



## Broadband Service Analyzer

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### Setting Up the STM-1 Electrical Interface Pod

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**Warranty**

A copy of the specific warranty terms applicable to your product and replacement parts can be obtained from your local Sales and Service Office.

**Printing history**

New editions of this guide are issued to reflect extensive changes made to the application. Revisions may be issued between application versions to correct errors in the manual. There may not be a new edition issued in conjunction with every application version release. The application version at the date of printing is noted in the following table.

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Product Model Number: HP E5123A

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1	May 1996	A.01.20
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**Product support**

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## Guide to the HP E5200A Broadband Service Analyzer Documentation

The HP E5200A Broadband Service Analyzer comes with a comprehensive set of paper and online documentation. Use the following table to determine which documents you should use.

<b>What is it?</b>	<b>What does it do?</b>	<b>Who is it for?</b>
User's Guide	<ul style="list-style-type: none"><li>• contains instructions on how to set up and install the analyzer</li><li>• provides an outline of the most common functions</li><li>• describes the online help</li><li>• provides an outline of the most common system administration functions</li><li>• lists electrical, mechanical, and environmental specifications</li></ul>	all users
Online Help	three volumes—User, Macro, and UPE Compatibility—contain information about, and instructions for using, the analyzer	all users
Quick Reference	provides a quick overview of the analyzer's main features and functions	all users
Setting Up the Interface Pod guides	a series of guides that provide descriptions of, and instructions for installing, individual interface pods	all users will refer to at least one of these guides
Worldwide Support card	provides information about support, service, and warranty	all users
Release Notice	provides information not available when this guide was printed	all users

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## About the STM-1 Electrical Interface Pod

### Overview

The HP E5123A STM-1 Electrical Interface Pod is a self-contained, plug-in module. You use it in conjunction with the HP E5200A Broadband Service Analyzer to test and analyze a system under test (SUT).

In the transmit direction, the interface pod

- automatically calculates and inserts Section/Regenerator Section BIP, Line/Multiplexer Section BIP, and Path BIP
- maps the ATM cells into the Virtual Container (VC)
- automatically generates the framing pattern

In the receive direction, the interface pod

- uses the A1 A2 framing pattern to frame align the electrical signal
- applies frame descrambling
- carries out pointer processing to align to the VC
- detects line errors using the Section/Regenerator Section BIP, Line/Multiplexer Section BIP, and Path BIP
- extracts ATM cells and passes them to the measurement system

### Hot swap and automatic configuration

Use the “hot swap” feature to insert and remove the interface pod while the analyzer’s power is switched on. The analyzer automatically detects the insertion of the interface pod and configures itself accordingly. Immediately after you connect the interface pod to the SUT, the analyzer automatically configures the receive and transmit parameters according to the signal it receives.

### Operating modes

The interface pod has four operating modes: full-duplex, transmit loopback, receive loopback, and regenerator.

### Components

The interface pod is shipped with

- a Calibration Certificate
- this set up guide

### Application

The HP E5123A STM-1 Electrical Interface Pod requires an E5200A base unit with Application Version number A.01.2 or greater.

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## Online Help

The *User Online Help* provides all the information you need to use the analyzer. Use the following sections to learn how to perform *tasks*:

- Getting started
- Monitoring
- Capturing
- Running tests
- Simulating
- System administration

Use the Reference section to *find information* about framing formats, alarms, errors, and measurements.

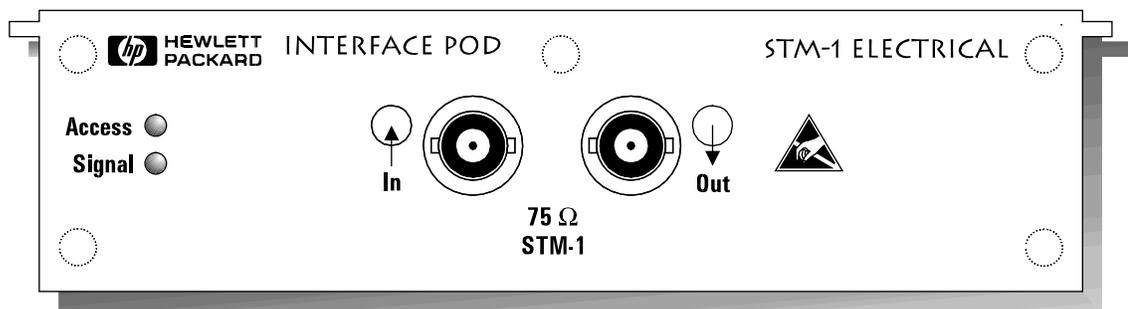
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## To Access User Online Help

There are four ways to access information in the *User Online Help*.

- Click the Help button that appears on most screens and windows to display information about that screen or window.
- From the main screen Help menu, select User to display the User Contents screen.
- Press F1. If the cursor is in an input field, you see help for that field; otherwise you see the User Help Contents screen.
- Press Shift+F1, or from the main screen Help menu, select Help on Item, to change the mouse pointer into a question mark (?). Move the question mark around the screen and place on the item for which you want help; then click the mouse. Use this option to get help on non-input fields.

## Front Panel at a Glance



<b>Access</b>	(green LED) Lights each time the interface pod is accessed by the network.
<b>Signal</b>	(yellow LED) Lights when a valid signal is present at the input connector.
<b>In</b>	(BNC) Accepts an electrical signal from the SUT.
<b>Out</b>	(BNC) Provides a signal to the SUT.

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## To Set Up the Interface Pod

**Caution**

Handle the interface pod with care to avoid electrostatic discharge (ESD) damage during unpacking, installation, and operation. The connectors on the front and rear of the interface pod are susceptible to ESD.

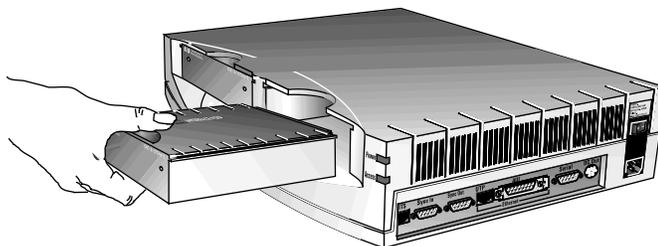
- 1** Insert the interface pod into the analyzer.  
See “To Insert the Interface Pod” on page 5. The procedure is the same for all interface pods.
- 2** Connect the interface pod to the SUT.  
See “To Connect to the System Under Test” on page 6. The analyzer automatically recognizes and configures the interface pod.
- 3** If you want to change any of the configuration parameters, see “To Manually Configure the Interface Pod” on page 9.

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## To Insert the Interface Pod

You can insert and remove interface pods at any time, even when the analyzer is powered on. Initially, you insert an interface pod when you set up the analyzer. Subsequently, you insert an interface pod when you change the physical layer interface that you want to monitor.

- 1 Hold the interface pod with the front panel connectors facing you and the Hewlett-Packard logo facing upwards.
- 2 Insert the interface pod into Port 1 or Port 2 of the analyzer.



- 3 Push the interface pod firmly into the analyzer until the connector at the rear is properly seated. The clip on the base of the interface pod clicks into place when the interface pod is fully inserted.

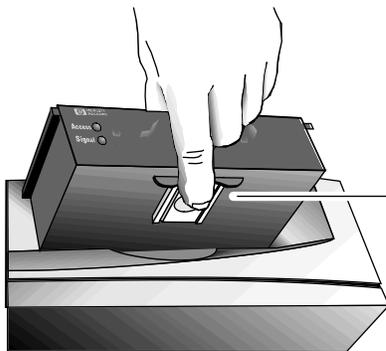
**Caution**

You must always have two interface pods inserted in the the HP E5200A Broadband Service Analyzer while it is operating. If your operations require only a single interface pod, insert the blank interface pod (provided with the analyzer) into the other port. The two interface pods are necessary to maintain a balanced airflow for cooling of internal components and to comply with EMC standards.

## To Set Up the Interface Pod

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### To Remove the Interface Pod



Gently press on the clip underneath the interface pod and pull the interface pod out of the analyzer.

When you remove the interface pod, make sure you store it in a dust free location that meets the environmental requirements listed in “Environmental Specifications” on page 13. An electrostatic-safe bag has been supplied for the storage of each interface pod.

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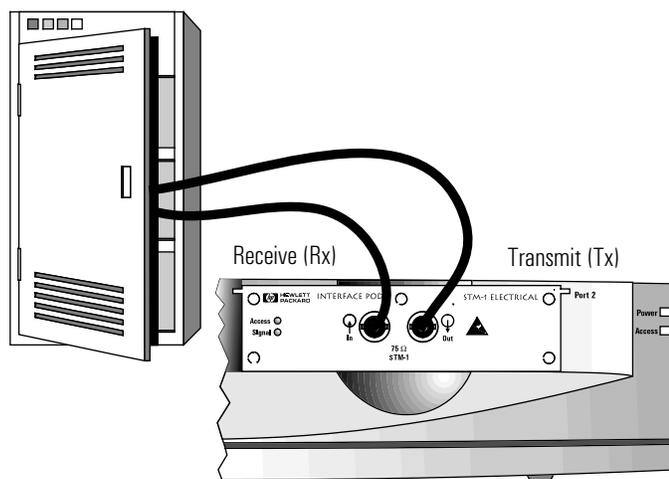
### To Connect to the System Under Test

Obtain a pair of 75  $\Omega$  coaxial cables with BNC connectors. Before you connect the interface pod to the system under test (SUT), ensure that you have

- connected the HP E5200A Broadband Service Analyzer to the controlling computer (workstation or notebook PC)
- inserted the HP E5123A STM-1 Electrical Interface Pod

Connect the cables to the BNC connectors on the front of the interface pod and to the equipment or link that you want to test. For example, you might want to test a network element (for example, switch, service gateway), service access equipment (for example, a multiplexer, router, or PAD), or transmission link.

## To Set Up the Interface Pod



Common system connections and test connections are

- non-intrusive system connection—T-piece and passive test connections
- intrusive system connection—network element, remote loopback, and in-line test connections
- diagnostic system connection—transmit loopback and external loopback test connections

See *the HP E5200A Broadband Service Analyzer User's Guide* or the *User Online Help* for details about these system connections.

The analyzer automatically sets the interface pod transmit and receive parameters and configures according to the signal it receives from the interface pod. See “Automatic Configuration Parameters” on page 8 for more details.

If you “hot swap” the interface pod while you are logged in to the analyzer, the screen displays the message

```
Auto configuring, please wait...  
Automatically configuring physical interfaces and  
protocols according to the monitored signal.
```

## To Set Up the Interface Pod

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### Automatic Configuration Parameters

After you insert the interface pod and connect it to the SUT, the analyzer automatically configures to the STM-1 electrical signal.

The analyzer sets the remaining physical layer receive and transmit parameters to the following defaults:

- reference (internal) clock
- 20 dB input gain off
- full duplex

#### **See also**

*User Online Help* contains information about the ATM layer automatic configuration parameters.

## To Manually Configure the Interface Pod

① From the Configure menu, select the appropriate port; then select Set Up.

② Click the STM-1 tab.

③ Select the parameters you require.

④ Click to set the configuration or

Click Auto to set the parameters to the default settings. A message warns you that the reconfiguration will cause some measurements and data to be lost and asks if you want to continue. Click OK.

**Note** When the configuration is complete, the analyzer updates all relevant screens and windows to reflect the new configuration parameters.

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## What to Do Next

The interface pod is now ready for use.

See the *User Online Help* to find out the different tasks you can perform using the analyzer and interface pod.

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## Standards and Specifications

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### Communications Standards

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ITU-T G.703	Physical/Electrical Characteristics of Hierarchical Digital Interfaces
ITU-T G.708	Network Node Interface for the Synchronous Digital Hierarchy
ITU-T G.709	Synchronous Multiplexing Structure
ITU-T I.432	B-ISDN User-Network Interface—Physical Layer Specifications
ITU-T G.825	The control of jitter and wander within digital networks which are based on the synchronous digital hierarchy
ATM Forum UNI 3.1	ATM User-Network Interface (UNI)
Bellcore GR-253-CORE	Synchronous Optical Network (SONET) Transport Systems: Common Generic Criteria (a module of TSGR, FR-440)

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## Input and Output Specifications

### Transmit Levels

Parameter	Nominal	Min.	Max.	Notes
Signal level	1.0 V (pp)	0.9 V (pp)	1.1 V (pp)	complies with ITU-T G.703
Line rate	155.52 Mb/s	-4.6 ppm	+4.6 ppm	using internal frequency reference
Line jitter				complies with ITU-T G.825 (SDH), Bellcore GR-253-CORE, and Bellcore TR-TSY-000499 (SONET)

### Receive Levels

Parameter	Nominal	Min.	Max.	Notes
Sensitivity		13 dB		complies with ITU-T G.703
Line rate	155.52 Mb/s	-15 ppm	+15 ppm	
Jitter tolerance				complies with ITU-T G.825 (SDH), Bellcore GR-253-CORE, and Bellcore TR-TSY-000499 (SONET)
Jitter transfer				complies with ITU-T G.825 (SDH), Bellcore GR-253-CORE, and Bellcore TR-TSY-000499 (SONET)

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## Physical Specifications

<b>Weight</b>	1.0 kg ( 2.2 lbs) (nominal)
<b>Dimensions</b>	Height: 44 mm (1.73 inches) Width: 149 mm (5.87 inches) Length: 222 mm (8.74 inches) not including front panel connectors 236 mm (9.29 inches) including front panel connectors

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## Environmental Specifications

Parameter	Nominal	Min.	Max.	Notes
<b>Operating Temperature</b>		5 °C (41 °F)	45 °C (113 °F)	with two interface pods installed
<b>Storage Temperature</b>		-40 °C (-40 °F)	70 °C (158 °F)	
<b>Humidity</b>		15%	90%	at 40 °C (104 °F)
<b>Altitude</b>			4.6 km (2.86 miles)	

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## Error Generation Specifications

Parameter	Nominal	Min.	Max.	Notes
<b>Line error ratios</b>		$1 \times 10^{-9}$	$1 \times 10^{-3}$	errors are added bit synchronously and are accurate to 0.1% or better
<b>FEBE ratio</b>		$1 \times 10^{-9}$	$1 \times 10^{-3}$	errors are added bit synchronously and are accurate to 0.1% or better

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## **Certification**

*Hewlett Packard Australia Ltd certifies that this product met its published specifications at the time of shipment from the factory. Hewlett-Packard (HP) further certifies that its calibration measurements are traceable to the extent allowed by the calibration facilities of other International Standards Organization members.*

## **Warranty**

The hardware is warranted against defects in materials and workmanship. If HP receives notice of such defects during the warranty period, HP shall, at its option, either repair or replace hardware products which prove to be defective.

HP software and firmware products that are designated by HP for use with a hardware product, when properly installed on that hardware product are warranted not to fail to execute their programming instructions due to defects in materials and workmanship. If HP receives notice of such defects during the warranty period, HP shall repair or replace software media and firmware which do not execute their programming instructions due to such defects. HP does not warrant that the operation of the software, firmware, or hardware shall be uninterrupted or error free.

If HP is unable, within a reasonable time, to repair or replace any product to a condition as warranted, the Buyer shall be entitled to a refund of the purchase price upon return of the product to HP.

For product warranties requiring return to HP, this product must be returned to a service facility designated by HP. Buyer shall prepay shipping charges to HP (and shall pay all duties and taxes) for products returned to HP for warranty service. Except

for products returned to buyer from another country, HP shall pay for return of products to Buyer

## **Duration and Commencement of the warranty**

The hardware has a three year, return to HP Service Centre warranty, commencing at delivery date (type 7A).

The software and firmware has a 90 day, replacement warranty commencing at delivery date (type 3C).

## **Limitation of Warranty**

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by Buyer, Buyer-supplied products or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications of the products, or improper site preparation or maintenance.

THE WARRANTY SET FORTH ABOVE IS EXCLUSIVE AND NO OTHER WARRANTY, WHETHER WRITTEN OR ORAL, IS EXPRESSED OR IMPLIED. HP SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

## **Exclusive Remedies**

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## **Additional Information for Test and Measurement Equipment**

If test and measurement equipment is operated with unscreened cables and/or used for measurements on open setups, the user has to ensure that under operating conditions the Radio Interference Limits are still met at the border of the user's premises.

## **Calibration**

Hewlett-Packard recommends that this equipment be recalibrated two years after first use and at two-yearly intervals thereafter. The on-shelf period prior to first use will not affect the calibration of this equipment. Call your local HP Service Representative for more information.

## Warnings

**The following general safety precautions must be observed during all phases of operation, service, and repair of this product. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the product.**

**Hewlett-Packard Company assumes no liability for the customer's failure to comply with these requirements.**

**Ground the equipment** For safety Class 1 equipment (equipment having a protective ground terminal), an uninterrupted safety ground must be provided from the mains power source to the product input wiring terminals or supplied power cable.

**DO NOT operate the product in an explosive atmosphere or in the presence of flammable gases or fumes.**

For continued protection against fire, replace the line fuse(s) only with fuse(s) of the same voltage and current rating and type. DO NOT use repaired fuses or short-circuited fuse holders.

### Keep away from live

**circuits** Operating personnel must not remove equipment covers or shields. Procedures involving the removal of covers and shields are for use by service-trained personnel only. Under certain conditions, dangerous voltages may exist even with the equipment switched off. To avoid electrical shock, DO NOT perform procedures involving cover or shield removal unless you are qualified to do so.

### DO NOT operate damaged

**equipment** Whenever it is possible that the safety protection features built into this product have been impaired, either through physical damage, excessive moisture, or any other reason, REMOVE POWER and do not use the product until safe operation can be verified by service-trained personnel. If necessary, return the product to a Hewlett-Packard Sales and Service Office for service and repair to ensure the safety features are maintained.

### DO NOT substitute parts or modify equipment

Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification to the product. Return the product to a Hewlett-Packard Sales and Service Office for service and repair to ensure features are maintained.

### DO NOT clean with fluids

Doing so may make the equipment unsafe for use.

## Safety Symbols



Instruction manual symbol affixed to product. Indicates that the user must refer to the manual for specific Warning or Caution information to avoid personal injury, or damage to the product.



Protective conductor terminal indicates the field wiring terminal that must be connected to ground before operating the equipment—protects against electrical shock in case of fault.



Frame or chassis ground terminal—typically connects to the equipment's metal frame.



Earth (ground) terminal.



Alternating current (ac).



Direct current (dc).



Indicates hazardous voltages.

### WARNING

Calls attention to a procedure, practice, or condition that could cause bodily injury or death.

### CAUTION

Calls attention to a procedure, practice, or condition that could possibly cause damage to equipment or permanent loss of data.



Indicates that antistatic precautions should be taken.

## Avertissement

Cet appareil répond aux normes de la "Classe de sécurité 1" et est muni d'un fil de mise à la terre pour votre protection.

Pour prévenir les risques de choc électrique, la broche de mise à la terre du cordon d'alimentation ne doit pas être désactivée.

## Restrictions d'utilisation

L'utilisateur se doit d'observer les mesures de précaution énumérées-dessous pour toutes les phases d'utilisation, de service et de réparation de cet appareil. Le fait de ne pas s'y conformer équivaut à ne pas respecter les mises en gardes spécifiques contenues dans ce manuel et constitue une violation des normes de sécurité relatives à la conception, la fabrication et l'utilisation prévue de cet appareil. La société Hewlett-Packard n'assume aucune responsabilité envers un client qui manquerait de se conformer à ces exigences.

## Mise à la terre

Afin de minimiser les risques de choc électrique, le châssis et le cabinet de l'appareil doivent être mis à la terre. L'appareil est équipé d'un cordon d'alimentation muni d'une fiche homologuée à trois lames, compatible c.a. La prise murale et la prise femelle de la rallonge électrique doivent respecter les normes de sécurité de la "Commission Électrotechnique Internationale" (IEC).

## Environnement

Ne faites pas fonctionner cet appareil en présence de gaz inflammables ou de vapeurs dangereuses. L'utilisation de n'importe quel appareil électrique dans ces conditions constitue un risque élevé pour votre sécurité.

## Service et ajustement

Des "tensions dangereuses" résident dans cet appareil. Par conséquent, le service et l'ajustement doivent être effectués uniquement par une personne qualifiée.

Ne remplacez pas de composants lorsque le cordon d'alimentation est sous tension. Il pourrait y avoir présence de "tension dangereuses" même lorsque l'appareil est déconnecté.

## Manipulation du tube cathodique

Une manipulation brusque, ou le fait de secouer l'appareil, peut provoquer le bris du tube cathodique. L'implosion qui s'en suivrait entraînerait la dispersion à grande vitesse d'éclats de verre. Le retrait ou l'installation du tube cathodique ne doit être exécuté que par un technicien qualifié, portant un masque et des gants de sécurité homologués.

## Service non autorisé

L'installation de pièces étrangères, ou toute modification apportée à l'appareil sans le consentement de Hewlett-Packard est formellement interdit. Le fait de procéder à de tels modifications sans autorisation pourrait entraîner l'annulation de la garantie de l'appareil ou de tout contrat de service.

Pour un service et des réparations autorisées, retournez l'appareil à un point de vente et service Hewlett-Packard.

## Symboles des sécurité



Attention (voir documents d'accompagnement)



Le conducteur protectif indique que la prise de terre doit être connectée avant d'utiliser l'équipement—protège contre le choc électrique en cas de faute.



Borne de terre



Borne de masse, châssis



Courant alternatif



Courant continu



Risque de choc électriques

## WARNING

Attire l'attention sur une procédure, une pratique, ou des conditions qui peuvent entraîner des blessures corporelles ou la mort.

## CAUTION

Attire l'attention sur une procédure, une pratique, ou des conditions qui peuvent endommager l'équipement.



Signale que des précautions antistatique doivent être prises.

## DECLARATION OF CONFORMITY

According to ISO/IEC Guide 22 and EN 45014

**Manufacturer's Name** Hewlett Packard Australia Ltd

**Manufacturer's Address** Australian Telecom Operation  
347 Burwood Highway  
Burwood East 3151  
Victoria, Australia

declares that the product:

**Product Name** STM-1 Electrical Interface Pod

**Model Numbers** HP E5123A

**Product Options** This declaration covers all options of the above product.

conforms to the following product specifications:

**Safety** EN 61010-1: 1993/IEC 1010-1: 1990 + A1

**EMC** EN 55011:1991/CISPR 11:1990 (Group 1, Class A<sup>1</sup>)  
EN 50082-1:1992  
IEC 801-2:1991<sup>2</sup> 4 kV CD, 8 kV AD  
IEC 801-3:1984 3 V/m  
IEC 801-4:1988 0.5 kV Signal Lines, 1 kV Power Lines

**Supplementary Information** This product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC.

<sup>1</sup>The product meets the listed specifications when installed in an HP E5200A with interface pods installed in both ports.

<sup>2</sup>Bit error performance will be reduced under these conditions.



Melbourne, Australia, July 1996 Issue 1 Graeme Cobb - Quality Manager

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