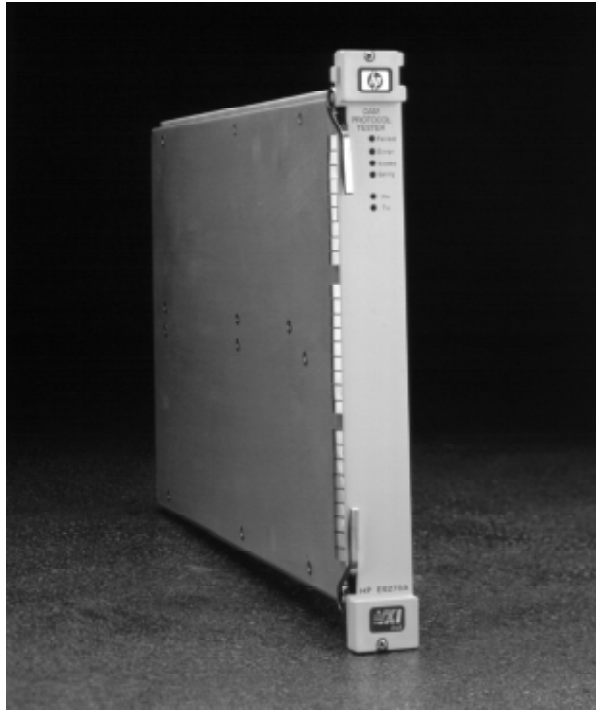# E6270A OAM Protocol Tester

For the HP Broadband Series Test System

E6270A

The E6270A OAM Protocol Tester - a compact single-slot VXIbus module for the industry standard Broadband Series Test System

New

Product Features:

- Powerful 124 channel user-data generator
- Automatic generation of F4 and F5 OAM cells on all user-data channels
- Two channel receiver which allows simultaneous OAM F4 and F5 testing
- Generate OAM source requests and report request outcome
- Emulate OAM destination responses
- Monitor OAM cell flows
- Generate impaired OAM cells to stress test equipment.

Part of the modular HP Broadband Series Test System (BSTS), the E6270A OAM Protocol Tester (OPT) is a dedicated module for the verification of the ATM Operations and Maintenance (OAM) protocol.

Much more than a simple OAM cell decoder, the OPT fully leverages the features of OAM to offer a product which may be used for the verification of the fault-detection, fault-localization and performance monitoring features of OAM.

The large-scale deployment of ATM networks and services presents new network management challenges for both network equipment manufacturers and service providers. Delivery of time-sensitive payloads, such as voice and video, over ATM networks requires fault management and performance monitoring tools. Simple verification of connections is not enough to guarantee that Quality of Service (QoS) standards are being met and usable customer services delivered.

The ATM OAM protocol offers a standardized, in-service method for network monitoring. Its standardized data elements may be used to provide fault detection, fault localization and performance monitoring of ATM connections. From this information, key network management information such as QoS and network connectivity can be delivered.

OAM is a complicated protocol, requiring careful implementation and a dedicated test solution to ensure conformance with the relevant ITU-T and Bellcore specifications. With this module, HP has delivered the industry's first real-time test solution for ATM OAM.

Key Features:

Traffic Generation

The E6270A features a powerful 124 channel traffic generator, permitting testing at "real world" traffic levels, with automatic insertion of OAM cells. Channel content and traffic profile are under complete user control. Each channel may have a user defined sequence of between 1 and 1000 cells defined from a large 7000 cell buffer.

Each channel may be programmed to have either a constant or burst profile. User traffic may be generated at rates between 100 bits per second to full line rate with a minimum resolution of 500 parts per million.

Alarm indication signal (AIS), remote defect indication (RDI), continuity check and forward performance monitoring (PM) cells can be automatically inserted on each channel.

OAM Source Behavior

Loopback and activation/deactivation requests may be made under user control on all defined channels.

OAM Destination Behavior

The OPT will emulate the following destination responses on up to 124 channels:

- AIS State. The OPT will automatically generate end-to-end RDI cells in response to AIS cells.

- OAM Loopback. The OPT will generate loopback response cells in response to loopback requests. The response cell can be automatically generated or it may contain user-defined information.

- Activation/Deactivation. The OPT will generate activation/deactivation confirmed or denied responses (configured under user control) in response to activation/deactivation requests.

Receiver

The module's two-channel receiver allows two flows to be simultaneously monitored.

All measurements and statistics are reported in real time, via an intuitive graphical user interface. The OPT measures and presents a wide array of OAM performance statistics to assist in evaluating QoS performance levels. These can be displayed using numeric or graphical viewers. Users can specify the interval at which statistics are updated, selecting from a range of 1 second to 72 hours.

Statistics

The following statistics are collected and displayed for up to two selected connections:

Fault Management:

- Fault management states: AIS, loss of continuity (LOC) and RDI.

- Each detected fault will display the time of the fault as well as the new fault management state.

Performance statistics:

- OAM cell counts: Received and lost PM cells.

- Impaired cell blocks: User cell blocks with CLP_0 and CLP_{0+1} loss, CLP_{0+1} misinsertions and CLP_{0+1} errors and total impaired cell blocks.

- Severely Errored Cell Blocks (SECB): CLP_0 and CLP_{0+1} loss, CLP_{0+1} misinsertions and CLP_{0+1} errors and total severely errored cell blocks

- User cell errors: Errored and misinserted cells, plus the

number of lost user cells and the total number of lost user cells including those lost in severely errored cell blocks.

- User cell counts: Lost PM cells, received PM cells, total CLP_0 and CLP_{0+1} cells and the minimum number of cells tagged during transmission.

- OAM Cell Delays: Minimum, average and minimum-maximum, as well as the number of cells with transmission delay in excess of a user-defined delay threshold.

Error Simulation

Simulate one of the following network events within user and forward monitoring PM cells:

- Lost PM cell
- Lost User Cells
- Tagged Cells
- Mis-inserted Cells
- Errored Cells

These errors may be inserted once, or periodically. Error simulation allows stress testing of an OAM implementation. Verification of the robustness of an implementation by subjecting it to real-world conditions in the lab can avoid costly rework during field trials.

Graphical User Interface and Programming Environment

The E6270A uses the powerful HP Visual User Environment, based on the X Window system and OSF/Motif. This product has an intuitive GUI which has been carefully designed to ensure rapid user setup of tests and to deliver clear, understandable results.

The BSTS's User Programming Environment (UPE) simplifies creation, storage and re-use of repeatable test routines for regression testing, quality assurance testing and production testing of ATM equipment.

Applicable Standards

The E6270A OPT complies with the following standards:

- ITU-T Recommendation I.610, B-ISDN Operation and Maintenance Principles and Functions. November, 1995
- Bellcore GR-1248-CORE, Generic Requirements for Operations of ATM Network Elements, Issue 3, August 1996.

OAM Testing Solution Note

"Testing Operation and Maintenance (OAM) Implementations for ATM," an HP Solution Note, is available and can be obtained by contacting your HP sales representative.

This solution note explains the underlying technology of OAM. This note also covers testing methodologies for OAM.

Configuration & Use With Other BSTS Line Interfaces, Hardware Modules & Test Software

The E6270A OPT requires a E4210A/B form-13 mainframe base or a E4200A/B form-7 mainframe base with at least one open slot. The E6270A requires system software of 3.08 or higher. The E6270A also requires an ATM based line interface (LIF) to provide a connection to ATM networking equipment.

The E6270A can also work in conjunction with an E4209A/B Cell Protocol Processor (CPP) and/or an E4219A ATM Network Impairment Emulator Module (NEM). The CPP can provide additional traffic generation, signalling and protocol analysis functions. The NEM may be used to simulate actual network conditions such as cell error and cell delay.

Warranty & Support Options

Hardware

All BSTS hardware components are warranted for a period of 3 years. Products must be returned to an authorized HP service center for service. At the time of purchase, you may select warranty option W01, a no-charge option which converts the standard 3-year return to HP warranty to a 1-year on-site warranty.

Software

HP Broadband Series Test System software and firmware products are supplied on transportable media such as disk, CD-ROM or integrated circuits. The warranty covers physical defects in the media, and defective media is replaced at no charge during the warranty period. When installed in an HP Broadband Series Test System, the software/firmware media has the same warranty period as the product.

Product Numbers

- **E4200B** BSTS Form-7 Transportable Base
- **E4210B** BSTS Form-13 Mainframe Base
- **E4209B** 0-155 Mb/s Cell Protocol Processor
- **E4219A** ATM Network Impairment Emulator Module
- **E6270A** OAM Protocol Tester

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For more information

For an introduction to the modular Broadband Series Test System, please request the *BSTS Product Catalog*, HP publication 5965-4721E or visit the BSTS web pages at http://www.hp.com/go/bsts.

The *BSTS Ordering Guide*, HP publication 5964-0393E, helps you determine the appropriate system configuration for your testing needs. Technical specifications detailing other dedicated test modules and test software packages for the BSTS are also available.

How to Find Out About Other HP Products, Publications & Services

For more information on Hewlett-Packard Test & Measurement products, publications or services, please call your local Hewlett-Packard sales office. A current listing is available via Web through AccessHP at http://www.hp.com. If you do not have access to the internet, please contact one of the HP centers listed below and they will direct you to your nearest HP representative.

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