------------|---|
| [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 module under the MIB object lineStatus in Appendix A, "SNMP Trap Messages" in any <i>PacketStar PSAX Multiservice Media Gateway User Guide</i> . |
| | 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. |
| Interface Type | Unconfigured | This interface is not configured |
| | Atm Ima | This interface is configured as an IMA interface. |
| [Admin Status] (display only) | Unconfigured | The interface for the port is not configured. |
| | OutOfService | The interface has not yet been brought into service, or in-service interface has been set to out of service with the Take Interface Out of Service command. |
| | InService | The interface has been brought into service with the Bring Interface Into Service command. |

Table 3-3. Field Descriptions for the E1 IMA Port and Channel Configuration Window

| Field Name | Values | Description |
|---------------------------------|--------------|---|
| [Oper Status] (display only) | Unconfigured | This channel is not operational because the interface is not configured. |
| | OutOfService | Two types of problems cause this status. <ol style="list-style-type: none"> 1. A loss-of-signal condition can exist due to any one of the following: <ul style="list-style-type: none"> • The module port is not physically connected to a cable. • The cable is not connected at the other end to a device. • The cable is broken. 2. A loss of frame or encoding can exist due to a problem with the framing or encoding of the signal. For example, a repeater could corrupt the signal. |
| | InService | The port is physically connected to a cable; the cable is conducting the signal; and the signal is being transmitted and received correctly. |

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

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

The selected interface configuration window is displayed. See Chapter 4, "Configuring the Interfaces Using the Console Interface," for instructions.

4 To bring the interface into service, select the **Bring Interface Into Service** command.

Note: You must bring the interface into service before you can set up E1 IMA groups.

End

Viewing Port Statistics

Viewing E1 IMA Port Statistics

Begin

Select the **View Port Statistics** command and press Enter. The E1 IMA Port Statistics window (see Figure 3-11) is displayed.

Chapter 3 Configuring Ports and Channels Using the Console Interface

Configuring the Module

```

E1 IMA Port Statistics [YourSiteName]
Slot: 11 Port: 01
-----
Errored Seconds..... 0000000000
Severely Errored Seconds..... 0000000000
Line Coding Violations..... 0000000000

Time Elapsed..... 0:00:00

Continuous Update
Reset Statistics
Go Back to E1 IMA Port Configuration ->
-----
Press RETURN and enter a slot number to view statistics for another slot.

```

Figure 3-11. E1 IMA Port Statistics Window

Commands

The commands in this window has 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 E1 IMA Port Configuration | Redisplays the E1 IMA Port and Channel Configuration window. |

Field Descriptions

Descriptions of the data fields for this window are given in Table 3-4.

Table 3-4. Field Descriptions of the E1 IMA Port Statistics Window

| Field Names | Field Values | Description |
|--------------------------|---|--|
| Errored Seconds | Default: 0 Range: N/A Format: numeric | A second with at least one of the following: <ul style="list-style-type: none"> • Path Code Violations • Controlled Slip events • A detected AIS defect • Presence of Bipolar Violations. |
| Severely Errored Seconds | Default: 0 Range: N/A Format: numeric | A second with at least one of the following: <ul style="list-style-type: none"> • 320 or more Path Code Violation Error events • Out of Frame defects • A detected AIS defect • A count of one-second intervals with Framing error events, an OOF defect, or a minimum of 1544 LCVs. |
| Line Coding Violations | Default: 0 Range: N/A Format: numeric | A Bipolar Violation or Excessive Zeroes Error Event has occurred. |
| Time Elapsed | Default: 00:00:00 Range: N/A Format: numeric | Time elapsed since last reset. |

Configuring IMA Groups

You can set up E1 IMA groups for the 6-Port E1 IMA module. You can configure up to three IMA groups for each module, and each group can contain up to six ports.

Up to three groups (channels) can be configured on the virtual port (port 7). A group must have at least two, and up to six of the physical ports assigned to it. For example:

- ~ You can assign all six of the physical ports to group 1 (channel 1)
- ~ You can assign ports 1, 3, 5 to group 1 (channel 1), and ports 2, 4, and 6 to group 2 (channel 2), and so on

Perform the steps in the following procedure to set up the E1 IMA groups.

Setting Up E1 IMA Groups

Begin

- 1 To configure an E1 IMA group, select the **Go Back to Port Configuration** command to return to the E1 IMA Port and Channel Configuration window (see Figure 3-10).
- 2 On the E1 IMA Port and Channel Configuration window, select the **Go Back to Card Configuration** command to return to the E1 IMA Card Configuration window (see Figure 3-9).

Chapter 3 Configuring Ports and Channels Using the Console Interface

Configuring the Module

- 3 On the E1 IMA Card Configuration window, select port 7, which is a virtual port, and press Enter. The E1 IMA Virtual Channel Configuration window is displayed (see Figure 3-12).

```

E1 IMA Virtual Channel Configuration [YourSiteName]
Slot: 11 Port: 07 Interface Type and IMA Group Assignment
-----
[Group/Channel]... 1 [InterfaceType].. Unconfigured
[Ports In Group].. [Admin Status]... Unconfigured
{ } [Oper Status].... Unconfigured Configure Gp1
-----
[Group/Channel]... 2 [InterfaceType].. Unconfigured
[Ports In Group].. [Admin Status]... Unconfigured
{ } [Oper Status].... Unconfigured Configure Gp2
-----
[Group/Channel]... 3 [InterfaceType].. Unconfigured
[Ports In Group].. [Admin Status]... Unconfigured
{ } [Oper Status].... Unconfigured Configure Gp3
-----

Bring Interfaces Into Service Delete All Interfaces
Take Interfaces Out of Service Go Back to Card Config ->

Press RETURN and enter a new slot number to configure a different module.
  
```

Figure 3-12. E1 IMA Virtual Channel Configuration Window

Commands

The commands in the E1 IMA Virtual Channel Configuration window have the following functions:

| Command | Function |
|--------------------------------------|--|
| Delete All Interfaces | Deletes all configured, out-of-service interfaces. The value Unconfigured displays in the [Interface Type], [Admin Status], and [Oper Status] fields for all interfaces that are deleted. Only the interfaces that are out of service can be unconfigured by this command. |
| Bring Interfaces Into Service | Brings out-of-service configured interfaces to in-service status. The value InService displays in the [Admin Status] and [Oper Status] fields for all configured interfaces. |

| Command | Function |
|---------------------------------------|--|
| Take Interfaces Out of Service | Takes the in-service configured interfaces to out-of-service status. The value OutOf-Service displays in the [Admin Status] and [Oper Status] fields for all configured interfaces. |
| Go Back to Card Configuration | Redisplays the IMA Card Configuration window. |

- Select the **Configure Gp1** field and press Enter. The E1 IMA Group Configuration window is displayed (see Figure 3-13).

```

E1 IMA Group Configuration [YourSiteName]
Slot: 11 Port: 07 Channel: 001
-----
Minimum Tx Links.... 1 | Interface Type.... Unconfigured
Minimum Rx Links.... 1 | [Admin Status].... Unconfigured
Near-end Tx Clock... Ctc | [Oper Status].... Unconfigured
Tx IMA Id..... 44 | |
Tx Frame Length.... M128 | [Near-end State].. StartUp
Link Delay Diff.... 25 ms | [Far-end State]... StartUp
Compatibility Mode.. No | [Failure Status].. StartUpNe
Alpha Value..... 2 cells | [Group Symmetry].. Sym0peration
Beta Value..... 2 cells | |
Gamma Value..... 1 cells | Apply IMA Group Configuration
Ports In The Group.. | Reset IMA Group Display
Ports Available.... 1 2 3 4 5 6 | Bring Interface Into Service
| |
[Far-end Tx Clock].. Itc | Configure Interface ->
[Rx IMA Id]..... 0 | View IMA Group Statistics ->
[Rx Frame Length]... M32 | |
[Least Delay Link].. Port 93 | |
[Max Delay Diff].... 1 ms | Go Back to Channel Config ->
-----
Press RETURN and enter a new slot number to configure a different module.

```

Figure 3-13. E1 IMA Group Configuration Window

Commands

The commands in the E1 IMA Group Configuration window have the following functions:

| Command | Function |
|--------------------------------------|--|
| Apply IMA Group Configuration | Applies the configuration field values you set. |
| Reset IMA Group Display | Resets the port configuration fields to the last set of saved values. |
| Bring Interface Into Service | Brings the out-of-service configured interface for the channel to in-service status. Note: You must first configure the interface before you can use this command. |

Chapter 3 Configuring Ports and Channels Using the Console Interface

Configuring the Module

| Command | Function |
|--------------------------------------|--|
| Take Interface Out Of Service | Takes the in-service configured interface to out-of-service status. Note: You must use this command first before using the Delete All Interfaces command. |
| Configure Interface | Displays the interface configuration window for the applied ATM interface. |
| View IMA Group Statistics | Displays the IMA group statistics window. |
| Go Back to Channel Config | Redisplays the IMA Virtual Group Channel Configuration window. |

Field Descriptions

- Enter values in the fields on this window according to the information provided in Table 3-5.

Table 3-5. Field Descriptions for the E1 IMA Group Configuration Window

| Field Name | Field Values | Description |
|-------------------|--|---|
| Minimum Tx Links | Default: 1 Range: 1-6 Format: numeric | Indicates the minimum number of transmit links required to be active for the IMA group to be in the Up state. |
| Minimum Rx Links | Default: 1 Range: 1-6 Format: numeric | Indicates the minimum number of receive links required to be active for the IMA group to be in the Up state. |
| Near-end Tx Clock | Default: ctc Range: N/A Format: predefined alphanumeric | Indicates the transmit clocking mode used by the near-end IMA group. |
| | ctc | Specifies that the Common Transmit Clock (CTC) mode will be used by the near-end IMA group. Select this value only if the transmit clock of all IMA links in this group will be derived from the same source. You must set up the underlying clock configuration to ensure operation in the selected mode. |
| | Itc | Specifies that the Independent Transmit Clock (ITC) mode will be used by the near-end IMA group. Select this value only if there will be at least one IMA link in this group whose transmit clock will be derived from a source that is different from at least one other link transmit clock. The ITC mode allows links to have different clock sources but does not require it. |

Table 3-5. Field Descriptions for the E1 IMA Group Configuration Window

| Field Name | Field Values | Description |
|--------------------|---|--|
| Tx IMA Id | Default: N/A Range: 0-255 Format: numeric | Indicates the IMA identifier to be used by the far-end IMA function. The Tx IMA Id is an identifier used to distinguish this IMA group from other IMA groups in a connection. Choose a unique value; it does not have to be the same as that of the far-end IMA group. |
| Tx Frame Length | Default: M128 Range: N/A Format: predefined alphanumeric | Indicates the frame length to be used by the IMA group in the transmit direction. This can be set only when the IMA group is configured. The frame length is the number of cells in each IMA frame. Use the smaller number (e.g. m32) to send more IMA frames and use the larger number (e.g. m256) to send fewer IMA frames. Smaller frames handle errors more quickly, but the larger frames result in less overhead. |
| | M32 | The frame length is M32 cells. |
| | M64 | The frame length is M64 cells. |
| | M128 | The frame length is M128 cells. |
| | M256 | The frame length is M256 cells. |
| Link Delay Diff | Default: 25 Range: 1-200 Format: numeric (ms) | Indicates the maximum number of milliseconds of delay differential among the links that will be tolerated. |
| Compatibility Mode | Default: No Range: N/A Format: predefined alphanumeric | Allows the near-end IMA group to receive the link status at the correct location in the IMA control protocol (ICP) cell from the far-end IMA group. This mode must be set correctly when connected to ATM IMA Specification Version 1.0 equipment. Compatibility mode must be enabled when connected to equipment following the alternate link state reporting mechanism described in Appendix C.8.1 of <i>Inverse Multiplexing for ATM Version 1.1</i> , af-phy-0086.001. |
| | No | Disables compatibility mode. |
| | Yes | Enables compatibility mode. |
| Alpha Value | Default: 2 Range: 1-2 Format: numeric | Indicates the alpha value used to specify the number of consecutive invalid IMA control protocol (ICP) cells to be detected before moving to the IMA HUNT state. The smaller the value, the faster the IMA link will go into a loss of IMA frame (LIF) failure state. |
| Beta Value | Default: 2 Range: 1-5 Format: numeric | Indicates the beta value used to specify the number of consecutive errored ICP cells to be detected before moving to the IMA HUNT state. The smaller the value, the faster the IMA link will go into an LIF failure state. |

Chapter 3 Configuring Ports and Channels Using the Console Interface

Configuring the Module

Table 3-5. Field Descriptions for the E1 IMA Group Configuration Window

| Field Name | Field Values | Description |
|---------------------------------------|--|--|
| Gamma Value | Default: 1 Range: 1-5 Format: numeric | Indicates the gamma value used to specify the number of consecutive valid ICP cells to be detected before moving from the IMA PRESYNC state to the IMA SYNC state. The smaller the value, the faster the IMA link will recover from an LIF error. |
| Ports In The Group Ports Available | Default: 1 2 3 4 5 6 Range: 1-6 Format: Numeric | Displays the ports that are available (in this case, all 6) to be included in a group. To select a port, navigate to a number in the lower, Ports Available row and press Enter. The number moves to the upper, Ports In The Group row. You may select 1 to 6 ports to make a group. |
| [Far-end Tx Clock] (display only) | Default: Ctc Range: N/A Format: predefined alphanumeric | Displays the transmit clocking mode used by the far-end IMA group. |
| | Ctc | Specifies that the Common Transmit Clock (CTC) mode will be used by the far-end IMA group. |
| | Itc | Specifies that the Independent Transmit Clock (ITC) mode will be used by the far-end IMA group. |
| [Rx IMA ID] (display only) | Default: 0 Range: 0-255 Format: numeric | Displays the IMA identifier currently in use by the far-end IMA function. The Rx IMA Id is an identifier used to distinguish this IMA group from other IMA groups in a connection. |
| [Rx Frame Length] (display only) | Default: M32 Range: N/A Format: predefined alphanumeric | Indicates the IMA frame length in cells as received from the remote IMA function. |
| | M32 | The frame length is M32 cells. |
| | M64 | The frame length is M64 cells. |
| | M128 | The frame length is M128 cells. |
| | M256 | The frame length is M256 cells. |
| [Least Delay Link] (display only) | Default: Port 0 Range: 0-6 Format: numeric | Displays the interface index of the link configured in the IMA group that has the smallest link propagation delay. This value has meaning only if more than one link has been configured in the IMA group. |
| [Max Delay Diff] (display only) | Default: 1 Range: N/A Format: numeric | Displays the observed number of milliseconds of delay differential among the links. |

Table 3-5. Field Descriptions for the E1 IMA Group Configuration Window

| Field Name | Field Values | Description |
|----------------------------------|--|--|
| Interface Type | Default: Unconfigured Range: N/A Format: predefined alphanumeric | Indicates the type of end-to-end connection protocol that governs the transmission parameters of the configured channel interface. Interface types can be configured only if ports exist in the group. |
| | Unconfigured | This interface is not configured. |
| | AtmUni3-0 | This interface is configured for the ATM UNI 3.0 interface. |
| | AtmUni3-1 | This interface is configured for the ATM UNI 3.1 interface. |
| | AtmUni4-0 | This interface is configured for the ATM UNI 4.0 interface. |
| | IispUser | This interface is configured for the ATM IISP user interface. |
| | IispNetwork | This interface is configured for the ATM IISP network interface. |
| | AtmPnni1-0 | This interface is configured for the ATM PNNI 1.0 interface. |
| [Admin Status] (display only) | Default: Unconfigured Range: N/A Format: predefined alphanumeric | Displays the administrative status of the port. |
| | Unconfigured | The interface for the port is not configured. |
| | OutOfService | The interface has not yet been brought into service, or its in-service interface has been set to out of service with the Take Interface Out of Service command. |
| | InService | The interface has been brought into service with the Bring Interface Into Service command. |
| [Oper Status] (display only) | Default: Unconfigured Range: N/A Format: predefined alphanumeric | Displays the operational status of the port and whether the port is exchanging a valid signal. |
| | Unconfigured | This channel is not operational because the interface is not configured. |
| | OutOfService | The group (near end and far end) is not operational because there is no connection. |
| | InService | The group (near end and far end) is operational. |

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Configuring the Module

Table 3-5. Field Descriptions for the E1 IMA Group Configuration Window

| Field Name | Field Values | Description |
|------------------------------------|---|---|
| [Near-end State] (display only) | Default: Not Configured Range: N/A Format: predefined alphanumeric | Displays the current operational state of the near-end IMA group state machine. |
| | NotConfigured | The group does not exist. |
| | StartUp | The near end is in start-up and is waiting to receive the indication that the far end is in start-up. |
| | StartUpAck | When both groups start up, they move through this transitional state to the Insufficient-Links state. While in this state, indications from the near-end that it is in start-up are ignored. |
| | CfgAbt | Configuration aborted. This state is entered when the near-end tries to use the following unacceptable configuration parameters (remaining fields below). |
| | UnsupportedM | Unsupported value of M (M = frame length). |
| | CfgAbtInc Symmetry | Incompatible group symmetry. |
| | CfgAbtOther | Configuration aborted for other reasons. |
| | Insufficient Links | This state implies that the group has accepted the near-end group parameters and that the near end has also accepted its own group parameters, but does not have sufficient links to move into the Operational state. |
| | Blocked | The group is blocked (e.g., inhibited by Unit Management (UM)). The group can be blocked for maintenance purposes while sufficient links are Active in both directions. The PSAX group is blocked when it is administratively out of service. |
| Operational | The group is operational and in the Up state. The group is not inhibited and has sufficient links in both the Tx and Rx directions. The IMA interface now has the capability to receive ATM layer cells and pass them from the IMA sublayer to the ATM layer. | |

Table 3-5. Field Descriptions for the E1 IMA Group Configuration Window

| Field Name | Field Values | Description |
|-----------------------------------|---|--|
| [Far-end State] (display only) | Default: NotConfigured Range: N/A Format: predefined alphanumeric | Displays the current operational state of the far end IMA group state machine. |
| | NotConfigured | The group does not exist. |
| | StartUp | The far end is in start-up and is waiting to receive the indication that the near end is in start-up. |
| | StartUpAck | When both groups start up, they move through this transitional state to the Insufficient-Links state. While in this state, indications from the near end that it is in start-up are ignored. |
| | CfgAbt | Configuration aborted. This state is entered when the far-end tries to use the following unacceptable configuration parameters (remaining fields below). |
| | UnsupportedM | Unsupported value of M (M = frame length). |
| | CfgAbtInc Symmetry | Incompatible group symmetry. |
| | CfgAbtOther | Configuration aborted for other reasons. |
| | InsufficientLinks | This state implies that the group has accepted the far-end group parameters and that the far-end has also accepted its own group parameters, but does not have sufficient links to move into the Operational state. |
| | Blocked | The group is blocked (e.g., inhibited by Unit Management (UM)). The group can be blocked for maintenance purposes while sufficient links are Active in both directions. |
| Operational | The group is operational and in the Up state. The group is not inhibited and has sufficient links in both the Tx and Rx directions. The IMA interface now has the capability to receive ATM layer cells and pass them from the IMA sublayer to the ATM layer. | |

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Configuring the Module

Table 3-5. Field Descriptions for the E1 IMA Group Configuration Window

| Field Name | Field Values | Description |
|------------------------------------|--|---|
| [Failure Status] (display only) | Default: NoFailure Range: N/A Format: predefined alphanumeric | Displays the current failure status of the IMA group (the reason why the group state machine is in the down state; either the near end or the far end is not operational). See the Near-end State and Far-end State field values above. |
| | NoFailure | The IMA group state machine is operational and in the up state. |
| | StartUpNe | The near end is in the start-up state. |
| | StartUpFe | The far end is in the start-up state. |
| | InvalidMValueNe | The near end has received an invalid M value (M = frame length). |
| | InvalidMValueFe | The far end has received an invalid M value (M = frame length). |
| | FailedAsymmetricNe | The near end is reporting that the far end is requesting a group symmetry that the near end does not support. |
| | FailedAsymmetricFe | The far end is not accepting near end symmetry. |
| | InsuffLinksNe | The near end does not have sufficient links to move into the Operational state. |
| | InsuffLinksFe | The far end does not have sufficient links to move into the Operational state. |
| | BlockedNe | The group is blocked at the near end. |
| | BlockedFe | The group is blocked at the far end. |
| OtherFailure | The group has failed for other reasons. | |
| [Group Symmetry] (display only) | Default: SymOperation Range: N/A/ Format: predefined alphanumeric | Displays the mode that allows symmetric or asymmetric cell rate transfer over the IMA virtual link. |
| | SymOperation | The IMA group is only required to carry ATM layer cells on physical links in which the IMA links in both the transmit and receive directions are Active. |
| | AsymOperation | The IMA group is allowed to carry ATM traffic over the physical links on which the IMA links in both the transmit and receive directions are not Active at the same time. |
| | AsymConfiguration | The IMA group is not required to configure IMA links in both directions of the physical links used by the IMA unit. |

- 6 Select the **Apply IMA Group Configuration** command and press Enter.
- 7 Select the **Configure Interface** command and press Enter. The selected interface type window displays. See Chapter 4, "Configuring the Interfaces Using the Console Interface," for instructions.
- 8 Repeat steps 1–7 for the remaining two IMA groups, as needed. All six physical ports may belong to one group.

End

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 values to the PSAX system database. It is recommended that you save your values frequently as you progress through your work, at a minimum, after finishing each stage of work:

- Configuring each module in your system
- Configuring the connections in your system
- Before exiting your current console session

Perform the following procedure to permanently save the values for your system.

▲ 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.

Returning to the Console Interface Main Menu

Begin

- 1 To return to the Console Interface Main Menu window, press Ctrl+G.

On the Console Interface Main Menu window, **[Modified]** is displayed next to the **Save Configuration** command, indicating you have made changes to your system that are not yet saved to the database.

- 2 Select the **Save Configuration** command.

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

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

When this function is completed, the system displays the following message:

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

You can now safely exit the current session.

Chapter 3 Configuring Ports and Channels Using the Console Interface

Saving the Equipment Configuration and Logging Off

3 Select the **Leave Console Interface** command.

You are now logged off the PSAX system console interface.

End

4 Configuring the Interfaces Using the Console Interface



Overview of This Chapter

This chapter provides instructions for configuring the following interface types for the 6-Port E1 IMA module:

- ATM IMA (inverse multiplexing over ATM)
- ATM inter-switch signaling protocol (IISP) user
- ATM inter-switch signaling protocol (IISP) network
- ATM private network-network interface (PNNI) 1.0
- ATM user-network interface (UNI) 3.0, 3.1, and 4.0

Before You Begin

Before you can set interface configuration values, you must have selected an interface type value other than **Unconfigured** in the Interface Type field on the 6-Port E1 IMA module's Port and Channel configuration window.

Note: For a matrix of interface types by PSAX I/O module types, see the Interface Types by I/O Module Types table in the appendix, "Reference Information."

Avoiding Common Errors When Configuring Interfaces

An error may occur when you apply an interface to channel. If an error condition occurs, the PSAX system sends an SNMP trap that is usually displayed in the console Trap Log Display window (accessible from the Console Interface Main Menu window). The list below includes the most common interface errors that cause the PSAX system to display a message. (See the appendix, "SNMP Trap Messages," in the appropriate *PacketStar* PSAX Multiservice Media Gateways user guide for more information about the SNMP traps related to interface errors).

- Entering field values 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)
- Entering field values that are not recognized by the PSAX system software

Optimizing SVC Call Performance

The information in this section provides guidance on optimizing call performance when configuring SVCs on the PNNI interface. The service-specific connection-oriented protocol (SSCOP) parameter is set on these interface configuration windows: ATM IISP network or IISP user, ATM UNI 3.0 or UNI 3.1, or ATM PNNI 1.0.

Note: These settings are suggested for connecting to a PSAX system from a remote site only. The PSAX system configures these settings internally in its own ATM switch.

When unacknowledged protocol data units (PDUs), the MaxPD field on the remote end peer (such as the *NavisCore*[™] CBX 500[™]) shows the maximum number of SSCOP packets transmitted since the last PSAX polling of the peer. To optimize call performance, the SSCOP Rx Window Size field of the local ATM interface should be less than the maximum value displayed in the MaxPD credit window at the remote end of the ATM interface. Otherwise, the rate at which switched calls can be set and released may be degraded.

On the ATM IISP Interface Configuration window, the maximum credit window (the SSCOP Rx Window Size field) is configurable with a value up to 32 for all ATM interfaces on the PSAX system. The interfaces of the ATM switches that are connected to the PSAX system should be configured with the same values. This method results in 100 percent call completion at a call setup rate of 60 calls per second using even distribution. If these values are not configured in this way, calls will be set up at a rate of less than 60 calls per second.

Note: Various SSCOP parameter settings determine the maximum credit window. As a result, you may not be able to directly use these settings.

For more information on the SSCOP parameter, see the Application Note entitled *Connecting a CBX or GX Switch to a PacketStar[®] PSAX Multiservice Media Gateway via an ATM Port*, Document No. 255-700-236.

Managing ATM IMA Interfaces

This section provides instructions for configuring an I/O module for the ATM Inverse Multiplexing over ATM (IMA) interface.

Viewing the ATM IMA Interface

If you selected the value **AtmIma** as the interface type, the ATM IMA Interface Configuration window (see Figure 4-1) is displayed. Table 4-1 describes the commands on the window. Table 4-2 describes the fields on the window.

```

ATM IMA Interface Configuration [Your Site Name]
Slot: 01 Port: 01 Channel: 001 Interface Statistics
-----
[Admin Status].. OutOfService | [IMA Violations]..... 0
[Oper Status]... OutOfService | [OIF Anomalies]..... 0
                               | [Near-end Tx Failures]... 0
Link States                    | [Near-end Rx Failures]... 0
[Near-end Tx]... NotInGroup   | [Far-end Tx Failures]... 0
[Far-end Tx].... NotInGroup   | [Far-end Rx Failures]... 0
[Near-end Rx]... NotInGroup   | [Tx Stuffs]..... 10866
[Far-end Rx].... NotInGroup   | [Rx Stuffs]..... 0
                               | [Time Elapsed]..... 0:00:00
Defects                        |
[Near-end Rx]... NoDefect     |
[Far-end Rx].... NoDefect     |
                               |
Update Display                |
Bring Interface Into Service  |
Delete Interface and Return -> |
                               |
                               | Continuous Update
                               | Reset Statistics
-----
Go Back to Port Configuration ->
-----
Press RETURN and enter a new slot number to configure a different interface.
    
```

Figure 4-1. ATM IMA Interface Configuration Window

Commands

The commands on this window have the following functions:

Table 4-1. Commands for the ATM IMA Interface Configuration Window

| Command | Function |
|-------------------------------------|---|
| Update Display | Refreshes the values in the Link States and the Defects fields |
| Bring Interface Into Service | Brings an out-of-service configured interface into service, and displays the value InService in the [Admin Status] field. An asterisk is displayed beside all the configured channels indicating that they are in service. You must first configure the interface before you can use this command. Note: This command is displayed only when the [Admin Status] field is OutOfService . Note: |

Table 4-1. Commands for the ATM IMA Interface Configuration Window

| Command | Function |
|--------------------------------------|---|
| Take Interface Out of Service | Takes the in-service configured interface out of service. The displayed asterisk is removed from all configured channels indicating that they are out of service. You must use this command first before using the Delete Interface and Return command. Note: This command is displayed only when the [Admin Status] field is InService . Note: |
| Delete Interface and Return | Deletes an out-of-service interface and redisplay the ATM IMA Configuration window. Note: You must first take interface out of service (using the Take Interface Out of Service command) before you can use this command. Note: |
| Continuous Update | Updates the values in the fields every second. |
| Reset Statistics | Removes the values in the Interface Statistics fields and resets them to 0 . |
| Go Back to Port Configuration | Redisplay the Port and Channel Configuration window for the module you are configuring. |

Field Descriptions Descriptions of the display-only fields on this window are described in Table 4-2.

Table 4-2. Field Descriptions for the ATM IMA Interface Configuration Window

| Field Name | Field Values | Description |
|------------------------------|--|---|
| [Oper Status] (display only) | Default: InService Range: N/A Format: Predefined alphanumeric | Displays the current operational status of the interface. |
| | InService | Indicates that the interface is operational. |
| | OutOfService | Indicates that the interface is not operational. |

Table 4-2. Field Descriptions for the ATM IMA Interface Configuration Window

| Field Name | Field Values | Description |
|--|---|---|
| [Admin Status] (display only) | Default: InService Range: N/A Format: Predefined alphanumeric | Displays the current administrative status of the interface. |
| | InService | Indicates that the interface is in service. |
| | OutOfService | Indicates that the interface is not in service. |
| Link States Panel (display only) | | |
| [Near-end Tx] [Far-end Tx] [Near-end Rx] [Far-end Rx] | Default: NotInGroup Range: N/A Format: Predefined alphanumeric | Displays the current status of the connections on both ends. |
| | NotInGroup | Indicates that the interface is not assigned to a group. |
| | UnusableNoReason | Indicates that the link does not work; nonspecific reason. |
| | Unusable Fault | Local failure status of a link belonging to an IMA group (not currently supported.) The PSAX device does not generate this condition, but may report such a condition generated by the far end of an IMA connection. |
| | Unusable Misconnected | An IMA link is not corrected to the proper end. (The PSAX device does not currently generate this condition, but the PSAX device reports this condition to the user if the far-end reports it to the PSAX device.) For example, when an IMA group is established, the links immediately discover which device they are connecting to on the far end. If cables are then removed and plugged back in differently, then the equipment may signify that it is misconnected. |
| | Unusable Inhibited | This is an administrative mechanism for taking an IMA link out of service. When in this state, it is unknown whether there are any physical problems with the link. |
| | Unusable Failed | Check the defect value displayed. |
| | Usable | There are no local reasons why this link is not active. The only thing preventing it from being active is the far-end state (for example, a transmitter cannot be active and send real data until the far-end receiver is ready to accept that data). |
| | Active | Interface in use. |

Chapter 4 Configuring the Interfaces Using the Console Interface

Managing ATM IMA Interfaces

Table 4-2. Field Descriptions for the ATM IMA Interface Configuration Window

| Field Name | Field Values | Description |
|--|--|---|
| Defects Panel (display only) | | |
| [Near-end Rx] [Far-end Rx] | Default: NoDefect Range: N/A Format: alphabetic | Displays the type of link defect. |
| | NoDefect | No link defects. |
| | Link failure | Physical failure/loss of signal. |
| | LIF | Persistent loss of IMA frame. |
| IMA Interface Statistics Panel (display only) | | |
| [IMA Violations] | Default: 0 Range: Variable Format: Numeric | Count of errored, invalid or missing cells during non-SES-IMA condition. |
| [OIF Anomalies] | Default: 0 Range: Variable Format: Numeric | Count of OIF anomalies during non-SES-IMA conditions. |
| [Near-end Tx Failures] | Default: 0 Range: Variable Format: Numeric | Count of near end Tx failure alarm conditions has been entered on this link. |
| [Near-end Rx Failures] | Default: 0 Range: Variable Format: Numeric | Count of near end Rx failure alarm conditions has been entered on this link. |
| [Far-end Tx Failures] | Default: 0 Range: Format: Numeric | Count of far end transmit failure alarm conditions has been entered on this link. |
| [Far-end Rx Failures] | Default: 0 Range: Variable Format: Numeric | Count of far end receive failure alarm conditions has been entered on this link. |
| [Tx Stuffs] | Default: 0 Range: Variable Format: Numeric | Count of stuff events inserted in the transmit direction on this link. |
| [Rx Stuffs] | Default: 0 Range: Variable Format: Numeric | Count of stuff events received in receive direction on this link. |
| [Time Elapsed] | Default: 0:00:00 Range: N/A Format: hours (X), minutes (XX), seconds (XX) | Time elapsed since last reset. |

Activating the ATM IMA Interface

Begin

Note: You may bring the ATM IMA interface into service from either of these windows:

- the module port and channel configuration window, or
- the ATM IMA Interface Configuration Window

Make sure that the module configuration is complete before bringing the interface into service.

To bring the interface into service on the ATM IMA Interface Configuration window, select the **Bring Interface Into Service** command.

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

End

Taking an ATM IMA Interface Out of Service

Note: You may take the ATM IMA interface out of service from either of these windows:

- the module port and channel configuration window, or
- the ATM IMA Interface Configuration Window

Make sure that the module configuration is complete.

Begin

- 1 To take the interface on the ATM IMA Interface Configuration Window out of service, select the **Take Interface Out Of Service** command.

On the ATM IMA Configuration Window, the window status line prompts:

```
Taking the interface down will cause all SVCs to be lost Continue? (y/n)
```

- 2 Select Y.

The **OutOfService** value is displayed in the [Admin Status] field.

End

Deleting the ATM IMA Interface

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

Begin

Note: ATM IMA interfaces configured in IMA groups can be deleted only from the module configuration window. See Chapter 3, “Configuring Ports and Channels Using the Console Interface.”

To delete the interface on the ATM IMA Interface Configuration window, proceed as follows:

- 1 Select the **Take Interface Out Of Service** command.

The following prompt is displayed:

```
Taking the interface down will cause all SVCs to be lost.  
Continue? (y/n)
```

- 2 Press Y to continue.

The **OutOfService** value is displayed in the [Admin Status] field.

- 3 Select the **Delete Interface and Return** command and press Enter.

The following prompt is displayed

```
Are you SURE that you want to delete this interface? (y/n)  
Press y to continue.
```

The interface is deleted and the port and channel configuration window is redisplayed.

End

Managing ATM IISP Interfaces

This section provides instructions for configuring an I/O module for the Interim Interswitch Signaling Protocol (IISP) user and network interfaces. IISP, (formerly known as PNNI, Phase 0), was introduced as an interim standard, pending completion of PNNI, Phase 1. Building on ATM UNI 3.0 and 3.1, it uses static routing tables established by the network administrator to route connections around link failures.

Each connection using the IISP interface is configurable as either the user side or the network side. See the Field Description Table following the ATM IISP Interface Configuration window for VPI and VCI connection limits.

This section provides instructions for managing interfaces by performing the following tasks:

- Configuring and applying interface(s)
- Bringing interface(s) into service
- Taking interface(s) out of service
- Viewing interface(s)
- Deleting interface(s)

- Viewing interface statistics

Configuring and Viewing the ATM IISP Interfaces

Begin

At the conclusion of the module port and channel configuration procedure, you accessed the ATM IISP Interface Configuration window (see Figure 4-2).

- 1 Select the values for the fields on the window in Figure 4-2 from the values given in Table 4-4. Table 4-3 describes the commands on the window.
- 2 To apply the interface values you selected, select the **Apply interface Configuration** command.
- 3 If your configuration requires you to bring the interface into service at this time, do so by selecting the **Bring Interface Into Service** command. For more information on other configuration windows on which you can bring interfaces into service, see the “Bringing One or More ATM IISP Interfaces into Service” procedure in this guide.

Note: The interface must have in-service status so that the PVC and SVC connections you will set up to use this interface will pass traffic.

End

```

ATM IISP Interface Configuration [YourSiteName]
Slot: 08 Port: 01 Channel: 001 Interface Statistics
[Admin Status]..... OutOfService | [Valid Cells Rcvd]..... 0.0000 e0
[Oper Status]..... OutOfService | [Errored Cells Rcvd]..... 0000000000
Over Subscription..... 10 | [Mismatched Cells Rcvd].. 0000000000
Min SVC VPI..... 0 | [Valid Cells Sent]..... 0.0000 e0
Max SVC VPI..... 0 | [Null Cells Sent]..... 0.0000 e0
Min SVC VCI..... 32 |
Max SVC VCI..... 255 | [Time Elapsed]..... 0:00:00
ATM Signaling..... Disabled |
UPC Support..... Disabled | Continuous Update
UBR Load Balancing.... Disabled | Reset Statistics
SSCOP Rx Window Size... 32 |
Traffic Shaping..... Disabled | [Ingress Avail BW]..... 0 cps
| [Egress Avail BW]..... 0 cps
| [Ingress Total BW]..... 0 cps
| [Egress Total BW]..... 0 cps
Apply Interface Configuration |
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 4-2. ATM IISP Interface Configuration Window

Chapter 4 Configuring the Interfaces Using the Console Interface

Managing ATM IISP Interfaces

Commands

The commands on this window have the following functions:

Table 4-3. Commands for the ATM IISP Interface Configuration Window

| Command | Function |
|--------------------------------------|---|
| Apply Interface Configuration | Applies the configuration field values you set. |
| Reset Interface Display | Resets the fields to the last set of applied values. |
| Bring Interface Into Service | Brings an out-of-service configured interface to in-service status, and then displays the value InService in the [Admin Status] field. You must first configure the interface before you can use this command. Note: This command is displayed only when the [Admin Status] field is OutOfService . |
| Take Interface Out of Service | Takes an in-service configured interface to out-of-service status, and then displays the value OutOfService in the [Admin Status] field. You must use this command first before using the Delete Interface and Return command. Note: This command is displayed only when the [Admin Status] field is InService . |
| Delete Interface and Return | Deletes an out-of-service interface and redisplay the Port and Channel Configuration window for the module you are configuring. Note: You must first take the 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 Interface Statistics fields every second. Select this command to turn the continuous updating on and off as needed. |
| Reset Statistics | Removes the values from the Interface Statistics fields and resets them to zero (0). |
| Go Back to Port Configuration | Redisplay the port and channel configuration window of the module you are configuring. |

Table 4-4. Field Descriptions for the ATM IISP Interface Configuration Window

| Field Name | Field Values | Description |
|---|---|--|
| [Oper Status] (display only) | Default: Unconfigured Range: N/A Format: Predefined | Indicates whether the interface can pass traffic or not. The administrative status field below must be InService before the interface can pass traffic. |
| | Unconfigured | The interface is unconfigured. |
| | InService | The interface is operational. |
| | OutOfService | The interface is not operational because some condition is preventing the port from being fully operational, such as a loss of signal to the port. |
| [Admin Status] (display only) | Default: Unconfigured Range: N/A Format: Predefined | Indicates the administrative status of the interface. |
| | Unconfigured | The interface is unconfigured. |
| | InService | The interface is in service. |
| | OutOfService | The interface is not in service. |
| Over Subscription | Default: 10 Range: 1–100 Format: Numeric | Allows for the allocated reserved bandwidth for the line to be over-utilized by up to a factor of 100. Generally, a value between 1 and 4 will normally not cause problems, although higher levels are often acceptable. |
| Note: For the maximum and minimum VPI/VCI values below, always enter or change the maximum value before the minimum value. | | |
| Min SVC VPI | Default: 0 Range: 0–255 Format: Numeric | Indicates the minimum VPI value in which signaling can occur on this interface. Any data you enter in this field is relevant only if you set the ATM Signaling field to Enabled . |
| Max SVC VPI | Default: 0 Range: 0–255 Format: Numeric | The maximum VPI in which signaling can occur on this interface. Any data you enter in this field is relevant only if you set the ATM Signaling field to Enabled . |
| Min SVC VCI | Default: 32 Range: 32–65535 Format: Numeric | The minimum VCI in which signaling can occur on this interface. Any data you enter in this field is relevant only if you set the ATM Signaling field to Enabled . |
| Max SVC VCI | Default: 255 Range: 32–65535 Format: Numeric | The maximum VCI in which signaling can occur on this interface. Any data you enter in this field is relevant only if you set the ATM Signaling field to Enabled . |

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Managing ATM IISP Interfaces

Table 4-4. Field Descriptions for the ATM IISP Interface Configuration Window

| Field Name | Field Values | Description |
|---------------|--|---|
| ATM Signaling | Default: Disabled Range: N/A Format: Predefined | Indicates whether the ATM Signaling path is enabled or disabled on the preceding Min SVC VPI and Max SVC VPI fields. SVCs use ATM signaling to set up and tear down dynamic connections on this interface. |
| | Disabled | SVCs cannot be created on this interface. All VPIs and VCI ranges are used for PVCs, not SVCs. |
| | Enabled | SVCs can be created on this interface. PVCs can be created only outside the maximum and minimum VPI and VCI ranges listed above in the Min SVC VPI, Max SVC VPI, Min SVC VCI, and Max SVC VCI fields. |
| UPC Support | Default: Disabled Range: N/A Format: Predefined | Indicates whether usage parameter control is to be used on all VCs on this interface. UPC determines if traffic control is performing to negotiated PCR, SCR, or MBS. |
| | Disabled | Disables UPC support. If UPC Support is disabled, traffic policing cannot be supported on any VC on this interface. |
| | Enabled | Enables UPC support, providing traffic control support on this interface. This feature is supported on these modules only: <ul style="list-style-type: none"> • 1-Port OC-12c/STM-4c MM/SM • 1-Port OC-3c 1+1 APS SM/MM • 1-Port STM-1 1+1 MSP SM/MM • 21-Port High Density E1 Multiservice • 12-Port Medium Density DS1 Multiservice The feature is supported on these channelized DS3 modules only (when channelizing to DS0s): <ul style="list-style-type: none"> • 1-Port Channelized DS3 Multiservice • 1-Port DS3 IMA • Quadserial Note: Enabling both UPC support and traffic shaping at the same time on this interface is an incompatible configuration and will be rejected. |

Table 4-4. Field Descriptions for the ATM IISP Interface Configuration Window

| Field Name | Field Values | Description |
|--------------------|--|--|
| UBR Load Balancing | Default: Disabled Range: N/A Format: Predefined | Specifies whether UBR Load Balancing is to be used on this interface. Load balancing is performed according to traffic conditions, which determines how the available bandwidth on individual channels is used for path and route selection. After a channel is saturated, the transmit load is distributed (balanced) among other available links (channels) having the same origin, destination, and parameters. Channels with the highest available bandwidth values are filled first, followed by the lower capacity channels. Note: Virtual interfaces do not support UBR Load Balancing. |
| | Disabled | Disables UBR Load Balancing on the connections on this interface. |
| | Enabled | Enables UBR Load Balancing on the connections on this interface. Selecting this value includes UBR in the cps counts of the [Egress Avail BW] field. |
| SSCOP Rx Wnd Size | Default: 32 Range: 8–32 Format: Packets | Indicates the service-specific connection-oriented protocol (SSCOP) layer receive window size for this interface. This window shows the total number of packets that must be acknowledged by the receiving side before more packets are sent from the transmitting side. On the receiving side, values must be equal to or greater than the values for the transmit side for fastest transmission rates. This prescription is suggested for connecting to a Multiservice Media Gateway from a remote site only. The Multiservice Media Gateway configures these settings internally in its own ATM switch. For more information, see the Application Note entitled <i>Connecting a CBX or GX Switch to a Packet-Star® PSAX Multiservice Media Gateway Via an ATM Port, Issue 2, Document No. 255-700-236</i> . |

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Managing ATM IISP Interfaces

Table 4-4. Field Descriptions for the ATM IISP Interface Configuration Window

| Field Name | Field Values | Description |
|--|--|--|
| Traffic Shaping | Default: Disabled Range: N/A Format: Predefined | Indicates whether traffic shaping is to be used on this interface. Traffic shaping is an input cell selection algorithm (leaky bucket) that smooths bursts of input traffic. This feature is available only on these modules: <ul style="list-style-type: none"> • 1-Port STM-1 MM/SM with AQueMan • 1-Port STM-1 MM/SM with Traffic Shaping • 1-Port OC-3c MM/SM with AQueMan • 1-Port OC-3c MM/SM with Traffic Shaping • 1-Port OC-12c/STM-4c MM/SM Note: This feature must be enabled if using ATM traffic shaping prior to egress from an ATM trunk port on the OC-3c APS or the STM-1 MSP modules. For instructions on configuring ATM traffic shaping, see the your PSAX chassis User Guide. |
| | Disabled | Disables the traffic shaping feature. |
| | Enabled | Enables the traffic shaping feature. Note: Enabling both the UPC Support and the Traffic Shaping fields on this interface is an incompatible configuration and will be rejected. |
| Interface Statistics Panel (display only) | | |
| [Valid Cells Rcvd] (display only) | Default: 0.0000 e0 Range: 0–2 ³² Format: Exponent notation | Displays the number of valid cells received since the statistics were last reset on this interface. |
| [Errored Cells Rcvd] (display only) | Default: 0 Range: 0–2 ³² Format: Numeric | Displays the number of errored cells received since the statistics were last reset on this interface. |
| [Mismatched Cells Rcvd] (display only) | Default: 0 Range: 0–2 ³² Format: numeric | Displays the number of mismatched cells received since the statistics were last reset on this interface. |
| [Valid Cells Sent] (display only) | Default: 0.0000 e0 Range: 0–2 ³² Format: Exponent notation | Displays the number of valid cells sent since the statistics were last reset on this interface. |
| [Null Cells Sent] (display only) | Default: 0.0000 e0 Range: 0–2 ³² Format: Exponent notation | Displays the number of null cells sent since the statistics were last reset on this interface. |

Table 4-4. Field Descriptions for the ATM IISP Interface Configuration Window

| Field Name | Field Values | Description |
|--------------------------------------|---|--|
| [Time Elapsed] (display only) | Default: 0:00:00 Range: Dependent on session length Format: Numeric (hour:minutes:seconds) | Displays the time elapsed since counter began running since the statistics were last reset on this interface. |
| [Ingress Avail BW] (display only) | Default: 0 Range: Module dependent Format: Numeric (cps) | Displays the total ingress bandwidth available for connections for this interface. The value 0 is changed to the cps count available for the interface after the Apply command is selected. (Any non-CES OC3 module will show the value 353207). (Any OC-12 module will show the value 1412830). The ingress available bandwidth depends on the configured module parameters, such as port strapping, type of PLCP mapping, configured port speed, and other factors. As each new connection is added, the amount of available bandwidth as indicated in this field may decrease. Bandwidth for UBR connections is not included, unless the UBR Load Balancing field on this interface is Enabled . You will see values in this field only for connections that are in service. |
| [Egress Avail BW] (display only) | Default: 0 Range: Module dependent Format: Numeric (cps) | Displays the total egress bandwidth available for connections for this interface. The value 0 is changed to 353207 after the Apply command is selected. As each new connection is added, the amount of available bandwidth as indicated in this field may decrease. Bandwidth for UBR connections is not included, unless the UBR Load Balancing field on this interface is Enabled . You will see values in this field only for connections that are in service. |
| [Ingress Total BW] (display only) | Default: 0 Range: User-configured Format: Numeric (cps) | Displays the total bandwidth available for use on the current interface in the incoming direction (in cps). Bandwidth for UBR connections is included. |
| [Egress Total BW] (display only) | Default: 0 Range: User-configured Format: Numeric (cps) | Displays the total bandwidth available for use on the current interface in the outgoing direction (in cps). Bandwidth for UBR connections is included. |

Bringing One or More ATM IISP Interfaces Into Service

Before you can configure a connection using an ATM IISP interface, you must first bring an ATM IISP interface into service. You can do this task from several different windows. To bring one or more interfaces into service, perform the step in the following procedure.

Steps to Bring One or More ATM IISP Interfaces into Service

Begin

Depending on which type of module you are configuring and which window you have currently displayed, select either the **Bring Interface Into Service** or the **Bring All Interfaces Into Service** command on the type of window shown in Table 4-5.

Table 4-5. Windows on Which You Can Bring an ATM IISP Interface into Service

| If the module you are configuring is: | you can bring one or more interfaces into service on these windows: |
|---------------------------------------|---|
| an unchannelized single-port module, | <ul style="list-style-type: none"> • Port and channel configuration window • ATM IISP Interface Configuration window |
| an unchannelized multiport module, | <ul style="list-style-type: none"> • Module configuration window (all interfaces for all ports) • Port and channel configuration window • ATM IISP Interface Configuration window |
| a channelized single-port module, | <ul style="list-style-type: none"> • Port configuration window (all interfaces for all virtual ports) • Virtual port configuration window (all channel interfaces on a virtual port) • Channel configuration window (just the interface for the channel) • ATM IISP Interface Configuration window (just the interface for the channel) |
| a channelized multiport module, | <ul style="list-style-type: none"> • Module configuration window (all interfaces for all ports) • Port and channel configuration window (all channel interfaces on a port) • Channel configuration window (just the interface for the channel) • ATM IISP Interface Configuration window (just the interface for the channel) |

After you select the command, the value **InService** is displayed in the [Admin Status] and the [Oper Status] fields. You can now provision connections that use this interface. (See the *PacketStar PSAX System Connections Provi-*

sioning Guide for more information). If connections have already been configured for this interface, the system can now resume passing traffic through this interface.

End

Viewing IISP Interface Configuration Parameters

Begin

The IISP interface is accessed for viewing by the same path as configuring the interface. This path may vary depending on the module you used (see the Reference Information appendix in this guide for a list of what modules can be used for the interfaces available). You should always view an interface and determine whether you have chosen the correct one before you perform any of the procedures in step 2 below.

- 1 Return to the Console Interface Main Menu for the module you configured the IISP interface on and repeat the steps in the “Configuring an IISP Interface” procedure in this guide until you access the ATM IISP Interface Configuration window.
- 2 Proceed to one of the following sections, as needed:
 - Bringing One or More ATM UNI Interfaces into Service
 - Taking One or More ATM UNI Interfaces out of Service
 - Deleting One or More ATM UNI Interfaces

End

Viewing IISP Interface Statistics

To view the ATM IISP interface statistics, perform the steps in the following procedure.

Begin

The IISP Interface Statistics are viewed on the ATM IISP Interface Configuration window. The commands and fields for the statistics panel are on the Field Description table for the same window.

Traffic must have passed on the connection before statistics will display. To see IISP statistics, see the ATM IISP Interface Configuration procedure in this guide and repeat the navigational steps only, not the configuration steps.

End

Taking One or More IISP Interfaces Out of Service

Use this procedure to take an interface out of service only after it is in service. If the interface you want to delete is not already in service, you will not see the **Take Interface Out of Service** Command on the interface configuration window.

On a module configuration, module channel configuration, or module interface configuration window:

- the [Oper Status] field indicates **InService** or **OutOfService**
- the [Admin Status] field indicates **InService** or **OutOfService**

On a module port and channel configuration window:

- the Chnl_OperStatus_ field indicates the service status. An asterisk character after the interface type in the Chnl_OperStatus_ field indicates the interface is not in service; the absence of the asterisk indicates the interface is in service. Look in the command field at the bottom of each of these window for the command to take the interface(s) out of service, and select it if necessary.

You need to take an ATM IISP interface out of service first before you can perform the following tasks:

- Deleting an interface
- Performing diagnostic or maintenance procedures on an interface

You can do this task from several different windows (see Table 4-23). To take one or more interfaces out of service, perform the steps in the following procedure.

Begin

- 1 Depending on the module you are using, select either the **Take Interface Out Of Service** or the **Take All Interfaces Out Of Service** command on the type of window shown in Table 4-23.

Table 4-6. Windows on Which You Can Take an IISP Interface out of Service

| If the module you are working with is: | you can take one or more interfaces out of service on these windows: |
|--|---|
| an unchannelized single-port module, | <ul style="list-style-type: none"> • Port and channel configuration window • IISP Interface Configuration window |
| an unchannelized multiport module, | <ul style="list-style-type: none"> • Module configuration window (all interfaces for all ports) • Port and channel configuration window • IISP Interface Configuration window |
| a channelized single-port module, | <ul style="list-style-type: none"> • Port configuration window (all interfaces for all virtual ports) • Virtual port configuration window (all channel interfaces on a virtual port) • Channel configuration window (just the interface for the channel) • IISP Interface Configuration window (just the interface for the channel) |
| a channelized multiport module, | <ul style="list-style-type: none"> • Module configuration window (all interfaces for all ports) • Port and channel configuration window (all channel interfaces on a port) • Channel configuration window (just the interface for the channel) • IISP Interface Configuration window (just the interface for the channel) |
| | |

The window status line prompts:

```
Taking the interface down will cause all SVCs to be lost.
Continue? (y/n)
```

2 Select Y.

The interface is taken out of service. The value **OutOfService** is now displayed in the [Admin Status] and the [Oper Status] fields. If a connection is already configured for this interface, the traffic flow is stopped. To resume traffic on the connection using this interface, you must bring the interface back into service (see the section, "Bringing One or More ATM IISP Interfaces into Service").

End

Deleting One or More ATM IISP Interfaces

Begin

You can do this task from several different windows. To delete one or more ATM UNI interfaces, perform the steps in the following procedure.

- 1 Make sure the interface is out of service before deleting it. See the “Taking One or More IISP Interfaces Out of Service” procedure if you need to take the interface out of service.
- 2 Depending on which module you are working with and which window you have currently displayed, select one of the following deletion commands on the type of window shown in Table 4-24:
 - **Delete All Interfaces**
 - **Delete All Interfaces On This Port**
 - **Delete Interface and Return**

Table 4-7. Windows on Which You Can Delete One or More ATM IISP Interfaces

| If the module you are working with is: | you can delete one or more interfaces on these windows: |
|--|---|
| an unchannelized single-port module, | <ul style="list-style-type: none"> • Port and channel configuration window <p>Note: On this window for this type of module, you delete a single interface by selecting Unconfigured in the Interface Type field.</p> <ul style="list-style-type: none"> • ATM IISP Interface Configuration window (deletes the interface for a single channel) |
| an unchannelized multiport module, | <ul style="list-style-type: none"> • Module configuration window (all interfaces for all ports) • Port and channel configuration window <p>Note: On this window for this type of module, you delete a single interface by selecting Unconfigured in the Interface Type field.</p> <ul style="list-style-type: none"> • ATM IISP Interface Configuration window (deletes the interface for a single channel) |
| a channelized single-port module, | <ul style="list-style-type: none"> • Port configuration window (all interfaces for all virtual DS1 ports) • Virtual port configuration window (all channel interfaces on a virtual port) • Channel configuration window <p>Note: On this window for this type of module, you delete a single interface by selecting Unconfigured in the Interface Type field.</p> <ul style="list-style-type: none"> • ATM IISP Interface Configuration window (deletes the interface for a single channel) |
| a channelized multiport module, | <ul style="list-style-type: none"> • Module configuration window (all interfaces for all ports) • Port and channel configuration window (all interfaces on one port) • Channel configuration window <p>Note: On this window for this type of module, you delete a single interface by selecting Unconfigured in the Interface Type field.</p> <p>ATM IISP Interface Configuration window (deletes the interface for a single channel)</p> |
| | |

- 3 On the ATM IISP Interface Configuration window, select the **Delete Interface and Return** command.

The window status line prompts with the following message (or something similar):

```
Are you sure that you want to delete this interface?
```

- 4 Select Y.

The window returns to channel configuration window of the module from which the interface was just deleted.

You may also delete an interface from the port and channel configuration window of the module configured for the IISP interface. If the interface is in service you must select the **Take All Interfaces Out of Service** command, then select the **Delete All Interfaces On This Port** command.

End

Modifying IISP Interface Values

After you have configured an ATM IISP interface for a specified port and channel, you cannot directly change the parameters for this interface even if it is out of service. The concept for “modifying” (replacing) an ATM IISP interface is that you delete the interface with the parameters you no longer want for a specified port and channel, and then configure a new interface for the same port and channel. Perform the following procedures in the sequence shown to replace an ATM IISP interface that has parameters you do not want.

- 1 On the Equipment Configuration window, select the module for which you want to replace an interface.
- 2 Select the port and channel for the interface you want to replace.
- 3 View the parameters of the interface you do not want to be sure you are choosing the right one. See the procedure in the section, “Viewing the Parameters for an ATM IISP Interface.”
- 4 Take the interface out of service. See the procedure in the section, “Taking One or More ATM IISP Interfaces out of Service.”

Note: After you perform this procedure, the traffic flow on the connection using the interface is stopped.

- 5 Delete the interface. See the procedure in the section, “Deleting One or More ATM IISP Interfaces.”

Note: After you perform this procedure, the connection using the interface is automatically deleted from the Connections database.

- 6 Configure a new interface. See the procedure in the section, “Configuring an ATM IISP Interface.”
- 7 Bring the newly configured interface into service. See the procedure in the section, “Bringing One or More ATM IISP interfaces into Service.”

Note: You now need to provision a new connection using the newly configured interface for the same specified port and channel for which you deleted the original interface (and connection). (See the *PacketStar PSAX System Connections Provisioning Guide* for more information.)

End

Managing ATM PNNI Interfaces

This section provides procedures on performing the following PNNI interface tasks:

- Configuring and applying interface(s)
- Bringing interface(s) into service
- Taking interface(s) out of service
- Viewing interface(s)
- Deleting interface(s)
- Viewing interface statistics

Note: This instruction is for a PNNI interface without a multi-level hierarchy. For hierarchical PNNI interface of two or more levels, see the appropriate chassis user guide.

Configuring a PNNI Interface

To set the values for the ATM PNNI interface, perform the steps in the following procedure.

Note: You must configure a PNNI node and bring it into service before configuring the PNNI interface. For instructions, see the System Configuration section in the appropriate chassis user guide.

Note: This procedure provides instructions in configuring a one-level, peer-to-peer PNNI interface **only**. If you want to configure a multi-level hierarchy, see the System Configuration section in the appropriate chassis user guide.

Begin

The ATM PNNI Interface Configuration window is displayed in Figure 4-3. Table 4-8 describes the commands on the window. Table 4-9 describes the fields on the window.

- 8 Select the values for the fields on this window from the values given in Table 4-9.
- 9 To apply the interface configuration values, select the **Apply Interface Configuration** command (or press Ctrl+A).

- 10 If your configuration requires you to bring the interface into service at this time, do so by selecting the **Bring Interface Into Service** command. For more information on other configuration windows on which you can bring interfaces into service, see the “Bringing One or More Interfaces into Service” procedure in this guide.

End

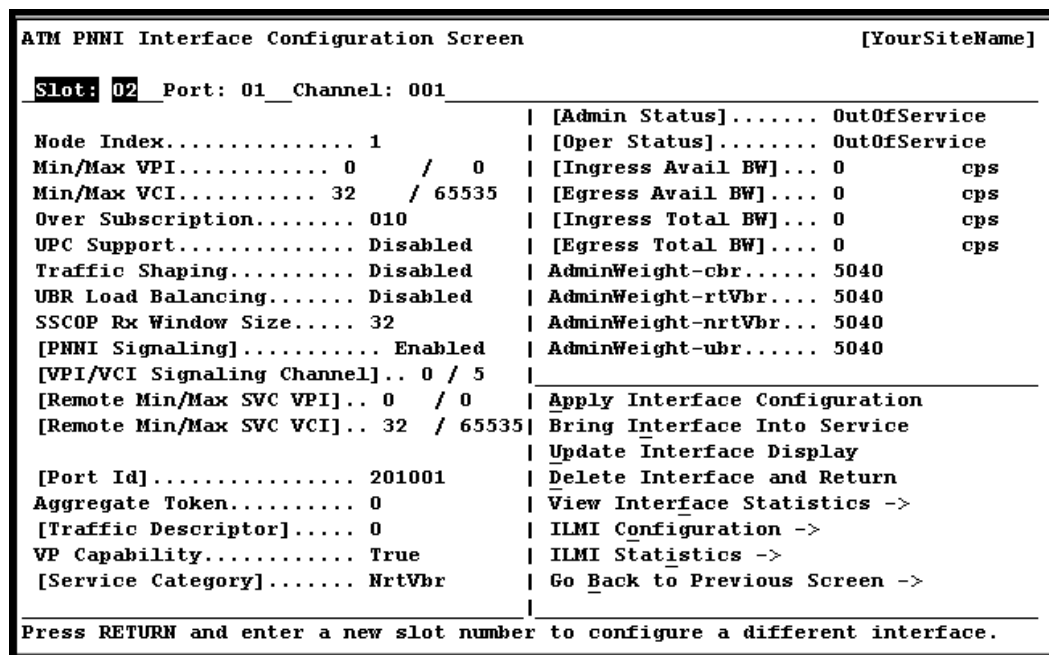


Figure 4-3. ATM PNNI Interface Configuration Window

Commands

The commands in this window have the following functions:

Table 4-8. Commands for the PNNI Interface Configuration Window

| Command | Function |
|---|--|
| Apply Interface Configuration | Applies the configuration field value you set. |
| Bring Interface Into Service (displays 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. |
| Take Interface Out of Service (displays 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. You must use this command first before using the Delete Interface and Return command. |
| Update Interface Display | Refreshes the values on this window. |

Table 4-8. Commands for the PNNI Interface Configuration Window

| Command | Function |
|------------------------------------|---|
| Delete Interface and Return | Deletes an out-of-service interface and redisplay the Port and Channel Configuration window for the module you are configuring. You must first take interface out of service (using the Take Interface Out of Service command) before you can use this command. |
| View Interface Statistics | Displays the ATM PNNI Interface Statistics window. |
| ILMI Configuration | Displays the PNNI ILMI Configuration window. |
| ILMI Statistics | Displays the PNNI ILMI Statistics window. |
| Go Back to Previous Screen | Redisplay the configuration window for the module you are configuring. |

Table 4-9. Field Descriptions for the ATM PNNI Interface Configuration Window

| Field Name | Field Values | Description |
|---|---|--|
| Node Index | Default: 0 Range: 0–65535 Format: Numeric | Specifies an index that identifies a logical PNNI entity within the managed system. The value 0 indicates a logical entity within the switching system that manages routes only over non-PNNI interfaces. By default, only the node identified by the node index is created, and all PNNI interfaces are associated with that node; only one PNNI node can be provisioned per switch. |
| Note: For the maximum and minimum VPI/VCI values below, always enter or change the maximum value before the minimum value. | | |
| Min/Max VPI | Default: 0/0 Max Limit: 255 (for low-speed modules); 4095 (for high-speed modules) Range: As noted above. VPI 0 is not available. See Note at right. Format: Numeric | Specifies the lower/upper boundary of the virtual path indicator (VPI) for SVC connections. Note: As the PNNI signaling field is enabled by default on this interface, VPI 0 is not available. |
| Min/Max VCI | Default: 32/65535 Range: Min Value: 32 Max Value: 65535 Format: Numeric | Specifies the lower/upper boundary of the VCI for SVC connections. |

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Managing ATM PNNI Interfaces

Table 4-9. Field Descriptions for the ATM PNNI Interface Configuration Window

| Field Name | Field Values | Description |
|-------------------|---|---|
| Over Subscription | Default: 10 Range: 1-100 Format: Numeric | Allows for the allocated reserved bandwidth for the line to be over-utilized by up to a factor of 100. Generally, a value between 1 and 4 is normally safe, although higher levels are often acceptable. |
| UPC Support | Default: Disabled Range: N/A Format: Character | Indicates usage parameter control (policing), which determines if traffic control is performing to negotiated PCR, SCR, or MBS. This feature is supported on these modules: <ul style="list-style-type: none"> • OC-12c/STM-4c MM/SM 1+1 APS/MSP • OC-3c 1+1 APS SM/MM • STM-1 1+1 MSP SM/MM • 21-Port High-Density E1 Multiservice • 12-Port Medium-Density DS1 Multiservice The feature is supported on these channelized DS3 modules (when channelizing to DS0s): <ul style="list-style-type: none"> • 1-Port Channelized DS3 Multiservice • 1-Port Channelized DS3 CES • 1-Port DS3 IMA |
| | Disabled | Disables UPC support. If UPC support is disabled, traffic policing cannot be supported on any VC. |
| | Enabled | Enables UPC support, providing traffic policing support for all VCs. Note: Do not enable the Traffic Shaping feature and the UPC Support feature for the same connection. Your configuration will be rejected. |

Table 4-9. Field Descriptions for the ATM PNNI Interface Configuration Window

| Field Name | Field Values | Description |
|--------------------|--|--|
| Traffic Shaping | Default: Disabled Range: N/A Format: Predefined | Indicates whether traffic shaping is used on this interface. Traffic shaping is an input cell selection algorithm (leaky bucket) that smooths bursts of input traffic. This feature is available only on these modules: <ul style="list-style-type: none"> • OC-12c/STM-4c 1+1 APS/MSP • OC-3c Multimode and Single-Mode • STM-1 Multimode and Single-Mode Note: This feature must be enabled if using rate shaping on the OC-3c APS or the STM-1 MSP modules prior to egress from an ATM trunk port. Rate shaping is not available on the OC-12c/STM-4c modules. |
| | Disabled | Disables the feature on this interface. |
| | Enabled | Enables the feature on this interface. Note: Do not enable the Traffic Shaping feature and the UPC Support feature for the same connection. Your configuration will be rejected. |
| UBR Load Balancing | Default: Disabled Range: N/A Format: Predefined | Specifies whether UBR Load Balancing is to be used on this interface. Load balancing is performed according to traffic conditions, which determines how the available bandwidth on individual channels is used for path and route selection. After a channel is saturated, the transmit load is distributed (balanced) among other available links (channels) having the same origin, destination, and parameters. Channels with the highest available bandwidth values are filled first, followed by the lower capacity channels. Note: Virtual interfaces do not support UBR Load Balancing. |
| | Disabled | Disables UBR load balancing on the channels supported by this interface. |
| | Enabled | Enables UBR load balancing on this interface. Selecting this value includes UBR in the cps counts of the [Egress Avail BW] field. |

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Table 4-9. Field Descriptions for the ATM PNNI Interface Configuration Window

| Field Name | Field Values | Description |
|--|---|--|
| SSCOP Rx Wnd Size | Default: 32 Range: 8–32 Format: Packets | Indicates the service-specific connection-oriented protocol (SSCOP) layer receive window size. This window shows the total number of packets that must be acknowledged by the receiving side before more packets are sent from the transmitting side. On the receiving side, values must be equal to or greater than the values for the transmit side for fastest transmission rates. Note: These settings are suggested for connecting to a Multiservice Media Gateway from a remote site only. The Multiservice Media Gateway configures these settings internally in its own ATM switch. For more information on this field, see the Application Note titled <i>Connecting a CBX or GX Switch to a PacketStar® PSAX Multiservice Media Gateway Via an ATM Port, Issue 2, Document No. 255-700-236</i> . |
| [PNNI Signaling] (display only) | Default: Enabled Range: N/A Format: Predefined | Enables ATM signaling over a PNNI link that sets up and tears down SVCs. |
| | Enabled | Enables ATM signaling over a PNNI link. |
| | Disabled | Disables ATM signaling over a PNNI link. |
| [VPI/VCI Signaling Channel] (display only) | Default: 0/5 Range: 0–4095 Format: Numeric | Displays the virtual path/virtual channel identifier for SVC signaling that carries the call setup and teardown data. |
| [Remote Min/Max SVC VPI] (display only) | Default: 0/0 Range: 0–4095 Format: Numeric | Indicates the minimum (lower) and maximum (upper) boundary of the VPI for SVC connections for the remote side. |
| [Remote Min/Max SVC VCI] (display only) | Default: 32/65535 Range: 32–65535 Format: Numeric | Displays the minimum (lower) and maximum (upper) boundary of the VCI for SVC connections for the remote side. |
| [Port Id] (display only) | Default: 201001 Range: Chassis dependent Format: Numeric | Displays the interface port identifier, a point of attachment of a logical link to a given logical node. This is automatically generated based on the location (slot, port, channel) of the interface. A value of 0 indicates that no port has been specified. |

Table 4-9. Field Descriptions for the ATM PNNI Interface Configuration Window

| Field Name | Field Values | Description |
|--|---|--|
| [Aggregate Token] (display only) | Default: 0 Range: 0–2147483647 Format: cps | Indicates the interface aggregate token, whose links to a given neighbor node are to be aggregated and advertised as a single node link. For example, if there are 3 physical links between two chassis, the user can set the aggregation token to the same value on each interface (both sides). This makes the aggregated links appear to the rest of the network as one logical link. |
| [Traffic Descriptor] (display only) | Default: 0 Range: N/A Format: Predefined | This field is not currently supported. Displays the traffic descriptor index, an entry in the atmTrafficDescrParamTable defined in <i>RFC 1695</i> that specifies the traffic allocation for the PNNI routing control channel (VCI=18) on this interface. |
| VP Capability | Default: True Range: N/A Format: Predefined | Indicates whether the interface is capable of having virtual path connections (VPCs) established within it. |
| | True | The interface is capable of having VPCs established within it. |
| | False | The interface cannot have VPCs established within it. |
| [Service Category] (display only) | Default: NrtVbr Range: N/A Format: Predefined | Indicates a quality of service class type. The speed and quality of transmission depends on the class-choice made. The higher the class, the higher the guarantee that the packets will get to their destination on time. Cbr is the highest class, and Ubr is the lowest. |
| | NrtVbr | Non-realtime variable bit rate service. |
| | Cbr | Constant bit rate service. |
| | RtVbr | Real-time variable bit rate service. |
| | Abr | Available bit rate service. |
| | Ubr | Unspecified bit rate service. |
| [Admin Status] (display only) | Default: OutOfService Range: N/A Format: Predefined | Indicates whether the interface is configurable to carry connections or not. |
| | OutOfService | Indicates that some condition is preventing the port from being configured with an interface. |
| | InService | Indicates that no conditions are preventing the port from being fully operational. |

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Managing ATM PNNI Interfaces

Table 4-9. Field Descriptions for the ATM PNNI Interface Configuration Window

| Field Name | Field Values | Description |
|--------------------------------------|---|--|
| [Oper Status] (display only) | Default: OutOfService Range: N/A Format: Predefined | Indicates whether the configured interface is capable of carrying traffic. |
| | OutOfService | Indicates that the configured interface is not operational. |
| | InService | Indicates that the configured interface is operational. |
| [Ingress Avail BW] (display only) | Default: 0 Range: User-configured Format: cps | <p>Displays the total ingress bandwidth available for connections for this interface. The value 0 is changed to the cps count available for the interface after the Apply command is selected. The ingress available bandwidth depends on the configured module parameters, such as port strapping, type of cell mapping, configured port speed, and other factors. As each new connection is added, the amount of available bandwidth as indicated in this field may decrease. Bandwidth for UBR connections is not included, unless the UBR Load Balancing field on this interface is Enabled. You will see values in the [Ingress Avail BW] field only for connections that are in service.</p> <ul style="list-style-type: none"> Any non-CES OC3 and STM-1 APS module will show the value 353207 Any OC-12 module will show the value 1412830 <p>The values for other types of I/O modules that use this field vary depending on the following parameters :</p> <ul style="list-style-type: none"> IMA - number of ports configured DS1/E1/STS-1e - number of channels strapped DS3/E3 - Cell Mapping (Plcp or DirectMapping) Serial - port bandwidth configured |

Table 4-9. Field Descriptions for the ATM PNNI Interface Configuration Window

| Field Name | Field Values | Description |
|--------------------------------------|---|--|
| [Egress Avail BW] (display only) | Default: 0 Range: User-configured Format: cps | Displays the total egress bandwidth available for connections for this interface. The value 0 is changed to the cps count available for the interface after the Apply command is selected. The egress available bandwidth depends on the configured module parameters, such as port strapping, type of cell mapping, configured port speed, and other factors. As each new connection is added, the amount of available bandwidth as indicated in this field may decrease. Bandwidth for UBR connections is not included, unless the UBR Load Balancing field on this interface is Enabled . You will see values in the [Egress Avail BW] field only for connections that are in service. <ul style="list-style-type: none"> Any non-CES OC3 and STM-1 APS module will show the value 353207 Any OC-12 module will show the value 1412830 <p>The values for other types of I/O modules that use this field vary depending on the following parameters :</p> <ul style="list-style-type: none"> IMA -IMA - number of ports configured DS1/E1/STS-1e - number of channels strapped DS3/E3 - Cell Mapping (Plcp or DirectMapping) Serial - port bandwidth configured |
| [Ingress Total BW] (display only) | Default: 0 Range: User-configured Format: cps | Specifies the total bandwidth available for use on the current interface in the incoming direction (in cps). Bandwidth for UBR connections is included. |
| [Egress Total BW] (display only) | Default: 0 Range: User-configured Format: cps | Specifies the total bandwidth available for use on the current interface in the outgoing direction (in cps). Bandwidth for UBR connections is included. |
| AdminWeight-cbr | Default: 5040 Range: 504–16777215 Format: cps | Specifies the administrative weight for the Cbr service category. This value is used by PNNI in path selection. The higher the weight, the lower the priority. See the Note below this table. |

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Managing ATM PNNI Interfaces

Table 4-9. Field Descriptions for the ATM PNNI Interface Configuration Window

| Field Name | Field Values | Description |
|--------------------|---|--|
| AdminWeight-rtVbr | Default: 5040 Range: 504–16777215 Format: cps | Specifies the administrative weight for the RtVbr service category. Used by PNNI in path selection. The higher the weight, the lower the priority. See the Note below this table. |
| AdminWeight-nrtVbr | Default: 5040 Range: 504–16777215 Format: cps | Specifies the administrative weight for the NrtVbr service category. Used by PNNI in path selection. The higher the weight, the lower the priority. See the Note below this table. |
| AdminWeight-ubr | Default: 5040 Range: 504–16777215 Format: cps | Specifies the administrative weight for the Ubr service category. Used by PNNI in path selection. The higher the weight, the lower the priority. See the Note below this table. |

Note: When configuring the Admin Weight fields, you can choose a value based on the range listed in the table above Table 4-9. However, it is recommended that if you want to use a value greater than **5040** (the default value), you should choose a number divisible by 5040, such as **10080**, **15120**, and so on. If you want to use a value smaller than **5040**, choose a multiple of 5040, such as 2, 3, 5, 6, 7, 8, 9, 10, and so on, or their multiples.

Bringing One or More PNNI Interfaces Into Service

Before you can configure a connection using an PNNI interface, you must first bring an PNNI interface into service. You can do this task from several different windows. To bring one or more interfaces into service, perform the step in the following procedure.

Begin

Depending on which type of module you are configuring and which window you have currently displayed, select either the **Bring Interface Into Service** or the **Bring All Interfaces Into Service** command on the type of window shown in Table 4-10.

Table 4-10. Windows on Which You Can Bring an PNNI Interface into Service

| If the module you are configuring is: | you can bring one or more interfaces into service on these windows: |
|---------------------------------------|---|
| an unchannelized single-port module, | <ul style="list-style-type: none"> • Port and channel configuration window • PNNI Interface Configuration window |
| an unchannelized multiport module, | <ul style="list-style-type: none"> • Module configuration window (all interfaces for all ports) • Port and channel configuration window • PNNI Interface Configuration window |
| a channelized single-port module, | <ul style="list-style-type: none"> • Port configuration window (all interfaces for all virtual ports) • Virtual port configuration window (all channel interfaces on a virtual port) • Channel configuration window (just the interface for the channel) • PNNI Interface Configuration window (just the interface for the channel) |
| a channelized multiport module, | <ul style="list-style-type: none"> • Module configuration window (all interfaces for all ports) • Port and channel configuration window (all channel interfaces on a port) • Channel configuration window (just the interface for the channel) • PNNI Interface Configuration window (just the interface for the channel) |
| | |

After you select the command, the value **InService** is displayed in the [Admin Status] and the [Oper Status] fields. You can now provision connections that use this interface. (See the *PacketStar PSAX System Connections Provisioning Guide* for more information). If connections have already been configured for this interface, the system can now resume passing traffic through this interface.

End

Viewing the Parameters of a PNNI Interface

To view a previously configured PNNI interface, perform the steps in the following procedure. You should always view an interface and determine whether you have chosen the correct one before you perform any of the procedures in step 3 below.

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Begin

- 1 On the Equipment Configuration window, select the module for which you want to view the interface parameters.

The module configuration window or the port and channel configuration window for the module is displayed.

- 2 On the module's port and channel configuration window or the channel configuration window, select the channel and then select the **Configure Interface** command.

The PNNI Interface Configuration window displaying the parameters for the port and channel you selected is displayed.

- 3 Proceed to one of the following sections, as needed:
 - Bringing One or More PNNI Interfaces into Service
 - Taking One or More PNNI Interfaces out of Service
 - Deleting One or More PNNI Interfaces

End

Viewing PNNI Interface Statistics

Begin

To view interface statistics for this connection, select the **View Interface Statistics** -> command on the ATM PNNI Interface Configuration window and press Enter (or press Ctrl+F).

The ATM PNNI Interface Statistics window is displayed (Figure 4-9).

Table 4-11 describes the commands on the window. Table 4-22 describes the fields on the window.

End

```

ATM PNNI Interface Statistics                                     [YourSiteName]
-----
[Valid Cells Rcvd]..... 2.5800 e2
[Errored Cells Rcvd].... 0000000000
[Mismatched Cells Rcvd].. 0000000000
[Valid Cells Sent]..... 2.5800 e2
[Null Cells Sent]..... 4.8653 e6

[Time Elapsed]..... 0:00:00

Continuous Update
Reset Statistics                                           Go Back to previous screen ->
-----
Press RETURN to update the statistics once every second.

```

Figure 4-4. ATM PNNI Interface Statistics Window

Commands

The commands on this window have the following functions:

Table 4-11. Commands for the ATM PNNI Interface Statistics Window

| Command | Function |
|-----------------------------------|---|
| Continuous Update | Continuously updates all fields once every second. |
| Reset Statistics | Resets statistics counters for this interface. |
| Go Back to previous screen | Returns to the ATM PNNI Interface Configuration window. |

- 4 Select the values for the fields on this window from Table 4-22.

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Table 4-12. Field Descriptions for the ATM PNNI Interface Statistics Window

| Field Name | Field Values | Description |
|-------------------------|--|---|
| [Valid Cells Rcvd] | Default: 0.0000 e0 Range: 0-($2^{31}-1$) Format: exponential notation | Specifies the number of valid cells received into interface side A during the amount of time shown in Time Elapsed field. |
| [Errored Cells Rcvd] | Default: 0000000000 Range: N/A Format: Numeric | Specifies the number of errored cells received into interface side A during the amount of time shown in Time Elapsed field. |
| [Mismatched Cells Rcvd] | Default: 0000000000 Range: N/A Format: Numeric Default: | Specifies the number of mismatched cells received into interface side A during the amount of time shown in Time Elapsed field. |
| [Valid Cells Sent] | Default: 0.0000 e0 Range: 0-($2^{31}-1$) Format: exponential notation | Specifies the number of valid cells transmitted out of interface side B during the amount of time shown in Time Elapsed field. |
| [Null Cells Sent] | Default: 0.0000 e0 Range: 0-($2^{31}-1$) Format: exponential notation | Specifies the number of null cells transmitted out of interface side B during the amount of time shown in Time Elapsed field. Note: This parameter is not supported in the OC-12c/STM-4c SM/MM 1+1 APS/MSP modules. |
| [Time Elapsed] | Default: 0:00:00 Range: NA Format: Time in hour (x), minutes (xx), seconds (xx) | Specifies the time elapsed since the last reset in h:mm:ss (hour: minute:seconds) format. |

Taking One or More PNNI Interfaces Out of Service

You need to take an an PNNI interface out of service first before you can perform the following tasks:

- Deleting an interface
- Performing diagnostic or maintenance procedures on an interface

You can do this task from several different windows. To take one or more interfaces out of service, perform the steps in the following procedure.

Begin

- 1 Depending on which type of module you are working with and which window you have currently displayed, select either the **Take Interface Out Of Service** or the **Take All Interfaces Out Of Service** command on the type of window shown in Table 4-13.

Table 4-13. Windows on Which You Can Take an PNNI Interface out of Service

| If the module you are working with is: | you can take one or more interfaces out of service on these windows: |
|--|---|
| an unchannelized single-port module, | <ul style="list-style-type: none"> • Port and channel configuration window • PNNI Interface Configuration window |
| an unchannelized multiport module, | <ul style="list-style-type: none"> • Module configuration window (all interfaces for all ports) • Port and channel configuration window • PNNI Interface Configuration window |
| a channelized single-port module, | <ul style="list-style-type: none"> • Port configuration window (all interfaces for all virtual ports) • Virtual port configuration window (all channel interfaces on a virtual port) • Channel configuration window (just the interface for the channel) • PNNI Interface Configuration window (just the interface for the channel) |
| a channelized multiport module, | <ul style="list-style-type: none"> • Module configuration window (all interfaces for all ports) • Port and channel configuration window (all channel interfaces on a port) • Channel configuration window (just the interface for the channel) • PNNI Interface Configuration window (just the interface for the channel) |

The following prompt is displayed:

```
Take the interface down Although Not Operational. Continue?
(y/n)
```

- 2 Type Y to continue.

The value **OutOfService** is now displayed in the [Admin Status] and the [Oper Status] fields. If a connection is already configured for this interface, the traffic flow is stopped. To resume traffic on the connection using this interface, you must bring the interface back into service (see the section, "Bringing One or More PNNI Interfaces into Service").

End

Deleting One or More PNNI Interfaces

You need to delete an PNNI interface before you can replace an interface for a specified port and channel.

Note: Before you can delete an PNNI interface, you must first take the interface out of service. See the section, “Taking One or More PNNI Interfaces out of Service.”

You can do this task from several different windows. To delete one or more PNNI interfaces, perform the steps in the following procedure.

Begin

1 Depending on which module you are working with and which window you have currently displayed, select one of the following deletion commands on the type of window shown in Table 4-14:

- **Delete All Interfaces**
- **Delete All Interfaces On This Port**
- **Delete Interface and Return**

Table 4-14. Windows on Which You Can Delete One or More PNNI Interfaces

| If the module you are working with is: | you can delete one or more interfaces on these windows: |
|--|---|
| an unchannelized single-port module, | <ul style="list-style-type: none"> • Port and channel configuration window <p>Note: On this window for this type of module, you delete a single interface by selecting Unconfigured in the Interface Type field.</p> <ul style="list-style-type: none"> • PNNI Interface Configuration window (deletes the interface for a single channel) |
| an unchannelized multiport module, | <ul style="list-style-type: none"> • Module configuration window (all interfaces for all ports) • Port and channel configuration window <p>Note: On this window for this type of module, you delete a single interface by selecting Unconfigured in the Interface Type field.</p> <ul style="list-style-type: none"> • PNNI Interface Configuration window (deletes the interface for a single channel) |
| a channelized single-port module, | <ul style="list-style-type: none"> • Port configuration window (all interfaces for all virtual DS1 ports) • Virtual port configuration window (all channel interfaces on a virtual port) • Channel configuration window <p>Note: On this window for this type of module, you delete a single interface by selecting Unconfigured in the Interface Type field.</p> <ul style="list-style-type: none"> • PNNI Interface Configuration window (deletes the interface for a single channel) |
| a channelized multiport module, | <ul style="list-style-type: none"> • Module configuration window (all interfaces for all ports) • Port and channel configuration window (all interfaces on one port) • Channel configuration window <p>Note: On this window for this type of module, you delete a single interface by selecting Unconfigured in the Interface Type field.</p> <ul style="list-style-type: none"> • PNNI Interface Configuration window (deletes the interface for a single channel) |
| | |

Depending on which module you are working with and which window you have currently displayed, a prompt similar to one of the following is displayed:

```
Delete interface: all connections for channel will be lost.  
Continue? (y/n)
```

```
Are you SURE that you want to delete ALL interfaces for this  
card? (y/n)
```

- 2 Type y to continue.

The interface is deleted, and any connections provisioned using the interface you just deleted are also automatically deleted.

End

Modifying a PNNI Interface

If you need to change the interface configuration values for AdminWeight-cbr, AdminWeight-rtVbr, AdminWeight-nrtVbr, or AdminWeight-ubr at any time after the interface has been brought into service, you must first take the interface out of service, reconfigure the desired values, apply those values, and bring the interface back into service. Perform the following procedure, “Steps to Modify an PNNI Interface” to replace an PNNI interface that has parameters you do not want.

Modifying the Non-administrative Weight Values for the ATM PNNI Interface

If you need to change the interface configuration values *other than* AdminWeight-cbr, AdminWeight-rtVbr, AdminWeight-nrtVbr, or AdminWeight-ubr at any time after the interface has been brought into service, you must first take the interface out of service, delete the interface, and then re-create the interface by configuring the desired values.

Begin

- 1 On the Equipment Configuration window, select the module for which you want to replace an interface.
- 2 Select the port and channel for the interface you want to replace.
- 3 View the parameters of the interface you do not want to be sure you are choosing the right one. See the procedure in the section, “Viewing the Parameters for an PNNI Interface.”
- 4 Take the interface out of service. See the procedure in the section, “Taking One or More PNNI Interfaces out of Service.”
Note: After you perform this procedure, the traffic flow on the connection using the interface is stopped.
- 5 Configure a new interface. See the procedure in the section, “Configuring an PNNI Interface.”

- 6 Bring the newly configured interface into service. See the procedure in the section, “Bringing One or More PNNI interfaces into Service.”

Note: You now need to provision a new connection using the newly configured interface for the same specified port and channel for which you deleted the original interface (and connection). (See the *PacketStar PSAX System Connections Provisioning Guide* for more information.)

End

Configuring PNNI ILMI

Perform these steps to configure your connection for PNNI integrated link management interface (ILMI):

Begin

- 1 From the ATM PNNI Interface Configuration window, select the ILMI Configuration command, or press Ctrl+O.

The PNNI ILMI Configuration window is displayed (see Figure 4-5).

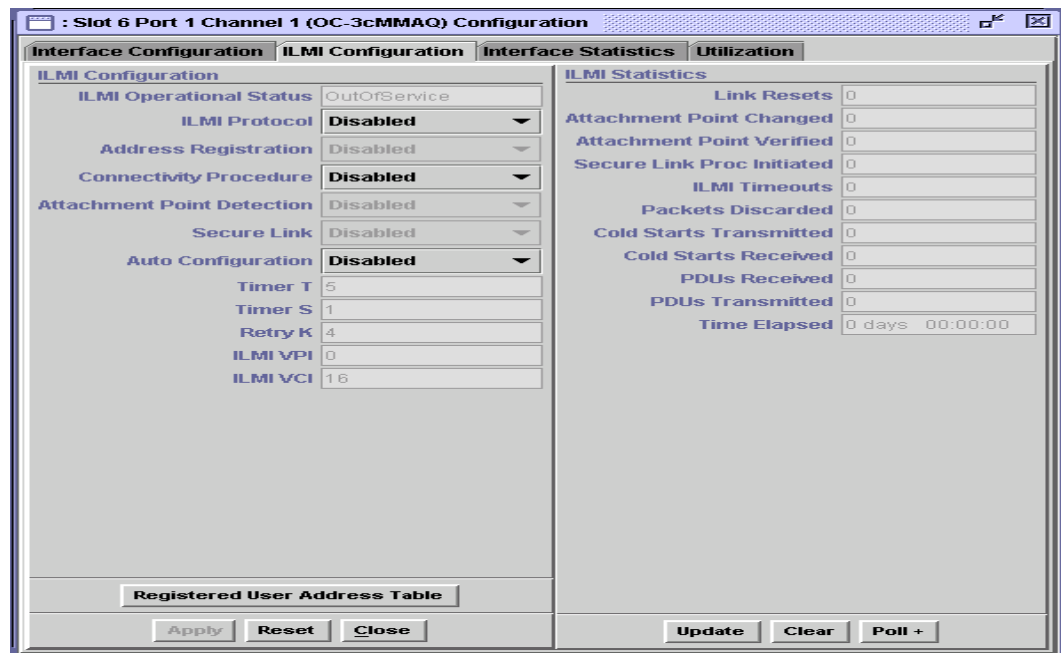


Figure 4-5. PNNI ILMI Configuration Window

Commands

The commands on this window have the following functions:

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Managing ATM PNNI Interfaces

Table 4-15. Commands for the PNNI ILMI Configuration Window

| Command | Function |
|------------------------------------|---|
| Apply ILMI Configuration | Applies the user input values entered on the window. |
| Go Back to Interface Screen | Returns to the ATM PNNI Interface Configuration window. |

2 Select the values for the fields on this window from Table 4-16.

Table 4-16. Field Descriptions for the PNNI ILMI Configuration Window

| Field Name | Field Values | Description |
|--|--|---|
| [ILMI Oper Status] (display only) | Default: OutOfService Range: N/A Format: predefined | Indicates whether ILMI connectivity is operational or not. |
| | OutOfService | Indicates that ILMI connectivity is not operational. |
| | InService | Indicates that ILMI connectivity is operational. |
| ILMI Protocol | Default: Disabled Range: N/A Format: predefined | Specifies the Integrated Links Management Interface. A bidirectional transmission protocol that enables exchange of ATM interface parameters between two connected ATM Interface Management Entities (IMEs). These entities are an end user and a public or private network, or a public network and a private network. |
| | Disabled | Disables ILMI protocol. If you select Disabled , the other fields in this window will not show. |
| | Enabled | Enables ILMI protocol. |
| [Address Registration] (display only) | Default: Disabled Range: As noted below. Format: predefined | Specifies whether address registration is disabled or enabled. |
| | Disabled | Disables the Address Registration field. Address Registration can be enabled only if the ILMI Protocol field is enabled. |
| | Enabled | Enables address registration. |

Table 4-16. Field Descriptions for the PNNI ILMI Configuration Window

| Field Name | Field Values | Description |
|--|--|--|
| Connectivity Procedure | Default: Disabled Range: N/A Format: predefined | Indicates the establishment and subsequent loss of ILMI connectivity detection. |
| | Disabled | Disables the ILMI Connectivity Procedure. |
| | Enabled | Enables the ILMI Connectivity Procedure: the Attachment Point Detection and Secure Link field functions are available for enablement. You must select Enabled if you want to also enable the Attachment Point Detection and Secure Link fields. |
| [Attachment Point Detection] (display only) | Default: Disabled Range: N/A Format: predefined | Specifies that a change of attachment point caused by possible swapping of 2 links that were not detected by signalling will be detected. |
| | Disabled | Disables Attachment Point Detection. |
| | Enabled | Enables Attachment Point Detection. A query will be sent every 5 seconds to detect a change in the address. A response indicates that the user id and address information are the same. However, if there is a change in the address, all calls will be cleared. Attachment Point Change Detection can be enabled only if Connectivity Procedure and ILMI Protocol fields are enabled. |
| [Secure Link] (display only) | Default: Disabled Range: N/A Format: predefined | Detects non-ILMI connections that were not dropped when an attachment point changed. ILMI Secure Link Procedure is disabled. It can be enabled only if the Connectivity Procedure and Attachment Point Detection fields are enabled. |
| | Disabled | Disables the ILMI Secure Link Procedure. |
| | Enabled | Enables the ILMI Secure Link Procedure. If a response is not received, all calls are cleared, and disconnected. |

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Table 4-16. Field Descriptions for the PNNI ILMI Configuration Window

| Field Name | Field Values | Description |
|------------------------------|--|---|
| Auto Configuration Procedure | Default: Disabled Range: N/A Format: Predefined | Specifies the ability to automatically configure the actual VPI/VCI range based on the local VPI/VCI and the remote VPI/VCI ranges (VPI and VCI range negotiation). For more information on automatic configuration procedures, see <i>ATM Forum ILMI (Integrated Local Management Interface), 4.0, af-ilmi-0065.000, Section 8.3.4.</i> |
| | Disabled | Disables the Automatic Configuration Procedure: the actual VPI and VCI are not automatically configured, and the connections are set up by using local VPI/VCI ranges which are defined by user. |
| | Enabled | Enables the Automatic Configuration Procedure: actual VPI/VCI are automatically configured, and the connections are set up by using the overlap VPI/VCI ranges of the local VPI/VCI and the remote VPI/VCI ranges. Auto configuration can be enabled only if the ILMI Protocol field is Enabled. |
| [TimerT] (display only) | Default: 5 Range: 0–(2 ³² -1) Format: numeric (seconds) | Used to poll when link is operational. The value in this field is displayed as a 32-bit integer, and any number may appear within the range specified (see the Values column). |
| [TimerS] (display only) | Default: 1 Range: 0–(2 ³² -1) Format: numeric (seconds) | Used to poll when link is not operational. The value in this field is displayed as a 32-bit integer, and any number may appear within the range specified (see the Values column). |
| [RetryK] (display only) | Default: 4 Range: 0–(2 ³² -1) Format: numeric (seconds) | Indicates the number of timeouts before the link becomes non-operational. The value in this field is displayed as a 32-bit integer, and any number may appear within the range specified (see the Values column). |
| [ILMI VPI] (display only) | Default: 0 Range: This value does not change. Format: numeric (seconds) | Indicates the VPI for ILMI protocol channel in which VPI will run. |
| [ILMI VCI] (display only) | Default: 16 Range: This value does not change. Format: numeric (seconds) | Indicates the VCI for ILMI protocol channel in which VCI will run. |

Viewing PNNI ILMI Interface Statistics

Perform the steps in the following procedure to view PNNI ILMI statistics.

Begin

- 1 To view interface statistics for this connection, select the **ILMI Statistics** command on the ATM PNNI Interface Configuration window and press Enter (or press Ctrl+I).

The PNNI ILMI Interface Statistics window is displayed (see Figure 4-6). Table 4-17 describes the commands on the window. Table 4-18 describes the fields on the window.

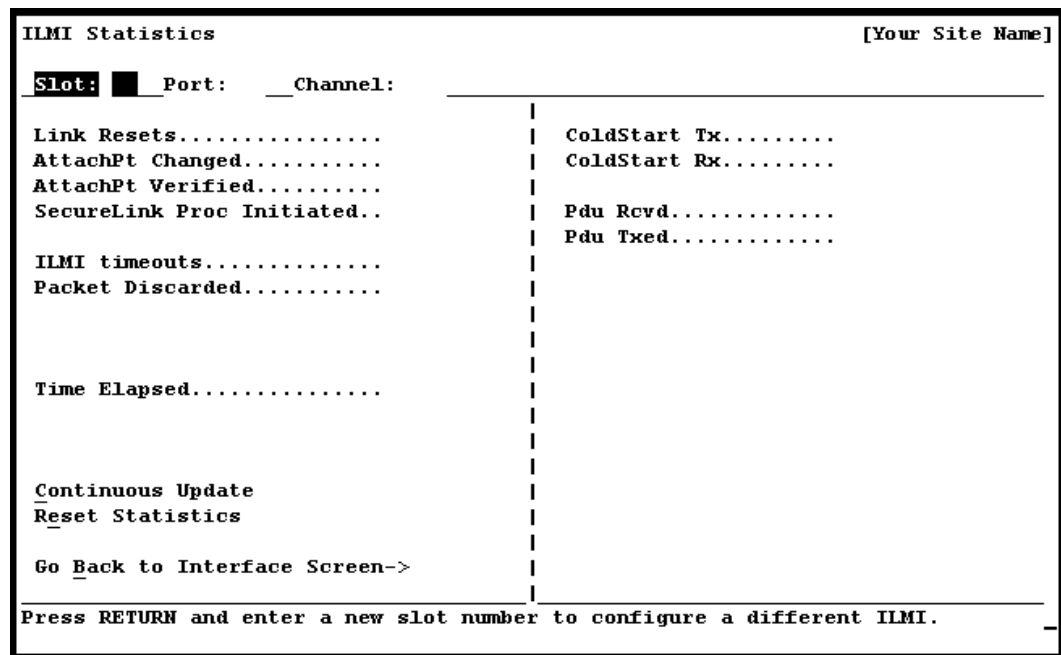


Figure 4-6. PNNI ILMI Interface Statistics Window

Commands

The commands on this window have the following functions:

Table 4-17. Commands for the PNNI ILMI Interface Statistics Window

| Command | Function |
|-----------------------------------|---|
| Continuous Update | Continuously updates all fields once every second. |
| Reset Statistics | Resets statistics counters for this interface. |
| Go Back to previous screen | Returns to the ATM PNNI Interface Configuration window. |

Field Descriptions

- 2 The values for this window are described on Table 4-18.

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Table 4-18. Field Descriptions for the ATM PNNI ILMI Interface Statistics Window

| Field Name | Field Values | Description |
|-------------------------|--|---|
| [Valid Cells Rcvd] | Default: 0.0000 e0 Range: 0-($2^{31}-1$) Format: exponential notation | Specifies the number of valid cells received into interface side A during the amount of time shown in Time Elapsed field. |
| [Errored Cells Rcvd] | Default: 000000000 Range: N/A Format: Numeric | Specifies the number of errored cells received into interface side A during the amount of time shown in Time Elapsed field. |
| [Mismatched Cells Rcvd] | Default: 000000000 Range: N/A Format: Numeric Default: | Specifies the number of mismatched cells received into interface side A during the amount of time shown in Time Elapsed field. |
| [Valid Cells Sent] | Default: 0.0000 e0 Range: 0-($2^{31}-1$) Format: exponential notation | Specifies the number of valid cells transmitted out of interface side B during the amount of time shown in Time Elapsed field. |
| [Null Cells Sent] | Default: 0.0000 e0 Range: 0-($2^{31}-1$) Format: exponential notation | Specifies the number of null cells transmitted out of interface side B during the amount of time shown in Time Elapsed field. Note: This parameter is not supported in the OC-12c/STM-4c SM/MM 1+1 APS/MSP modules. |
| [Time Elapsed] | Default: 0:00:00 Range: NA Format: Time in hour (x), minutes (xx), seconds (xx) | Specifies the time elapsed since the last reset in h:mm:ss (hour: minute:seconds) format. |

Managing ATM UNI Interfaces

This section provides instructions for configuring the ATM user-to-network interface (UNI) 3.0, 3.1, and 4.0 and the integrated link management interface (ILMI).

Configuring the ATM UNI Interface

Perform the steps in the following procedure to configure an ATM UNI interface.

Begin

When you configure the value **AtmUni3-0**, **AtmUni3-1**, or **AtmUni4-0** as the interface type on a module port and channel configuration window for a module that supports this type of interface, the ATM UNI Interface Configuration window is displayed (see Figure 4-7 for ATM UNI 3.0/3.1 and Figure 4-8 for ATM UNI 4.0). Table 4-19 describes the commands on these windows. Table 4-20 describes the fields on these windows.

```

ATM UNI Interface Configuration                                     [YourSiteName]
Slot: 03 Port: 01 Channel: 001
Over Subscription... 010 | [Admin Status]..... OutOfService
Min/Max SVC VPI..... 0 / 0 | [Oper Status]..... OutOfService
Min/Max SVC VCI..... 32 / 255 |
ATM Signaling..... Disabled | [Ingress Avail BW].. 0 cps
Interface Type..... Network | [Egress Avail BW]... 0 cps
Interface Name.. | [Ingress Total BW].. 0 cps
Prefix... 20202020202020202020202020202020 | [Egress Total BW]... 0 cps
Neighbor System IP.. 000.000.000.000 |
Neighbor Name... | Traffic Shaping..... Disabled
UPC Support..... Disabled |
UBR Load Balancing.. Disabled |
Sscop Rx Wnd Size... 32 |
VI Support..... Disabled |
|
Apply Interface Configuration | ATM UNI Interface Statistics ->
Reset Interface Display | ILMI Configuration ->
Bring Interface Into Service | ILMI Registered User Address ->
Delete Interface and Return -> | ILMI Statistics ->
| Go Back to Port Configuration ->
|
Press RETURN and enter a new slot number to configure a different interface.
    
```

Figure 4-7. ATM UNI Interface Configuration Window (ATM UNI 3.0 or 3.1 Selected on the Module)

Chapter 4 Configuring the Interfaces Using the Console Interface

Managing ATM UNI Interfaces

```

ATM UNI Interface Configuration [YourSiteName]
Slot: 03 Port: 01 Channel: 001
Over Subscription... 010 | [Admin Status]..... OutOfService
Min/Max SVC VPI..... 0 / 0 | [Oper Status]..... OutOfService
Min/Max SVC VCI..... 32 / 255 |
ATM Signaling..... Disabled | [Ingress Avail BW].. 0 cps
Interface Type..... Network | [Egress Avail BW]... 0 cps
Interface Name.. | [Ingress Total BW].. 0 cps
Prefix... 202020202020202020202020202020 | [Egress Total BW]... 0 cps
Neighbor System IP.. 000.000.000.000 |
Neighbor Name... | Traffic Shaping..... Disabled
UPC Support..... Disabled |
UBR Load Balancing.. Disabled |
Sscop Rx Wnd Size... 32 |
VI Support..... Disabled |
VUNI Support..... Disabled |
Apply Interface Configuration | ATM UNI Interface Statistics ->
Reset Interface Display | ILMI Configuration ->
Bring Interface Into Service | ILMI Registered User Address ->
Delete Interface and Return -> | ILMI Statistics ->
 | Go Back to Port Configuration ->
Press RETURN and enter a new slot number to configure a different interface.

```

Figure 4-8. ATM UNI Interface Configuration Window (ATM UNI 4.0 Selected on the Module)

Note: The ATM UNI Interface Configuration window for UNI 4.0 has the addition of the VUNI Support field.

- 1 Enter values in the fields on this window according to the information provided in Table 4-20.
- 2 To apply the interface configuration values, select the **Apply Interface Configuration** command.
- 3 Go the procedure, “Bringing One or More ATM UNI Interfaces into Service.”

End

Commands

The commands on this window have the following functions:

Table 4-19. Commands for the ATM UNI Interface Configuration Window

| 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. |

Table 4-19. Commands for the ATM UNI Interface Configuration Window

| Command | Function |
|--------------------------------------|--|
| Bring Interface Into Service | 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. Note: This command is displayed only when the [Admin Status] field is OutOfService . |
| Take Interface Out of Service | Takes an in-service configured interface to out-of-service status. The value OutOfService is displayed in the [Admin Status] field. You must use this command first before using the Delete Interface and Return command. Note: This command is displayed only when the [Admin Status] field is InService . |
| Delete Interface and Return | Deletes an out-of-service interface and redisplay the Port and Channel Configuration window for the module you are configuring. You must first take the interface out of service (by selecting the Take Interface Out of Service command) before you can use this command. |
| ATM UNI Interface Statistics | Displays the ATM UNI Interface Statistics window. |
| ILMI Configuration | Displays the ATM UNI ILMI Configuration window. |
| ILMI Registered User Address | Displays the ILMI Registered User Address Table. |
| ILMI Statistics | Displays the ILMI Statistics window |
| Go Back to Port Configuration | Redisplay the port and channel configuration window of the module you are configuring. |

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Table 4-20. Field Descriptions for the ATM UNI Interface Configuration Window

| Field Name | Field Values | Description |
|--|--|---|
| Over Subscription | Default: 10 Range: 1–100 Format: Numeric | Specifies the risk factor for this function, which indicates the level of oversubscription allowed by the system. |
| Note: When entering the maximum and minimum VPI and VCI values in the following two fields, always enter or change the maximum value before entering the minimum value. | | |
| Min/Max SVC VPI | Default: 0 Range: 0–255 Format: Numeric | Specifies the minimum and maximum VPI values that you can assign to an SVC on this interface. Note: Disable the ATM signaling field if you want to use the value 0 for the VPI. Enter the maximum value after the slash and then enter the minimum value before the slash. |
| Min/Max SVC VCI | Default: Min: 32 Default: Max: 255 Range: 0–65535 Format: Numeric | Specifies the minimum and maximum VCI values that you can assign to an SVC on this interface. Enter the maximum value after the slash and then enter the minimum value before the slash. |
| ATM Signaling | Default: Disabled Range: N/A Format: Predefined alphanumeric | Specifies whether SVCs can be created on this interface. Note: The value 0 for the VPI is not available for use. |
| | Disabled | Indicates that SVCs cannot be created on this interface. |
| | Enabled | Indicates that SVCs can be created on this interface. If you want to use the ILMI protocol, you must select this value. The ILMI protocol is not required if ATM signaling is disabled. Note: The value 0 for VPI is available for use. |
| Interface Type | Default: Network Range: N/A Format: Predefined alphanumeric | Specifies whether the network or user format for cell headers will be used. Note: When you select this value, the Prefix field is displayed below the Interface Name field. |
| | Network | Indicates that the NNI format for the cell headers will be used. Wireless Applications: Select this value if you are configuring a link on the MSC side of a cell site-to-MSC link. |
| | User | Indicates that the UNI format for the cell headers will be used. Note: When you select this value, the User Add field is displayed below the Interface Name field. Wireless Applications: Select this value if you are configuring a link on the cell-site side of a cell site-to-MSC link. |

Chapter 4 Configuring the Interfaces Using the Console Interface

Managing ATM UNI Interfaces

Table 4-20. Field Descriptions for the ATM UNI Interface Configuration Window

| Field Name | Field Values | Description |
|--------------------|---|---|
| UPC Support | Default: Disabled Range: N/A Format: Predefined alphanumeric | Specifies whether usage parameter control (policing) is to be used on this interface. UPC determines if traffic control is performing to the negotiated PCR, SCR, or MBS values. This feature is supported on the following modules only: <ul style="list-style-type: none"> • OC-12c/STM-4c MM/SM 1+1 APS/MSP • OC-3c 1+1 APS SM/MM • STM-1 1+1 MSP SM/MM • High Density E1 • 12-Port Medium Density DS1 The feature is supported on the following channelized DS3 modules only (when the port(s) are channelized to DS0s): <ul style="list-style-type: none"> • 1-Port Channelized DS3 Multiservice • 1-Port DS3 IMA • Quadserial |
| | Disabled | Indicates that UPC support is disabled. Note: If UPC Support is disabled, traffic policing cannot be supported on any VC. |
| | Enabled | Indicates that UPC support is enabled, providing traffic policing support for all VCs. Note: Do not enable the UPC Support field and the Traffic Shaping field at the same time. Your interface configuration will be rejected. However, UPC Support and VI Support are compatible configuration settings. |
| UBR Load Balancing | Default: Disabled Range: N/A Format: Predefined alphanumeric | Specifies whether unspecified bit rate (UBR) load balancing is used or not. Note: The virtual interface does not support UBR load balancing. |
| | Disabled | Indicates that unspecified bit rate (UBR) load balancing on the interface is disabled. |
| | Enabled | Indicates that UBR load balancing on the interface is enabled. |

Table 4-20. Field Descriptions for the ATM UNI Interface Configuration Window

| Field Name | Field Values | Description |
|----------------------------------|---|---|
| SSCOP Rx Wnd Size | Default: 32 Range: 8–32 Format: Numeric (Packets) | Specifies the service-specific, connection-oriented protocol (SSCOP) layer receive window size. This window shows the total number of packets that must be acknowledged by the receiving side before more packets are sent from the transmitting side. On the receiving side, values must be equal to or greater than the values for the transmit side for fast-transmission rates. These settings are suggested for connecting to a PSAX system from a remote site only. The PSAX system configures these settings internally in its own ATM switch. For more information, see the Application Note entitled <i>Connecting a CBX or GX Switch to a Packet-Star® PSAX Multiservice Media Gateway Via an ATM Port, Issue 2, Document No. 255-700-236</i> . |
| VI Support | Default: Enabled Range: N/A Format: Predefined alphanumeric | Specifies whether virtual interfaces are supported on this interface. Virtual interfaces connect to a module's physical ports and allow virtual channels (VCs) to be assigned to virtual trunks, each with its own priority queue. This option is available only on the following modules: <ul style="list-style-type: none"> • OC3-c APS MM/SM • STM-1 MSP MM/SM • OC-12c/STM-4c MM/SM 1+1 APS/MSP |
| | Enabled | Indicates that VI support is enabled on this interface, providing bandwidth allocation restrictions. Note: To configure a virtual interface, you must select Enabled . See the section, "Configuring Virtual Interfaces," in this chapter. Note: Do not enable the UPC Support field and the Traffic Shaping field at the same time. Your interface configuration will be rejected. However, UPC Support and VI Support are compatible configuration settings. |
| | Disabled | Indicates that VI support is disabled on this interface. |
| [Admin Status] (display only) | Default: OutOfService Range: N/A Format: Predefined alphanumeric | Displays the administrative status of the interface. |
| | OutOfService | Indicates that the interface is out of service. |
| | InService | Indicates that the interface is in service. |

Chapter 4 Configuring the Interfaces Using the Console Interface

Managing ATM UNI Interfaces

Table 4-20. Field Descriptions for the ATM UNI Interface Configuration Window

| Field Name | Field Values | Description |
|---|--|--|
| [Oper Status] (display only) | Default: Unconfigured Range: N/A Format: Predefined alphanumeric | Displays the operational status of the interface. |
| | Unconfigured | Indicates that this interface has not been configured. |
| | InService | Indicates that the interface is operational. |
| | OutOfService | Indicates that the interface is not operational. |
| [Ingress Avail BW] (cps) (display only) | Default: 0 Range: 0-353207 Format: Predefined alphanumeric | This represents the total ingress bandwidth available for virtual interfaces. The value 0 changes to 353207 after you select the Apply command. As each new virtual interface is created, the amount of available bandwidth as indicated in this field decreases. |
| [Egress Avail BW] (cps) (display only) | Default: 0 Range: 0-353207 Format: Predefined alphanumeric | This represents the total egress bandwidth available for virtual interfaces. The value 0 changes to 353207 after you select the Apply command. As each new virtual interface is created, the amount of available bandwidth as indicated in this field decreases. |
| Traffic Shaping | Default: Disabled Range: N/A Format: Predefined alphanumeric | An input cell selection algorithm (leaky bucket) that smooths bursts of input traffic. Available on these modules: <ul style="list-style-type: none"> • STM-1 Multi-Mode and Single-Mode, • OC-3c Multi-Mode and Single-Mode. • OC-12c/STM-4c) |
| | Disabled | Disables the feature. |
| | Enabled | Enables the feature. Note: This field must be set to Enabled if using rate shaping on the OC-3c APS or the STM-1 MSP modules prior to egress from an ATM trunk port. Rate Shaping is not available on the OC-12c/STM-4c APS/MSP module. Note: Do not enable Traffic Shaping and UPC Support at the same time. Your interface configuration will be rejected. |

Bringing One or More ATM UNI Interfaces into Service

Before you can configure a connection using an ATM UNI interface, you must first bring an ATM UNI interface into service. You can do this task from several different windows. To bring one or more interfaces into service, perform the step in the following procedure.

Viewing the Parameters for an ATM UNI Interface

To view a previously configured ATM UNI interface, perform the steps in the following procedure. You should always view an interface and determine whether you have chosen the correct one before you perform any of the procedures in step 3 below.

Begin

- 1 On the Equipment Configuration window, select the module for which you want to view the interface parameters.

The module configuration window or the port and channel configuration window for the module is displayed.

- 2 On the module's port and channel configuration window or the channel configuration window, select the channel and then select the **Configure Interface** command.

The ATM UNI Interface Configuration window displaying the parameters for the port and channel you selected is displayed.

- 3 Proceed to one of the following sections, as needed:

- Bringing One or More ATM UNI Interfaces into Service
- Taking One or More ATM UNI Interfaces out of Service
- Deleting One or More ATM UNI Interfaces

End

Viewing ATM UNI Interface Statistics

To view the statistics for a configured ATM UNI interface, perform the step in the following procedure.

Begin

On the ATM UNI Interface Configuration window, select the **ATM UNI Interface Statistics** command.

The ATM UNI Interface Statistics window is displayed (see Figure 4-9). Table 4-21 describes the commands on this window. Table 4-22 describes the display-only fields on this window.

End

Chapter 4 Configuring the Interfaces Using the Console Interface

Managing ATM UNI Interfaces

```
ATM UNI Interface Statistics [Your Site Name]
-----
[Valid Cells Rcvd]..... 0.0000 e0
[Errored Cells Rcvd].... 0000000000
[Mismatched Cells Rcvd].. 0000000000
[Valid Cells Sent]..... 0.0000 e0
[Null Cells Sent]..... 0.0000 e0

[Time Elapsed]..... 0:00:00

Continuous Update
Reset Statistics          Go Back to previous screen ->
-----
Press RETURN to update the statistics once every second.
```

Figure 4-9. ATM UNI Interface Statistics Window

Commands

The commands on this window have the following functions:

Table 4-21. Commands for the ATM UNI Interface Statistics Window

| Command | Function |
|-----------------------------------|--|
| Continuous Update | Continuously updates all fields once every second. |
| Reset Statistics | Resets statistics counters for this interface. |
| Go Back to previous screen | Redisplays the ATM UNI Interface Configuration window. |

Field Descriptions

The display-only fields on this window are described on the table below.

Table 4-22. Field Descriptions for the ATM PNNI Interface Statistics Window

| Field Name | Field Values | Description |
|-------------------------|--|---|
| [Valid Cells Rcvd] | Default: 0.0000 e0 Range: 0-(2 ³¹ -1) Format: exponential notation | Specifies the number of valid cells received into interface side A during the amount of time shown in Time Elapsed field. |
| [Errored Cells Rcvd] | Default: 0000000000 Range: N/A Format: Numeric | Specifies the number of errored cells received into interface side A during the amount of time shown in Time Elapsed field. |
| [Mismatched Cells Rcvd] | Default: 0000000000 Range: N/A Format: Numeric Default: | Specifies the number of mismatched cells received into interface side A during the amount of time shown in Time Elapsed field. |
| [Valid Cells Sent] | Default: 0.0000 e0 Range: 0-(2 ³¹ -1) Format: exponential notation | Specifies the number of valid cells transmitted out of interface side B during the amount of time shown in Time Elapsed field. |
| [Null Cells Sent] | Default: 0.0000 e0 Range: 0-(2 ³¹ -1) Format: exponential notation | Specifies the number of null cells transmitted out of interface side B during the amount of time shown in Time Elapsed field. Note: This parameter is not supported in the OC-12c/STM-4c SM/MM 1+1 APS/MSP modules. |
| [Time Elapsed] | Default: 0:00:00 Range: NA Format: Time in hour (x), minutes (xx), seconds (xx) | Specifies the time elapsed since the last reset in h:mm:ss (hour: minute:seconds) format. |

Taking One or More ATM UNI Interfaces out of Service

You need to take an ATM UNI interface out of service first before you can perform the following tasks:

- Deleting an interface
- Performing diagnostic or maintenance procedures on an interface

You can do this task from several different windows. To take one or more interfaces out of service, perform the steps in the following procedure.

Begin

- 1 Depending on which type of module you are working with and which window you have currently displayed, select either the **Take Interface Out Of Service** or the **Take All Interfaces Out Of Service** command on the type of window shown in Table 4-23.

Table 4-23. Windows on Which You Can Take an ATM UNI Interface out of Service

| If the module you are working with is: | you can take one or more interfaces out of service on these windows: |
|--|--|
| an unchannelized single-port module, | <ul style="list-style-type: none"> • Port and channel configuration window • ATM UNI Interface Configuration window |
| an unchannelized multiport module, | <ul style="list-style-type: none"> • Module configuration window (all interfaces for all ports) • Port and channel configuration window • ATM UNI Interface Configuration window |
| a channelized single-port module, | <ul style="list-style-type: none"> • Port configuration window (all interfaces for all virtual ports) • Virtual port configuration window (all channel interfaces on a virtual port) • Channel configuration window (just the interface for the channel) • ATM UNI Interface Configuration window (just the interface for the channel) |
| a channelized multiport module, | <ul style="list-style-type: none"> • Module configuration window (all interfaces for all ports) • Port and channel configuration window (all channel interfaces on a port) • Channel configuration window (just the interface for the channel) • ATM UNI Interface Configuration window (just the interface for the channel) |

The following prompt is displayed:

```
Take the interface down Although Not Operational. Continue?
(y/n)
```

- 2 Type y to continue.

The value **OutOfService** is now displayed in the [Admin Status] and the [Oper Status] fields. If a connection is already configured for this interface, the traffic flow is stopped. To resume traffic on the connection using this interface, you must bring the interface back into service (see the section, “Bringing One or More ATM UNI Interfaces into Service”).

End

Deleting One or More ATM UNI Interfaces

You need to delete an ATM UNI interface before you can replace an interface for a specified port and channel.

Note: Before you can delete an ATM UNI interface, you must first take the interface out of service. See the section, “Taking One or More ATM UNI Interfaces out of Service.”

You can do this task from several different windows. To delete one or more ATM UNI interfaces, perform the steps in the following procedure.

Begin

- 1 Depending on which module you are working with and which window you have currently displayed, select one of the following deletion commands on the type of window shown in Table 4-24:

- **Delete All Interfaces**
- **Delete All Interfaces On This Port**
- **Delete Interface and Return**

Table 4-24. Windows on Which You Can Delete One or More ATM UNI Interfaces

| If the module you are working with is: | you can delete one or more interfaces on these windows: |
|--|--|
| an unchannelized single-port module, | <ul style="list-style-type: none"> • Port and channel configuration window <p>Note: On this window for this type of module, you delete a single interface by selecting Unconfigured in the Interface Type field.</p> <ul style="list-style-type: none"> • ATM UNI Interface Configuration window (deletes the interface for a single channel) |
| an unchannelized multiport module, | <ul style="list-style-type: none"> • Module configuration window (all interfaces for all ports) • Port and channel configuration window <p>Note: On this window for this type of module, you delete a single interface by selecting Unconfigured in the Interface Type field.</p> <ul style="list-style-type: none"> • ATM UNI Interface Configuration window (deletes the interface for a single channel) |
| a channelized single-port module, | <ul style="list-style-type: none"> • Port configuration window (all interfaces for all virtual DS1 ports) • Virtual port configuration window (all channel interfaces on a virtual port) • Channel configuration window <p>Note: On this window for this type of module, you delete a single interface by selecting Unconfigured in the Interface Type field.</p> <ul style="list-style-type: none"> • ATM UNI Interface Configuration window (deletes the interface for a single channel) |
| a channelized multiport module, | <ul style="list-style-type: none"> • Module configuration window (all interfaces for all ports) • Port and channel configuration window (all interfaces on one port) • Channel configuration window <p>Note: On this window for this type of module, you delete a single interface by selecting Unconfigured in the Interface Type field.</p> <ul style="list-style-type: none"> • ATM UNI Interface Configuration window (deletes the interface for a single channel) |
| | |

Depending on which module you are working with and which window you have currently displayed, a prompt similar to one of the following is displayed:

```
Delete interface: all connections for channel will be lost.  
Continue? (y/n)
```

```
Are you SURE that you want to delete ALL interfaces for this  
card? (y/n)
```

- 2 Type y to continue.

The interface is deleted, and any connections provisioned using the interface you just deleted are also automatically deleted.

End

Modifying an ATM UNI Interface

After you have configured an ATM UNI interface for a specified port and channel, you cannot directly change the parameters for this interface even if it is out of service. The concept for “modifying” (replacing) an ATM UNI interface is that you delete the interface with the parameters you no longer want for a specified port and channel, and then configure a new interface for the same port and channel. Perform the following procedures in the sequence shown to replace an ATM UNI interface that has parameters you do not want.

Begin

- 1 On the Equipment Configuration window, select the module for which you want to replace an interface.
- 2 Select the port and channel for the interface you want to replace.
- 3 View the parameters of the interface you do not want to be sure you are choosing the right one. See the procedure in the section, “Viewing the Parameters for an ATM UNI Interface.”
- 4 Take the interface out of service. See the procedure in the section, “Taking One or More ATM UNI Interfaces out of Service.”
Note: After you perform this procedure, the traffic flow on the connection using the interface is stopped.
- 5 Delete the interface. See the procedure in the section, “Deleting One or More ATM UNI Interfaces.”
Note: After you perform this procedure, the connection using the interface is automatically deleted from the Connections database.
- 6 Configure a new interface. See the procedure in the section, “Configuring an ATM UNI Interface.”
- 7 Bring the newly configured interface into service. See the procedure in the section, “Bringing One or More ATM UNI interfaces into Service.”

Note: You now need to provision a new connection using the newly configured interface for the same specified port and channel for which you deleted the original interface (and connection). (See the *PacketStar PSAX System Connections Provisioning Guide* for more information.)

End

Provisioning Connections

For instructions on configuring connections, see your *PacketStar® PSAX System Provisioning Connections User Guide for PacketStar® PSAX Multiservice Media Gateways 255-700-377*. In using that guide, keep in mind that the following connection types are supported by the 6-Port E1 IMA module:

- PVC connections:
 - ~ ATM-to-ATM virtual channel connection (VCC)
 - ~ ATM-to-ATM virtual path connection (VPC)
 - ~ Bridge-to-ATM virtual channel connection (VCC) (z)
 - ~ Circuit Emulation-to-ATM virtual channel connection (VCC)
 - ~ Variable bit rate (VBR)-to-ATM virtual channel connection (VCC)
 - ~ AAL2 Trunk Connection (w)
- SVC connections:
 - ~ ATM-to-ATM virtual channel connection VCC (n)
 - ~ ATM IISP CBR connection
 - ~ ATM IISP VBR connection
- SPVC connections:
 - ~ ATM-to-ATM virtual channel connection (VCC) (z)
 - ~ Circuit Emulation-to-ATM virtual channel connection (VCC) (y)
 - ~ Circuit Emulation-to-ATM Std AAL2 virtual channel connection (VCC)
 - ~ Variable bit rate (VBR)-to-ATM virtual channel connection (VCC) (w)

Part 3: AQueView EMS Operation

5 Configuring Ports and Channels Using the *AQueView*[®] EMS



Overview of This Chapter

This chapter describes how to use the *AQueView* EMS to perform the following tasks:

- Setting the values for the port and channel configuration of the 6-Port E1 IMA module
- Creating IMA groups
- Saving the module configuration and logging off

Before You Begin

Be sure to complete the following tasks first before configuring the 6-Port E1 IMA module:

- *Navis*[™] *AQueView*[®] *Element Management System User Guide*.
- Set the values to configure your PSAX device (see the appropriate *Navis*[™] *AQueView*[®] *Element Management System User Guide*).
- Set the values to configure the Stratum 3–4 module (see the appropriate *Navis*[™] *AQueView*[®] *Element Management System User Guide*).

When configuring the 6-Port E1 IMA module using the *AQueView* EMS, display-only fields are displayed as “ghosted,” or gray.

Loopback Configuration Options

To aid network troubleshooting and testing, loopback capability is provided for the 6-Port E1 IMA module. The loopback option on the module port and channel configuration window for the module enables you to verify the integrity of a port by transmitting a received signal back to the source. Selecting a loopback option is described in Chapter 3.

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

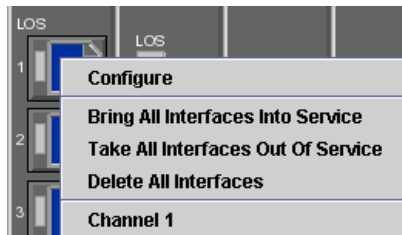


Figure 5-1. Sample Port Configuration (Displaying Right-Click Menu)

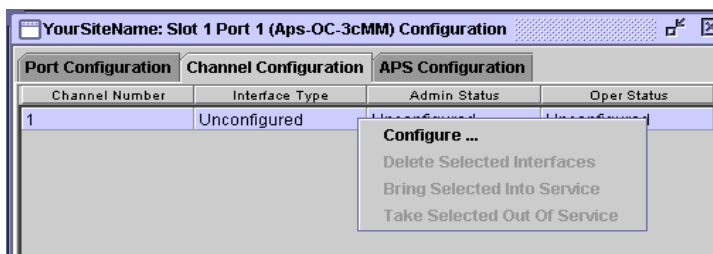


Figure 5-2. Sample Channel Configuration (Displaying Right-Click Menu)

Table 5-1.

| Option | Function |
|---|--|
| Configure | Opens the port and channel configuration window of a module. |
| Bring All Interfaces Into Service | Sets all configured interfaces on a channel administratively into service. |
| Take All Interfaces Out of Service | Takes all configured interfaces on a channel administratively out of service. |
| Delete All Interfaces | Deletes all configured interfaces that are not in service. To delete interfaces, you must first take them administratively out of service. |
| 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 or channel configuration window, a description of that field appears (see Figure 5-3).

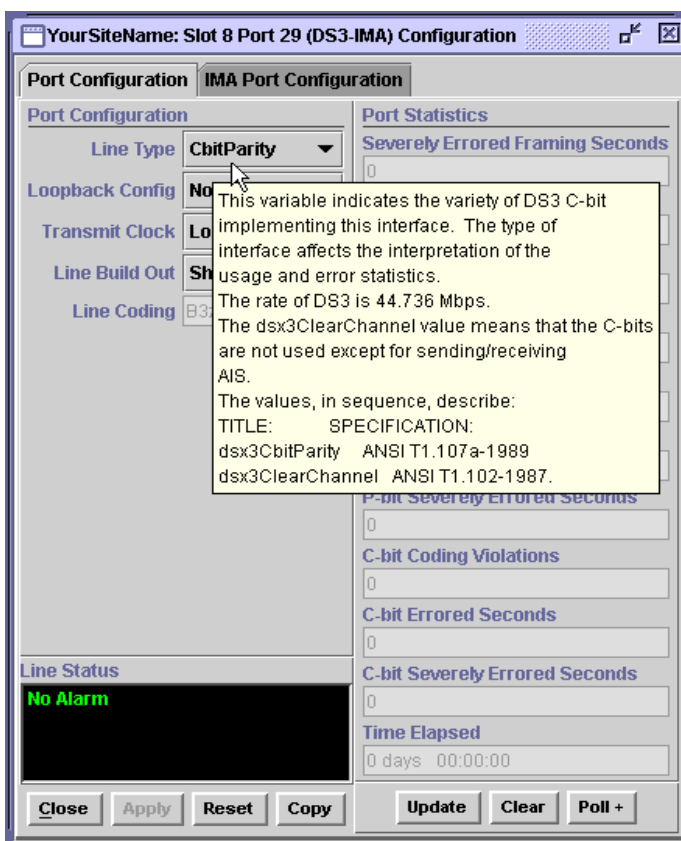


Figure 5-3. Sample of Context-Sensitive Help (Displayed on a Port and Channel Configuration Window)

Accessing Port and Channel Configuration Options

You must first configure the 6-Port E1 IMA module before you can set up connection provisioning.

Perform the steps in the following procedure to access the port and channel configuration functions in the AQueView EMS.

Begin

- 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 PSAX device that you opened appears in the Front Panel, and its components are also displayed in the Device Tree (see Figure 5-4).

End

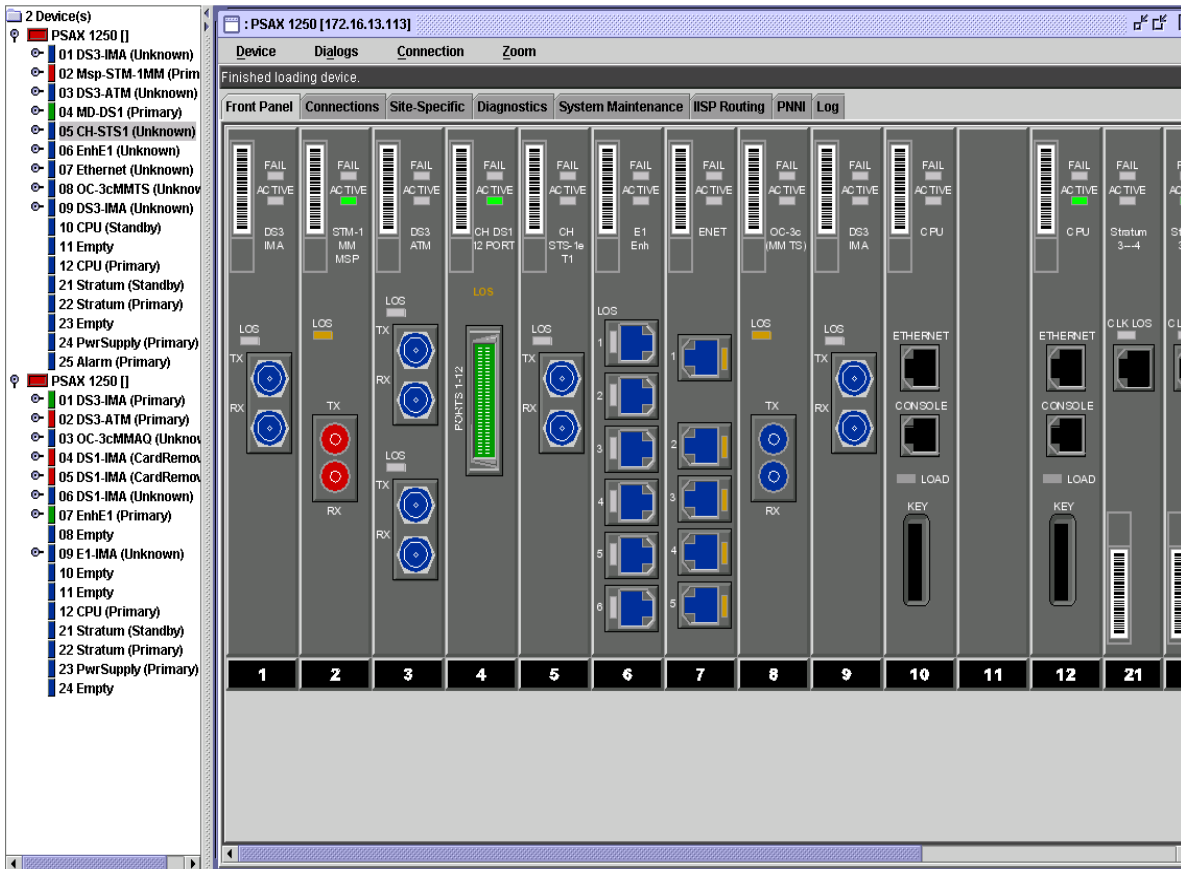


Figure 5-4. Device Tree and Device Window (Displaying a Typical Setup)

Configuring the Module

Configuration Overview

The configuration of the 6-Port E1 IMA involves the following major tasks:

1. Each port must be configured with the IMA interface, and that IMA interface must be brought into service.
2. Each IMA group must be established.
3. Each IMA group must be configured with an ATM interface (IISP, UNI, or PNNI).

Configuring the Ports

Perform the steps in the following procedure to configure ports on the 6-Port E1 IMA .

Begin

- 1 Do one of the following to open the Port and Channel Configuration window:
 - In the Front Panel, double-click the port to be viewed or configured.
 - In the Front Panel, right-click the port and a menu appears. Select Configure.
 - In the Device Tree, double-click the desired port symbol or identifier.
 - In the Device Tree, select a port, then right-click the icon for the module within Device Tree and a menu appears. Select Configure.

The E1 IMA Port and Channel Configuration window is displayed (see Figure 5-6).

- 2 Enter values for the fields on this window according to the information provided in Table 5-2.
- 3 Click **Apply**.

End



Figure 5-5. Front Panel View of the E1 IMA Module

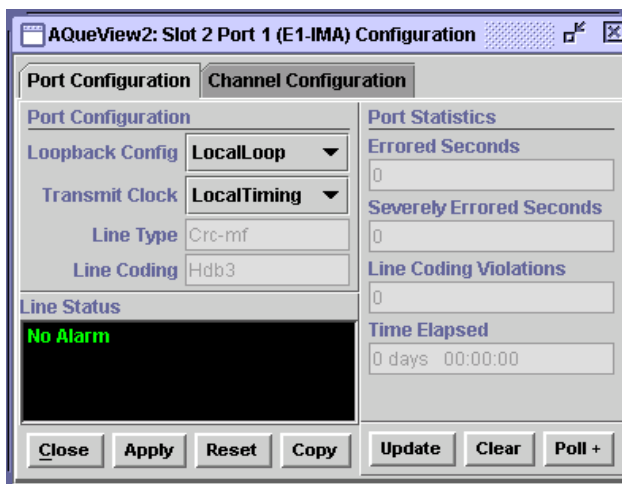


Figure 5-6. E1 IMA Port and Channel Configuration Window

The window contains:

- The Port Configuration page allows you to do the following:
 - Select and apply port settings
 - View port statistics, which display line errors and coding violations
 - View line status
- The Channel Configuration page allows you to do the following:
 - 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.

The buttons in this window have the following functions:

| Button | Function |
|-----------------------|--|
| Close | Closes this window. |
| Apply | Applies the configuration field value you set. |
| Reset | Resets the fields to the last set of applied values. |
| Copy | Copies a port configuration to a range of ports. |
| 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. |

Table 5-2. Field Descriptions for the E1 IMA Port and Channel Configuration Window

| Field Name | Values | Description |
|-------------------------------|----------------------|--|
| Loopback | Default: NoLoop | The port is not in 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 | Local clock source is used as the timing source. |
| | LoopTiming | Recovered receive clock is used as the transmit clock |
| | Adaptive Timing | Monitors the port buffers to increase or decrease the transmission rate. |
| Line Type (display only) | CRC-MF (default) | Indicates the framing mode is cyclic redundancy multi-frame format. |
| Line Coding (display only) | Hdb3 (default) | High-density bipolar of order 3. A bipolar coding method that does not allow more than 3 consecutive zeros. |
| | Ami | Alternate mark inversion. Indicates zero code suppression. |

Table 5-2. Field Descriptions for the E1 IMA Port and Channel Configuration Window

| Field Name | Values | Description |
|--|-------------------|---|
| 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 module under the MIB object lineStatus in Appendix A, "SNMP Trap Messages" in any <i>PacketStar PSAX Multiservice Media Gateway User Guide</i> . |
| | 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. |
| Interface Type (is displayed on the Channel Configuration page) | Unconfigured | This interface is not configured |
| | Ima | This interface is configured as an IMA interface. |

Viewing Port Statistics

You can view E1 IMA port statistics from the Port Statistics panel on the E1 IMA Port Configuration window (see Figure 5-6 on page 5-6).

Descriptions of the data fields for the E1 IMA Port Statistics window are given in the following table.

Table 5-3. Field Descriptions of the E1 IMA Port Statistics Window

| Field Names | Field Values | Description |
|--------------------------|---|--|
| Errored Seconds | Default: 0 Range: N/A Format: numeric | A second with at least one of the following: <ul style="list-style-type: none"> • Path Code Violations • Controlled Slip events • A detected AIS defect • Presence of Bipolar Violations. |
| Severely Errored Seconds | Default: 0 Range: N/A Format: numeric | A second with at least one of the following: <ul style="list-style-type: none"> • 320 or more Path Code Violation Error events • Out of Frame defects • A detected AIS defect • A count of one-second intervals with Framing error events, an OOF defect, or a minimum of 1544 LCVs. |
| Line Coding Violations | Default: 0 Range: N/A Format: numeric | A Bipolar Violation or Excessive Zeroes Error Event has occurred. |
| Time Elapsed | Default: 00:00:00 Range: N/A Format: numeric | Time elapsed since last reset. |

Configuring Channels

Applying an Interface to a Channel Perform the steps in the following procedure to configure channels on the 6-Port E1 IMA .

Begin

- 1 Click the Channel Configuration tab.

The Channel Configuration page appears (see Figure 5-7).

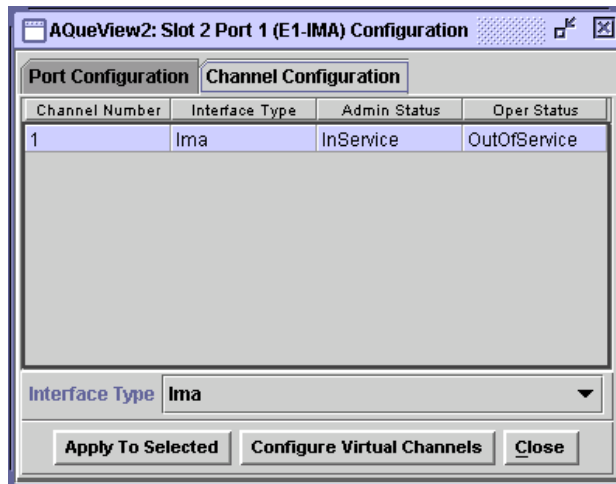


Figure 5-7. Channel Configuration Page

The buttons in this window have the following functions:

| Button | Function |
|-----------------------------------|--|
| Apply to Selected | Applies the configuration field value you set. |
| Configure Virtual Channels | Displays the E1 IMA Virtual Channel Configuration window (see Figure 5-8). |
| Close | Closes this window. |

- 2 In the Channel Configuration page, click the Interface Type field and select an ATM interface from the list. Click **Apply to Selected**.
- 3 On the Channel Configuration window, click **Apply to Selected**.

Note: You must bring the interface into service before you can set up E1 IMA groups.

End

Configuring an Interface

For a list of valid interface types for the 6-Port E1 IMA module, instructions on configuring interfaces, and instructions on changing an interface configuration, see Chapter 6.

IMA Virtual Channels

You can set up E1 IMA virtual channels on the 6-Port E1 IMA . You can configure up to three IMA channels for each module, and each channel can contain up to six ports.

Up to three channels can be configured on the virtual port (port 7). A group must have at least two, and up to six of the physical ports assigned to it. For example:

- ~ You can assign all six of the physical ports to channel 1
- ~ You can assign ports 1, 3, 5 to channel 1, and ports 2, 4, and 6 to channel 2, and so on

Perform the steps in the following procedure to set up the E1 IMA virtual channels.

Configuring Virtual Channel

Begin

- 1 Do one of the following to open the Port and Channel Configuration window:
 - In the Front Panel, double-click the port to be viewed or configured.
 - In the Front Panel, right-click the port and a menu appears. Select **Configure**.
 - In the Device Tree, double-click the desired port symbol or identifier.
 - In the Device Tree, select a port, then right-click the icon for the module within Device Tree and a menu appears. Select **Configure**.
- 2 Click **Configure Virtual Channels**.

The IMA Virtual Channel Configuration window appears (see Figure 5-8).
- 3 Enter values for the fields on this window according to the information provided in Table 5-4.
- 4 Click **Apply to Selected > Close**.
- 5 Select the channel to be configured in the E1 IMA Virtual Channel Configuration window.
- 6 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, and select an ATM interface from the list (ATM PNNI, ATM UNI, or ATM IISP). Click **Apply to Selected**.

Note: The interface cannot be configured until after the port groups have been selected and applied to the virtual channel.

Note: You can double-click in the channel in the list 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 list, the Interface Configuration window appears.

End

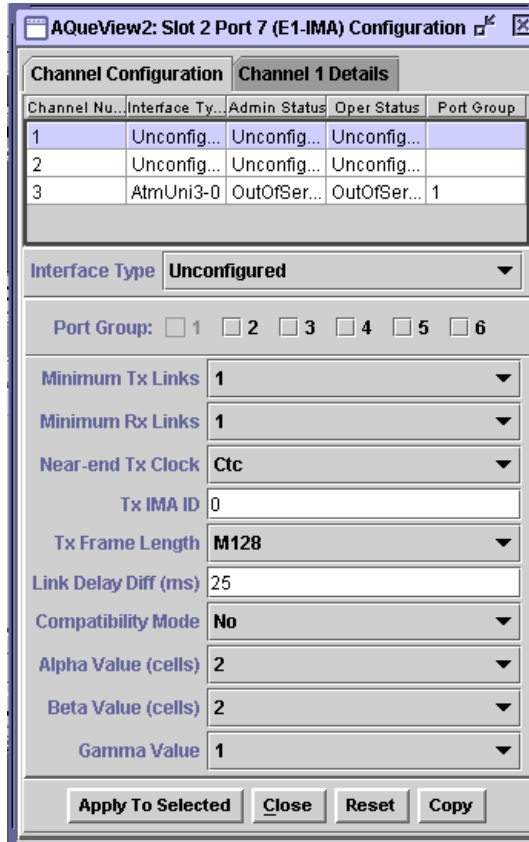


Figure 5-8. IMA Virtual Channel Configuration Window

Table 5-4. Field Descriptions for the IMA Virtual Channel Configuration Page

| Field Name | Field Values | Description |
|------------------|--|--|
| Interface Type | Default: Unconfigured Range: N/A Format: predefined alphanumeric | Interface types can be configured only if ports exist in the group. |
| | Unconfigured | The interface for this channel is not configured. |
| | AtmUni3-0 | This interface is configured for ATM UNI 3.0 interface. |
| | AtmUni3-1 | This interface is configured for ATM UNI 3.1 interface. |
| | AtmUni4-0 | This interface is configured for ATM UNI 4.0 interface. |
| | IispUser | This interface is configured for ATM IISP user interface. |
| | IispNetwork | This interface is configured for ATM IISP network interface. |
| | AtmPnni1-0 | This interface is configured for ATM PNNI 1.0 interface. |
| Port Group | Default: N/A Range: 1-6 Format: numeric | Displays the ports which are configured to be in the current IMA virtual channel. If this field is blank, it shows that no port groups are assigned to this virtual channel. Port groups that are available are highlighted, and ports that are unavailable are gray. IMA ports must be configured and in service before they can be in a group. |
| Minimum Tx Links | Default: 1 Range: 1-6 Format: numeric | Indicates the minimum number of transmit links required to be active for the IMA group to be in the Up state. |
| Minimum Rx Links | Default: 1 Range: 1-6 Format: numeric | Indicates the minimum number of receive links required to be active for the IMA group to be in the Up state. |

Table 5-4. Field Descriptions for the IMA Virtual Channel Configuration Page

| Field Name | Field Values | Description |
|----------------------|---|---|
| Near-end Tx Clock | Default: Ctc Range: N/A Format: predefined alphanumeric | Indicates the transmit clocking mode used by the near-end IMA group. |
| | Ctc | Specifies that the Common Transmit Clock (CTC) mode will be used by the near-end IMA group. Select this value only if the transmit clock of all IMA links in this group will be derived from the same source. You must set up the underlying clock configuration to ensure operation in the selected mode. |
| | Itc | Specifies that the Independent Transmit Clock (ITC) mode will be used by the near-end IMA group. Select this value only if there will be at least one IMA link in this group whose transmit clock will be derived from a source that is different from at least one other link transmit clock. The ITC mode allows links to have different clock sources but does not require it. |
| Tx IMA ID | Default: N/A Range: 0-255 Format: numeric | Indicates the IMA identifier to be used by the far-end IMA function. The Tx IMA Id is an identifier used to distinguish this IMA group from other IMA groups in a connection. Choose a unique value; it does not have to be the same as that of the far-end IMA group. |
| Tx Frame Length | Default: M128 Range: N/A Format: predefined alphanumeric | Indicates the frame length to be used by the IMA group in the transmit direction. This can be set only when the IMA group is configured. The frame length is the number of cells in each IMA frame. Use the smaller number (e.g. m32) to send more IMA frames and use the larger number (e.g. m256) to send fewer IMA frames. Smaller frames handle errors more quickly, but the larger frames result in less overhead. |
| | M32 | The frame length is M32 cells. |
| | M64 | The frame length is M64 cells. |
| | M128 | The frame length is M128 cells. |
| | M256 | The frame length is M256 cells. |
| Link Delay Diff (ms) | Default: 25 Range: 1-200 Format: numeric (ms) | Indicates the maximum number of milliseconds of delay differential among the links that will be tolerated. |

Table 5-4. Field Descriptions for the IMA Virtual Channel Configuration Page

| Field Name | Field Values | Description |
|---------------------|---|--|
| Compatibility Mode | Default: No Range: N/A Format: predefined alphanumeric | Allows the near-end IMA group to receive the link status at the correct location in the IMA control protocol (ICP) cell from the far-end IMA group. This mode must be set correctly when connected to ATM IMA Specification Version 1.0 equipment. Compatibility mode must be enabled when connected to equipment following the alternate link state reporting mechanism described in Appendix C.8.1 of <i>Inverse Multiplexing for ATM Version 1.1</i> , af-phy-0086.001. |
| | No | Disables compatibility mode. |
| | Yes | Enables compatibility mode. |
| Alpha Value (cells) | Default: 2 Range: 1-2 Format: numeric | Indicates the alpha value used to specify the number of consecutive invalid IMA control protocol (ICP) cells to be detected before moving to the IMA HUNT state. The smaller the value, the faster the IMA link will go into a loss of IMA frame (LIF) failure state. |
| Beta Value (cells) | Default: 2 Range: 1-5 Format: numeric | Indicates the beta value used to specify the number of consecutive errored ICP cells to be detected before moving to the IMA HUNT state. The smaller the value, the faster the IMA link will go into an LIF failure state. |
| Gamma Value | Default: 1 Range: 1-5 Format: numeric | Indicates the gamma value used to specify the number of consecutive valid ICP cells to be detected before moving from the IMA PRESYNC state to the IMA SYNC state. The smaller the value, the faster the IMA link will recover from an LIF error. |

Table 5-4. Field Descriptions for the IMA Virtual Channel Configuration Page

| Field Name | Field Values | Description |
|----------------------------------|---|---|
| Near-end State (display only) | Default: Not Configured Range: N/A Format: predefined alphanumeric | Displays the current operational state of the near-end IMA group state machine. |
| | NotConfigured | The group does not exist. |
| | StartUp | The near end is in start-up and is waiting to receive the indication that the far end is in start-up. |
| | StartUpAck | When both groups start up, they move through this transitional state to the Insufficient-Links state. While in this state, indications from the near-end that it is in start-up are ignored. |
| | CfgAbt | Configuration aborted. This state is entered when the near-end tries to use the following unacceptable configuration parameters (remaining fields below). |
| | UnsupportedM | Unsupported value of M (M = frame length). |
| | CfgAbtInc Symmetry | Incompatible group symmetry. |
| | CfgAbtOther | Configuration aborted for other reasons. |
| | Insufficient Links | This state implies that the group has accepted the near-end group parameters and that the near end has also accepted its own group parameters, but does not have sufficient links to move into the Operational state. |
| | Blocked | The group is blocked (e.g., inhibited by Unit Management (UM)). The group can be blocked for maintenance purposes while sufficient links are Active in both directions. The PSAX group is blocked when it is administratively out of service. |
| Operational | The group is operational and in the Up state. The group is not inhibited and has sufficient links in both the Tx and Rx directions. The IMA interface now has the capability to receive ATM layer cells and pass them from the IMA sublayer to the ATM layer. | |

Table 5-4. Field Descriptions for the IMA Virtual Channel Configuration Page

| Field Name | Field Values | Description |
|---------------------------------|---|--|
| Far-end State (display only) | Default: NotConfigured Range: N/A Format: predefined alphanumeric | Displays the current operational state of the far end IMA group state machine. |
| | NotConfigured | The group does not exist. |
| | StartUp | The far end is in start-up and is waiting to receive the indication that the near end is in start-up. |
| | StartUpAck | When both groups start up, they move through this transitional state to the Insufficient-Links state. While in this state, indications from the near end that it is in start-up are ignored. |
| | CfgAbt | Configuration aborted. This state is entered when the far-end tries to use the following unacceptable configuration parameters (remaining fields below). |
| | UnsupportedM | Unsupported value of M (M = frame length). |
| | CfgAbtInc Symmetry | Incompatible group symmetry. |
| | CfgAbtOther | Configuration aborted for other reasons. |
| | InsufficientLinks | This state implies that the group has accepted the far-end group parameters and that the far-end has also accepted its own group parameters, but does not have sufficient links to move into the Operational state. |
| | Blocked | The group is blocked (e.g., inhibited by Unit Management (UM)). The group can be blocked for maintenance purposes while sufficient links are Active in both directions. |
| Operational | The group is operational and in the Up state. The group is not inhibited and has sufficient links in both the Tx and Rx directions. The IMA interface now has the capability to receive ATM layer cells and pass them from the IMA sublayer to the ATM layer. | |

Table 5-4. Field Descriptions for the IMA Virtual Channel Configuration Page

| Field Name | Field Values | Description |
|----------------------------------|--|---|
| Failure Status (display only) | Default: NoFailure Range: N/A Format: predefined alphanumeric | Displays the current failure status of the IMA group (the reason why the group state machine is in the down state; either the near end or the far end is not operational). See the Near-end State and Far-end State field values above. |
| | NoFailure | The IMA group state machine is operational and in the up state. |
| | StartUpNe | The near end is in the start-up state. |
| | StartUpFe | The far end is in the start-up state. |
| | InvalidMValueNe | The near end has received an invalid M value (M = frame length). |
| | InvalidMValueFe | The far end has received an invalid M value (M = frame length). |
| | FailedAsymmetricNe | The near end is reporting that the far end is requesting a group symmetry that the near end does not support. |
| | FailedAsymmetricFe | The far end is not accepting near end symmetry. |
| | InsuffLinksNe | The near end does not have sufficient links to move into the Operational state. |
| | InsuffLinksFe | The far end does not have sufficient links to move into the Operational state. |
| | BlockedNe | The group is blocked at the near end. |
| | BlockedFe | The group is blocked at the far end. |
| OtherFailure | The group has failed for other reasons. | |
| Group Symmetry (display only) | Default: SymOperation Range: N/A/ Format: predefined alphanumeric | Displays the mode that allows symmetric or asymmetric cell rate transfer over the IMA virtual link. |
| | SymOperation | The IMA group is only required to carry ATM layer cells on physical links in which the IMA links in both the transmit and receive directions are Active. |
| | AsymOperation | The IMA group is allowed to carry ATM traffic over the physical links on which the IMA links in both the transmit and receive directions are not Active at the same time. |
| | AsymConfiguration | The IMA group is not required to configure IMA links in both directions of the physical links used by the IMA unit. |

Viewing Channel Details

Perform the steps in the following procedure to view channel details for the 6-Port E1 IMA .

Begin

- 1 On the IMA Virtual Channel Configuration window, click the Channel 1 Details tab (or whichever channel number of which you wish to view statistics).

The Channel 1 Details page appears (see Figure 5-9). The field values for this window are described in Table 5-5.

- 2 In the Channel Details page, click **Close**.

End

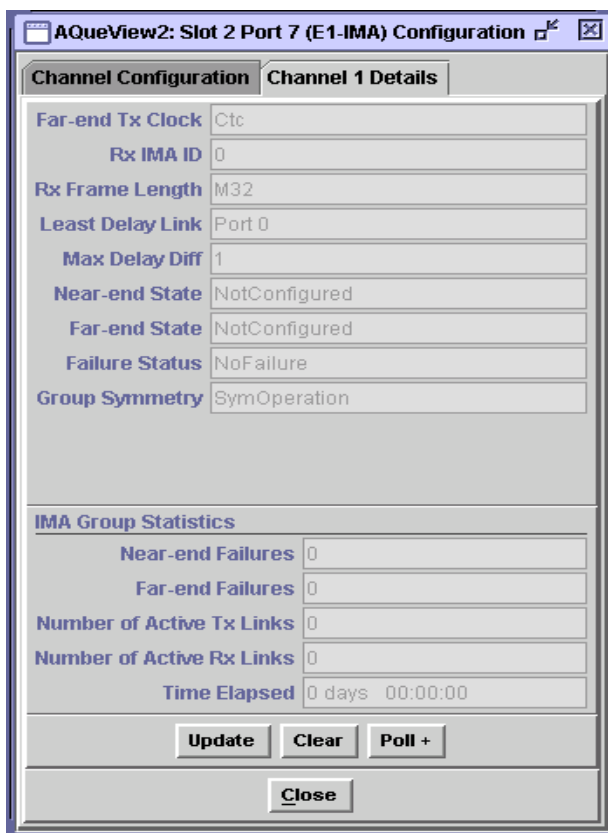


Figure 5-9. E1 IMA Channel Details Window

The buttons in this window have the following functions:

| Button | 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. |
| Close | Closes this window. |

Table 5-5. Field Descriptions for the IMA Channel Details Page

| Field Name | Values | Description |
|------------------------------------|---------------------------------------|---|
| Far-end Tx Clock (display only) | Default: Ctc Itc | Transmit clocking mode used by the far-end IMA group. There are two possible modes: the Common Transmit Clock (CTC) and the Independent Transmit Clock (ITC). The CTC mode corresponds to the case when the transmit clock of all IMA links are derived from the same source. The ITC configuration corresponds to the case where there is at least one IMA link whose transmit clock is derived from a source different than at least another link transmit clock. |
| Rx IMA ID (display only) | Default: 0 Range: 0-255 | The IMA ID currently in use by the far-end IMA function. |
| Rx Frame Length (display only) | Default: M32 m64, m128, m256 | Value of IMA frame length as received from remote IMA function. |
| Least Delay Link (display only) | Default: Port 0 | The interface index of the link configured in the IMA group which has the smallest link propagation delay. This value has meaning only if at least 1 link has been configured in the IMA group. |
| Max Delay Diff (display only) | Default: 1 | Maximum delay differential. The maximum number of milliseconds of delay differential among the links that will be tolerated on this interface. |

Table 5-5. Field Descriptions for the IMA Channel Details Page

| Field Name | Values | Description |
|----------------------------------|---------------------------|---|
| Near-end State (display only) | | The current operational state of the near-end IMA group state machine. |
| | Default: NotConfigured | The group does not exist. |
| | StartUp | This end is in start-up and is waiting to receive the indications that the Far-end is in start-up. |
| | StartUpAck | When both groups start up, they move through this transitional state to the Insufficient-Links state. While in this state, indications from the near-end that it is in start-up are ignored. |
| | CfgAbt | Configuration aborted. This state is entered when the near-end tries to use the following unacceptable configuration parameters. <ul style="list-style-type: none"> • UnsupportedM: Unsupported value of M • CfgAbtInc Symmetry: Incompatible group symmetry • CfgAbtOther: Other reasons |
| | Insufficient Links | This state implies that the group has accepted the near-end group parameters and that the near-end has also accepted its own group parameters, and does not have sufficient links to move into the Operational state. This state is excited when “sufficient links” can be moved into the Active state. |
| | Blocked | The group is blocked (e.g., inhibited by the UM). The group can be blocked for maintenance purposes while sufficient links are Active in both directions. The group is not inhibited and has sufficient links in both the Tx and Rx directions. The IMA interface has now the capability to receive ATM layer cells and pass them from the IMA sublayer to the ATM layer. |
| Operational | The group is operational. | |

Table 5-5. Field Descriptions for the IMA Channel Details Page

| Field Name | Values | Description |
|---------------------------------|---------------------------|--|
| Far-end State (display only) | Default: NotConfigured | The current operational state of the near-end IMA group state machine. The group does not exist. |
| | StartUp | This end is in start-up and is waiting to receive the indications that the near-end is in start-up. |
| | StartUpAck | When both groups start up, they move through this transitional state to the Insufficient-Links state. While in this state, indications from the near-end that it is in start-up are ignored. |
| | CfgAbt | Configuration aborted. This state is entered when the near-end tries to use the following unacceptable configuration parameters . <ul style="list-style-type: none"> • UnsupportedM: Unsupported value of M • CfgAbtInc Symmetry: Incompatible group symmetry • CfgAbtOther: Other reasons |
| | Insufficient Links | This state implies that the group has accepted the far-end group parameters and that the far-end has also accepted its own group parameters, and does not have sufficient links to move into the Operational state. This state is excited whe “sufficient links” can be moved into the Active state. |
| | Blocked | The group is blocked (e.g., inhibited by the UM). The group can be blocked for maintenance purposes while sufficient links are Active in both directions. The group is not inhibited and has sufficient links in both the Tx and Rx directions. The IMA interface has now the capability to receive ATM layer cells and pass them from the IMA sublayer to the ATM layer. |
| | Operational | The group is operational. |

Table 5-5. Field Descriptions for the IMA Channel Details Page

| Field Name | Values | Description |
|--|-----------------------------|---|
| Failure Status (display only) | | The current failure status of the IMA group (the reason why the group state machine is in the down state). See the operational state values for Near-end State and Far-end State above. |
| | Default: NoFailure | |
| | StartUpNe | |
| | StartUpFe | |
| | InvalidM ValueNe | |
| | InvalidM ValueFe | |
| | Failed AssymmetricNe | |
| | Failed AssymmetricFe | |
| | InsuffLinksNe | |
| | InsuffLinksFe | |
| | BlockedNe | |
| | BlockedFe | |
| OtherFailure | | |
| Group Symmetry (display only) | | Symmetry of the IMA group. |
| | Default: Sym- Operation | Symmetric operation. |
| | AsymOperation | Asymmetric operation. |
| | AsymConfigura- tion | Asymmetric configuration. |
| IMA Group Statistics panel (display only): | | |
| Near-end Fail- ures | Default: 0 | Count of near end Rx failure alarm conditions has been entered on this link. |
| Far-end Fail- ures | Default: 0 | Count of far end Rx failure alarm conditions has been entered on this link. |
| Number of Active Tx Links | Default: 0 Range 1-32 | Minimum number of transmit links required to be Active for the IMA group to be in the Up state. |
| Number of Active Rx Links | Default: 0 Range 1-32 | Minimum number of receive links required to be Active for the IMA group to be in the Up state. |
| Time Elapsed | Default: 0 days 00:00:00 | Time elapsed, in days, hours, minutes, and seconds, since last reset. |

Configuring Interfaces

For a list of valid interface types for the 6-Port E1 IMA module, instructions on configuring interfaces, and instructions on changing an interface configuration, see Chapter 6.

Provisioning Connections

To provision connections for this module, refer to the *PacketStar PSAX System Connections Provisioning Guide*, which is provided on the *PacketStar PSAX Product Information Library CD-ROM*.

Copying a Port Configuration

The **Copy** button on the Port and Channel Configuration window of each I/O module allows you to copy a port configuration to a range of ports, either from a given module, or for a range of modules¹.

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. This procedure is optional.

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 5-10).

- 2 Select the range of slots and ports to which you wish the port configuration to be copied as follows (refer to Figure 5-11):

In the Start At panel, choose the slot and port where the copying should begin. In the Stop At panel, choose the slot and port where the copying should end.

- 3 To copy the associated interface configuration for this port, click the box beside Copy interface configuration.

Note: Step 3 not applicable unless you have configured at least one channel of the port you are copying (see step 2) with an interface type. You may also choose to copy an interface configuration to range of slots from the appropriate Interface Configuration window.

- 4 To overwrite the existing interface configuration of the destination ports, click the box beside Overwrite configured interfaces.

¹ If you are copying a port configuration from an I/O module with only one port, you must select different slot numbers in the Start At and Stop At panels.

Note: “Overwrite” means that the existing interface will be deleted and a new interface will be created in its place. This option is only available if Copy interface configuration is selected. The Overwrite configured interfaces option is disabled until you click the box beside Copy interface configuration. The Disable traps during copy option is enabled by default. To overwrite the port specified in the Stop At column, it must be out of service.

5 Click **Copy**.

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

End

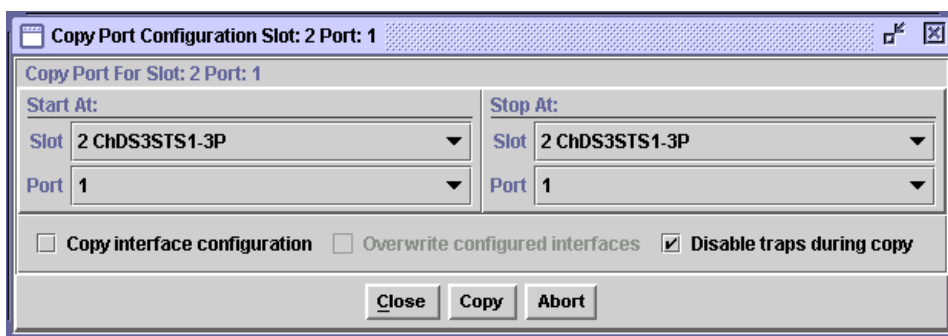


Figure 5-10. Sample Copy Port Configuration Window (After Initially Selecting the Copy Button From a Port Configuration Page)

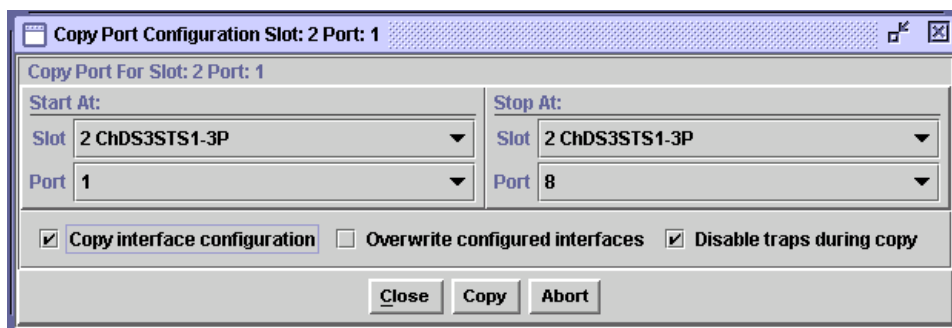


Figure 5-11. Sample Copy Port Configuration Window (After Selecting a Valid Attributes)

The buttons in this window have the following functions:

Table 5-6.

| Button | Function |
|--------------|---|
| Close | Closes this window. |
| Copy | Copies this interface to a range of channels. |
| Abort | Cancel the copying process after it is initiated. |

Obtaining Module Hardware Information

This section describes how to obtain product, model, version, and serial number data about a module, either directly from the Front Panel tab or from the Device Tree (see Figure 5-12).

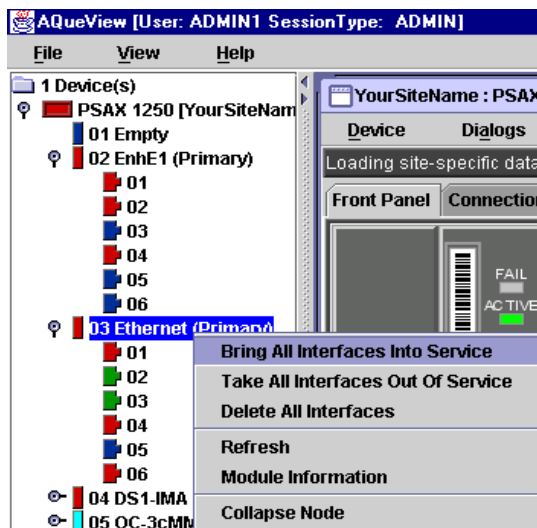


Figure 5-12. Sample Device Tree

Data about the hardware for a specific I/O or server module on a PSAX device can be obtained from the Module Information window. Perform the steps in the following procedure to obtain data about the hardware for a specific I/O or server module.

Begin

- 1 Double-click the bar code image on the Front Panel (see Figure 5-13), or click the name of the module in the Device Tree.
- 2 A menu appears. Select Module Information.

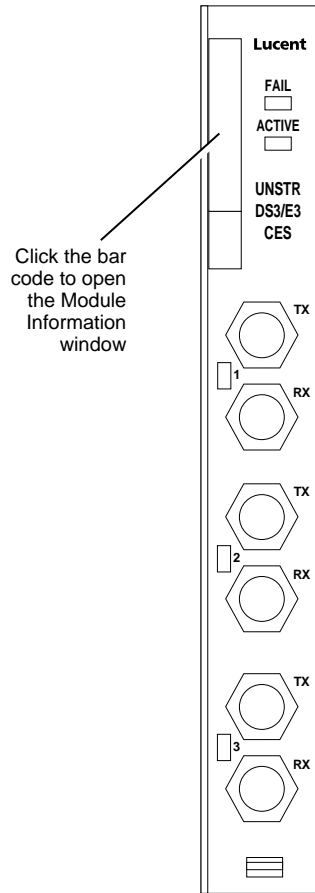


Figure 5-13. Obtaining Hardware Data from a Module

The corresponding Module Information window appears (see Figure 5-14).

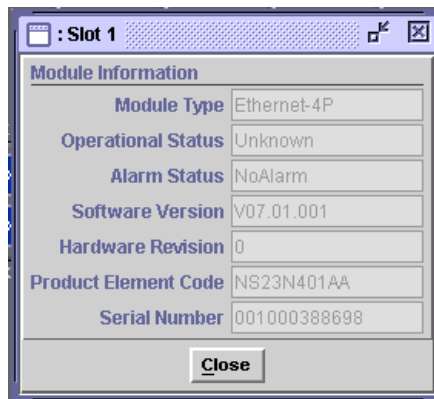


Figure 5-14. Sample Module Information Window

On the Module Information window, you can view serial numbers, hardware versions, and additional inventory data about the modules.

The fields on this window are described in the following table.

Table 5-7. Field Descriptions for the Module Information Window

| | | |
|--------------------|---|---|
| Module Type | Default: N/A Range: from PSAX system database Format: Predefined alphanumeric alphanumeric | Indicates the type of the module in the slot. When a module is inserted into the chassis, its name is displayed in the Card Type field next to the slot number. When the module is removed from the chassis, its name is no longer displayed in the Card Type field and is replaced with None . |
| Operational Status | Default: Unknown Range: N/A Format: Predefined alphanumeric | Displays the operational status of the module. |
| | Unknown | Indicates that the module has not been configured. |
| | Primary | For an I/O or server module, indicates that at least one port or channel on the module has been configured. For a CPU module, indicates that this module is the primary CPU module. |
| | Standby | Indicates that the module, in redundant systems, is operating as the standby (backup) module to the primary module. Indicates, for the CPU module in redundant systems, that this module is the standby (backup) CPU module. |
| Alarm Status | Default: No Alarm Range: N/A Format: Predefined alphanumeric | Displays the present alarm condition of the module. For the alarm status conditions, see the table “Alarm Status Descriptions” following these field descriptions. For the alarm status conditions, see “Obtaining Module Hardware Information” in this chapter. |
| Software Version | Default: N/A Range: (from module firmware) Format: Predefined alphanumeric | Displays the version of PSAX system software with which the modules’ firmware was released. The software version is encoded in the module firmware. Because not all modules require firmware upgrades with every new PSAX system software release, the software version that is displayed in this window may be lower than the CPU system software that is currently running on the PSAX system. See the most recent Release Note document for the latest software and firmware lineup information. |
| Hardware Revision | Default: N/A Range: from module firmware Format: Predefined alphanumeric | Displays the hardware revision for the selected module. |

Table 5-7. Field Descriptions for the Module Information Window (Continued)

| | | |
|----------------------|--|---|
| Product Element Code | Default: N/A Range: from module firmware Format: Predefined alphanumeric | Displays the product element code (PEC) used to identify and order this type of module. The PEC is encoded in the module firmware. |
| Serial Number | Default: N/A Range: (from module firmware) Format: Predefined alphanumeric | Displays the unique serial number of the individual module. The product serial number is encoded in the module firmware. The format of this field is the following: PSAX System Rel. 6.5.0 and later: 12-digit number in the format: <i>YYVDDnnnnnn</i> , where <i>YY</i> = year of manufacture <i>VV</i> = vendor ID code (manufacturer and location) <i>DD</i> = date code of manufacture (either month or week depending on vendor's preference) <i>nnnnnn</i> = sequential number, which in conjunction with <i>YY</i> , <i>VV</i> , and <i>DD</i> , creates a unique number for each hardware component in the PSAX product line For existing products with the 10-digit serial number used in Rel. 6.5.0 or later systems, this number is displayed with two preceding zeros. PSAX Rel. 6.3.0 and earlier: 10-digit number. For products with 12-digit serial numbers used in Rel. 6.3.0 or earlier systems, the first two digits (<i>YY</i>) are not displayed. |
| Operating Mode | Default: N/A Range: module dependent Format: Predefined alphanumeric | Displays the current operating mode (module type) for those modules that can be switched between two module operating mode, for example, DS3 and E3. This field is displayed only for modules that support a switchable module type. |

Obtaining Module Status Information

This section describes how to obtain hardware operating status data about a module. You can quickly obtain status information about ports, interfaces, and connection on the PSAX devices using the *AQueView* EMS. All of this information can be obtained from the Front Panel tab or the Device Tree.

Obtaining Hardware Operating Status Data

Data about the operating status of a module can be obtained from the Device Tree or from the Front Panel tab. The operating status of a module is reflected in the various colors displayed on the LED status indicators, the ports on the module in the Front Panel tab, and the modules and PSAX sys-

tems listed in the Device Tree. Alarms that display in the Front Panel tab and Device Tree clear automatically when the condition that created them is corrected.

Obtaining LED Status Indicator Data

The LED status indicators on the Front Panel tab (see Figure 5-15) directly reflect the status lights on the modules in the actual PSAX device. The color of the LEDs represent the current operational and alarm status values for that module, as described in Table 5-8.

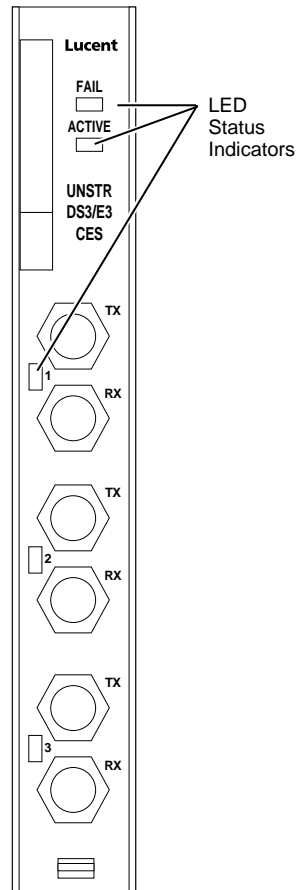


Figure 5-15. Obtaining LED Status Indicator Data

Table 5-8. LED Status Indicator Descriptions

| Indicator | LED Name on Faceplate | Description |
|--|--|---|
| Module Status Indicators | FAIL | A red light at the top of a module indicates the complete failure of a module. Possible causes include the following: <ul style="list-style-type: none"> • Module was removed from chassis • Module is improperly seated into the chassis • Module is malfunctioning • Module is not configured properly |
| | ACTIVE | A green light on the module indicates that the module is functioning properly. |
| Note: If both lights are displayed as gray in the Front Panel, the module is functioning properly but no ports, channels, or interfaces have been configured. | | |
| Line Signal Indicator | LOS | A yellow light indicates a loss of signal on that port. |
| Timing Indicators | CLK LOS | A yellow light on an active Stratum 3-4 module indicates a loss of the clock timing signal. If neither the FAIL nor the ACTIVE light is on, then the module is the backup Stratum 3-4 module. |
| CPU Indicator | If neither the FAIL nor the ACTIVE light is on, the module is the backup CPU. | |
| Power Supply (non-redundant) | The Power Supply module contains an additional yellow LED. This light is off when a second power supply module is installed in the system and is drawing less than 50 percent of its power capacity. | |

Obtaining Port Configuration Data

The color of the ports on the Front Panel tab and of the modules in the Device Tree directly reflect whether the port is configured and if it is in or out of service. The current operational status of a PSAX device or any of the modules in the device also can be determined by looking at the color of the name of the PSAX device or module in the Device Tree. To obtain port status information about a specific module in a PSAX device, do one of the following:

- View the ports on the module in the Front Panel tab (see Figure 5-16)
- View at the status indicators in the Device Tree (see Figure 5-17)

Use the information in Table 5-9 to evaluate the color of a module's ports.

Chapter 5 Configuring Ports and Channels Using the AQueView® EMS

Obtaining Module Status Information

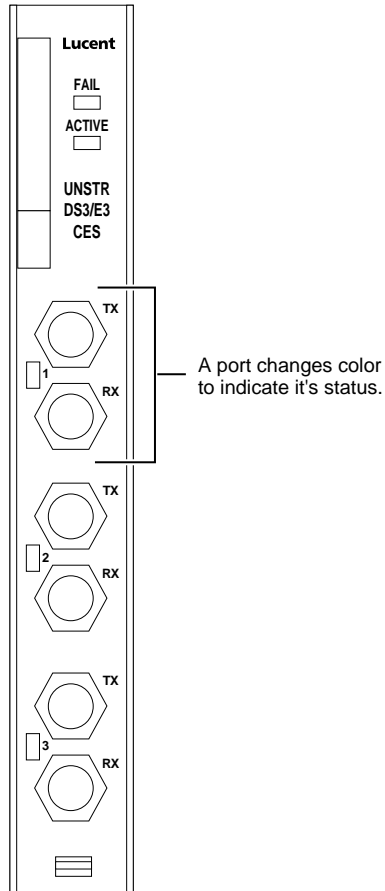


Figure 5-16. Port Status Data

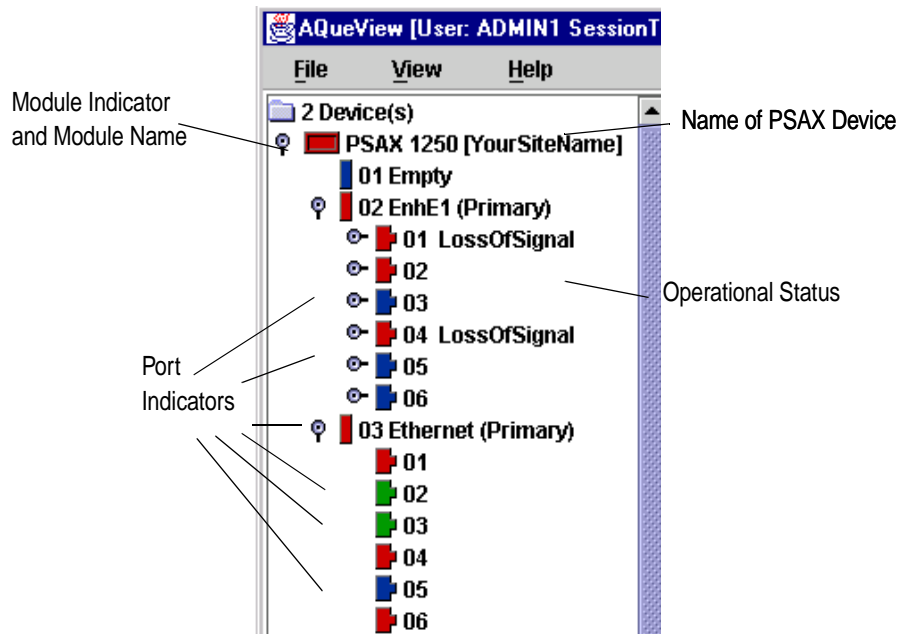


Figure 5-17. Device Tree Status Indicators

Table 5-9. Port Status Data

| Color | Description |
|------------|---|
| Dark Blue | The port is unconfigured; no interface is applied to the port. |
| Light Blue | The port is configured and out-of-service; an interface is applied to the port but it is neither administratively nor operationally in service. |
| Green | The port is configured, operational, and in service. |
| Red | The port is configured and administratively in service, but it is operationally out of service. (Something other than an operator command has caused the port or interface to go out of service.) |
| Yellow | The port is configured; a transmit clock loss of signal (LOS) alarm was received. |

Ghosted Modules

If a configured I/O or server module has failed or is removed from the PSAX chassis, a “ghosted” or light gray version of the module appears in the Front Panel tab.

To correct this condition, you must do one of the following as described in Table 5-10.

Table 5-10. Removing Ghosted Modules from the Front Panel

| If a module... | and you want to... | then do this ... |
|--|---|--|
| has failed | <ul style="list-style-type: none"> retain all configurations on this module restore service | remove the failed module and insert an identical module. |
| has been removed in error | | reinsert the original module into the chassis. |
| is being replaced with a dissimilar module | remove the ghosted module from the Front Panel | delete all interfaces to unconfigure the module (afterward you may insert and configure another module). |

Saving the Configuration

▲ CAUTION:

Select Device > Save PSAX Configuration to permanently save the configuration.

Applied, but unsaved, configuration data will not be lost if 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 in the PSAX device, not in the *AQueView* EMS.

6 Configuring the Interfaces Using the *AQueView*[®] EMS



Overview of This Chapter

This chapter provides instructions for configuring the following interface types on the 6-Port E1 IMA module using the *AQueView* EMS:

- ATM IMA (inverse multiplexing over ATM)
- ATM inter-switch signaling protocol (IISP) user
- ATM inter-switch signaling protocol (IISP) network
- ATM private network-network interface (PNNI) 1.0
- ATM user-network interface (UNI) 3.0, 3.1, and 4.0

Before You Begin

Before you can set interface configuration values, you must have selected an interface type value other than **Unconfigured** in the Interface Type field on the 6-Port E1 IMA module's Port and Channel configuration window.

Note: For a matrix of interface types by PSAX I/O module types, see the Interface Types by I/O Module Types table in the appendix, "Reference Information."

Configuring the ATM IISP Interface

This section provides instructions for configuring an I/O module for the Interim Interswitch Signaling Protocol (IISP) user and network interfaces. IISP, (formerly known as PNNI, Phase 0), was introduced as an interim standard, pending completion of PNNI, Phase 1. Building on ATM UNI 3.0 and 3.1, it uses static routing tables established by the network administrator to route connections around link failures.

Accessing or Viewing the ATM IISP Interface Configuration Window

After applying the **IispUser** or **IispNetwork** interface type to a channel from the Channel Configuration page, do one of the following to access the IISP Interface Configuration window:

- ~ 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.

Chapter 6 Configuring the Interfaces Using the AQueView® EMS

Configuring the ATM IISP Interface

The IISP Interface Configuration window (see Figure 6-1) appears.

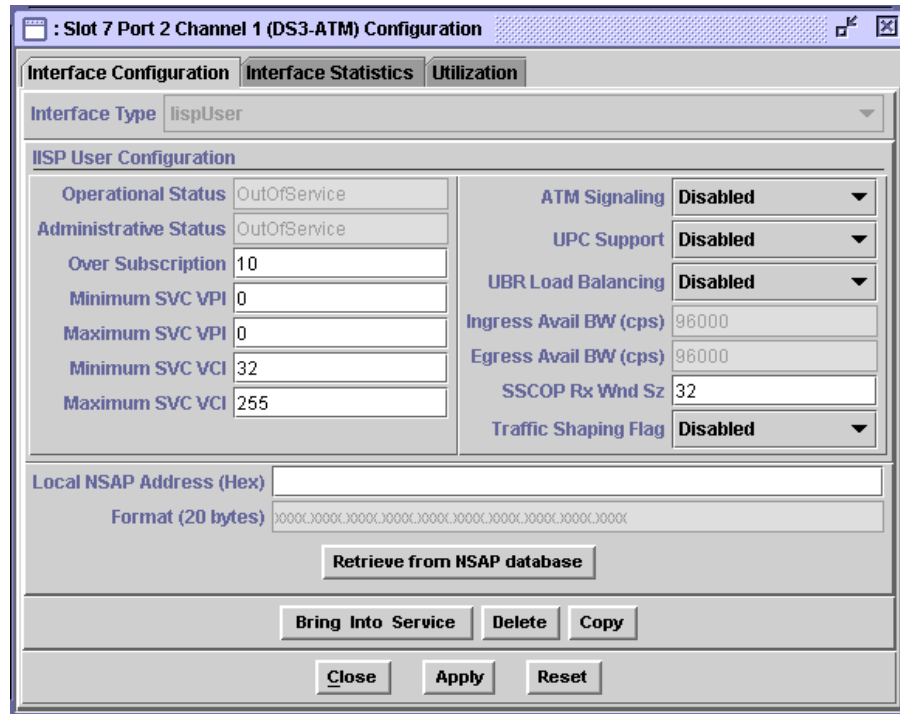


Figure 6-1. ATM IISP Configuration Window

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 | Displays when you configure user properties to include the Navis NSAP format. For more information, see the appropriate <i>Navis AQueView Element Management System User Guide</i> . 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. |

| Button | Function |
|----------------------------|--|
| Bring Into Service | Displays when the Administrative Status field is OutOfService). Brings an out-of-service configured interface to in-service status. The value InService displays in the Administrative Status field. You must first configure the interface before you can use this command. |
| Take Out of Service | Displays when the Administrative Status field is InService . Takes an in-service configured interface to out-of-service status. The value OutOfService displays in the Administrative Status field. You must use this command first before using the Delete command. |
| Delete | Deletes an out-of-service interface and redisplay the Port and Channel Configuration window for the module you are configuring. You must first take interface out of service (by clicking the Take Out of Service button) before you can use this button. |
| Copy | Copies this interface to a range of slots, ports, and channels. |
| Close | Closes this window. |

Setting the Values for the ATM IISP Interface

To set values for the ATM IISP interface, perform the steps in the following procedure.

- 1 Select the values for the fields on this window from the values given in Table 6-1.
- 2 To configure the Local NSAP Address (Hex) field, perform the steps in the section, “Adding NSAP Addresses,” in this chapter, and then return to this procedure.
- 3 To apply the interface configuration values, including the NSAP address configuration, click **Apply**.

Note: The interface must have in-service status so that the PVCs and SVCs you will set up to use this interface will work.

End

Chapter 6 Configuring the Interfaces Using the AQueView® EMS

Configuring the ATM IISP Interface

Table 6-1. Field Descriptions for the ATM IISP Interface Configuration Window

| Field Name | Field Values | Description |
|---|---|--|
| Operational Status (display only) | Default: Unconfigured Range: N/A Format: Predefined | Indicates whether the interface can pass traffic or not. The administrative status field below must be InService before the interface can pass traffic. |
| | Unconfigured | The interface is unconfigured. |
| | InService | The interface is operational. |
| | OutOfService | The interface is not operational because some condition is preventing the port from being fully operational, such as a loss of signal to the port. |
| Administrative Status (display only) | Default: Unconfigured Range: N/A Format: Predefined | Indicates the administrative status of the interface. |
| | Unconfigured | The interface is unconfigured. |
| | InService | The interface is in service. |
| | OutOfService | The interface is not in service. |
| Over Subscription | Default: 10 Range: 1-100 Format: Numeric | Allows for the allocated reserved bandwidth for the line to be over-utilized by up to a factor of 100. Generally, a value between 1 and 4 will normally not cause problems, although higher levels are often acceptable. |
| Note: For the maximum and minimum VPI/VCI values below, always enter or change the maximum value before the minimum value. | | |
| Minimum SVC VPI | Default: 0 Range: 0-255 Format: Numeric | Indicates the minimum VPI value in which signaling can occur on this interface. Any data you enter in this field is relevant only if you set the ATM Signaling field to Enabled . |
| Maximum SVC VPI | Default: 0 Range: 0-255 Format: Numeric | The maximum VPI in which signaling can occur on this interface. Any data you enter in this field is relevant only if you set the ATM Signaling field to Enabled . |
| Minimum SVC VCI | Default: 32 Range: 32-65535 Format: Numeric | The minimum VCI in which signaling can occur on this interface. Any data you enter in this field is relevant only if you set the ATM Signaling field to Enabled . |
| Maximum SVC VCI | Default: 255 Range: 32-65535 Format: Numeric | The maximum VCI in which signaling can occur on this interface. Any data you enter in this field is relevant only if you set the ATM Signaling field to Enabled . |

Table 6-1. Field Descriptions for the ATM IISP Interface Configuration Window

| Field Name | Field Values | Description |
|---------------|--|---|
| ATM Signaling | Default: Disabled Range: N/A Format: Predefined | Indicates whether the ATM Signaling path is enabled or disabled on the preceding Min SVC VPI and Max SVC VPI fields. SVCs use ATM signaling to set up and tear down dynamic connections on this interface. |
| | Disabled | SVCs cannot be created on this interface. All VPIs and VCI ranges are used for PVCs, not SVCs. |
| | Enabled | SVCs can be created on this interface. PVCs can be created only outside the maximum and minimum VPI and VCI ranges listed above in the Min SVC VPI, Max SVC VPI, Min SVC VCI, and Max SVC VCI fields. |
| UPC Support | Default: Disabled Range: N/A Format: Predefined | Indicates whether usage parameter control is to be used on all VCs on this interface. UPC determines if traffic control is performing to negotiated PCR, SCR, or MBS. |
| | Disabled | Disables UPC support. If UPC Support is disabled, traffic policing cannot be supported on any VC on this interface. |
| | Enabled | Enables UPC support, providing traffic control support on this interface. This feature is supported on these modules only: <ul style="list-style-type: none"> • 1-Port OC-12c/STM-4c MM/SM • 1-Port OC-3c 1+1 APS SM/MM • 1-Port STM-1 1+1 MSP SM/MM • 21-Port High Density E1 Multiservice • 12-Port Medium Density DS1 Multiservice The feature is supported on these channelized DS3 modules only (when channelizing to DS0s): <ul style="list-style-type: none"> • 1-Port Channelized DS3 Multiservice • 1-Port DS3 IMA • Quadserial Note: Enabling both UPC support and traffic shaping at the same time on this interface is an incompatible configuration and will be rejected. |

Table 6-1. Field Descriptions for the ATM IISP Interface Configuration Window

| Field Name | Field Values | Description |
|---------------------------------------|--|--|
| UBR Load Balancing | Default: Disabled Range: N/A Format: Predefined | Specifies whether UBR Load Balancing is to be used on this interface. Load balancing is performed according to traffic conditions, which determines how the available bandwidth on individual channels is used for path and route selection. After a channel is saturated, the transmit load is distributed (balanced) among other available links (channels) having the same origin, destination, and parameters. Channels with the highest available bandwidth values are filled first, followed by the lower capacity channels. Note: Virtual interfaces do not support UBR Load Balancing. |
| | Disabled | Disables UBR Load Balancing on the connections on this interface. |
| | Enabled | Enables UBR Load Balancing on the connections on this interface. Selecting this value includes UBR in the cps counts of the [Egress Avail BW] field. |
| Ingress Avail BW (cps) (display only) | Default: 0 Range: Module dependent Format: cps | Displays the total ingress bandwidth available for connections for this interface. The value 0 is changed to the cps count available for the interface after clicking Apply . The ingress available bandwidth depends on the configured module parameters, such as port strapping, type of cell mapping, configured port speed, and other factors. As each new connection is added, the amount of available bandwidth as indicated in this field may decrease. Bandwidth for UBR connections is not included, unless the UBR Load Balancing field on this interface is Enabled . You will see values in the [Ingress Avail BW] field only for connections that are in service. <ul style="list-style-type: none"> Any non-CES OC3 and STM-1 APS module will show the value 353207 Any OC-12 module will show the value 1412830 <p>The values for other types of I/O modules that use this field vary depending on the following parameters :</p> <ul style="list-style-type: none"> IMA - number of ports configured DS1/E1/STS-1e - number of channels strapped DS3/E3 - Cell Mapping (Plcp or DirectMapping) Serial - port bandwidth configured |

Table 6-1. Field Descriptions for the ATM IISP Interface Configuration Window

| Field Name | Field Values | Description |
|--------------------------------------|---|--|
| Egress Avail BW (cps) (display only) | Default: 0 Range: Module dependent Format: cps | <p>Displays the total egress bandwidth available for connections for this interface. The value 0 is changed to the cps count available for the interface after clicking Apply. The egress available bandwidth depends on the configured module parameters, such as port strapping, type of cell mapping, configured port speed, and other factors. As each new connection is added, the amount of available bandwidth as indicated in this field may decrease. Bandwidth for UBR connections is not included, unless the UBR Load Balancing field on this interface is Enabled. You will see values in the [Egress Avail BW] field only for connections that are in service.</p> <ul style="list-style-type: none"> Any non-CES OC3 and STM-1 APS module will show the value 353207 Any OC-12 module will show the value 1412830 <p>The values for other types of I/O modules that use this field vary depending on the following parameters :</p> <ul style="list-style-type: none"> IMA - number of ports configured DS1/E1/STS-1e - number of channels strapped DS3/E3 - Cell Mapping (Plcp or DirectMapping) Serial - port bandwidth configured |
| SSCOP Rx Wnd Size | Default: 32 Range: 8–32 Format: Packets | <p>Indicates the service-specific connection-oriented protocol (SSCOP) layer receive window size for this interface. This window shows the total number of packets that must be acknowledged by the receiving side before more packets are sent from the transmitting side.</p> <p>On the receiving side, values must be equal to or greater than the values for the transmit side for fastest transmission rates. This prescription is suggested for connecting to a Multiservice Media Gateway from a remote site only. The Multiservice Media Gateway configures these settings internally in its own ATM switch.</p> |

Table 6-1. Field Descriptions for the ATM IISP Interface Configuration Window

| Field Name | Field Values | Description |
|--------------------------|--|--|
| Traffic Shaping | Default: Disabled Range: N/A Format: Predefined | Indicates whether traffic shaping is to be used on this interface. Traffic shaping is an input cell selection algorithm (leaky bucket) that smooths bursts of input traffic. This feature is available only on these modules: <ul style="list-style-type: none"> • 1-Port STM-1 MM/SM with AQueMan • 1-Port STM-1 MM/SM with Traffic Shaping • 1-Port OC-3c MM/SM with AQueMan • 1-Port OC-3c MM/SM with Traffic Shaping • 1-Port OC-12c/STM-4c MM/SM Note: This feature must be enabled if using ATM traffic shaping prior to egress from an ATM trunk port on the OC-3c APS or the STM-1 MSP modules. For instructions on configuring ATM traffic shaping, see the your PSAX chassis User Guide. |
| | Disabled | Disables the traffic shaping feature. |
| | Enabled | Enables the traffic shaping feature. Note: Enabling both the UPC Support and the Traffic Shaping fields on this interface is an incompatible configuration and will be rejected. |
| Local NSAP Address (Hex) | Default: 0 Range: N/A Format: Hexadecimal | Specifies the ATM NSAP address of the local end of the connection, in hexadecimal notation. Enter the NSAP address of the local ATM interface. |

Viewing Interface Statistics

To view interface statistics, click the Interface Statistics tab.

The Interface Statistics page appears (see Figure 6-2).

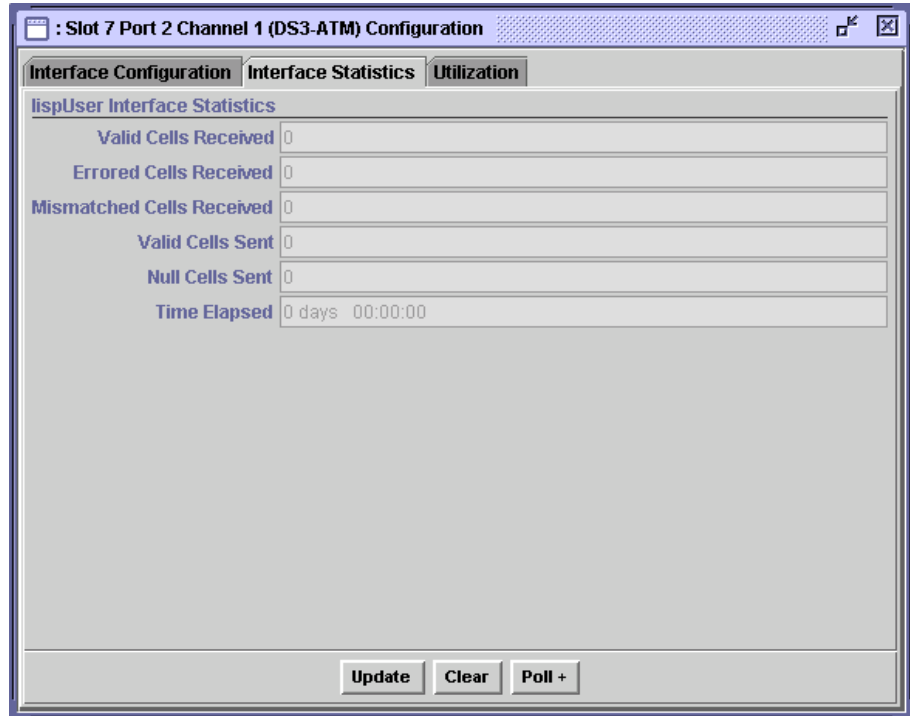


Figure 6-2. ATM IISP Interface Statistics Page

The buttons in this window have the following functions:

The buttons in this window have the following functions:

| Button | Function |
|---------------|---|
| Update | Updates the information in the fields. |
| Clear | Removes the values in this window and resets them to 0. |
| Poll | Poll+ initiates the continuous update of statistics and changes the button to Poll- . Poll- suspends polling and changes the button to Poll+ . |

Descriptions of the ATM IISP Interface Statistics window are described in Table 6-2.

Chapter 6 Configuring the Interfaces Using the AQueView® EMS

Configuring the ATM IISP Interface

Table 6-2. Field Descriptions for the ATM IISP Interface Statistics Page

| Field Name | Field Values | Description |
|--|---|--|
| Valid Cells Received (display only) | Default: 0 Range: N/A Format: numeric | Number of valid cells received into interface side A during the amount of time shown in Time Elapsed field. |
| Errored Cells Received (display only) | Default: 0 Range: N/A Format: numeric | Number of errored cells received into interface side A during the amount of time shown in Time Elapsed field. |
| Mismatched Cells Received (display only) | Default: 0 Range: N/A Format: numeric | Number of mismatched cells received into interface side A during the amount of time shown in Time Elapsed field. |
| Valid Cells Sent (display only) | Default: 0 Range: N/A Format: numeric | Number of valid cells transmitted out of interface side B during the amount of time shown in Time Elapsed field. |
| Null Cells Sent (display only) | Default: 0 Range: N/A Format: numeric | Number of null cells transmitted out of interface side B during the amount of time shown in Time Elapsed field. |
| Time Elapsed (display only) | Default: 00:00:00 Range: N/A Format: numeric | Time elapsed since last reset. |

Viewing Interface Utilization Information

Perform the steps in the following procedure to view interface utilization information.

Begin

- 1 Click the Utilization tab.

The Utilization page appears (see Figure 6-3).

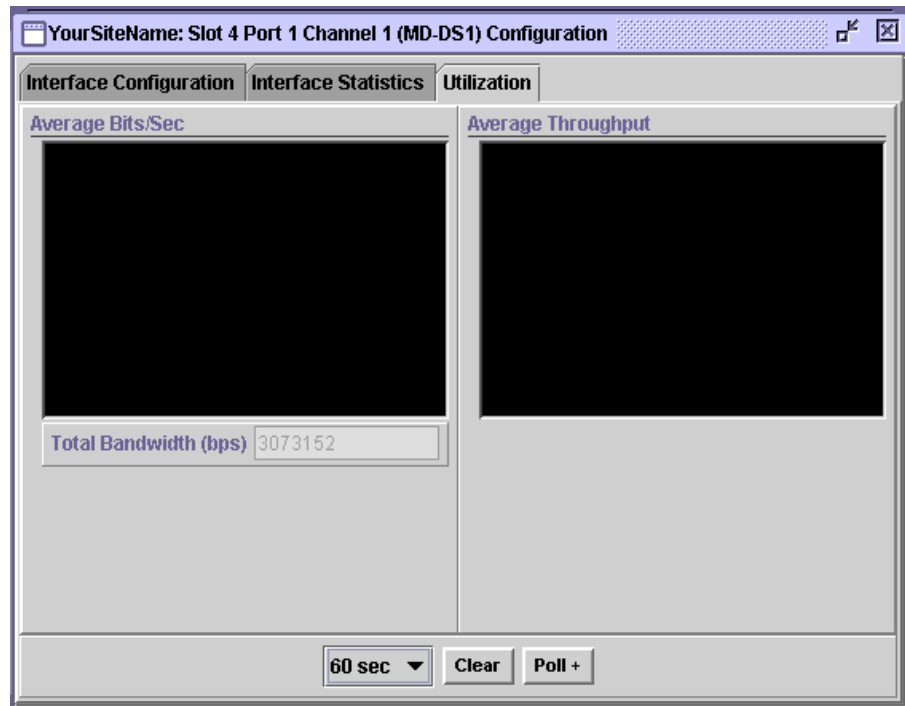


Figure 6-3. ATM IISP Utilization Page

The buttons at the bottom of the window 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 |

Chapter 6 Configuring the Interfaces Using the AQueView® EMS

Accessing or Viewing the ATM IMA Interface and Statistics

| Button | Function |
|--------------|---|
| Clear | Removes the data in the Average Bits/Sec and Average Throughput panels. |
| Poll | Poll+ continuously updates the statistics and changes the button label to Poll- . Poll- terminates polling and changes the button label to Poll+ . |

Average Throughput/Utilization measurements for ATM interfaces may be enabled or disabled per interface (the default value is **Disabled**).

2 Select the time interval in the 60 sec field.

3 Click **Poll+** and the polling begins.

The following interface measurements are calculated and displayed:

- ~ Average number of cells per second
- ~ Average number of bits per second
- ~ Average interface utilization, displayed as a percentage of the interface speed

4 Click **Poll-** and the polling terminates.

End

For more information on the Utilization page, see the section, “Utilization Calculations,” in this chapter.

Accessing or Viewing the ATM IMA Interface and Statistics

Begin

- 1 After applying the **Ima** interface type to a channel from the Channel Configuration page,
- 2 Do one of the following to access or view the IMA interface and IMA interface statistics.
 - a Double-click the left mouse button on the channel for which you want to configure the interface.
 - b 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 IMA Interface Configuration window appears (see Figure 6-4).
 The values for the fields on this window are described in Table 6-3.

End

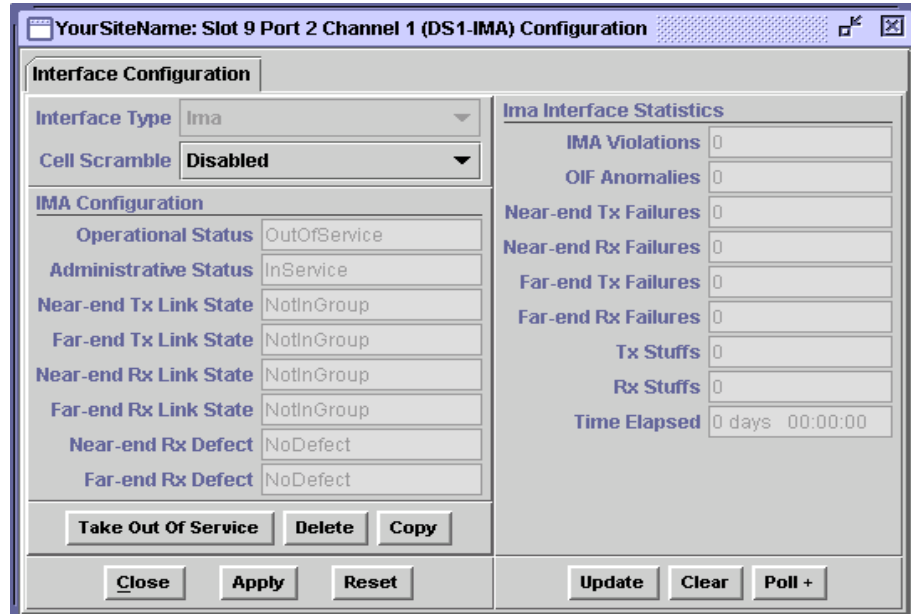


Figure 6-4. IMA Interface Configuration Window

The buttons in this window have the following functions:

| Button | Function |
|----------------------------|---|
| 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. You must first configure the interface before you can use this button. |
| 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. You must use this command first before clicking Delete . |

Chapter 6 Configuring the Interfaces Using the AQueView® EMS

Accessing or Viewing the ATM IMA Interface and Statistics

| Button | Function |
|-----------------------|---|
| Delete | Deletes an out-of-service interface and redisplay the Port and Channel Configuration window for the module you are configuring. You must first take interface out of service (by clicking Take Out of Service) before you can use this button. |
| Copy | Copies this interface to a range of slots, ports, and channels. |
| Close | Closes this window. |
| Reset | Resets the fields to the last set of applied values. |
| Update | Updates the information in the fields. |
| Clear | Removes the values in the Ima Interface Statistics panel and resets them to 0. |
| Poll- or Poll+ | Poll+ initiates the continuous update of statistics. Poll- suspends polling. |

Table 6-3. Field Descriptions for the ATM IMA Interface Configuration Window

| Field Name | Field Values | Description |
|-------------------------------|---|---|
| Interface Type (display only) | Default: Ima Range: N/A Format: Predefined alphanumeric | The interface type you are configuring. |
| Cell Scramble | Default: Disabled Range: N/A Format: Predefined alphanumeric | Specifies whether the ATM cell payload is scrambled. |
| | Disabled | Disables ATM cell payload scrambling. |
| | Enabled | Enables ATM cell payload scrambling (optimized cell synchronization). |

Table 6-3. Field Descriptions for the ATM IMA Interface Configuration Window

| Field Name | Field Values | Description |
|---|---|---|
| IMA Configuration panel (display only) | | |
| Operational Status | Default: InService Range: N/A Format: Predefined alphanumeric | Displays the current operational status of the interface. |
| | InService | Indicates that the interface is operational. |
| | OutOfService | Indicates that the interface is not operational. |
| Administrative Status | Default: InService Range: N/A Format: Predefined alphanumeric | Displays the current administrative status of the interface. |
| | InService | Indicates that the interface is in service. |
| | OutOfService | Indicates that the interface is not in service. |
| Near-end Tx Link State Far-end Tx Link State Near-end Rx Link State Far-end Rx Link State Near-end Rx Defect Far-end Rx Defect | Default: NotInGroup Range: N/A Format: Predefined alphanumeric | Displays the current status of the connections on both ends. |
| | NotInGroup | Indicates that the interface is not assigned to a group. |
| | UnusableNoReason | Indicates that the link does not work; nonspecific reason. |
| | Unusable Fault | Local failure status of a link belonging to an IMA group (not currently supported.) The PSAX device does not generate this condition, but may report such a condition generated by the far end of an IMA connection. |
| | Unusable Mismatched | An IMA link is not corrected to the proper end. (The PSAX device does not currently generate this condition, but the PSAX device reports this condition to the user if the far-end reports it to the PSAX device.) For example, when an IMA group is established, the links immediately discover which device they are connecting to on the far end. If cables are then removed and plugged back in differently, then the equipment may signify that it is mismatched. |

Chapter 6 Configuring the Interfaces Using the AQueView® EMS

Accessing or Viewing the ATM IMA Interface and Statistics

Table 6-3. Field Descriptions for the ATM IMA Interface Configuration Window

| Field Name | Field Values | Description |
|--|---|---|
| | Unusable Inhibited | This is an administrative mechanism for taking an IMA link out of service. When in this state, it is unknown whether there are any physical problems with the link. |
| | Unusable Failed | Check the defect value displayed. |
| | Usable | There are no local reasons why this link is not active. The only thing preventing it from being active is the far-end state (for example, a transmitter cannot be active and send real data until the far-end receiver is ready to accept that data). |
| | Active | Interface in use. |
| | LODS | Link out of delay synchronization. |
| IMA Interface Statistics Panel (display only) | | |
| IMA Violations | Default: 0 Range: Variable Format: Numeric | Count of errored, invalid or missing cells during non-SES-IMA condition. |
| OIF Anomalies | Default: 0 Range: Variable Format: Numeric | Count of OIF anomalies during non-SES-IMA conditions. |
| Near-end Tx Failures | Default: 0 Range: Variable Format: Numeric | Count of near end Tx failure alarm conditions has been entered on this link. |
| Near-end Rx Failures | Default: 0 Range: Variable Format: Numeric | Count of near end Rx failure alarm conditions has been entered on this link. |
| Far-end Tx Failures | Default: 0 Range: Format: Numeric | Count of far end transmit failure alarm conditions has been entered on this link. |
| Far-end Rx Failures | Default: 0 Range: Variable Format: Numeric | Count of far end receive failure alarm conditions has been entered on this link. |

Table 6-3. Field Descriptions for the ATM IMA Interface Configuration Window

| Field Name | Field Values | Description |
|--------------|--|--|
| Tx Stuffs | Default: 0 Range: Variable Format: Numeric | Count of stuff events inserted in the transmit direction on this link. |
| Rx Stuffs | Default: 0 Range: Variable Format: Numeric | Count of stuff events received in receive direction on this link. |
| Time Elapsed | Default: 0:00:00 Range: N/A Format: hours (X), minutes (XX), seconds (XX) | Time elapsed since last reset. |

Configuring the ATM PNNI Interface

Accessing or Viewing the ATM PNNI Interface Configuration Window

This section provides instructions for configuring an I/O module for the ATM private network-network interface (PNNI) 1.0. The following I/O modules have ATM PNNI 1.0 interface capability:

Before you can select the value as the interface type, you must first configure the PNNI node (see Chapter 6 in the appropriate *Navis™ AQueView® Element Management System User Guide*).

After applying the **AtmPnni1_0** interface type to a channel from the Channel Configuration page, do one of the following to access the ATM PNNI Interface Configuration window:

- ~ 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 ATM PNNI Interface Configuration window appears (see Figure 6-5).

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Configuring the ATM PNNI Interface

YourSiteName: Slot 1 Port 2 Channel 1 (EnhDS1) Configuration

Interface Configuration | ILMI Configuration | Interface Statistics | Utilization

Interface Type: AtmPnni1-0
Cell Scramble: Disabled

PNNI 1.0 Configuration

| | | | |
|------------------------|----------|------------------------|--------------|
| Node Index | 1 | Operational Status | OutOfService |
| Minimum SVC VPI | 0 | Administrative Status | OutOfService |
| Maximum SVC VPI | 0 | PNNI Signaling | Enabled |
| Minimum SVC VCI | 32 | VPI Signaling Channel | 0 |
| Maximum SVC VCI | 65535 | VCI Signaling Channel | 5 |
| Remote Min SVC VPI | 0 | Port ID | 102001 |
| Remote Max SVC VPI | 0 | Aggregate Token | 0 |
| Remote Min SVC VCI | 32 | Traffic Descriptor | 0 |
| Remote Max SVC VCI | 65535 | VP Capability | True |
| Over Subscription | 10 | Service Category | NrtVbr |
| Admin Weight - CBR | 5040 | Ingress Avail BW (cps) | 0 |
| Admin Weight - RT VBR | 5040 | Egress Avail BW (cps) | 0 |
| Admin Weight - NRT VBR | 5040 | SSCOP Rx Wnd Sz | 32 |
| Admin Weight - UBR | 5040 | UBR Load Balancing | Disabled |
| UPC Support | Disabled | Traffic Shaping Flag | Disabled |

Local NSAP Address (Hex):

Retrieve from NSAP database | Calculate Navis NSAP Address

Bring Into Service | Delete | Copy

Close | Apply | Reset

Figure 6-5. ATM PNNI 1.0 Interface Configuration Window

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 | Displays when you configure user properties to include the Navis NSAP format. For more information, see the appropriate <i>Navis AQueView Element Management System User Guide</i> . 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. |
| Bring Into Service | Displays when the Administrative Status field is OutOfService). Brings an out-of-service configured interface to in-service status. The value InService displays in the Administrative Status field. You must first configure the interface before you can use this command. |
| Take Out of Service | Displays when the Administrative Status field is InService . Takes an in-service configured interface to out-of-service status. The value OutOfService displays in the Administrative Status field. You must use this command first before using the Delete command. |
| Delete | Deletes an out-of-service interface and redisplay the Port and Channel Configuration window for the module you are configuring. You must first take interface out of service (by clicking the Take Out of Service button) before you can use this button. |
| Copy | Copies this interface to a range of slots, ports, and channels. |
| Close | Closes this window. |

PNNI Interface Values To set the values for the ATM PNNI interface, perform the steps in the following procedure.

Chapter 6 Configuring the Interfaces Using the AQueView® EMS

Configuring the ATM PNNI Interface

Begin

- 1 Select the values for the fields on this window from the values given in Table 6-4.
- 2 To configure the Local NSAP Address (Hex) field, perform the steps in the section, “Adding NSAP Addresses,” in this chapter, and then return to this procedure.
- 3 To apply the interface configuration values, including the NSAP address configuration, click **Apply**.
- 4 To activate the interface after you have applied the configuration values, click **Bring Into Service**.
- 5 Continue to step 2 of the section, “Performing Bulk Operations,” in this chapter.

Note: The interface must have in-service status so that the PVCs and SVCs you will set up to use this interface will work.

End

Table 6-4. Field Descriptions for the ATM PNNI Interface Configuration Window

| Field Name | Field Values | Description |
|---|--|--|
| Node Index | Default: 0 Range: 0-65535 Format: Numeric | Specifies an index that identifies a logical PNNI entity within the managed system. The value 0 indicates a logical entity within the switching system that manages routes only over non-PNNI interfaces. By default, only the node identified by the node index is created, and all PNNI interfaces are associated with that node; only one PNNI node can be provisioned per switch. |
| Note: For the maximum and minimum VPI/VCI values below, always enter or change the maximum value before the minimum value. | | |
| Minimum SVC VPI | Default: 0 Range: 1-255 (for low-speed modules); 1-4095 (for high-speed modules). See Note at right Format: Numeric | Specifies the lower boundary of the VPI for SVC connections. Note: As the PNNI signaling field is enabled by default on this interface, VPI 0 is not available. |
| Maximum SVC VPI | Default: 0 Range: 1-255 (for low-speed modules); 1-4095 (for high-speed modules). See Note at right. Format: Numeric | Specifies the upper boundary of the VPI for SVC connections. Note: As the PNNI signaling field is enabled by default on this interface, VPI 0 is not available. |

Table 6-4. Field Descriptions for the ATM PNNI Interface Configuration Window

| Field Name | Field Values | Description |
|-------------------------------|--|--|
| Minimum SVC VCI | Default: 32/65535 Range: 32–65535 Format: Numeric | Specifies the lower boundary of the VCI for SVC connections. |
| Maximum SVC VCI | Default: 65535 Range: 32–65535 Format: Numeric | Specifies the upper boundary of the VCI for SVC connections. |
| Remote SVC VPI (display only) | Default: 0 Range: 0–4095 Format: Numeric | Displays the lower boundary of the VPI for SVC connections for the remote side. |
| Remote SVC VPI (display only) | Default: 0 Range: 0–4095 Format: Numeric | Displays the upper boundary of the VPI for SVC connections for the remote side. |
| Remote SVC VCI (display only) | Default: 32/65535 Range: 32–65535 Format: numeric | Displays the lower boundary of the VCI for SVC connections for the remote side. |
| Remote SVC VCI (display only) | Default: 65535 Range: 32–65535 Format: Numeric | Displays the upper boundary of the VCI for SVC connections for the remote side. |
| Over Subscription | Default: 10 Range: 1–100 Format: Numeric | Allows for the allocated reserved bandwidth for the line to be over-utilized by up to a factor of 100. Generally, a value between 1 and 4 is normally safe, although higher levels are often acceptable. |

Chapter 6 Configuring the Interfaces Using the AQueView® EMS

Configuring the ATM PNNI Interface

Table 6-4. Field Descriptions for the ATM PNNI Interface Configuration Window

| Field Name | Field Values | Description |
|--------------------|--|--|
| UPC Support | Default: Disabled Range: N/A Format: Predefined | Indicates whether usage parameter control (policing) is used on this interface. UPC determines if traffic control is performing to negotiated PCR, SCR, or MBS. This feature is supported on these modules only: <ul style="list-style-type: none"> • OC-12c/STM-4c MM/SM 1+1 APS/MSP • OC-3c 1+1 APS SM/MM • STM-1 1+1 MSP SM/MM • High Density E1 • Medium Density DS1 The feature is supported on these channelized DS3 modules (when channelizing to DS0s only): <ul style="list-style-type: none"> • 1-Port Channelized DS3 Multiservice • 1-Port DS3 IMA • Quadserial |
| | Disabled | Disables UPC support on this interface. If UPC support is disabled, traffic policing cannot be supported on any VC. |
| | Enabled | Enables UPC support on this interface, providing traffic policing support for all VCs. Note: Do not enable the Traffic Shaping feature and the UPC Support feature for the same connection. Your configuration will be rejected. |
| UBR Load Balancing | Default: Disabled Range: N/A Format: Character | Specifies whether UBR Load Balancing is to be used on this interface. Load balancing is performed according to traffic conditions, which determines how the available bandwidth on individual channels is used for path and route selection. After a channel is saturated, the transmit load is distributed (balanced) among other available links (channels) having the same origin, destination, and parameters. Channels with the highest available bandwidth values are filled first, followed by the lower capacity channels. Note: Virtual interfaces do not support UBR Load Balancing. |
| | Disabled | Disables UBR load balancing on the connections on this interface. |
| | Enabled | Enables UBR load balancing on the connections on this interface. Selecting this value includes UBR in the cps counts of the [Egress Avail BW] field. |

Table 6-4. Field Descriptions for the ATM PNNI Interface Configuration Window

| Field Name | Field Values | Description |
|--------------------------------------|--|---|
| AdminWeight - CBR | Default: 5040 Range: 504-16777215 Format: Numeric | Specifies the administrative weight for the constant bit rate service category. Used by PNNI in path selection, the higher the weight, the lower the priority. See the note below this table. |
| AdminWeight - RT VBR | Default: 5040 Range: 504-16777215 Format: Numeric | Specifies the administrative weight for the real time-variable bit rate service category. Used by PNNI in path selection, the higher the weight, the lower the priority. See the note below this table. |
| AdminWeight - NRT VBR | Default: 5040 Range: 504-16777215 Format: Numeric | Specifies the administrative weight for the non-real time-variable bit rate service category. Used by PNNI in path selection, the higher the weight, the lower the priority. See the note below this table. |
| AdminWeight - UBR | Default: 5040 Range: 504-16777215 Format: Numeric | Specifies the administrative weight for the unspecified bit rate service category. Used by PNNI in path selection, the higher the weight, the lower the priority. See the note below this table. |
| Operational Status (display only) | Default: OutOfService Range: N/A Format: Predefined | Indicates whether the interface is capable of passing traffic or not. |
| | InService | Indicates that the interface is operational. |
| | OutOfService | Indicates that the interface is not operational. |
| Administrative Status (display only) | Default: OutOfService Range: N/A Format: Predefined | Indicates the configured status of the interface. |
| | 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. |
| PNNI Signaling (display only) | Default: Enabled Range: N/A Format: Predefined | Enables ATM signaling over a PNNI link that sets up and tears down SVCs. |
| | Enabled | Enables ATM signaling over a PNNI link. |
| | Disabled | Disables ATM signaling over a PNNI link. |
| VPI Signaling Channel (display only) | Default: 0 Range: 0-4095 Format: Numeric | Displays the virtual path/Virtual channel identifier for SVC signaling. |
| VPI Signaling Channel (display only) | Default: 5 Range: 0-4095 Format: Numeric | Displays the virtual channel identifier for SVC signaling. |

Chapter 6 Configuring the Interfaces Using the AQueView® EMS

Configuring the ATM PNNI Interface

Table 6-4. Field Descriptions for the ATM PNNI Interface Configuration Window

| Field Name | Field Values | Description |
|--|---|--|
| Remote Min/Max SVC VPI (display only) | Default: 0/0 Range: 0–4095 Format: Numeric | Indicates the minimum (lower) and maximum (upper) boundary of the VPI for SVC connections for the remote side. |
| Port Id. (display only) | Default: 201001 Range: Chassis dependent Format: Numeric | Displays the interface port identifier, a point of attachment of a logical link to a given logical node. This is automatically generated based on the location (slot, port, channel) of the interface. A value of 0 indicates that no port has been specified. |
| Aggregate Token | Default: 0 Range: 0–2147483647 Format: cps | Indicates the interface aggregate token, whose links to a given neighbor node are to be aggregated and advertised as a single node link. For example, if there are 3 physical links between two chassis, the user can set the aggregation token to the same value on each interface (both sides). This makes the aggregated links appear to the rest of the network as one logical link. |
| Traffic Descriptor (display only) | Default: 0 Range: N/A Format: Predefined | This field is not currently supported. Displays the traffic descriptor index, an entry in the atmTrafficDescrParamTable defined in <i>RFC 1695</i> that specifies the traffic allocation for the PNNI routing control channel (VCI=18) on this interface. |
| VP Capability | Default: True Range: N/A Format: Predefined | Indicates whether the interface is capable of having virtual path connections (VPCs) established within it. |
| | True | The interface is capable of having VPCs established within it. |
| | False | The interface cannot have VPCs established within it. |
| Service Category (display only) | Default: NrtVbr Range: N/A Format: Predefined | Indicates a quality of service class type. The speed and quality of transmission depends on the class-choice made. The higher the class, the higher the guarantee that the packets will get to their destination on time. Cbr is the highest class, and Ubr is the lowest. |
| | NrtVbr | Non-realtime variable bit rate service. |
| | Cbr | Constant bit rate service. |
| | RtVbr | Real-time variable bit rate service. |
| | Abr | Available bit rate service. |
| | Ubr | Unspecified bit rate service. |

Table 6-4. Field Descriptions for the ATM PNNI Interface Configuration Window

| Field Name | Field Values | Description |
|---|---|--|
| Ingress Avail BW (cps) (display only) | Default: 0 Range: User-configured Format: cps | <p>Displays the total ingress bandwidth available for connections for this interface. The value 0 is changed to the cps count available for the interface after the Apply command is selected. The ingress available bandwidth depends on the configured module parameters, such as port strapping, type of cell mapping, configured port speed, and other factors. As each new connection is added, the amount of available bandwidth as indicated in this field may decrease. Bandwidth for UBR connections is not included, unless the UBR Load Balancing field on this interface is Enabled. You will see values in the [Ingress Avail BW] field only for connections that are in service.</p> <ul style="list-style-type: none"> Any non-CES OC3 and STM-1 APS module will show the value 353207 Any OC-12 module will show the value 1412830 <p>The values for other types of I/O modules that use this field vary depending on the following parameters :</p> <ul style="list-style-type: none"> IMA - number of ports configured DS1/E1/STS-1e - number of channels strapped DS3/E3 - Cell Mapping (Plcp or DirectMapping) Serial - port bandwidth configured |

Table 6-4. Field Descriptions for the ATM PNNI Interface Configuration Window

| Field Name | Field Values | Description |
|--------------------------------------|---|--|
| Egress Avail BW (cps) (display only) | Default: 0 Range: User-configured Format: cps | <p>Displays the total egress bandwidth available for connections for this interface. The value 0 is changed to the cps count available for the interface after the Apply command is selected. The egress available bandwidth depends on the configured module parameters, such as port strapping, type of cell mapping, configured port speed, and other factors. As each new connection is added, the amount of available bandwidth as indicated in this field may decrease. Bandwidth for UBR connections is not included, unless the UBR Load Balancing field on this interface is Enabled. You will see values in the [Egress Avail BW] field only for connections that are in service.</p> <ul style="list-style-type: none"> • Any non-CES OC3 and STM-1 APS module will show the value 353207 • Any OC-12 module will show the value 1412830 <p>The values for other types of I/O modules that use this field vary depending on the following parameters :</p> <ul style="list-style-type: none"> • IMA -IMA - number of ports configured • DS1/E1/STS-1e - number of channels strapped • DS3/E3 - Cell Mapping (Plcp or DirectMapping) • Serial - port bandwidth configured |
| SSCOP Rx Wnd Size | Default: 32 Range: 8–32 Format: Packets | <p>Indicates the service-specific connection-oriented protocol (SSCOP) layer receive window size. This window shows the total number of packets that must be acknowledged by the receiving side before more packets are sent from the transmitting side.</p> <p>On the receiving side, values must be equal to or greater than the values for the transmit side for fastest transmission rates.</p> <p>Note: These settings are suggested for connecting to a Multiservice Media Gateway from a remote site only. The Multiservice Media Gateway configures these settings internally in its own ATM switch.</p> <p>For more information on this field, see the Application Note entitled <i>Connecting a CBX or GX Switch to a PacketStar® PSAX Multiservice Media Gateway Via an ATM Port, Issue 2, Document No. 255-700-236</i>.</p> |

Table 6-4. Field Descriptions for the ATM PNNI Interface Configuration Window

| Field Name | Field Values | Description |
|--------------------------|--|---|
| Local NSAP Address (Hex) | Default: 0 Range: Format: Hexadecimal | Specifies the ATM NSAP address of the local end of the connection. Enter the NSAP address of the local ATM interface. |

Note: When configuring the Admin Weight fields, you can choose a value based on the range listed in the table above Table 6-4. However, it is recommended that if you want to use a value greater than **5040** (the default value), you should choose a number divisible by 5040, such as **10080**, **15120**, and so on. If you want to use a value smaller than **5040**, choose a multiple of 5040, such as 2, 3, 5, 6, 7, 8, 9, 10, and so on, or their multiples. The PSAX system allows up to 20 administrative weight entries per PNNI route.

Viewing Interface Statistics

To view interface statistics, click the Interface Statistics tab.

The Interface Statistics page appears (see Figure 6-6).

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Configuring the ATM PNNI Interface

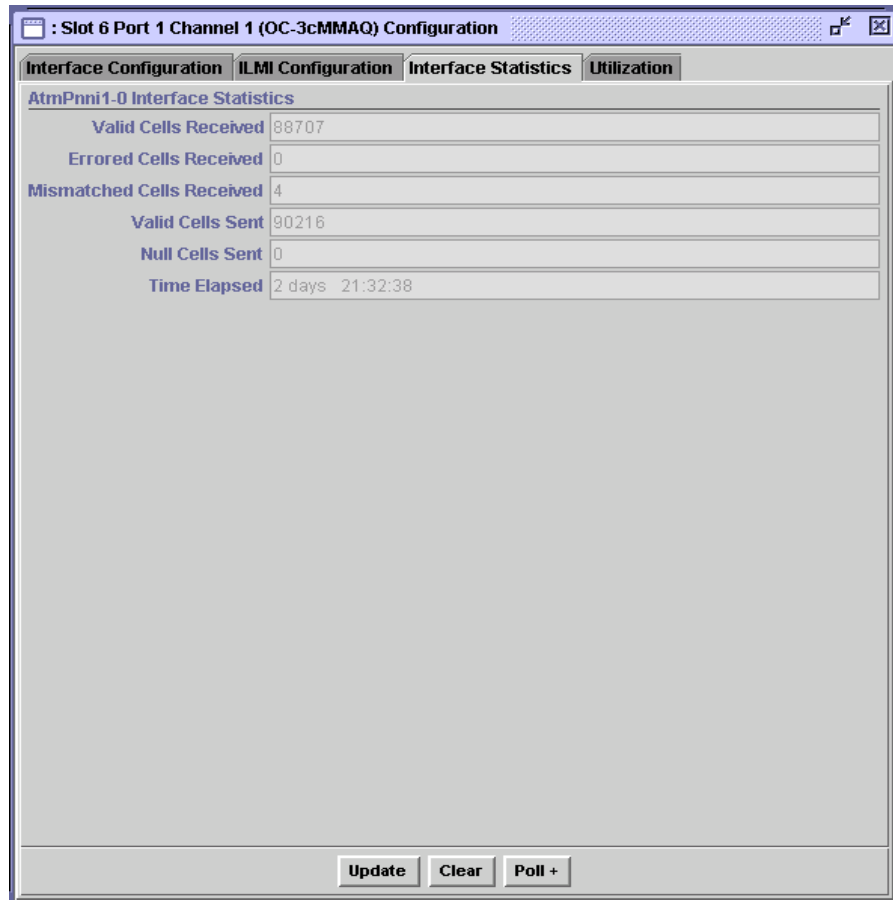


Figure 6-6. ATM PNNI 1.0 Interface Statistics Page

The buttons in this window have the following functions:

| Button | Function |
|---------------|---|
| Update | Updates the information in the fields. |
| Clear | Removes the values in this window and resets them to 0. |
| Poll | Poll+ initiates the continuous update of statistics and changes the button to Poll- . Poll- suspends polling and changes the button to Poll+ . |

The fields on this window are described in Table 6-5.

Table 6-5. Field Descriptions for the ATM PNNI Interface Statistics Page

| Field Name | Field Values | Description |
|---------------------------|--|---|
| Valid Cells Received | Default: 0.0000 e0 Range: 0-(2 ³¹ -1) Format: exponential notation | Specifies the number of valid cells received into interface side A during the amount of time shown in Time Elapsed field. |
| Errored Cells Received | Default: 0000000000 Range: N/A Format: Numeric | Specifies the number of errored cells received into interface side A during the amount of time shown in Time Elapsed field. |
| Mismatched Cells Received | Default: 0000000000 Range: N/A Format: Numeric Default: | Specifies the number of mismatched cells received into interface side A during the amount of time shown in Time Elapsed field. |
| Valid Cells Sent | Default: 0.0000 e0 Range: 0-(2 ³¹ -1) Format: exponential notation | Specifies the number of valid cells transmitted out of interface side B during the amount of time shown in Time Elapsed field. |
| Null Cells Sent | Default: 0.0000 e0 Range: 0-(2 ³¹ -1) Format: exponential notation | Specifies the number of null cells transmitted out of interface side B during the amount of time shown in Time Elapsed field. Note: This parameter is not supported in the OC-12c/STM-4c SM/MM 1+1 APS/MSP modules. |
| Time Elapsed | Default: 0:00:00 Range: NA Format: Time in hour (x), minutes (xx), seconds (xx) | Specifies the time elapsed since the last reset in h:mm:ss (hour: minute:seconds) format. |

Configuring the Integrated Link Management Interface (ILMI)

Accessing or Viewing the ILMI Configuration Page To display the ILMI Configuration page (see Figure 6-7), click the ILMI Configuration tab.

Setting ILMI Configuration Values To set values for ILMI configuration, perform the steps in the following procedure.

Begin

- 1 Click the ILMI Configuration tab.
The ILMI Configuration page appears (see Figure 6-7).
- 2 Select the values for the fields on this window from the values given in Table 6-6.
- 3 To apply the interface configuration values, click **Apply**.

4 To go back to the ATM UNI Interface Configuration window, click **Close**.

End

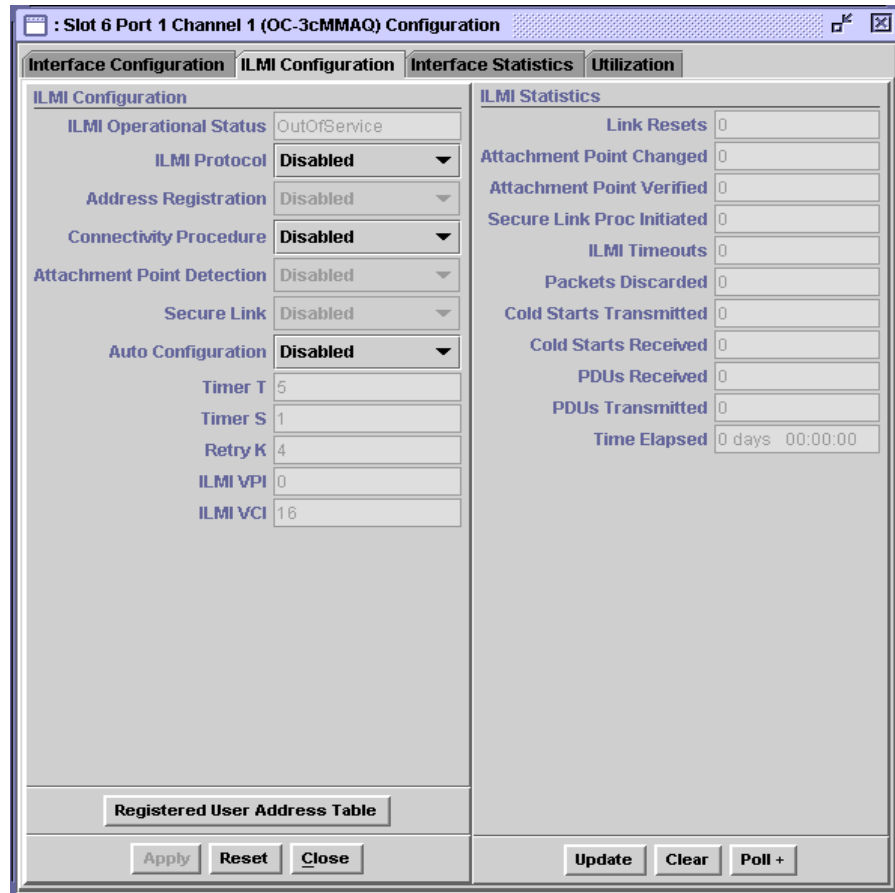


Figure 6-7. ILMI Configuration Page

The buttons in this window have the following functions:

| Button | Function |
|--------------------------------------|--|
| Registered User Address Table | Displays the Registered User Address Table. |
| Apply | Applies the configuration field values you set. |
| Reset | Resets the fields to the last set of applied values. |
| Close | Closes this window. |
| Update | Updates the information in the fields. |

Table 6-6. Field Descriptions for the PNNI ILMI Configuration Window

| Field Name | Field Values | Description |
|---|--|---|
| ILMI Operational Status (display only) | Default: OutOfService Range: N/A Format: predefined | Indicates whether ILMI connectivity is operational or not. |
| | OutOfService | Indicates that ILMI connectivity is not operational. |
| | InService | Indicates that ILMI connectivity is operational. |
| ILMI Protocol | Default: Disabled Range: N/A Format: predefined | Specifies the Integrated Links Management Interface. A bidirectional transmission protocol that enables exchange of ATM interface parameters between two connected ATM Interface Management Entities (IMEs). These entities are an end user and a public or private network, or a public network and a private network. |
| | Disabled | Disables ILMI protocol. If you select Disabled , the other fields in this window will not show. |
| | Enabled | Enables ILMI protocol. |
| Address Registration (display only) | Default: Disabled Range: As noted below. Format: predefined | Specifies whether address registration is disabled or enabled. |
| | Disabled | Disables the Address Registration field. Address Registration can be enabled only if the ILMI Protocol field is enabled. |
| | Enabled | Enables address registration. |
| Connectivity Procedure | Default: Disabled Range: N/A Format: predefined | Indicates the establishment and subsequent loss of ILMI connectivity detection. |
| | Disabled | Disables the ILMI Connectivity Procedure. |
| | Enabled | Enables the ILMI Connectivity Procedure: the Attachment Point Detection and Secure Link field functions are available for enablement. You must select Enabled if you want to also enable the Attachment Point Detection and Secure Link fields. |

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Configuring the ATM PNNI Interface

Table 6-6. Field Descriptions for the PNNI ILMI Configuration Window

| Field Name | Field Values | Description |
|--|--|--|
| Attachment Point Detection (display only) | Default: Disabled Range: N/A Format: predefined | Specifies that a change of attachment point caused by possible swapping of 2 links that were not detected by signalling will be detected. |
| | Disabled | Disables Attachment Point Detection. |
| | Enabled | Enables Attachment Point Detection. A query will be sent every 5 seconds to detect a change in the address. A response indicates that the user id and address information are the same. However, if there is a change in the address, all calls will be cleared. Attachment Point Change Detection can be enabled only if Connectivity Procedure and ILMI Protocol fields are enabled. |
| Secure Link (display only) | Default: Disabled Range: N/A Format: predefined | Detects non-ILMI connections that were not dropped when an attachment point changed. ILMI Secure Link Procedure is disabled. It can be enabled only if the Connectivity Procedure and Attachment Point Detection fields are enabled. |
| | Disabled | Disables the ILMI Secure Link Procedure. |
| | Enabled | Enables the ILMI Secure Link Procedure. If a response is not received, all calls are cleared, and disconnected. |
| Auto Configuration | Default: Disabled Range: N/A Format: Predefined | Specifies the ability to automatically configure the actual VPI/VCI range based on the local VPI/VCI and the remote VPI/VCI ranges (VPI and VCI range negotiation). For more information on automatic configuration procedures, see <i>ATM Forum ILMI (Integrated Local Management Interface), 4.0, af-ilmi-0065.000, Section 8.3.4.</i> |
| | Disabled | Disables the Automatic Configuration Procedure: the actual VPI and VCI are not automatically configured, and the connections are set up by using local VPI/VCI ranges which are defined by user. |
| | Enabled | Enables the Automatic Configuration Procedure: actual VPI/VCI are automatically configured, and the connections are set up by using the overlap VPI/VCI ranges of the local VPI/VCI and the remote VPI/VCI ranges. Auto configuration can be enabled only if the ILMI Protocol field is Enabled. |
| Timer T (display only) | Default: 5 Range: 0–(2 ³² -1) Format: numeric (seconds) | Used to poll when link is operational. The value in this field is displayed as a 32-bit integer, and any number may appear within the range specified (see the Values column). |

Table 6-6. Field Descriptions for the PNNI ILMI Configuration Window

| Field Name | Field Values | Description |
|----------------------------|--|--|
| Timer S (display only) | Default: 1 Range: 0–(2 ³² -1) Format: numeric (seconds) | Used to poll when link is not operational. The value in this field is displayed as a 32-bit integer, and any number may appear within the range specified (see the Values column). |
| Retry K (display only) | Default: 4 Range: 0–(2 ³² -1) Format: numeric (seconds) | Indicates the number of timeouts before the link becomes non-operational. The value in this field is displayed as a 32-bit integer, and any number may appear within the range specified (see the Values column). |
| ILMI VPI (display only) | Default: 0 Range: This value does not change. Format: numeric (seconds) | Indicates the VPI for ILMI protocol channel in which VPI will run. |
| ILMI VCI (display only) | Default: 16 Range: This value does not change. Format: numeric (seconds) | Indicates the VCI for ILMI protocol channel in which VCI will run. |

Viewing Registered Addresses

To set values for ILMI registered addresses, perform the steps in the following procedure.

Begin

- 1 Click **Registered User Address Table** on the ILMI Configuration page.

The ILMI Registered User Address Table window appears (see Figure 6-8).

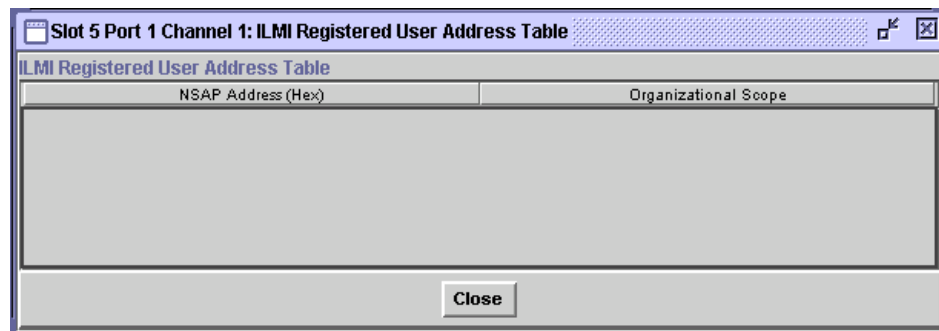


Figure 6-8. Registered User Address Table

The **NSAP Address (Hex)** column displays the user's registered addresses. The **Org Scope** column displays the scope of the registered addresses. If the scope is not set by the user, it will default to global (a value of 15).

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Configuring the ATM PNNI Interface

2 To go back to the ATM UNI Interface Configuration window, click **Close**.

End

Viewing ILMI Statistics

You can view ILMI statistics on the ILMI Statistics panel of the ILMI Configuration page (see Figure 6-7).

Descriptions of the ILMI statistics data fields are given in the following table.

Table 6-7. Field Descriptions for the ILMI Statistics Page

| Field Name | Field Values | Description |
|--|--|---|
| Link Resets (display only) | Default: 0 Range: N/A Format: Numeric | Number of times connectivity went down and then up again. |
| Attachment Point Changed (display only) | Default: 0 Range: N/A Format: Numeric | Number of times attachment point change was detected. |
| Attachment Point Verified (display only) | Default: 0 Range: N/A Format: Numeric | Number of times attachment point was verified successfully. |
| Secure Link Proc Initiated (display only) | Default: 0 Range: N/A Format: Numeric | Number of times the secure link procedure was initiated. |
| ILMI Timeouts (display only) | Default: 0 Range: N/A Format: Numeric | Number of times the Get Request of any type was timed out. |
| Packet Discarded (display only) | Default: 0 Range: N/A Format: Numeric | Number of times a packet (pdu) was discarded due to format error. |
| Cold Starts Transmitted (display only) | Default: 0 Range: N/A Format: Numeric | Number of times a Cold Start trap message was transmitted. |
| Cold Starts Received (display only) | Default: 0 Range: N/A Format: Numeric | Number of times a Cold Start trap message was received. |

Table 6-7. Field Descriptions for the ILMI Statistics Page

| Field Name | Field Values | Description |
|-------------------------------------|---|--------------------------------------|
| PDU's Received (display only) | Default: 0 Range: N/A Format: Numeric | Total number of packets received. |
| PDU's Transmitted (display only) | Default: 0 Range: N/A Format: Numeric | Total number of packets transmitted. |
| Time Elapsed (display only) | Default: 0 Range: N/A Format: Time in seconds (XX) | Time, in seconds, since last reset. |

Viewing Interface Utilization Information

Perform the steps in the following procedure to view interface utilization information.

Begin

- 1 Click the Utilization tab.

The Utilization page appears (see Figure 6-9).

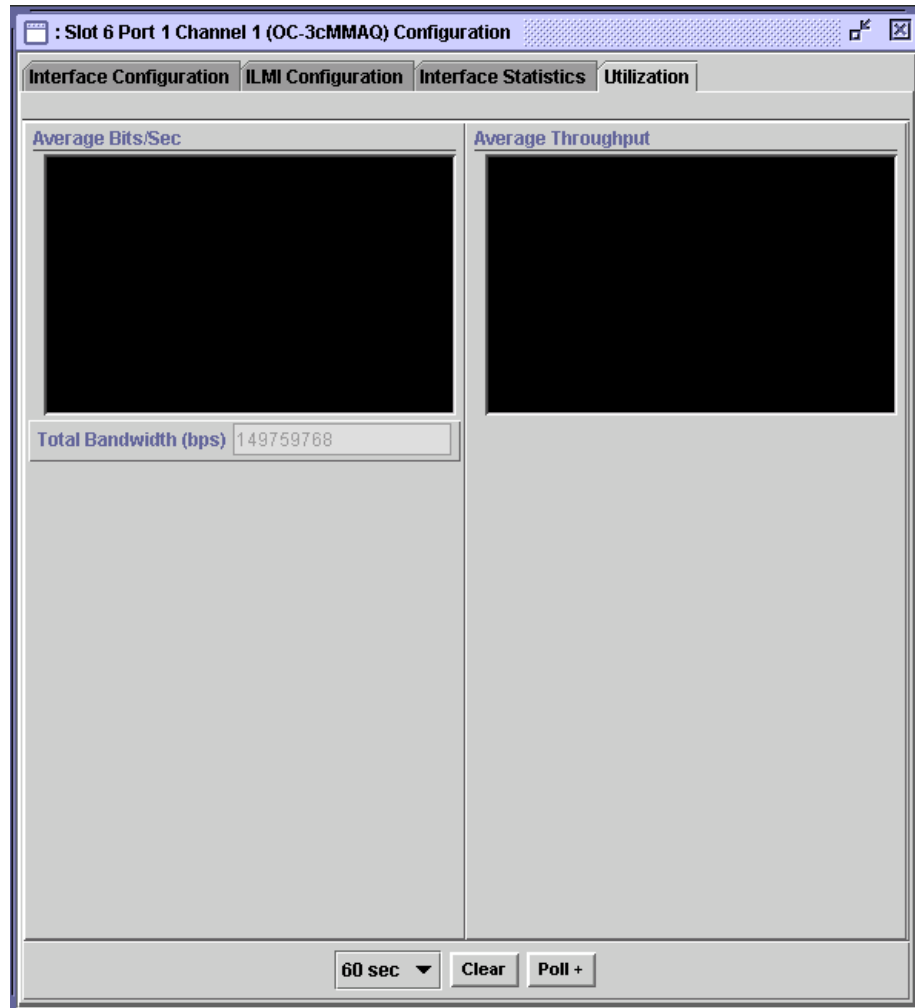


Figure 6-9. ATM PNNI Utilization Page

The buttons at the bottom of the window 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 | Removes the data in the Average Bits/Sec and Average Throughput panels. |
| Poll | Poll+ continuously updates the statistics and changes the button label to Poll- . Poll- terminates polling and changes the button label to Poll+ . |

Average Throughput/Utilization measurements for ATM interfaces may be enabled or disabled per interface (the default value is **Disabled**).

2 Select the time interval in the 60 sec field.

3 Click **Poll+** and the polling begins.

The following interface measurements are calculated and displayed:

- ~ Average number of cells per second
- ~ Average number of bits per second
- ~ Average interface utilization, displayed as a percentage of the interface speed

4 Click **Poll-** and the polling terminates.

End

For more information on the Utilization page, see the section, “Utilization Calculations,” in this chapter.

Configuring the ATM UNI Interfaces

Accessing or Viewing the ATM UNI Interface Configuration Window

This section provides instructions for configuring an I/O module for the ATM user-to-network interface (UNI) 3.0, 3.1, 4.0 and Integrated Link Management Interface (ILMI) interfaces.

After applying one of the ATM UNI interface types (**AtmUni3-0**, **AtmUni3-1** or **AtmUni4-0**) to a channel from the Channel Configuration page, do one of the following to access the ATM UNI Interface Configuration window:

- ~ 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 ATM UNI Interface Configuration window appears (see Figure 6-10 and Figure 6-11).

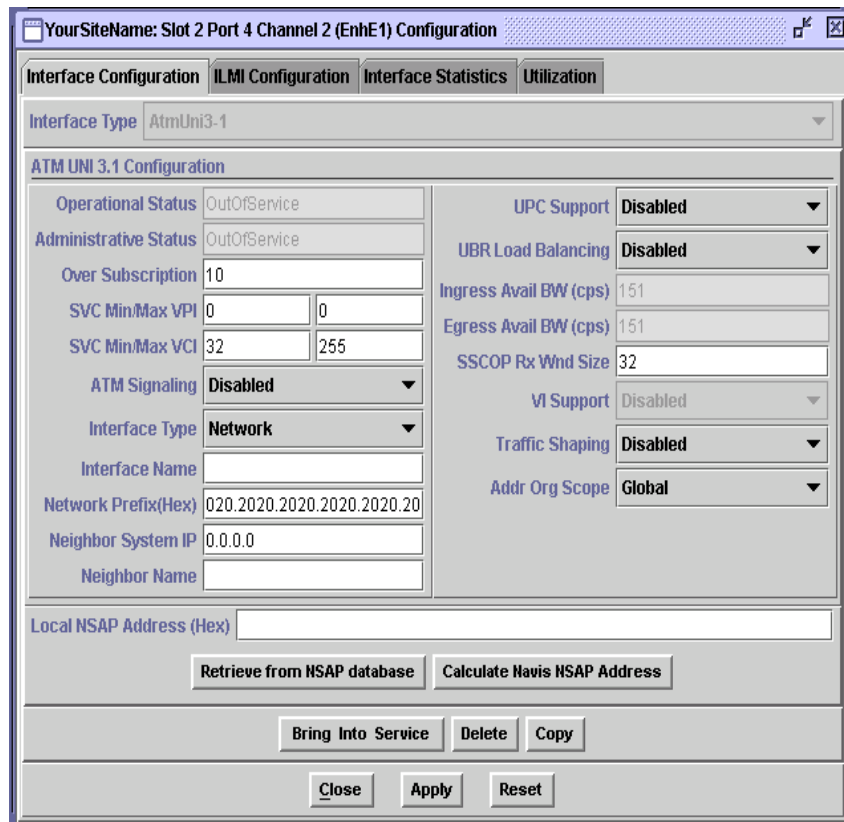


Figure 6-10. ATM UNI Interface Configuration Window (3.0 or 3.1)

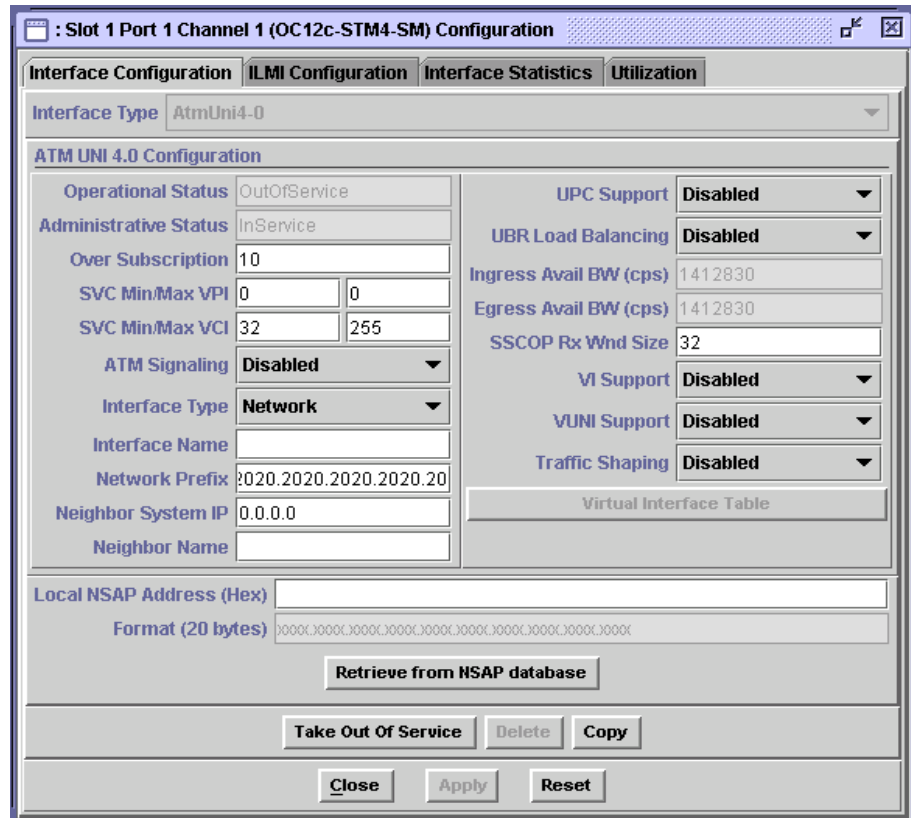


Figure 6-11. ATM UNI Interface Configuration Window (4.0)

The buttons in the ATM UNI windows 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 | Displays only when you configure user properties to include the Navis NSAP format. For more information, see the appropriate <i>Navis AQueView Element Management System User Guide</i> . 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. |

| Button | Function |
|----------------------------|---|
| Bring Into Service | Displays when the Administrative Status field is OutOfService. Brings an out-of-service configured interface to in-service status. The value InService appears in the Administrative Status field. You must first configure the interface before you can use this button. |
| Take Out of Service | Displays when the Administrative Status field is InService . Takes an in-service configured interface to out-of-service status. The value OutOfService appears in the Administrative Status field. You must use this command first before clicking the Delete . |
| Delete | Deletes an out-of-service interface and redisplay the Port and Channel Configuration window for the module you are configuring. You must first take interface out of service (by clicking Take Out of Service) before you can use this button. |
| Copy | Copies this interface to a range of slots, ports, and channels. |
| Close | Closes this window. |
| Apply | Applies the configuration field value you set. |
| Reset | Resets the fields to the last set of applied values. |

ATM UNI Interface Values

To set values for the ATM UNI interface, perform the steps in the following procedure.

Begin

- 1 Enter values for the fields on this window according to the information provided in Table 6-8.
- 2 To configure the Local NSAP Address (Hex) field, perform the steps in the section, “Adding NSAP Addresses,” in this chapter, and then return to this procedure.

- 3 To apply the interface configuration values, including the NSAP address configuration, click **Apply**.

End

Table 6-8. Field Descriptions for the ATM UNI Interface Configuration Window

| Field Name | Field Values | Description |
|--|--|---|
| Administrative Status (display only) | Default: OutOfService Range: N/A Format: Predefined alphanumeric | Displays the administrative status of the interface. |
| | OutOfService | Indicates that the interface is out of service. |
| | InService | Indicates that the interface is in service. |
| Operational Status (display only) | Default: Unconfigured Range: N/A Format: Predefined alphanumeric | Displays the operational status of the interface. |
| | Unconfigured | Indicates that this interface has not been configured. |
| | InService | Indicates that the interface is operational. |
| | OutOfService | Indicates that the interface is not operational. |
| Over Subscription | Default: 10 Range: 1–100 Format: Numeric | Specifies the risk factor for this function, which indicates the level of oversubscription allowed by the system. |
| Note: When entering the maximum and minimum VPI and VCI values in the following two fields, always enter or change the maximum value before entering the minimum value. | | |
| SVC Min/Max VPI | Default: 0 Range: 0–255 Format: Numeric | Specifies the minimum and maximum VPI values that you can assign to an SVC on this interface. Note: Disable the ATM signaling field if you want to use the value 0 for the VPI. Enter the minimum value in the left box and the maximum value in the right box. |
| SVC Min/Max VCI | Default: Min: 32 Default: Max: 255 Range: 0–65535 Format: Numeric | Specifies the minimum and maximum VCI values that you can assign to an SVC on this interface. Enter the minimum value in the left box and the maximum value in the right box. |

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Configuring the ATM UNI Interfaces

Table 6-8. Field Descriptions for the ATM UNI Interface Configuration Window

| Field Name | Field Values | Description |
|----------------------|---|---|
| ATM Signaling | Default: Disabled Range: N/A Format: Predefined alphanumeric | Specifies whether SVCs can be created on this interface. Note: The value 0 for the VPI is not available for use. |
| | Disabled | Indicates that SVCs cannot be created on this interface. |
| | Enabled | Indicates that SVCs can be created on this interface. If you want to use the ILMI protocol, you must select this value. The ILMI protocol is not required if ATM signaling is disabled. Note: The value 0 for VPI is available for use. |
| Interface Type | Default: Network Range: N/A Format: Predefined alphanumeric | Specifies whether the network or user format for cell headers will be used. Note: When you select this value, the Network Prefix field is displayed below the Interface Name field. |
| | Network | Indicates that the NNI format for the cell headers will be used. Wireless Applications: Select this value if you are configuring a link on the MSC side of a cell site-to-MSC link. |
| | User | Indicates that the UNI format for the cell headers will be used. Note: When you select this value, the User Address field is displayed below the Interface Name field. Wireless Applications: Select this value if you are configuring a link on the cell-site side of a cell site-to-MSC link. |
| Interface Name | Default: N/A Range: 0–20 characters maximum Format: Alphanumeric | Specifies a textual name of this interface. This interface must be uniquely named on this system to distinguish parallel links with a neighboring system. If you do not give this interface a textual name, the value of this object is a zero-length string. |
| Network Prefix (Hex) | Default: 2020.2020.2020.2020.20 Range: N/A Format: Hexadecimal (13-byte: 18-hexadecimal digit beginning with 39, 45 or 47) | Note: This field is displayed only when the value Network is selected in the Interface Type field. Specifies the network prefix address, which is used only for the address registration procedure of ILMI. This field represents the first 13 bytes of the 20-byte NSAP address. The last 7 bytes are the user part of this address (User Address field). |

Table 6-8. Field Descriptions for the ATM UNI Interface Configuration Window

| Field Name | Field Values | Description |
|--------------------|--|---|
| User Address | Default: 2020.2020.2020.2020.20 Range: N/A Format: Hexadecimal (13-byte: 18-hexadecimal digit beginning with 39, 45 or 47) Format: | Note: This field is displayed only then you select the value User in the Interface Type field. Specifies the user address. |
| Neighbor System IP | Default: 0.0.0.0 Range: N/A Format: Numeric | Specifies the IP address of the neighboring system. This field is used by auto-discovery protocols. The neighboring system is the attached device for an ILMI-enabled interface, or the user-configured IP address for an ILMI-disabled interface. For an ILMI-enabled interface, any user-configured value overrides the ILMI discovered values. Enter the IP address of the PSAX chassis (or other device) to which the physical connection is made using this interface. |
| Neighbor Name | Default: N/A Range: 1–20 characters maximum Format: Alphanumeric | Specifies the name of the neighboring system. This field is used for identifying the device in a network topology. Enter a descriptive name up to 20 alphanumeric characters in length for the PSAX chassis (or other device) to which the physical connection is made using this interface. |

Table 6-8. Field Descriptions for the ATM UNI Interface Configuration Window

| Field Name | Field Values | Description |
|--------------------|---|---|
| UPC Support | Default: Disabled Range: N/A Format: Predefined alphanumeric | Specifies whether usage parameter control (policing) is to be used on this interface. UPC determines if traffic control is performing to the negotiated PCR, SCR, or MBS values. This feature is supported on the following modules only: <ul style="list-style-type: none"> • OC-12c/STM-4c MM/SM 1+1 APS/MSP • OC-3c 1+1 APS SM/MM • STM-1 1+1 MSP SM/MM • High Density E1 • 12-Port Medium Density DS1 The feature is supported on the following channelized DS3 modules only (when the port(s) are channelized to DS0s): <ul style="list-style-type: none"> • 1-Port Channelized DS3 Multiservice • 1-Port DS3 IMA • Quadserial |
| | Disabled | Indicates that UPC support is disabled. Note: If UPC Support is disabled, traffic policing cannot be supported on any VC. |
| | Enabled | Indicates that UPC support is enabled, providing traffic policing support for all VCs. Note: Do not enable the UPC Support field and the Traffic Shaping field at the same time. Your interface configuration will be rejected. However, UPC Support and VI Support are compatible configuration settings. |
| UBR Load Balancing | Default: Disabled Range: N/A Format: Predefined alphanumeric | Specifies whether unspecified bit rate (UBR) load balancing is used or not. Note: The virtual interface does not support UBR load balancing. |
| | Disabled | Indicates that unspecified bit rate (UBR) load balancing on the interface is disabled. |
| | Enabled | Indicates that UBR load balancing on the interface is enabled. |

Table 6-8. Field Descriptions for the ATM UNI Interface Configuration Window

| Field Name | Field Values | Description |
|--|---|---|
| Ingress Avail BW (cps) (display only) | Default: 0 Range: Module dependent Format: Numeric | <p>Displays the total ingress bandwidth available for connections for this interface. The value 0 is changed to the cps count available for the interface after clicking Apply. The ingress available bandwidth depends on the configured module parameters, such as port strapping, type of cell mapping, configured port speed, and other factors. As each new connection is added, the amount of available bandwidth as indicated in this field may decrease. Bandwidth for UBR connections is not included, unless the UBR Load Balancing field on this interface is Enabled. You will see values in the [Ingress Avail BW] field only for connections that are in service.</p> <ul style="list-style-type: none"> • Any non-CES OC3 and STM-1 APS module will show the value 353207 • Any OC-12 module will show the value 1412830 <p>The values for other types of I/O modules that use this field vary depending on the following parameters :</p> <ul style="list-style-type: none"> • IMA - number of ports configured • DS1/E1/STS-1e - number of channels strapped • DS3/E3 - Cell Mapping (Plcp or DirectMapping) • Serial - port bandwidth configured |

Table 6-8. Field Descriptions for the ATM UNI Interface Configuration Window

| Field Name | Field Values | Description |
|---|---|---|
| Egress Avail BW (cps) (display only) | Default: 0 Range: Module dependent Format: Numeric | <p>Displays the total egress bandwidth available for connections for this interface. The value 0 is changed to the cps count available for the interface after clicking Apply. The egress available bandwidth depends on the configured module parameters, such as port strapping, type of cell mapping, configured port speed, and other factors. As each new connection is added, the amount of available bandwidth as indicated in this field may decrease. Bandwidth for UBR connections is not included, unless the UBR Load Balancing field on this interface is Enabled. You will see values in the[Egress Avail BW] field only for connections that are in service.</p> <ul style="list-style-type: none"> • Any non-CES OC3 and STM-1 APS module will show the value 353207 • Any OC-12 module will show the value 1412830 <p>The values for other types of I/O modules that use this field vary depending on the following parameters :</p> <ul style="list-style-type: none"> • IMA - IMA - number of ports configured • DS1/E1/STS-1e - number of channels strapped • DS3/E3 - Cell Mapping (Plcp or DirectMapping) • Serial - port bandwidth configured |
| SSCOP Rx Wnd Size | | The service-specific connection-oriented protocol (SSCOP) layer. This window shows the total number of packets that must be acknowledged by the receiving side before more packets are sent from the transmitting side. |
| | Default: 32 Range: 8-256 Format: Numeric | Range: On the receiving side, the window size for this value must be equal to or greater than the values for the transmitting side for fastest transmission rates. |

Table 6-8. Field Descriptions for the ATM UNI Interface Configuration Window

| Field Name | Field Values | Description |
|------------------------------------|---|--|
| VI Support | Default: Disabled Range: N/A Format: Predefined alphanumeric | Virtual interfaces connect to a module's physical ports and allow virtual channels (VCs) to be assigned to virtual trunks, each with its own priority queue. This option is available only for these modules: <ul style="list-style-type: none"> • 1-Port OC3-c 1+1 APS Multimode and Single-Mode • 1-Port STM-1 1+1 Multimode and Single-Mode • 1-Port OC-12c/STM-4c 1+1 APS/MSP Multimode and Single-Mode • 3-Port DS3/E3 ATM • 3-Port DS3/E3 ATM Protection <p>Note: To configure a virtual interface, you must select Enabled. After doing so, the Virtual Interface Table button becomes active.</p> <p>Note: This field and the Virtual Interface button below it will be ghosted if you are not configuring the ATM UNI interface on the modules in the preceding list.</p> |
| | Disabled | VI support is disabled. |
| | Enabled | Virtual interface support is enabled, providing bandwidth allocation restrictions. In order to configure a virtual interface, you must select Enabled . Note: This field is ghosted if you are not configuring the ATM UNI interface on a module that supports virtual interfaces. Note: Do not enable UPC Support and Traffic Shaping at the same time. Your interface configuration will be rejected. However, UPC Support and VI Support are compatible configuration settings. |
| VUNI Support (ATM UNI 4.0 only) | Default: Disabled Range: N/A Format: Predefined alphanumeric | Note: This field is displayed only when the value AtmUni4-0 is selected as the interface type on the module channel configuration window. Specifies whether VUNI is supported on this interface. |
| | Disabled | Disables virtual UNI support. |
| | Enabled | Enables virtual UNI support. |

Table 6-8. Field Descriptions for the ATM UNI Interface Configuration Window

| Field Name | Field Values | Description |
|--------------------------|--|---|
| Traffic Shaping | Default: Disabled Range: N/A Format: Predefined alphanumeric | An input cell selection algorithm (leaky bucket) that smooths bursts of input traffic. Available on these modules: <ul style="list-style-type: none"> • STM-1 Multimode and Single-Mode • OC-3c Multimode and Single-Mode • OC-12c/STM-4c MM/SM 1+1 APS/MSP. |
| | Disabled | Disables the feature. |
| | Enabled | Enables the feature. Note: This feature must be enabled if using rate shaping prior to egress from an ATM trunk port on the OC-3c APS or the STM-1 MSP modules. Rate shaping is not available on the OC-12c/STM-4c module. Note: Do not enable Traffic Shaping and UPC Support at the same time. Your interface configuration will be rejected. |
| Addr Org Scope | Default: Global Range: N/A Format: Predefined alphanumeric Intra Organization Organization PlusOne Community PlusOne Regional InterRegional | ATM user address organizational scope. |
| Local NSAP Address (Hex) | Default: N/A Range: N/A Format: Valid dotted quad | The ATM NSAP address of the local end of the connection, in hexadecimal notation. Enter the NSAP address of the local ATM interface (optional). |

Viewing ATM UNI Interface Statistics

To view statistics for the ATM UNI interface, on the ATM UNI Interface Configuration window, click the Interface Statistics tab.

The ATM UNI Interface Statistics page appears (see Figure 6-12).

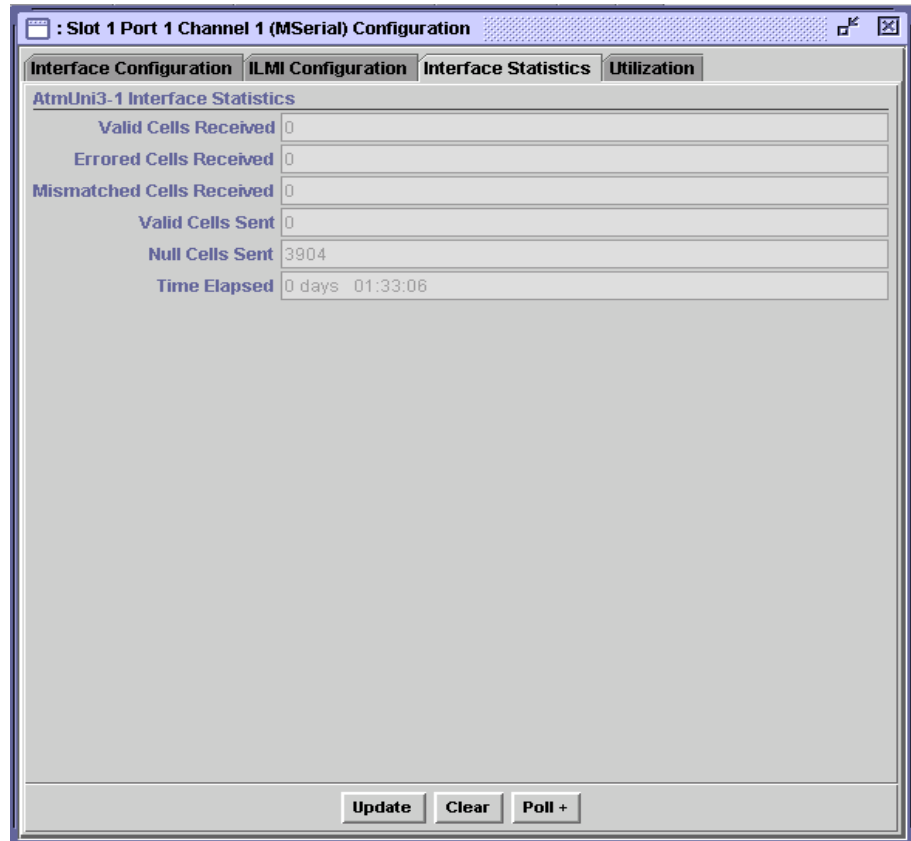


Figure 6-12. ATM UNI Interface Statistics Page

The buttons on this window have the following functions:

Table 1

| Button | Function |
|---------------|--|
| Update | Updates the information in the fields. |
| Clear | Removes the values in this window and resets them to 0. |
| Poll | Poll+ initiates the continuous update of statistics. Poll- suspends polling. |

The fields on this window are described in Table 6-9.

Table 6-9. Field Descriptions for the ATM UNI Interface Statistics Page

| Field Name | Field Values | Description |
|---------------------------|--|---|
| Valid Cells Received | Default: 0.0000 e0 Range: 0-(2 ³¹ -1) Format: Numeric | Number of valid cells received into interface side A during the amount of time shown in Time Elapsed field. |
| Errored Cells Received | Default: 0000000000 Range: N/A Format: Numeric | Number of errored cells received into interface side A during the amount of time shown in Time Elapsed field. |
| Mismatched Cells Received | Default: 0000000000 Range: N/A Format: Numeric Default: | Number of mismatched cells received into interface side A during the amount of time shown in Time Elapsed field. |
| Valid Cells Sent | Default: 0.0000 e0 Range: 0-(2 ³¹ -1) Format: Numeric | Number of valid cells transmitted out of interface side B during the amount of time shown in Time Elapsed field. |
| Null Cells Sent | Default: 0.0000 e0 Range: 0-(2 ³¹ -1) Format: Numeric | Number of null cells transmitted out of interface side B during the amount of time shown in Time Elapsed field. Note: This parameter is not supported in the OC-12c/STM-4c SM/MM 1+1 APS/MSP modules. |
| Time Elapsed | Default: 0:00:00 Range: NA Format: Time in hour (x), minutes (xx), seconds (xx) | Time elapsed since the last reset in h:mm:ss (hour: minute:seconds) format. |

Configuring the Integrated Link Management Interface (ILMI)

Accessing or Viewing the ILMI Configuration Page To display the ILMI Configuration page (see Figure 6-13), click the ILMI Configuration tab.

Setting ILMI Configuration Values To set values for ILMI configuration, perform the steps in the following procedure.

Begin

- 1 Enter values for the fields on this window according to the information provided in Table 6-10.
- 2 To apply the interface configuration values, click **Apply**.

3 To go back to the ATM UNI Interface Configuration window, click **Close**.

End

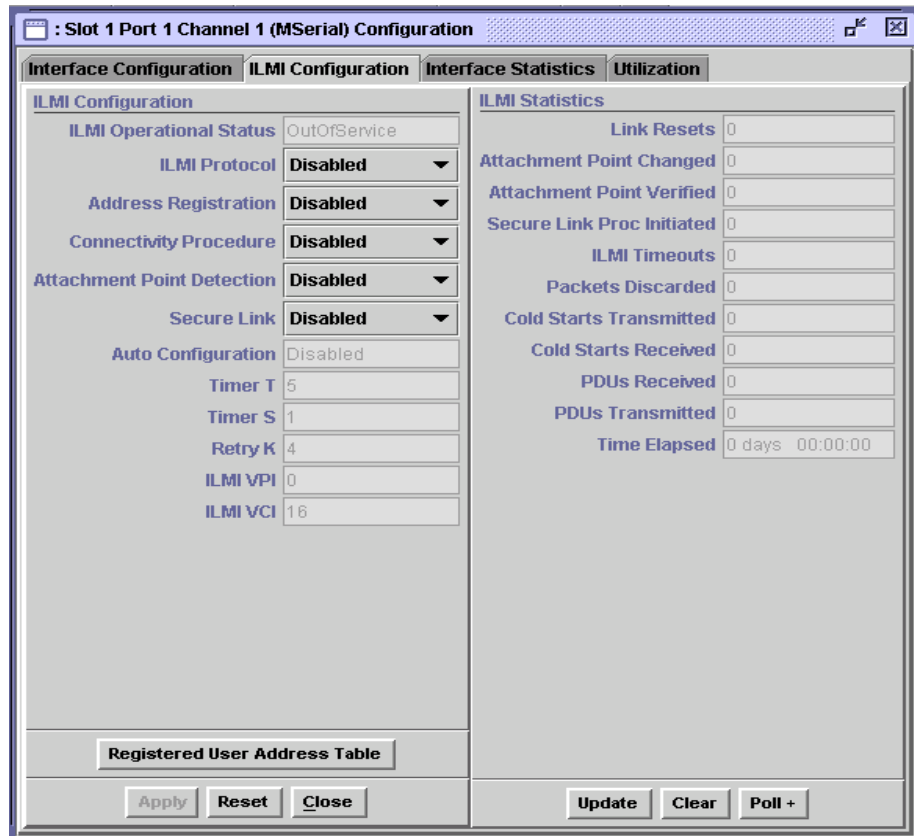


Figure 6-13. ILMI Configuration Page

The buttons in this window have the following functions:

| Button | Function |
|--------------------------------------|--|
| Registered User Address Table | Displays the Registered User Address Table. |
| Apply | Applies the configuration field values you set. |
| Reset | Resets the fields to the last set of applied values. |
| Close | Closes this window. |
| Update | Updates the information in the fields. |

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Configuring the ATM UNI Interfaces

Table 6-10. Field Descriptions for the ATM UNI ILMI Configuration Window

| Field Name | Field Values | Description |
|---|---|--|
| ILMI Operational Status (display only) | Default: OutOfService Range: N/A Format: Character | Indicates that ILMI connectivity is not operational. |
| | InService | Indicates that ILMI connectivity is operational. |
| ILMI Protocol | Default: Disabled Range: N/A Format: Character | If you select Disabled , the other fields in this window will not take effect. |
| | Enabled | Enables ILMI. |
| Address Registration | Default: Disabled Range: N/A Format: Character | Address registration can be enabled only if the ILMI Protocol field is enabled. |
| | Enabled | Enables address registration. |
| Connectivity Procedure | Default: Disabled Range: N/A Format: Character | ILMI Connectivity Procedure is disabled. You must select Enabled if you want to also enable the Attachment Point Detection and Secure Link fields. |
| | Enabled | ILMI Connectivity Procedure is enabled. |
| Attachment Point Detection | Default: Disabled Range: N/A Format: Character | Attachment Point Change Detection can be enabled only if Connectivity Procedure and ILMI Protocol fields are enabled. |
| | Enabled | A query will be sent every 5 seconds to detect a change in the address. A response indicates that the user id and address information are the same. However, if there is a change in the address, all calls will be cleared. |
| Secure Link (display only) | Default: Disabled Range: N/A Format: Character | ILMI Secure Link Procedure is disabled. It can be enabled only if Connectivity Procedure and Attachment Point Detection fields are enabled. |
| | Enabled | ILMI Secure Link Procedure is enabled. If you do not receive a response, all calls are cleared, and you will be disconnected. |
| Auto Configuration (display only) | Default: Disabled Range: N/A Format: Character | The ability to automatically configure VPI and VCI is disabled. |
| | Enabled | Automatically configures the VPI and VCI. Auto configuration can be enabled only if the ILMI Protocol field is enabled. |

Table 6-10. Field Descriptions for the ATM UNI ILMI Configuration Window

| Field Name | Field Values | Description |
|------------|---|--|
| Timer T | Default: 5 Range: Varies Format: Numeric | Timer T in seconds. Used to poll when link is operational. The value in this field in displayed as a 32-bit integer, and any number may appear. |
| Timer S | Default: 1 Range: Varies Format: Numeric | Timer S in seconds. Used to poll when link is not operational. The value in this field in displayed as a 32-bit integer, and any number may appear. |
| Retry K | Default: 4 Range: Varies Format: Numeric | Retry K in seconds. Indicates the number of time-outs before the link becomes non-operational. The value in this field in displayed as a 32-bit integer, and any number may appear. |
| ILMI VPI | Default: 0 Range: This value does not change. Format: Numeric | VPI for the ILMI protocol channel in which VPI will run. |
| ILMI VCI | Default: 16 Range: This value does not change. Format: Numeric | VCI for the ILMI protocol channel in which VCI will run. |

Viewing Registered Addresses

To set values for ILMI registered addresses, perform the steps in the following procedure.

Begin

- 1 Click **Registered User Address Table** on the ILMI Configuration page.
 The ILMI Registered User Address Table window appears (see Figure 6-14).

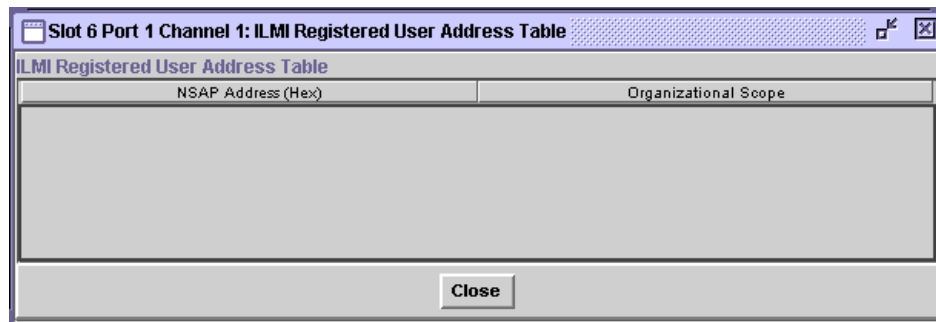


Figure 6-14. Registered User Address Table

The NSAP Address (Hex) column displays the user's registered addresses. The Org Scope column displays the scope of the registered addresses. If the scope is not set by the user, it will default to global (a value of 15).

Chapter 6 Configuring the Interfaces Using the AQueView® EMS

Configuring the ATM UNI Interfaces

2 To go back to the ATM UNI Interface Configuration window, click **Close**.

End

Viewing ILMI Statistics

You can view ILMI statistics on the ILMI Statistics panel of the ILMI Configuration page (see Figure 6-13). Descriptions of the ILMI statistics data fields are given in Table 6-11.

Table 6-11. Field Descriptions for the ILMI Statistics Page

| Field Name | Field Values | Description |
|--|--|---|
| Link Resets (display only) | Default: 0 Range: N/A Format: Numeric | Number of times connectivity went down and then up again. |
| Attachment Point Changed (display only) | Default: 0 Range: N/A Format: Numeric | Number of times attachment point change was detected. |
| Attachment Point Verified (display only) | Default: 0 Range: N/A Format: Numeric | Number of times attachment point was verified successfully. |
| Secure Link Proc Initiated (display only) | Default: 0 Range: N/A Format: Numeric | Number of times the secure link procedure was initiated. |
| ILMI Timeouts (display only) | Default: 0 Range: N/A Format: Numeric | Number of times the Get Request of any type was timed out. |
| Packet Discarded (display only) | Default: 0 Range: N/A Format: Numeric | Number of times a packet (pdu) was discarded due to format error. |
| Cold Starts Transmitted (display only) | Default: 0 Range: N/A Format: Numeric | Number of times a Cold Start trap message was transmitted. |
| Cold Starts Received (display only) | Default: 0 Range: N/A Format: Numeric | Number of times a Cold Start trap message was received. |

Table 6-11. Field Descriptions for the ILMI Statistics Page

| Field Name | Field Values | Description |
|-------------------------------------|---|--------------------------------------|
| PDU's Received (display only) | Default: 0 Range: N/A Format: Numeric | Total number of packets received. |
| PDU's Transmitted (display only) | Default: 0 Range: N/A Format: Numeric | Total number of packets transmitted. |
| Time Elapsed (display only) | Default: 0 Range: N/A Format: Time in seconds (XX) | Time, in seconds, since last reset. |

Viewing Interface Utilization Information

Perform the steps in the following procedure to view interface utilization information.

Begin

- 1 Click the Utilization tab.

The Utilization page appears (see Figure 6-15).

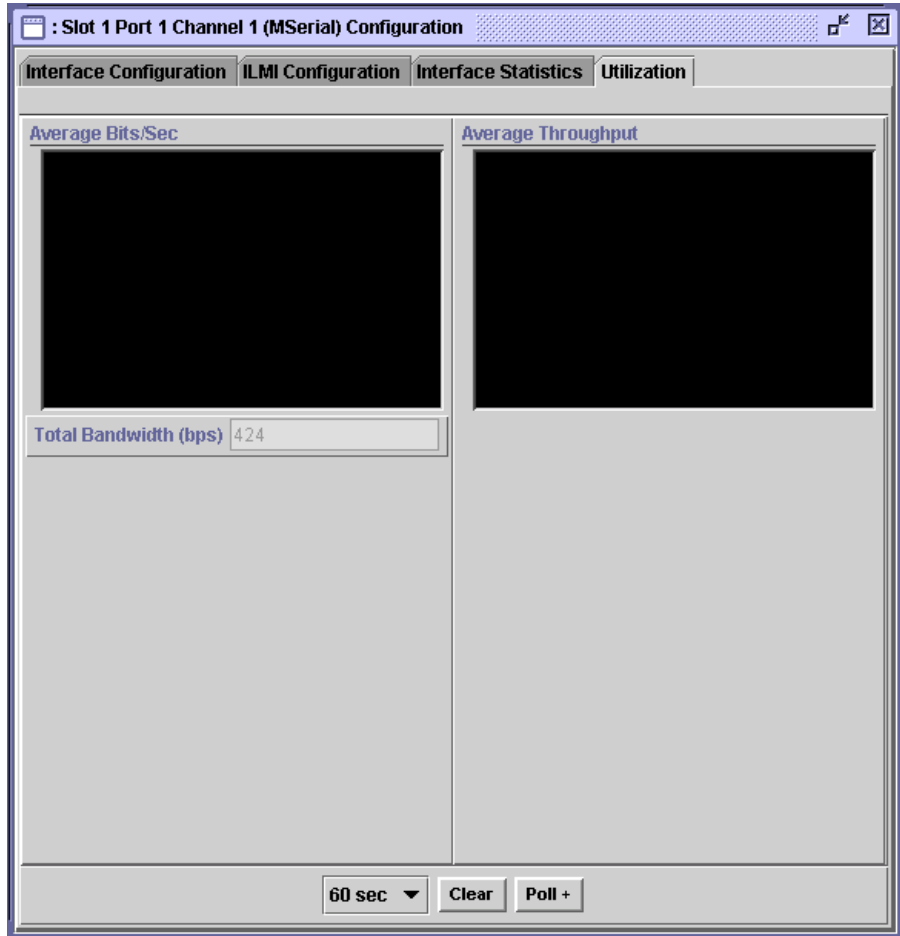


Figure 6-15. ATM UNI Utilization Page

The buttons at the bottom of the window 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 | Removes the data in the Average Bits/Sec and Average Throughput panels. |
| Poll | Poll+ continuously updates the statistics and changes the button label to Poll- . Poll- terminates polling and changes the button label to Poll+ . |

Average Throughput/Utilization measurements for ATM interfaces may be enabled or disabled per interface (the default value is **Disabled**).

2 Select the time interval in the 60 sec field.

3 Click **Poll+** and the polling begins.

The following interface measurements are calculated and displayed:

- ~ Average number of cells per second
- ~ Average number of bits per second
- ~ Average interface utilization, displayed as a percentage of the interface speed

4 Click **Poll-** and the polling terminates.

End

For more information on the Utilization page, see the section, "Utilization Calculations," in this chapter.

Correcting Errors When Applying an Interface

An error may occur when you apply an interface to channel.

- Entering field values 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)

Bringing an Interface Into Service

To bring an interface into service, click **Bring Into Service** on the appropriate Interface Configuration window, then continue to step 2 of the section, “Performing Bulk Operations,” in this chapter.

Performing Bulk Operations

Perform the steps in the following procedure to enable or disable trap messages.

Begin

- 1 Do one of the following:

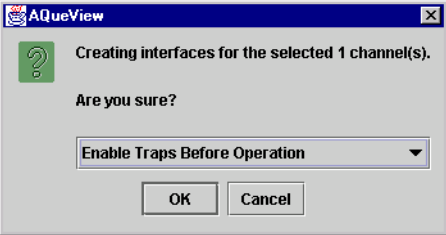
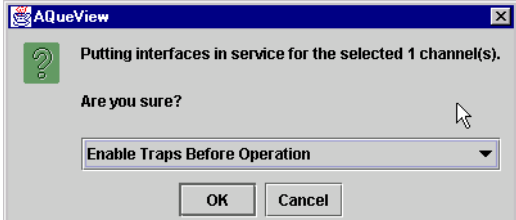
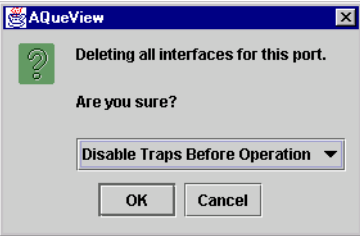
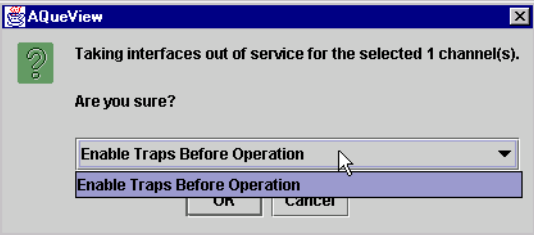
Table 6-12. Performing an Action on an Interface

| If you want to... | then do this... |
|--|--|
| create a new interface and apply it to a channel | From the Channel Configuration page, select a channel, select any value in the Interface Type field, and click Apply to Selected . |
| bring an interface into service | From the Channel Configuration page, right-click the channel(s) and a menu appears. Select Bring Selected Into Service. or From the Front Panel or the Device Tree, right-click the port and select Bring All Interfaces Into Service. |
| take an interface out of service | Right-click on the channel(s) and a menu appears. Select Take Selected Out of Service. |
| delete an interface | From the Channel Configuration page, right-click the channel(s) and a menu appears. Select Delete Selected Interfaces. or From the Front Panel or the Device Tree, right-click the port and select Delete All Interfaces. |
| | |

A confirmation window appears (see the following table).

2 Do one of the actions described in the following table.

Table 6-13. Enabling or Disabling Traps Decision Table

| If you are performing this action... | and you... | then do this... |
|--|--|--|
| <p>creating an interface and applying it to a channel</p>  <p>or</p> <p>bringing an interface into service</p>  <p>or</p> <p>deleting an interface</p>  | <p>want to enable traps</p> <p>want to disable traps</p> <p>decide not to complete this action</p> | <p>select Enable Traps Before Operation and click OK.</p> <p>select Disable Traps Before Operation and click OK.</p> <p>click Cancel.</p> |
| <p>taking an interface out of service</p>  | <p>want to enable traps</p> <p>want to disable traps</p> <p>decide not to complete this action</p> | <p>click OK.</p> <p>click Cancel. When taking an interface out of service, you cannot disable traps because the interfaceOutOfServiceNotify trap is permanently activated on the device.</p> <p>click Cancel.</p> |

The confirmation window closes.

To view the status of interface traps, click the Trap Activation tab and select **Interface Events** in the Show traps from: field at any time.

End

Copying an Interface Configuration

The **Copy** button on each Interface Configuration window allows you to copy an interface configuration to a range of channels, either from a given module, or for a range of modules¹.

To copy an interface configuration to a range of channels, perform the steps in the following procedure from the appropriate Interface Configuration window.

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 6-16). Select the range of channels to which you wish the interface configuration to be copied in the Slot, Port, and Channel fields as follows (refer to Figure 6-17):

In the Start At panel, choose the slot and port where the copying should begin. In the Stop At panel, choose the slot and port where the copying should end.

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

Note: “Overwrite” means that the existing interface will be deleted and a new interface will be created in its place. To overwrite the interface specified in the Stop At column, it must be out of service. The Disable traps during copy option is enabled by default.

- 3 Click **Copy**.

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

- 4 Click **Close**.

End

¹ If you are copying a port configuration from an I/O module with only one port, you must select different slot numbers in the Start At and Stop At panels.

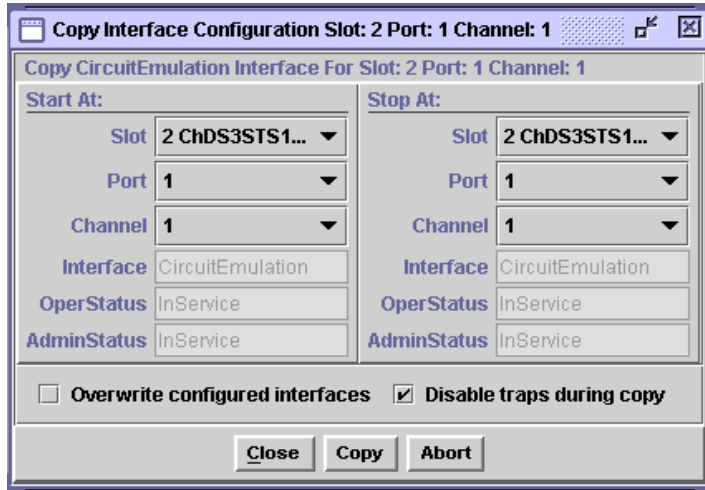


Figure 6-16. Sample Copy Interface Configuration Window (After Initially Selecting the Copy Button From a Port Configuration Page)

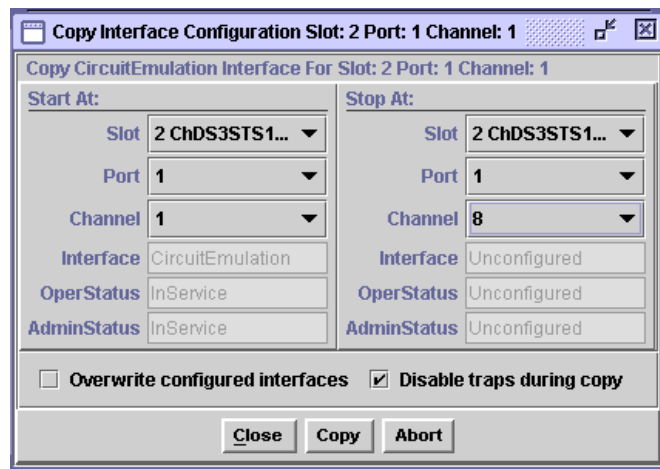


Figure 6-17. Sample Copy Interface Configuration Window (After Selecting Valid Attributes)

The buttons in this window have the following functions:

| Button | Function |
|--------------|---|
| Close | Closes this window. |
| Copy | Copies this interface to a range of channels. |
| Abort | Cancel the copying process after it is initiated. |

Changing Interface Configuration Values

If you need to change the interface configuration values at any time after the interface has been brought into service, you must take the interface out of service, delete the current interface, and then re-create another interface after configuring the desired values.

Note: The interface must have in-service status in order for the PVCs and SVCs you establish on this interface to work.

Changing ATM PNNI Interface Values

If you need to change the interface configuration values for the AdminWeight-cbr, AdminWeight-rtVbr, AdminWeight-nrtVbr, or AdminWeight-ubr fields at any time after the interface has been brought into service, you must first take the interface out of service, reconfigure the desired values, apply those values, and bring the interface back into service (see the section, "Taking the Interface Out of Service").

If you need to change the interface configuration values *other than* for the AdminWeight-cbr, AdminWeight-rtVbr, AdminWeight-nrtVbr, or AdminWeight-ubr fields at any time after the interface has been brought into service, you must first take the interface out of service, delete the interface, and then re-create the interface by configuring the desired values.

Taking the Interface Out of Service

To take the interface out of service, perform the steps in the following procedure, beginning from the Port and Channel Configuration window.

Begin

- 1 Click the Channel Configuration tab.
- 2 Select the channel to be taken out of service.
- 3 Click **Take Out Of Service**.
- 4 Press the Y key (to indicate yes) to continue.

The interface is taken out of service.

End

Deleting an Interface

To delete any interface type other than a virtual interface, perform the steps in the following procedure.

 **CAUTION:**

If you delete the interface, the current permanent virtual circuits (PVCs) and switched virtual circuits (SVCs) using this interface will be deleted from the system.

Note: To delete the interface, the interface must be out-of-service. You can see whether the interface is in or out of service by looking at the Admin Status and Oper Status fields on the channel configuration windows or the interface configuration windows. The ChnlOperStatus field on the port and channel configuration window also indicates the service status. An asterisk character after the interface type in the Chnl_OperStatus field indicates the interface is not in service; the absence of the asterisk indicates the interface is in service. Look in the command field at the bottom of each window for the command to take the interface(s) out of service, and select it if necessary.

Begin

- 1 From the Interface Configuration window, click **Delete**.

A confirmation window is displayed (see Figure 6-18).

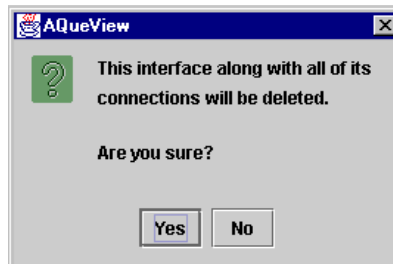


Figure 6-18. Delete Interface Confirmation Window

- 2 Click **Yes** to delete the interface.
- 3 To re-create the interface, repeat steps in the procedure, "Setting the Values for the Interface."
- 4 To save this interface configuration to the PSAX configuration database, in the Provisioning Menu Bar, click Device > Save PSAX Configuration.

Note: The interface must have in-service status in order for the PVCs and SVCs you establish on this interface to work.

End

Saving Your Configuration

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

Applied, but unsaved, configuration data will not be lost if 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 in the PSAX device, not in the *AQueView* EMS.

Provisioning Connections

For instructions on configuring connections, see your *PacketStar® PSAX System Provisioning Connections User Guide for PacketStar® PSAX Multiservice Media Gateways 255-700-377*. In using that guide, keep in mind that the following connection types are supported by the 6-Port E1 IMA module:

- PVC connections:
 - ~ ATM-to-ATM virtual channel connection (VCC)
 - ~ ATM-to-ATM virtual path connection (VPC)
 - ~ Bridge-to-ATM virtual channel connection (VCC) (z)
 - ~ Circuit Emulation-to-ATM virtual channel connection (VCC)
 - ~ Variable bit rate (VBR)-to-ATM virtual channel connection (VCC)
 - ~ AAL2 Trunk Connection (w)
- SVC connections:
 - ~ ATM-to-ATM virtual channel connection VCC (n)
 - ~ ATM IISP CBR connection
 - ~ ATM IISP VBR connection
- SPVC connections:
 - ~ ATM-to-ATM virtual channel connection (VCC) (z)
 - ~ Circuit Emulation-to-ATM virtual channel connection (VCC) (y)
 - ~ Circuit Emulation-to-ATM Std AAL2 virtual channel connection (VCC)
 - ~ Variable bit rate (VBR)-to-ATM virtual channel connection (VCC) (w)

A Pin Configurations



Overview of This Appendix

This appendix describes the connector pin assignments for the 6-Port E1 IMA module.

Configuration for the DS1/T1/E1 Interface Cable Connector

A 6-Port DS1/T1/E1 interface using an RJ-45 connector provides connectivity on the 6-Port E1 IMA module. See Table A-1 for descriptions of the RJ-45 connector pin assignments.

Table A-1. Pin Assignments for the RJ-45 Connector on the 6-Port E1 IMA Module

| Pin | Description |
|-----|--------------|
| 1 | Rx Ring |
| 2 | Rx Tip |
| 3 | Not used |
| 4 | Tx Ring |
| 5 | Tx Tip |
| 6 | Frame Ground |
| 7 | Not used |
| 8 | Not used |

A-
Configuration for the DS1/T1/E1 Interface Cable Connector

B Reference Information



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

ATM Traffic Descriptors

Purpose of Traffic Descriptors

When you create a PVC, you can select one of several traffic descriptors by entering the desired value in the Conformance Type field on the user interface windows for certain connection types. 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.

Connections Supporting Traffic Descriptors

The traffic descriptors used in the *PacketStar* Multiservice Media Gateway system software are supported for the following types of connections:

- ATM-to-ATM VCC PVC
- ATM-to-ATM VPC PVC
- Bridge-to-ATM VCC PVC
- Circuit Emulation-to-ATM VCC PVC
- Frame Relay-to-ATM VCC PVC
- In-band ATM PVC

- VBR-to-ATM VCC PVC

Traffic Descriptors Supported

The available traffic descriptors are as follows:

- 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.

SPVC Connection Cause Codes Table for Connection Retry

SPVC connection cause codes, displayed in the Last Rls Cause field on all the SPVC connection configuration windows, are provided in Table B-2. The word Yes in the “Prompts a Retry” column indicates that if the cause code number, shown in the “Cause Code” column, is reported by the equipment at the far (remote) end, the PSAX system will try to establish the connection again up to the number of times specified in the Retry Limit field on the SPVC connection configuration windows. The ATM Forum UNI and Frame Relay Forum FRF.4 standards use many (but not all) of the same cause codes, and these standards reference ITU-T standards for many of the cause codes.

Table B-2. Connection Cause Codes for SPVCs

| Cause Code | Description | Prompts a Retry | Referenced Standard |
|------------|--|-----------------|-----------------------|
| 1 | Unallocated (unassigned) number. The called party number is not currently assigned. As a result, the called party cannot be reached. | No | ITU-T Q.850 |
| 2 | No route to specified transit network. The equipment sending this cause code received a request to route the call through an unknown transit network. The transit network is unknown to the equipment because it does not exist or does not serve the equipment. | No | ITU-T Q.850 |
| 3 | No route to destination. The network through which the call was routed does not serve the destination. As a result, the called party cannot be reached. | Yes | ITU-T Q.850 |
| 10 | VCC is unacceptable. The VPI/VCI is unacceptable to the sending entity for use in the call. | No | ATM Forum UNI 3.0/3.1 |
| 16 | Normal call clearing. | No | ITU-T Q.850 |
| 17 | User is busy. The called party is unable to accept another call because the user-busy condition has been encountered. | Yes | ITU-T Q.850 |
| 18 | No user is responding. A called party did not respond to a call establishment message with either an alerting or connect indication within a designated time period. | No | ITU-T Q.850 |

Appendix B Reference Information

SPVC Connection Cause Codes Table for Connection Retry

Table B-2. Connection Cause Codes for SPVCs (Continued)

| Cause Code | Description | Prompts a Retry | Referenced Standard |
|------------|--|-----------------|-----------------------|
| 21 | Call was rejected. Although the equipment sending this cause code is neither busy nor incompatible, the equipment sending this cause code does not want to accept the call. The cause can be generated by the network to indicate that the call might have been cleared as a result of a supplementary service constraint. | No | ITU-T Q.850 |
| 22 | Number was changed. The number of the called party is no longer assigned. A new number must be used to call the called party. | No | ITU-T Q.850 |
| 23 | User rejects all calls with calling line identification restriction (CLIR). The called party returns this cause code when the call comes in without calling party number information and the called party requires this information. | No | ATM Forum UNI 3.0/3.1 |
| 27 | Destination is out of order. The user cannot reach the destination because the interface to the destination is not functioning properly; that is, a signaling message could not be delivered to the destination. | Yes | ITU-T Q.850 |
| 28 | Number format is not valid (address incomplete). The called party is unreachable because the number of the called party is not in the proper format or it is not complete. | No | ITU-T Q.850 |
| 30 | Response to STATUS ENQUIRY. A STATUS message was sent in response to receipt of a STATUS ENQUIRY message. | Yes | ITU-T Q.850 |
| 31 | Normal unspecified. A normal event occurred for which no other cause applies. As a result, the event is normal but unspecified. | No | ITU-T Q.850 |
| 32 | Too many pending ADD PARTY requests currently exist. | Yes | ATM Forum PNNI 1.0 |
| 35 | Requested VPCI/VCI is not available. The SPVC attempted to use a VPCI/VCI that is unavailable. | Yes | ITU-T Q.2610 |
| 36 | VPCI/VCI assignment failure. A VPCI/VCI could not be assigned to the SPVC. | Yes | ITU-T Q.2610 |
| 37 | User cell rate is unavailable. The requested cell rate is unavailable for the SPVC. | Yes | ITU-T Q.2610 |
| 38 | Network is out of order (not used in this implementation agreement). The problem will probably last a long period of time; that is, an immediate retry of the call is not likely to succeed. | Yes | ITU-T Q.850 |
| 41 | Temporary failure. The problem will probably last a short period of time; that is, an immediately retry of the call has a good chance to succeed. | Yes | ITU-T Q.850 |

Appendix B Reference Information

SPVC Connection Cause Codes Table for Connection Retry

Table B-2. Connection Cause Codes for SPVCs (Continued)

| Cause Code | Description | Prompts a Retry | Referenced Standard |
|------------|---|-----------------|-----------------------|
| 43 | Access information was discarded. The network failed to deliver access information to the remote user (for example, user-to-user, low-layer compatibility, high-layer compatibility, or subaddress). | Yes | ITU-T Q.850 |
| 44 | Circuit is unavailable. The requested circuit or channel is not available. | No | ITU-T Q.850 |
| 45 | No VPCI/VCI is available. A VPCI/VCI is not available for the SPVC. | Yes | ITU-T Q.2610 |
| 47 | Resource is unavailable or unspecified. A resource is unavailable, and no other cause code exists to report this event. | Yes | ITU-T Q.850 |
| 49 | Quality of service is unavailable. The requested QoS class is unavailable for the SPVC. | No | ITU-T Q.850 |
| 51 | User cell rate is unavailable. The requested cell rate is unavailable for the SPVC. | Yes | ATM Forum UNI 3.0/3.1 |
| 53 | PGL was changed. The call was cleared due to a change in the peer group leader (PGL). | No | ATM Forum PNNI 1.0 |
| 57 | Bearer capability is not authorized. The SPVC user requested a bearer capability for which the user is not authorized. | No | ITU-T Q.850 |
| 58 | Bearer capability is not presently available. The SPVC user requested a bearer capability that is not available at this time. | No | ITU-T Q.850 |
| 63 | Service or option is unavailable or unspecified. A service or option is unavailable, and no other cause code exists to report this event. | No | ITU-T Q.850 |
| 65 | Bearer capability is not implemented. The equipment that generated this cause code does not support the requested bearer capability. | No | ITU-T Q.850 |
| 73 | Combination of traffic parameters is not supported. | No | ATM Forum UNI 3.0/3.1 |
| 78 | AAL parameters cannot be supported. | No | ITU-T Q.2610 |
| 81 | Call reference value is not valid. The equipment that sends this cause code has received a message with a call reference that is not currently in use on the user-network interface. | No | ITU-T Q.850 |
| 82 | Identified channel does not exist. The equipment sending this cause code received a request to use a channel that was not activated on the call interface. For example, if a user subscribed to those channels on a primary rate interface numbered from 1 to 12, this cause code would be generated if the user equipment or the network attempts to use channels 13 through 23. | No | ITU-T Q.850 |
| 88 | Incompatible destination. The equipment sending this cause code received a request to establish a call with low-layer compatibility, or other compatibility attributes that cannot be accommodated, for example, data rate. | No | ITU-T Q.850 |

Appendix B Reference Information

SPVC Connection Cause Codes Table for Connection Retry

Table B-2. Connection Cause Codes for SPVCs (Continued)

| Cause Code | Description | Prompts a Retry | Referenced Standard |
|------------|---|-----------------|-----------------------|
| 89 | Endpoint reference is not valid. The equipment sending this cause code received a message with an endpoint reference that is currently not in use on the user-network interface. | No | ATM Forum UNI 3.0/3.1 |
| 91 | Transit network selection is not valid. A transit network identification was received that is not formatted correctly. Correct formats are defined in the standard, Q.931, Annex C. | No | ITU-T Q.850 |
| 92 | Too many pending ADD PTY requests were generated on the SPVC. This condition occurs when the calling party sends an ADD PTY request, but the network cannot accept another ADD PTY message because its queues are full. This condition is temporary. | No | ATM Forum UNI 3.0/3.1 |
| 93 | AAL parameters cannot be supported. | No | ITU-T Q.2610 |
| 95 | Unspecified message is not valid. This cause code reports a message event that is not valid when no other message cause code that is not valid applies. | No | ITU-T Q.850 |
| 96 | Mandatory information element is missing. The equipment sending the cause code received a message that is missing a mandatory information element. | No | ITU-T Q.850 |
| 97 | Message type is nonexistent or not implemented. The equipment sending the cause code received one of the following message types: <ul style="list-style-type: none"> • Not defined • Defined but not implemented by the equipment sending the cause code | No | ITU-T Q.850 |
| 99 | Information element is nonexistent or not implemented. The equipment sending the cause code received a message that includes information elements or parameters that meet one of the following criteria: <ul style="list-style-type: none"> • Not recognized because the elements or parameters are not defined • Defined but not implemented by the equipment sending the cause code <p>The cause code indicates that the elements or parameters were discarded. However, the information element is not required to be present in the message so that the equipment sending the cause code can process the message.</p> | No | ITU-T Q.850 |
| 100 | Information element content is not valid. The equipment sending this cause code received an information element that the equipment has implemented, but one or more fields in the information element are coded in a way that has not been implemented. | No | ITU-T Q.850 |
| 101 | Message type is not compatible with call state. A message was received that is incompatible with the call state. | Yes | ITU-T Q.850 |

Table B-2. Connection Cause Codes for SPVCs (Continued)

| Cause Code | Description | Prompts a Retry | Referenced Standard |
|------------|--|-----------------|-----------------------|
| 102 | Recovery on timer expiration. A procedure has been initiated by the expiration of a timer that is related to error handling procedures. | Yes | ITU-T Q.850 |
| 104 | Message length is not correct. | No | ATM Forum UNI 3.0/3.1 |
| 111 | Unspecified protocol error. A protocol error occurred for which no defined protocol error exists. | No | ITU-T Q.850 |
| 127 | Optional information element content error (nonstandard). This cause code indicates the occurrence of internetworking with a network that does not provide cause codes for actions that it takes. The precise cause for any message that is sent cannot be determined. | No | ITU-T Q.850 |
| 128 | Next node is unreachable. | No | ATM Forum PNNI 1.0 |
| 160 | DTL transit is not my node ID. | No | ATM Forum PNNI 1.0 |

DSP Tone Detection Modes Table

Table B-3. DSP Tone Detection Modes¹ 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 Circuit Emulation-to-ATM VCC PVC Connection window

Appendix B Reference Information

DSP2C Module Channel Reduction When Using Fax Relay Mode

DSP2C Module Channel Reduction When Using Fax Relay Mode

Table B-4. 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 |
| 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

Compliance specifications for the *PacketStar*[®] PSAX Multiservice Media Gateway I/O and server modules are contained in Table B-5.

Table B-5. 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/Multimode/APS, STM-1 Single-Mode/Multimode/MSP, OC-12c/STM-4c, and Quadserial modules | af-ilmi-0065.000 Integrated Local Management Interface (ILMI) | |
| 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/Multimode/APS, STM-1 Single-Mode/Multimode/MSP, OC-12c/STM-4c, and Quadserial modules | af-pnni-0026.000 Interim Inter-Switch Signaling Protocol (IISP) | |

Appendix B Reference Information

Industry Compliance Specifications

Table B-5. Industry Compliance Specifications (Continued)

| Feature Name/Product Name | Specification Title | Notes |
|---|---|--|
| 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/Multimode/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 |
| 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/Multimode/APS, STM-1 Single-Mode/Multimode/MSP, OC-12c/STM-4c, and Quadserial modules | af-sig-0061.000 User-Network Interface (UNI) 4.0 | |
| Traffic Management (UPC Support) Route Server-to-ATM Interworking | af-tm-0121.000 Traffic Management, Usage Parameter Control | Route Server-to-ATM Interworking: Section 5.5 |

Table B-5. Industry Compliance Specifications (Continued)

| Feature Name/Product Name | Specification Title | Notes |
|---|---|-----------------------------------|
| 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/Multimode/APS, STM-1 Single-Mode/Multimode/MSP, OC-12c/STM-4c, and Quadserial modules | af-uni-0010.001 User-Network Interface (UNI) 3.0 | |
| PSAX 1000 Multiservice Media Gateway 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/Multimode/APS, STM-1 Single-Mode/Multimode/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 Narrow-band Services | af-vmoa-0145.000 Voice and Multimedia Over ATM-Loop Emulation Service Using AAL2 | |
| 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) |
| AAL2 Trunking | af-vtoa-0089.000 ATM Trunking Using AAL1 for Narrow Band Services V1.0 | |

Appendix B Reference Information

Industry Compliance Specifications

Table B-5. Industry Compliance Specifications (Continued)

| Feature Name/Product Name | Specification Title | Notes |
|--|---|-------|
| I.610 OAM F4/F5 Processing (remote defect indication [RDI] and alarm indication signal [AIS]) | af-vtoa-0098.000 VTOA AAL1 Trunking Services | |
| | af-vtoa-0119.000 Low Speed Circuit Emulation Service | |
| 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 Narrow-band Services DS1 IMA, E1 IMA, Enhanced DS1, DS3 ATM, DSP2C Voice Server, and OC-3c Single-Mode or Multimode modules | ANSI T1.403 Network-to-Customer Installation-DS1 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 | |
| GR-303 DLC Services | ANSI T1.409 Network-to-Customer Installation Interfaces- Analog Voice Grade Special Access Lines Using E&M Signaling | |

Table B-5. Industry Compliance Specifications (Continued)

| Feature Name/Product Name | Specification Title | Notes |
|--|--|--|
| GR-303 DLC Services VTOA AAL2 Trunking Narrow-band 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 Narrow-band 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 |
| | DSL Forum TR 017 ATM over ADSL Recommendations | |
| GR-303 DLC Services VTOA AAL2 Trunking Narrow-band Services | EIA-464-B Requirements for Private Branch Exchange (PBX) Switching Equipment | |
| | 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. |

Appendix B Reference Information

Industry Compliance Specifications

Table B-5. Industry Compliance Specifications (Continued)

| Feature Name/Product Name | Specification Title | Notes |
|---|--|-------|
| | 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 | |
| | GR-820-CORE OTGR Section 5.1 Generic Transmission Surveillance | |
| 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 | |
| | 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 | |
| | 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 | |
| | IETF RFC 2364 PPP Over AAL5 | |

Table B-5. Industry Compliance Specifications (Continued)

| Feature Name/Product Name | Specification Title | Notes |
|--|---|-------|
| | <p>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</p> | |
| | <p>ITU-T G.702 General Aspects of Digital Transmission Systems— Terminal Equipment: Digital Hierarchy Bit Rates</p> | |
| <p>1.544 Mbps, 2.048 Mbps, 44.736 Mbps; includes channel-associated signaling (CAS) ABCD in-band signaling</p> | <p>ITU-T G.704 Synchronous frame structures used at 1544, 6312, 2048, 8488 and 44 736 Kbps hierarchical levels</p> | |
| | <p>ITU-T G.706 Frame alignment and cyclic redundancy check (CGC) procedures relating to basic frame structures defined in Recommendation G.704</p> | |
| | <p>ITU-T G.707 Transmission Systems and Media—Digital transmission systems— Terminal equipment— General: Network node interface for the synchronous digital hierarchy (SDH)</p> | |
| <p>Annex A: Voice compression (8 Kbps) Annex B: Silence suppression</p> | <p>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)</p> | |
| | <p>ITU-T G.732 General Aspects of Digital Transmission Systems Terminal Equipments: Characteristics of Primary PCM Multiplex Equipment Operating at 2048 Kbit/s</p> | |

Appendix B Reference Information

Industry Compliance Specifications

Table B-5. Industry Compliance Specifications (Continued)

| Feature Name/Product Name | Specification Title | Notes |
|---|---|--|
| | 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 | |
| | 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 | |
| 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 |
| | 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. |

Table B-5. Industry Compliance Specifications (Continued)

| Feature Name/Product Name | Specification Title | Notes |
|---|--|--|
| | 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 H.248 H.248 Base Root Package | Annex E.2 |
| | 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 | |
| | 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 | |

Appendix B Reference Information

Industry Compliance Specifications

Table B-5. Industry Compliance Specifications (Continued)

| Feature Name/Product Name | Specification Title | Notes |
|---|--|---|
| | 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 | |
| | 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 | |
| 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 | |

Table B-5. Industry Compliance Specifications (Continued)

| Feature Name/Product Name | Specification Title | Notes |
|---|--|---------|
| | ITU-T I.432.2 B-ISDN User-Network- Physical Layer Specification: 155 520 Kbps and 622 080 Kbps operation | |
| | 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, Route Server, High-Density E1, High Speed, Medium-Density DS1, Multi-Serial, Quadserial, OC-3c Single-Mode/Multi-mode/APS, STM-1 Single-Mode/Multimode/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 | |

Appendix B Reference Information

Industry Compliance Specifications

Table B-5. Industry Compliance Specifications (Continued)

| Feature Name/Product Name | Specification Title | Notes |
|---|--|-------|
| <ul style="list-style-type: none"> • AAL1 Trunking CCS (Q.931) • AAL1 Trunking CCS (Q.931/QSIG), AAL1 Trunking CAS • AAL2 Trunking CCS (Q.931) | <p>ITU-T Q.931</p> <p>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</p> | |
| | <p>ITU-T Q.933 Annex A</p> <p>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</p> | |
| ATM UNI interfaces (3.0, 3.1, 4.0) | <p>ITU-T Q.2110</p> <p>B-ISDN SAAL Service Specific Connection Oriented Protocol (SSCOP)</p> | |
| ATM UNI interfaces (3.0, 3.1, 4.0) | <p>ITU-T Q.2130</p> <p>B-ISDN SAAL Service Specific Coordination Function (SSCF) for Support of Signaling at the User-Network Interface</p> | |
| | <p>ITU-T Q.2931</p> <p>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</p> | |
| | <p>ITU-T Q.2941.2</p> <p>Draft: Broadband Integrated Services Digital Network (B-ISDN)- Digital Subscriber Signaling System No. 2 (DSS2): Generic identifier transport (</p> | |

Table B-5. Industry Compliance Specifications (Continued)

| 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 | |
| | X.144 User information transfer performance parameters for data networks providing international frame relay PVC service | |

Appendix B Reference Information

Interface Type by Connection Type

Interface Type by Connection Type

Table B-6. Connection Type by Interface Type Table

| Interface | ATM IISP (Network/User) | ATM IMA | ATM PNNI 1.0 | ATM UNI 3.0/3.1/4.0 | Bridge | CAS TrunkLine | Circuit Emulation | Dynamic BW Circuit Emul. | Frame Relay (UNI, NNI) | GR-303 | HDLC Pass-through | PRI ISDN (Network/User) | Terminal Emulation | Virtual Interface (OC-3, STM-1, OC-12/STM-4 APS/MSP Modules Only) |
|---|-------------------------|---------|--------------|---------------------|--------|---------------|-------------------|--------------------------|------------------------|--------|-------------------|-------------------------|--------------------|---|
| Connection | | | | | | | | | | | | | | |
| AAL2 Trunking | X | X | X | X | | | | | | | | | | X |
| ATM-to-ATM virtual channel connection (VCC) PVC | X | X | X | X | | | | | | | | | | X |
| ATM-to-ATM virtual path connection (VPC) PVC | X | X | X | X | | | | | | | | | | |
| Bridge-to-ATM VCC PVC | X | X | X | X | X | | | | | | | | | X |
| Bridge-to-bridge PVC | | | | | X | | | | | | | | | |
| Circuit emulation-to ATM VCC PVC | X | 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 | | | | | X |
| Frame relay-to-frame relay PVC | | | | | | | | | X | | | | | |
| In-band management ATM PVC | X | X | X | X | | | | | | | | | | |
| Variable bit rate (VBR)-to-ATM VCC PVC | X | X | X | X | | | | | | | X | | X | X |
| VBR-to-VBR PVC | | | | | | | | | | | X | | X | |
| ATM-to-ATM IISP constant bit rate (CBR) SVC | X | X | X | X | | | | | | | | | | |
| ATM-to-ATM IISP VBR SVC | X | X | X | X | | | | | | | | | | |
| ATM-to-ATM VCC SPVC | X | X | X | X | | | | | | | | | | |

Table B-6. Connection Type by Interface Type Table (Continued)

| Interface | ATM IISP (Network/User) | ATM IMA | ATM PNNI 1.0 | ATM UNI 3.0/3.1/4.0 | Bridge | CAS TrunkLine | Circuit Emulation | Dynamic BW Circuit Emul. | Frame Relay (UNI, NNI) | GR-303 | HDLC Pass-through | PRI ISDN (Network/User) | Terminal Emulation | Virtual Interface (OC-3, STM-1, OC-12/STM-4 APS/MSP Modules Only) |
|-----------------------------------|-------------------------|---------|--------------|---------------------|--------|---------------|-------------------|--------------------------|------------------------|--------|-------------------|-------------------------|--------------------|---|
| Connection | | | | | | | | | | | | | | |
| Circuit emulation-to-ATM VCC SPVC | X | X | X | X | | | X | X | | | | | | X |
| CE-to-ATM Std AAL2 VCC SPVC | | X | X | X | | | X | | | | | | | |
| Frame relay-ATM VCC SPVC | X | X | X | X | | | | | X | | | | | |
| VBR-to-ATM VCC SPVC | X | X | X | X | X | | | | | | X | | X | |
| VBR-to-ATM Std AAL2 VCC SPVC | | X | X | X | | | | | | | X | | X | |

Interface Type by I/O Module Type

Table B-7 shows the available interface types for each *PacketStar* PSAX I/O module used in the *PacketStar* PSAX Multiservice Media Gateway. This table does not include other PSAX modules that are not I/O modules, which include: the Alarm module, the DSP2x Voice Server modules, the Route Server module, and the Tones and Announcements Server module.

Table B-7. Interface Types by I/O Module Types

| 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 | Virtual |
|--|-------------------------|---------|--------------|-------------|-----------------|--------|---------------|-------------------|-------------------------------------|------------------------|--------|-------------------|-------------------------|---------|--------------------|---------|
| Module | | | | | | | | | | | | | | | | |
| DS1/T1 Interface Modules | | | | | | | | | | | | | | | | |
| 6-Port DS1 IMA (IMA DS1) | X | X | X | X | X | | | | | | | | | | | |
| 6-Port Enhanced DS1/T1 Multiservice (DS1/T1 Enh) | X | | X | | X | | X | X | X | X | X | X | X | | | |

Appendix B Reference Information

Interface Type by I/O Module Type

Table B-7. Interface Types by I/O Module Types (Continued)

| 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 | Virtual |
|---|----------------------------|---------|--------------|-------------|-----------------|--------|---------------|-------------------|--|---------------------------|--------|-------------------|----------------------------|---------|--------------------|---------|
| Module | | | | | | | | | | | | | | | | |
| 12-Port Medium-Density DS1 Multiservice (MD DS1) | X | | X | X | X | | | X | | X | X | X | X | | | |
| 12-Port Medium-Density DS1 IMA (MD DS1 IMA) | X | X | X | X | X | | | | | | | X | | | | |
| 12-Port Medium-Density DS1/E1/DS0A CES (MD DS1/E1/DS0A CES) | | | | | | | | 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 | | | |
| 21-Port High-Density E1 IMA (HD E1 IMA) | X | X | X | X | X | | | | | | | | | | | |
| DS3, E3, and STS-1e Interface Modules | | | | | | | | | | | | | | | | |
| 1-Port Channelized DS3 Multiservice (CH DS3) | X | | X | X | X | | X | X | | X | X | X | X | | | |
| 1-Port Channelized DS3 CES (CH DS3) | | | | | | | | | | | | | | | | |

Table B-7. Interface Types by I/O Module Types (Continued)

| 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 | Virtual |
|---|----------------------------|---------|--------------|-------------|-----------------|--------|---------------|-------------------|--|---------------------------|--------|-------------------|----------------------------|---------|--------------------|---------|
| Module | | | | | | | | | | | | | | | | |
| 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 | X | | | | | | | | | | | |
| 2-Port E3 ATM (E3 ATM) | X | | X | X | X | | | | | | | | | | | |
| 3-Port Channelized DS3/STS-1e CES (CH DS3/STS-1e) | | | | | | | X | X | | | X | | X | | | |
| 3-Port Channelized DS3/STS-1e CES Protection (CH DS3/STS-1e) | | | | | | | X | X | | | X | | X | | | X |
| 3-Port DS3/E3 ATM (DS3/E3 ATM) | X | | X | X | X | | | | | | | | | | | 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-3/OC-3c Interface Modules | | | | | | | | | | | | | | | | |
| 1-Port OC-3c Single-Mode with AQueMan (OC-3c SM AQ) | X | | X | X | X | | | | | | | | | | | |

Appendix B Reference Information

Interface Type by I/O Module Type

Table B-7. Interface Types by I/O Module Types (Continued)

| 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 | Virtual |
|---|----------------------------|---------|--------------|-------------|-----------------|--------|---------------|-------------------|--|---------------------------|--------|-------------------|----------------------------|---------|--------------------|---------|
| Module | | | | | | | | | | | | | | | | |
| 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 | | | | | | | | | | | X |
| 1-Port OC-3c 1+1 APS Single-Mode (OC-3c SM APS) | X | | 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 | | | | | | | | | | | X |

Table B-7. Interface Types by I/O Module Types (Continued)

| 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 | Virtual | |
|--|----------------------------|---------|--------------|-------------|-----------------|--------|---------------|-------------------|--|---------------------------|--------|-------------------|----------------------------|---------|--------------------|---------|---|
| Module | | | | | | | | | | | | | | | | | |
| 1-Port STM-1 1+1 MSP Single-Mode (STM-1 SM MSP) | X | | X | X | X | | | | | | | | | | | | X |
| OC-12c/STM-4c Interface Modules | | | | | | | | | | | | | | | | | |
| 1-Port OC-12c/STM-4c Multimode (OC-12c/STM-4c MM) | X | | X | X | X | | | | | | | | | | | | X |
| 1-Port OC-12c/STM-4c Single-Mode (OC-12c/STM-4c SM) | X | | X | X | X | | | | | | | | | | | | X |
| Voice 2-Wire Interface Modules | | | | | | | | | | | | | | | | | |
| 4-Port Voice 2-Wire Office (VOICE 2WO) | | | | | | | | X ¹ | | | | | | | | | |
| 8-Port Voice 2-Wire Station (VOICE 2WS) | | | | | | | | X ¹ | | | | | | | | | |
| Serial Interface Modules | | | | | | | | | | | | | | | | | |
| 2-Port High Speed (HIGH SPEED) | X | | | X | X | | | X ² | | | | | | | | | |
| Quadserial (QUAD SERIAL) | X | | X | | X | | | X | | X | | X | | | | | |
| 6-Port Multiserial (SERIAL) | | | | | X | | | X | | X | | X | | | | X | |
| Ethernet Interface Modules | | | | | | | | | | | | | | | | | |
| Ethernet (ENET) | | | | | | X | | | | | | | | | X | | |
| 4-Port Ethernet (ENET) | | | | | | X | | | | | | | | | X | | |

1 European modules do not support this interface with the 8-Port Voice 2-Wire Station or 4-Port 2-Wire Office module.

2 Port 2 only.

Minimum AAL2 Trunk Size Requirements

Setting up channels with standard AAL2 multiplexing helps reduce traffic delay, as voice samples from at two channels or more are multiplexed into one VC, decreasing the amount of time necessary to fill one ATM cell before it is transmitted. (Without multiplexing, only one VC is allowed per ATM cell. The cell must wait to fill with samples from one channel before transmission). 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 multiplexed channels. 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 use multiplexing. Enabling silence detection further enhances bandwidth savings by a factor of approximately half on the value in the cells/sec column in Table B-8.

Table B-8 summarizes bandwidth savings at different compression rates with standard AAL2 multiplexing.

Table B-8. Standard (Multiplexed) AAL2 Bandwidth Calculation¹

| Compression Rate (in Kbps) | Data Bytes /sec | Data + Overhead Calculation | Data + Overhead /sec | Cells/sec calculation | Cells /sec | Average Expected cells/sec with silence detection 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.

Standard AAL2 Calculation Example

The following calculation computes the compression rate for 32 Kbps (see Table B-8). This calculation includes the AAL2 header in cells per second (cps):

$4,000 \text{ samples} / 20 \text{ samples received from DSP} * 23 \text{ bytes to be packed into an AAL2 cell, where } 23 \text{ bytes} = 20 \text{ bytes of data in the cps packet and } 3 \text{ bytes for the cps header.}$

With 47 data bytes in the AAL2 cell, the cell rate = $4600/47 \approx 98$

The expected cell rate with silence detection is: $98/2 = 49$.

See Table B-9 for the cell rates for Lucent nonmultiplexed AAL2.

Table B-9. Non-Multiplexed AAL2 Transmission Rates

| Compression Rate (in Kbps) | Cell/sec |
|----------------------------|----------|
| 64 | 200 |
| 40 | 200 |
| 32 | 100 |
| 24 | 100 |
| 16 | 50 |
| 8 | 25 |

Fax Relay Using AAL2 Requirements

Table B-10 shows the cell rate for fax relay modulation/demodulation using Algosets 4 or 6 on the DSP2C or DSP2D Voice Server modules.

- 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 B-10. Standard AAL2 Bandwidth Calculation for Fax Relay Mode Using DSP AlgoSets 4 or 6

| 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 descriptions for the Alarm Status field on the Equipment Configuration window are provided in Table B-11. When underscored numbers are displayed in this field, they represent one or more ports on the module that currently have a loss of signal.

Appendix B Reference Information

Quality of Service (QoS) Information Tables

Table B-11. Alarm Status Descriptions for Modules on the Equipment Configuration Window

| Number | Alarm Status | Module Type Affected | Description |
|--------|----------------------|----------------------|---|
| 1 | NoAlarm | I/O | NoAlarm indicates that the module is inserted in the chassis slot and not configured. |
| 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 dc Power Supply output has failed. |
| 9 | Plus120vFailed | Power Supply | The 120 V ac Power Supply input has failed. |
| 10 | Minus48vFailed | Power Supply | The -48 V dc Power Supply output has failed. |
| 11 | UnknownAlarm | I/O | The reason for failure is not known. |
| 12 | CompleteClockFailed | Stratum | The backplane has detected a clock error. |
| 14 | PowerFailed | Power Supply | Power failed |

Quality of Service (QoS) Information Tables

Table B-12 details the PSAX system support of defined ATM QoS classes.

Table B-12. PSAX System-Supported Quality of 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 B-13 illustrates the attributes of the classes of service supported by the PSAX system software.

Table B-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 | | |
| Timing Required at Source or Destination | Required | | Not required | |
| Service Examples | Private line | Compressed voice | Frame relay, switched multi-media data service | Raw cell, Ethernet |
| AAL | 1 | 2 | 3/4 and 5 | 3/4 and 5 |

The following tables illustrate how ATM classes of service correspond to internal priority levels as the AQueMan algorithm functions. Table B-14 identifies the cell loss and cell delay tolerance of each service class, with internal priorities. Table B-15 lists the class-of-service choices available when configuring PVC connections on a PSAX system and shows service examples for each PVC connection type. The service examples in Table B-15 are intended simply as illustrations and you should choose your service class

Appendix B Reference Information

Quality of Service (QoS) Information Tables

based on your network applications supported by the PSAX system. The flexibility of the PSAX system allows you to tailor the system based on the required service applications by selecting the appropriate priority levels.

Table B-14. Cell Loss and Cell Delay Characteristics of ATM Service Classes

| ATM Classes of Service | QoS Classes Supported by the PSAX System | 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) Variable Bit Rate—Real Time (VBR-RT) | Class 2 | Very Low | Very Low | VBR-1 |
| | Class 2 | Low | Low | VBR-2 |
| | 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 B-15. Mapping ATM Service Classes to PSAX 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—Non-real 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

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| 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. |

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| 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 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. |

Glossary

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| 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 <i>AQueView</i> Element Management System. See also Configurator; Monitor |
| 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. |

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| 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. |
| alternate mark inversion | See AMI. |
| alternating current | See AC. |
| American National Standards Institute | See ANSI. |
| American Standard Code for Information Exchange | See ASCII. |
| AMI | alternate 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). |

Glossary

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| AQueMan algorithm | <p>A traffic management algorithm 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.</p> <p>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.</p> |
| <i>AQueView</i> [®] Element Management System | <p>This <i>PacketStar</i> software product is a graphical user interface (GUI)-based element management tool that is used to provision the <i>PacketStar</i> PSAX Multiservice Media Gateway systems. The <i>AQueView</i> system enables a network of PSAX products to be managed and provisioned with easy-to-use windows from a single location.</p> |
| architecture | <p>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.</p> |
| ARP | <p>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.</p> |
| ASCII | <p>American Standard Code for Information Exchange. This coding standard specifies the representation of characters in a binary format.</p> |
| AS-PVC | <p>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.</p> |
| asynchronous transfer mode | <p>See ATM.</p> |
| ATM | <p>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.</p> |
| ATM adaptation layer | <p>See AAL.</p> |
| ATM addressing | <p>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.</p> |

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| 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 used 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 <i>PacketStar</i> 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 traffic shaping | A method for controlling bursty data traffic exiting from a PSAX back- or midplane via the OC-3c APS or STM-1 MSP modules. (For specific configuration instructions, see the appropriate module user guide). Also see cell bus traffic shaping, bursty. |
| 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. |

Glossary

AW administrative weight. This parameter allows network architects to indicate relative link preference when deciding between alternate routes.

B

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| 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 its endpoint and back to its endpoint. 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 on one side 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. Also see midplane. |
| 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. <u>Narrowband</u> generally refers to some number of 64 Kbps channels (Nx64) and provides aggregate bandwidth less than 1.544 Mbps (24x64 Kbps, or T1 rate). <u>Wideband</u> is 1.544 Mbps to 45 Mbps (T1 to T3 rate), while <u>broadband</u> operates at 45 Mbps (T3 rate) or higher. |
| base station | In a wireless communication, the base station receives and transmits all calls in its cell to the MSC, which is located outside the cell (also see MSC). |
| basic rate interface | See BRI. |

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| 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 | 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 word created from the term <i>binary digit</i> , 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. |

Glossary

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| 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 polynomial 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 large, short spurts that typically exceed traffic contracts. Traffic over a local area network is usually bursty. See also cell bus traffic shaping, ATM traffic shaping. |
| bus | <ol style="list-style-type: none">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

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| 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-aided design/computer-aided manufacturing. A computer and its related software and terminals that is used to design and manufacture all types of hardware devices. 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 PSAX Multiservice Media Gateway switches back and forth between a number of instruction sequences so rapidly it seems as if 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. |

Glossary

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| 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. |
| CDVT | Cell Delay Variation Tolerance. The upper bound of variability in cell delay for an ATM layer connection. |
| CE | <ol style="list-style-type: none">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 bus traffic shaping | A method for controlling the bursty flow of data traffic entering a PSAX back- or midplane, via the modules that support this feature: the OC-3c Multimode and Single-Mode, STM-1 Multimode and Single-Mode TS modules. Traffic shaping ensures that the variable bit-rate (VBR) traffic exiting the OC-3c TS and STM-1 TS modules) complies with the parameters of the established service contracts. See also ATM traffic shaping, bursty. |
| 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. |

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| 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 emulation 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. |

Glossary

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| 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. |
| channel-associated signaling | See CAS. |
| 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 | shortened term for microchip, a very complex, yet tiny module that stores computer memory or provides 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 integrated circuit (IC). |
| chipset | A group of microchips designed to work together and to 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 grooming | A practice that separates used from unused DS0s in wireless backhauling. The voice circuits are separated from a T1 trunk consisting of a mixture of voice and data circuits. The voice circuits are then directed to a T1 switch specifically servicing voice circuits. |
| 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. |

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| 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, IXC's, 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 wireline-only circuits of business and residence telephones are connected. (See also MSC). |
| 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 noise deliberately added to a digital line to provide a humming or hissing sound to the connection, which assures the caller that the connection is active. |
| command line interface | See CLI. |
| committed burst size | See Bc. |
| committed information rate | See CIR. |
| common-channel signaling | See CCS. |

Glossary

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| community name | The name given to an SNMP community for identification purposes. A member has associated access rights (read-only or read/write). |
| compond | (Com)pression + Ex(pand)ing). A technique of compressing voice or data before transmission and extracting (expanding) it at the target device to use bandwidth as economically as possible during transmission. |
| 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 | Reducing a voice signal to use less bandwidth during transmission. Accomplished by sampling an analog voice signal by means of an algorithm and converting it to a digital signal. |
| compression | Applying an algorithm to a voice or data stream resulting in using fewer bits to reproduce it at the target end. |
| configurator | A user who has read-write capabilities on PSAX devices when using the <i>AQueView</i> system, but the capabilities are subordinate to the Administrator. <i>See also</i> Administrator; Monitor. |
| 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 and slowest 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 <i>PacketStar</i> Multiservice Media Gateway systems and act as an adjunct processor to handle ISDN, 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. |

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| 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 connector. |
| constant bit rate | See CBR. |
| Consultive Committee for International Telephony and Telegraphy | See CCITT. |
| context | In the H.248 Media Gateway protocol, a context is an association of not more than two terminations. The context ends when the contained terminations end. See <i>termination</i> . |
| 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 with circuit-switched voice calls. |
| 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 abbreviation was used to indicate cycles per second, the unit of measure for frequency. However, Hertz is the proper unit of measure for frequency. |
| CPU | central processing unit. The computing part of a computer that manipulates data and processes instructions coming from software or a user. |
| CPU module system disk | The fixed disk on the PSAX CPU module. This disk provides permanent data storage for the PSAX system. |
| 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. |

Glossary

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| 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 phenomenon occurs when you hear someone you did not call talking on your telephone line to another person you did not call. This event 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

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| 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. |
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| 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. |

Glossary

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| debouncing | <i>Bouncing</i> is the tendency of any two metal contacts in an electronic device to generate multiple signals as the contacts close or open; <i>debouncing</i> 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 <i>AQueView</i> 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. |

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| 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. |

Glossary

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| 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

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| 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. Member nations are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom. |

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| 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 | In matters of UPC, cell bus traffic shaping, ATM traffic shaping, virtual interface, egress describes data exiting the last module on a PSAX switch before going to another switch. |
| 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. <i>See also</i> network element; network management system. |
| encapsulation | The process of inserting a packet, in its entirety, from one protocol into the packet header of another incompatible protocol, for transport across a network. |
| end point | A network element at the end of the network. |

Glossary

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| 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. |

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| 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 <i>AQueView's</i> SOV_LOG/trapd.log and SOV_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

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| 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 it to digital bits -- a stream of 9600 bps. Then, for transmission over phone lines, the 9.6 Kbps is converted into an analog signal. But if you wish to transmit the fax signal over a digital line, it makes sense to convert it back to its original 9.6 Kbps. This means you can put several fax transmissions on one 56 Kbps or 64 Kbps line -- the capacity you would normally need if you transmitted one voice conversation, or one analog fax transmission. |
| FCS | frame check sequence. Bits added to the end of a frame for error detection. |
| 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. |

Glossary

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| 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 for, system 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 trunk capable of transmitting telephone flash hook signaling. Trunks supporting this feature will switch between one phone line and another upon receiving the signal, created by briefly depressing the flash hook. |
| flow control | The buffering that turns a device on and off in order to stop or reduce data loss during transmission. |
| foreign exchange office | See FXO. |
| foreign exchange service | See FX. |
| foreign exchange station | See FXS. |
| forward direction | The direction of data away from the origination 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). |

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| 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.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. |

Glossary

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| 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. |
| FRF.x | A reference to a voice over Frame Relay Implementation Agreement, which specifies how frames are relayed. |
| 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

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| 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. |

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| 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 <i>PacketStar</i> 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. Visual user interface that uses icons and graphics to represent files and options such as windows, icons, pull-down menus, and a pointer icon; for example, the Windows, Macintosh, and UNIX operating systems use this interface. Options are selected by pointing and clicking a mouse and/or keyboard key combinations. |
| 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

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| 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. |

Glossary

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| 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 NNM | The Hewlett-Packard OpenView Network Node Manager is network management product that allows network administrators to monitor and control network devices using tools for accounting management, fault management, security management, configuration management, and performance management. <i>See also</i> Standalone). |
| 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

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| 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). In cell bus traffic shaping, ATM traffic shaping, and UPC, output is ATM data streams leaving a switch to go to another switch or network, (as distinguished from traffic output from one switch hardware device to another hardware device within the same switch or network data processing entity). See also 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 for 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. |

Glossary

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| 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 | Data entering a PSAX switch to the first module for processing, as distinguished from subsequent modules, a distinction useful for UPC, virtual interface, cell bus traffic shaping, and ATM traffic shaping. |
| 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 interface | See PRI ISDN. <ol style="list-style-type: none">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. |
| integrated 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. |

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| 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 for 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. |

Glossary

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| 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 simplifies 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 Telecommunications Union, the principal international telecommunications standards organization, a United Nations agency based in Geneva, Switzerland. |
| ITU-T | The Telecommunications Standardization Sector of the ITU. |
| IUA | ISDN User Adaptation Layer Protocol. |
| 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

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| 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, coupled 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.

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.

Glossary

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| link management interface | See LMI. |
| link out of delay synchronization | See LODS. |
| link state routing | In Private Network-Network Network Interface, link-state routing is a LAN routing technique where neighboring routers exchange routing table updates as they occur. |
| LLC | logical link control. An IEEE 802.2 standard that includes end-system addressing and error-checking. It controls the assembly of data packets and their exchange between data stations regardless of how the packets are transmitted. |
| LLC-SNAP | logical link control-subnetwork access protocol. |
| 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 exchange carrier | See LEC. |
| 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. |

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| loop emulation | This service uses the ATM AAL2 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 AAL2 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 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 number of protocol data units 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. |

Glossary

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| MCR | minimum cell rate. Parameter defined by the ATM Forum for ATM traffic management. MCR is defined only for ABR transmissions, and specifies the minimum value for allowed cell rate. |
| media access control (MAC) layer | See MAC. |
| media gateway | A device that converts media streams from one type of network to a different format for another type of network. |
| 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. |
| minimum cell rate | See MCR. |
| mixed circuit emulation | Mixed voice/data traffic on a single private access line. |
| MMAQ | A Multimode module which uses the AQueMan algorithm for flow control. |
| MMTS | A Multimode module which uses cell bus traffic shaping for flow control. |
| Mobile Switching Center | See MSC. |
| 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 <i>AQueView</i> system. <i>See also</i> Administrator; Configurator. |
| 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. |
| MSC | Receives and transmits calls between cellular base stations and the CO. |
| 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. |

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| 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. Also see A-law. |
| 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 <i>demultiplexer</i> reverses this process at the opposite end. |
| multiplexing | The process of transmitting several signals over a single communications channel by separating each signal into packets and interleaving the packets with packets from other signals. The packets are reassembled into a coherent data stream at the receive end. |
| 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

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| N to M protection group | |
| N:1 Traffic Protection modules | PacketStar PSAX I/O modules that support the N:1 Protection feature on the PSAX 4500 system. These modules do not have external connectors; they rely on LIM3-4 modules to receive and send traffic outside the PSAX 4500 system. |
| 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 Open-View 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 convergence | In a LAN, convergence occurs when all the interworking devices have updated each other on the routing topology. The more quickly convergence occurs, the more quickly link failures are resolved. |
| network elements | See NE. |
| network equipment building standard | See NEBS. |

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| 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. |
| non-revertive | A term used with software/hardware features where connections have been switched from primary to backup configurations after a link failure. Non-revertive means that the connection does not automatically revert back to the primary configuration location if the primary connection location link is restored. (From Telcordia Technologies standard GR-253-CORE). |
| 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

Glossary

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| OAM | Operations, Administration, and Maintenance. These cells typically provide network fault indications, performance information, and data diagnosis functions. |
| OC-12 | Optical carrier 12. A SONET channel that transmits at 622 Mbps. |
| 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. |
| 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 system 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 | <p>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.</p> <p>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.</p> |
| 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. |

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| 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 Pipe | A non-trademarked term for a T1 consisting of several DS0 virtual paths on which wireless voice and data, together in the same packet, are transmitted between terminations over an HDLC interface. |
| 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. |
| <i>PacketStar</i> [®] PSAX family of products | The Lucent Technologies <i>PacketStar</i> 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). |

Glossary

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| 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. |

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| 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. |
| PRI Offload | A method for transferring internet data calls from a PSTN 5ESS switch to a PSAX, which sends them to ISP RAS's and world wide web switches. Since internet data calls are much longer and have much bigger payloads than DS0 voice calls, this transfer frees PSTN circuits for shorter voice calls and relieves PSTN network congestion. |
| private automatic branch exchange | See PBX. |

Glossary

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| 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 the <i>AQueView</i> EMS. <i>End-to-end provisioning</i> means controlling the entire building's telecommunications by software at a central location. <i>Flow-through provisioning</i> 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.

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.

Glossary

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| 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. |

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| rounding error | A cumulative calculation error caused by omission of pre-selected 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 |
| RS | recommended standard. Standards often set by the EIA (Electronic Industries Association), the TIA (Telecommunications Industry Association), or both (EIA/TIA). |
| RS-232 | |
| RS-449 | 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. |
| RS-530 | 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. |

Glossary

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| SAP | <p>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:</p> <ol style="list-style-type: none">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. |

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| 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. In a client/server architecture, the server functions as the high-end computer, which processes data and applications that are shared by all users of the network. The client is the user's personal computer that is used to access the network and run other 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 in 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 device 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 gateway | See SG. |
| Signaling System 7 | See SS7. |

Glossary

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| signaling | <p>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.</p> <p><i>In-channel signaling</i> reserves part of the available data-communication bandwidth for control information. <i>Out-of-channel signaling</i> schemes use a separate channel for signals, so data transmissions can use all available bandwidth.</p> |
| 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 cell bus 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. |

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| 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 <i>AQueView Element Management System</i> . |
| Soft Hand Off | For a vehicular cellular phone user, soft handoff occurs when the MSC of the current cell whose signal is weakening transfers the call to the MSC for the cell being approached. "Soft" indicates the user does not detect the handoff. |
| 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. |

Glossary

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| 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 <i>AQueView</i> that binds the client and the server into a single process, without HP OpenView or NNM. <i>See also</i> HP OpenView 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 SDH 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 | synchronous transport. A SDH standard for transmitting over an OC-3 optical fiber at 622.08 Mbps. The “c” stands for concatenated, 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 <i>PacketStar</i> 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. |

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| 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 masks 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. |

Glossary

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| synchronized dynamic random access memory | See SDRAM. |
| synchronous digital hierarchy | See SDH. |
| synchronous optical network | See SONET. |
| systems network architecture | See SNA. |

T

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| 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. |

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| termination | In the H.248 Media Gateway protocol, a termination is an origination or destination of a media stream. Terminations can be persistent (permanent) or ephemeral (set up and torn down). See also context. |
| throughput | The measure of the rate at which data flows through a device. |
| time-division multiplex access | See TDMA. |
| time-division multiplexing | See TDM. |
| 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. |

Glossary

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| 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 |
| 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. <i>Logical trunk alarms</i> provide statistical alarming on dropped cells and are separately maintained for the virtual trunks on the same port. <i>Physical alarm trunks</i> 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

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| 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

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| 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. |
| V5.2 | European emulated CO loop control protocol. |

Glossary

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| 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. |

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| 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 identifier | 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 its own routing and packet statistics. |
| VLAN | virtual local area network. A logical grouping of two or more nodes, which are not on the same physical network segment but which have priority access privileges across the same LAN backbone. The priority-level access of these nodes across the transmission backbone enables them to appear as if they were on the same physical LAN. |
| VNN | Virtual Network Navigator TM . Lucent's, open shortest path first network routing technology embedded as firmware in switches such as the Lucent GX 550 TM . 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 Telephony over ATM | See VTOA. |

Glossary

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| 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 telephony over ATM. A broadband packet technology, based on open standards by the ATM Forum and ITU-T, that enables equipment vendors to build open architectures for delivering toll-quality voice services with guaranteed QoS (quality of service) levels. |

W

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| 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). |
| wireless backhaul | All traffic that travels back and forth between the cell site base station and its MSC is backhauled, meaning it travels the between these two points and back many times for the duration of a call. Write backhaul or backhauling as one word. |
| workstation | A powerful, stand-alone computer. |

X

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| 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. |
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Z

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| 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. |

Glossary



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