Quad E1/PRA Module

User Manual

Part Number 1200264L1

61200264L1-1A
April 1999

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Product Matrix	www.adtran.com/y2kfax.html
E-mail	year2000@adtran.com
Faxback Document Line	(256) 963-8200 *Y2K plans and product certifications are listed in the Product Matrix (see above)*
Y2K Project Line	(256) 963-2200

FCC regulations require that the following information be provided to the customer in this manual:

1. Your telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the proper operation of your equipment. If they do, you will be given advance notice to give you an opportunity to maintain uninterrupted service.
2. If you experience trouble with this equipment (ATLAS), please contact ADTRAN at (256) 963-8000 for repair / warranty information. The telephone company may ask you to disconnect this equipment from the network until the problem has been corrected or until you are sure the equipment is not malfunctioning.
3. This unit contains no user-serviceable parts.
4. The following information may be required when applying to your local telephone company for leased line facilities.

Federal Communications Commission Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio frequencies. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Shielded cables must be used with this unit to ensure compliance with Class A FCC limits.

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

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Chapter 1 Introduction

OVERVIEW

The Quad E1/PRA Module is a member of the ATLAS family of Integrated Access products and provides four channelized E1 or Primary Rate Access (PRA) interfaces. Using the available converter assembly (P/N 1200209L1), each interface impedance can be independently selected, and any port can serve as the primary or backup timing source for the entire system.

The Quad E1/PRA Module combines with the ATLAS base unit and other ATLAS modules to support requirements calling for multiple E1 and/or PRA circuits. As many Quad E1/PRA Modules can be installed in a system as can be physically accommodated in the ATLAS chassis.

Typical applications calling for ATLAS and the Quad E1/PRA Module include the following:

- Digital Access Cross Connect System (DACS). Any TS0 on any E1 circuit can be switched to any other TS0 on any other E1 circuit.
- E1Bandwidth Management. E1 circuits carrying voice, data, video, and other traffic can have their payload groomed and directed to the appropriate interface inside the ATLAS system.
- Digital Circuit Provisioning. When combined with the Octal BRI/U Module (P/N 1200186L1), the Quad E1/PRA Module can combine data from multiple dedicated-bandwidth U-interfaces into a single E1.

Figure 1-1 shows the E1 bandwidth management application.

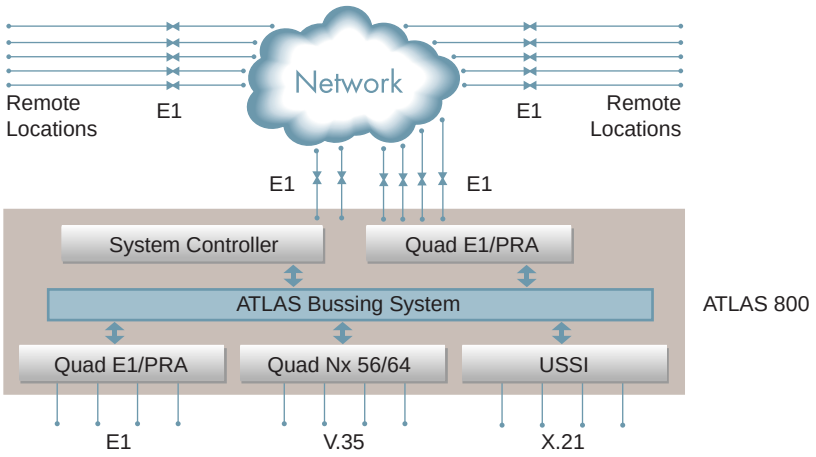

Figure 1-1. E1 Bandwidth Management Application

FUNCTIONAL DESCRIPTION

The Quad E1/PRA Module can be installed in any available option slot in the ATLAS chassis. The status of the module itself, as well as the circuits to which it interfaces, can be viewed from the ATLAS front panel. Additional status information is available via the terminal menu, accessible through either a VT 100 terminal connected to the ATLAS Base Unit's control port or through a Telnet session established through the base unit's Ethernet port. The Quad E1/PRA Module can be configured and application software can be downloaded using the terminal menu.

Features

- Four E1 interfaces
- Each interface configurable for 75-ohm unbalanced, 120-ohm balanced, or 75-ohm balanced impedance using the available converter assembly (P/N 1200209L1)
- Diagnostic loopback support (line, port)
- Various timing options
- Performance per G.821 and RFC1406
- HDB3 and AMI coding
- NFAS, FAS, TS16 MF and CRC-4 framing
- CCS and CAS signaling
- Supports inherent DACS capability of the ATLAS
- Report line performance data via SNMP in RFC1406 format
- Trunk conditioning for proper setting of alarmed and unused TS0s

Specifications

Each port of the Quad E1/PRA Module conforms to the following specifications:

Line rate	2.048 Mbps, ± 75 bps
Capacity	E1: 1 to 31 TS0s PRA: 30B +D
Line Codes	HDB3, AMI
Framing	NFAS, FAS, TS16 MF and CRC-4
Tests	Self test, line loopback, port loopback
Connectors	DB-15 (using supplied converter cable)
Terminating Impedance	120 ohms balanced ± 5% 75 ohms unbalanced ± 5% (with P/N 1200209L1) 75 ohms balanced ± 5% (with P/N 1200209L1)

PHYSICAL DESCRIPTION

The Quad E1/PRA Module plugs into any available option slot in the rear of the ATLAS 800 or ATLAS 800^{PLUS} (see Figure 1-2).

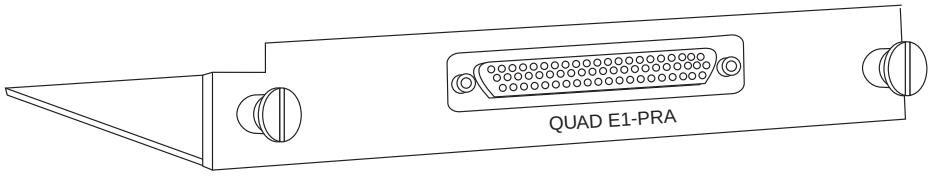

Figure 1-2. Quad E1/PRA Module

Chapter 2 Installation

UNPACK AND INSPECT

Carefully inspect the Quad E1/PRA Module for any shipping damages. If damage is suspected, file a claim immediately with the carrier and then contact ADTRAN Technical Support (see the last page of this manual for pertinent information). If possible, keep the original shipping container for shipping the Quad E1/PRA Module back for repair or for verification of damage during shipment.

Contents of ADTRAN Shipment

The following items are included in the ADTRAN shipment:

- Quad E1/PRA Module
- Quad E1/PRA Module *User Manual* (to be inserted into the *ATLAS User Manual*)
- One high density to Quad DB-15 female cable (ADTRAN P/N 3125I061).

INSTALLING THE QUAD E1/PRA MODULE

Figure 2-1 represents the action required for proper placement of the Quad E1/PRA Module, as described here:

1. Remove the cover plate from the ATLAS 800 or 800 ^{PLUS} rear panel.
2. Slide the Quad E1/PRA Module into the option slot until the module is firmly positioned against the front of the chassis.
3. Fasten the thumbscrews at both edges of the module.

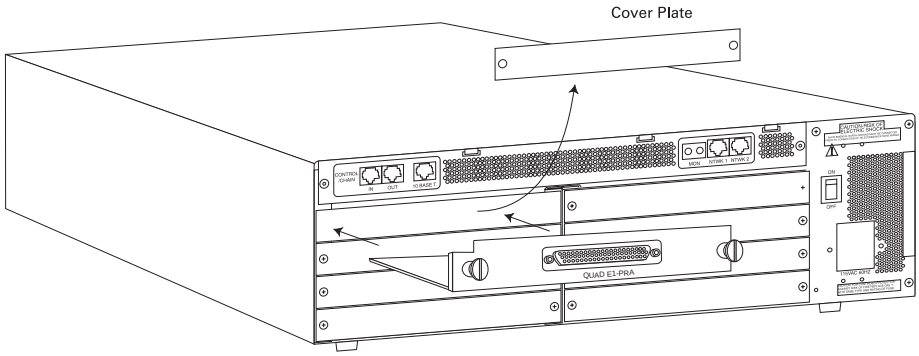

Figure 2-1. Installing the Quad E1/PRA Module

WIRING

Each port of the Quad E1/PRA Module offers a single DB-15 for connecting to the E1 or PRA circuit. Table 2-1 and Table 2-2 give the pinouts for the DB-15 connector and for the DB-62 connector on the module.

Table 2-1. Network Connection Pinout (DB-15)

DB-15		
Pin	**Name**	**Description**
1	RT	Receive Tip
2	GND	Ground
3	TT	Transmit Tip
4	GND	Ground
5	GND	Ground
7	GND	Ground
9	RR	Receive Ring
11	TR	Transmit Ring

Note: Pins that are not identified are not used.

Table 2-2. Module Connector Pinout (DB-62)

DB-62					
Pin	**Name**	**Description**	**Pin**	**Name**	**Description**
1	P4 TT	Port 4 Transmit Tip	42	GND	Ground
2	P4 TR	Port 4 Transmit Ring	43	P4 RT	Port 4 Receive Tip
3	GND	Ground	44	P4 RR	Port 4 Receive Ring
6	GND	Ground	45	GND	Ground
7	P3 TT	Port 3 Transmit Tip	48	GND	Ground
8	P3 TR	Port 3 Transmit Ring	49	P3 RT	Port 3 Receive Tip
9	GND	Ground	50	P3 RR	Port 3Receive Ring
12	GND	Ground	51	GND	Ground
13	P2 TT	Port 2 Transmit Tip	54	GND	Ground
14	P2 TR	Port 2 Transmit Ring	55	P2 RT	Port 2 Receive Tip
15	GND	Ground	56	P2 RR	Port 2 Receive Ring
18	GND	Ground	57	GND	Ground
19	P1 TT	Port 1 Transmit Tip	60	GND	Ground
20	P1 TT	Port 1 Transmit Ring	61	P1 RT	Port 1Receive Tip
21	GND	Ground	62	P1 RR	Port 1Receive Ring

Note: Pins that are not identified are not used.
Note: P(1-4) indicates the Port.

WARRANTY AND CUSTOMER SERVICE

ADTRAN will replace or repair this product within five years from the date of shipment if the product does not meet its published specification, or if it fails while in service. For detailed warranty, repair, and return information, refer to the ADTRAN Equipment Warranty and Repair and Return Policy Procedure (see the last page of this manual for pertinent information).

A return material authorization (RMA) is required prior to returning equipment to ADTRAN.

For service, RMA requests, or more information, see the last page of this manual for the toll-free contact number.

Chapter 3 Operation

OVERVIEW

The Quad E1/PRA Module can be configured and controlled from a variety of sources, including the following:

- The ATLAS front panel, providing minimal configuration and status support
- The terminal menu, allowing detailed configuration, status, and diagnostics
- SNMP, used primarily for reporting alarm conditions and system status

You can access the terminal menu using either a VT-100 terminal attached to the ATLAS Base Unit's control port or a Telnet session established through the Base Unit's Ethernet port. Detailed instructions on each of the supported management approaches are presented in the *ATLAS User Manual*.

To edit items in the terminal menu, you must have the appropriate password level. Each menu description in this section indicates the password level required for write and read access. See "Access Passwords" in the ***ATLAS User Manual*** *for detailed information on working with passwords. Security level 0 users can view and edit every available field. Security level 5 users can view any field but cannot edit.*

The remainder of this section describes the menu items available when managing the Quad E1/PRA Module via the terminal menu.

TERMINAL MENU STRUCTURE

ATLAS uses a form of hierarchical menus to access all features. The topmost menu level leads to submenus which are grouped by functionality. All menu items display in the terminal window.

Refer to the ***ATLAS User Manual*** *for detailed instructions on how to navigate through the terminal menu.*

The ATLAS system controller automatically detects the presence of the Quad E1/PRA Module when it is installed in the system. To see the menus for the Quad E1/PRA Module via the terminal menu, use the arrow keys to scroll to

the **Modules** menu and press **Enter** to access the module choices. Figure 3-1 shows the **Modules** menu. The following sections describe all the ATLAS **Modules** menu options.

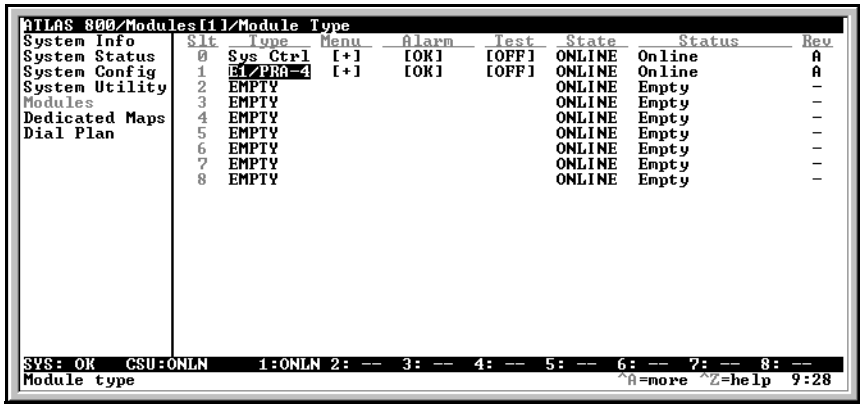

Figure 3-1. Modules Menu

MENU DESCRIPTION

To help you follow the terminal menu hierarchy, the following notations are used.

>MENUS
» Submenus
»» Sub-submenus

> SLT

Read security: 5
(Slot) Displays the number of available option slots in the ATLAS chassis. Slot 0 refers to the ATLAS Base Unit. This field is read-only.

> TYPE

Write security: 3; Read security: 5
Displays the type of module actually installed in the slot or the type of module you plan to install in the slot. If a Quad E1/PRA Module is installed, the **Type** field automatically defaults to **E1/PRI-4** (the Quad E1/PRI Module). You can use this field to preconfigure a system before installing modules by specifying the module that you want to install into each slot.

If you install one type of module in a slot, and then want to install a different type of module in the slot, you must set this field to Empty before selecting the other module type.

If a module is installed, the module type automatically displays the name of the installed module, and cannot be set to any other option.

> MENU

Displays additional status and configuration menus for the selected module. (To access the submenus for this item, use the arrow keys to scroll to the Menu column for the module you want to edit, and press **Enter**.) For detailed information on each submenu item, see *Menu Options* on page 3-4.

> ALARM

Read security: 5
Displays whether there is an alarm condition on the Quad E1/PRA Module. Press **Enter** in this field to activate the menu.

> TEST

Read security: 5
Displays whether the Quad E1/PRA Module is executing a test. Press **Enter** in this field to activate the menu.

> STATE

Write security: 3; Read security: 5
Displays whether the module is online or offline. Even though a module is physically installed, it must be marked **Online** for it to be considered an available resource. This field allows an installed module to be marked **Offline**, which may be useful in system troubleshooting. If you choose **Offline**, the module will not be in alarm condition, but will display **Offline**.

A module must be in the Online state in order for ATLAS to use the module for any data bandwidth.

> STATUS

Read security: 5
Read-only field that presents status information on the Quad E1/PRA Module. The following messages may display:

Online	The module is enabled and is responding to the system controller's status polls. This is the normal response of the system.
No Response	The module is enabled, but is not responding to the system controller's status polls. This response indicates either a problem in the system or that the module is not installed.
Empty	The system controller has not detected the presence of a module in the slot, nor has a module been manually enabled for this option slot.
Offline	The module is installed, but has been taken Offline by a user. The module is still responding to controller polls.
Offline/ No Response	The module is installed, but has been taken Offline by a user. The module is not responding to controller polls.
Not Supported	The module is not supported by the current system controller. Please call ADTRAN technical support or visit our Web site at www.adtran.com. (See, also, inside back cover.)

> REV

Read security: 5
(Hardware Revision) Read-only field that displays the hardware revision of the Quad E1/PRA Module.

MENU OPTIONS

Figure 3-2 shows the menu options available for the Quad E1/PRA Module. The following sections describe these options.

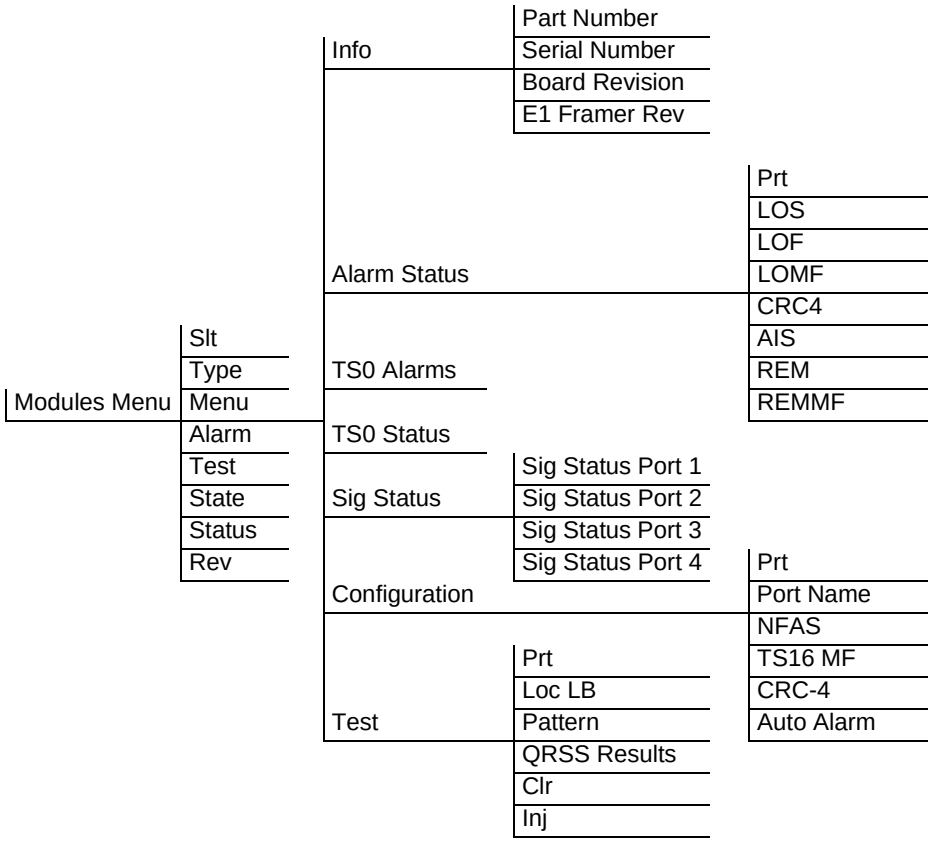

Figure 3-2. Quad E1/PRA Menu Tree

> INFO

Read security: 5

Indicates the status of the module (see Figure 3-3).

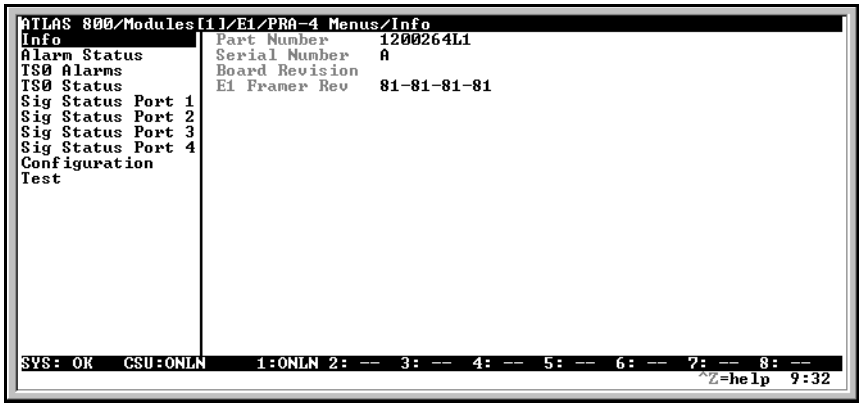

Figure 3-3. Info Menu

» Part Number

Displays the part number of the module (read only).

» Serial Number

Displays unique ADTRAN product serial number (read only).

» Board Revision

Displays the PCB revision (read only).

» E1 Framer Rev

Displays E1 framer hardware revision (read-only).

> ALARM STATUS

Read security: 5

Identifies, by port number, the status of various alarm conditions (see Figure 3-4).

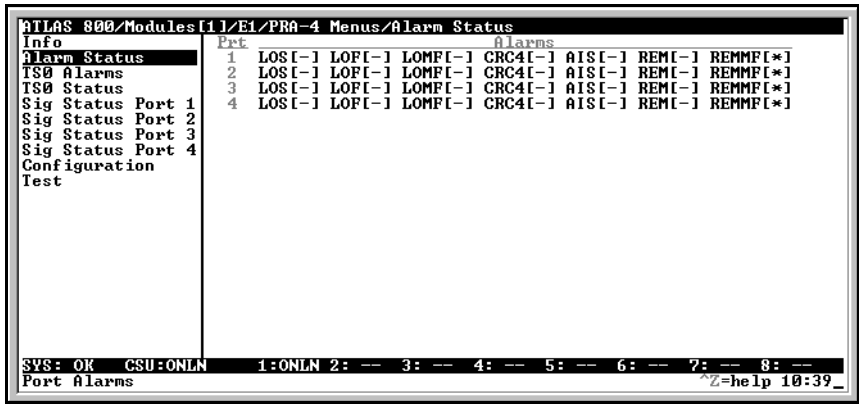

Figure 3-4. Alarm Status Menu

» Prt

(Port) Indicates the port number.

»» LOS

(Loss of Signal) Indicates no signal received on port interface.

»» LOF (Loss of Frame) Indicates that receiver is unable to synchronize to the FAS framing pattern of the received signal.

»» LOMF (Loss of Multi-Frame) Indicates that receiver is unable to synchronize to the TS16 multi-frame pattern of the received signal.

»» CRC4 (Loss of CRC-4 Framing) Indicates that receiver is unable to synchronize to the CRC-4 frame pattern of the received signal.

»» AIS (Alarm Indication Signal Received) Indicates that all ones are being received.

»» REM (Remote Frame Alarm) Indicates loss of frame alarm being received from far end.

»» REMMF (Remote Multi-Frame Alarm) Indicates loss of multi-frame alarm being received from far end.

> TS0 ALARMS

Read Security: 5

For each TS0 (Ports 1—4), displays an appropriate alarm code. This set of possible alarms is comprised mainly of alarms that indicate the failure of some upper-level protocol configured to be carried in the TS0 (read only). See Figure 3-5.

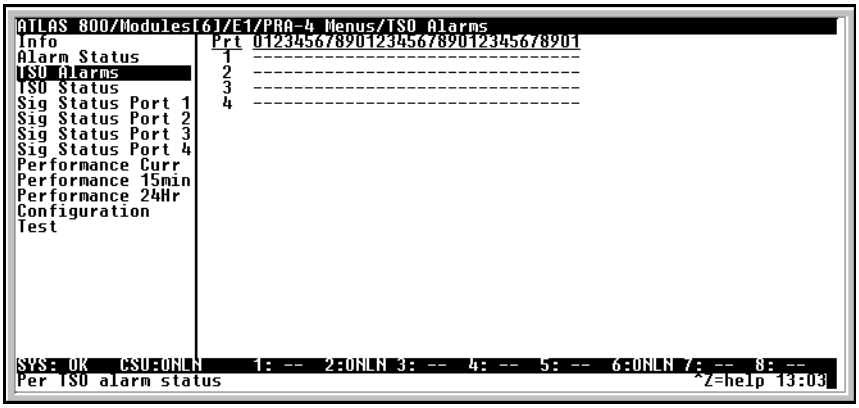

Figure 3-5. TS0 Alarms Menu

> TS0 STATUS

Read security: 5

For each TS0 (Ports 1—4), displays a code indicating the current usage for the TS0 (read only). See Figure 3-6.

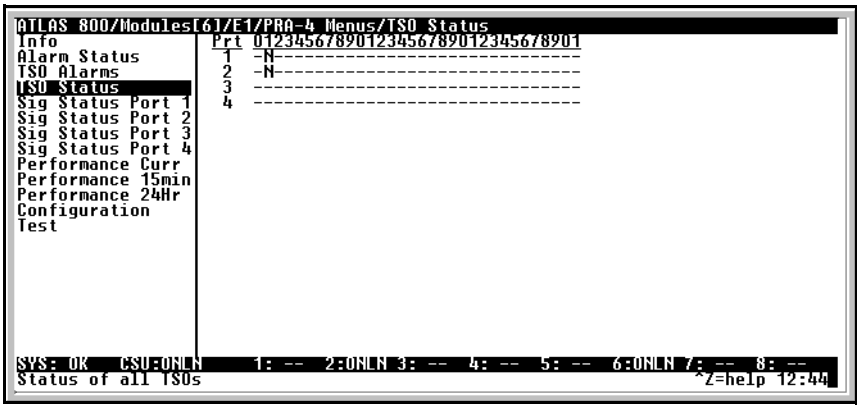

Figure 3-6. TS0 Status Menu

The current usage codes are as follow:

-	Inactive	**O**	Off hook detected
A	Active call on this TS0	**R**	Ringing detected
D	Active ISDN D Channel TS0	**F**	Framing TS0
M	Maintenance TS0	**S**	Signaling TS0
N	Dedicated TS0		

> SIG STATUS

Read security: 5

(Ports 1—4) Displays the state of the A/B/C/D signaling bits for Ports 1—4 of the Quad E1/PRA Module. Dashes indicate TS0s where signaling is not being transferred by the ATLAS (read only). See Figure 3-7.

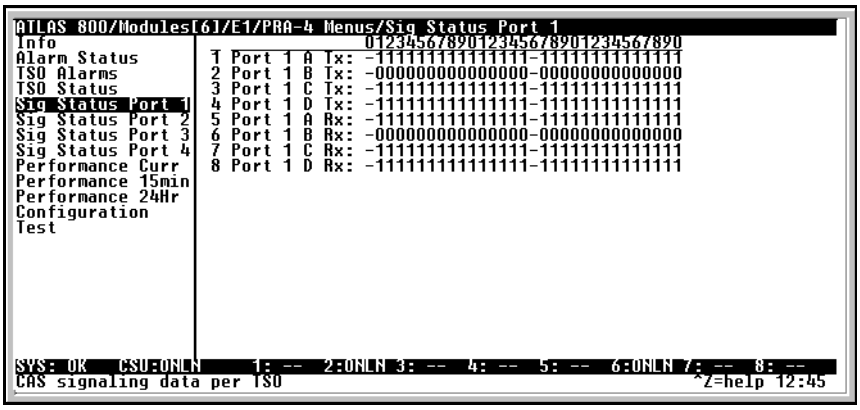

Figure 3-7. Sig Status Menu

> CONFIGURATION

All of the following configurable parameters apply regardless of whether the port is connected to a Primary Rate Access or channelized E1 circuit (see Figure 3-8).

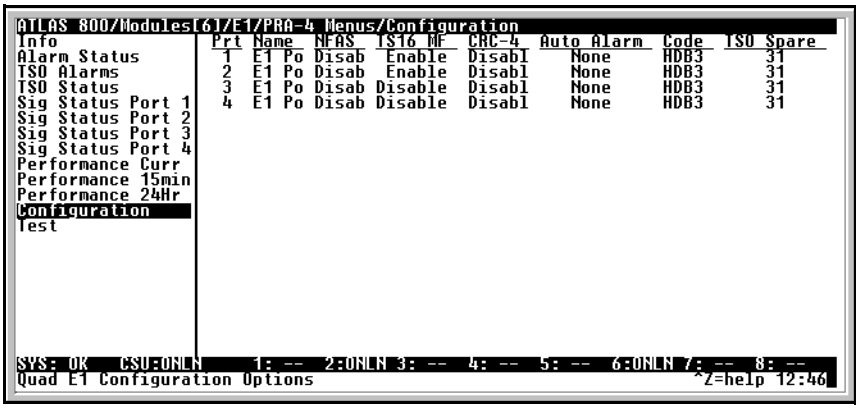

Figure 3-8. Configuration Menu

» Prt

Read security: 5
Displays the port number.

» Port Name

Write security: 3; Read security: 5
Enter any text up to 16 characters to uniquely identify each port on the Quad E1/PRA Module.

» NFAS

Write security: 3; Read security: 5
If enabled, the network interface receiver requires the NFAS word (TS0 0 in odd frames) and the FAS word (TS0 0 in even frames) for frame sync. When disabled, only the FAS word is needed for frame sync.

» TS16 MF

Write security: 3; Read security: 5
If enabled, the receiver requires MFAS word in TS16 to achieve sync. The transmitter outputs MFAS word in TS16 (see also, *CAS* on page 3-11).

» CRC-4

Write security: 3; Read security: 5
Transmits the CRC-4 checksum bits in the outgoing E1 data stream, when enabled. Also, checks the received signal for errors.

» Auto Alarm

Write security: 3; Read security: 5
Transmits a remote alarm when framing is lost (when Red Alarm Generation is on), and transmits an AIS alarm when all ones are received (when RCM AIS Generation is on).

» Code

Write security: 3; Read security: 5
Allows selection of line coding. HDB3 is normally the only coding method used on public networks. AMI may be selected for testing purposes.

» TS0 Spare

Write security: 3; Read security: 5
Allows setting of the TS0 spare bits, Sa4 (MXB) to Sa8 (LSB).

» Intl Bit

Write security: 3; Read security: 5
Allows setting of International Spare Bit.

> TEST

Write security: 4; Read security: 5
These options initiate different types of tests and display test results. The test menu contains the following menu options (see Figure 3-9).

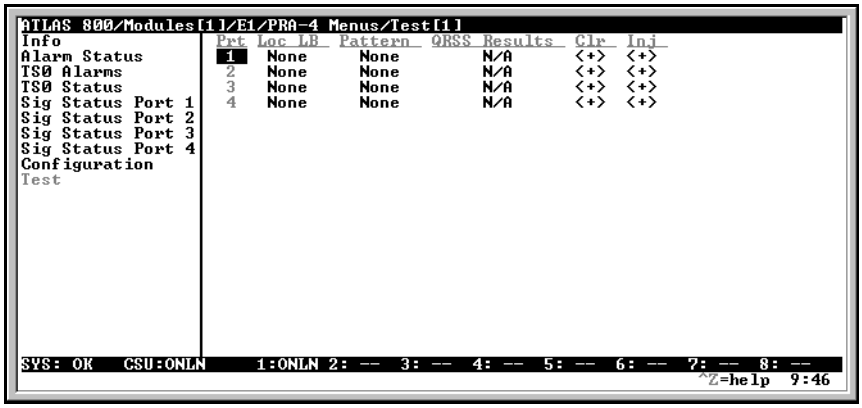

Figure 3-9. Test Menu

CAUTION *These test commands temporarily disrupt service.*

» Prt

Read security: 5
Displays the port number.

» Loc LB

Write security: 4; Read security: 5
(Local Loopback) Causes loopback on near-end port. The following options are available:

Line Metallic loopback (see Figure 3-10).

Port Internal loopback (see Figure 3-10).

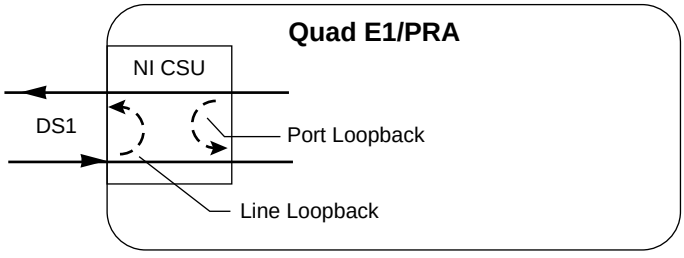

Figure 3-10. Network Loopback Test

» Pattern

Write security: 4; Read security: 5
Test pattern to be transmitted out the port. The following options are available:

All ones	framed ones
All zeros	framed zeros
QRSS	pseudorandom pattern with suppression of excess zeros

» QRSS Results

Write security: 4; Read security: 5
(Test Pattern Results) Indicates sync and errors of received data pattern.

» Clr

Write security: 4; Read security: 5
(Test Pattern Results Clear) Results clear - clears error counters on test pattern results menu.

» Inj

Write security: 4; Read security: 5
(Test Pattern Error Inject) Injects errors into transmitted test pattern.

ADDITIONAL ATLAS FEATURES

In addition to the Quad E1/PRA Module menu items, additional ATLAS menu items may be operated in conjunction with the Quad E1/PRA Module. These are **Factory Restore**, **Run Self Test**, and **Dedicated Maps**.

> FACTORY RESTORE

Factory Restore, a submenu of the ATLAS front panel main menu item **Utilities** (**UTIL**), restores the factory installed default setting for all Quad E1/PRA Module parameters. When **Factory Restore** displays, place the cursor on it and press **Enter**. The unit is restored to preset factory defaults and returns to the main ATLAS menu.

> RUN SELF TEST

Run Self Test, a submenu of the ATLAS main menu item **Test**, executes both the Quad E1/PRA Module internal test and the ATLAS internal test. For additional information on **Run Self Tes**t see the *ATLAS 800 User Manual*. When **Run Self Test** is displayed, place the cursor on it and press **Enter** to execute the test. The results of the self-test are displayed in the LCD.

> DEDICATED MAPS

TS0s are used as defined in the **Dedicated Map**. See the *ATLAS 800 User Manual* for detailed information.

Defining a port as a E1 or PRA is determined by the way it is assigned in the Dedicated Map or in the Dial Plan.

»» CAS

When **CAS** (channel associated signaling) is turned on, **TS16 MF** is turned on in the **Configuration** menu and **Signaling** is propagated across the link (see Figure 3-11 on page 3-11). When **CAS** is turned off, **Signaling** is no longer propagated. If MFAS framing is no longer required, turn off **TS16 MF** in the **Config** menu (see also, *TS16 MF* on page 3-8).

Figure 3-11. Dedicated Map View with CAS Turned On

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Product Support Information

Presales Inquiries and Applications Support

Please contact your local distributor, ADTRAN Applications Engineering, or ADTRAN Sales:

Applications Engineering	(800) 615-1176
Sales	(800) 827-0807

Post-Sale Support

Please contact your local distributor first. If your local distributor cannot help, please contact ADTRAN Technical Support and have the unit serial number available.

Technical Support	(888) 4ADTRAN

Repair and Return

If ADTRAN Technical Support determines that a repair is needed, Technical Support will coordinate with the Customer and Product Service (CAPS) department to issue an RMA number. For information regarding equipment currently in house or possible fees associated with repair, contact CAPS directly at the following number:

CAPS Department	(256) 963-8722

Identify the RMA number clearly on the package (below address), and return to the following address:

ADTRAN, Inc.
6767 Old Madison Pike
Progress Center
Building #6 Suite 690
Huntsville, Alabama 35806

RMA # _____