Lucent Technologies
Bell Labs Innovations

PacketStar® PSAX
12-Port Medium-Density DS1/E1/DS0A CES Module User Guide (DS1 Mode)

for *PacketStar*® PSAX Multiservice Media Gateways

Issue 1, September 2002
System Software Release 8.0.0
AQueView® EMS Software Release 6.0.0

Doc. No.: 255-700-379

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Legal Notices, Safety, and Regulatory Information

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This document was prepared by the Information Design and Development Team of Lucent Technologies, *PacketStar* PSAX products. Offices are located in Landover, Maryland, USA.

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Warranty Information

Software and Hardware Limited Warranties

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

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 12-Port Medium-Density DS1/E1/DS0A CES 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 12-Port Medium-Density DS1/E1/DS0A CES 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 12-Port Medium-Density DS1/E1/DS0A CESmodule (model 24N64):

- 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)

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 telephone 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.

Contents

Figures

Tables

Part 1: General

1 Getting Started

Purpose of This Guide

The *PacketStar® 12-Port Medium-Density DS1/E1/DS0A CES Module User Guide (DS1 Mode)* provides a description of the 12-Port Medium-Density DS1/E1/DS0A CES 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.*

Audience for This Guide

The information in this guide is intended for users who will configure ports and channels for the 12-Port Medium-Density DS1/E1/DS0A CES module in the DS1 mode, configure the interface types, and provision connections for the PSAX Multiservice Media Gateway system using the console interface. To configure ports and channels for the 12-Port Medium-Density DS1/E1/DS0A CES module in the DS0A mode, see the *PacketStar® PSAX 12-Port Medium-Density DS1/E1/DS0A CES Module User Guide (DS0A Mode)*, 255-700-378.

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 Information" at the end of this 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.

For More Information

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

About the *PacketStar*® PSAX Product Family

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

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.

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 *x*DSL, 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
`Fixed-width normal`	Message text displayed on the user interface window
Serif bold	• Button name (GUI interface) or command name (console interface) on the user interface window • Literal text for values that the user types 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
Serif italics	• A variable name or string for which you will substitute your own information • An argument or parameter on a command line for which you will substitute your own information

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`Fixed-width bold`	System prompts displayed on the user interface window
Serif italics	• A variable name or string for which you will substitute your own information • An argument or parameter on a command line for which you will substitute your own information

Icons and Symbols

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 1-3).

Table 1-3. 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 1-4).

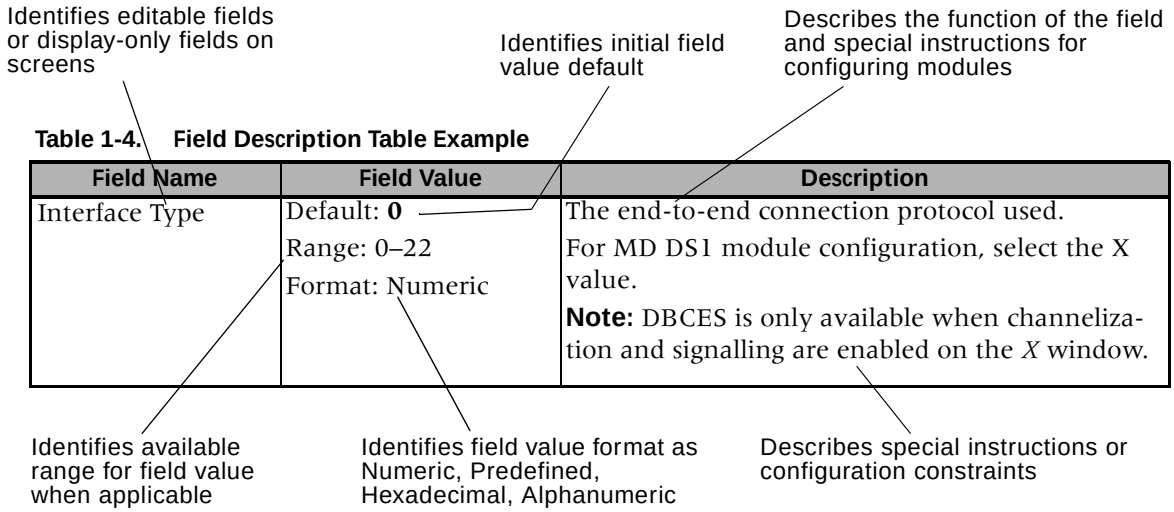


Table 1-4. Field Description Table Example

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.

Selecting Options, Fields, and Commands

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 1-5.

Table 1-5. 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	The following variations occur: • 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. Read-only fields, which you cannot change, are enclosed in square brackets (example: [LineStatus]).
command	The following variations occur: • A message in the information line indicating an error or successful completion of the command is displayed. • The next higher level or previous window (*window name*) is displayed. • The next lower level or succeeding window (*window name*) is displayed.

- **To navigate through the Console windows**, use the shortcuts listed in Table 1-6.

Table 1-6. 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.

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).

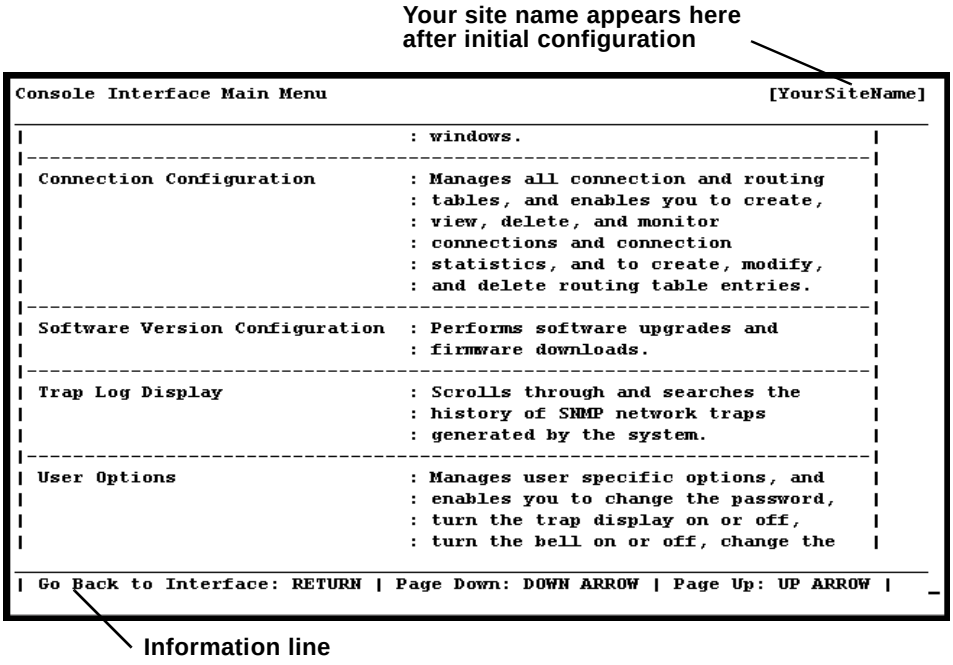


Figure 1-1. Main Menu Help Window

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 12-Port Medium-Density DS1/E1/DS0A CES module, refer to the *Lucent Technologies InterNetworking Systems Global Warranty*, which accompanied your shipment, for instructions on obtaining support in your area.

Comments on This Guide

To comment on the *PacketStar® 12-Port Medium-Density DS1/E1/DS0A CES Module User Guide (DS1 Mode)*, 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.

Before You Begin

Before you start configuring and using your new 12-Port Medium-Density DS1/E1/DS0A CES module (DS1 mode), 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

2 Module Description

Overview of This Module

The 12-Port Medium-Density DS1/E1/DS0A CES module (Figure 2-1) provides DS1 circuit emulation services, including a new Nx64 Kbps CAS mode to support channelized AAL1 tariff services. It also provides a line rate of 1.544 Mbps per DS1 port. Each port can be independently configured to provide Nx64 Kbps (fractional T1) structured, channelized and unchannelized circuit emulation service (CES) with Nx64 Kbps CAS,integrated services digital network with a primary rate interface (ISDN PRI) service, and unstructured CES. For a description of the 12-Port Medium-Density DS1/E1/DS0A CES module when it is configured in the DS0A mode, see the *PacketStar® PSAX 12-Port Medium-Density DS1/E1/DS0A CES Module User Guide (DS0A Mode)*, 255-700-378.

Note: The E1 signaling mode is not currently supported.

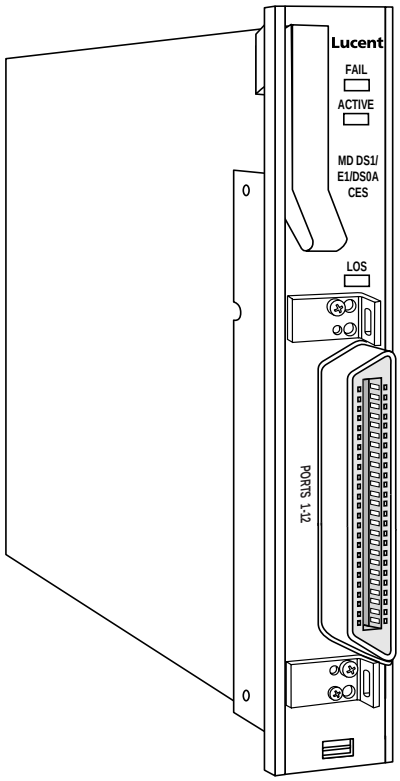


Figure 2-1. 12-Port Medium-Density DS1/E1/DS0A CES Module

When configured for DS1 circuit emulation service, the module interfaces with TDM channelized DS1 circuits. It converts channelized data (usually voice data) to ATM virtual channels. By using structured (channelized) circuit emulation, this module can adapt a maximum of 24 DS0 channels per port to ATM virtual channels with individual VPIs and VCIs. Signaling bit transport is also provided, based on ATM Forum standards for CAS.With the Nx64 Kbps clear channel capability, this module can connect to a device using an ISDN PRI service. Because this structured circuit emulation service can be configured to use only a fraction of the time slots, you can configure several independent emulated circuits to share one service interface.

Connection Options

The 12-Port Medium-Density DS1/E1/DS0A CES module connects to user equipment via a shielded 10-foot Lucent cable assembly (COMCODE 300468030) and a PSAX patch panel. An equivalent shielded cable with an RJ-48H connector (for example, a Cinch p/n 57-10500-7, 90^{o} plug, a Cinch p/n 57-30500-4, 180^{o} plug, a Cinch p/n 57-10500-271, 270^{o} plug, or equivalent) on one end may also be used. Cable connector screws and cable tie wraps are provided in a kit with the module. See Figure 2-2 for an illustration of this connection.

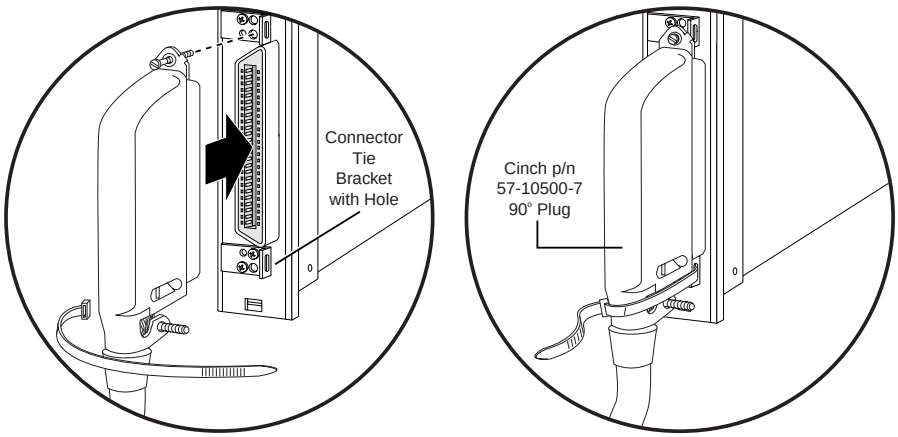


Figure 2-2. 12-Port MD DS1/E1/DS0A CES Module Cable Connection (with Cinch connector)

The Lucent cable is used to connect the module to one of the following patch panels:

- 12-Port BNC Patch Panel (COMCODE 300298569) (E1 mode only)
- 24-Port RJ Patch Panel (COMCODE 300298551)
- 48-Port RJ Patch Panel (COMCODE 300298544).

Note: The Telco connector on this module is not the same as the Mini-Champ connector on the 12-Port Medium-Density DS1 Multiservice module and the 12-Port Medium-Density DS1 IMA module.

Figure 2-3 and Figure 2-4 show the connectors of two modules connected to a 24-port RJ Patch Panel (COMCODE 300298551).

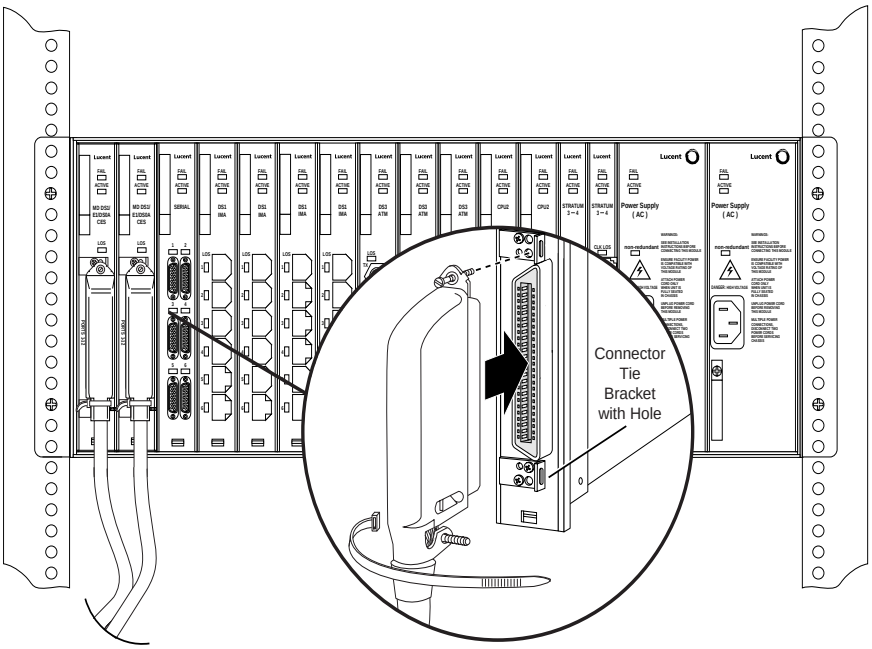


Figure 2-3. 12-Port Medium-Density DS1/E1/DS0A CES Modules Connected to 24-port RJ Patch Panel (Telco frame with modules)

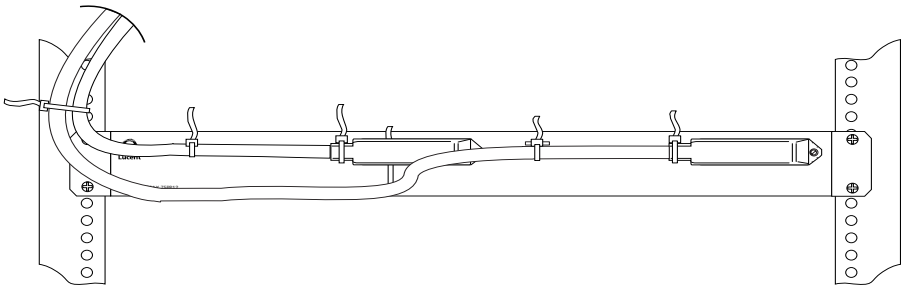


Figure 2-4. 12-Port Medium-Density DS1/E1/DS0A CES Modules Connected to 24-port RJ Patch Panel (Telco frame with patch panel)

Figure 2-5 and Figure 2-6 show the connectors of four modules connected to a 48-port RJ Patch Panel (COMCODE 300298551).

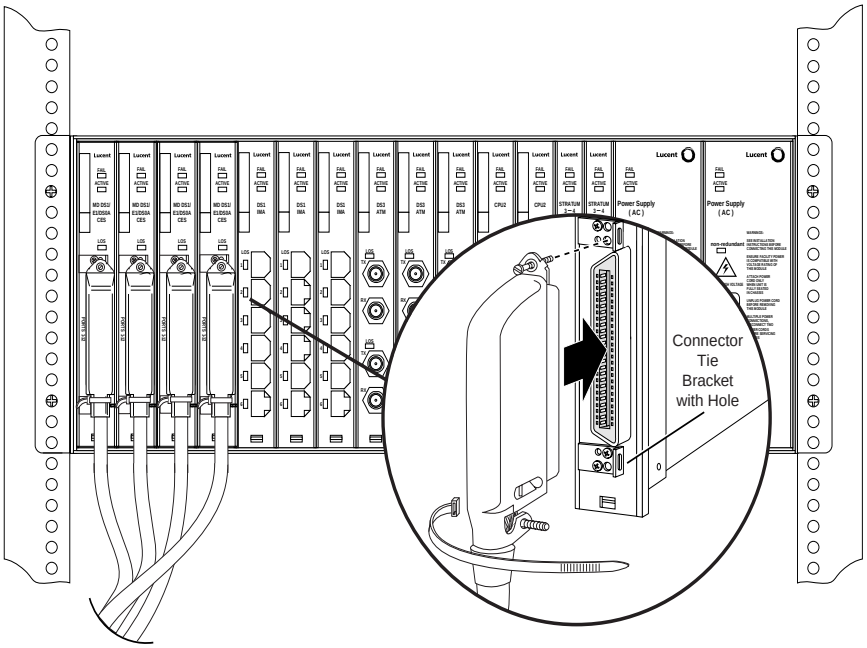


Figure 2-5. 12-Port Medium-Density DS1/E1/DS0A CES Modules Connected to 48-port RJ Patch Panel (Telco frame with modules)

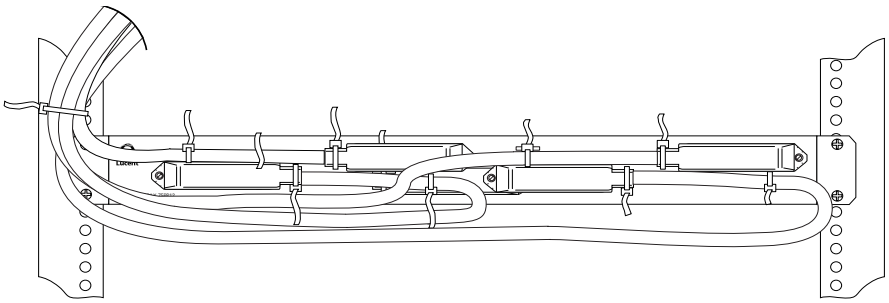


Figure 2-6. 12-Port Medium-Density DS1/E1/DS0A CES Modules Connected to 48-port RJ Patch Panel (Telco frame with patch panel)

These patch panels are separately orderable. See the *PSAX Patch Panels for PSAX Multiservice Media Gateways Installation Guide*, 255-700-117, for instructions. Further connections to user equipment may be made per the specifications outlined in ANSI T1.403-1999. See Appendix A, "Pin Configurations," for more details.

Software Features

The 12-Port Medium-Density DS1/E1/DS0A CES (DS1 Mode) module supports the following services:

- Circuit emulation service (CES):
  - ~ Structured DS1 signal transport
  - ~ Nx64 Kbps circuit emulation (where 1<=N<=24)
  - ~ Channel-associated signaling (CAS) Nx64
- Integrated services digital network with primary rate interface service (PRI ISDN) with 64 Kbps clear channel capability for the D-channel
- AAL2 cell formatting for interworking with the DSP2A, DSP2B, DSP2C, and DSP2D Voice Server modules.

Hardware Features

The 12-Port Medium-Density DS1/E1/DS0A CES (DS1 Mode) module provides the following hardware features:

- Number of ports: 12
- Connector type: one 25-pair, 100-ohm, RJ-48H, 50-pin Telco connector (receptacle) (see Appendix A for pinouts)
- Line rate: 1.544 Mbps
- Physical interfaces supported: ANSI T1.403; ITU-T G.703, ITU G.704
- Line encoding mode: B8ZS, AMI
- Loopback capabilities: line loopback, local loopback, payload loopback
- Line buildout: Up to 133, 266, 399, 533, and 655 feet; - 7dB through -5dB, -15dB, and -22dB through -5dB
- Framing mode: ESF, D4
- Transmit clock: local timing, loop timing
- Pulse: meets pulse shape mask of ANSI T1.403

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

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 12-Port Medium-Density DS1/E1/DS0A CES Module

Module	Total Amount of SDRAM	Module Program and Data Space	Maximum Input Buffer*	Output Buffer†	Chassis Speed ‡	Power Consumption
12-Port Medium-Density DS1/E1/DS0A CES (**MD DS1/E1/DS0A CES**)	8 MB	8 MB	2 cells/ port	16 cells/ port	High Speed	11.5 W

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

† Indicates the size of the output buffer.

‡ 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.

Module Placement

The 12-Port Medium-Density DS1/E1/DS0A CES module is installed in any PSAX chassis slot intended to contain an I/O or server module. If you are installing the module in a newly installed PSAX chassis, be sure to follow your facility site plan for placing this module in the correct location in the chassis.

Note: When operating this module in the DS0A mode, the Stratum 3–4 module you use in the PSAX 1250 chassis should be one with the PEC NS20N053DC and COMCODE 300412699, or a subsequent model.

LED Indicators

Table 2-3 describes how the LED indicators on the 12-Port Medium-Density DS1/E1/DS0A CES module faceplate respond to different module conditions. These LEDs indicate if the module is installed and operating properly.

Table 2-3. LED Indicators for the 12-Port Medium-Density DS1/E1/DS0A CES 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] (yellow)	Lights briefly[2]	N/A	Lights only when a port is configured and no signal is received	Lights	• Does not light if signal is being received • Lights if signal is missing

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

[2]Note: 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.

Part 2: Console Operation

3 Configuring Ports and Channels Using the Console

Overview of This Chapter

This chapter describes how to configure ports and channels for the 12-Port Medium-Density DS1/E1/DS0A CES module module (DS1 mode) on the PSAX Multiservice Media Gateway system console interface.

Loopback Configuration Options

To aid network troubleshooting and testing, loopback capability is provided for the 12-Port Medium-Density DS1/E1/DS0A CES module module(DS1 mode). 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, payload loop, and local loop options.

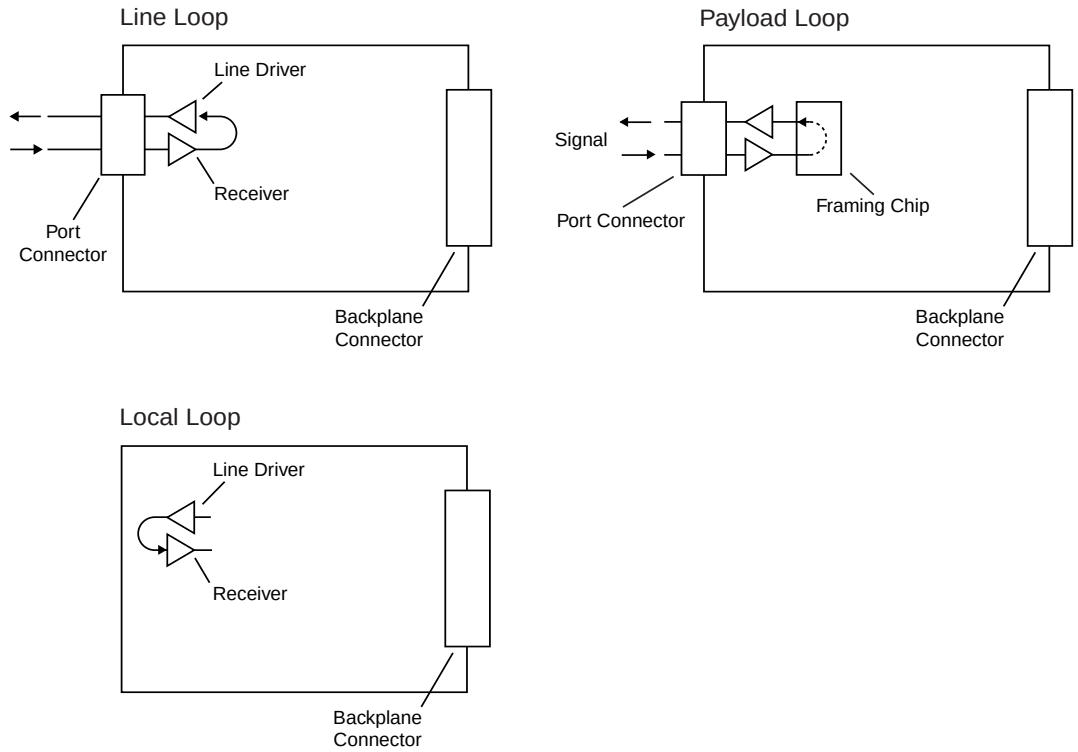


Figure 3-1. Loopback Configuration Options

Configuring the Module

The 12-Port Medium-Density DS1/E1/DS0A CES module module (DS1 mode) has 12 physical ports, which may be used for DS1 circuit emulation services. You must first configure the 12-Port Medium-Density DS1/E1/DS0A CES module module (DS1 mode) before setting up connection provisioning. To configure ports and channels for the 12-Port Medium-Density DS1/E1/DS0A CES module in the DS0A Mode, see the *PacketStar® PSAX 12-Port Medium-Density DS1/E1/DS0A CES (DS0A Mode) Module User Guide*, 255-700-378.

Note: The E1 mode is not supported in this release.

Configuring Ports and Channels in the DS1 Mode

To configure the 12-Port Medium-Density DS1/E1/DS0A CES module module ports and channels in the DS1 mode, perform the steps in the following procedure.

Configuring the Ports and Channels

Begin

1 On the Console Interface Main Menu window (see Figure 3-2), select the Equipment Configuration option and press Enter.

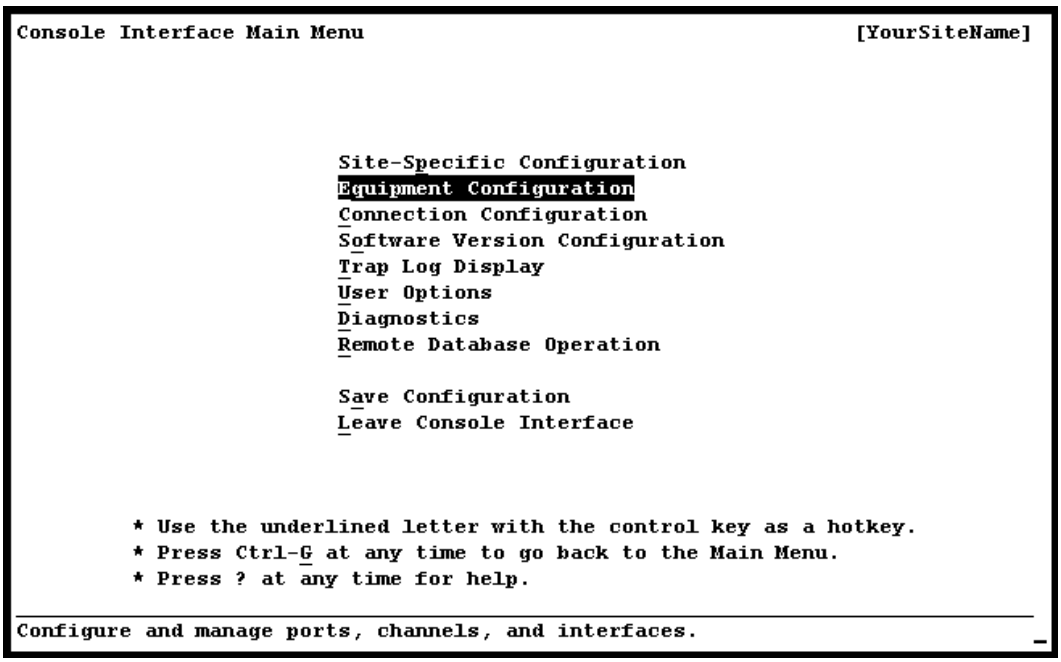


Figure 3-2. Console Interface Main Menu Window (Equipment Configuration Selected)

The Equipment Configuration window is displayed (see Figure 3-3 and Figure 3-4).

```
Equipment Configuration                                          [YourSiteName]
 Slot Card Type      Status  Alarm Status     SW Version  PEC          Serial #
 ---- ------------- ------- ---------------- ----------- ---------- ------------
  1   MD-DS1E1DS0A  Primary NoAlarm          V07.01      NS24N640AA 022820021230
  2   MD-DS1E1DS0A  Primary NoAlarm          V07.01      NS24N640AA 022820021231
  3   MD-DS1E1DS0A  Primary NoAlarm          V07.01      NS24N640AA 022820021232
  4   MD-DS1E1DS0A  Primary NoAlarm          V07.01      NS24N640AA 022820021233
  5   MD-DS1-IMA    Primary NoAlarm          V07.01      NS23N640AA 022820021234
  6   MD-DS1-IMA    Primary NoAlarm          V07.01      NS23N640AA 022820021235
  7   MD-DS1-IMA    Primary NoAlarm          V07.01      NS23N640AA 022820021236
  8   MD-DS1-IMA    Primary NoAlarm          V07.01      NS23N640AA 022820021237
  9   Aps-OC-3cMM   Primary NoAlarm          V07.01      NS20N720BA 022820021238
 10   Aps-OC-3cMM   Primary NoAlarm          V07.01      NS20N720BA 022820021239
 11   CPU 2         Primary NoAlarm          V07.01      NS20N201EA 022820021240
 12   CPU 2         Primary NoAlarm          V07.01      NS20N201EA 022820021241
 13
 14
 15
 16
 17

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

Press RETURN to configure the equipment in slot 4
```

Figure 3-3. Equipment Configuration Window (As Displayed on the PSAX 1250, PSAX 2300, and PSAX 4500 Console, Page 1)

2 Select **Page Down** to display page 2 of this window (Figure 3-4).

```
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 3-4. Equipment Configuration Window (As Displayed on the PSAX 1250, PSAX 2300, and PSAX 4500 Console, Page 2)

3 On the Equipment Configuration window, select an **MD–DS1E1DS0A** module in the Card Type column and press Enter. The 12-Port Medium-Density DS1 Port Configuration window is displayed (see Figure 3-5).

```
12-Port Medium-Density DS1 Port Configuration                    [YourSiteName]

 Slot: 04
     # Channels # Interfaces
Port Configured In Service   Line Status
---- ---------- ------------ --------------------------------------------------
   1          0            0      NoAlarm
   2          0            0      NoAlarm
   3          0            0      NoAlarm
   4          0            0      NoAlarm
   5          0            0      NoAlarm
   6          0            0      NoAlarm
   7          0            0      NoAlarm
   8          0            0      NoAlarm
   9          0            0      NoAlarm
  10          0            0      NoAlarm
  11          0            0      NoAlarm
  12          0            0      NoAlarm
 Operating Mode..... DS1
 Apply Operating Mode Change              Bring All Interfaces Into Service
 Update Display                           Take All Interfaces Out Of Service
 Delete All Interfaces                    Go Back to Equipment Configuration ->

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

Figure 3-5. 12-Port Medium-Density DS1 Port Configuration Window

This window allows you to select a physical port (1–12) to configure. It also provides the operational status of the channels and interfaces for each port.

Commands

The commands in this window have the following functions:

Command	Function
Apply Operating Mode Change	Changes the mode in which the module will operate. After changing the value to **DS1** or **DS0A** in the Operating Mode field, select this command to apply the change. The module reboots and the window reflects your selection. **Note:** All interfaces must be unconfigured, out of service, and deleted before using this command.
Update Display	Updates the values in the fields to show the most current configuration. Use this command to display the most current information in the Line Status field.

Command	Function
Delete All Interfaces	Deletes the configured interfaces for the 12 ports. You must 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.
Bring All Interfaces Into Service	Brings the out-of-service configured interfaces for the 12 ports to in-service status.
Take All Interfaces Out Of Service	Takes the in-service configured interfaces for the 12 ports to out-of-service status. You must use this command first before using the **Delete All Interfaces** command.
Go Back to Equipment Configuration	Redisplays the Equipment Configuration window.

Field Descriptions

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

Table 3-1. Field Descriptions for the 12-Port Medium-Density DS1 Port Configuration Window

Field Name	Field Values	Description
Slot: nn	Default: **N/A** Range: Variable Format: Numeric	The PSAX chassis slot that the selected module occupies.
Port (display only)	Default: **N/A** Range: 1-12 Format: Numeric	The physical port on the module.
# Channels Configured (display only)	Default: **0** Range: 1-24 Format: Numeric	The number of channels configured for this port.
# Interfaces In Service (display only)	Default: **0** Range: 1-24 Format: Numeric	The number of interfaces configured for this port that are operationally in service.
Line Status (display only)	Default: **No Alarm** Range: N/A Format: Predefined	The alarm status of the physical port. Displays the most current information when a trap message is received or when the **Update Display** command is selected. **Note:** Shows **No Alarm** when no interfaces are configured.
Operating Mode	Default: **DS1** Range: DS1, DS0A Format: Predefined	Allows you to change the operating mode value to **DS1** or **DS0A**. Select the **Apply Operating Mode Change** command to apply the change. **Note:** All interfaces must be unconfigured, out of service, and deleted before changing the operating mode.

4 Select the line with the port you want to configure. The 12-Port Medium-Density DS1 Port and Channel Configuration window is displayed (see Figure 3-6).

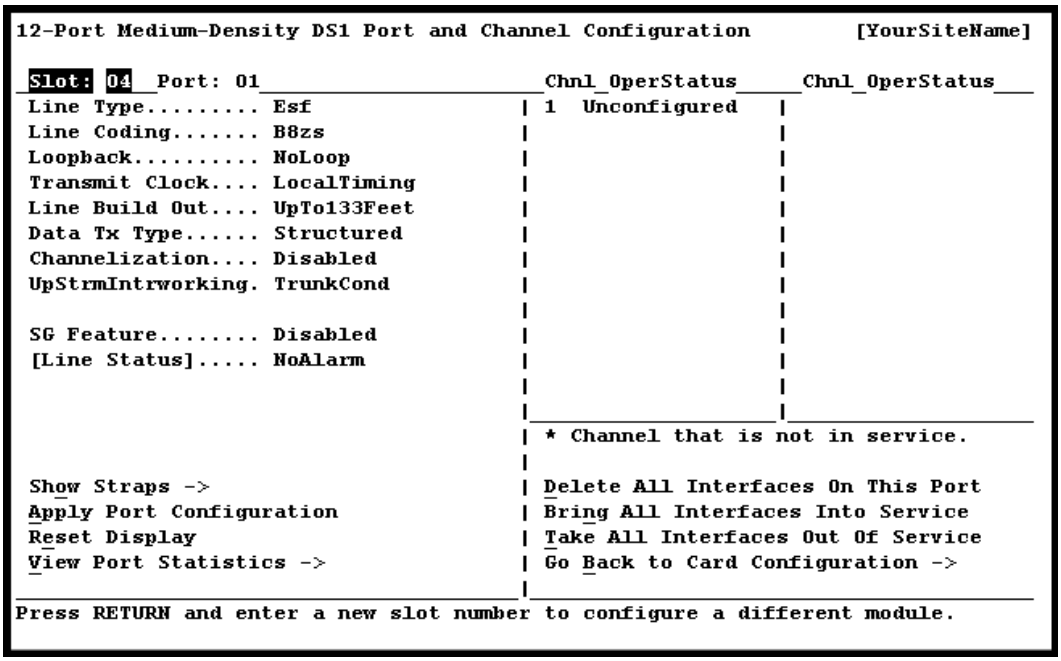


Figure 3-6. 12-Port Medium-Density DS1 Port and Channel Configuration Window (Channelization Disabled)

Commands

The commands in this window have the following functions:

Command	Function
Delete Interfaces: through	Deletes a selected range of configured interfaces when channelization has been enabled. Select the command and follow the prompts to enter the channel numbers and delete the selection. **Note:** This command does not display when channelization has been disabled. **Note:** You must first take the configured interfaces that are in-service to out-of-service (using the **Take All Interfaces Out Of Service** command) before you can use this command.
Show Straps	Displays the 12-Port Medium-Density DS1 DS0s Strap Display window.
Apply Port Configuration	For the current port, applies the port configuration field values.
Reset Display	Resets the port configuration fields to the last set of saved values.

Command	Function
View Port Statistics	Displays the 12-Port Medium-Density DS1 Port Statistics window.
Delete All Interfaces On This Port	Deletes the configured interface and sets the channel to unconfigured status. The value **Unconfigured** displays in the Chnl Status field. **Note:** You must first take the interface that is in-service to out-of-service (using the **Take All Interfaces Out Of Service** command) before you can use this command.
Bring All Interfaces Into Service	Brings the out-of-service configured interface for the channel to administrative in-service status. An asterisk displays beside all the configured channels when they are administratively or operationally out-of-service. **Note:** You must first configure the interface before you can use this command.
Take All Interfaces Out Of Service	Takes the in-service configured interface to out-of-service status. An asterisk displays beside all the configured channels when they are administratively or operationally out-of-service. **Note:** You must use this command first before using the **Delete All interfaces On This Port** command.
Go Back to Card Configuration	Redisplays the 12-Port Medium-Density DS1 Port Configuration window.

Field Descriptions

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

Table 3-2. Field Descriptions for the 12-Port Medium-Density DS1 Port and Channel Configuration Window

Field Name	Field Values	Description
Line Type	Default: **Esf** Range: N/A Format: Predefined	Indicates the framing mode to be used on this port. **Note:** When you select the value **Unstructured** in the Data Tx Type field, the Line Type field disappears.
	Esf	Extended Super Frame DS1 format.
	D4	D4 format.

Table 3-2. Field Descriptions for the 12-Port Medium-Density DS1 Port and Channel Configuration Window

Field Name	Field Values	Description
Line Coding	Default: **B8ZS** Range: N/A Format: Predefined	Indicates the type of line coding to be used on this port. (The data format that lets either end of the communications channel correctly interpret messages from the other.)
	B8ZS	Bipolar with 8 zero substitution. Indicates the use of a specified pattern of normal bits and bipolar violations to replace sequence of 8 zero bits.
	Ami	Alternate mark inversion. Indicates zero code suppression.
Loopback	Default: **NoLoop** Range: N/A Format: Predefined	Indicates whether the port is to be used for loopback testing and, if so, the type of loopback to be performed.
	NoLoop	Indicates that the port will not be used for loopback.
	LocalLoop	Indicates that local loopback will be used on this port. The signal will be received from another module in the chassis, sent through the module circuitry (including the SAR function) and the chassis backplane to the originating module.
	LineLoop	Indicates that line loop will be used on this port. The received signal will be sent through the receiver and the line driver, and then back out to the originating point.
	PayloadLoop	Indicates the received signal is sent through the framing chip on the module, but not on the SAR circuitry, and then back out to the originating point. The data link is regenerated.
Transmit Clock	Default: **Local Timing** Range: N/A Format: Predefined	Indicates the timing source to be used on this port. The timing source is a signal that provides a timing reference for a transmission link.
	LocalTiming	Indicates that local clock source will be used as the timing source.
	LoopTiming	Indicates that recovered receive clock is used as the timing source.
	Adaptive Timing	Monitors the port buffers to increase or decrease the transmission rate. Displays only when the port is configured as **Unstructured** in the Data Transfer Type field.

Table 3-2. Field Descriptions for the 12-Port Medium-Density DS1 Port and Channel Configuration Window

Field Name	Field Values	Description
Line Build Out	Default: **UpTo133 Feet** Range: N/A Format: Predefined	Indicates the selectable output attenuation.
	UpTo133Feet	Indicates the DS1 signal level is transmitted to be received from 0 to 133 f eet
	UpTo266Feet	Indicates the DS1 signal is transmitted to be received from 0 to 266 feet
	UpTo399Feet	Indicates the DS1 signal is transmitted to be received from 0 to 399 feet
	UpTo533Feet	Indicates the DS1 signal is transmitted to be received from 0 to 533 feet
	UpTo655Feet	Indicates the DS1 signal is transmitted to be received from 0 to 655 feet
	negative7-5Db	Indicates the T1 signal level range at which the DS1 is configured is negative 7.5 dB
	negative15Db	Indicates the T1 signal level range at which the DS1 is configured is negative 15 dB
	negative22-5Db	Indicates the T1 signal level range at which the DS1 is configured is negative 22.5 dB
Data Tx Type (Data Transfer Type)	Default: **Structured** Range: N/A Format: Predefined	Indicates whether this port has structured or unstructured interfaces.
	Structured	Indicates that this port supports Nx64 Kbps channelized interfaces.
	Unstructured	Indicates that this port has unstructured (unchannelized) interfaces. **Note:** When you select this value, the Line Type, Channelization, and UpStrmIntrworking fields disappear.

Table 3-2. Field Descriptions for the 12-Port Medium-Density DS1 Port and Channel Configuration Window

Field Name	Field Values	Description
Channelization	Default: **Disabled** Range: N/A Format: Predefined	Indicates whether the DS1 port is divided into 24 channels. **Note:** When you select the value **Unstructured** in the Data Tx Type field, the Channelization field disappears.
	Disabled	Indicates that the division of the DS1 port into 24 channels is disabled. Use this setting if you want to set up only one channel for the port. When you select the **Apply Port Configuration** command, only channel 1 displays the value **Unconfigured**.
	Enabled	Indicates that the division of the DS1 port into 24 channels is enabled. Use this setting if you want to set up more than one channel for the port.
UpStrm Intrworking	Default: **TrunkCond** Range: N/A Format: Predefined	Displays the communications mode selected between the CE and ATM sides of a connection on this port during alarm conditions. **Note:** When you select the value **Unstructured** in the Data Tx Type field, the UpStrmInter working field disappears**.**
	TrunkCond	Indicates that trunk conditioning will be done for each channel of this port whose corresponding ATM side is alarmed. This improves the communication of the trunk status for TDM traffic. See the *PacketStar PSAX Multiservice Media Gateway Trunk Conditioning Application Note* for more details.
	Unframed1s	Indicates that a sequence of unframed all 1's will be transmitted to the CES end point whenever there is an alarm indication signal (AIS) on the ATM side for any CE to ATM connection on this port.
SG Feature	Default: **Disabled** Range: N/A Format: Character	Displays the status of the connection gateway feature. **Note:** This feature is not supported in this release.
	Disabled	Indicates that the connection gateway feature is disabled. See the *PacketStar® Connection Gateway API Specification* for more details.
	Enabled	Indicates that the connection gateway feature is enabled.
[Line Status] (display only)	Default: **NoAlarm** Range: N/A Format: Character	Indicates the status of the line: **NoAlarm**, **LossOfSignal**, or one of several alarms. See the line status table for the DS1 mode below.

The following table shows line status alarms for the 12-Port MD DS1/E1/DS0A CES module (DS1 mode):

Table 3-3. DS1 Line Status Alarms

Bit Value	Alarm	Description
1	NoAlarm	No alarm present
2	RcvFarEndLOF	PSAX is receiving an RAI alarm. The RAI (yellow) alarm is usually sent by the far-end device when an LOS, AIS, or LOF condtion is detected on its receive port.
4	XmtFarEndLOF	Near-end sending LOF indication
8	RcvAIS	Far-end sending AIS (red alarm)
16	XmtAIS	Near-end sending AIS
32	LossOfFrame	Near-end LOF
64	LossOfSignal	Near-end loss of signal
128	LoopbackState	Near-end is looped
256	T16AIS	E1 TS16 AIS (not valid for DS1)
512	RcvFarEndLOMF	Far-end sending TS16 LOMF (not valid for DS1)
1024	XmtFarEndLOMF	Near-end sending TS16 LOMF (not valid for DS1)
2048	RcvTestCode	Near-end detects a test code
4096	OtherFailure	Any other line status not shown in this table
8192	RmtLoopback	Far-end loopback

6 To configure channels, perform one of the following procedures:

Table 3-4. Configuring Channels

If you want to configure...	then...
the port as one channel,	you must have selected the value **Disabled** in the Channelization field (see Table 3-2). Continue with instructions in "Configuring a Port with One Channel".
several channels for a port,	you must have selected the value **Enabled** in the Channelization field (see Table 3-2). Continue with instructions in "Configuring a Port with Several Channels" on page 3-15.

End

Port with One Channel

Configuring a Port with One Channel

Begin

To configure one or more ports on the 12-Port Medium-Density DS1/DS0A CES module with only one channel for a port, proceed as follows:

1 Select **1 Unconfigured** on the 12-Port Medium-Density DS1 Port and Channel Configuration window (see Figure 3-6).

Note: You must have selected the value **Disabled** in the Channelization field on the 12-Port Medium-Density DS1 Port and Channel Configuration window.

The Medium Density 12-Port DS1 Channel Configuration window (see Figure 3-7) is displayed.

```
Medium Density 12-Port DS1 Channel Configuration                [YourSiteName]

_[Slot: 04]__Port: 01__Channel: 001_____________________________________________

  Interface Type....... Unconfigured      [Admin Status]....... Unconfigured
                                          [Oper Status]........ Unconfigured




  [Available DSOs]:



  [DSOs Strapped]:
   01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
_____________________________________________________________________________

                                      Bring Interface Into Service
  Apply Configuration                 Configure Interface ->
  Reset Display                       Go Back to Port Configuration ->
_____________________________________________________________________________
Press RETURN and enter a new port number to configure another port.
```

Figure 3-7. Medium Density 12-Port DS1 Channel Configuration Window (One Channel per Port)

Commands

The commands in this window have the following functions:

Command	Function
Apply Configuration	For a specified port and channel number value, applies the interface configuration you selected.
Reset Display	Resets the fields to the last set of saved values.
Bring Interface Into Service	Brings the out-of-service configured interface to in-service status. The value **InService** is displayed in the [Admin Status] field.

Command	Function
Take Interface Out Of Service	Takes the in-service configured interface to out-of-service status. The value **OutOfService** is displayed in the [Oper Status] and the [Admin Status] fields.
Configure Interface	Displays an interface configuration window for the selected interface.
Go Back to Port Configuration	Redisplays the 12-Port Medium-Density DS1 Port and Channel Configuration window.

Field Descriptions

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

Table 3-5. Field Descriptions for the Medium Density 12-Port DS1 Channel Configuration Window

Field Name	Field Values	Description
[Slot: nn] (display only)	Default: **N/A** Range: Variable Format: Numeric	The PSAX chassis slot that the selected module occupies.
Port: nn	Default: **N/A** Range: 1-12 Format: Numeric	The physical port on the module.
Channel: nnn	Default: **001** Range: 001-024 Format: Numeric	Indicates the channel selected. **Note:** Only channel **001** is available when channelization is disabled.
Interface Type	Default: **Unconfigured** Range: N/A Format: predefined character	Indicates the type of end-to-end connection protocol that governs the transmission parameters of the configured channel interface.
	Unconfigured	This interface is not configured.
	CircuitEmulation	This interface is configured for the circuit emulation interface.
Signaling	Default: **Disabled** Range: N/A Format: Character	Indicates signaling status on the configured interface. When channelization is disabled and **CircuitEmulation** is selected, this field is display only.
	Disabled	Indicates that signaling is disabled. This interface uses common channel signaling (Ccs).
	Enabled	Indicates that signaling is enabled. This interface uses channel-associated signaling (Cas).

Table 3-5. Field Descriptions for the Medium Density 12-Port DS1 Channel Configuration Window

Field Name	Field Values	Description
[Admin Status] (display only)	Default: **Unconfigured** Range: N/A Format: predefined character	Displays the administrative status of the selected channel.
	Unconfigured	The interface for the channel is not configured.
	InService	The interface has been brought into service with the **Bring Interface Into Service** command.
	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.
[Oper Status] (display only)	Default: **Unconfigured** Range: N/A Format: predefined character	Displays the operational status of the selected channel and whether the channel is exchanging a valid signal.
	Unconfigured	This channel is not operational because the interface is not configured.
	InService	The configured interface is currently operational, that is, capable of receiving and sending signals.
	OutOfService	The configured interface is not currently operational, that is, not capable of receiving and sending signals, because no connection exists.
[Available DS0s]: (display only)	Default: **N/A** Range: 01-24 Format: numeric	Indicates the number of unchecked DS0s available to be strapped to a particular channel. DS0s are only available when channelization is enabled. This field is not displayed when signaling is **Enabled**.
[DS0s Strapped] (display only)	Default: **N/A** Range: 01-24 Format: numeric	Indicates the number of checked DS0s strapped to a particular channel. When channelization is disabled, all 24 DS0s are strapped to channel **001**.

3 Select an interface in the Interface Type field.

4 Select the **Apply Configuration** command.

5 Select the **Bring Interface Into Service** command.

6 Select the **Configure Interface** command. The interface configuration window is displayed.

See Chapter 4, "Configuring the Interfaces Using the Console," for a description of this window.

7 Repeat "Configuring Ports and Channels in the DS1 Mode", and steps 1-6 under "Configuring a Port with One Channel" for the remainder of the ports, as needed.

Note: Be sure to complete the module port and channel configuration and then the interface configuration for each port before beginning the configuration of a new port.

8 You can save the values permanently to the Multiservice Media Gateway system database now, or before you exit the current session of the Multiservice Media Gateway system console interface. See "Saving the Equipment Configuration and Logging Off" on page 3-21.

End

Port with Several Channels

Configuring a Port with Several Channels

Begin

To configure one or more ports on the 12-Port Medium-Density DS1/E1/DS0A CES module with several DS0s strapped together in one channel and several channels for a port, proceed as follows:

1 Select **1 Unconfigured** on the 12-Port Medium-Density DS1 Port and Channel Configuration window (see Figure 3-8).

```
12-Port Medium-Density DS1 Port and Channel Configuration        [YourSiteName]

_Slot: 04__Port: 01_____________________Chnl_OperStatus_____Chnl_OperStatus___
 Line Type......... Esf                | 1  Unconfigured   |13  Unconfigured
 Line Coding....... B8zs               | 2  Unconfigured   |14  Unconfigured
 Loopback.......... NoLoop             | 3  Unconfigured   |15  Unconfigured
 Transmit Clock.... LocalTiming        | 4  Unconfigured   |16  Unconfigured
 Line Build Out.... UpTo133Feet        | 5  Unconfigured   |17  Unconfigured
 Data Tx Type...... Structured         | 6  Unconfigured   |18  Unconfigured
 Channelization.... Enabled            | 7  Unconfigured   |19  Unconfigured
 UpStrmIntrworking. TrunkCond          | 8  Unconfigured   |20  Unconfigured
                                       | 9  Unconfigured   |21  Unconfigured
 SG Feature........ Disabled           |10  Unconfigured   |22  Unconfigured
 [Line Status]..... NoAlarm            |11  Unconfigured   |23  Unconfigured
                                       |12  Unconfigured   |24  Unconfigured
                                       |___________________|__________________
                                       | * Channel that is not in service.
 Delete Interfaces:    through         |
 Show Straps ->                        | Delete All Interfaces On This Port
 Apply Port Configuration              | Bring All Interfaces Into Service
 Reset Display                         | Take All Interfaces Out Of Service
 View Port Statistics ->               | Go Back to Card Configuration ->
_______________________________________|_____________________________________
The port configuration has been applied.
```

Figure 3-8. 12-Port Medium-Density DS1 Port and Channel Configuration Window (Channelization Enabled)

Note: You must have selected the value **Enabled** in the Channelization field on this window.

The Medium Density 12-Port DS1 Channel Configuration window (see Figure 3-9) is displayed.

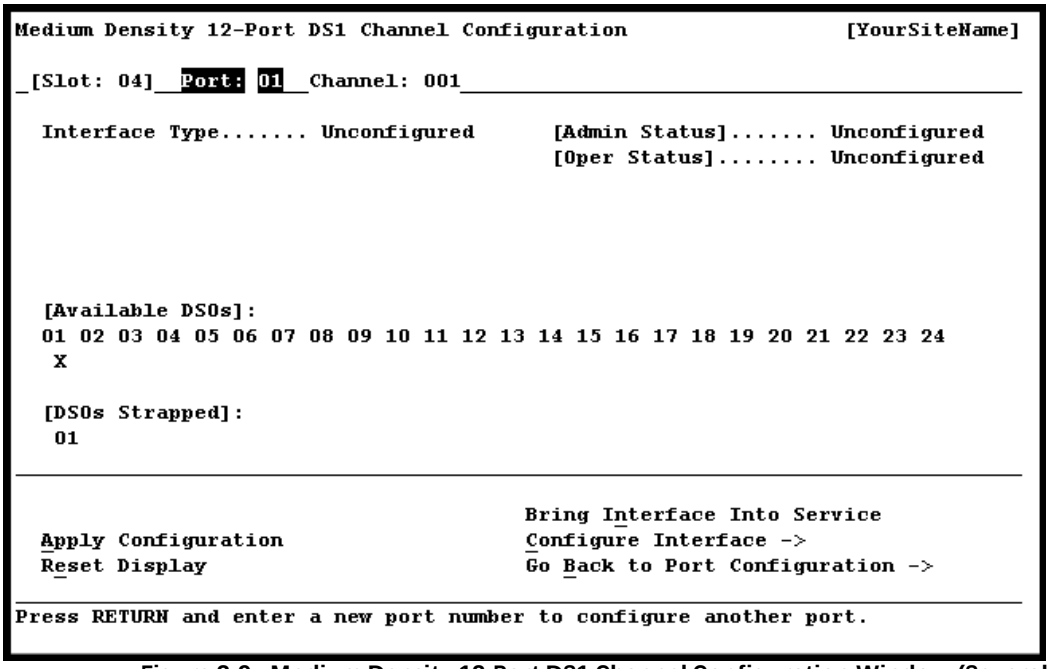


Figure 3-9. Medium Density 12-Port DS1 Channel Configuration Window (Several Channels per Port)

See page 3-12 for a description of the commands and fields in this window.

2. Select an interface in the Interface Type field. The Signaling field appears with the **Disabled** default value.
3. In the [Available DS0s] field, move the cursor to value **01** (indicates DS0 1) and press Enter to display **x** below DS0 **01**.
4. Move the cursor to the next DS0 value and press Enter to display **x** below the DS0 value. Select as many DS0s as you want to strap together for the selected channel.
5. Select the **Apply Configuration** command.

   In the [DS0s Strapped] field (display only), the values for the DS0s you just selected are displayed.
6. Select the **Bring Interface Into Service** command.
7. Select the **Configure Interface** command. The interface configuration window is displayed.

   See Chapter, 5, "Configuring the Interfaces Using the Console," for a description of this window.

Note: Be sure to complete the module port and channel configuration and then the interface configuration for each port before beginning the configuration of a new port.

8. To strap together DS0s for another channel in the selected port, reselect the Channel field and enter the next channel number, for example, **002**.

9 Repeat steps 2-7.

10 To view the strapped DS0s and their associated channels at any time, select the **Show Straps** command on the 12-Port Medium-Density DS1 Port and Channel Configuration window (see Figure 3-8). The 12-Port Medium-Density DS1 DS0s Strap Display window (see Figure 3-10) is displayed.

```
12-Port Medium-Density DS1 DS0s Strap Display                    [YourSiteName]

_[Slot: 04]__Port: 01_____________________________________________________________

 Ch DS0s                                  Ch DS0s
--- ------------------------------------ ------------------------------------
  1 01                                   |13 13
  2 02                                   |14 14
  3 03                                   |15 15
  4 04                                   |16 16
  5 05                                   |17 17
  6 06                                   |18 18
  7 07                                   |19 19
  8 08                                   |20 20
  9 09                                   |21 21
 10 10                                   |22 22
 11 11                                   |23 23
 12 12                                   |24 24
____________________________________     |_____________________________________

  Update Display                          Go Back to DS1 Port Configuration ->

_____________________________________________________________________________
Press RETURN and enter a new port number to configure another port.
```

Figure 3-10. 12-Port Medium-Density DS1 DS0s Strap Display Window

Note: The strapped DS0s you set up are displayed next to their associated channels.

Commands

The commands in this window have the following functions:

Command	Function
Update Display	Resets the fields to the last set of saved values.
Go Back to DS1 Port Configuration	Redisplays the 12-Port Medium-Density DS1 Port and Channel Configuration window.

Field Descriptions

The fields in this window are described in Table 3-6.

Table 3-6. Field Descriptions for the 12-Port Medium-Density DS1 DS0s Strap Display Window

Field Name	Field Values	Description
[Slot: nn] (display only)	Default: **N/A** Range: Variable Format: Numeric	Displays the chassis slot that the selected module occupies.
Port: nn	Default: **N/A** Range: 1-12 Format: Numeric	Displays the physical port selected.
Ch (display only)	Default: **N/A** Range: 1-24 Format: Numeric	Displays the channels available. **Note:** Only channel **1** is available when channelization is disabled.
DS0s (display only)	Default: **N/A** Range: 1-24 Format: Numeric	Displays the DS0s strapped to a particular channel. When channelization is disabled, all 24 DS0s are strapped to channel **1**.

End

Port Statistics

Viewing 12-Port Medium-Density DS1 Port Statistics

Begin

To view statistics for a port, from the 12-Port Medium-Density DS1 Port and Channel Configuration window (Figure 3-8), select the **View Port Statistics** command. The 12-Port Medium-Density DS1 Port Statistics window (see Figure 3-11) is displayed.

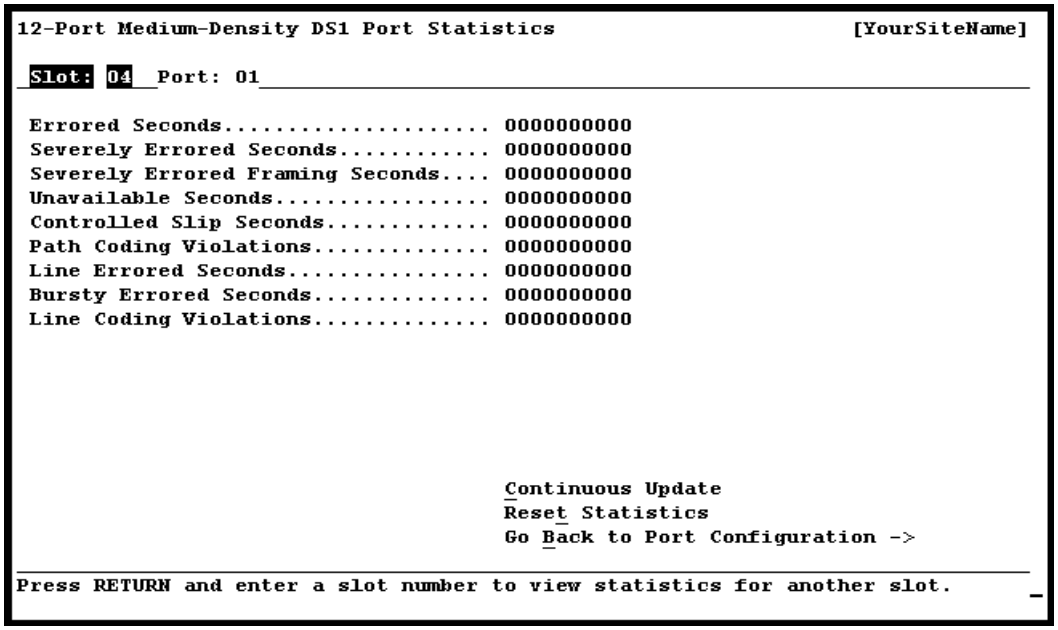


Figure 3-11. 12-Port Medium-Density DS1 Port Statistics Window

Commands

The commands in this window have the following functions:

Command	Function
Continuous Update	Updates the values in the fields every second.
Reset Statistics	Sets all field values to **0**.
Go Back to Port Configuration	Redisplays the 12-Port Medium-Density DS1 Port and Channel Configuration window.

Field Descriptions

The fields in this window are described in Table 3-7.

Table 3-7. Field Descriptions for the 12-Port Medium-Density DS1 Port Statistics Window

Field Name	Field Values	Description
Errored Seconds	Default: **0000000000** Range: N/A Format: numeric	Displays the number of errored seconds that have occurred on the DS1 port since the last time statistics were reset. For ESF signals, an errored second contains at least one of the following: • Path coding violation • Controlled slip event • Detected alarm indication signal (AIS) defect • Out-of-frame (OOF) defect For D4 signals, this field indicates the presence of bipolar violations
Severely Errored Seconds	Default: **0000000000** Range: N/A Format: numeric	Displays the number of severely errored seconds that have occurred on the DS1 port since the last time statistics were reset. For ESF signals, a severely errored second contains at least one of the following: • 320 or more path coding violation error events • OOF defect • Detected AIS defect For D4 signals, a severely errored second contains at least one of the following: • one-second intervals with framing error events • OOF defect • 1,544 or more line coding violations (LCVs)
Severely Errored Framing Seconds	Default: **0000000000** Range: N/A Format: numeric	Displays the number of severely errored framing seconds encountered by the DS1 port in one of the previous 96 individual 15-minute intervals. A severely errored framing second has one or more out-of-frame defects or a detected AIS defect.
Unavailable Seconds	Default: **0000000000** Range: N/A Format: numeric	Displays the number of unavailable seconds encountered by the DS1 port in one of the previous 96 individual 15-minute intervals. Unavailable seconds (UAS) are calculated by the number of seconds that the interface is unavailable.
Controlled Slip Seconds	Default: **0000000000** Range: N/A Format: numeric	Displays the number of controlled slip seconds encountered by the DS1 port in the previous 24-hour period. A controlled slip second is a one-second interval containing one or more controlled slip events.
Path Coding Violations	Default: **0000000000** Range: N/A Format: numeric	Displays the number of path coding violations encountered by the DS1 port in the previous 24-hour period. A path coding violation is a frame synchronization bit error in the D4 and DS1-no-CRC formats, or a CRC error in the ESF and DS1-CRC formats.

Table 3-7. Field Descriptions for the 12-Port Medium-Density DS1 Port Statistics Window

Field Name	Field Values	Description
Line Errored Seconds	Default: **0000000000** Range: N/A Format: numeric	Displays the number of line errored seconds encountered by the DS1 port in the previous 24-hour period. A line errored second is a second in which one or more line code violation error events were detected.
Bursty Errored Seconds	Default: **0000000000** Range: N/A Format: numeric	Displays the number of bursty errored seconds encountered by the DS1 port in the previous 24-hour period. A bursty errored second has fewer than 320 and more than 1 path coding violation error events, no severely errored frame defects, and no detected incoming AIS defects.
Line Coding Violations	Default: **0000000000** Range: N/A Format: numeric	Displays the number of line coding violations that have occurred on the DS1 port since the last time statistics were reset. Line coding violations indicate that a bipolar violation or an excessive zeroes error event has occurred.

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

After configuring your basic systemwide values, you must save them to the PSAX system database. It is recommended that you save your values frequently as you progress through your work.

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.

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

Overview of This Chapter

This chapter provides instructions for configuring the following interface types on the 12-Port Medium-Density DS1/E1/DS0A CES module (DS1 mode):

- Circuit emulation
- GR-303
- Primary Rate Interface (PRI) Integrated Services Digital Network (ISDN) network
- Primary Rate Interface (PRI) Integrated Services Digital Network (ISDN) user

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 12-Port Medium-Density DS1/E1/DS0A CES 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."

Examples on how to configure GR-303 interface groups using the DSP2C and DSP2D Voice Server modules are provided in the *Configuring the GR-303 Voice Gateway User Guide, Document Number 255-700-135.* This user guide also includes a list of modules certified as interoperable with other call processing devices, such as the Lucent CellPipe™ IAD and the CO 5ESS switch.

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

Managing Circuit Emulation Interfaces

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 a Circuit Emulation Interface

This section provides instructions for configuring an I/O module for the circuit emulation interface.

Begin

Note: To display the windows for configuring a circuit emulation interface (see Figure 4-1), you must have completed the following three steps in a previous procedure:

- Selected the value **CircuitEmulation** in the Interface Type field on the appropriate Port and Channel, DS1 Channel, or Virtual DS1 Channel Configuration window of the module that you are configuring for circuit emulation.

Note: Channel strapping is done before the Apply Configuration step below. (For instructions, see the Port and Channel Configuration chapter of this guide).

- Selected the **Apply Configuration** command.
- Selected the **Configure Interface** command. The Circuit Emulation Interface Configuration window (see Figure 4-1) is displayed. Table 1-1 describes the commands for the window. Table 4-1 describes the fields on the window.

1. On the Circuit Emulation Interface Configuration window, enter the values in the fields on this window according to the information provided in Table 4-1.
2. Select the **Apply Interface Configuration** command to set the valus you selected.
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 Circuit Emulation Interfaces into Service" procedure in this guide.

End

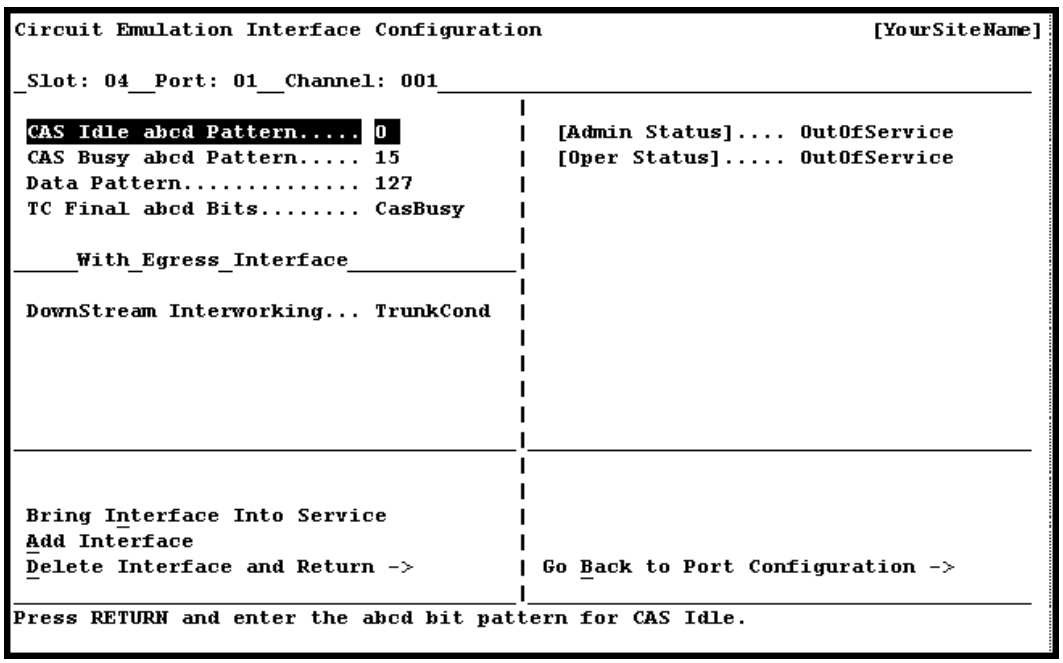


Figure 4-1. Circuit Emulation Interface Configuration Window

Commands The commands on this window have the following functions:

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. **Note:** This command is displayed when the [Admin Status] field is **OutOfService**. You must first configure the interface before you can use this command.
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. **Note:** This command is displayed when the [Admin Status] field is **InService**. You must use this command first before using the **Delete Interface and Return** command.
Add Interface	Applies the configuration field values you set.
Delete Interface and Return	Deletes an out-of-service interface and redisplays the Port and Channel Configuration window for the module you are configuring. **Note:** You must first take interface out of service (using the **Take Interface Out of Service** command) before you can use this command.
Go Back to Port Configuration	Redisplays the Port and Channel Configuration window of the module you are configuring.

Table 4-1. Field Descriptions for the Circuit Emulation Interface Configuration Window

Field Names	Field Values	Description
CAS Idle abcd Pattern	Default: **0** Range: 0–15 Format: Numeric	Displays the Signaling abcd bit pattern for first 2.5 seconds.
CAS Busy abcd Pattern	Default: **15** Range: 0–15 Format: Numeric	Displays the Signaling abcd bit pattern after 2.5 seconds.
Data Pattern	Default: **127 (idle pattern)** Range: 0–255 Format: Numeric	Displays the data pattern to be transmitted out on a circuit emulation port, if no user data is available for the transmission.
TC Final abcd Bits	Default: **CasBusy** Range: N/A Format: Predefined	Specifies the bit pattern to be transmitted after 2.5 seconds.
	CasBusy	Indicates that CAS busy bit pattern is to be transmitted after 2.5 seconds.
	CasIdle	Indicates that CAS idle bit pattern is to betransmitted after 2.5 seconds.
With_Egress_Interface, Left Panel		
DownStream Interworking	Default: **TrunkCond** Range: N/A Format: predefined alphanumeric	Indicates that trunk conditioning will be done with ATM network. The PSAX system will generate an idle data pattern in the payload of ATM cells to send a signal to indicate a connection failure. For more information, see the *Trunk Conditioning Application Note for PacketStar® PSAX Multiservice Media Gateways*.
	Unsupp	Indicates that no interworking will be done with ATM network. The PSAX system will not send a signal to indicate a connection failure. Do not choose this value if you want to enable trunk conditioning.
	OAM	Indicates that OAM interworking will be done with ATM network. The PSAX system will use ATM OAM cells to send a signal to indicate a connection failure. You can use this value if all the ATM switches along the connection support ATM OAM cells. You must use this value if you selected **Unframed1s** in the UpStrmIntrworking field on the Port and Channel Configuration window of the module you are configuring. The PSAX system does not support upstream interworking of unframed 1s with a downstream setting of trunk conditioning.

Table 4-1. Field Descriptions for the Circuit Emulation Interface Configuration Window

Field Names	Field Values	Description
Right Panel		
[Admin Status] (display only)	Default: **OutOfService** Range: N/A Format: Predefined	Indicates whether the interface is configured and brought into service.
	OutOfService	Indicates that the interface is not configured and brought into service.
	InService	Indicates that the interface is configured and brought into service.
[Oper Status] (display only)	Default: **OutOfService** Range: N/A Format: predefined alphanumeric	Indicates whether any condition is preventing the interface from passing traffic.
	OutOfService	Indicates that a condition is preventing the interface from passing traffic.
	InService	Indicates that no condition is preventing the interface from passing traffic.

Bringing a Circuit Emulation Interface Into Service

Begin

Note: You may bring the Circuit Emulation interface into service from either of these windows:

- the module port and channel configuration window, or
- the Circuit Emulation 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 Circuit Emulation Interface Configuration Window, select the **Bring Interface Into Service** command, (or press Ctrl+N).

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

End

Viewing the Parameters of a Specific Circuit Emulation Interface

Begin

The circuit emulation interface window is accessed for viewing by the same navigational steps as the "Configuring an Interface..." procedure. 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 Circuit Emulation interface on and repeat the steps in the "Configuring a Circuit Emulation Interface" procedure in this guide until you access the Circuit Emulation Interface Configuration window.

1 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 the Circuit Emulation Module Port Statistics

To view the Circuit Emulation interface statistics, perform the steps in the following procedure.

Begin

The Circuit Emulation Interface Statistics are viewed on the Port Statistics window of the module you are using for the Circuit Emulation Interface. Access this window from the module port and channel configuration window. See the appropriate module guide for more details on module port statistics windows.

Traffic must have passed on the connection before statistics will display.

End

Taking a Circuit Emulation Interface Out of Service

Note: You may take a Circuit Emulation interface out of service from either of these windows:

- the module port and channel configuration window, or
- the Circuit Emulation Interface Configuration window.

Make sure that the module configuration is complete.

Begin

1. To take the interface out of service on the Circuit Emulation Interface Configuration Window, select the **Take Interface Out Of Service** command (or press Ctrl+N).

   On the Circuit Emulation Interface Configuration Window, the window status line prompts:

   ```
   Taking the interface down will lose all
   configurations. Continue? (y/n)
   ```

   On the module Port and Channel Configuration window, the status line prompts:

   ```
   Are you SURE that you want to take ALL interfaces out
   of service? (y/n)
   ```

2. Select Y.

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

End

Deleting a Circuit Emulation Interface

Begin

Note: You may delete the Circuit Emulation interface from either of these windows:

- the module port and channel configuration window, or
- the Circuit Emulation Interface Configuration Window. In either case, you must first take the interface out of service.

To delete the interface on the Circuit Emulation Interface Configuration Window, proceed as follows:

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

On the module Port and Channel Configuration window, the window prompt reads:

`Are you SURE that you want to take ALL interfaces out of service? (y/n)`

On the Circuit Emulation Interface Configuration window, the window prompt reads:

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

2 Type Y to continue.

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

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

On the module Port and Channel Configuration window, the window prompt reads:

`Are you SURE that you want to take ALL interfaces out of service? (y/n)`

On the Circuit Emulation Interface Configuration window, the window prompt reads:

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

3 Press Y The interface is deleted and you are returned to the port and channel configuration window.

End

Modifying a Circuit Emulation Interface

After you have configured an Circuit Emulation 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 Circuit Emulation 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 Circuit Emulation 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 Circuit Emulation Interface."

4 Take the interface out of service. See the procedure in the section, "Taking One or More Circuit Emulation Interfaces Out of Service."

Note: After you perform this step, 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 Circuit Emulation Interfaces."

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

6 Configure a new interface. See the procedure in the section, "Configuring a Circuit Emulation Interface."

7 Bring the newly configured interface into service. See the procedure in the section, "Bringing One or More Circuit Emulation interfaces into Service."

End

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 PRI ISDN Interfaces

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

Accessing/Viewing the Enhanced ISDN LAPD and BChannel Configuration Window

This section provides instructions for configuring an I/O module for the PRI ISDN User/Network interface.

To configure the PRI ISDN network or user interface, you must have already configured settings for your PSAX system in the site-specific conguration stage and in the DS1 port configuration stage. You must set up specific values on the Call Control Resource Allocation Configuration window and the TCP Server Configuration window (see Chapter 4 of the appropriate PSAX Multiservice Media Gateway user guide). Also you must enable the signalling gateway (SG) feature on the port configuration window for the modules listed below.

If you selected the value **Pri-isdn-network** or **Pri-isdn-user** as the interface type, the Enhanced ISDN LAPD and BChannel Configuration window is displayed (see Figure 4-2).

```
Enhanced ISDN LAPD and BChannel Configuration                    [YourSiteName]

 Slot: 07  Port: 04  [Channel: 001]      BChnl AdminStatus   BChnl AdminStatus
 [Administrative Status] OutOfService  | 1  InService      |13  InService
 [Operational Status]... OutOfService  | 2  InService      |14  InService
 Switch Type............ Pri-ni2       | 3  InService      |15  InService
 DChannel Number........ 00            | 4  InService      |16  InService
 LAPD Parameters                       | 5  InService      |17  InService
 ---------------                       | 6  InService      |18  InService
 [Status].. Not-initiated              | 7  InService      |19  InService
 [State]... Tei-unassigned             | 8  InService      |20  InService
                                       | 9  InService      |21  InService
 T200.............. 01.0 Secs          |10  InService      |22  InService
 T203.............. 10   Secs          |11  InService      |23  InService
 N200.............. 3    Times         |12  InService      |24  InService
 N201.............. 260  Octets        |___________________|___________________
 Window Size (K).. 007  Frames         |
                                       | Apply BChannel Configuration
 Apply Interface Configuration         | Reset BChannel Display
 Reset Interface Display               | Bring All BChannels Into Service
 Bring Interface Into Service          | Take All BChannels Out Of Service
 Delete Interface and Return ->        | Go Back to Channel Configuration ->
_______________________________________|___________________________________
Press RETURN and enter a new slot number to configure a different interface.
```

Figure 4-2. Enhanced ISDN LAPD and BChannel Configuration Window

The commands in this window have the following functions:

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.

Command	Function
Bring Interface Into Service	Displays when the [Admin Status] field is **OutOfService**. Takes an in-service configured interface to out-of-service status. Brings an out-of-service configured interface to in-service status. The value **InService** is displayed in the [AdminStatus] 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.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.
Delete Interface and Return	Deletes an out-of-service interface and redisplays 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.
Apply BChannel Configuration	Applies the BChannel Admin Status values you set.
Reset BChannel Display	Refreshes the fields to the last set of applied values.
Bring All BChannels Into Service	Displays when the [Admin Status] field is **OuOfService**. Takes an in-service configured interface to out-of-service status. Brings an out-of-service configured BChannel to in-service status. The value **InService** is displayed in the [Admin Status] field.
Take All BChannels Out of Service	Displays when the [Admin Status] field is **InService**. Takes an in-service configured interface to out-of-service status. Takes an in-service configured BChannel to out-of-service status. The value **OutOfService** is displayed in the [Admin Status] field.
Go Back to Channel Configuration	Redisplays the Port and Channel Configuration window for the module you are configuring.

Configuring the PRI ISDN Interface

Begin

To set the values for the PRI ISDN interface, perform the steps in the following procedure.

1. Select the values for the fields on this window from the values given in Table 4-2.
2. To apply the interface configuration values, select the **Apply Interface Configuration** command.

   The value **OutOfService** is displayed in the [Operational Status] field.
3. To apply the BChannel configuration values, select the **Apply BChannel Configuration** command.

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

End

Table 4-2. Field Descriptions for the Enhanced ISDN LAPD and B Channel Configuration Window

Field Name	Values	Description
[Oper Status] (display only)	**InService**	Indicates that the interface is operational.
	OutOfService	Indicates that the interface is not operational.
[Admin Status] (display only)	**InService**	Indicates that the interface is in service.
	OutOfService	Indicates that the interface is not in service.
DChannel Number	Default: **00** Range: 0–24 Format: numeric	If the D Channel number is **0**, the LAP-D will not be enabled.
[Status] (display only)	Default: **Not-initiated**	The operational status of the ISDN Layer 2. Not-initiated means that the first SETUP message has not been transmitted and the L2 establishment procedure has not yet been initiated.
[State] (display only)	**Tei-unassigned, tei-assigned, waiting-establishment, awaiting-release, multiple-frame-established, timer-recovery**	The current state of the ISDN Layer 2 protocol.
T200	Default: **01.0 Secs** Range: 0.1–10.0 Format: numeric, in 1/10 seconds	The value of the L2 T200 timer.

Table 4-2. Field Descriptions for the Enhanced ISDN LAPD and B Channel Configuration Window

Field Name	Values	Description
T203	Default: **10 Secs** Range: 1–60 Format: seconds	The value of the L2 T203 timer
N200	Default: **3 Times** Range: 1–5 Format: numeric	The maximum number of retransmissions before the LAP-D link is declared to be not operational.
N201	Default: **260 Octets** Range: 1–300 Format: numeric	The maximum number of octets in an information field.
Window Size (K)	Default: **007 Frames** Range: 1–127 Format: numeric	The maximum number of outstanding I frames.

Bringing the Interface Into Service

Before you can configure a connection using an PRI ISDN interface, you must first bring an PRI ISDN interface into service. To bring one or more interfaces into service, perform the step in the following procedure.

Begin

4 Select the **Bring Interface Into Service** command.

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

5 To activate the interface after you have applied the configuration values, select the **Bring All BChannels Into Service** command.

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

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

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 12-Port Medium-Density DS1/E1/DS0A CES module (DS1 mode):

- PVC connections:
  - ~ Circuit Emulation-to-ATM virtual channel connection (VCC)
  - ~ Circuit Emulation-to-Circuit Emulation channel connection (VCC)
  - ~ GR-303-to-AAL2 VCC/PVC channel connection
- SPVC connections:
  - ~ Circuit Emulation-to-ATM virtual channel connection (VCC)
  - ~ Circuit Emulation-to-ATM Std AAL2 virtual channel connection (VCC)

Part 3: AQueView 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 12-Port Medium-Density DS1/E1/DS0A CES module
- Saving the module configuration and logging off

Before You Begin

Be sure to complete the following tasks first before configuring the 12-Port Medium-Density DS1/E1/DS0A CES 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 12-Port Medium-Density DS1/E1/DS0A CES 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 12-Port Medium-Density DS1/E1/DS0A CES 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

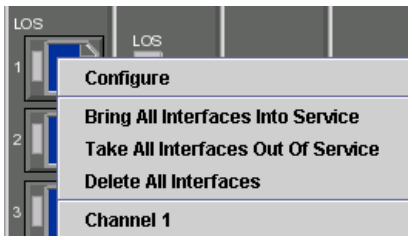


Figure 5-1. Sample Port Configuration (Displaying Right-Click Menu)

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.

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 5-2).

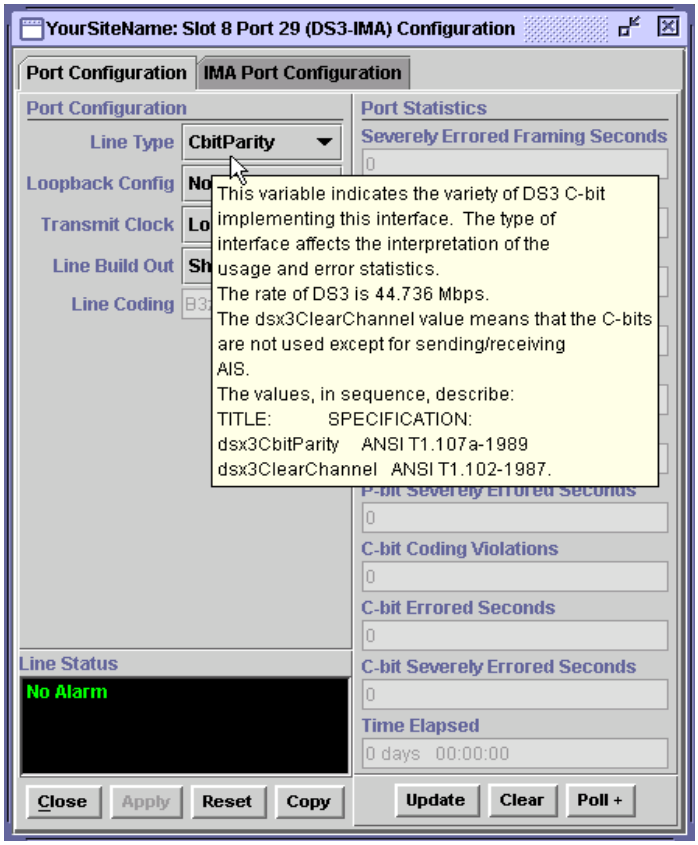


Figure 5-2. Sample of Context-Sensitive Help (Displayed on a Port and Channel Configuration Window)

Accessing Port and Channel Configuration Options

You must first configure the 12-Port Medium-Density DS1/E1/DS0A CES 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.

The PSAX device that you opened appears in the Front Panel, and its components are also displayed in the Device Tree (see Figure 5-3).

End

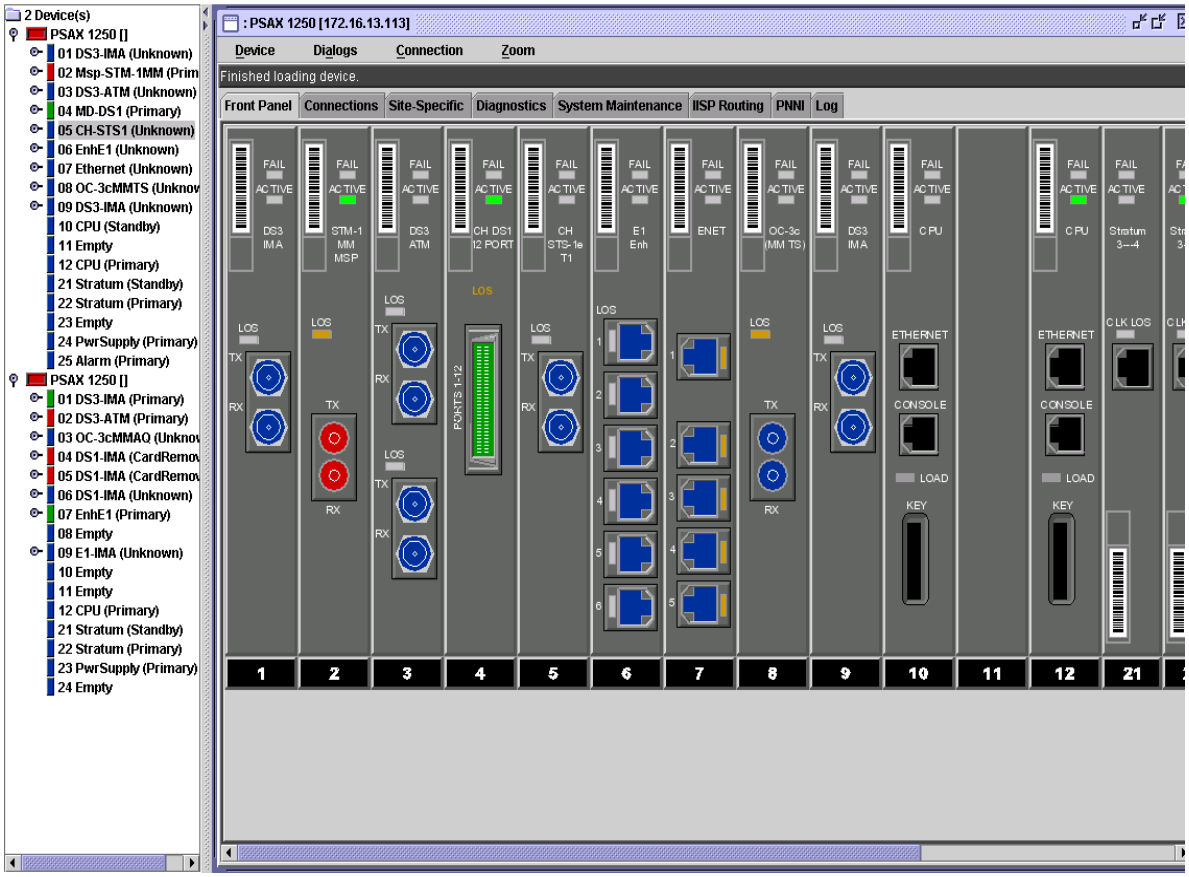


Figure 5-3. Device Tree and Device Window (Displaying a Typical Setup)

Configuring the Module

Changing the Operating Mode

When all interfaces on the 12-Port Medium-Density DS1/E1/DS0A CES module are unconfigured, you can switch between the available operating modes of the module.

To change the module's operating mode, perform the steps in the following procedure.

Begin

1 Do one of the following to access the Module Information window:

- **a** Double-click the mouse on the bar code image on the Front Panel.
- **b** Double-click the mouse on the name of the module in the Device Tree.

c Right-click the mouse on the bar code image on the Front Panel. A menu appears (see Figure 5-4). Select Module Information.

d Right-click the mouse on the name of the module in the Device Tree. A menu appears (see Figure 5-4). Select Module Information.

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

For information about the values in the fields on this window are provided in the section, "Obtaining Port and Interface Data," in this chapter.

2 In the Operating Mode field, select **DS1** and click **Apply**.

Two trap messages appear: one trap states that a module was "removed," and another trap states that a new module was "inserted."

3 Click **Close**.

End

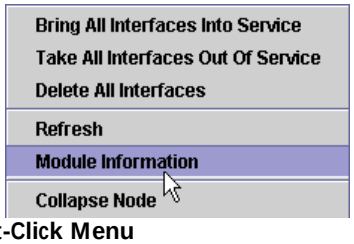


Figure 5-4. Module Right-Click Menu

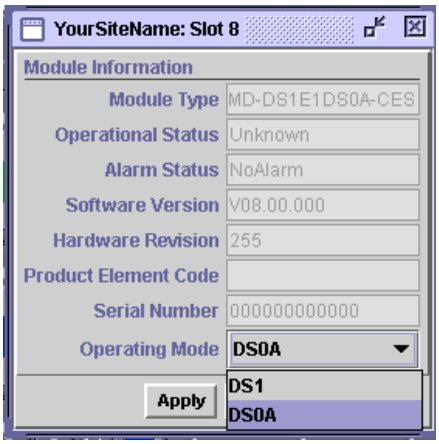


Figure 5-5. Module Information Window

The buttons on this window have the following functions:

Table 5-2.

Button	Function
Apply	Applies the set configuration.
Close	Closes this window.

Configuring the Ports

Perform the steps in the following procedure to configure ports for the 12-Port Medium-Density DS1/E1/DS0A CES.

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 12-Port Medium-Density DS1/E1/DS0A CES Module Port Configuration window appears (see Figure 5-7).
2. To configure a port, select a port entry, or double-click the mouse and a menu appears (see Figure 5-8).

   The 12-Port Medium-Density DS1/E1/DS0A CES Module Port and Channel Configuration window appears (see Figure 5-9).
3. Enter values in the fields on this window according to the information provided in Table 5-3.
4. Click **Apply**.

End

Figure 5-6. Front Panel View of the 12-Port Medium-Density DS1/E1/DS0A CES Module

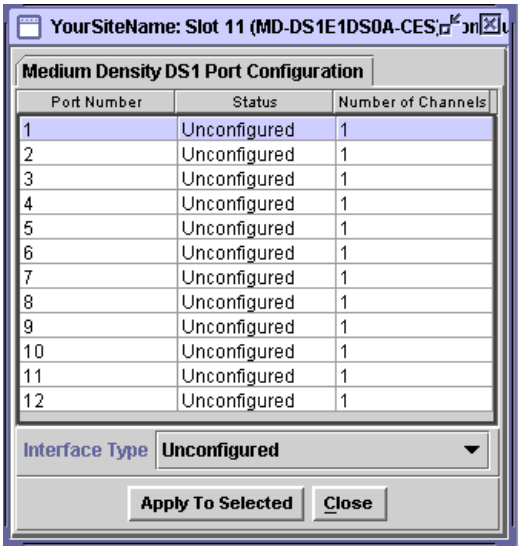


Figure 5-7. 12-Port Medium-Density DS1/E1/DS0A CES Module Port Configuration Window

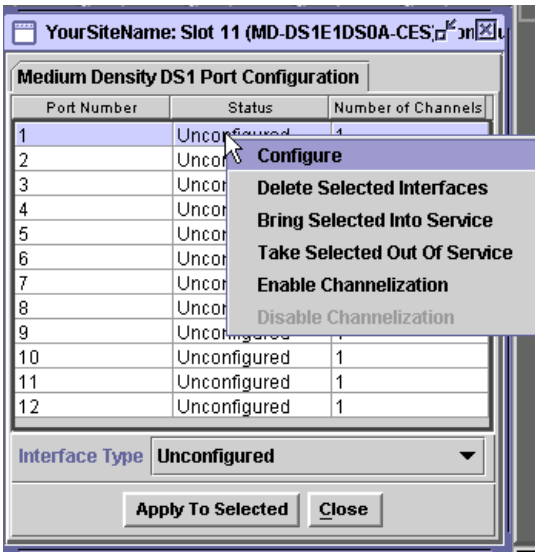


Figure 5-8. 12-Port Medium-Density DS1/E1/DS0A CES Module Port Configuration Window (Menu Displayed)

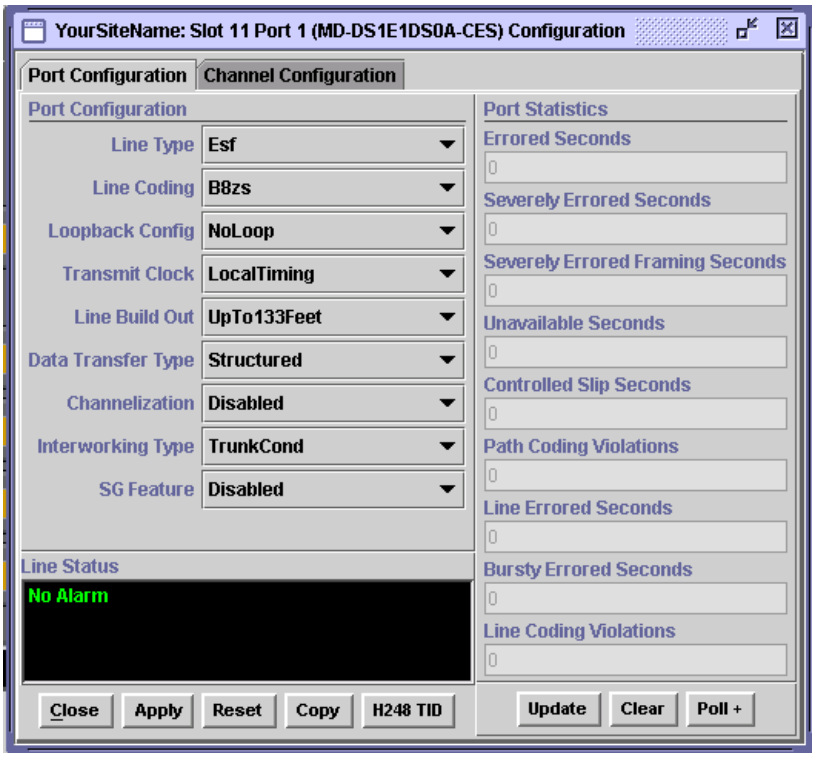


Figure 5-9. 12-Port Medium-Density DS1/E1/DS0A CES Module Port and Channel Configuration Window

The 12-Port Medium-Density DS1/E1/DS0A CES Module Port and Channel Configuration window has two sections:

- The Port Configuration page allows you to:
  - ~ Select port settings
  - ~ View port statistics, which display line errors and coding violations
  - ~ View line status
- The Channel Configuration page allows you to:
  - ~ Select an interface
  - ~ Open the Interface Configuration window to configure the interface
  - ~ Select multiple channels, DS0 strapping, and interfaces

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 on 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 this configuration to a range of ports.
H248 TID	Opens the H.248 Termination ID window.
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 5-3. Field Descriptions for the 12-Port Medium-Density DS1 Port and Channel Configuration Window

Field Name	Field Values	Description
Line Type	Default: **Esf** Range: N/A Format: Predefined	Indicates the framing mode to be used on this port. **Note:** When you select the value **Unstructured** in the Data Transfer Type field, the Line Type field disappears.
	Esf	Extended Super Frame DS1 format.
	D4	D4 format.

Table 5-3. Field Descriptions for the 12-Port Medium-Density DS1 Port and Channel Configuration Window

Field Name	Field Values	Description
Line Coding	Default: **B8ZS** Range: N/A Format: Predefined	Indicates the type of line coding to be used on this port. (The data format that lets either end of the communications channel correctly interpret messages from the other.)
	B8ZS	Bipolar with 8 zero substitution. Indicates the use of a specified pattern of normal bits and bipolar violations to replace sequence of 8 zero bits.
	Ami	Alternate mark inversion. Indicates zero code suppression.
Loopback Config	Default: **NoLoop** Range: N/A Format: Predefined	Indicates whether the port is to be used for loopback testing and, if so, the type of loopback to be performed.
	NoLoop	Indicates that the port will not be used for loopback.
	LocalLoop	Indicates that local loopback will be used on this port. The signal will be received from another module in the chassis, sent through the module circuitry (including the SAR function) and the chassis backplane to the originating module.
	LineLoop	Indicates that line loop will be used on this port. The received signal will be sent through the receiver and the line driver, and then back out to the originating point.
	PayloadLoop	Indicates the received signal is sent through the framing chip on the module, but not on the SAR circuitry, and then back out to the originating point. The data link is regenerated.
Transmit Clock	Default: **Local Timing** Range: N/A Format: Predefined	Indicates the timing source to be used on this port. The timing source is a signal that provides a timing reference for a transmission link.
	LocalTiming	Indicates that local clock source will be used as the timing source.
	LoopTiming	Indicates that recovered receive clock is used as the timing source.
	Adaptive Timing	Monitors the port buffers to increase or decrease the transmission rate. Displays only when the port is configured as **Unstructured** in the Data Transfer Type field.

Table 5-3. Field Descriptions for the 12-Port Medium-Density DS1 Port and Channel Configuration Window

Field Name	Field Values	Description
Line Build Out	Default: **UpTo133 Feet** Range: N/A Format: Predefined	Indicates the selectable output attenuation.
	UpTo133Feet	Indicates the DS1 signal level is transmitted to be received from 0 to 133 f eet
	UpTo266Feet	Indicates the DS1 signal is transmitted to be received from 0 to 266 feet
	UpTo399Feet	Indicates the DS1 signal is transmitted to be received from 0 to 399 feet
	UpTo533Feet	Indicates the DS1 signal is transmitted to be received from 0 to 533 feet
	UpTo655Feet	Indicates the DS1 signal is transmitted to be received from 0 to 655 feet
	negative7-5Db	Indicates the T1 signal level range at which the DS1 is configured is negative 7.5 dB
	negative15Db	Indicates the T1 signal level range at which the DS1 is configured is negative 15 dB
	negative22-5Db	Indicates the T1 signal level range at which the DS1 is configured is negative 22.5 dB
Data Transfer Type	Default: **Structured** Range: N/A Format: Predefined	Indicates whether this port has structured or unstructured interfaces.
	Structured	Indicates that this port supports Nx64 Kbps channelized interfaces.
	Unstructured	Indicates that this port has unstructured (unchannelized) interfaces. **Note:** When you select this value, the Line Type, Channelization, and UpStrmIntrworking fields disappear.

Table 5-3. Field Descriptions for the 12-Port Medium-Density DS1 Port and Channel Configuration Window

Field Name	Field Values	Description
Channelization	Default: **Disabled** Range: N/A Format: Predefined	Indicates whether the DS1 port is divided into 24 channels. **Note:** When you select the value **Unstructured** in the Data Transfer Type field, the Channelization field disappears.
	Disabled	Indicates that the division of the DS1 port into 24 channels is disabled. Use this setting if you want to set up only one channel for the port. When you select the **Apply Port Configuration** command, only channel 1 displays the value **Unconfigured**.
	Enabled	Indicates that the division of the DS1 port into 24 channels is enabled. Use this setting if you want to set up more than one channel for the port.
Interworking Type	Default: **TrunkCond** Range: N/A Format: Predefined	Displays the communications mode selected between the CE and ATM sides of a connection on this port during alarm conditions. **Note:** When you select the value **Unstructured** in the Data Transfer Type field, the Interworking Type field is display only, showing the value **Unframed1s.**
	TrunkCond	Indicates that trunk conditioning will be done for each channel of this port whose corresponding ATM side is alarmed. This improves the communication of the trunk status for TDM traffic. See the *PacketStar PSAX Multiservice Media Gateway Trunk Conditioning Application Note* for more details.
	Unframed1s	Indicates that a sequence of unframed all 1's will be transmitted to the CES end point whenever there is an alarm indication signal (AIS) on the ATM side for any CE to ATM connection on this port.
SG Feature	Default: **Disabled** Range: N/A Format: Character	Displays the status of the connection gateway feature. **Note:** This feature is not supported in this release.
	Disabled	Indicates that the connection gateway feature is disabled. See the *PacketStar® Connection Gateway API Specification* for more details.
	Enabled	Indicates that the connection gateway feature is enabled.
Line Status (display only)	Default: **NoAlarm** Range: N/A Format: Character	Indicates the status of the line: **NoAlarm**, **LossOfSignal**, or one of several alarms. See the line status table for the DS1 mode below.

The following table shows line status alarms for the 12-Port MD DS1/E1/DS0A CES module (DS1 mode):

Table 5-4. DS1 Line Status Alarms

Bit Value	Alarm	Description
1	NoAlarm	No alarm present
2	RcvFarEndLOF	PSAX is receiving an RAI alarm. The RAI (yellow) alarm is usually sent by the far-end device when an LOS, AIS, or LOF condtion is detected on its receive port.
4	XmtFarEndLOF	Near-end sending LOF indication
8	RcvAIS	Far-end sending AIS (red alarm)
16	XmtAIS	Near-end sending AIS
32	LossOfFrame	Near-end LOF
64	LossOfSignal	Near-end loss of signal
128	LoopbackState	Near-end is looped
256	T16AIS	E1 TS16 AIS (not valid for DS1)
512	RcvFarEndLOMF	Far-end sending TS16 LOMF (not valid for DS1)
1024	XmtFarEndLOMF	Near-end sending TS16 LOMF (not valid for DS1)
2048	RcvTestCode	Near-end detects a test code
4096	OtherFailure	Any other line status not shown in this table
8192	RmtLoopback	Far-end loopback

Viewing Port Statistics

You can view statistics for this port on the Port Statistics panel of the 12-Port Medium-Density DS1/E1/DS0A CES Module Port and Channel Configuration window (see Figure 5-9).

Descriptions of the data fields for the Port Statistics panel are given in Table 5-5.

Table 5-5. Field Descriptions for the 12-Port Medium-Density DS1 Port Statistics Window

Field Name	Field Values	Description
Errored Seconds	Default: **0000000000** Range: N/A Format: numeric	Displays the number of errored seconds that have occurred on the DS1 port since the last time statistics were reset. For ESF signals, an errored second contains at least one of the following: • Path coding violation • Controlled slip event • Detected alarm indication signal (AIS) defect • Out-of-frame (OOF) defect For D4 signals, this field indicates the presence of bipolar violations
Severely Errored Seconds	Default: **0000000000** Range: N/A Format: numeric	Displays the number of severely errored seconds that have occurred on the DS1 port since the last time statistics were reset. For ESF signals, a severely errored second contains at least one of the following: • 320 or more path coding violation error events • OOF defect • Detected AIS defect For D4 signals, a severely errored second contains at least one of the following: • one-second intervals with framing error events • OOF defect • 1,544 or more line coding violations (LCVs)
Severely Errored Framing Seconds	Default: **0000000000** Range: N/A Format: numeric	Displays the number of severely errored framing seconds encountered by the DS1 port in one of the previous 96 individual 15-minute intervals. A severely errored framing second has one or more out-of-frame defects or a detected AIS defect.
Unavailable Seconds	Default: **0000000000** Range: N/A Format: numeric	Displays the number of unavailable seconds encountered by the DS1 port in one of the previous 96 individual 15-minute intervals. Unavailable seconds (UAS) are calculated by the number of seconds that the interface is unavailable.
Controlled Slip Seconds	Default: **0000000000** Range: N/A Format: numeric	Displays the number of controlled slip seconds encountered by the DS1 port in the previous 24-hour period. A controlled slip second is a one-second interval containing one or more controlled slip events.
Path Coding Violations	Default: **0000000000** Range: N/A Format: numeric	Displays the number of path coding violations encountered by the DS1 port in the previous 24-hour period. A path coding violation is a frame synchronization bit error in the D4 and DS1-no-CRC formats, or a CRC error in the ESF and DS1-CRC formats.

Table 5-5. Field Descriptions for the 12-Port Medium-Density DS1 Port Statistics Window

Field Name	Field Values	Description
Line Errored Seconds	Default: **0000000000** Range: N/A Format: numeric	Displays the number of line errored seconds encountered by the DS1 port in the previous 24-hour period. A line errored second is a second in which one or more line code violation error events were detected.
Bursty Errored Seconds	Default: **0000000000** Range: N/A Format: numeric	Displays the number of bursty errored seconds encountered by the DS1 port in the previous 24-hour period. A bursty errored second has fewer than 320 and more than 1 path coding violation error events, no severely errored frame defects, and no detected incoming AIS defects.
Line Coding Violations	Default: **0000000000** Range: N/A Format: numeric	Displays the number of line coding violations that have occurred on the DS1 port since the last time statistics were reset. Line coding violations indicate that a bipolar violation or an excessive zeroes error event has occurred.

Configuring the Channels

Perform the steps in the following procedure to configure channels for the 12-Port Medium-Density DS1/E1/DS0A CES.

Applying an Interface to a Channel

Begin

1. Click the Channel Configuration tab.

   The Channel Configuration window appears (see Figure 5-10).

2. Select the channels to be configured as described in Table 5-6.

Table 5-6. Selecting Channels for Configuration

If you want to select...	then do this...
a single channel	click the channel in the list.
more than one consecutive channel in a list **Note:** You can only do this if you selected **Enabled** in the Channelization field on the Port Configuration page.	a. Press the Shift key. b. Click the left mouse button to select the first and final channels in the list. c. Release the Shift key. All channels in this range become selected.
more than one consecutive channel in a list **Note:** You can only do this if you selected **Enabled** in the Channelization field on the Port Configuration page.	press the left mouse button and drag it over the consecutive channels.
several channels that are not consecutive in a list **Note:** You can only do this if you selected **Enabled** in the Channelization field on the Port Configuration page.	a. Press the Ctrl key. b. Click the left mouse button to select each of the channels in the list as desired. c. Release the Ctrl key. All channels that you clicked become selected.

3 In the Channel Configuration page (see Figure 5-10), either click the arrow in the Interface Type field (in the middle of the window), or double-click the channel in the Interface Type field, and select an interface from the list.

4 Click **Apply to Selected**.

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

5 Click **Close**.

6 In the Front Panel, right-click the mouse on the port that contains the channels you configured in Step 2.

End

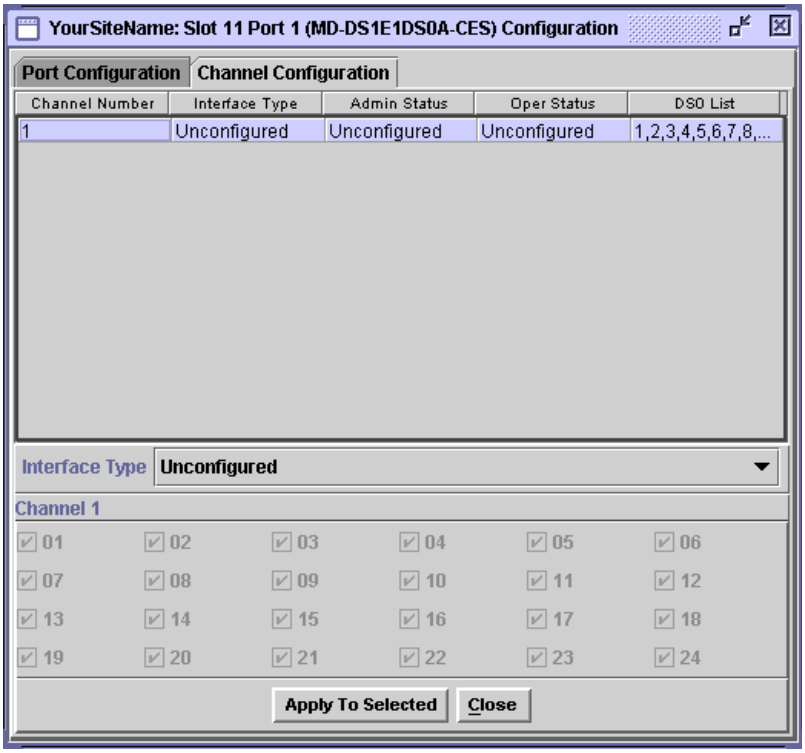


Figure 5-10. 12-Port Medium-Density DS1/E1/DS0A CES Module Channel Configuration Page

The Channel Configuration page allows you to:

- Select and apply an interface
- Select DS0s and apply strapping
- 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 or the **Apply** button will appear to be ghosted.

The buttons in this window have the following functions:

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

Configuring Interfaces

For a list of valid interface types for the 12-Port Medium-Density DS1/E1/DS0A CESmodule, 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 modules[1].

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 5-11).

2 Select the range of slots and ports to which you wish the port configuration to be copied as follows (refer to Figure 5-12):

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.

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.

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.

5 Click **Copy.**

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

End

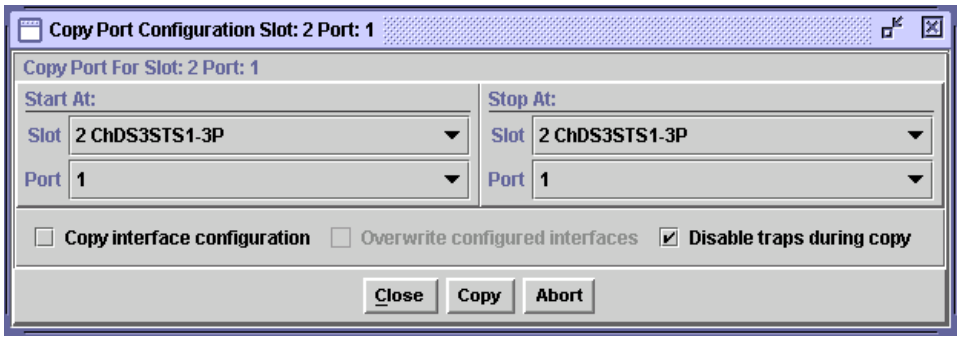


Figure 5-11. Sample Copy Port Configuration Window (After Initially Selecting the Copy Button From a Port Configuration Page)

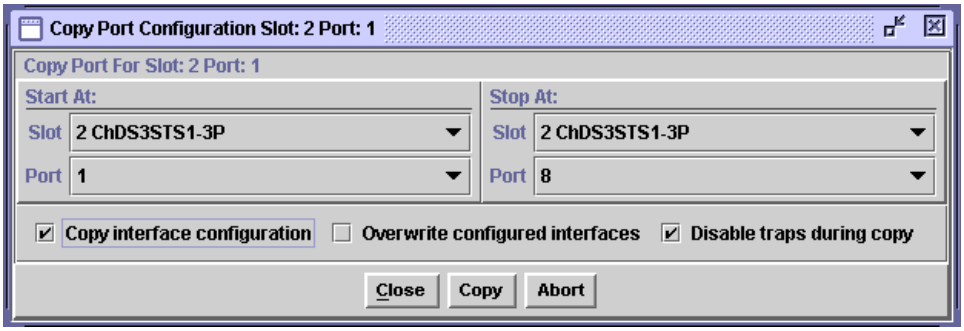


Figure 5-12. Sample Copy Port Configuration Window (After Selecting a Valid Attributes)

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	Cancels 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 5-13).

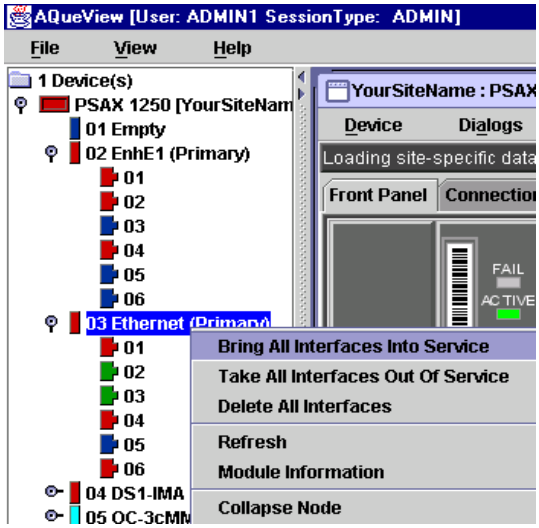


Figure 5-13. Sample Device Tree

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 5-14), or click the name of the module in the Device Tree.
2. A menu appears. Select Module Information.

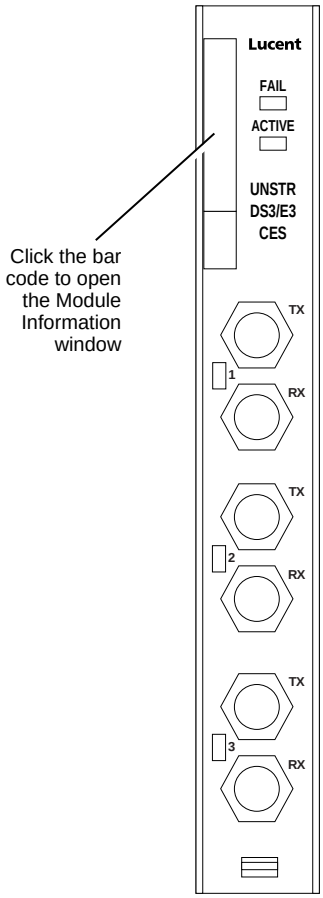


Figure 5-14. Obtaining Hardware Data from a Module

The coresponding Module Information window appears (see Figure 5-15).

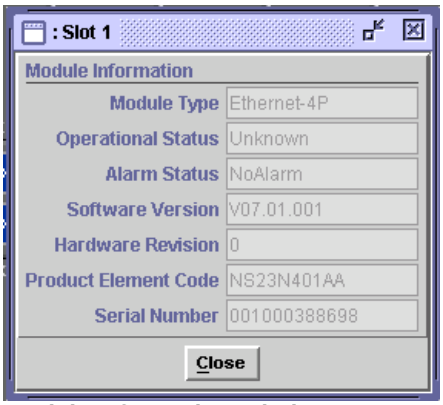


Figure 5-15. Sample Module Information Window

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

Field Name	Field Values	Description
Module Type	Default: **N/A** Range: from PSAX system database Format: Predefined alphanumeric alpha-numeric	Indicates the name of the module in the slot. All modules supported by the PSAX systems and the *AQueView* system are listed in the section "I/O and Server Modules" in this chapter.
Operational Status	Default: **Unknown** Range: N/A Format: Predefined alphanumeric	Displays the operational mode of the module.
	Unknown	Indicates that the module has not been config-ured.
	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 backup module to the primary module. Indicates for the CPU module, in redundant sys-tems, that this module is the backup CPU mod-ule.
Alarm Status	Default: **No Alarm** Range: N/A Format: Predefined alphanumeric	Displays the present alarm condition of the mod-ule. For the alarm status conditions, see the table “Alarm Status Descriptions” following these field descriptions.For the alarm status conditions, see “Obtaining Hardware Operating Status Data for Modules” 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 firm-ware upgrades with every new PSAX system soft-ware release, the software version that is dis-played 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 version of the hardware for the selected module.

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

Field Name	Field Values	Description
Product Element Code	Default: **N/A** Range: (from module firmware) Format: Predefined	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: *YYVVDDnnnnnn*, where *YY* = year of manufacture *VV* = vendor ID code (manufacturer and location) *DD* = date code of manufacture (either month or week depending on vendor's preference) *nnnnnn* = sequential number, which in conjunction with *YY*, *VV*, and *DD*, 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 (*YY*) are not displayed.
Operating Mode	Default: **N/A** Range: (module-dependent) Format: Predefined alphanumeric	Displays the module type for those modules that can be switched between two module types, 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 5-16) 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.

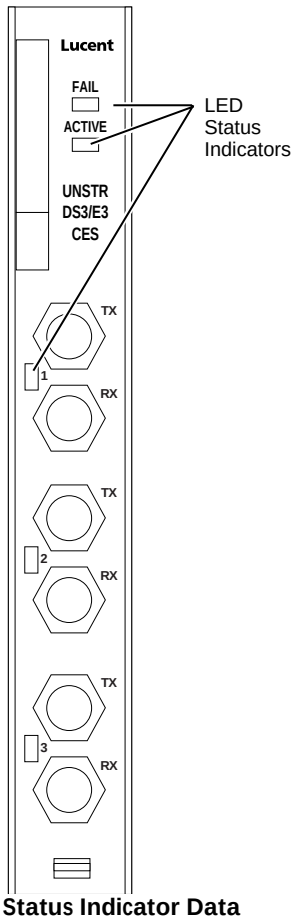


Figure 5-16. Obtaining LED Status Indicator Data

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: • 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 5-17)
- View at the status indicators in the Device Tree (see Figure 5-18)

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

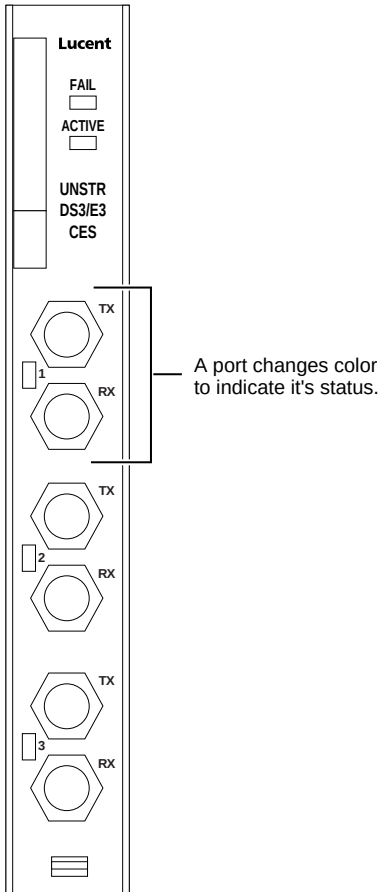


Figure 5-17. Port Status Data

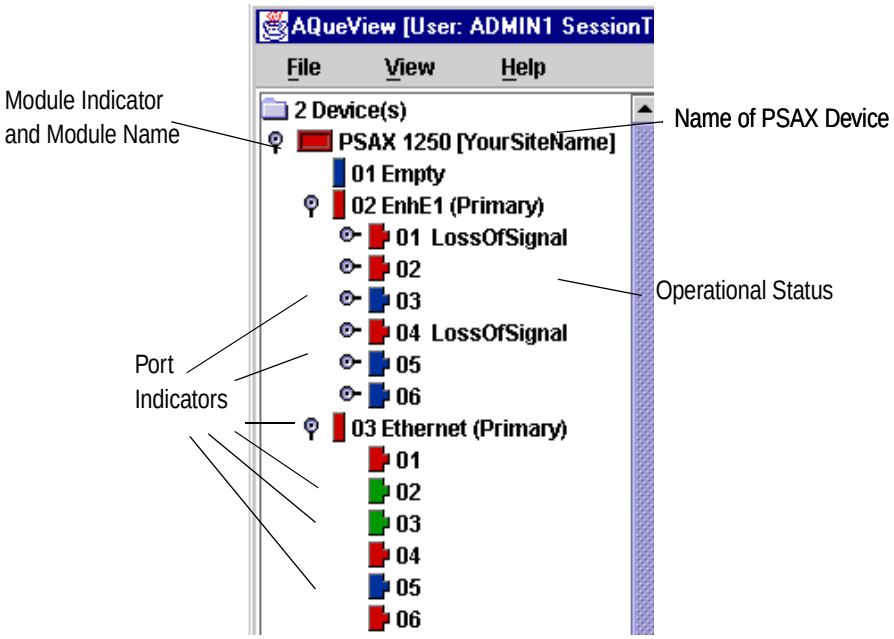


Figure 5-18. Device Tree Status Indicators

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	• 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 12-Port Medium-Density DS1/E1/DS0A CES module (DS1 mode):

- Circuit emulation
- GR-303
- Primary Rate Interface (PRI) Integrated Services Digital Network (ISDN) network
- Primary Rate Interface (PRI) Integrated Services Digital Network (ISDN) user

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 12-Port Medium-Density DS1/E1/DS0A CES 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 Circuit Emulation Interface

Accessing or Viewing the Circuit Emulation Interface Configuration Window

This section provides instructions for configuring an I/O module for the circuit emulation interface.

After applying the **CircuitEmulation** interface type to a channel from the Channel Configuration page, do one of the following to access the Circuit Emulation 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 Circuit Emulation Interface Configuration window appears (see Figure 6-1).

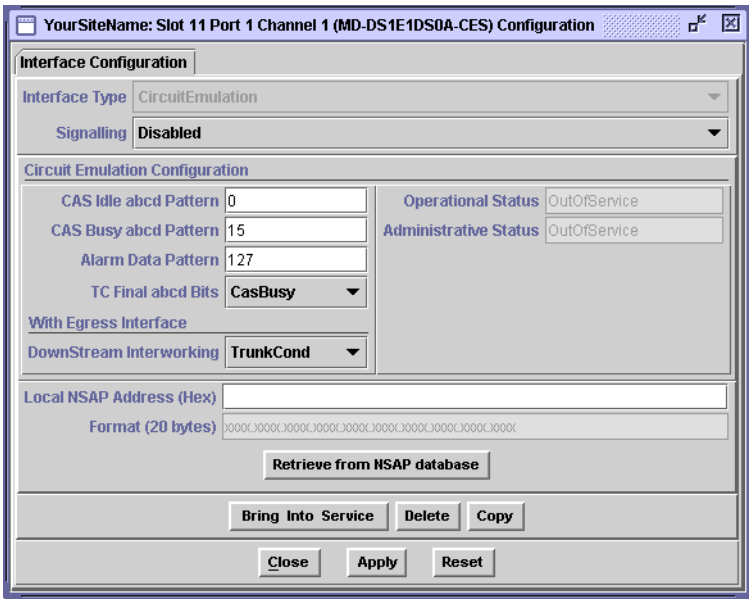


Figure 6-1. Circuit Emulation Interface Configuration Window

The buttons on this window have the following functions:

Button	Function
Calculate Navis NSAP Address	Displays only when you configure user properties to include the Navis NSAP format. For more information, see the appropriate *Navis AQueView Element Management System User Guide*. 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** appears in the Administrative Status field. You must first configure the interface before you can use this button.

Button	Function
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 redisplays 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.
Configure H248 TID	Displays the H.248 Termination ID Configuration window. For more information on using this module with H.248, see the *H.248 Media Gateway Control User Guide for the PacketStar® PSAX Multiservice Media Gateways*.
Close	Closes this window.
Apply	Applies the configuration field value you set.
Reset	Resets the fields to the last set of applied values.

Button	Function
Retrieve from NSAP database	When you enter an ATM NSAP address in the Local NSAP Address (Hex) field and click this button, the Select NSAP window displays. You can retrieve or add this NSAP address into the Select NSAP window.
Calculate Navis NSAP Address	**Note:** This button appears only when you configure user properties to include the Navis NSAP format. For more information, see the appropriate *Navis™ AQueView Element Management System User Guide*. 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 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** displays in the Administrative Status field. You must use this button first before using the **Delete** button.
Delete	Deletes an out-of-service interface and redisplays the Port and Channel Configuration window for the module you are configuring. You must first take interface out of service (using the **Take Out of Service** button) before you can use the **Delete** button.
Copy	Copies this interface to a range of slots, ports, and channels.

Button	Function
Configure H248 TID	Displays the H.248 Termination ID Configuration window. For more information on using this module with H.248, see the *H.248 Media Gateway Control User Guide for the PacketStar® PSAX Multiservice Media Gateways.*
Close	Closes this window.
Apply	Applies the configuration field value you set.
Reset	Resets the fields to the last set of applied values.

Configuring Circuit Emulation Interface Values

To set the values for the Circuit Emulation interface, perform the steps in the following procedure.

Begin

1. Enter values in the fields on this window according to the information provided 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**.

End

Table 6-1. Field Descriptions for the Circuit Emulation Interface Configuration Window

Field Names	Field Values	Description
Interface Type	Default: **N/A** Range: N/A Format: predefined alphanumeric	Circuit Emulation displays as the interface type.
Signaling	Default: **CCS Clear Channel signaling** Range: N/A Format: predefined alphanumeric	The type of signaling used. **Note:** This field is displayed only when configuring the circuit emulation interface on these modules: • 6-Port Multiserial • 6-Port Enhanced DS1 Multiservice • 1-Port Channelized DS3
	CCS Clear Channel signaling	Clear channel signaling—ABCD signaling bits not used.
	CAS (channel-associated signaling)	Channel associated signaling—signaling bit transport based on ATM Forum stardard for ABCD signaling bits. ISDN requires the use of the whole port. Will not function with CAS.
Speed Adaptation	Default: **Enabled** Range: N/A Format: predefined alphanumeric	Refers to robbed-bit signaling in circuit emulation interfaces.
	Disabled	Refers to robbed-bit signaling in circuit emulation interfaces.
CAS Idle abcd Pattern	Default: **0** Range: 0–15 Format: Numeric	Signaling abcd bit pattern for first 2.5 seconds.
CAS Busy abcd Pattern	Default: **15** Range: 0–15 Format: Numeric	Signaling abcd bit pattern after 2.5 seconds.
Data Pattern	Default: **127 (idle pattern)** Range: 0–255 Format: Numeric	The data pattern to be transmitted out on a circuit emulation port, if no user data is available for the transmission.
TC Final abcd Bits	Default: **CasBusy** Range: N/A Format: Predefined	Specifies the bit pattern to be transmitted after 2.5 seconds.
	CasBusy	CAS busy bit pattern transmitted after 2.5 seconds.
	CasIdle	CAS idle bit pattern transmitted after 2.5 seconds.

Table 6-1. Field Descriptions for the Circuit Emulation Interface Configuration Window

Field Names	Field Values	Description
DownStream Interworking	Default: **TrunkCond** Range: N/A Format: predefined alphanumeric	Trunk conditioning will be done with ATM network. The PSAX system will generate an idle data pattern in the payload of ATM cells to send a signal to indicate a connection failure.
	Unsupp	No interworking will be done with ATM network. The PSAX system will not send a signal to indicate a connection failure. Do not choose this value if you want to enable trunk conditioning.
	OAM	OAM interworking will be done with ATM network. The PSAX system will use ATM OAM cells to send a signal to indicate a connection failure. You can use this value if all the ATM switches along the connection support ATM OAM cells. You must use this value if you selected **Unframed1s** in the UpStrmIntrworking field on the Port and Channel Configuration window of the module you are configuring. The PSAX system does not support upstream interworking of unframed 1s with a downstream setting of trunk conditioning.
[Admin Status] (display only)	Default: **OutOfService** Range: N/A Format: Predefined	Indicates whether the interface is configured and brought into service or not.
	OutOfService	The interface is not configured and brought into service.
	InService	The interface is configured and brought into service.
[Oper Status] (display only)	Default: **OutOfService** Range: N/A Format: predefined alphanumeric	Indicates whether any condition is preventing the interface from passing traffic.
	OutOfService	Indicates that a condition is preventing the interface from passing traffic.
	InService	Indicates that no condition is preventing the interface from passing traffic.
Local NSAP Address (Hex)	Default: **Hexadecimal** Range: N/A Format: Hexadecimal	The ATM NSAP address of the local end of the connection, in hexadecimal notation. Enter the NSAP address of the local ATM interface.

Configuring the GR-303 Interface

Examples on how to configure GR-303 interface groups using the DSP2C and DSP2D Voice Server modules are provided in the *Configuring the GR-303 Voice Gateway User Guide, Document Number 255-700-135.* This user guide also includes a list of modules certified as interoperable with other call processing devices, such as the Lucent CellPipe™ IAD and the CO 5ESS switch.

Configuring the PRI ISDN User/Network Interfaces

Accessing or Viewing the PRI ISDN User/Network Interface Configuration Window

This section provides instructions for configuring an I/O module for the PRI ISDN User/Network interface.

Note: To configure the PRI ISDN User/Network interface, you must select **Enabled** in the SG Feature field channelization on the Port Configuration page.

After applying the **Pri_Isdn_Network** or **Pri_Isdn_User** interface type to a channel from the Channel Configuration page, do one of the following to access the ISDN 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 ISDN Interface Configuration window appears (see Figure 6-2) .

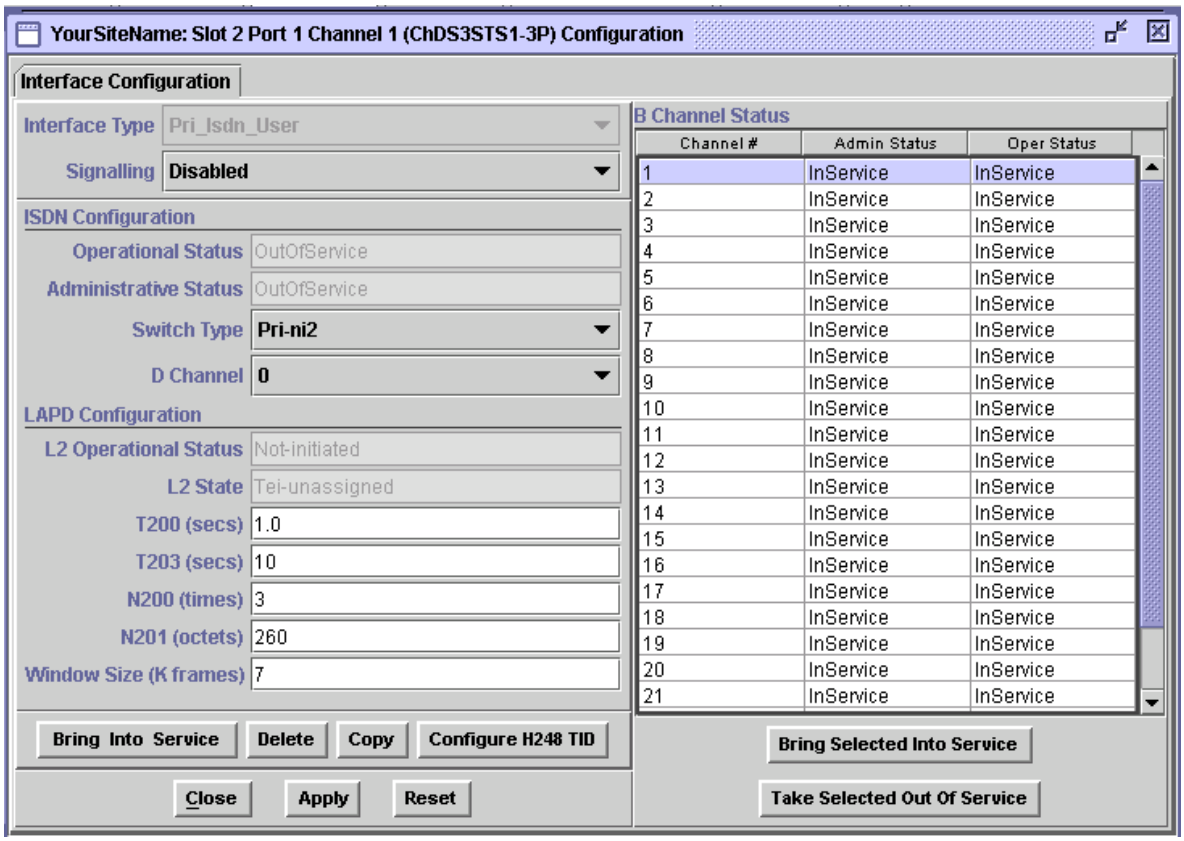


Figure 6-2. PRI ISDN Interface Configuration Window (User)

The buttons in this window have the following functions:

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	Displays when the [Admin Status] field is **OutOfService**. Takes an in-service configured interface to out-of-service status. Brings an out-of-service configured interface to in-service status. The value **InService** is displayed in the [AdminStatus] field. You must first configure the interface before you can use this command.

Command	Function
Take Interface Out of Service	Displays when the [Admin Status] field is **InService**. Takes an in-service configured interface to out-of-service status.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.
Delete Interface and Return	Deletes an out-of-service interface and redisplays 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.
Apply BChannel Configuration	Applies the BChannel Admin Status values you set.
Reset BChannel Display	Refreshes the fields to the last set of applied values.
Bring All BChannels Into Service	Displays when the [Admin Status] field is **OuOfService**. Takes an in-service configured interface to out-of-service status. Brings an out-of-service configured BChannel to in-service status. The value **InService** is displayed in the [Admin Status] field.
Take All BChannels Out of Service	Displays when the [Admin Status] field is **InService**. Takes an in-service configured interface to out-of-service status. Takes an in-service configured BChannel to out-of-service status. The value **OutOfService** is displayed in the [Admin Status] field.
Go Back to Channel Configuration	Redisplays the Port and Channel Configuration window for the module you are configuring.

Configuring PRI ISDN Interface Values

To set the values for the PRI ISDN User/Network interface, perform the steps in the following procedure.

Begin

1. Enter values in the fields on this window according to the information provided in Table 6-2.
2. Click **Apply**.

End

Table 6-2. Field Descriptions for the PRI ISDN Network/User Configuration Window

Field Name	Values	Description
Interface Type (display only)	Default: **Pri_Isdn_Network or Pri_Isdn_User** Range: N/A Format: predefined	Indicates the primary rate network or user interface that you are configuring.
	Pri_Isdn_Network	Indicates that that you are configuring the primary rate network interface.
	Pri_Isdn_User	Indicates that that you are configuring the primary rate user interface.
Signalling	Default: **Disabled** Range: N/A Format: predefined	Indicates the type of signaling used for this interface.
	Disabled	Clear Channel Signaling; ABCD signaling bits not used.
	Enabled	Channel Associated Signaling; signaling bit transport based on ATM Forum stardard for ABCD signaling bits. ISDN requires the use of the whole port. Will not function with CAS.
Operational Status (display only)	**InService**	Indicates that the interface is operational.
	OutOfService	Indicates that the interface is not operational.
Administrative Status (display only)	**InService**	Indicates that the interface is in service.
	OutOfService	Indicates that the interface is not in service.
Switch Type	Default: **Pri_ni2** Range: N/A Format: predefined **Pri_net5, Pri_1tr6, Pri_4ess, Pri_5ess, Pri_dass2, Pri_dms100, Pri_kdd, Pri_ntt, Pri_net5sw, Pri_ts014, Pri-vn**	The primary rate interface (PRI) switch type.
DChannel	Default: **0** Range: 0–24 Format: numeric	If the D Channel number is **0**, the LAP-D will not be enabled.
L2 Operational Status (display only)	Default: **Not-initiated**	The operational status of the ISDN Layer 2. Not-initiated means that the first SETUP message has not been transmitted and the L2 establishment procedure has not yet been initiated.

Table 6-2. Field Descriptions for the PRI ISDN Network/User Configuration Window

Field Name	Values	Description
L2 State (display only)	**Tei-unassigned, tei-assigned, waiting-establishment, awaiting-release, multiple-frame-established, timer-recovery**	The current state of the ISDN Layer 2 protocol.
T200 (secs)	Default: **1.0** Range: 0.1–10.0 Format: numeric, in 1/10 seconds	The value of the L2 T200 timer.
T203 (secs)	Default: **10** Range: 1–60 Format: seconds	The value of the L2 T203 timer
N200 (secs)	Default: **3** Range: 1–5 Format: numeric	The maximum number of retransmissions before the LAP-D link is declared to be not operational.
N201 (octets)	Default: **260** Range: 1–300 Format: numeric	The maximum number of octets in an information field.
Window Size (K frames)	Default: **7** Range: 1–127 Format: numeric	The maximum number of outstanding I frames.

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:

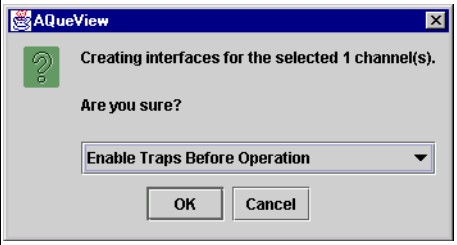
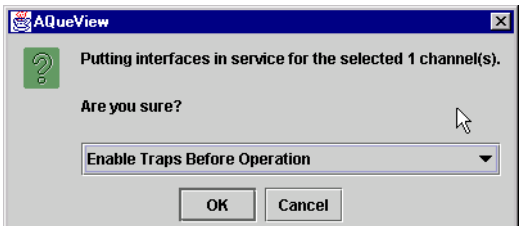
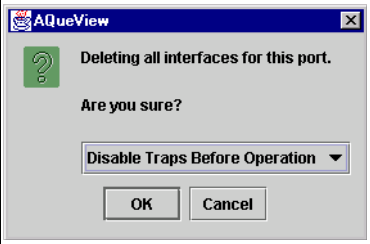
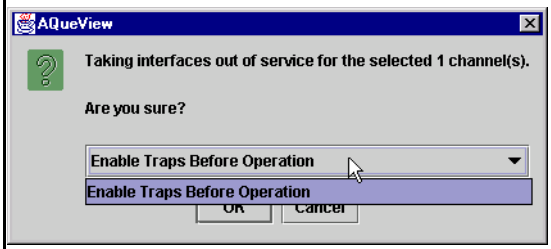
Table 6-3. Performing an Action on an Interface

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 6-4. Enabling or Disabling Traps Decision Table

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

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 modules[1].

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 6-3). 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 6-4):

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.

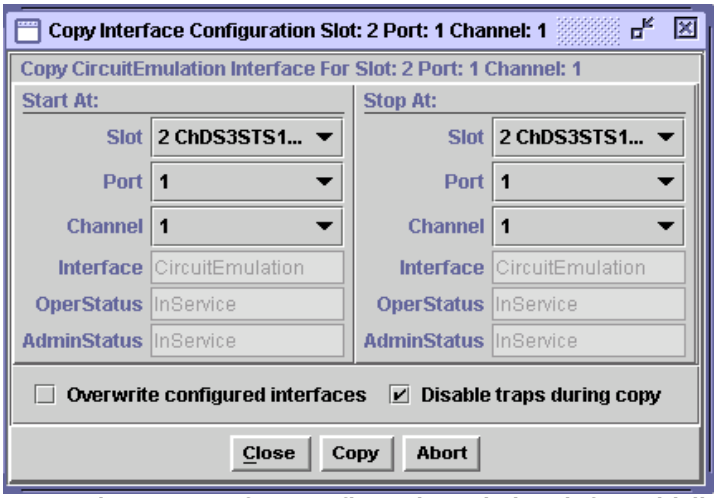


Figure 6-3. Sample Copy Interface Configuration Window (After Initially Selecting the Copy Button From a Port Configuration Page)

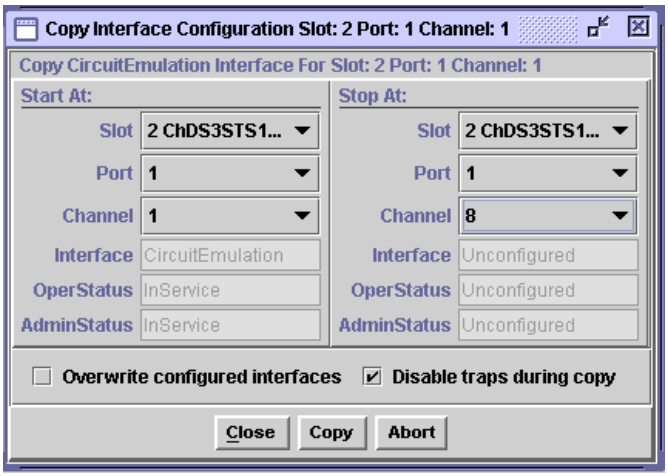


Figure 6-4. Sample Copy Interface Configuration Window (After Selecting Valid Attributes)

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	Cancels 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.

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 6-5).

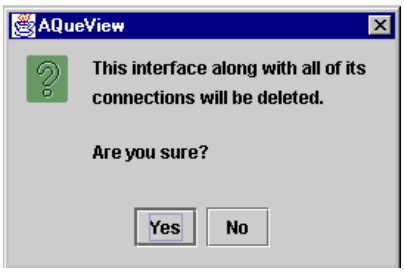


Figure 6-5. Delete Interface Confirmation Window

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 12-Port Medium-Density DS1/E1/DS0A CES module (DS1 mode):

- PVC connections:
  - ~ Circuit Emulation-to-ATM virtual channel connection (VCC)
  - ~ Circuit Emulation-to-Circuit Emulation channel connection (VCC)
  - ~ GR-303-to-AAL2 VCC/PVC channel connection
- SPVC connections:
  - ~ Circuit Emulation-to-ATM virtual channel connection (VCC)
  - ~ Circuit Emulation-to-ATM Std AAL2 virtual channel connection (VCC)

A Pin Configurations

Overview of This Appendix

This appendix describes the pin assignments for the connectors on the 12-Port Medium-Density DS1/E1/DS0A CES modulemodule. Use the following information to connect correctly configured cables to this module.

Configurations for the 12-Port MD DS1/E1/DS0A CES Module Connectors

The following table shows the pin configurations for the 12-Port Medium-Density DS1/E1/DS0A CES module connector. Each port consists of two transmit and two receive pins. Note that two pins are not used.

Table A-1. Telco Connector Pin Assignments for the 12-Port MD DS1/E1/DS0A CES Module

Top Row Ring Pin #	Bottom Row Tip Pin #	Network Signal Pair Connector	Port Connector
1	26	Tx 1	1
2	27	Tx 2	2
3	28	Tx 3	3
4	29	Tx 4	4
5	30	Tx 5	5
6	31	Tx 6	6
7	32	Tx 7	7
8	33	Tx 8	8
9	34	Tx 9	9
10	35	Tx 10	10
11	36	Tx 11	11
12	37	Tx 12	12
13	38	Do Not Use	Do Not Use
14	39	Rx 1	1
15	40	Rx 2	2
16	41	Rx 3	3
17	42	Rx 4	4
18	43	Rx 5	5
19	44	Rx 6	6

Table A-1. Telco Connector Pin Assignments for the 12-Port MD DS1/E1/DS0A CES Module

Top Row Ring Pin #	Bottom Row Tip Pin #	Network Signal Pair Connector	Port Connector
20	45	Rx 7	7
21	46	Rx 8	8
22	47	Rx 9	9
23	48	Rx 10	10
24	49	Rx 11	11
25	50	Rx 12	12

The 12-Port Medium-Density DS1/E1/DS0A CES module port connector mates with a shielded 10-foot Lucent cable assembly (COMCODE 300468030). An equivalent shielded cable with an RJ-48H connector (for example, a Cinch p/n 57-10500-7, 90° plug, a Cinch p/n 57-30500-4, 180° plug, a Cinch p/n 57-10500-271, 270° plug, or equivalent) may also be used (see Chapter 2, "Module Description," and Figure A-1). The pin wiring for this cable, shown in Table A-2, details the RJ-48H network connection to the user equipment. You can connect to this cable per the specifications outlined in ANSI T1.403-1999.

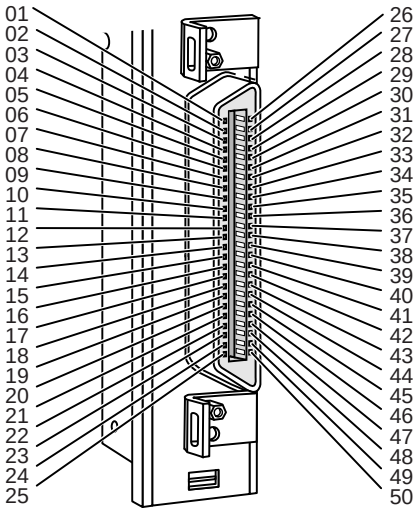


Figure A-1. Pin Locations on the Telco Port Socket Connector

Table A-2. Standard 25-Pair Telco Connector to RJ-48H Cable Wiring

Port Connector	Signal Name	Telco Socket Pin	RJ-48H Pin	Twisted Pair	Wire Color	Input/Output
1	TRING_1	1	39	1	Blue/White	Output
1	TTIP_1	26	14	1	White/Blue	Output
2	TRING_2	2	1	2	Orange/White	Output
2	TTIP_2	27	26	2	White/Orange	Output
3	TRING_3	3	40	3	Green/White	Output
3	TTIP_3	28	15	3	White/Green	Output
4	TRING_4	4	2	4	Brown/White	Output
4	TTIP_4	29	27	4	White/Brown	Output
5	TRING_5	5	41	5	Gray/White	Output
5	TTIP_5	30	16	5	White/Gray	Output
6	TRING_6	6	3	6	Blue/Red	Output
6	TTIP_6	31	28	6	Red/Blue	Output
7	TRING_7	7	42	7	Orange/Red	Output
7	TTIP_7	32	17	7	Red/Orange	Output
8	TRING_8	8	4	8	Green/Red	Output
8	TTIP_8	33	29	8	Red/Green	Output
9	TRING_9	9	43	9	Brown/Red	Output
9	TTIP_9	34	18	9	Red/Brown	Output
10	TRING_10	10	5	10	Gray/Red	Output
10	TTIP_10	35	30	10	Red/Gray	Output
11	TRING_11	11	44	11	Blue/Black	Output
11	TTIP_11	36	19	11	Black/Blue	Output
12	TRING_12	12	6	12	Orange/Black	Output
12	TTIP_12	37	31	12	Black/Orange	Output
Do Not Use	Do Not Use	13	13	13	Green/Black	N/A
Do Not Use	Do Not Use	38	38	13	Black/Green	N/A
1	RRING_1	14	45	14	Brown/Black	Input
1	RTIP_1	39	20	14	Black/Brown	Input
2	RRING_2	15	7	15	Gray/Black	Input
2	RTIP_2	40	32	15	Black/Gray	Input
3	RRING_3	16	46	16	Blue/Yellow	Input
3	RTIP_3	41	21	16	Yellow/Blue	Input
4	RRING_4	17	8	17	Orange/Yellow	Input
4	RTIP_4	42	33	17	Yellow/Orange	Input
5	RRING_5	18	47	18	Green/Yellow	Input

Table A-2. Standard 25-Pair Telco Connector to RJ-48H Cable Wiring <BlueItalic9>Continued<BlueDingbat9>Ø

Port Connector	Signal Name	Telco Socket Pin	RJ-48H Pin	Twisted Pair	Wire Color	Input/Output
5	RTIP_5	43	22	18	Yellow/Green	Input
6	RRING_6	19	9	19	Brown/Yellow	Input
6	RTIP_6	44	34	19	Yellow/Brown	Input
7	RRING_7	20	48	20	Gray/Yellow	Input
7	RTIP_7	45	23	20	Yellow/Gray	Input
8	RRING_8	21	10	21	Blue/Violet	Input
8	RTIP_8	46	35	21	Violet/Blue	Input
9	RRING_9	22	49	22	Orange/Violet	Input
9	RTIP_9	47	24	22	Violet/Orange	Input
10	RRING_10	23	11	23	Green/Violet	Input
10	RTIP_10	48	36	23	Violet/Green	Input
11	RRING_11	24	50	24	Brown/Violet	Input
11	RTIP_11	49	25	24	Violet/Brown	Input
12	RRING_12	25	12	25	Gray/Violet	Input
12	RTIP_12	50	37	25	Violet/Gray	Input

B Reference Information

Overview of This Appendix

This appendix contains reference information that is helpful while configuring your PSAX 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

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.

ATM User-Network Interface Specification Cause Codes Table

SPVC connection cause codes, displayed in the Last Rls Cause field on all the SPVC connection configuration windows, are provided in Table B-1. 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-1. 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

Table B-1. 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

Table B-1. 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

Table B-1. 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: • 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: • Not recognized because the elements or parameters are not defined • Defined but not implemented by the equipment sending the cause code 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.	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-1. 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-2. DSP Tone Detection Modes* 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.

* Modes selected on the Circuit Emulation-to-ATM VCC PVC Connection window

DSP2C Module Channel Reduction When Using Fax Relay Mode Table

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

Number of DSPs for Fax Relay	Total Connections Assigned for Fax Relay	Percent of All DSP Connections Assigned for Fax Relay	Remaining Voice Processing Available Channels*
1	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% †	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

* 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.

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

Industry Compliance Specifications Table

Compliance specifications for the *PacketStar*® PSAX Multiservice Media Gateway I/O and server modules are contained in Table B-4.

Table B-4. Industry Compliance Specifications

Feature Name/Product Name	Specification Title	Notes
ATM Maintenance Mode In-band Management SVC	af-pnni-0066000 Private Network-Network Interface (PNNI) Addendum (Soft PVC)	
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
GR-303 DLC Services VTOA AAL2 Trunking Narrowband Services	af-vmoa-0145.000 Voice and Multimedia Over ATM–Loop Emulation Service Using AAL2	
AAL2 Trunking	af-vtoa-0089.000 ATM Trunking Using AAL1 for Narrow Band Services V1.0	
I.610 OAM F4/F5 Processing (remote defect indication [RDI] and alarm indication signal [AIS])	af-vtoa-0098.000 VTOA AAL1 Trunking Services	
	af-vtoa-0119.000 Low Speed Circuit Emulation Service	
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	
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-4. Industry Compliance Specifications (Continued)

Feature Name/Product Name	Specification Title	Notes
GR-303 DLC Services VTOA AAL2 Trunking Narrowband Services	ANSI T1.602 Integrated Services Digital Network (ISDN)- Data-link Layer Signaling Specification for Application at the User-Network Interface	
GR-303 DLC Services VTOA AAL2 Trunking Narrowband Services	ANSI T1.607; T1.607a Digital Subscriber Signaling System Number 1 (DSS1)-Layer 3 Signaling Specification for Circuit-switched Bearer Services	T1.607a is for GR-303 DLC Services
	DSL Forum TR 017 ATM over ADSL Recommendations	
GR-303 DLC Services VTOA AAL2 Trunking Narrowband 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.

Table B-4. 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	
	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	
	ITU-T E.164 Overall Network Operation, telephone service, service operation, and human factors: Operation, numbering, routing and mobile services International operation- Numbering plan of the international telephone service	

Table B-4. Industry Compliance Specifications (Continued)

Feature Name/Product Name	Specification Title	Notes
	ITU-T G.702 General Aspects of Digital Transmission Systems— Terminal Equipment: Digital Hierarchy Bit Rates	
1.544 Mbps, 2.048 Mbps, 44.736 Mbps; includes channel-associated signaling (CAS) ABCD in-band signaling	ITU-T G.704 Synchronous frame structures used at 1544, 6312, 2048, 8488 and 44 736 Kbps hierarchical levels	
	ITU-T G.706 Frame alignment and cyclic redundancy check (CGC) procedures relating to basic frame structures defined in Recommendation G.704	
	ITU-T G.707 Transmission Systems and Media—Digital transmission systems— Terminal equipment—General: Network node interface for the synchronous digital hierarchy (SDH)	
Annex A: Voice compression (8 Kbps) Annex B: Silence suppression	ITU-T G.729 General Aspects of Digital Transmission Systems: Coding of Speech at 8 Kbps Using Conjugate-Structure Algebraic-Code-Excited Linear-Prediction (CS-ACELP)	
	ITU-T G.732 General Aspects of Digital Transmission Systems Terminal Equipments: Characteristics of Primary PCM Multiplex Equipment Operating at 2048 Kbit/s	
	ITU-T G.736 General Aspects of Digital Transmission: Characteristics of a Synchronous Digital Multiplex Equipment Operating at 2048 kbits/sec	

Table B-4. Industry Compliance Specifications (Continued)

Feature Name/Product Name	Specification Title	Notes
	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.
	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.

Table B-4. Industry Compliance Specifications (Continued)

Feature Name/Product Name	Specification Title	Notes
	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	
	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	

Table B-4. Industry Compliance Specifications (Continued)

Feature Name/Product Name	Specification Title	Notes
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 Narrowband 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	
	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	

Table B-4. Industry Compliance Specifications (Continued)

Feature Name/Product Name	Specification Title	Notes
	ITU-T I.432.4 B-ISDN User-Network- Physical Layer Specification: 51 840 Kbps Operation	
	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	
• AAL1 Trunking CCS (Q.931) • AAL1 Trunking CCS (Q.931/QSIG), AAL1 Trunking CAS • AAL2 Trunking CCS (Q.931)	ITU-T Q.931 Switching and Signaling - Digital subscriber Signalling System No. 1 - Network layer: Digital Subscriber Signaling System No. 1 (DSS 1) - ISDN User-Network Interface Layer 3 Specification for Basic Call Control	
	ITU-T Q.933 Annex A Digital Subscriber Signaling System No. 1—Integrated Services Digital Network (ISDN) Digital Subscriber Signaling System No. 1 (DSS 1)—Signaling Specifications for Frame Mode Switched and Permanent Virtual Connection Control and Status Monitoring	
ATM UNI interfaces (3.0, 3.1, 4.0)	ITU-T Q.2110 B-ISDN SAAL Service Specific Connection Oriented Protocol (SSCOP)	
ATM UNI interfaces (3.0, 3.1, 4.0)	ITU-T Q.2130 B-ISDN SAAL Service Specific Coordination Function (SSCF) for Support of Signaling at the User-Network Interface	

Table B-4. Industry Compliance Specifications (Continued)

Feature Name/Product Name	Specification Title	Notes
	ITU-T Q.2931 B-ISDN Application protocols for access signalling—Broadband Integrated Services Digital Network (B-ISDN)— Digital Subscriber Signalling System No. 2 (DSS 2)—User Network Interface (UNI) Layer 3 Specification For Basic Call/Connection Control	
	ITU-T Q.2941.2 Draft: Broadband Integrated Services Digital Network (B-ISDN)- Digital Subscriber Signaling System No. 2 (DSS2): Generic identifier transport (	
	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	

Interface Type by Connection Type Table

Table B-5. Connection Type by Interface Type Table

Interface / Connection	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)
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-5. Connection Type by Interface Type Table (Continued)

Interface / Connection	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)
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

Table B-6 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 DSP2*x* Voice Server modules, the Route Server module, and the Tones and Announcements Server module.

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

Interface / Module	ATM IISP (Network/User)	ATM IMA	ATM PNNI 1.0	ATM UNI 4.0	ATM UNI 3.0/3.1	Bridge	CAS Trunkline	Circuit Emulation	Dynamic Bandwidth Circuit Emulation	Frame Relay (UNI, NNI)	GR-303	HDLC Pass-through	PRI ISDN (Network/User)	Routing	Terminal Emulation	Virtual
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			

Table B-6. Interface Types by I/O Module Types (Continued)

Module \ Interface	ATM IISP (Network/User)	ATM IMA	ATM PNNI 1.0	ATM UNI 4.0	ATM UNI 3.0/3.1	Bridge	CAS Trunkline	Circuit Emulation	Dynamic Bandwidth Circuit Emulation	Frame Relay (UNI, NNI)	GR-303	HDLC Pass-through	PRI ISDN (Network/User)	Routing	Terminal Emulation	Virtual
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**)																
1-Port DS3 IMA (**DS3 IMA**)	X	X	X	X	X											

Table B-6. Interface Types by I/O Module Types (Continued)

Module \ Interface	ATM IISP (Network/User)	ATM IMA	ATM PNNI 1.0	ATM UNI 4.0	ATM UNI 3.0/3.1	Bridge	CAS Trunkline	Circuit Emulation	Dynamic Bandwidth Circuit Emulation	Frame Relay (UNI, NNI)	GR-303	HDLC Pass-through	PRI ISDN (Network/User)	Routing	Terminal Emulation	Virtual
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											

Table B-6. Interface Types by I/O Module Types (Continued)

Module \ Interface	ATM IISP (Network/User)	ATM IMA	ATM PNNI 1.0	ATM UNI 4.0	ATM UNI 3.0/3.1	Bridge	CAS Trunkline	Circuit Emulation	Dynamic Bandwidth Circuit Emulation	Frame Relay (UNI, NNI)	GR-303	HDLC Pass-through	PRI ISDN (Network/User)	Routing	Terminal Emulation	Virtual
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-6. Interface Types by I/O Module Types (Continued)

Module \ Interface	ATM IISP (Network/User)	ATM IMA	ATM PNNI 1.0	ATM UNI 4.0	ATM UNI 3.0/3.1	Bridge	CAS Trunkline	Circuit Emulation	Dynamic Bandwidth Circuit Emulation	Frame Relay (UNI, NNI)	GR-303	HDLC Pass-through	PRI ISDN (Network/User)	Routing	Terminal Emulation	Virtual
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*								
8-Port Voice 2-Wire Station (**VOICE 2WS**)								X*								
Serial Interface Modules																
2-Port High Speed (**HIGH SPEED**)	X			X	X			X †								
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		

* European modules do not support this interface with the 8-Port Voice 2-Wire Station or 4-Port 2-Wire Office module.

† Port 2 only.

Module Alarm Status Table

The alarm status descriptions for the Alarm Status field on the Equipment Configuration window are provided in Table B-7. 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 B-7. 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-8 details the PSAX system support of defined ATM QoS classes.

Table B-8. 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-9 illustrates the attributes of the classes of service supported by the PSAX system software.

Table B-9. 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 multimedia 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-10 identifies the cell loss and cell delay tolerance of each service class, with internal priorities. Table B-11 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-11 are intended simply as illustrations and you should choose your service class

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-10. 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)	Class 2	Very Low	Very Low	VBR-1
Variable Bit Rate—Real Time (VBR-RT)	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-11. 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

1+1 APS (automatic protection switching)	In a North American SONET, 1+1 protection switching is commonly referred to as automatic protection switching (APS). See APS for additional information.
1+1 MSP (multiplex section protection)	In a European synchronous digital hierarchy (SDH) network, 1+1 protection switching is commonly referred to as multiplex section protection (MSP). See MSP for additional information.
100Base-T	This IEEE standard specifies the transmission of data at 100 Mbps on Ethernet networks.
10Base-T	This IEEE standard (802.3) specifies the transmission of data at 10 Mbps on Ethernet networks with twisted-pair cabling and a wiring hub, referred to as a 10Base-T hub.
10-nibble header space	In a protocol data unit (PDU), the 40 bits of protocol control information located at the beginning of the PDU.
5ESS switch	A digital Central Office electronic switching system made by Lucent, typically used at an end office, which serves local subscribers.

A

AAL	ATM adaptation layer. The protocol layer that allows multiple applications to have data converted to and from the ATM cell. AAL also refers to a protocol used to translate higher layer services into the size and format of an ATM cell.
AAL1	ATM adaptation layer type 1. This layer supports Class A traffic (uncompressed, digitized voice and video).
AAL2	ATM adaptation layer type 2. This layer supports Class B traffic (variable bit rate compressed voice and video).
AAL2 trunking	A communication line established between two switching systems that supports Class B traffic (AAL2).
AAL3/4	ATM adaption layer 3/4. This layer supports Class C and D traffic (variable bit rate compressed voice and video).
AAL5	ATM adaptation layer type 5. This layer supports Class C traffic (connection-oriented variable bit rate [VBR] data traffic and signaling messages, used predominantly for classical IP [CLIP] over ATM and LAN Emulation [LANE] traffic)
ABCD signaling bits	Bits robbed from bytes in each DS0 or T1 channel in particular subframes, which are then used to carry in-band all status information.

ABR	available bit rate. ABR changes after a connection is established, and allows the receiving device to accept data from a variety of transmitting devices which are operating at different speeds, without the need to set up data rates in advance.
ACELP	algebraic code excited linear prediction. This voice-coding algorithm standardized by the ITU-T in G.729 provides voice compression. ACELP is specified by the Frame Relay Forum as one of the minimum voice compression algorithms required for network-to-network interoperability.
active/standby mode	Alternate terms for working/protection. See Automatic protection switching.
adaption service permanent virtual circuit	See AS-PVC.
adaptive differential pulse code modulation	See ADPCM.
address	A data structure or logical convention used to identify a device on a network.
address mask	A bit combination used to describe which portion of an address refers to the network or subnet, and which portion refers to the host.
address resolution protocol	See ARP.
administrative weight	See AW.
administrator	A user who has full read-write capabilities on all PSAX devices managed by the *AQueView* Element Management System. *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.

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).

AQueMan algorithm	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. Within each set of queues, the AQueMan algorithm assigns internal priorities even more specialized than the ATM Forum class definitions. Generally, the lower the assigned priority number, the greater the access to bandwidth and the less likelihood of loss.
AQueView® Element Management System	This *PacketStar* software product is a graphical user interface (GUI)-based element management tool that is used to provision the *PacketStar* PSAX Multiservice Media Gateway systems. The *AQueView* system enables a network of PSAX products to be managed and provisioned with easy-to-use windows from a single location.
architecture	The design of the hardware and software components of a system that controls how all the various components interoperate with each other and with other devices or systems.
ARP	address resolution protocol. This low-level protocol maps IP addresses, or other non-ATM addresses to the target ATM device. Once the ATM device has been identified, an ARP server can send it data, as long as the session is maintained.
ASCII	American Standard Code for Information Exchange. This coding standard specifies the representation of characters in a binary format.
AS-PVC	adaption service permanent virtual circuit. This type of circuit allows ATM adaptation services to be connected by ATM switched virtual circuits. AS-PVC specifies parameters (such as circuit emulation) for the sending device, specifying the receiving device.
asynchronous transfer mode	See ATM.
ATM	asynchronous transfer mode. This cell-switching technology converts multiple incoming streams of information into fixed-length cells of 53 bytes, that are composed of a 48-byte information field and a five-byte address header. ATM enables high-speed transmission of data, voice, and video over the same lines, at speeds up to 13.22 Gbps.
ATM adaptation layer	See AAL.
ATM addressing	This addressing scheme enables an operating system to find a specific piece of ATM information in the application memory. Every memory location has an address. ATM addressing provides user-specific virtual path identifier/virtual channel identifier (VPI/VCI) coding, bandwidth allocation, and quality of service (Qos) information.

ATM edge switch	A device that resides at the edge of a carrier network and provides access from the end user to a carrier's ATM network backbone.
ATM Forum	This organization is a consortium of corporations who develop hardware and software products using ATM to facilitate the development, deployment, and standardization of ATM protocols and specifications.
ATM Forum Implementation Agreements	The formal documents use for the implementation of the standards for ATM specifications agreed on by the ATM Forum.
ATM interface management entities	See IME.
ATM terminal emulation interface	Terminal emulation is an application that follows an intelligent computing device to mimic the operation of a nonprogrammable terminal for communication with a mainframe computer or a minicomputer. This communication is made possible by inserting special printed circuit boards into the systemboard of the emulating device, and/or special software. The *PacketStar* PSAX 6-Port Multiserial module supports this interface.
ATM traffic policing	This software feature provides basic data on the amount and type of ATM traffic handled by the network.
ATM 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.

AW	administrative weight. This parameter allows network architects to indicate relative link preference when deciding between alternate routes.

B

B channel	A channel that carries 56-Kbps or 64-Kbps of user data on a line using ISDN D-channel signaling.
B8ZS	bipolar 8-zero substitution. This encoding scheme is used for transmitting data bits over T1 transmission systems. This scheme is "smarter" than the B7ZS scheme, because it transparently adds a one-bit as needed to ensure that no more than seven zero-bits are ever transmitted in a row. However, unlike the B7ZS scheme, the B8ZS scheme provides a "clear channel" capability, which allows each of the 24 channels to carry 64 Kbps of data.
backbone	The portion of a communications network that carries the heaviest traffic and employs high-speed transmission pathways. In a wide area network (WAN), the backbone is that portion that links all the individual local area networks (LANs) together.
backhauling	A technique in which data traffic is transmitted beyond 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. Narrowband generally refers to some number of 64 Kbps channels (Nx64) and provides aggregate bandwidth less than 1.544 Mbps (24x64 Kbps, or T1 rate). Wideband is 1.544 Mbps to 45 Mbps (T1 to T3 rate), while broadband operates at 45 Mbps (T3 rate) or higher.
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.

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 *binary digit*, which represents the value high or low, or yes or no. A bit is written as either the value zero or the value 1.
bit error rate	See BER.
bit stuffing	The technique of inserting a zero-bit into a string of one-bits to prevent the receiver from interpreting the series of one-bits as something else, such as a flag control character. The sender inserts the zero-bit automatically, and the receiver automatically deletes it.
BITS	building integrated timing supply. A single-building master timing that provides and distributes timing to a wireline network's lower levels.
bits per second	See bps.
block-error correction scheme	This scheme provides a method for accomplishing forward error correction (FEC) to compensate for error bursts created in data transmission. This method is done by specifying a polynominal that plots, or statistically samples, a large number of points in a data block.

bps	bits per second. This unit of measure indicates the number of bits transmitted every second during data transmission.
BRI	basic rate interface. This interface is composed of two B-channels (bearer channels) at 64 Kbps and a data D-channel (data channel) at 16 Kbps. The bearer B-channels are designed for PCM voice, slow-scan video conferencing, Group 4 facsimile data, or other types of data that can fit into a full-duplex 64,000 bps channel. The D-channel used to receive information about incoming calls and to transmit information about outgoing calls. It is also used for accessing slow-speed data networks, such as packet-switched networks.
bridge	A link that connects several LANs, but provides no routing. Each bit of information is transferred to all other bridges on the LANs, which creates the potential for a bridge to clog a network. Routers have generally replaced bridges.
bridging	A link across a circuit that is made by placing one test lead from a test set or a conductor from another circuit and placing it on one conductor of another circuit, and then doing the same thing to the second conductor.
broadband	In a WAN environment, a description of a transmission capability greater than 45 Mbps (T3 rate), that frequently operates on a fiber- optic transmission line.
Broadband Integrated Services Digital Network	See B-ISDN.
bucket	A discrete sample of data.
building integrated timing supply	See BITS.
burst errors	Transmission errors that occur when data is transmitted in short spurts.
bursty	A reference to data that is transmitted in 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	1. An electrical connection allowing two or more wires or lines to be connected together. Common in electrical and computer use. 2. Broadcast and unknown server (an ATM term), working in conjunction with a LAN emulation server, the bus automatically registers and resolves differences between LAN MAC addresses and ATM addresses by labeling each device transmission with both addresses.
byte	A series of consecutive binary digits operated upon as a unit.

C

CAC	connection admission control. The set of actions a network takes during a call setup or renegotiation phase that determine whether to accept or reject a connection request.

CAD/CAM	computer-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.
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 dsk, 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	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.
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 DSP*x* voice processing module hardware chip.
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.
circuit-switched network	A network that sets up and maintains a connection for the exclusive use of two or more communicating parties for the duration of their call. The familiar, voice telephone network is circuit-switched.
clear channel	A digital circuit where no framing or control bits are required, thus making the full bandwidth available for communications.

CLEC	competitive local exchange carrier. A type of business permitted by the Telecommunications Act of 1996. CLECs offer local exchange service, long distance, internal, Internet access and such entertainment as video on demand. These carriers include cellular/PCS providers, ISPs, IXCs, CATV providers, CAPs, LMDS operators, and power utilities. They compete with ILECs.
CLI	command line interface. The visual appearance and command input conventions that enable system administrators and system operators to configure, monitor, and manage the connected nodes in a data network.
CLM	cell-loss margin. A negotiated quality of service parameter in an ATM network. This parameter indicates the margin of error of lost cells to total transmitted cells.
CLP	cell loss priority. A bit in the ATM cell header set to 0 or 1. CLP=1 cells may be discarded in congested transmission to preserve the cell loss ratio of CLP=0 cells. Some service categories generate traffic flows with cell loss priority markings, CLP=0 (higher priority) and CLP=1 (lower priority). The network may follow models which treat this marking as transparent or significant. If the marker is significant, the network may selectively discard cells marked with low priority to protect the QoS of cells with high priority
CO	Central Office. The building that houses the switching equipment to which 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.
community name	The name given to an SNMP community for identification purposes. A member has associated access rights (read-only or read/write).
compand	(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 *AQueView* system, but the capabilities are subordinate to the Administrator. *See also* 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 *PacketStar* Multiservice Media Gateway systems and act as an adjunct processor to handle IDSN, SS7 signaling, and other call control.
connectivity	The degree to which any given computer or application can cooperate with other network components in a shared-resource network environment.
connector	A device connecting wires or fibers in cable either to equipment or to other wires or fibers.
connector pin	The contacts protruding from a 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 *termination*.

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.
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

D Channel	In an ISDN interface, the D channel is the data channel that carries control signals and customer call data in a packet switched mode. The B Channel is used for voice.
D4 framing	A common framing format in the T-1 environment. The name stems from the way framing is performed in the D-series of channel banks from AT&T. There are 12 separate 193-bit frames in a super-frame. A D-4 framing bit is used to identify both the channel and the signaling frame. In D-4 framing, signaling for voice channels is carried in-band by every channel, along with the encoded voice.
data bits	In asynchronous transmission, the bits that contain the data being sent (also known as payload).
data communications equipment	See DCE.
data link	Any serial data communications transmission path, without any intermediate nodes, that is generally between two nodes or devices.
data link connection identifier	See DLCI.
data link control	A standard method for sending data over a single communications link.
data service unit	See DSU.

data service unit/channel service unit	See DSU/CSU.
data terminal equipment	See DTE.
datagram	A logical grouping of information which is sent as a network layer unit over a transmission medium prior to establishing a virtual circuit.
DB-25	The standard 25-pin connector used for RS-232 serial data communications. This connector has 13 pins in one row, and 12 in the next.
DBCES	dynamic bandwidth circuit emulation service. This feature is used with voice PVC connections to best utilize the available network bandwidth. Based on ABCD signaling-bit information, it allows channels to be dynamically allocated as needed. The implementation of DBCES is Lucent proprietary. The firmware supports 1x56 kbps time-slot trunking with channel-associated signaling (CAS) detection used, based on ATM Forum Specification af-vtoa-0085.000. It should be noted this feature is not fully compliant with the specification and does not interoperate with other devices that are fully compliant.
DBS	Direct Broadcast Satellite. A satellite that sends relatively powerful signals to small (generally 18-inch) dishes installed at homes.
DC	Direct Current. A flow of electricity always in the same direction.
DCE	Data Communications Equipment. An interface standard between computers and printers. DCE works like data terminal equipment, except pins 2 and 3 are reversed.
debouncing	*Bouncing* is the tendency of any two metal contacts in an electronic device to generate multiple signals as the contacts close or open; *debouncing* is any kind of hardware device or software that ensures that only a single signal will be acted upon for a single opening or closing of a contact.
demodulate	To recover a signal from a modulated carrier that has essentially the same characteristics as the original modulating signal.
designated transit lists	See DTL.
destination address	The address portion of the packet that identifies the destination node.
device tree	The left pane in the main *AQueView* window, which allows a user to access configuration and provisioning menus for all open PSAX devices.
DHPVC	Dual-Homed Permanent Virtual Circuit. A virtual circuit that is connected to the network through two independent access points.
digital loop carrier	See DLC.
digital loop carrier system	A system that concentrates analog local loop lines, digitized, and multiplexed calls for transmission to the Central Office.

digital service interface	An interface that enables the implementation of digital service circuits with the network interface. It is defined at a point where the signal has not yet been reshaped into a standard digital signal.
digital signal processor	See DSP.
digital signal, level 1	See DS1.
digital signal, level 3	See DS3.
digital signal, level zero	See DS0.
digital subscriber line access multiplexer	See DSLAM.
digital subscriber lines	See DSL.
DIP switch	Dual In-line Position switch. A small switch used to select the operating mode of a device.
direct broadcast satellite	See DBS.
direct current	See DC.
direct serial connection	A direct connection through a serial port to another computer.
DLC	Digital Loop Carrier. Network transmission equipment used to provide pair gain on a local loop, by deriving multiple channels, typically 64 Kb, from a single 4-wire distribution cable running from the Central Office to a remote site.
DLCI	Data Link Connection Identifier. A frame relay term which defines a 10-bit field within the address field that includes committed information rate, committed burst size, committed rate measurement interval, and excess burst size.
DMA interface	Direct Memory Access Interface. A fast method of moving RAM which in turn, speeds processing.
downstream node	A reference to the relative position of two nodes in a LAN topology. A node is downstream if it receives data signals after the previous node.
DS0	digital signal, level zero. The North American Digital Hierarchy signaling standard for transmission at 64,000 bits per second. DS0 is the basic building block of the DS hierarchy, equal to one voice conversation digitized over PCM. There are 24 DS0 channels in a DS1.
DS1	digital signal, level 1. The North American Digital Hierarchy signaling standard for transmission at 1.544 million bits per second. Based on an old Bell System standard, DS1 is the equivalent of T1, which supports 24 voice conversations, each encoded at 64 Kbps, or 1.544 million. Outside the US, E1 designations are used which start at 2.048 million bits per second.

DS1 circuit-emulation service	A configuration that interfaces with TDM channelized DS1 circuits by converting the channelized digital signals (usually voice data) to ATM virtual channels.
DS3	digital Signal, level 3. The North American Digital Hierarchy signaling standard transmission at 44.736 Mbps that is used by a T3 carrier. DS3 supports 28 DS1s plus overhead. In a channel application, it supports 672 channels, each at 64 kbps.
DSL	Digital Subscriber Lines. A family of evolving services local telephone companies provide their local subscribers. DSL is also synonymous with a ISDN BRI channel which offers up to 8 million bits per second downstream to the customer, and somewhat slower service from the customer back to the telephone company.
DSLAM	Digital Subscriber Line Access Multiplexer. Technology installed in the telephone company's Central Office that links through the line to a box in the customer's home or office. When a PC and telephone are plugged into the box, the DSLAM provides both telephone service and high-speed Internet service.
DSP	Digital Signal Processor. A specialized digital microprocessor that performs calculations on digitized signals that were originally analog (for example, voice) and then sends the results on. DSPs are used extensively in telecommunications for tasks such as echo cancellation, call process monitoring, voice processing and for the compression of voice and video signals.
DSU	Data (or digital) Service Unit. A device designed to connect data terminal equipment to a digital phone line, thus allowing fully digital communications.
DSU/CSU	Data Service Unit/Channel Service Unit. Devices that are used to access digital data channels.
DTE	Data Terminal Equipment. Equipment to which DCE (Data Communications Equipment) is connected, such as personal computers or data terminals. As defined in the RS-232 specification, DTE refers to application equipment, such as a videoconference terminal or LAN bridge or router, while DCE refers to equipment such as network access equipment.
DTL	Designated Transit List. A list of nodes and optional link IDs that completely specify a path across a single PNNI peer group.
DTMF	dual-tone multi-frequency. Also known as "touchtone", a specification for the double audio signals generated through touch-tone telephones and auto-dial modems.
dual in-line position switch	See DIP switch.
dual-bus	A pair of parallel buses arranged so the direction of data flow in one bus is opposite to the direction of data flow in the other bus.

dual-homed permanent virtual circuit	See DHPVC.
dual-tone multi-frequency	See DTMF.
duplex	Simultaneous two-way transmission in both directions.
dynamic bandwidth circuit emulation service	See DBCES.

E

E1	The European equivalent of the North American 1,544 Mbps T1, except that E1 carries information at the rate of 2.048 Mbps. This rate is used by the European Conference of European Postal and Telecommunication Administrations (CEPT) carriers to transmit 3064 Kbps digital signals for voice or data calls, plus a 64 Kbps channel for signaling, and a 64 Kbps channel for framing and maintenance.
E3	A CEPT signal which carries 16 CEPT E1 circuits and overhead at an effective data rate of 34,368 Mbps or 512 simultaneous voice conversations.
E4	A signal which carries four E3 channels, or 139,264 million bits per second, or 1920 simultaneous voice conversations.
EC	European Community. Member nations are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom.
echo cancellation	A method of controlling speaker echo on long haul digital trunks. An echo cancellation system monitors the transmitted signal, digitally predicts the echo, then cancels it by subtracting the prediction from the received signal.
echo canceller	Equipment that removes the echo introduced into a voice call by telephone handsets and is further handicapped by network delay.
EDGE	enhanced data rates for global evolution. A final stage in the devolution of data communications within the existing GSM standards, supporting data transmission rates up to 384 Kbps. EDGE is also anticipated to be used with IS-136 TDMA networks in the US.
edge node	The closest node to the perimeter of the customer's network, but still inside the customer's network. After a transmission leaves this node, it is in the ATM cloud and has to make its own way through switches and nodes not under the control of the originating network.
edge switch	A Broadband Switching System located at the edge of the network; the first point of user access and the final point of exit.

EEPS	End-to-End Provisioning Server. A server that provides service-level provisioning, and allows a network management system to issue commands that will set up connections to go throughout the network without needing to set up connections on each individual switching device.
egress	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. *See also* 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.
end-to-end provisioning	Service-level provisioning that allows a network management systems (NMS) to issue commands that will set up connections to go throughout the network, without setting up connections on each individual switching device.
end-to-end provisioning server	See EEPS.
enhanced data rates for global evolution	See EDGE.
enterprise provider	A business that provides network services such as colocation, high speed Internet access and network management services.
EOC	Embedded Operations Channel, a dedicated communications channel, similar to TMC, which allows remote OAM control. The EOC is frequently found in timeslot 12 of the first and second DS1 circuits (for redundancy).
error rate	The ratio between the number of bits received incorrectly and the total number of bits in the transmission.
errored	The state of having a value or condition that is inconsistent with the true, specified, or expected value or condition.
errored path	A faulty link between two nodes in a network.

error-tolerant addressing scheme	A way to protect the cell header by establishing multiple virtual circuits to the same destination. The addresses for the circuits are within the error space of the principal address used for actual transmission. Thus, the most probable error patterns occurring in the address field simply changes the address to another valid one.
ESD	electrostatic discharge. The release of a built-up electrical charge from an electronic component such as a printed circuit board.
ESF	extended superframe format. A T1 framing standard used in wide area networks grouping 24 (rather than 12) frames together.
Ethernet	A local area network that connects computers, printers, terminals, workstations, and servers within the same building or campus. Operating over twisted wire or coaxial cable, it is capable of carrying over ten million Bps.
Ethernet address	A 48-bit number physical address. Each Ethernet address is unique to a specific network module or PC on a LAN which forms the basis of a network-addressing scheme.
Ethernet bridge	A device that controls data packets within a subnet in an attempt to cut down the amount of traffic. A bridge is usually placed between two separate groups of computers that talk within themselves, and occasionally to computers in another group.
ETSI	European Telecommunications Standards Institute. Equivalent to ANSI. ETSI is creating a single European telecommunications system as part of the single European market program.
European Telecommunications Standards Institute	See ETSI.
events browser	The events browser is a view of the received events contained in *AQueView's* $OV_LOG/trapd.log and $OV_LOG/trapd.log.old.
events log	The HP OpenView Events Log is a central repository for all incoming events received by the NNM ovtapd background process.
excess burst size	See Be.
extended superframe format	See ESF.

F

facility interface code	A numerical code designating a facility interface.

fault monitoring	In network management, the set of functions that (a) detect, isolate, and correct malfunctions in a telecommunications network, (b) compensate for environmental changes, and (c) include maintaining and examining error logs, accepting and acting on error detection notifications, tracing and identifying faults, carrying out sequences of diagnostics tests, correcting faults, reporting error conditions, and localizing and tracing faults by examining and manipulating database information.
fax demodulation/remodulation	A technique for taking a Group III fax signal and converting it from, or back to, its original 9.6 Kbps. For example, when a sheet of paper is inserted into a fax machine, the fax machine scans 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.
fiber optic cable	Fiber made of extremely pure glass. To date, the best option for voice/data/video communications, being faster and less resistant than metal.
FIFO	First In, First Out. A buffering scheme in which the first byte of data that enters the buffer is also the first byte received by the CPU.
file transfer protocol	See FTP.
firmware	Software which is kept in semipermanent memory, and is usually stored in PROMS (programmable read-only memory) or EPROMS (electrical PROMS). Firmware is used in conjunction with hardware and software and shares the characteristics of both. It contains software which is so constantly called upon by a computer or phone system that it is written into a chip electrically, at higher-than-usual voltage, causing the bits to retain the pattern as it is "burned in."
fixed-rate connection	A connection whose QoS is determined by a consistent monthly rate.

flash	A type of nonvolatile memory. Flash memory is functionally similar to EPROM memory, but it must be erased in blocks, whereas EPROM can be erased one byte at a time. Because of its block-oriented nature, flash memory is commonly used as a supplement to, or a replacement fork in, 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).
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.
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

gateway	A shared connection between a LAN and a larger system, or a large packet-switched network whose communication protocols differ.
Gb	gigabit, 10^9 bits
GB	gigabyte, a unit of physical data storage equal to 1,073,741,824 bytes.
Gbps	gigabits per second
GBR	guaranteed bit rate
GCAC	generic connection admission control. A process that determines if a link has enough resources to support a connection.
generic connection admission control	See GCAC.
generic flow control	See GFC.
GFC	generic flow control. A field in the ATM header which can be used to provide local functions (e.g., flow control). It has local significance only and the value encoded in the field is not carried end-to-end.
GFR	guaranteed frame rate. A service that provides minimum cell rate guarantees and fair access to excess bandwidth left over from higher-priority services.
GMT	Greenwich Mean Time. The former name for mean solar time at the original site of the Royal Observatory in Greenwich, England, which is located on the prime meridian. GMT is now called Coordinated Universal Time.
GR-303	The Telcordia Technologies General Requirements 303 (GR-303) standard provides for both an open interface network architecture and a digital loop carrier system that operates on T1 circuits. This standard allows a remote terminal such as a Central Office *PacketStar* PSAX Multiservice Media Gateway to interface with a Central Office voice switch, such as the Lucent Technologies 5ESS switch.
graphical user interface	See GUI.
Greenwich Mean Time	See GMT.
guaranteed bit rate	See GBR.
guaranteed frame rate	See GFR.

GUI	graphical user interface. 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

handshake	An exchange of predetermined control signals for establishing a session between a computer and a modem.
HDLC	high-level data link control. An ITU-TSS link layer protocol standard for point-to-point and multipoint communication. In HDLC, the control information is always placed in the same position, and it uses specified bit patterns dramatically different from the data, thus reducing the likelihood of confusion.
header	The initial part of a data block, packet, or frame, which provides basic information about how to handle the rest of the block, packet, or frame.
header error correction	See HEC.
heartbeat	An Ethernet-defined signal quality error (SQE) signal quality test function, as defined in IEEE 802.3. Heartbeat is created by a circuit (normally part of the transceiver) that generates a collision signal at the end of a transmission. This signal is used by the controller interface for self-testing.
HEC	header error control (or correction). A code located in the last byte of an ATM header. It is used to check the integrity of the cell header at the various cell switches.
HELLO	A routing protocol that allows trusting packet switches to discover minimal delay routes.
hertz	See Hz.
hexadecimal	A numbering system using any of the following 16 characters: 0 to 9 and A to F.
high-level data link control	See HDLC.
horizontal link	A link between two logical ATM nodes belonging to the same peer group.
hot-swappable	A feature that allows the user to install, or remove I/O and server modules in the PSAX system without interrupting its operations.

HP OpenView 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 managment, and performance management. *See also* 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

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 distintuished 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.
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, vitual 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	See PRI ISDN.
interface	1. Hardware microprocessor (chip) on a DSPx voice processing module. Also see channel. 2. An end-to-end connection protocol that governs the transmission parameters of a configured port or channel interface. Examples: ATM UNI 4.0, PNNI, IISP.
Interface management entity	See IME.
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.
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.
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

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.
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.
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.
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 *AQueView* system. *See also* 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.
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 *demultiplexer* 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 multiprotocol 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

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 OpenView to provide multiservice IP, frame relay, asynchronous transfer mode (ATM) switched multimegabit data service (SMDS) configuration, and management of Lucent core switches from a single platform.
NE	Network Elements. 1. Any basic part of the network, such as a modem, a multiplexer, a switch. 2. Processor-controlled parts of the telecommunications network that primarily provides switching and transporting functions and contains network operating functions. In SONET, the five network elements are: add/drop multiplexer, broadband digital cross-connect, wideband digital cross-connect, digital loop carrier, and switch interface.
near-end echo cancellation	The isolation and filtering of unwanted signals caused by echoes from the main transmitted signal at the originating end of a trunk circuit or connecting path.
NEBS	Network Equipment Building Standard. A standard that defines a rigid, extensive set of performance, quality, environmental, and safety standards. They range from fire spreading and extinguishability tests to earthquake tests, thermal shock measures, cyclic temperature, mechanical shock, and electrostatic discharge standards.
neighbor peer	The relationship a node in the PSAX system has with a neighboring node within the same peer group.
network	A network consists of one or more management stations and network elements, which are individual nodes on the network that can communicate with one another. These nodes are individual machines on the network and can be PSAX systems, routers, computers, or other communications equipment.

network convergence	In a LAN, convergence occurs when all the interworking devices have updated each other on the routing topology. The more quickly convergerce occurrs, the more quickly link failures are resolved.
network elements	See NE.
network equipment building standard	See NEBS.
network interface card	See NIC.
network management system	See NMS.
network mask	A 32-bit number that distinguishes the portion of an IP address referring to the network or subnet from the portion referring to the host.
network service access point	See NSAP.
network-network interface	See NNI.
network-to-network (NNI) Implementation Agreement	See FRF2.1
nibble	Four bits. Usually described as one hexadecimal digit.
NIC	Network Interface Card. The device that connects a computer or other device to a LAN.
NMS	Network Management System. A comprehensive set of equipment used in monitoring, controlling, and managing a data communications network. Typically, it includes testing devices, CRT displays and printers, patch panels, and circuitry for diagnosing and reconfiguring channels, generally all housed in the same central console.
NNI	network to network interface. A Frame Relay Forum/ATM Forum protocol governing how ATM switches establish connections and how ATM signals get routed.
node	An abstract representation of a peer group or a switching system as a single point.
node index	An index that identifies a logical PNNI entity in the PSAX system.
non-native ATM networking protocols	Communications protocols such as ISDN, SS7, and CAS.
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

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	open systems interconnection. The only internationally accepted framework of standards for communicating between different systems made by different vendors, developed by the International Standards Organization. The OSI model organizes the communication process into seven different categories and places these categories in a layered sequence based on their relation to the user. Layers 7 through 4 deal with end to end communications between the message source and the message destination, while layers 3 through 1 deal with network access.

out of frame	A T1 error condition where two or three framing bits of any consecutive frames are in error.
out-of-service	The condition, or state, of an interface that is operating but not ready to accept or place calls.
outside link	A link to an outside node.

P

PABX	Private Automatic Branch Exchange, see PBX.
packet	Also referred to as a Level 3 Protocol Data Unit (L3-PDU). A packet is a group of bits that is transmitted as a unit through a network. It usually includes data and control information such as addressing, identification, and error control fields.
packet internet groper	See ping.
Packet 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.
PacketStar® PSAX family of products	The Lucent Technologies *PacketStar* PSAX Multiservice Media Gateways are a product line of scalable, flexible multiservice ATM access devices offered to service providers' Central Offices, and small to large enterprises.
pass-through	Gaining access to one network through another element.
payload	The portion of a frame that contains the actual data.
payload length	The length of a data field, block or stream being processed or transported. The payload includes user information and may include such additional information such as user-requested network management and accounting information.
payload loop	When a received signal is sent through the framing chip on the module, but not the SAR circuitry, and then back out to the originating point.
payload protection	A process that identifies and extracts ATM cells at bit error rates as high as 10^{-2}.
payload scrambling	The removal of long strings of 1s and 0s that could be mistaken as error conditions.
payload type indicator	See PTI.

PBX	private branch exchange. Originally a switch inside a private business, part of a manual device that requires an operator to complete the call. Now those calls are automatic (at one time there was the need to differentiate the manual private automatic branch exchange [PABX] from the automatic PBX).
PCM	pulse code modulation. The most common method of encoding an analog voice signal into a digital bit stream. The most common PCM method samples a voice conversation at 8,000 times a second, twice the highest frequency in a voice line, 4,000 Hz.
PCM coding translation	There are two different PCM coding schemes in G.711, A-law and µ-law. In the US and Canada, µ-law is used. In many other parts of the world, A-law is used. When calls are placed between countries that use different coding laws, a code translation is performed in the network.
PCR	peak cell rate. An ATM term for cell-rate-per-second limit the transmitting source can never exceed.
PDU	protocol data unit. A packet created at any one of the OSI layers. It contains control information and a payload, and passes through the interfaces between one protocol layer and another.
peak cell rate	See PCR.
peer	In data networking, a router that operates on the same protocol layer as another router.
peer group	A set of logical nodes, grouped to create a routing hierarchy. All members of the group exchange PNNI topology state elements (PTSEs).
peer group identifier	A string of bits that unambiguously identifies a peer group.
peer group leader	See PGL.
permanent virtual circuit	See PVC.
PGL	peer group leader. In networks that use a PNNI hierarchy, the switches at each level elect one switch that concurrently belongs to its own level, and the next highest level. This switch is referred to as the peer group leader.
physical layer convergence control	See PLCP.
physical media access layer	This handles functions specific to each physical interface, and connects each user port to other users, or network elements.
pin configuration	The physical arrangement of prongs on a connector.
PING	packet internet groper. A utility program, originally used in the Internet, to test whether a destination can be reached by sending it an Internet Control Message Protocol (ICMP) echo request and waiting for a reply; it also tests for delay.

PING server	A utility serving PINGs; a signal also called the Internet Control Message Protocol (ICMP) Special Request Packet, to a specific address to test the connection. If the PING does not return a response, the address is either down or unreachable. If only a portion of the PING returns, it indicates trouble with the connection and warns that communications may be slow or unreliable.
pinout	A description or diagram of the pins of a chip or connector.
plain old telephone service	See POTS.
PLAR	private line, automatic ringdown. A leased voice circuit connecting two telephones. When either handset is lifted, the other telephone rings automatically.
PLCP	Physical Layer Convergence Protocol. Part of the physical layer that adapts the transmission facility to handle Distributed Queue Dual Bus (DQDB) functions, used for DC-3 transmission of ATM. ATM cells are encapsulated in a 125-microsecond frame defined by the PLCP, which is defined within the DS3 M-frame.
PNNI	Private network-to-network interface. A routing information protocol that enables extremely scalable, full function, dynamic multivendor ATM switches to be integrated in the same network.
PNNI topology state packets	See PTSP.
point-to-multipoint	A circuit by which a single signal goes from one origination point to many destination points.
point-to-point protocol	A protocol that connects two nodes (for example, router-to-router and host-to-network) over both synchronous and asynchronous circuits. PPP replaces Serial Line Interface Protocol (SLIP), an older protocol.
polling	An access control method in which one master device, such as a NMS, queries other network devices, and requests they transmit one at a time.
POTS	Plain Old Telephone Service. The basic service supplying standard, single-line telephones (with no features like call waiting or call forwarding).
PRI	Primary Rate Interface. The ISDN equivalent of a T1 circuit. Delivered to the customer's premises, it delivers 23 B+D at 1.544 Mbps. PRI enables IP connectivity to the PSTN.
PRI ISDN	Integrated Services Digital Network with Primary Rate Interface service. A network with 24 B (bearer) channels, each of which is a full 64,000 bits per second. One of these channels is typically used to carry signaling information for other 23 channels. In Europe, PRI ISDN is 30 bearer channels of 64 Kbps and two signaling channels, each of 64 Kbps.
primary rate interface	See PRI.

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.
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 *AQueView* EMS. *End-to-end provisioning* means controlling the entire building's telecommunications by software at a central location. *Flow-through provisioning* is a step up from that, that allows a central location to control a network across several locations, such as a college campus.
PTI	payload type indicator. This field value distinguishes the various management cells and user cells. Example: Resource Management cells has PTI=110, end-to-end OAM F5 Flow cell has PTI=101.

PTSP	PNNI Topology State Packet. The PNNI routing packet used to exchange reachability and resource information between ATM switches. It is also designed to ensure that a connection request is routed on a path with high probability of meeting quality of service standards. Typical, PTSP includes bidirectional information about the transit behavior of particular nodes (based on entry and exit ports) and current internal states.
pulse code modulation	See PCM.
PVC	Permanent Virtual Circuit. A virtual circuit that provides the equivalent of a dedicated private line service over a packet switching network between two DTEs. Virtual circuits and SDNs are other types of virtual networks.

Q

QoS	quality of service. An ATM Forum Protocol that is defined in terms of an end-to-end ATM connection under ITU-T Recommendation 1.350. QoS measures cell error ratio, severely errored cell block ratio, cell loss ratio and cell misinsertion rate, cell transfer delay, mean cell transfer delay, and cell delay variability.
Quadserial	A Lucent module, superseding multiserial and high-speed modules.
quality of service	See QoS.
queuing	Stacking or holding calls to be handled by a trunk, or trunk group, when there are insufficient trunks to handle the amount of traffic.

R

R1	ITU name for a particular North American digital trunk protocol that uses multi-frequency (MF) pulsing.
R2	A series of ITU-T specs for European analog and digital trunk signaling, which uses compelled handshaking on every MF (multi-frequency) signaling digit.
radio frequency	A group of electromagnetic energy whose wavelengths are between the audio and the light range. The electromagnetic waves transmitted usually are between 500 KHz and 300 GHz.
RAI	remote alarm indication. This alarm indicates that a device on the T1 line, DS3 line, or DS2 stream is detecting framing-error conditions in the signal it receives. An RAI is also called a yellow alarm signal.
RAS	remote access service. A network unit that enables branch offices, telecommuters, and traveling computer users to gain access to the corporate LAN backbone over dedicated or dialed, digital, or analog lines.

RDI	remote defect indication. An alert to a failure at the far end of an ATM network. Unlike FERF (far-end remote failure), the RDI alarm doesn't indicate the specific circuit with failure.
ready to receive	See RR.
ready to send	See RTS.
recommended standard	See RS.
redundancy	The duplication of hardware or software within a network to endure fault-tolerant or back-up operation.
Reed Solomon (RS) coding	An algorithm that performs forward error correction (FEC) in order to compensate for error bursts in data transmission.
remote access service	See RAS.
remote alarm indication	See RAI.
remote defect indication	See RDI.
remote dial-access server	See RAS.
remote input status	A reference to how a user defines the external alarm condition (input) at their site, such as a temperature sensor, that results in an action (output) such as a fan. When the STATUS/CONTROL connectors on the Alarm module are connected to an external device that is triggered remotely, a signal is sent, indicating a fault condition, which is displayed by either **Closed** or **Open** on the **Remote Input Status** field.
repeater	A device that receives data on one communication link and transmits it, bit by bit, on another link as fast as it is received without buffering.
RFC	request for comment. Draft RFCs on particular topics are circulated through the Internet community to gain feedback from engineers and programmers on proposed TCP/IP standards about the Internet. The Internet Engineering Task Force meets three times a year and either adopts what becomes a standard RFC, or discards it.
right mouse button	The right button on a computer mouse. Clicking the right mouse button on many computer screens brings up a menu different from the drop-down options, or is more comfortable for some users.
RIP	routing information protocol. A set of rules based on distance-vector algorithms that measure the shortest path between points on a network. Each router maintains a routing table or database with this information and periodically broadcasts it to neighboring routers.
RJ-11, RJ-45	registered jacks. An RJ-11 is a six-conductor modular jack typically wired for four conductors, the most common telephone jack in the world. The male connects a telephone, modem, or fax machine to a female RJ-11 jack in the wall or floor. The RJ-45 is an eight-pin connector used for transmitting data from a data PBX, a modem, a printer, or a print buffer over telephone wire.

robbed-bit signaling	A popular signaling mechanism used in T1 connections. Robbed-bit signaling typically uses bits known as A and B bits. These bits are sent by each side of a T1 termination and are buried in the voice data of each voice channel in the T1 circuit, hence the term "robbed bit" as the bits are stolen from the voice data.
rounding error	A cumulative calculation error caused by omission of preselected values. The omitted values can be the ones, tens, and/or hundreds decimal places. A typical rounding algorithm increases the value to the left by one if the value to the right is over 5. The value to the right is then dropped. The more aggressive the algorithm used, the greater the rounding error.
router	A physical device, connected to two or more networks, that receives Internet Protocol (IP) packets through one network interface and forwards them out another interface, based on network layer information.
routing	The process of directing data from a source node to the correct interface.
routing entry	The NSAP address on a routing table.
routing information protocol	See RIP.
routing protocol	Rules that determine a path between two nodes, that often occurs in an environment in which two nodes in different networks interwork with routers and bridges.
routing table	A database that contains entries, each of which includes a destination address and a pointer to the destination.
RR	ready to receive
RS RS-232 RS-449 RS-530	recommended standard. Standards often set by the EIA (Electronic Industries Association), the TIA (Telecommunications Industry Association), or both (EIA/TIA). RS-232 is a set of standards specifying three sets of interfaces (electrical, functional, and mechanical) for communicating between computers, terminals, and modems. Once only available on a 25-pin connector, they now come in a variety of configurations that aren't always compatible to other devices without add-ons. The RS-449 is essentially a faster version of RS-232, and typically has 37 pins. Each RS-449 pin has its own signal return instead the common ground available on the RS-449 pin. RS-530 supersedes RS-449 and complements RS-232. Based on a 25-pin connection, it works in conjunction with either electrical interface RS-422 (balanced electrical circuits) or RS-423 (unbalanced electrical circuits).
RTS	request to send

S

SAM	Service Access Multiplexer. A device that determines how to map ATM cells into SONET rings.
SAP	Service Access Point. The point at which the services of an OSI layer are made available to the next highest layer. A SAP is used for the following purposes: 1. When the application initiates an outgoing call to a remote ATM device, a destination_SAP specifies the ATM address of the remote device, and also specifies further addressing that identifies the target software entity within the remote device. 2. When the application prepares to respond to incoming calls from remote ATM devices, a local_SAP specifies the ATM address of the device housing the application, and also specifies further addressing that identifies the application within the local device.
Sapphire	Another term for Connection Gateway API..
SAR	segmentation and reassembly. A process of segmenting relatively large data packets into smaller packets compatible with SAR. It often works in conjunction with ATM, SMDS, and X.25 networks.
scope number	Similar to an IP subnet mask, the scope number specifies how much of the 13-byte network part is common to the switch addresses at a particular level in the hierarchy.
SCR	sustained cell rate. A parameter defined by the ATM forum for ATM traffic management. The SCR is an upper bound on the conforming average rate of an ATM connection over time scales which are long enough relative to those for which the peak cell rate (PCR) is defined. The enforcement of this boundary by the UPC can allow the network to allocate sufficient resources, but less than those based on the PCR, while at the same time, ensuring that the network's performance objectives can still be achieved.
SCSI	Small Computer System Interface. A standard high-speed parallel interface defined by ANSI. A SCSI interface is used to connect CPUs to SCSI peripheral devices.
SDH	Synchronous Digital Hierarchy, a set of fiber-optics-based standards planned for use with SONET and ATM in Europe, standardized by the ITU-T. Some of the SDH and SONET standards are identical.
SDRAM	Synchronized Dynamic Random Access Memory. An emerging replacement for DRAM because SDRAM's memory access cycles are synchronized with the CPU clock, thus eliminating the wait time associated with memory fetches between RAM and the CPU.
segment	A single ATM link, or group of interconnected links, of an ATM connection.
segmentation and reassembly	See SAR.

SEL	selector. A subfield in the SETUP message part of an ATM endpoint address domain specific part (DSP), defined by ISO 10589. This is not used for ATM network routing, but by ATM end systems only.
semipermanent virtual circuit	See SPVC.
serial	A transmission method that sends each data bit sequentially on a single channel.
server	Any system that maintains and administers files that are used by independent, client applications. 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 sublayer	See SSCS.
SF	superframe. A DS1 framing format is which 24 DSO timeslots plus a coded framing bit are organized into a frame. This frame is then repeated 12 times to form the superframe.
SG	signaling gateway. A devise that initiates and manages call setup and release, and then executes call routing in a Signaling System 7 (SS7) configuration. A signaling gateway uses an Access SS7 Gateway Control Protocol-Q.931+ (ASGCP-Q.931+) license, and Internet Protocol Device Control (IPDC) license, or a Q.931+ license. It uses a TCP/IP protocol to carry control messages back and forth between a Multiservice Media Gateway.
signaling gateway	See SG.
Signaling System 7	See SS7.

signaling	The control of information a network uses to set up and maintain connections. On-hook and off-hook are, for instance, the familiar voice-telephone signals that tell the Central Office that you have picked up the telephone handset or hung up at the end of a call. *In-channel signaling* reserves part of the available data-communication bandwidth for control information. *Out-of-channel signaling* schemes use a separate channel for signals, so data transmissions can use all available bandwidth.
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.

SNMP	Simple Network Management Protocol. A standard way for computers to share networking information. In SNMP, two types of communicating devices exist: agents and managers. An agent provides networking information to a manager application running on another computer. The agents and managers share a database of information, called the Management Information Base (MIB). An agent can use a message called a traps-PDU to send unsolicited information to the manager.
SNMP agent	The interface that enables a device to communicate with other SNMP devices. The agent for a PSAX system can be configured to send SNMP messages to a management station without a specific request. These messages are called traps. To retrieve and modify MIB information through an agent, the software loaded on the CPU of the PSAX system itself must be directly accessed, either through the console user interface or an SNMP-based manager, such as the *AQueView Element Management System.*
Soft 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.

SS7	Signaling System 7. A signaling method, separate from voice or data channel, that allows intelligent network elements exchange information among themselves.
SSCOP	Service-Specific Connection-Oriented Protocol. This protocol provides mechanisms for establishing, releasing, and monitoring signaling information exchanged between peer signaling entities.
SSCS	Service Specific Convergence Sublayer. The portion of the convergence sublayer that is dependent upon the type of traffic that is being converted.
standalone	A monolithic application for *AQueView*that binds the client and the server into a single process, without HP OpenView or NNM. *See also* 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 concatentated, which means the whole STM-4 is seen as one link.
Stratum3–4 timing, Stratum 3–4 module	These terms refer to the stratum level, the clock that lets a digital network transmission know where it begins and ends. These levels were established by ANSI/TI.101.1987, "Synchronization Interface Standards for Digital Networks." Level one is best, and is usually based on atomic clock or reference oscillator. Stratum 2 tracks on input and in an emergency, holds to the last, best estimate of that input reference frequency. Level 3 also tracks an input but over a wider range. Stratum 4 also tracks an input, but has a wider adjustment and drift range. It has no holdover capability, and runs freely within the adjustment range limits if the external reference fails. Therefore, it is typically written as either Stratum 3, or Stratum 4, not 3–4. However, the Stratum in the *PacketStar* line qualifies for both Stratum 3 and Stratum 4, so 3–4 is appropriate.
structured	A type of bandwidth that offers framing which indicates where a channel begins and ends, while an unstructured bandwidth has no framing. While unstructured bandwidth can only be unchannelized (because it does not have framing), structured bandwidth can either be channelized or unchannelized.
structured circuit emulation service	See channelized circuit emulation service.
subchannel connection	The associations between IP network interfaces and their traffic-bearing connections.

subnet	A portion of a network, possibly a physically independent network, which shares a network address with other portions of the network and is distinguished by a subnet number. A subnet is to a network what a network is to the Internet.
subnet mask	A bit pattern that lets a network administrator define a "subnet" by using the host-machine portion of the IP address. A subnet mask has binary ones in positions which correspond to the network and subnet parts of the address, and zeros in the remaining, host-address positions. During IP address resolution, zero fields in the mask hide corresponding host-address field in the address, causing the router to ignore them. The router resolves only the networking part of the address, leaving the host part for the local subnet to resolve. This increases speed and makes multicasting more efficient. Subnet mass are usually written in the decimal notation used for IP address, **255** represents a binary one and **0** represents a zero.
subtree	Any node within a tree, along with any selection of connected, descendant nodes.
superframe	See SF.
sustained cell rate	See SCR.
SVC	Switched Virtual Circuit. A network connection that is created only as needed, and lasts only the duration of the message transfer. Used extensively in X.25 and frame relay networks, SVCs are far more complex than permanent virtual circuits, as they automatically consider the level of network congestion, including at both end points, and dynamically balance the network, by transmitting on a route specifically designed for the least possible delay in transmitting data.
SVCC	Switched Virtual Channel Connection, a switched connection is one that is established and taken down dynamically through control signaling. A virtual channel connection is an ATM connection where switching is performed on the VPI/VCI fields of each cell.
switch	A computer that maintains circuits by matching an input port to an output port for each connection. The switch contains switching tables to track this information.
switched multimegabit data service	See SMDS.
switched virtual channel connection	See SVCC.
switched virtual circuit	See SVC.
symmetric operation	A connection with the same bandwidth in both directions.
synchronization	The timing of separate elements or events to occur simultaneously. Hardware and software must be synchronized so file transfers can occur.
synchronized dynamic random access memory	See SDRAM.

synchronous digital hierarchy	See SDH.
synchronous optical network	See SONET.
systems network architecture	See SNA.

T

T1	A digital transmission link with a capacity of 1.544 Mbit/s, used in North America. Typically channelized into 24 DS0s, each link is capable of carrying a single voice conversation or data stream. T1 links use two pairs of twisted pair wires.
T3	A digital transmission link with a capacity of 45 Mbps, or 28 T1 lines.
tails	An echo cancellation term. The tail, measured in milliseconds, is the amount of your conversation which returns to you in echo, as measured in milliseconds.
TCP/IP	Transmission Control Protocol/Internet Protocol. A networking protocol allowing communication over interconnected networks between computers with diverse hardware architectures and various operating systems.
TDM	time-division multiplex. A method of transmitting a number of separate voice, data, and/or video signals simultaneously over one communications medium by interleaving a piece of each signal, one after another.
TDMA	time-division multiplex access. One of several technologies used to separate multiple conversation transmissions over a finite allocation of bandwidth. TDMA allocates a set amount of frequency bandwidth and a specific timeslot to each user. Cellular telephones send bursts of information during those timeslots. The receiving equipment then reassembles the packets of information into the original voice components. This allows multiple simultaneous conversations over the same equipment.
telco	The local telephone company. (The industry derives the word “telco” from the word “telecommunications.”)
telco frame, telco rack	A metal framework on which equipment is mounted.
Telcordia Technologies	See Bellcore.
telecommunications management network	See TMN.
telnet	Terminal/remote host protocol developed for ARPAnet to allow a computer user to log onto a computer in a remote location and communicate between the two. Mostly superseded by GUI browsers such as Netscape and Internet Explorer.
terminating node	The last point of connection from a network.
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.
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. *Logical trunk alarms* provide statistical alarming on dropped cells and are separately maintained for the virtual trunks on the same port. *Physical alarm trunks* are used when a virtual trunk also has trunk port alarms that are shared with all other virtual trunks on the port. These alarms are cleared and set together for all the virtual trunks sharing the same port.
trunk group	A collection of trunks that all terminate at the same public switch, PBX, or server.
trunk line	1. A direct line between two telephone switchboards. 2. The main line of a communications system.
trunking	The establishment of a communications line between two switching systems.
Type 102, 105, 108 milliwatt termination tests	For the 102, 105 108 milliwatt termination tests, calls are defined for a responder, a director, and a remote office test line (ROTL). The PSAX behaves as the ROTL, as it makes more logical sense for the 5E or PBX to be the responder (initiator of the test). The initiator of the tests sends an inband MF tone to stimulate the PSAX to generate the tone.
Type of Service	See ToS.

U

UBR	undefined (or unspecified) bit rate. An ATM service class that handles bursty LAN traffic and data that is tolerant of delays and cell loss. UBR is a best-effort service that does not specify bit-rate or traffic values, and offers no QoS guarantees.
undefined (or unspecified) bit rate	See UBR.

UNI	User Network Interface. The physical, electrical, and functional demarcation between the user and the network service provider. A UNI sets the specifications for procedures and protocols between the user's equipment and an ATM or frame relay network.
unidirectional	The transmission of information in one direction only.
universal time coordinate	See UTC.
unshielded twisted pair	See UTP.
unspecified bit rate	See UBR.
UPC	usage parameter control. Network actions used to monitor and control traffic at the end system. UPS detects negotiated parameters violations, and it can take appropriate action to protect against malicious or unintentional misbehavior. Its actions include cell tagging and cell discarding.
uplink	The connectivity between an ATM border node and an upnode.
upnode	In ATM, the border node's outside neighbor in the common peer group. The upnode must be a neighboring peer of one of the border node's ancestors.
usage parameter control	See UPC.
user network interface	See UNI.
user-to-network (UNI) Implementation Agreement	See FRF.1
UTC	Universal Time Coordinate. The new term for Greenwich Mean Time. See GMT.
UTP	unshielded twisted pair. A pair of wires that is twisted so as to minimize the crosstalk with other pairs of wires in the same cable (which are twisted at a slightly different rate) but not shielded.

V

V ac	volt, alternating current
V dc	volt, direct current
V.35	A standard module used for communication between a network access device and a packet network. It provides clocking 19.2 Kbps to 4.0966 Mbps.
V5.2	European emulated CO loop control protocol.
validation	The checking of data for correctness or for compliance with applicable standards, rules, and conventions.
variable bit rate	See VBR.
variable bit rate - real time	See VBR-RT
variable bit rate- non-real time	See VBR-NRT.

VBR	variable bit rate. A voice service over an ATM switch which provides only as much bandwidth as voice conversations need at any moment (making bandwidth "elastic"). The remaining bandwidth is dynamically allocated to other services. VBR be divided into VBRnrt (variable bit rate, nonreal time) and VBRrt (variable bit rate, real time). See also VBR-NRT, and VBR-RT.
VBR-NRT	variable bit rate-non-real time. A voice service that operates on both a connection and connectionless basis and allows delay variance between the delivery of cell. VBR-NRT is used for data applications that have potentially bursty traffic characteristics, including LAN interconnect, CAD/CAM, and multimedia. This class can be used to support SMDS (switched multimegabit data service).
VBR-RT	variable bit rate - real time. A voice service that operates on a connection basis and offers very low delay variance but requires access to a variable amount of network bandwidth. It is used for such applications as packet video and voice.
VC	virtual channel. A logical circuit set up to ensure reliable communication between two network devices. virtual circuit. The pre-arranged route through the ATM network that all cells in an ATM transmission follow.
VCC	virtual channel connection,. An ATM term describing unidirectional virtual channel links that extends beyond where the ATM service users access the ATM layer. The VCC end is where the cell load is passed to, or received from, the users of the ATM layer.
VCI	virtual channel identifier. An ATM term for the 16-bit field in the ATM cell header that indicates which virtual channel the ATM should use in routing the stream of cells.
verification	The act of determining whether an operation has been accomplished correctly.
VI	Virtual Interface. Connections made to a module's physical ports that allow virtual channels (VCs) to be assigned to virtual trunks, each with its own priority queue. By using VIs instead of physical connections, it is possible to achieve advanced bandwidth management capability that allows for fully flexible service provisioning. Working in conjunction with AQueMan software and Usage Parameter Control (UPC), VIs give service providers a way to maximize revenue by oversubscribing their bandwidth without violating their QoS agreements.
virtual access line	A communications link that appears to the end user to be dedicated point-to-point circuit. For IMA, the virtual access line would be the link between IMA groups.
virtual channel	See VC.
virtual channel indentifier	See VCI.
virtual circuit	See VC.

virtual circuit connection	See VCC.
virtual interface	See VI.
virtual network navigator	See VNN.
virtual path	See VP.
virtual path identifier	See VPI.
virtual private network	See VPN.
virtual router	A virtual router is a grouping of IP interfaces. Each virtual router with IP interfaces has its own associated IP routing table, IP ARP table, IP route cache, and IP address pools, and maintains it's own routing and packet statistics.
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™. Lucent's, open shortest path first network routing technology embedded as firmware in switches such as the Lucent GX 550™. multiservice WAN switch. VNN builds seamless networks where data and OAM functions flow seamlessly across service and technology (ATM, frame relay and IP) boundaries to build end-to-end multiservice networks.
voice compression	The process of reducing a voice signal to use less bandwidth during transmission to obtain a channel of 32 Kbps or fewer, currently to under 10 Kbps.
voice Telephony over ATM	See VTOA.
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

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

xDSL	A generic term standing for a variety of digital subscriber line services (the lowercase x standing for generic): ADSL, HDSL, IDSL, SDSL, and VDSL. This family of services provides extremely high bandwidth over the telephone company unshielded twisted-pair lines. Telephone companies are offering these services to compete with the cable TV industry's high speed access via modem as a way to provide high speed Internet services to consumers.

Z

ZBTSI	Zero Byte Timeslot Interchange. A technique used with the T carrier extended superframe (ESF) in which an area in the ESF frame carries information about the location of all-zero bytes (eight consecutive "0"s) within the data stream.
ZCS	zero code suppression. This type of line coding substitutes a 1 for the second least-significant bit of every all-zero byte in AMI-encoded data. ZCS encoding has no effect on voice communications, but corrupts digital data.
Zero Bit Timeslot Interchange	See ZBTSI.
zero code suppression	See ZCS.

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