Lucent Technologies
Bell Labs Innovations

Release Note for Release 10.0.9

of the *PacketStar*® PSAX 4500, PSAX 2300, PSAX 1250, and PSAX 1000 Multiservice Media Gateways

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Contents

1 Covering Information

1.1 Copyright

1.2 Distribution

This document contains information about the feature content and application restrictions of Release 10.0.9 for the *PacketStar*® PSAX Multiservice Media Gateways. The information in this document is intended for distribution to users of the software and hardware of these products. It carries the same restrictions on duplication and redistribution, as does the software that it describes.

1.3 Trademarks

1.4 Executive Summary

This document outlines the feature content for Release 10.0.9 of the *PacketStar*® PSAX Multiservice Media Gateways. As of July 21, 2006, Release 10.0.9 has passed all testing and has been released. The software, firmware, and hardware lineup is documented, and a brief description of each new feature delivered in this release is provided. Also included is a list of those problems from the last release that have been resolved in Release 10.0.9, and a list of unresolved problems in Release 10.0.9, as of the date of this document. PSAX interoperability is supported back to Release 8.0.0.

1.5 Table of Revisions

Issue	Author	Date	Reason	Changes
1.0	Danny Canton	July 21, 2006	Initial Release	---

2 Introduction

2.1 Purpose of This Document

The purpose of this document is to present the following types of information for users of PSAX system software Release 10.0.9:

- To provide a list of the software, firmware, and hardware components that comprise Release 10.0.9 of the *PacketStar*® PSAX Multiservice Media Gateways product line.
- To provide an overview of the features introduced in Release 10.0.9.
- To list problems from the previous release that have been resolved in the current release.
- To list unresolved problems and operational considerations for the current release.

2.2 Document Organization

This document is organized into the following sections:

- Section 1 of this document provides an executive summary and miscellaneous front matter such as trademark information and the Table of Revisions.
- Section 2 is an introduction section and provides an overview of contents of this document.
- Section 3 provides the software, firmware, and hardware lineup for the release.
- Section 4 describes the new feature content for the release. This section also identifies the hardware dependencies, software dependencies, price list options, and specific attributes for each feature.
- Section 5 provides a list of those problems from the previous release that have been resolved in this release.
- Section 6 provides a list of unresolved problems in this release as of the date of this document.
- Section 7 provides a list of operational considerations for the current release.

For definitions of acronyms and terms used in this document, please refer to the *PacketStar*®*PSAX Master Glossary*, which is included on the Product Information Library CD that accompanies factory shipments of this software.

3 Release Lineup

3.1 Release Lineup Overview

The *PacketStar*® PSAX Multiservice Media Gateways, Release 10.0.9 has been tested by Lucent Technologies, Inc. and has been declared suitable for release. Release 10.0.9 consists of software, firmware, and hardware changes.

Note: This release has been fully tested within a Lucent laboratory environment. As the Lucent test lab cannot replicate all customer networks, it is recommended that specific customer testing be conducted prior to deployment. This testing should include the PSAX upgrade testing and interoperability testing with the elements that will be used in the live network.

Note: Table 1 indicates the latest revisions of all modules supported by this release. Shaded rows highlight changes that have been made since the last release (Release 10.0.8), or the introduction of new modules with this release.

Note: The configuration guidelines contained in this document and other product related documents are intended to provide customers with focused and specific configuration information only. The configuration information is not intended to be used for network planning and designing, which is beyond the scope of these documents. Lucent recommends that this configuration information be used in conjunction with network architecture documents, growth planning guides, traffic pattern studies and network availability data.

Lucent Worldwide Services (LWS) is available to provide consulting services and can assist with network audits, network planning and design needs. Contact the LWS representative to avail of these services.

System Software:

CPU Software Release V10.00.C09.00 (PEC NS20F001009)

Table 1. Release Lineup Table for Release 10.0.9

Module Name and PEC Code	Socketed Chipset		
	Position	Part Number	Checksum
20N79 Alarm (**ALARM**) NS20N790AC	U7	680-001	EDD4
45N79 PSAX 4500 Alarm (**ALARM**) NS45N790AA	U6	680-001	EDD4
10N14 PSAX 1000 Fan/Alarm (**FAN/ALARM**) NS10N141AD	none	none	none

Table 1. Release Lineup Table for Release 10.0.9 (Continued)

Module Name and PEC Code	Socketed Chipset		
	Position	Part Number	Checksum
20N20 CPU2 (**CPU2**) NS20N201FA *EOL Announced June 1, 2003*	U113B	200-003	OBE7
	U14	825-001	A3A5
	U15	835-001	B1D1
10N20 PSAX 1000 CPU3L (**CPU3L**) NS10N200AA *EOL Announced June 1, 2003*	U113B	200-003	OBE7
	U14	825-001	A3A5
	U15	835-001	B1D1
10N20 CPU3 (**CPU3**) NS10N203AD	U31	845-002	0741
23N20 CPU4 (**CPU4**) NS23N203AC	U31	845-002	0741
20N36 6-Port Enhanced DS1/T1 Multiservice (**DS1/T1 ENH**) NS20N360KD	U2	210-003	3764
	U10	520-006	FC44
	U9	510-010	9370
	U48	200-004	0A1E
23N64 12-Port Medium-Density DS1 Multiservice (**MD DS1**) NS23N643AE	Flash2	840-001	BFAE
23N35 24-Port High-Density DS1 Multiservice (**HD DS1**) NS23N353AH	Flash2	841-001	FEBC
20N33 6-Port DS1 IMA (**IMA DS1**) NS20N330BC	U2	210-003	3764
	U9	760-002	9671
	U10	520-005	1908
	U48	200-004	0A1E
23N33 12-Port Medium-Density DS1 IMA (**MD DS1 IMA**) NS23N333AE	Flash2	851-001	91C9
20N56 6-Port Enhanced E1 Multiservice (**E1 ENH**) NS20N560HD	U2	210-003	3764
	U10	520-006	FC44
	U9	510-010	9370
	U48	200-004	0A1E
23N66 21-Port High-Density E1 Multiservice (**HD E1**) NS23N663AH	Flash2	840-001	BFAE
20N34 6-Port E1 IMA (**IMA E1**) NS20N340CC	U2	210-003	3764
	U9	760-002	9671
	U10	520-005	1908
	U48	200-004	0A1E
23N34 21-Port High-Density E1 IMA (**HD E1 IMA**) NS23N343AH	Flash2	851-001	91C9

Table 1. Release Lineup Table for Release 10.0.9 (Continued)

Module Name and PEC Code	Socketed Chipset		
	Position	**Part Number**	**Checksum**
24N64 12-Port Medium-Density DS1/E1/DS0A CES (**MD DS1/E1/DS0A CES**) NS24N642AC	U35	852-001	B3EE
23N69 8-Port HDSL-2 (**HDSL2 MS**) NS23N693AB	Flash2	853-001	5C13
20N02 2-Port DS3 ATM (**DS3 ATM**) NS20N020FE *EOL Announced February 18, 2004*	U6	210-003	3764
	U14	420-011	DA00
	U34	480-001	9C35
	U35	240-001	4434
	U39	200-004	0A1E
	U43	330-001	06BE
23N68 1-Port DS3 IMA (**DS3 IMA**) NS23N683AE	Flash2	850-001	A298
23N60 1-Port Channelized DS3 Multiservice (**CH DS3**) NS23N603CF	Flash2	801-003	255A
23N62 1-Port Channelized STS-1e, T1 Format (**CH STS-1E T1**) NS23N623CG	Flash2	801-003	255A
20N03 1-Port Unchannelized DS3 Frame Relay (**DS3 FR**) NS20N031CB	U14	570-004	1B53
20N22 2-Port E3 ATM (**E3 ATM**) NS20N220EC *EOL Announced February 18, 2004*	U6	210-004	3664
	U14	420-011	DA00
	U34	480-001	9C35
	U35	240-001	4434
	U39	200-004	0A1E
	U43	330-001	06BE
23N74 3-Port DS3/E3 ATM (**DS3/E3 ATM**) NS23N741AA	U1	901-001	2149
45N74 3-Port DS3/E3 ATM Protection (**DS3/E3 ATM**) NS45N741AB	U1	901-001	2149
23N03 3-Port Channelized DS3/STS-1e CES (**CH DS3/STS-1E**) NS23N030AB	U1	802-001	6D99
45N03 3-Port Channelized DS3/STS-1e CES Protection (**CH DS3/STS-1E**) NS45N032AA	U1	902-001	0315

Table 1. Release Lineup Table for Release 10.0.9 (Continued)

Module Name and PEC Code	Socketed Chipset		
	Position	**Part Number**	**Checksum**
45N63 3-Port Channelized DS3/STS-1e Multiservice (**CH DS3/STS-1E**) NS45N631AA	U53	904-001	7BDB
10N01 3-Port Line Interface, PSAX 1000 (**LIM3-1**) NS10N010AA	none	none	none
45N01 3-Port Line Interface, PSAX 4500 (**LIM3-4**) NS45N010AA	none	none	none
23N02 3-Port Unstructured DS3/E3 CES (**UNSTR DS3/E3 CES**) NS23N020BB	U1	900-002	CD15
45N02 3-Port Unstructured DS3/E3 CES Protection (**UNSTR DS3/E3 CES**) NS45N020AA	U19	903-001	FCC8
23N27 DSP2C Voice Server (**DSP2C**)	U7	780-001	5FC852
NS23N271AA *EOL Announced August 15, 2003*	U8	770-001	913B
23N29 DSP2D Voice Server (**DSP2D**)	U43	771-001	C003
NS23N292AC	U41	584-001	A4B3D5
	U39	583-001	2DE9CC
	U37	582-001	2CC080
	U36	581-001	2D9B11
23N26 DSP2E Voice Server (**DSP2E**)	U43	589-001	55A4
NS23N262AB	U41	588-001	911DF1
	U39	587-001	141899
	U37	586-001	1649FC
	U36	585-001	19B471
23N25 DSP2F Voice Server (**DSP2F**)	U43	591-001	63B9
NS23N252BB	U41	588-001	911DF1
	U39	587-001	141899
	U37	586-001	1649FC
	U36	585-001	19B471
23N24 DSP2G Voice Server (**DSP2G**)	U43	592-001	28C6
NS23N242AA	U41	584-001	A4B3D5
	U39	583-001	2DE9CC
	U37	582-001	2CC080
	U36	581-001	2D9B11
23N28 Tones and Announcements Server (**TAS**)	U7	780-001	5FC852
NS23N280AA	U8	870-001	6BC9

Table 1. Release Lineup Table for Release 10.0.9 (Continued)

Module Name and PEC Code	Socketed Chipset		
	Position	Part Number	Checksum
20N40 Ethernet (**ENET**) NS20N402LE *EOL Announced August 15, 2003*	U36	551-001	E228
	U66	530-001	B32D
	U67	540-003	ABB8
23N40 4-Port Ethernet (**ENET**) NS23N401AB	U3	552-001	03A9
	U4	553-001	CFDA
20N41 Route Server (**ROUTE SERVER**) NS20N410BA	U14	820-002	D8AE
	U15	830-002	06B0
	U67	540-002	1086
	U66	530-001	B32D
23N41 Enhanced Router (**ROUTER**) NS23N412AA	U2	855-001	DC83
20N07 6-Port Multiserial (**SERIAL**) NS20N071DC	U1	380-001	1738
	U7	400-013	C31D
	U2	210-004	3664
	U50	200-004	0A1E
23N07 Quadserial (**QUAD SERIAL**) NS23N070AA	Flash1	475-001	B36D
20N30 8-Port Voice 2-Wire Station (**VOICE 2WS**) NS20N301DB	U1	350-001	2E77
	U7	410-006	93BD
	U2	210-003	3764
	U50	200-004	0A1E
20N32 4-Port Voice 2-Wire Office (**VOICE 2WO**) NS20N321CB	U1	440-002	8462
	U7	450-006	93BA
	U48	200-004	0A1E
20N72 1-Port OC-3c 1+1 APS Multimode (**OC-3C MM APS**) NS20N720CC *EOL Announced December 10, 2003*	U2	800-003	AD24
20N73 1-Port OC-3c 1+1 APS Single-Mode (**OC-3C SM APS**) NS20N730CD *EOL Announced December 10, 2003*	U2	800-003	AD24
24N70 2-Port OC-3c/STM-1 ATM Multimode (**OC-3C/STM-1 MM ATM**) NS24N700AA	U2	808-001	95EF
24N71 2-Port OC-3c/STM-1 ATM Single-Mode (**OC-3C/STM-1 SM ATM**) NS24N710AA	U2	808-001	95EF

Table 1. Release Lineup Table for Release 10.0.9 (Continued)

Module Name and PEC Code	Socketed Chipset		
	Position	Part Number	Checksum
24N74 2-Port OC-3c/STM-1 Enhanced ATM Multimode (**OC-3C/STM-1 MM ENH ATM**) NS24N740AA	U2	809-000	DE2A
24N75 2-Port OC-3c/STM-1 Enhanced ATM Single-Mode (**OC-3C/STM-1 SM ENH ATM**) NS24N750AA	U2	809-000	DE2A
24N72 4-Port OC-3c/STM-1 Multimode (**OC-3C/STM-1 MM**) NS24N720BA	U2	807-002	AD31
24N73 4-Port OC-3c/STM-1 Single-Mode (**OC-3C/STM-1 SM**) NS24N730BA	U2	807-002	AD31
23N75 1-Port Channelized OC-3/STM-1 Unstructured CES/ATM Multimode (**CH OC-3/STM-1 UNSTR/ATM MM**) NS23N750AA	U12	806-001	F5EE
23N76 1-Port Channelized OC-3/STM-1 Unstructured CES/ATM Single-Mode (**CH OC-3/STM-1 UNSTR/ATM SM**) NS23N760AA	U12	806-001	F5EE
23N12 1-Port Channelized OC-3/STM-1 CES Multimode (**CH OC-3/STM-1 CES MM**) NS23N122BA	U8	805-002	5ABB
23N13 1-Port Channelized OC-3/STM-1 CES Single-mode (**CH OC-3/STM-1 CES SM**) NS23N132BA	U8	805-002	5ABB
23N72 1-Port OC-12c/STM-4c Multimode (**OC-12C/STM-4C MM**) NS23N722AC	U7	481-002	8DF8
23N73 1-Port OC-12c/STM-4c Single-Mode (**OC-12C/STM-4C SM**) NS23N732AC	U7	481-002	8DF8
20N92 1-Port STM-1 1+1 MSP Multimode (**STM-1 MM MSP**) NS20N920AB *EOL Announced December 10, 2003*	U2	800-003	AD24
20N93 1-Port STM-1 1+1 MSP Single-Mode (**STM-1 SM MSP**) NS20N930AC *EOL Announced December 10, 2003*	U2	800-003	AD24
20N05 PSAX 1250 Stratum 3–4 (**STRATUM 3–4**) NS20N053DC	U1	810-005	1509
23N05 PSAX 2300 Stratum 3–4 (**STRATUM 3–4**) NS23N050DC	U1	810-004	2495

Table 1. Release Lineup Table for Release 10.0.9 (Continued)

Module Name and PEC Code	Socketed Chipset		
	Position	Part Number	Checksum
45N05 PSAX 4500 Stratum 3–4 (**STRATUM 3–4**) NS45N050BC	U15	811-002	6B4C
10N11 PSAX 1000 Stratum 3–4/-48 V dc Power Supply (**PSAX STRATUM/PS48**) NS10N113BC	U25	910-002	D54D
10N04 PSAX 1000 Stratum 3–4/110/220 V ac Power Supply (**PSAX STRATUM/PSAC**) NS10N043AD	U17	910-002	D54D
10N10 PSAX 1000 Stratum 3–4/24 V dc Power Supply (**PSAX STRATUM/PS24**) NS10N101AB	U12	910-002	D54D

Note: Element Management Software necessary to support systems software Release 10.0.8 is described separately in the *Navis® EMS-PSAX Release 10.0.0 Release Note*.

3.2 Firmware Driver Files

Firmware driver files for I/O, server, and stratum modules are part of each system software release and permit remote firmware updates.

Note: Shaded rows in Table 2 indicate driver changes that have occurred since Release 10.0.8.

Table 2. Firmware Driver Files for Release 10.0.9

Module Name	Driver Files	Change Description
23N72 1-Port OC-12c/STM-4c Multimode 23N73 1-Port OC-12c/STM-4c Single-Mode	040d93aa	No Change.
24N72 4-Port OC-3c/STM-1 Multimode 24N73 4-Port OC-3c/STM-1 Single-Mode	87354a7c	No Change.
20N72 1-Port OC-3c 1+1 APS Multimode 20N73 1-Port OC-3c 1+1 APS Single-Mode 20N92 1-Port STM-1 1+1 MSP Multimode 20N93 1-Port STM-1 1+1 MSP Single-Mode	87351c15	No Change.
24N70 2-Port OC-3c/STM-1 ATM Multimode 24N71 2-Port OC-3c/STM-1 ATM Single-Mode	873540d0	No Change.

Table 2. Firmware Driver Files for Release 10.0.9 (Continued)

Module Name		Driver Files	Change Description
24N74 24N75	2-Port OC-3c/STM-1 Enhanced ATM Multimode 2-Port OC-3c/STM-1 Enhanced ATM Single-Mode	040cc1ed	No change.
20N12 20N13 20N62 20N63	1-Port OC-3c Multimode with AQueMan 1-Port OC-3c Single-Mode with AQueMan 1-Port STM-1 Multimode with AQueMan 1-Port STM-1 Single-Mode with AQueMan	03331376	No change.
20N14 20N15 20N64 20N65	1-Port OC-3c Multimode with Traffic Shaping 1-Port OC-3c Single-Mode with Traffic Shaping 1-Port STM-1 Multimode with Traffic Shaping 1-Port STM-1 Single-Mode with Traffic Shaping	03a47968	No change.
23N12 23N13	1-Port Channelized OC-3/STM-1 CES Multimode 1-Port Channelized OC-3/STM-1 CES Single-mode	abbfbcdd	Driver changes due to sustaining engineering and for improved performance.
23N75 23N76	1-Port Channelized OC-3/STM-1 Unstructured CES/ATM Multimode (CES Mode) 1-Port Channelized OC-3/STM-1 Unstructured CES/ATM Single-Mode (CES Mode)	040fc494	No change.
23N75 23N76	1-Port Channelized OC-3/STM-1 Unstructured CES/ATM Multimode (ATM Mode) 1-Port Channelized OC-3/STM-1 Unstructured CES/ATM Single-Mode (ATM Mode)	ae2e4922	Driver changes due to sustaining engineering and for improved performance.
23N03 45N03	3-Port Channelized DS3/STS-1e CES 3-Port Channelized DS3/STS-1e CES Protection	041a96e3	No change.
23N02	3-Port Unstructured DS3/E3 CES	04394fd1	No change.

Table 2. Firmware Driver Files for Release 10.0.9 (Continued)

Module Name	Driver Files	Change Description
45N02 3-Port Unstructured DS3/E3 CES Protection	041c121f	No change.
20N02 2-Port DS3 ATM 20N22 2-Port E3 ATM	039a1c05	No change.
23N74 3-Port DS3/E3 ATM 45N74 3-Port DS3/E3 ATM Protection	041b9fa8	No change.
45N63 3-Port Channelized DS3/STS-1e Multiservice Protection	95d30c49	No change.
23N60 1-Port Channelized DS3 Multiservice 23N62 1-Port Channelized STS-1e, T1 Format	0415802b	No change.
20N03 1-Port Unchannelized DS3 Frame Relay	035e3541	No change.
23N64 12-Port Medium-Density DS1 Multiservice 23N66 21-Port High-Density E1 Multiservice	97b15922	No change. Default driver for the 21-Port HD E1 MS module. Non-default driver for the 12-Port MD DS1 MS module
23N64 12-Port Medium-Density DS1 Multiservice (MS and IMA)	0421592a	No change.
23N35 24-Port High-Density DS1 Multiservice	04149e56	Driver changes due to sustaining engineering and for improved performance.
20N36 6-Port Enhanced DS1/T1 Multiservice 20N56 6-Port Enhanced E1 Multiservice	03281500	No change. (Non-default driver includes HDLC Bit Inversion)
20N36 6-Port Enhanced DS1/T1 Multiservice 20N56 6-Port Enhanced E1 Multiservice	034cfa15	No change.
23N68 1-Port DS3 IMA 23N33 12-Port Medium-Density DS1 IMA 23N34 21-Port High-Density E1 IMA	042b3242	Driver changes due to sustaining engineering and for improved performance
20N33 6-Port DS1 IMA 20N34 6-Port E1 IMA	0464a36c	No change.
24N64 12-Port Medium-Density DS1/E1/DS0A CES (DS1 Mode)	03a95bb4	No change.

Table 2. Firmware Driver Files for Release 10.0.9 (Continued)

Module Name		Driver Files	Change Description
24N64	12-Port Medium-Density DS1/E1/DS0A CES (DS0A Mode)	03aed665	No change.
24N64	12-Port Medium-Density DS1/E1/DS0A CES (E1 Mode)	03b2ec9d	No change.
45N74	8-Port HDSL-2	042e9aaa	No change.
20N40	Ethernet	03203448	No change.
20N40	Ethernet 2	03d6f876	No change.
23N40	4-Port Ethernet	03d4b24d	No change.
20N07	6-Port Multiserial	0358b70b	No change. (Non-default driver, retained for previous implementation of Noise Tolerant feature)
20N07	6-Port Multiserial	03ac89b9	No change.
23N07	Quadserial	04288156	No change.
20N16	2-Port High Speed	0322e40e	No change.
20N32	4-Port Voice 2-Wire Office	032aac9d	No change.
20N30	8-Port Voice 2-Wire Station	032b8db3	No change.
20N29	DSP2A Voice Server (20N291*xx*)	032fd435	No change.
20N29	DSP2A Voice Server (20N292*xx*)	0331fedc	No change.
20N28	DSP2B Voice Server (20N281*xx*)	0330f149	No change.
20N28	DSP2B Voice Server (20N282*xx*)	03320c6a	No change.
23N27	DSP2C Voice Server	0313ad79	No change.
23N29	DSP2D Voice Server	0425e8ad 8319f25c	Default driver. Optional driver. For more information on using this driver, see Step 21 on page 7-39.
23N26	DSP2E Voice Server	0426ac20	No change.
23N25	DSP2F Voice Server	04273ffa	Driver changes due to sustaining engineering and for improved performance.
23N24	DSP2G Voice Server	041e48e0	No change.

Table 2. Firmware Driver Files for Release 10.0.9 (Continued)

Module Name		Driver Files	Change Description
20N41	Route Server	042d2d21	No change.
23N41	Enhanced Router (Multi-Instance Mode)	0435bb6d	No change.
23N41	Enhanced Router (Single-Instance Mode)	042060c2	No change.
23N28	Tones and Announcements Server	03a5c88b	No change.
10N11 10N04 10N10	PSAX 1000 Stratum 3–4/-48 V dc Power Supply PSAX 1000 Stratum 3–4/110/220 V ac Power Supply PSAX 1000 Stratum 3–4/24 V dc Power Supply	02cba85e	No change.
20N05	PSAX 1250 Stratum 3–4	04374fa1	No change.
23N05	PSAX 2300 Stratum 3–4	04544fa1	No change.
45N05	PSAX 4500 Stratum 3–4	0429f77d	No change.

4 Feature Content

4.1 Feature Numbering Scheme

Each feature is given a unique feature ID number for ease of cross-referencing features between various documents. For several reasons, the marketing name used for a feature may change over time; however, the feature ID number will remain consistent.

The mechanism for delivering features is via a product release (e.g., *PacketStar* PSAX Release 10.0.9). A product release will typically deliver a number of individual features and usually consists of software, firmware, and hardware modifications to achieve numerous product enhancements. From time to time, the planned delivery release for a particular feature may change, due to changing market pressures, etc. Therefore, all the features in a particular release may not have sequential numbers. Over time, planned features may be dropped entirely from the product plan. When this happens the feature number will be dropped also; therefore, all possible numbers in a series may not appear in the feature lists.

4.2 Feature List

No new features are included in this release.

4.3 Feature Descriptions Scheme

Each feature description in the section "Feature Descriptions" on page 18 contains six subheadings as follows:

Category This section provides a high-level categorization of the feature. It indicates whether the feature is implemented in hardware, software, firmware, or a combination.

Description This section contains a brief, high-level description of the feature.

Attributes This section lists additional specific attributes of the feature that may be required to describe the specific scope or limitations of the feature, amplifying the details provided in the description section.

Hardware Dependency This section lists any hardware that might be required to implement the feature. This section is used for software features that have a hardware dependency.

Software Dependency For hardware features, this section lists any software features that might be required to implement the feature.

Price List Option This section designates if a feature is an "optional" feature or a "base" feature. Optional features are typically contained within an I/O or server module which are not required for every customer application. Purchase of the module containing the feature is optional. Base features are included with the system software upgrade with no incremental cost associated with the feature.

4.4 Feature Descriptions

No new features are included in this release.

5 Resolved Problems

This section covers problems from previous releases that are considered to be resolved in this version of Release 10.0.9. This release is based on the V10.00.B71 software build.

The highlighted items in the table below show the defects that were resolved in this release:

Table 3. Resolved Problems in Release 10.0.9

No.	Description	Vantive Ref#
1	1-Port DS3 IMA module: The module intermittently reboots without any apparent cause. Fixed.	102713
2	Stratum module: When the Ssm Byte Usage is enabled on the stratum module, the clock switches to the secondary line source. The Ssm RX Byte and Ssm Tx Byte continue to display GL-SEC although the S1 byte of the secondary line source is set to PRC clock. Moreover, if the S1 byte of the secondary line source is modified to DNU clock, the module does not enter the Holdover state and the Ssm RX Byte and Ssm Tx Byte continue to display GL-PRC. Fixed.	104410
3	3-Port DS3/E3 ATM Protection module: N:1 protection does not work on a module that has PNNI configured on the E3 interfaces. The PNNI links flap and PNNI Hello mismatches are observed on performing forced switchovers. Fixed.	106601
4	DSP2F Voice Server module: When all of the interfaces on the module are taken out of service, the CPU module reboots. Fixed.	107075 CR701 9047
5	1-Port Channelized OC-3/STM-1 Unstructured CES/ATM module: The loop back change from No Loop to Local Loop is not working. The port stays in service and no alarm is displayed even though the port is disconnected. This problem is observed on the IMA interface of the virtual DS1 port. Fixed.	107077
6	CPU*n* module: The Circuit Emulation-to-ATM SPVC connection to a remote Passport switch is not working. The following issues are observed: • When PSAX is configured as the passive party with a QoS of CBR2 or CBR4, the SPVC connection is not established. The release cause response is 31 (Normal, unspecified). • When PSAX is configured as the active party, the SPVC connection is not established due to an interoperability issue. Fixed.	107376 CR701 9149
7	CPU*n* module: The AAL2 SVCs are not fully complaint with the *af-vtoa-0113* specification. Fixed.	107593
8	Alarm module: The module generates minor alarms when connected to a 5ESS switch. Fixed.	108003 CR701 9479
9	In-band management: The in-band management SVC connections do not come up. Fixed.	108828

Table 3. Resolved Problems in Release 10.0.9 (Continued)

No.	Description	Vantive Ref#
10	1-Port Channelized OC-3/STM-1 Unstructured CES/ATM module: The cell test diagnostics results in mismatched packets for ports 35 through 41. Fixed.	109503
11	1-Port Channelized OC-3/STM-1 CES Single-Mode module: The Circuit Emulation-to-ATM SPVC connection is not working. Fixed.	109504 CR702 0406
12	CPU*n* module: The XRT version H LIU enhancements for the 8-Port Medium-Density E1 Multiservice and 24-Port High-Density DS1 Multiservice modules are not supported on the CPUn module. Fixed.	109659
13	DSP2F Voice Server module: The automatic rerouting mechanism that is used to reroute affected connections upon detection of a chip failure is not working. This problem is observed when the DSP2F Voice Server module is used for traffic on Circuit Emulation-to-ATM circuits. Fixed.	109897 CR702 0423
14	CPU*n* module: The module is losing free memory during GR-303 application queries from a 5ESS switch. Fixed.	109974
15	CPU*n* module: When there are more than one APS pairs on the PSAX chassis and the protection module of one of the pairs is removed from the chassis, then the snmpwalk command stops working at that pair and does not proceed to the next APS pair. Fixed.	110121
16	1-Port Channelized OC-3/STM-1 Unstructured CES/ATM module: The IMA group does not come up when an MSP switchover is performed. The IMA group status displayed is Insufficient Links. Fixed.	110126

6 Unresolved Problems

This section covers known unresolved problems in this version of Release 10.0.9, which, in the judgment of Lucent Technologies, may have a customer impact.

Table 4. Unresolved Problems in Release 10.0.9

No.	Description	Workaround	QPR Ref #	Vantive Ref #	Status
1	CPU1 and CPU2 modules: The MBS calculation on FR policing to ATM UPC assigns the value of CIR/AR to be 1/3.	None	5198		Fix planned for future development
2	CPU4 module: The MAC address cannot be viewed and an IP address cannot be assigned for the **ETHERNET 2** port on the console or through the *Navis* EMS-PSAX.	Do not use the **ETHERNET 2** port.	9666		Fix planned for future development
3	Channelized STM-1 module: If a yellow alarm is displayed on the physical interface, the user will not see an alarm in the Line Status field on the Channelized STM-1 ATM SM AU-3 Port Configuration window or the Channelized STM-1 ATM MM AU-3 Port Configuration window.	None	9911		No plan to fix
4	GR-303 Application: AAL2 PVCs do not become inactive immediately following inactivity of the AAL2 trunk with which it is associated.	None	10080		Fix planned for future development
5	Enhanced Router module: Static routes with a next hop that does not have a valid IP address are accepted.	None	10315		No plan to fix

Table 4. Unresolved Problems in Release 10.0.9 (Continued)

No.	Description	Workaround	QPR Ref #	Vantive Ref #	Status
6	ATM UNI interface: The PSAX system fails to accept more than 101 ATM UNI interfaces on any module at anytime while leaving the interface out of service. When the user tries to provision the 102nd ATM UNI interface, it will fail. This happens when the interfaces are left out of service. For each interface that is brought administratively into service, the PSAX system allows the user to provision an additional ATM UNI interface.	When configuring ATM UNI interfaces, create no more than 100 in a chunk and then bring all of them into service. By doing so, all of the resources that were reserved when the interface was created will be released.	10407		Fix planned for future development
7	Enhanced Router module: PPP may be configured on other connection types, but is only supported on HDLC.	None	10729		Fix planned for future development
8	Enhanced Router module: The RIP1 Border filter on the VPN does not work when enabled.	None	10813		No plan to fix
9	3-Port Channelized DS3/STS-1e CES module: When a backup CPU*n* module boots up, minimal bit errors are observed.	None	10819		Fix planned for future development
10	Lack of remote access to the SNMPv3 Security and Access Control subsystems is not compliant with RFC 3411, STD 62 (Architecture for SNMP Management Frameworks).	None	11649		Fix planned for future development
11	Enhanced Router module: 300 SPVCs will take approximately 2 minutes to finish rerouting if one of the PNNI links go down.	None	12116		Fix planned for future development
12	V5.2 Application: The V5 User Port Configuration window displays the ISDN Bx Channels CID fields that are associated with an ISDN-BRA configuration when the user port is configured as ISDN Port Type PRA.	None	12153		Fix planned for future development

Table 4. Unresolved Problems in Release 10.0.9 (Continued)

No.	Description	Workaround	QPR Ref #	Vantive Ref #	Status
13	Enhanced Router module: An erroneous SNMP response status occurs when the module is too busy to process commands such as; deleting an interface, creating an interface, bringing a VPN into service, or deleting a VPN.	None	12250		Fix planned for future development
14	GR-303 Application: CAS bits change too slowly on the MD DS1 module causing a 2-3 second lag in dial tone.	None	12576		Fix planned for future development
15	Enhanced Router module: VPNs remain administratively out of service after a CPU switchover.	None	13125		Fix planned for future development
16	V5.2 Application: Some LES interfaces do not come into service after a chassis reboot.	Do not leave the DSP2D chip configured. Take the module administratively OOS while the module is still in the chassis. The DSP configuration can either be deleted or the DSP2 module can be removed.	13211		Fix planned for future development
17	1-Port OC-3c 1+1 APS module: Upgrading from Release 6.5.4 to any release higher than Release 7.1.0 will result in loss of all configurations and access to any preconfigured OC-3s in the PSAX system.	Prior to upgrading to a higher release, upgrade to Release 7.1.0 first and then save the configuration.	13327		No plan to fix.
18	DSP2E and DSP2F Voice Server modules: Lost frames and errored frames occur when using the GSM2 mode of operation.	Only use the GSM1 mode of operation.	13335		No plan to fix
19	IMA: The IMA group gets stuck in the start up state after a chassis reboot when the far-end device is not in service	Change one field in the IMA group configuration or take the interface out of service and then bring it back into service.	13347		Fix planned for future development

Table 4. Unresolved Problems in Release 10.0.9 (Continued)

No.	Description	Workaround	QPR Ref #	Vantive Ref #	Status
20	PSAX 2300 Stratum module: The removal of a Stratum module in a PSAX 2300 chassis, using the CPU2 module and the CPU4 module side by side or two CPU2 modules side by side, causes the primary CPU*n* module to reboot.	Use two side by side CPU4 modules in a PSAX 2300 chassis.	13585		No plan to fix
21	4-Port Ethernet module: Throughput performance is 12% lower for the 64 byte packet size.	None	13902		Fix planned for future development
22	1-Port Ch OC-3/STM-1 Unstructured CES/ATM modules: Changing the frame size on the module in IMA mode requires up to 20 seconds for the IMA group to become operational.	None	13929		Fix planned for future development
23	In-Band Management: The PSAX system does not allow the user to set Maximum Frame Size on FGR2 connections.	None	13987		No plan to fix
24	GR-303 Application: The Line loop does not tear down after looping the 1-Port Ch STS1e module containing interfaces configured for GR-303. Interfaces do not need to be taken out of service to change loop settings. This problem occurs only if the loop is broken when interfaces in the port are out of service.	Set the port to LineLoop and back to NoLoop without taking interfaces out of service.	14015		Fix planned for future development
25	Enhanced Router module: When deleting an IP route, the error message `Deleting IP Route Failed` is received, however, the IP route was successfully deleted.	None	14036		Fix planned for future development
26	Enhanced Router module: Traffic through SPVCs stops after a CPU switchover.	Reboot the module when a CPU switchover occurs or when the module is upgraded. Also, by manually determining which SPVC is failing, the connection can be re-established.	14107		Fix planned for future development

Table 4. Unresolved Problems in Release 10.0.9 (Continued)

No.	Description	Workaround	QPR Ref #	Vantive Ref #	Status
27	1-Port Ch OC-3/STM-1 Unstructured CES/ATM module: The PSAX system does not report high-order path maintenance events to the SDH.	None	14122		Fix planned for future development
28	CPU*n* module: The PSAX system acting as an inband ARP server becomes unreachable via Ethernet.	None	14234		Fix planned for Release future development
29	1-Port Ch OC-3/STM-1 CES, 1-Port Ch OC-3/STM-1 Unstructured CES/ATM modules: The modules cannot connect AMS with a PSAX system. AMS reports a problem with the frame structure	None	14320		Fix planned for future development
30	Enhanced Router module (Multi-instance mode): "ErmStatusBusyFlagClear" trap continues to display. However, no traffic exists. This prevents all the tables that poll the IXP from displaying any entry.	None	14323		Fix planned for future development
31	DSP2G Voice Server module: Rerouting a small number of connections using the module is slower than rerouting the same number of connections using the DSP2D Voice Server module.	Rerouting must be modified so that active calls are not affected for longer periods of time using the DSP2G module compared to the DSP2D module.	14367		Fix planned for future development
32	2-Port DS3/E3 ATM, 3-Port DS3/E3 ATM modules: With the Interface Protection feature enabled, connection names disappear when switching interface ports.	None	14410		Fix planned for future development
33	V5.2 Application: When a V5.2 trap message is received by the PSAX system, the user port table refreshes and the user port provisioning is lost if it was not applied or added. This prevents the provisioning of a user port when V5.2 trap messages are being received.	None	14425		Fix planned for future development

Table 4. Unresolved Problems in Release 10.0.9 (Continued)

No.	Description	Workaround	QPR Ref #	Vantive Ref #	Status
34	V5.2 Application: Call completion rates are not the same for the DSP2D and the 1-Port STM-1 ATM modules for the V5.2 and ISDN service.	None	14428		Fix planned for future development
35	3-Port Ch DS3/STS-1e MS Protection modules: Switching from the working module to the protection module clears port alarms on the module.	The protection module should be rebooted after the working module is up.	14435		Fix planned for future development
36	Enhanced Router module: When an Interface is administratively out of service the SPVC connection does not go out of service and remains connected.	None	14437		Fix planned for future development
37	The SD BER Threshold used for Line Defect Protection should only be usable if the module is in Unprotected mode. In APS mode, the SF and SD thresholds are programmed individually and the card is protected against signal degradation. In case the SD Threshold is enabled when the card is in Protection mode, this configuration would be neglected by the IO cards. This bug exists for the configuration of all SONET/SDH APS/MPS line cards.	None	14440		Fix planned for future development
38	Enhanced Router module: When having 10 VPNs the performance of RIP, ARPs, and all PPC usage will be degraded.	None	14449		Fix planned for future development
39	V5.2 Application: In certain situations during an upgrade from V09.01.C02 to V10.00.C00 with 2 CPU*n* modules as the backup CPU*n* is coming into service, the replication fails, and the upgrade procedure is halted.	Telnet into the backup CPU*n* using the backup CPU*n* IP Address.	14495		Fix planned for future development

Table 4. Unresolved Problems in Release 10.0.9 (Continued)

No.	Description	Workaround	QPR Ref #	Vantive Ref #	Status
40	PNNI: When a permanent virtual circuit (PVC) is configured on a PNNI, and the VPI exceeds the valid range, the following error message is displayed: pvcFailureReason-`Code=VpGreaterThanVpMaxIispEgrsA2B` This error message refers to an IISP interface instead of a PNNI.	None	14524	94117	Fix planned for future development
41	21-Port High-Density E1 IMA and 12-Port Medium-Density DS1 IMA modules: A near-end failure is shown for an IMA group when its far end group is brought into service from the out-of-service state. Also, the IMA group statistics do not work for near-end/far-end failures when the `Continuous Update` command is issued after the statistics are reset.	None		95046	Fix planned for future development
42	1-Port Channelized OC-3/STM-1 Unstructured CES/ATM module: The PNNI links status for some PNNI groups in an IMA group configuration that are taken out-of-service and brought back into service show `ATTEMPT` instead of `TWO WAY INSIDE`.	Take all the PNNI groups in the IMA group configuration out-of-service and bring them back into service. Then, reboot the 1-Port Channelized OC-3/STM-1 Unstructured CES/ATM card from the CPU.		96146	Fix planned for future development
43	1-Port Channelized OC-3/STM-1 Unstructured CES/ATM module: The Operation and Administrative status does not display on a PNNI interface over an IMA group.	None		96148	Fix planned for future development
44	1-Port Channelized OC-3/STM-1 Unstructured CES/ATM module: When the optical cable is disconnected in the MSP configuration for a 1-Port Channelized OC-3/STM-1 Unstructured CES/ATM card that is active and has 250 SPVCs created, the SPVCs become inactive and the PNNI link is torn down.	Check the IMA Group Configuration screen in which the ports will be shown as available as soon as they are deleted from a Group.		96360	Fix planned for future development

Table 4. Unresolved Problems in Release 10.0.9 (Continued)

No.	Description	Workaround	QPR Ref #	Vantive Ref #	Status
45	1-Port Channelized OC-3/STM-1 Unstructured CES/ATM module: When traffic shaping is enabled under various conditions, there is traffic loss on PVCs.	None		96911	Fix planned for future development
46	BERT: The BERT test fails when CE-to-ATM PVC connection is configured between a PSAX 1000 and an Alcatel/Newbridge ATM switch with circuit emulation interface looped back.	None		101265	Fix planned for future development
47	1-Port Channelized OC-3/STM-1 Unstructured CES/ATM module: The incorrect bandwidth is displayed when the LockOutProtection APS command is used with the IMA groups.	Apply the clear command. Reboot the working module and wait for two minutes. Reboot the protection module.		104527	Fix planned for future development
48	1-Port Channelized OC-3/STM-1 Unstructured CES/ATM module: The primary CPU module reboots after configuring the maximum possible number of IMA groups (42).	Traffic will not be affected when using a dual CPU configuration.		104611	Fix planned for future development
49	Enhanced Router module: After configuring the maximum possible number of IMA groups (42 total groups) on a 1-Port Channelized OC-3/STM-1 Unstructured CES/ATM module, configure the circuits from these interfaces to the ERM. Rebooting both the modules in the APS pair (with the protection module as active) when traffic is passing on the circuits causes the ERM route entries to get deleted.	Reboot the Enhanced Router module.		106783	Fix planned for future development

7 Operational Considerations

7.1 CPU*n* Modules

1. It is recommended that you save the configuration frequently when making changes. If a CPU*n* switchover occurs while changes are being made to a connection table, the connection IDs used internally within the I/O modules may not match those in the CPU*n* module. Adding or deleting any more connections may corrupt data flow.

2. It is recommended that you select a relatively short timeout period (for example, 1 minute) in the Timeout Length field on the User Options window. A short timeout period helps to safeguard the PSAX system from unauthorized users as well as potential lockouts from the Telnet session.

3. The CPU (CPU1) module is not supported by system software releases 7.1.0 and subsequent due to the larger memory capacity these releases require. The CPU2, CPU3, CPU3L, or CPU4 modules are required for these releases.

4. It is important to exit the console interface session first, prior to exiting a Telnet session, by using the **Leave Console Interface** command on the Console Interface Main Menu window. Using the **Disconnect** command in the Telnet window while still logged on to the PSAX system may cause future CPU memory malfunctions.

5. Inserting the CPU2 module into the chassis extremely slowly may cause future CPU2 module operational problems.

6. With an interface out of service, connections can still be provisioned. If an interface is **Unconfigured**, connections are not accepted.

7. Guidelines for setting the call control resource values on the Call Control Resource Allocation Configuration window are provided in any *PacketStar* PSAX Multiservice Media Gateway user guide. The values on this window specify how the PSAX system uses that portion of total memory that is set aside for SVC and SPVC calls.

   The maximum numbers for PVC, SPVC, and SVC duplex calls per connection type available on the PSAX system, as well as the call setup rate for all types of CPU*n* modules, are shown in Table 5.

Table 5. PSAX System Performance Capabilities Per Node for Release 10.0.9

Connection Type	Maximum Number of Duplex Calls per Node	Call Set-up Rate for CPU2 and CPU3L Modules*	Call Set-up Rate for CPU3 and CPU4 Modules*
PVC	60,000	N/A	N/A
SPVC	10,000†	60 calls per second	120 calls per second
SVC	15,000†	60 calls per second	120 calls per second
All connections combined	60,000‡		

* A CPU3 or CPU4 module paired in the same chassis with a CPU2 or CPU3L module will operate at the lower CPU2/CPU3L module call rate.

† When using both SPVC and SVC connection types, you can set up any combination of calls as long as you do not exceed 100% of the call control resource memory allocation (callContrlResAllocUsage field on the Call Control Resource Allocation Configuration window).

‡ For all three types of connections, you cannot configure more than the maximum number of duplex calls indicated. For OAM monitoring the maximum number of calls that can be monitored in one direction is 2,000, and the maximum number of calls that can be monitored in both directions is 1,000.

8. When a total system reboot (power down/power up or cold start) is performed on a PSAX system that has a medium-to-heavily loaded configuration (for example, 45,000 PVCs, 10,000 SPVCs, 10,000 NSAPs, and 60 PNNI links), the system could take as long as 25 minutes to complete the configuration process. For a heavily loaded configuration, as many as 100,000 configuration commands could be required to bring the system online from a cold start.

9. If you are modifying an SNMP manager (network management system) to manage the PSAX system, be sure that the parameter for polling the PSAX system does not exceed 100 polls per second for a CPU*n* module.

10. When using the Ethernet port on the CPU*n* module for in-band management of remote PSAX systems, the maximum number of remote systems must not exceed five for this small Enterprise network focused feature. This limitation is due to the CPU*n*'s maximum in-band management performance capability of 1,600 Kbps total. Exceeding this limitation may interfere with local tasks performed by the CPU*n* module, affecting the timers associated with the local tasks, and potentially causing the CPU*n* module to reboot. For in-band management of larger networks, use of the Ethernet module and Enhanced Router module or ATM interfaces to the customer's management network router is recommended.

11. If a large number of SPVC connections are torn down or created across multiple interfaces, the console access may be suspended for up to 2 minutes due to the CPU performing these higher priority tasks. After the CPU is finished performing higher priority tasks, console access resumes.

12. It is recommended that you do not overload the CPU2 module by turning on multiple features, for example, GR-303, PNNI, BulkStats, and so on. System performance may be degraded when the CPU2 module performs multiple tasks in a heavily loaded chassis.

13. Table 6 indicates the types of CPU*n* modules that support PSAX system software releases since Release 6.0.*n*.

Table 6. PSAX System Software Releases Supported by CPU*n* Modules

PSAX System Software Release	CPU1 (model 20P*nn*[*])	CPU2 (model 20P*nn*[†])	CPU3L (model 10P*nn*[‡])	CPU3 (model 10P23[‡])	CPU4 (model 20P30[§])
6.2.0–6.2.1	Yes	No	No	No	No
6.2.2–6.2.*n*	Yes	Yes	No	No	No
6.3.*n*	Yes	Yes	No	No	No
6.5.*n*	Yes[¶]	Yes	No	No	No
7.0.*n*	Yes[¶]	Yes	No	No	No
7.1.0–7.1.2	No	Yes	No	No	No
7.1.3–7.1.*n*	No	Yes	Yes	No	No
8.0.0	No	Yes	Yes	No	No
8.1.0	No	Yes	Yes	Yes	No
8.1.1–8.1.6	No	Yes	Yes	Yes	Yes
9.0.0–9.0.3	No	Yes	Yes	Yes	Yes
9.1.0–9.1.3	No	Yes	Yes	Yes	Yes
9.2.0	No	Yes	Yes	Yes	Yes
10.0.0-10.0.*n*	No	Yes	Yes	Yes	Yes

[*] The CPU1 module includes several models, 20P*nn*, where *nn* is a number less than 23. This module was delivered with PSAX system software Release 6.5.0 and earlier.

[†] The CPU2 module includes several models, 20P*nn*, where *nn* is a number 23–29.

[‡] The CPU3L and CPU3 modules must be used only in the PSAX 1000 chassis. The CPU3L module includes two models, 10P*nn*, where *nn* is a number 21–22.

[§] The CPU4 module must be used only in the PSAX 1250, the PSAX 2300, and the PSAX 4500 chassis.

[¶] The CPU1 module can be used for these releases only if you do not use the GR-303 Interface feature (must be in disabled mode).

14. A combination of two different types of CPU*n* modules cannot be used for normal system operations in the same PSAX system for Release 10.0.0 and subsequent releases. However, the CPU2 and CPU4 combination can be used in the same PSAX system for upgrades from a CPU2 to a CPU4 only.

7.2 DSP2*x* Voice Server Modules

1. Silence suppression over AAL1 is not supported on the DSP2*x* Voice Server modules. This will be addressed in a future release.

2. To calculate the bandwidth savings realized with the DSP2A through DSP2E modules, use the following simplified equations (The equations are not applicable to AAL2-to-AAL5 conversions):

   To calculate bandwidth (BW) required for # DS0s:
   Without silence detection:

   Required BW (Kbps) = # DS0s * compression (32,16,8) * 1.33

   With silence detection:

   Required BW (Kbps) = # DS0s * compression (32,16,8) * 0.94

   To calculate # DS0s for a BW-sized pipe:
   Without silence detection:

   # DS0s = BW (Kbps) * 0.75 / compression (32,16,8)

   With silence detection:

   # DS0s = BW (Kbps) * 1.06 / compression (32,16,8)

   Note: The 40 Kbps compression is only as good as 64 Kbps and the 24 Kbps is only as good as the 32 Kbps. This is driven by cell fill efficiency.

   These equations are derived from the following:

   calls per interface = (interface data rate x ATM cell utilization x compression ratio) / (uncompressed DS0 PCM data rate x silence detection factor)

   where:

   ATM cell utilization is the number of data bytes divided by the overall number of bytes in an ATM cell. For AAL-2 this is 40/53. Silence detection factor = constant used for calculating silence savings (approximately 0.70 to 0.72 when using silence detection (SD), 1 when not))

   Example: for 8 Kbps (SD disabled): calls/T1 = (1544 x (40/53) x 8) / (64 x 1) = 145.6 or 145 calls. Adding SD: 145/.72 = 202.2 (Connection Admission Control [CAC] conservatively rounds down to 201) = 201

3. In Release 8.1.0, an analog **Level Adjustment** field was added to the CE-to-ATM connections that receive voice channels from channel banks, PBXs, or analog Key Telephone customer equipment. If this equipment lacks the ability to adjust incoming analog levels to an acceptable level for the DSP2C/D/E Voice Server modules, the user can readjust the level from 0 dB to –12 dB. This feature is for use with standard AAL2 only, in the CE-to-ATM direction.

4. When using the DSP2A through DSP2E, the Enhanced DS1/E1, and the HD E1 modules with a customer's PBX and/or Key Telephone System, the PSAX chassis and the customer's equipment must share a common

ground to avoid ground-current loops, which could affect voice quality. (This limitation does not apply to AAL2-to-AAL5 conversions on the DSP2E module).

5. When using DSP2A through DSP2E voice processing on E1 to E1 voice circuits, A-law to A-law code conversion must be selected. If **None** is selected for code conversion, µ-law to µ-law conversion is used in the DSP2A/B/C processing, which will result in noise on the E1 voice circuits. (This limitation does not apply to AAL2-to-AAL5 conversions on the DSP2E module).

6. To use the Fax Relay feature, at least one DSP processor on the DSP2C module must be configured for FaxRelayMode. Each DSP can process four simultaneous fax calls in this mode. As fax calls will be processed only if resources are available, users should estimate the need for this mode based on how much fax traffic is sent or received and configure the DSPs accordingly. The firmware automatically reroutes all incoming fax calls to DSPs configured for FaxRelayMode processing. At the completion of the fax transmission, the connection is rerouted back to its original voice path. This frees the fax path for the next incoming fax call. If FaxRelayMode DSP resources are not available when a fax call arrives, due either to not being configured or to all the fax channels being occupied with other fax calls, the call is not rerouted and will be processed according to available, enabled DSP Voice Processing options. Fax relay also works on the DSP2D/E modules, and allocating DSP resources is not required.

7. AAL2 trunks are setup through the ATM SVC signaling initiated by the connection gateway. However, SPVCs on AAL2 trunks do not require the signaling gateway.

8. Individual AAL2 CIDs are assigned by the connection gateway by sending ADD_CONN commands to the PSAX. There is no signaling for AAL2 CID allocation. The connection gateways on both ends of a call must negotiate the CIDs.

9. Explicit cut-through should be chosen for AAL2 standard multiplexing connections.

10. The following table depicts AAL2 modes supported for major PSAX system software releases:

Table 7. AAL2 Modes

Release	PVCs		SPVCs		SVCs	
	Non-mux AAL2	Standard AAL2	Non-mux AAL2	Standard AAL2	Non-mux AAL2	Standard AAL2
6.3	Supported	Supported	Supported	Not Supported	Not Supported	Not Supported
6.5	Supported	Supported	Supported	Not Supported	API Supported	API Supported
7.0	Supported	Supported	Supported	Not Supported	API Supported	API Supported
7.1+	Supported	Supported	Supported	Supported	Supported	API Supported

11. **PacketPipe AAL2 Trunking Constraint on the DSP2D Voice Server Module.** On the DSP2D Voice Server module, the PSAX CPU*n* module allows you to create up to 384 connections (8 connections per DSP resource configured as **AlgoSet6**) on a VBR-to-ATM connection type. However, if you configure that number, the DSP2D module might fail, because the module cannot handle 64-Kbps traffic per DS0 consisting of small and large packet sizes. Configure your connections based on these known outcomes:

    - The module can process 96 DS0s sending 15-byte packets at 64 Kbps.
    - A small percentage of frames will be lost on 96 DS0s sending 256-byte packets at 64 Kbps.

    When configuring the AAL2 trunk, the IWF Type field on the AAL2 Trunk Connection Configuration window, should be set to **None** (the default) when you set up the AAL2 trunk group. Within this trunk, **AlgoSet6** allows the mixing of voice (CE-to-ATM) and data (VBR-to-ATM).

12. **PacketPipe AAL2 Trunking Constraint on the DSP2F Voice Server Module.** On the DSP2F Voice Server module, the PSAX CPU*n* module allows you to configure up to 672 connections (84 connections per DSP resource configured as **AlgoSet7**) on VBR-to-ATM connections. However, if you configure that number, the DSP2F module might fail, because the module cannot handle 64-Kbps traffic per DS0 consisting of small and large packet sizes. Configure your connections based on these known outcomes:

    - The module can process 672 DS0s sending 15-byte packets at 64 Kbps.
    - A small percentage of frames will be lost on 672 DS0s sending 256-byte packets transmitted at 64 Kbps.

    When configuring the AAL2 trunk, set the IWF Type field on the AAL2 Trunk Connection Configuration window to **Packet-pipe**. Within this trunk you **cannot** mix voice (CE-to-ATM) and data (VBR-to-ATM). For this type of connection, the DS0s can be strapped. Currently, the CAC is unaware of the strapping and uses the PCR of the VBR-to-ATM connection to determine the DSP load when fewer than 84 connections per

DSP resource are used. Using the configured PCR rate can cause the CPU*n* module to overload the DSP2F module if the user does not configure the connection setups correctly.

13. **DSP Resource Architecture and Connection Packet Stream Loads.** On the DSP2F module, each DSP resource configured as **AlgoSet7** can support a maximum of 84 DS0s each at 64 Kbps with 15-byte packets. The data passes through buffers before processing in the host, and also through the DSP resource buffer on its way in and out. The cps rate transmitting from the back/midplane to the DSP host processor does not match the cps rate exiting from the DSP resource back to the host. The cps rate exiting from the DSP resource going back to the host varies greatly depending on a number of factors, but primarily on the byte size of the packets that came in from the multiservice module (see Figure 1).

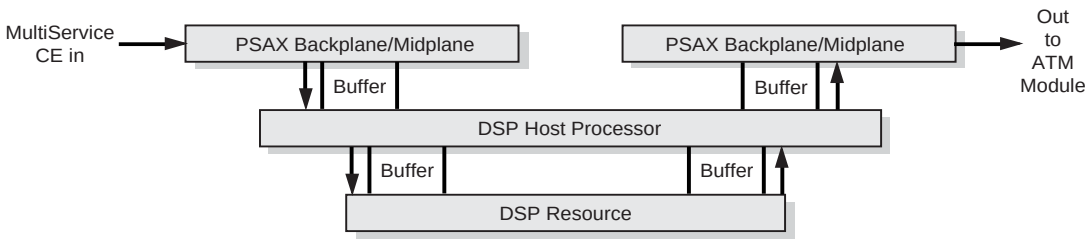

Figure 1. Traffic Flow To and From DSP Resources on DSP2*x* Modules

14. **PacketPipe AAL2 Trunking on the DSP2E Voice Server Module.** On the DSP2E Voice Server module, any of the eight DSP resources (voice) can be configured the same as the DSP2D module. Configure the last two DSP resources (7 and 8) the same as the DSP2F module configuration parameters in the previous operational consideration.

15. **DSP Rerouting feature for standard AAL2 connections.** This feature (on the DSP Resource Table) is fully supported only on the DSP2D, DSP2E, and DSP2F Voice Server modules, beginning with System Software Release 8.1.0. When standard AAL2 connections are used on the DSP2C Voice Server module with software prior to Release 8.1.0, the DspReroutingFeature field must be set to **Disabled**. If DSP rerouting is enabled when using a DSP2C Voice Server module, some connections may be lost when several DSP2C modules are rebooted at the same time. In addition, a small possibility of loosing connections exists if the CPU*n* module reboots. If connections are lost, the connection may not be listed in the PSAX system after rerouting occurs. The best way to recover lost connections is to trace each lost connection and find the associated DSP2C Voice Server modules and then reboot the affected DSP2C Voice Server modules one module at a time. If a DSP2C Voice Server module failure occurs and DSP rerouting is disabled, the affected connections may be moved to another module by momentarily enabling rerouting and performing a forced distribution. DSP rerouting should be disabled immediately after the connections are rerouted.

16. In PSAX systems with redundant CPU*n* modules and the DSP Rerouting Feature field set to **Auto-rerouting-enabled,** you must save the configuration after a DSP auto-reroute has occurred. (The DSP Rerouting Feature field is located on the DSP Resource Table, accessed from the Site Specific Menu –> DSP Resource Configuration menu option). After you observe either of the following trap messages, you must immediately save your configuration by using the "Saving the Configuration" procedure (found in the module user guides). The traps are:

    ```
    dsp2CardReroutingSucceededNotify
    dsp2IntfReroutingSucceededNotify
    ```

    These trap messages indicate that a DSP2*x* module, or channels on a module interface, were rerouted to another DSP2*x* module, or another module interface. By saving the configuration, the DSP connections are copied to the standby CPU*n* module. This action updates the standby CPU*n* module with the new location of the DSP connections. If you do not save your configuration, and a CPU*n* switchover occurs, the connections will be lost, because the standby CPU*n* module was not notified that the original connections were rerouted to a new location.

    You will see either of the DSP reroute traps under one of the following conditions:

    - If you are logged on to the console, during traffic transmission to and from the PSAX system, either trap will appear on the console status line (it does not matter which window is displayed at the time)
    - If you are not logged on to the console, the next time you log on, the following display message appears after the Save Configuration menu option:

      ```
      Save Configuration Modified
      ```

    The preceding display message after the Save Configuration menu option may indicate that a DSP reroute has occurred. This event can be confirmed by checking the trap log display by using the Trap Log Display option on the Console Interface Main Menu. If a reroute has occurred, you must save the configuration to update the standby CPU*n* module.

    After you select the **Save Configuration** command, the standby CPU*n* module reboots. During this time, the standby CPU*n* module is temporarily unavailable. When the rebooting process is completed, the following message is displayed:

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

    A more graceful handling of this situation (i.e., eliminating the need for a reboot) is under development and will be introduced as soon as possible.

17. If you decide to change the AAL mode on a DSP2D Voice Server module with channels already in service, use the following steps to ensure that the channels on the module make a complete change from one AAL mode to another AAL mode, for example, from AAL1 to AAL2, or vice versa.

a. When configuring a DSP2D module, always configure all the channels and bring them all into service before you start adding connections.

b. After the channels have been brought into service, you can take chips out of service if you want to do so.

c. If the module was configured for one AAL type and you are reconfiguring it for another AAL type in the same slot, perform step a, and reboot the module before adding connections. See the appropriate chassis user guide for instructions on rebooting the module.

18. For Release 9.0, collecting statistics on an AAL2 trunk when using a DSP2C module, requires upgrading the DSP2C module to a DSP2D module. Following the procedure below allows the CE-to-ATM PVC connections on the DSP2C module to be re-routed to the DSP2D module.

    a Insert the DSP2D module into an empty slot in the PSAX system.

    b Configure the DSP2D module as AlgoSet 6 and bring the module into service.

    c On the DSP Rerouting Table window, set the DSP Rerouting Feature to Auto-rerouting-enabled.

    d Remove the DSP2C module from the PSAX system.

19. The Circuit Emulation-to-ATM VCC PVC Connection Statistics window displays the number of cells the CE side sends or receives from the backplane on the left side of the window and displays the number of cells the DSP side receives or sends on the right side of the window. The right side of the window displays the number of cells that were received and sent to the backplane before and after compression, respectively. The cell count on the ATM side is displayed on the AAL2 TRUNK Statistics window. This window also displays the number of cells received or transmitted from/to the backplane by the DSP2*x* Voice Server module for the trunk side of the connections. The ATM cell count must be observed using the AAL2 Trunk Statistics window when using AAL2. The Circuit Emulation-to-ATM VCC PVC Connection Statistics window is misleading when using AAL2. This actually displays the CE cells to and from the DSP2*x* Voice Server module.

20. The fax and data calls are not transmitted properly because the PSAX DSP receives idle pattern from the voice switch.

21. Beeps and clicks were heard when 404Hz, 1004Hz, 1780Hz, 2010Hz and 2804Hz, single tone frequencies are detected and regenerated for 8k, 16k and 24k compression schemes. **The dsp2d-98942_1-827ea44e.drv driver provides a solution to this problem by disabling certain frequency tones**. **Release 10.0.9 contains both the old and new drivers. If you need to use the driver without the frequency tones disabled, after you have upgraded to the 10.0.9 build, download the old driver, dsp2d-952_1-03b8fc51.drv.**

7.3 6-Port Enhanced DS1 and Enhanced E1 Modules

1. No unique statistical field exists for displaying the number of frames discarded due to frame relay policing. Due to limited module memory available for counter maintenance, discarded frames due to frame relay policing will continue to be included in the Errored Frames field.

2. When using FRF.5 on the Frame Relay interface, the data link connection identifier (DLCI) will be changed to 1022 for ATM transport.

3. When Nx64 is selected, although the ABCD signaling field is selectable, it has no impact since the bits are not transmitted.

4. All transmit source address (SA) bits are set to **1**. This field may be user configurable in future releases.

5. The Enhanced E1 module will generate errors if 25 DS0s are strapped together. Strapping less than, or more than 25 DS0s together allows the module to function normally. This is an anomaly found in the hardware that has been corrected by the introduction of the HD E1 module.

6. Cyclic redundancy check (CRC) and Frame errors may occur when the 6-Port Enhanced E1 module is set to LoopTiming while configured with a frame relay interface.

7. Invoking a loopback causes the operational status to be displayed as Out Of Service. However, the operational status is in service and the LoopBackState is never reported.

7.4 Ethernet Module

1. The backplane-to-Ethernet port direction is limited to a total nominal bandwidth of 33 Mbps, depending on packet size. The Ethernet port device drivers can support greater than wire-speed (140 Mbps), both receiving and transmitting. The backplane device driver on the module can support greater than wire-speed (140 Mbps) transmitting, but is limited to a maximum of around 33 Mbps for receiving. Note that these driver bandwidth numbers are for sustained throughput.

2. Due to the throughput limitation of this module, performance is optimized if the number of interfaces included in each bridge group is kept to a minimum and the Spanning Tree algorithm is disabled. Of course, if the topology requires Spanning Tree protection, it should be used. Although the Ethernet module's physical ports can receive traffic at full

rate (140 Mbps total for 5 ports), the rate at which traffic can be received from the backplane is limited. Listed below are workload factors which may affect the module's throughput:

a. Number of physical ports passing traffic.

b. Average packet size (smaller packets increase processor workload and decrease overall throughput).

c. Number of interfaces assigned to a bridge group. Even if Spanning Tree is blocking parallel channels, the processor must service each bridge group interface.

d. Use of the Spanning Tree algorithm. Analysis of the network topology is a continuous process that adds to the module's workload.

3. Not all statistical counters recommended by the IEEE 802.1D specification and displayed in the user interface are supported by the Ethernet module's firmware. The following counters are supported: alignment errors, frame check sequence (FCS) errors, late collisions, internal media access control (MAC) transmit errors, internal MAC receive errors, frames too long, frames in, frames out, in discards, and topology change count.

4. The following counters are not supported:

   Single-collision frames, multiple-collision frames, signal quality error (SQE) test errors, deferred transmissions, excessive collisions, carrier sense errors, delay exceeded Discards, maximum transmission unit (MTU) Exceeded Discards, Learned Entry Discards, and Cells Encoded/Decoded (Connection Statistics).

5. The IEEE 802.1D Specification indicates that the default Path Cost for Bridges should be 1000/associated port speed. The aim of the specification's recommended default value is to drive traffic toward 100BASE-T ports, vice 10BASE-T ports since the default cost values would be 10 for 100BASE-T supported Bridges and 100 for 10BASE-T supported bridges. The Ethernet module's Port 1 can be either 10BASE-T or 100BASE-T, and with a Link Type of **Auto**, the port speed is only determined when connected to an external device, possibly after configuration. The PSAX system treats Port 1 and the virtual channels as 100 Mbps capable and Ports 2–5 as 10 Mbps capable for the default path cost calculation, even if Port 1 is subsequently connected to a 10BASE-T device.

6. An Ethernet module supports a maximum of 70 connections, which correlates to the number of virtual channels available on the module. These 70 connections may consist of any combination of SPVC and PVC connections. For example, the following configurations are allowed:

   - 70 SPVC connections, 0 PVC connections = 70 total
   - 0 SPVC connections, 70 PVC connections = 70 total
   - 20 SPVC connections, 50 PVC connections = 70 total

   However, the following configuration is not allowed:

   - 70 SPVC connections, 1 PVC connections = 71 total

7. The Autosensing feature is used to determine the link type (10BASE-T or 100BASE-T) and the duplex mode (half duplex or full duplex). Note the following considerations when configuring the link type and the duplex mode for both Ethernet modules:
   - If the link type and duplex modes are known in advance, it is recommended that the respective configuration parameters be explicitly configured as opposed to using the Autosense feature.
   - When using the Autosensing feature, both the Link Type and the Duplex Mode fields must be set to **Auto**. The link will be unstable if one field is set to **Auto** and the other field is set to an explicit value.
   - This feature has been successfully tested with a variety of network components and network interface cards. However, for some test equipment, difficulties may arise with proper negotiation in **100Base-T** line mode wherein the autosensing capabilities of the Ethernet module and the other device do not select the same line mode. This problem has never arisen with non-test network equipment. Should you experience this problem, it is recommended that you set the Link Type and Duplex Mode fields to explicit values rather than to **Auto**.

7.5 4-Port Ethernet Module

1. The Autosensing feature is used to determine the link type (10BASE-T or 100BASE-T) and the duplex mode (half duplex or full duplex). Note the following considerations when configuring the link type and the duplex mode for both Ethernet modules:
   - If the link type and duplex modes are known in advance, it is recommended that the respective configuration parameters be explicitly configured as opposed to using the Autosense feature.
   - When using the Autosensing feature, both the Link Type and the Duplex Mode fields must be set to **Auto**. The link will be unstable if one field is set to **Auto** and the other field is set to an explicit value.
   - This feature has been successfully tested with a variety of network components and network interface cards. However, for some test equipment, difficulties may arise with proper negotiation in **100Base-T** line mode wherein the autosensing capabilities of the Ethernet module and the other device do not select the same line mode. This problem has never arisen with non-test network equipment. Should you experience this problem, it is recommended that you set the Link Type and Duplex Mode fields to explicit values rather than to **Auto**.

2. The Physical Port path cost is determined by the configured link type. When the link type is configured for **Auto** or **100BaseT** the path cost will be 19. Regardless of the negotiated port speed, the path cost will remain at 19 unless changed through management action. When the

Link Type is configured for **10BaseT** the path cost will be 100. These default values follow the recommendations in Table 8-5 of the IEEE 803.1D Bridging specification.

3. A bridge group cannot be configured with virtual channels for both IP Forwarding and Bridging. A bridge can support either IP Forwarding or Bridging, but not both features simultaneously. When using the IP Forwarding feature only one physical and one virtual interface may be configured on the bridge group.

4. Throughput testing of the 4-Port Ethernet module is 294,118 packets per second (64-byte packets), which is in excess of 195 Mbps including the Ethernet overhead. Testing was conducted in accordance with RFC 1242 using two 100 Mbps interfaces on two 4-Port Ethernet modules and a NETCOMM 2000 SmartBits. Bridge-to-bridge connections were made between the ports on the two Ethernet modules. The theoretical maximum rate based on 64 byte packets for 2 100 Mbps Ethernet links is 297,620 packets per second.

5. The MAC Address table can hold in excess of 16,000 MAC addresses. Once the MAC Address table has been populated with the maximum number of entries, new entries will be discarded. Packets that do not have source or destination addresses in the MAC Address table will be flooded out of all interfaces in the bridge group.

6. Virtual interfaces configured for VC Multiplexing cannot support the Spanning Tree algorithm.

7. The 4-Port Ethernet module supports a maximum Ethernet packet length of 1,518 bytes. Any packets longer than 1,518 bytes will be dropped. When the 4-Port Ethernet module is used to transport VLAN trunks, the MTU size must be adjusted to reflect the 4 byte IEEE 802.1Q VLAN tag. When the 4-Port Ethernet module is used to transport Cisco ISL trunks the MTU size must be adjusted to reflect the 30-byte proprietary VLAN tag.

8. A 4-Port Ethernet module supports a maximum of 120 connections, which correlates to the number of virtual channels available on the module. These 120 connections may consist of any combination of SPVC and PVC connections. For example, the following configurations are considered valid:

   - 80 SPVC connections, 40 PVC connections = 120 total
   - 120 SPVC connections, 0 PVC connections = 120 total
   - 0 SPVC connections, 120 PVC connections = 120 total

   However, the following configuration is not considered valid:

   - 80 SPVC connections, 41 PVC connections = 121 total

7.6 6-Port Multiserial Module

1. When assigning traffic to the ports it is important to enter the data rate. This information is used by the system to prioritize traffic flow on the module.

2. In order to set up or change the Frame Relay local management interface (LMI), the interface must first be returned to an unconfigured state.

3. When a port is configured for anything other than Limitless ATM Network (LANET), the port's LEDs represent whether or not the port is configured. The LEDs of all other I/O modules represent loss of signal (LOS) conditions.

4. When using the Frame Relay option, the *actual* sustained data rate should not exceed 80% of the *provisioned* bandwidth for a connection. At higher rates, lost frame bursts occur. This situation only occurs when a constant rate of traffic is applied. This is highly unlikely since most Frame Relay traffic is bursty. However, to avoid this problem, set the data rate to 125% of the sustained data rate. This behavior is typical of all packet switching equipment.

5. X.21 interfaces may be supported by selecting EIA-449 (Electronic Industries Alliance standard) or EIA-530 for the interface type and using the Lucent X.21 cable. Although the V06.00.C04.00 System Software does not explicitly indicate that X.21 is supported, use of these options will successfully inter-operate with X.21 devices.

6. The 75 bps mode only supports asynchronous transmission. This feature was implemented to support Teletype equipment.

7. The 6-Port Multiserial module does not currently support Speed Adaption, however, this is displayed as a selectable option in this release. If Speed Adaption is required, the Quadserial module fully supports this feature.

8. The 6-Port Multiserial module can be installed in any I/O slot of any PSAX chassis with the following exceptions. In the PSAX 4500 chassis, it can be installed in slots **1**, **2**, and **14** only and in the PSAX 1000 chassis, it can be installed in slot **1** only. On modules with PEC NS20N071DB and prior, port 5 is not operational in the PSAX 1000 chassis.

7.7 1-Port OC-3c and STM-1 Modules with Traffic Shaping

1. The default value for both Sustained Cell Rate (SCR) and Peak Cell Rate (PCR) is the value 1. The module will not pass data until these parameters are set to a specified rate.

2. When setting up a frame relay-to-ATM connection to OC-3c or STM-1 modules with Traffic Shaping, the Sustained Cell Rate field is not available on the ATM side of the connection. To control the rate, set the Committed Info Rate field on the frame relay side of the connection on both ends of the link.

3. Very large bursts of traffic may exceed the 8 MB memory capacity typically shipped with the module, resulting in dropped cells.

7.8 PSAX 2300/PSAX 4500 Power Supply Modules

1. The PSAX 2300/PSAX 4500 Power Supply modules use rear mounted compression connectors for -48 VDC power. The connectors will accept 12 AWG solid or 14 AWG stranded copper wire. The grounding lug will comfortably hold up to 8 AWG stranded copper wire.

7.9 PSAX Stratum 3–4 Modules

1. The following PSAX modules **cannot** be used to provide line source timing for the PSAX 1000, PSAX 1250, PSAX 2300, or PSAX 4500 Stratum 3–4 modules:

20N32	4-Port Voice 2-Wire Office
23N40	4-Port Ethernet
20N30	8-Port Voice 2-Wire Station
24N64	12-Port Medium-Density DS1/E1/DS0A CES (When operating in DS0A mode only)
20N79	Alarm
23N27	DSP2C Voice Server
23N29	DSP2D Voice Server
23N26	DSP2E Voice Server
23N25	DSP2F Voice Server
23N24	DSP2G Voice Server
23N41	Enhanced Router
20N40	Ethernet
20N41	Route Server
23N28	Tones and Announcements Server

2. The 2-Port High Speed module is intended for use in a LAN environment, and typically, is connected to a workstation or other LAN equipment, where the clock is not assumed to be stable.

3. The Quadserial module can be used to provide line source timing; however, it is recommended that a module with a T1, E1, or higher speed interface be used whenever possible.

4. The 6-Port Multiserial module can be used to provide line source timing at frequencies that are multiples of 64 Kbps; however, baud rates are not supported as valid sources.

5. In a PSAX 2300 system, inserting an I/O module during firmware downloading to a PSAX 2300 Stratum 3–4 module may cause this module to restart the firmware downloading attempt. In this case, a trap message for a failed firmware downloading attempt is generated, but a retry is triggered by the system without user intervention. If the firmware downloading process fails after three consecutive attempts, you must clear the failed state by manually triggering the firmware downloading process.

6. In a PSAX 2300 system, the number of times a Statum module is removed and inserted should be minimized. Removing Stratum modules may cause other modules to reboot.

7. Communication between the PSAX 4500 Stratum 3–4 module and the CPU*n* module takes longer than between other PSAX Stratum 3–4 modules and the CPU*n* module. The firmware downloading process to the PSAX 4500 Stratum 3–4 module will take up to 30 minutes per Stratum 3–4 module. After you upgrade the PSAX system software on the PSAX 4500 system, do **not** attempt to perform any of the following actions on the system for approximately 60 minutes while the Stratum 3–4 firmware is downloading:

   - Reboot the primary or standby CPU*n* module or the PSAX chassis
   - Perform a primary CPU switchover
   - Synchronize the standby CPU*n* module to the primary CPU*n* module
   - Restore your database files from a separate storage medium to the PSAX system using the Remote Database Operation window (using this function causes the PSAX chassis to automatically reboot)
   - Change any configuration values

   Before performing any of the actions in the preceding list, you must verify that the firmware downloading process for all modules is complete. You should see the value **Done** in the Status field for this module on the Firmware Version Control window. If, for some reason, the firmware downloading to the PSAX 4500 Stratum 3–4 modules is interrupted, the CPU*n* modules can no longer communicate with the PSAX I/O and server modules.

   In case a communication disruption, caused by incomplete firmware downloading to the PSAX 4500 Stratum 3–4 modules, occurs between the CPU*n* modules and the PSAX I/O and server modules, perform the following procedure to restart the firmware downloading to the PSAX 4500 Stratum 3–4 modules and recover the PSAX 4500 system.

▲ CAUTION:
Performing the following procedure will stop all traffic through the PSAX system.

Begin

1 Eject the following modules, in the order indicated, from the PSAX 4500 midplane, so that they are protruding from the front edge of the chassis by about 1 inch:

   a Both CPU*n* modules (if you have redundant modules)

   b Both Stratum 3–4 modules (if you have redundant modules)

   c All I/O and server modules

2 Reinsert the following two modules, in the order indicated, into the chassis midplane:

   a A Stratum 3–4 module into Slot A.

   b A CPU*n* module into Slot 16.

3 Wait 30 minutes for the Stratum 3–4 module firmware to be downloaded from the CPU*n* module.

4 To verify that the Stratum firmware is successfully downloaded, display the Firmware Version Control window to check whether the value **Done** is displayed in the Status field. If **Done** is not displayed, wait an additional 30 minutes. If **Done** is still not displayed after a total of 60 minutes, call Lucent Worldwide Services for technical support, or your Lucent representative for additional instructions.

5 If you have redundant Stratum 3–4 modules, reinsert the second Stratum 3–4 module into Slot B and repeat Steps 4 and 5.

6 After the second Stratum 3–4 module firmware is successfully downloaded from the CPU*n* module, reinsert the second (redundant) CPU*n* module (if applicable) into Slot 17.

7 Wait several minutes for the second CPU*n* module to complete its boot process.

8 Reinsert all I/O and server modules into the chassis midplane, and wait for all modules to complete their boot process.

9 To verify that all modules are functioning correctly, display the Equipment Configuration window to check that all module information is displayed showing the correct software version and status.

End

8. After a CPU*n* module reboot the order in which the stratum modules come up can be random and may take as long as 30 minutes to synchronize with the primary clock.

9. In PSAX 4500, when the primary CPU module is removed from the backplane of the system, the LEDs on the Stratum do not display the correct state.

7.10 8-Port Voice 2-Wire Station Module

1. Before the test mode can be entered, the configuration must be returned to an unconfigured state.

2. Noise may be detected on Station lines when simple network management protocol (SNMP) configuration commands are being sent to the CPU*n* module.

3. The echo cancellation mode is always enabled on this module.

7.11 4-Port Voice 2-Wire Office Module

1. Noise may be present at the beginning of the first call after the telephone line is installed because the echo cancellation circuit cannot converge until voice traffic is present. After the first call has been placed, the echo cancellation circuit will converge and noise will not be observed on subsequent calls.

7.12 12-Port DS1 and 21-Port E1 Multiservice Modules

1. Due to the frame sizes and hardware design of the following modules, FR-to-ATM statistics are inaccurate.

   23N66 21-Port High-Density E1 Multiservice

   23N64 12-Port Medium-Density DS1 Multiservice

   23N60 1-Port Channelized DS3 Multiservice

   23N62 1-Port Channelized STS-1e, T1 Format

   23N07 Quadserial

2. When clocking to the Stratum module is provided by the modules listed below, it is recommended that port 4 and port 8 be used for line timing. Clocking to the Stratum module from these modules does not meet *ITU-T G.813* option 1 requirements.

   23N68 1-Port DS3 IMA

   23N33 12-Port Medium-Density DS1 IMA

   23N64 12-Port Medium-Density DS1 Multiservice

   23N34 21-Port High-Density E1 IMA

   23N66 21-Port High-Density E1 Multiservice

3. If a port is configured for UNI3.1 on the 21-Port High Density E1 module and if the available bandwidth is checked, it is noticed that the amount of bandwidth available is 4530 instead of 4528.

   When the bandwidth is calculated for the whole E1 port, the system uses the bandwidth of one DS0 and multiplies it by 30, for 30 DS0s. One DS0 is approximated to 151cps and when multiplied by 30 the total equals 4530. The value of 4528 is obtained from multiplying the actual bandwidth of a DS0 which is 150.94 cps by 30.

7.13 DS1 and E1 IMA Modules

1. The link operational status of the CPU*n* module does not refer to IMA status, but to only the physical link status. The group operational status refers to IMA group status.

2. To restart an IMA group, take it administratively out of service and bring it back into service.

3. Individual IMA links cannot be inhibited.

4. After an IMA group has been deleted, its status will be displayed as **InsufficientLinks**.

5. Invoking a loopback causes the operational status to be displayed as Out Of Service. However, the operational status is in service and the Loop-BackState is never reported.

6. IMA is a point-to-point protocol. Each port in an IMA group must be directly connected (via a clear channel connection) to another IMA group. IMA cannot tolerate cells being reordered on the individual links. As a result, none of the individual links can been sent through an ATM cloud. This is true of all IMA vendor links.

7. If one link is broken, the group can be configured to automatically continue using the other links. For example, if a group has three DS1 links and one fails, the throughput will drop from 4.5 Mbps to 3.0 Mbps, but the entire group does not stop.

8. The maximum allowable link delay differential is configurable from 1–200 msec in 1 msec increments. The number of milliseconds entered is rounded to the nearest number of "4 cell times" which is used as the configuration parameter, amounting to about 1.1 msec on DS1 IMA and 0.85 msec on the E1 IMA.

9. When configuring a high link delay, be aware that this allows that much total delay in the IMA interface. The only way to compensate for link delay differential is to store cells in the switch for the faster links. When a receive link is ready to make the transition from the usable state to the active state, the IMA module checks that its delay differential is within the bounds specified. If so, it is put in the active state, otherwise, it is given a link out of delay synchronization (LODS) defect. Periodically, the IMA module checks all receive links that are either active or only have LODS errors. It selects the best set of links to use that are within the specified link delay differential bounds, allowing those links to become active.

10. When a failure occurs on the slowest link, some cell loss on constant bit rate (CBR) connections can be expected as the other links speed up their cell rate in order to eliminate the now excessive delay due to their buffering of cells.

11. Difficulties can be expected if the IMA Group is configured for symmetric operation but is experiencing asymmetric link delays. One end may consider links A, B, and C to have link delay problems, while the other end considers links D, E, and F to have problems.

12. Four configurable transmit frame lengths are provided: 32, 64, 128, and 256 cells. One IMA communication protocol (ICP) cell is sent over each link once per IMA frame, by selecting a larger frame length, less overhead will be incurred. By selecting a smaller frame length, the IMA group will have better response in communications with the far end (faster error detection and recovery). Note that the IMA specification only requires equipment to support a frame length of 128. If a frame length other than 128 is configured and the far-end is connected to equipment that does not support it, the far-end group will enter the configuration-abort state.

13. The IMA ID is simply an 8-bit (0-255) identifier for this IMA group. There is no special significance to any particular values of IMA IDs. However, the IMA ID is used to identify a group to the far end, so it is best to pick a unique value instead of leaving it at the default of 0.

14. Some vendors have incorrectly interpreted version 1.0 of the ATM Forum IMA specification. The result of this misinterpretation is to incorrectly report link states to the far-end of the IMA connection (and also incorrectly interpret the link states reported to them by the far-end). To aid users who may have to inter-operate with such equipment, a compatibility mode has been added. When an IMA group is configured with this compatibility mode turned on, the IMA module will make the same errors that many of the 1.0 products made, enabling interoperability.

15. The IMA protocol requires that each end of an IMA connection acquire some knowledge of the far-end. As a result, it knows which port in the far-end group is connected to which port in the near-end group (it needs this information in order to properly merge the data cells received on these links). One side effect of this is that if the connector A from port 1 is removed, connector B from port 2 is also removed, then connector A is plugged into port 2 and B into port 1, the IMA group will detect that something is wrong. If plugged in improperly, the cables must be corrected or the group must be restarted (taken out of service and put back in service).

16. As described in the previous note, each end of an IMA connection acquires knowledge about the far-end. If all the cables are removed from the far-end of an IMA connection and are connected to another IMA box (with a different IMA ID), the near-end IMA group will detect that the far end is no longer sending the same IMA ID. Upon detecting this

circumstance, the IMA module will automatically restart the IMA group, allowing it to begin communicating with the far end. Some other products do not do this, and require a manual restart of the IMA group.

17. Alpha, beta, and gamma are configuration parameters that affect how the IMA module reacts to errors. Alpha and beta determine how quickly error states are entered. The smaller the number, the faster the error state is entered. Gamma determines how long error recovery takes. The smaller the number, the faster the recovery. According to the T1/E1 specification, cell scrambling is always to be turned on. The IMA module turns scrambling on for both T1 and E1. Unfortunately, the old T1 specification was ambiguous about the use of scrambling, so there is still some equipment deployed that does not scramble.

18. For all E1 ATM and IMA applications, time slots 0 and 16 are never used for ATM cells. These time slots are always reserved for framing, OAM, and signaling functions. The field description for time slot 16 in the port and channel configuration window will be changed to read "Indicates that time slot 16 is reserved for network use and not available for ATM payload" in the 6-Port E1 IMA and 21-Port High-Density E1 IMA module user guides.

19. When a DS1 or E1 IMA interface in an IMA group transitions from an alarm condition to a no alarm condition, the interface will be reconfigured, resulting in a loss of data. To prevent this data loss, when an interface in an IMA group transitions into an alarm condition, the interface should be removed from the IMA group. Once the alarm condition has cleared, the interface can be returned to the IMA group without data loss.

20. When clocking to the Stratum module is provided by the modules listed below, it is recommended that port 4 and port 8 be used for line timing. Clocking to the Stratum module from these modules does not meet *ITU-T G.813* option 1 requirements.

    23N68 1-Port DS3 IMA

    23N33 12-Port Medium-Density DS1 IMA

    23N64 12-Port Medium-Density DS1 Multiservice

    23N34 21-Port High-Density E1 IMA

    23N66 21-Port High-Density E1 Multiservice

21. E1 cards can have more than one interface on the port when channelization is enabled. When the port is taken out of service and the command is applied, the following message is displayed:

    ```
    Are you sure that you want to take ALL interfaces out of service?
    ```

    "All" refers to all the interfaces on a port. If there is only one interface on a port, then only that interface will be taken out of service.

22. Upto 21 IMA links can be added to an IMA group that is configured as ATM PNNI or ATM UNI.

23. To run a loopback test on an IMA port that is already assigned to an IMA group, you must first take the DS1/E1 circuit out of the IMA group. Once the loopback tests are completed the DS1/E1 can be added back to the IMA group.

7.14 24-Port High-Density DS1 Multiservice Module

1. An indeterminate recovery period is observed on the 24-Port High-Density DS1 Multiservice module (PECs NS23N353AA and NS23N353AB) when both patch panel cables are attached. By following the PSAX system initial installation procedures in the *PacketStar PSAX 24-Port High-Density DS1 Multiservice Module Description and Specifications* and the *PacketStar PSAX 24-Port High-Density DS1 Multiservice Module User Guide*, you will prevent an indeterminate recovery period from occurring. An indeterminate recovery period might occur if **all** of the following conditions are present:

   - The PSAX chassis has lost power because of a failure and the entire chassis is rebooted, or the module is installed in a chassis that is already operational **and**
   - Both patch panel cables are attached **and**
   - The input signals on 12 DS1 lines are greater than 0 dB

   During this indeterminate recovery period, the module remains in a failed state. While the module is in a failed state, all four LEDs are illuminated. Once the module becomes operational and can successfully sequence its bootup procedure, the module recovers and it returns to an active state. If the module does not recover by itself, removing the port connector cable will allow the module to boot up. The chassis must be booted up and the module must be installed with the cables removed during chassis bootup. Once the module has booted up, the cables can be attached. If any of the ports are configured, the **LOS/STANDBY** or **ACTIVE** LEDs will be illuminated. If all ports are unconfigured, no LEDs will be illuminated.

7.15 OC-*n*/STM-*n* APS/MSP Modules

1. OAM loopback is only supported in the APS/MSP bidirectional mode. It is not supported in the APS/MSP unidirectional mode.

2. For successful working of the APS/MSP automatic protection feature, a module pair must be installed in the chassis in a side-by-side configuration, with the left module installed in an odd numbered slot, and the

right module in the adjacent, consecutive even-numbered slot. In this configuration, either module can serve as the working module, and the other module will serve as the APS/MSP protection module.

3. The Release 6.2 and subsequent versions of the driver for this module will only download to a module that has a Release 6.2 or subsequent boot loader. Pre-Release 6.2 OC-3c 1+1 APS customers who want to eventually upgrade to Release 6.2 or subsequent releases will need to replace the boot loader programmable read only memories (PROMs). Release 6.2 System Software includes the older driver files to support the existing modules.

4. The APS engine can enter a deadlock state when changing from unidirectional to bi-directional mode and there is a local protection lockout at both ends. Manual commands and line conditions should be cleared before entering bi-directional mode from the unidirectional mode to prevent or recover from this condition.

5. Loss of cell delineation (LCD), occurs when the STM-1 MSP or OC-3c APS module cannot extract intact ATM cells out of the framing. Be sure that cell scrambling is configured the same on both terminations, the PSAX system and the other ATM switch, to eliminate one cause of the LCD line status error. The LCD line status error information will be added to the reference information appendix of the STM-1 MSP and OC-3c APS module user guides in a future release.

6. When setting the cell rate to approximately 20,000 or higher on virtual interface numbers 254 and 255, bit errors start to occur on other configured virtual interfaces. Do not use virtual interfaces 254 and 255.

7. The following applies to the OC-*n* APS and STM-*n* MSP modules:

   - For the STM-1 MSP and STM-4 MSP modules, the *ITU-T G.841 Transmission Systems and Media, Digital Systems and Networks, Section 7.1* (formerly G.783 Annex A) mandates channel 0 to indicate the switch configuration and channel 1 to indicate the bridge configuration. The PSAX system is compliant with G.841 Section 7.1 by using channel 0 and 1 coding in both the uni- and bi-directional modes.
   - For the OC-3c APS and OC-12c APS modules, the *Telcordia GR-253-CORE Synchronous Optical Network (SONET) Transport Systems: Common Generic Criteria* (formerly G.783 Annex B) mandates channel 1 to indicate the switch configuration and channel 2 to indicate the bridge configuration (0 indicates no request). The PSAX system is not compliant with G.841 Annex B.
   - The APS and MSP protocols use the K1/K2 byte in the SONET/SDH overhead to exchange information between multiplexed section endpoints. The protocols use bits 6 to 8 of the K2 byte in different ways:
     - ~ The STM-1 MSP and STM-4 MSP modules use these bits to indicate an MS-AIS or MS-RDI alarm.
     - ~ The OC-3 APS and OC-12 APS modules use these bits to indicate the mode of operation.

On the STM-*n* MSP Port Configuration windows, the K1/K2 byte values are displayed when the data is being transmitted and/or received, but those values do not include bits 6–8 of the K2 byte.

8. The APS/MSP protection modes must be disabled before removing the protection module. If any module is inserted in the same slot as the protection module without disabling the APS/MSP mode first, the newly inserted module will not work properly.

9. If the optical cable is disconnected from an active card after the traps are received for IMA groups on a standby card, there may be a delay of 25 seconds in the switchover.

10. The following applies to the 1-Port Channelized OC-3/STM-1 Unstructured CES/ATM module when APS/MSP is configured:
    - In some scenarios such as a software upgrade or a chassis reboot, both the working and protection modules are rebooted almost simultaneously and the protection module becomes active. However, a switchover from the protection module to the working module affects the traffic in some of the circuits.
    - To reduce the possibility of occurence of a race condition after an upgrade, ensure the working module is active before the upgrade.
    - In case a race condition is observed, reboot the working module. Wait for the working module to become active and then reboot the protection module.

7.16 1-Port Channelized OC-3/STM-1 CES Modules

1. The 1-Port Channelized OC-3/STM-1 CES modules do not support the ISDN User or Network interfaces with H.248 enabled. Support is planned for a future release.

2. The High-level data link control passthrough interface (HDLC passthrough interface) cannot be configured on all channels.

3. When the 1-Port Channelized OC-3/STM-1 CES modules are configured to run in STM mode and the Release 8.1 driver is loaded, and you insert it into a chassis running Release 8.0, the CPU*n* module will crash. Release 8.0 does not support STM mode. Do not insert the module in a chassis running Release 8.0 or do not put the module into STM mode.

4. When the 1-Port Channelized OC-3/STM-1 CES module is operating in STM-1 mode the user is allowed to change the functionality of the Data Transfer Type to Structured/Unstructured for the E1 port and channel configuration, however, this option is not supported in this release.

7.17 1-Port Channelized OC-3/STM-1 Unstructured CES/ATM Modules

1. The matrix below summarizes the operating modes that are available now and in future releases.

Table 8. Implementation of Functional Modes for the 1-Port Channelized OC-3/STM-1 Unstructured CES/ATM Modules

Operating Mode	Hardware Operating Mode	
	OC-3	STM-1
Unstructured CE	**OC3-UCE**[*]	**STM1-UCE**[†]
ATM	**OC3-ATM**[†]	**STM1-ATM**[*]
IMA	**OC3-ATM**[‡]	**STM1-ATM**[§]

[*] This module operating mode was introduced in PSAX System Software Release 8.1.0.
[†] This module operating mode was introduced in PSAX System Software Release 9.0.0.
[‡] This module operating mode was introduced in PSAX System Software Release 10.0.3.
[§] This module operating mode was introduced in PSAX System Software Release 9.2.0.

2. When the stratum module is configured for line timing from port 85, 86, or 87, the system may indicate that successful synchronization has occurred even though the configuration is not supported. To configure line timing use physical port 88, virtual ports 1 through 84 for OC3 mode, or virtual ports 1 through 63 for STM1 mode.

3. The PSAX system virtual port numbering scheme does not match the numbering scheme described in G.707 ITU standard for allocation of TU-n capacity to Time Slots within a VC-4. The numbering scheme is described in Table 7-1 of the G.707 ITU standard. The following table represents the PSAX system virtual port number mapping:

Table 9. PSAX System Virtual Port Numbering Scheme

PSAX Virtual E1 Port	SDH TUG Number K L M	PSAX Virtual E1 Port	SDH TUG Number K L M	PSAX Virtual E1 Port	SDH TUG Number K L M
1	111	22	211	43	311
2	121	23	221	44	321
3	131	24	231	45	331
4	141	25	241	46	341
5	151	26	251	47	351
6	161	27	261	48	361
7	171	28	271	49	371

PSAX Virtual E1 Port	SDH TUG Number K L M	PSAX Virtual E1 Port	SDH TUG Number K L M	PSAX Virtual E1 Port	SDH TUG Number K L M
8	112	29	212	50	312
9	122	30	222	51	322
10	132	31	232	52	332
11	142	32	242	53	342
12	152	33	252	54	352
13	162	34	262	55	362
14	172	35	272	56	372
15	113	36	213	57	313
16	123	37	223	58	323
17	133	38	233	59	333
18	143	39	243	60	343
19	153	40	253	61	353
20	163	41	263	62	363
21	173	42	273	63	373

4. When the module is in IMA mode, traffic stops if some links are deleted and then added back to the IMA group. This occurs only when all the links are removed from the group at the same time other links are added into the group without unconfiguring and reconfiguring the IMA group. Do not remove all of the links from the group when changing link configurations. If it is necessary to remove and then add other links each operation performed on the group must be delayed for at least 1 minute.

5. When the 1-Port Channelized OC-3/STM-1 Unstructured CE/ATM modules are configured with 31 IMA groups, the E1 IMA links can only pass 1.90408 Mbps, not 2.048 Mbps. The maximum line rate is (64k * 30 Channels * 127)/128. The Tx Frame Length is 128 and IMA ICP is 127 (128-1).

6. A known problem exists between the interaction of the APS protocol and the IMA protocol. The APS protocol can perform a switchover in no more than 50 ms. However, the APS mechanism does not provide a means to synchronize the IMA states of the working and protection modules. This results in an unexpected delay until the IMA link becomes operational after the APS switchover.

7. When the 1-Port Channelized OC-3/STM-1 modules are configured with MSP, a PNNI cannot be created on an IMA group. Instead, configure an IMA group in the bidirectional mode (APS).

8. When the primary CPU is rebooted, there is a 1-2 minute outage on the SPVCs that go through the MSP link.

9. Re-routing between PNNI links within the same physical optical cable takes longer than the defalt value that is set.

10. Whenever an IMA group is in the StartupAck/Startup state, if an attempt is made to add a link, the operation fails and as a result the IMA group does not become active.

11. Unidirectional APS in the IMA operating mode is not supported at this time. When using IMA and APS, bidirectional switching is the only option.

12. The IMA interface re-evaluates the Tx and Rx LSM state for each incoming ICP cell with a new state indication per R-81. The IMA protocol stack is implemented in this module. Therefore, the PSAX firmware does not dictate link states.

13. As per the IMA Frame Synchronization Mechanism, when alpha consecutive invalid ICP cells are received, the link goes to the out of sync state. To recover, the Link Addition and Slow Recovery (LASR) procedure is initiated on the link.

14. As per R-65, the IMA group selects the TRL from a set of links that are in the Active state. Also, if there are no links in the Active state, the IMA group selects a link that is in the Usable state (per R-66).

15. When a soft reboot is performed on the working card, a cell loss of 552 cells is observed. When a soft reboot is done on the protection card, a cell loss of 956 cells is observed.

16. From the console, the options to bring all interfaces into service, delete all interfaces, or take all interfaces out of service at the same time are not available.

17. In a VBR-RT-1 over 1-Port Channelized OC-3/STM-1 Unstructured CES module (IMA or native VC12), traffic policing does not take place if the PCR is exceeded.

18. When an IMA group is "Not in service" or not in "operational" state, if a link addition or deletion is attempted, the operation becomes invalid and subsequently the IMA group does not become operational.

    This problem is observed in the following scenarios:

    - Configure an IMA group / interface and bring it to operational state. Reboot the module at far end with IMA. While the IMA interface state is still in "out of service", try to add or delete IMA ports to the IMA group/interface.
    - Take the IMA group OOS or pull out the fiber. Add or delete the IMA links. Bring the IMA group In service or connect the fiber back.

    As a workaround, delete the IMA group and configure it again. Reboot the module.

Perform the following steps to avoid this problem:

Add IMA ports to the IMA group or delete IMA ports from the IMA group dynamically while the group is in operational state without taking the interface out of service or without disconnecting the fiber cable.

19. After the IMA groups are configured in Near End and Far End , the ICP cells are exchanged between the IMA links. If one of the links in the IMA group does not receive the ICP cell from Far End, then the LIF is declared as Ne Rx defect. If these IMA links are deleted and added back to the IMA group when the ports are in LIF failure state, then the link status is displayed as NIG. Sometimes, these links cannot be added back to the IMA group.

    As a workaround, perform any one of the following:

    • Delete the IMA group and configure it again.

    • Reboot the module.

    To avoid this problem, do not attempt to remove the IMA link from the group through the PSAX console and add it again when a Loss of IMA frame (LIF) defect is detected at the IMA link.

20. Refer to the section “DS1 and E1 IMA Modules” for more information on the IMA functionality. With the exception of the module-specific data in 8, 17, 18, 19 and 22, all of these notes also apply to the 1-Port Channelized OC-3/STM-1 Unstructured CES/ATM module.

7.18 1-Port Unchannelized DS3 Frame Relay Module

1. Traffic destined for the module from the backplane should be engineered such that the total sustained data rate does not exceed 150% of the line rate.

7.19 1-Port DS3 IMA Module

1. The module currently only supports **Esf** and **B8zs**, but the configuration screens for the module provide options for **D4**, **Esf**, and **B8zs**. A user can change the parameter but when the change is applied, the values revert to the default of **Esf**, **B8zs**. A trap will NOT be generated when the system rejects any attempt to set the **D4** value.
2. D4 Framing is almost exclusively used with AMI line coding. AMI line coding requires a certain ones density in the data stream. Without that density, the receiver signals loss of frame. Although general ATM traffic usually has the necessary ones density for AMI, it is not guaranteed, making AMI an inappropriate choice for ATM. Unfortunately with IMA, the IMA filler cells (null cell equivalent) and control cells use a VP/VC of 0/0, which violates the AMI ones density requirement. So AMI line coding will not work with IMA. For this significant reason, unless a cus-

tomer specifies a need to use D4 framing with B8ZS line coding (as opposed to the far more common ESF with B8ZS), support for D4 with B8ZS is not a planned option.

3. Refer to "DS1 and E1 IMA Modules" on page 57 for more information on IMA functionality. With the exception of module-specific data in 8, 17, 18, and 19, all of these notes also apply to the 1-Port DS3 IMA module.

7.20 2-Port DS3 ATM Module

1. Rebooting the 2-Port DS3 ATM module in a PSAX 1250 system may cause a short burst of cell loss on other I/O modules.

7.21 3-Port DS3/E3 ATM Modules

1. On the 3-Port DS3/D3 ATM module and the 3-Port DS3/E3 ATM Protection module, when you upgrade the system software or reboot the chassis and then access the Firmware Version Control window, the PSAX system (console interface or EMS-PSAX) might cease to respond. To avoid this situation, do not access this window until all 3-Port DS3/E3 ATM modules in the PSAX system have all been upgraded with the firmware download. This process requires approximately 3 minutes.

2. High capacity cards wrap faster than low rate cards. OC-3 has a capacity of 353, 207 cells/s, whereas E3 has a capacity of 80,000 cells/s. For a fixed size, OC-3 takes less time to wrap than E3. This is because the PCR and CDVT for the two cards are the same, but their bandwidth is different.

3. When UPC and PNNI configured on endpoints are used, policing of the peak cell rate happens late on the VBR SPVC. The hardware and firmware of the 3-Port DS3/E3 ATM module require a correction factor to be applied when the PCR is calculated. This correction factor causes the difference.

7.22 3-Port Channelized DS3/STS-1e CES Module

1. Each port is capable of supporting 28 channelized DS1 interfaces for circuit emulation services.

   Note: This module provides HDLC controllers to support integrated services digital network with primary rate interface service (PRI ISDN) with 64 Kbps clear channel capability for the D-channel.

Each DS3 port on the module supports up to 64 of these channels. This is consistent with the requirement for transporting and terminating D-channels on PRI links.

2. When interfacing with any DS3 module, cable connections shorter than 50 feet may require a 1dbm attenuation. This is seen with some Lucent DACS equipment.

7.23 Channelized DS3 Modules

1. When provisioning a loop on Channelized DS3 modules (23N03, 23N60, 23N61, 45N03) with the OAM connection selection set to "on", the module will send out an AIS/RDI signal. If this module is placed in a loop to perform physical layer testing, the test pattern will not be seen due to receiving an AIS/RDI signal. Delete the OAM connection(s) and re-add the connection(s) to resume physical layer testing.

2. Invoking a loopback causes the operational status to be displayed as Out Of Service. However, the operational status is in service and the LoopBackState is never reported.

7.24 1-Port Channelized STS-1e, T1 Format Module

1. Due to the frame sizes and hardware design of the following modules, FR-to-ATM statistics are inaccurate.

23N66	21-Port High-Density E1 Multiservice
23N64	12-Port Medium-Density DS1 Multiservice
23N60	1-Port Channelized DS3 Multiservice
23N62	1-Port Channelized STS-1e, T1 Format
23N07	Quadserial

2. The ATM Forum standards (af-vmoa-145.001) specifies the valid CID range of 16 to 223. However, in Release 10.0.3, you can specify CID values from 0 to 225. Ensure that the CID values that you specify while

configuring the GR-303 to AAL2 PVC connections in the connection table are in the 16 to 223 range. Invalid CID values will make the system unstable.

7.25 Tones and Announcements Server Module

1. The Type 102, Type 105, and Type 108 test calls are defined for a responder, a director and a Remote Office Test Line (ROTL). The PSAX only behaves as the ROTL as it makes more logical sense for the 5ESS Voice Switch or PBX to be the responder (initiator of the test). The initiator of the Type 102 test actually sends an inband MF tone to stimulate the PSAX to generate the tone. This is not mentioned in GR-822-CORE, but is given in the Compatibility Bulletin 106 "*Guidelines relative to interface provisions and configurations to insure compatibility between Bell System Centralized Automatic Reporting on Trunks (CAROT) System including associated Remote Office Test Lines (ROTLs) and responders and similar systems used by Independent Telephone Companies*".

2. The TONE_ANNCE_REQ Connection Gateway API message can be used to stimulate the PSAX system to generate certain tones (including 1004 Hz), but this message was defined in conjunction with CAS signaling and is not part of the test calls specification.

3. The TAS Module System-wide Configuration menu displays **Memory Action** as a selectable menu option. However, this option and its associated table, TAS Memory Action Configuration, are not supported in Release 10.0.9.

4. On the Initiate the Announcement File Compression window of the TAS Module System-wide Configuration menu, the following field values in the File Type field are currently not supported: **ToneVoice**, **UserTones**, **Music**, **MusicVoice**, and **ToneMusic**.

7.26 Quadserial Module

1. The optional FRF.5 feature that provides many-to-one multiple FR logical connections multiplexed into a single ATM Virtual Channel Connection (VCC) is not supported. All FRF.5 connections map a single DLCI into a single PVC. This methodology is implemented on all Frame Relay interfaces.

2. Due to the frame sizes and hardware design of the following modules, FR-to-ATM statistics are inaccurate.

23N66 21-Port High-Density E1 Multiservice

23N64 12-Port Medium-Density DS1 Multiservice

23N60 1-Port Channelized DS3 Multiservice

23N62 1-Port Channelized STS-1e, T1 Format

23N07 Quadserial

3. Line loopback is not supported on the Quadserial module.

4. Invoking a loopback causes the operational status to be displayed as Out Of Service. However, the operational status is in service and the Loop-BackState is never reported.

5. The Quadserial module supports Terminal Emulation async mode at 75 and 150 bps. The module only supports Circuit Emulation sync mode at bit rates greater than or equal to 300 bps.

7.27 Enhanced Router Module

1. The Enhanced Router Radius Server Statistics and Enhanced Router RADIUS Server Configuration windows are accessible, but are not supported in Release 10.0.9.
2. The CHAP and PAP field values are accessible from the Enhanced Router PPP Status and Enhanced Router PPP Configuration windows, but are not supported in Release 10.0.9.
3. The OSPF field is accessible, but is not supported in Release 10.0.9.

4. PPP configuration parameters are accessible from each of the Enhanced Router Connection Configuration windows (ATM, Bridge, FR, HDLC, and IBM); however, in Release 10.0.9, PPP is supported only on the Enhanced Router HDLC Connection Configuration window.

5. To prevent stability problems with both the Enhanced Router module and the CPU*n* module, do not continuously or excessively display the ERM Route, RIP, or ARP tables when there is a maximum configuration on all configurable VPN parameters. Also, do not continuously or excessively display the ERM Route, RIP, or ARP tables when there are many flows of traffic causing the ARP entries to be flushed and reestablished. Last, do not continuously or excessively display the ERM Route, RIP, or ARP table when RIP is running with more than 200 routes.

6. The Enhanced Router IP Route Table only displays one entry for multiple routes configured with the same destination. The displayed route may not be the most specific route, however, it is the first route created.

7. The Cisco HDLC interface/network are not properly defined in the route table. No entries are available for Cisco HDLC and the Rt-Proto=LOCAL is an incorrect status.

8. When upgrading from System Software Release 8.1.5 to Release 9.0.*n* the ERM cannot be deleted from the Equipment Configuration. As a work around, all of the VPN configurations from the Enhanced Router VPN Configuration window must be deleted before upgrading to Release 9.0.*n*.

9. The following operational considerations for the Enhanced Router module exist:

   - For PPP over HDLC:
     - ~ PPP keepalive is sent from the Enhanced Router module to a remote endpoint every 3 minutes.
     - ~ Does not negotiate down the maximum received unit (MRU) size.
     - ~ Does not support any type of compression.
     - ~ Does not support local username/password capabilities.
     - ~ Does not support 2-way authentication.
     - ~ Does not support configuring specific length of challenge for CHAP.
   - CiscoHDLC: Does not support keepalives.

     Note: When provisioning an HDLC connection on Cisco, ensure that the keepalive-interval equals zero.
   - For Inverse Address Resolution Protocol:
     - ~ Only responds to Inverse ARP requests.
     - ~ Does not generate Inverse ARP requests.
   - For the Authentication feature:
     - ~ Does not support Internal Authentication.
     - ~ Does not support sending accounting messages to the RADIUS Server.
   - For Access Control Lists/Filtering:
     - ~ Does not support range function for the source/destination IP address.
     - ~ Does not support a user-defined range function for the source/destination port.
     - ~ Does not support the Internet Control Message Protocol (ICMP).
   - For DHCP:
     - ~ The DHCP RelayAgent Supp field must be enabled on both the interface receiving the DHCP broadcast (from the PC) and the interface used to send the DHCP Request (the WAN side).
     - ~ The Primary/Secondary DHCP Server functionality is not truly primary/secondary. If both entries are provisioned, DHCP discovery packets are unicast to both servers at the same time.

10. Interdependencies exist between the number of interfaces and the number of routes this module can support. The number of entries in the route table depends on the number of routes learned via each RIP enabled interface. Cisco HDLC and PPP over HDLC interfaces allow two route table entries per interface provisioned. Performance degradation in a route table display may occur when the number of entries exceeds 500; therefore, the number of routes learned per configured interface must be taken into consideration.

11. When subchannel connections associated with an Enhanced Router module are deleted from the I/O module equipment window, administrative changes must be made in the corresponding ERM interface window. This condition is present only when CoS is enabled on the affected Subchannels and Interfaces. To correct the situation, the affected ERM Interface must be taken administratively out of service.

12. Static routes cannot be created if the corresponding next-hop interface is administratively or operationally out of service. To create a static route, the corresponding next-hop interface must be operationally in service.

13. The following RIP Automated Network Validation Library (ANVL) minor non conformities exist:

    - A non valid RIP packet sent with the version and unused bits set to 0xFF is accepted by the ERM module. However, this packet should not be accepted.
    - A non valid RIP packet sent with the version set to 0xFF is accepted by the ERM module. However, this packet should not be accepted.
    - Host routes are not accepted by the ERM module.
    - The default route is not sent in RIP updates on a particular interface if that interface is the next-hop of the route.
    - When the ERM module is configured to accept and receive ripV2 only, broadcast/multicast packets are sent out as a response to a valid RIP V2 request instead of a unicast response.
    - RIP authentication should be valid for RIP V2 only. The console correctly blocks setting the authentication parameters if the version is not V2. However, the same is not performed during direct SNMP configuration. SNMP configuration of the authentication mode or password should be rejected if the configured RIP version for that interface is not RIP V2.
    - The RIP route expiration timer is consistently inaccurate by more than the allowed 2 seconds. It expires at 186 seconds instead of 180.

14. Numerous iterations of configuring then unconfiguring ERM interface and static route parameters can cause a persistent failure condition. Should a failure condition occur the module must be rebooted. To avoid this situation, first develop a detailed network map and perform the

configuration operations in a structured (as opposed to ad-hoc) fashion. Avoid saving the ERM configuration database until a proper configuration is established.

15. The interaction between LOS/LOF/OAM and the ERM can become inaccurate under extreme circumstances. This would include deliberate toggling of line status while signaling protocols are not yet stabilized. Actions similar to this can lead to race conditions that will show improper status requiring varying degrees of reconfiguration to correct. Saving the ERM configuration database while the system is in a state of flux should be avoided.

16. When using *Navis* EMS-PSAX bulk operations to change administrative status of ERM interfaces, bringing multiple VPN interfaces in and out of service fails to change the admin status of all the interfaces in the PDU. Usually, only the first interface in the PDU changes its admin status, the other interfaces remain unchanged. Repeated attempts will produce the desired result.

17. Only the Enhanced Router Module should be used for in-band management applications, especially when using Navis EMS-PSAX. The Route Server module cannot fragment large packets going from the in-band management network to an Ethernet Network Management System. With *Navis* EMS-PSAX 9.0 and later, this creates a problem when opening a device as the packets sent from the switch to the NMS can be as large as 2,100 bytes.

18. The limit for the DHCP relay is 200 interfaces. If more than 200 interfaces are configured, after rebooting the ERM the DHCP relay does not work in any of the interfaces.

19. When a VPN is configured by specifying the parameters and applying the configuration the VPN is not actually created on the ERM module. The VPN is created on the ERM only after the VPN is brought into service. PPP and DHCP can only be created on the first VPN created. Attempting to take a VPN out of service that has never been brought into service causes the ERM module to reboot and PPP and DHCP protocols cannot be enabled on the module. Then when the VPN is brought into service the ERM remains in a bad state. To avoid this situation, do not take the first VPN that is created out of service.

20. The ERM module continually reboots if the first VPN created is not VPN 1. The first VPN created should begin with VPN 1. All other VPNs should be numbered sequentially. PPP and DHCP is only supported on the first VPN created.

21. During load testing using automated SNMP scripts it was noted that a route table with 2,560 entries required approximately 10 seconds to initially load. Approximately 15 seconds was required for the Find command to locate IP addresses in the route table. The Find command is recommended over PgDn/Up to locate routes in the route table when the total number of entries is greater than 500. The PgDn /PgUp command

can take a long period of time with a large number of entries in the table. The route table window can hang for a few minutes and comes up with 0 entries during Pg/Dn or PgUp of the route table. If this occurs, the user needs to go up to the VPN window and come back to the route table for the window to display the correct number of entries in the route table again.

22. The MI driver has been fully tested within a Lucent laboratory environment. As the Lucent test lab cannot replicate all customer networks it is recommended that specific customer testing be conducted prior to deployment.

7.28 PSAX System

1. The PSAX 1000 system is available with AC or DC power supply modules. The PSAX 1250 system is available with AC (for 19 in. chassis) or DC (for 19 in. and 23 in. chassis) power supply modules, while the PSAX 4500 and PSAX 2300 systems are available with DC only power supply modules. These modules provide power to the PSAX systems as follows:

Table 10. Power Provided to PSAX Systems (in Watts)

PSAX Power Supply	Power
PSAX 1250 110 V AC	200 watts
PSAX 1250 220 V AC	200 watts
PSAX 1250 -48 V DC	360 watts
PSAX 2300 -48 V DC	400 watts
PSAX 4500 -48 V DC	400 watts
PSAX 1000 24 V DC	225 watts
PSAX 1000 -48 V DC	225 watts
PSAX 1000 110/220 V AC	225 watts

The maximum input power and maximum output power values for the PSAX 1000 Stratum 3–4/Power Supply modules have been recalculated to reflect useful values for the installed I/O and server modules as follows:

PSAX 1000 Stratum 3–4/Power Supply Module Power Requirements

- -48 V DC Power Supply power requirements
  - ~ Input voltage range: -42.5 to -56.5 V DC
  - ~ Rated input current: 5.0 A maximum per module
  - ~ Maximum input power: 181 W (618 BTU/hr) maximum per chassis
  - ~ Maximum output power: 135 W (461 BTU/hr)
- 24 V DC Power Supply power requirements

- ~ Input voltage range: 20–30 V DC (nonredundant) and 18–30 V DC (redundant)
- ~ Rated input current: 10 A maximum per module
- ~ Maximum input power: 213 W (727 BTU/hr) maximum per chassis
- ~ Maximum output power: 160 W (546 BTU/hr)

- 110/220 V AC Power Supply power requirements
  - ~ Input voltage range: 100–127 or 200–240 V AC (autosensing)
  - ~ Rated input current: 2.5 A (100–127 V AC) or 1.5 A (200–240 V AC) maximum per module
  - ~ Maximum input power: 245 W (836 BTU/hr) maximum per chassis
  - ~ Maximum output power: 186 W (635 BTU/hr)
  - ~ Input frequency: 50 or 60 Hz

PSAX 2300 and PSAX 4500 -48 V dc Power Supply Module Power Requirements

- ~ Voltage range: -42.5 to -56.5 V DC
- ~ Rated current: 12.5 A maximum per module
- ~ Maximum input power: 470 W (1605 BTU/hr) maximum per chassis
- ~ Maximum output power: 400 W (1366 BTU/hr)

PSAX 1250 Power Supply Module Power Requirements

- PSAX 1250 -48 V dc Power Supply module
  - ~ Voltage range: -42.5 to -56.5 V DC
  - ~ Rated current: 7.0 A maximum per module for the 19 in. chassis and 9.0 A maximum per module for the 23 in. chassis
  - ~ Maximum input power: 470 W (1605 BTU/hr) maximum per 19-in. or 23-in. chassis
  - ~ Maximum output power: 400 W (1366 BTU/hr)
- PSAX 1250 110 V ac Power Supply module
  - ~ Voltage range: 100 to 125 V AC at 50 to 60 Hz
  - ~ Rated current: 5 A maximum per module
  - ~ Maximum input power: 300 W (1024 BTU/hr) maximum per chassis
  - ~ Maximum output power: 250 W (854 BTU/hr)
- PSAX 1250 220 V ac Power Supply module
  - ~ Voltage range: 200 to 250 V AC at 50 to 60 Hz
  - ~ Rated current: 2.5 A maximum per module
  - ~ Maximum input power: 300 W (1024 BTU/hr) maximum per chassis
  - ~ Maximum output power: 250 W (854 BTU/hr)

2. To maintain full redundancy, power consumption calculations should be made with only one active power supply module per system. The following table indicates maximum power consumption/heat dissipation values for current modules.

Table 11 provides the chassis speed, power consumption, and memory allocation specifications for the PSAX modules.

Table 11. Performance and Power Specifications for the PSAX Modules

Module*	Total Amount of SDRAM	Module Program and Data Space	Maximum Input Buffer†	Output Buffer‡	Chassis Speed§	Maximum Power Consumption
DS1/T1 Interface Modules						
20N33 6-Port DS1 IMA (**IMA DS1**)	16 MB	8 MB	1 MB	7 MB (114,688)	Low Speed	18 W
20N36 6-Port Enhanced DS1/T1 Multiservice (**DS1/T1 ENH**)	16 MB	8 MB	1 MB	7 MB (114,688)	Low Speed	18 W
23N64 12-Port Medium-Density DS1 Multiservice (**MD DS1**)	24 MB	7 MB	4 MB	13 MB (212,992)	Low Speed	14.5 W
24N64 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
23N33 12-Port Medium-Density DS1 IMA (**MD DS1 IMA**)	24 MB	7 MB	4 MB	13 MB (212,992)	Low Speed	14.5 W
23N35 24-Port High-Density DS1 Multiservice (**HD DS1**)	24 MB	7 MB	4 MB	13 MB (212,992)	Low Speed	20.5 W
23N69 8-Port HDSL-2 (**HDSL2 MS**)	24 MB	7 MB	4 MB	13 MB (212,992)	Low Speed	20.5 W
E1 Interface Modules						
20N34 6-Port E1 IMA (**IMA E1**)	16 MB	8 MB	1 MB	7 MB (114,688)	Low Speed	18 W
20N56 6-Port Enhanced E1 Multiservice (**E1 ENH**)	16 MB	8 MB	1 MB	7 MB (114,688)	Low Speed	18 W
23N66 21-Port High-Density E1 Multiservice (**HD E1**)	24 MB	7 MB	4 MB	13 MB (212,992)	Low Speed	14.5 W
23N34 21-Port High-Density E1 IMA (**HD E1 IMA**)	24 MB	7 MB	4 MB	13 MB (212,992)	Low Speed	14.5 W
DS3, E3, and STS-1e Interface Modules						
23N60 1-Port Channelized DS3 Multiservice (**CH DS3**)	24 MB	7 MB	4 MB	13 MB (212,992)	Low Speed	13 W

Table 11. Performance and Power Specifications for the PSAX Modules (Continued)

Module*	Total Amount of SDRAM	Module Program and Data Space	Maximum Input Buffer†	Output Buffer‡	Chassis Speed§	Maximum Power Consumption
23N68 1-Port DS3 IMA (**DS3 IMA**)	24 MB	7 MB	4 MB	13 MB (212,992)	Low Speed	13 W
20N03 1-Port Unchannelized DS3 Frame Relay (**DS3 FR**)	8 MB	4 MB	1 MB	4 MB (65,536)	Low Speed	13 W
20N02 2-Port DS3 ATM (**DS3 ATM**)	8 MB	3 MB	1 MB	4 MB (65,536)	Low Speed	15 W
20N22 2-Port E3 ATM (**E3 ATM**)	8 MB	3 MB	1 MB	4 MB (65,536)	Low Speed	15 W
23N03 3-Port Channelized DS3/STS-1e CES (**CH DS3/STS-1E**)	8 MB	8 MB	2 cells/ port	16 cells/ port	High Speed	17 W
45N03 3-Port Channelized DS3/STS-1e CES Protection (**CH DS3/STS-1E**)	8 MB	8 MB	2 cells/ port	16 cells/ port	High Speed	17 W
45N63 3-Port Channelized DS3/STS-1e Multiservice Protection (**CH DS3/STS1 PROT**)	64 MB	32 MB	16 MB	16 MB (262,144)	High Speed	15 W
23N74 3-Port DS3/E3 ATM (**DS3/E3 ATM**)	72 MB	8 MB	32 MB	32 MB (524,288)	High Speed	12 W
45N74 3-Port DS3/E3 ATM Protection (**DS3/E3 ATM**)	72 MB	8 MB	32 MB	32 MB (524,288)	High Speed	12 W
23N02 3-Port Unstructured DS3/E3 CES (**UNSTR DS3/E3 CES**)	N/A	8 MB	2 cells/ port	16 cells/ port	High Speed	7 W
45N02 3-Port Unstructured DS3/E3 CES Protection (**UNSTR DS3/E3 CES**)	N/A	8 MB	2 cells/ port	16 cells/ port	High Speed	7 W
23N62 1-Port Channelized STS-1e, T1 Format (**CH STS-1E T1**)	24 MB	7 MB	4 MB	13 MB (212,992)	Low Speed	13 W

Table 11. Performance and Power Specifications for the PSAX Modules (Continued)

Module*	Total Amount of SDRAM	Module Program and Data Space	Maximum Input Buffer†	Output Buffer‡	Chassis Speed§	Maximum Power Consumption
Fiber-Optic Interface Modules						
23N75 1-Port Channelized OC-3/STM-1 Unstructured CES/ATM Multimode (**CH OC-3/STM-1 UNSTR/ATM MM**)	8 MB	8 MB	64 MB	64 MB (1,048,576)	High Speed	10 W
23N76 1-Port Channelized OC-3/STM-1 Unstructured CES/ATM Single-Mode (**CH OC-3/STM-1 UNSTR/ATM SM**)	8 MB	8 MB	64 MB	64 MB (1,048,576)	High Speed	10 W
23N12 1-Port Channelized OC-3/STM-1 CES Multimode (**CH OC-3/STM-1 CES MM**)	8 MB	8 MB	2 cells/ port	16 cells/ port	High Speed	17 W
23N13 1-Port Channelized OC-3/STM-1 CES Single-mode (**CH OC-3/STM-1 CES SM**)	8 MB	8 MB	2 cells/ port	16 cells/ port	High Speed	17 W
20N72 1-Port OC-3c 1+1 APS Multimode (**OC-3C MM APS**)	32 MB	8 MB	12 MB	12 MB (196,608)	Low Speed	11.5 W
20N73 1-Port OC-3c 1+1 APS Single-Mode (**OC-3C SM APS**)	32 MB	8 MB	12 MB	12 MB (196,608)	Low Speed	11.5 W
24N74 2-Port OC-3c/STM-1 Enhanced ATM Multimode (**OC-3C/STM-1 MM ENH ATM**)	72 MB	8 MB	32 MB	32MB (524,288)	High Speed	12 W
24N75 2-Port OC-3c/STM-1 Enhanced ATM Single-Mode (**OC-3C/STM-1 SM ENH ATM**)	72 MB	8 MB	32 MB	32MB (524,288)	High Speed	12 W

Table 11. Performance and Power Specifications for the PSAX Modules (Continued)

Module*	Total Amount of SDRAM	Module Program and Data Space	Maximum Input Buffer†	Output Buffer‡	Chassis Speed§	Maximum Power Consumption
24N70 2-Port OC-3c/STM-1 ATM Multimode (**OC-3C/STM-1 MM ATM**)	72 MB	8 MB	32 MB	32MB (524,288)	High Speed	12 W
24N71 2-Port OC-3c/STM-1 ATM Single-Mode (**OC-3C/STM-1 SM ATM**)	72 MB	8 MB	32 MB	32MB (524,288)	High Speed	12 W
24N72 4-Port OC-3c/STM-1 Multimode (**OC-3C/STM-1 MM**)	72 MB	8 MB	32 MB	32MB (524,288)	High Speed	18 W
24N73 4-Port OC-3c/STM-1 Single-Mode (**OC-3C/STM-1 SM**)	72 MB	8 MB	32 MB	32MB (524,288)	High Speed	18 W
20N92 1-Port STM-1 1+1 MSP Multimode (**STM-1 MM MSP**)	32 MB	8 MB	12 MB	12 MB (196,608)	Low Speed	11.5 W
20N93 1-Port STM-1 1+1 MSP Single-Mode (**STM-1 SM MSP**)	32 MB	8 MB	12 MB	12 MB (196,608)	Low Speed	11.5 W
23N72 1-Port OC-12c/STM-4c Multimode (**OC-12C/STM-4C MM**)	72 MB	8 MB (SDRAM) 1 MB (SRAM)	32 MB	32 MB (524,288)	High Speed	13 W
23N73 1-Port OC-12c/STM-4c Single-Mode (**OC-12C/STM-4C SM**)	72 MB	8 MB (SDRAM) 1 MB (SRAM)	32 MB	32 MB (524,288)	High Speed	13 W
Voice 2-Wire Interface Modules						
20N32 4-Port Voice 2-Wire Office (**VOICE 2WO**)	8 MB	4 MB	N/A	N/A	Low Speed	14 W
20N30 8-Port Voice 2-Wire Station (**VOICE 2WS**)	8 MB	4 MB	N/A	N/A	Low Speed	15 W

Table 11. Performance and Power Specifications for the PSAX Modules (Continued)

Module*	Total Amount of SDRAM	Module Program and Data Space	Maximum Input Buffer†	Output Buffer‡	Chassis Speed§	Maximum Power Consumption
Serial Interface Modules						
23N07 Quadserial (**QUAD SERIAL**)	24 MB	7 MB	4 MB	13 MB (212,992)	Low Speed	15 W
20N07 6-Port Multiserial (**SERIAL**)	8 MB	3 MB	1 MB	4 MB (65,536)	Low Speed	15 W
Ethernet Interface Modules						
23N40 4-Port Ethernet (**ENET**)	32 MB¶	8 MB	24 MB**	N/A	High Speed	13 W
20N40 Ethernet (**ENET**)	64 MB	8 MB	4 MB	4 MB (65,536)	Low Speed	16 W
DSP2 Voice Servers						
23N29 DSP2D Voice Server (**DSP2D**)	2 MB (SRAM)	2 MB	N/A	N/A	High Speed	15 W
23N26 DSP2E Voice Server (**DSP2E**)	2 MB (SRAM)	2 MB	N/A	N/A	High Speed	13 W
23N25 DSP2F Voice Server (**DSP2F**)	2 MB (SRAM)	2 MB	N/A	N/A	High Speed	13 W
23N24 DSP2G Voice Server (**DSP2G**)	2 MB (SRAM)	2 MB	N/A	N/A	High Speed	15 W
Other Server Modules						
23N41 Enhanced Router (**ROUTER**)	512 MB††	490 MB	N/A	N/A	High Speed	18 W
20N41 Route Server (**ROUTE SERVER**)	64 MB	8 MB	N/A	N/A	Low Speed	15 W
23N28 Tones and Announcements Server (**TAS**)	1 MB (SRAM)	512 KB (SRAM)	N/A	N/A	Low Speed	17 W
Alarm Modules						
45N79 PSAX 4500 Alarm (**ALARM**)	N/A	N/A	N/A	N/A	N/A	3 W
10N14 PSAX 1000 Fan/Alarm (**FAN/ALARM**)	N/A	N/A	N/A	N/A	N/A	14 W
20N79 Alarm (**ALARM**)	N/A	N/A	N/A	N/A	N/A	3 W
Stratum 3–4 Module						
20N05 PSAX 1250 Stratum 3–4 (**STRATUM 3–4**)	N/A	N/A	N/A	N/A	N/A	6 W

Table 11. Performance and Power Specifications for the PSAX Modules (Continued)

Module*	Total Amount of SDRAM	Module Program and Data Space	Maximum Input Buffer†	Output Buffer‡	Chassis Speed§	Maximum Power Consumption
23N05 PSAX 2300 Stratum 3–4 (**STRATUM 3–4**)	N/A	N/A	N/A	N/A	N/A	6 W
45N05 PSAX 4500 Stratum 3–4 (**STRATUM 3–4**)	N/A	N/A	N/A	N/A	N/A	6 W
CPU Modules						
10N20 CPU3 (**CPU3**)	256 MB	N/A	N/A	N/A	N/A	16 W
23N20 CPU4 (**CPU4**)	512 MB	N/A	N/A	N/A	N/A	15 W

* The 6-Port Multiserial module can be installed in slots 1, 2, and 14 only of the PSAX 4500 chassis, and only in slot 1 of the PSAX 1000 chassis. On modules with PEC NS20N071DB and prior, port 5 of the module is not operational in the PSAX 1000.

† On all PSAX I/O modules, except the 4-Port Voice 2-Wire Office and the 8-Port Voice 2-Wire Station modules, the I/O buffers carry 16,384 cells per megabyte. The PSAX server modules carry no cells on the I/O buffers. Any module with 24 MB SDRAM can buffer only 16,384 packets, or approximately 682 packets per megabyte. Traffic on the 4-Port Ethernet module is buffered packet by packet, not cell by cell.

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

§ This column relates only to the speed at which the module communicates within the chassis. A high-speed module will communicate at high speed (1.2 Gbps) in a chassis that has a high-speed bus (PSAX 4500 chassis). High-speed modules will communicate at 600 Mbps in any other chassis. Low-speed modules will always communicate at 600 Mbps in any chassis.

¶ The total SDRAM for this module includes 2 MB of SRAM.

** The value 24 MB refers to the maximum data buffer (input and output buffers combined).

†† The SDRAM listed only takes into account the memory associated with the upper layer processor. It does not take into account the fastpath processor (firmware) or the hardware reassembly buffers.

3. When inserting or removing an I/O module from the PSAX chassis, ensure that the module is not receiving any traffic from the user interface by removing the physical connection on the faceplate before inserting or removing the module.

4. The 6-Port Multiserial and the 2-Port High Speed modules do not support the OAM feature when their ports are configured for ATM. This feature is viewed as a WAN connection enhancement; therefore, it is not implemented on these modules.

5. The 23-inch PSAX 1250 chassis requires the PSAX 1250 Stratum module, PEC NS20N053DC or subsequent, when any of the following PSAX modules are installed:

   23N02 3-Port Unstructured DS3/E3 CES

   23N03 3-Port Channelized DS3/STS-1e CES

   23N12 1-Port Channelized OC-3/STM-1 CES Multimode

23N13	1-Port Channelized OC-3/STM-1 CES Single-mode
23N24	DSP2G Voice Server
23N25	DSP2F Voice Server
23N26	DSP2E Voice Server
23N29	DSP2D Voice Server
23N40	4-Port Ethernet
23N72	1-Port OC-12c/STM-4c Multimode
23N73	1-Port OC-12c/STM-4c Single-Mode
23N74	3-Port DS3/E3 ATM
23N75	1-Port Channelized OC-3/STM-1 Unstructured CES/ATM Multimode
23N76	1-Port Channelized OC-3/STM-1 Unstructured CES/ATM Single-Mode
24N64	12-Port Medium-Density DS1/E1/DS0A CES
24N70	2-Port OC-3c/STM-1 ATM Multimode
24N71	2-Port OC-3c/STM-1 ATM Single-Mode
24N72	4-Port OC-3c/STM-1 Multimode
24N73	4-Port OC-3c/STM-1 Single-Mode
23N41	Enhanced Router

6. When changing configuration parameters for the user options and SNMP Agent system-wide configurations listed below, save the configuration by using the **Save Configuration** command on the Console Interface Main Menu window after applying the new configuration. If these configuration parameters are saved using an SNMP manager, the changes will not be saved. The **Save Configuration** command on the Console Interface Main Menu window displays **[Modified]**, indicating that a save is necessary.

   - Alternate Navigation Keys (Up, Down, Left, and Right)
   - Bell (Enabled/Disabled)
   - Trap Display (Enabled/Disabled)
   - Timeout Length
   - SNMPv3 password
   - Community String Configuration
   - System passwords

7. PSAX systems expect to receive a four octet numerical value (not a character string) from RADIUS servers for the PSAX-security-level attribute. Some RADIUS servers, like the ACE/Server, enforce the attribute to be a numerical value by putting a pound sign (#) in front of the attribute

value. Other RADIUS servers may enforce the attribute to be a numerical value in different ways, consult with the relevant RADIUS server documentation for specific details.

7.29 PSAX System Software Upgrade

1. When the XModem/YModem method is used to transfer PSAX system software upgrade files to the CPU*n* module, the Upgrade Software Version command does not display the new software version that was just downloaded. However, the new software files are now resident on the system disk of the CPU*n* module. Even though the Upgrade Software Version command does not display the version, you can select this command and proceed with the system upgrade.

   Transferring the software upgrade files to your PSAX system using XModem/YModem takes approximately 24 hours. For this reason, it is recommended that you transfer these files via FTP using the SRD Download Configuration window. Transferring the software upgrade files via FTP takes only 5 to 10 minutes.

2. If non printable characters such as del or ctrlx are included in the user password, it will not be possible to login after a system software upgrade. Prior to upgrading to System Software Release 9.0.0, it is recommended that all user passwords be changed to printable characters (see Table 1-1 for a list of valid ASCII characters). User passwords that contain only printable characters will not cause problems when performing a system software upgrade.

Table 12. ASCII Characters Permitted for Use in Passwords

Dec	Char	Description	Dec	Char	Description
32		space *	80	P	Uppercase P
33	!	Exclamation mark	81	Q	Uppercase Q
34	"	Quotation mark	82	R	Uppercase R
35	#	Cross hatch (number sign)	83	S	Uppercase S
36	$	Dollar sign	84	T	Uppercase T
37	%	Percent sign	85	U	Uppercase U
38	&	Ampersand	86	V	Uppercase V
39	‘	Closing single quote (apostrophe)	87	W	Uppercase W
40	(	Opening parentheses	88	X	Uppercase X
41	)	Closing parentheses	89	Y	Uppercase Y
42	*	Asterisk (star, multiply)	90	Z	Uppercase Z
43	+	Plus	91	[	Opening square bracket
44	,	Comma	92	\	Backslash
45	-	Hyphen, dash, minus	93	]	Closing square bracket
46	.	Period	94	^	Caret (Circumflex)

Table 12. ASCII Characters Permitted for Use in Passwords (Continued)

Dec	Char	Description	Dec	Char	Description
47	/	Slant (forward slash, divide)	95	_	Underscore
48	0	Zero	96	‘	Opening single quote
49	1	One	97	a	Lowercase a
50	2	Two	98	b	Lowercase b
51	3	Three	99	c	Lowercase c
52	4	Four	100	d	Lowercase d
53	5	Five	101	e	Lowercase e
54	6	Six	102	f	Lowercase f
55	7	Seven	103	g	Lowercase g
56	8	Eight	104	h	Lowercase h
57	9	Nine	105	i	Lowercase i
58	:	Colon	106	j	Lowercase j
59	;	Semicolon	107	k	Lowercase k
60	<	Less than sign	108	l	Lowercase l
61	=	Equals sign	109	m	Lowercase m
62	>	Greater than sign	110	n	Lowercase n
63	?	Question mark	111	o	Lowercase o
64	@	At-sign	112	p	Lowercase p
65	A	Uppercase A	113	q	Lowercase q
66	B	Uppercase B	114	r	Lowercase r
67	C	Uppercase C	115	s	Lowercase s
68	D	Uppercase D	116	t	Lowercase t
69	E	Uppercase E	117	u	Lowercase u
70	F	Uppercase F	118	v	Lowercase v
71	G	Uppercase G	119	w	Lowercase w
72	H	Uppercase H	120	x	Lowercase x
73	I	Uppercase I	121	y	Lowercase y
74	J	Uppercase J	122	z	Lowercase z
75	K	Uppercase K	123	{	Opening curly brace
76	L	Uppercase L	124	|	Vertical line
77	M	Uppercase M	125	}	Closing curly brace
78	N	Uppercase N	126	~	Tilde (approximate)
79	O	Uppercase O			

* The space character is valid only for PSAX passwords for the “root”, “readwrite”, and “readonly” users. The space character cannot be used in SNMP community strings, or in SNMP authentication or privacy passwords.

3. Ensure that your network has adequate bandwidth to support the FTP process in a timely manner. A minimum of 256K is recommended to allow the FTP process to complete successfully. By default, the FTP process will timeout if the files are not received within 4 minutes. A new link timeout variable has been added to the download configuration window with Release 10.0.0. This variable allows the FTP timeout value to be changed via the console.

4. The following issues apply to upgrades to Release 10.0.9:

   - If the traffic is not passing through the ATM-ATM PVC connections over the 1-Port Channelized OC-3/STM-1 Unstructured CES/ATM module after a software upgrade, reboot the working module, wait for two minutes and then reboot the protection module.
   - If the Enhanced Router Module is in the chassis, delete and re-create the VPNs on the ERM as the database is corrupted by a previous release.
   - After performing the two procedures noted above, save the configuration. Check whether the standby CPU reboots and loads the new configuration. Wait until the "Fully Sync" trap message is received on the chassis.
   - Finally, check whether all the links and circuits are up and the traffic is flowing on them.

7.30 PSAX Alarm Values

1. In PSAX release 9.x.x and earlier, alarm values were associated with an integer that had a value for the line status. In release 10.0.0 and later, the alarm is associated with a hexadecimal value.

   - Consider that there are two alarms at a single instance of time — Far end remote loopback(rmtLoopback) and Receiving AIS failure state(rcvAIS). The value displayed would be **0x 04 20 00 00**. Separate the values based on those given in table as follows:

     0x 04 20 00 00 = 0x 04 00 00 00 + 0x 00 20 00 00.

     Therefore, the two alarms are rcvAIS and rmtLoopback respectively.

     If the value displayed is 0x 03 00 00 00, then separate the values based on those given in table as followsK

     0x 03 00 00 00 = 0x 02 00 00 00 + 0x 01 00 00 00.

     Therefore, the two alarms are loopbackState and rcvTestCode respectively.
   - Consider that there are three alarms at a single instance of time. For example, Far end remote loopback(rmtLoopback), Receiving AIS failure state(rcvAIS), and Reveiving LOS failure state(lOS). The value displayed is **0x 14 20 00 00**. Separate the values based on those given in table as follows:

     0x 14 20 00 00 = 0x 10 00 00 00 + 0x 04 00 00 00 + 0x 00 20 00 00.

Therefore, the three alarms are lOS, rcvAIS, and rmtLoopback respectively.

If the value displayed is **0x 07 00 00 00**, then seperate the values based on as follows:

0x 07 00 00 00 = 0x 04 00 00 00 + 0x 02 00 00 00 + 0x 01 00 00 00

Therefore, the three alarms are rcvAIS , loopbackState, and rcvTestCode respectively.

Note: These scenarios are examples only. provides a complete mapping of alarm integer values to hexadecimal values.

Table 13. PSAX ALarm Hexadecimal Value

Serial Number	Bit from the Left	Alarm	Represented as	Hexadecimal Value
1	0	No alarm is present	noAlarm	0x 80 00 00 00
2	1	Card is removed	cardRemoved	0x 40 00 00 00
3	2	Receiving LOF failure state	lOF	0x 20 00 00 00
4	3	Reveiving LOS failure state	lOS	0x 10 00 00 00
5	4	Receiving Yellow/Remote Alarm Indication	rcvRAI	0x 08 00 00 00
6	5	Receiving AIS failure state	rcvAIS	0x 04 00 00 00
7	6	Looping the received signal	loopbackState	0x 02 00 00 00
8	7	Receiving a Test Pattern	rcvTestCode	0x 01 00 00 00
9	8	Receiving LOS code from remote	rmtLOS	0x 00 80 00 00
10	9	Receiving Idle from remote	rmtIdle	0x 00 40 00 00
11	10	Far end remote loopback	rmtLoopback	0x 00 20 00 00
12	11	Receiving Loss of Cell Delineation	lCD	0x 00 10 00 00
13	12	Receiving Idle from remote	rcvIdle	0x 00 08 00 00
14	13	Receiving PLCP LOF failure state	pLCPLOF	0x 00 04 00 00
15	14	Receiving PLCP Yellow/Remote Alarm	pLCPYel	0x 00 02 00 00
16	15	Receiving Line RDI failure state	lRDI	0x 00 01 00 00
17	16	Receiving Path RDI failure state	pRDI	0x 00 00 80 00
18	17	Receiving Signal Degradation failure state	sD	0x 00 00 40 00
19	18	Receiving Line AIS failure state	lAIS	0x 00 00 20 00
20	19	Receiving Path AIS failure state	pAIS	0x 00 00 10 00
21	20	Ethernet line status is down	down	0x 00 00 08 00
22	21	Ethernet line is Full duplex	fullDuplex	0x 00 00 04 00
23	22	Ethernet line is Half Duplex	halfDuplex	0x 00 00 02 00
24	23	Ethernet line is 10baseT	link-10baseT	0x 00 00 01 00
25	24	Ethernet line is 100baseT	link-100baseT	0x 00 00 00 80
26	25	Ethernet line is 1000baseT	link-1000baseT	0x 00 00 00 40

7.31 Virtual Interfaces

1. To ensure that the VI cell rate is large enough for setting signal connections, the egress available bandwidth for the virtual interface and egress available bandwidth for the ATM PNNI VPC interface must be equal. For example, the [Avail Bw in Egr Direc] field on the Virtual Interface Configuration window should display the same value as the [Egress Avail BW] field on the ATM PNNI VPC Interface Configuration window.

2. When VI Support is **Enabled** on the ATM UNI Interface Configuration window and a virtual interface is configured, and VI Support is **Enabled** on the ATM PNNI VPC Interface Configuration window, the Ingress Total BW and Egress Total BW field values must not be assigned on the ATM PNNI VPC Interface Configuration window. Those values are assigned automatically from the configured VI Cell Rate (minimum 475 cps) on the Virtual Interface Configuration window.

3. To allow traffic for other services besides PNNI VPC on the same virtual interface, the user should provision a value (default 10) in the range of 1-100 in the Over Subscription Rate field on the Virtual Interface configuration window.

4. When VI Support is **Disabled** on the ATM UNI Interface Configuration window and VI Support is **Disabled** on the ATM PNNI VPC Interface Configuration window, the Ingress Total BW and Egress Total BW field values must be assigned a minimum of 475 cps on the ATM PNNI VPC Interface Configuration window. For unconfigured interfaces, the default values are **0** cps regardless of whether VI Support is **Disabled** or **Enabled** on the ATM UNI Interface Configuration window.

5. The user has the option of provisioning multiple ATM PNNI VPC interface connections, with or without virtual interfaces, on the same physical port and ATM UNI interface. In this scenario, VI Support must be **Enabled** on the ATM UNI Interface Configuration window. Configured ATM PNNI VPC interfaces over configured virtual interfaces share the same interface index and ID. Configured ATM PNNI VPC interfaces that are not over configured virtual interfaces must have different interface indices and IDs.

   Note: When VI Support is **Enabled** on the ATM UNI Interface Configuration window and Virtual Interfaces are configured, VI Support must be **Enabled** on the ATM PNNI VPC Interface Configuration window for *all* ATM PNNI VPC interfaces on that main ATM UNI interface.

Note: When VI Support is **Disabled** on the ATM UNI Interface Configuration window, VI Support must be **Disabled** on the ATM PNNI VPC Interface Configuration window for *all* ATM PNNI VPC interfaces on that main ATM UNI interface.

6. When VI Support is **Enabled** on the ATM UNI Interface Configuration window and VI Support is **Disabled** on the ATM PNNI VPC Interface Configuration window, only UBR SVC/SPVC traffic can pass through the configured interface. However, mixed traffic is not recommended.

   Note: When VI Support is **Enabled** on the ATM UNI Interface Configuration window and Virtual Interfaces are configured, VI Support must be **Enabled** on the ATM PNNI VPC Interface Configuration window for *all* ATM PNNI VPC interfaces on that main ATM UNI interface.

   Note: When VI Support is **Disabled** on the ATM UNI Interface Configuration window, VI Support must be **Disabled** on the ATM PNNI VPC Interface Configuration window for *all* ATM PNNI VPC interfaces on that main ATM UNI interface.

7. In the 4-Port OC-3c/STM-1, 3-Port DS3/E3 ATM, and 3-Port Unstructured DS3/E3 CES modules, when SPVC is shaped with UBR traffic, if the user enables shaping at both the circuit and interface levels for the UBR circuit, there is some traffic loss. VBR must be used if shaping is required. The MBS parameter is configurable for the VBR traffic class and an appropriate MBS can be chosen for the circuit configuration being used. The traffic queue depth is set as per the MBS configured for the circuit being used. Since MBS is not a configurable class for the UBR traffic class, a default value of 1 is used by the implementation. PSAX is designed to handle only two cells of burst, and will drop cells when the traffic volume increases.

7.32 PNNI Node/Interface Configuration

1. Starting from Release 8.1.5, the PNNI interface and PNNI node configuration hierarchical relationship has been adjusted as follows:

   - To modify the highest level PNNI node, you must first take the PNNI interface out of service and then take highest level PNNI node out of service. You can modify the highest level PNNI node without deleting the PNNI interface.
   - To delete the highest level PNNI node, you must first delete the PNNI interface.
   - To add higher level PNNI node(s), you must first configure the lowest level (one level, if it is single) PNNI node, and then configure and bring into service the PNNI interface. Once the PNNI interface is configured and in service, you can add more PNNI node levels without deleting the PNNI interface.
   - To modify or delete a lower level PNNI node, you must first delete any higher level PNNI node.

This adjustment was made for simplicity and system integrity. These changes will be made in the next issue of the PSAX system user guides.

2. Although the PNNI System-Wide Configuration menu indicates that the Transit Network Selection (TNS) routing option is active, the PSAX system will not route calls on TNS at this time. However, the PSAX will accept and propagate TNS route information using the TNS mapping option. The PSAX system also allows TNS route provision. These menu options are being maintained to preserve the additional capability for potential debugging usage in PNNI.
3. When a child node is created, it must be brought into service before creating the parent node. If a parent node is brought into service before the child node, the parent node must be deleted and then the child node can be brought into service and finally the parent node can be recreated and brought into service. This child first sequence must be followed.
4. The field value for the Link Port ID field on the PNNI Link Information window refers to a slot/port/channel notation if the Link Type field value is **LowestLevelHorizontal_link**.
5. It may take up to five minutes for SPVCs to recover after switches in a multiple-level PNNI hierarchy network are upgraded one at a time.
6. It is recommended that UNI/PNNI interfaces have UPC or Traffic Shaping enabled (as appropriate and if the particular I/O modules supports these features) to prevent signaling connections on those interfaces from being torn down due to higher priority, non-conforming traffic from the network user. This is not specific to the VPC PNNI feature itself and extends to all PNNI/UNI interfaces.

7.33 ATM Traffic Management

1. If you are enabling traffic shaping on the ATM side of a FR-to-ATM VCC PVC connection (on the ATM UNI Interface Configuration and the Frame-Relay-to-ATM VCC PVC Traffic Parameters windows), the only conformance type supported is the value **2B-T-0+1-0-f-GCRA** in the Cnfrmnce Type field on the Frame Relay-to-ATM VCC PVC Connection window. This conformance type is the only one that recognizes frames. Using any other conformance type will probably result in overpolicing, causing an excessive number of cells to be dropped on the frame relay side of the connection.

2. For all I/O modules, ingress traffic that exceeds the size of the VI or the physical port speed will be buffered. If constant ingress traffic continues for an extremely long period of time, the incoming data will exceed the egress buffer capacity. In this case, some traffic may be lost due to buffer purging. The formula for determining buffer size in cells is:

$$\frac{\textit{module output buffer capacity in MB} \times 1024 \times 1024}{64}$$

As the amount of CBR and VBRrt traffic on an interface increases, the probability increases that traffic will have to be queued. This action impedes the ability to maintain the SCR of the ATM traffic-shaped connection(s), and eventually the queues will overflow causing packets to be dropped.

See the MBS field on the field description table for any connection screen for more information on MBS egress buffer size. See Table 11 on page 93 for the egress buffer capacity of all PSAX I/O modules.

3. To prevent an ATM traffic-shaped connection from having packets dropped due to queuing, the connection must be set up with the PCR value greater than the SCR value plus a function of the total CBR and VBRrt traffic provisioned for the interface. Setting the PCR value to be greater than the SCR value creates, in effect, a "guard band" around the connection to minimize the probability that a CBR or VBRrt cell will be transmitted at the same time an ATM traffic-shaped cell is scheduled to be transmitted. It is critical that accurate values for the connection parameters be used.

4. For ATM traffic-shaped connections, you should set the PCR value so that it conforms to the following expression:

$$PCR > \frac{SCR}{(1 - F)}$$

where:

PCR = the PCR of the ATM traffic-shaped connection

SCR = the SCR of the ATM traffic-shaped connection

F is a function of the summation of the PCRs of constant bit rate connections plus the SCRs of the variable bit rate (real time) connections divided by the interface data rate. The value of *F* can be expressed mathematically as follows:

$$F = \frac{\sum PCR \text{ of CBR connections} + \sum SCR \text{ of VBRrt connections}}{\text{interface data rate}}$$

The network should be designed with a bounded value of *F*. When the value of *F* is initially calculated, it must use the PCR and SCR of the total number of CBR and VBRrt connections that will be provisioned on the network interface.

5. On the OC-12c APS/STM-4 MSP (single-mode and multimode) and the 3-Port DS3/E3 ATM modules, the full complement of 32,000 virtual connections can be shaped using per VC queuing. On those modules, each of the per VC queues has a maximum of ATM MBS or Frame Relay (Burst Size) in cells. On the 1-Port OC-3c 1+1 APS and the 1-Port STM-1 1+1 MSP modules, the limit is 2,046 virtual connections shaped using per VC queuing. The maximum queue size is 1,000 bytes on the OC-3c 1+1 APS and STM-1 1+1 MSP modules. In all cases, the minimum PCR value that is supported for traffic shaping is 20 cps. Maximum PCR is

approximately 1% of the port bandwidth. For example, on the STM-1 1+1 MSP module, the maximum PCR is 4,680 cps (E1 interface speed). Traffic shaping performance is not guaranteed above the 1% of the port speed rates.

6. Parameters for the maximum number of virtual connections that can be shaped and the minimum PCR for traffic shaping on relevant modules are provided in Table 13.

   The ATM Traffic Shaping capability is supported on the PSAX modules listed in Table 14. The table includes information on the maximum number of VCs using traffic shaping, minimum PCR for traffic shaping, queue size, priority, and precision of traffic shaping for one connection.

   Configuration compatibility among the ATM Traffic Shaping, UPC Support, and VI Support features is shown in Table 14.

   The PSAX modules supporting ATM Traffic Shaping, UPC, or VI are listed in Table 14. The table includes information on the maximum number of VCs using traffic shaping, minimum PCR for traffic shaping, queue size, priority, and precision of traffic shaping for one connection.

Table 14. ATM Traffic Management Capabilities by Module

Modules	Feature Support						ATM Traffic Shaping (TS)				
	AQD	EPD	GFR	UPC	VI	TS	Max. No. of VCs	Min. PCR*	Queue Size	Priority	Precision for One Connection†
DS1/T1 Interface Modules											
23N33 12-Port Medium-Density DS1 IMA (**MD DS1 IMA**)	x	x	x	x		x	32,000	150 cps	2 × MBS	After VBR-rt2	~50% of line rate
23N64 12-Port Medium-Density DS1 Multiservice (**MD DS1**)	x	x	x	x		x	32,000	150 cps	2 × MBS	After VBR-rt2	~50% of line rate
23N35 24-Port High-Density DS1 Multiservice (**HD DS1**)	x	x	x	x		x	32,000	150 cps	2 × MBS	After VBR-rt2	~50% of line rate
E1 Interface Modules											
23N34 21-Port High-Density E1 IMA (**HD E1 IMA**)	x	x	x	x		x	32,000	150 cps	2 × MBS	After VBR-rt2	~50% of line rate
23N66 21-Port High-Density E1 Multiservice (**HD E1**)	x	x	x	x		x	32,000	150 cps	2 × MBS	After VBR-rt2	~50% of line rate
DS3, E3, and STS-1e Interface Modules											
23N62 1-Port Channelized STS-1e, T1 Format (**CH STS-1E T1**)	x	x	x	x		x	32,000	150 cps	2 × MBS	After VBR-rt2	~50% of line rate
23N68 1-Port DS3 IMA (**DS3 IMA**)	x	x	x	x		x	32,000	150 cps	2 × MBS	After VBR-rt2	~50% of line rate

Table 14. ATM Traffic Management Capabilities by Module (Continued)

Modules	Feature Support						ATM Traffic Shaping (TS)				
	AQD	EPD	GFR	UPC	VI	TS	Max. No. of VCs	Min. PCR*	Queue Size	Priority	Precision for One Connection†
23N60 1-Port Channelized DS3 Multiservice (**CH DS3**)	x	x	x	x		x	32,000	150 cps	2 × MBS	After VBR-rt2	~50% of line rate
23N74 3-Port DS3/E3 ATM (**DS3/E3 ATM**)	x	x	x	x	x	x	32,000	7 cps	2 × MBS	After CBR	~1% of line rate
45N74 3-Port DS3/E3 ATM Protection (**DS3/E3 ATM**)	x	x	x	x	x	x	32,000	7 cps	2 × MBS	After CBR	~1% of line rate
45N63 3-Port Channelized DS3/STS-1e Multiservice Protection	x	x	x	x		x	32,000	1 cps	2 × MBS	After CBR	1 % of the line rate
Fiber-Optic Interface Modules											
23N72 1-Port OC-12c/STM-4c Multimode (**OC-12C/STM-4C MM**)	x	x	x	x	x	x	32,000	87 cps	2 × MBS	After CBR	~1% of line rate
23N73 1-Port OC-12c/STM-4c Single-Mode (**OC-12C/STM-4C SM**)	x	x	x	x	x	x	32,000	87 cps	2 × MBS	After CBR	~1% of line rate
23N75 1-Port Channelized OC-3/STM-1 Unstructured CES/ATM Multimode (**CH OC-3/STM-1 UNSTR/ATM MM**)	x	x	x	x		x	32,000	9 cps	2 × MBS	After CBR	~50% of line rate
23N76 1-Port Channelized OC-3/STM-1 Unstructured CES/ATM Single-Mode (**CH OC-3/STM-1 UNSTR/ATM SM**)	x	x	x	x		x	32,000	9 cps	2 × MBS	After CBR	~50% of line rate
24N70 2-Port OC-3c/STM-1 ATM Multimode (**OC-3C/STM-1 MM ATM**)	x	x	x	x	x	x	32,000	24 cps	2 × MBS	After CBR	~1% of line rate
24N71 2-Port OC-3c/STM-1 ATM Single-Mode (**OC-3C/STM-1 SM ATM**)	x	x	x	x	x	x	32,000	24 cps	2 × MBS	After CBR	~1% of line rate
24N74 2-Port OC-3c/STM-1 Enhanced ATM Multimode (**OC-3C/STM-1 MM ENH ATM**)	x	x	x	x		x	32,000	24 cps	2 × MBS	After CBR	~1% of line rate
24N75 2-Port OC-3c/STM-1 Enhanced ATM Single-Mode (**OC-3C/STM-1 SM ENH ATM**)	x	x	x	x		x	32,000	24 cps	2 × MBS	After CBR	~1% of line rate

Table 14. ATM Traffic Management Capabilities by Module (Continued)

Modules	Feature Support						ATM Traffic Shaping (TS)				
	AQD	EPD	GFR	UPC	VI	TS	Max. No. of VCs	Min. PCR*	Queue Size	Priority	Precision for One Connection†
24N72 4-Port OC-3c/STM-1 Multimode (**OC-3C/STM-1 MM**)	x	x	x	x	x	x	32,000	24 cps	2 × MBS	After CBR	~1% of line rate
24N73 4-Port OC-3c/STM-1 Single-Mode (**OC-3C/STM-1 SM**)	x	x	x	x	x	x	32,000	24 cps	2 × MBS	After CBR	~1% of line rate
Serial Interface Modules											
23N07 Quadserial (**QUAD SERIAL**)	x	x	x	x			N/A	N/A	N/A	N/A	N/A

* If you specify a rate below the minimum supported PCR, the module defaults to traffic shaping at the minimum supported PCR.

† A connection configured for a PCR less than the specified rate has an output rate within 1% of the configured PCR.

7. On the ATM UNI Interface Configuration window for the modules listed in Table 12, traffic shaping can be enabled or disabled in the Traffic Shaping field. If the traffic shaping feature is to be used on these modules, the Traffic Shaping field must be set to **Enabled**. Also, for traffic shaping to function correctly on connections, the values in the TS fields for both endpoints of the ATM-to-ATM VCC PVC, ATM-to-ATM VPC PVC, ATM-to-ATM VCC SPVC, and ATM-to-ATM VPC SPVC connections must be set to **Enabled**.

8. Traffic Shaping for VBR service is optimized around typical traffic profiles. Running traffic at PCR for long periods of time will cause cell loss when Traffic Shaping is enabled. If the traffic profile is constantly at PCR, then consider changing to CBR Traffic Shaping.

9. When testing the OAM F5 Segment and End-to-End functionality, PCR throughput is reduced on the analyzer for the 1-Port STM-1 1+1 MSP,3-Port DS3/E3 ATM, and 21-Port High-Density E1 IMA modules. When these cells are replaced by regular test cells, the expected throughput is restored. This conforms with I.610.

7.34 N:1 Protection

1. In the event of a protection module failure when traffic is carried by the protection module, a 3 second fail-over time occurs while switching back to the working module. This fail-over time can be reduced further to less than 50 msec (on average) by selecting the value **Clear** in the

Command field on the N to M Protection Configuration window. This command must be used as soon as is practical (after the original failed working module is restored or replaced).

2. Currently, a switchover occurs when a module has failed, not because of the port or cable status. Therefore, if the working module of a protection pair is removed, a switchover will occur regardless of the port or cable status.

3. When a working module and a protection module are in a protection group, **only** the working module is used to configure the ports. Any attempt to configure the ports while working in the protection module configuration screen will be unsuccessful.

7.35 Interface Protection Group

1. This feature makes the PVC connection database "dirty" during normal operation, which causes the affected I/O module to be rebooted whenever the primary CPU module is rebooted.

7.36 GR-303 Application

1. OAM is not required for GR-303 connections. Any failure on the ATM side will be detected by the DSP module through CAS monitoring.

2. Currently, you can set up a GR303-to-AAL2 connection with combinations of voice compression and silence detection settings that are not valid. Note that only the combinations listed in Table 15 will work.

Table 15. Valid Encoding/Compression Settings

Encoding Profile	Voice Compression	Silence Detection
Itut-profile-1	none	disabled
Itut-profile-3	none	enabled
Itut-profile-3	G726-16K	enabled
Itut-profile-3	G726-24k	enabled
Itut-profile-3	G726-32k	enabled
Itut-profile-3	G726-40k	enabled
Itut-profile-7	none	disabled
Itut-profile-7	G729a-8k	disabled
Itut-profile-7	G729a-8k	enabled
Af-profile-7	none	disabled
Af-profile-7	G726-32k	disabled
Af-profile-8	none	disabled

Table 15. Valid Encoding/Compression Settings (Continued)

Encoding Profile	Voice Compression	Silence Detection
Af-profile-9	none	disabled
Af-profile-10	none	disabled
Af-profile-10	G726-32k	disabled
Af-profile-11	none	disabled
Af-profile-11	G726-32k	disabled
Af-profile-12	none	disabled
Af-profile-12	G726-32k	disabled

Note: When using the PSAX system with the Cellpipe IAD V3.0.0, only the settings in Table 16 will work.

Table 16. Valid Encoding/Compression Settings (Cellpipe IAD V3.0.0)

Encoding Profile	Voice Compression	Silence Detection
Itut-profile-1	none	disabled
Af-profile-11	none	disabled
Af-profile-11	G726-32k	disabled

3. The 5ESS does not recognize when a DS0 is down; therefore, the line will still link to the failed DS0. The 5ESS has visibility to the PSAX system only at the DS1 level, not at the DS0 level.

4. After a CPU*n* switchover is performed, TMC and EOC state information is lost and both states return to their default values.

5. The IADs listed in Table 17 have been tested with the PSAX GR-303 Interface.

Table 17. GR-303 IAD Interoperability

Vendor and Model	Software Release	Signaling	WAN Interface Type	LAN Interface Type Port Limits
Lucent CellPipe 4A	3.4.19-R1	Loop Start	ADSL	4 analog FXO ports
Lucent CellPipe 4H/8H	3.4.19-R1	Loop Start	SHDSL	4 or 8 analog FXO ports
Lucent CellPipe 8T	3.4.19-R1	Loop Start, Ground Start	T1 ATM	8 analog FXO ports
Verilink NetEngine 6104/6108	3.4.19-R1	Loop Start	ADSL	4 or 8 analog FXO ports
Verilink NetEngine 6300	3.4.19-R1	Loop Start	SDSL	8 analog FXO ports
Verilink NetEngine 6504/6508	3.4.19-R1	Loop Start	SHDSL	4 or 8 analog FXO ports

Table 17. GR-303 IAD Interoperability (Continued)

Vendor and Model	Software Release	Signaling	WAN Interface Type	LAN Interface Type Port Limits
Verilink NetEngine 6200	3.4.19-R1	Loop Start, Ground Start	T1 ATM	8 analog FXO ports
Adtran TA 624	D04.02.12	Loop Start	T1 ATM	24 analog FXS ports
Adtran TA 850	D04.02.12	Loop Start, Ground Start	T1 ATM	24 analog FXS ports
Adtran TA 608	D04.03.26	Loop Start, Ground Start	SDSL	8 analog FXS ports
Siemens/Efficient Networks	Contact PSAX Product Management for details.	Loop Start	ADSL	4 analog FXO ports
Verilink 8100	3.7.5–R1	CCS/ELCP	ADSL	4 or 8 POTS FXS ports
Verilink 8200	3.7.5–R1	CCS/ELCP	T1/E1	8, 16, or 24 POTS FXS ports
Verilink 8300	3.7.5–R1	CCS/ELCP	SDSL	4, 8, 16, or 24 POTS FXS ports
Verilink 8500	3.7.5–R1	CCS/ELCP	SHDSL	4, 8, 12, 16, or 24 POTS FXS ports

Contact PSAX Product Management for a list of IADs tested using this Software Release.

6. The PSAX GR-303 Interface has been tested with the voice switches listed in Table 18.

Table 18. Class 5 Voice Switch and GR-303 Interface Interoperability on the PSAX System

Vendor and Model	Software Release	Signaling	Supporting Module
Lucent 5ESS	5E15.1	Loop Start, Ground Start	23N62 1-Port Channelized STS-1e, T1 Format (**CH STS-1E T1**) 45N03 3-Port Channelized DS3/STS-1e CES Protection (**CH DS3/STS-1E**)
Nortel DMS 100	Contact PSAX Product Management for details.	Loop Start, Ground Start	23N60 1-Port Channelized DS3 Multiservice (**CH DS3**) 23N03 3-Port Channelized DS3/STS-1e CES (**CH DS3/STS-1E**)

7. When the PSAX system and a Verilink/CellPipe IAD are used, if the ATM link between the PSAX system and a DSLAM experiences an LOS while an OAM continuity check is being performed on any AAL2 trunks, the AAL2 trunks will not come back into service. When this occurs, each trunk must be removed and re-added to recover. This results in service

interruption for the subscribers on that trunk until it is manually recovered. OAM loopback does not have this issue. This has been deemed to be a Verilink/CellPipe IAD issue.

8. When using the DSP Resource Configuration option with the GR-303 application, be sure that the Dsp Rerouting Feature field on the DSP Resource Table window, is set to **Auto-rerouting-enabled**. The DSP rerouting feature is fully supported only on the DSP2D, DSP2E, and DSP2F Voice Server modules beginning with System Software Release 8.1.0. (See "DSP2x Voice Server Modules" on page 36.). Two algorithms may be used to assign DSP resources in the Dsp Resource Selection field: **FirstFit** and **LeastUsed**. The **FirstFit** method will assign DSP resources starting on the first available DSP module in the chassis in ascending slot order. The **LeastUsed** method will select the module with the least used DSP resources and assign the AAL2 trunk being provisioned. When the **FirstFit** value is selected, the PSAX system does not automatically distribute DSP connections across multiple DSP modules after a chassis reboot. A user must manually request a Graceful DSP resource distribution in the DSP Resource Distribution field (on the same window). This is done after a chassis reboot to allocate the DSP connections across DSP modules in the chassis. Access the DSP Resource Table by selecting the Site-Specific Configuration menu option on the Console Interface Main Menu. Then from the Site-Specific Configuration menu, select the DSP Resource Configuration command to display the DSP Resource Feature Menu. From the DSP Resource Feature Menu, select the DSP Resource Table option to display the DSP Resource Table. When the **FirstFit** algorithm is selected from the DSP Resource Selection field, it is recommended that the AAL2 trunks have a number of reserved DSP resources. If an AAL2 trunk has no DSP resources reserved, it is recommended that the **LeastUsed** method be selected to assign DSP resources.

7.37 V5.2 European IDLC

1. When using the DSP Resource Configuration option with the V5.2 application, be sure that the Dsp Rerouting Feature field on the DSP Resource Table window, is set to **Auto-rerouting-enabled**. The DSP rerouting feature is fully supported only on the DSP2D, DSP2E, and DSP2F Voice Server modules beginning with System Software Release 8.1.0. (See section 7.2, Note 15 on page 33). Two algorithms may be used to assign DSP resources in the Dsp Resource Selection field: **FirstFit** and **LeastUsed**. The **FirstFit** method will assign DSP resources starting on the first available DSP module in the chassis in ascending slot order. The **LeastUsed** method will select the module with the least used DSP resources and assign the AAL2 trunk being provisioned. When the **FirstFit** value is selected, the PSAX system does not automatically distribute DSP connections across multiple DSP modules after a chassis reboot. A user must manually request a Graceful DSP resource distribution in the DSP Resource Distribution field (on the same window). This is done after a chassis reboot to allocate the DSP connections across DSP modules in the chassis. Access the DSP Resource Table by selecting the

Site-Specific Configuration menu option on the Console Interface Main Menu. Then from the Site-Specific Configuration menu, select the DSP Resource Configuration command to display the DSP Resource Feature Menu. From the DSP Resource Feature Menu, select the DSP Resource Table option to display the DSP Resource Table. When the **FirstFit** algorithm is selected from the DSP Resource Selection field, it is recommended that the AAL2 trunks have a number of reserved DSP resources. If an AAL2 trunk has no DSP resources reserved, it is recommended that the **LeastUsed** method be selected to assign DSP resources.

2. With Release 8.1.0, oversubscription of AAL2 trunks is supported when using the V5.2 protocol. The oversubscription value may be changed on the V5.2 Resource Allocation Configuration window. The default oversubscription value is 100%, or no oversubscription.

3. When **Auto-rerouting-enabled** is selected on the DSP Resource Table window a voice call remains active through a DSP module failure. A silent period is maintained while rerouting occurs. This period may range from 2 seconds up to 15 seconds, depending on the number of active calls that must be rerouted on the same HD E1 module.

4. Due to ELCP traffic burstiness or ATM cell policing, the PSAX V5.2 gateway occasionally sends an allocation reject to the LE while waiting for an allocation complete message from the IAD. This will result in a no dial tone condition for a single user. This event has an extremely low frequency of occurrence and only impacts a single user when it occurs. The workaround is to enable traffic shaping on the ATM module, if it is supported. Otherwise, it is recommended to change the Resource Manager TR1 field on the V5 Interface Variant Configuration window to 1500 msec to allow the IAD to return allocation complete messages before the PSAX gateway timer expires. This may delay dial tone for up to 1.5 seconds.

5. This software release does not support the V5.2 Link ID Verification procedure. If the V5.2 application is enabled, the user must ensure that the AN Initiate LINK Proc field is set to **False** on the V5 Interface Variant Configuration window prior to performing a software upgrade to this release.

6. In this release, each PSAX system supports up to 4,096 remote IWFs and each remote IWF supports up to 100 VCCs (based on VCC ID). If a user attempts to provision more than 100 VCC IDs in one remote IWF, a trap will be generated and the VCC configuration will fail. It is strongly recommended that some resources not associated with the atmTrunkVccs in the Call Control Resource Allocation Configuration window under the Site-Specific Menu be reduced to a number between 1 and 100 when a user plans to support many remote IWFs in a single PSAX system.

7. The PSAX V5.2 interface supports up to 6,000 user ports in this release, including PSTN and ISDN ports. The default number of ISDN user ports is set to 8,000 ISDN and 8,000 PSTN ports. If a user reduces the number of ISDN ports to 0, then 6,000 PSTN ports will be supported per chassis. If a user wants to increase the maximum number of V5.2 interfaces, the number of user ports per V5 group must be reduced according to the following formula:

   maximum number of user ports per V5 interface = (*former maximum number of user ports per V5 interface*) × 4 / *number of V5 interfaces*

   maximum number of ISDN ports per V5 interface = (*former maximum number of ISDN ports per V5 interface*) × 4 / *number of V5 interfaces*

   For example, if you want to change your configuration from four V5 groups (default) to ten groups, then the maximum number of user ports per V5 interface must be set to ≤ 4 K × 4 / 10 = 1,600. This formula determines the maximum number of user ports that a PSAX system supports per V5 group. You must not allow the specified values for the parameters given above to exceed the allowed maximum limit.

8. If a V5 group is manually taken out of service prior to a CPU*n* switchover and the configuration is not saved, the V5 group must be manually brought back into service when the standby CPU*n* module switches back to the primary CPU*n* module.

9. The IADs listed in Table 19 have been tested with the PSAX V5.2 Interface on the PSAX system.

Table 19. V5.2 IAD Interoperability

Vendor and Model	Software Release	Signaling	WAN Interface Type	LAN Interface Type Port Limits
Lucent CellPipe 4A/4AU	3.4.19	CCS/ELCP	ADSL	4 analog FXO ports
Lucent CellPipe 4AI	3.4.19	CCS/ELCP	ADSL	4 BRI ports
Lucent CellPipe 4H/8H	3.4.19	CCS/ELCP	SHDSL	4 or 8 analog FXO ports
Lucent CellPipe 4HI	3.4.19	CCS/ELCP	SHDSL	4 BRI ports
Verilink NetEngine 6104/6108	3.4.19	CCS/ELCP	ADSL	4 or 8 analog FXO ports
Verilink NetEngine 6104i	3.4.19	CCS/ELCP	ADSL	4 BRI ports
Verilink NetEngine 6300	3.4.19	CCS/ELCP	SDSL	8 analog FXO ports
Verilink NetEngine 6504/6508	3.4.19	CCS/ELCP	SHDSL	4 or 8 analog FXO ports
Verilink NetEngine 6504i	3.4.19	CCS/ELCP	SHDSL	4 BRI ports
RAD LA-110	Contact PSAX Product Management for details.	CCS/ELCP	SHDSL	4 BRI ports

Table 19. V5.2 IAD Interoperability (Continued)

Vendor and Model	Software Release	Signaling	WAN Interface Type	LAN Interface Type Port Limits
RAD LA-140	Contact PSAX Product Management for details.	CCS/ELCP	SHDSL	4 BRI ports
Verilink 8100	3.7.5–R1	CCS/ELCP	ADSL	4 or 8 POTS FXS ports
Verilink 8200	3.7.5–R1	CCS/ELCP	T1/E1	8, 16, or 24 POTS FXS ports
Verilink 8300	3.7.5–R1	CCS/ELCP	SDSL	4, 8, 16, or 24 POTS FXS ports
Verilink 8500	3.7.5–R1	CCS/ELCP	SHDSL	4, 8, 12, 16, or 24 POTS FXS ports

Contact PSAX Product Management for a list of IADs tested using this Software Release.

10. The V5.2 Interface has been tested with the LE voice switches listed in Table 20 and the PSAX system.

Table 20. V5.2 Voice Switch Interoperability

Vendor and Model	Software Release	Signaling	Supporting Module
Lucent 5ESS	5EE14	CCS for POTS and ISDN	23N66 21-Port High-Density E1 Multiservice (**HD E1**)
Alcatel S-10	Contact PSAX Product Management for details.	CCS for POTS	23N66 21-Port High-Density E1 Multiservice (**HD E1**)
Ericsson AXE-10	Contact PSAX Product Management for details.	CCS for POTS	23N66 21-Port High-Density E1 Multiservice (**HD E1**)
Nortel DMS 100	Contact PSAX Product Management for details.	CCS for POTS	23N66 21-Port High-Density E1 Multiservice (**HD E1**)
Siemens EWSD	Contact PSAX Product Management for details.	CCS for POTS	23N66 21-Port High-Density E1 Multiservice (**HD E1**)

11. When the AN Initiate LINK ID Proc field is set to **True** on the V5 Interface Variant Configuration window, E1 link IDs between the PSAX system and the voice switch must match. If two E1 links are crossed over, the PSAX system will generate two trap messages every 30 seconds: `v5E1LinkOperInServiceNotify` followed by

`v5E1LinkOperOutOfServiceNotify`. To clear these two trap messages, look for the E1 cables that are crossed over and ensure that the link IDs match.

12. When the V5.2 application is enabled, a save configuration followed by a chassis reboot must be performed immediately after a software upgrade from Release 8.1 or prior to Release 9.0 or subsequent releases. This will ensure that all configurations are maintained in the chassis. Rebooting the chassis causes active calls to be dropped and brings down the V5 interface for a few minutes. Therefore, it is strongly recommended that a software upgrade be performed during a scheduled maintenance window.

13. When the V5.2 application is enabled, the Site Specific ATM trunking menu must be used to create or delete an AAL2 trunk. Otherwise, database corruption may occur if a trunk is deleted using the ATM Trunk Group table in the Connection Configuration menu.

    System Software Release 9.0 prevents deletion of AAL2 trunk groups using the ATM Trunk Group table on the Connection Configuration menu. This applies only to trunk groups created using this release. If the trunk group is created in a release prior to Release 9.0, the Site Specific ATM trunking menu must be used to create or delete an AAL2 trunk.

14. When a V5.2 ATM trunk is added without physically connecting an IAD, it is recommended to leave the Remote IWF admin status down or take the associated VCC OOS until the IAD is physically connected and turned on for service.

15. It is recommended that the Resource Manager TR1 field on the V5 Interface Variant Configuration window be set to **1500** msec to allow LAPD messages to be retransmitted within 1 second in the event that they are lost. In addition, the TBCC1 timer on the LE side must match the Resource Manager TR1 field on the PSAX system side to avoid timer mismatch between the PSAX system and the LE. The default value of the Resource Manager TR1 field is **500** msec. Changing this field value requires that the V5.2 group be taken OOS and brought back into service.

16. The PSAX system supports up to 6,000 user ports and 2,000 remote IWFs when the V5.2 application is enabled using Release 9.0.

17. When the PSAX system and a Verilink/CellPipe IAD are used, if the ATM link between the PSAX system and a DSLAM experiences an LOS while an OAM continuity check is being performed on any AAL2 trunks, the AAL2 trunks will not come back into service. When this occurs, each trunk must be removed and re-added to recover. This results in service

interruption for the subscribers on that trunk until it is manually recovered. OAM loopback does not have this issue. This has been deemed to be a Verilink/CellPipe IAD issue.

18. If some or all of the DSP2D Voice Server modules fail and then recover, the PSAX system does not automatically re-distribute DSP resources and some LES interface may not have enough DSP resource for D-channel allocation or active calls. If D-channel allocation fails due to the absence of DSP resources, LES interfaces must be reset to re-allocate the D-channel even after new DSP resources are available and have been re-distributed.

19. When upgrading system software from Release 8.1.5 to Release 10.0.9, attempting to save a configuration before the chassis is rebooted causes the primary and backup CPU*n*s to remain in an unsynchronized state. To avoid this situation, save the configuration after the backup CPU*n* becomes the primary CPU*n* with the new version of software. Then perform a chassis reboot immediately after the CPU*n* file transfer is complete and begins to synchronize. Do not wait for a trap message indicating that the CPU*n*s are fully synchronized before rebooting the chassis.

20. The performance and capacity of the V5.2 application is determined by the slot configuration and oversubscription factor. The capacities in Table 18 are based on 10 DSPs (PSAX 2300 or PSAX 4500):

Table 21. V5.2 Capacity Guide

Release	Maximum Recommended IADs per			Maximum Recommended User Ports	Maximum Active Voice Calls	Comments
	DSP2D	DSP2G	Chassis*			
8.1	100	NA	1000	4,000	2840	CPU2 or CPU4
9.1	100	NA	1000	6,000	2840	CPU2 or CPU4
10.0	100	--	1000	8,000	2840	Based on CPU2
10.0	100	--	1000	10,000	2840	Based on CPU4
10.0	--	200	2000	10,000	3840	Requires CPU4, DSP2G, Enhanced ATM module†
11.0‡	100	--	1000	10,000	2840	CPU4 Only
11.0	--	200	2000	10,000	3840	Requires DSP2G & Enhanced ATM module§

* Based on 10 DSPs
† 2-Port OC-3c/STM-1 Enhanced ATM Multimode Module
‡ PSAX Release 11.0 does not support CPU2
§ 2-Port OC-3c/STM-1 Enhanced ATM Multimode Module

The following are examples of a specific configuration and the capacity for the configuration in the release specified:

Table 22. Examples of PSAX Configuration and Resultant Capacity

Configuration	PSAX System	PSAX Release Version	Capacity
Redundant CPU4, Stratum, and Power 1x STM-1 or STM-4 module, 4x 21-Port E1 modules, 10x DSP2D modules	PSAX 2300 POTS	10.0.4	1000 IADs, 2840 calls, 10000 ports
Redundant CPU2, Stratum, and Power 1x STM-1 or STM-4 module, 3x 21-Port E1 modules, 6x DSP2D modules	PSAX 1250 19″ POTS	9.1.6	600 IADs, 1704 calls, 6000 ports

21. The interoperability between PSAX software and Verilink Firmware is as described in Table 23:

Table 23. PSAX Software and Verilink FIrmware Interoperability

PSAX Software Version	6000 IAD Firmware	8000 IAD Firmware	Comments
8.1.3 and 8.1.5	3.4.19-R1	3.7.5	It is recommended that customers currently on PSAX Release 8.x upgrade to Release 9.1.6.
9.1.4.1, 9.1.5, and 9.1.6	3.4.19-R1	3.7.5	Customers on CPU4 require Release 9.1.6 or higher.
10.0.2	3.4.19-R1	3.7.5 3.7.8	Only CPU2 is supported.
10.0.4	3.4.19-R1	3.7.5 3.7.8	This release will be available in September 2005 and CPU2 and CPU4 will be supported.
11.0.1*	3.4.19-R1	3.7.8	This release is pending V5.2 Interoperability Testing.

* The Release 11.0.0 V5.2 interoperability testing is planned for the 11.0.1 maintenance release.

7.38 High-level Data Link Control (HDLC) Passthrough Interface

1. Do not use short frame sizes when using the HDLC passthrough or bit inverted HDLC passthrough function. Two-byte frames will not pass through; the payload must be at least 3 bytes for the HDLC frame to pass.

7.39 Standard AAL2 Soft Permanent Virtual Connections

1. The SPVC trunk may bounce in and out due to a timing issue. To avoid this situation, the retry timer of the AAL2 SPVC trunk may need to be increased if OAM is required and the TDM switch has some kind of

debouncing mechanism. We recommend a longer retry of 3 to 5 seconds and limit the number of retries. The timer is configurable and can be adjusted in the field.

7.40 Early Packet Discard (EPD) for UBR Connections

1. During a protection switchover, EPD VCCs may experience a small number (less than 10) of AAL5 errors.

2. The minimum value for the minimum cell rate (MCR) is 53 cps. This provides an upper bound for the maximum number of connections each module can support, which is AR/53, where AR is the access rate in cps.

7.41 Fixed Maximum Frame Size for GFR2 Connections

1. The maximum frame size (MFS) currently supported is 32 cells. This will accommodate datagrams up to 1528 octets. The average PDU size on the internet, weighted by the number of cells in the corresponding AAL5 PDU, is 560 (12 cells) octets with the majority of PDUs being 552 and 40 octets. The largest ethernet LAN bridged PDU is 1518 octets. As a result, this maximum frame size will accommodate the entire range of PDU sizes that are likely to be seen.

7.42 Forward Error Correction (FEC)

1. The Forward Error Correction (FEC) feature is currently supported on the 6-Port Multiserial module and the Quadserial module. This feature is designed to be used only on ATM-to-ATM VCC PVC connections running VBR traffic.

7.43 Operations, Administration, and Maintenance (OAM)

1. The OAM flows are supported on all ATM interfaces and the ATM modules listed in Table 24.

Table 24. Modules Supporting OAM Flows

Modules	OAM Flow			
	F1	F3	F4	F5
DS1/T1 Interface Modules				
20N33 6-Port DS1 IMA	X		X	X
20N36 6-Port Enhanced DS1/T1 Multiservice	X		X	X
23N33 12-Port Medium-Density DS1 IMA	X		X	X
23N35 24-Port High-Density DS1 Multiservice	X		X	X
23N64 12-Port Medium-Density DS1 Multiservice	X		X	X
DS3, E3, and STS-1e Interface Modules				
20N02 2-Port DS3 ATM	X		X	X
20N22 2-Port E3 ATM	X		X	X
23N60 1-Port Channelized DS3 Multiservice	X		X	X
23N62 1-Port Channelized STS-1e, T1 Format	X		X	X
23N68 1-Port DS3 IMA	X		X	X
23N74 3-Port DS3/E3 ATM	X		X	X
45N63 3-Port Channelized DS3/STS-1e Multiservice Protection	X		X	X
45N74 3-Port DS3/E3 ATM Protection	X		X	X
E1 Interface Modules				
20N34 6-Port E1 IMA	X		X	X
20N56 6-Port Enhanced E1 Multiservice	X		X	X
23N34 21-Port High-Density E1 IMA	X		X	X
23N66 21-Port High-Density E1 Multiservice	X		X	X
Fiber-Optic Interface Modules				
20N72 1-Port OC-3c 1+1 APS Multimode	X	X	X	X
20N73 1-Port OC-3c 1+1 APS Single-Mode	X	X	X	X
20N92 1-Port STM-1 1+1 MSP Multimode	X	X	X	X
20N93 1-Port STM-1 1+1 MSP Single-Mode	X	X	X	X
23N12 1-Port Channelized OC-3/STM-1 CES Multimode	X	X	X	X
23N13 1-Port Channelized OC-3/STM-1 CES Single-mode	X	X	X	X
23N72 1-Port OC-12c/STM-4c Multimode	X	X	X	X
23N73 1-Port OC-12c/STM-4c Single-Mode	X	X	X	X
23N75 1-Port Channelized OC-3/STM-1 Unstructured CES/ATM Multimode	X	X	X	X

Table 24. Modules Supporting OAM Flows (Continued)

Modules		OAM Flow			
		F1	F3	F4	F5
23N76	1-Port Channelized OC-3/STM-1 Unstructured CES/ATM Single-Mode	X	X	X	X
24N70	2-Port OC-3c/STM-1 ATM Multimode	X	X	X	X
24N71	2-Port OC-3c/STM-1 ATM Single-Mode	X	X	X	X
24N72	4-Port OC-3c/STM-1 Multimode	X	X	X	X
24N73	4-Port OC-3c/STM-1 Single-Mode	X	X	X	X
Serial Interface Modules					
23N07	Quadserial	X		X	X

2. The following modules support OAM flows with an end-to-end variant:

   20N33 6-Port DS1 IMA

   20N36 6-Port Enhanced DS1/T1 Multiservice

   20N02 2-Port DS3 ATM

   20N22 2-Port E3 ATM

   20N34 6-Port E1 IMA

   20N56 6-Port Enhanced E1 Multiservice

   20N12 1-Port OC-3c Multimode with AQueMan

   20N14 1-Port OC-3c Multimode with Traffic Shaping

   20N13 1-Port OC-3c Single-Mode with AQueMan

   20N15 1-Port OC-3c Single-Mode with Traffic Shaping

   20N62 1-Port STM-1 Multimode with AQueMan

   20N64 1-Port STM-1 Multimode with Traffic Shaping

   20N63 1-Port STM-1 Single-Mode with AQueMan

   20N65 1-Port STM-1 Single-Mode with Traffic Shaping

3. The following modules support OAM flows with end-to-end and segment endpoint variants:

   20N72 1-Port OC-3c 1+1 APS Multimode

   20N73 1-Port OC-3c 1+1 APS Single-Mode

   20N92 1-Port STM-1 1+1 MSP Multimode

   20N93 1-Port STM-1 1+1 MSP Single-Mode

   23N07 Quadserial

23N33 12-Port Medium-Density DS1 IMA

23N34 21-Port High-Density E1 IMA

23N35 24-Port High-Density DS1 Multiservice

23N60 1-Port Channelized DS3 Multiservice

23N62 1-Port Channelized STS-1e, T1 Format

23N64 12-Port Medium-Density DS1 Multiservice

23N66 21-Port High-Density E1 Multiservice

23N68 1-Port DS3 IMA

23N72 1-Port OC-12c/STM-4c Multimode

23N73 1-Port OC-12c/STM-4c Single-Mode

23N74 3-Port DS3/E3 ATM

23N75 1-Port Channelized OC-3/STM-1 Unstructured CES/ATM Multimode

23N76 1-Port Channelized OC-3/STM-1 Unstructured CES/ATM Single-Mode
(ATM mode only)

24N70 2-Port OC-3c/STM-1 ATM Multimode
(ATM mode only)

24N71 2-Port OC-3c/STM-1 ATM Single-Mode

24N72 4-Port OC-3c/STM-1 Multimode

24N73 4-Port OC-3c/STM-1 Single-Mode

45N63 3-Port Channelized DS3/STS-1e Multiservice Protection

45N74 3-Port DS3/E3 ATM Protection

7.44 Documentation

1. In the PSAX user guides and module guides, the transmit clock SRTS option appears in a number of unsupported I/O modules. The transmit clock SRTS feature is supported only on the following PSAX I/O modules as of this release:

   24N64 12-Port Medium-Density DS1/E1/DS0A CES
   (in DS1 and E1 operating modes)

   23N75 1-Port Channelized OC-3/STM-1 Unstructured CES/ATM Multimode
   (in unstructured CES OC-3 and STM-1 operating modes)

   23N76 1-Port Channelized OC-3/STM-1 Unstructured CES/ATM Single-Mode
   (in unstructured CES OC-3 and STM-1 operating modes)

Note: You may find the SRTS option on the Transmit Clock field of other modules, however it cannot be applied to the module configuration. If SRTS is selected and the configuration is applied, the module defaults to the previously applied option.

2. When using the GSM2 compression mode of operation with Release 9.0.0 through Release 10.0.9, a problem exists that manifests as frame loss. It is recommended that the GSM1 compression mode of operation be used until this issue is addressed in a future release.

3. The *PacketStar PSAX User Guide* has an incorrect minimum value for the Revertive Line Timing feature. The default value is 300 seconds, but this can be set to a minimum revertive time of 60 seconds.

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