FLUKE ®

E1port Plus
Handheld E1/ATM Network Analyzer

Users Manual

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Table of Contents

Chapter	Title	Page

Appendices

Index

List of Tables

List of Figures

Chapter 1
Introduction

Contents	**Page**

About This Manual

The *E1port Plus Users Manual* describes how to operate the E1port Plus handheld E1/ATM analyzer and provides instructions on how to test and evaluate E1 networks and ATM services and equipment.

Who This Manual Is For

This manual provides pertinent technical information and instruction on the operation and use of the E1port Plus. It is written for anyone who uses this product to test and troubleshoot E1 and ATM networking problems, for those involved in the installation, maintenance, and deployment of E1 and ATM networks, and for individuals who perform network acceptance testing.

What You Should Know

This manual is not meant to be a tutorial in data communications and networking nor an ATM tutorial. A basic familiarity with wide-area networking, in general, and an in-depth understanding of E1 networks and ATM protocols, in particular, are required to effectively understand and use this manual.

How to Use This Manual

We suggest that the first-time user continue with this chapter, "Introduction". This chapter describes the features and capabilities of the E1port Plus and familiarizes you with the safety precautions regarding use of the tester.

Next read Chapter 2 "Controls and Connections". Before you begin using the E1port Plus, you should familiarize yourself with the functions of the keys, status indicators, and other elements on the tester's front panel. You also need to understand the menu interface and how to navigate through the E1port Plus menus. This chapter covers these fundamentals.

After you become acquainted with the tester's interface elements, go to Chapter 3 "Setting Up and Operating the E1port Plus", which shows you how to set up and program the overall operation of the tester so that it suits your particular style and preference for working.

The remaining chapters show you how to run specific tests and perform other operations necessary for troubleshooting network problems and monitoring network performance.

Notations and Typographical Conventions

The following notations and typographical conventions are used in this manual:

Key names	The names of keys are in boldface type.
	For example, the **AUTOTEST** key and the **Print** key.
Key sequences	A plus sign, as in **SHIFT 1 + M**, indicates that you should press and hold down the **SHIFT 1** key then press the **M** key.
Screen names	The names of screens are in capital letters and boldface type.
	For example, the **SYSTEM INFORMATION** screen.
Options	Options are boldface type.
	For example, the **Date** option.
Arrow keys	The arrow keys are the four keys that encircle the **ENTER** key.
	The name of an individual arrow key refers to the direction in which the arrow points: the **Up Arrow** key, the **Down Arrow** key, the **Left Arrow** key, and the **Right Arrow** key.
Italics	Italic type is used for emphasis.
	For example: Do *not* operate the unit in the presence of flammable gases.
Lists	Procedures are shown in sequentially numbered lists.
Monospace	Monospace type is used to indicate messages displayed on the tester's LCD.
	For example, `INITIALIZING ANALYZER`.
Cautions	A caution message advises you that failure to take or avoid a specific action can result in loss of data.
	All cautions are preceded by the word "Caution".
Warnings	A warning message cautions you that failure to take or avoid a specific action can result in physical harm to you or damage to the tester.
	All warnings are preceded by this symbol ⚠ and the word "Warning".

Introduction

The E1port Plus portable handheld tester provides an extensive set of E1 and ATM testing capabilities that address a broad range of test requirements for E1- and ATM-based transmission and communications systems.

With the growing deployment of the ATM technology, it is becoming increasingly important for service personnel to be able to quickly and effectively test ATM network equipment and services as well as E1 networks. The E1port Plus addresses this need by combining E1 testing capability with an advanced set of ATM testing features. This practical solution enables you to do detailed testing from the E1 physical layer up through the ATM layer. And, you can take the E1port Plus with you and do this testing either on the customer premises (inside the NID) or anywhere in the central office. With the E1port Plus, you can easily test and verify customer service contracts, ensure proper conformance of ATM equipment, and qualify network operation and performance.

The following sections describe the features and capabilities of the E1port Plus and provide important information about the operation and use of the tester.

Overview of E1port Plus Features and Capabilities

The E1port Plus provides you with E1 and ATM testing capability in a single, handheld design. At the physical layer, you can use the E1port Plus to diagnose many common E1 network problems. The tester provides complete E1 error and alarm transmission and monitoring capability so that you can effectively isolate E1 problems and test E1 networks from any access point. The E1port Plus also provides these features:

- Transmission and detection of E1 errors and alarms
- E1 frame testing
- E1 Bit Error Rate testing
- Line error measurements

At the ATM layer, the E1port Plus provides an advanced set of features that supports the monitoring of ATM network conditions, the testing and qualifying of ATM services, and ATM equipment installation testing. More specifically, you can:

- Automatically discover ATM activity and list up to 64 unique ATM headers that are in use along with their associated bandwidth allocations
- Transmit up to eight ATM streams with traffic profiles that simulate CBR and VBR service categories. Selected VBR traffic distribution patterns simulate random, burst, or network file transfer traffic.
- Determine the bit error rate experienced by test cell streams after transmission through a network
- Perform these Quality of Service (QoS) tests: Cell Loss, Cell Transfer Delay, and Cell Delay Variation (1- and 2-point)
- Test access to customer premise equipment using IP Ping transmission and monitoring capability
- Capture and view cell payloads so that user data can be analyzed
- Test I.610 OAM Fault Management and Performance Management functions
- Monitor I.610 OAM cells
- Perform AAL type detection
- Perform conformance testing using GCRA
- Test UNI point-to-point signaling procedures to assess Switched Virtual Circuit (SVC) capability

In addition to advanced diagnostic and testing capabilities, the E1port Plus gives you immediate feedback on the condition of any E1 circuit under test through its front-panel LEDs. The tester also lets you print test results, making it possible for you to produce reports of network statistics.

The E1port Plus Handheld Tester: at a Glance

The E1port Plus is an easy-to-use handheld tester. It is rugged yet lightweight, so you can use it anywhere. This tester has features and capabilities and a level of performance previously found only in large, benchtop analyzers. Figure 1-1 highlights these features.
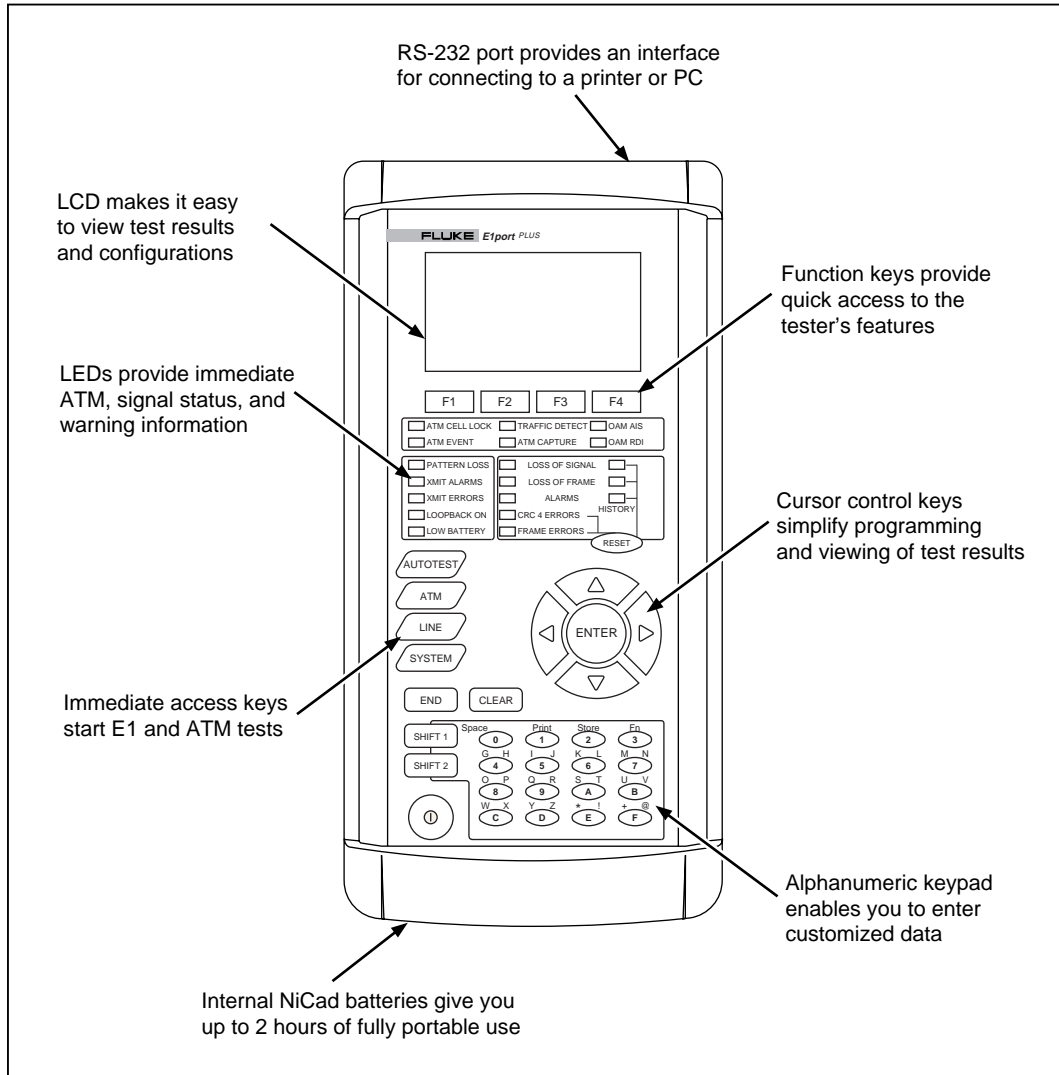
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Figure 1-1. E1port Plus Features

E1port Plus Specifications

Following are the physical and operational characteristics of the E1port Plus.

Physical

Size (L x W x H): approximately 26.5 cm x 13.0 cm x 6.0 cm (10.4" x 5.1" x 2.4") with boot

Weight: less than 1.3 kg (2.9 lbs.)

Display: 8-line by 21-character backlit LCD

LED indicators: ATM Cell Lock, Traffic Detect, OAM AIS, ATM Event, ATM Capture, OAM RDI, Pattern Loss, XMIT Alarms, XMIT Errors, Loopback On, Low Battery, Loss of Signal, Loss of Frame, Alarms, CRC 4 Errors, and Frame Errors.

Connectors: the connector you use depends on the type of network you are connecting to. There are two types of connectors:

- Miniature twin telephone input jack for Line In and Line Out connections that mate with "TT" Bantam Type .173-inch 3 conductor telephone plugs.

- BNC connector for coaxial cable.

Power

AC operation: operates from an external AC adapter/charger

Battery type: operates from an internal non-removable NiCad battery pack

Battery life: minimum battery life is two hours of continuous use

Battery recharge time: 12 hours maximum

Environmental

Operating temperature: 0° C to 50° C

Storage temperature: -20° C to 60° C

Humidity tolerance: 5% to 90% non-condensing

Standards Compliance

EMC: EN50081, including Amendment 1

Safety: EN60950

Telecomm: CTR12, CTR13

Certifications

CE168X

RS-232 Port

Connector: RJ-11

Baud rates: supports 1200, 2400, and 9600 bits per second

E1 Physical Layer

Receiver

Connector: BNC or Bantam

Bit rates:

- 1.920 Mbps data rate minimum +/-20 ppm

- 2.048 Mbps line rate +/-20 ppm

Input signal:

- Bantam

  ♦ Term or Bridge: 3.3 Volts peak, 3.0 Volts peak typical attenuated by 6000 feet of 120 ohm cable

  ♦ Monitor: 0.33 Volts peak, 0.3 Volts peak typical attenuated by 6000 feet of 120 ohm cable

- Coax

  ♦ Term: 2.6 Volts peak, 2.37 Volts peak typical attenuated by 6000 feet of 75 ohm cable

  ♦ Monitor: 0.26 Volts peak, 0.237 Volts peak typical attenuated by 6000 feet of 75 ohm cable

Input impedance:

- Bantam

  ♦ Term or Monitor: 120 ohm +/-20%

  ♦ Bridge: 1000 ohm +/-20%

- Coax

  ♦ Term or Monitor: 75 ohm +/-20%

Signal loss: Loss of Signal declared after 10 consecutive spaces received, approximately 4.88 us

Signal level meter: in Term mode, provides a measured level of the received signal within +/-20% accuracy

Transmitter

Output signal:

- Bantam: 3.0 Volts peak +/-10%, 120 ohm termination
- Coax: 2.37 Volts peak +/-10%, 75 ohm termination

Pulse shape: conforms to ITU-T Recommendation G.703

E1 Framing, Errors, and Alarms

Supported cell delineation: HEC

E1 errors detected: LCV, FEBE, Framing Error, CRC 4

E1 errors injected: Framing Error

E1 alarms detected: AIS, LOF, LOS, RAI, RED, MRAI, and T16AIS

E1 alarms generated: RAI, AIS, MRAI, and T16AIS

E1 Bit Error Rate test patterns:

- 2^{15} -1 pseudo-random pattern
- 2^{20}-1 pseudo-random pattern
- 2^{23}-1 pseudo-random pattern
- 11111111
- 00000000
- 10101010
- 11001100
- 3 in 24
- 1 in 8
- 2 in 8
- 1 in 16
- QRSS
- User-defined

ATM Layer

Cell alignment: ATM cells carried in E1 payload, byte-aligned

Rate adaptation: provided by the insertion of idle or unassigned cells

Cell delineation: performed by using the HEC mechanism as described in ITU I.432

Header Error Checksum: generated and checked as described in ITU I.432

Payload scrambling: supports scrambling of ATM cell payloads within the E1 cell stream

ATM Transmission

Cell transmission streams: capable of transmitting up to eight simultaneous cell streams at bandwidths that aggregate to 100% or less of the available bandwidth

Transmission parameters: provides configurable SCR, PCR, CDVT, and Maximum Burst Size parameters to configure each stream

Traffic patterns: CBR (Constant Bit Rate) and VBR (Variable Bit Rate), including Burst and Poisson patterns defined by Fluke Corporation

ATM Reception

Automatic circuit detection: automatic discovery and presentation of the first 64 active cell streams

Circuit monitor formats:

- Statistics in cell counts, cells per second, megabits per second, and percent bandwidth

- Cell header in VPI/VCI, GFC/PT/CLP/HCS, and hexadecimal representation

- Sorting by "as found", VPI/VCI (high to low and low to high), and frequency (high to low and low to high)

Cell capture:

- Cell capture buffer is capable of holding 500 complete cells.

- Each cell can be time-stamped, using a 24-bit timer that has a 488 ns resolution. The cell buffer presents time of arrival or inter-cell arrival times.

- Trigger mechanisms are provided, which are based on cell header information.

OAM cell detection: on a selected circuit, detects F4 and F5 flows (segment and end-to-end), AIS, RDI, Continuity Check, Loopback, Performance Management, Activation and Deactivation cells

ATM Tests

Bit Error Rate: available within a single ATM cell stream

QoS: 1-point and 2-point CDV, CTD, Cell Loss

AAL detection

IP Ping and IP Ping Responder

OAM testing and detection

Conformance testing with GCRA

SVC signaling procedures

Notices, Warnings, and Operating Restrictions

The E1port Plus is intended for use by qualified personnel inside a central office or on a customer premises in areas where the network is protected against voltage transients (SELV circuits). The E1port Plus is *not* rated for use outdoors on an E1 span or anywhere telephone network voltages may be present (TNV1 circuits).

The following general safety precautions must be observed during all phases of operation, service and repair of this instrument. Failure to comply with these precautions or with specific warnings in this manual violates safety standards of design, manufacture, and intended use of this instrument. Fluke Corporation assumes no liability for the customer's failure to comply with these requirements.

⚠**Warning**

- **For protection from electric shock hazard, the power cord ground must not be defeated.**

- **Do *not* operate the tester in the presence of flammable gases or fumes. Operation of any electrical instrument in such an environment constitutes a safety hazard.**

- **Do not remove the covers. There are no user-serviceable parts inside. To avoid electric shock, use only the supplied power module.**

- **Should the LCD display become damaged, the liquid crystal material can leak. Avoid all contact with this material, especially swallowing. Use soap and water to thoroughly wash all skin and clothing contaminated with the liquid crystal material.**

- **This tester contains a Nickel-Cadmium battery. Used batteries should be disposed of by a qualified recycler or hazardous materials handler. Contact your authorized Fluke Service Center for recycling information.**

Service and Adjustment

Service and adjustment of this tester is to be performed only by trained Fluke Corporation service personnel.

If the E1port Plus requires service, pack it in the original shipping container and send it, postage paid and insured, to the nearest Fluke Service Center. Include a written description of the problem. Fluke assumes no responsibility for shipping damage.

If the E1port Plus is covered under warranty, it will be promptly repaired or replaced (at Fluke's option) and returned to you, postage paid, at no charge. See the registration card for warranty terms. If the warranty has lapsed, Fluke will repair the tester for a fixed fee and return it to you postage paid. Contact the nearest Service Center for information and repair prices.

For service information in the USA, call 1-888-99-FLUKE (1-888-993-5853). Outside the USA, contact the nearest Fluke Service Center.

AC Adapter/charger

Only the AC adapter/charger supplied by Fluke Corporation may be used with this equipment. The use of any other AC adapter/charger is expressly forbidden and will void all warranty rights.

If the battery does not charge, contact a Fluke Service Center. The NiCad battery is rated 3.6 V 4AH (Fluke part number 623014) and the in-line battery fuse is rated 250 V 3A (Fluke part number 645173). Both items must be replaced by Fluke Service Center personnel only.

The AC socket outlet shall be installed near the equipment and shall be easily accessible. Failure to have this outlet easily accessible may constitute a safety hazard.

Checking Your Package

Take time to check the contents of your E1port Plus package. The following items are included:

- *E1port Plus Users Manual*
- E1port Plus network analyzer with boot
- Padded soft case
- AC adapter/charger with power cord
- RJ-11 to DB-9 cable
- DB-9 to DB-25s female adapter
- DB-9 to DB-25s male adapter

Technical Support

Fluke Corporation offers a variety of support options to help you get the most from your E1port Plus. If you require technical support, please have the following information available:

- Your name and company
- E1port Plus model number and serial number
- E1port Plus software revision that appears when you power on the tester
- Any error messages or flags that appear on the screen
- Make, model numbers, and configurations of equipment under test
- A printout of the setup parameters for the E1port Plus

For application or operation assistance or information about the E1port Plus, call:

USA and Canada: 1-888-993-5853
Europe: +31 402-678-200
Japan: +81-3-3434-0181
Singapore: +65-738-5655
Anywhere in the world: +1-425-356-5500

Or, visit Fluke's Web site at www.fluke.com.

Chapter 2
Controls and Connections

Contents   **Page**

Introduction

This chapter familiarizes you with the physical layout of the E1port Plus so that you know where the various controls and connections are located and understand the functions of the keys and general status indicators. This chapter also describes the E1port Plus menu interface and shows you how to access and navigate through its menu system.

The Connector Panel

The connector panel (Figure 2-1) is located at the top of the tester. It contains the following:

- **Printer/download serial port**

  This is an RJ-11 female jack that accepts the Fluke-supplied serial conversion cable. With this cable, you can connect to a local printer or computer.

- **E1 signal connectors**

  The IN and OUT connectors connect to the transmit and receive ports of an E1 network. The type of connector you use (Coax or Bantam) depends on the port you are connecting to.

- **DC power input**

  This is the connector for the AC power adapter/charger. This connector accepts 5 VDC input.

⚠ Warning
Only an AC adapter/charger supplied by Fluke Corporation can safely be used with the E1port Plus. Use of any other adapter voids your warranty and can damage the tester.
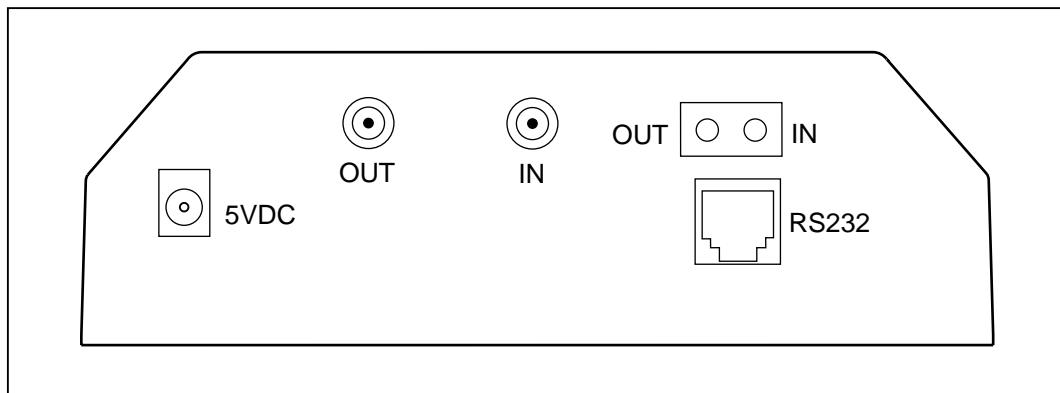
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Figure 2-1. The Connector Panel is Located at the Top of the Tester

The Front Panel

Figure 1-1 is a representation of the front panel. This section describes each of the areas on the front panel.

LCD

The E1port Plus has an 8-line by 21-character Liquid Crystal Display (LCD), which is located at the top of the front panel (see Figure 2-2). The LCD displays the tester's menus as well as any error messages, test results, and setup parameters.

Function Keys

Just below the LCD are four keys labeled **F1**, **F2**, **F3**, **and F4**. The function of these keys is screen dependent. To find out the current function of a key, look on the LCD directly above its name key. For example, in Figure 2-2, the function keys perform the following actions on the **ATM BER TEST** (P1) screen:

- **F1** (PGDN) displays the next page.
- **F2** (INJCT) injects a single error.
- **F3** (START) starts an ATM BER test.
- **F4** (BACK) returns you to the **ATM TESTS** menu.
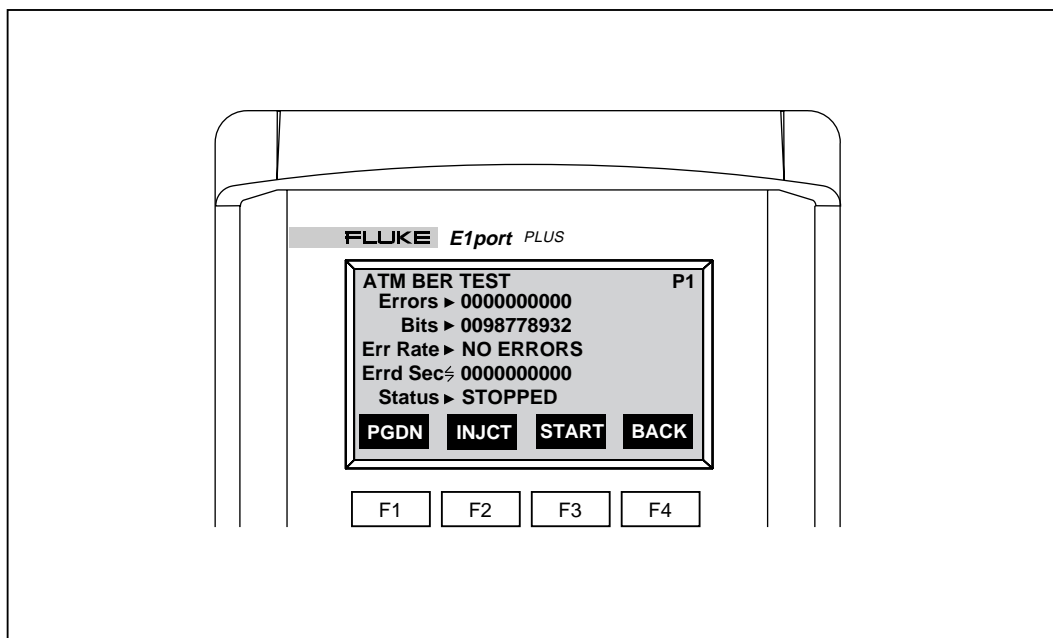
Aai004f.eps

Figure 2-2. The Function Keys are Screen Dependent

ATM LEDs

The E1port Plus has six ATM LEDs. These LEDs are located on the front panel immediately below the four function keys (see Figure 2-3).
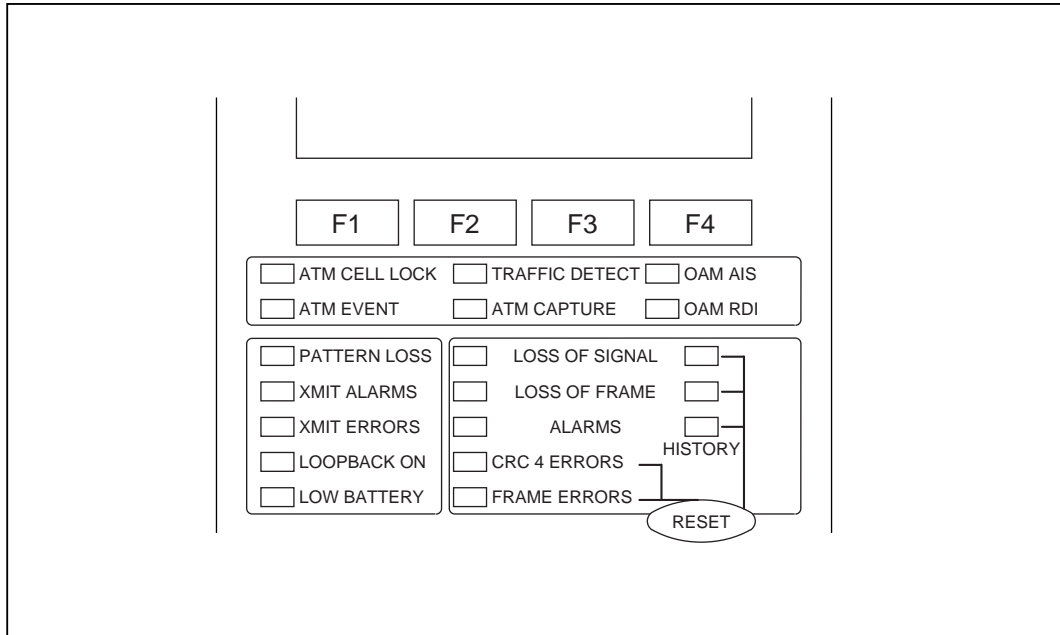
aai005f.eps

Figure 2-3. Front Panel ATM, Status, and Warning LEDs

The ATM LEDs, when lit, indicate the following conditions:

- **ATM CELL LOCK**

  Lights green when ATM cell delineation is achieved, indicating that ATM cells are currently being detected in the received E1 transmission. This LED is off if there is no ATM cell delineation.

- **TRAFFIC DETECT**

  Lights green whenever cells other than idle or unassigned are detected in the last second. Updated every second.

- **OAM AIS**

  Lights yellow whenever the tester detects an Alarm Indication Signal (AIS) OAM cell while running OAM detection or OAM tests.

- **ATM EVENT**

  Undefined in the current release.

- **ATM CAPTURE**

  Lights green when the programmed conditions for capturing ATM cells are met.

- **OAM RDI**

  Lights yellow whenever the tester detects a Remote Defect Indication (RDI) OAM cell while running OAM detection or OAM tests.

Status LEDs

The status LEDs are found on the left side of the tester directly under the row of ATM LEDs (see Figure 2-3). These LEDs indicate the operational status of your E1port Plus.

- **PATTERN LOSS**

  Lights to indicate that the tester is not synchronized to the configured BER test pattern.

- **XMIT ALARMS**

  Lights whenever the tester is transmitting an alarm.

- **XMIT ERRORS**

  Lights whenever the tester is transmitting an error.

- **LOOPBACK ON**

  Lights when the tester is a loopback mode.

- **LOW BATTERY**

  When flashing, this LED indicates that the tester is critically low on battery power. When this condition occurs, connect the tester to the supplied AC adapter/charger and recharge it (see "Responding to Low Battery Warnings" in Chapter 3 for details).

  When constantly lit, this LED indicates that the tester has a couple of minutes of operating time remaining.

Warning LEDs

The E1port Plus has five warning LEDs (see Figure 2-3), which light under the following circumstances:

- **LOSS OF SIGNAL**

  Lights red to indicate a loss of signal level at the E1 input connection and/or a very low ones density, which causes a dropout of the E1 signal.

  Lights yellow (history) to indicate that a loss of signal was detected at some time in the past but is no longer being detected.

- **LOSS OF FRAME**

  Lights red to indicate a loss of E1 framing.

  Lights yellow (history) to indicate that a loss of E1 framing was detected at some time in the past but is no longer being detected.

- **ALARMS**

  Lights red when the tester detects an E1 alarm.

  Lights yellow (history) to indicate that an E1 alarm was detected at some time in the past but is not currently being detected.

- **CRC 4 ERRORS**

  Lights when the tester detects CRC4 and/or CAS errors.

  Note

  The type of error detected is a function of selections that you make when you configure the tester. See "Setting Up the E1port Plus for E1 Network Testing" in Chapter 4 for details.

- **FRAME ERRORS**

  Lights when the tester detects framing errors.

  Note

  The tester maintains a count of frame errors. See "Monitoring a Signal for Errors and Alarms" in Chapter 4 for details.

RESET Key

The **RESET** key is located on the right side of the tester just below the warning LEDs (see Figure 2-3). Pressing this key clears the warning history (yellow) LEDs.

Immediate Access Keys

The E1port Plus has four immediate access keys (see Figure 2-4). These keys, when pressed, immediately display the main menu for the function named on the key.

The immediate access keys are located halfway down the left side of the front panel. They have the following functions:

- **AUTOTEST** accesses the automatic test routines.

- **ATM** accesses ATM tests and setups.

- **LINE** accesses Line tests and setups.

- **SYSTEM** accesses system configuration parameters.
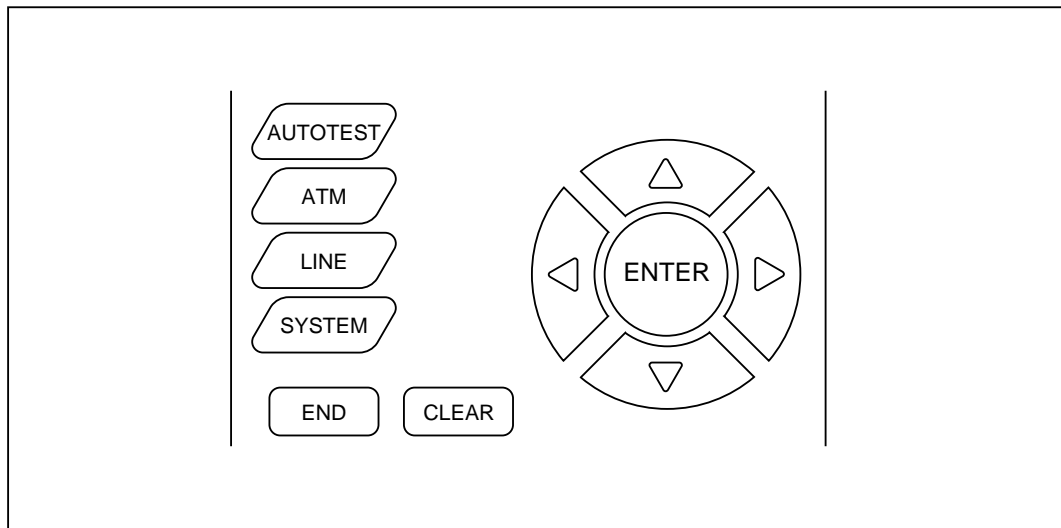
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Figure 2-4 Immediate Access, Arrow, and ENTER Keys

Arrow Keys and the ENTER Key

The arrow keys are the four arrow-shaped keys that encircle the **ENTER** key (see Figure 2-4). These keys control the on-screen cursor and, when pressed, move you to the different fields on a menu.

The **ENTER** key, when pressed, selects the option that is currently highlighted or the setting that the cursor is positioned on.

The END Key

The **END** key is located directly under the immediate access keys (see Figure 2-4). Pressing **END** once places you at the top-level introductory screen. Pressing **END** twice in quick succession resets the tester and places you at the top-level introductory screen (see Figure 3-1).

The Clear Key

The **CLEAR** key is to the right of the **END** key (see Figure 2-4). Pressing **CLEAR** resets all of the counters on a test result screen to zero.

Alphanumeric Keypad

The alphanumeric keypad is located at the bottom of the front panel (see Figure 2-5). You use this keypad to type test parameters and to make changes to information on a menu. The oval-shaped gray keys contain the values 0-F and are used to enter numeric and hexadecimal values. When you press a gray key, the value contained on the face of the key is displayed on the LCD.

Above each gray key is a pair of alphabetic characters from G-Z, a command name (for example, **Print**), or a pair of special characters, such as the space, asterisk (*), or exclamation mark (!).

Notice that the color of a character or command name above each gray key is either yellow or white and that the color corresponds, respectively, to the color of the **SHIFT 1** or **SHIFT 2** key. When you press and hold a yellow or white **SHIFT** key, then press a gray key, the tester displays the character or performs the command whose color corresponds to the color of the **SHIFT** key. For example, if you press and hold **SHIFT 1**, then press **Print**, the information associated with the current screen is printed.
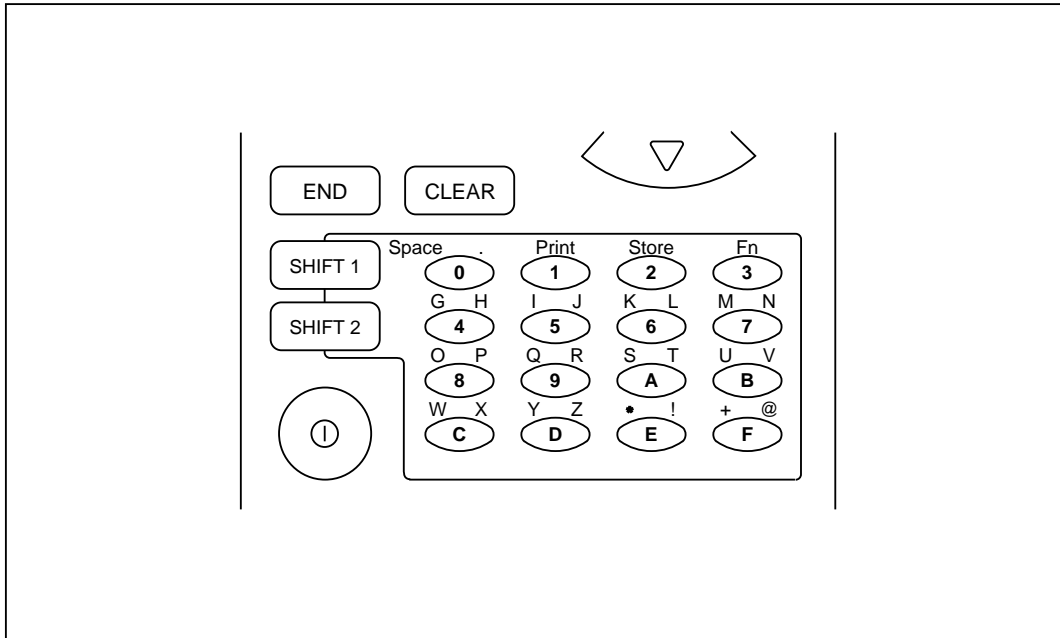
ta007f.eps

Figure 2-5. Use the Alphanumeric Keypad to Type Test Parameters

The Print, Store, and Function (Fn) Command Keys

The **Print**, **Store,** and **Fn** keys are located on alphanumeric keypad above the **1, 2,** and **3** keys, respectively (see Figure 2-5). These keys are used with the yellow **SHIFT 1** key. Table 2-1 lists these command keys and describes their function.

Table 2-1. Function of Print, Store, and Fn keys

Key Name	Purpose
Print	Prints test result and configuration information. See Appendix A for representative samples of the printouts you can obtain.
Store	Not implemented in this release.
Fn	A general function key which is used to graphically display ATM results.

The E1port Plus Menu System

The E1port Plus has a menu interface. Figure 2-6 illustrates the structure of the menu system
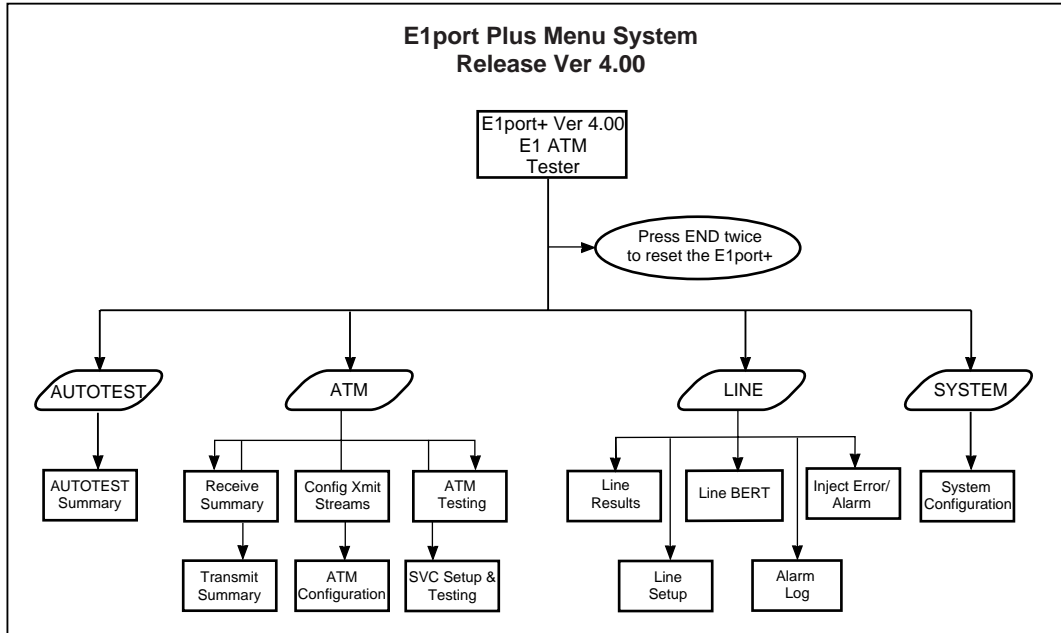
Aai008f.eps

Figure 2-6. E1port Plus Menu System

Displaying a Main Menu

A main menu contains entries that are grouped according to the types of operations they perform. The E1port Plus has four main menus:

- **AUTOTEST**

- **LINE SELECTIONS**

- **ATM SELECTIONS**

- **SYSTEM INFORMATION**

To display a main menu, press one of the four immediate access keys located on the left side of the tester.

Choosing an Option from a Main Menu

To choose an option from a main menu, press the **Up** or **Down Arrow** key to move the cursor to the option. When the option is highlighted, press **ENTER**. The menu or screen associated with the option is displayed.

The Menu Page and Screen Page

The main elements of a menu and screen page are identified in the Figure 2-7 and described in the text that follows.
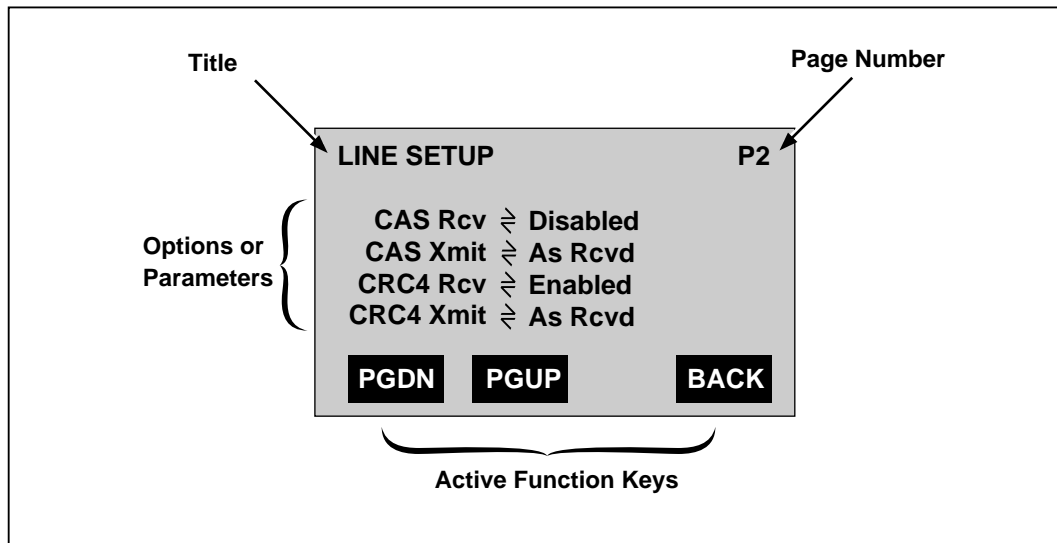
Aai010f.eps

Figure 2-7. Sample Screen Page

A menu or screen page has four main parts:

- Title

  The title of a menu or screen is located on the first line. In Figure 2-7, the title of the screen is **LINE SETUP**.

- Page number

  Most menus and screens have more than one page of entries. If there is more than one page, the page number is displayed in the upper right. In Figure 2-7, you are viewing Page 2 (P2).

- List of menu options or parameters

  Options or parameters are found under the title. In Figure 2-7, the screen has four parameters: **CAS Rcv**, **CAS Xmit**, **CRC4 RCV**, and **CRC4 Xmit**.

- Function key names

  The function keys that are active for the displayed menu or screen are located at the bottom of the screen. In Figure 2-7, three function keys are active: the **PGDN** (Page Down), **PGUP** (Page Up), and **BACK** keys.

Special Symbols Used on the Menus and Screens

The E1port Plus uses special symbols on its menus and screens to guide you in the operation of the tester. Table 2-2 lists these symbols and describes their meaning.

Table 2-2. Symbols Used on E1port Plus Menus

Symbol	Description
⇆	Indicates that you can select a setting or value for the option by pressing the **Left** or **Right Arrow** key.
⋮	Indicates that you can supply a value for the option by using the keypad.
▶	Indicates that what follows it is an information field that has no choices and cannot be modified.
↴	Indicates that you can select a setting for the option by pressing the **Left** or **Right Arrow** key. After you select a setting, press **ENTER** to view a menu for the option.
_	Indicates that the option is disabled or deactivated.
✓	Indicates that the option is enabled or activated or specifies a "CARE" (include) condition for a parameter.
X	Indicates that a parameter can be sent only once or specifies a "DON'T CARE" condition for a parameter.

Exiting a Menu

There are three ways to exit a menu:

- If you want to return to the top-level introductory menu, press **END**.

- If you are at one level in a menu's hierarchy and want to go up to the next level, press **F4**(BACK).

- If you want to go to a main menu, press the desired immediate access key.

Setting Up and Operating the E1port Plus

Contents   Page

Introduction

This chapter covers the basics of setting up and operating the E1port Plus. The first section guides you through connecting the tester to an external power source, external peripherals, and the network.

The second section covers basic E1port Plus operations. You learn how to turn on the tester and perform such fundamental tasks as clearing the display, setting the date and time, printing results and configuration reports, and running the automatic tests.

Connecting the E1port Plus

This section shows you how to connect the E1port Plus to an external power source and how to connect the tester to a printer or PC so that you can store or print test results and configurations. The information in this section also shows you how to connect the tester to the network.

Connecting to the External Power Supply

When the tester is connected to an AC outlet, you can use the power supply as a continuous power source. In this way, you can test for long periods of time without concern for depleting the batteries. The power supply also allows you to recharge the tester's battery.

To connect the tester to an AC outlet, follow these steps:

1. Plug the AC adapter/charger into an AC outlet.

2. Connect the power supply jack to the 5 VDC jack on the connector panel (see Figure 2-1).

3. Turn on the E1port Plus and begin usage.

Connecting the E1port Plus to a Printer or PC

The E1port Plus can interface with a printer or a personal computer. This capability enables you to directly print paper copy of acquired test results or copy results to a file for later printing.

To connect the tester to a printer or a PC, you need the following supplied accessories:

- RJ-11 to DB-9 female cable for direct connection to a PC

- DB-9 male to DB-25 female adapter for connection to a computer

- DB-9 male to DB-25 male adapter for connection to a printer.

Note

*If you have trouble connecting your tester to a printer or PC, you
may need additional equipment. Contact Fluke Technical Support for
assistance.*

Tables 3-1 through 3-4 describe the serial control signals available at each of the
connectors. Refer to these tables when establishing working connections.

Table 3-1. RJ-11 Pin Descriptions

Pin	3	4	5	6	1,2
Description	CTS clear to send	RXD receive data	TXD transmit data	RTS request to send	GND signal ground

Table 3-2. Serial Port DB-9 (Female) Computer Connector Socket Descriptions

Pin	7	3	2	8	5
Description	CTS clear to send	RXD receive data	TXD transmit data	RTS request to send	GND signal ground

Table 3-3. Serial Port DB-25-(Female) Computer Connector Socket Descriptions

Pin	4	2	3	5	7
Description	CTS clear to send	RXD receive data	TXD transmit data	RTS request to send	GND signal ground

Table 3-4. Serial Port DB-25 (Male) Printer Connection Pin Descriptions

Pin	5	3	2	4	7
Description	CTS clear to send	RXD receive data	TXD transmit data	RTS request to send	GND signal ground

To connect the tester to a printer or PC:

1. Plug the RJ-11 end of the serial cable into the RS-232 jack, which is located on the connector panel (see Figure 2-1).

2. Plug the DB-9 end of the serial cable into the serial port on the printer or PC.

Note

You may need to adapt the DB-9 end of the serial cable with one of the supplied DB-9 to DB-25 adapters.

3. Set the baud rate on the tester. To do this:

    a. Press **SYSTEM** to display the **SYSTEM INFORMATION** (P1) screen.

    b. Press **F1**(PGDN) twice to display the **SYSTEM INFORMATION** (P3) screen:

```
┌──────────────────────────────────────┐
│ SYSTEM INFORMATION            P3      │
│           SW Ver► 4.00, 25            │
│          Remote► Enabled              │
│      EIA232 Spd⇕ 9600                 │
│            Sound⇕ On                  │
│      Set  Factory  Defaults           │
│   ┌──────┐ ┌──────┐                   │
│   │ PGDN │ │ PGUP │                   │
│   └──────┘ └──────┘                   │
└──────────────────────────────────────┘
```
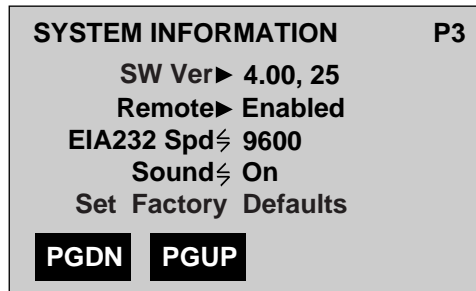
ta019f.eps

    The cursor is positioned on the **EIA232 Spd** parameter.

    c. Press the **Right** or **Left Arrow** key to select the appropriate interface speed (9600, 2400, or 1200 baud) for your application.

4. Configure your printer or PC as follows:

    *   Baud rate   Match E1port Plus
    *   Data bits   8
    *   Stop bits   1
    *   Parity   None

5. To test the connection, press **END**.

   The tester returns you to the top-level introductory screen. The printer or PC running the terminal emulation program prints or displays this message: E1port Plus.

Connecting the E1port Plus to the Network

Depending on the interface, you need two Bantam or two BNC cables to connect to the network.

Note

*Make sure that you select the appropriate connector setting for the tester. To do this, display Page 1 of the **LINE SETUP** menu. For the **Connector** parameter, select **Bantam** or **Coax**.*

To connect your E1port Plus to the network:

1. To receive network signals, connect one end of the cable to the E1port Plus IN connector (see Figure 2-1). Connect the other end to the transmit (Tx) port of the equipment under test.

2. To transmit network signals, connect a second cable to the E1port Plus OUT connector. Connect the other end to the receive (Rx) port of the equipment under test.

Note

To create a loopback situation to verify E1port Plus operation, connect one end of a single cable into the IN jack. Connect the other end of this cable into the OUT jack.

Performing Basic Operations

You need to know some fundamental things about how to operate the E1port Plus before you can start to configure the tester to perform tests or to acquire test results. In this section, you learn how to turn on the tester and how to do essential tasks that you will need to operate the tester.

Turning on the E1port Plus

To turn on the E1port Plus:

1. Press the **ON/OFF** button, which is located on the lower left side of the front panel.

   The LCD lights up, and this message is displayed: Initializing Analyzer. Please wait.

The tester's LEDs light in sequence. After the tester finishes initializing, it beeps and displays the top-level introductory screen (see Figure 3-1).

```
            FLUKE
    E1port+   Ver  4.00
   01-21-99      12:45:01
          E1  ATM
          TESTER


   COPYRIGHT  (c)1996,99
      Fluke Corporation
```

aai015f.eps

Figure 3-1. Top-Level Introductory Screen

2. Connect a loopback cable or connect the E1port Plus to the network (see "Connecting the E1port Plus to the Network" for details).

Setting the Date and Time

The E1port Plus contains a real-time clock. To set the date and time, follow these steps:

1. Press **SYSTEM** to display the **SYSTEM INFORMATION** (P1) screen.

2. Press **F1**(PGDN) to display the **SYSTEM INFORMATION** (P2) screen:

```
SYSTEM INFORMATION          P2
12-21-98                4:43:52
Backlight ⇌  On
 Contrast ⇌  5
     Date:  12-21-98
     Time:  04:41

 PGDN   PGUP
```
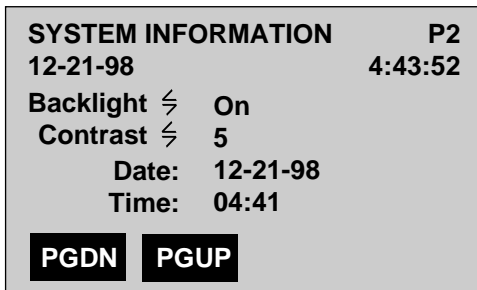
Ta018f.eps

3. Press the **Down Arrow** key to move the cursor to the **Date** parameter. Then, use the keypad to supply the desired date.

4. Press the **Down Arrow** key to move the cursor to the **Time** parameter. Then, use the keypad to supply the desired time (in 24-hour format).

The tester is now set up with your date and time selections.

Adjusting the Contrast and Backlight of the LCD

If your screen is too light or too dark, you may need to adjust the contrast or the backlight (the light behind the LCD). Follow these steps:

1. Press **SYSTEM** to display the **SYSTEM INFORMATION** (P1) screen.

2. Press **F1**(PGDN) to display the **SYSTEM INFORMATION** (P2) screen:

```
SYSTEM INFORMATION          P2
12-21-98                4:43:52
Backlight ⇋  On
 Contrast ⇋  5
     Date:  12-21-98
     Time:  04:41

PGDN   PGUP
```

Ta018f.eps

The cursor is positioned on the **Backlight** parameter's setting.

3. To change the lighting behind the LCD, press the **Left** or **Right Arrow** key to change **Backlight** setting.

4. To change the contrast, press the **Down Arrow** key to move the cursor to the **Contrast** parameter. Then, do one of the following:

    *   Press the **Left Arrow** key to reduce the contrast.

    *   Press the **Right Arrow** key to increase the contrast.

Note

*You can also press **F1** and **F2** from the introductory display to adjust the contrast of the LCD. Pressing **F1** decreases the contrast, and pressing **F2** increases the contrast.*

Turning the Audible Tone On or Off

You can enable or disable the beeping sound that is produced when you press the tester's keys. To do this, follow these steps:

1. Press **SYSTEM** to display the **SYSTEM INFORMATION** (P1) screen.

2. Press **F1**(PGDN) twice to display the **SYSTEM INFORMATION** (P3) screen:

```
┌──────────────────────────────────┐
│ SYSTEM INFORMATION        P3     │
│       SW Ver► 4.00, 25           │
│       Remote► Enabled            │
│   EIA232 Spd⇵ 9600               │
│        Sound⇵ On                 │
│   Set  Factory  Defaults         │
│                                  │
│  PGDN    PGUP                    │
└──────────────────────────────────┘
```
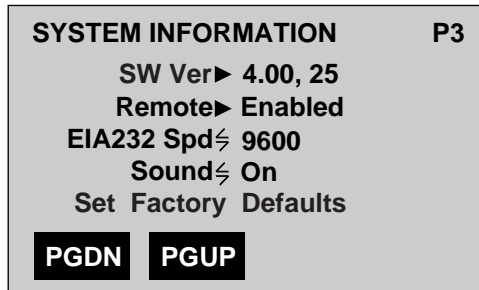
Ta019f.eps

The cursor is positioned on the **EIA232 Spd** parameter.

3. Press the **Down Arrow** key to move the cursor to the **Sound** parameter, which has two settings:

   - **On** turns the sound on.
   - **Off** turns the sound off.

4. Press the **Left** or **Right Arrow** key to select the desired setting.

Changing the Communications Speed

The default serial port speed for the RS232 port is 9600. To change the speed, complete the following:

1. Press **SYSTEM** to display the **SYSTEM INFORMATION** (P1) screen.

2. Press **F1**(PGDN) twice to display the **SYSTEM INFORMATION** (P3) screen:

```
┌─────────────────────────────────┐
│ SYSTEM INFORMATION        P3    │
│         SW Ver▶ 4.00, 25        │
│         Remote▶ Enabled         │
│     EIA232 Spd⇋ 9600            │
│          Sound⇋ On              │
│     Set  Factory  Defaults      │
│                                 │
│   [PGDN]   [PGUP]               │
└─────────────────────────────────┘
```
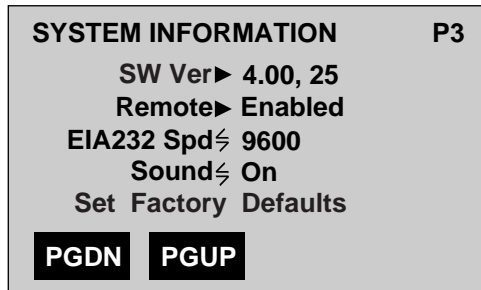
Ta019f.eps

The cursor is positioned on the **EIA232** parameter.

3. Press the **Left** or **Right Arrow** key to select one of the available baud rates: 9600, 2400, or 1200.

The tester is now set up with the serial port speed you selected.

Restoring the Default Settings

You can restore all of the tester's settings to their original values (as shipped by the factory). Restoring the tester's default settings is a useful task when you want to put the tester in a known state.

To restore the default settings, complete the following:

Caution

When you restore the factory default settings, any settings that you previously programmed for the unit are permanently erased.

1. Press **SYSTEM** to display the **SYSTEM INFORMATION** (P1) screen.

2. Press **F1**(PGDN) twice to display the **SYSTEM INFORMATION** (P3) screen:

```
SYSTEM INFORMATION        P3

       SW Ver▶ 4.00, 25
       Remote▶ Enabled
   EIA232 Spd⇵ 9600
        Sound⇵ On
   Set  Factory  Defaults

  PGDN    PGUP
```

Ta019f.eps
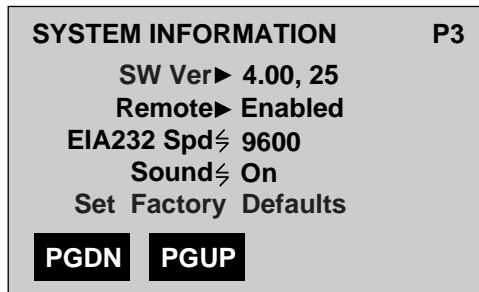
The cursor is positioned on the **EIA232 Spd** parameter.

3. Press the **Down Arrow** key to highlight the **Set Factory Defaults** parameter.
   Then, press **ENTER**.

   The tester beeps and displays this message: Unit Resetting. The E1port
   Plus restores all settings to their factory-programmed values and resets itself.
   The tester then displays the top-level introductory screen (see Figure 3-1).

   Note

   If the screen is too light or too dark, press **F1** *to decrease the
   contrast or* **F2** *to increase the contrast.*

Returning to the Top-level Introductory Screen

When you finish a particular task (for example, viewing test results or setting up a
transmission stream), you may want to return to the top-level introductory screen
(see Figure 3-1). To do this, press **END**.

Resetting the E1port Plus

To reset the E1port Plus, press **END** twice rapidly. When you reset the tester, it
performs a series of internal self-tests and then displays the top-level introductory
screen (see Figure 3-1).

When you reset the E1port Plus, it does *not* restore the factory default settings. For
information on how to restore these settings, see "Restoring the Default Settings"
earlier in this chapter.

Clearing the Error Result Counters

If there are errors on a signal, they are presented on the tester's result screens. As certain errors are detected, the counters on the screen continuously increase.

In certain situations, you may want to clear the error counters. To do this, press **CLEAR** while you are viewing the errors on the LCD. The tester immediately resets each error counter to zero.

Clearing the History LEDs

To clear the history (yellow) LEDs, press **RESET**. This key is located on the right side of the tester below the history LEDs and directly above the **Up Arrow** key (see Figure 2-4).

Responding to Low Battery Warnings

The E1port Plus uses NiCad internal batteries. When the battery power is low, the LOW BATTERY LED flashes. This indicates that you only have a couple of minutes of operating time remaining. If you wait too long, the tester issues this message: Low Battery Shutting Down! Then, the tester turns off immediately.

To recharge the tester, connect it to the supplied AC adapter/charger. On a full battery charge, which takes between 8 to 12 hours, the tester can run for approximately two hours. If the battery does not charge, contact Fluke Customer Service.

⚠ **Warning**

The NiCad battery is rated 3.6 V 4AH (Fluke part number 623014) and the in-line battery fuse is rated 250 V 3A (Fluke part number 645173). Both items must be replaced by a Fluke Service Center.

Displaying System Information

To display system information, do the following:

1. Press **SYSTEM** to display the **SYSTEM INFORMATION** (P1) screen:

```
SYSTEM INFORMATION          P1

        Model ► E1port+
          UNI ► 3.1/4.0
    Remote ID ► 65437
         User:   E1user

 PGDN
```
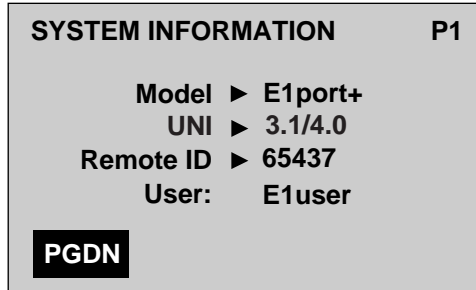
aai022f.eps

On this page, you can obtain the following information about the tester:

*   Type of tester

*   UNI specification supported

*   Remote ID

*   User identification label

2. Press **F1**(PGDN) to display Pages 3 and 4. The following information is given:

*   **SW Ver** (P3)

    Software version of the tester

*   **E1XC Version** (P4)

    Version of the internal framer

*   **Diag Loopback** (P4)

    Should be set to **Off**. Do not change this setting without guidance from Fluke Technical Support personnel.

Giving Your E1port Plus an Identification Label

You can assign unique identification label to your E1port Plus. To do this, follow these steps:

1. Press **SYSTEM** to display the **SYSTEM INFORMATION** (P1) screen.

    The cursor is positioned on the **User** field.

2. Use the keypad to type the desired name or label.

Note

The name you choose can be from one to ten characters long.

Updating the E1port Plus with New Software

When a software update becomes available for the E1port Plus, you can download the software from the Fluke website. The **Enter Download** parameter, which is found on the **SYSTEM INFORMATION** (P4) screen, puts the tester in download mode so that you can update the tester with the latest version of the software. The Fluke website provides you with instructions on the use of this option when you download new software.

Note

*Do not select the **Enter Download** option unless instructed to while downloading software from the Fluke website. If you accidentally put the tester in download mode, contact Fluke Technical Support for assistance.*

Printing Test and Configuration Reports

The E1port Plus can print reports of test results and configurations.

For representative samples of these reports, see "Appendix A. Sample Reports".

To print a report, do the following:

1. Make sure that your tester is correctly connected to a printer. For information on how to do this, see "Connecting the E1port Plus to a Printer or PC" in this chapter.

2. Display the kind of information that you want to print (for example, if you want to print general information, display any page on the **SYSTEM INFORMATION** screen). Then, press **SHIFT 1** + **Print**.

Information that is associated with the displayed screen is printed.

The Automatic Diagnostic Tests

The E1port Plus has a set of built-in diagnostic tests that you can run to assess the basic condition of the signal that is present on the line. These tests take about 30 seconds to run. When the tests finish running, the tester displays a summary of its results.

Before you run the diagnostic tests, turn on the E1port Plus. When the tester finishes initializing, check to make sure that the LOSS OF SIGNAL and LOSS OF FRAME LEDs are off. If these LEDs are off, you are ready to run the tests.

If the LOSS OF SIGNAL LED is on, check your input connections. If the LOSS OF FRAME LED is lit, the receiver settings for the **CAS Rcv** and **CRC4 Rcv** parameters may not be consistent with the network under test. See "Setting Up the E1port Plus for E1 Network Testing" in Chapter 4 for details. Note the information in Table 4-1 for the **CAS Rcv** and **CRC4 Rcv** parameters. The settings you select for these parameters must match the signal being analyzed.

Running a Diagnostic Test

To run the automatic diagnostic tests, press **AUTOTEST**.

The E1port Plus begins running the tests. While the tester performs each test, you see this message: Testing. When the test ends, the E1port Plus summarizes its findings for you on the LCD.

Following is a sample **AUTOTEST** result screen:

```
     A U T O T E S T
   Mapping ► HEC Delin
   ATM Detected ► Okay
   Idle/Unasgnd ► Idle
   OAM F4 ► Yes
   OAM F5 ► No
   ILMI ► No
   Errors ► No   Alarms ► Yes
```
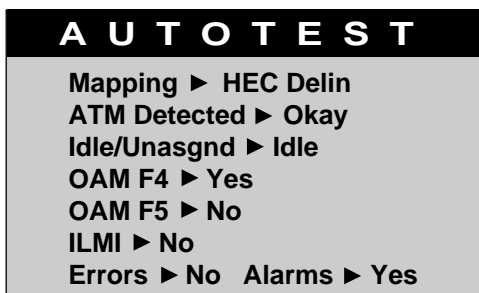
Ta021f.eps

An explanation of the diagnostic test results is given in Table 3-5.

Table 3-5. Diagnostic Test Results for ATM and Line Layers

Results	Meaning
Mapping	Displays HEC Delin as the current mapping scheme.
ATM Detected	Indicates the condition of the ATM traffic that was detected. • Okay: ATM cells were detected and cell delineation was achieved. • Error: Header Checksum (HCS) errors were detected. • No: no ATM cells were detected.
Idle/Unasgnd:	Indicates the type of ATM background traffic that the tester detected. • Idle: background cells are idle (CLP bit set to 1). • Unassigned: background cells are unassigned (CLP bit set to 0). • None: no background cells were detected.
OAM F4	Indicates whether or not the tester detected OAM F4 cells. • Yes: F4 cells were detected. • No: F4 cells were not detected.
OAM F5	Indicates whether or not the tester detected OAM F5 cells. • Yes: F5 cells were detected. • No: F5 cells were not detected.
ILMI	Indicates whether or not the tester detected ILMI cells on VPI 0, VCI 16: • Yes: ILMI cells were detected. • No: ILMI cells were not detected.
Errors	Indicates whether the tester detected an E1 Line error. • Yes: one or more of these errors were detected. • No: no errors were detected.
Alarms	Indicates whether or not the tester detected an E1 alarm condition on the received signal. • Yes: one or more E1 alarms were detected. • No: no E1 alarms were detected.

If these test results indicate that there are errors or certain types of cells on the input signal, you can view the detailed information for these findings (see "Interpreting the Automatic Diagnostic Test Results", which immediately follows for information on how to do this).

Interpreting the Automatic Diagnostic Test Results

For certain diagnostic test results, the E1port Plus provides detailed error measurement and status reports. This section shows you how to locate these reports and how to interpret the statistical information they provide.

ATM Detected Results

If HCS errors are detected during a diagnostic test, the E1port Plus displays Error for the **ATM Detected** result. If you receive this result, do the following:

1. Press **ATM** to display the **ATM SELECTIONS** menu.

2. Make sure that the **Receive Summary** option is highlighted. Then, press **ENTER** to display the **RECEIVE SUMMARY** screen.

3. Press **ENTER** to display the **ATM ERRORS** screen:

```
┌─────────────────────────────────────┐
│ ATM ERRORS                          │
│                                      │
│   HCS Errs  ►     00000012          │
│   Delin Errs ►    00000013          │
│                                      │
│                                      │
│                            ┌──────┐ │
│                            │ BACK │ │
│                            └──────┘ │
└─────────────────────────────────────┘
```

Ta023f.eps

This screen provides a count of HCS errors or cell delineation loss events detected by the tester.

OAM F4 and F5 Results

If OAM F4 or OAM F5 cells are detected during a diagnostic test, the E1port Plus displays Yes for OAM F4 or OAM F5 when it completes the tests. If you obtain this result and want to view detailed information about OAM cells, do the following:

1. Press **ATM** to display the **ATM SELECTIONS** menu.

2. Press the **Down Arrow** key to highlight **ATM Testing**. Then, press **ENTER** to display the **ATM TESTS** menu.

3. Press the **Down Arrow** key to highlight **OAM**. Press **ENTER** to display the **OAM** menu.

4. Press the **Down Arrow key** to highlight **OAM Detection**. Press **ENTER**.

   The **OAM F4 ACTIVITY** (P1) screen is displayed.

5. Press **F3**(START) to begin detection of OAM activity.

   Information on OAM F4 activity is displayed.

6. Press **F1**(PGDN) to view the **OAM F5 ACTIVITY** (P2) screen.

Note

Additional information on OAM cells can be found under "OAM Testing and Detection" in Chapter 6.

Line Error Results

When the E1port Plus detects Line errors during its diagnostic testing, it displays Yes for the **Errors** result. If you receive this result, do the following:

1. Press the **LINE** key to display the **LINE SELECTIONS** menu.

2. Make sure that the **Line Results** option is highlighted. Then, press **ENTER** to display the **E1 LINE RESULTS** (P1) screen.

3. Press **F1**(PGDN) to display the **E1 LINE RESULTS** (P2) screen:

```
E1 LINE RESULTS              P2
            Error  Count
       LCV  ▶  0000000210
      FEBE  ▶  0000000001
   FRM Err  ▶  0000000001
      CRC4  ▶  0000000000
  PGDN   PGUP   ESEC   BACK
```

aai030f.eps

This screen lists these E1 errors:

- LCV (Line Code Violation)

- FEBE (Far-end Block Error)

- FRM Err (Framing Errors)

- CRC4 (Cyclic Redundancy Check 4)

Note

The field displays "N/A" if the particular measurement is not available.

4. Press **F3** to view results for these errors in the following formats:

- **ESEC**

   Errored seconds. The number of seconds in which one or more errors occurred.

- **EFS**

   Error-free seconds. The number of seconds in which no errors occurred.

- **%EF**

   Percent error-free. The percentage of seconds in which no errors occurred.

- **CNT**

   The total number of errors that occurred.

Line Alarm Results

When the E1port Plus detects an E1 alarm during its diagnostic testing, it displays Yes for the **Alarms** result. To view the detailed reports for each detected alarm, do the following:

1. Press the **LINE** key to display the **LINE SELECTIONS** menu.

2. Make sure that the **Line Results** option is highlighted. Then, press **ENTER** to display the **E1 LINE RESULTS** (P1) screen.

3. Press **F1**(PGDN) twice to display Page 3 (P3):

```
┌─────────────────────────────────────┐
│ E1 LINE RESULTS               P3     │
│                 Status               │
│          AIS  ►  N/A                 │
│          LOF  ►  N/A                 │
│          LOS  ►  Active              │
│          RAI  ►  N/A                 │
│  ┌─────┐ ┌─────┐ ┌─────┐ ┌─────┐     │
│  │PGDN │ │PGUP │ │STRT │ │BACK │     │
│  └─────┘ └─────┘ └─────┘ └─────┘     │
└─────────────────────────────────────┘
```

aai031f.eps
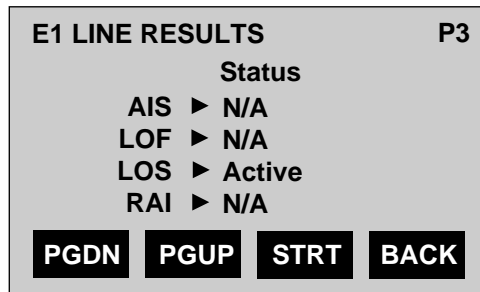
This screen provides status on any detected AIS (Alarm Indication Signal), LOF (Loss of Frame), LOS (Loss of Signal), or RAI (Remote Alarm Indication) alarm:

- ACTIVE

  Indicates that the alarm is detected on the received signal

- INACTIVE

  Indicates that the alarm is not detected on the received signal

- N/A

  Indicates that results are not available

4. Press **F3** to view the following information for the displayed alarms:

   - STRT (when the alarm began)

   - END (when the alarm ended)

   - TTL (how long the alarm lasted)

   - STAT (status of the alarm as ACTIVE, INACTIVE, or N/A)

5. Press **F1**(PGDN) to display the **E1 LINE RESULTS** (P4) screen. This screen displays status information on the following E1 alarms:

   - RED (Red alarm)

   - MRAI (Multi-frame Remote Alarm Indication)

   - T16AIS (Timeslot 16 Alarm Indication Signal)

6. Press **F3** to view starting and ending times and information on the duration of these alarms.

Contents   **Page**

Introduction

This chapter describes the E1 network testing functions of the E1port Plus. The chapter begins by showing you how to set up the E1port Plus for testing at the E1 physical layer. You will then learn how to monitor an E1 signal to determine its status and strength and how to detect error and alarm activity. In addition, you will find out how to generate specific E1 errors and alarms to test the network's response to these conditions. Finally, you will learn how to set up and run a Line BER test.

Setting Up the E1port Plus for E1 Network Testing

To assess the performance of an E1 circuit, you first need to set up the E1port Plus to match the network under test so that the tester can send and receive E1 signals.

To set up the E1port Plus, complete the following:

Note

See Table 4-1 for a list and description of E1 line setup parameters.

1. Press **LINE** to display the **LINE SELECTIONS** menu.

2. Press the **Down Arrow** key to highlight the **Line Setup** option. Then, press **ENTER** to display the **LINE SETUP** (P1) screen:

```
LINE SETUP                      P1


      Connector  ⇋  Bantam
      Input Type ⇋  Term
      Loopback   ⇋  Normal
        TxClock  ⇋  Internal

 PGDN                      BACK
```

aai033f.eps

The cursor is positioned on the **Connector** parameter.

3. Press the **Left** or **Right Arrow** key to select the desired setting for the **Connector** parameter. Then, press the **Down Arrow** key to move the cursor to each remaining parameter on this screen and select the desired setting.

4. Press **F1**(PGDN) to display the **LINE SETUP** (P2) screen:

```
┌─────────────────────────────────┐
│ LINE SETUP                  P2  │
│                                 │
│    CAS Rcv ⇕  Disabled          │
│   CAS Xmit ⇕  As Rcvd           │
│   CRC4 Rcv ⇕  Enabled           │
│  CRC4 Xmit ⇕  As Rcvd           │
│                                 │
│  ▐PGDN▌  ▐PGUP▌      ▐BACK▌      │
└─────────────────────────────────┘
```
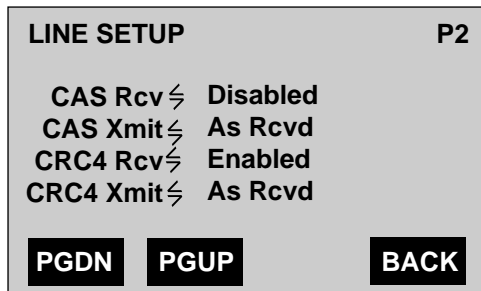
aai34f.eps

The cursor is positioned on the **CAS Rcv** parameter.

5. Press the **Left** or **Right Arrow** key to select the desired setting for the **CAS Rcv** parameter. Then, press the **Down Arrow** key to move the cursor to each remaining parameter on this screen and choose the desired setting.

6. Press **F1**(PGDN) to display the **LINE SETUP** (P3) screen:

```
┌─────────────────────────────────┐
│ LINE SETUP                  P3  │
│                                 │
│   RAI Valid ⇕  2 Frames         │
│  Mframe RAI ⇕  2 Frames         │
│    LCV Type ⇕  G.703            │
│                                 │
│         ▐PGUP▌      ▐BACK▌       │
└─────────────────────────────────┘
```
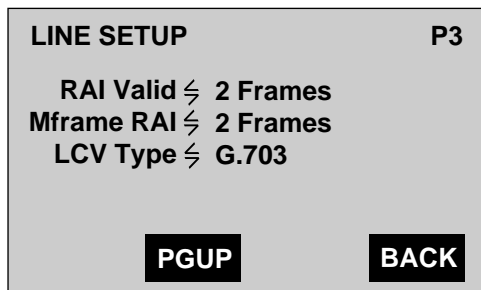
aai035f.eps

The cursor is positioned on the **RAI Valid** parameter.

7. Press the **Left** or **Right Arrow** key to select the desired setting for the **RAI Valid** parameter. Then, press the **Down Arrow** key to move the cursor to each remaining parameter on this screen and choose the desired setting.

You have completed setting up the E1port Plus for E1 testing.

Table 4-1. E1 Line Setup Parameters

Parameter	Description
Connector	Specifies the type of connection as **Bantam** or **Coax**.
Input Type	Sets the termination type of the E1port Plus to one of the following: • **Term**: sets the input impedance to 120 ohms (Bantam) or 75 ohms (Coax). Select this setting if the E1port Plus is being used to terminate an E1 line. • **Monitor**: sets the input impedance to 120 ohms (Bantam) or 75 ohms (Coax) and increases the gain on the input signal. Select this setting if the E1port Plus is connected to a monitor point on a piece of E1 equipment. • **Bridge**: sets the input impedance to 1000 ohms (Bantam). Select this setting if the E1port Plus is bridged across E1 lines that are terminated by another piece of equipment. This setting is not available if the connector type is set to **Coax**.
Loopback	Sets the signal loopback mode, which enables the E1port Plus to loop back the E1 signal or payload from its receiver back through its transmitter. • **Payload**: loops back the received E1 frame payload only. Framing bits are generated by the E1port Plus. • **Normal**: input is not looped back. • **Line**: Loops back framing and payload.
TxClock	Identifies the timing source. • **Internal**: timing is derived from the tester's internal crystal oscillator. • **LoopRcvd**: timing is derived from the received E1 signal.
CAS Rcv	Checks for Channel Associated Signaling (CAS) multi-frame alignment. • **Disabled**: does not check for CAS alignment. • **Enabled**: checks for CAS alignment.

Table 4-1. E1 Line Setup Parameters (cont.)

Parameter	Description
CAS Xmit	Generates Channel Associated Signaling (CAS) multi-frame alignment. • **Disabled**: does not generate CAS alignment. • **Enabled**: generates CAS alignment. • **As Rcvd**: uses the same setting that is selected for the **CAS Rcv** parameter.
CRC4 Rcv	Checks for CRC4 multi-frame alignment. • **Disabled**: does not check for CRC4 alignment. • **Enabled**: checks for CRC4 alignment.
CRC Xmit	Generates CRC4 multi-frame alignment. • **Enabled**: generates CRC alignment. • **Disabled**: does not generate CRC alignment. • **As Rcvd**: uses the same setting that is selected for the **CRC4 Rcv** parameter.
RAI Valid	Specifies the number of frames for which the Remote Alarm Indication (RAI) has to be valid in order for an alarm to be declared. • **2 Frames**: declares an alarm if the tester detects an RAI for two consecutive frames. • **3 Frames**: declares an alarm if the tester detects an RAI for three consecutive frames.
Mframe RAI	Specifies the number of frames for which the multi-frame Remote Alarm Indication (RAI) has to be valid in order for an alarm to be declared. • **2 Frames**: declares an alarm if the tester detects a multi-frame RAI for two consecutive frames. • **3 Frames**: declares an alarm if the tester detects a multi-frame RAI for three consecutive frames.
LCV Type	Identifies the ITU standard for a Line Code Violation (LCV) as one of the following: • **O.162** • **G.703**

Monitoring an E1 Signal

This section shows you how to monitoring the incoming E1 signal. It shows you how to check the status and strength of a received signal and how to monitor the signal for error and alarm conditions.

Checking Signal Status and Strength

To check the status and strength the received E1 signal, follow these steps:

1. Press **LINE** to display the **LINE SELECTIONS** menu.

2. Make sure that the **Line Results** option is highlighted. Press **ENTER** to display the **E1 LINE RESULTS** (P1) screen:

```
E1 LINE RESULTS                P1

    Signal Lvl ▶ 3.18Vpk
                17.04dBm
    Line Code ▶ HDB3
    Loop State ▶ Normal

 PGDN                       BACK
```
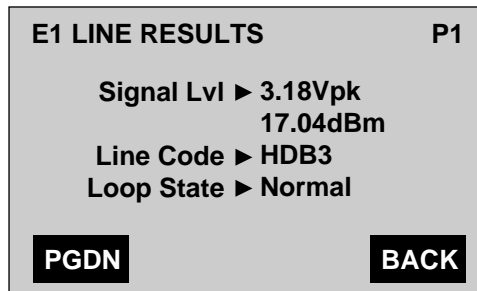
aai037f.eps

This screen provides signal level and line code information. It also indicates the loopback state of the received E1 signal.

Monitoring a Signal for Errors and Alarms

To monitor an E1 signal for error and alarms, do the following:

1. Press **LINE** to display the **LINE SELECTIONS** menu.

2. Make sure that the **Line Results** option is highlighted. Press **ENTER** to display the **E1 LINE RESULTS** (P1) screen.

3. Press **F1**(PGDN) to display the **E1 LINE RESULTS** (P2) screen:

```
┌─────────────────────────────────────┐
│ E1 LINE RESULTS              P2      │
│            Error  Count             │
│      LCV  ►  0000000210             │
│     FEBE  ►  0000000001             │
│  FRM Err  ►  0000000001             │
│     CRC4  ►  0000000000             │
│ ┌─────┐┌─────┐┌─────┐┌─────┐        │
│ │PGDN ││PGUP ││ESEC ││BACK │        │
│ └─────┘└─────┘└─────┘└─────┘        │
└─────────────────────────────────────┘
```

aai030f.eps

This screen lists these E1 errors:

- LCV (Line Code Violation)

- FEBE (Far-end Block Error)

- FRM Err (Framing Errors)

- CRC4 (Cyclic Redundancy Check 4)

Note

The field displays "N/A" if the particular measurement is not available.

4. Press **F3** to view results for these errors in the following formats:

- **ESEC**

  Errored seconds. The number of seconds in which one or more errors occurred.

- **EFS**

  Error-free seconds. The number of seconds in which no errors occurred.

- **%EF**

  Percent error-free. The percentage of seconds in which no errors occurred.

- **CNT**

  The total number of errors that occurred.

5. Press **F1(**PGDN) to display the **E1 LINE RESULTS** (P3) screen:

```
E1 LINE RESULTS              P3
              Status
       AIS  ►  N/A
       LOF  ►  N/A
       LOS  ►  Active
       RAI  ►  N/A
  PGDN   PGUP   STRT   BACK
```
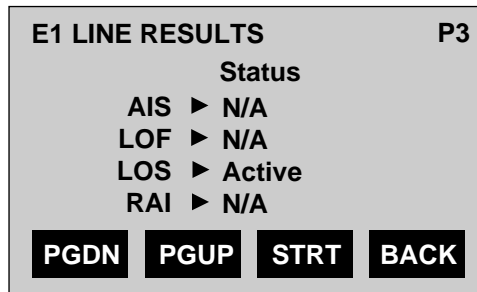
aai031f.eps

This screen provides status on any detected AIS, LOF, LOS and RAI alarms. For each alarm, one of the following types of status is displayed:

*   ACTIVE

    Indicates that the alarm is detected on the received signal

*   INACTIVE

    Indicates that the alarm is not detected on the received signal

*   N/A

    Indicates that results are not available

6. Press **F3**(STRT).

With each successive press of this key, you can view the following information for each alarm:

*   STRT (when the alarm began)
*   END (when the alarm ended)
*   TTL (how long the alarm lasted)
*   STAT (status of the alarm as ACTIVE, INACTIVE, or N/A)

7. Press **F1**(PGDN) to display the **E1 LINE RESULTS** (P4) screen, which provides status information on these E1 alarms:

- RED (RED alarm)

- MRAI (Multi-frame Remote Alarm Indication)

- T16AIS (Timeslot 16 Alarm Indication Signal)

Viewing the Alarm Log

The E1port Plus keeps a record of the alarms it detects on the received E1 signal. When an alarm is detected, the ALARMS LED lights and the type of alarm is entered into the alarm log.

The alarm log can hold up to 64 entries. Each entry includes the name the alarm, its starting and ending times, and its duration. See Table 4-2 for a list of alarms that the E1port Plus detects.

To view alarm log entries, follow these steps:

1. Press **LINE** to display the **LINE SELECTIONS** menu.

2. Press the **Down Arrow** key to highlight the **Alarm Log** option. Press **ENTER** to display the tester's alarm log:

```
    ALARM  LOG  RECORD    001
       Type      Start  Time
        LOF  ► 03/20/99
             ► 15:19:02
        LOS  ► 03/20/99
             ► 15:19:02

   PGDN          END   BACK
```
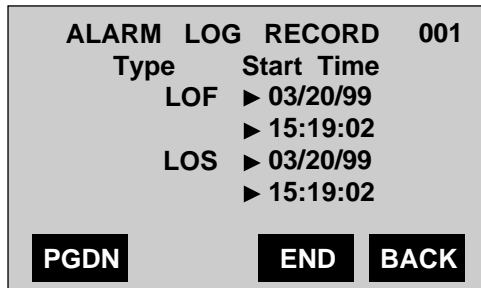
aai041f.eps

The top right corner of the first line on this screen indicates which record in the log you are currently viewing. The following lines indicate the type of alarm detected (**Type**) and when it began (**Start Time**).

3. Press **F3**(END) to view the time that the alarm ended (**End Time**).

4. Press **F3**(TTL) again to view the duration (**Total Time**) of the alarm.

5. To view any other alarms stored in the log, press **F1**(PGDN).

6. To remove all entries from the alarm log, press **CLEAR**.

   The following message is displayed: Alarm Log Empty.

Table 4-2. E1 Alarms Detected by the E1port Plus

Alarm	Description
LOS	Indicates a Loss of Signal. Declared when no pulses are received for 4.88 us.
OOF	Indicates an Out of Frame condition. Declared when three consecutive Frame Alignment Signals (FAS) are received in error.
RED	Indicates a Red alarm. Declared when an out-of-frame condition exists for 100 ms.
AIS	Indicates reception of a Alarm Indication Signal. Declared when an AIS condition (all 1's unframed) persists for 100 ms.
RAI	Indicates a Remote Alarm Indication. Bit 3 is a 1 in time slot 0 in NFAS frames for the number of frames specified by the user for the **RAI Valid** parameter.
MRAI	Indicates a multi-frame Remote Alarm Indication. Bit 6 is a 1 in time slot 16 of CAS multi-frame for the number of frames specified by the user for the **Mframe RAI** parameter.
T16AIS	Declared after an all-ones byte has been detected in time slot 16 for two consecutive frames while out of signaling multiframe alignment.

Injecting Errors and Alarms

The E1port Plus can inject four different types of E1 alarms as well as frame alignment errors on an outgoing E1 signal. This feature allows you to test the network's response to specific alarm and error conditions.

Injecting E1 Alarms

You can independently activate and deactivate the injection of E1 alarms. Once activated, an alarm remains active even when the tester is performing other functions. More than one alarm can be active at the same time. Each alarm remains active until you stop it or turn off the tester.

To inject an E1 alarm:

1. Press **LINE** to display the **LINE SELECTIONS** menu.

2. Press the **Down Arrow** key to highlight the **Inject Error/Alarm** option. Then, press **ENTER** to display the **LINE INJECTION** screen:

```
LINE INJECTION

 - RAI            x Frame Errs
 - AIS
 - MRAI
 - T16 AIS


              ON      BACK
```
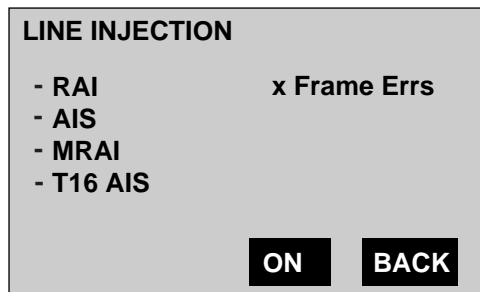
aai040f.eps

The E1port Plus can generate the following types of alarms:

- RAI (Remote Alarm Indication)

- AIS (Alarm Indication Signal)

- MRAI (Multi-frame Remote Alarm Indication)

- T16AIS (Timeslot 16 Alarm Indication Signal)

Note that each alarm is preceded by a minus sign (-), which indicates that it is currently not being transmitted.

3. To generate an alarm, move the cursor to the name of the alarm. Then, press **F3**(ON).

Note that a check mark ($\checkmark$) replaces the minus sign (-). The check mark indicates that the E1port Plus is generating the alarm.

4. To stop transmission, position the cursor on the alarm. Then, press **F3**(OFF).

The E1port Plus immediately stops injecting the alarm.

Injecting Frame Alignment Errors

The E1port Plus can inject framing alignment errors one-at-a-time into the outgoing E1 transmit stream. When this error is injected, an out-of-frame condition is created on the transmitted E1 signal.

To inject a frame alignment error, follow these steps:

1. Press **LINE** to display the **LINE SELECTIONS** menu.

2. Press the **Down Arrow** key to highlight the **Inject Error/Alarm** option. Then, press **ENTER** to display the **LINE INJECTION** screen:

```
 LINE INJECTION

  - RAI              x Frame Errs
  - AIS
  - MRAI
  - T16 AIS


                  ON     BACK
```
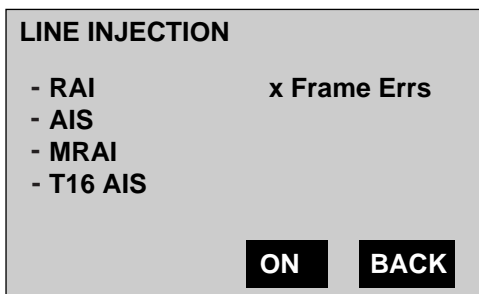
aai040f.eps

3. Press the **Right Arrow** key to move the cursor to the **Frame Errs** parameter.

   Note that the label above the **F3** key changes to "INJCT".

4. Press **F3**(INJCT).

   A single frame alignment error is transmitted on the outgoing E1 signal.

5. To inject additional frame alignment errors, press **F3**(INJCT) the desired number of times.

Line Bit Error Rate (BER) Testing

The E1port Plus can perform a Line BER test on E1 signals. In this test, a BER test pattern is transmitted and detected in the E1 payload.

To perform a Line BER test, the E1port Plus requires an input test pattern, which is defined in the setup for the test. The source of the test pattern can be from the E1port Plus itself (on a looped back circuit) or from the circuit under test.

The Line BER test overrides ATM cell transmission. Therefore, when this test is running, the E1port Plus no longer transmits ATM cells.

Setting Up a Line BER Test

To set up a Line BER test, do the following:

1. Press **LINE** to display the **LINE SELECTIONS** menu.

2. Press the **Down Arrow** key to highlight the **Line BERT** option. Then, press **ENTER** to display the **LINE BER TEST** (P1) screen.

3. Press **F1**(PGDN) to display the **LINE BER TEST** (P2) screen:

```
┌─────────────────────────────────────┐
│ LINE BER TEST                 P2     │
│                                      │
│       Pattern  ⇵  2**15              │
│          Edit:    00 00 00 00        │
│      Ptrn Sze  ⇵  1                  │
│         Invert ⇵  No                 │
│  ┌─────┐ ┌─────┐ ┌─────┐ ┌─────┐     │
│  │PGDN │ │PGUP │ │START│ │BACK │     │
│  └─────┘ └─────┘ └─────┘ └─────┘     │
└─────────────────────────────────────┘
```
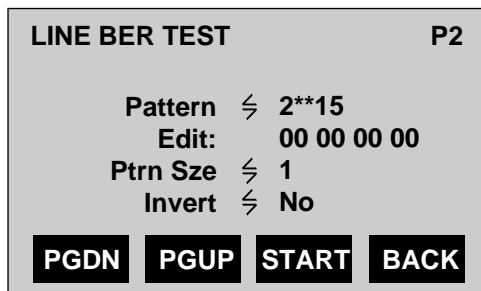
Ta047f.eps

The cursor is positioned on the **Pattern** parameter. The settings for this parameter represent the patterns of bits that you can transmit during a Line BER test. See Table 4-3 for a list and description of these patterns.

4. Do *one* of the following:

- If you want to use one of the pre-defined patterns, press the **Left** or **Right Arrow** key to select the one that you want to use.

- If you want to create your own test pattern, follow these steps:

  1. Press the **Left** or **Right Arrow** key to select the **User Def** setting.

  2. Press the **Down Arrow** key to move the cursor to the **Edit** parameter. Then, press the keys on the alphanumeric keypad to specify the hexadecimal value of the bit pattern that you want to send.

  3. Press the **Down Arrow** key to move the cursor to the **Ptrn Sze** (Pattern Size) parameter.

     This parameter has four settings, 1 - 4, which represent the user bytes that are transmitted continuously.

  4. Select the desired setting for **Ptrn Sze**.

5. Press the **Down Arrow** key to move the cursor to the **Invert** parameter. Then, press the **Left** or **Right Arrow** key to select one of the following settings:

   - **No**

     Does not invert the polarity of the selected bit pattern.

   - **Yes**

     Inverts the polarity of the selected bit pattern.

6. Press **F1**(PGDN) to display the **LINE BER TEST** (P3) screen:

```
┌─────────────────────────────────────┐
│ LINE BER TEST              P3        │
│                                      │
│                                      │
│      Err Inject  ⇵  NONE             │
│                                      │
│                                      │
│         PGUP  START  BACK            │
└─────────────────────────────────────┘
```
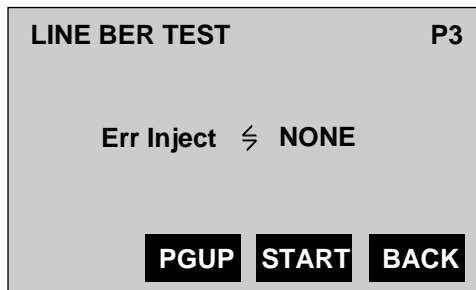
Ta048f.eps

The **Err Inject** (Error Injection) parameter determines the rate of error injection. Errors are injected into the transmitted BER test pattern according to one of four rates (see Table 4-4 for a list and description).

7. Press the **Left** or **Right Arrow** key to select the desired error injection rate.

Note

*Even if you select **NONE**, you can still inject single bit errors while the BER test is running. To do this, press **F2**(INJCT). Each time you press this key, a single error is injected into the BER test stream.*

You have completed the setup for the BER test. See "Starting a Line BER Test" for information on running the test.

Table 4-3. BER Test Patterns

Pattern	Description
2**15	Pseudo-random 2^{15}-1 pattern
2**20	Pseudo-random 2^{20}-1 pattern
QRSS	Quasi-random signal
2**23	Pseudo-random 2^{23}-1 pattern
11111111	11111111 bit pattern
00000000	00000000 bit pattern
10101010	10101010 bit pattern
11001100	11001100 bit pattern
3 in 24	Three out of 24 bits is set to 1
1 in 8	One out of eight bits is set to 1
1 in 16	One out of 16 bits is set to 1
2 in 8	Two out of eight bits is set to 1
User Def	User-definable bit pattern

Table 4-4. BER Test Error Injection Rates

Injection Rate	Description
NONE	The default. No errors are inserted.
10E-3	Inserts one bit pattern error in every 1000 bits.
10E-6	Inserts one bit pattern error in every 1,000,000 bits.
10E-9	Inserts one bit pattern error in every 1,000,000,000 bits.

Starting a Line BER Test

Notes

You cannot perform any ATM operations or run any ATM tests if the tester is currently running a Line BER test. You must stop this test first.

If you decide to change a setting while the tester is running a BER test, you must first stop the test, change the setting, then restart the test with the new settings.

If the tester is the source of the BER test pattern, you can inject individual bit errors while the BER test is running. To do this, press **F2***(INJCT). Each time you press this key, a single error is injected into the BER test stream.*

1. To start a Line BER test, press **F3**(START).

    The E1port Plus recovers and synchronizes the received pattern. Then, the following result screen is displayed:

    ```
    LINE BER TEST              P1
        Errors  ►  0000000000
          Bits  ►  7694459600
      Err Rate  ►  NO ERRORS
      Errd Sec  ⇌  0000000000
        Status  ►  RUNNING

     PGDN   INJCT   STOP   BACK
    ```
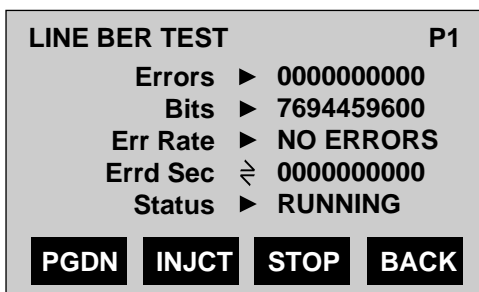
    Wg063f.eps

    The cursor is positioned on the **Errd Sec** result. Table 4-5 describes the BER test results displayed on this screen.

2. Press the **Left** or **Right Arrow** key to view BER test results in the following formats (see Table 4-5 for descriptions):

    *   **Efree Sc**
    *   **% Efree**
    *   **Elap Sec**
    *   **Errd Sec**

Table 4-5. BER Test Results

Result	Description
Errors	Total number of errored bits detected since the **F3**(START) or **CLEAR** key was pressed.
Bits	Total number of bits received since the **F3**(START) or **CLEAR** key was pressed.
Err Rate	Error Rate. Number of errored bits divided by the total number of bits received since the **F3**(START) or **CLEAR** key was pressed.
Efree Sc	Error-free Seconds. The number of seconds in which no errors were detected since the **F3**(START) or **CLEAR** key was pressed.
% Efree	Percent Error Free. The percentage of the seconds in which no errors were detected since the **F3**(START) or **CLEAR** key was pressed.
Elap Sec	Elapsed Seconds. The number of seconds that the test has been running since the **F3**(START) or **CLEAR** key was pressed.
Errd Sec	Errored Seconds. Number of seconds in which one or more errors was detected since the **F3**(START) or **CLEAR** key was pressed.
Status	Status of the test: either STOPPED, RUNNING, NO ACTIVITY, NO SIGNAL or OUT OF SYNC.

Stopping a Line BER Test

To stop a Line BER test, press **F3**(STOP). The test ends immediately.

Chapter 5
Transmitting and Monitoring ATM Traffic

Contents   **Page**

Introduction

This chapter describes the ATM network transmission and monitoring functions of the E1port Plus. The first section shows you how to configure the overall traffic characteristics and format of ATM cell transmission. The following sections then show you how to configure specific traffic profiles, called transmission streams, and how to load these streams and start transmission.

With the E1port Plus, you can monitor the input E1 signal for ATM cells. The final section shows you how to monitor "live" traffic as it is being generated.

Defining the Traffic Characteristics of Transmission Streams

There are three general setup parameters that affect the operation of all the ATM tests that you can run on the E1port Plus. These parameters, which are described in this section, let you configure the tester to do the following:

- Verify the incoming header checksum

- Identify the type of header (UNI or NNI)

- Specify the type of cells to use as background traffic

Verifying the Incoming Header Checksum (HCS)

The **HCS Coset** parameter determines whether the tester verifies the incoming header checksum using the coset polynomial $(x^6 + x^4 + x^2 + 1)$. One of the chief benefits of your use of this parameter is that it can improve the efficiency of the cell delineation process and facilitate the recovery of the frame structure, thereby reducing the likelihood of cell lock errors.

Whether you choose to use the **HCS Coset** parameter or not depends on your particular application. Most ATM equipment supports the coset polynomial, but some equipment does not. If you set this parameter to **Off** on the tester and the equipment supports the coset polynomial, it can cause interoperability problems. It is best to check to make sure that both sides (the tester and the equipment) have the same setting.

To enable or disable the **HCS Coset** parameter, do the following:

1. Press **ATM** to display the **ATM SELECTIONS** menu.

2. Press the **Down Arrow** key to highlight **ATM Configuration**. Then, press **ENTER** to display the **ATM CONFIGURATION** (P1) screen:

```
┌─────────────────────────────────────┐
│ ATM CONFIGURATION           P1       │
│          HCS Coset ⇕ On              │
│       Net Interface ⇕ NNI            │
│        Delineation ▶ HEC             │
│     Bckgrnd Format ⇕ Idle            │
│       Fixed Pattern : 6A             │
│  ┌──────┐              ┌──────┐       │
│  │ PGDN │              │ BACK │       │
│  └──────┘              └──────┘       │
└─────────────────────────────────────┘
```

aai049f.eps
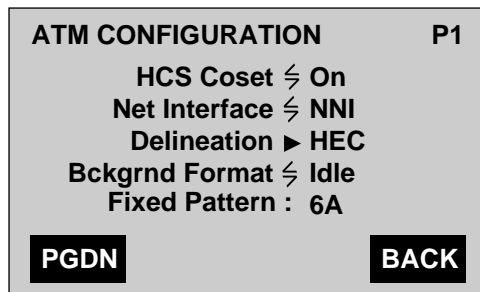
The cursor is positioned on the **HCS Coset** parameter.

3. Press the **Left** or **Right Arrow** key to select the desired setting (see Table 5-1).

The setting you selected is now the current value of the **HCS Coset** parameter.

Identifying the Header Type

Two different header schemes are used for ATM cells: UNI (User Network Interface) and NNI (Network-to-Network Interface). UNI is an interface that connects ATM users with a private ATM switch that is managed locally, such as within the same corporate network. NNI, on the other hand, is an interface that connects ATM users with an ATM switch deployed in the public telecommunications network. NNI is typically more global or far-reaching and capable of spanning long distances such as that between two countries.

Both UNI and NNI cells use five-byte headers. The header format of UNI cells and NNI cells is identical, except that for NNI cells the GFC field is replaced by an additional four bits of VPI, resulting in a 12-bit VPI. This means that the VPI address range for UNI is 0 - 255, while the address range for NNI is 0 - 4095.

Depending on the type of network you are connecting to, you need to configure the tester so that the header type (either UNI or NNI) conforms to the ATM cell structure of that network.

Follow these instructions to define the header type for the network you are testing.

1. Press **ATM** to display the **ATM SELECTIONS** menu.

2. Press the **Down Arrow** key to highlight **ATM Configuration**. Press **ENTER** to display the **ATM CONFIGURATION** (P1) screen:
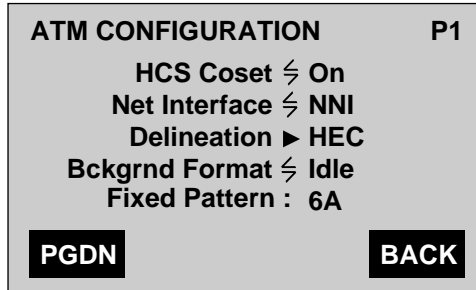
```
ATM CONFIGURATION          P1

         HCS Coset ⇋ On
       Net Interface ⇋ NNI
        Delineation ▶ HEC
    Bckgrnd Format ⇋ Idle
      Fixed Pattern : 6A

  PGDN                    BACK
```

aai049f.eps

The cursor is positioned on the **HCS Coset** parameter.

3. Press the **Down Arrow** key to highlight the **Net Interface** parameter. Then, press the **Left** or **Right Arrow** key to select the desired setting (see Table 5-1).

The setting you selected is now the value of the **Net Interface** parameter.

Specifying the Type of Cells Used for Background Traffic

There are two types of cells that you can specify for use as background traffic: idle and unassigned. An idle cell is defined as one with a five-byte ATM header set to 00 00 00 01 52 (hex), and an unassigned cell is defined as one with a five-byte header of 00 00 00 00 55 (hex). Both types of cells are used in an ATM cell stream to fill unused bandwidth.

To specify which type of cell to use as background traffic, do the following:

1. Press **ATM** to display the **ATM SELECTIONS** menu.

2. Press the **Down Arrow** key to highlight **ATM Configuration**. Then, press **ENTER** to display the **ATM CONFIGURATION** (P1) screen:

```
ATM CONFIGURATION          P1

         HCS Coset ⇋ On
       Net Interface ⇋ NNI
        Delineation ▶ HEC
    Bckgrnd Format ⇋ Idle
      Fixed Pattern : 6A

  PGDN                    BACK
```
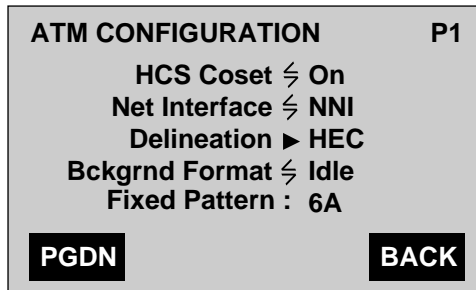
aai049f.eps

The cursor is positioned on the **HCS Coset** parameter.

3. Press the **Down Arrow** key to highlight the **Bckgrnd Format** parameter. Then, press the **Left** or **Right Arrow** key to select the desired setting (see Table 5-1).

The setting you selected is now the value of the **Bckgrnd Format** parameter.

Table 5-1. General Setup Parameters for ATM Transmission Streams

Parameter	Description
HCS Coset	Determines whether the tester adds the coset polynomial to the HEC. • **On** (the default) adds the coset polynomial to the HEC. • **Off** does not add the coset polynomial to the HEC
Net Interface	Defines the header type for the network under test. • **NNI** specifies a Network-to-Network Interface. • **UNI** (the default) specifies a User Network Interface.
Bckgrnd Format	Specifies the types of cells to be used as background traffic. • **Idle** (the default) specifies idle cells. • **Unas** specifies unassigned cells.

Configuring a Transmission Stream

The E1port Plus lets you define and transmit up to eight separate ATM cell transmission streams using up to 100% of the available E1 bandwidth. These transmission streams can be configured to accommodate CBR (Constant Bit Rate) or VBR (Variable Bit Rate) traffic.

A CBR transmission stream is used for transmitting data in a steady or constant flow. It is the simplest type of transmission stream available and is used to effectively simulate the transmission of CBR-type services through an ATM network. A VBR transmission stream is used for simulating variable traffic sources, such as LANs, where instantaneous bandwidth varies over time.

The following procedure shows you how to configure a transmission stream. Because there are many parameters, this procedure is divided into three parts, which show you how to do the following:

1. Program the ATM cell header.

2. Set the transmission rate.

3. Specify the type of payload.

Complete all parts of the procedure for each transmission stream that you configure.

Note

For illustration purposes, this procedure shows you how to configure a single transmission stream (Stream 6).

Programming the ATM Cell Header

1. Press **ATM** to display the **ATM SELECTIONS** menu:

2. Press the **Down Arrow** key to highlight the **Config Xmit Streams** option. Then, press **ENTER** to display the **ATM SOURCES** screen:

```
ATM SOURCES

1√CBR ⊥      5 - CBR⊥
2√CBR ⊥      6 - CBR⊥
3√CBR ⊥      7 - CBR⊥
4√CBR ⊥      8 - CBR⊥

  ON    OFF   LOAD  BACK
```
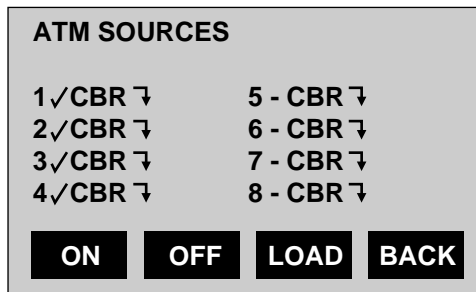
Ta051f.eps

All eight cell transmission streams (1-8) are represented on the **ATM SOURCES** screen. From this screen, you can access a setup screen for each transmission stream.

Each transmission stream is preceded by either a check mark (√) or a minus sign (-). A check mark indicates that the stream is enabled for transmission. A minus sign indicates that the stream is currently disabled.

3. With the cursor positioned on Stream 1, press **F2**(OFF).

Notice that a minus sign (-) appears following the number 1, indicating that this stream is disabled.

4. Press the **Down Arrow** key to move the cursor to Stream 2. Press **F2**(OFF) again to disable Stream 2.

Continue in this manner so that Streams 3 and 4 are disabled.

5. Press the **Down Arrow** key to move the cursor to Stream 6. Then, press **F1**(ON).

A check mark (✓) appears, indicating that the tester will transmit Stream 6:

```
ATM SOURCES

1 - CBR ↴      5 - CBR ↴
2 - CBR ↴      6✓CBR ↴
3 - CBR ↴      7 - CBR ↴
4 - CBR ↴      8 - CBR ↴

  ON     OFF    LOAD   BACK
```
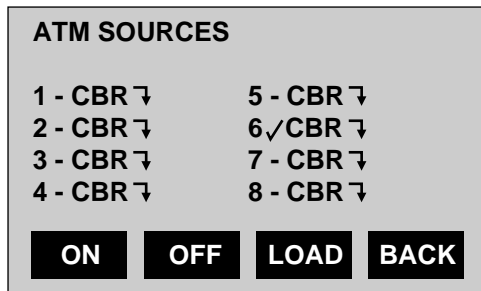
Ta052f.eps

Stream 6 is the only transmission stream preceded by a check mark, so, in this example, it is the only one that will be transmitted when you load the transmission stream later in this procedure.

6. Press the **Right Arrow** key.

Notice that the transmission source for Stream 6 changes. You can change the transmission source to one of the following:

- **CBR**

    Constant Bit Rate transmission (the default)

- **VBR/RND**

    Variable Bit Rate/Random transmission (using Poisson distribution)

- **VBR/PDU**

    Variable Bit Rate/Protocol Data Unit transmission (simulates network file transfer traffic)

- **VBR/BUR**

    Variable Bit Rate/Burst transmission

In this example, we will leave Stream 6's transmission source set to **CBR**.

7. Press **ENTER**.

   The setup screen for Stream 6 is displayed:

   ```
   Stream:  Stream 6              P1
   VPI:  0021     VCI:  00069
   PT:  0     CLP:  0    GFC:  0


   Hex:  01  50  04  50  84
   HEC⇆  OK
   PGDN                      BACK
   ```

   Ta053f.eps

   From this screen, you can define the transmission stream's header. The cursor is positioned on the name of the stream, which in this example, is "Stream 6". To identify a stream, you can use the keyboard to type a name.

8. If desired, type a name for the stream.

9. Press the **Down Arrow** key to move the cursor to each parameter. Then, use the keypad to supply a value for the parameter.

   Note

   *The **HEC** parameter allows the generation of the header checksum to be correct, correctable (with a 1-bit error), or uncorrectable (with an 8-bit error). If you select **Off**, you can supply a checksum value in the header. To do this, edit the **Hex** representation of the header.*

You have completed configuring Stream 6's ATM cell header.

Setting the Traffic Rate

To set the traffic rate, complete the following:

1. Press **F1**(PGDN) to display the **RATES** (P2) screen:

```
RATES       Stream 6          P2
 PCR   :      0.153    MBS
 PCR   :        362    CPS
 PCR   :      10.00    %
MXBSZ :         21   cells
Shaper ⇆   On

 PGDN    PGUP            BACK
```

Ta054f.eps

On this screen, you can set the traffic rate parameters for Stream 6. There are two traffic rate parameters: **PCR** (Peak Cell Rate) and **MXBSZ** (Maximum Burst Size).

The **PCR** defines the bandwidth for the transmission stream. On this screen, you can choose one of three forms to express the bandwidth: **MBS** (megabits per second), **CPS** (cells per second), and **%** (percent bandwidth).

MXBSZ defines the maximum number of cells that can be transmitted consecutively at the rate defined by the PCR.

Note

*For a CBR transmission source, the **MXBSZ** parameter does not apply. When you configure any of the three VBR transmission sources, you must specify a value for **MXBSZ**.*

2. Press the **Down Arrow** key to move the cursor to the form that you want to use to express the **PCR**. Then, use the keypad to supply the desired value.

For example, change the **PCR %** parameter to 25. Notice that the two remaining forms for expressing the bandwidth (**MBS** and **CPS**) automatically change their values to reflect the change you make to **PCR %**.

The screen now looks like this:

```
RATES      Stream 6          P2
 PCR  :    0.153   MBS
 PCR  :     3622   CPS
 PCR  :    25.00   %
MXBSZ :       20 cells
Shaper ⇋   On

  PGDN    PGUP          BACK
```

Ta055f.eps

The **Shaper** parameter is on the last line of the **RATES** screen. This parameter enables you to regulate the output of the transmission stream so that its specified traffic parameters (**PCR**, **SCR**, and **MXBSZ** values) are not exceeded.

The **Shaper** has two settings: **On** or **Off**. When set to **Off** (the default), the shaper *does not* constrain the transmission stream. When set to **On**, the **Shaper** guarantees that the values you supply for the **PCR**, **SCR**, and **MXBSZ** parameters are respected.

3. Press the **Left** or **Right Arrow** key to select a setting for the **Shaper**.

4. Press **F1**(PGDN) to display the **RATES** (P3) screen:

```
RATES      Stream 6          P3

 SCR  :     0.614        MBS
 SCR  :      1449        CPS
 SCR  :     10.00        %
CDVT  :      25.0        cells

  PGDN    PGUP          BACK
```

Ta056f.eps

On this page, you can specify values for the **SCR** (Sustained Cell Rate) and the **CDVT** parameters.

The **SCR** parameter defines the average number of cells that can be transmitted on a given virtual circuit.

Note

*For a CBR source type, the **SCR** parameter does not apply. This parameter, however, is required when you set up a transmission stream with a VBR transmission source.*

The **SCR** parameter has three forms of expression:

- MBS (Megabits per second)
- CPS (Cells per second)
- % (Percent)

5. Press the **Down Arrow** key to move the cursor to the **SCR** form that you want to use. Then, use the keypad to supply a value.

6. Press the **Down Arrow** key to move the cursor to the **CDVT** parameter.

   The tester provides optimum spacing and positioning between cells in a transmission stream. The **CDVT** parameter defines the maximum limit (in units of ATM cells) that the tester can vary from this optimum placement.

7. Use the keypad to supply a value for **CDVT**.

   You are now ready to define the payload for the transmission stream.

Specifying the Type of Payload

The type of test that you run on the E1port Plus affects the choices you make when you configure the payload carried by a transmission stream. For example, if you run a BER test, you need configure a BERT payload. The ATM tests that you can run are documented in Chapter 6. If a test requires that you specify a particular payload type, the test procedure references one of the sections that follows.

In this section, you will learn how to configure the following types of payloads:

- Fixed
- BERT
- O.191
- User-defined cell list

Specifying a Fixed Payload

A fixed payload is one in which the same pattern is repeated in each of the 48 bytes in a cell's payload. This procedure shows you how to specify a fixed payload and how to define the fixed pattern.

Note

*To locate the screens documented in this procedure, press **ATM**. Then, scroll to the **Config Xmit Streams** option and press **ENTER**. Finally, select a transmission stream from the **ATM SOURCES** screen and press **ENTER**.*

To specify a fixed payload, follow these steps:

1. Press **F1**(PGDN) to display the **PAYLOAD** (P4) screen.

2. Press the **Left** or **Right Arrow** key to change the setting of the **Type** parameter to **Fixed**.

3. Press **F4**(BACK) two times to return to the **ATM SELECTIONS** menu.

4. Press the **Down Arrow** key to highlight the **ATM Configuration** option. Then, press **ENTER** to display the **ATM CONFIGURATION** (P1) screen:

```
┌─────────────────────────────────────┐
│  ATM CONFIGURATION          P1       │
│          HCS Coset ⇆ On              │
│       Net Interface ⇆ NNI            │
│        Delineation ▶ HEC             │
│    Bckgrnd Format ⇆ Idle             │
│       Fixed Pattern :  6A            │
│                                      │
│  PGDN                      BACK      │
└─────────────────────────────────────┘
```
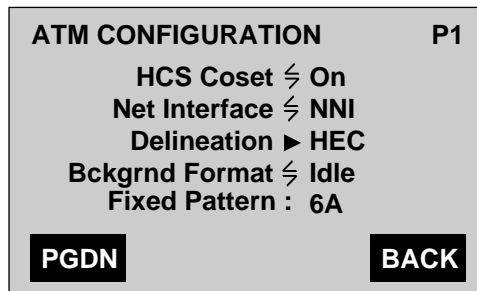
aai049f.eps

5. Press the **Down Arrow** key to move the cursor to the **Fixed Pattern** parameter.

   This parameter allows you to define the pattern that is repeated in every byte of the cell's payload. The default fixed payload pattern is 6A.

6. Use the keypad to supply the desired hexadecimal value for the **Fixed Pattern** parameter.

7. Press **F4**(BACK) to return to the **ATM SELECTIONS** menu.

8. Press the **Up Arrow** key to highlight the **Config Xmit Streams** option. Press **ENTER** to return to the **ATM SOURCES** screen.

You are now ready to load and transmit the stream. See "Starting Stream Transmission", later in this chapter for details.

Specifying a BERT Payload

When you run a Bit Error Rate test, you need to configure the transmission stream to carry a BERT payload.

Note

*To locate the screens documented in this procedure, press **ATM**. Scroll to the **Config Xmit Streams** option and press **ENTER**. Finally, select a transmission stream from the **ATM SOURCES** screen and press **ENTER**.*

To specify a BERT payload, follow these steps:

1. Press **F1**(PGDN) to display the **PAYLOAD** (P4) screen.

    The cursor is positioned on the **Type** parameter.

2. Press the **Left** or **Right Arrow** key to change the setting of the **Type** parameter to **BERT**, as in the following:

```
┌─────────────────────────────────────┐
│  PAYLOAD  Stream 6           P4      │
│                                      │
│   TYPE ⇄  BERT                       │
│                                      │
│                                      │
│                                      │
│        PGUP            BACK          │
└─────────────────────────────────────┘
```

ta058f.eps

3. Press **F4**(BACK) to return to the **ATM SOURCES** screen.

You are now ready to load and transmit the stream. See "Starting Stream Transmission", later in this chapter.

Note

*Reloading the transmit stream with a payload other than **BERT** while running a BER test will produce invalid results.*

Specifying an O.191 Payload

When you run a Cell Delay Variation, Cell Transfer Delay or a Cell Loss test, you need to configure an ITU-T O.191 payload for the E1port Plus. The tester uses the O.191 timestamp to calculate delays in the transmission of cells and uses the O.191 sequence number to determine if cells are missing or incorrectly inserted.

Note

*To locate the screens documented in this procedure, press **ATM**. Then, scroll to the **Config Xmit Streams** option and press **ENTER**. Finally, select a transmission stream from the **ATM SOURCES** screen and press **ENTER**.*

To specify an O.191 payload, do the following:

1. Press **F1**(PGDN) to display the **PAYLOAD** (P4) screen.

   The cursor is positioned on the **Type** parameter.

2. Press the **Left** or **Right Arrow** key to change the setting of the **Type** parameter to **O.191**, as in the following:

```
┌─────────────────────────────────────┐
│ PAYLOAD  Stream 6              P4    │
│                                      │
│  TYPE⇕  O.191                        │
│                                      │
│                                      │
│                                      │
│        PGUP            BACK          │
└─────────────────────────────────────┘
```
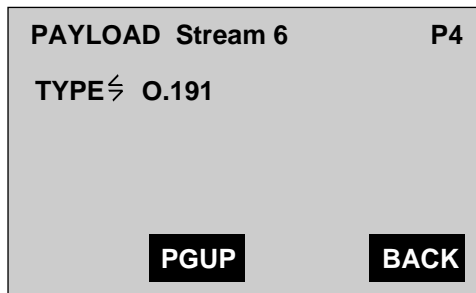
ta059f.eps

   The tester will now insert an O.191 test payload into every cell in the transmission stream.

3. Press **F4**(BACK) to return to the **ATM SOURCES** screen.

You are now ready to load and transmit the stream. See "Starting Stream Transmission", later in this chapter**.**

Note

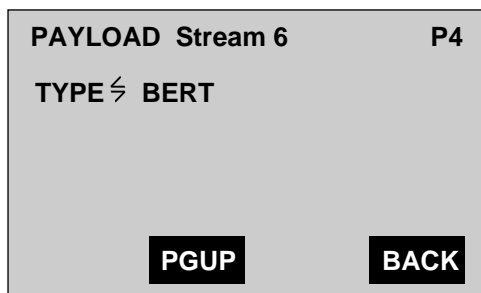*Reloading the transmit stream with a payload other than **O.191** while running a Cell Loss or CDV 2- point/CTD test will produce invalid results.*

Specifying a User-defined Cell List

Another type of payload that you can specify is called a user-defined cell list. This type of payload consists of a sequence of one or more cells.

Before you use the following procedure to specify this type of payload, you may find it easier to create the cell payloads first. Go to "Creating a User-defined Cell List" later in this chapter for details.

Note

To locate the screens documented in this procedure, press **ATM**.
Then, scroll to the **Config Xmit Streams** *option and press* **ENTER**.
Finally, select a transmission stream from the **ATM SOURCES**
screen and press **ENTER**.

To specify a user-defined cell list, follow these steps:

1. Press **F1**(PGDN) to display the **PAYLOAD** (P4) screen.

2. The cursor is positioned on the **Type** parameter.

3. Press the **Left** or **Right Arrow** key to change the setting for the **Type** parameter to **Cell List**, as in the following:

```
┌─────────────────────────────────────┐
│ PAYLOAD  Stream 6              P4    │
│                                     │
│ Type ⇵  Cell List                   │
│ Cells in List:      03              │
│                                     │
│                                     │
│                                     │
│  PGDN   PGUP            BACK         │
└─────────────────────────────────────┘
```
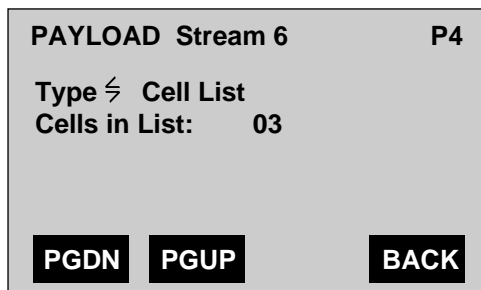
ta061f.eps

The **Cell List** parameter indicates that you want to transmit a payload that consists of cells that you have defined. These cells are found on the **CELL LIST** menu.

4. Press the **Down Arrow** key to move the cursor to the **Cells in List** parameter.

This parameter specifies how many cells on the **CELL LIST** menu that you want to send.

5. Use the keypad to supply a value for **Cells in List**. Then, press **ENTER**.

The **CELL LIST** menu is displayed, as in the following:

```
PAYLOAD    Stream 6              P5
              CELL LIST
1  CELL 1             5
2  CELL  2            6
3  MY CELL            7
4                     8

  PGDN    PGUP              BACK
```
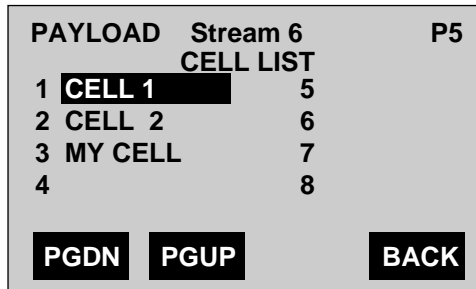
ta062f.eps

Note

*The number of cells listed on the CELL LIST menu reflects the
number specified for **Cells in List**. Note that on the PAYLOAD (P5)
screen, only three cells are listed on the **CELL LIST** menu. This is
because the value **03** was specified for the **Cells in List** parameter
on the **PAYLOAD** (P4) screen.*

When you load the transmission stream, the tester sends out the cells in the
same order that they are listed on this menu. The tester continues to send out
the cells in this order until you stop transmission.

6. Do *one* of the following:

•   If the cells on the **CELL LIST** menu are in the correct order, press
    F4(BACK) to return to the **ATM SOURCES** screen.

    You are now ready to start transmission. See "Starting Stream
    Transmission", later in this chapter for details.

    OR

•   If the cells on the **CELL LIST** menu are not in the correct order, see
    "Changing the Order of Cells on the CELL LIST Menu", which follows.

Changing the Order of Cells on the CELL LIST Menu

If you want to change the order in which the payload cells are transmitted, you need to change the order in which they are listed on the **CELL LIST** menu. This section provides an example of how to change this menu.

Suppose that you want to make the following changes to the **CELL LIST** menu:

Current Order:

1. CELL 1

2. CELL 2

3. MY CELL

New Order:

1. CELL 1

2. MY CELL

3. CELL 2

To change the current order of cells on the **CELL LIST** menu, follow these steps:

1. From the **CELL LIST** menu, press the **Down Arrow** key to highlight the name of the cell that is currently second in the list (this is because **CELL 2** is the cell that you want to change).

    Consider this example:
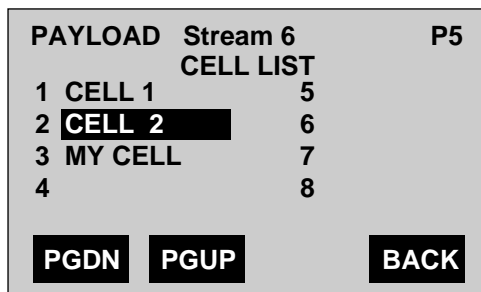
ta063f.eps

2. Press **ENTER** to display the **SELECT CELL** menu:

```
┌─────────────────────────────────┐
│ SELECT CELL              P1      │
│                                  │
│ 1 CELL  1       5 CELL  5        │
│ 2 CELL  2       6 CELL  6        │
│ 3 MY CELL       7 CELL  7        │
│ 4 CELL  4       8 CELL  8        │
│                                  │
│ PGDN                    BACK     │
└─────────────────────────────────┘
```
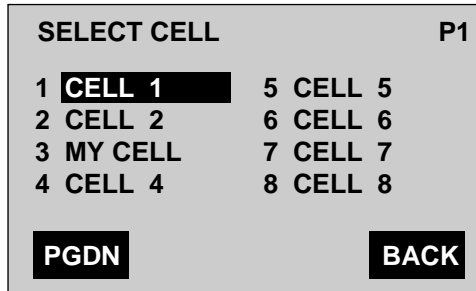
ta064f.eps

3. From the **SELECT CELL** menu, select the name of the cell (**MY CELL**) that you want to put in second place on the **CELL LIST** menu. Then, press **ENTER**.

   You return to the **CELL LIST** menu, which now looks like this:

```
┌─────────────────────────────────┐
│ PAYLOAD  Stream 6         P5     │
│           CELL LIST              │
│ 1 CELL 1         5               │
│ 2 MY CELL        6               │
│ 3 MY CELL        7               │
│ 4                8               │
│                                  │
│ PGDN   PGUP             BACK     │
└─────────────────────────────────┘
```
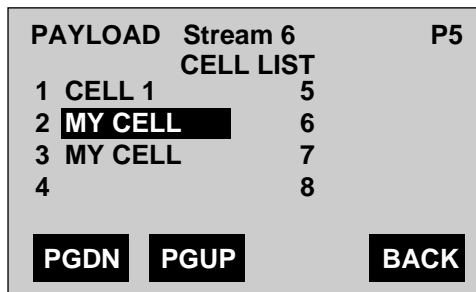
Wg089f.eps

   Note that the cell you selected (**MY CELL)** is highlighted and is now second in the list. You now need to put **CELL 2** in the third position.

4. Press the **Down Arrow** key to highlight the name of the third cell (**MY CELL**). Then, press **ENTER** to return to the **SELECT CELL** menu.

5. Press the **Down Arrow** key to highlight **CELL 2**. Then, press **ENTER**.

   The **CELL LIST** menu is displayed again:

```
┌────────────────────────────────┐
│ PAYLOAD  Stream 6          P5   │
│           CELL LIST            │
│  1  CELL 1          5          │
│  2  █MY CELL█       6          │
│  3  CELL 2          7          │
│  4                  8          │
│                                │
│  PGDN   PGUP            BACK    │
└────────────────────────────────┘
```
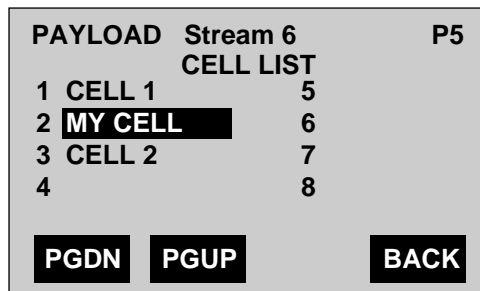
Ta065f.eps

   The cells in the list are now in the desired order.

6. Press **F4**(BACK) to return to the **ATM SOURCES** screen.

   You are now ready to start transmission. See "Starting a Transmission Stream"
   later in this chapter for details.

Creating a User-defined Payload

There may be situations in which you need to create special test patterns. In these
situations, you can define a payload and transmit it over the network. The tester
allows you to define every byte in an ATM cell's payload. This procedure shows
you how to do this.

Selecting a Cell

The first step in transmitting this type of payload is to select which cells you want
to edit.

1. Press **ATM** to display the **ATM SELECTIONS** menu.

2. Press the **Down Arrow** key to move the cursor to the **ATM Configuration**
   option. Press **ENTER** to display the **ATM CONFIGURATION** (P1) screen.

3. Press **F1**(PGDN) to display the **ATM CONFIGURATION** (P2) screen:

```
ATM CONFIGURATION          P2


      Edit  Cell  Contents ⌐



         PGUP              BACK
```
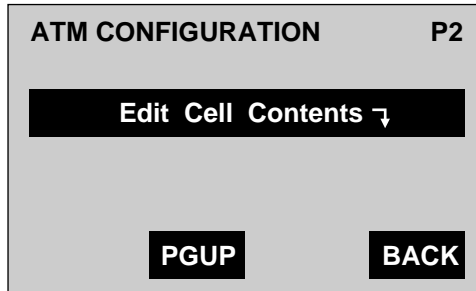
ta066f.eps

4. Press **ENTER** to display the **SELECT CELL** menu:

```
SELECT CELL                P1

1 CELL 1        5 CELL 5
2 CELL 2        6 CELL 6
3 MY CELL       7 CELL 7
4 CELL 4        8 CELL 8

PGDN                      BACK
```
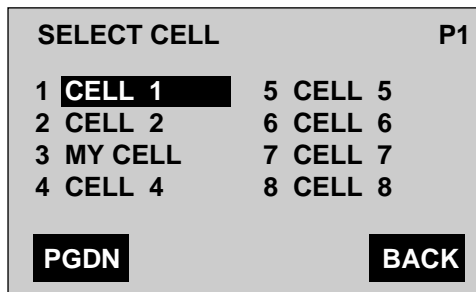
ta064f.eps

From the **SELECT CELL** menu, you can select the cells whose payloads you want to define. You can define the payloads for up to 16 cells.

Note

The 16 cells are numbered 1-9 and A-G, respectively. Press
F2(PGDN) to display the remaining cells (CELLS 9 - G).*

5. To select a cell whose contents you want to define, press the **Down Arrow** key to highlight its name. Then, press **ENTER**.

The tester displays the contents of the cell you selected.

For example, if you select **CELL 3** then press **ENTER**, a screen similar to the following is displayed:

ta067f.eps

This screen contains the 48 bytes in the cell's payload. You can edit each of these bytes, which are found on four pages.

To help you locate a byte, use the number in the beginning of each row as your starting point. For example, on this page, the zero (0) at the beginning of the first row means that the first byte in the row is Byte 0. The second row begins with Byte 6.

For each byte, there is a hexadecimal and an ASCII representation. The hexadecimal representation is presented in the top portion of the byte, and the ASCII representation is presented in the bottom portion of the byte.

6. Press **F1**(PGDN) to display Page 2 (P2).

   Note that the two rows on this page begin with Byte 12 and Byte 18, respectively.

7. Continue to press **F1**(PGDN) to see that all 48 bytes of the selected cell are represented.

Naming a Cell

Each of the 16 cells can be given a specific name to help you identify them. To name a cell, follow these steps:

1. Press **F2**(PGUP) to return to Page 1 (P1).

   The cursor is positioned on the first letter of the name of the cell, which in this example, is **CELL 3**.

2. Use the keypad to give the cell a name.

   In our example, we will type **MY CELL**.

   Notes

   For information about how to use the keypad, see "Alphanumeric Keypad" in Chapter 2.

   To put a space between the two words "MY" and "CELL", press
   SHIFT 1 + **Space***.*

   The change takes effect immediately. In our example, "CELL 3" is now renamed "MY CELL".

Editing the Bytes in a Cell's Payload

You are now ready to define the payload that is carried the cell. You do this by editing the payload bytes. You can define these bytes in ASCII or hexadecimal. Choose the representation that is appropriate for your particular application.

The following exercise gives you practice with editing the bytes of "MY CELL".

1. Press the **Down Arrow** key. The cursor moves to the top portion of Byte 0, the first byte in the payload. This is where you can define the byte using a hexadecimal number.

2. Press the **Down Arrow** key again. The cursor moves to the bottom of Byte 0. This is where you can define the byte using ASCII.

3. To practice editing a byte using a hexadecimal or ASCII representation, follow these steps:

a. Change the hexadecimal representation of Byte 0 to "3C". To do this, press the **Up Arrow** key to move to the top portion of Byte 0. Then, press the **3** and the **C** keys. Note that the value in the bottom cell changes to the corresponding ASCII representation, "<".

The cursor is now positioned on Byte 1.

b. Change the ASCII representation of Byte 1 to "E". To do this, press the **Down Arrow** key.

The cursor moves to the bottom portion of Byte 1.

c. Now press the **E** key.

Note that the hexadecimal value in the top portion of the byte changes to "45".

d. Finish editing the bytes in **MY CELL** to match this list:

- Byte 2 5B
- Byte 5 A
- Byte 7 7

MY CELL now looks like this:

ta068f.eps

The values you supply for any cell you edit are stored in memory and are saved even when you turn off the tester.

Caution
These values are permanently erased if you restore the factory default settings.

Now that you have defined each cell's payload, you need to configure the tester to transmit the cells in the cell list. Go to "Configuring a Transmission Stream"

earlier in this chapter for details. When you specify the type of payload, follow the procedure under "Specifying a User-defined Cell List".

Starting Stream Transmission

1. From the **ATM SOURCES** screen, press **F3**(LOAD).

```
┌─────────────────────────────────────────┐
│  ATM SOURCES                             │
│                                          │
│  1 - CBR ⤵        5 - CBR ⤵              │
│  2 - CBR ⤵        6 ✓CBR ⤵              │
│  3 - CBR ⤵        7 - CBR ⤵              │
│  4 - CBR ⤵        8 - CBR ⤵              │
│                                          │
│   ███ON███  ██OFF██  █LOAD█  █BACK█      │
└─────────────────────────────────────────┘
```
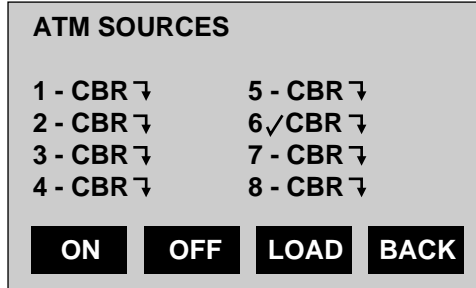
ta052f.eps

The tester loads the patterns defined for the selected transmission streams (in this example, Stream 6 is the only selected stream as indicated by check mark). During this process, you see a series of messages that indicate that the E1port Plus is building and loading the transmission stream and then starting cell generation.

When the E1port Plus finishes, the **TRANSMIT STATS** (P1) screen is displayed:

```
┌─────────────────────────────────────────┐
│  TRANSMIT STATS                     P1   │
│   ⇅ VPI   VCI     Cells                  │
│    0016  00064           0               │
│    0017  00065           0               │
│    0018  00066           0               │
│    0019  00067           0               │
│    Total   Tx      50549390              │
│   █PGDN█              █CPS█  █BACK█       │
└─────────────────────────────────────────┘
```
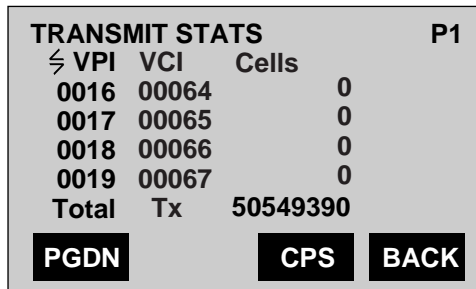
ta069f.eps

This is the first of two screens that display transmission statistics. These screens provide information about the number of cells that are being transmitted on each of the tester's eight transmission streams.

Note the information in the last column with the heading "Cells". In this example, a total of 50,549,390 cells have been transmitted. However, none of these cells have been transmitted on any of the streams you see on this screen.

2. Press **F1**(PGDN) to display the **TRANSMIT STATS** (P2) screen:

```
TRANSMIT STATS              P1
 ⇋ VPI  VCI    Cells
  0020  00068          0
  0021  00069  50549390
  0022  00070          0
  0023  00071          0
  Total  Tx    50549390
┌──────┐        ┌─────┐┌─────┐
│ PGDN │        │ CPS ││BACK │
└──────┘        └─────┘└─────┘
```

ta070f.eps

Look at the cell activity on VPI 21/VCI 69, which is Stream 6. The column labeled "Cells" indicates that all 50,549,390 cells have been transmitted on this stream since transmission began.

3. Press **F3**(CPS).

Note that the information in the last column is now presented in a different form: cells per second (CPS).

4. Press **F3** several more times to see the same information presented in these other forms:

    - MBS (Megabits per second)

    - BW % (Bandwidth percentage)

    - CELL (Exact cell counts)

5. Press **CLEAR**.

The current values are erased. Notice that the counters immediately reset to zero and begin counting again.

6. With the cursor positioned on the ⇋ symbol on Line 2, press the **Right Arrow** key.

Notice that the information on the screen changes to display each stream's values for the **GF**, **PT**, **CL**, **HCS** parameters.

For example:

```
TRANSMIT STATS                    P2
  ⇅ GF PT CL HCS        Cells
    0   0   0   56              0
    0   0   0   84       50549390
    0   0   0   F5              0
    0   0   0   27              0
   Total  TX            50549390
                PGUP    CPS   BACK
```

ta071f.eps

7. Press the **Right Arrow** key again.

    Now, the hexadecimal header value of each circuit is displayed on this line.

8. Press the **Right Arrow** key once more.

    The name of each stream is displayed.

Viewing ATM Circuit Activity

To view activity on detected circuits, follow these steps:

1. Press **ATM** to display the **ATM SELECTIONS** menu.

2. Make sure that the **Receive Summary** option is highlighted. Then, press **ENTER** to display the **RECEIVE SUMMARY** screen.

3. Press the **Down Arrow** key to highlight the **Circuit Activity List** option. Then, press **ENTER** to display the following:

```
RCV STATS            (01 - 04)
  ⇅ VPI  VCI        Cells
   0000   00000     3950803
   0016   00064      658466
   0017   00065      658466
   0018   00066      658466
      ⇅  as found    5 ckts
  PGDN              CPS   BACK
```

ta102f.eps

This screen indicates the number of cells that the tester has received since you pressed **CLEAR**. The tester can keep track of activity on up to 64 different circuits.

Note

*The **RCV STATS** screen also displays circuits on which **ATM** tests are being conducted or have been conducted since the display was last cleared.*

In this example, the E1port Plus has detected activity on five streams (5 ckts). The first stream listed has a VPI of 0 and a VCI of 0. These are background cells. On each of the remaining streams displayed, the tester has received 658,466 cells.

Note that the first line of this screen has the numbers 01 - 04. These numbers correspond to the circuits listed on this screen. That is, '01' is the first circuit (the one with VPI 0/VCI 0), '02' is the second circuit, and so forth.

1. Press **F3**(CPS).

   Notice that the information in the last column changes from a count to cells per second (CPS).

2. Press **F3** several times again to see the same information presented in these forms:

   - MBS (Megabits per second)

   - %BW (Bandwidth percentage)

   - CELL (Exact cell counts)

3. In the sample display, you are viewing circuits 1 - 4. To display information for additional circuits, press **F1**(PGDN).

   The tester "beeps" and displays the information.

4. To display information for the previous four circuits, press **F2**(PGUP).

5. To display the information for a specific circuit, position the cursor on Line 1. Then, use the keypad to type the number (01 to 64) of the circuit that you want to view.

   The information for the circuit you selected is displayed on Line 3.

Note

The E1port Plus can detect up to 64 circuits. Each detected circuit is put in a list and assigned a number from 1 to 64. When you want to view the information for a specific circuit, you use its assigned number (for example, enter '04' to view the fourth circuit in the list).

6. Move the cursor to the ⇆ symbol on Line 2. Then, press the **Right Arrow** key.

   Notice that the information in this field changes to display values for the **GF**, **PT**, **CL**, **HCS** parameters.

   For example:

```
RCV STATS        (01 - 04)
 ⇄ GF PT CL  HCS        Cells
    0   0   0    66        3950803
    0   0   0    52         658466
    0   0   0    17         658466
    0   0   0    C5         658466
    ⇄  as found            5 ckts
 PGDN                CPS   BACK
```
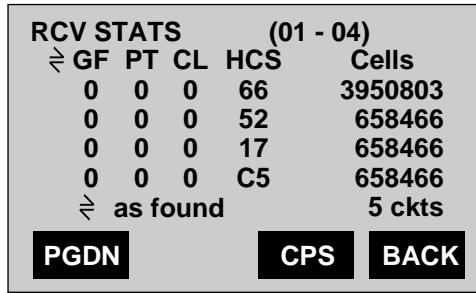
ta103f.eps

7. Press the **Right Arrow** key again to view the header Hex values for the circuits.

8. To view the receive summary statistics in graphical form, complete these steps:

   a. Press the **Right Arrow** key to return to the display showing the VPI/VCI values.

   b. Press **SHIFT 1** + **Fn**.

      The receive summary statistics are now presented in a bar graph.

      Note that the bar graph is at 100% of scale:

```
RCV STATS        (01 - 04)
 ⇄ VPI  VCI   Cells ⇄ 100%─┐
0000   00000  ████████████
0016   00064  █
0017   00065  █
0018   00066  █
    ⇄  as found      5 ckts
 PGDN            CPS   BACK
```
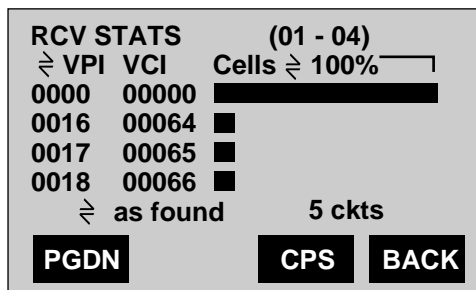
ta104f.eps

c. To change the scale of the graph, press **SHIFT 1** + **Fn**.

With each successive press of these keys, you can view the graph reduced to these proportions: 50%, 25%, and 10%.

d. To exit graphical mode, press **SHIFT 1** + **Fn**.

9. Press the **Down Arrow** key to move the cursor to the ⇵ symbol at the bottom of the screen. Then, press the **Right Arrow** key.

Notice that the wording following this symbol changes from **as found** to **vp/vc H>L**. Note also that the order of the circuits listed on the screen also changes. They are now in a rank order from high to low by VPI/VCI (**vp/vc H>L**).

Consider the following screen:

```
RCV STATS        (01 - 04)
 ⇵ VPI   VCI      Cells
  0018   00066    658466
  0017   00065    658466
  0016   00064    658466
  0000   00000   3950803
     ⇵  vp/vc  H>L     5 ckts

           PGUP   CPS   BACK
```

ta105f.eps

10. Press the **Right Arrow** key again to view the following information:

- **vp/vc L>H**

  Sorts circuits by VPI/VCI and displays a rank order listing from low to high

- **freq H>L**

  Sorts circuits by number of cells and displays a rank order listing from high to low

- **freq L>H**

  Sorts circuits by number of cells and displays a rank order listing from low to high
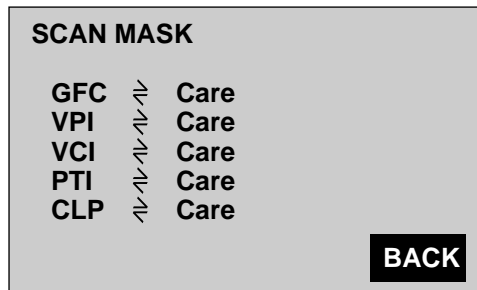
Changing the Presentation of Circuit Activity Statistics

The default method of reporting circuit activity entails providing separate statistics for a circuit based on differing values for each cell header field. While this method gives you a more detailed look at circuit activity, there may be times when you need to summarize or group the data to better understand signal traffic and performance.

The E1port Plus can be configured to ignore or mask certain header characteristics when reporting activity on detected circuits. For example, suppose you want a bandwidth summary for each VPI. In this case, you could set up the tester to ignore all of the header fields except the VPI. When reporting the circuit activity, the tester would provide you with a summary of its statistics by VPI only.

To change the way the E1port Plus presents circuit activity statistics:

1. Press **ATM** to display the **ATM SELECTIONS** menu.

2. Make sure that the **Receive Summary** option is highlighted. Then, press **ENTER** to display the **RECEIVE SUMMARY** screen.

3. Press the **Down Arrow** key to highlight the **Config Scan Mask** option. Then, press **ENTER** to display the **SCAN MASK** screen:

```
SCAN MASK

   GFC  ⇌  Care
   VPI  ⇌  Care
   VCI  ⇌  Care
   PTI  ⇌  Care
   CLP  ⇌  Care

                        BACK
```

ta106f.eps

This screen lists the five header fields. You can set each field to one of the following:

- **Care**

  The tester includes the field when reporting statistics

- **Don't Care**

  The tester ignores the field when reporting statistics

5-31

4. Position the cursor on the header field you want to change. Then, press the **Left** or **Right Arrow** key to select the desired setting.

5. Press **F4**(BACK) to return to the **RECEIVE SUMMARY** screen.

6. Press the **Down Arrow** key to highlight the **Circuit Activity List** option. Then, press **ENTER** to return to the **RCV STATS** screen.

Notes

On the RCV STATS screen, an 'X' is used to designate that the tester ignored the field.

Some ATM tests automatically ignore a bit or two in a header field so that they can perform a calculation. When this is done, an asterisk (*) is used to indicate that a portion of the field was ignored.

Monitoring a Signal for ATM Errors

To monitor the E1 signal for ATM errors, complete the following:

1. Press **ATM** to display the **ATM SELECTIONS** menu.

2. Make sure that the **Receive Summary** option is highlighted. Then, press **ENTER** to display the **RECEIVE SUMMARY** screen.

3. Make sure that the **ATM Errors** option is highlighted, Then, press **ENTER**.

   The **ATM ERRORS** screen is displayed:

```
ATM ERRORS

  HCS Errs  ►    00000012
  Delin Errs ►   00000013




                        BACK
```
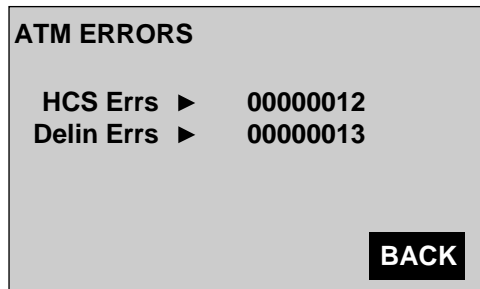
ta023f.eps

This screen lists the following errors:

- **HCS Errs**

  Header Checksum errors. Indicates errors relating to the HEC field of ATM cells.

- **Delin Errs**

  Cell delineation errors. Indicates errors related to cell framing.

Chapter 6
ATM Network Testing

Contents   **Page**

Introduction

This chapter describes the ATM network testing functions of the E1port Plus. The first part of this chapter shows you how to configure the tester's receive filter, which is used by many of the ATM tests to detect and identify incoming cells. The second part of this chapter shows you how to set up and run the ATM tests.

Before you can transmit or receive ATM cells, your tester must be configured to match the E1 signal to be tested. See "Chapter 4. Testing E1 Networks" for information on how to do this.

Configuring the Receive Filter

For many of the ATM tests that you will be running, you will need to configure the tester's receive filter as part of the setup. The tester uses the receive filter to route incoming cells to its statistical counters, enabling you to analyze cell payloads and check for errors in the received ATM cell stream.

The following tests, which are documented later in this chapter, require you to configure the receive filter as part of their setup:

• Bit Error Rate

• Quality of Service

• Cell Capture

• AAL Detection

• IP Ping and IP Ping Responder

• GCRA

The parameters you define as part of the configuration of the receive filter set the attributes that the tester uses to check incoming ATM cells on its input E1 signal. The specific settings for these parameters vary depending on the type of test you are running. Like all other E1port Plus settings, the receive filter settings are saved in memory even when the tester is turned off.

To configure the receive filter:

1. Press **ATM** to display the **ATM SELECTIONS** menu.

2. Press the **Down Arrow** key to highlight the **ATM Testing** option. Then, press **ENTER** to display the **ATM TESTS** (P1) menu.

   The cursor is positioned on the **Receive Filter** option.

3. Press **ENTER** to display the setup screen for the receive filter:

```
┌─────────────────────────────────┐
│  RECEIVE FILTER                 │
│                                 │
│ √VPI: 0016        √PT:  0        │
│ √VCI:00064        x CLP:0        │
│ √GFC:0                           │
│                                 │
│                                 │
│  Hex:   01  00  04  00  17       │
│                    DONTC  BACK   │
└─────────────────────────────────┘
```

ta108f.eps

On this screen, you can specify a value for each of the five fields in the ATM cell header. Consult Table 6-1 for descriptions of the receive filter setup parameters.

For each ATM cell header field, the **F3** key is used to specify an include (CARE) or ignore (DONTC) condition. When preceded by a check mark √(CARE), the tester filters and displays results only for the value you specify in the field. When preceded by an **x** (DONTC), the tester filters and displays results for any value in the field.

4. To set up the receive filter, choose *one* of the following methods:

- Use the keypad to specify a value for the **VPI** , **VCI**, **PT**, **CLP**, and **GFC** parameters.

  If you want the tester to include or exclude a header field when it checks the input stream, position the cursor on the field's value and press **F3** to select the desired condition.

  You have completed setting up the receive filter.

  OR

- Move the cursor to the **Hex** field. Then, use the keypad to specify a value for each byte.

  You have completed setting up the receive filter.

Table 6-1. Receive Filter Setup Parameters

Parameter	Description
VPI	Virtual Path Indicator. Defines the address of the cell.
VCI	Virtual Channel Indicator. Defines the address of the cell.
PT	Payload Type. Indicates whether the contents of the cell are user data or network signaling information.
CLP	Cell Loss Priority. A priority indicator, which indicates whether or not the network can discard the cell.
GFC	Generic Flow Control. Used for traffic control (for the UNI interface only).
Hex	Hexadecimal header. This is a hexadecimal representation of the ATM cell header. This parameter provides you with an alternate way of entering values for the **VPI**, **VCI**, **PT**, **CLP**, and **GFC** fields.

Bit Error Rate Test

The E1port Plus can fill the payloads of cells on any one of its eight transmission streams with a pseudo-random or fixed bit cell pattern and determine the effective error rate of the cell stream. In addition, the E1port Plus can receive cells generated by other equipment that has been filled with a standard test pattern and analyze the resultant bit error rate (BER).

This section shows you how to set up the tester to generate and analyze an ATM cell stream or a E1 stream that is carrying a BER test payload. It shows you how to set up a BER test using a predefined test pattern or a pattern that you create, and how to run the test using the pattern you select. It also describes the measurement results that the tester provides.

Setting Up a BER Test

A BER test uses the receive filter and the BER test pattern to check the incoming signal. To set up the E1port Plus to run this test, first do the following:

1. Set up the receive filter. Make sure that the header matches the header of the transmission stream carrying the BER test payload (see "Configuring the Receive Filter" earlier in this chapter for information on how to do this).

2. If the tester is to be the source of the BER test pattern, set up a transmission stream with the payload type set to **BERT** (see "Configuring a Transmission Stream" in Chapter 5 for information on how to do this).

Note

*You can select **BERT** as the payload for more than one transmit
stream. However, be aware that when you do this, the BER test data
is "shared" among the streams. As a result, your BER test results
may be invalid unless the receiving tester is configured to
simultaneously test the BER-configured streams. This is also a useful
way of providing "random" cell payloads on multiple cell streams.*

After you set up the receive filter, you need to define the BER test pattern. The
instructions that follow show you how to complete this phase of the setup for the
BER test.

1. Press **ATM** to display the **ATM SELECTIONS** menu.

2. Press the **Down Arrow** key to highlight the **ATM Testing** option. Then, press
    ENTER to display the **ATM TESTS** (P1) menu.

3. Press the **Down Arrow** key to highlight the **Bit Error Rate** option. Then, press
    ENTER to display the **ATM BER TEST** (P1) screen.

4. Press **F1**(PGDN) to display the **ATM BER TEST** (P2) screen:

```
┌─────────────────────────────────────────┐
│  ATM  BER  TEST                    P2    │
│                                          │
│      Pattern ⇋ 2**15                     │
│        Edit:    00 00 00 00              │
│    Ptrn Sze ⇋ 1                          │
│       Invert ⇋ No                        │
│                                          │
│  ┌──────┐┌──────┐┌───────┐┌──────┐       │
│  │ PGDN ││ PGUP ││ START ││ BACK │       │
│  └──────┘└──────┘└───────┘└──────┘       │
└─────────────────────────────────────────┘
```
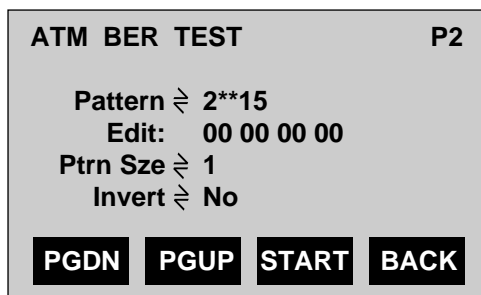
ta109f.eps

The cursor is positioned on the **Pattern** parameter. The settings for this
parameter represent the patterns of bits that you can select during a BER test.
For a list and description of BER test patterns, refer to Table 4-3.

5. Do *one* of the following:

   • If you want to use one of the predefined patterns, press the **Left** or **Right Arrow** key to select the one that you want to use. Then, go to Step 6.

     OR

   • If you want to create your own test pattern, follow these steps:

      1. Press the **Left** or **Right Arrow** key to select the **User Def** setting.

      2. Press the **Down Arrow** key to move the cursor to the **Edit** parameter. Then, use the keypad to specify the exact bit pattern that you want to send.

      3. Press the **Down Arrow** key to move the cursor to the **Ptrn Sze** (Pattern Size) parameter.

         This parameter has four settings, 1 - 4, which represent the number of bytes (containing the selected pattern) that are continuously transmitted.

      4. Press the **Right Arrow** key to select a value for the size of the pattern.

6. Press the **Down Arrow** key to move the cursor to the **Invert** parameter. Then, press the **Left** or **Right Arrow** key to select one of the following settings:

   • **No**

     Does not invert the polarity of each of the selected bit patterns

   • **Yes**

     Inverts the polarity of each of the selected bit patterns

7. Press **F1**(PGDN) to display the **ATM BER TEST** (P3) screen:


```
ATM  BER  TEST                P2


       Err Inject ⇌     NONE



           PGUP  START  BACK
```
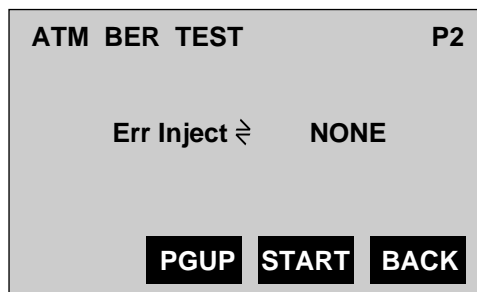
Ta110f.eps

The **Err Inject** (Error Injection) parameter determines the error injection rate. Errors are injected in the transmitted BER test pattern according to one of four rates (see Table 4-4 for error injection rate choices).

8. Press the **Left** or **Right Arrow** key to select the desired error injection rate.

Note

*Even if you select **NONE**, you can still inject single bit errors while the BER test is running. To do this, press **F2**(INJCT). Each time you press this key, a single error is injected into the BER test stream.*

You have completed the setup for the BER test.

Starting a BER Test

Notes

If you decide to change a setting while the tester is running a BER test, you must first stop the test, change the setting, then restart the test with the new settings.

*If the tester is the source of the BER test pattern, you can inject individual bit errors while the BER test is running. To do this, press **F2**(INJCT). Each time you press this key, a single error is injected into the BER test stream.*

1. To start a BER test, press **F3**(START).

Several messages, indicating that the tester is building then loading the specified cell stream, are displayed. Then, results (see Table 4-8) are displayed on the **ATM BER TEST** (P1) screen:

```
ATM BER TEST                    P1
              Errors▶  0000000000
                Bits▶  0176111900
            Err Rate▶  NO ERRORS
            Errd Sec⇌  0000000000
              Status▶  RUNNING
     PGDN   INJCT   STOP   BACK
```
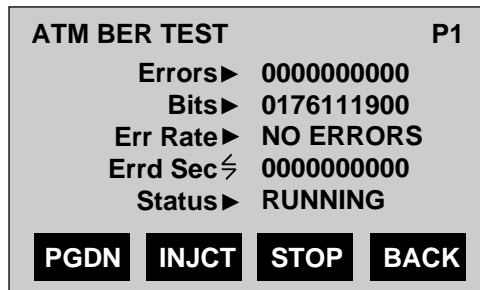
wg115.eps

The cursor is positioned on the **Errd Sec** result.

2. Press the **Left** or **Right Arrow** key to view BER test results in the following formats (see Table 4-5 for descriptions):

- **Efree Sc**

- **% Efree**

- **Elap Sec**

- **Errd Sec**

Stopping a BER Test

To stop the BER test, press **F3**(STOP).

Quality of Service Tests

The E1port Plus has three Quality of Service (QoS) tests that are used to test the integrity of an ATM circuit and to ensure that a particular network meets contracted levels of service. The following QoS tests are documented in this section:

- Cell Delay Variation (CDV) 1-point

- Cell Delay Variation 2-point and Cell Transfer Delay (CTD) using ITU-T O.191 test cell

- Cell Loss using ITU-T O.191 test cell

Cell Delay Variation Tests

The E1port Plus calculates Cell Delay Variation (CDV), which is a quantification of how cells clump together as they travel on a particular VPI/VCI. The tester performs two types of CDV tests: a 1-point and a 2-point. This section shows you how to set up and run these two types of tests.

CDV 1-point Test

A CDV 1-point test is concerned with the early arrival of cells, which indicates that the transmission source is in violation of its traffic contract. During this test, the tester captures a sample of cells in its buffer and assigns each cell a received time stamp. The arrival times of cells are then compared with the expected arrival time (which is based on the value you supply for the **PCR** parameter) and a resultant CDV value is derived.

CDV results are expressed in microseconds, and cells are either early or late. Early cells indicate clumping and possible excessive usage above the contract rate by the transmission source. If the cells sampled arrive later than expected, the transmission source is not exceeding the contract rate. After each analysis of the
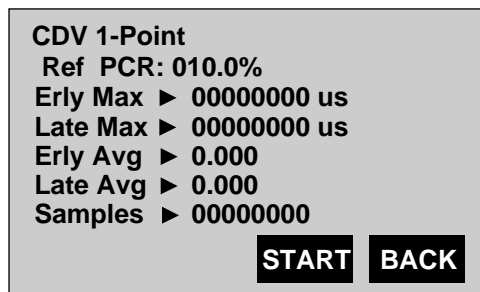
buffer's contents, the tester empties its buffer and then refills it so that the test can continue.

Setting Up a CDV 1-point Test

To set up a CDV 1-point test, first set up the receive filter. For information on how to do this, see "Configuring the Receive Filter" earlier in this chapter.

Then, complete these steps:

1. Press **ATM** to display the **ATM SELECTIONS** menu.

2. Press the **Down Arrow** key to highlight the **ATM Testing** option. Then, press **ENTER** to display the **ATM TESTS** (P1) menu.

3. Press the **Down Arrow** key to move the cursor to the **QoS Tests** option. Then, press **ENTER** to display the **QoS TESTS** menu.

4. Make sure that the cursor is positioned on the **CDV 1-Point** option. Then, press **ENTER** to display the **CDV 1-Point** (P1) screen:

```
CDV 1-Point
 Ref  PCR: 010.0%
Erly Max ► 00000000 us
Late Max ► 00000000 us
Erly Avg ► 0.000
Late Avg ► 0.000
Samples ► 00000000
                    START  BACK
```

ta113f.eps

The cursor is positioned on the **Ref PCR** parameter. The tester uses the **Ref PCR** value to calculate an expected cell arrival time. It then compares the computed cell arrival time with the actual cell arrival time to arrive at the CDV statistics.

5. Specify a value for **Ref PCR**.

You have completed the setup for the CDV 1-point test.

Running a CDV 1-point Test

1. To run the test, press **F3**(START).

   The test begins and results are displayed on the LCD (see Table 6-2 for a description).

2. To stop the test, press **F3**(STOP).

Note

The CDV 1-point test also stops when you start another test.

Table 6-2. Test Results for the CDV 1-Point Test

Result	Description
Erly Max	Arrival time (in microseconds) of the earliest cell in the sample
Late Max	Arrival time (in microseconds) of the latest cell in the sample
Erly Avg	Average arrival time (in microseconds) of all early cells in the sample
Late Avg	Average arrival time (in microseconds) of all late cells in the sample
Samples	Total number of cells being measured

CDV 2-point/CTD Test

The CDV 2-point/CTD test is concerned with cell delivery times, specifically with the actual delay and the delay variation of cells transmitted between two points in a network. During this test, the tester captures a sample of cells. Each cell contains a timestamp indicating when it was transmitted. The tester calculates the difference between each cell's timestamp and arrival time. The result is reported as the Cell Transfer Delay (CTD). The variation in this delay from cell to cell is reported as Cell Delay Variation (CDV). The tester reports these results in microseconds.

This test uses the ITU-T O.191 specified test cell. This standard allows you to use the E1port Plus to calculate CDV 2-point values when supplied with O.191 cells from another Fluke handheld ATM tester or any other compliant equipment. When measuring CTD, however, you must use the same E1port Plus as the source of O.191 test cells.

Setting Up a CDV 2-point/CTD Test

To set up the E1port Plus to run a CDV 2-point/CTD test, you must configure the receive filter. See "Configuring the Receive Filter" earlier in this chapter.

If the E1port Plus is to source the O.191 test cells, you also need to configure an ATM transmission stream. For information on how to do this, see "Configuring a Transmission Stream" in Chapter 5 for details.

When you configure the transmission stream, do the following:

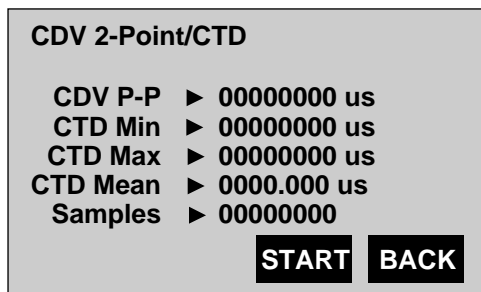1. Set the payload type in the **Type** field to **O.191**.

Note

*You can select **O.191** as the payload for more than one transmit stream. However, be aware that when you do this, the O.191 test data is "shared" among the streams. As a result, your CDV 2-point/CTD test results may be invalid unless the receiving tester is configured to simultaneously test the O.191-configured streams.*

2. Load the transmission stream.

Running a CDV 2-point Test

To run a CDV 2-point test:

1. Press **ATM** to display the **ATM SELECTIONS** menu.

2. Press the **Down Arrow** key to move the cursor to the **ATM Testing** option. Then, press **ENTER** to display the **ATM TESTS** (P1) menu.

3. Move the cursor to the **QoS Tests** option. Press **ENTER** to display the **QoS TESTS** menu.

4. Press the **Down Arrow** key to highlight the **CDV 2-Point/CTD** option. Then, press **ENTER** to display the **CDV 2-Point/CTD** screen:

```
┌─────────────────────────────────────┐
│ CDV 2-Point/CTD                      │
│                                      │
│    CDV P-P   ► 00000000 us           │
│   CTD Min    ► 00000000 us           │
│   CTD Max    ► 00000000 us           │
│  CTD Mean    ► 0000.000 us           │
│   Samples    ► 00000000              │
│                       ┌─────┐┌─────┐ │
│                       │START││BACK │ │
└───────────────────────┴─────┴┴─────┴─┘
```

ta116f.eps

5. Press **F3**(START).

The CDV 2-point/CTD test begins. While the test is running, the tester displays results to you on the LCD. See Table 6-3 for a description of test results.

6. Press **F3**(STOP) to stop the test.

Note
The CDV 2-point/CTD test also stops when you start another test.

Table 6-3. Test Results for 2-Point CDV/CTD Test

Result	Description
CDV P-P	CDV Peak-to-Peak. Difference (in microseconds) between the cell in the sample that arrived the earliest and the cell that arrived the latest.
CTD Min	Time (in microseconds) of the cell in the sample that arrived the earliest.
CTD Max	Time (in microseconds) of the cell in the sample that arrived the latest.
CTD Mean	Average delay of all cells in the sample.
Samples	Total number of cells in the sample.

Cell Loss Test

The Cell Loss test is used to test an ATM network for the loss or incorrect insertion of ATM cells. During this test, the tester captures cells that each contain a sequence number. Using the sequence numbers, the tester verifies that all the cells are recovered and are in the correct order. The results are reported as Cell Loss and Mis-insertion errors.

This test uses the ITU-T O.191 specified test cell. This standard allows you to use the E1port Plus to measure Cell Loss when supplied with O.191 cells from another Fluke Handheld ATM tester or any other compliant equipment.

Setting Up a Cell Loss Test

To set up the E1port Plus to run a Cell Loss test, you must configure the receive filter. See "Configuring the Receive Filter" earlier in this chapter.

If the E1port Plus is to source the O.191 test cells, you also need to configure an ATM transmission stream. For information on how to do this, see "Configuring a Transmission Stream" in Chapter 5 for details. Do the following:

1. Set the payload type in the **Type** field to **O.191**.

Note

*You can select **O.191** as the payload for more than one transmit stream. However, be aware that when you do this, the O.191 test data is "shared" among the streams. As a result, your Cell Loss test results may be invalid unless the receiving tester is configured to simultaneously test the O.191-configured streams.*

2. Load the transmission stream.

Running a Cell Loss Test

To run a Cell Loss test, follow these steps:

1. Press **ATM** to display the **ATM SELECTIONS** menu.

2. Press the **Down Arrow** key to highlight the **ATM Testing** option. Then, press **ENTER** to display the **ATM TESTS** (P1) menu.

3. Press the **Down Arrow** key to highlight the **QoS Tests** option. Then, press **ENTER** to display the **QoS TESTS** menu.

4. Press the **Down Arrow** key to highlight the **Cell Loss** option. Then, press **ENTER** to display the **CELL LOSS** screen:

```
CELL LOSS
        Lost  ►  00000000
  Loss Ratio  ►  0.00E+00
   Mis-insert  ►  00000000
   MisIn Rate  ►  0.00E+00
       Errors  ►  00000000
      Samples  ►  00000000
   LOSS   MISIN  START  BACK
```

ta117f.eps

5. Press **F3**(START).

   The Cell Loss test begins and results are displayed on the tester's LCD. See Table 6-4 for a description of test results.

   Note

   *You can use **F1**(LOSS) and **F2**(MISIN) to artificially insert a lost or mis-inserted cell into the transmit stream of the tester.*

6. Press **F3**(STOP) to stop the test.

   Note
   The Cell Loss test also stops when you start another test.

Table 6-4. Cell Loss Test Results

Result	Description
Lost	Number of cells lost
Loss Ratio	A count of the number of cells loss divided by the number of cells reported as received
Mis-insert	Number of cells with incorrect sequence numbers
MisIn Rate	A count of the number of cells mis-inserted divided by the number of seconds that the test ran
Errors	A count of O.191 cells with incorrect or mismatched CRCs received
Samples	Total number of cells in the sample

ATM Cell Capture

The E1port Plus lets you capture ATM cells in its buffer so that you can look inside each cell to examine its contents. This feature is useful when you are troubleshooting circuits and attempting to isolate network problems. This procedure shows you how to set up the tester to capture ATM cells, how to start a cell capture, and how to view the cell capture results.

Setting Up the E1port Plus to Capture ATM Cells
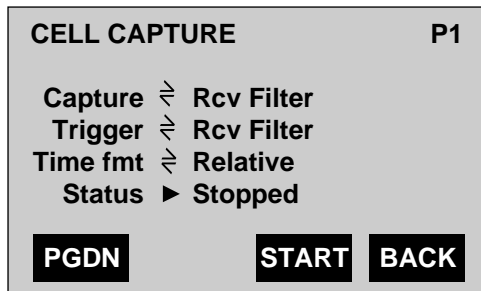
To set up a cell capture, complete the following:

1. Press **ATM** to display the **ATM SELECTIONS** menu.

2. Press the **Down Arrow** key to highlight the **ATM Testing** option. Then, press **ENTER** to display the **ATM TESTS** (P1) menu.

   The **Receive Filter** option is highlighted.

3. Press **ENTER** to display the setup screen for the receive filter. Set up the receive filter with the correct header information for the transmission stream to be captured.

4. Press **F4**(BACK) to return to the **ATM TESTS** (P1) menu. Then, press the **Down Arrow** key to highlight the **Cell Capture** option. Press **ENTER**.

The **CELL CAPTURE** (P1) setup screen is displayed:

```
┌─────────────────────────────────────┐
│  CELL CAPTURE                  P1    │
│                                      │
│    Capture  ⇌  Rcv Filter            │
│    Trigger  ⇌  Rcv Filter            │
│   Time fmt  ⇌  Relative              │
│    Status   ►  Stopped               │
│                                      │
│   PGDN            START   BACK       │
└─────────────────────────────────────┘
```

ta119f.eps

The first three parameters on this screen are used to set up the cell capture. Table 6-5 describes the parameters on this screen.

The cursor is positioned on the **Capture** parameter.

5. Press the **Down Arrow** key to move the cursor to each parameter. Then, press the **Right** or **Left Arrow** key to select the desired setting.

Setup is completed. You can now start to capture cells.

Table 6-5. Cell Capture Setup Parameters and Status Information

Parameter/Status	Description
Capture	Determines which cells the tester stores. • **Rcv Filter**: stores only those cells whose header matches the receive filter settings. • **All Cells**: stores all the cells it receives (on the 64 circuits).
Trigger	Determines when the tester begins storing cells. • **Rcv Filter**: the tester begins storing cells after it receives a cell with a header that matches the receive filter settings. • **All Cells**: the tester begins storing cells after it receives the first cell. • **AAL5/Rcv Flt**: the tester begins storing cells after it detects the end of an AAL5 PDU.

Table 6-5. Cell Capture Setup Parameters and Status Information

Parameter/Status	
Time fmt	Determines the method used to calculate cell arrival time.
	• **Relative**: the tester records each cell's arrival time relative to the previous cell's arrival time.
	• **Absolute**: the tester records the absolute arrival time (in microseconds) of each cell (using zero as reference point) since the cell capture began.
Status	Updates you on the status of the cell capture.
	• Stopped: the tester is not presently capturing cells and that it has no cells that were previously captured in its buffer.
	• Running: the tester is in the process of capturing cells.
	• Captured: the tester is not presently capturing cells but that it currently contains previously captured cells in its buffer.

Starting a Cell Capture

Notes

Idle and unassigned cells are not captured.

If you decide to change a setting while the tester is capturing cells, you must first stop the cell capture, change the setting, then restart the test with the new settings.

To start a cell capture, press **F3**(START).

The cell capture process begins. The status indicator reads: Running. If the buffer fills to capacity, the indicator reads: Captured and the result screen is displayed.

Viewing Cell Capture Results

To view the results of a cell capture, follow these steps:

1. Press **F1**(PGDN) to display the first cell capture result screen:

```
CELL CAPTURE                    P2
Cell : 000       VP ▶ 0016
VC ▶ 00064   PT ▶ 0      CL ▶ 0
Time ▶ 0000000000.0 us
00>  bd  72  70  d2  dd
05>  11  31  99  5a  a8
10>  20  0f  3f  dd  7f
            PGUP              BACK
```

ta120f.eps

This screen lists the number of the cell you are currently viewing. (The first cell captured is always assigned the number '000'.) It also provides the header information for the cell and the arrival timestamp.

The row starting with '00' contains the hexadecimal header values. The remaining lines display the bytes in the cell's payload. The number that starts each row is the number of the first byte in that row. For example, the last line starts with '10', which means that the first byte in this row is Byte 10. In this example, Byte 10 has a value of 20.

2. To see the remaining bytes in the payload, press the **Down Arrow** key.

Notice that the rows move up. For example, if you press the **Down Arrow** key once, the row starting with '00' moves up and out of the viewing area, and the line starting with '15' moves up and into the last line of the viewing area:

```
CELL CAPTURE                    P2
Cell : 000       VP▶ 0016
VC ▶ 00064   PT ▶ 0      CL ▶ 0
Time ▶ 0000000000.0 us
05>  11  31  99  5a  a8
10>  20  0f  3f  dd  7f
15>  30  fd  5d  f0  33
            PGUP              BACK
```

ta121f.eps

3. To view the next cell captured in the buffer, press **ENTER**.

The tester advances to the next cell and displays its contents and arrival time. Note that the cell number changes to indicate that you are now viewing information for the next cell.

Note

To view the information for the cell that was captured immediately before the one you are currently viewing, press **SHIFT 1** + **ENTER**.

4. To view a specific cell in the buffer, use the keypad to type the number of the cell that you want to see.

The tester advances directly to that cell and displays its contents and arrival time.

OAM Testing and Detection

This section describes procedures that you can use to test and detect ATM-layer Operations and Maintenance (OAM) cells as defined in *ITU-T I.610 B-ISDN Operation and Maintenance Principles and Functions.* The E1port Plus implements monitoring and testing of OAM F4 and F5 flows for the following network management functions:

- Fault management

    ♦ Alarm Indication Signal (AIS)

    ♦ Remote Defect Indication (RDI)

    ♦ Loopback

    ♦ Continuity Check

- Performance management

    ♦ Forward Monitoring

    ♦ Backward Reporting

- Activation/Deactivation

    ♦ Performance Monitoring

    ♦ Continuity Check

Testing OAM F4 and F5 Flows

The E1port Plus provides the following tests that are designed to test specific aspects of network management by verifying that an ATM network is responding appropriately to OAM cells:

- AIS/RDI

  In this test, the E1port Plus simulates alarm signals by sending OAM AIS and RDI cells. This test enables you to evaluate a network's fault detection and notification capability by determining whether OAM AIS and RDI cells are properly transmitted and received.

- Loopback

  In this test, the E1port Plus sends OAM Loopback cells and responds to these cells when received from a connected device. This test enables you to evaluate a network's ability to send and respond to OAM Loopback cells and to verify connectivity of part of or the complete end-to-end connection.

- Continuity Check

  In this test, the E1port Plus sends or receives OAM Continuity Check (CC) cells. This test enables you to evaluate CC activation and deactivation procedures and to confirm that a node is active and that a path or channel maintains a working connection.

- Performance

  In this test, the E1port Plus sends blocks of cells followed by an OAM Forward Monitoring cell to a connected device and waits for the device to return an OAM Backward Reporting cell. The tester then compares the information in the Backward Reporting cell and generates performance statistics. This test enables you to evaluate Performance Management activation and deactivation procedures and evaluate network performance in terms of basic cell transfer outcomes.

Setting Up the E1port Plus for OAM Testing

Note

The parameters you select in this setup procedure apply to all of the OAM tests documented in the following sections.
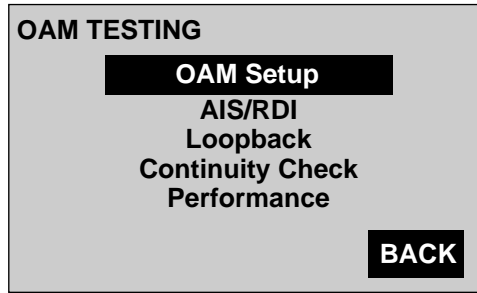
To set up the E1port Plus for OAM testing, complete the following:

1. Press **ATM** to display the **ATM SELECTIONS** menu.

2. Press the **Down Arrow** key until the **ATM Testing** option is highlighted. Then, press **ENTER** to display the **ATM TESTS** (P1) menu.

3. Press the **Down Arrow** key to select the **OAM** option. Then, press **ENTER** to display the **OAM** menu.

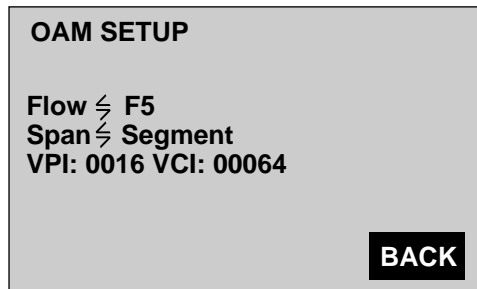   The cursor is positioned on the **OAM Testing** option.

4. Press **ENTER** to display the **OAM TESTING** menu:


```
OAM TESTING

              OAM Setup
              AIS/RDI
              Loopback
          Continuity Check
            Performance

                          BACK
```

ta156f.eps

   The cursor is positioned on the **OAM Setup** option.

5. Press **ENTER** to display the **OAM SETUP** screen:


```
 OAM SETUP


Flow ⇆ F5
Span ⇆ Segment
VPI: 0016 VCI: 00064


                          BACK
```

ta157f.eps

   The cursor is positioned on the **Flow** parameter. See Table 6-6 for descriptions of the setup parameters on this screen.

6. Select a setting for the **Flow** parameter. Then, press the **Down Arrow** key to move the cursor to each remaining parameter and select a setting or use the keypad to supply the desired value.

7. Press **F4**(BACK) to return to the **OAM TESTING** menu and select the test that you want to run.

Table 6-6. OAM Test Setup Parameters

Parameter	Description
Flow	Designates the flow as F4 or F5.
Span	Identifies the portion of the line as either End-to-end or Segment.
VPI	Sets the VPI of the OAM transmission for F4 or F5.
VCI	Sets the VCI of the OAM transmission for F5. Also used to specify the VCI of the transmission for user data in the Performance test.

Running an OAM AIS/RDI Test

The OAM AIS/RDI test can be used to assess a network's ability to transmit and respond to AIS and RDI cells. In this test, you can set up the E1port Plus to send OAM AIS cells or respond to an AIS by sending OAM RDI cells

In Sender mode, the tester generates OAM AIS cells. When you press **F3**(START), the tester transmits OAM AIS cells at a rate of one per second. The **AIS Sent** counter on the tester's LCD increments as it transmits each cell. When the network detects the AIS, it should declare an AIS state and send RDI cells at a nominal rate of one per second. Upon receipt of RDI cells, the tester's OAM RDI LED lights and the **RDI Rcvd** counter on the LCD records the number of RDI cells received.

In Responder mode, the tester waits to receive OAM AIS cells from the network. When the cells are received, the tester's OAM AIS LED lights and the **AIS Rcvd** counter records the number of AIS cells received. In response to AIS cells, the tester sends RDI cells at the rate of one per second, and the **RDI Sent** counter records the number of RDI cells transmitted. If AIS cells are not received for 2.5 seconds, the OAM AIS LED turns off and the tester's transmission of RDI cells ends.

To run an AIS/RDI test, complete the following:

Note

You cannot run this test at the same time that the tester is detecting OAM cells or running another ATM test.

1. From the **OAM TESTING** menu, select **AIS/RDI**. Then, press **ENTER** to display the following:

```
OAM AIS/RDI

Action⇋ AIS Sender

          AIS        RDI
Sent ▶ 0000000    0000000
Rcvd▶ 0000000     0000000
                  START   BACK
```
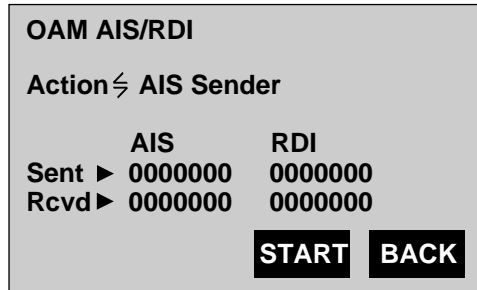
ta158f.eps

The cursor is positioned on the **Action** parameter. Table 6-7 describes the items on this screen.

2. Select a setting for the **Action** parameter.

3. Press **F3**(START) to start the test.

The counters reset and begin incrementing as the tester transmits and receives OAM AIS/RDI cells.

4. Press **F3**(STOP) to end the test.

Table 6-7. OAM AIS/RDI Test Parameters and Results

Parameter/Result	Description
Action	Selects the mode of the tester. • **AIS Sender**: will send OAM AIS cells at a rate of one per second. • **RDI Responder**: will wait to receive OAM AIS cells from the network, then respond by sending OAM RDI cells.
AIS Sent	Number of AIS cells sent on the selected OAM flow since the **F3**(START) or **CLEAR** key was pressed.
AIS Rcvd	Number of AIS cells received on the selected OAM flow since the **F3**(START) or **CLEAR** key was pressed.
RDI Sent	Number of RDI cells sent on the selected OAM flow since the **F3**(START) or **CLEAR** key was pressed.
RDI Rcvd	Number of RDI cells received on the selected OAM flow since the **F3**(START) or **CLEAR** key was pressed.

Running a Loopback Test

The Loopback test can be used to verify connectivity of segments or entire spans of a network and determine whether a network can properly transmit and respond to OAM Loopback cells. In this test, you can set up the E1port Plus to send or respond to OAM Loopback cells.

In Send mode, the tester transmits OAM Loopback cells over the OAM flow specified in the setup for the test. These cells are transmitted at a rate of one every five seconds. As Loopback cells are sent, the **Sent** field indicates the number of cells transmitted. As the Loopback cells are returned, the tester compares them to the transmitted payload. Corresponding payloads that are received before the next OAM Loopback cell is transmitted, indicate a successful loopback. As the tester identifies each successful Loopback cell, it "beeps" and increments the count in the **Rcvd** field. If the tester does not receive a corresponding OAM Loopback cell in five seconds, it displays Timeout in the **Status** field.

In Respond mode, the tester waits to receive OAM Loopback cells over the OAM flow specified in the setup for the test. When the tester receives a proper OAM Loopback cell, it "beeps" and increments the count the **Rcvd** field. The tester changes the Loopback Indication within the Loopback payload of the cell, then re-transmits the cell. With each re-transmission, the count in the **Sent** field increments.

To run a Loopback test, complete the following:

Note

You cannot run this test while the tester is detecting OAM cells or running another ATM test.

1. From the **OAM TESTING** menu, select **Loopback**. Then, press **ENTER** to display the following:

```
OAM LOOPBACK

Mode ⇋  Send
Status▶ Stopped
Sent ▶ 00000000
Rcvd▶ 00000000


              START  BACK
```

ta159f.eps

The cursor is positioned on the **Mode** parameter. See Table 6-8 for a description of the items on this screen.

2. Select a setting for **Mode**.

3. Press **F3**(START).

The **Sent** and **Rcvd** counters reset and begin incrementing as the tester respectively transmits and receives OAM Loopback cells. See Table 6-8 for a description of Loopback status and test results.

4. Press **F3**(STOP) to end the test.

Table 6-8. OAM Loopback Test Parameters and Results

Parameter/Result	Description
Mode	Selects the mode of the tester as one of the following. • **Send**: the tester will send OAM Loopback cells at a rate of one every five seconds and test for the receipt of corresponding Loopback cells. • **Respond**: the tester will wait to receive OAM Loopback cells, then generate responding Loopback cells.
Status	Displays status of the test as one of the following: • `Sending`: the tester is the source of transmission of Loopback cells. Cells are sent at a rate of one every five seconds. • `Receiving`: the tester is ready to respond to received Loopback cells. • `Timeout`: the tester did not receive a corresponding Loopback cell within five seconds. • `Stopped`: that the tester is not the source of transmission of Loopback cells and is not ready to respond to received Loopback cells. This status is displayed after you press **F3**(STOP).
Sent	Displays a count of Loopback cells transmitted since the **F3**(START) or **CLEAR** key was pressed.
Rcvd	Displays a count of Loopback cells received since the **F3**(START) or **CLEAR** key was pressed.

Running a Continuity Check Test

The Continuity Check (CC) test can be used to verify continuity of a connection and test a network's OAM CC Activation and Deactivation procedures. In this test, you can set up the E1port Plus to send or respond to OAM CC cells in a specified direction. Before a CC test can begin on a connection, it must be initiated with a handshake (activation). After a CC test is completed, it must be ended with another handshake (deactivation).

In Send mode, the test begins when you press **F3**(ACTV) to send an OAM Activate CC request. The tester then waits to receive a confirmation message from the connected device. In Respond mode, the test begins when you press **F3**(START). The tester waits to receive an OAM Activate CC request from a connected device. When activated, the tester sends a confirmation message to the connected device.

If the E1port Plus is activated to transmit, CC cells are sent at a rate of one per second. The **Tx Count** on the LCD increments as each CC cell is sent. If an AIS is received while the tester is activated to transmit CC cells, a Loss of Continuity in the A to B direction is assumed and reported in the **Defect** field.
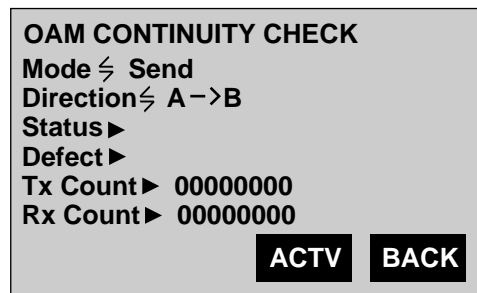
If the E1port Plus is activated to receive, the **Rx Count** on the LCD increments as each CC cell is received. If no user cells or CC cells are received while the tester is activated to receive them, a Loss of Continuity in the B to A direction is reported in the **Defect** field, and the tester generates AIS cells.

To run a continuity check test, proceed as follows:

Note

You cannot run this test while the tester is detecting OAM cells or running another ATM test.

1. From the **OAM TESTING** menu, select **Continuity Check**. Then, press **ENTER** to display the following:

```
OAM CONTINUITY CHECK
Mode ⇋ Send
Direction⇋ A−>B
Status▶
Defect▶
Tx Count▶ 00000000
Rx Count▶ 00000000
                    ACTV   BACK
```

ta160f.eps

The cursor is positioned on the **Mode** parameter. See Table 6-9 for a description of the items on this screen.

2. Do one of the following:

    •   If you want the tester to activate Continuity Checking, select **Send**. Then, press the **Down Arrow** key to move the cursor to **Direction** and select the desired direction.

        OR

    •   If you want the tester to wait to be activated by a connected device for Continuity Checking, select **Respond**.

3. Press **F3**(ACTV/START).

    Depending on the test mode selected, the following occurs:

    •   If you selected **Send**, the E1port Plus sends an OAM CC Activate request to the connected device. If the device complies with the request, it returns an Activate confirmed message.

    •   If you selected **Respond**, the E1port Plus waits to receive an OAM CC Activate request from a connected device.

If the tester is the source of transmission, CC cells are generated at a rate of one per second on the specified flow. The **Tx Count** field on the tester's LCD indicates the number of CC cells transmitted. If the tester is to receive CC cells, it waits to receive these cells or user cells. As CC cells are received, the **Rx Count** on the tester's LCD increments (see Table 6-9).

4. To end the test, press **F3**(DEACT/STOP).

Depending on the test state, the tester does the following:

- If the tester activated CC or was CC activated, the **F3** key is labeled "DEACT". When you press **F3**, the tester sends an OAM Deactivate CC request to the connected device. The tester terminates transmission and/or reception of OAM CC cells.

- If the tester is in Respond mode and has not been CC activated, the **F3** key is labeled "STOP". When you press **F3**, the tester no longer responds to OAM Activate CC requests.

Table 6-9. OAM Continuity Check Test Parameters and Results

Parameter/Result	Description
Mode	Selects the test mode as one of the following: • **Send**: the E1port Plus will send an Activate CC request. • **Respond**: the E1port Plus will wait to receive an Activate CC request from a connected device.
Direction	Indicates the direction of transmission of CC cells as one of the following: • **A** -\>**B**: one-way transmission from A (the E1port Plus) to B (the connected device). • **2-Way**: two-way transmission between A (the E1port Plus) and B (the connected device). • **B** -\>**A**: one-way transmission from B (the connected device) to A (the E1port Plus).

Table 6-9. OAM Continuity Check Test Parameters and Results (cont.)

Parameter/Result	Description
Status	Displays status of the test as one of the following: • `Activating`: the tester has sent an OAM Activate CC request but has not yet received confirmation. • `Act Confrmed`: confirmation was received for an OAM Activate CC request. • `Act Denied`: an OAM Activate CC request was denied. • `Act Timeout`: the tester did not receive a reply to an OAM Activate CC request within two seconds. • `Deactivating`: the tester has sent an OAM Deactivate CC request but has not yet received confirmation. • `Deact Confrmd`: confirmation was received for an OAM Deactivate CC request. • `Deact Denied:` an OAM Deactivate CC request was denied. • `Deact Timeout:` the tester did not receive a reply to an OAM Deactivate CC request within two seconds.
Defect	This field indicates the direction of Loss of Continuity (LOC) as one of the following: • **A ->B LOC**: Loss of Continuity from A (the E1port Plus) to B (the connected device). LOC is assumed if the tester receives an AIS on the specified OAM flow while it is generating CC cells. • **B ->A LOC**: Loss of Continuity from B (the connected device) to A (the E1port Plus) if the tester is activated to receive CC cells but does not receive these cells or user data over the specified OAM flow. • **2-Way LOC**: Loss of Continuity in both directions if the tester is activated to both send and receive CC cells.
Tx Count	Number of CC cells transmitted on the specified OAM flow since the **F3**(ACTV/START) or **CLEAR** key was pressed.
Rx Count	Number of CC cells received on the specified OAM flow since the **F3**(ACTV/START) or **CLEAR** key was pressed.

Running a Performance Test

The Performance test can be used to evaluate a network's basic performance. You can also use this test to check a network's OAM Performance Management (PM) Activation and Deactivation procedures.

In this test, the E1port Plus sends blocks of cells to gather performance data on errored cell blocks, cell loss, and cell misinsertion. The tester fixes the size of each cell block it transmits to 128 cells. Cell payloads contain the fixed pattern byte as specified on the **ATM CONFIGURATION** (P1) screen.

Before a Performance test can begin, it must be initiated with a handshake (activation). After the testing is completed, it must be ended with another handshake (deactivation). The tester can only be activated to transmit OAM Forward Monitoring cells and receive OAM Backward Reporting cells.

In Send mode, the test begins when you press **F3**(ACTV) to send an OAM Activate PM request. The tester then waits to receive a confirmation message from the connected device. In Respond mode, the test begins when you press **F3**(START). The tester waits to receive an OAM Activate PM request from the connected device. When activated, the tester sends a confirmation message to the connected device.

After the request to activate is confirmed, the E1port Plus sends a block of cells at CBR using the specified PCR to the connected device. Following this block, the tester sends a Forward Monitoring cell. The connected device should return a corresponding Backward Reporting cell. The tester uses the information in this cell to calculate performance statistics. This process is repeated until the test is ended with an OAM Deactivate PM request.

To run a Performance test, complete the following:

Notes

The VCI specified in the setup for this test is used for transmission of user data.

When you start this test, user-generated transmission streams are halted.

You cannot run this test while the tester is detecting OAM cells or running another ATM test.

1. From the **OAM TESTING** menu, select the **Performance** option. Then, press **ENTER** to display the following:

```
┌─────────────────────────────────────┐
│ OAM PERFORMANCE              P1      │
│                                      │
│ Mode ⇆ Send                          │
│ PCR: 025.0 %                         │
│                                      │
│ Status►                              │
│                                      │
│ PGDN              ACTV   BACK         │
└─────────────────────────────────────┘
```
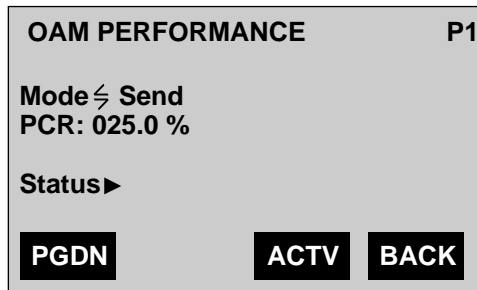
ta165f.eps

The cursor is positioned on the **Mode** parameter. Table 6-10 describes the setup parameters on this screen.

2. Press the **Left** or **Right Arrow** key to select the test mode.

3. Press the **Down Arrow** key to the **PCR** parameter. Then, use the keypad to supply the desired value.

4. Press **F3**(ACTV/START).

Depending on the test mode selected, the tester does the following:

- In **Send** mode, the E1port Plus sends an OAM Activate PM request to the connected device and waits for confirmation.

- In **Respond** mode, the E1port Plus waits to receive an OAM Activate PM request from a connected device.

Note

The tester will only confirm OAM Activate PM requests that specify a direction from the tester to the connected device.

After confirmation is received, the tester sends a block of cells followed by a Forward Monitoring cell at the specified PCR. The connected device should return a corresponding Backward Reporting cell.

The tester counts the number of Forward Monitoring cells sent and Backward Reporting cells received over the specified OAM flow. The result screen reports these counts along with other performance statistics (see Table 6-11).

5. To end the test, press **F3**(DEACT/STOP).

Depending on the test state, the tester does the following:

- If the tester activated PM or was PM activated, the **F3** key is labeled "DEACT". When you press **F3**, the tester sends an OAM Deactivate PM request to the connected device. The tester terminates transmission and reception of OAM PM cells.

- If the tester is in Respond mode and has not been PM activated, the **F3** key is labeled "STOP". When you press **F3**, the tester no longer responds to OAM Activate PM requests.

Table 6-10. OAM Performance Test Parameters and Status

Parameter/Status	Description
Mode	Selects the test mode as one of the following: • **Send**: the E1port Plus will send an OAM Activate PM request. • **Respond**: the E1port Plus will wait to receive an OAM Activate PM request from a connected device.
PCR	Specifies the rate at which the block of cells is transmitted. Values range from 5% to 100%.

Table 6-10. OAM Performance Test Parameters and Status (cont.)

Parameter/Status	Description
Status	Displays status of the test as one of the following:
	• `Activating`: the tester has sent an OAM Activate PM request but has not yet received confirmation.
	• `Act Confrmed`: confirmation was received for an OAM Activate PM request.
	• `Act Denied`: an OAM Activate PM request was denied.
	• `Act Timeout`: the tester did not receive a reply to an OAM Activate PM request within two seconds.
	• `Deactivating`: the tester has sent an OAM Deactivate PM request but has not yet received confirmation.
	• `Deact Confrmd`: confirmation was received for an OAM Deactivate PM request.
	• `Deact Denied`: an OAM Deactivate PM request was denied.
	• `Deact Timeout`: the tester did not receive a reply to an OAM Deactivate PM request within two seconds.
	• `Reprt Timeout`: a corresponding PM Backward Reporting cell was not received within five seconds.

Table 6-11. OAM Performance Test Results

Result	Description
Forward	Number of PM Forward Monitoring cells sent on the specified OAM flow since the **F1**(ACTV/START) or **CLEAR** key was pressed.
Backward	Number of PM Backward Reporting cells received on the specified OAM flow since the **F1**(ACTV/START) or **CLEAR** key was pressed.
Misinsert	Number of misinserted (out-of-sequence) PM Backward Reporting cells detected on the specified OAM flow since the **F1**(ACTV/START) or **CLEAR** key was pressed.
Err	Number of errored blocks indicated in the PM Backward Reporting cell for CLP0+1 streams on the specified OAM flow since the **F1**(ACTV/START) or **CLEAR** key was pressed.
Lost	Number of lost cells indicated in the PM Backward Reporting cell for CLP0 and CLP0+1 streams on the specified OAM flow since the **F1**(ACTV/START) or **CLEAR** key was pressed.

Detecting OAM Cells

The E1port Plus can monitor a network for the presence of OAM cells over the entire length of a virtual connection (end-to-end) and between links (segments). The tester detects the following types of OAM cells:

- Alarm Indication Signal (AIS)

- Remote Defect Indication (RDI)

- Loopback

- Continuity Check

- Performance Management (PM)

- Activation/Deactivation

To monitor the network for these types of OAM cells, do the following:

Note

The tester cannot detect OAM cells while it is running an ATM test.

1. Press **ATM** to display the **ATM SELECTIONS** menu.

2. Press the **Down Arrow** key to highlight the **ATM Testing** option. Then, press **ENTER** to display the **ATM TESTS** (P1) menu.

3. Press the **Down Arrow** key to highlight the **OAM** option. Then, press **ENTER** to display the **OAM** menu.

4. Press the **Down Arrow** key to highlight the **OAM Detection** option. Then, press **ENTER** to display the **OAM F4 ACTIVITY** (P1) screen:

```
OAM F4 ACTIVITY              P1
VPI    VCI    Lst Time
none   none   none


Time now► 13:25:53


 PGDN            START  BACK
```

ta122f.eps

5. Press **F3**(START).

   The following message is momentarily displayed Counting OAM Cells. Then, the tester begins searching for OAM cells. As OAM cells are detected, the results of the search are displayed on the tester's LCD.

Following is a sample screen that summarizes OAM F4 cell activity:

```
OAM F4 ACTIVITY                 P1
VPI     VCI     Lst Time
0016    00003   13:00:22
0017    00004   13:03:45


Time now ▶ 13:03:53
 PGDN              STOP   BACK
```

ta123f.eps

This screen indicates the VPI/VCIs on which OAM F4 activity was detected since the test was started or since the **CLEAR** key was pressed. It also tells you when (**Lst Time**) the tester detected OAM F4 cells.

Note

VCI 3 is reserved for F4 Segment and VCI 4 is reserved for F4 End-to-End cells.

6. Press **F1**(PGDN) to display the summary screen for OAM F5 cell activity.

7. To view the detailed reports for OAM F4 cell activity, press **F1**(PGDN).

F4 Segment counts are displayed on the **OAM COUNTERS** (P3) screen:

```
OAM COUNTERS                    P3
VPI : 0016
F4 Segment Counts :
Tot ▶ 00000    Lpb▶ 00000
AIS ▶ 00000     PM▶ 00000
RDI ▶ 00000    Act▶ 00000
 CC ▶ 00000    Dac▶ 00000
 PGDN  PGUP   STOP   BACK
```
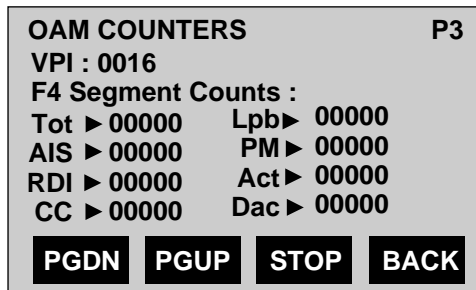
ta125f.eps

Table 6-12 describes the items on this screen.

8. To view OAM statistics for a specific circuit, make sure that the cursor is positioned on the **VPI** field. Then, use the keypad to type the desired VPI.

9. To view additional OAM reports, press **F1**(PGDN).

   With each successive press of this key, you can view these reports:

   - F4 End-to-end
   - F5 Segment
   - F5 End-to-end

Table 6-12. OAM F4/F5 Detection Results

OAM Result	Description
VPI/VCI	The address on which OAM F4 cells were detected
Tot	Total OAM cell count for the type of cell displayed on Line 3
AIS	Number of AIS cells detected
RDI	Number of RDI cells detected
CC	Number of Continuity Check cells detected
Lpb	Number of Loopback cells detected
PM	Number of Performance Monitoring cells detected
Act	Number of Activation cells detected
Dac	Number of Deactivation cells detected

Determining AAL Traffic on a Circuit

You can set up the E1port Plus to determine AAL (ATM Adaptation Layer) type traffic on a circuit. To do this, complete these steps

1. Set up the receive filter with the desired header information. See "Configuring the Receive Filter", earlier in this chapter for details.

2. Press **ATM** to display the **ATM SELECTIONS** menu.

3. Press the **Down Arrow** key to highlight the **ATM Testing** option. Then, press **ENTER** to display the **ATM TESTS** (P1) menu.

4. Press **F1**(PGDN) to display the **ATM TESTS** (P2) menu.

    The **AAL Detect** option is highlighted.

5. Press **ENTER** to display this **AAL DETECTION** setup screen:

```
┌─────────────────────────────────────┐
│  AAL DETECTION                       │
│                                      │
│  Timeout :      1000 secs            │
│      Status  ►  Stopped              │
│      Result  ►                       │
│                                      │
│                                      │
│                      START   BACK    │
└─────────────────────────────────────┘
```
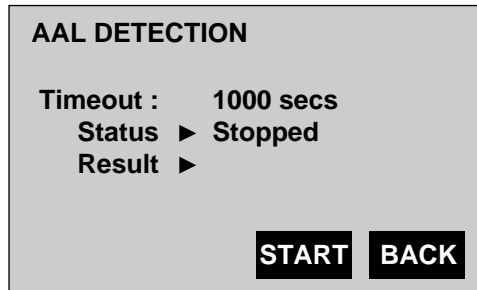
ta128f.eps

The cursor is positioned on the **Timeout** parameter (see Table 6-13 for a description).

6. Use the keypad to specify a value for **Timeout**.

7. Press **F3**(START).

    The tester begins the search. The **Status** field displays this message: Collecting.

    The tester scans the network until the AAL type is determined or until the time you specified expires. Results (see Table 6-13) of the search are displayed in the **Result** field.

Table 6-13. AAL Test Setup Parameter, Status, and Results

Parameter	Description
Timeout	Specifies the duration (in seconds) of the search. Values range from 0 to 9999. Default value is 1000 seconds.
Status	Indicates the status of the search as one of the following: • `Stopped`: displayed when you press **F3**(STOP) or when the time-out has expired. Indicates that the test is not running. • `Collecting`: indicates that the tester is searching for AAL traffic.
Result	Displays the type of AAL traffic detected as one of the following: • `Unknown`: indicates that not enough cells were received for the tester to determine the AAL type. Check that the receive filter matches the desired transmission stream. • `AAL 0`: AAL 0 traffic • `AAL 1`: AAL 1 traffic • `AAL 3/4`: AAL 3 / 4 traffic • `AAL 5`: AAL 5 traffic

IP Ping Tests

The E1port Plus has two categories of IP Ping tests: IP Ping and IP Ping Responder. Both tests are used to test connectivity between the tester and a particular device or client on the IP layer. The major difference between the two types of tests has to do with the role of the E1port Plus.

In the IP Ping test, the E1port Plus (the source) sends a particular IP message called a "ping request" over the network to a device (the destination). The tester waits for a specified period of time for the device to respond with a "ping reply", confirming that it received the request. If the device responds within the allotted time, the tester reports that the device is connected; if the device does not respond, the tester reports that the device is not connected.

In the IP Ping Responder test, the E1port Plus is placed in a "wait" (or responder) state, in which it waits to receive a ping request from a network client. When the tester receives the request, it generates a ping reply back to the source to indicate that it is connected.

Two types of IP pings are supported: Routed Ping and Bridged Ethernet/802.3 Type 7 Ping (hereafter referred to as IP Bridged Ping). The following sections show you how to set up and run the IP Ping test and the IP Ping Responder test.

Setting Up an IP Ping or IP Ping Responder Test

To set up the E1port Plus to run an IP Ping or IP Ping Responder test, complete the following:

1. Set up the receive filter (see "Configuring the Receive Filter" for instructions). The receive filter's header information is used both for IP Ping transmission and reception.

2. Select the ping type (see "Selecting the Ping Type" for instructions). You must select the ping type when running either the IP Ping test or the IP Ping Responder test.

3. Set up the IP address table (see "Setting Up the IP Address Table" for instructions).

4. Provide the Media Access Control (MAC) addresses. These addresses are required only when you specify an IP Bridged Ping (see "Setting Up MAC Addresses" for instructions).

Selecting the Ping Type

To select the type of ping, do the following:

1. Press **ATM** to display the **ATM SELECTIONS** menu.

2. Press the **Down Arrow** key to highlight the **ATM Testing** option. Then, press **ENTER** to display the **ATM TESTS** (P1) menu.

3. Press **F1**(PGDN) to display the **ATM TESTS** (P2) menu.

4. Press the **Down Arrow** key to highlight the **IP Ping Tests** option. Then, press **ENTER** to display the **IP PING TESTS** menu:

```
IP PING TESTS
        Ping Type ⇌ Bridged
              IP Ping
        IP Ping Responder
            IP Addresses
           MAC Addresses
                            BACK
```
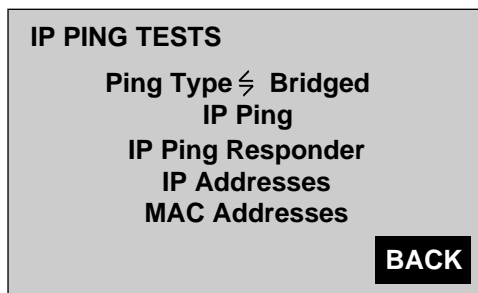
ta166f.eps

The cursor is positioned on the **Ping Type** parameter.

5. Press the **Left** or **Right Arrow** key to select one of the following settings for **Ping Type**:

- **Routed** (Routed Ping)

- **Bridged** (Bridged Ethernet/802.3 Type 7 Ping)

6. Do *one* of the following:

- If you selected **Routed**, continue the setup for the test by proceeding to "Setting Up the IP Address Table" and completing the instructions.

   OR

- If you selected **Bridged**, the **MAC Addresses** parameter is now displayed on the last line of the menu.
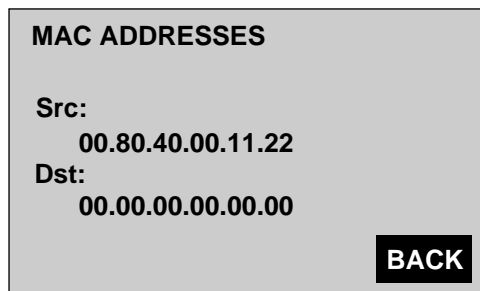
   You must supply a MAC address for both the source (E1port Plus) and destination device. To continue the setup for the test, go to "Specifying MAC Addresses" and complete the instructions. When you finish, go to "Setting Up the IP Address Table".

Specifying MAC Addresses (IP Bridged Ping only)

The IP Bridged Ping requires you to supply a MAC address for the source (the E1port Plus) and the destination device.

To specify MAC addresses, complete the following:

1. From the **IP PING TESTS** menu, press the **Down Arrow** key to select the **MAC Addresses** option. Then, press **ENTER** to display the **MAC ADDRESSES** setup screen:

```
MAC ADDRESSES


Src:
   00.80.40.00.11.22
Dst:
   00.00.00.00.00.00

                      BACK
```

ta167f.eps

The **Src** field identifies the address of the source (the E1port Plus), and the **Dst** field identifies the address of the destination device.

When the tester is set to factory defaults, you can use the default **Src** value as the address for the E1port Plus or you can supply an alternative address. You must supply a MAC address for the destination device.

2. Type a MAC address in the **Src** (if desired) and **Dst** fields.

Setting Up the IP Address Table

The IP address table is an index or listing of IP addresses. In order for the E1port Plus and the equipment under test to communicate, you need to assign each an IP address, which must be included in this table. Both ping tests (IP Ping and IP Ping Responder) require you to set up this table.

To set up the IP address table, complete the following:

1. From the **IP PING TESTS** menu, press the **Down Arrow** key to highlight the **IP Addresses** option. Press **ENTER** to display the **IP ADDRESSES** (P1) screen:

```
IP ADDRESSES              P1
1:000.000.000.000
2:000.000.000.000
3:000.000.000.000
4:000.000.000.000
5:000.000.000.000

 PGDN                   BACK
```

ta130f.eps

This screen and the one following can accommodate 10 addresses, one of which must be assigned to the E1port Plus.

Note

*You can define any valid IP address that you want for the E1port Plus in this table. Just make note of the number of the entry that corresponds to the address that you assign to the tester. When you run a test, you need refer to the entry by number when you define the **IP Src** and **Dst** parameters (for IP Ping) or when you define the **IP Addr** parameter (for IP Ping Responder).*

The cursor is positioned on the first IP address listed in the table.

2. Move the cursor to the IP address that you want to modify. Then, use the keypad to supply the desired address.

    Complete this step for each IP address that you want to put in the table.

3. Press **F1**(PGDN) to display the next page and continue adding IP addresses to the table, if necessary.

Running an IP Ping Test

To run an IP Ping test, complete the following:

Note

The E1port Plus can be set up to operate in one of two modes for sending an IP ping: automatic or manual. In automatic mode, the tester continuously sends a IP ping to a network client until you stop the test. In manual mode, an IP ping is transmitted only when you press a key. This procedure documents both methods.

1. From the **IP PING TESTS** menu, press the **Down Arrow** key to highlight the **IP Ping** option. Then, press **ENTER** to display the **IP PING** (P1) screen:

```
IP PING                        P1
  Timeout :    01000 ms
  Interval :   01 secs
Num Cells  ⇌ 1
     PCR :     100.00%
IP Scr : 01   Dst : 01

 PGDN            START  BACK
```

ta131f.eps

The cursor is positioned on the **Timeout** parameter. Table 6-14 describes the setup parameters on this screen.

2. Use the keypad to supply a value for **Timeout**.

3. Do *one* of the following:

    *   If you want the E1port Plus to automatically send an IP Ping at specific intervals, press the **Down Arrow** key to move the cursor to the **Interval** parameter and supply a value between 1 and 99 seconds.

        OR

    *   If you want the E1port Plus to send a single IP ping every time you press a key, press the **Down Arrow** key to move the cursor to the **Interval** parameter and supply a value of 0.

4. Select a value for the **Num Cells** parameter.

Note

*If you specified an IP Routed Ping, the value of **Num Cells** is fixed at **3**.*

5. Press the **Down Arrow** key to move the cursor to the **PCR**, **IP Src**, and **Dst** parameters and use the keypad to supply the desired values.

6. Press **F3**(START).

The test begins and the E1port Plus displays IP Ping test results.

Note

If you decide to change a parameter while the test is running, first stop the test, change the parameter, then restart the test.

The result screen differs depending on whether you are running the test in automatic or manual mode. For a description of the result screen for the test you are running, see "IP Ping Test Result Screen for Automatic Mode" or "IP Ping Test Result Screen for Manual Mode".

Table 6-14. IP Ping Setup Parameters

Parameter	Description
Timeout	Specifies how long the E1port Plus waits for the destination address to respond to an IP ping.
	If the tester receives no response within the given time period, you may want to increase the value of this parameter. If the tester receives no response within a reasonable amount of time, you can conclude that the device is not connected. The value for **Timeout** ranges from 100 to 99900 milliseconds, which is set in increments of 100 milliseconds.
Interval	Specifies how often the IP ping is sent.
	For example, if you specify 2, the E1port Plus sends out an IP ping to the destination device every two seconds. The value for **Interval** ranges from 0 to 99 seconds.
Num Cells	Determines the number of ATM cells used to carry the IP ping.
	For the Routed Ping test, **Num Cells** has two settings:
	• **1**: formats the IP ping and places it into one ATM cell.
	• **3**: formats the IP ping and places it into three ATM cells.
	For the IP Bridged Ping, the value of **Num Cells** is fixed at **3**.

Table 6-14. IP Ping Setup Parameters (cont.)

Parameter	Description
PCR	Specifies the peak cell rate or bandwidth of the transmission when **Num Cells** is set to **3**. Values range from 0% to 100%.
IP Src	A reference to the listing in the IP address table that corresponds to the address of the E1port Plus (see "Setting Up the IP Address Table" for details).
Dst	A reference to the listing in the IP address table that corresponds to the address of the destination device (see "Setting Up the IP Address Table" for details).

IP Ping Test Result Screen for Automatic Mode

If you are running the test in automatic mode, the IP Ping test result screen looks like this:

```
IP PING                      P2
        000.000.000.000
              is
        Not Responding
Sent : 30
Responded : 0

        PGUP          BACK
```
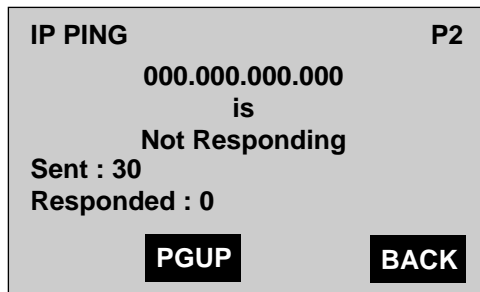
ta132f.eps

This screen updates you on the progress of the test. It also provides the following status information:

- Line 1 indicates the name of the test (IP PING).

- Line 2 lists the IP address of the destination device.

- Lines 3 and 4 provide the response status of the destination device:

  ♦ If there is no response and the time-out period has expired, you see this message: Not Responding.

  ♦ If a connection is made, you see this message: is alive.

  ♦ If there is no response but the time-out period has not yet expired, the status line is blank.

- Line 5 indicates the number of IP pings that the E1port Plus has sent to the destination device.

- Line 6 indicates the number of responses that the E1port Plus has received from the destination device.

Notes

The E1port Plus also issues a "beep" each time it receives a response from the destination device.

The test continues until you stop it. To stop the test, press **F2***(PGUP). Then, press* **F3***(STOP).*

IP Ping Test Result Screen for Manual Mode

If you are running the IP Ping test in manual mode, the result screen looks like this:

```
IP PING                          P2
         000.000.000.000
                is

Sent : 0
Responded : 0
              PGUP    PING   BACK
```
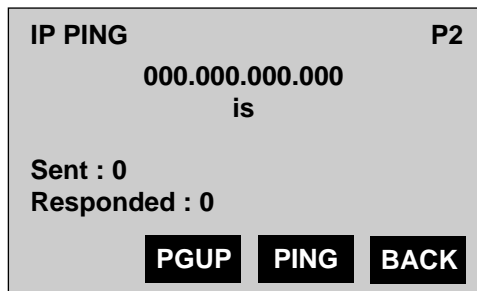
ta133f.eps

Note that there is currently no information on this screen. This is because you have not yet sent the IP ping.

To send the IP ping, do the following:

1. Press **F3**(PING).

   The E1port Plus sends a single IP ping to the destination address, then updates you on the progress of the test. The following information is provided on the result screen:

   - Line 1 displays the name of the test (IP PING).

   - Line 2 lists the IP address of the destination device.

- Lines 3 and 4 provide the response status of the destination device:

  ♦ If there is no response and the time-out period has expired, you see this message: `Not Responding`.

  ♦ If a connection is made, you see this message: `is alive`.

  ♦ If there is no response but the time-out period has not yet expired, the status line is blank.

- Line 5 indicates the number of IP pings that the E1port Plus has sent to the destination device. This value is updated every time you press **F3**(PING).

- Line 6 indicates the number of responses that the E1port Plus has received from the destination device.

Note

The tester also issues a "beep" each time it receives a response from the destination device.

2. To stop the test, press **F2**(PGUP). Then, press **F3**(STOP).

Running an IP Ping Responder Test

There may be instances in which you want to test connectivity to a network by setting up the E1port Plus as the destination device and then determining whether it can receive an IP ping from a network client. The IP Ping Responder test can be used in this type of situation.

Notes

Before you can run this test, you need to set up the receive filter, the IP address table, and, if you specified an IP Bridged Ping, you need to provide MAC Addresses for the source and destination devices.

*The tester responds only to the type of ping selected for **Ping Type**. See "Selecting the Ping Type" for details.*

To run an IP Ping Responder test, complete the following:

1. From the **IP PING TESTS** menu, press the **Down Arrow** key to highlight the **IP Ping Responder** option. Then, press **ENTER** to display the **PING RESPONDER** (P1) screen:

```
IP PING RESPONDER            P1

IP Addr:  01
PCR: 100.00 %




 PGDN              START  BACK
```
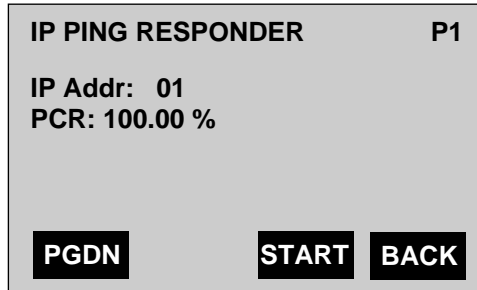
ta134f.eps

The cursor is positioned on the **IP Addr** parameter. This parameter identifies the address in the IP address table that corresponds to the E1port Plus. The settings for this parameter range from 1 to 10, which correspond, respectively, to the ten addresses listed in the IP address table.

2. Press the **Left** or **Right Arrow** key to select the number that matches the listing for the E1port Plus in the IP address table.

3. Press the **Down Arrow** key to move the cursor to the **PCR** parameter, which is used to define the bandwidth of the transmission for the IP ping response. Then, use the keypad to specify the **PCR** value.

4. Press **F3**(START).

The test begins. The following result screen is displayed:

```
IP PING RESPONDER            P2

Status►  Collecting
Responses  Sent ►  0

Last  Ip  Addr ►  000.000.000.000


        PGUP   STOP   BACK
```
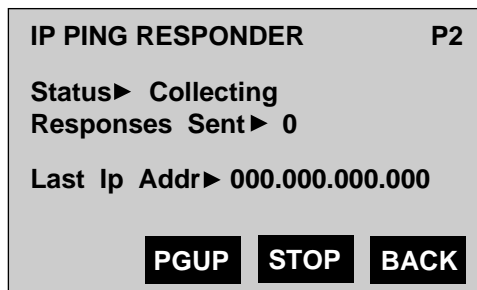
ta135f.eps

This screen updates you on the progress of the test. It also provides the following information:

- Line 1 indicates the name of the test (IP PING RESPONDER).

- Line 2 displays the status of the test as one of the following:

  ♦ `Collecting`: waiting to receive an IP ping

  ♦ `Processing`: analyzing received cells to determine if any is an IP ping

  ♦ `Stopped`: not running

- Line 3 indicates the number of IP pings that the E1port Plus has responded to.

> *Note*
>
> *If **Responses Sent** continues to be 0, this may indicate that the E1port Plus has not received any IP pings.*

- Line 4 lists the address of the device that sent an IP Ping to the E1port Plus. If the tester receives an IP ping from a device whose address is not listed in the IP address table, it updates the table with the address of the device.

5. Press **F3**(STOP) to stop the test.

Conformance Testing Using GCRA

The Generic Cell Rate Algorithm (GCRA), which is referred to as a "continuous state leaky bucket algorithm", is a function specified for policing CBR and VBR traffic at the UNI. This algorithm is used to control the flow of network traffic and to ensure that the volume conforms to agreed-upon rates.

The E1port Plus provides a method for testing conformance definitions CBR.1 and VBR.1 using GCRA. Specifications for these definitions are documented in the ATM Forum *Traffic Management Specification*.

For a given connection, the tester checks each incoming cell against user-specified conformance parameters. Cells not meeting these parameters are counted non-conforming. Statistics are displayed on the tester's LCD.

To test traffic conformance over a connection using GCRA, complete the following:

1. Press **ATM** to display the **ATM SELECTIONS** menu.

2. Press the **Down Arrow** key to highlight **ATM Testing**. Then, press **ENTER** to display the **ATM TESTS** (P1) menu.

   The cursor is positioned on the **Receive Filter** option.

3. Press **ENTER** to display the setup screen for the receive filter. Then, set up the receive filter with the correct header information for the stream to be tested.

4. Press **F4**(BACK) to return to the **ATM TESTS** (P1) menu. Then, press **F1**(PGDN) to display the **ATM TESTS** (P2) menu.

5. Press the **Down Arrow** key to highlight the **GCRA** option. Then, press **ENTER** to display the **GCRA** (P1) setup screen:

```
┌─────────────────────────────────────┐
│ GCRA                            P1   │
│           Mode ⇅ CBR.1               │
│            PCR: 010.0 %              │
│            SCR: 010.00 %             │
│       PCR CDVT: 001.0 cells          │
│       SCR CDVT: 001.0 cells          │
│         MXBSZ: 0020 cells            │
│  PGDN               START   BACK     │
└─────────────────────────────────────┘
```
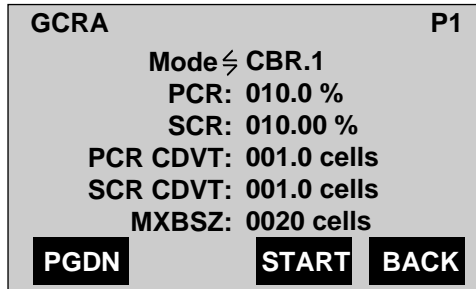
ta168f.eps

The cursor is positioned on the **Mode** parameter. Consult Table 6-15 for descriptions of the parameters on this screen.

6. Select a conformance definition for **Mode**, then supply values for the parameters that apply to the conformance definition you selected.

7. Press **F3**(START).

The **GCRA RESULTS** (P2) screen is displayed. Statistics (see Table 6-16) on non-conforming cells are provided on this screen:

```
┌─────────────────────────────────────┐
│ GCRA RESULTS                    P2   │
│ Status▶ Running                      │
│ Non-Conformance                      │
│ Count ▶ 00145072 cells               │
│  Rate ▶ 00022.30 CPS                 │
│ Ratio ▶ 4.52 %                       │
│                                      │
│         PGUP    STOP   BACK          │
└─────────────────────────────────────┘
```
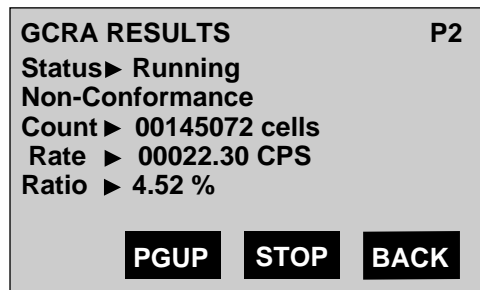
ta169f.eps

8. Press **F3**(STOP) to end the test.

Table 6-15. Setup Parameters for GCRA Test

Parameter	Description
Mode	Selects the conformance definition (defined in the ATM Forum *Traffic Management Specification*) as one of the following: • **CBR.1** (PCR CLP0+1) • **VBR.1** (PCR CLP0+1, SCR CLP0+1)
PCR	Specifies the Peak Cell Rate of the connection. Values range from 0.1% to 100%.
SCR	(For VBR.1 only). Specifies the Sustained Cell Rate of the connection.
PCR CDVT	Specifies the delay variation in cells that can be tolerated in relation to the PCR. Values range from 0 to 999.9 cells.
SCR CDVT	(For VBR.1 only). Specifies the delay variation in cells that can be tolerated in relation to the SCR. Values range from 0 to 999.9 cells.
MXBSZ	(For VBR.1 only). Specifies the maximum burst size. Values range from 0 to 9999 cells.

Table 6-16. GCRA Test Status and Results

Status/Result	Description
Status	Displays the status of the test as one of the following: • Running: the test is in progress. • Stopped: displayed after you press **F3**(STOP). The values displayed represent final test results. • Off: the test has not run yet. The values displayed do not represent final test results.
Count	Number of cells received that exceed the traffic parameters specified in the setup for the test (non-conforming cells) since the **F3**(START) or **CLEAR** key was pressed.
Rate	The rate (in cells per second) of received non-conforming cells since the **F3**(START) or **CLEAR** key was pressed.
Ratio	The number of non-conforming cells received divided by the total number of cells received since the **F3**(START) or **CLEAR** key was pressed.

Testing SVC Service

Contents   **Page**

Introduction

The E1port Plus features a point-to-point Switched Virtual Circuit (SVC) test capability. This capability enables you to test UNI signaling procedures to determine if an ATM device can properly handle point-to-point connection requests and responses. The tester sends and receives UNI signaling over the default signaling channel, VPI 0, VCI 5.

This chapter shows you how to set up the E1port Plus to test SVCs. It describes the types of configurations that you can employ and gives you instructions for establishing an SVC connection.

The SVC test capability documented in this chapter applies to portions of *ATM User-Network Interface Specification (UNI)*, *versions 3.1 and 4.0*. The E1port Plus is operationally compatible with user devices and network equipment that are UNI 4.0-compliant in that it understands and responds appropriately to UNI 4.0 requests. UNI 4.0 ABR is not supported.

The information in this chapter assumes that you have an understanding of the applicable specifications and requirements outlined in *ATM User-Network Interface Specification*, *versions 3.1 and 4.0*.

Emulation Modes

When testing SVC capability, the E1port Plus can be set up to operate in one of two modes:

- User emulation
- Network emulation

User Emulation Mode

In user emulation mode, the E1port Plus can function as either of the following:

- Calling party (user as a source)
- Called party (user as a destination)

Emulating a User Calling Party

When set up to operate as a user calling party, the E1port Plus emulates a user device that is connected to an ATM network and wants to establish an SVC. The tester can also monitor the network's response to a connection request.

You might use this mode of operation to determine whether the network can recognize and respond to a user calling party and to verify that calls are being properly routed.

To set up and use the E1port Plus as a user calling party, do the following:

Note

Instructions for each task in the following list are provided under "Setting Up the E1port Plus for SVC Testing". Refer to the procedure by name to locate it.

1. Set the emulation mode to **User Side**.

2. Supply the network address information for the calling party (E1port Plus).

3. Supply the network address information for the called party.

4. Define the traffic parameters of the call setup request.

To test the SVC, do the following:

Note

Instructions for the tasks in this list are provided under "Testing SVCs". Refer to the procedure by name to locate it.

1. Establish the signaling connection (SAAL).

2. Initiate the SVC call.

    The E1port Plus and network will exchange a series of messages. If the network cannot meet the request, the tester displays an indication of the failure.

    To verify whether the call went through, see "Monitoring a Call" and Obtaining Status on the Remote Device" for instructions.

After testing is completed, you can do the following:

1. Release or restart the call.

2. Release the signaling connection (SAAL).

Emulating a User Called Party

When set up to operate as a user called party, the E1port Plus emulates a user device that is connected to an ATM network and is ready to receive SVC call requests. The tester is put in a wait state or answer mode, in which it is prepared to respond to a call connection request from the network.

You might use this mode of operation to determine whether the network can recognize and respond to a user called party and to verify that calls are being properly routed.

To set up the E1port Plus as a user called party, do the following:

Note

Instructions for each task in the following list are provided under "Setting Up the E1port Plus for SVC Testing". Refer to the procedure by name to locate it.

1. Set the emulation mode to **User Side**.

2. Supply the network address information for the E1port Plus (calling party).

After you set up the tester, you need to enable the E1port Plus to respond to a call connection request. Follow the instructions under "Establishing the Signaling Connection (SAAL)".

If the E1port Plus receives an SVC request, it will exchange a series of messages with the network. If the request cannot be met, the tester displays an indication of the failure.

To obtain information on the status of a call, see "Monitoring a Call" and "Obtaining Status on the Remote Device".

After testing is completed, do the following:

1. Release or restart the call.

2. Release the signaling connection (SAAL).

Network Emulation Mode

In network emulation mode, the E1port Plus can function as one of the following:

- Calling party (network as a source)

- Called party (network as a destination)

Emulating a Network Calling Party

When set up to operate as a network calling party, the E1port Plus emulates both a network and user device that want to establish an SVC. The tester can also monitor a called party's response to a connection request.

You might use this mode of operation to determine whether a user called party can recognize and respond to a network calling party.

To set up the E1port Plus as a network calling party, do the following:

Note

Instructions for each task in this list are provided under "Setting Up the E1port Plus for SVC Testing". Refer to the procedure by name to locate it.

1. Set the emulation mode to **Network Side**.

2. Supply the network address information for the calling party (E1port Plus).

3. Supply the network address information for the called party.

4. Define the traffic parameters of the call setup request.

To test the SVC, do the following:

Note

Instructions for the tasks in this list are provided under "Testing SVCs". Refer to the procedure by name to locate it.

1. Establish the signaling connection (SAAL).

2. Initiate the SVC call.

   The E1port Plus and network will exchange a series of messages. If the network cannot meet the request, the tester displays an indication of the failure.

   To verify whether the call went through, see "Monitoring a Call" and "Obtaining Status on the Remote Device" for instructions.

After testing is completed, you can do the following:

1. Release or restart the call.

2. Release the signaling connection (SAAL).

Emulating a Network Called Party

When set up to operate as a network called party, the E1port Plus emulates both the network and a user device that are ready to receive SVC call requests. The tester is put in a wait state or answer mode, in which it is prepared to respond to a call connection request from a user calling party.

You might use this mode of operation to determine whether a user calling party initiating a call connection request can properly format and respond to messages.

To set up the E1port Plus to operate as the network called party, do the following:

Note

Instructions for the tasks in the following lists are provided under "Setting Up the E1port Plus for SVC Testing". Refer to the procedure by name to locate it.

1. Set the emulation mode to **Network Side**.

2. Supply the network address information for the E1port Plus (calling party).

After you set up the tester, you need to enable the E1port Plus to respond to a call connection request. Follow the instructions under "Establishing the Signaling Connection (SAAL)".

If the E1port Plus receives an SVC request, it will exchange a series of messages with the network. If the request cannot be met, the tester displays an indication of the failure.

To obtain information on the status of a call, follow the steps under "Monitoring the Call" and "Obtaining Status on the Remote Device".

After testing is completed, do the following:

Note

Instructions for the tasks in this list are provided under "Testing SVCs". Refer to the procedure by name to locate it

1. Release or restart the call.

2. Release the signaling connection (SAAL).

Setting Up the E1port Plus for SVC Testing

This section shows you how to set up the E1port Plus to test an SVC. The setup process differs depending on which emulation mode you choose for the E1port Plus. To determine which setup procedures apply, refer to the lists under "User Emulation Mode" or "Network Emulation Mode".

To display the screens shown in the procedures documented in this section, do the following:

1. Press **ATM** to display the **ATM SELECTIONS** menu.

2. Press the **Down Arrow** key to highlight the **SVC Setup & Testing** option.

3. Press **ENTER**.

    The **SAAL CONTROL** (P1) screen is displayed.

Selecting the Emulation Mode of the E1port Plus

This procedure shows you how to set up the E1port Plus to operate as a user device or a network. For an explanation of the differences between these two modes, read the descriptions under "User Emulation Mode" and "Network Emulation Mode".

To select an emulation mode, complete the following:

Note

The emulation mode cannot be changed while the SAAL is established. You must first stop the SAAL as described under "Releasing the Signaling Channel (SAAL)", then change the mode.

1. Display the **SVC MODE** (P3) screen:
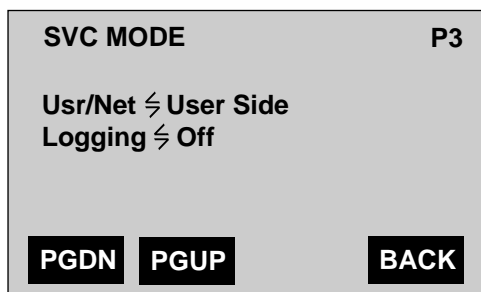
ta137f.eps

2. Press the **Left** or **Right Arrow** key to select one of the following settings for the **Usr/Net** parameter:

- **User Side**

  Sets up the tester to operate as a user device for testing network equipment.

- **Network Side**

  Sets up the tester to operate as a network for testing user equipment.

3. Press the **Down Arrow** key to move the cursor to the **Logging** parameter. This parameter has two settings:

    Note

  *Selecting **On** causes the tester to experience a slower response to the connected device.*

- **On**

  Provides detailed information about the SVC session on the RS-232 port. This includes all data PDUs (decoded and in hexadecimal notation) that are transmitted and received by the tester. See "SVC Log Report" in Appendix A, for an example of the information provided.

- **Off**

  Provides no detailed information on the RS-232 port.

4. Select a setting for the **Logging** parameter.

Specifying the Address of the Calling Party (E1port Plus)

The network address of the E1port Plus is defined as the calling party address regardless of the emulation mode of the tester. This procedure shows you how to configure the tester with the appropriate network address information.

1. Display the **SVC CALLING PARTY** (P4) screen:

```
┌──────────────────────────────────────┐
│  SVC CALLING PARTY           P4       │
│                                       │
│  Plan ⇋ NSAP                          │
│  Pres ⇋ Allowed                       │
│                                       │
│  #47000580FFE1000000F2                │
│  #1A251100191427362304                │
│                                       │
│  ▛PGDN▜ ▛PGUP▜ ▛ILMI▜ ▛BACK▜          │
└──────────────────────────────────────┘
```

ta139f.eps

On this screen, you need to supply address information that identifies the E1port Plus. This address is used as the calling party address when the tester issues a setup message. It is also used as the address of the E1port Plus when it receives a call request. See Table 7-1 for a description of each parameter listed on this screen.

2. Move the cursor to the **Plan** and **Pres** parameters and select a setting for each.

3. Press the **Down Arrow** key to move the cursor to the address field, which begins with the **#** symbol. Then, use the keypad to supply the address of the calling party.

4. If the emulation mode is set to **User Side** and if **Plan** is set to **NSAP**, the tester supports ILMI registration of the calling party address. To register the tester's address with the network, press **F3**(ILMI).

    The tester negotiates address registration with the network. If address registration is successful, the following message is displayed: ILMI Address Registration Successful. The **NSAP** address field is updated with the network prefix.

    If registration is not successful, a message is displayed indicating the failure.

The E1port Plus is now configured with the calling party address.

Specifying the Address of the Called Party

Before an SVC can be established, the network needs the address of the called party. To provide the network with this information, do the following:

1. Display the **SVC CALLED PARTY** (P5) screen:

```
┌─────────────────────────────────────┐
│  SVC CALLED PARTY         P5         │
│                                      │
│  Plan ⇋ NSAP                         │
│                                      │
│                                      │
│  #47000580FFE1000000F2               │
│  #1A251100191427362404               │
│                                      │
│  ▉PGDN▉  ▉PGUP▉          ▉BACK▉       │
└─────────────────────────────────────┘
```

ta140f.eps

Table 7-1 describes the called party address parameters listed on this screen.

2. Select the desired setting for the **Plan** parameter

3. Move the cursor to the address field, which begins with the **#** symbol. Then, use the keypad to supply the address of the called party.

The E1port Plus is now configured with the called party address.

Table 7-1. Calling/Called Party Address Parameters

Parameter	Description
Plan	Selects the address format that is compatible with the network connection. • **NSAP** specifies ISO NSAP as the address format. • **ISDN** specifies E.164 as the address format.
Pres (for calling party only)	Determines the presentation of the calling number to the called user. • **Allowed** specifies presentation of the calling number to the called user. • **Restricted** specifies that the calling number cannot be presented to the called user. (The called user device has the option of rejecting calls that do not allow presentation of the calling number.) • **Not Avail**. specifies that the calling number is not available. • **Reserved** specifies that the presentation indicator is filled with a reserved bit pattern. The result of choosing this setting is network dependent.
#	The address field. For ISDN, the address is up to a 15-digit number. For NSAP, the address is a 40-character hexadecimal value.

Defining the Traffic Parameters of the Call Setup Request

1. Display the **SVC AAL CONFIG** (P6) screen:

```
┌────────────────────────────────────┐
│  SVC AAL CONFIG              P6     │
│                                     │
│      Type ⇆ AAL 5                   │
│  Max SDU :  00100                   │
│      SSCS ⇆ NULL                    │
│   MID Lo :  00000                   │
│   MID Hi :  00000                   │
│  ┌──────┐ ┌──────┐      ┌──────┐    │
│  │ PGDN │ │ PGUP │      │ BACK │    │
│  └──────┘ └──────┘      └──────┘    │
└────────────────────────────────────┘
```

ta141f.eps

On this screen, you can define the AAL parameters of the call connection request. See Table 7-2 for a list and description of the AAL configuration parameters contained on this screen.

2. Select a setting or use the keypad to supply the desired values for the AAL parameters.

3. Press **F1**(PGDN) to display the **SVC TRAFFIC 1** (P7) screen:

```
┌────────────────────────────────────┐
│  SVC  TRAFFIC  1             P7     │
│                                     │
│    PCR:  000500  CPS                │
│    SCR:  000400  CPS                │
│  MXBSZ:  000050  cells              │
│                                     │
│                                     │
│  ┌──────┐ ┌──────┐      ┌──────┐    │
│  │ PGDN │ │ PGUP │      │ BACK │    │
│  └──────┘ └──────┘      └──────┘    │
└────────────────────────────────────┘
```

ta142f.eps

4. Set the values for **PCR** and **SCR** (in cells per second) and **MXBSZ** (in cells). See Table 7-3 for a list and description of the SVC traffic parameters.

Note

These rates apply to forward (sending) and backward (receiving) directions. Rates are applied to all PCR/SCR fields in the ATM Traffic Descriptor Information Element of the setup message as required.

5. Press **F1**(PGDN) to display the **SVC TRAFFIC 2** (P8) screen:

```
SVC TRAFFIC 2              P8

Best Effort ⇋ False
   Tagging ⇋ False
       QOS ⇋ Class 1


PGDN   PGUP           BACK
```
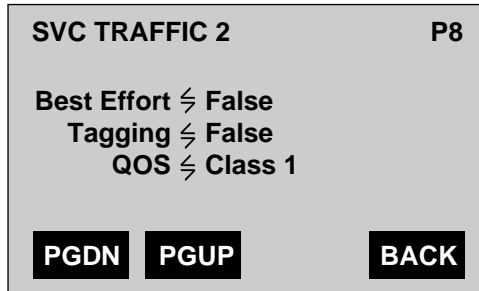
ta143f.eps

6. Select the desired setting for the SVC traffic parameters on this screen. Consult Table 7-3 for descriptions.

7. Press **F1**(PGDN) to display the **SVC BEARER** (P9) screen:

```
SVC BEARER                P9

 Bearer Class ⇋ X
 X Class Type ⇋ VBR
     Clipping ⇋ Not Sus
       Timing ⇋ No Ind
              PGUP    BACK
```
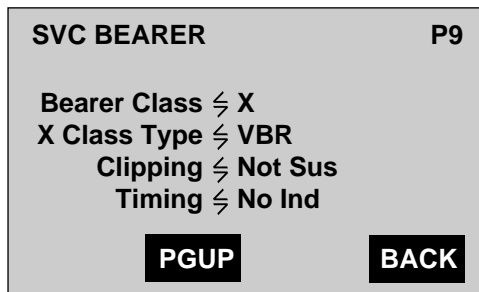
ta144f.eps

8. Select a setting for each SVC Bearer parameter. Descriptions of the SVC Bearer parameters are found in Table 7-4.

You have completed configuring the traffic parameters of the call request.

Table 7-2. AAL Configuration Parameters

Parameter	Description
Type	Identifies the AAL traffic type as AAL 3/4, AAL 5, or AAL1.
Max SDU (applies to AAL 3/4 and AAL 5 only)	Specifies the forward and backward maximum size (in bytes) of the Service Data Unit. The value ranges between 0 and 65535.
SCSS (applies to AAL 3/4 and AAL 5 only)	Identifies the Service Specific Convergence Sublayer (SSCS) as one of the following: • **Null** indicates an undefined SSCS type. • **Assured** indicates data SSCS-based on SSCOP assured operation. • **Unassured** indicates data SSCS-based on SSCOP non-assured operation.
MID Lo (applies to AAL 3/4 only)	Integer representation of the lowest MID value. Only values between 0 and 1023 are valid.
MID Hi (applies to AAL 3/4 only)	Integer representation of the highest MID value. Only values between 0 and 1023 are valid.

Table 7-3. SVC Traffic Parameters

PCR	Peak Cell Rate. Defines the maximum transmission rate. Applies to forward (sending) and backward (receiving) directions.
SCR	Sustained Cell Rate. Defines the average transmission rate. Applies to forward (sending) and backward (receiving) directions.
MXBSZ	Maximum Burst Size. Defines the amount of bursting allowed. Applies to forward (sending) and backward (receiving) directions.
Best Effort	Determines conformance of the call to the specified PCR. • **False** rejects the call if the specified PCR is not available. • **True** does not reject the call if the specified PCR is not available.
Tagging	Requests that the network tag cells that violate the specified PCR. • **True** requests tagging of cells. • **False** requests no tagging of cells.

Table 7-3. SVC Traffic Parameters (cont.)

Parameter	Description
QoS	Specifies the Quality of Service:
	• **Class 0** indicates unspecified QoS class (see *ATM User-Network Interface Specification* for details).
	• **Class 1** indicates QoS meeting Service Class A (Circuit emulation, CBR video) performance.
	• **Class 2** indicates QoS meeting Service Class B (VBR audio and video) performance.
	• **Class 3** indicates QoS meeting Service Class C (connection-oriented data transfer) performance.
	• **Class 4** indicates QoS meeting Service Class D (connectionless data transfer) performance.
	• **Reservd** is reserved by ITU-T for future use.

Table 7-4. SVC Bearer Parameters

Parameter	Description
Bearer Class	Selects the Broadband Connection Oriented Bearer (BCOB) service.
	• **A** stands for BCOB-A.
	• **C** stands for BCOB-C.
	• **X** stands for BCOB-X.
X Class Type	Identifies the type of traffic.
	• **CBR** (Constant Bit Rate)
	• **VBR** (Variable Bit Rate)
	• **No Ind** (No indication)

Table 7-4. SVC Bearer Parameters (cont.)

Parameter	Description
Clipping	Refers to the possibility of data loss (clipping) if transmission occurs immediately following the receipt of a connection acknowledgment message. • **Suscep**: specifies that the data is susceptible to clipping. • **Not Sus**: specifies that the data not be susceptible to clipping.
Timing	Specifies the timing requirement. • **No Ind**: timing requirement not indicated. • **E2E Req**: end-to-end timing required. • **E2E Not**: end-to-end timing not required. • **Reservd**: is reserved for future use.

Testing SVCs

This section shows you how to establish and release a signaling connection, how to initiate and terminate an SVC call, and how to obtain call state and diagnostic information.

Establishing the Signaling Connection (SAAL)

Signaling between the user and network is handled by the Signaling ATM Adaptation Layer (SAAL). You must establish a SAAL connection before you can transmit or receive signaling messages.

To establish the signaling connection, complete the following:

1. Display the **SAAL CONTROL** (P1) screen:

```
SAAL CONTROL             P1
       0 NOT STARTED
  Action ⇌ Start
 Tx Poll ► 0
 Tx Stat ► 0
 Rx Poll ► 0
 Rx Stat ► 0

 PGDN           EXEC  BACK
```
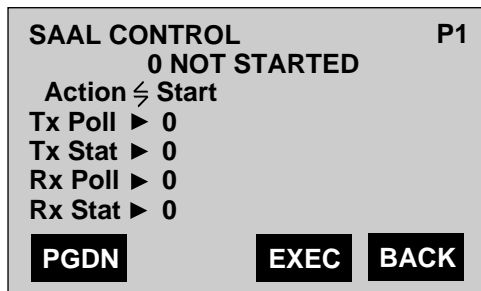
ta138f.eps

2. There are two ways to establish a signaling connection. Press the **Left** or **Right Arrow** key to select the method that meets your requirements:

- **Start**

  Enables the tester to respond to messages from the other side of the interface. Select this setting if you want to wait for the network or connected user device to initiate communication.

- **Establish**

  Enables the tester to initiate communication with the other side of the interface. Select this setting if you want to initiate communication with the network or connected user device.

3. Press **F3**(EXEC).

Depending on your selection, the tester does the following:

- If you selected **Start**, the tester waits to receive a BEGIN message. After receiving this message, the tester automatically sends and receives the required messages to maintain the signaling connection.

  OR

- If you selected **Establish**, the tester sends a BEGIN message to start dialog with the network or connected user device. Then, the tester automatically sends and receives the required messages to establish and maintain the signaling connection.

During communication between the tester and the network, you will see one or more of the following messages displayed on Line 2 of the **SAAL CONTROL** (P1) screen:

- AWAIT ESTABLISH

  Indicates that the E1port Plus sent a BEGIN message, but that it has not received acknowledgment that the message was received.

- ESTABLISHED

  Indicates that the E1port Plus is connected to the SAAL.

- AWAIT RELEASE

  Indicates that the E1port Plus has sent a release message but has not received acknowledgment that the message was received.

- RELEASED

  Indicates that the SAAL connection is released.

- NOT STARTED

  Indicates that no communication has been initiated. In this state, the
  E1port Plus will not respond to SAAL messages.

If the E1port Plus successfully connects to the SAAL, you will see a count of
the transmitted (**Tx Poll**/**Tx Stat**) and received (**Rx Poll**/**Rx Stat**) poll and
status messages. Note that the values increase approximately one per second.
This indicates that the required information exchange between the E1port Plus
and the network or connected user device is occurring over the interface.

Initiating an SVC Call

To initiate an SVC call, you have to send a setup message. To send this message,
complete the following:

1. Display the **SVC** (P2) screen:

```
┌────────────────────────────────────┐
│ SVC Test ⇆ Setup              P2   │
│ State►  NULL      #►                │
│ Remote State►  NULL                 │
│ VPI►  0000  VCI►  00000             │
│ PCR►    0       SCR ►    0          │
│ Cause Rcvd►001                      │
│ Diag ► 89 00 00 00 00               │
│ ┌─────┐┌─────┐┌─────┐┌─────┐        │
│ │PGDN ││PGUP ││EXEC ││BACK │        │
│ └─────┘└─────┘└─────┘└─────┘        │
└────────────────────────────────────┘
```

ta145f.eps

The cursor is positioned on the **Test** parameter.

2. Press the **Left** or **Right Arrow** key to select **Setup**.

   When you select **Setup**, a setup message with the parameters you selected will
   be sent to the destination device in an attempt to establish an SVC.

3. Press **F3**(EXEC) to send the setup message.

   If the destination device can accommodate the request, the call is accepted. If
   the destination device cannot meet the request, the call is rejected and an
   indication of the failure is displayed in the **Cause Rcvd** and **Diag** fields on the
   SVC (P2) screen (see "Monitoring a Call", which follows, for details).

Monitoring a Call

To monitor a call, display the **SVC** (P2) screen:

```
SVC Test ⇵ Setup                P2
State ► NULL      #►
Remote State ► NULL
VPI ► 0000  VCI ► 00000
PCR ►    0      SCR ►    0
Cause Rcvd ► 001
Diag ► 89 00 00 00 00
 PGDN   PGUP   EXEC   BACK
```

ta145f.eps

The tester reports the call state in the **State** field (see Table 7-5 for a list of call states) and provides the call reference number in the **#** field.

If the call setup message is successfully sent, the **State** field displays ACTV. The E1port Plus also reports the VPI and VCI for the established connection and the PCR and SCR available for the circuit (in cells per second).

The **Cause Sent**/**Cause Rcvd** field displays cause values that are included in certain messages. Some cause values have associated diagnostics, which, if applicable, are displayed in the **Diag** field. Consult *ATM User-Network Interface Specification* for descriptions of cause values and diagnostics, or set the **Logging** parameter **On** to print decoded cause messages (see "Selecting the Emulation Mode of the E1port Plus" for details).

Note

*The **Cause Sent** field displays cause values sent by the tester to a connected device. The **Cause Rcvd** field displays cause values received by the tester from a connected device.*

Table 7-5. Call States

State	Meaning
NULL	Null state. No call exists.
INIT	Call initiated. Issued for an outgoing call when the network or user has received a request to establish a call but has not yet responded.
OGCP	Outgoing call proceeding. Issued for an outgoing call when the network or user has received all call information required to establish a call.
CDLV	Call delivered (UNI 4.0 only). Issued for an outgoing call when the network or calling user has received an indication that remote user alerting has been initiated.
CPRT	Call present. Issued for an incoming call when the network or user has sent a call establishment request but has not yet received a satisfactory response from the destination party.
CRCV	Call received (UNI 4.0 only). Issued for an incoming call when the user has indicated alerting but has not yet answered.
CNRQ	Connection request. Issued for an incoming call when the network or user has received an answer from the destination party but has not yet awarded the call.
INCP	Incoming call proceeding. Issued for an incoming call when the network or user has received acknowledgment from the destination party that it has received all call information necessary to effect call establishment.
ACTV	Call active. Issued for incoming or outgoing calls after confirmation has been received from the network or user that the call is established.
RLRQ	Release request. Issued when the network or user receives a request from the destination party to clear the end-to-end connection and is waiting for a response.
RLIN	Release indication. Issued when the network or user has disconnected the end-to-end connection and has sent an invitation to disconnect the user-network connection.

Obtaining Status on the Remote Device

To obtain call status from the other connected device:

Note

You can obtain status on a call request only if the call is not released.

1. Display the **SVC** (P2) screen:
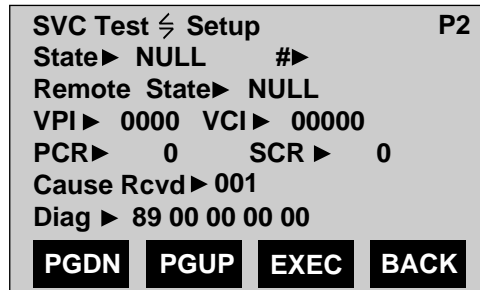
```
SVC Test ⇋ Setup                    P2
State▶ NULL        #▶
Remote State▶ NULL
VPI▶ 0000  VCI▶ 00000
PCR▶    0       SCR ▶    0
Cause Rcvd▶ 001
Diag ▶ 89 00 00 00 00
 PGDN   PGUP   EXEC   BACK
```

ta145f.eps

The cursor is positioned on the **Test** parameter.

2. Press the **Left** or **Right Arrow** key to select **Enquire**.

3. Press **F3**(EXEC).

The tester sends a message requesting status on the call. In response to the inquiry, call status information is reported in the **Remote State** field (see Table 7-5 for a list of call states).
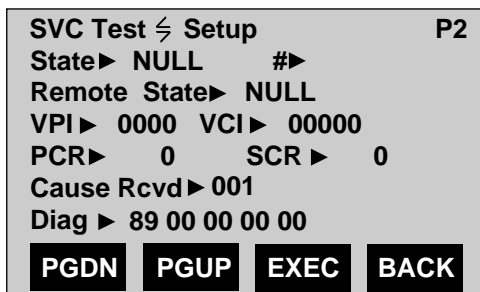
Releasing or Restarting a Call

Note

You might need to restart a call when a failure occurs or when the other side of the interface is not responding to other call control messages.

To release or restart a current call, complete the following:

1. Display the **SVC** (P2) screen:

```
SVC Test ⇆ Setup              P2
State► NULL      #►
Remote State► NULL
VPI► 0000  VCI► 00000
PCR►    0      SCR ►    0
Cause Rcvd► 001
Diag ► 89 00 00 00 00
  PGDN   PGUP   EXEC   BACK
```

ta145f.eps

The cursor is positioned on the **Test** parameter.

2. Press the **Left** or **Right Arrow** key to select one of the following settings for the **Test** parameter:

    -   **Release**

        Will send a message to clear the connection and make the virtual channel available for use in a new virtual channel connection.

    -   **Restart**

        Will send a message to restart the call. If there is an active call when the message is sent, the specific call channel is re-initialized. If no calls are active, the message requests that all call channels be restarted.

3. Press **F3**(EXEC).

A release or restart message is sent to the connected device.

Resynchronizing the Signaling Channel (SAAL)

Note

This procedure is used to resynchronize the buffers and data transfer state variables.

To resynchronize the signaling channel, complete these steps:

1. Display the **SAAL CONTROL** (P1) screen:
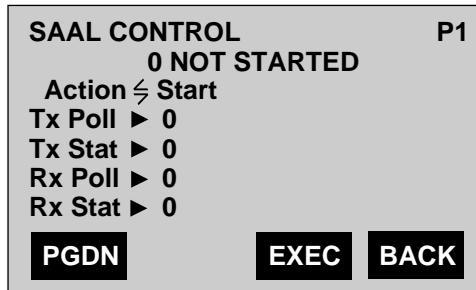
```
SAAL CONTROL                    P1
           0 NOT STARTED
  Action ⇆ Start
Tx Poll ▶ 0
Tx Stat ▶ 0
Rx Poll ▶ 0
Rx Stat ▶ 0
 PGDN              EXEC   BACK
```

ta138f.eps

The cursor is positioned on the **Action** parameter.

2. Press the **Left** or **Right Arrow** key to choose the **Resynchrn** setting.

3. Press **F3**(EXEC).

    A resynchronization message is sent to the connected device.

Releasing the Signaling Channel (SAAL)

To release the signaling channel:

1. Display the **SAAL CONTROL** (P1) screen:
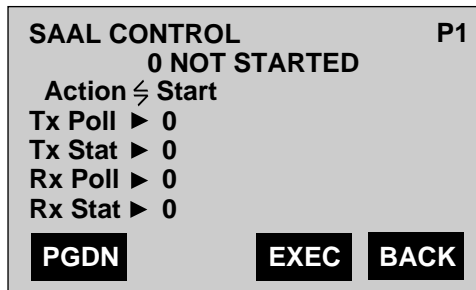
```
SAAL CONTROL                    P1
           0 NOT STARTED
  Action ⇆ Start
Tx Poll ▶ 0
Tx Stat ▶ 0
Rx Poll ▶ 0
Rx Stat ▶ 0
 PGDN              EXEC   BACK
```

ta138f.eps

The cursor is positioned on the **Action** parameter.

2. Press the **Left** or **Right Arrow** key to choose one of the following settings for the **Action** parameter:

- **Release**

  Will cause the E1port Plus to release the connection to the other side of the interface.

  The SAAL layer operation on the E1port Plus will continue and the tester will be able to respond to requests from the other side of the interface to restart the signaling channel.

- **Stop**

  Will cause the E1port Plus to release the connection to the other side of the interface and stop the SAAL layer operation on the tester.

  The E1port Plus will not respond to attempts by the other side of the interface to reestablish the link.

3. Press **F3**(EXEC).

   An end SAAL message is sent to the connected device.

Appendices

Appendix A
Sample Reports

Introduction

This appendix shows you how to print reports with the E1port Plus. Before you can print, you need to connect the tester to a printer. See Connecting the E1port Plus to a Printer or PC" in Chapter 3 for details.

Product Information Report

To print a product information report, do the following:

1. Press the **SYSTEM** key. Then, display any **SYSTEM INFORMATION** menu screen.

2. Press **SHIFT 1 + Print**.

   The E1port Plus prints a report similar to this one:

```
+++++++++++++++++++++++++++++++++++++
* PRODUCT INFORMATION *
+++++++++++++++++++++++++++++++++++++
PRODUCT
  Model: FLUKE E1port+
  Software Ver: 4.00
  Display Ver: 25
  Build: Tue Jan 12 99  15:59:01
  Remote ID: 10199

CONFIGURATION
  User: E1user
  UNI: 3.1/4.0
  Remote: ENABLED
  Framer: E1XC.1


            as of 02-12-99  16:03:15
------------------------------------
NOTES:




```

aai150f.eps

Line Setup Report

A Line setup report contains a summary of the parameter settings for each line setup option. To print this report, do the following:

1. Press the **LINE** key.

2. Select **Line Setup**. Then, press **ENTER**.

3. Display any **LINE SETUP** screen. Then, press **SHIFT 1** + **Print**.

   The E1port Plus prints a report similar to the following:

```
+++++++++++++++++++++++++++++++++++
* E1 LINE SETUP *
+++++++++++++++++++++++++++++++++++
  Connector: Bantam
  Input Type: Terminal
  Loopback: Normal
  TxClock: Internal

  CAS Rcv: Disabled
  CAS Xmit: As Received
  CRC4 Rcv: Enabled
  CRC4 Xmit: As Received

  RAI Valid: 2 Frames
  MFrame Valid: 2 Frames
  LCV Type: G.703
  LineCode: HDB3

  Error/Alarm Injection
       RAI: Off
       AIS: Off
       MRAI: Off
       T16AIS: Off

          as of 02-12-99  22:42:45
-----------------------------------
NOTES:
```

aai151f.eps

A-3

Line Results Report

To print a Line results report, do the following:

1. Press the **LINE** key. Select **Line Results**. Then, press **ENTER**.

2. Display any **E1 LINE Result** screen.

3. Press **SHIFT 1** + **Print**.

   The E1port Plus prints a report similar to the following:

```
+++++++++++++++++++++++++++++++++++++
* E1 LINE RESULTS *
+++++++++++++++++++++++++++++++++++++
SUMMARY
  Signal Level: 3.10Vpk, 16.03dBm
  Line Code: HDB3
  Loop State: Normal

DETAILED STATISTICS
        Count      ErrdSec     ErrFreeSec %ErrFree
LCV     000005868  000000004   000000544  99.27%
FEBE    000000019  000000003   000000545  99.45%
FRM Err 000000377  000000005   000000543  99.09%
CRC4    000000020  000000003   000000545  99.45%

Elapsed Test Time: 548 sec
Total Errors: 6284

        Status    Start       End         Total
AIS     INACTIVE  --:--:--    --:--:--    --:--:--
LOF     INACTIVE  22:43:00    22:43:00    --:--:--
LOS     INACTIVE  22:42:56    22:42:59    00:00:03
RAI     INACTIVE  22:33:54    22:33:54    --:--:--
RED     INACTIVE  22:42:59    22:42:59    --:--:--
MRAI    INACTIVE  --:--:--    --:--:--    --:--:--
T16AIS  INACTIVE  --:--:--    --:--:--    --:--:--

          as of 02-12-99  22:43:06
-----------------------------------
NOTES:
```

aai153f.eps

Line BER Test Report

To print a Line BER test report, do the following:

1. Press the **LINE** key. Select **LINE BERT**. Then, press **ENTER**.

2. Display any **Line BER Test** screen.

3. Press **SHIFT 1** + **Print**.

The E1port Plus prints a report similar to this one:

```
++++++++++++++++++++++++++++++++++++
* E1 BIT ERROR RATE TEST RESULTS *
++++++++++++++++++++++++++++++++++++
RESULTS
 Err Rate: 9.98003E-04
 Errors: 0000926534
 Bits: 0928387840
 Errd Sec: 0000000020
 Elapsed time: 0 days 00:00:23

CONFIGURATION
 Pattern: 2**15
 User Defined Pattern: NA
 Pattern Type: NORMAL
 Err Inject: 10E-3

             as of 01-21-99 18:20:52
------------------------------------
NOTES:
```

aai152f.eps

ATM BER Test Report

To print an ATM BER test report, do the following:

1. Press the **ATM** key.

2. Select **ATM Testing**. Then, press **ENTER**.

3. Select **Bit Error Rate**. Press **ENTER**.

4. Display any **ATM BER Test** screen. Then, press **SHIFT 1** + **Print**.

    The E1port Plus prints a report similar to this one:

```
+++++++++++++++++++++++++++++++++++++
* ATM BIT ERROR RATE TEST RESULTS *
+++++++++++++++++++++++++++++++++++++
ATM RECEIVE CIRCUIT
  VPI: 0016  VCI: 00064  PT: 0  CLP: X  GFC: 0

RESULTS
  Err Rate: 1.00707E-06
  Errors: 0000000086
  Bits: 0085396104
  Errd Sec: 0000000021
  Elapsed time: 0 days 00:00:32

CONFIGURATION
  Pattern: 2**15
  User Defined Pattern: N/A
  Pattern Type: NORMAL
  Err Inject: 10E-6

           as of 02-12-99  16:08:02
-------------------------------------
NOTES:



```

ta150f.eps

ATM Configuration Report

To print an ATM configuration report, do the following:

1. Press the **ATM** key. Select **ATM Configuration**. Then, press **ENTER**.

2. Press **SHIFT 1** + **Print** to print a report similar to the following:

```
++++++++++++++++++++++++++++++++++++
* ATM CONFIGURATION REPORT *
++++++++++++++++++++++++++++++++++++
GENERAL
  Network Interface Support: UNI
  Cell Delineation Method: HEC
  Background Cell Format: IDLE
  Add COSET polynomial: ON

TRAFFIC SOURCE  1  - ON CBR
 Header
   VPI: 0016  VCI: 00064  PT: 0  CLP: 0  GFC: 0
   Checksum: OK Hexadecimal: 0100040017
 Payload
   Type: BERT
 Traffic
   PCR:    191 kbps     452 CPS   10.00%
   SCR:    191 kbps     452 CPS   10.00%
   Maximum Burst Size:   20 cells
   Cell Delay Variation Limit:  25.0 cells

TRAFFIC SOURCE  2  - ON VBR/Burst
 Header
   VPI: 0017  VCI: 00065  PT: 0  CLP: 0  GFC: 0
   Checksum: OK Hexadecimal: 01100410C5
 Payload
   Type: FIXED
 Traffic
   PCR:    191 kbps     452 CPS   10.00%
   SCR:    191 kbps     452 CPS   10.00%
   Maximum Burst Size:   20 cells
   Cell Delay Variation Limit:  25.0 cells

TRAFFIC SOURCE  3  - OFF

TRAFFIC SOURCE  4  - OFF

TRAFFIC SOURCE  5  - OFF

TRAFFIC SOURCE  6  - OFF

TRAFFIC SOURCE  7  - OFF

TRAFFIC SOURCE  8  - OFF

            as of 02-12-99  16:06:28
------------------------------------
NOTES:
```

ta152f.eps

ATM Circuit Activity Report

To print a report of the activity on detected circuits, follow these steps:

1. Press the **ATM** key.

2. Select **Receive Summary**. Then, press **ENTER.**

3. Select **Circuit Activity List**. Then, press **ENTER**.

4. From the **RCV STATS** screen, press **SHIFT 1** + **Print**.

   The E1port Plus prints a report similar to the following:

```
+++++++++++++++++++++++++++++++++++++
* ATM SUMMARY *
+++++++++++++++++++++++++++++++++++++
RECEIVED CIRCUIT ACTIVITY -  5 CIRCUITS DETECTED
VPI   VCI  GF PT CL HC   BW%    CPS    MBS    Count
0000 00000  0  0  1 07 60.00%  2716  1.1510   45360
0016 00064  0  0  0 42 10.00%   453  0.1920    7560
0017 00065  0  0  0 90 10.00%   453  0.1920    7560
0018 00066  0  0  0 E1 10.00%   453  0.1920    7560
0019 00067  0  0  0 33 10.00%   453  0.1920    7560


CURRENT TRANSMISSION ACTIVITY
VPI   VCI  GF PT CL HC   BW%    CPS    MBS    Count
0016 00064  0  0  0 17 10.00%   453  0.1920    7560
0017 00065  0  0  0 C5 10.00%   453  0.1920    7560
0018 00066  0  0  0 B4 10.00%   453  0.1920    7560
0019 00067  0  0  0 66 10.00%   453  0.1920    7560
0020 00068  0  0  0 56  0.00%     0  0.0000       0
0021 00069  0  0  0 84  0.00%     0  0.0000       0
0022 00070  0  0  0 F5  0.00%     0  0.0000       0
0023 00071  0  0  0 27  0.00%     0  0.0000       0


          as of 02-12-99  16:05:23
-----------------------------------
NOTES:

```

ta151f.eps

ATM Cell Capture Report

To print an ATM cell capture report, do the following:

1. Press the **ATM** key. Select **ATM Testing**. Then, press **ENTER.**

2. Select **Cell Capture**. Then, press **ENTER**.

3. Display any **CELL CAPTURE** screen. Then, press **SHIFT 1** + **Print**.

    The E1port Plus prints a report similar to the following:

```
+++++++++++++++++++++++++++++++++++++
* ATM CELL CAPTURE *
+++++++++++++++++++++++++++++++++++++
CONFIGURATION
  Capture ON: Rcv Filter
  Trigger ON: Rcv Filter
  Time Format: Relative

CELL BUFFER CONTENTS
  Cell: 000  VPI: 0016  VCI: 00064 PT: 0 CLP: 0 GFC: 0
  Time: 0000000000.0 us
  Payload:
  dd 71 30 d9 5d 28 31 0f 59 dc 2b 37 05 4d e0 53
  be 16 7b 8a e6 c1 a9 7a 08 e3 cd b7 52 4c 12 57
  92 0e 93 d8 97 2c 8d 14 d1 85 1a e1 a1 ba 3a 63

  Cell: 001  VPI: 0016  VCI: 00064 PT: 0 CLP: 0 GFC: 0
  Time: 0000000095.9 us
  Payload:
  62 b4 b0 44 5e 66 3a ab 60 04 bf e4 7f a6 fe 29
  fb 0b e5 c7 a3 6e 34 9b 44 a4 64 26 a7 28 2d 0f
  11 dd 9b 32 a5 50 20 1f 3f bd 7e 70 fa dd e1 33


            as of 02-12-99  16:05:23
---------------------------------------
NOTES:
```

ta153f.eps

QoS Test Report

To print a QoS test report, do the following:

1. Press the **ATM** key. Select **ATM Testing**. Then, press **ENTER.**

2. Select **QoS Tests**. Then, press **ENTER**.

3. Press **SHIFT 1** + **Print**.

The E1port Plus prints a report similar to the following:

```
+++++++++++++++++++++++++++++++++++++++
* ATM QUALITY OF SERVICE RESULTS *
+++++++++++++++++++++++++++++++++++++++
ATM Receive Circuit
  VPI: 0016  VCI: 00064  PT: 0  CLP: X  GFC: 0

1 POINT CELL DELAY VARIATION
  Number of Samples: 00018025 Reference PCR: 9.0%
  Early Arrival
    Maximum: 00032001 us    Average: 15900.230 us
  Late Arrival
    Maximum: 00000000 us    Average: 0.230 us

2 POINT CELL DELAY VARIATION
  Number of samples: 00000000
  Peak-to-Peak Cell Delay Variation: 00000000 us
  Cell Transfer Delay
    Minimum: 00000000 us Maximum: 00000000 us Mean: 0.000

CELL LOSS TEST RESULTS
  Lost Cells:        00000000  Loss Ratio:     0.00e+00
  Misinserted Cells: 00000000  Misinsert Rate: 0.00e+00

            as of 02-12-99  16:08:33
-------------------------------------
NOTES:



```

ta154f.eps

OAM Test Report

To print an OAM test report, do the following:

1. Press the **ATM** key. Select the **ATM Testing** option. Press **ENTER**.

2. Select **OAM**. Then, press **ENTER**.

3. Display any **OAM TESTING** or **OAM DETECTION** screen. Then, press **SHIFT 1** + **Print**.

The E1port Plus prints a report similar to the following:

```
++++++++++++++++++++++++++++++++++++
* ATM OAM OPERATION *
++++++++++++++++++++++++++++++++++++
OAM F4 ACTIVITY SUMMARY
  VPI    Last Occurrence
  0016   16:08:57

OAM F5 ACTIVITY SUMMARY
  VPI    VCI    Last Occurrence
  0016  00064   16:09:10

CURRENT TRANSMIT CONFIGURATION
  OAM Flow: F5
  OAM Span: Segment
  Circuit: VPI: 0016  VCI: 00064

           as of 02-12-99  16:09:14
------------------------------------
NOTES:



```

ta155f.eps

SAAL Statistics Report

To print SAAL statistics report, do the following:

1. Press the **ATM** key.

2. Select **SVC Setup & Testing**. Press **ENTER**.

3. Press **SHIFT 1** + **Print**.

The E1port Plus prints a report similar to the following:

```
++++++++++++++++++++++++++++++++++++
* SAAL STATISTICS *
++++++++++++++++++++++++++++++++++++
  Counter  Transmit    Receive
     Poll:      10          9
   Status:       9          9
  dt/poll:       0          0
   Begack:       1          1
    Begin:       1          1
  RsynAck:       0          0
   Resync:       0          0
   Bgnrej:       0          0
  unsolst:       0          0
     data:       0          0
   Endack:       0          0
      End:       0          0
    Error:       0          0
   ErrAck:       0          0

           as of 02-12-99  16:21:00
------------------------------------
NOTES:




```

ta164f.eps

SVC Log Report

Following is an example of an SVC log report. A report of this type is generated when you set the **Logging** parameter to **On** (see "Selecting the Emulation Mode of the E1port Plus").

```
Rx_RAW  -  Time Ref: 105850
 09,03,00,00,02,05,80,00,59,59,80,00,08,84,00,01,
 f4,85,00,01,f4,5e,80,00,03,10,80,80,70,80,00,15,
 82,47,00,05,80,ff,e1,00,00,00,f2,1a,25,11,91,42,
 73,62,32,02,70,5c,e0,00,02,01,01,58,80,00,09,05,
 8c,00,64,81,00,64,84,00,6c,80,00,16,02,80,47,00,
 05,80,ff,e1,00,00,00,f2,1a,25,11,91,42,73,62,32,
 02,60,

Rx_PDU  -  Time Ref: 105960
      Call Reference =  000002
      Mess Type =  0005, SETUP
      AAL Parameters
             Coding Standard =  00
             AAL Type =  05
             Forward SDU size =  100
             Backward SDU Size =  100
             SSCS = 00
      ATM Traffic Descriptor
             Coding Standard =  00
             Forward PCR 0+1 =  500
             Backward PCR 0+1 =  500
             Forward Tagging =  0
             Backward Tagging =  0
      Broadband Bearer Capability
             Coding Standard =  00
             Class =  10, X
             Traffic Type =  00
             Timing =  00
             Susceptibility to Clipping =  00
             User Plane Connection Config =  00
      Called Party Number
             Coding Standard =  00
             Number Type =  00
             Plan Identification =  02
             Called Number =  47,00,05,80,ff,e1,00,
         00,00,f2,1a,25,11,91,42,73,62,32,02,70,
      Calling Party Number
             Coding Standard =  00
             Number Type =  00
             Plan Identification =  02
             Presentation Indicator =  00
             Screen Indicator =  00
             Calling Number =  47,00,05,80,ff,e1,00,
         00,00,f2,1a,25,11,91,42,73,62,32,02,60,
      Quality Of Service Parameter
             Coding Standard =  03
             QoS Forward =  01
             QoS Backward =  01
```

ta172f.eps

```
Tx_PDU  -  Time Ref: 106120
        Call Reference =  000002
        Mess Type =  0002, CALL PROCEEDING
        Connection Identifier
                Coding Standard =  00
                VP Associated Signalling =  01
                Preferred/Exclusive =  00
                VPCI =  0001
                VCI =  00033

Tx_RAW  -  Time Ref: 106150
 09,03,80,00,02,02,80,00,09,5a,80,00,05,88,00,01,
 00, 21,

Tx_PDU  -  Time Ref: 106180
        Call Reference =  000002
        Mess Type =  0007, CONNECT
        Connection Identifier
                Coding Standard =  00
                VP Associated Signalling =  01
                Preferred/Exclusive =  00
                VPCI =  0001
                VCI =  00033

Tx_RAW  -  Time Ref: 106210
 09,03,80,00,02,07,80,00,09,5a,80,00,05,88,00,01,
 00,21,

Rx_RAW  -  Time Ref: 106750
 09,03,00,00,02,0f,80,00,00,

Rx_PDU  -  Time Ref: 106770
        Call Reference =  000002
        Mess Type =  000f, CONNECT ACKNOWLEDGE
```

ta173f.eps

Appendix B
Applications

Introduction

This appendix contains procedures that show you how to test ATM equipment policing algorithms and how to test for the effect of high traffic rates on a payload's transmission capability.

Testing ATM Equipment Policing Algorithms

To provide a minimum of acceptable service, the traffic sent across most ATM connections must comply with a predetermined traffic "contract". Traffic sources that exceed their traffic requirements must be "policed" in some way so that they do not adversely affect other users of the ATM network.

Although there are a number of ways to specify the limiting parameters of any traffic contract, two methods are more commonly used to react to traffic that is considered non-conforming:

- The ATM equipment that receives traffic that it believes is in violation of an established traffic contract can mark the offending cells by setting their CLP bit to 1.

- The ATM equipment that receives traffic that it believes is in violation of an established traffic contract can drop the offending cells.

This section describes these two methods and how you can set up the E1port Plus to use them to test a policing algorithm.

Note

See "Conformance Testing Using GCRA" in Chapter 6 for another method that you can use to test traffic conformance.

Forcing Contract Violations and Detecting Marked Cells

To detect marked cells, do the following:

1. Configure the Equipment Under Test to receive a policed stream on VCI/VPI "A" and return it on the same port (or a different port) on VCI/VPI "B".

2. Set up a transmission stream on the circuit to be tested with its header set up to match VPI/VCI "A" at a rate that is just below the contract limit. Make sure that the CLP bit in the header is set to 0.

3. Observe the traffic received on Circuit B. Examine the header to ensure that the CLP is 0.

4. Gradually increase the transmission rate on circuit "A". As you exceed the policing limit, cells will be received on filter "B" that have had their CLP bits set. This causes another circuit to appear with the same VPI/VCI as "B" but with the CLP bit set.

Forcing Contract Violations and Detecting Dropped Cells

To detect dropped cells, complete these steps:

1. Configure the Equipment Under Test to receive a policed stream on VCI/VPI "A" and return it on the same port (or a different port) on VCI/VPI "B".

2. Set up a VBR/RND transmission stream on the circuit to be tested. Also set the circuit's header to match VCI/VPI "A" and set the SCR at a rate that, on average, is just under the contract limit. Set the PCR and MBS limits so that they can exceed the contract parameters.

3. Set up a receive filter that matches the return circuit on header "B" for the transmission stream that you set up in Step 1. Set the CLP bit to 1.

4. Run the Cell Loss test.

   Occasionally, you will see cells dropped as the transmission steam randomly breaches the traffic contract.

Appendix C
Glossary

AAL

Abbreviation for ATM Adaptation Layer.

AIS

Abbreviation for Alarm Indication Signal. Formerly called a "Blue Alarm". A signal that is sent by a network device when it detects or receives an error condition or receives notification of an error from another device.

asynchronous

Not synchronized; not timed to an outside clock.

ATM

An abbreviation for Asynchronous Transfer Mode. A transmission protocol that relays user traffic by segmenting it into small, fixed-sized packets called cells. The cells are then inserted into a framing structure and transmitted across a data link. At the receiving end, the cells are extracted from the structure and reassembled to form the original input.

bandwidth

Identifies the capacity of a communications channel. In analog communications, bandwidth is measured in Hertz; in digital communications, in bits per second.

BERT

Abbreviation for Bit Error Rate Testing. A test that entails analyzing a received signal's payload pattern and comparing it with a specified test pattern. Any discrepancies between the received pattern and the test pattern are reported as bit errors.

bit error rate

The number of errored bits divided by the total number of bits received.

CBR

Abbreviation for Constant Bit Rate. One of the five classes of service defined by the ATM Forum. Constant bit rate service is used to carry traffic that is constant and non-bursty, such as voice and compressed video.

CDV

Abbreviation for Cell Delay Variation. A measure of cell jitter or how cells clump together as they traverse a network. More specifically, CDV is defined as the variability between the expected time of arrival of a cell and its actual arrival time.

CDVT

Abbreviation for Cell Delay Variation Tolerance. An ATM traffic contract parameter that defines the maximum amount of cell jitter that can be tolerated by the end-to-end connection. This parameter is typically specified when tightly constrain cell inter-arrival time
is critical.

cell

The fundamental unit of ATM transmission. A fixed-length information package that is used to carry user traffic. Consists of 53 bytes. Of these, five constitute the header while 48 carry the information field or payload.

cell loss ratio

In cell loss testing, the number of displaced or lost cells in relation to the total number of cells received by the activated ATM receive filter.

cell misinsertion rate

The number of cells that are misinserted on a particular connection over a particular time period.

channel

A transmission facility with defined bandwidth.

CLP

Abbreviation for Cell Loss Priority. A bit in the ATM header that indicates whether (all other factors being equal) a cell can be discarded under certain network conditions. If CLP is set to 1, the cell can be discarded; if it is set to 0, it cannot be discarded.

CLR

Abbreviation for Cell Loss Ratio. See cell loss ratio.

CPS

Abbreviation for cells per second.

CRC

Abbreviation for Cyclic Redundancy Check. A mathematical algorithm used to detect bit errors in data transmission.

CTD

Abbreviation for Cell Transfer Delay. The elapsed time between the transmission of a cell from a defined exit point and arrival of a cell at a defined entry point on a network.

DUT

Abbreviation for device under test.

E1

A digital carrier facility used to transmit an E1 digital stream at a 2.048 Mbit interface rate.

error rate

The number of errors per second.

errored second

A second in which at least one defect or error occurred.

frame

A group of data bits that varies in length yet has a specific format containing flags at the beginning and end to provide demarcation.

GCRA

Abbreviation for Generic Cell Rate Algorithm. An algorithm that is used by an ATM network to measure conformance with negotiated traffic usage.

GFC

Abbreviation for Generic Flow Control. The first four bits of byte 1 in an ATM cell header.

HCS

Abbreviation for Header Checksum.

header

That portion of an ATM cell (the first five bytes) that precedes the actual data and contains source and destination addresses and control and error-checking information.

HEC

Abbreviation for Header Error Control. That portion of an ATM cell header that performs error detection, thereby reducing the likelihood of bit errors causing information to be mis-delivered.

Hex

Abbreviation for hexadecimal header. That portion of an ATM cell that contains a summary of all of the values programmed into the individual header fields (that is, the VPI, VCI, PT and CLP values).

idle cell

In ATM, a type of background cell. An idle cell has its CLP bit set to 1. Contrast with unassigned cell.

LCD

Abbreviation for Liquid Crystal Display.

LCV

Abbreviation for Line Code Violation.

leaky bucket

A term used to describe the algorithm used for conformance checking of cell flows against specified traffic parameters. See GCRA.

loopback

A state in which the transmission signal is reversed and sent back as the receive signal.

MAC Address

The address for a device as it is identified by the Media Access Control (MAC) layer.

MBS

Abbreviation for megabits per second (a million bits per second).

MRAI

Abbreviation for Multi-frame Remote Alarm Indication.

MXBSZ

Abbreviation for Maximum Burst Size. An ATM traffic contract parameter that defines the maximum number of cells that can be transmitted consecutively at the rate defined by the PCR. This parameter is used for VBR services only.

NNI

Abbreviation for Network to Network-Interface. An interface between two public carriers, such as a local carrier and a long-distance carrier.

OAM

Abbreviation for Operations and Maintenance. An ATM cell that is used by the network to perform network management functions, such as fault management, performance management, and connection management. OAM cells are divided into two types: F4 flows, which are used for virtual path connection operations and F5 flows, which are used for virtual channel operations.

overhead

That portion of a cell or frame that contains control information as opposed to data. For example, a flag or delimiter, a header, and a trailer each constitute a cell or frame's overhead.

payload

That portion of an ATM cell that contains user information or data as opposed to routing or control information. Contrast with header.

PCR

Abbreviation for Peak Cell Rate. An ATM traffic contract parameter that defines the maximum bandwidth that can be supported by a particular end-to-end connection. This parameter is used for CBR, and VBR services. For CBR services, it represents the guaranteed constant bandwidth that is supported. For VBR services, it defines the maximum bandwidth that can be supported for the MXBSZ.

PT

Abbreviation for payload type. Bits in the header that indicate what type of information is being carried by the cell. For example, bits are used to distinguish between cells carrying user information and cells carrying operations and maintenance information.

RDI

Abbreviation for Remote Defect Indication.

receive filter

A piece of logic that allows the E1port Plus to discriminate among incoming data streams based on specific header information. The filter uses pattern matching to capture certain traffic record statistics based upon specific header values.

SAAL

Abbreviation for Abbreviation for Signaling ATM Adaptation Layer. The SAAL is between the ATM layer and Q.2931. The purpose of this layer is to provide reliable transport of Q.2931 messages between peer Q.2931 entities (for example, an ATM switch and host) over the ATM layer.

SCR

Abbreviation for Sustained Cell Rate. An ATM traffic contract parameter that defines, for VBR services only, the guaranteed bandwidth that can be supported on a continuous basis by a particular end-to-end connection.

scrambling

A method whereby the bits are pseudo-randomly mixed to provide for easier clock recovery and recovery of data. Used to guarantee a higher ones density and no false triggering of alarms.

shaper

A function that is used to guarantee that traffic parameters are not exceeded.

SVC

Abbreviation for Switched Virtual Connection. This type of connection is dynamic in that it is established in real time using signaling procedures. The connection remains active for an arbitrary amount of time, but is not automatically re-established after a network failure.

T16AIS

Abbreviation for Timeslot 16 Alarm Indication Signal.

transmission stream

On the E1port Plus, used to generate ATM traffic. Allows the user to set up cell transmission parameters that fully describe the ATM traffic generated by the E1port Plus. These parameters include address designation, cell loss priority, and bandwidth, to name a few.

unassigned cell

In ATM, a cell containing no information that is inserted into the data stream and used as filler for bandwidth or a place holder. An unassigned cell has its CLP bit set to 0. Contrast with idle cell.

UNI

Abbreviation for User-to-Network Interface. An interface between privately owned or leased customer equipment and a public network service provider.

VBR

Abbreviation for Variable Bit Rate. One of the five classes of service defined by the ATM Forum. Variable bit rate service is used to transmit "bursty" types of ATM traffic.

VCI

Abbreviation for Virtual Channel Indicator. That portion of an ATM cell header that identifies the channel used to route a cell.

VPI

Abbreviation for Virtual Path Indicator. That portion of an ATM cell header that identifies the path used to route a cell.

Index