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OC3port® Plus

Handheld OC3 / ATM Network Analyzer

Users Manual

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June 1996, Rev 1, 5/99
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Chapter 1
Introduction

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Introduction

The OC3port® Plus portable hand-held tester provides an extensive set of OC3 and ATM testing capabilities that address a broad range of test requirements for OC3- and ATM-based transmission and communications systems. The OC3port Plus is specifically designed to allow you to test any type of OC3/ATM equipment for proper operation, configuration, compliance, and interoperability.

This chapter describes the features and capabilities of the OC3port Plus and provides important information about the operation and use of the tester.

About This Manual

The *OC3port Plus Users Manual* describes how to operate the OC3port Plus network analyzer and provides step-by-step instructions on how to perform network testing and evaluation of ATM networks and equipment.

Who This Manual Is For

This manual provides pertinent technical information and instruction on the operation and use of the OC3port Plus. It is written for anyone who uses this product to test and troubleshoot OC3 and ATM network problems, for those involved in network installation and maintenance, and for individuals who perform network acceptance testing.

What You Should Know

This manual is not meant to be a SONET or ATM tutorial. A basic familiarity with wide-area networking, in general, and an in-depth understanding of SONET, OC3 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 OC3port Plus and familiarizes you with the safety precautions regarding its use.

Next read Chapter 2 “Getting Started”. Before you begin using the OC3port Plus, you should understand the functions of the keys and status indicators as well as other elements on the unit’s front panel. You also need to understand the menu interface and how to navigate through the OC3port Plus menus. This chapter covers these fundamentals.

After you configure the OC3port Plus, you can go directly to any of the subsequent chapters that show you how to perform specific tests or operations.

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This book also contains a Glossary of terms that are used throughout this manual. Terms found in the Glossary area highlighted in text when they are first used.

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 and 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 **Down Arrow** key, the **Left Arrow** key, the **Right Arrow** key, and the **Up 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 the symbol ⚠ and the word **Warning**.

OC3port Plus Features and Capabilities

The OC3port Plus combines SONET testing features with advanced ATM testing features, giving you the ability to quickly test and troubleshoot any OC3 circuit as well as test ATM equipment and services for proper operation and conformance.

At the physical layer, the OC3port Plus can be used to diagnose many common OC3 network problems. The tester provides complete OC3 Section, Line, and Path error and alarm transmission and monitoring capabilities that enable you to

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effectively monitor and test OC3 networks from any access point. The OC3port Plus also provides the following:

- OC3 pointer control and monitoring
- Support for SONET and SDH framing formats
- Date and time stamping of OC3 alarm occurrences
- A passive monitoring mode, which allows for non-intrusive testing
- Automatic testing of OC3 circuits so that you can obtain immediate pass/fail results and quickly assess problems with SONET networks.

In addition, the OC3port Plus offers a comprehensive set of advanced ATM testing capabilities, which includes:

- Automatic scanning of active virtual circuits
- Ability to transmit up to eight ATM traffic sources simultaneously
- Quality of Service tests: Cell Delay, Cell Variation, and Cell Loss
- Cell payload capture and viewing
- Various cell transmission modes, including single cell, programmable burst size, and constant rate
- Transmission of ATM traffic that simulates CBR, VBR, and UBR service categories with programmable random, poisson, or constant traffic distribution patterns
- AAL type recognition
- OAM cell transmit and monitoring of AIS, RDI, and loopback F4 and F5 flows
- Quality of service measurements: CTD (mean, max), CDV (max), CLR, and CMR.

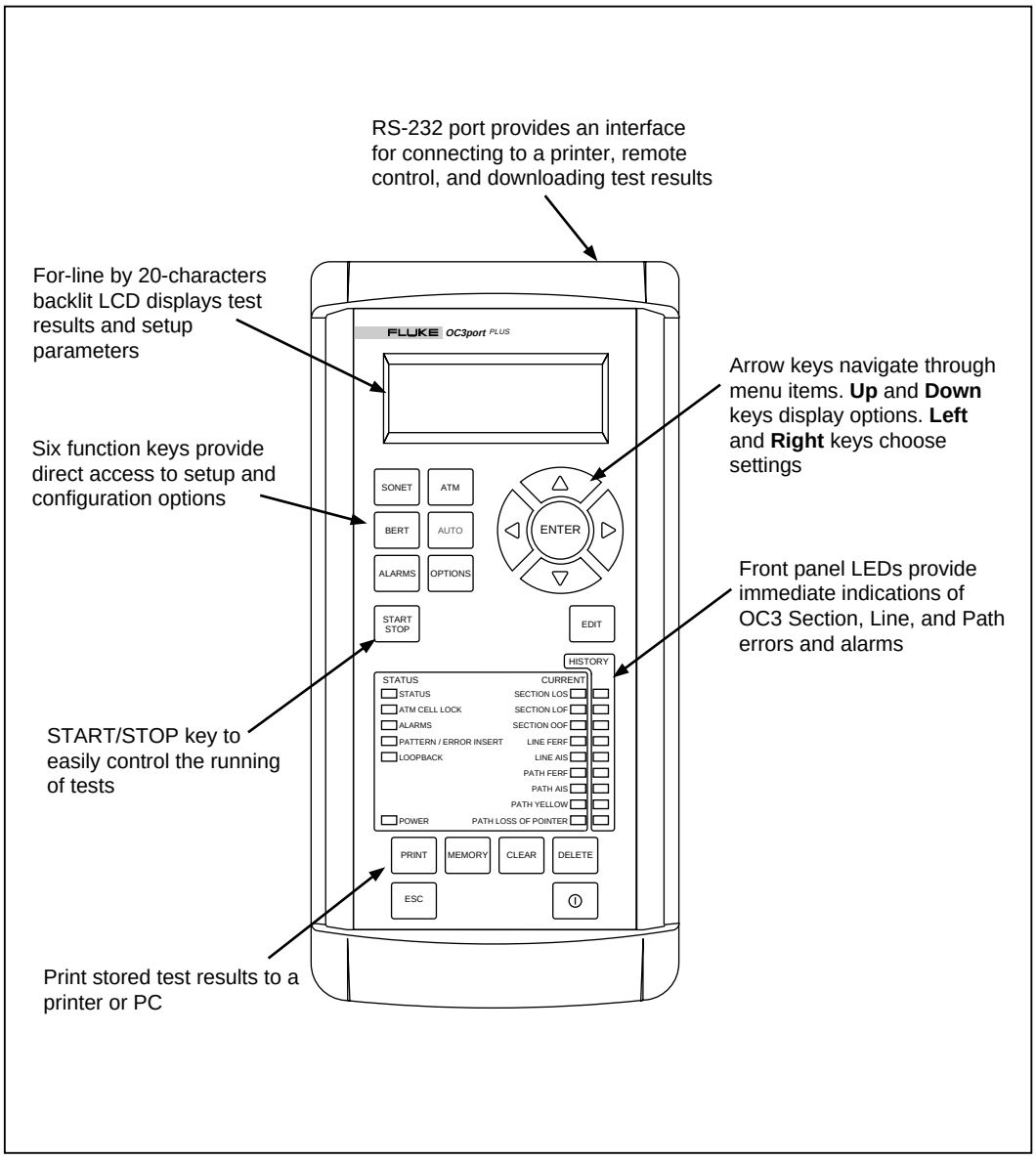
In addition to advanced diagnostic and testing capabilities, the OC3port Plus gives you immediate feedback on the condition of any OC3 circuits under test through its front-panel LEDs. The tester also lets you store and print test results, making it possible for you to gather and later examine network statistics.

For long-term monitoring, the OC3port Plus can be connected to a network, which can be monitored remotely through a modem connected to a PC with Fluke's remote control software. This gives you the added advantage of being able to leave the OC3port Plus connected at a customer premise or central office location and dial into the tester from a PC or laptop computer from a central monitoring location.

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The OC3port Plus Handheld Tester: at a Glance

The OC3port Plus is an easy-to-use handheld tester. It is rugged yet lightweight, so you can use it anywhere.



za001f.eps

Figure 1-1. OC3port Plus at a Glance

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Specifications

This section describes the physical and operational characteristics of the OC3port Plus.

OC3 Physical

Bit rate: 155.52 Mbps ± 20 ppm

Receiver:

- Single-mode version:

  Maximum input power: -8 dBm

  Minimum receive sensitivity: -28 dBm

- Multi-mode version:

  Maximum input power: -14 dBm

  Minimum receive sensitivity: -32.5 dBm

- UTP-155 version: ATM Forum UTP-155-PMD compliant

Transmit Outputs:

- Single-mode version:

  Average output power: -12.5 dBm (typical)

  Range: -15 dBm to -8 dBm

  Center wavelength: 1260 to 1360 nm, spectral width: 7.7 nm

- Multi-mode version:

  Average output power range: -19 dBm to -14 dBm

  Center wavelength: 1270 to 1380 nm, spectral width: 130 nm

- UTP-155 version: ATM Forum UTP-155-PMD compliant

  NRZ encoded

  Transmit level: 0.90 - 1.10 Vpp

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Physical

Size: Approximately 10 in (L) by 6.75 in (W) by 2 in (H)

Weight: 2.50 lbs.

Display: Back-light, 4-line by 20-character text

Connectors:

Single-mode version: FC/PC or SC Duplex

Multi-mode version: SC Duplex

UTP-155 version: RJ-45

Power

AC operations: Operates from an external AC adapter/charger.

Battery type: Operates from internal rechargeable Ni-Cad battery.

Battery life: Minimum battery life is three hours of continuous use.

Recharge time: 12 hours.

Environmental

Operating temperature: 0 °C to 50 °C

Storage temperature: -20 °C to +60 °C

Humidity: 5 % to 90 % non-condensing

Serial Communications Port

Port: EIA/RS-232

Connector: RJ-11 connector

Baud rates: 1200, 2400, 9600

Flow control: XON/XOFF or RTS/CTS

Standards Compliance

Applicable sections of ATM Forum UNI 3.1

Applicable sections of ANSI T1.105

Applicable sections of BellCore TR-NWT-000253

Applicable sections of ITU I.432, ITU I.610, and ITU I.510

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Regulatory Compliance

Instrument complies with ETL product category 31

Instrument complies with FCC Part 15, Subpart B, Class A

OC3 Errors Detected

Section, Line, and Path Bit Interleave Parity errors; Line and Path Far-End-Block errors.

OC3 Alarms Detected

Signal Loss, Loss of Frame, Line FERF, Line AIS, Path FERF, Path AIS, Path YELLOW, Loss of Pointer alarms.

OC3 Alarms Generated

Signal Loss, Loss of Frame, Line FERF, Line AIS, Path FERF, Path AIS,

Path YELLOW alarms.

SDH-STM-1 Support

SDH option available which provides control and monitoring of S-bits.

Pointer Features

Positive and negative pointer adjustment, programmable pointer value, viewable received pointer value: current, minimum, and maximum.

ATM Layer

Cell mapping: ATM cells carried in the OC3 payload are byte-aligned.

Cell rate adaptation: Provided by the insertion of idle cells.

Cell delineation: Performed using the HEC mechanism as described in ITU I432. HEC is generated and checked as described in ITU I.432.

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Notices, Warnings, Operating Restrictions

This product complies with UL 1950 (2/26/93). This compliance has been certified for both the United States and Canada by ETL Testing Laboratories and will carry the ETL listing mark. This product meets the requirements of FCC Part 15-Subpart A, electronics emission and susceptibility.

Service and adjustment of this unit is to be performed only by trained Fluke service personnel. 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 book violate 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.

⚠ *Potential Danger*

- **Explosion Hazard:** Do not operate the system in the presence of flammable gases.
- **Hazardous Material:** 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.
- **Electric Shock Hazard:** Do not remove the system covers. To avoid electric shock, use only the supplied power module.
- **Laser:** This product contains a Class 1 Laser Device. Do not look into the connector labeled "output". Invisible laser energy is emitted from that connector whenever the laser is on.

⚠ Warning

AC adapter/charger:

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

Outlet:

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.

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Laser Operation

The single-mode version of the OC3port Plus contains a laser transmitting device. As a safety precaution, this transmitter is off when the tester is powered on. For the tester to function, you must turn on the laser setting. See "Starting the OC3port Plus" in Chapter 3 for instructions on how to turn on the laser transmitter. The laser turns on automatically if there is an input signal while you are running the automatic diagnostic tests.

Checking Your Package

Take time to check your OC3port Plus package. The following items are included:

- OC3port Plus Network Analyzer Users Manual
- AC adapter / charger
- OC3port Plus network analyzer
- RJ-11 to RJ-11 cable
- RJ-11 to DB-9 female adapter
- DB-9 to DB-25 female adapter
- DB-9 to DB-25 male adapter

If your package does not contain an item from this list contact Fluke at one of the telephone numbers listed under "Technical Support" below.

Technical Support

Fluke Corporation offers a variety of support options to help you get the most from your OC3port Plus. If you require technical support, please have the following information available:

- Your name and company.
- OC3port Plus model number and serial number.
- OC3port Plus software revision that appears when you power on the unit.
- 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 OC3port Plus.

For application or operation assistance or information about the OC3port 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**.

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Service Center Repair

If the OC3port 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 OC3port Plus is covered under warranty, it will be properly 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 unit 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 Service Center.

Visit Fluke's web site at **www.fluke.com**.

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Chapter 2
Getting Started

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Introduction

Chapter 2 first acquaints you with the physical layout of the OC3port Plus so that you know where the various controls and connections are located and understand the functions of the keys and general status indicators. Next, it describes the menu interface and shows you how to access the menus and navigate through them. Finally, chapter 2 describes how to connect the OC3port Plus to an external power source and how to connect the tester to the network and to remote devices.

OC3port Plus Controls and Connections

The OC3port Plus has two main panels: a connector panel and a front panel with status and control sections. Take a moment to become familiar with these two panels so that you can work more efficiently.

The Connector Panel

Figure 2-1 is a representation of the OC3port Plus connector panel.

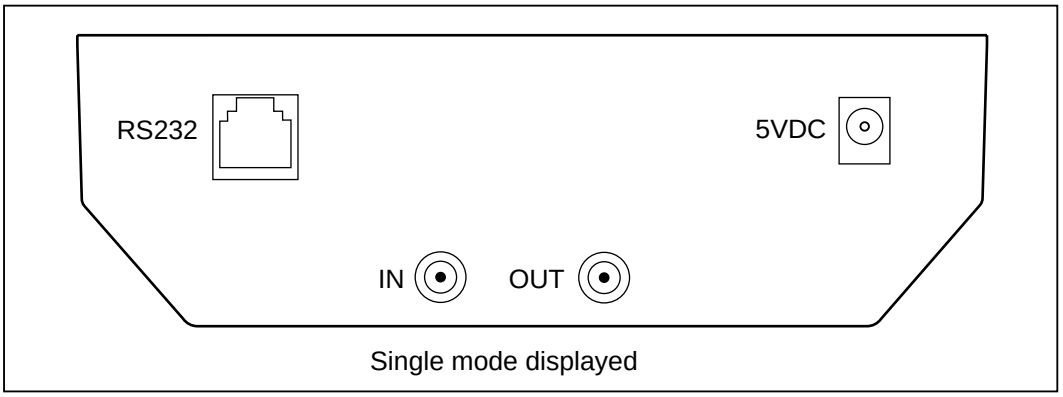


Figure 2-1. OC3port Plus Connector Panel

The connector panel, which is located on the top of the tester, has a **5V DC** input jack.

Use this jack to attach the AC adapter/charger supplied by Fluke Corporation.

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⚠Warning

Do not disconnect the AC adapter/charger while the OC3port Plus is powered on. Doing so can result in the corruption of current or stored test results.

Only an AC adapter/charger supplied by Fluke can safely be used with the OC3port Plus. Use of any other adapter voids your warranty and can damage the tester.

Network connectors. The IN and OUT connector jacks are attached to the OC3 network. Depending on the type of interface, you will attach single-mode, multi-mode, or twisted pair connections to these jacks.

EIA-232 serial port. This is a RJ-11 female jack that accepts the Fluke-supplied serial conversion cable. Using this cable, you can download to a PC or a printer and upload the latest version of OC3port Plus software.

The Front Panel

The front panel contains four main sections:

- LCD
- Direct access keys
- Status section
- System keys

Descriptions of these sections follow.

The LCD

The LCD is located at the top of the tester. It is a four-line by 20-character back-light display that presents the OC3port Plus menus, test configurations, and results of specific tests.

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Direct Access Keys

The OC3port Plus has six direct access keys that provide immediate access to tests and user setup options. These keys are located on the upper left side of the unit directly across from the **ENTER** key.

Figure 2-2 is a representation of the LCD and the direct access keys.

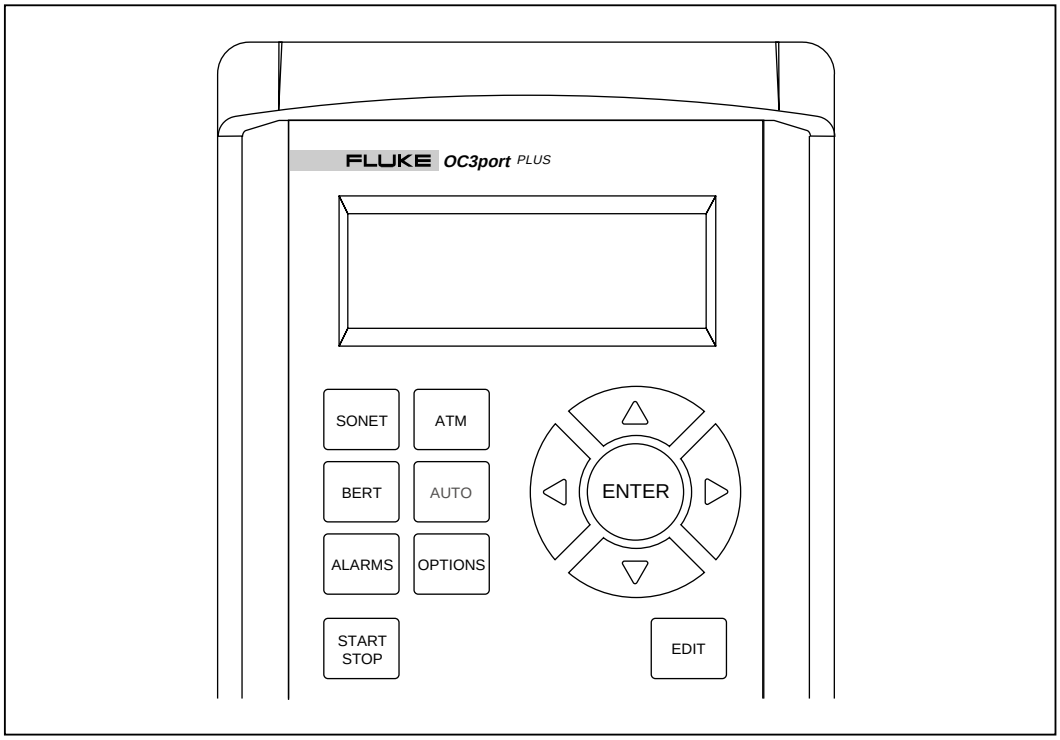


Figure 2-2. OC3port Plus LCD and Direct Access Keys

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The Table 2-1 lists the six direct access keys other front panel keys and describes their function.

Table 2-1. OC3port Plus Direct Access Keys and their Function

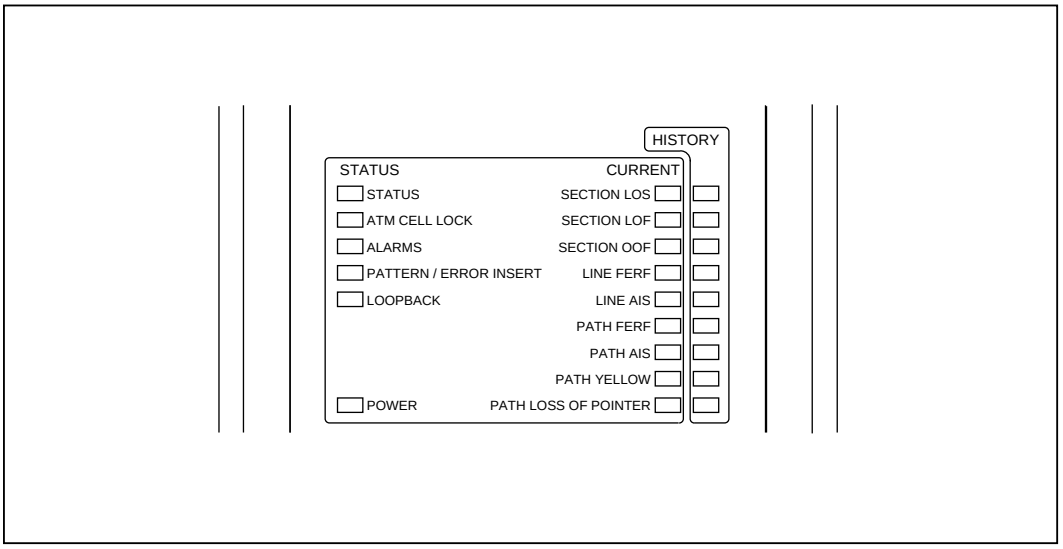
Direct Access Key	Function
SONET	Accesses OC3 and STS-3c setups and tests.
ATM	Accesses ATM setups and tests.
BERT	Accesses Bit Error Rate test parameters and tests.
AUTO	Accesses automatic diagnostic tests and identifies virtual paths/channels with ATM activity.
ALARMS	Displays, clears, and controls SONET alarms.
OPTIONS	Stores user-defined opt8ions in internal memory.
START/STOP	Starts and stops testing. In burst mode, pressing this key initiates a burst of ATM cells. In transmit mode, pressing this key once pauses transmission; pressing the key again causes transmission to resume.
EDIT	Places the tester in Edit mode for changing the parameters for an option.
ENTER	Accepts user options and editing changes.

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Status Section

The lower middle section of the front panel on the OC3port Plus contains 24 LEDs that represent the operating and alarm status of the OC3port Plus and any attached network.

Figure 2-3 is a representation of the status section.



za004f.eps

Figure 2-3. OC3port Plus Status LEDs

The six general status LEDs appear on the left.

These LEDs provide laser transmitter status, ATM status, and power status information.

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Table 2-2 lists the general status LEDs and their meanings.

Table 2-2. OC3port Plus General Status LEDs

LED Name	LED Condition	Meaning
STATUS	Slow blinking	Indicates that the laser transmitter is set to **OFF**. (for single-mode units only)
	Constant Green	Indicates that the laser transmitter is set to **ON.** (For single-mode units only).
ATM CELL LOCK	On	Indicates that ATM cell delineation has been achieved.
ALARMS	On	Indicates that alarms are being transmitted
PATTERN / ERROR INSERT	On	Indicates that patterns or errors are being transmitted.
LOOPBACK	On	Indicates that the unit is in **line loopback** or in **cell loopback** mode.
POWER	ON	Indicates adequate AC or battery power.
	Blinking	Indicates that the battery is low on power.

The remaining 18 LEDs, found on the right side of the tester, indicate the status of the connected SONET network.

The OC3port Plus can detect nine separate alarms.

The red LEDs indicate active or current alarms, while the yellow (History) LEDs indicate that an alarm occurred at some time in the past but is no longer being detected.

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Table 2-3 lists the alarms the OC3port Plus can detect and their meanings.

Table 2-3. SONET Alarms Detected by the OC3port Plus on the Status LEDs

SONET Status LED	Description
SECTION LOS (Loss of Signal)	Lights when an incoming optical OC3 signal cannot be detected.
SECTION LOF (Loss of Frame)	Declared when a Section OOF condition persists for three milliseconds. This three-millisecond timer does not reset until an in-frame condition also persists for three milliseconds, prohibiting oscillations and the declaration of an LOF in the presence of intermittent OOF conditions.
SECTION OOF (Out of Frame)	Declared when four consecutive STS-3c frames containing one or more framing pattern errors are received. A Section OOF alarm is removed when two sequential frames with correct framing patterns are detected (an in-frame condition).
LINE FERF (Far End Receive Failure)	Detects the presence of a Line FERF in the received STS-3c stream. Declared when a “110” pattern is detected in bits 6, 7 and 8 of the K2 framing byte for five consecutive frames. A LINE FERF alarm is removed when a pattern other than “110” is detected for five consecutive frames.
LINE AIS (Line Alarm Indication Signal)	Detects the presence of a Line FERF in the received STS-3c stream. Declared when a “111” pattern is detected in bits 6, 7 and 8 of the K2 framing byte for five consecutive frames. A Line AIS alarm is removed when a pattern other than “111” is detected for five consecutive frames.

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Table 2-3. SONET Alarms Detected by the OC3port Plus on the Status LEDs (cont.)

SONET Status LED	Description
PATH FERF (Far End Receive Failure)	Dedicated when the 4th bit FEBE field within the Path Status Byte (G1) is set to "1001" for two consecutive frames. If any other pattern is present for two consecutive frames, a Path FERF alarm is removed.
PATH AIS (Alarm Indication Signal)	Declared when an all-ones pattern is detected in the pointer bytes (H1 and H2) for three consecutive STS-3c frames. A Path AIS alarm is removed whenever a valid pointer is detected in H1 and H2 for three consecutive frames.
PATH YELLOW	Declared whenever bit 5 of the Path Status Byte (G1) is set high (1) for five consecutive frames. A path YELLOW alarm is removed when bit 5 returns low (0) for five consecutive frames.
PATH LOSS OF POINTER	Declared whenever a normal pointer (generally values within the 0 to 782 range) is not found in eight consecutive frames. Path Loss of Pointer is removed when a valid pointer is detected for three consecutive frames. A received Path AIS indication does not result in a Path Loss of pointer alarm. Negative and Positive stuff indications do not trigger a Path Loss of Pointer alarm.

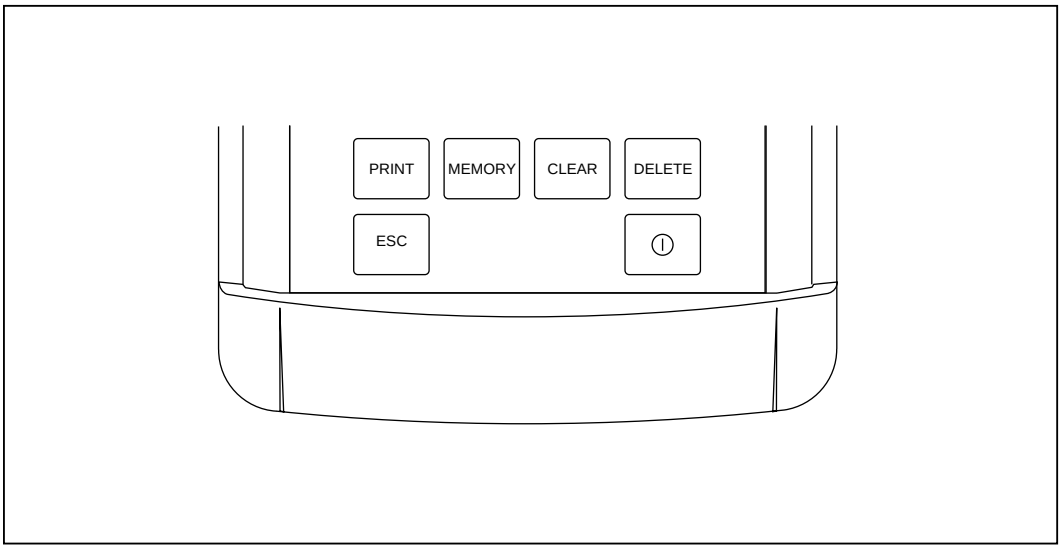
System Control Keys

The system control keys are located at the bottom of the tester.

You use these keys to control the entire unit; for example, to turn the OC3port Plus on and off (**ON/OFF** key), to print configuration information and test results (**PRINT** key), and to clear counters and delete alarms. (**CLEAR** key)

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Figure 2-4 is a representation of the system control keys, which are found on the bottom part of the front panel.



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Figure 2-4. The System Keys Control the Entire Unit.

Table 2-4 lists the system control keys and describes their usage.

Table 2-4. Description of the System Control Keys on the OC3port Plus

Key Name	Description
ON/OFF	Turns the unit on and off.
ESC	A single press returns you to the introductory display (see "Returning to the Introductory Display" in Chapter 3). A double-press resets the OC3port Plus (see "Resetting the OC3port Plus" in Chapter 3).
PRINT	Prints test results and configuration information.
MEMORY	Stores and retrieves test results.
CLEAR	Resets the test result counters and deletes individual test results.
DELETE	Clears the alarm history LEDs and deletes stored results.

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Getting Acquainted with the OC3port Plus Menus

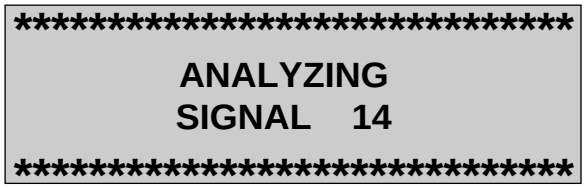
The OC3port Plus is a menu driven system. Each time you power on the unit, a series of self-tests and automatic ATM and SONET diagnostic tests is performed.

Note

The single-mode version of the OC3port Plus contains a laser transmitting device. As a safety precaution, this transmitter is off when the unit is powered on. You must turn the laser on each time you turn on the unit. It remains on until you shut off the unit.

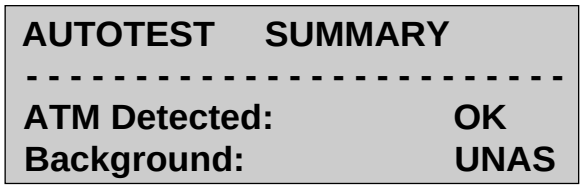
See "Turning on the Laser Transmitter" in this chapter for instructions on how to turn on the laser transmitter. Note that the laser comes on automatically if the OC3port Plus detects an input signal while you are running the automatic diagnostic tests.

While the automatic tests are running, you see displays similar to this:



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When the tests are completed, you hear a "beep" and see the **AUTOTEST SUMMARY** display, which looks like this:



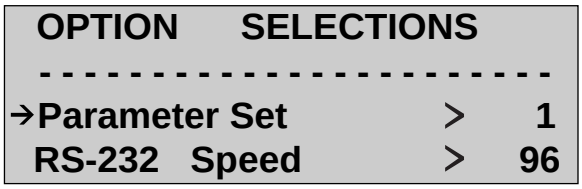
za007f.eps

From this display, you can access any of the OC3port Plus menus. See "Accessing a Menu", which follows in this chapter.

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Accessing a Menu

You can access any OC3port Plus menu by simply pressing one of the six direct access keys located under the LCD. For example, press the **OPTIONS** key. The OC3port Plus displays the following:



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The display has four lines of information:

- Line 1 contains the menu title, which in this example is named **OPTIONS SELECTIONS**.
- Line 2 is a dashed line. Depending on its location, this line indicates where you are on a menu. If the line appears directly under the menu title, as it does in this example, it is the **top-of-menu bar.** If it appears at the bottom of the menu, it is the **end-of-menu bar.**
- Line 3 is the selection line. The arrow (→) to the left of the option means that it can be selected or changed (when you are in edit mode). To the right of the option is a greater-than symbol (>), which is followed by a `1`. A greater-than symbol can be followed by a number, a word, or a three-letter abbreviation, which is the current value of the option. In this example, the current value for the **Parameter Set** option is `1`.

Note

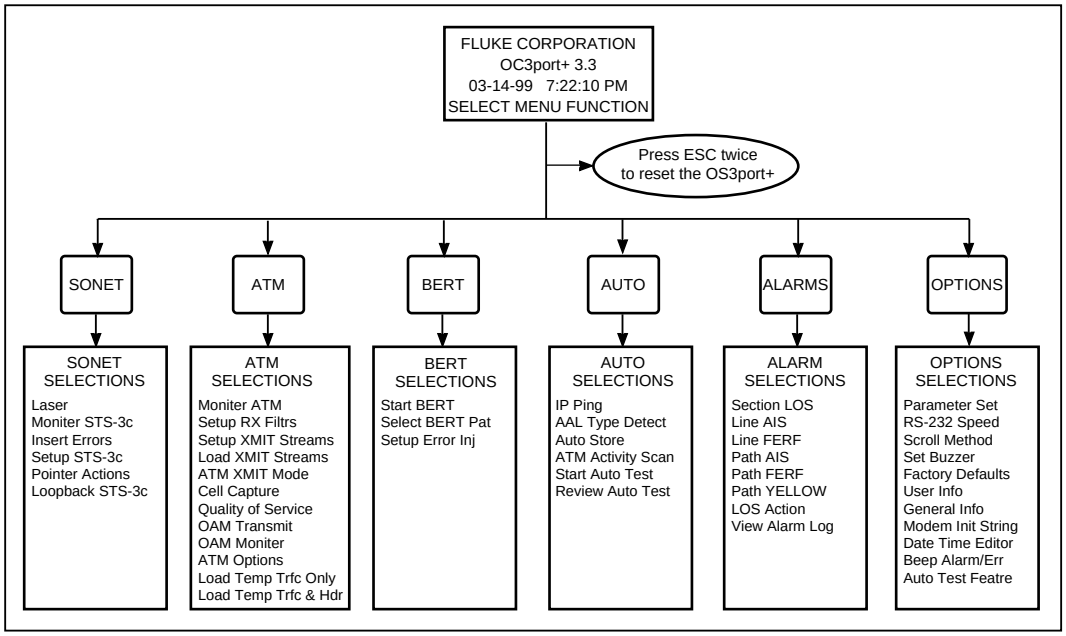
- When you press the **Left** or **Right Arrow** key to change the setting of an option that has a greater-than symbol (>) after it, that new setting takes effect immediately.
- Line 4 displays the next item on the menu, which in this case is **the RS-232 Speed** option.

The OC3port Plus main menus contain a variety of items. These include:

- **Options** These present choices for you to make when programming the OC3port Plus
- **Actions** These let you perform a test or setup function; for example, **Start BERT** or **Setup RX Filtrs.**
- **Test items** These let you start or monitor test results

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Figure 2-5 is an illustration of the OC3port Plus menu system. All of the tester's functions are accessed through this menu system. On the first level is the introductory display, which is the display you see when you first turn on or reset the tester. On the second level are the six direct access keys. These keys control the operation of the entire tester. When you press any one of these keys, you gain direct access to the selected function and any of its related subfunctions.



za009f.eps

Figure 2-5. OC3port Plus Menu System (Version 3.3)

Using the Directional Arrow Keys

You use the directional arrow keys to scroll through OC3port Plus menus and, where applicable, to change parameters or edit values for options. There are four arrow keys, each named for the direction in which they point: the **Up Arrow** key, the **Down Arrow** key, the **Left Arrow** key, and the **Right Arrow** key.

Scrolling through Menu Options

The **Up** and **Down Arrow** keys are used to scroll through the options listed on OC3port Plus menus.

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Note

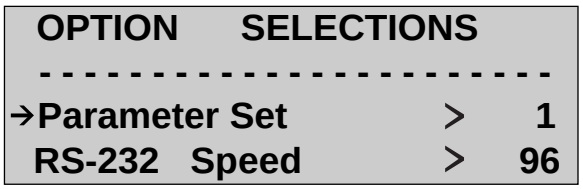
*The scrolling behavior of the **Up** and **Down Arrow** keys is user-programmable. The examples in this book assume that you are using the default scrolling method, which is **WIN** (for Windows). To change this scrolling method, see "Changing the Default Scrolling Method" in Chapter 3.*

When you press the **Down Arrow** key, the menu selection that was previously on the fourth line of the display moves up to the selection line. If you continue to press this key, you eventually reach the end-of-menu bar, and the unit "beeps" if you try to go past this point. To scroll in the opposite direction, press the Up Arrow key.

Changing the Setting for an Option

The **Left** and **Right Arrow** keys are used to change the settings for options found on OC3port Plus menus. The following example shows you how to use these keys to change the setting for an option.

1. Press the **Up** or **Down Arrow** key to move the option whose setting you want to change to the selection line. For example:



za008f.eps

   Note that the **Parameter Set** option is on the selection line as indicated by the arrow to its left.

2. Press the **Left** or **Right Arrow** key. Notice that the value of the current setting (in this example, the `1`) changes to one of the other available settings for this option. Continue pressing the arrow key until the setting you want is displayed.

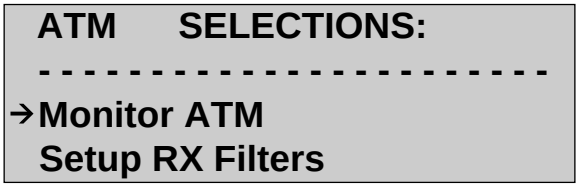
   The change takes effect immediately. The value you display by pressing the **Left** or **Right Arrow** key becomes the current setting for the option that is on the selection line.

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Editing the Setting for an Option

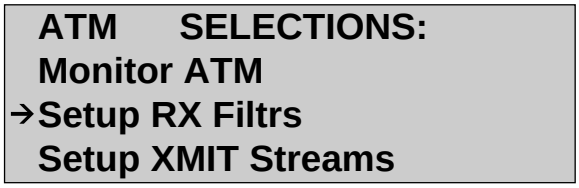
Some settings for an option require you to supply a value rather than select an item from a menu. You do this by editing the current value of the setting. This example shows you how to edit a setting.

1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed:



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2. Press the **Down Arrow** key until the **Setup RX Filtrs** option is on the selection line, as in:



za011f.eps

3. Press **ENTER**. You see the **RECEIVE FILTER 1** submenu:



za012f.eps

4. Press the **Down Arrow** key until the VCI setting is on the selection line (as indicated by the blue directional arrows located on each side of the LCD). Then, press the **EDIT** key.

   The first character of the VCI field is flashing. This flashing character indicates that you are now in Edit mode.

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5. Press the **Up** or **Down Arrow** key until the value you want in the first position of the VCI field is displayed. Then, press the **Right Arrow** key to move to the next position.
6. Continue pressing the **Up** or **Down Arrow** key to display the desired value and the **Right Arrow** key to move to the next position in the field.
7. When you are finished making changes, do one of the following:
   a. Press the **ENTER** key. You exit Edit mode. The tester saves your changes.
   b. Press the **EDIT** key. You exit Edit mode. The tester does not save your changes and restores the original value.

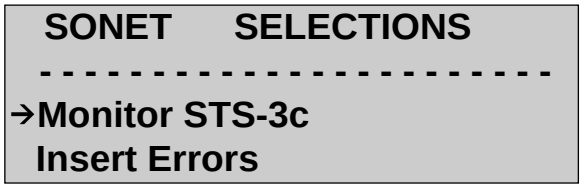
Accessing OC3port Plus Submenus

Many options on the OC3port Plus menus have an extended menu or submenu that you have to access when you need to change their parameters. Some of the OC3port Plus tests, for example, have many parameters, so to modify these, you may have to access a submenu.

Typically, any option on a menu that appears by itself (that is, with no setting to its right) has an additional menu (submenu) associated with it.

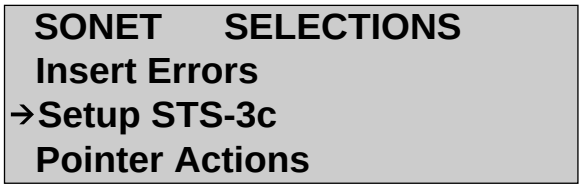
The following example shows you how to access an OC3port Plus submenu.

1. Press the **SONET** direct access key. The **SONET SELECTIONS** main menu is displayed. For example:



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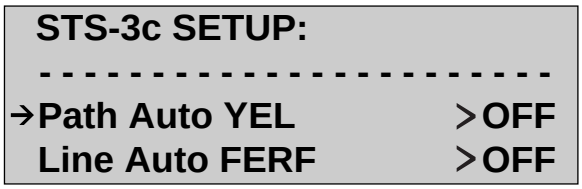
2. Press the **Down Arrow** key until the **Setup STS-3c** option is on the selection line as in the following:



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3. Press **ENTER**. You are now accessing the **STS-3c SETUP** submenu:



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This submenu contains all of the STS-3c setup parameters. You navigate through this and all other submenus by pressing the **Up** or **Down Arrow** key to move an option to the selection line and then pressing the **Left** or **Right Arrow** key to choose a value for the option.

Exiting OC3port Plus Submenus

To leave a submenu, simply press the **ESC** key to return to the introductory display, or press any one of the direct access keys to begin a specific test or perform a setup.

Connecting the OC3port Plus

Depending on the specific physical interface, the OC3port Plus is designed to be connected to either intermediate-range, single-mode fiber systems, multi-mode fiber optic systems, or unshielded twisted pair-155 systems. A single-mode OC3port Plus uses fiber optic connectors located on the top of the tester.

The multi-mode version of the OC3port Plus is designed to be connected to multi-mode fiber systems. This version uses the SC Duplex fiber-optic connectors located on the top of the tester.

The UTP-155 version of the OC3port Plus is designed to be connected to UTP-155 networks.

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Connecting the OC3port Plus to Network Devices

You need the appropriate type of cable to connect the OC3port Plus to network devices. You can contact Fluke to obtain a variety of fiber optic and UTP cables.

⚠Warning

Do not move the fiber connectors from side to side as you insert them into the receptacles. Doing so can cause the alignment ferrule to break.

1. To receive signals from network devices, connect the fiber optic cable to the OC3port Plus **IN** jack.
2. To send signals on the line, connect the fiber optic cable to the OC3port Plus **OUT** jack.

To create a loopback situation, complete both steps.

Connecting to Remote Devices

The OC3port Plus provides two methods of making remote (RS-232) connections: direct and modem. The direct method allows you to connect the OC3port Plus to a PC. You can then use the PC to control the OC3port Plus or to print test results. If you prefer this type of connection, the PC must have the appropriate software to control these functions. Contact Fluke Corporation for a programming book or information about the Testview package.

As an alternative, you can use the RS-232 line to connect the OC3port Plus to a modem. After these connections are made, you must set the baud rate from the OC3port Plus and change the communication settings from the receiving device.

Connecting the OC3port Plus to a PC or Laptop

To connect the OC3port Plus to a PC or laptop computer, do the following:

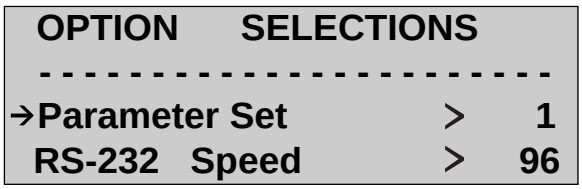
1. Connect the RS-232 line to the OC3port Plus.
2. Connect the other end to the computer serial port. If the computer has a DB-9 connector, use a DB-25-to-DB-9 converter.
3. Turn on the OC3port Plus.
4. Start the appropriate PC software.

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Connecting the OC3port Plus to a Modem

When you use a modem, you must set the baud rate on the OC3port Plus and on the receiving device. Follow these steps to set up the OC3port Plus for modem communications:

1. Set up the OC3port Plus as described under "Connecting to the Network" in this chapter.
2. Use the RS-232 line to connect the OC3port Plus to the modem.
3. Make the necessary hardware and software connections on the receiving end.
4. Turn on the OC3port Plus. Wait until the self-test ends (when the tester "beeps").
5. Press the **OPTIONS** key. The **OPTION SELECTIONS** menu is displayed:



za008f.eps

6. Press the **Down Arrow** key until the RS-232 Speed option is on the selection line. Then, press the **Left** or **Right Arrow** key to display the desired port speed (96 = 9600 baud; 24 = 2400 baud; or 12 = 1200 baud).
7. When the port speed you want is displayed, press **ENTER**.

   The OC3port Plus is now connected to the modem. After the remote session starts, the OC3port Plus simultaneously sends all test results.

Connecting to a Printer

To connect the OC3port Plus to a printer, do the following:

1. Connect the OC3port Plus to the serial port on the printer.
2. Power on the printer.
3. Power on the OC3port Plus.

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Connecting to an External Power Supply

The power supply allows you to recharge the tester's battery.

When the OC3port Plus is connected to an AC outlet, you can also use the power supply as a continuous power source. In this way, you can test for long periods of time without worrying about batteries.

To connect the OC3port Plus to an AC outlet, follow these steps:

1. Plug the power cable into an AC outlet.
2. Connect the power supply jack to the 5V DC outlet on the OC3port Plus.

Turn on the OC3port Plus and begin usage.

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Chapter 3
Setting Up and Operating the OC3port Plus

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Introduction

This chapter covers the basics of setting up and operating the OC3port Plus. The first section shows you how to program the overall operation of the tester to configure such elements as the scrolling method and the status of the key beeping mechanism and how to set the date and time. It also shows you how to create parameter sets so that you can store different but commonly used configurations in separate groups and switch quickly between groups.

The second section covers basic OC3port Plus operations. You learn how to turn on the unit and perform such fundamental tasks as clearing the display, resetting the unit, storing and retrieving test results, and running diagnostic tests.

Programming the Overall Operation of the OC3port Plus

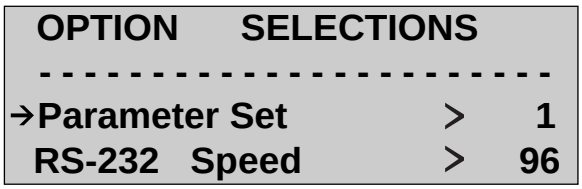
The OC3port Plus has a number of programmable setup options that enable you to determine its overall operating characteristics. Any settings that you choose for these options when you configure the OC3port Plus are stored in internal memory so that even when you shut off the tester, you do not lose valuable configuration information.

Following is a list of OC3port Plus setup options available for you to change:

- **Scroll method**
  Determines the behavior of the arrow keys when you scroll through menus.
- **Buzzer operation**
  Enables/disables the sounding of a warning buzzer whenever you press an invalid key.
- **Date/time setting**
  Sets the system date and time.
- **Communications speed**
  Sets the baud rate.
- **Automatic tests**
  Enable/disable the execution of a series of automatic diagnostic tests when you power on the tester.
- **Parameter sets**
  Store two different configuration sets under the respective labels, Parameter Set 1 and 2.

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These setup options are found on the **OPTION SELECTIONS** menu. To display this menu, press the **OPTIONS** key. You see this display:



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The following sections show you how to change these setup options so that you can configure the tester to suit your personal style and work preferences:

Changing the Default Scrolling Method

You can change the way the arrow keys operate when you scroll through OC3port

Plus menus. There are two scrolling methods available:

- **WIN** In **WIN** mode, the arrow keys move the display window up or down over the menus.
- **ARW** In **ARW** mode, the arrow keys pull the menu up or down through the display window.

The default scrolling method is **WIN.** If you want to change to **ARW** mode for scrolling, follow these steps: (for Windows) mode

1. From the **OPTION SELECTIONS** menu, press the **Down Arrow** key to move the **Scroll Method** option to the selection line.
2. Press the **Left** or **Right Arrow** key to display the ARW setting.
3. The change takes effect immediately. **ARW** is now the current setting for the **Scroll Method** option.

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Turning on the Warning Buzzer

The OC3port Plus has a warning buzzer that causes the unit to issue a "beep" when you try to go beyond the top-of-menu or end-of-menu bar, or when you press the **MEMORY** key to store information in the tester's memory. This buzzer is controlled by the **Set Buzzer** option, which can be set to **ON** or **OFF** (the default).

To turn on the warning buzzer, do the following:

1. From the **OPTION SELECTIONS** menu. Then, press the **Down Arrow** key to move the Set Buzzer option to the selection line.
2. Press the **Left** or **Right Arrow** key to change the setting for this option to **ON**.

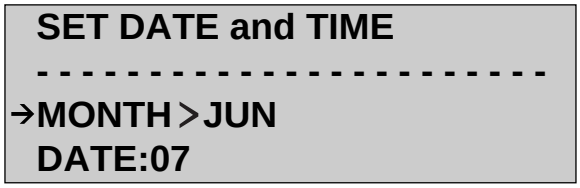
   The change takes effect immediately. The warning buzzer is now activated.

Setting the System Date and Time

The **DateTime Editor** is used to set the internal clock on the OC3port Plus. With this editor, you can set the date in **month : day : year** format and the time in **hour : minute : time-of-day** format. The tester uses the date and time you supply to time-stamp stored test results and alarm information.

To set the date and time, follow these steps:

1. From the **OPTION SELECTIONS** menu, press the **Down Arrow** key to move the **DateTime Editor** option to the selection line.
2. Press **ENTER**. The **SET DATE** and **TIME** submenu displays. For example:



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3. Press the **EDIT** key to enter **Edit mode**. The current setting for **MONTH** flashes. Press the **Up** or **Down Arrow** key to display the desired month. Then, press **ENTER** to save your selection.

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4. Press the **Down Arrow** key to move **DATE** to the selection line. Then, press the **EDIT** key. The number in the first position of the **DATE** field flashes.

   Press the **Up** or **Down Arrow** key to display the desired number. Then, press the **Right Arrow** key to move to the next position and enter the desired value there. Finally, press **ENTER** to save your selection.

5. Press the **Down Arrow** key to move **YEAR** to the selection line. Press the **EDIT** key to enter **Edit mode** and make the necessary changes. Make sure you press **ENTER** when you are done to save the change.

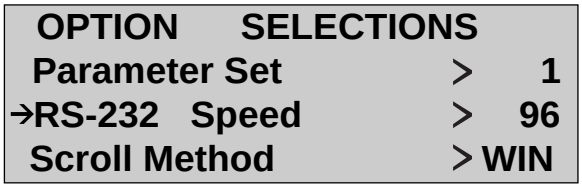
6. Press the **Down Arrow** key to move **TIME** to the selection line. Press the **EDIT** key to enter **Edit mode** and set the time. When you finish, press **ENTER** to save your selection.

7. The tester is now configured with your date and time selections.

Setting the Communications Speed

To set the communications speed on the OC3port Plus, complete these steps:

1. From the **OPTION SELECTIONS** menu, press the **Down Arrow** key to move the **RS-232 Speed** option to the selection line:



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   This option has these three settings:

   - **96** 9600 baud
   - **24** 2400 baud
   - **12** 1200 baud

2. Press the **Left** or **Right Arrow** key to select the correct communications speed. The change takes effect immediately. The OC3port Plus is configured with the baud rate you selected.

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Turning Off the Automatic Diagnostic Tests

When you first power on the OC3port Plus, it automatically conducts a series of self-tests and diagnostic tests that assess the basic health of any OC3 signal provided to its input connector. If no signal is present or if theOC3port Plus is not yet connected to a network, the tester waits until a signal is detected.

After a signal is detected, the OC3port Plus begins a 25-second analysis of the signal and its format. Then, the OC3port Plus displays a set of summary statistics for both ATM and SONET. For information on the results provided by these tests, see "Running the Automatic Diagnostic Tests" later in this chapter.

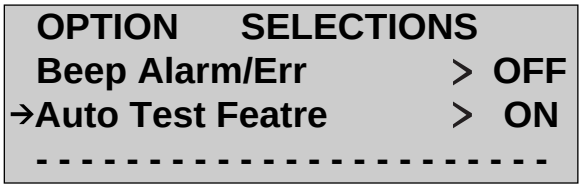
The automatic tests are conducted and results are displayed every time you power on the OC3port Plus unless you prevent the tester from running them. The instructions in this section show you how to do this.

Note

You can run the automatic tests under your own control. For information on how to do this, see "Running the Automatic Diagnostic Tests" later in this chapter.

If you want to prevent the OC3port Plus from running the diagnostic tests every time you turn on the tester, do the following:

1. From the **OPTION SELECTIONS** menu, press the **Down Arrow** key until the **AutoTest Featre** option is on the selection line:



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2. Press the **Left** or **Right Arrow** key to change the setting for this option to **OFF**.

   The change takes effect immediately. The OC3port Plus does not perform the automatic tests when you power on the unit.

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Parameter Sets

The OC3port Plus can store in memory up to two distinct groups of user-defined configurations under the respective labels Parameter Set 1and 2. Each group can contain any of the programmable options available on the OC3port Plus. These include any setups you create, the parameters and settings for tests, transmission modes, ATM states, and BERT test patterns, to name a few.

Parameter sets are useful when you need to retain test setups and configurations that you use frequently. For example, you can create one parameter set for BERT testing and the other for ATM testing. Parameter sets are also useful when more than one person uses the unit. Each user can store his or her own user definitions for tests and setups in a separate parameter set.

You can use only one parameter set at any given time, but you can easily switch to the other set and begin using its setups.

This section shows you how to do the following:

- Create a parameter set
- Name a parameter set
- Switch between parameter sets
- Edit a parameter set.

Creating a Parameter Set

Note

When you turn on the OC3port Plus, it uses the parameter set that was in use when the unit was last turned off. If this is the first time that you are using the tester, the parameter set that is active when you turn on the unit is Parameter Set 1.

To find out what parameter set you are currently in, press the ***OPTIONS*** *key to display the* ***OPTION SELECTIONS*** *menu. Scroll through the list until you see the* ***Parameter Set*** *option. The number to the right of this option indicates which parameter set you are currently in.*

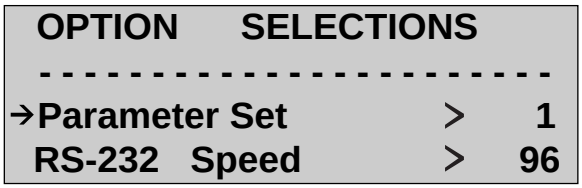
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Caution

Be careful when you restore the factory defaults because any settings and configurations you previously stored in Parameter Sets will be replaced by the factory default values.

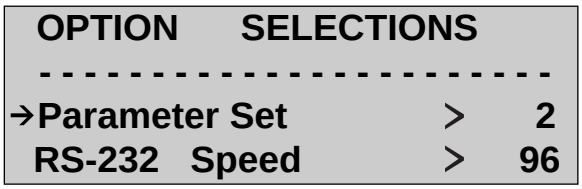
To create a parameter set, do the following:

1. Press the **OPTIONS** key. The **OPTION SELECTIONS** menu is displayed:



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2. Make sure that the Parameter Set option is on the selection line. Then, press the **Left** or **Right Arrow** key to select the parameter set you want to create. For example:



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   In this example, Parameter Set 2 is selected.

3. Press the **ENTER** key. The tester resets itself and activates the parameter set you selected. In this example, **Parameter Set 2** is now activated.

Note

*To make sure that the parameter set you selected is the active one, press the **OPTIONS** key again. The number of parameter set that is currently active is displayed to the right of the **Parameter Set** option.*

In this example, the setting for the **Parameter Set** option is 2, which indicates that Parameter Set 2 is the active parameter set.

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4. You can now create the parameter set you selected. Any setups or configurations that you create are automatically stored within this parameter set as you make them.

Naming a Parameter Set

To distinguish one parameter set from another, you can give each a unique, identifying name. For example, if one of your parameter sets contains ATM setups and tests, you can give it the name "ATM Tests". Or, if you share the OC3port Plus with another person and each of you has created a parameter set, you can each identify your parameter set with your own name.

Follow these steps to create a name for your parameter sets.

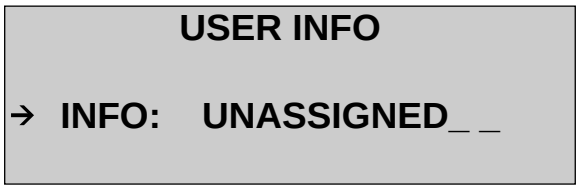
1. Press the **OPTIONS** key. The **OPTION SELECTIONS** menu is displayed.
2. Make sure that the **Parameter Set** option is on the selection line. Do one of the following:
   a. If you want to name the active parameter set, go to Step 3.

Note

*The active parameter set is the one represented by the number to the right of the **Parameter Set** option.*

   b. If want to name one the other parameter set, press the **Left** or **Right Arrow** key to display the desired set. Then, press **ENTER**. The OC3port Plus reboots and activates the parameter set you selected. Go to Step 3.

3. Press the **Down Arrow** key to move the **User Info** option to the selection line. Then, press **ENTER**. You see this display:



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You are in Edit mode as indicated by the flashing "U" in the first position of the **INFO** field. The name UNASSIGNED is the default name assigned to each parameter set.

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

4. Press the **Up** or **Down** key to display the desired letter or number in the first position of the **INFO** field.
5. Then, press the **Right Arrow** key to move to the next position.
6. Continue pressing the arrow keys in this manner until the name you want is displayed.
7. When you finish, press **ENTER** to save the newly created name.

Complete this procedure for each parameter set that you want to name.

Switching to a Different Parameter Set

To switch to the other parameter set, follow these steps:

1. Press the **OPTIONS** key. The **OPTION SELECTIONS** menu is displayed.
2. Make sure that the **Parameter Set** option is on the selection line.
3. Then, press the **Left** or **Right Arrow** key to display the number of the parameter set that you want to switch to.
4. Press **ENTER**.

   The OC3port Plus immediately reboots and switches to the parameter set that you selected.

Editing a Parameter Set

When you change the setting for an option or re-configure a setup, those changes are automatically stored in the parameter set that is currently active.

Therefore, when you want to edit a parameter set, first activate the parameter set that you want to edit. (See "Creating a Parameter Set" if you need to know how to activate a parameter set.)

Then, make the desired changes, which the OC3port Plus automatically stores in the parameter set you are working in.

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Performing Basic Operations

You need to know some fundamental things about how to operate the OC3port

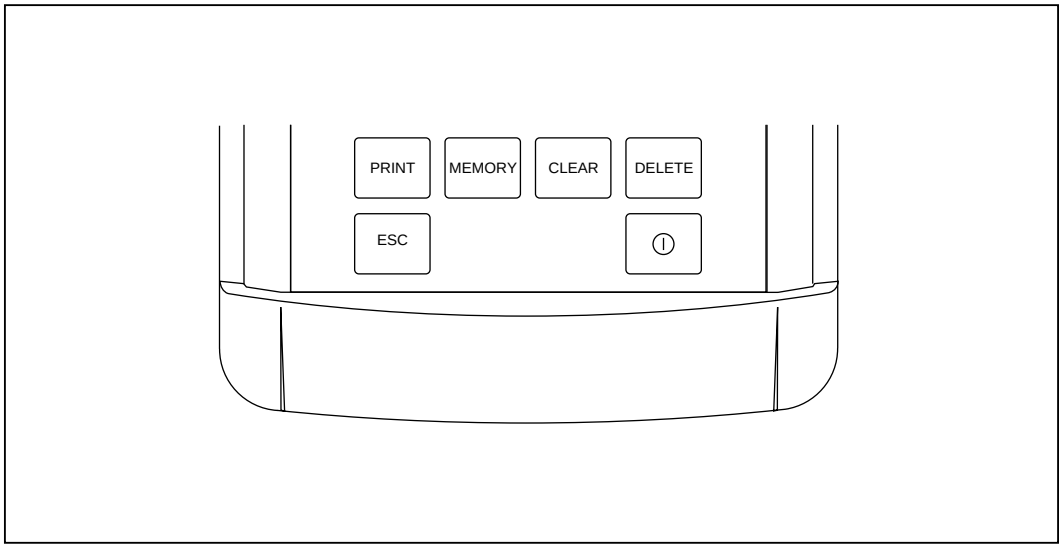
Plus before you can start configuring the unit to perform tests or acquiring test results.

In this section, you learn how to turn on the unit then how to do essential tasks that you will need to operate the OC3port Plus.

Turning on the OC3port Plus

The OC3port Plus has an **ON/OFF** switch built into the membrane keypad.

This switch is located in the lower right corner as shown in Figure 3-1.



za005f.eps

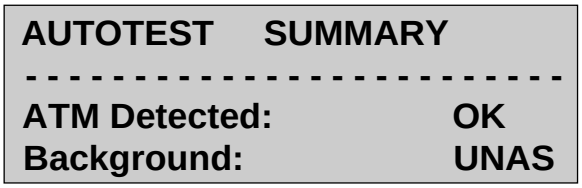
Figure 3-1. OC3port Plus ON/OFF switch

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To turn on the OC3port Plus, do the following:

1. Press the **ON/OFF** switch.

   The OC3port Plus performs a series of automatic self-tests and other signal verification tests. When these tests are completed, all of the status LEDs on its front panel light. The unit "beeps" and you see a display similar to the following:



za007ff.eps

Note

If you want to prevent the OC3port Plus from performing these automatic tests, see "Turning Off the Automatic Diagnostic Tests" in this chapter. If you want information about this test and the types of results it provides, see "Running the Automatic Diagnostic Tests" also in this chapter.

2. You can now press any one of the direct access keys to select tests or set up configurations.

Note

*If you are using a single-mode OC3port Plus, the first line of the display flashes a *LASER OFF* message if you power on the unit with no input signal present. If you want to perform tests that use the SONET transmitter, you must turn the laser on. For information on how to do this, see "Turning on the Laser Transmitter" in this chapter.*

3. When you finish using the unit, press the **ON/OFF** switch.

   The OC3port Plus shuts off and saves all of your setup information in its internal memory.

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Turning on the Laser Transmitter

Notes

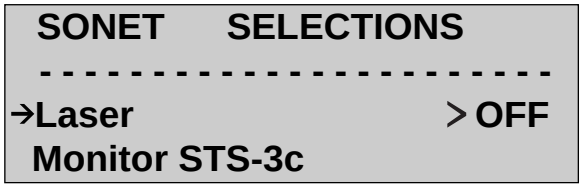
This procedure applies only if you are using a single-mode OC3port Plus.

When the laser transmitter is off, the top line of all OC3port Plus flashes the ****LASER OFF**** *message, and the* ***STATUS LED*** *blinks. After you turn on the transmitter, the message disappears and the* ***STATUS LED*** *emits a steady green light.*

When you first turn on the single-mode version of the OC3port Plus, the laser transmitter may be set to **OFF**. If you want to transmit, you must set the transmitter to **ON**.

To turn the laser on, follow these steps.

1. Press the **SONET** key. The **SONET SELECTIONS** menu is displayed. For example:



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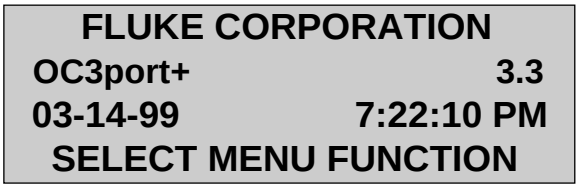
2. The Laser option is on the selection line. In this example, notice that the setting is **OFF**.
3. Press the **Right Arrow** key to change the setting to **ON.**

   The change takes effect immediately. The *LASER OFF* message disappears, indicating that the transmitter is now on.

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Returning to the Introductory Display

Whenever you are finished with a particular function (for example, monitoring test results or performing setups), you can return to the introductory display from any menu or submenu by pressing the **ESC** key. The unit returns you to this introductory display:



za023f.eps

Resetting the OC3port Plus

You reset the OC3port Plus by pressing the **ESC** key twice within one second. When you reset the tester, it performs a self-test and leaves you at the introductory display. This function is useful when you want to put the OC3port Plus in a known state.

When you reset the OC3port Plus, it does not restore the default settings. For information on restoring these settings, see "Restoring Factory Default Settings" in this chapter.

Restoring Factory Default Settings

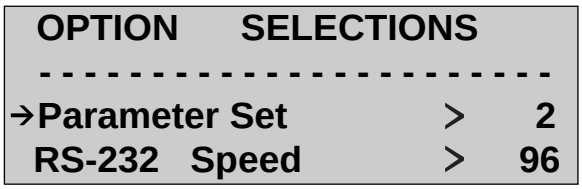
You can reset the OC3port Plus so that the settings for menu options are the same as they were when the unit was shipped from the factory. To restore the factory default settings, follow these steps:

Caution

Be careful when you restore the factory defaults because any settings and configurations you previously stored in Parameter Sets 1 through 4 are replaced by the factory default values.

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1. Press the **OPTIONS** key. The **OPTION SELECTION** menu is displayed:



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2. Press the **Down Arrow** key until the **Factory Defaults** option is on the selection line:
3. Press **ENTER**. The unit issues a short "beep" and resets to the factory defaults. You return to the introductory display.

Clearing the Error Counters

If there are errors on a signal, they are presented on the LCD. As certain errors are detected, the counters on the display continuously increase. To clear the display of any errors and reset the error counter to zero, press the **CLEAR** key while you are viewing the errors on the LCD.

Responding to Low Battery Warnings

The OC3port Plus uses NiCad internal batteries. These batteries last for about one year. When the battery charge is low, the OC3port Plus issues periodic "beeps" and then displays a `LOW BATTERY` warning on the LCD. When this situation occurs, the unit has approximately five minutes of battery power remaining. We suggest that you use the remaining time to immediately store any current test results and then recharge the unit.

Note

If the battery does not charge, contact Fluke Customer Service for replacement batteries.

You can connect the tester to the supplied AC adapter/charger and charge it without shutting it off. On a full battery charge, which takes between 12 to 14 hours, the OC3port Plus will run for approximately three hours.

Caution

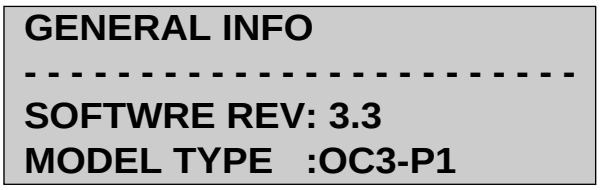
The AC adapter/charger should never be disconnected while the OC3port Plus is powered on. This can cause corruption of current or stored test results.

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Obtaining Information about Your OC3port Plus

If you ever require technical assistance you will need to provide certain information about your OC3port Plus, such as the software revision number, serial number, and model type. This procedure shows you how to obtain this and other pertinent information about your OC3port Plus.

1. Press the **OPTIONS** key. The **OPTIONS SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the General Info option to the selection line. Then, press **ENTER**. You see a display similar to the following:



za025f.eps

This display contains the following information:

- Software revision number
- Model type
- List of installed options
- Transceiver type (single-mode, multi-mode, or UTP-155)
- Electronic serial number
- Remote (indicates whether your unit is enabled or disabled for remote control).

Storing and Retrieving Test Results

You can store results from the many OC3port Plus tests in memory for later use and review. These results remain in memory even after you shut off the unit. This section shows you how to do the following:

- Store test results manually and automatically
- Display stored test results
- Delete stored test results
- Print stored test results.

Using the **Auto Store** option, you can program the OC3port Plus to automatically store test results in memory as they are acquired. The **Auto Store** option can also be used to automatically send test results periodically to the printer. This section also shows you how to set up the OC3port Plus for automatic test storage.

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Manually Storing Test Results

To store test results, press the **MEMORY** key while viewing the results on the LCD. After you press the **MEMORY** key, you see this message: RECORD SAVED. This message indicates that the result you are viewing has been stored in the tester's memory. Any results you store are retained even after you turn off the OC3port Plus.

You can store LED status records and results from any of the following tests:

- BERT
- ATM Cell loss
- SONET
- Automatic tests.

Depending on the type of test record, the OC3port Plus has a limitation on the number of records that it can store in memory. In addition, the tester's storage is circular so that when the limitation for a particular test is reached, the record at the bottom of the stack is deleted as a new record is added to the top.

Table 3-1 provides a list of storage limitations for each group of test records that you can store:

Table 3-1. Storage Limits for Test Records

Test Records	Storage Limit
BERT	100
LED Status	100
ATM cell loss	128
Alarm	128
Counters	32
Automatic diagnostic tests	10

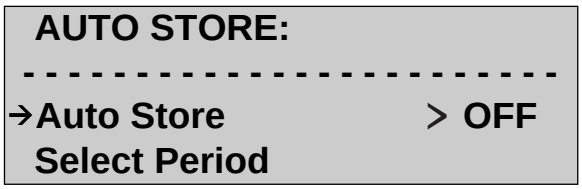
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Automatically Storing Test Results in Memory

In this procedure, you will set up the OC3port Plus to automatically store test results. This entails selecting which test results to store and setting the timing criteria which determines how frequently those results are collected and stored.

To set up the OC3port Plus to automatically collect and store test results:

1. Press the **AUTO** key to display the **AUTO SELECTIONS** menu.
2. Press the **Down Arrow** key to move the **Auto Store** to the selection line. Then, press **ENTER**. The **AUTO STORE** submenu is displayed, as in the following: option



za026f.eps

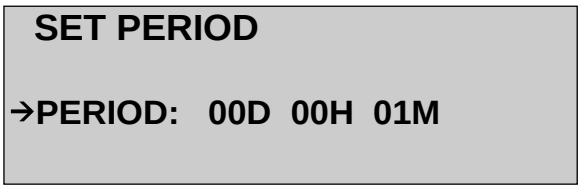
3. Make sure that the **Auto Store** option is on the selection line. This option has two settings:
   - **OFF** (the default)

     Turns off the automatic test storage feature.
   - **ON**

     Turns on the automatic test storage feature.
4. Press the **Left** or **Right Arrow** key to change the **Auto Store** setting to **ON**.

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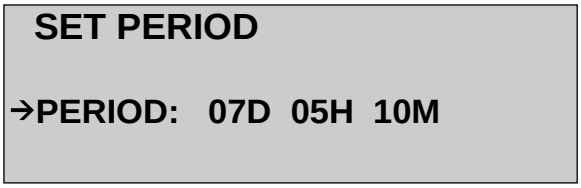
5. Press the **Down Arrow** key to move the **Select Period** option to the selection line. Then, press **ENTER**. The display shows:



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On this display, you can set a value that determines how frequently the OC3port Plus stores test results. The format is **D / H / M,** where **D** is the number of days, **H** is the number of hours, and **M** is the number of minutes.

For example, if you wanted to store test results every 7 days, 5 hours, and 10 minutes, your display would look like this:

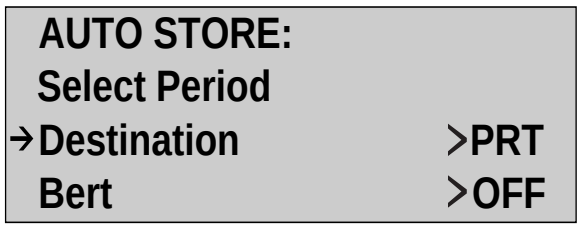


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6. You are in Edit mode. To set a time period for collection and storage, press the arrow keys to supply the desired value. When, you finish, press **ENTER** to save the change.
7. Press the **AUTO** key again. You return to the **AUTO SELECTIONS** menu.
8. Make sure that the **Auto Store** option is on the selection line. Then, press **ENTER** to re-display the **AUTO STORE** submenu.

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9. Press the **Down Arrow** key to move the **Destination** option to the selection line, as in the following:



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This option determines where the OC3port Plus sends the test results. This option has three settings:

- **PRT** Sends results to an attached printer.
- **MEM** Stores results in memory.
- **BTH** Sends results to an attached printer and stores them in memory.

10. Press the **Left** or **Right Arrow** key to choose the desired destination.
11. Press the **Down Arrow** key to move each of the following options to the selection line:

- **Bert**
- **Cell Loss**
- **Counters**
- **Alarm Status**

These options determine which test records the OC3port Plus stores automatically.

Each option has two settings, **ON** and **OFF**.

When set to **ON**, test records for the selected option are automatically collected and stored.

When set to **OFF**, no records are automatically stored.

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12. Press the **Left** or **Right Arrow** key to choose the desired setting for each test record that you want to automatically collect and store records for.

    In the following example, the OC3port Plus is set up to automatically collect and store BERT test records.



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    Setup is completed.

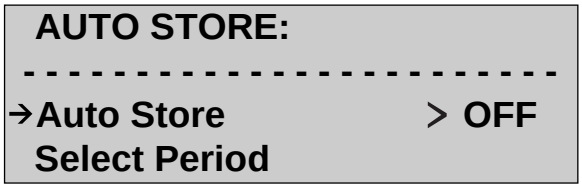
The OC3port Plus is now configured to automatically collect and store test records.

Displaying Stored Test Results

To display test results stored in memory, do the following:

1. Press the **AUTO** key. The **AUTO SELECTIONS** menu is displayed.
2. Make sure that the **Auto Store** option is on the selection line.
3. Then, press **ENTER**.

   The **AUTO STORE** submenu is displayed:



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4. Press the **Down Arrow** key until the Review Records is on the selection line. Then, press **ENTER**. The **REVIEW RECORDS** submenu is displayed: option

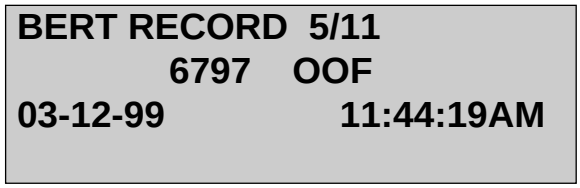


za031f.eps

This menu has the following choices, representing the four types of test records that the OC3port Plus can store:

- Bert
- Cell loss
- Counters
- Alarm Status

5. Make sure that the name of the group containing the test results you want to review is on the selection line. Then, press **ENTER**. The first record stored in the test group you selected is displayed. If no records are stored, you see this message: `NO RECORDS COLLECTED`. Following is a sample OC3port Plus test record:



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Note that, when saved, each result is categorized by the type of test (in this example, BERT). A counter to the right of the test name indicates which record you are viewing (in this example, record 5 out of a total of 11). Line 2 of the display indicates the number and type of error recorded (in this example, 6797 OOF). At the bottom of the display, the date and time that the record was stored is given (in this example, the record was stored on March 12, 1996 at 11:44:19 a.m.).

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The **Left** and **Right Arrow** keys can be used to cycle through the various display formats available for the particular record you are reviewing. For example, by pressing these keys, you can view these two additional displays for BERT records stored in memory:

```
BERT RECORD  5/11
1.00E-03     BER
3.016E+05    ERRORS
3.016E+08    BITS
```

za033f.eps

```
BERT RECORD  5/11
             5  E/S
             1  ESEC
             0  THSEC
```

za034f.eps

Press the **Up** or **Down Arrow** key to view additional records that you have stored. In this example, pressing the **Up** or **Down Arrow** key allows you to see the ten remaining BERT records.

Deleting Stored Test Results

You can delete stored test records individually or you can delete all records in a particular group from memory.

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Deleting a Single Record

To delete a single test record, follow these steps:

Caution

Be careful when you delete a stored test record. Deleting a stored test record cannot be undone.

1. Press the **AUTO** key to display the **AUTO SELECTIONS** menu.
2. Make sure that the **Auto Store** option is on the selection line. Then, press **ENTER**. The **AUTO STORE** submenu is displayed.
3. Press the Down Arrow key to move the **Review Records** to the selection line. Then, press **ENTER**. The **REVIEW RECORDS** submenu is displayed: option



za031f.eps

4. Move the name of the group containing the test record you want to delete to the selection line. Then, press **ENTER**. The first test record in the group you selected is displayed.
5. Press the **Up** or **Down Arrow** key to display the particular test record you want to delete. Then, press the **CLEAR** key. The individual test record you selected is deleted from the tester's memory.

Deleting All Stored Records in a Test Group

To delete all test records in a group from storage, do the following:

⚠Warning

Be careful when you delete a stored test record. Deleting a stored test record cannot be undone.

1. Press the **AUTO** key to display the **AUTO SELECTIONS** menu.
2. Make sure the **Auto Store** option is on the selection line. Then, press **ENTER**. The **AUTO STORE** submenu is displayed.
3. Press the **Down Arrow** key to move the Delete Records option to the selection line. Then, press **ENTER**. The **DELETE RECORDS** submenu is displayed:

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za035f.eps

4. Make sure that the name of the group whose records you want to delete is on the selection line. Then, press **ENTER**.

All of the tests in the group you selected are deleted from the tester's memory.

Printing, Downloading, and Remote Control

On its connector panel, the OC3port Plus has an EIA-232 serial port, which is designed into an RJ-11 (telephone) jack. With this port, you can:

- Connect the OC3port Plus to a serial printer.
- Connect the OC3port Plus to a PC that is running any standard communications terminal program (such as *Procomm* or *Crosstalk*) and capture test results and configuration information.
- Control the operation of the OC3port Plus remotely.

The information in this section shows you how to set up your OC3port Plus for printing and remote control operation.

Connecting to the Serial Port

To connect your OC3port Plus to a computer, printer, or modem you need the following equipment, which is supplied with the OC3port Plus:

- RJ-11 to RJ-11 cable
- RJ-11 to DB-25s female adapter for connection to a computer
- RJ-11 to DB-25s male adapter for connection to modems and printers
- RJ-11 to DB-9 female adapter.

To assist you in establishing working connections, Tables 3-2, 3-3, and 3-4 are provided, which describe the serial control signals available at the RJ-11 connector and 25-pin computer and modem/printer connectors.

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Table 3-2. RJ-11 Pin Descriptions

Pin	Description	Pin	Description	Pin	Description
3	CTS- Clear to Send	5	TXD- Transmit Data	1,2	Gnd- Signal Ground
4	RXD- Receive Data	6	RTS- Request to Send		

Table 3-3. Serial Port 25-pin Computer Connection Pin Descriptions

Pin	Description	Pin	Description	Pin	Description	Pin	Description	Pin	Description
2	TXD- Transmit Data	3	RXD- Receive Data	4	RTS- Request to Send	5	CTS- Clear to Send	7	GND- Signal Ground

Table 3-4. Serial Port 25-Pin Modem/Printer Connection Pin Descriptions

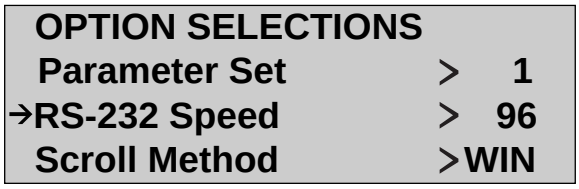
Pin	Description	Pin	Description	Pin	Description	Pin	Description	Pin	Description
2	RXD- Receive Data	3	TXD- Transmit Data	4	CTS- Clear to Send	5	RTS- Request to Send	6	DSR- Data Set Ready
7	GND- Signal Ground	20	DTR- Data Terminal Ready						

To connect your OC3port Plus to a printer or PC, follow these steps:

1. Plug one end of the RJ-11 to RJ-11 cable into the RS-232 jack, which is located on the connector panel.
2. Plug the other end of this cable into the appropriate adapter.
3. Plug the adapter into the serial port on the printer or PC.

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4. Set the baud rate on the OC3port Plus:
   a. Press the **OPTIONS** key. The **OPTION SELECTIONS** menu is displayed.
   b. Press the **Down Arrow** key until the **RS-232 Speed** option is on the selection line. For example:



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   c. Press the **Right** or **Left Arrow** key to select the interface speed (**96** = 9600 baud, **24** = 2400 baud, **12** = 1200 baud) you want.

Note

For the best results, select the baud rate that matches the fastest rate on your printer or PC. The change takes effect immediately. The OC3port Plus is configured with the baud rate you selected.

5. Configure your printer or PC as follows:

• Baud rate	Match OC3port Plus
• Data bits	8
• Stop bits	1
• Parity	None
• Flow control	Xon/Xoff or CTS/RTS
• Local echo (terminals)	On
• Line feed (terminals)	Carriage return = line feed (inbound /outbound).

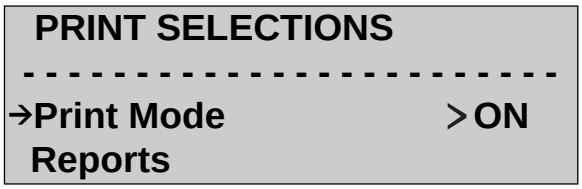
To test the connection, press the **ESC** key. The OC3port Plus resets and returns you to the introductory display. The printer or PC running the terminal emulation program prints or displays OC3port Plus.

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Printing Reports and Configuration Information

The OC3port Plus prints configuration reports and test results for reference purposes. To obtain a printout of a report, complete these steps:

1. Press the **PRINT** key. The **PRINT SELECTIONS** menu is displayed.



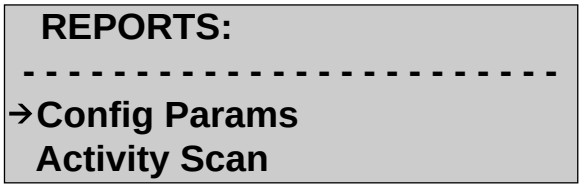
za037f.eps

2. Leave **Print Mode** setting **ON**.

Note

*We suggest that you leave the print mode setting **ON** (the default). When set to **ON**, printing is done in the background, making it secondary to any network testing or monitoring that is going on.*

3. Press the **Down Arrow** key to move the **Reports option** to the selection line. Then, press **ENTER**. You see this submenu:



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This menu lists the following types of reports that you can print.

- Config Params — Parameter sets
- Activity Scan — Activity scan reports
- Alarm Log — Alarm log data
- Error/Alarm Insert — Errors/alarms
- Auto Store Params — Automatic test storage parameter

4. Press the **Down Arrow** key to move the report that you want to print to the selection line. Then, press the **PRINT** key. The report you selected begins to print.

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Pausing a Print Job

To pause a job that is currently printing, do the following:

1. From the **PRINT SELECTIONS** main menu, make sure that the **Print Mode** option is on the selection line.
2. Press the **Right Arrow** key to display the **PSE** (pause) setting.

   The print job temporarily stops.

Preventing a Report from Being Printed

To prevent a report from being printed, follow these steps:

1. From the **PRINT SELECTIONS** main menu, make sure that the **Print Mode** option is on the selection line.
2. Press the **Right Arrow** key to display the **OFF** setting.

   All printing is currently prevented from occurring.

Controlling the OC3port Plus Remotely

For information about remote control software, contact Fluke at:

1-888-99-FLUKE in the USA. and Canada
31-402-678-200 in Europe
81-3-3434-0181 in Japan
65-738-5655 Singapore
206-356-5500 anywhere in the world

Visit Fluke's web site at **www.fluke.com**.

To connect the OC3port Plus to a modem, follow these steps:

1. Make sure that the OC3port Plus and the modem are powered off.
2. Plug one end of the RJ-11 to RJ-11 cable into the RS-232 jack, which is located on the connector panel. Plug the other end of this cable into the RJ-11 to DB-25s adapter marked "modem/printer".
3. Plug the RJ-11 to DB-25s adapter into the serial port on the modem.
4. Connect the modem to the phone jack.
5. Turn on the modem.
6. Turn on the OC3port Plus.

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Running the Automatic Diagnostic Tests

The OC3port Plus has a set of built-in diagnostic tests that you can run to assess the basic condition of any signal that is present on a line. These tests take about 25 seconds to run. When the tests are completed, a summary of the results is displayed in two categories:

- ATM
- SONET

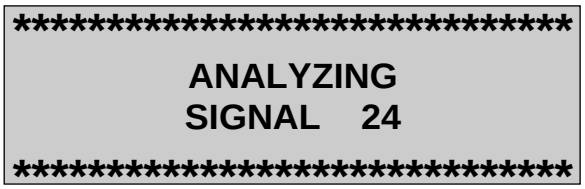
To start the diagnostic tests, follow these steps:

Note

When the OC3port Plus is shipped from the factory, it is configured to automatically run the diagnostic tests described in this section every time that you power on the unit. For instructions on how to prevent the tester from running these tests when you turn it on, see "Turning Off the Automatic Diagnostic Tests" earlier in this chapter.

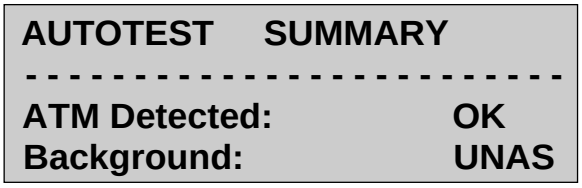
1. Press the **AUTO** key. The **AUTO SELECTIONS** menu is displayed. .
2. Press the **Down Arrow** key to move the **Start AutoTest** option to the selection line. Then, press **ENTER**.

   The OC3port Plus begins running the diagnostic tests. As the tests progress, you see a series of countdown displays like this:



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3. Then, the OC3port Plus summarizes its findings. For example:



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The diagnostic test results provided by the OC3port Plus are listed in the Table 3-5. Press the **Down Arrow** key to scroll through the list.

Table 3-5. OC3port Plus Diagnostic Test Results for ATM and SONET

Network	Results	Meaning
ATM	ATM Detected:	Indicates condition of ATM traffic detected:
	OK	• **OK** (if ATM cell delineation is obtained)
	NO	• **NO** (no ATM cell delineation)
	ERR	• **ERR** (header checksum errors found)
	Background:	Indicates type of background traffic detected:
	UNAS	• **UNAS** (unassigned cells detected)
	IDLE	• **IDLE** (idle cells detected)
	BOTH	• **BOTH** (both idle and unassigned cells detected)
	OAM F4:	Indicates whether OAM F4 cells were detected on VCI 3 or VCI 4:
	YES	• **YES** (detected)
	NO	• **NO** (not detected)
	OAM 5:	Indicates where OAM F5 cells were detected with payload types of 4 or 5:
	YES	• **YES** (detected)
	NO	• **NO** (not detected)
	ILMI:	Indicates where ILMI cells were detected on VCI 16:
	YES	• **YES** (detected)
	NO	• **NO** (not detected)
SONET	Section:	Indicates whether any section-level errors were found:
	OK	• **OK** (no section errors found)
	ERR	• **ERR** (section errors found)
	Line:	Indicates whether any line-level errors were found:
	OK	• **OK** (no line errors found)
	ERR	• **ERR** (line errors found)
	Path:	Indicates whether any path-level errors were found:
	OK	• **OK** (no path errors found)
	ERR	• **ERR** (path errors found)
	Pointer:	Indicates whether there is a problem with SONET pointer:
		• **OK** (valid pointer was detected)
	OK	• **LOSS** (loss of pointer)
	LOSS	
	Alarms:	Indicates whether SONET alarms have been detected:
	YES	• **YES** (alarms detected)
	NONE	• **NONE** (no alarms detected)

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Chapter 4
SONET/SDH Configuration and Testing

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Introduction

The OC3port Plus constantly monitors the SONET/SDH framing structure to detect errors. This chapter describes how to set up your OC3port Plus to test STS-3c and STM-1 signals. It shows you how to monitor these signals and describes the various results provided by the OC3port Plus about the transmitted signals. Finally, this chapter describes the alarms that you can transmit. It shows you how to generate an alarm and view information about received alarms.

Configuring the Framing Format

If your OC3port Plus has been factory configured and shipped to work on a SONET OC3 STM-1 network, you have the ability to do testing that is compliant with **Synchronous Digital Hierarchy (SDH)** standards. This section describes the major differences between SONET OC3 STS-3c and SDH STM-1 standards and then shows you how to configure the framing format on the OC3port Plus so that you can work with SDH-compliant equipment.

Differences between SONET OC3 STS-3c and SDH STM-1

The differences between SONET OC3 STS-3c and SDH STM-1 standards are minimal. Both technologies operate at 155 Mbits per second. SONET OC3 networks use STS-3c frames. SDH networks, on the other hand, use STM-1 frames. ATM traffic is carried on both of these formats and the formats are nearly identical.

Although the differences are minor, STS-3c frames can only be used on SONET OC3 networks, and STM-1 frames can only be used on SDH networks. The following information summarizes the differences between the SONET and SDH-compliant networks:

- To configure the OC3port Plus for compliance with SDH standards, you need to change the framing format. When you choose STS as the framing format, the OC3port Plus automatically sets the S-bits to "00" for SONET STS-3c networks. When you choose STM as the framing format, the OC3port Plus automatically sets the S-bits to "10" for the SDH STM-1 networks.

Note

After you choose a framing format, you can (for diagnostic purposes) override the S-bit settings used by the framing format. To do this, see "Changing the S-Bit Values" later in this chapter for information on how to do this.

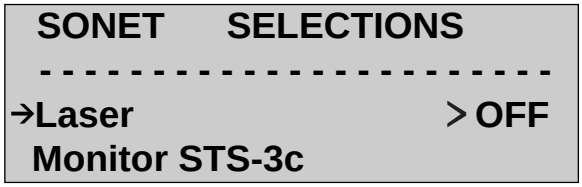
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- In SONET, the Path FERF alarm is indicated by setting the Path FEBE bits in the STS-3c frames to "1001". In the SDH STM-1 networks, the 5th bit in the G1 byte is set to "1".
- SDH networks require equipment to declare a Path FERF alarm whenever the alarm condition is present for five consecutive frames.
- In the SONET network, there is a YELLOW alarm indication. In the SDH networks, there is no such alarm.

Changing the Framing Format

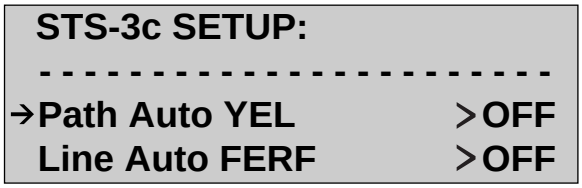
To change the framing format, follow these steps:

1. Press the **SONET** key. The **SONET SELECTIONS** menu is displayed:



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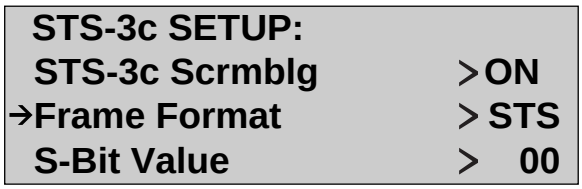
2. Press the **Down Arrow** key until the **Setup STS-3c** option is on the selection line. Then, press **ENTER**. The **STS-3c SETUP** submenu is displayed:



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3. Press the **Down Arrow** key to move the **Frame Format** option to the selection line, as in the following:



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4. Press the **Left** or **Right Arrow** key to toggle between the **STS** and **STM** settings.
   - If you select **STS** as the framing format, all of the relevant OC3port Plus menus reflect this change. In addition, the S-bit values automatically change to the correct network values (when you toggle between the two settings, notice the change in the **S-Bit Value** option, which is next on the menu). That is, when transmitted, the S-bits are set to the value of "00". FEBE bits are used to detect Path FERF, and Bit 5 of the G1 byte is used to indicate a Path Yellow alarm. The Yellow alarm indication must be present for at least 10 frames before it is recorded and the Path Yellow Alarm is enabled.
   - If you select **STM** as the framing format, all of the relevant OC3port Plus menus reflect this change. In addition, the S-bit values are automatically set to the correct network values (when you toggle between the two settings, notice the change in the **S-Bit Value** option, which is next on the menu). That is, when transmitted, the S-bits are set to the value of "10". Bit 5 of the G1 byte will be used to detect Path FERF. The Path FERF alarm indication must be present for at least 5 frames before it is recorded. The Path Yellow Alarm is disabled and other menus dealing with the Yellow Alarm are either removed or disabled.

The setting you selected is now the framing format used by the OC3port Plus.

Changing the S-Bit Values (optional)

When you select a framing format, the correct S-bit values for your network are automatically set. However, it is possible to set the OC3port Plus for either SONET or SDH operation and then use the S-bit values to indicate the opposite frame type (that is, you can set framing to STM and then set the S-bits to "00" for SONET). Such a configuration can be used to diagnose various network problems. However, as noted earlier, changing the framing affects more than just the S-bit values.

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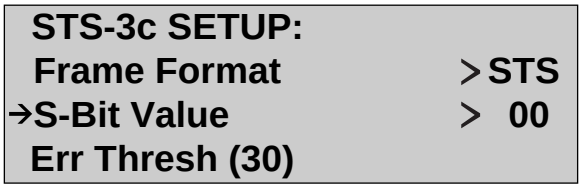
The S-bit value option can be set to one of four possible values, independent of the setting you choose for the Frame Format option. This allows you to transmit incorrectly set values in the S-bit locations. You should, however, be careful when using this technique.

To change the S-bit value, follow these steps:

Note

The sample screens presented in this procedure are STS-3c screens. If the framing format you selected is STM-1, the OC3port Plus displays equivalent STM-1 screens.

1. Press the **SONET** key. The **SONET SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **Setup STS-3c** or **Setup STM-1** option to the selection line.
3. Then, press **ENTER**. You see the setup menu for the option you selected.
4. Press the **Down Arrow** key to move the **S-Bit Value** option to the selection line. For example:



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5. Press the **Left** or **Right Ar**row key to change the S-bit value to the desired setting. The following settings are available:
   - `00` Normally indicates a SONET network.
   - `01` Not defined on SONET or SDH networks.
   - `10` Normally indicates an SDH network
   - `11` Not defined on SONET or SDH networks

   The change takes effect immediately. The setting you chose is now the current S-bit value.

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Setting Up for Testing STS-3c and STM-1 Signals

Setting up the OC3port Plus for testing STS-3c and STM-1 signals entails configuring the tester to do the following:

- Detect errors and generate automatic alarms
- Use the appropriate clock source for data transmission
- Scramble payloads
- Record results when an error counter exceeds a threshold value
- Enable/disable PATH FERF support (for STS-3c format only).

Generating Automatic Alarms

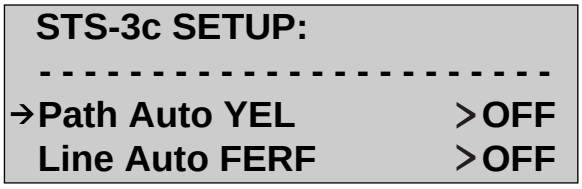
You can setup the OC3port Plus so that it automatically generates a PATH YELLOW or LINE FERF alarm any time it receives a respective PATH or LINE error from the transmitting equipment. To do this, follow these steps:

Note

The sample screens presented in this procedure are STS-3c screens. If the framing format you selected is STM-1, the OC3port Plus displays equivalent STM-1 screens.

1. Press the **SONET** key. The **SONET SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **Setup STS-3c** or **Setup STM-1** option to the selection line. Then, press **ENTER**.

   The **SETUP** submenu is displayed. Following is an example of the STS-3c setup menu:



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   The first three options on this menu determine whether the OC3port Plus issues an alarm when it detects a certain type of incoming error. See Table 5.1 for a description of these options and their settings.

3. To enable the OC3port Plus to issue a YELLOW alarm, make sure that the **Path Auto YEL** option is on the selection line. Then, press the **Left** or **Right Arrow** key to change the setting to ON.

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Note

If you are configured for SDH networks, there is no YELLOW alarm.

4. To enable the OC3port Plus to issue a Line FERF alarm, make sure that the **Line Auto FERF** option is on the selection line. Then, press the **Left** or **Right Arrow** key to change the setting to ON.

5. To enable the OC3port Plus to issue a Line or Path **FEBE**, make sure that the **L/P Auto FEBE** option is on the selection line. Then, press the **Left** or **Right Arrow** key to change the setting to ON.

   The tester is now set up to generate automatic alarms. Table 4-1 lists the alarms that the OC3port Plus can generate and describes their meanings.

Table 4-1. STS-3c/STM-1 Alarms

Alarm	Description
Path Auto YEL:OFF (For STS-3c only)	When set is **ON**, the OC3port Plus issues a Path YELLOW alarm immediately upon detection of a loss of signal (LOS), loss of frame (LOF), Line AIS, loss of pointer (LOP), or STS Path AIS. When set to **OFF** (the default), the OC3port Plus detects and accepts the error, indicates detection by lighting the appropriate LED, but does not issue an alarm.
Line Auto FERF: OFF	When set to **ON**, the OC3port Plus issues a Line FERF alarm when it detects an LOS, LOF, or line AIS. When set to **OFF** (the default), the OC3port Plus detects and accepts the error, indicates detection by lighting the appropriate LED, but does not issue an alarm.
L/P Auto FEBE: OFF	When set to **ON**, the OC3port Plus issues a Line or Path FEBE alarm when it detects a line or a path BIP error. When set to **OFF** (the default), the OC3port Plus detects and accepts the error. Results are obtained by pressing the **SONET** key, then selecting the **Monitor STS-3c** or **Monitor STM-1** option.

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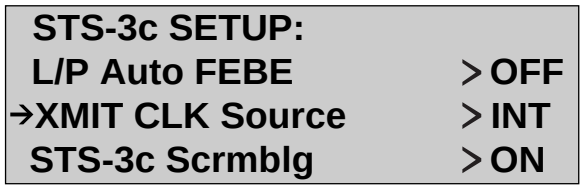
Setting the Transmit Clock Source

For proper testing and valid results, clock synchronization of theOC3port Plus with the network under test may be required. To set the transmit clock source, do the following:

Note

The sample screens shown in this procedure are STS-3c screens. If the framing format you selected is STM-1, the OC3port Plus displays equivalent STM-1 screens.

1. Press the **SONET** key. The **SONET SELECTIONS** menu displays.
2. Press the **Down Arrow** key to move the **Setup STS-3c** or **Setup STM-1** option to the selection line. Then, press **ENTER**. The **STS-3c SETUP** submenu is displayed.
3. Press the **Down Arrow** key to move the **XMIT CLK Source** option to the selection line:



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4. Then, press the **Left** or **Right** key to change to one of the following settings:
   - `INT` Transmits data using the internal clock on the OC3port Plus (155.52 MHz) (the default)
   - `LPR` (Loop Recovered). Uses the frequency of the recovered signal to transmit data.

   The tester is now configured with your clock source selection.

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Scrambling Payloads

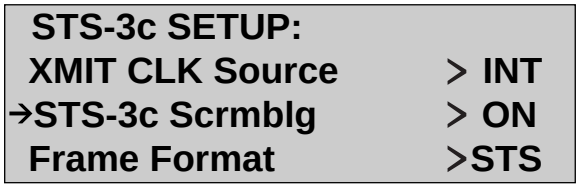
The OC3port Plus provides a scrambling feature that controls the automatic scrambling of payloads. Depending on your needs, you can turn this feature on or off.

Note

The sample screens presented in this procedure are STS-3c screens. If the framing format you selected is STM-1, the OC3port Plus displays equivalent STM-1 screens.

To activate or de-activate the payload scrambling feature, follow these steps:

1. Press the **SONET** key. The **SONET SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **Setup STS-3c** or **Setup STM-1** option to the selection line. Then, press **ENTER**. The **SETUP** submenu is displayed.
3. Press the **Down Arrow** key to move the **STS-3c Scrmblg** or **STM-1 Scrmblg** option to the selection line. For example:



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4. Then, press the **Left** or **Right** key to change to one of the following settings:
   - `ON` Scrambles payloads
   - `OFF` Does not scramble payloads

The tester is now configured with your payload scrambling selection.

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Changing the Threshold Setting for Counters

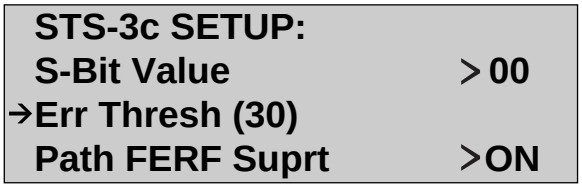
The **Err Thresh** option on the **STS-3c** or **STM-1 SETUP** submenu is used to specify the number of errors or events that must occur in one second for the threshold counter to increment by one. The default setting for this option is 30.

Note

The sample screens presented in this procedure are STS-3c screens. If the framing format you selected is STM-1, the OC3port Plus displays equivalent STM-1 screens.

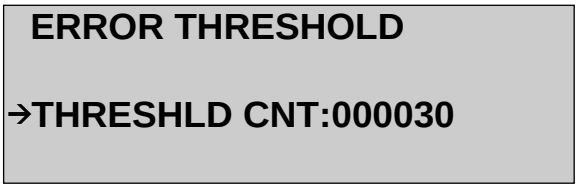
To change the threshold setting for counters, do the following:

1. Press the **SONET** key. The **SONET SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **Setup STS-3c** or **Setup STM-1** option to the selection line. Then, press **ENTER**. The **SETUP** submenu is displayed.
3. Press the **Down Arrow** key to move the **Err Thresh** option to the selection line. For example:



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4. Press **ENTER**. You see this display:



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You enter Edit mode as indicated by the flashing number in the first position of the **THRESHLD CNT** field.

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5. Press the **Up** or **Down Arrow** key to change the value in the first position. Then, press the **Right Arrow** key to move to the next position and make the necessary change. Continue in this manner until the new value is displayed. Then, press **ENTER**.

   The tester stores the value you specified, which is now the current setting for the **Err Thresh** option.

Enabling/Disabling PATH FERF Support

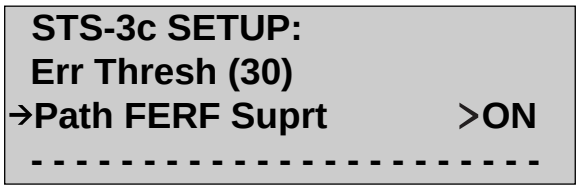
Note

You can enable/disable PATH FERF support only if you configured the framing format for STS-3c.

When you enable (select **ON**) PATH FERF support, the OC3port Plus detects and generates the FERF pattern in the Path FEBE bits of the G1 byte and uses the G1 byte in Bit 5 for Yellow alarms. When you disable (select **OFF**) PATH FERF support, the OC3port Plus interprets G1 bits as an RDI (FERF) indication.

To enable or disable support for PATH FERF, do the following:

1. Press the **SONET** key. The **SONET SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **Setup STS-3c** option to the selection line. Then, press **ENTER**. The **SETUP** submenu is displayed.
3. Press the **Down Arrow** key to move the **Path FERF Suprt** option to the selection line:



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4. Press the **Left** or **Right Arrow** key to set this option to ON or OFF.

The tester is now configured with your PATH FERF selection.

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Monitoring Incoming STS-3c or STM-1 Signals

When you monitor STS-3c or STM-1 signals, any errors detected by the OC3port Plus are displayed to you on the LCD. This section shows you how to monitor incoming signals and describes the types of measurement results provided to you by the tester.

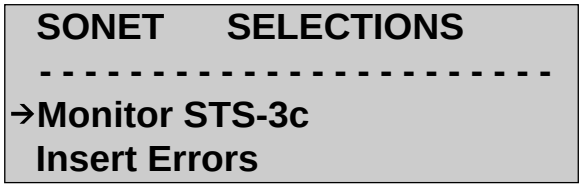
Note

*To clear any of the error displays, press the **CLEAR** key while the errors are being displayed.*

The sample screens presented in this procedure are STS-3c screens. If the framing format you selected is STM-1, the OC3port Plus displays equivalent STM-1 screens.

To monitor a signal:

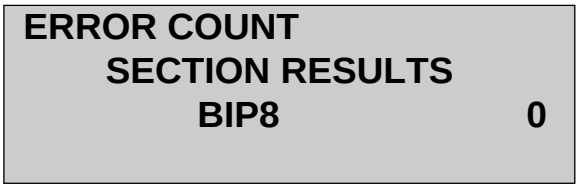
1. Press the **SONET** key. The **SONET SELECTIONS** menu is displayed:



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2. Make sure that the **Monitor STS-3c** or **Monitor STM-1** is on the selection line. Then, press the **ENTER** key. option

   You are now viewing the first STS-3c error display:



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   The information on this display presents a discrete count of Section BIP8 errors.

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Note

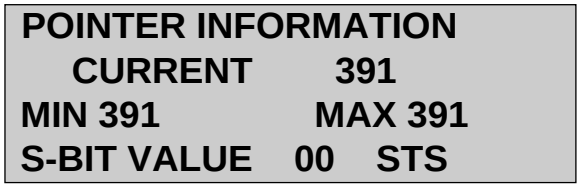
A count is only one of six available formats available for viewing STS-3c errors. Press the ***Left*** *or* ***Right Arrow*** *key to view the remaining formats. See Table 4.2 for a complete list and description of measurement results.*

3. Press the **Up Arrow** key to view these next two error displays:
   - Line BIP24 and Line FEBE errors
   - Path BIP8 and Path FEBE errors

Note

Press the ***Left*** *or* ***Right Arrow*** *key to view other measurements available for each of these types of errors. See Table 4.3 for a complete list and description of these measurements.*

4. Press the **Up Arrow** key to display the **POINTER INFORMATION** display. For example:



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The OC3port Plus samples the received SONET pointer value five times every second. It then maintains a record of the MIN, MAX, and current pointer values. The display indicates this using the format **MIN << CURRENT << MAX.** Whenever the pointer is lost or invalid, the center value changes to **ERROR** and then **LOSS**.

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Table 4-2 lists the five different measurement results provided when you monitor STS-3c or STM-1 signals.

Table 4-2. STS-3c/STM-1 Measurement Results

Measurement	Description
ERROR COUNT	The total number of errors that have occurred.
ERRORS, LAST SECOND	The number or errors that have occurred each second (rate in errors per second). This value is updated every second.
BIT ERROR RATE	The bit error rate (BER) in errors per bit received.
ERRORED SECONDS	The number of seconds in which one or more errors have occurred.
THRESHOLD ERRD SECS	The number of seconds in which the number of errors that have occurred exceed the threshold value. Note: This value is set by the **Err Thresh** option, which is found on the Setup STS-3c submenu accessed from the SONET SELECTIONS menu.
% SECONDS ERROR FREE	The percent of time (since the error counters were last cleared) that the OC3port Plus has operated without a particular error occurring.

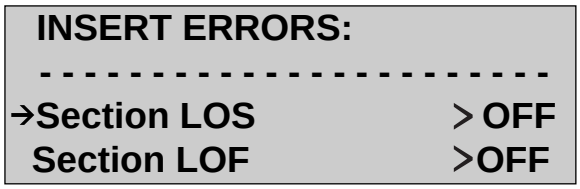
Inserting Errors

The OC3port Plus allows you to insert six different types of errors into the SONET or SDH overhead stream. To insert an error, follow these steps:

1. Press the **SONET** key. The **SONET SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key until the Insert Errors is on the selection line. Then, press the **ENTER** key. option

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The **INSERT ERRORS** submenu is displayed:



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This menu contains all of the STS-3c or STM-1 errors that you can insert into the transmit signal. (See Table 4-3 for a complete list and description of these errors.)

3. Press the **Down Arrow** key to move to the selection line the error you want to inject. Then, press the **Left** or **Right Arrow** key to choose the **ON** setting for the error.
4. Press **ENTER**. The error you selected is immediately inserted into the overhead stream.

Table 4-3 lists the types of STS-3c/STM-1 errors that you can insert. Factory default values are given.

Table 4-3. Description of STS-3c/STM-1 Errors

Errors	Description
Section LOS: OFF	Specifying **ON** forces the OC3port Plus to transmit a continuous stream of zeros, effectively causing a Loss of Signal.
Section LOF: OFF	Specifying **ON** causes continuous framing error to occur by inverting on bit of the framing byte information. (Sets A1 Framing byte to 76 instead of F6)
Section BIP8: OFF	Specifying **ON** inverts the B1 Section parity byte, which results in the transmission of continuous BIP8 error indications. Eight BIP8 errors are indicated per frame. Equipment receiving this signal should indicate 64,000 BIP8 errors every second.
Line BIP24: OFF	Specifying **ON** inverts the B2 Line parity bytes, which results in the transmission of continuous BIP24 error indications. Twenty-four BIP24 errors are indicated per frame. Equipment receiving this signal should indicate 192,000 BIP24 errors every second.
Path BIP8: OFF	Specifying **ON** inverts the B3 Path parity byte which results in the transmission of continuous BIP8 error indications. Eight BIP8 errors are indicated per frame. Equipment receiving this signal should indicate 64,000 BIP8 errors every second.

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Table 4-3. Description of STS-3c/STM-1 Errors (cont)

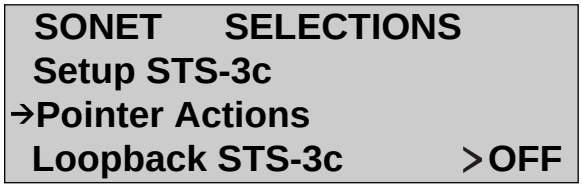
Errors	Description
Path FEBE: TX1-TX8	Pressing **ENTER** forces the transmitted PATH FEBE indicator to indicate a `Far End Block Error`. Each time **ENTER** is pressed another FEBE indication is sent. The **Right** or **Left Arrow** key can be used to change the **TX1** setting to **TX2…TX8**. Each of these selections represents an increase in the number of transmitted FEBE indications that can be sent with each press of the **ENTER** key (for example, selecting **TX4** results in the transmission of four FEBE indications every time you press **ENTER**).

Modifying the Value of the Payload Pointer

Both the SONET and SDH transmit overhead contains a payload pointer, which is used to determine where the beginning of the **Synchronous Payload Envelope** (SPE) is located. The starting location of the SPE within the frame may change in order to respond to small frequency differences among various elements in a communications network. For this reason, you may need to modify the value of the payload pointer to determine the location of the first byte of the SPE. This pointer can take on any value from 0 to 782 decimal. It represents the offset from the start of the frame required to locate the SPE.

To change the value of the payload pointer, follow these steps:

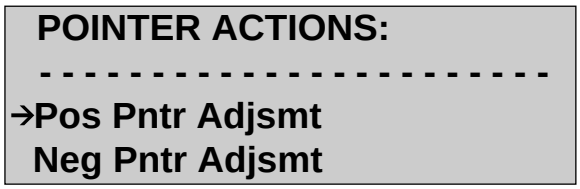
1. Press the **SONET** key. The **SONET SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **Pointer Actions** option to the selection line:



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3. Press **ENTER**. The **POINTER ACTIONS** submenu is displayed:



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This menu contains these three options, which allow you to choose how you want to modify the transmitted payload pointer:

- **Pos Pntr Adjsmt** — Increases the value of transmitted pointer in single increments up to a value of 782 (the top of the valid pointer range).
- **Neg Pntr Adjsmt** — Decreases the transmitted pointer by one. The pointer can be decreased to zero.
- **Set New Pointer** — Directly switches to a new pointer value. Allows you to view and edit the current transmit payload pointer. Values from 0 to 1023 can be entered.

4. Press the **Down Arrow** key until the option you want to use is on the selection line. Then, press **ENTER**. The OK message flashes next to the option to indicate that the selection was accepted.

Generating Alarms

The OC3port Plus can generate a variety of alarms. It can also detect alarms and events on received OC3 signals and store these in its alarm log. The information in this section describes the alarm transmission capabilities of the OC3port Plus. It shows you how to generate alarms and how to view alarms that are stored in the tester's alarm log.

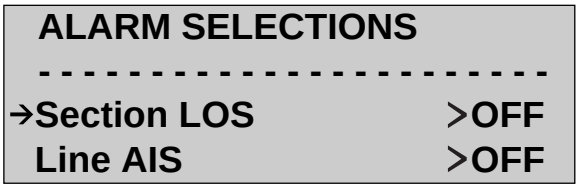
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Transmitting an Alarm

You can transmit up to five alarms. These alarms can be independently turned on or off. When turned on, the OC3port Plus continuously transmits the alarm until you turn it off. For information on turning off an alarm, see "Turning Off an Alarm", which follows in this section.

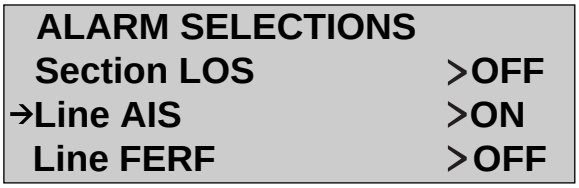
To transmit an alarm, do the following:

1. Press the **ALARMS** key. The **ALARM SELECTIONS** menu is displayed:



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2. Press the **Down Arrow** key to move the alarm you want to transmit to the selection line. Then, press the **Left** or **Right Arrow** key to select the **ON** setting for the alarm you want to transmit. For example, on the following display, the setting for Line AIS is now set to **ON**:



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Note

*See Table 4.4 for a complete list of alarms and the action performed when you select the **ON** setting.*

The alarm you selected is immediately sent. It continues to be sent until you stop transmission by selecting **OFF** or until you turn off or reset the tester.

Table 4-4 lists the types of alarms you can send.

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Table 4-4. Alarms Transmitted by the OC3port Plus

Alarm	Action Performed When You Select ON
Section LOS	Forces the transmission bit stream to all zeros, which causes transmission to stop.
Line AIS	Sets all bits in the SONET STS-3c frame to logic 1 prior to scrambling.
Line FERF	Transmits a binary value of '110' in bit positions 6, 7 and 8 of the STS-3c K2 byte.
Path AIS	Overwrites the SPE and Pointer bytes H1, H2, and H3 with ones.
Path FERF	Sets the G1-FEBE field to a binary value of '1001'.

Turning Off an Alarm

To turn off an alarm, do the following:

1. Press the **ALARMS** key. The **ALARM SELECTION** menu displays.
2. Press the **Down Arrow** key to move the alarm you want to turn off to the selection line.
3. Press the **Left** or **Right Arrow** key to select the **OFF** setting for any of the alarms on this menu. See Table 5-4 for a complete list and description of SONET alarms.

The alarm you select is immediately turned off.

Viewing Alarms Stored in the Alarm Log

The OC3port Plus keeps a history of the alarms received in an alarm log. The tester can store as many as 128 alarms in this log along with such information as the type of alarm, the date the alarm was received, the starting and ending times of the alarm, and the duration of the alarm.

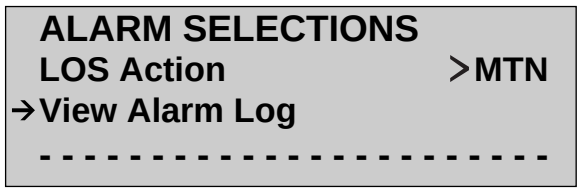
This section shows you how to access the alarm log and the type of information the tester maintains on the alarms in the log. It also shows you how to remove all the alarms from the alarm log.

To view alarms stored in the alarm log, follow these steps:

1. Press the **ALARMS** key. The **ALARM SELECTIONS** menu is displayed.

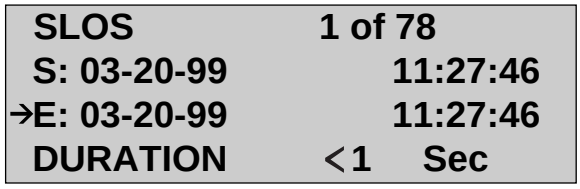
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2. Press the **Down Arrow** key to move the **View Alarm Log** option to the selection line:



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3. Press **ENTER**. The alarm log is displayed. You see the first alarm listed in the log, which looks similar to this:



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Line 1 of the display shows the type of alarm (in this example, SLOS) that was detected and the number of this alarm (1 of 78) in the alarm log.

The alarm log uses the following prefixes to identify the type of alarm:

- **S** Indicates "Section".

  For example, SLOS is a SECTION LOS alarm.

- **L** Indicates "Line".

  For example, LAIS is a Line AIS alarm.

- **P** Indicates "Path".

  For example, PYEL is a PATH YELLOW alarm.

An ATM Cell Lock alarm or cell delineation alarm is identified as **CELLD** in the alarm log.

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RESET and **POWERUP** indicate when the OC3port Plus was last reset and when it was last powered up, respectively.

Line 2 gives you the start time (as indicated by the **S**), and Line 3 provides the end time (as indicated by the **E**) of the alarm. Line 4 indicates the duration (one second) of the alarm.

4. Press the **Up** or **Down Arrow** key to display remaining alarms in the alarm log.

Note

*The alarm log is a circular list. When you reach the last alarm in the list and then press the **Up Arrow** key, the first alarm in the list is re-displayed.*

Removing All Alarms from the Alarm Log

To remove all alarms from the alarm log, do the following:

⚠Warning

Deleting alarms from the alarm log cannot be undone.

1. Press the **ALARMS** key. The **ALARM SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **View Alarm Log** option to the selection line. Then, press **ENTER**. One of the alarms in the alarm log is displayed.
3. Press the **CLEAR** key. All of the alarms in the alarm log are removed. You see this display:



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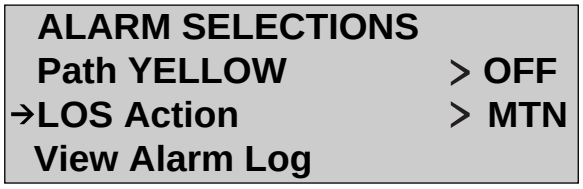
This display indicates that currently there are no alarms stored in the alarm log.

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Responding to an LOS Condition

You can configure the OC3port Plus so that it maintains its error counter during an LOS condition or restarts the counter from zero after a signal is regained. To do this, complete the following:

1. Press the **ALARMS** key. The **ALARM SELECTIONS** menu is displayed.
2. Press the **Up** or **Down Arrow** key to move the **LOS Action** option to the selection line:



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The **LOS Action** option has two settings:

- **MTN** Maintains the error counter, continuing to increment it from the value it had before the LOS occurred.
- **CLR** Clears the alarm log and resets the error counter to zero whenever an LOS occurs.

3. Press the **Left** or **Right Arrow** key to display the desired setting.

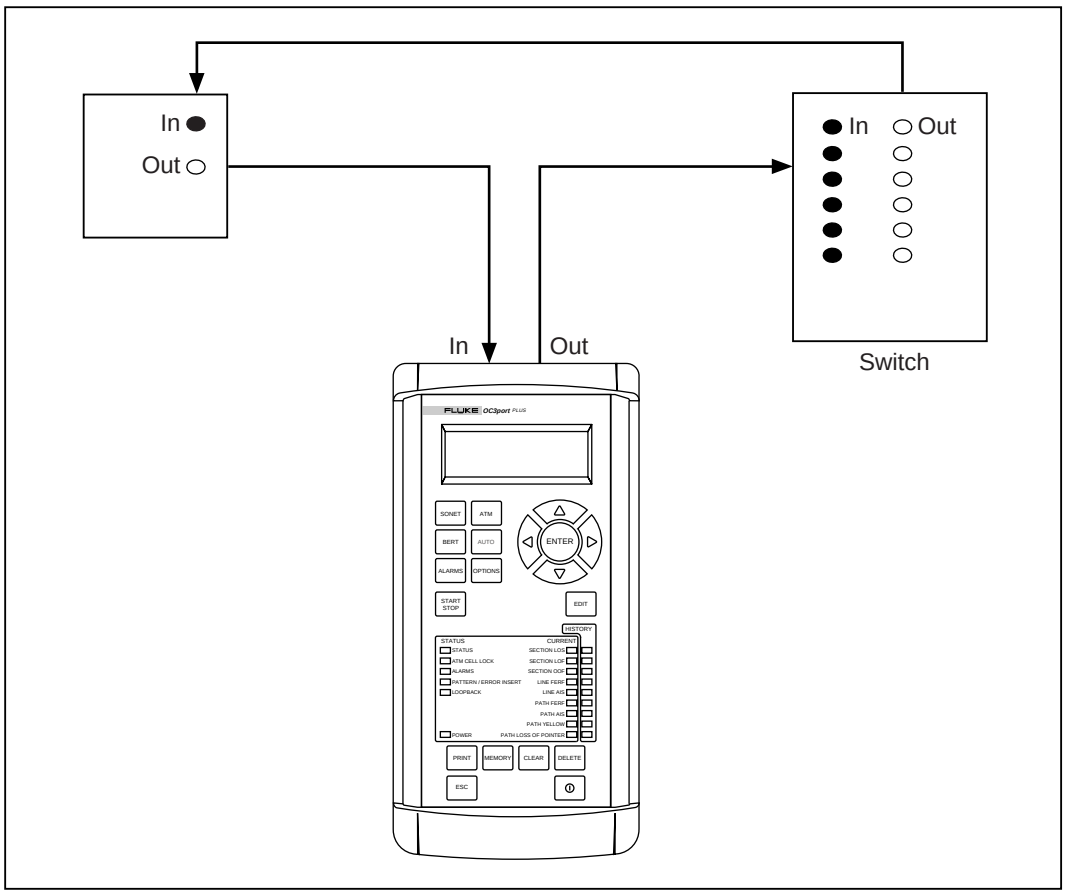
In-Service Signal Monitoring

With the OC3port Plus, you can do in-service signal testing, which is a method of monitoring the performance of a live signal in one direction without any disruption of the service on a line.

Loopback is a state in which a signal is transmitted into the OC3port Plus and routed back out. The signal is analyzed and sent back out along with any alarm or error conditions that may have been detected on the line.

Figure 4-1 illustrates how the OC3port Plus connects to a circuit to perform uni-directional monitoring and analysis of live data on an STS-3c/STM-1 signal.

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Figure 4-1. In-service Monitoring of Network Performance

To set up the OC3port Plus to monitor the performance of a live signal, follow these steps:

1. Connect the transmit side of the OC3port Plus to the receiver of the device under test (DUT). Then, connect the receive side of the OC3port Plus to the transmitter of the other DUT or network.
2. Turn on the tester and press the **SONET** key. The **SONET SELECTIONS** menu is displayed.

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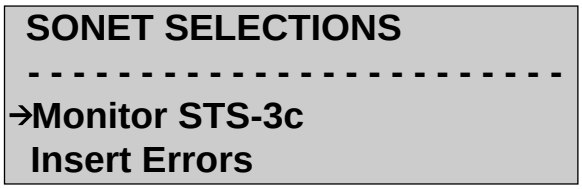
Note

*If the framing format you selected is STM-1, the option on the SONET SELECTIONS menu is **STM-1** instead of **STS-3c.** The sample screens in this procedure are STS-3c setup screens. If you selected STM-1 as the framing format, the OC3port Plus displays STM-1 setup screens.*

3. Press the **Down Arrow** key to move the **Loopback STS-3c** or **Loopback STM-1** option to the selection line. Then, press the **Left** or **Right Arrow** key to choose one of the following settings for this option:

   - **OFF** The OC3port Plus receives data and analyzes it. Sends out what the user programs the unit to transmit.
   - **ON** Line loopback state. The OC3port Plus analyzes data and routes the same data back out.

4. Press the **SONET** key. The **SONET SELECTIONS** menu is displayed again:



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   Make sure that the **Monitor STS-3c** or **Monitor STM-1** option is on the selection line. Then, press **ENTER**. The OC3port Plus begins monitoring the DUT.

5. To view results of the monitoring, press the **Up** or **Down Arrow** key. See "Monitoring Incoming STS-3c or STM-1 Signals" in this chapter for a description of the result displays.

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Chapter 5
Configuring for ATM Network Testing

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Introduction

Before you can transmit cells into a network or monitor incoming ATM traffic, you need to configure the OC3port Plus for ATM testing. This chapter shows you how to configure the tester by showing you how to program a receive filter to check incoming cells on input OC3 signals and how to set up a transmission stream to generate ATM traffic.

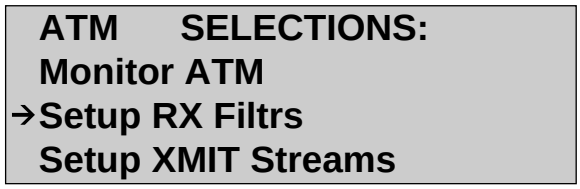
Configuring a Receive Filter

The OC3port Plus has four receive filters that can be configured to perform statistical analyses on ATM cell streams. The OC3port Plus uses these receive filters to route cells to statistical counters.

There are nine parameters that you can modify when configuring a receive filter. See Table 5-1 for a complete list and description of these setup parameters.

This procedure uses RECEIVE FILTER 1 as an example. Complete the following steps for each receive filter that you want to configure:

1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Up** or **Down Arrow** key to move the **Setup RX Filtrs** option to the selection line:



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3. Press **ENTER**. The setup menu for **RECEIVE FILTER 1** is displayed:

Note

If the setup menu displayed is for a receive filter other than **RECEIVE FILTER 1**, *press the* **Left** *or* **Right Arrow** *key to display* **RECEIVE FILTER 1**.

```
  RECEIVE FILTER:          1
  ←or→ for Change
→NAME:FILTER_1_
  LOAD TX HDR>TX1
```

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You are viewing the **NAME** parameter for **RECEIVE FILTER 1**. Each of the four receive filters can be given a specific name to help you identify it when you analyze results. The name you choose can be from one to ten characters long. Each character can be set to a value between 0 and 9 and from A to Z. The space (underscore) is also allowed and counts as a character. It is located in the character set between 9 and A.

4. To give the receive filter a name, do the following:

Note

The filter names are provided for your convenience and do not have to be changed. You can leave them set to their default values, for example ***FILTER*** *1 and* ***FILTER 2.***

   a. Press the **EDIT** key to enter edit mode. The **F** in the first field of the filter name is flashing.

   b. Press the **Up** or **Down Arrow** key to display the desired letter or number in the first position of the **NAME** field. Then, press the **Right Arrow** key to move to the next position. Continue pressing the arrow keys in this manner until the name you want is displayed.

   c. Press **ENTER**. The name you entered is now the new name for Receive Filter 1.

5. Press the **Down Arrow** key to move the next setup parameter, which is **LOAD TX HDR**, to the selection line.

   In certain situations, you will want to set up one or more receive filters to match headers that you configured for your transmission streams. For example, test streams are often sent to equipment under test and returned to the OC3port Plus using the same virtual circuit. To facilitate the setup, you can

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program the **LOAD TX HDR** parameter, which allows you to copy the GFC, VPI, VCI, PT, and CLP values directly from any one of the eight transmission streams into a receive filter with one press of a key.

Do one of the following:

- If you want to copy the parameters from a transmission stream into this receive filter, press the **Left** or **Right Arrow** key to display the name of the transmit header (**TX1** through **TX8**) whose values you want to copy.
- Next, press **ENTER**. The OC3port Plus copies the parameters from the transmit stream you selected and places them into Receive Filter 1.
- Finally, press the **Down Arrow** key to confirm that the values for all the parameters were transferred.
- Go to Step 6.
- If you do not want to copy the parameters from a transmission stream into this receive filter, go to Step 6.

6. Press the **Down Arrow** key to move each of the following parameters to the selection line:

Note

These parameters define the ATM cell header. Instead of supplying specific values for each parameter in this list, you can skip them all and simply supply an exact value for the hexadecimal header. To do this, go to Step 7.

- **VCI** Virtual Channel Indicator
- **VPI** Virtual Path Indicator
- **PT** Payload Type
- **CLP** Cell Loss Priority
- **GFC** Generic Flow Control

Each of these parameters can be changed. Depending on the type of parameter, complete the instructions that follow:

a. If the parameter is followed by a colon (**:**), press the **EDIT** key to enter edit mode. Then, press the arrow keys to change the parameter's setting. Values for these parameters range from **0** to **9** and **x**. Choose the **x** when you want the OC3port Plus to ignore the field when it attempts to match this filter.

Make sure that you press **ENTER** to save each change.

b. If the parameter is followed by a greater-than symbol (**>**), press the **Left** or **Right Arrow** key to change the parameter's setting. The change takes effect immediately.

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7. Press the **Down Arrow** key to move the **HDR** parameter to the selection line. This is a hexadecimal representation of the ATM cell header which, in most cases, should not be changed.

   If you want to change the hexadecimal value, press the **EDIT** key to enter Edit mode. Then, press the arrow keys to make the change. Press **ENTER** when you finish to save the change.

8. Press the **Down Arrow** key to move the **DET ALARM** parameter to the selection line. This parameter has two settings, **ON** and **OFF**.

   If you select **ON**, the tester "beeps" once a second whenever ATM traffic that matches the receive filter is detected. If you select **OFF**, the tester issues no "beep" when it detects filter matches.

   You are finished configuring the receive filter.

   Table 5-1 lists the setup parameters that define the configuration of a receive filter.

Table 5-1. Receive Filter Setup Parameters

Parameter	Description
NAME: FILTER_1_2	A ten-character label that identifies the receive filter. Any of the ten characters in this name can be set to a value between 0-9 and A-Z. The space is also allowed and counts as a character.
LOAD TX HDR>TX1	When activated, causes the OC2poirt Plus to automatically copy the VPI, VCI, PT, CLP, and GFC values from the selected transmission stream (**TX1** through **TX8**) into the receive filter.
VPI: 0000	Virtual Path Indicator. This parameter can be programmed by the user. Values range from 0 to 255 (**UNI**) and from 0 to 4095 (**NNI**). When **x** is specified, the OC3port Plus ignores the parameter when attempting to match the receive filter.
VCI: 00000	Virtual Channel Indicator. This parameter can be programmed by the user. Values range from 0 to 65535. When **x** is specified, the OC3port Plus ignores the field when attempting to match the receive filter.
PT>x	Payload Type. Indicates whether the contents of the cell are user data or network signaling information. Value range from 0-7. When **x** is specified, the OCe3port Plus ignores the parameter when attempting to match the receive filter.

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Table 5-1. Receive Filter Setup Parameters (cont)

Parameter	Description
CLP>x	Cell Loss Priority. Indicates whether or not the contents of the cell can be discarded by the network. Values range from 0-1. If set to 0, the cell has a higher priority and should not be discarded. If set to 1, the cell can be discarded by the network. When **x** is specified, the OCe3port Plus ignores the parameter when attempting to match the receive filter.
GFC>x	Generic Flow Control. Values range from 0-F. When **x** is specified, the OC3port Plus ignores the parameter when attempting to match the receive filter.
HDR: 00 00 00 00 55	Hexadecimal header. A representation of the values programmed into the individual header fields. Editing is not recommended unless you know the exact value to supply.
DETALARM> OFF/ON	Alarm detection mechanism. Determines whether or not the OC3port Plus issues an alarm when ATM traffic matching the receive filer is detected. When set to **ON**, an alarm sounds once every second. When set to **OFF**, the alarm does not sound.

Configuring an ATM Cell Transmission Stream

The OC3port Plus can be configured to provide up to eight individual ATM cell transmission streams.

There are 17 parameters that can be configured to define a cell stream. Of the 17, one provides an alphanumeric label or name for the stream, seven configure the ATM cell header, three alter the payloads carried by the cells, and six affect the transmission rate and traffic shape.

During actual testing, you can configure the header once. Then, you can make minor adjustments to the transmission stream parameters and/or the header to run additional tests.

Table 5-2 lists the 17 parameters and describes their use.

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

1. Name a cell transmission stream and configure the ATM cell header
2. Define the payload carried by the cells
3. Set the transmission rate and traffic shape.

Detailed steps follow. This procedure uses TRANSMIT STREAM 1 as an example. Complete this procedure for each transmission stream that you want to set up.

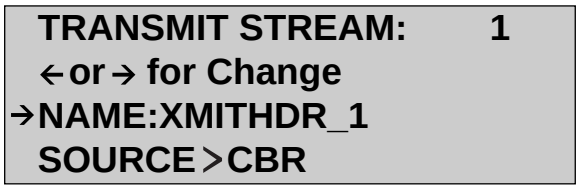
Step 1: Naming a Transmission Stream and Configuring the ATM Cell Header

To name a transmission stream and configure the ATM cell header, do the following:

1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Up** or **Down Arrow** key to move the **Setup XMIT Streams** option to the selection line. Press **ENTER**. The setup for **TRANSMIT STREAM 1** is displayed:

Note

If the setup menu displayed on the LCD is for a transmission stream other than **TRANSMIT STREAM 1**, *press the* **Left** *or* **Right Arrow** *key to display* **TRANSMIT STREAM 1**.



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The **NAME** parameter for **TRANSMIT STREAM 1** is on the selection line. Each of the eight transmission streams can be given a specific name to help you identify it when you analyze results.

The name you choose can be from one to nine characters long. Each character can be set to a value between 0 and 9 and from A to Z. The space is also allowed and counts as a character.

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3. To give the transmission stream a name, do the following:

   Note

   The names are provided for your convenience and do not have to be changed. You can leave them set to their default values, for example ***XMITHDR 1*** *and* ***XMITHDR 2.***

   a. Press the **EDIT** key to enter edit mode. The X in the first field of the **NAME** parameter is flashing.

   b. Press the **Up** or **Down Arrow** key to display the desired letter or number in the first position of the **NAME** field. Then, press the **Right Arrow** key to move to the next position. Continue pressing the arrow keys in this manner until the name you want is displayed.

   c. Press **ENTER** to save the change. The name you entered is now the current name of **TRANSMIT STREAM 1**.

4. Define the ATM cell header. Do one of the following:

   a. If you want to define the ATM cell header by changing the individual parameters that make up the ATM cell header, press the **Down Arrow** key to move each of the following parameters to the selection line:

      - VPI
      - VCI
      - PT
      - CLP
      - GFC
      - CHECK SUM

      After you move a parameter to the selection line, press the **EDIT** key to enter Edit mode. Then, press the arrow keys to set the parameter's value. Make sure that you press **ENTER** after you make a change to save it.

      The ATM cell header is configured after you change the value for the **CHECK SUM** parameter.

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b. If you want to define the ATM cell header by changing the hexadecimal header representation only, press the **Down Arrow** key to move the **HDR** parameter to the selection line:

Note

The HDR parameter is a hexadecimal representation of the ATM cell header parameters. You can edit the value of this parameter; however, in the majority of cases, it should be left alone.

```
 TRANSMIT STREAM:      1
 CHECK SUM>ON/OK
→HDR:00 00 00 00 55
 - - - - - - - - - - - - - - - - - - - - -
```

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Press the **EDIT** key to enter Edit mode. Then, press the arrow keys to set a value. Make sure that you press **ENTER** after you make the change to save it.

The ATM header is configured after you press **ENTER**.

Step 2: Define the payload carried by the cells

Three parameters can be used to configure the payload carried by a transmission stream's cells.

1. On the setup menu for **TRANSMIT STREAM 1**, press the **Up Arrow** key to move the **TIME STAMP** parameter to the selection line:

```
 TRANSMIT STREAM:      1
 SHAPER>ON
→TIME STAMP>OFF
 FIXED PAYLOAD:6A
```

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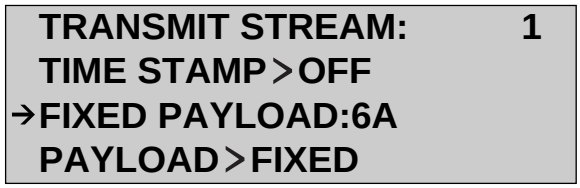
This parameter has two settings: ON and OFF. When set to ON, the OC3port Plus places a 24-bit time stamp value in the first three bytes of each cell's payload.

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

   The setting you selected is now the current value for the **TIME STAMP** parameter.

3. Press the **Down Arrow** key to move the **FIXED PAYLOAD** parameter to the selection line:



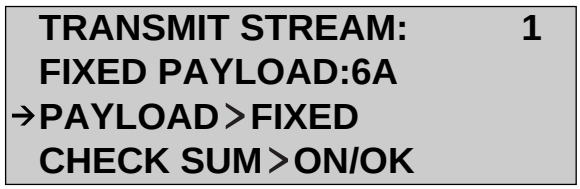
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   This hexadecimal value is used to fill the payloads of all cells in a transmission stream when the **PAYLOAD** parameter is set to `FIXED`. The hexadecimal value can be set from 00 to FF.

   If you want to change this parameter, press the **EDIT** key to enter Edit mode. Then, press the arrow keys to supply the desired value. Make sure that you press **ENTER** to save the change.

   The value you specified is now the current value of the **FIXED PAYLOAD** parameter.

4. Press the **Down Arrow** key to move the **PAYLOAD** parameter to the selection line:



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   The **PAYLOAD** parameter selects the type of payload used by every cell in the transmission stream. This parameter has three settings:

   - FIXED
   - OAM
   - BERT

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You can configure the OC3port Plus to fill the payloads of cells on any of the eight transmission streams with fixed bit patterns (**FIXED**), with OAM cells (**OAM**), or, when doing BERT testing, with pseudo-random or user-defined patterns (**BERT**). You can also program the tester to mix OAM cells with other traffic.

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

Note

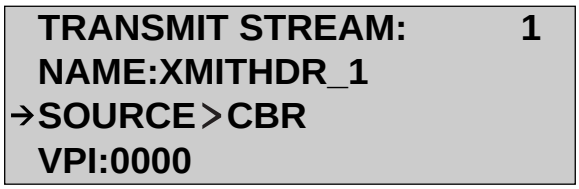
*To generate BERT cells, the **PAYLOAD** parameter must be set to **BERT**.*

The setting you selected is now the current value for the **PAYLOAD** parameter.

You have completed configuration of the transmission stream's payload.

Step 3: Set the transmission source, transmission rate, and traffic shape parameters

1. On the setup menu for **TRANSMIT STREAM 1,** press the **Up Arrow** key to move the **SOURCE** parameter to the selection line, as in:



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The OC3port Plus supports four different transmission sources. These configure the traffic pattern to be:

- CBR (Constant Bit Rate)
- VBR / Poisson (Variable Bit Rate / Poisson)
- PDU (Protocol Data Unit -- simulates network file traffic)
- VBR / BURST (Variable Bit Rate / Burst)
- OFF

Note

*The transmission source you choose determines which traffic parameters (that is, **PCR, SCR, MBS**, and **CDV LIM**) you can use. See Table 5.3 for a list of traffic parameters that are permitted for each source.*

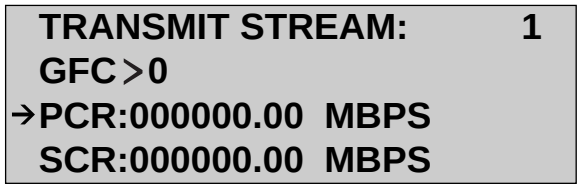
For detailed explanations and illustrations of the use of these parameters, see Appendix B.

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2. Press the **Left** or **Right Arrow** key to display the desired setting.

   The change takes effect immediately. The setting you selected is now the current transmission source.

3. Press the **Down Arrow** key to move the **PCR** parameter to the selection line.



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The **PCR (Peak Cell Rate)** traffic parameter defines the upper limit on the number of cells that can be transmitted on a given virtual channel.

Note

*The default form for expressing **PCR** is in **MBPS** (megabits per second). You can change the representation to a percent **(%BW)** or cells per second (**CPS**). For information on how to change the format for expressing **PCR**, see " Changing the Default Form for Expressing the PCR and SCR" later in this chapter.*

Press the **EDIT** key to enter Edit mode and supply a value for **PCR**. Press **ENTER** when you finish to save the change.

4. Press the **Down Arrow** key to move the **SCR** traffic parameter to the selection line. The **SCR (Sustained Cell Rate)** traffic parameter defines the average number of cells that can be transmitted on a given virtual channel.

Note

*The default form for expressing **SCR** is in **MBPS** (megabits per second. You can change this representation to a percent **(%BW)** or cells per second **(CPS)**. For information on how to change the format for expressing **SCR**, see "Changing the Default Form for Expressing the PCR and SCR" later in this chapter.*

Press the **EDIT** key to enter Edit mode and supply a value for **SCR**. Press **ENTER** when you finish to save the change.

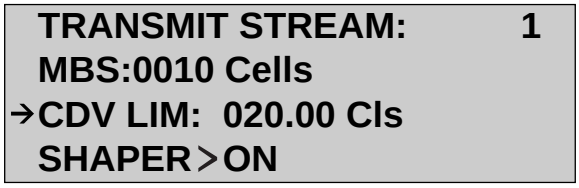
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5. Press the **Down Arrow** key to move the **MBS** parameter to the selection line.

   The **MBS (Maximum Burst Size)** traffic parameter defines the maximum number of cells that can be transmitted consecutively at the rate defined by **PCR**.

   Press the **EDIT** key to enter Edit mode and supply a value for **MBS**. Press **ENTER** when you finish to save the change.

6. Press the **Down Arrow** key to move the **CDV LIM** to the selection line: parameter

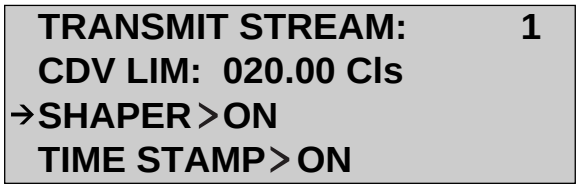


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   The OC3port Plus provides optimum spacing and positioning between cells in a transmission stream. The **CDV LIM** parameter lets you set the maximum limit (in units of ATM cells) that the tester can vary from this optimum placement.

   To change the value of the **CDV LIM** parameter, press the **EDIT** key to enter Edit mode. Then, press the arrow keys and supply the desired value. Make sure that you press **ENTER** when you are done to save the change.

7. Press the **Down Arrow** key to move the **SHAPER** parameter to the selection line:



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   This parameter has two settings: **ON** and **OFF**. When set to **ON**, the values you specify for the **MBS, PCR**, and **SCR** traffic parameters are enforced.

8. Press the **Left** or **Right Arrow** key to select the desired value for the **SHAPER** parameter.

   The OC3port Plus is now configured with your transmission source, traffic rate, and traffic shape selections.

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Table 5-2 lists the setup parameters that define how an ATM transmission stream is configured.

Table 5-2. OC3port Plus Transmission Stream Parameters

Parameter	Description
NAME:XMITHDR_1	A nine - character label that identifies the transmission stream. Any of the nine characters in this name can be set to a value between 0-9 and A-Z. The space is also allowed and counts as a character.
SOURCE>CBR	Identifies the source of the transmission stream traffic. Has five settings • **OFF**: use when the transmission stream is not being transmitted. • **CBR**: generates ATM cells as a rate equal to the specified peak cell rate (PCR). • **VBR / POISSON**: random Poisson distribution of individual cells. • **PDU**: random Poisson distribution of groups of cells. • **VBR / BURST**: a special stress-test pattern that runs at the PCR for the maximum burst size.
VPI:0000	Sets the Viral Path Indicator parameter as a decimal value between 0 and 255 (**UNI**) and between 0 and 4095 (**NNI**).
VCI:00000	Sets the Virtual Channel Indicator parameter as a decimal value between 0 and 65535.
PT>0	Sets the payload type parameter as a decimal value between 0 and 7.
CLP>0	Sets the cell loss priority bit to binary 1 or 0.
GFC>0	Sets the generic flow control field to a hexadecimal number between 0 and F (**UNI**).
PCR:000037.44 MBPS	Sets the peak cell rate using on eof the following formats: • Decimal number in MBPS (from 0 % to 149.76) • Percent (from 0 % to 100 %) • Cells per Second (from 0 to 353207.00)

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Table 5-2. OC3port Plus Transmission Stream Parameters (cont)

Parameter	Description
SCR:000000.00 MPS	Sets the sustained cell rate using one of the following formats: • Decimal number in MBPS (from 0 to 149.76) • Percent (from 0 % to 100 %) • Cells per Second (from 0 to 353207.00)
MBS:010 Cells	Sets the maximum burst size in units of ATM cells. Values range from 0 to 8000.
CDV LIM:020.00 Cls	Sets the cell delay variation limit.
SHAPER ON OFF	Activates (**ON)** or de-activates (**OFF**) the shaping function for a particular transmission stream. When activated, the shaper function guarantees that the **PCR**, **SCR**, and **MBS** values are respected.
TIME STAMP ON OFF	Activates (**ON**) or de-activates (**OFF**) the placement of a 24-bit time stamp value in the first three bytes of the payload of each cell. The time stamp can then be analyzed by a receiving unit to provide cell delay measurements.
FIXED PAYLOAD: 6A	Hexadecimal byte used to fill the payloads of all cells in a stream when the **PAYLOAD** parameter (see next entry in this table) is set to **FIXED**.
PAYLOAD>FIXED	Selects the type of payload used by every cell in a particular transmission stream. Has three settings: **FIXED**: on byte repeats throughout the cell's payload **OAM**: predefined OAM F4 and F5 payloads. **BERT**: pseudo-random or user-defined patterns for BER tests.
CHECK SUM?ON/OK	Determines the validity of the header checksum used in each ATM cell. Has three settings: **ON** / **OK**: forces the checksum byte to be correct **OFF**: allows the user to modify the checksum byte **ON / BAD**: forces an incorrect value for the header checksum
HDR:00 00 00 00 55	Five hexadecimal header bytes that represent the header as defined by the **VPI, VCI, PT, CLP**, and **GFC** parameters. Can be edited by the user.

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Table 5-3 lists the traffic parameters that must be set for each transmission source. The traffic parameters are listed in the first column and the traffic source selections are listed across the table. To use the table, find the traffic source you want to use. If the traffic source must be used with a particular traffic parameter, the intersecting cell indicates "required". If selection of a particular traffic parameter is optional, the intersecting cell indicates "optional".

Table 5-3. Valid Combinations of Traffic Parameter and Traffic Source Selections

	CBR	VBR / Position	PDU	VBR / Burst
PCR	Required	Required	Required	Required
SCR	N/A*	Required	Required	Required
MBS	N/A	Required	Required	Required
CDV LIM	Optional	Optional	Optional	Optional
* N/A = not applicable				

Some Suggestions for Configuring Multiple Cell Streams

The OC3port Plus can transmit up to eight ATM cell streams. To effectively take advantage of this capability, keep the following in mind:

- The sum of the allocated bandwidths of all eight transmission streams cannot equal more than 100 % of the OC3 payload-carrying capability.
- Configuring multiple transmission streams that must contend for the same slotted transmission media results in contention for the available transmission slot times, which, in turn, forces the resulting streams to deviate more from the requested values.

An individual transmission stream can be shaped or can bypass the shaper at the user's discretion. Because of this, consider the following:

- Shaped cell streams are always constrained by their traffic contract parameters. In some cases, the combination of cell slot contention and shaper operation causes effective transmission rates to be lower than expected.
- Cell streams that are not shaped have an intrinsic advantage over shaped streams as time slots are allocated and may instantaneously exceed some equipment's capability to buffer traffic.

Combining well-behaved and rogue transmission streams provides a realistic environment for stress testing all types of ATM equipment.

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When multiple transmission streams are defined and carry specific payload types (for example, BERT, OAM, or a user-defined payload), the OC3port Plus may issue the message:

```
TRAFFIC SELECTIONS OVERFLOW TX BUFFER
```

after it attempts to load the traffic pattern. This message indicates that the tester could not produce the requested traffic pattern. To correct the problem, try reducing the total bandwidth allocation for the transmissions streams or changing one or more of the payload types to **FIXED**.

Configuring a VBR / Poisson Transmission Source

Each ATM transmission stream can be configured to operate as a CBR or VBR / Poisson source. These cell sources can then be passed through a cell "shaper" that applies PCR, SCR, MBS, and CDVT traffic parameters to each stream to guarantee compliance.

A CBR source is specified in the OC3port Plus by setting a PCR value. ATM cells are then generated at intervals equal to 1/PCR. A VBR / Poisson source is specified in the OC3port Plus by setting an SCR value. The OC3port Plus then generates randomly spaced ATM cells that have a Poisson distribution and a mean rate equal to 1/SCR. The instantaneous transmission rate will not exceed the PCR value specified.

The shaper regulates the output of each traffic source so that its specified traffic parameters are not exceeded. The shaper must adjust for deviations in ideal cell placement because of the slotted nature of ATM transmission and the contention for time slots among the eight transmission streams. The shaper's parameters, especially the **CDV LIM** (Cell Delay Variation limit), constrain and limit the quantity of cells that can be generated by the OC3port Plus. If you specify transmit streams and parameters that conflict with the shaper's settings, the effective transmission rates of the various streams will be less than you expect.

Other ATM Configuration Options

There are five additional ATM setup options available that allow you to further configure the OC3port Plus for ATM testing. These options let you configure the tester to do the following:

- Scramble ATM cell payloads
- Enable or disable the Coset Polynomial
- Correct single-bit HCS errors
- Specify the type of cells to use as background traffic
- Identify the type of header (**UNI** vs. **NNI**)
- Change the form for expressing the **PCR** and **SCR** parameters
- Large transmit queue selection.

These options are described in the following sections.

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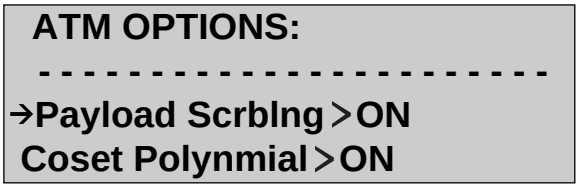
Payload Scrambling Option

The OC3port Plus has a payload scrambling option that turns the automatic scrambling of ATM cell payloads on and off. The advantage of using this option is that it lets you further differentiate the header bytes from the payload, thereby improving the efficiency of the cell delineation process. Payload scrambling can provide a solution to some transmission equipment that is sensitive to certain bit patterns in the ATM payload. The scrambler guarantees a higher ones density and no false triggering of alarms.

In payload scrambling, ATM cells are extracted from the transmitted payload and scrambled using an $X^{43}+1$ self-synchronizing polynomial. On the receive side, the process is reversed and the $X^{43}+1$ polynomial is used to de-scramble the received payload.

Payload scrambling is activated or de-activated by changing the setting for the **Payload Scrblng** option. To change this setting, follow these steps:

1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Up** or **Down Arrow** key to move **ATM Options** to the selection line. Then, press **ENTER**. The **ATM Options** submenu is displayed, as in the following:



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3. Make sure that the **Payload Scrblng** option is on the selection line. This option has two settings: ON and OFF. When set to ON, payload scrambling is activated. When set to **OFF**, payload scrambling is de-activated.
4. Press the **Left** or **Right Arrow** key to select the desired setting.

   The change takes effect immediately. The setting you selected is now the current value of the **Payload Scrbling** option.

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Coset Polynomial Option

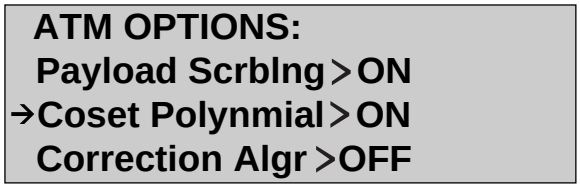
The OC3port Plus has a coset polynomial ($X^6+X^4+X^2+1$) option, which is used to verify the incoming header checksum.

One of the chief benefits of using this option is that you can improve the efficiency of the cell delineation process and facilitate the recovery of the frame structure, thereby reducing the likelihood of signal loss errors.

Whether you choose to use the coset polynomial or not depends on your particular application. Most ATM equipment supports the coset polynomial, but some equipment does not. If you set this option to OFF on the tester and the equipment supports the coset polynomial, it can cause interoperability problems. It is best to check and then make sure that both sides (the OC3port Plus and the equipment) have the same setting.

To enable or disable the **Coset Polynomial** option, do the following:

1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move **ATM Options** to the selection line. Press **ENTER**. The **ATM OPTIONS** submenu is displayed.
3. Press the **Down Arrow** key to move the **Coset Polynomial** option to the selection line, as in:



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This option has two settings: `ON` and `OFF`.

When set to `ON` (the default), the OC3port Plus adds the coset polynomial to the HEC.

When set to `OFF`, the OC3port Plus does not add the coset polynomial to the HEC.

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

   The change takes effect immediately. The setting you selected is now the current value of the **Coset Polyn0mial** option.

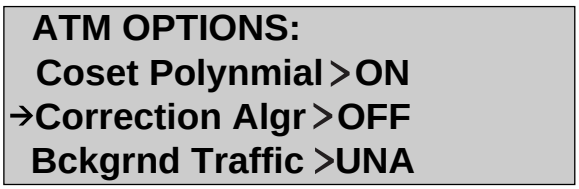
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Correction Algorithm Option

The OC3port Plus has a Correction Algorithm option that provides a means for finding and correcting single-bit errors in the ATM cell header. You can turn this option **ON** to enable correction of these errors or **OFF** to prevent correction of these errors.

To enable or disable correction of single-bit errors, follow these steps:

1. Press the **ATM** key. The **ATM SELECTIONS** menu displays.
2. Press the **Down Arrow** key to move the **ATM Options** to the selection line. Press **ENTER**. The **ATM OPTIONS** submenu is displayed.
3. Press the **Down Arrow** key to move the **Correction Algr** option to the selection line, as in:



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   This option has two settings: ON and OFF.

   When set to ON, the OC3port Plus corrects cells with single-bit **HCS** errors. The cells are not reported as having checksum errors because these errors were corrected.

   When set to OFF (the default), if the OC3port Plus finds errors in the cell header, the cells are treated as non-correctable. The cells are then discarded and reported as having checksum errors.

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

   The change takes effect immediately. The setting you selected is now the current value of the **Correction Algr** option.

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Background Traffic Option

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 the ATM cell stream to fill unused bandwidth.

To specify which type of cell to use as background traffic, follow these steps:

1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key until **ATM Options** is on the selection line. Press **ENTER**. The **ATM OPTIONS** submenu is displayed.
3. Press the **Down Arrow** key to move the **Bckgrnd Traffic** option to the selection line, as in:

```
 ATM OPTIONS:
 Correction Algr  >OFF
→Bckgrnd Traffic  >UNA
 Header Type      >UNI
```

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   There are two settings for this option: `UNA` (unassigned) and `IDL` (idle).

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

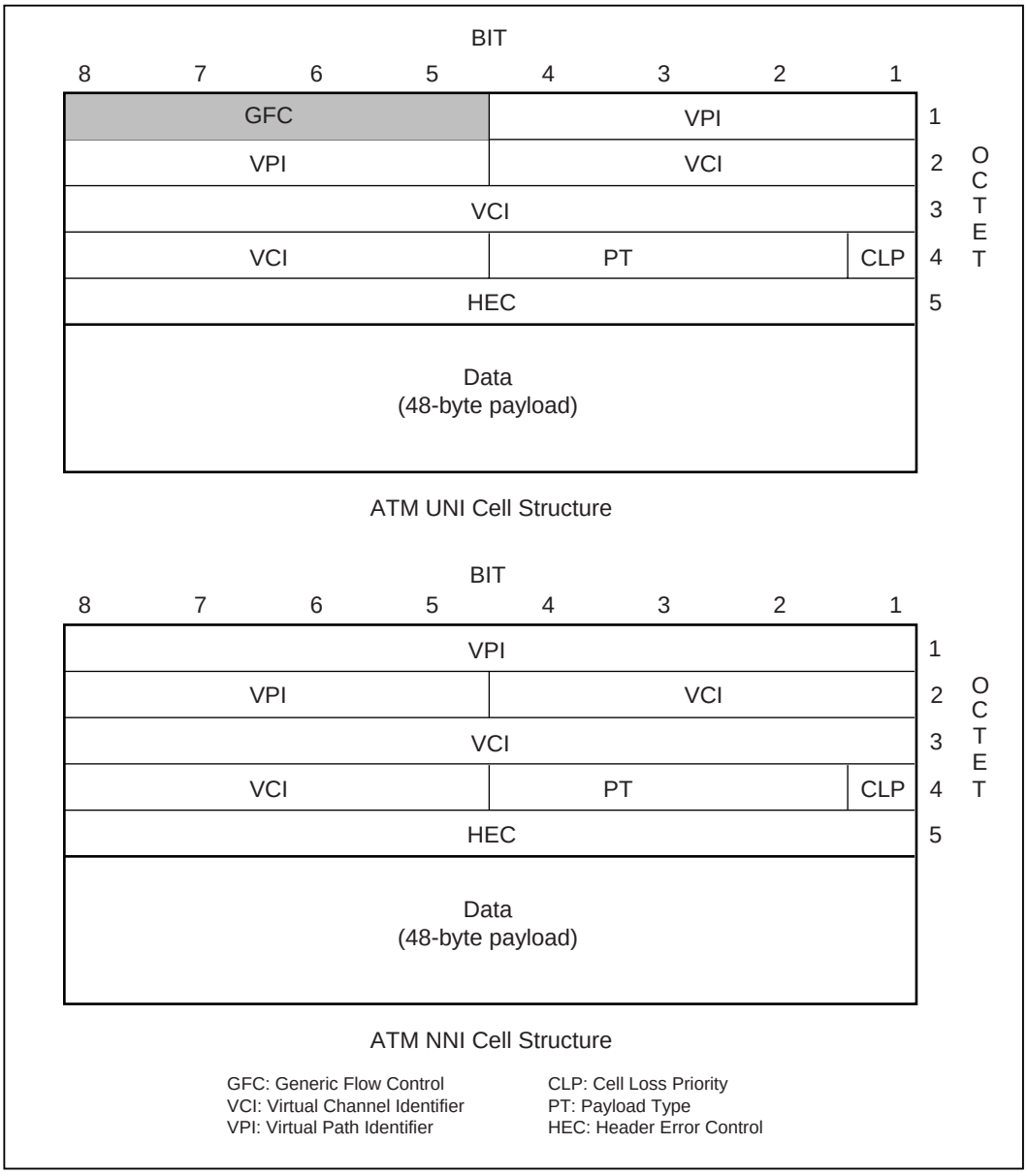
   The OC3port Plus is now set up to use as background traffic the setting you selected.

Header Type Option

Two different header schemes are used for ATM cells: one for **UNI** (User Network Interface) and one for **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. Figure 5-1 illustrates the differences in structure between the UNI and NNI cells.

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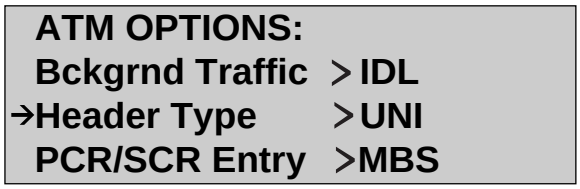
Figure 5-1. UNI and NNI Cell Structure Differences

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One further difference between UNI and NNI cells is 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 set the OC3port Plus 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 the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key until **ATM Options** is on the selection line. Press **ENTER**. The **ATM OPTIONS** submenu is displayed.
3. Press the **Down Arrow** key to move the **Header Type** option to the selection line, as in:



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   This option has two settings: `UNI` (the default) and `NNI`.
4. Press the **Left** or **Right Arrow** key to select the desired setting.

   The OC3port Plus is now set up to use the setting you selected as the current value of the **Header Type** option.

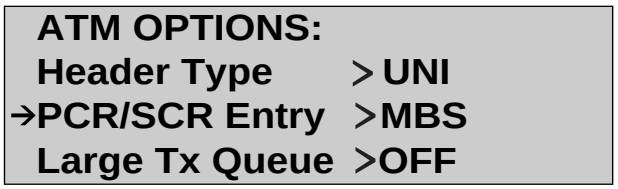
Changing the Form for Expressing the PCR and SCR

The default form for expressing the **PCR** and **SCR** parameters is in megabits per second (**MPBS**). You can change the default representation to a percent (**%BW**) or cells per second (**CPS**). To do this, follow these steps:

1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key until **ATM Options** is on the selection line. Press **ENTER**. The **ATM OPTIONS** submenu is displayed.

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3. Press the **Down Arrow** key to move the **PCR/SCR Entry** option to the selection line, as in:



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4. Press the **Left** or **Right Arrow** key to change the format to **PCT (%BW**) or **CPS** (cells per second). The setting you selected is now the current format for expressing the **PCR** and **SCR** parameters.

Large Transmit Queue

The eight transmit streams are shaped in a transmit queue. In most cases traffic can be shaped in a smaller queue (the default selection). However, there are combinations of parameters (i.e., smaller PCR / SCR, larger MBS values) that require a large queue in order to meet the traffic requested.

The OC3port Plus will display a warning when the combination of traffic parameters cannot be met. Enabling the large transmit queue allows a wider range of parameters to be met. The drawback to using the large transmit queue, however, is that loading the selected traffic pattern can take considerably longer.

To enable or disable the use of the large transmit queue, do the following:

1. Press the **ATM** key.

   The **ATM SELECTIONS** menu is displayed.

2. Press the **Down Arrow** key until **ATM Options** is on the selection line.

3. Press **ENTER**.

   The **ATM OPTIONS** submenu is displayed.

4. Press the **Down Arrow** key to move the **Large Tx Queue** option to the selection line.

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

The transmit queue selection will be used the next time transmit streams are loaded.

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Chapter 6
Testing ATM Networks

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Introduction

This chapter describes the ATM network testing functions of the OC3port Plus. It shows you how to start cell stream transmission and how to monitor ATM cells on an OC3 signal.

The OC3port Plus has the ability to capture cell payloads and store them in a buffer for later viewing and analysis. This chapter also describes the cell capture process and shows you how to set up the OC3port Plus to capture and analyze ATM, ILMI, and OAM cell streams.

To facilitate testing and enable you to quickly assess problems with a network, the OC3port Plus has an automatic testing function. These tests can automatically scan virtual circuits for ATM activity and identify for you which circuits are in use. This chapter shows you how to set up and run these tests and how to interpret the results provided about the detected circuits.

To simplify the process of configuring the OC3port Plus to perform ATM network testing, the OC3port Plus provides four pre-configured traffic templates. These templates, which are described in this chapter, provide complete transmission stream parameters for up to four transmit streams. Using these templates, you can easily set up and modify more complicated cell streams.

The OC3port Plus has three Quality of Service (QoS) tests: Cell Loss, Cell Delay Variation, and Cell Transfer Delay. This chapter provides details about the operation of these tests and shows you how to set up, run them, and interpret their results.

The OC3port Plus can transmit ATM BERT test patterns. This chapter describes the operation of the BERT test and shows you how to configure the tester's BERT function and run a BERT test.

The OC3port Plus provides IP Ping capability, which enables you to test connectivity to devices on the IP layer. This chapter shows you how to set up the tester so that you can send and receive IP messages.

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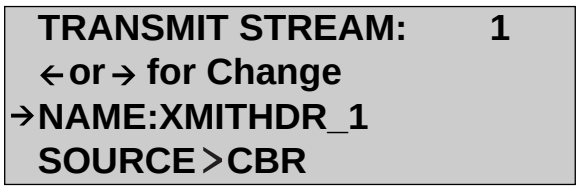
Starting Stream Transmission

The OC3port Plus can simultaneously transmit up to eight cell transmission streams using up to 100 % of the available OC3 bandwidth. To transmit one or more cell transmission streams, do the following:

1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **Setup XMIT Streams** option to the selection line. Then, press **ENTER**. The setup menu for **TRANSMIT STREAM 1** is displayed:

Note

*Press the **Left** or **Right Arrow** key to display the setup menus for the seven remaining cell transmission streams.*



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3. Edit the options on this menu (see "Configuring an ATM Cell Transmission Stream" in Chapter 5 for details).
4. Press the **ATM** key to return to the **ATM SELECTIONS** menu.
5. Press the **Down Arrow** key to move the **ATM XMIT Mode** option to the selection line. Then, press the **Left** or **Right Arrow** key to select one of these transmission modes:
   - **STR** Constantly transmits ATM cells based on the traffic patterns configured for the eight transmission streams. Repeats the cycle of transmission until you end transmission.
   - **BUR** Transmits a burst of cells based on the traffic pattern configured for TRANSMIT STREAM 1 each time you press the **START/STOP** key. The size of each burst is equal to the **MBS** setting.

Note

*You can transmit a burst of cells by pressing the **START/STOP** key from any display. When you press this key to transmit the burst, the* * SENT BURST * *message is displayed to indicate that the transmission took place.*

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6. Press the **Up Arrow** key to move the **Load XMIT Streams** option to the selection line. Then, press **ENTER**.

The patterns defined for the configured transmission streams are loaded. This takes a few seconds while the OC3port Plus prepares the cell generator and shaper for operation. After the traffic patterns are loaded, the OC3port Plus displays results to you on the LCD.

Note

When multiple transmissions streams are defined and carry value-specific payload types (for example, BERT, OAM, or a user-defined payload), the OC3port Plus may issue the message `TRAFFIC SELECTIONS OVERFLOW TX BUFFER` *after it attempts to load the traffic patterns. This message means that the OC3port Plus cannot produce the traffic pattern you specified. Try reducing the total bandwidth allocation for the transmission streams or change one or more of the payload types to FIXED to remedy the problem.*

Transmitting OAM Cells on a Single Circuit

The OC3port Plus allows you to transmit one of the following Fault Management OAM cells at a rate of one OAM cell per second:

- F4 Segment RDI
- F4 Segment AIS
- F4 Segment Loopback
- F4 End-to-End RDI
- F4 End-to-End AIS
- F4 End-to-End Loopback
- F5 Segment RDI
- F5 Segment AIS
- F5 Segment Loopback
- F5 End-to-End RDI
- F5 End-to-End AIS
- F5 End-to-End Loopback.

To perform OAM transmission, the OC3port Plus does the following:

1. Builds the correct OAM payload as defined in the setup.
2. Combines the OAM payload with TRANSMIT STREAM 1.

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3. Modifies TRANSMIT STREAM 1's value to reflect the correct OAM flow. TRANSMIT STREAM 1's header is used with the following modifications:
   - F4 Segment OAM cells force the VCI field to 3 and set bits 0 and 2 of the Payload Type Indicator to 0.
   - F4 End-to-End OAM cells force the VCI field to 4 and set PT0 and PT2 to 0.
   - F5 Segment OAM cells change the Payload Type Indicator to 4.
4. Begins transmitting the specified OAM cell at a one-cell-per-second rate.

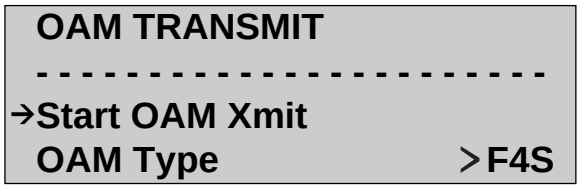
This section shows you how to configure the OC3port Plus for OAM cell transmission and how to transmit cells on one circuit at a one-second rate.

1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **Setup XMIT Streams** to the selection line. Press **ENTER**. Then, edit the setup options for **TRANSMIT STREAM 1.**
3. Press the **ATM** again. Then, press the **Down Arrow** key to move the **OAM Transmit** option to the selection line. For example:



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4. Press **ENTER**. The **OAM TRANSMIT** submenu is displayed:



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5. Press the **Down Arrow** key to move the **OAM Type** option to the selection line. This option has four settings, which represent the type of OAM cell to be sent:
   - F4S F4 Segment
   - F4E F4 End-to-End
   - F5S F5 Segment
   - F5E F5 End-to-End.
6. Press the **Left** or **Right Arrow** key to choose the desired setting for **OAM Type**.

Note

The OC3port Plus displays a warning message if you attempt to transmit F5 OAM cells when the VCI for TRANSMIT STREAM 1 is set to zero. This is an illegal cell format. Therefore, make sure that the VCI for TRANSMIT STREAM 1 is non-zero value before you attempt to transmit F5 OAM cells.

7. Press the **Down Arrow** key to move the **Cell Format** option to the selection line. This option has three settings, which represent the format of the OAM cell to be sent:
   - RDI Remote Diagnostics Indicator
   - AIS Alarm Indication Signal
   - LBK Loopback
8. Press the **Left** or **Right Arrow** key to choose the desired setting for **Cell Format**.
9. Press the **Up Arrow** key to move the **Start OAM Xmit** option to the selection line. Then, press **ENTER**. OAM cell transmission begins and you see a display similar to this:



za081f.eps

This is the Transmit Stream display. The TX STR1 counter consecutively increases every second or every time an OAM cell is transmitted.

10. To stop OAM transmission, press the **ATM** key to return to the **ATM SELECTIONS** menu. Then, select the **Load XMIT Streams** option.

Transmitting OAM Cells on Multiple Circuits

The OC3port Plus lets you mix OAM cells with other traffic by setting the payload to OAM for any of the eight transmission streams.

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To transmit OAM cells on a number of circuits at the same time, complete this procedure for each transmission stream that you want to send OAM cells on.

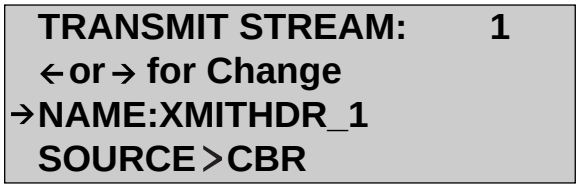
Notes

The OAM parameters (for OAM Type and OAM Format) that are used to construct the cell are programmable under the OAM Transmit menu.

Selecting OAM as the payload modifies portions of the transmission stream's header (the VCI and PT fields), but this modification does not show up in the setup options.

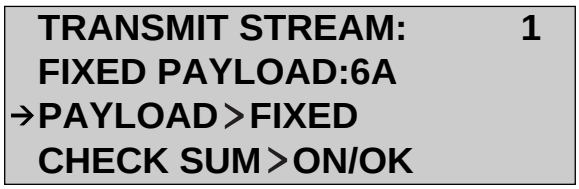
Multiple transmission streams can simultaneously have their payload set to OAM. They all generate the same OAM cell, but with different headers.

1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the Down Arrow key to move the **Setup XMIT Streams** option to the selection line. Press **ENTER**. The setup menu for one of the transmission streams is displayed. For example:



za063f.eps

3. Press the **Left** or **Right Arrow** key to display the transmission stream that you want to use to transmit OAM cells.
4. Press the **Down Arrow** key to move the **PAYLOAD** parameter to the selection line:



za067f.eps

5. Press the **Left** or **Right Arrow** key to change the setting to OAM.
6. Press the **ATM** key to return to the **ATM SELECTIONS** menu.

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7. Press the **Down Arrow** key to move the **Load XMIT Streams** option to the selection line. Then, press **ENTER**.

The OC3port Plus loads the transmission streams, then displays results to you on the transmit stream displays.

Monitoring an ATM Network

This section describes the network monitoring functions of the OC3port Plus.

The OC3port Plus has four receive filters that can be used to monitor the input OC3 signal for ATM cells. The information in the first part of this section shows you how to monitor ATM traffic using a receive filter and how to interpret the statistical measurements provided by the OC3port Plus.

Using the receive filters, you can monitor "live" ATM traffic as it is being generated. The OC3port Plus also lets you capture active cells and put them in a storage for later examination. The second part of this section describes the cell capture operation and shows you how to store and view captured ATM, ILMI, and OAM cell payloads.

The OC3port Plus can monitor an ATM network for the presence of AAL traffic. The last part of this section shows you how to set up the OC3port Plus to detect AAL cells and identify their format.

Monitoring ATM Traffic with a Receive Filter

To monitor an traffic using a receive filter, do the following:

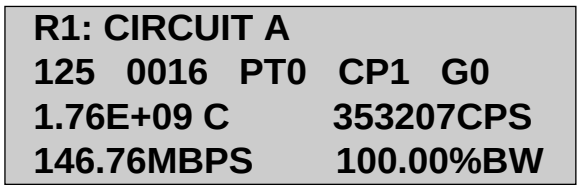
1. Configure the OC3port Plus for the input signal by configuring one of the receive filters (see "Configuring a Receive Filter" in Chapter 5).
2. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.

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3. Make sure that the **Monitor ATM** option is on the selection line. Then, press **ENTER**. You see the result display for the receive filter. For example:

Note

*If you press the **CLEAR** key while viewing a result display, all counters are set to zero.*

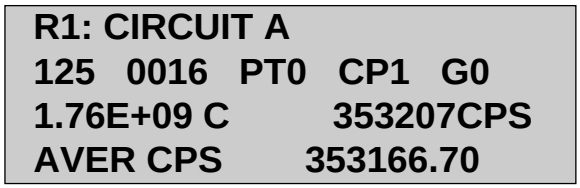


za082f.eps

This display contains the following information:

- **Line 1** Identifies the receive filter (R1) by name (in this case, "Circuit A").
- **Line 2** Provides the header information (values of the VPI, VCI, PT, CLP, and GFC settings).
- **Line 3** Provides both the total count of ATM cells received that match the receive filter and a count of matching cells received during the previous second.
- **Line 4** Indicates the cell reception rate in megabits per second and the percent bandwidth.

4. Press the **Right Arrow** key. You see additional information on Line 4 for the receive filter:



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This display presents the cell reception rate in average cells per second (**AVER CPS**).

Note

AVER CPS *is the average number of cells received per second since the test began, since the filter was activated, or since the* ***CLEAR*** *key was last pressed.*

5. Press the **Right Arrow** key again. Line 4 now shows you the bandwidth statistics for the receive filter:

```
R1: CIRCUIT A
125  0016  PT0  CP1  G0
1.76E+09 C      353207CPS
BW:100% <100% <100%
```

za084f.eps

The bandwidth percentages provided represent the **MINIMUM <CURRENT <MAXIMUM** bandwidth achieved since the test began, since the filter was activated, or since the **CLEAR** key was last pressed.

6. Press the **Up Arrow** key to view result displays for the remaining receive filters.

   Note that if a receive filter is currently not active, you see a display similar to this one:

```
R3: FILTER 3
255  1000  PTx  CPx  G0
NOT ACTIVE:  PRESS
ENTER TO ACTIVATE
```

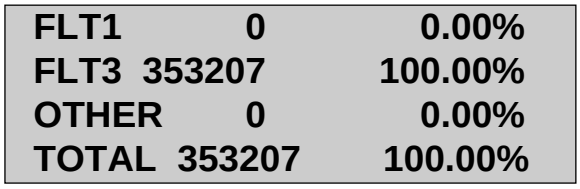
za085f.eps

Note

- *Only two of the four receive filters can be active at any one time.*
- *To activate or de-activate a receive filter, press* ***ENTER*** *while viewing that receive filter's result display.*

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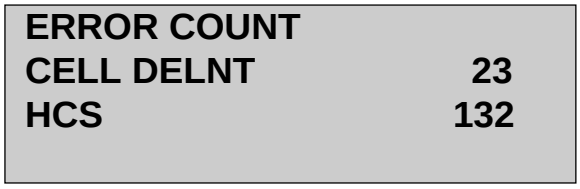
7. Press the **Up Arrow** key until you see a display similar to this one:



za086f.eps

This is a summary display of ATM cell activity being detected by the OC3port Plus. Lines 1 and 2 show the number of cells received (the number steadily increases if cells are being detected) and the bandwidth settings that match the currently active receive filters. Line 3 (**OTHER**) shows the number of cells received that do not match the currently active receive filters. Line 4 displays the total cell count and the overall bandwidth percent.

8. Press the **Up Arrow** key again. You see the first of six result displays. For example:



za087f.eps

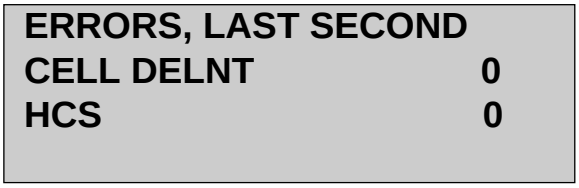
This is the **ERROR COUNT** display. It provides counts of cell delineation (23) and header checksum errors (132).

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9. Press the **Left** or **Right Arrow** key to view the remaining ATM error displays. These include the following:

   - ERRORS, LAST SECOND
   - BIT ERROR RATE
   - ERRORED SECONDS
   - THRESHOLD ERRD SECS
   - % SECONDS ERROR FREE

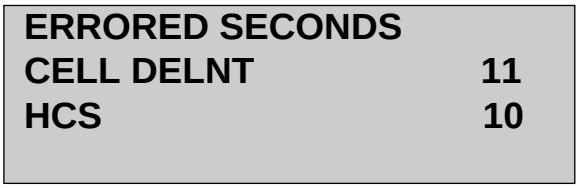
   Following are two examples of displays from this list and the information they provide:



za088f.eps

The **ERRORS, LAST SECOND** display gives you the number of errors received in the previous second. Following from the previous example, this display indicates that of the 23 cell delineation errors detected, none (`0`) occurred in the previous second, and of the 132 header checksum errors detected, none (`0`) occurred in the previous second.

Consider this next display:



za089f.eps

The **ERRORED SECONDS** display provides the number of seconds in which one or more errors occurred. Following from the previous example, these results indicate that of the 23 cell delineation errors detected, there were **11** seconds in which one or more of the errors occurred, and that of the 132 header checksum errors, there were **10** seconds in which one or more of these types of errors occurred.

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10. Press the **Up Arrow** key. You see this display:



za090f.eps

This display shows you the percentage of transmitted background (idle or unassigned) cells.

11. Press the **Up Arrow** key again to display the transmission stream counters. For example:



za091f.eps

This display provides a count of the cells transmitted on Transmit Streams 5 - 8 since the time the traffic pattern was loaded.

12. Press the **Up Arrow** key again to display the counts of cells transmitted on Streams 1 - 4.

Capturing ATM Cells

The OC3port Plus allows you to capture and store complete ATM cells, ATM cells with headers and the first three bytes of the payload, and ATM cell headers only. Note that the header checksums are not saved.

The cells can be captured with the timestamp set to `OFF` or to `ABS/REL`. The quantity of data that the OC3port Plus can capture is shown Table 6-1. After the cells are captured, you can view information about them on the LCD. This section shows you how to configure the OC3port Plus to capture ATM cells and describes the reports generated by the cell capture process.

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Table 6-1. Captured Buffer Size

Capture Type	Qty -- Timestamp OFF	Qty -- Timestamp ABS / REL
Header and payload	630	595
Header and first 3 bytes of payload	4681	3276
Header only	8192	4681

Configuring the OC3port Plus for Capturing ATM Cells

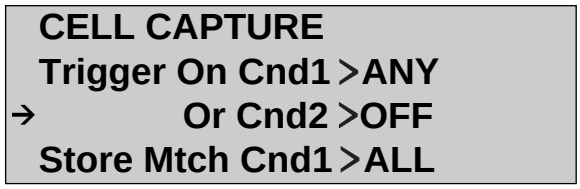
To configure the tester to capture ATM cells, first set up a receive filter with the appropriate header information.

Then, do the following:

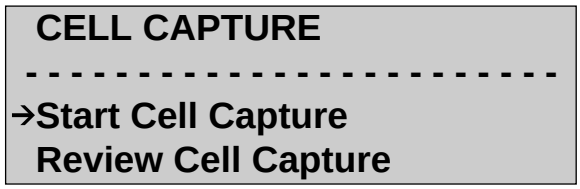
1. Program the OC3port Plus with the desired trigger condition (criteria for determining which cells to capture).
2. Set the storage controls (which cells to store).

The following procedure steps you through this part of the process.

1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **Cell Capture** option to the selection line.
3. Press **ENTER**. The **CELL CAPTURE** submenu is displayed:



za092f.eps



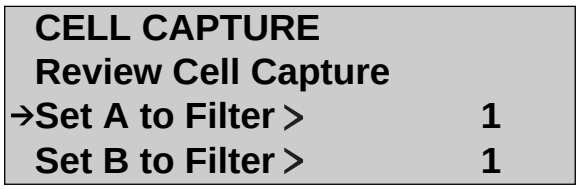
za093f.eps

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4. Press the **Down Arrow** key to locate these options:

   - **Set A to Filter**
   - **Set B to Filter**

   For example:



za094f.eps

   The OC3port Plus has two cell capture filters, A and B, which are used to control the capturing of cells. You can set each capture filter to match any one of the four receive filters, or you can set both capture filters to match the same receive filter. By default, both capture filters are set to Receive Filter 1.

5. With the **Set A to Filter** option on the selection line, press the **Left** or **Right Arrow** key to set it to the desired receive filter.

6. Press the **Down Arrow** key to move the **Set B to Filter** option to the selection line. Then, press the **Left** or **Right Arrow** key to set it to the desired receive filter.

7. Press the **Down Arrow** key to locate the following options, which represent the trigger conditions (the criteria for storing cells):

   - **Trigger On Cnd1**
   - **Or Cnd2**

   These two options are used together. They set up an either/or condition for determining the criteria for storing cells.

   Trigger On Cnd1 has these four settings:

   - ANY Begins storing cells when any ATM cell is received.
   - A Begins storing cells when a cell matching the receive filter set for capture filter A is received.
   - !A Begins storing cells when a cell matching any receive filter except the one set for capture filter A is received.
   - OFF Tells the OC3port Plus not to evaluate this condition.

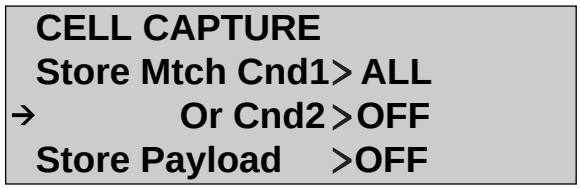
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Or Cnd2 has these three settings:

- OFF Tells the OC3port Plus not to evaluate this condition.
- B Begins storing cells when a cell matching capture filter B's receive filter is received.
- !B Begins storing cells when a cell matching any receive filter except the one set for capture filter B is received.

8. With the **Trigger On Cnd1** on the selection line, press the **Left** or **Right Arrow** key to set the desired trigger condition.
9. Press the **Down Arrow** key to move the **Or Cnd2** option to the selection line. Then, press the **Left** or **Right Arrow** key to set its trigger condition.
10. Press the **Down Arrow** key to locate these next two setup options:
    - **Store Mtch Cnd1**
    - **Or Cnd2**

    For example:



za095f.eps

These options determine which cells the OC3port Plus stores in the capture buffer after the trigger condition is met.

Store Mtch Cnd1 has these four settings:

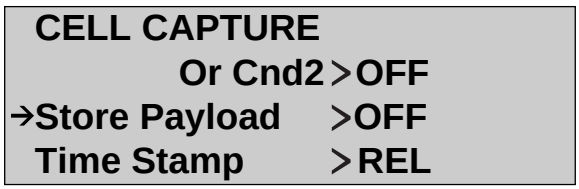
- ALL Stores all cells received.
- A Stores only the cells that match the receive filter set for capture filter A.
- !A Stores cells that match any receive filter except the receive filter set for capture filter A.
- OFF Tells the OC3port Plus not to evaluate this condition.

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Or Cnd2 has these three settings:

- OFF Tells the OC3port Plus not to evaluate this condition.
- B Stores only the cells that match the receive filter set for capture filter B.
- !B Store cells that match any receive filter except the receive filter set for capture filter B.

11. Press the **Down Arrow** key to move the **Store Payload** option to the selection line:



za096f.eps

The **Store Payload** option determines whether the OC3port Plus stores complete ATM cells (headers and payloads) or partial ATM cells (header and timestamp information only).

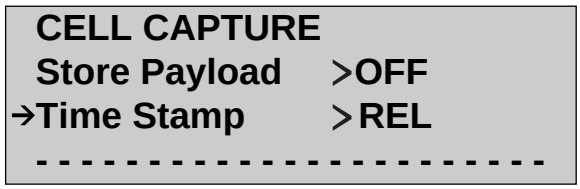
This option has two settings:

- ON Stores complete ATM cells. The OC3port Plus has the capacity to store about 700 complete ATM cells.
- OFF Store partial ATM cells. The OC3port Plus has the capacity to store about 4600 partial ATM cells.

12. Press the **Left** or **Right Arrow** key to set a value for the **Store Payload** option.

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13. Press the **Down Arrow** key to move the **Time Stamp** option to the selection line:



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The **Time Stamp** option determines whether the OC3port Plus records the arrival time between captured cells and how that arrival time is calculated. The option has three settings:

- REL Records each cell's arrival time relative to the time that the previous cell was captured.
- OFF Does not record the arrival time between captured cells.
- ABS Records the absolute arrival time (uses zero as the reference point) of each cell from the time the cell capture began.

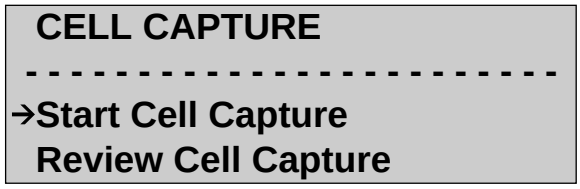
14. Press the **Left** or **Right Arrow** key to set a value for the **Time Stamp** option.

The setup is completed. The OC3port Plus is now configured for capturing ATM cells.

Starting a Cell Capture

To start a cell capture, complete these steps:

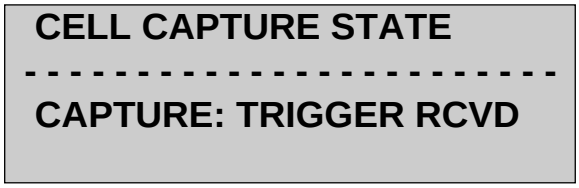
1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Make sure that the **Cell Capture** option is on the selection line. Then, press **ENTER**. The **CELL CAPTURE** submenu is displayed:



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3. Make sure that the **Start Cell Capture** option is on the selection line. Then, press **ENTER**. You see this display:

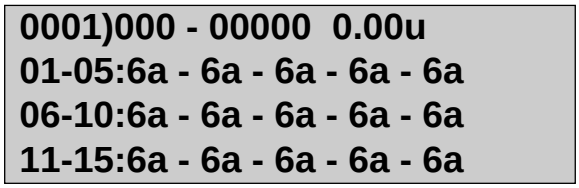


za098f.eps

The OC3port Plus immediately begins to fill the capture buffer with cells. When the buffer is full, the contents are displayed to you on the LCD. See "Looking at the Captured Cells", which follows for an explanation of the cell capture result displays.

Looking at the Captured Cells

When you run a Cell Capture, the OC3port Plus immediately displays results to you on its LCD. Following is a sample display of the information provided about Cell 0001, the first cell captured by the OC3port Plus:



za099f.eps

Note

The first cell in the buffer, Cell 0001, is always the cell that triggered the capture.

This information, which is displayed on four lines, tells you the following:

- **Line 1** The first field contains the number of the cell you are currently viewing. In this example, you are viewing Cell 0001. This field is followed by the VPI (000), VCI (00000), and the cell's time stamp (**u** stands for microseconds and **m** stands for milliseconds).
- **Line 2** Contains hexadecimal representation (6a) of payload bytes 1 - 5.
- **Line 3** Contains hexadecimal representation (6a) of payload bytes 6 - 10.
- **Line 4** Contains hexadecimal representation (6a) of payload bytes 11 - 15.

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To view the rest of the payload for Cell 0001, press the **Left** or **Right Arrow** key. For example:

```
0001)000 - 00000  0.00u
16-20:6a - 6a - 6a - 6a - 6a
21-25:6a - 6a - 6a - 6a - 6a
26-30:6a - 6a - 6a - 6a - 6a
```

za100f.eps

This display shows you the contents of bytes 16 - 30. To view the rest of the payload, continue pressing the **Left** or **Right Arrow** key.

To view other cells captured in the buffer, press the **Down Arrow** key. For example:

```
0002)125 - 00016  2.83u
01-05:27 - 08 - ac - 12 - 12
06-10:12 - 12 - 12 - 12 - 12
11-15:12 - 12 - 12 - 12 - 12
```

za101f.eps

Note that in this example, you are viewing Cell 0002. It has a VPI of 125, a VCI of 16, and a time stamp of 16.9 microseconds. The majority of payload bytes are 12, except for the first three bytes, which carry the transmit time stamp.

If you want to see additional header information, press **ENTER**. For example:

```
0002)G0  P0  C0   2.83u
01-05:27 - 08 - ac - 12 - 12
06-10:12 - 12 - 12 - 12 - 12
11-15:12 - 12 - 12 - 12 - 12
```

za102f.eps

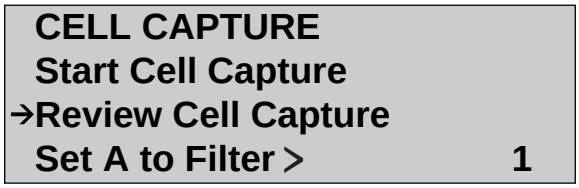
This display shows you the GFC, Payload Type, and CLP bit on Line 1. If you press **ENTER** again, you see the full header in hexadecimal format.

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Displaying the Results of the Previous Cell Capture

The OC3port Plus stores the results of the last cell capture you conducted since you turned on the tester. To display the results of the last cell capture you conducted, do the following:

1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **Cell Capture** option to the selection line. Then, press **ENTER**. The **CELL CAPTURE** submenu is displayed.
3. Press the **Down Arrow** key to move the **Review Cell Capture** option to the selection line, as in the following:



za103f.eps

4. Press **ENTER**. The results of the previously conducted cell capture are displayed. (See "Looking at the Captured Cells" for information that the OC3port Plus provides on the cells stored in the buffer.)

Note

If no cells are stored in the buffer, you see this message: `NO CELLS CAPTURED`.

Capturing ILMI Cells

A number of ATM standards bodies have provided for the transportation of Interim Local Management Interface (**ILMI**) traffic on a dedicated virtual circuit (VCI 16) in any virtual path.

This section shows you how to set up the OC3port Plus to capture ILMI cells and how to look at the captured cells, which are stored in the tester's buffer. Capturing ILMI cells provides you with a good deal of information about the operation of an OC3-ATM link.

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Configuring the OC3port Plus for Capturing ILMI Cells

To configure the OC3port Plus for capturing ILIMI cells, do the following:

1. From the **ATM SELECTIONS** menu, set up the receive filter you want to use to check the incoming cells. Edit this receive filter so that its **VCI** is set to `00016`.
2. Press the **ATM** key to re-display the **ATM SELECTIONS** menu. Then, press the **Down Arrow** key to move the **Cell Capture** option to the selection line, as in the following:

```
 ATM SELECTIONS:
 ATM XMIT Mode        >STR
→Cell Capture
 Quality of Service
```

za104f.eps

3. Press **ENTER**. The **CELL CAPTURE** submenu is displayed:

```
 CELL CAPTURE
 - - - - - - - - - - - - - - - - - - - - - - -
→Start Cell Capture
 Review Cell Capture
```

za093f.eps

4. Press the **Down Arrow** key to locate these options:
   - **Set A to Filter**
   - **Set B to Filter**

   For example:

```
 CELL CAPTURE
 Review Cell Capture
→Set A to Filter >          1
 Set B to Filter >          1
```

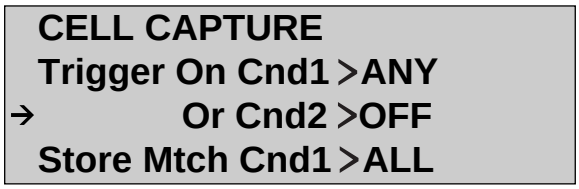
za094f.eps

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The OC3port Plus has two cell capture filters, A and B, which are used to control the capturing of cells. You can set each capture filter to match any one of the four receive filters, or you can set both capture filters to match the same receive filter. By default, both filters are set to **RECEIVE FILTER 1**.

5. With the **Set A to Filter** option on the selection line, press the **Left** or **Right Arrow** key to set it to the desired receive filter.
6. Press the **Down Arrow** key to move the **Set B to Filter** option to the selection line. Then, press the **Left** or **Right Arrow** key to set it to the desired receive filter.
7. Press the **Down Arrow** key to locate the following options, which represent the trigger conditions (the criteria for storing cells):
   - **Trigger On Cnd1**
   - **Or Cnd2**

   For example:



za092f.eps

These two options are used together. They set up an either/or condition for determining the criteria for storing cells.

Trigger On Cnd 1 has these settings:

- ANY Begins storing cells when any ATM cell is received.
- A Begins storing cells when a cell matching the receive filter set for capture filter A is received.
- !A Begins storing cells when a cell matching any receive filter except the one set for capture filter A is received.
- OFF Tells the OC3port Plus not to evaluate this condition.

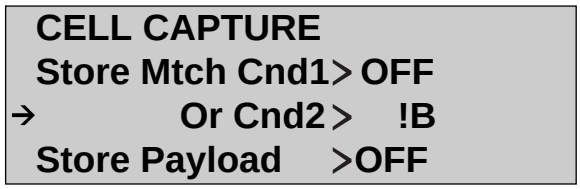
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Or Cnd2 has these settings:

- OFF Tells the OC3port Plus not to evaluate this condition.
- B Begins storing cells when a cell matching capture filter B's receive filter is received.
- !B Begins storing cells when a cell matching any receive filter except the one set for capture filter B is received.

8. With the **Trigger On Cnd 1** on the selection line, press the **Left** or **Right Arrow** key to set the desired trigger condition.
9. Press the **Down Arrow** key to move the **Or Cnd2** option to the selection line. Then, press the **Left** or **Right Arrow** key to set its trigger condition.
10. Press the **Down Arrow** key to locate these next two setup options:
    - **Store Mtch Cnd1**
    - **Or Cnd2**

    For example:



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These options determine which cells the OC3port Plus stores in the capture buffer after the trigger condition is met.

Store Mtch Cnd1 has these settings:

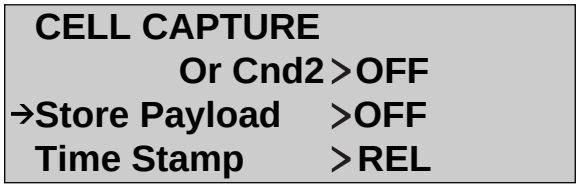
- ALL Stores all cells received.
- A Stores only the cells that match the receive filter set for capture filter A.
- !A Store cells that match any receive filter except the one set for capture filter A.
- OFF Tells the OC3port Plus not to evaluate this condition.

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Or Cnd2 has these settings:

- OFF Tells the OC3port Plus not to evaluate this condition.
- B Stores only the cells that match the receive filter set for capture filter B.
- !B Store cells that match any receive filter except the one set for capture filter B.

11. With the **Store Mtch Cnd 1** on the selection line, press the **Left** or **Right Arrow** key to set the cell storage condition.
12. Press the **Down Arrow** key to move the **Or Cnd2** option to the selection line. Then, press the **Left** or **Right Arrow** key to set its cell storage condition.
13. Press the **Down Arrow** key to move the **Store Payload** option to the selection line:



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The **Store Payload** option determines whether the OC3port Plus stores complete ATM cells (headers and payloads) or partial ATM cells (header and timestamp information only). This option has two settings:

- ON Stores complete ATM cells. The OC3port Plus has the capacity to store about 700 complete ATM cells.
- OFF Store partial ATM cells. The OC3port Plus has the capacity to store about 4600 partial ATM cells.

14. Press the **Left** or **Right Arrow** key to set a value for the **Store Payload** option.

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15. Press the **Down Arrow** key to move the **Time Stamp** option to the selection line:

```
 CELL CAPTURE
 Store Payload    >OFF
→Time Stamp       >REL
 - - - - - - - - - - - - - - - - - - - - -
```

za097f.eps

The **Time Stamp** option determines whether the OC3port Plus records the arrival time between captured cells and how that arrival time is calculated. The option has three settings:

- REL Records each cell's arrival time relative to the time that the previous cell that was captured.
- OFF Does not record the arrival time between captured cells.
- ABS Stores the absolute arrival time (uses zero as the reference point) of each cell from the time the cell capture began.

16. Press the **Left** or **Right Arrow** key to set a value for the **Time Stamp** option. The setup is completed. The OC3port Plus is now configured for capturing ILMI cells.

Starting an ILMI Cell Capture

To start the cell capture, follow the steps under "Starting a Cell Capture" earlier in this chapter.

Looking at Captured ILMI Cells

For a description of the information stored on the captured cells, see "Looking at the Captured Cells" earlier in this chapter. To view results from the last cell capture you conducted since you turned on the OC3port Plus, see "Displaying the Results of the Previous Cell Capture" earlier in this chapter.

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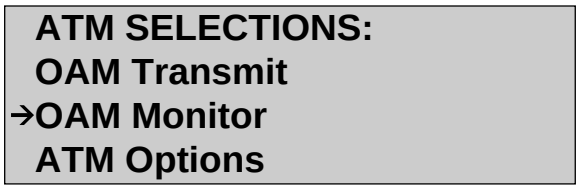
Capturing OAM Cells

The OC3port Plus can capture and analyze received OAM cells. This section shows you how to set up and run an OAM cell capture and how to look at the captured cells, which are stored in the tester's buffer.

Configuring the OC3port Plus for Capturing OAM Cells

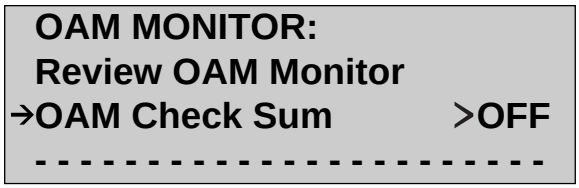
To configure the OC3port Plus for capturing OAM cells, do the following:

1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **OAM Monitor** option to the selection line:



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3. Press **ENTER**. The **OAM MONITOR** submenu is displayed.
4. Press the **Down Arrow** key to move the **OAM Check Sum** option to the selection line:



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This option has two settings, which determine whether or not the checksums of received OAM cells are calculated. Use of this calculation affects the number of cells the OC3port Plus can store in the capture buffer.

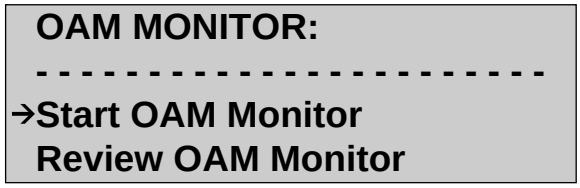
- OFF (default) A checksum for each OAM cell is not calculated. The OC3port Plus stores the first few bytes of any OAM cell it receives, allowing up to 4600 partial cells to be captured before the buffer reaches the limit of its storage capacity.
- ON A checksum for each OAM cell is calculated and errored cells are ignored. The OC3port Plus can store approximately 700 cells in the capture buffer.

5. Press the **Left** or **Right Arrow** key to activate the checksum calculation.

The OC3port Plus is now set up to perform an OAM cell capture.

Starting an OAM Cell Capture

1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **OAM Monitor** option to the selection line. Then, press **ENTER**. The **OAM MONITOR** submenu is displayed:



za108f.eps

3. Make sure that the **Start OAM Monitor** option is on the selection line. Then, press **ENTER**.

   The OC3port Plus begins to capture detected OAM cells. Results are immediately shown to you on the **OAM EVENT MONITOR** display. Following is a sample result display:



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This display gives you the following information about the captured OAM cells:

- **Line 2** Unique / Logged count provides a count of unique OAM cells received, where "unique" is defined in terms of the ATM cell header and OAM cell type (for example, F4 Segment AIS cell).
- **Line 3** Detected displays a count of the total number of OAM cells received.
- **Line 4** ET indicates the amount of time that has elapsed (in **days : hours : minutes : seconds** format) since the monitoring began.

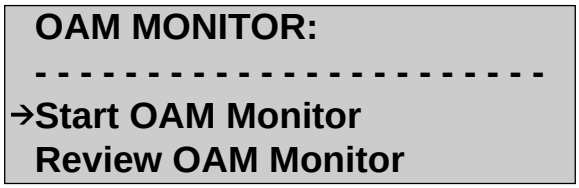
4. Press **ENTER** to end the monitoring.

Looking at Captured OAM Cells

Captured OAM cells are stored in the OAM capture buffer. This buffer stores only unique instances of OAM cells. After a new OAM cell is detected, it is stored and any duplicates (cells that match the header and cell type) are discarded.

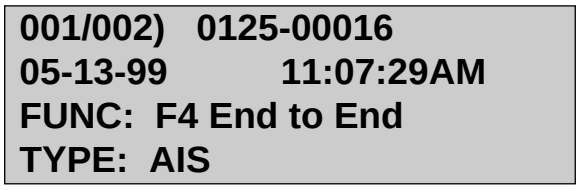
To view OAM cells stored in the buffer, do the following:

1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **OAM Monitor** option to the selection line. Then, press **ENTER**. The **OAM MONITOR** submenu is displayed:



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3. Press the **Down Arrow** key to move the **Review OAM Monitor** option to the selection line. Then, press **ENTER**. You are now viewing information about the first cell in the buffer. For example:



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In this example, there are two OAM cells stored in the capture buffer. The following information is recorded on for the first cell:

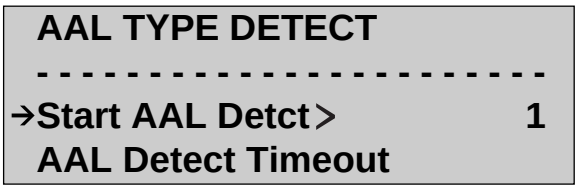
- **Line 1** Captured cell being viewed (`001`) / Total number of cells in the buffer (`002`)
- **Line 2** Date and time that the cell was received
- **Line 3** Type of OAM cell received (`F4 End-to-End`)
- **Line 4** OAM cell type (`AIS`)

4. Press the **Up** or **Down Arrow** key to display information about the next cell in the buffer.

Searching for AAL Traffic on an ATM Network

To search for the presence of AAL traffic, do the following:

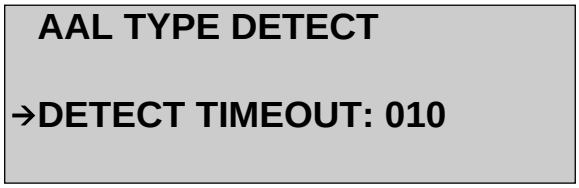
1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **Setup RX Filtrs** option to the selection line. Then, press **ENTER**. One of the receive filter submenus is displayed.
3. Program the receive filter that you want to use to monitor the signal with the correct header information.
4. Press the **AUTO** key. The **AUTO SELECTIONS** menu is displayed.
5. Press the **Down Arrow** key to move the **AAL Type Detect** option to the selection line. Then, press **ENTER**. The **AAL TYPE DETECT** submenu is displayed:



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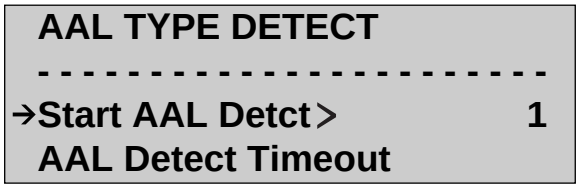
6. Press the **Down Arrow** key to move the **AAL Detect Timeout** option to the selection line. Then, press **ENTER**. You see this display:



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The **DETECT TIMEOUT** parameter determines the amount of time that the OC3port Plus searches for AAL traffic on the designated VPI/VCI. The default setting is 10 seconds.

7. You are in Edit mode as indicated by the flashing number in the first position of the **DETECT TIMEOUT** field. Press the arrow keys to supply the desired duration for the search. When you finish, press **ENTER** to save the change.
8. Press the **AUTO** key to return to the **AUTO SELECTIONS** menu.
9. Make sure that the **AAL Type Detect** option is on the selection line. Then, press **ENTER** to return to the **AAL TYPE DETECT** submenu:



za111f.eps

10. Make sure that the **Start AAL Detct** option is on the selection line. This option, which is used to start the search, has four settings (1-4), which respectively correspond to the four receive filters.
11. Press the **Left** or **Right Arrow** key to display the number corresponding to the receive filter that you set up earlier to monitor AAL traffic. Then, press **ENTER** to start the search.

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The OC3port Plus begins searching for AAL traffic on the designated circuit. While the search is in progress, you see a display similar to this:

```
AAL DETERMINATION
STATUS: COLLECTING
ET: 0 days      00:00:15
```

za180f.eps

This display indicates the status of the test (`COLLECTING`) and the amount of time that has elapsed since the test began (**ET**).

After the time you specified for the search expires, you see a display similar to the following if AAL traffic is detected:

```
AAL DETERMINATION
STATUS: COMPLETE
AAL 3/4 DETECTED
```

za113f.eps

This display indicates the status of the test (`COMPLETE`) the type of AAL traffic found (in this example, **AAL 3/4**).

If no AAL traffic is detected, you see this display:

```
AAL DETERMINATION
STATUS: COMPLETE
INSUFFICIENT DATA
(INCREASE TIMEOUT)
```

za114f.eps

One reason why the OC3port Plus failed to detect AAL traffic may be because you did not allow enough time for the search. You may want to increase the value of the **DETECT TIMEOUT** option and try running the test again. If after several attempts, you continue to receive this same `INSUFFICIENT DATA` message, you can assume that no AAL traffic is present on the designated VPI/VCI.

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Scanning Circuits for ATM Activity

The OC3port Plus can automatically scan an ATM network and record the virtual paths and channels on which ATM activity is found. This type of scan is best suited for testing networks when you know little about the virtual circuit configurations.

During the test, the OC3port Plus systematically scans the input signal, changing its receive filters and "don't care" conditions until all areas of cell activity have been isolated and identified. The scan takes place in two phases. In the first phase, each VPI is checked for cell activity and a list of active VPIs is constructed. In the second phase, each active path in the VPI list is scanned for circuit cell activity.

This section first shows you how to set up an ATM activity scan. Then, it shows you how to run the test and describes the types of results generated by the OC3port Plus. Finally, it shows you how to print an activity scan report.

Setting Up an ATM Activity Scan

Note

The information in this section shows you how to configure the OC3port Plus so that it performs more efficient and quicker scanning of ATM circuits. If you prefer, you can skip this setup information and go directly to "Running an ATM Activity Scan", which follows this section.

This three-part setup procedure shows you how to do the following:

1. Configure the VPI and VCI address ranges.

   If you know the range of virtual path and virtual channel addresses, it is advisable to use these to set the upper and lower search boundaries, thereby limiting the address space over which the OC3port Plus searches. By doing this, you can increase the efficiency of the scan and effectively reduce the duration of the scan.

2. Determine the duration of the scan.

   You can select a scan rate that determines the amount of time spent searching for individual addresses.

3. Turn on the activity detection alarm.

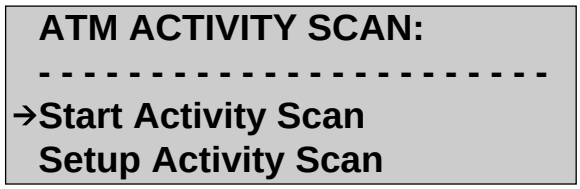
   You can configure the unit to issue an audible alarm (a "beep") whenever activity is found within the search boundaries you establish.

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Step One: Set up the boundaries of the search

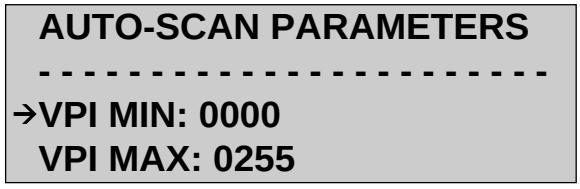
To set up the boundaries of the scan, do the following:

1. Press the **AUTO** key. The **AUTO SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **ATM Activity Scan** option to the selection line. Then, press **ENTER**. The **ATM ACTIVITY SCAN** submenu is displayed:



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3. Press the **Down Arrow** key to move the **Setup Activity Scan** option to the selection line. Then, press **ENTER**. The **AUTO-SCAN PARAMETERS** submenu is displayed:



za116f.eps

From this submenu, you can set the search boundaries to limit the address space over which the OC3port Plus searches for ATM activity. There are four items that you can edit:

VPI MIN: `0000` Minimum virtual path address to begin the search with.

VPI MAX: `0255` Maximum virtual path address to end the search with.

VCI MIN: `00000` Minimum virtual circuit address to begin the search with.

VCI MAX: `65535` Maximum virtual circuit address to end the search with.

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4. Press the **EDIT** key. You enter Edit mode. The number in the first position of the **VPI MIN** field is flashing to indicate that Edit mode is active.

   Press the arrow keys to supply a value for **VPI MIN**. When you finish, press **ENTER** to save the change.

5. Repeat Step 4 for each of the remaining **AUTO-SCAN** parameters.

   You are finished setting up the search boundaries for the scan after you save the value for **VCI MAX**.

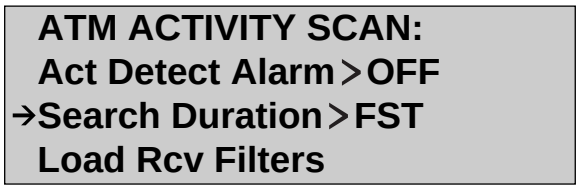
Step Two: Set the Scan Rate

The scan rate determines the amount of time that the OC3port Plus spends searching for individual addresses. This time can be adjusted to provide a, relatively speaking, longer or shorter scan time. The value you specify determines the minimum amount of time that traffic must arrive on a particular VPI/VCI combination to be recorded.

Most scans take at least 30 seconds to complete. The more activity that is present on a circuit and the slower the scan duration, the longer the actual time required to complete a scan.

To select a scan rate, follow these steps:

1. Press the **AUTO** key. The **AUTO SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the ATM Activity Scan option to the selection line. Then, press **ENTER**. The **ATM ACTIVITY SCAN** submenu is displayed.
3. Press the **Down Arrow** key to move the **Search Duration** option to the selection line:



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This option has these four settings:

- FST Performs a fast scan (maximum of one second per address bit) of the ATM signal.
- MED Performs a medium scan (maximum of two seconds per address bit) of the ATM signal.
- SLW Performs a slow scan (maximum of five seconds per address bit) of the ATM signal.
- !USR Performs a scan of the ATM signal using a user-defined value for the scan duration. This value can range from .01 to 10.00 seconds.

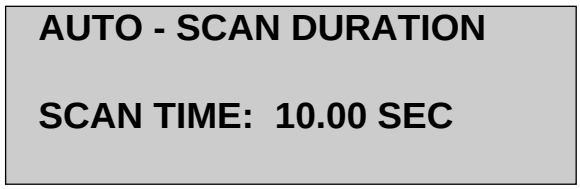
4. Do one of the following:

   - If you want to use the pre-defined scan rates (FST, MED, or SLW), press the **Left** or **Right Arrow** key to display the desired setting.

     The change takes effect immediately. The setting you selected is now the rate the OC3port Plus uses to scan received signals.

     OR

   - If you want to set your own scan rate, press the **Left** or **Right Arrow** key to select the !USR setting. Then, press **ENTER**. You see this display:



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     You are in Edit mode as indicated by the flashing **1** in the first position of the **SCAN T!ME** field. Press the arrow keys to select a value. The valid range is from .01 to 10.00 seconds.

     When you finish, press **ENTER**. The value you entered is now the rate the OC3port Plus uses to scan received signals.

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Step Three: Turn on the activity detection alarm

You can configure the OC3port Plus so that it issues an audible alarm (a "beep) whenever it detects cell activity within the VPI and VCI address ranges you provide. To turn on this alarm:

1. Press the **AUTO** key. The **AUTO SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **ATM Activity Scan** option to the selection line. Then, press **ENTER**. The **ATM ACTIVITY SCAN** submenu is displayed.
3. Press the **Down Arrow** key to move the **Act Detect Alrm** option to the selection line:

```
  ATM ACTIVITY SCAN:
  Review Last Scan
→Act Detect Alrm >OFF
  Search Duration  !USR
```

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4. Press the **Left** or **Right Arrow** key to change the setting to **ON**.

   The activity detection alarm is now activated. The OC3port Plus will issue a "beep" during an ATM activity scan whenever it detects traffic between the address ranges you specified.

Scanning an ATM Circuit

To scan a circuit:

1. Press the **AUTO** key. The **AUTO SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **ATM Activity Scan** option to the selection line. Then, press **ENTER**. You see this display:

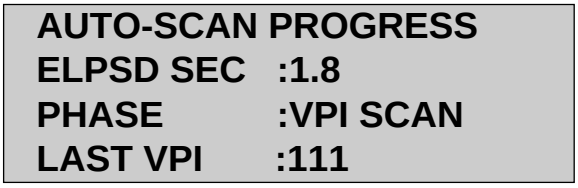
```
  ATM ACTIVITY SCAN:
  - - - - - - - - - - - - - - - - - - - - -
→Start Activity Scan
  Setup Activity Scan
```

za115f.eps

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3. Make sure that the **Start Activity Scan** option is on the selection line. Then, press **ENTER**. The OC3port Plus begins testing the received traffic and storing address results.

   The scanning is done in two stages. First, the activity is isolated to the virtual paths; then, channel activity within the active virtual paths is identified. During the scan, the OC3port Plus displays the following progress reports:

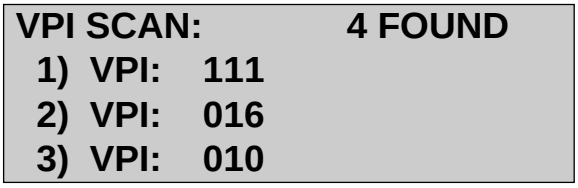


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   This display gives you the following information:

   - **Line 1** Title Line (**AUTO-SCAN PROGRESS**)
   - **Line 2** Elapsed scan time in seconds (`1.8`)
   - **Line 3** Portion of the search underway (`VPI SCAN`)
   - **Line 4** Address of last VPI (`LAST VPI`) or VCI (`LAST VCI`) detected.

   When the scan is completed, the OC3port Plus displays the results of the scan on the LCD. For example:



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   As indicated on Line 1 of this display, the OC3port Plus found four virtual paths with ATM activity. The specific VPIs are identified by address.

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If no activity is found, you see this display:

```
-*SCAN COMPLETE*-
- - - - - - - - - - - - - - - - - - - - - - -
NO ACTIVE VPI/VCI
```

za122f.eps

4. Press the **Left** or **Right Arrow** key to display VP/VC results. For example:

```
VP/VC SCAN:          4 FOUND
VPI  111        VCI  16000
VPI  016        VCI  00001
VPI  010        VCI  00000
```

za123f.eps

Printing the Results of an Activity Scan

To print the results of an activity scan:

1. Press the **PRINT** key. The **PRINT SELECTIONS** menu is displayed:

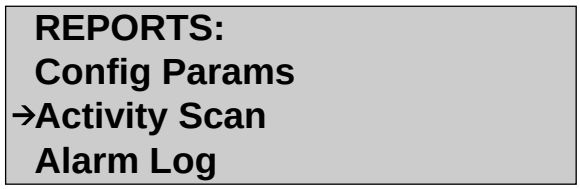
```
 PRINT SELECTIONS
- - - - - - - - - - - - - - - - - - - - - - -
→Print Mode                    >ON
 Reports
```

za124f.eps

2. Press the **Down Arrow** key to move the **Reports** option to the selection line. Then, press **ENTER**. The **REPORTS** submenu is displayed.

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3. Press the **Down Arrow** key to move the **Activity Scan** option to the selection line. For example:



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4. Press **ENTER**. The activity scan report begins to print. Following is a sample printout of an activity scan report:

```
OC3port Plus, Fluke Corporation    03/14/99 07:22:10 PM

VIRTUAL PATH SCAN BOUNDARIES      :  000 - 255
VIRTUAL CHANNEL SCAN BOUNDARIES   :  00000 - 65535

CELL ACTIVITY DETECTED ON 4 VIRTUAL PATHS:

1) VPI  111
2) VPI  16
3) VPI  10
4) VPI  0

CELL ACTIVITY DETECTED ON A VIRTUAL CHANNELS:

1) VPI  111  VCI  16000
2) VPI  016  VCI  00001
3) VPI  10   VCI  00310
4) VPI  000  VCI  00000
```

za126f.eps

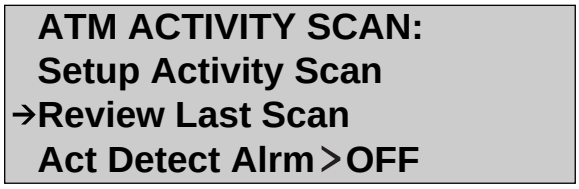
Note that this report provides the date and time the test was conducted. It also lists the boundaries you set for the scan and the cell activity detected on the virtual paths and virtual channels that were searched.

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Displaying the Results of the Previous Activity Scan

To view the results of the last activity scan you conducted:

1. Press the **AUTO** key. The **AUTO SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the ATM Activity Scan option to the selection line. Then, press **ENTER**. The **ATM ACTIVITY SCAN** submenu is displayed.
3. Press the **Down Arrow** key to move the **Review Last Scan** option to the selection line. For example:



za127f.eps

4. Press **ENTER**. The OC3port Plus immediately displays the results of the previous ATM activity scan.

Using the ATM Traffic Templates

To simplify the process of configuring the OC3port Plus for ATM transmission, Fluke provides four pre-defined cell transmission templates that you can use as a starting point for creating ATM test patterns. These templates provide complete transmission stream parameters for up to four transmission streams.

This section describes the four templates available and shows you how with a few keystrokes, you can quickly configure the OC3port Plus to provide ATM traffic.

ATM Traffic Templates: a Description

These four templates are included in the OC3port Plus:

- 20% SPREAD
- RAMPDOWN
- BER TEST
- POLICE 10MBS

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20% SPREAD

This template sets up Transmit Streams 5 - 8 to provide 20 % bandwidth on each of the four CBR circuits for a total load of 80 % of the OC3 rate.

RAMPDOWN

This template sets up Transmit Streams 5 - 8 to provide 40 %, 30 %, 10 %, and 5 % bandwidth transmission, respectively, on the four circuits for 95 % utilization.

BER Test

This template provides a simple Bit Error Rate pattern test configuration using 25 % bandwidth on Stream 5, with the circuit set to VPI = 0 and VCI = 101.

POLICE 10MBS

This template provides a VBR stress test on Stream 5 that runs at a 10Mbs PCR rate for a maximum burst size of 31 cells, then runs at 2Mbs and 4Mbs, which allows the "leaky bucket" charge to drain.

Selecting and Loading an ATM Traffic Template

You can load a traffic template using one of these methods:

- With traffic only
- With traffic and header.

If you load a template with traffic only (the **Load Temp trfc** only option), the OC3port Plus defines the traffic for you by setting the payload and rate parameters. You need to supply the appropriate header information. This method is useful when you have a specific circuit that you want to test and you know the VPI / VCI.

If you load a template with both the traffic and header (the **Load Temp trfc&hdr** option), the OC3port Plus defines all of the transmit parameters and traffic for you. This method is useful when knowledge of the specific VPI/VCI is not important, such as when you want to do some quick testing in a straight pass-through, loopback configuration. In this case, the OC3port Plus supplies default header values, which are pre-selected to simplify their use.

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After you load any one of the templates, you can edit them to meet the particular requirements of your network (see "Editing a Template", which follows, in this chapter).

To select and load a template, complete these steps:

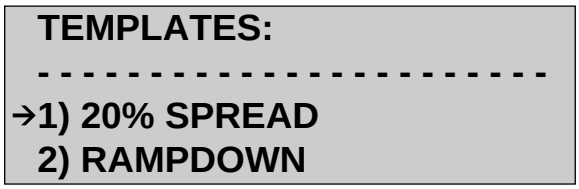
1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **Load Temp trfc only** option or the **Load Temp trfc&hdr** option to the selection line.

   For example:



za128f.eps

3. Press **ENTER**. The **TEMPLATES** submenu is displayed:



za129f.eps

4. Press the **Down Arrow** key to move the template you want to load to the selection line.
5. Then, press **ENTER**.

   When the template is loaded you see this message:

   ```
   * TEMPLATE LOADED *
   ```


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Starting Transmission with a Loaded Template

To start transmission using a loaded template:

1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Up Arrow** key to move the **Load XMIT Streams** option to the selection line:

```
 ATM SELECTIONS:
 Setup XMIT Streams
→Load XMIT Streams
 ATM XMIT Mode        >STR
```

za130f.eps

3. Press **ENTER**. The OC3port Plus loads the traffic pattern defined for the selected template. While the pattern is being loaded, you see this display:

```
**********************************
*      LOADING SELECTED          *
*       TRAFFIC PATTERN          *
**********************************
```

za131f.eps

After the pattern is loaded, the OC3port Plus displays results to you on the ATM result displays. Following is an example of ATM cell counts for Streams 5 - 8:

```
TX  STR5    3.30E+08    Cnt
TX  STR6    2.59E+08    Cnt
TX  STR7    86758910    Cnt
TX  STR8    44361596    Cnt
```

za132f.eps

Note

See "Monitoring an ATM Signal" in this chapter for detailed descriptions of the ATM result displays.

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4. Press the **Up** or **Down Arrow** key to examine additional ATM result displays.

Note

*If you press the **CLEAR** key while you are viewing a result display, all of the counters are re-set to zero.*

5. Press the **Left** or **Right Arrow** key to view other error formats.

Editing a Template

After you load a template, you can change its transmission stream parameters to meet your particular testing requirements. To do this, follow these steps:

1. Select and load the template that you want to use (complete the instructions under "Selecting and Loading an ATM Traffic Template" earlier in this chapter).
2. After you receive the `* TEMPLATE LOADED *` message, press the **ATM** key. You return to the **ATM SELECTIONS** menu.
3. Press the **Up Arrow** key to move the **Setup XMIT Streams** option to the selection line. Then, press **ENTER**. The setup menu for one of the eight transmit streams is displayed.
4. Press the **Left** or **Right Arrow** key to display the transmit stream you want to modify.
5. Press the **Down Arrow** key to move the option you want to change to the selection line. Then, press the **EDIT** key and supply the desired value. When you finish, press **ENTER** to save the change.
6. Repeat this edit process for each transmit stream you want to change.

Quality of Service Tests

The OC3port Plus has four specialized tests that can be used to test the integrity of an ATM circuit and to zero in on network performance problems. This section shows you how to set up and run the following Quality of Service tests:

- Cell Loss test
- Remote Cell Loss test
- Cell Delay Variation test
- Cell Transfer Delay test

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Cell Loss Test

The Cell Loss test is used to test an ATM switch for the loss of cells. In a typical Cell Loss test, a burst of cells is transmitted on TRANSMIT STREAM 1 for a specified length of time. After the burst transmission, the OC3port Plus counts the number of cells received on RECEIVE FILTER 1 (within a time period specified by the user as "round-trip delay").

If the count of received cells on RECEIVE FILTER 1 matches the count of transmitted cells from TRANSMIT STREAM 1, no cell loss occurred. If, on the other hand, no match occurs (cells are missing), the cell loss ratio (number of cells loss/number of cells transmitted) is calculated and stored in memory. The cycle of transmission and detection is repeated continuously until the user stops the test by selecting another OC3port Plus operation.

This section shows you how to set up and run a Cell Loss test.

Setting Up a Cell Loss Test

To set up a Cell Loss test, complete the following steps:

1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **Setup RX Filtrs** option to the selection line. Press **ENTER** to display the setup menu for **RECEIVE FILTER 1**:



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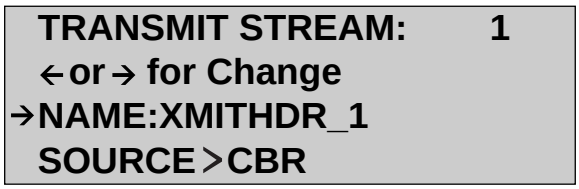
3. Set up RECEIVE FILTER 1's parameters. (See "Configuring a Receive Filter" in Chapter 5 for details.)

Note

RECEIVE FILTER 1 must be configured to match the cell stream that is being checked for cell loss or mis-insertion.

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4. Press the **ATM** key to return to the **ATM SELECTIONS** menu. Then, press the **Down Arrow** key to move the **Setup XMIT Streams** parameter to the selection line. Press **ENTER** to display the setup menu for **TRANSMIT STREAM 1**:



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5. Set up TRANSMIT STREAM 1's parameters.

Note

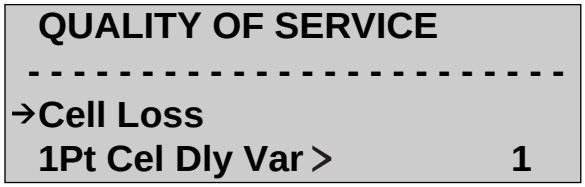
TRANSMIT STREAM 1 must be configured correctly because it is the "source" of the Cell Loss test stream.

6. Press the **ATM** key to return to the **ATM SELECTIONS** menu. Then, press the **Down Arrow** key to move the **Quality of Service** option to the selection line:



za133f.eps

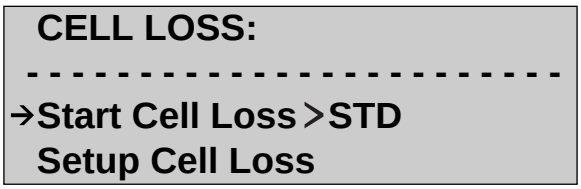
7. Press **ENTER**. The **QUALITY OF SERVICE** submenu is displayed:



za134f.eps

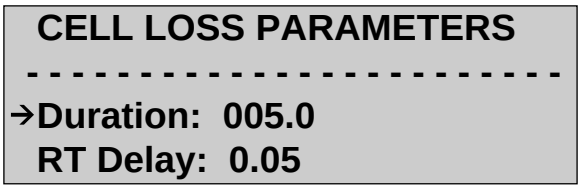
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8. Make sure that the **Cell Loss** option is on the selection line. Then, press **ENTER**. The **Cell Loss** submenu is displayed:



za135f.eps

9. Press the **Down Arrow** key to move the **Setup Cell Loss** option to the selection line. Then, press **ENTER**. The **CELL LOSS PARAMETERS** menu is displayed:



za136f.eps

10. Make sure that the **Duration** parameter is on the selection line. This parameter determines the amount of time for each burst of cell loss transmission. The values of this parameter range from `0.1` to `300` seconds. The default value is `5.0` seconds.
11. Press the **EDIT** key to enter Edit mode and supply the desired value for the **Duration** parameter. Press **ENTER** when you are done to save the change.
12. Press the **Down Arrow** key to move the **RT Delay** option to the selection line.

    This parameter sets the maximum amount of time that the OC3port Plus should wait for the return of transmitted cells. The value of **RT Delay** ranges from `.01` seconds to `9.99` seconds. The default value is `.05` seconds.
13. Press the **EDIT** key to enter Edit mode and supply the desired value for **the RT Delay** parameter. Press **ENTER** when you are done to save the change.

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14. Press the **ATM** key to return to the **ATM SELECTIONS** menu. With the **Quality of Service** option on the selection line, press **ENTER** again to select **Cell Loss**. Press the **Down Arrow** key to move the **Store Lost Only** option to the selection line.

    This parameter has the following settings:

    `Off:` Stores Cell Loss records based on AutoStore settings.

    `PRD:` Stores Cell Loss record based on AutoStore settings, but only for records that indicate a loss.

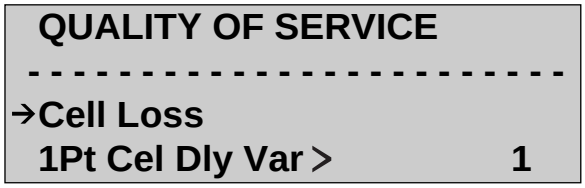
    `ON:` Stores Cell Loss records every time a loss is detected. This mode is independent of AutoStore settings. results, even if it detects no cell loss. If you select `OFF`, the OC3port Plus stores only those records that contain cell loss errors.

The OC3port Plus is now set up to run a Cell Loss test.

Running a Cell Loss Test

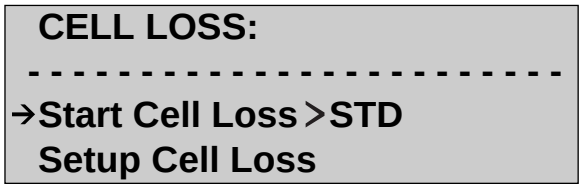
To start a Cell Loss test, follow these steps:

1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **Quality of Service** option to the selection line. Then, press **ENTER**. The **QUALITY OF SERVICE** submenu is displayed:



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3. Make sure that the **Cell Loss** option is on the selection line. The, press **ENTER**. The **CELL LOSS** submenu is displayed:



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4. Make sure that the **Start Cell Loss** option is on the selection line and that the setting for this option is **STD**.
5. Then, press **ENTER**. The Cell Loss test begins. You see this message: `LOADING SELECTED TRAFFIC PATTERN`.

Note

It takes a few seconds for the OC3port Plus to load the test pattern based on TRANSMIT STREAM 1's parameters. Then, the Cell Loss test results are immediately displayed to you on the LCD. See "Understanding Cell Loss Test Results", which follows, for a description of these results.

Re-running a Cell Loss Test

To re-run a Cell Loss test that is currently in progress, press the **CLEAR** key. The current test results are erased and the test begins again.

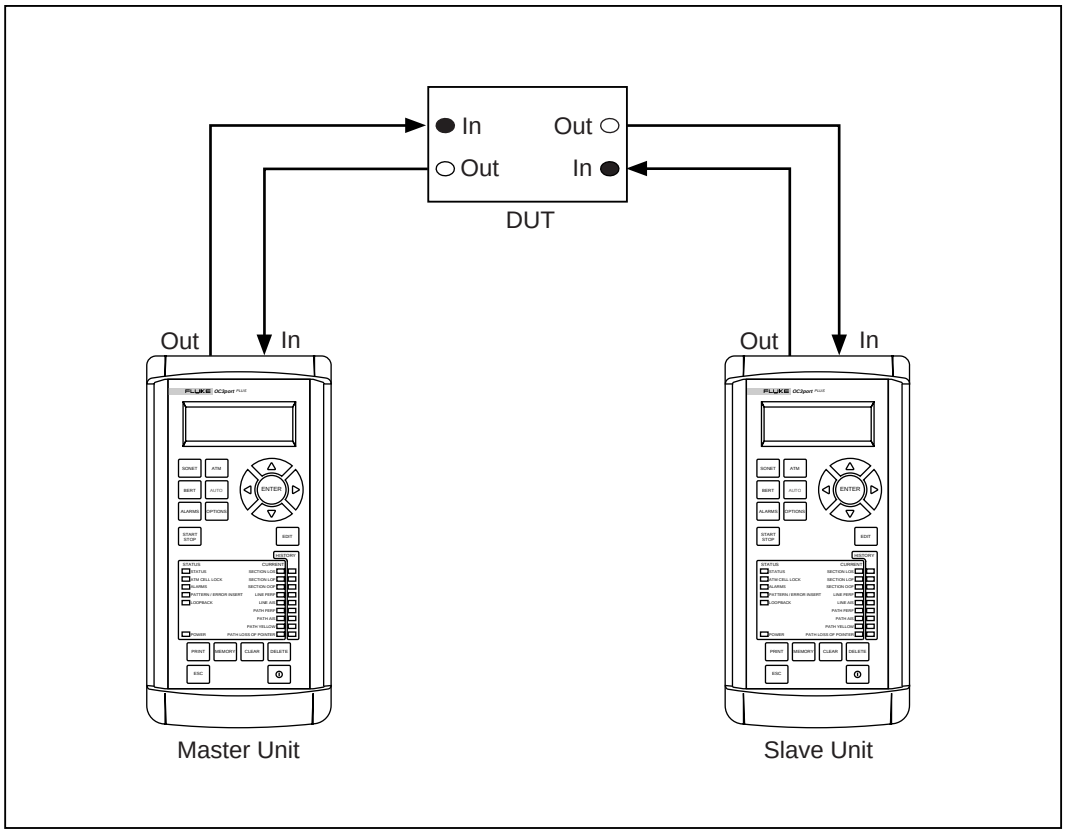
Remote Cell Loss Test

The Remote Cell Loss test involves the initial transmission of a pre-defined burst of cells (called a "trigger") from one OC3port Plus acting as a "master" through the network to a second OC3port Plus functioning as a "slave". When the slave unit receives the trigger, it verifies that the number of cells it received matches the number of cells it expected.

When a match occurs, the slave unit responds by transmitting a burst of cells back through the network. On the other end, the master unit receives this burst of cells and compares the number of cells received with the number of cells it expected. The difference between the number of cells the master unit received and the number of cells it expected constitutes the cell loss on the specific virtual channel. This process continues until you stop the test or select another OC3port Plus function.

To perform Remote Cell Loss testing, you need two OC3port Plus testers. Figure 6-1 illustrates how the two testers are connected to the device under test (DUT) to analyze live data.

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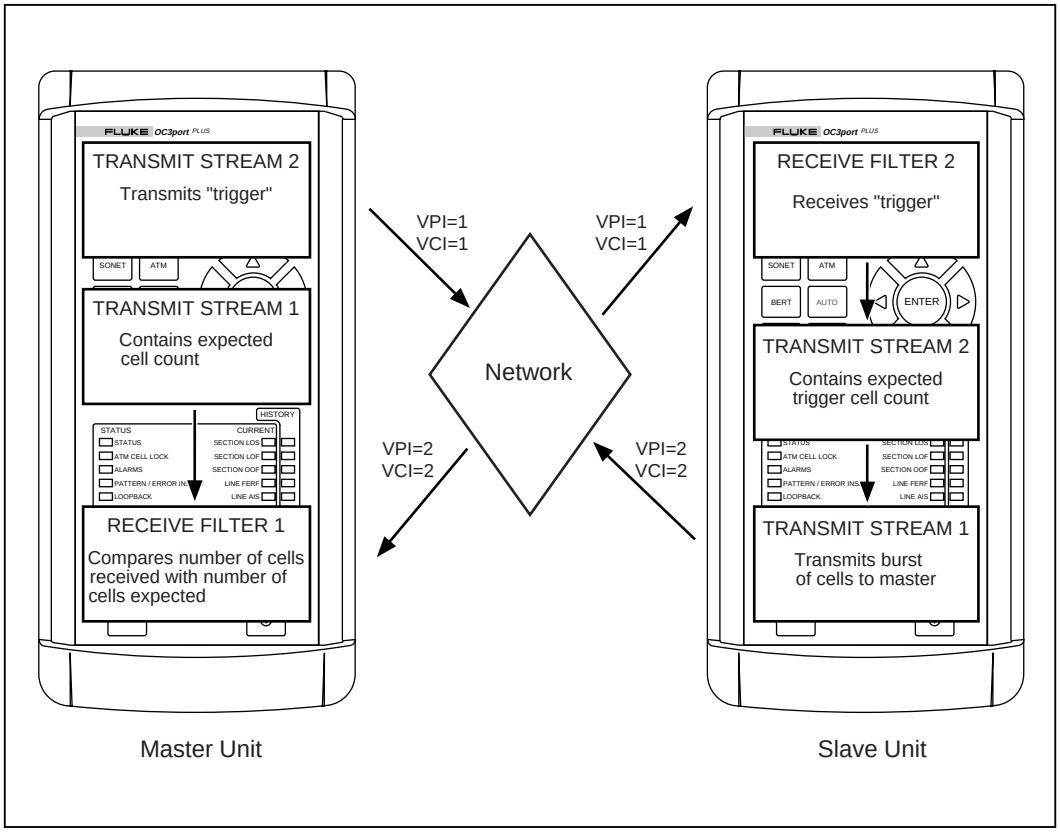
Figure 6-1. Remote Cell Loss test connections

The following sections give you instructions on setting up and starting a Remote Cell Loss test.

Setting Up a Remote Cell Loss Test

In this test, one unit is set up to function as the master and the second unit as the slave. Figure 6-2 illustrates the relationship between the two units.

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Figure 6-2. Remote Cell Loss Testing

To set up the OC3port Plus this test, you need to program both units. The following sections give you step-by-step instructions on how to do this.

Setting up the Master Unit

On the master unit, you need to do the following:

1. Identify the address of the trigger burst transmission and specify the number of cells to send as a trigger to the slave unit.
2. Specify the number of cells to expect from the slave unit.
3. Identify the address on which to receive the cell transmission from the slave unit.
4. Specify the length of time to wait for cells from the slave unit and the length of time to transmit cells.

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Step 1: Identify the address of the trigger burst transmission and the number of cells to send as a trigger to the slave unit.

1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **Setup XMIT Streams** option to the selection line:



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3. Press **ENTER**. The setup menu for **TRANSMIT STREAM 1** is displayed.
4. Press the **Right Arrow** key to display the setup menu for **TRANSMIT STREAM 2**.
5. Press the **Down Arrow** key to move the **SOURCE** option to the selection line. Then, press the **Left** or **Right Arrow** key to change the setting to CBR:



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6. Press the **Down Arrow** key to move the **VPI** option to the selection line. Then, press the **EDIT** key and enter a value for this option. Press **ENTER** to save the change.

   Continue in this manner until the entire header (**VPI, VCI, PT, CLP**, and **GFC** options) is programmed.

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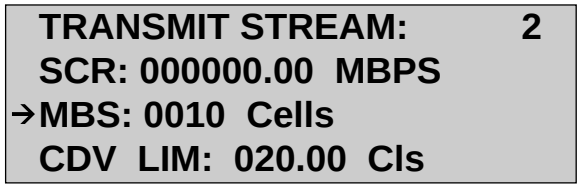
7. Press the **Down Arrow** key to move the **PCR** option to the selection line.

   This option defines the percentage of active-to-idle cells transmitted (in other words, the percent bandwidth).

   Note

   *The default form for expressing the **PCR** value is in megabits per second (**MBS**). You can change the representation to a percent **(%BW)** or cells per second (**CPS**). For information on how to do this, see "Changing the Form for Expressing the PCR and SCR" in Chapter 5.*

8. Press the **EDIT** key and enter a value for the **PCR** option. Press **ENTER** when you finish to save the change.
9. Press the **Down Arrow** key to move the **MBS** (Maximum Burst Size) option to the selection line:



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   This option determines the number of cells the master sends to the slave unit as a trigger.

10. Press the **EDIT** key and enter a value for the **MBS** option. Press **ENTER** when you finish to save the change.

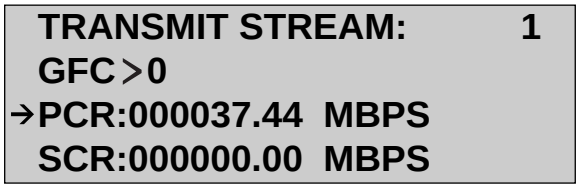
    The master unit is now configured with both an address for the trigger burst transmission and the number of cells to send as a trigger.

Step 2: Specify the number of cells to expect from the slave unit.

1. Scroll to the top of the menu, then press the **Left Arrow** key to display the setup menu for **TRANSMIT STREAM 1.**

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2. Press the **Down Arrow** key to move the **PCR** option to the selection line:



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This option sets the expected cell count.

Note

*The default form for expressing the **PCR** value is in megabits per second (**MBS**).*

*This representation can be changed to a percent (%**BW**) or cells per second (**CPS**). For information on how to do this, see "Changing the Form for Expressing the PCR and SCR" in Chapter 5.*

3. Press the **EDIT** key and enter a value for the **PCR** option. Press **ENTER** when you finish to save the change.

   The master unit is now configured with the number of cells to expect from the slave unit.

Step 3: Identify the address of the cell transmission from the slave unit.

1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Up Arrow** key to move the **Setup RX Filtrs** option to the selection line. Then, press **ENTER**. The setup menu for **RECEIVE FILTER 1** is displayed:



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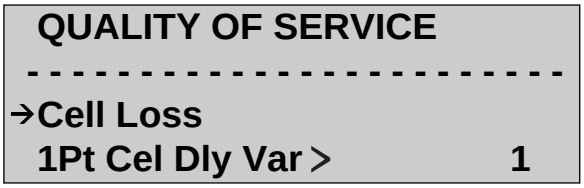
3. Press the **Down Arrow** key to move the VPI option to the selection line. Then, press the **EDIT** key and enter a value for this option. Make sure that you press **ENTER** to save the change.

   Continue in this manner until you program the entire header (the **VPI, VCI, PT, CLP,** and **GFC** options).

   The master unit is now configured with the address of the cell transmission from the slave.

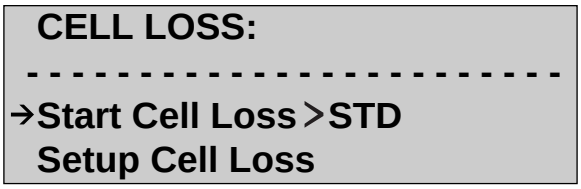
Step 4: Specify the length of time to wait for cells from the slave unit and the duration of the cell transmission.

1. Press the **ATM** key. You return to the **ATM SELECTIONS** menu.
2. Press the **Down Arrow** key to move the **Quality of Service** option to the selection line. Press **ENTER**. The **QUALITY OF SERVICE** submenu is displayed:



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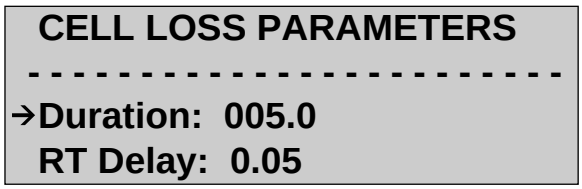
3. Make sure that the **Cell Loss** option is on the selection line. Then, press **ENTER**. The **CELL LOSS** submenu is displayed:



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4. Press the **Down Arrow** key to move the **Setup Cell Loss** option to the selection line. Then, press **ENTER**. The **CELL LOSS PARAMETERS** submenu is displayed:



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5. Make sure that the **Duration** parameter is on the selection line. This parameter determines how long the slave unit transmits the burst of cells to the master unit. The default setting is `005.0` seconds.

   Press the **EDIT** key and enter a value for the Duration parameter. Press **ENTER** when you finish to save the change.

6. Press the **Down Arrow** key to move the **RT Delay** parameter to the selection line. This parameter determines the amount of time the master unit waits to receive cells back from the slave unit.

   Notes

   The amount of time the master unit waits begins when it sends the initial trigger to the slave unit and ends when it receives the cells sent from the slave unit.

   *When setting the **RT Delay** value, you need to take into consideration the time for the initial transmission (the trigger), the slave unit's receipt of the trigger, and the slave unit's transmission of cells back to the master unit. Because of inherent delays in this process, you will probably have to increase (as compared with a regular Cell Loss test) the value of the **RT Delay** parameter.*

7. Press the **EDIT** key and enter a value for the **RT Delay** parameter. Press **ENTER** when you finish to save the change.

   You have completed the configuration of the master unit for the **Remote Cell Loss** test.

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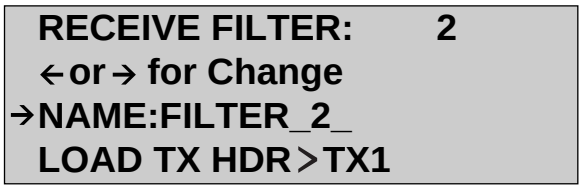
Setting Up the Slave Unit

On the slave unit, you need to do the following:

1. Identify the address on which to receive the trigger burst transmission from the master unit.
2. Specify the number of cells to expect in the trigger.
3. Identify the address of the cell transmission.
4. Specify the length of time to wait for cells from the slave unit and the length of time to transmit cells.

Step 1: Identify the address of the trigger burst transmission and number of cells to expect in the trigger.

1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **Setup RX Filtrs** option to the selection line. Then, press **ENTER**. The submenu **RECEIVE FILTER 1** is displayed.
3. Press the **Left** or **Right Arrow** key to display the submenu for **RECEIVE FILTER 2**:



za146f.eps

4. Press the **Down Arrow** key to move the **VPI** option to the selection line. Then, press the **EDIT** key and change the **VPI** to the same value you used when you set up TRANSMIT STREAM 2 on the master unit. Make sure that you press **ENTER** to save the change.

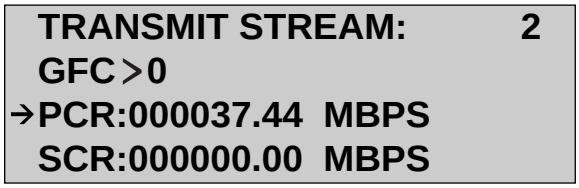
   Program the entire header for RECEIVE FILTER 2 in this manner, making sure that the value you specify for each option matches its counterpart on TRANSMIT STREAM 2 on the master unit.

   The slave unit is now configured with the address of the trigger burst transmission.

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Step 2: Specify the number of cells to expect in the trigger burst.

1. Press the **ATM** key. You return to the **ATM SELECTIONS** menu.
2. Press the **Down Arrow** key to move the **Setup XMIT Streams** option to the selection line. Then, press **ENTER**. The submenu for **TRANSMIT STREAM 1** is displayed.
3. Press the **Right Arrow** key to display the submenu for **TRANSMIT STREAM 2.**
4. Press the **Down Arrow** key to move the **PCR** option to the selection line, as in:



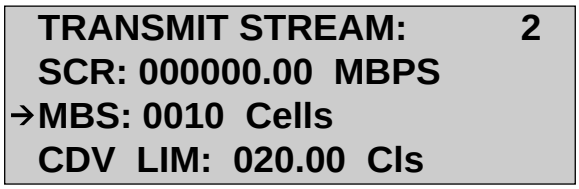
za147f.eps

5. Press the **EDIT** key and enter a value for **PCR** that matches the value you supplied when you set up TRANSMIT STREAM 1 on the master unit. Press **ENTER** when you finish to save the change.

Note

*The default form for expressing the **PCR** value is in megabits per second (**MBS**). You can change the form to a percent (%**BW**) or cells per second (**CPS**). For information on how to do this, see "Changing the Form for the PCR and SCR" in Chapter 5.*

6. Press the **Down Arrow** key to move the **MBS** option to the selection line:



za142f.eps

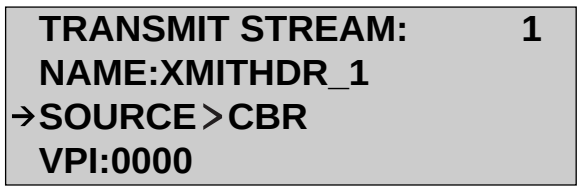
7. Press the **EDIT** key and enter a value for **MBS** that matches the value you supplied for MBS when you set up TRANSMIT STREAM 1 on the master unit. Press **ENTER** when you finish to save the change.

   The slave unit is now configured with the number of cells to expect in the trigger burst.

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Step 3: Identify the address of the cell transmission.

1. Scroll to the top of the menu.
2. Press the **Left Arrow** key to display the setup menu for **TRANSMIT STREAM 1.**
3. Press the **Down Arrow** key to move the **SOURCE** option to the selection line.
4. Press the **Left** or **Right Arrow** key to set its value to **CBR**, as in the following:



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5. Press **Down Arrow** key to move the **VPI** option to the selection line.
6. Press the **EDIT** key to enter Edit mode and supply a value for this option.
7. Press **ENTER** to save the change.

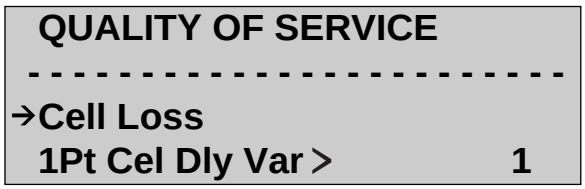
   Continue in this manner until the entire header (**VPI, VCI, PT, CLP**, and **GFC** options) is set up, making sure that you press **ENTER** after you specify a value for each parameter.

   You have completed setting up the address information for the cell transmission to the master unit.

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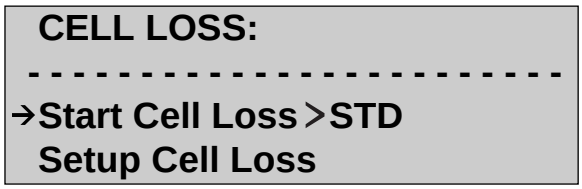
Step 4: Specify the length of time the master unit should wait for cells and the length of time that the slave unit transmits cells.

1. Press the **ATM** key. You return to the **ATM SELECTIONS** menu.
2. Press the **Down Arrow** key to move the **Quality of Service** option to the selection line. Press **ENTER**. The **QUALITY OF SERVICE** submenu is displayed:



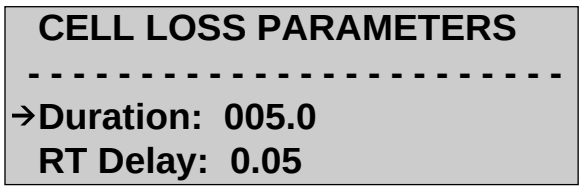
za134f.eps

3. Make sure that the **Cell Loss** option is on the selection line. Then, press **ENTER**. The **CELL LOSS** submenu is displayed:



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4. Press the **Down Arrow** key to move the **Setup Cell Loss** option to the selection line. Then, press **ENTER**. The **CELL LOSS PARAMETERS** submenu is displayed:



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5. Make sure that the **Duration** parameter is on the selection line.

   This parameter determines how long the slave unit transmits the burst of cells to the master unit. The default setting is `005.0` seconds.

6. Press the **EDIT** key and enter the same value for Duration that you specified when you set up the master unit. Press **ENTER** when you finish to save the change.

7. Press the **Down Arrow** key to move the **RT Delay** parameter to the selection line.

   This parameter determines the amount of time the master unit waits to receive the cells transmitted from the slave unit.

   Note

   The amount of time the master unit waits begins when it sends the initial trigger to the slave unit and ends when it receives the cells sent from the slave unit.

   *When setting the **RT Delay** value, you need to take into consideration the time for the initial transmission (the trigger), the slave unit's receipt of the trigger, and the slave unit's transmission of cells back to the master unit. Because of inherent delays in this process, you will probably have to increase (as compared with a regular Cell Loss test) the value of the **RT Delay** parameter.*

8. Press the **EDIT** key and enter the same value for the **RT Delay** parameter that you specified when you set up the master unit.

9. Press **ENTER** when you finish to save the change.

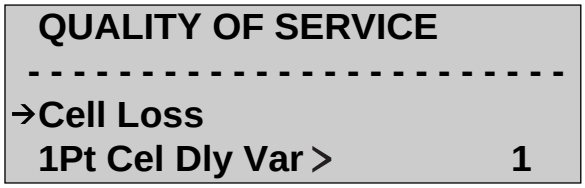
You have completed the setup for the Remote Cell Loss test.

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Running a Remote Cell Loss Test

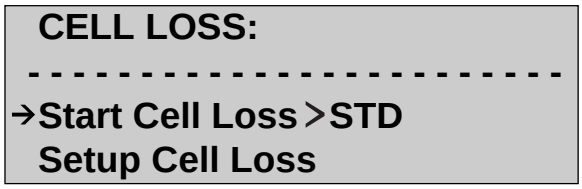
To run a Remote Cell Loss test, connect the two testers across the ATM network ports under test. Then, complete the following steps first on the slave unit, then on the master unit.

1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **Quality of Service** option to the selection line. Then, press **ENTER**. The **QUALITY OF SERVICE** submenu is displayed:



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3. Make sure that the **Cell Loss** option is on the selection line. Then, press **ENTER**. The **CELL LOSS** submenu is displayed:



za135f.eps

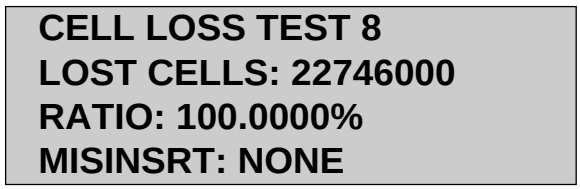
4. Make sure that the **Start Cell Loss** option is on the selection line. Then, do one of the following:
   a. If the tester you are programming is the slave unit, press the **Left or Right Arrow** key to change the setting to SLV. Press **ENTER**. Then, go to Step 1 and complete this entire procedure again on the master unit.
   b. If the tester you are programming is the master unit, press the **Left** or **Right Arrow** key to change the setting to MAS. Press **ENTER**.

      The Remote Cell Loss test begins. The master and slave units synchronize with each other. Then, results are provided to you on the master unit's LCD. See "Understanding Cell Loss Test Results", which follows, for a detailed description of the test results.

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Understanding Cell Loss Test Results

After you start a Cell Loss test, results are immediately displayed on the LCD. Following is a sample Cell Loss test result display:



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This display provides you with the following information:

- **Line 1** Indicates the number of times the Cell Loss test has been run.
- **Line 2** Provides a count of the number of cells lost.
- **Line 3** Provides the cell loss ratio (number of cells lost/number sent).
- **Line 4** Indicates the number of mis-inserted cells detected.

If you press the **Left** or **Right Arrow** key, you can see these additional results, which are given on Line 4 of the display:

- `MIS RATE` The cell mis-insertion ratio.
- `ET` The elapsed test time.
- `RECORD #` The number of result records stored.
- `CELLS SENT` The total number of test cells transmitted.

Exiting and Returning to a Test in Progress

To exit a test that is currently running, press any key (except the **START / STOP** and **EDIT** keys) while you are viewing test results on the LCD. You immediately exit the test in progress. However, the test continues to run in the background.

To return to the test in progress, do the following:

1. Press the **ATM** key to display the **ATM SELECTIONS** menu.
2. Press the **Down Arrow** key to move the **Quality of Service** option to the selection line. Press **ENTER**. The **QUALITY OF SERVICE** submenu is displayed.
3. Make sure that the **Cell Loss** option is on the selection line. Then, press **ENTER**. The **CELL LOSS** menu is displayed.
4. Make sure that the **Start Cell Loss** option is on the selection line. Press **ENTER**.

You return to the test in progress.

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Cell Delay Variation Tests

The OC3port 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 CDV
- A 2- point CDV

This section shows you how to set up and run these tests.

1-point CDV Test

A 1-point CDV test is concerned with the early arrival of cells, which indicates that the transmit source is in violation of its traffic contract.

During this test, the OC3port Plus captures a sample of cells and assigns each cell a received time stamp. The arrival times of cells in the capture buffer are then compared with an "ideal" arrival time (which is the inverse of the PCR) and a resultant one-point CDV value is derived.

If the result is positive, the cells sampled arrived early, which indicates clumping and possible excessive usage above the contract rate by the transmit source.

After each analysis of the buffer's contents, the buffer is emptied and allowed to re-fill so that the test can continue.

Setting Up a 1-point CDV Test

Note

The OC3port Plus does not have to be used as the cell source. The operation of this test depends only upon the CDV PCR value and receive filter selected when the test is run.

If, for example, you use RECEIVE FILTER 3 to perform the test, the OC3port Plus analyzes only cells that have headers matching this filter. The "ideal" arrival time for each cell is the inverse of the value specified for CDV PCR..

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To set up a 1-point CDV test, complete these steps:

1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **Setup RX Filtrs** option to the selection line.
3. Then, press **ENTER**. One of the **RECEIVE FILTER** setup menus is displayed. For example:

```
  RECEIVE FILTER:          1
  ←or→ for Change
→NAME:FILTER_1_
  LOAD TX HDR>TX1
```

za012f.eps

4. Press the **Left** or **Right Arrow** key to display the receive filter you want to use. Then, program the receive filter with the desired header.
5. Press the **ATM** key to re-display the **ATM SELECTIONS** menu.
6. Press the **Down Arrow** key to move the **Quality of Service** option to the selection line. Then, press **ENTER**. The **QUALITY OF SERVICE** submenu is displayed.
7. Press the **Down Arrow** key to move the **Set CDV PCR value** option to the selection line, as in the following:

```
  QUALITY OF SERVICE
  Cell Xfer Delay  >       1
→Set CDV PCR value
  - - - - - - - - - - - - - - - - - - - - -
```

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8 Press **ENTER**. You see this display:

```
STS-3c SETUP:
- - - - - - - - - - - - - - - - - - - - -
→Path Auto YEL          >OFF
 Line Auto FERF         >OFF
```

za015f.eps

Note

*The default form for expressing the **PCR** value is in megabits per second (**MBS**). You can change this form to a percent **(%BW)** or cells per second (**CPS**). For information on how to do this, see "Changing the Format for the PCR and SCR" in Chapter 5.*

9. You are in Edit mode as indicated by the flashing number in the first position of the **PCR** field. Press the arrow keys to supply the desired **PCR** value. When you finish, press **ENTER** to save the change.

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

Running a 1-point CDV Test

To run a 1-point CDV test:

1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Make sure that the **Quality of Service** option is on the selection line. Then, press **ENTER**. The **QUALITY OF SERVICE** submenu is displayed.
3. Press the **Down Arrow** key to move the **1PT Cel Dly Var** option to the selection line, as in the following:

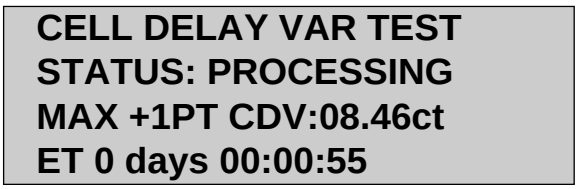
```
QUALITY OF SERVICE
Cell Loss
→1Pt Cel Dly Var >          1
 2Pt Cel Dly Var >          1
```

za151f.eps

The **1Pt Cel Dly Var** option has four settings (1-4), which respectively correspond to the four receive filters.

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4. Press the **Left** or **Right Arrow** key to display the number corresponding to the receive filter you programmed during the setup for this test.
5. Press **ENTER**. The 1-point CDV test begins. You see the `LOADING SELECTED TRAFFIC PATTERN` message, which is followed by this Cell Delay Variation test result display:



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This display contains the following information:

- **Line 1** Title of the Test (**CELL DELAY VAR TEST**)
- **Line 2** Status of test. Indicates whether the OC3port Plus is currently capturing cells (`COLLECTING`), processing test results (`PROCESSING`), or stopped (`STOPPED`).
- **Line 3** Provides the maximum one-point CDV (in units of cell times) since the test began.
- **Line 4** Displays the elapsed test time, in **days : hours : minutes : seconds** format.

6. Press **ENTER** to exit the result display.

Note

Unlike the Cell Loss Test, you cannot exit a Cell Delay Variation test result display and let the test run in the background while you perform other OC3port Plus tasks.

The Cell Delay Variation test requires all of the processing power of the OC3port Plus; therefore, if you want to exit the result display, you must stop the test. To do this, press **ENTER**. *The test ends immediately. Line 2, the status line, displays this message:* `STOPPED`. *You can now press any key to perform another operation.*

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2-point CDV Test

A 2-point CDV test is concerned with cell delivery times, specifically with the actual delay experienced by cells transmitted between two points in a network. During this test, the OC3port Plus captures a sample of cells and calculates the cell transfer delay. The tester reports the delay in cell times.

Setting Up a 2-point CDV Test

Note

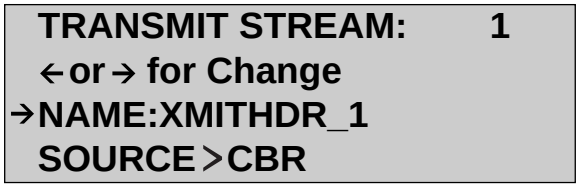
The OC3port Plus, at best, can guarantee a CDV of two cell times for each transmission stream. Therefore, a minimum CDV test result that uses the OC3port Plus as a source will be 2.0 cell times.

The same OC3port Plus analyzer must be used in this test as both the source and receiver of test traffic because the transmit and receive time stamps must originate from the same timing source.

The operation of this test depends on the transmit stream definitions selected when the test is run. If, for example, TRANSMIT STREAM 3 is used to perform the test, only cells that have headers matching this stream are analyzed.

To set up the OC3port Plus to perform a 2-point CDV test, complete these steps:

1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **Setup XMIT Streams** option to the selection line. Then, press **ENTER**. One of the **TRANSMIT STREAM** setup menus is displayed. For example:



za063f.eps

3. Press the **Left** or **Right Arrow** key to display the transmission stream that you want to configure.
4. Press the **Down Arrow** key to move the header and traffic parameters that you want to program to the selection line. Then, supply the desired values.

Note

*Make sure that the **PAYLOAD** parameter is set to **FIXED**.*

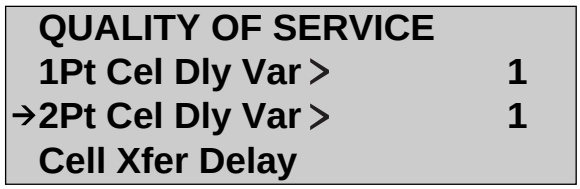
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The setup for this test is completed after you program the last transmission stream parameter and press **ENTER**.

Running a 2-point CDV Test

To run a 2-point CDV test, do the following:

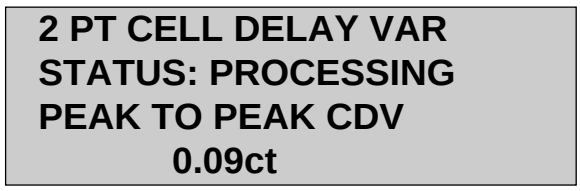
1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **Quality of Service** option to the selection line. Then, press **ENTER**. The **QUALITY OF SERVICE** submenu is displayed.
3. Press the **Down Arrow** key to move the **2Pt Cel Dly Var** option to the selection line:



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This option has eight settings (1-8), which respectively represent the eight available transmission streams.

4. Press the **Left** or **Right Arrow** key to select the desired transmission stream. Then, press **ENTER**. The Cell Delay Variation Test begins. You see the **LOADING SELECTED TRAFFIC PATTERN** message, which is followed by the CDV test result display. For example:



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This display contains the following information:

Line 1 Title of the Test (**2 PT CELL DELAY VAR**)

Line 2 Status of test. Indicates whether the OC3port Plus is currently capturing cells (`COLLECTING`), processing test results (`PROCESSING`), or stopped (`STOPPED`).

Line 3 Provides the peak-to-peak CDV (the difference between the earliest arriving cell and the latest arriving cell) in units of cell times (ct).

5. Press **ENTER** to exit the result display.

Note

Unlike the Cell Loss test, you cannot exit a Cell Delay Variation test result display and let the test run in the background while you perform other OC3port Plus tasks.

The Cell Delay Variation test requires all of the processing power of the OC3port Plus; therefore, if you want to exit the result display, you must stop the test. To do this, press ENTER*. The test ends immediately. Line 2, the status line, displays this message:* `STOPPED`*. You can now press any key to perform any other operations.*

Cell Transfer Delay Test

This test enables you to measure transit delays as cells are sent across a network. In this test, the OC3port Plus transmits cells, marking them with a transmit time stamp. It then captures these same cells and attaches a time stamp to them as they are received. Finally, it performs an analysis of the transfer delay of each cell by comparing the transmit and receive timestamps.

Note

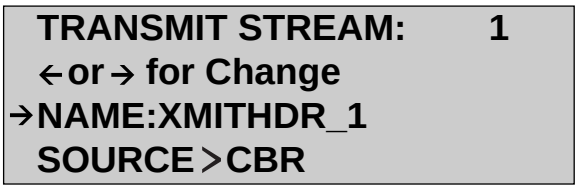
The same OC3port Plus analyzer must be used in this test as both the source and receiver of test traffic because the transmit and receive time stamps must originate from the same timing source.

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Setting Up a Cell Transfer Delay Test

To set up the OC3port Plus to run a Cell Delay Transfer test, do the following:

1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **Setup XMIT Streams** option to the selection line. Then, press **ENTER**. The setup menu for one of the transmission streams is displayed. For example:



za063f.eps

3. Press the **Left** or **Right Arrow** key to display the transmit stream that you want to configure.

Note

The operation of this test depends on the transmit stream definitions selected when the test is run. If, for example, TRANSMIT STREAM 3 is used to perform the test, only cells that have headers matching this stream are analyzed.

4. Press the **Down Arrow** key to move the header and traffic parameters that you want to program to the selection line. Then, supply the desired values.

Note

*Make sure that you set the **PAYLOAD** parameter to **FIXED**.*

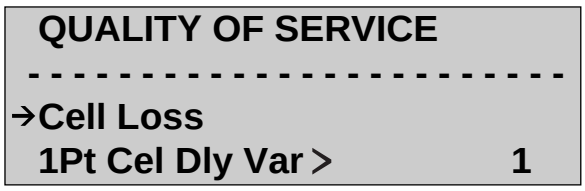
You have completed the setup for a Cell Transfer Delay test.

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Running a Cell Transfer Delay Test

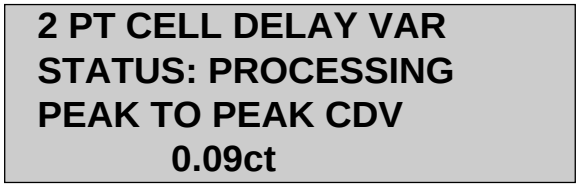
To run a Cell Transfer Delay Test, do the following:

1. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **Quality of Service** option to the selection line. Then, press **ENTER**. The **QUALITY OF SERVICE** submenu is displayed:



za134f.eps

3. Press the **Down Arrow** key to move the **Cell Xfer Delay** option to the selection line:



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This option has eight settings (1-8), which respectively represent the eight available transmission streams.

4. Press the **Left** or **Right Arrow** key to select the desired transmission stream. Then, press **ENTER**. The Cell Transfer Delay Test begins. You see the `LOADING SELECTED TRAFFIC PATTERN` message on the LCD.

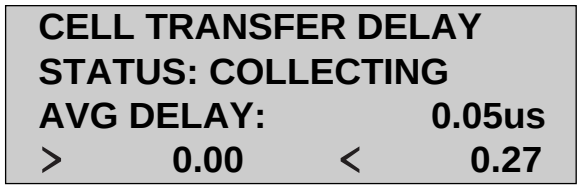
   After loading the requested transmission pattern, the OC3port Plus displays results to you on the LCD. See "Understanding Cell Transfer Delay Test Results", which follows, for an explanation of the result display.

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Understanding Cell Transfer Delay Test Results

While a Cell Transfer Delay test is running, results are immediately displayed on the LCD.

Following is a sample Cell Transfer Delay test result display:



za156f.eps

This display contains the following information:

- **Line 1** Name of the test (**CELL TRANSFER DELAY**).
- **Line 2** Status of test. Indicates whether the OC3port Plus is currently capturing cells (`COLLECTING`), processing test results (`PROCESSING`), or stopped (`STOPPED`).
- **Line 3** AVG. Delay. Provides the average cell transfer delay in microseconds (`us`).
- **Line 4** Provides the minimum and maximum transfer delays in microseconds (`us`) seen since the test began.

Exiting a Cell Transfer Delay in Progress Test

Unlike the Cell Loss test, you cannot exit a Cell Transfer Delay test result display and let the test run in the background while you perform other OC3port Plus tasks. The Cell Transfer Delay test requires all of the processing power of the OC3port Plus; therefore, if you want to exit a test in progress, you must stop the test. To do this, press **ENTER**. The test in progress ends immediately. The display looks similar to this:



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Note that Line 2, the status line, indicates that the test is stopped. You can now press any key to perform another operation.

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Bit Error Rate Test (BERT)

The OC3port Plus can fill the payloads of cells on any one of the eight transmission streams with a pseudo-random or fixed bit pattern and determine the effective error rate of such a cell stream. In addition, the OC3port Plus can receive cells generated by other equipment that has been filled with a standard test pattern and analyze the resultant bit error rate.

This section shows you how to set up the OC3port Plus to generate and analyze an ATM cell stream that is carrying a Bit Error Rate test load. It shows you how to set up a BERT test using a pre-defined input test pattern or a pattern you create, and how to run the test using the pattern you select. It also describes the types of measurements that the OC3port Plus provides.

Setting up a BERT Test

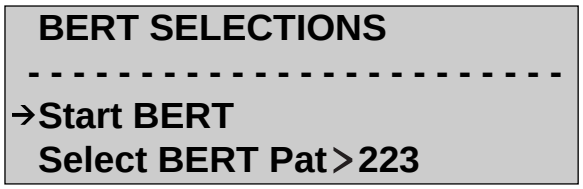
A BERT test uses RECEIVE FILTER 1 and the BERT test pattern to check the incoming signal. Before you can successfully run a BERT test, you need to make sure that you do the following:

- Set the **PAYLOAD** option of any transmission streams involved to **BERT**.
- Make sure that RECEIVE FILTER 1's header matches the header of the transmission stream carrying the BERT payload. Only ATM cell streams that match RECEIVE FILTER 1 can be analyzed for Bit Error Rate.

For information on configuring a receive filter and a transmission stream, see Chapter 5.

After you configure RECEIVE FILTER 1 and any transmission streams, you need to define a test pattern to be transmitted and choose a background rate for injecting errors into the data stream. The following instructions show you how to complete this phase of the setup for a BERT test.

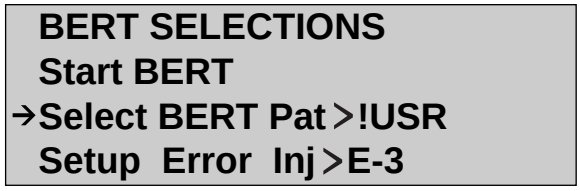
1. Press the **BERT** key. The **BERT SELECTIONS** menu is displayed:



za158f.eps

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2. Press the **Down Arrow** key until the **Select BERT Pat** option is on the selection line. Then, press the **Left** or **Right Arrow** key to display the BERT test pattern you want to use. For example:



za159f.eps

Note

These settings represent the patterns of bits you can transmit during a BERT test. See Table 6-2 for the list of available patterns and a description of their meanings.

One of the patterns (!USR*) is user-editable. For instructions on how to edit this pattern, see "Creating Your Own BERT Test Pattern", which follows in this chapter.*

3. Press the **Down Arrow** key to move the **Setup Error Inj** option to the selection line. This option sets the BERT injection error rate. Errors are injected based on your selection of one of three options: OFF, E-3, and E-6.

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

Note

*Even if you select **OFF**, which means "no errors", you can still inject individual errors during the BERT test. See "Running a BERT Test" later in this chapter.*

See Table 6-3 for a list of BERT injection error rates and a description of their meanings.

The unit is now configured to perform BERT testing. The available BERT test patterns are listed in the following table. The settings representing these patterns are accessed from the **Select BERT Pat** option, which is on the **BERT SELECTIONS** menu.

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Table 6-2. BERT Test Patterns

Test Pattern	Description
223 (default)	Pseudo-random 2^{23}-1 pattern.
220	Pseudo-random 2^{20}-1 pattern.
215	Pseudo-random 2^{15}-1 pattern.
111	11111111
000	00000000
101	10101010
110	110110110
!USR	User-definable pattern

The three BERT error injection rates are listed in the next table. The settings for these rates are accessed from the **Setup Error Inj** option, which is on the **BERT SELECTIONS** menu.

Table 6-3. BERT Error Injection Rates

Injection Rate	Meaning
OFF (the default)	No errors are inserted.
E-3	Inserts errors at a 1.0E-3 rate, which is roughly one bit pattern error every thousand bits.
E-6	Inserts errors at a 1.0E-6 rate, which is roughly one bit pattern error every million bits.

Creating Your Own BERT Test Pattern

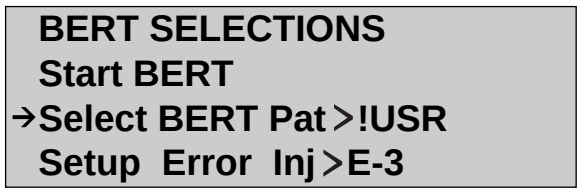
One of the settings for the **Select BERT Pat** option is the user-definable pattern, named **!USR**. If you select this setting, a pop-up menu displays which allows you to set the exact bit sequence that you want to use for BERT testing.

Follow these steps to create your own BERT test pattern:

1. Press the **BERT** key. The **BERT SELECTIONS** menu is displayed.
2. Press the **Down Arrow** key to move the **Select BERT Pat** option to the selection line.

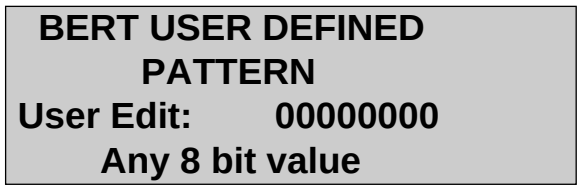
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3. Press the **Left** or **Right Arrow** key until the !USR setting is displayed:



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4. Press **ENTER**. The following menu is displayed:



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You are now in Edit mode. The number in the first position of the **User Edit** field is flashing to indicate that you are now operating in this mode.

5. Press the **Up** or **Down Arrow** key to select a value for the first position in the **User Edit** field. Then, press the **Right Arrow** key to move to the second position.

   Continue pressing the arrow keys in this manner until all of your selections are made. Then, press **ENTER**.

   The tester stores the pattern you created. This is the pattern that the OC3port Plus uses when you run a BERT test.

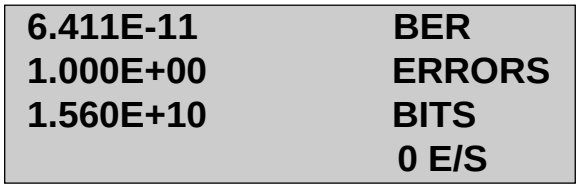
Running an ATM BERT Test

To run an ATM BERT test, do the following:

1. Press the **BERT** key. The **BERT SELECTIONS** menu is displayed:
2. Make sure that the **Start BERT** option is on the selection line.
3. Press **ENTER**. The BERT test begins.

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You see the LOADING SELECTED TRAFFIC PATTERN message, followed by the BERT results display. For example:



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This particular display shows the bit error rate (BER), which is the number of errored bits divided by the total number of bits received. Note that the display also shows you the total number of errors (ERRORS), the total number of bits that have been received (BITS), and the errors per second (E/S).

4. Press the **Left** or **Right Arrow** key to view the remaining BERT measurements. These include the following:

   - ESEC Errored seconds. The number of seconds with one or more errors.
   - THSEC Threshold seconds. The number of seconds in which the number of errors exceeded the threshold value.
   - OOF ATM BERT synchronization out of frame condition.
   - ET Elapsed time since the test began running.

Injecting Individual BERT Errors

To inject individual bit errors into BERT payloads, press the **ENTER** key during the BERT test. Each press of the **ENTER** key cause one bit to be corrupted in the outgoing pattern. The top line of the LCD flashes the *INJECT BERT ERR* message to indicate that the error was injected.

Note

*You can automatically insert errors by selecting one of the rates for the **Setup Error Inj** option when you set up the BERT test (see "Setting Up a BERT Test" earlier in this chapter for details).*

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IP Ping Test

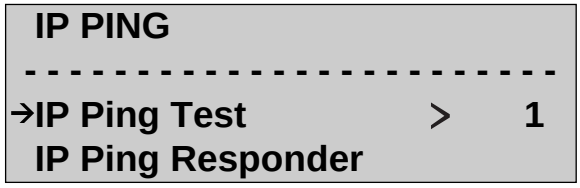
The IP Ping test is used to test connectivity to a particular device or client on the IP layer. To determine connectivity, the OC3port Plus (the source) sends an IP message (called a "ping") over the network to a device (the destination), then waits for the device to respond, confirming that the message was received. If the device responds, this indicates that it is connected; if the device does not respond, you can assume that it is not connected.

The following sections show you how to set up and run an IP Ping test.

Setting Up the OC3port Plus to Send an IP Message

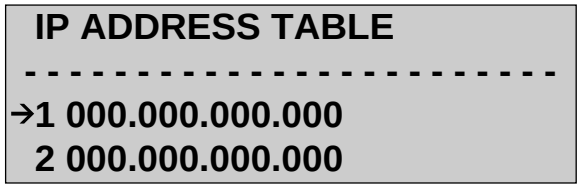
To set up the OC3port Plus to send an IP message, complete these steps:

1. Press the **AUTO** key. The **AUTO SELECTIONS** menu is displayed.
2. Make sure that the **IP Ping** option is on the selection line. Then, press **ENTER**. The **IP PING** submenu is displayed:



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3. Press the **Down Arrow** key to move the **IP Addresses** option to the selection line. Then, press **ENTER**. You see the **IP ADDRESS TABLE** menu, which looks like this:



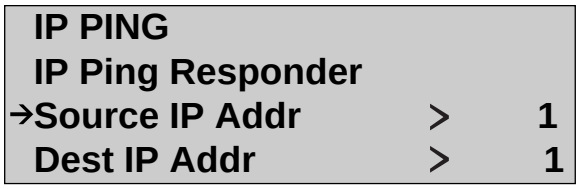
za163f.eps

For the OC3port Plus and the device under test to communicate, each needs to be assigned an IP address. These addresses are entered into this table.

The table has enough space to accommodate eight addresses (1-8), one of which is assigned to the OC3port Plus.

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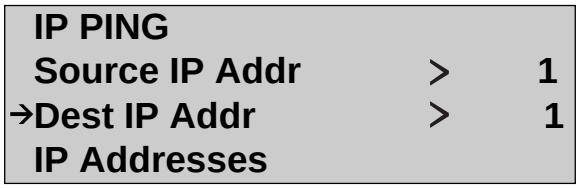
4. Press the **Down Arrow** key to move the IP address that you want to change to the selection line. Then, press the **EDIT** key and enter the desired address. Make sure that you press **ENTER** when you are finished to save the change. Complete this step for each IP address that you want to put in this table.
5. Press the **AUTO** key again. You return to the **AUTOS ELECTIONS** menu.
6. Make sure that the `IP Ping` option is on the selection line. Then, press **ENTER** to return to the **IP PING** submenu.
7. Press the **Down Arrow** key to move the **Source IP Addr** option to the selection line:



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This option identifies which address in the IP address table corresponds to the OC3port Plus, which is the "source" or sender of the message. The settings for this option range from 1 to 8, which respectively correspond to the eight address listed in the IP ADDRESS TABLE.

8. Press the **Left** or **Right Arrow** key to select the setting that matches the address in the IP ADDRESS TABLE corresponding to the OC3port Plus.
9. Press the **Down Arrow** key to move the **Dest IP Addr** option to the selection line:

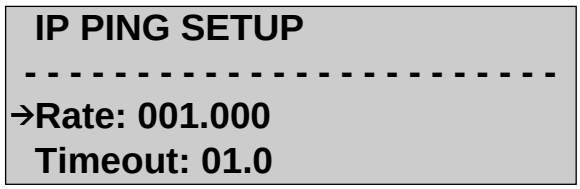


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This option determines which address in the IP ADDRESS TABLE that the OC3port Plus uses as the "destination" or receiver of the IP message. The settings for this option range from 1 to 8, which respectively correspond to the eight addresses listed in the IP ADDRESS TABLE.

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10. Press the **Left** or **Right Arrow** key to select the setting that corresponds to the destination address in the IP ADDRESS TABLE.
11. Press the **Down Arrow** key to move the **Ping Setup** option to the selection line. Then, press **ENTER**. The **IP PING SETUP** menu is displayed:



za166f.eps

This menu has the following options:

- `Rate` Determines how frequently the OC3port Plus sends a message to the destination address. The default rate is one IP message per second.

Note

*To use this option, you must set the **ATM XMIT Mode** option's setting to **STR.** (This is done later in this procedure.)*

- `Timeout` Determines how long the OC3port Plus waits for the destination address to respond to an IP message. If no response is received within the specified time period, you may have to increase the value for Timeout. If no response is received within a reasonable amount of time for the network under test, you can assume that the device is not connected.

12. Press the **EDIT** key to enter Edit mode and change the value of the **Rate** option. Make sure that you press **ENTER** when you finish to save the change.
13. Press the **Down Arrow** key to move the Timeout option to the selection line. Then, press the **EDIT** key to enter Edit mode and change the value of the Timeout option. When you finish, press **ENTER** to save the change.
14. Press the **ATM** key. The **ATM SELECTIONS** menu is displayed.

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15. Press the **Down Arrow** key to move the **Setup XMIT Streams** option to the selection line. Press **ENTER**. The setup menu for **TRANSMIT STREAM 1** is displayed:



za167f.eps

Note

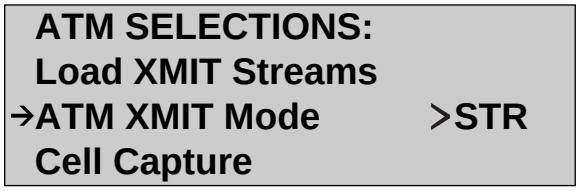
The IP Ping test is conducted on TRANSMIT STREAM 1. Therefore, make sure that you display the setup menu for this transmission stream.

16. Program TRANSMIT STREAM 1 with the desired header information.

Note

The OC3port Plus uses the VPI / VCI specified for TRANSMIT STREAM 1 to transmit IP Ping messages and to monitor responses to those messages. Therefore, for the OC3port Plus to detect a response from the device under test, that response must be sent back to the tester on the same VPI / VCI.

17. Press the **ATM** key again. You return to the **ATM SELECTIONS** menu.
18. Press the **Down Arrow** key to move the **ATM XMIT Mode** option to the selection line:



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This option has two settings that affect the way the IP message is transmitted:

- STR In STR (stream) mode, the OC3port Plus repeatedly sends an IP message to the destination address at the rate you specified on the IP Ping Setup menu.
- BUR In BUR (burst) mode, the OC3port Plus sends a single message to the destination address every time you press the **START/STOP** key.

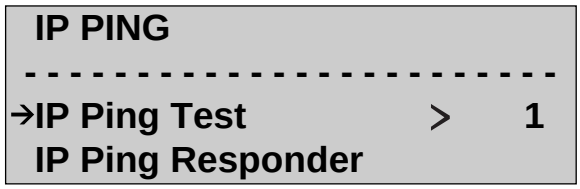
Setup is completed. You are now ready to send an IP message.

Sending an IP Message

Note

When sending an IP message, the OC3port Plus uses the VPI/VCI specified for TRANSMIT STREAM 1. The destination device's return message must be sent back to the OC3port Plus on this same VPI/VCI for the tester to receive the response.

1. Press the **AUTO** key. The **AUTO SELECTIONS** menu is displayed.
2. Make sure that the IP Ping option is on the selection line. Then, press **ENTER**. The **IP PING** submenu is displayed. For example:

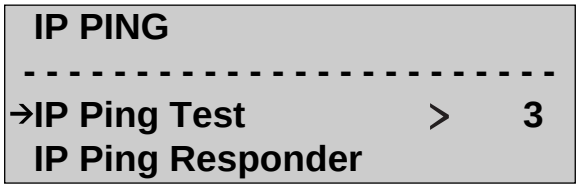


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3. Make sure that the **IP Ping Test** option is on the selection line. This option has the following settings, which determine the format of the ATM cell that carries the message:
   - 1 Formats the IP message and places it into one ATM cell.
   - 3 Formats the IP message and places it into three ATM cells.

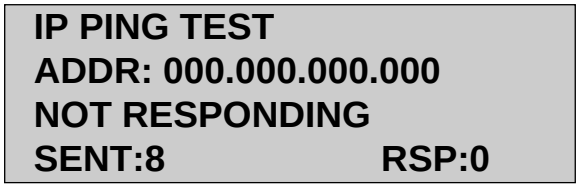
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4. Press the **Left** or **Right Arrow** key to change the setting to 3, as in:



za169f.eps

5. Press **ENTER**. The IP Ping test begins. As the test proceeds, you see a display similar to this:



za170f.eps

This display updates you on the progress of the test. It provides the following information:

- **Line 1** Name of the test
- **Line 2** IP address of destination device
- **Line 3** Response status of the destination device. If there is no response, you get this message: `NOT RESPONDING`. If a connection is made, you get this message: `IS ALIVE`.
- **Line 4** Number of messages sent and number of responses received

6. Press **ENTER** to end the test.

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Receiving an IP Message

There may be situations in which you want to test connectivity to a network by setting up the OC3port Plus as the destination device and then determining whether it can receive an IP message from a network client. This procedure shows you how to do this.

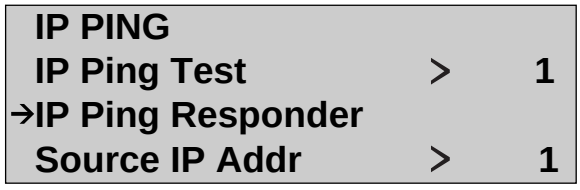
1. Set up RECEIVE FILTER 1 with the desired VPI / VCI.

Note

The OC3port Plus uses the VPI/VCI specified on RECEIVE FILTER 1 to receive IP Ping messages and to respond to those messages.

2. Press the **AUTO** key. The **AUTO SELECTIONS** menu is displayed.
3. Make sure that the **IP Ping** option is on the selection line. Then, press **ENTER**. The **IP PING** submenu is displayed.
4. Press the **Down Arrow** key to move the **Source IP Addr** option to the selection line.

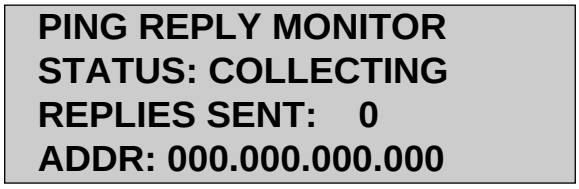
   This option identifies which address in the IP address table corresponds to the OC3port Plus. The settings for this option range from `1` to `8`, which respectively correspond to the eight addresses listed in the IP ADDRESS TABLE.
5. Press the **Left** or **Right Arrow** key to select the setting that matches the address in the IP ADDRESS TABLE corresponding to the OC3port Plus.
6. Press the **Down Arrow** key to move the `IP Ping Responder` option to the selection line, as in the following:



za171f.eps

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7. Press **ENTER**. You see a display similar to the following:



za172f.eps

This display indicates that the OC3port Plus is in receiver mode (`COLLECTING`), waiting to receive an IP message. It also indicates the number of times the OC3port Plus has received a message (`REPLIES SENT`) and the address (ADDR) from which the message was received.

8. Press **ENTER** to exit receiver mode.

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Appendixes

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B	OC3port Plus ATM Transmission	B-1
C	Glossary	C-1

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Appendix A
Applications

Introduction

Appendix A 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 pre-determined 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 OC3port Plus to use them to test a policing algorithm.

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 CBR 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.

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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. Initially you should see no traffic on the configured receive filter.
5. 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.

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 / Poisson transmission stream on the circuit to be tested. Also set the circuit's header to match VCI/VPI "A" 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.

Determining Effects of High Traffic Rates on Transmission

One way of determining the effect that high traffic rates have on a payload's transmission capability is to program one of the transmit streams with a BERT stream and set the remaining transmit streams to run simultaneously with that BERT stream. When using this technique, observe the following rules when programming the background traffic:

- Only one transmit stream's payload can be set to BERT. The OC3port Plus does not prevent you from selecting BERT in each of the eight transmit payloads (in some cases, this is a useful way of providing random payload data in multiple streams), but you will not be able to correctly analyze this type of transmission.
- RECEIVE FILTER 1 must match the incoming BERT stream's header and only cells with BERT payloads can use that header.

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Appendix B
OC3port Plus ATM Transmission

Introduction

The OC3port Plus supports four different transmission source types:

- CBR
- VBR / Poisson
- PDU
- VBR / Burst

The OC3port Plus can be configured to provide up to eight individual ATM transmission streams, and, for each stream, one of these four transmission sources must be selected.

Appendix B describes these transmission sources and provides examples of their use.

CBR (Constant Bit Rate) Transmission

A CBR transmission source generates ATM cells periodically at a rate equal to the Peak Cell Rate (PCR). It is the simplest type of transmission source available and is used to effectively simulate the transmission of CBR-type services, such as DS3 and DS1, through an ATM network.

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CBR Parameter Setup

Two transmission stream parameters affect the way a CBR transmission source is transmitted:

- **PCR** (Peak Cell Rate)

  Determines the amount of bandwidth consumed by the CBR source and the inter-cell arrival times for the periodic transmission. The OC3port Plus places cells in transmission queue that are separated by a minimum interval equal to the inverse of the PCR. If a cell slot is not available at that interval, the next open slot is used. For example, a PCR set to 45 Mbits results in a source that consumes 45 Mbits of OC3 bandwidth (almost 30 %). The cells, on average, are periodically spaced approximately 9.42 microseconds apart.

- **CDV LIM** (Cell Delay Variation Limit)

  When the shaper is left enabled for a stream, the **CDV LIM** parameter guarantees that the cells, which are adjusted for slotting and contention, are never spaced more closely than (1/PCR) - **CDV LIM**. For example, a CDV LIM set to 2.0 cells and a **PCR** set to 45 Mbits guarantees cells that, on average, are spaced 9.42 microseconds apart but that may be separated by as little as 3.76 microseconds (9.42 - (2*2.83).

Results

If you set up a small number of CBR streams and if these streams are in the highest priority positions (that is, Stream 1, Stream 2, etc.), the resulting ATM transmission stream will match (to within 1 %) the bandwidth and spacing assigned by the PCR parameter.

If you configure a low-priority CBR transmission stream and if other higher priority transmission streams are using the majority of the available OC3 bandwidth, the low-priority CBR stream will be transmitted at a rate lower than the specified PCR.

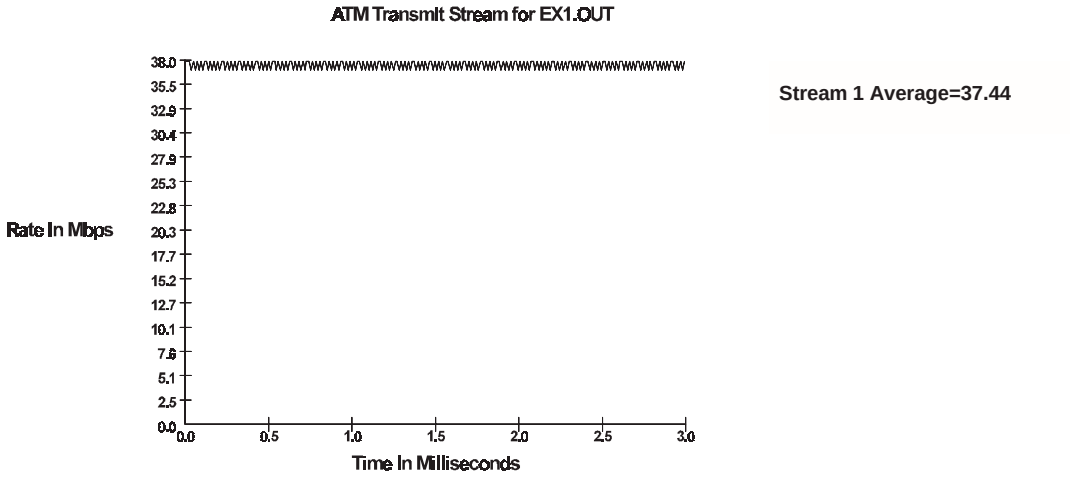
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Examples

The examples that follow are accompanied by graphs that depict the actual transmission queue output of the OC3port Plus. These graphs show instantaneous bandwidth plotted against time. In addition, each graph presents the average bandwidth used by each individual transmission stream.

Example 1: A 37.44 MBPS (25 %) CBR source configured as follows:

- **PCR**: 37.44 MBPS
- **SCR**: Does not matter
- **MBS**: Does not matter
- **CDV LIM**: 20 Cls (default)
- **Shaper**: ON (default)

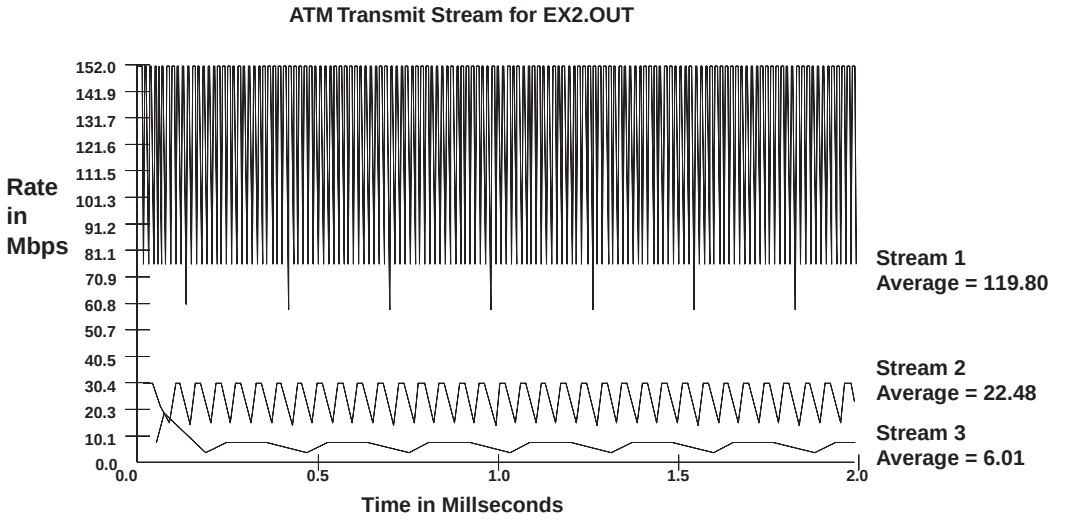


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Example 2: Three CBR sources using 99 % of the available OC3 bandwidth configured as follows:

- Stream 1: PCR 0 % (119.0), CDV LIM: 20 Cls, Shaper: ON
- Stream 2: PCR 15 % (22.46), CDV LIM: 20 Cls, Shaper: ON
- Stream 3: PCR 4 % (5.99), CDV LIM: 20 Cls, Shaper: ON



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VBR / Burst (Variable Bit Rate) Stress Test

A VBR / BURST transmission source is used to check ATM policing algorithms at their limits. The OC3port Plus, when configured, for VBR / BURST, generates a cell stream that has three distinct segments:

- Stress segment

  A burst of cells, which are equal in length to the count specified by the MBS parameter, are transmitted at the PCR rate. This fills the "leaky bucket" (as defined in the ATM Forum implementation agreements) to the maximum level acceptable by the ATM policing algorithm.

- Drain segment

  A burst of cells is generated at 1/2 the SCR rate until the "leaky bucket" is drained to the SCR rate. The number of cells required to do this depends on the amount of stress supplied in the stress segment and is directly proportional to the MBS size and PCR rate.

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- Idle segment

  The OC3port Plus transmits cells at the SCR rate until it reaches the end of its transmit queue. Then, the OC3port Plus starts again with the stress segment and the cycle continues.

VBR / BURST Parameter Setup

Many parameters affect the way VBR / BURST works:

- **PCR**

  Determines the cell transmission rate used in the stress segment. PCR must be set higher than the SCR setting.

- **SCR**

  Determines the cell transmission rate used during both the drain and idle segments.

  Low rates for SCR allow the policing algorithm to recover more quickly.

- **MBS**

  Determines the exact number of cells transmitted at the PCR rate during the stress segment.

Because the OC3port Plus employs a cell transmission queue that repeats after its cells are transmitted, care must be taken to allow enough time for the drain segment to occur.

The OC3port Plus will display a warning when the combination of parameters cannot be met.

Results

If you have a test device that can plot the cell arrivals of an individual cell stream, you can see all three segments of the VBR / BURST transmission as illustrated in the examples that follow.

If you look only at the statistics on the receive filters, the stress, drain, and idle segments are averaged over time and a simple bandwidth number is present.

Note

This average is close to the average values shown in the examples.

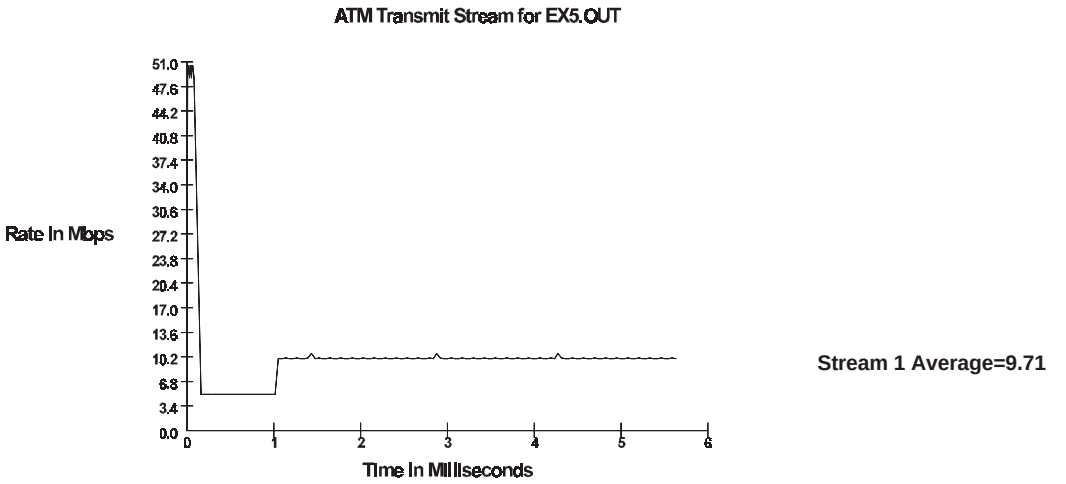
If you can capture cells in the buffer with the time stamps set on, you will see the exact number of MBS cells arriving at the PCR rate. These cells are followed by cells at half the SCR rate.

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Example 3: Stream 1 configured for VBR / BURST as follows:

- **PCR**: 50.00 Mbps
- **SCR**:10.00 Mbps
- **MBS**: 10.00 Cls,
- **CDV LIM**: 2.00

A fast, high-speed burst followed by a slow sustained rate and a tight CDV.



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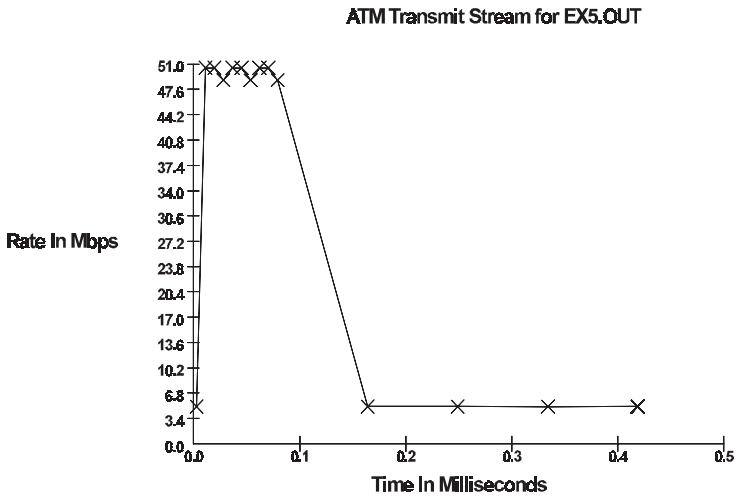
Notice that the transmission rate runs at Mbps for a very short time (equivalent to 10 cells being transmitted).

Then the transmission rate runs at 5.0 Mbps to drain the "bucket" and returns to the SCR for the rest of the transmission queue.

The queue then immediately restarts with a high burst.

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Example 3 (continued): A closer look at the stress segment



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The "x's" indicate actual cell transmissions.

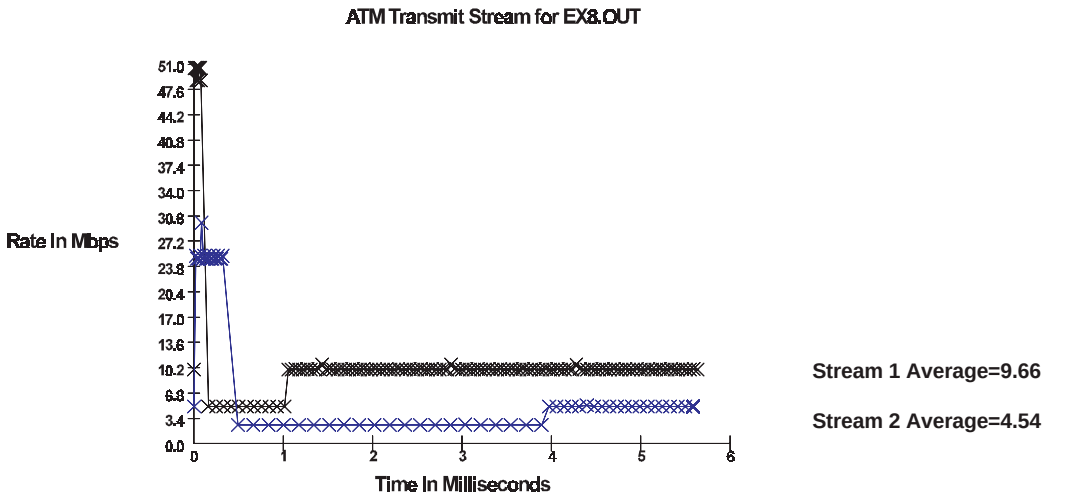
Notice how the OC3port Plus transmits a 10-cell burst in the beginning and then quickly scales back to half the SCR rate or 5 Mbps.

This shape simulates the worst-case burst allowed by the defined traffic parameters.

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Example 4: Dual VBR / BURST transmissions configured as follows:

- Stream 1: PCR: 50 Mbps, SCR: 10 Mbps, MBS: 10 cells, CDV LIM: 2.0
- Stream 2: PCR: 25 Mbps, SCR: 5 Mbps, MBS: 20 cells, CDV LIM: 2.0



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Notice that both VBR / BURST transmissions work as programmed.

Stream 1 has a much higher burst for a shorter duration.

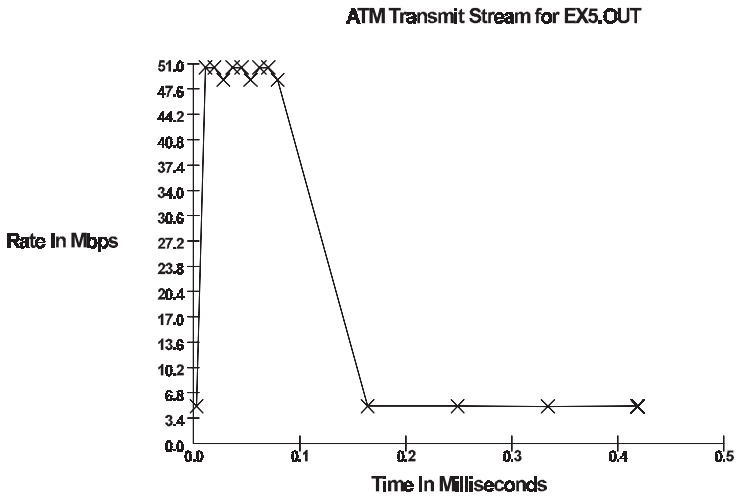
Stream 2 has a lower burst for a longer duration.

Note that a longer drain period is required before Stream 2 returns to the SCR rate.

The "x's" indicate actual cell transmissions.

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Example 4 (continued): A closer look at the combined bursts



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Note that Stream 1 and Stream 2 interleave tightly throughout the entire transmission.

The peak that occurs during Stream 2's burst is the result of contention with Stream 1.

This peak still falls within the CDV limit set for Stream 2.

VBR (Variable Bit Rate) / Poisson Transmission

A VBR / Poisson transmission source generates ATM cells at an average rate of transmission that is equal to the programmed Sustained Cell Rate (SCR), but has an instantaneous arrival rate that is random and varies around the SCR with a Poisson distribution that is bounded by the programmed PCR. A further constraint on VBR / Poisson is that the maximum number of cells transmitted at the PCR rate is limited by the programmable Maximum Burst Size (MBS) setting.

This transmission source can be used to effectively emulate variable traffic sources, such as LANs, where the instantaneous bandwidth varies over time. The VBR / Poisson source can also be constrained and well behaved (when the shaper is activated) or not well behaved (when the shaper is de-activated).

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VBR / POISSON Parameter Setup

Many parameters affect the way VBR / Poisson works:

- **SCR** (Sustained Cell Rate)

  Determines the "center" transmission rate, around which the cell inter-arrival times are distributed.

- **PCR** (Peak Cell Rate)

  Determines the upper bound on the cell transmission rate. The instantaneous cell rate varies randomly between the PCR and SCR - (PCR-SCR) as long as the CDV limit is not exceeded. This is only enforced if the Shaper is enabled.

- **MBS** (Maximum Burst Size)

  Limits the number of cells that can be generated sequentially at the PCR rate. This is only enforced if the Shaper is enabled.

- **CDV LIM** (Cell Delay Variation Limit)

  Constrains early arrival times to an integral number of cells before the expected SCR interval. This is only enforced if the Shaper is enabled.

Results

If you view a VBR / Poisson source with an instrument that presents average results (any sampling interval greater than 100 cells or so), you will see an average arrival rate and bandwidth very close to the **SCR** setting. If the instrument is capable of detecting instantaneous minimum and maximum transmission rates, you will see a stream that varies around the **SCR** setting.

If you capture a group of VBR / Poisson cells that have been transmitted with the Shaper off, you will see cell inter-arrival times that are random but centered around the **SCR** setting. No limits are placed upon the inter-arrival variations. In effect this is a "rogue" cell stream that may exceed contract parameters over short periods.

If you capture a group of VBR / Poisson cells that have been transmitted with the Shaper on, you will see cell inter-arrival times that are random but are constrained to the PCR and CDV LIM values. In effect, they adhere to the ATM contract parameters.

Because these are RANDOM sources, every time that you load the traffic settings on the OC3port Plus, even with the same parameters, a source with new characteristics is transmitted.

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Appendix C
Glossary

AIS	Acronym for Alarm Indication Signal.
asynchronous	Not synchronized; not timed to an outside clock.
ATM	Acronym for Asynchronous Transfer Mode. A transmission protocol that relays user traffic by segmenting it into small, fixed-sized packets called cells. The ATM 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 or amount of data that can be sent through a given circuit.
BERT	Abbreviation for Bit Error Rate Testing. A test which 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.
BIP-8	Acronym for Bit-Interleaved Parity 8 Bit. An error monitoring scheme whereby an 8-bit code provides parity over a certain part of a signal.
bit error rate	The number of errored bits divided by the total number of bits received.
CBR	Acronym for Constant Bit Rate.
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.

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cell loopback mode	A mode in which the OC3port Plus loops back the incoming ATM cells for in-line testing.
cell loss ratio	In cell loss testing, the number of displaced cells in relation to the total number of cells received by the activated ATM receive filter.
channel	A transmission facility with defined bandwidth.
CLP	Acronym 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	Acronym for Cell Loss Ratio.
CMR	Acronym for Cell Misinsert Ratio.
CPS	Acronym for cells per second.
CTD	Acronym for Cell Transmission Delay.
DUT	Acronym for device under test.
E/S	Acronym for errors per second.
end-of-menu bar	On the OC3port Plus menus, the dashed line that appears after the last item on a menu and indicates that you are at the bottom of a menu.
error rate	The number of errors per second.
errored second	A second in which at least one defect or error occurred.
FEBE	Acronym for Far End Block Error.
FERF	Acronym for Far End Receive Failure.
FM	Acronym for Fault Management.
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.
GFC	Acronym for Generic Flow Control. The first four bits of byte 1 in an ATM cell header.
HCS	Acronym 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.

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HEC	Acronym 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.
idle cell	In ATM, a type of background cell. An idle cell has its CLP bit set to 1. Contrast with unassigned cell.
in-frame condition	A SONET frame contains frame alignment bytes, which function to locate it in the data stream. The receiver searches the incoming data stream for the correct pattern of framing bytes. When the receiver detects two sequential frames with correct framing patterns, an in-frame condition is declared.
LCD	Acronym for Liquid Crystal Display.
LINE FERF	Acronym for LINE Far End Receive Failure.
line loopback mode	A state in which transmit signals are routed into the OC3port Plus and back out as receive signals without anything being done to them.
LOP	Acronym for Loss of Pointer.
MBPS	Acronym for megabits per second (a million bits per second).
MBS (Maximum Burst Size)	The maximum number of cells that can be transmitted consecutively at the rate defined by the PCR.
NNI	Acronym for Network to Network-Interface. An interface between two public carriers, such as a local carrier and a long-distance carrier.
OC3	Acronym for Optical Carrier 3. A SONET optical signal that runs at a rate of 155 Mbps.
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.
PATH AIS alarm	Abbreviation for PATH Alarm Indication Signal. Declared when an all-ones pattern is detected in the pointer bytes (H1 and H2) for three consecutive STS-3c frames.
PATH FERF alarm	Abbreviation for PATH Far End Receive Failure. Declared when the fourth bit FEBE field within the Path Status Byte (G1) is set to '1001' for two consecutive frames.
PATH YELLOW alarm	An alarm that is declared whenever a normal pointer (generally values within the range of 0 to 782) is not found in eight consecutive frames.

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payload	That portion of an ATM cell that contains user information or data as opposed to routing or control information. Contrast with header.
payload pointer	Indicates the starting point of a SONET synchronous payload envelope.
PCR (Peak Cell Rate)	The maximum number of cells that can be transmitted on a given virtual channel.
PT	Acronym 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	Acronym for Remote Defect Indication.
receive filter	A piece of logic that allows the OC3port 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.
SCR	Acronym for Sustained Cell Rate. The average number of cells that can be transmitted on a given virtual channel.
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.
SDH	Acronym for Synchronous Digital Hierarchy. The European equivalent of SONET.
SECTION LOF	Acronym for SECTION Loss of Frame.
SECTION LOS	Acronym for SECTION Loss of Signal.
SECTION OOF	Acronym for SECTION Out-of-Frame.
selection line	On the OC3port Plus menus, the line that appears between the two blue directional arrows and, in some cases, is preceded by the greater-than (>) symbol. When a menu
SONET	Acronym for Synchronous Optical Network. A format and framing structure that provides a physical layer for transporting and managing digital traffic over fiber optic facilities.

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STS-3c	Acronym for Synchronous Transport Signal 3-c. A (concatenated) SONET framing structure. The STS-3c frame is 125 microseconds long and contains 2430 bytes, which are organized into nine rows and 270 columns.
synchronous payload envelope (SPE)	A defined area of an STS-3c or STM-1 frame that carries the data for customer services.
threshold seconds	The number of seconds in which the number of errors exceeds a specified threshold value.
top-of-menu bar	On the OC3port Plus menus, the dashed line that appears directly under the menu title and before the first item on a menu. This line indicates that you are at the top of a menu. Contrast with end-of-menu bar.
transmit stream	On the OC3port Plus, used to generate ATM traffic. Allows the user to set up cell transmission parameters that fully describe the ATM traffic generated by the OC3port Plus. These parameters include address designations, 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	Acronym for User-to-Network Interface. An interface between privately owned or leased customer equipment and a public network service provider.
VCI	Acronym for Virtual Channel Indicator. That portion of an ATM cell header that identifies the channel used to route a cell.
VPI	Acronym for Virtual Path Indicator. That portion of an ATM cell header that identifies the path used to route a cell.

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