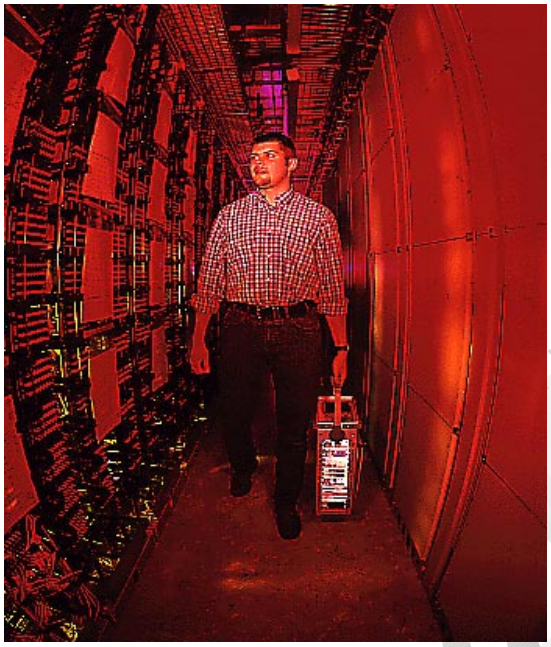
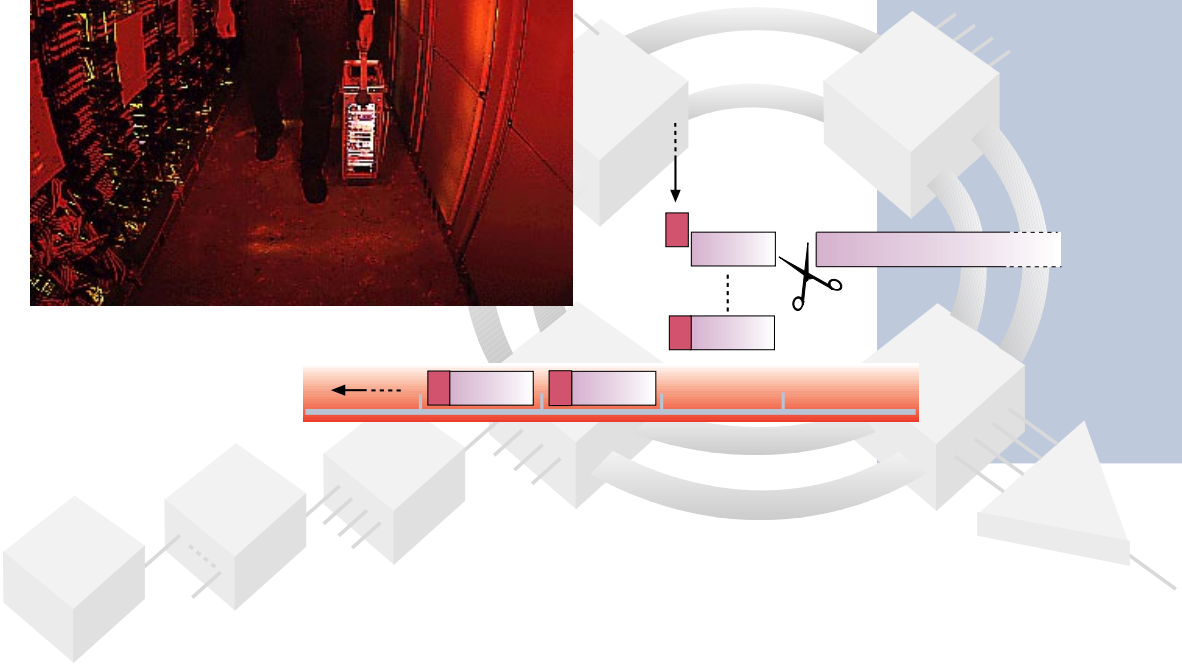
HEWLETT® PACKARD

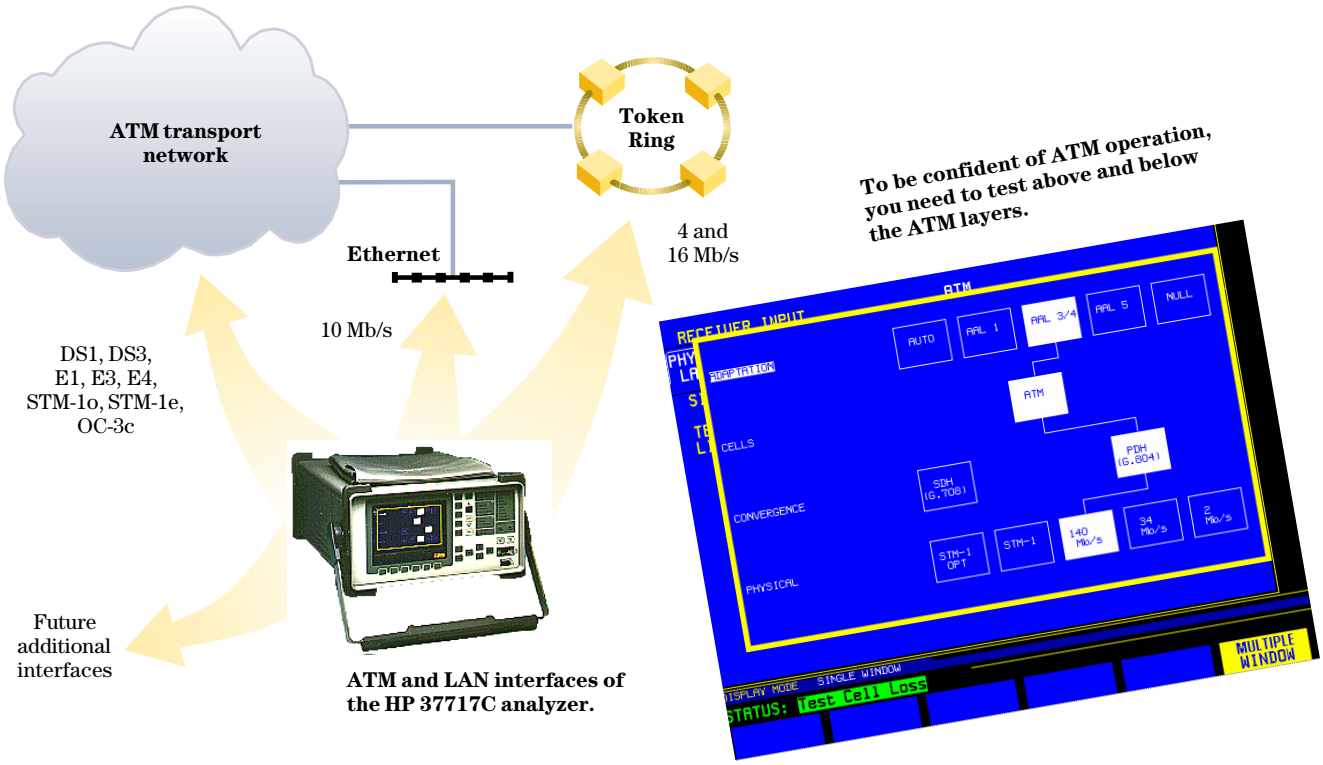
**ATM test modules for HP 37717C communications performance analyzer**





# Ease your network's migration to ATM

# Install ATM that's ready to carry user services




**ATM and LAN interfaces of the HP 37717C analyzer.**

*Be certain that new ATM equipment will perform correctly and provide good quality of service. For effective installation, maintenance and general-purpose R&D, you need to test your equipment from the physical layer through the ATM layer to higher layers – then check that it interacts properly with equipment from other vendors.*

*You must verify your equipment is resilient to physical layer impairments (eg, bit errors, physical layer jitter) – and ensure that it correctly carries basic and mixed services, including CBR services (eg, channel emulation, voice or video), VBR services (eg, file or data transfer), Native Ethernet and Token Ring.*

*The HP 37717C communications performance analyzer, with both ANSI and ETSI interfaces, gives you all this capability – and more – in one instrument.*

**Becoming effective at ATM testing is simple**

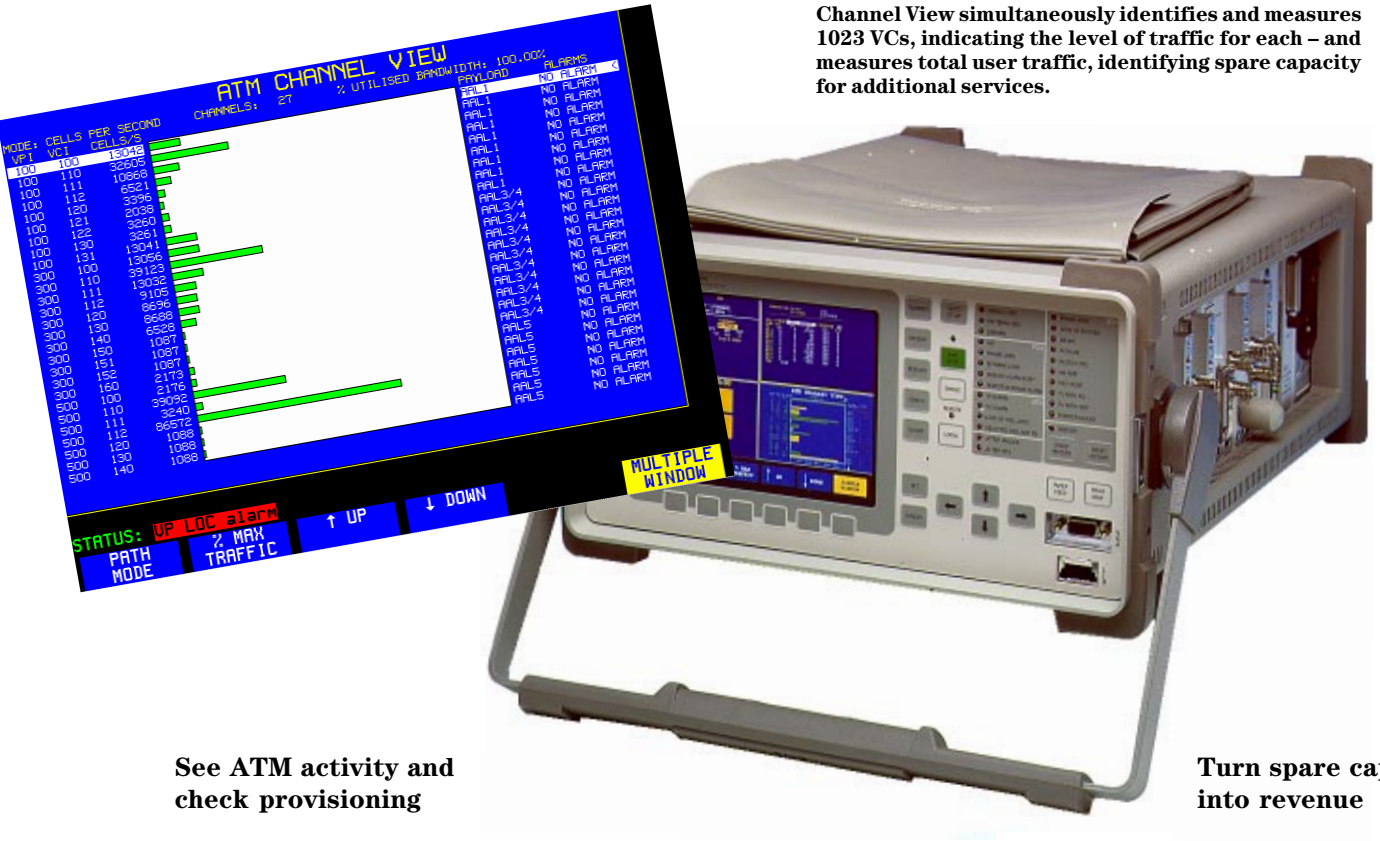
For effective installation and maintenance you need the HP 37717C communications performance analyzer.

Powerful features such as Channel View and TroubleScan take you straight to important performance and status indicators, and make the interpretation of results easy. In-service monitoring capabilities let you see the key ATM quality of service parameters, check for ATM-layer alarms and extract results from performance monitoring OAM flows. The HP 37717C analyzer excels in out-of-service testing too. It has the capability to generate and analyze standardized test cells and produce simulated test traffic.

**Useful ATM terms . . .**

AAL – ATM adaptation layer
ABR – available bit rate
ATM – asynchronous transfer mode
CBR – constant bit rate
CDV – cell delay variation
OAM – operations and maintenance
VBR – variable bit rate
VC – virtual channel
VP – virtual path

# Monitor what's happening on ATM




**Channel View simultaneously identifies and measures 1023 VCs, indicating the level of traffic for each – and measures total user traffic, identifying spare capacity for additional services.**

### See ATM activity and check provisioning

Whenever you connect to a link you will want to see what is there. Channel View finds, identifies and displays in real time the cell rate of all found channels simultaneously so you know the usage profile on the link.

Channel View's capability to identify virtual channels is a powerful and convenient way to check that cross-connects are configured correctly, particularly when misconfigured cross-connects are so often the cause of provisioning problems.

### Look above the ATM Layer

To check that the correct services are routed properly, use Channel View to analyze all channels, and identify the AAL type of the traffic being carried. Channel View displays this (or any active ATM AIS or RDI alarm) alongside other channel data.

### Keep key customers happy

Ensure the network maintains a high quality of service for your main revenue earners. Use Channel View's mean cell rate measurement to find the key bandwidth users and select them for further analysis such as CDV and AAL monitoring.

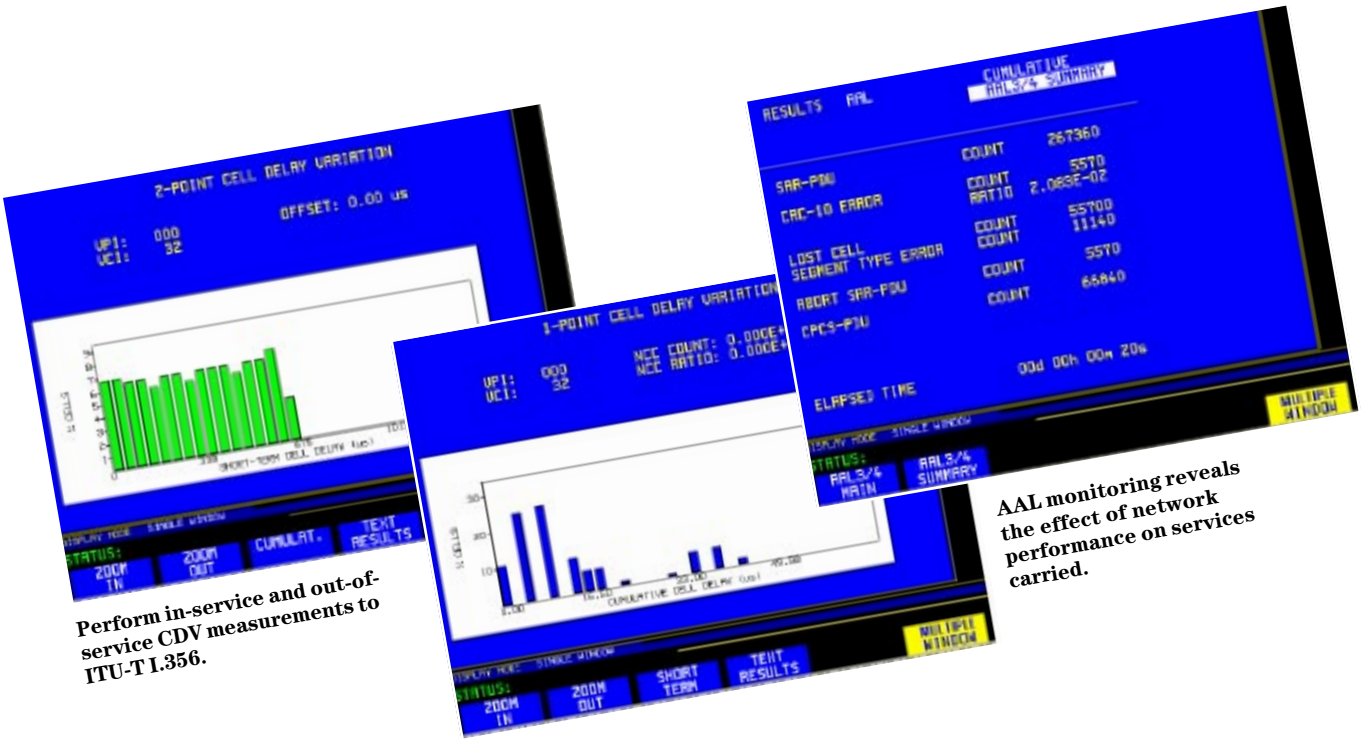
### Turn spare capacity into revenue

Use Channel View's user traffic (%) measurement to see the total user traffic on the link and any spare capacity that could be utilized to increase revenue.

### Identify intermittent problems

When rogue cells occur in the network, they can lead to irregular, intermittent and difficult-to-resolve faults. Where they map onto a valid channel, they become misinserted cells. Use Channel View to check the VP/VC of every cell and help identify rogue cells. This is a very sensitive way of detecting problems in the network.

# Test the key quality of service parameters




**Perform in-service and out-of-service CDV measurements to ITU-T I.356.**

**AAL monitoring reveals the effect of network performance on services carried.**

### Meet quality of service commitments

Cell delay variation (CDV) in the network is a serious problem for CBR services such as voice, video and circuit emulation. Now you can see the CDV profile in an easy-to-interpret graphical display that simplifies testing of this critical parameter.

The HP 37717C analyzer can perform the 1-point CDV defined by the ITU in I.356 and adopted by the ATM Forum in Traffic Management 4.0. You can also check for non-conformance to traffic parameters.

### Perform out-of-service tests during commissioning or in the lab

The HP 37717C analyzer can generate a variety of test traffic. Test cells conforming to ITU-T O.191 allow you to make measurements of cell loss ratio (CLR), cell error ratio (CER), cell misinsertion rate (CMR), as well as 1-point and 2-point CDV, all to ITU-T I.356 and ATM Forum Traffic Management 4.0, at up to the full link rate.

Alternatively, use PRBS traffic to get more detailed payload bit error information.

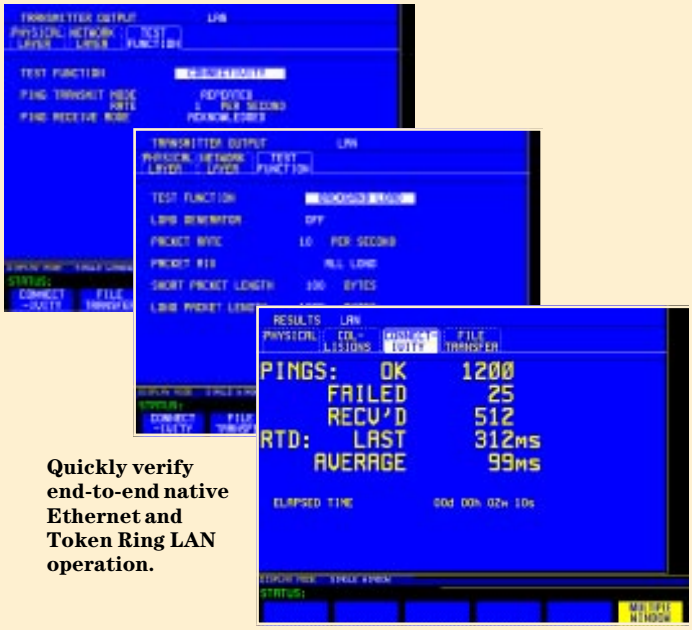
### Use the AAL structure and PM-OAM to tell you more

Analyze the AAL structure of live, in-service traffic at full rate to infer the health of the underlying layers of your network; dropped cells cause CRC failures, sequence number jumps, length errors, etc.

For network performance problems, examine ITU-T I.610 performance monitoring OAM cells to measure cell loss and misinsertion, and verify user data integrity.

# Verify LAN over WAN functionality


**The cell rate history shows how your customer's traffic varies during potential problem times.**




**Quickly verify end-to-end native Ethernet and Token Ring LAN operation.**

### Identify spare network capacity

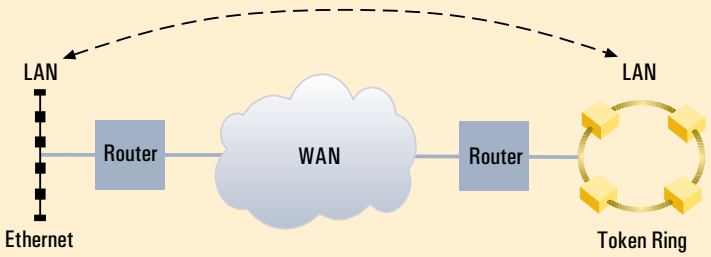
Customers who violate their traffic contracts will suffer as policing functions throw away their non-conforming cells. However, customers who over-provision their traffic contracts are keeping other potential users from gaining access. You can examine a graph of the minimum, maximum and mean cell rate usage of any channel over time, allowing you the opportunity to get more revenue out of your network or to spot potential problems as a customer's traffic approaches the traffic contract boundaries.

### Check out LAN over WAN

After installing a native LAN over WAN service and before handing it over to the customer, you'll want to be certain that the service performs properly. Using the provided IP and Novell Netware IPX protocols, you can readily check latency (delay) and connectivity in LAN links by sending 'pings' or simulating file transfers to confirm the correct operation of the service.

### Ensure reliable installation

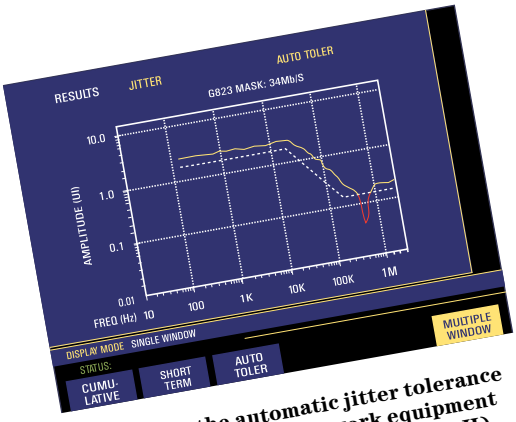
Verify reliable end-to-end communication under simulated real-traffic conditions by sending 'pings' or simulated files in conjunction with variable, mixed-length packet loads and rates that stress the links more realistically. Then check the end-to-end communication by monitoring packet delays, loss rates and file transfer times.




**Test LAN over WAN**

# Simulate voice, video and data services


**Modelled service traffic lets you set up and simulate real ATM traffic conditions (eg, CBR, burst, and random for both foreground and background channels).**




**Use the automatic jitter tolerance test to verify network equipment conforms to ITU-T G.823 (PDH) and G.958 (SDH) jitter masks.**

### Simulate live traffic

Ensure customer satisfaction before turning up the customer's service by testing your network equipment under traffic conditions that simulate voice, video and data service transportation. Create benchmark traffic using ten independently-set cell traffic streams with periodic, periodic-burst and random distribution to simulate CBR and VBR services.

### Reduce the chance of congestion

Avoid congestion by verifying that network policing discards non-conforming user cells correctly. Using modelled service traffic for policing tests, you can set generated traffic profiles to verify that the switch reports unauthorized traffic behavior accurately.

### Eliminate the most common switch configuration problem

When commissioning new switches, it's easy and common to make mistakes in entries for routing or translation tables. Fortunately, verifying these tables is now easy and fast. Simply use modelled service traffic to set up ten different VPs and VCs, and use Channel View to display the VPs and VCs on output ports to verify table entries.

### Include full jitter tests

Excessive physical layer jitter can cause cell errors, cell loss, loss of cell delineation and ultimately, loss of physical layer frame synchronization, thus directly affecting the quality of service within the network.

During the transition to ATM networks it is important to verify that the new equipment is within the specified jitter tolerance limits and will not contribute to the above jitter problems. With the appropriate options fitted to your HP 37717C analyzer, you can generate jittered ATM signals while looking for ATM impairments and measure the intrinsic jitter of ATM interface outputs signals.

# As standards change and develop, so can your HP 37717C analyzer

**Choose your required test capability from the range of optional PDH, SDH, ATM and jitter test modules – that include electrical and optical interfaces up to 622 Mb/s (STM-4).**

**Use HP E4540A software to enhance the effectiveness of your technical support.**

### Select the test capability to suit your needs

The HP 37717C communications performance analyzer is a modular tester you can upgrade as your needs change. The analyzer is a portable, rugged unit that can pack a powerful set of ATM, SDH/SONET, PDH/DSn and jitter/wander capabilities. This flexibility allows users to tailor the analyzer for general-purpose R&D, production, installation/ commissioning, maintenance and trouble-shooting applications.

The HP 37717C analyzer can monitor non-intrusively via protected monitor points in the network, using thru mode or via an optical splitter (eg, the HP 15744A in a replacement lid for the analyzer) for SDH/SONET. The analyzer can be used in both single- and multi-mode fiber environments.

The HP 37717C analyzer has a large color display and an optional high-resolution, 80-column wide, lid-based graphical printer.

*For more information, refer to publication 5964-0106.*

### Gain better assistance

Use HP E4540A distributed network analyzer software, for a PC or laptop, to increase the effectiveness of technical support. Now, when technicians contact the support center for assistance, the technical support team can access the remote analyzer's graphical user interface and help to resolve the problem interactively. Or, you can control the analyzer for easy data collection and detailed report generation. This easy-to-use, Windows®-based software requires no programming skills.

*For more information, refer to publication 5964-2240E.*

***Call HP today and find out how HP multi-application error and jitter test sets give you everything you need for PDH network installation and maintenance – and stay with you as your network is evolving to SDH/SONET and ATM.***

## Summary of measurements

(for full details refer to technical specifications 5964-2255E)

### General

Interface rates: E1 (2 Mb/s), E3 (34 Mb/s), E4 (139 Mb/s), DS1 (1.5 Mb/s), DS3 (45 Mb/s), STM-1e/STM-1o, OC-3c (155 Mb/s).
Native LAN: Ethernet (10 Mb/s), Token Ring (4 and 16 Mb/s).

*Check with your local HP sales offices for planned new interfaces.*

### Generation

One foreground (stimulus) and nine background (traffic simulation) channels independently set for header parameters, CBR (periodic), and VBR (burst or Poisson) distributions.

Foreground payload: Test cell (ITU-T O.191), PRBS payloads, user bytes.

User set trail trace.

Alarm/error generation: Physical layer (see technical specifications) plus ATM VP AIS and RDI (FERF), VC AIS and RDI (FERF), VP and VC CC (on or off).
HEC errors – single, double, sequences.
Rates – single or 1 in $10^3$.
Payload errors.
Line frequency offset control.
Jitter and wander generation.

Native LAN (Network protocols: IP, Novell Netware IPX): Ping origination, single or continuous, file transfer simulation, mixed packet length backgrounds.

### Measurements and analysis

Channel View: Display of up to 1023 channel cell rates, user traffic percentage, VP display filter, AAL type and alarms.

Cell delay: Graphical CDV delay distribution, late and early peak deviation, 1-point and 2-point CDV (ITU-T I.356 and ATM Forum Traffic Management 4.0), cell delay, non-conforming cell count.

AAL monitoring (AAL-1, AAL-3/4, AAL-5): CRC, sequence, segment, lost cells, aborted PDUs and length errors.

VP/VC rate history: Graphical display of maximum, mean and minimum cell rate.

Errors: Error monitoring BIP-8, FEBE, corrected and non-corrected HECs, cell loss, cell misinsertion and bit errors.

Error analysis: ITU-T G.826.
Physical layer alarms: (see technical specfications).
ATM alarms/warnings: Selected cell not received, congestion, VP/VC AIS and RDI (FERF), VP/VC LOC, PM OAM LOM, AAL loss, test cell loss, cell sync loss and pattern loss.
Line frequency and optical power.
Jitter and wander analysis.

Native LAN: Pings received, lost; round trip delay under different loads.
Verification of file transfer, transfer time.

*Contact your local HP sales offices for full ATM, SDH/SONET, PDH/DSn and jitter/wander specifications.*

## Ordering information

For full details of the capability of the HP 37717C communications performance analyzer, refer to the technical specification 5964-2255E and the configuration guide 5964-1662E.

### Telecom production test

The HP 37717C communications performance analyzer also forms part of Hewlett-Packard's TS-2000 range for production testing.

*For more information, refer to publication 5964-3920E.*

Class 3a laser product
EN60825-1: 1994

Class 1 laser product
FDA 23 CER CH.1 1040.10 (1994)

*Windows is a US trademark of Microsoft Corporation.*

*Hewlett-Packard manufactures ATM modules for the HP 37717C communications performance analyzer under a quality system approved to the international standard ISO 9002 (BSI Registration Certificate No FM 10987).*

HEWLETT® PACKARD

For more information on Hewlett-Packard Test & Measurement products, applications or services please call your local Hewlett-Packard sales offices. 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.

**United States:**
Hewlett-Packard Company
Test and Measurement Organization
5301 Stevens Creek Blvd.
Bldg. 51L-SC
Santa Clara, CA 95052-8059
1 800 452 4844

**Canada:**
Hewlett-Packard Canada Ltd.
5150 Spectrum Way
Mississauga, Ontario
L4W 5G1
(905) 206 4725

**Europe:**
Hewlett-Packard
European Marketing Centre
P. O. Box 999
1180 AZ Amstelveen
The Netherlands

**Japan:**
Hewlett-Packard Japan Ltd.
Measurement Assistance Center
9-1, Takakura-Cho, Hachioji-Shi
Tokyo 192, Japan
Tel: (81-426) 56-7832
Fax: (81-426) 56-7840

**Latin America:**
Hewlett-Packard
Latin American Region Headquarters
5200 Blue Lagoon Drive
9th Floor
Miami, Florida 33126
USA
(305) 267 4245/4220

**Australia/New Zealand:**
Hewlett-Packard Australia Ltd.
31-41 Joseph Street
Blackburn, Victoria 3130
Australia
1 800 629 485

**Asia Pacific:**
Hewlett-Packard Asia Pacific Ltd.
17-21/F Shell Tower, Times Square
1 Matheson Street, Causeway Bay
Hong Kong
Fax: (852) 2506 9285



Printed in USA
Data subject to change
5965-4968E (08/96)