Reference Guide

Agilent Technologies

85097B VNA Interface Kit for Electronic Calibration

Manufacturing Part Number: 85091-90010

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1 General Information

VNA Interface Kit Overview

This manual provides reference information for the Agilent 85097B vector network analyzer (VNA) interface kit for electronic calibration (ECal).

The VNA interface kit is part of the VNA-based ECal system. The interface kit provides the hardware to connect and allow data transfer between ECal modules and compatible network analyzers. See Table 1-1 below.

ECal modules are precision, single-connection devices that provide consistent calibrations for your network analyzer. ECal uses fully traceable and verifiable electronic standards. The interface kit does not include the ECal modules, but they can be ordered separately. For ordering information, see "Contacting Agilent" on page 2-4.

NOTE For more information about ECal modules, refer to the *Electronic Calibration Module Reference Guide* (included with the VNA interface kit).

Option 100

Adds an adapter cable that allows the interface kit to connect to N469x (microwave) ECal modules. The Option 100 adapter cable can also be ordered separately.

Compatible Network Analyzers

Refer to Table 1-1 for network analyzers and ECal modules compatible with the 85097B VNA interface kit. The network analyzer must have the appropriate firmware revision installed to operate with the ECal models shown.

Table 1-1 Supported Network Analyzers and ECal Models

Network Analyzer	ECal Model	Firmware Revision
8753ES/ET 8719D/ES/ET 8720D/ES/ET 8722D/ES/ET	8509xB/C	7.68 or higher
	8506x	
	N4431A[a]	
	N469x	7.74 or higher

a. Ports A and B only

NOTE PNA network analyzers are not compatible with the 85097B VNA interface kit. PNA analyzers allow direct connection of the ECal modules through a USB connector interface. Refer to the PNA analyzer on-line help system for more details.

VNA Interface Kit Contents

The following table and illustration identify the contents of the 85097B VNA interface kit.

Table 1-2 Contents of the VNA Interface Kit

Description	Quantity	Part Number
Interface Unit	1	85097-60002
Shielded Cable, DB25 to DB25	3	8120-8710
Adapter Cable, DB25 to AMP Champ (Option 100)	1	8121-1047
Power Supply	1	0950-3331
VNA Interface Kit Reference Guide (this manual)	1	85091-90010
Electronic Calibration Module Reference Guide	1	N4693-90001

Figure 1-1 85097B Kit Contents

Description of the VNA Interface Kit Contents

This section describes the contents of the 85097B VNA interface kit. Refer to Figure 1-3 on page 1-7 for a system setup diagram using the kit contents.

NOTE ECal modules are not included in the 85097B VNA interface kit, but are ordered separately. Refer to the *Electronic Calibration Module Reference Guide* (part number N4693-90001) for information on the types and specifications of ECal modules.

Interface Unit

The interface unit (shown in Figure 1-1) functions as the digital interface and power source for ECal modules. The interface can connect to one or two ECal modules. Power is automatically turned off when an ECal module is disconnected.

NOTE If you are using an 8506xA microwave module with a serial number below 800, a jumper must be installed in the module to make it compatible with the interface unit. Contact Agilent for information about returning your module for this modification. See "Contacting Agilent" on page 2-4.

Shielded Cables, DB25 to DB25

The shielded cables (shown in Figure 1-1) are male to male RS-232 cables. Three shielded cables are included in the kit. The cables connect between the VNA and the interface unit and between the interface unit and one or two ECal modules (except N469x series). The length of each shielded cable is 1.8 m.

Adapter Cable, DB25 to AMP Champ (Option 100)

The adapter cable (shown in Figure 1-1) is configured with a DB25 to AMP Champ (36-pin) connector. The adapter cable connects N469x (microwave) ECal modules to the interface unit. The adapter cable (part no. 8121-1047) can be ordered separately or by adding Option 100 to the interface kit. The length of the adapter cable is 1.0 m.

CAUTION Use only the interface cables supplied with this kit. Other cables may cause the system to fail EMC specifications.

ECal Power Supply Unit

The ECal power supply unit (shown in Figure 1-1) provides 24 Vdc to the interface unit and power to the ECal modules through the interface unit.

WARNING **To prevent electrical shock, disconnect from mains before cleaning. Use a dry cloth or one slightly dampened with water to clean the external case parts. Do not attempt to clean internally.**

CAUTION Always use the three-prong ac power cord supplied with this product. Failure to insure adequate earth grounding by not using this cord may cause product damage.

WARNING **The detachable power cord is the instrument disconnecting device. It disconnects the mains circuits from the mains supply before other parts of the instrument.**

VNA Interface Kit Setup and Operation

The VNA-based ECal system requires the following components:

- VNA (with appropriate firmware revision) — functions as the ECal system controller
- ECal module — acts as the calibration device for the ECal system
- VNA Interface kit — provides an interface between the ECal module and the VNA

Setup Procedure

Refer to the graphics on the following page for all connections.

CAUTION Exercise the necessary ESD precautions before connecting the devices. Refer to "Electrostatic Discharge" on page 1-10.

Connect Interface Unit to VNA (DB25 to DB25 Cable)

1. Connect one end of the DB25 to DB25 cable to the connector on the interface unit labeled "DB25 Interface to Parallel Interface on Network Analyzer."
2. Connect the other end of the DB25 to DB25 cable to the connector on the rear panel of the VNA labeled "Parallel Port".

CAUTION Connecting the interface cable to an unspecified connector on the VNA will cause damage.

Connect RF Module to Interface Unit (DB25 to DB25 Cable)

1. Connect one end of the DB25 to DB25 cable to the parallel port on the ECal module.
2. Connect the other end of the DB25 to DB25 cable to the connector on the interface unit labeled "DB25 Interface to ECal Module A" or "DB25 Interface to ECal Module B".

Connect Microwave Module to Interface Unit (DB25 to AMP Champ Cable)

1. Connect the AMP Champ end of the adapter cable to the parallel port on the ECal module. Press the tabs on the connector housing to engage the connector.
2. Connect the DB25 end of the adapter cable to the connector on the interface unit labeled "DB25 Interface to ECal Module A" or "DB25 Interface to ECal Module B".

Connect Interface Unit to Power Supply

1. Connect the interface power supply to the interface unit and then connect to AC power.
2. Allow the ECal module to warm up for 15 minutes (20 minutes for a four-port module) or until the module indicates READY.
3. ECal module is ready to perform a calibration. Press the **Cal** button on the VNA to access the calibration types available with ECal.

Figure 1-2 Interface Connection to ECal Module

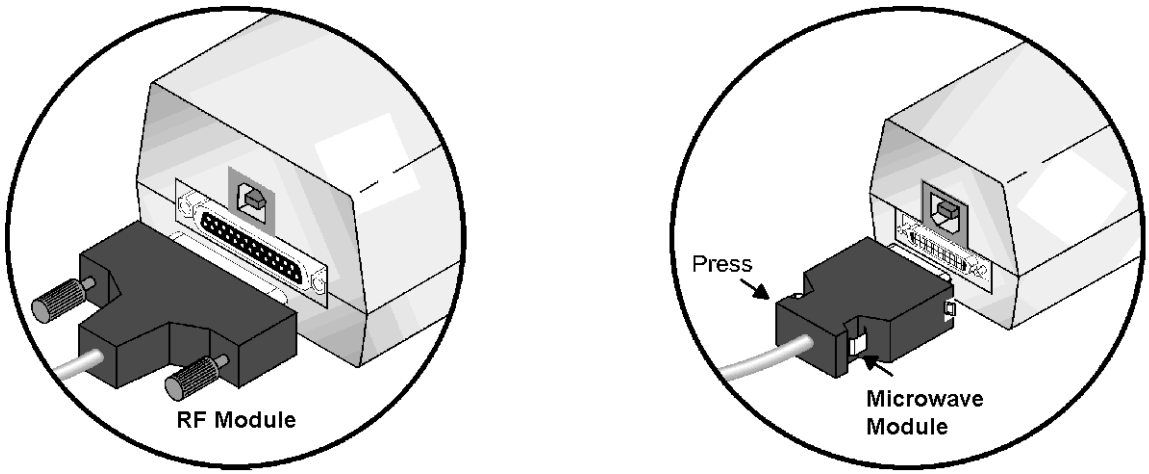
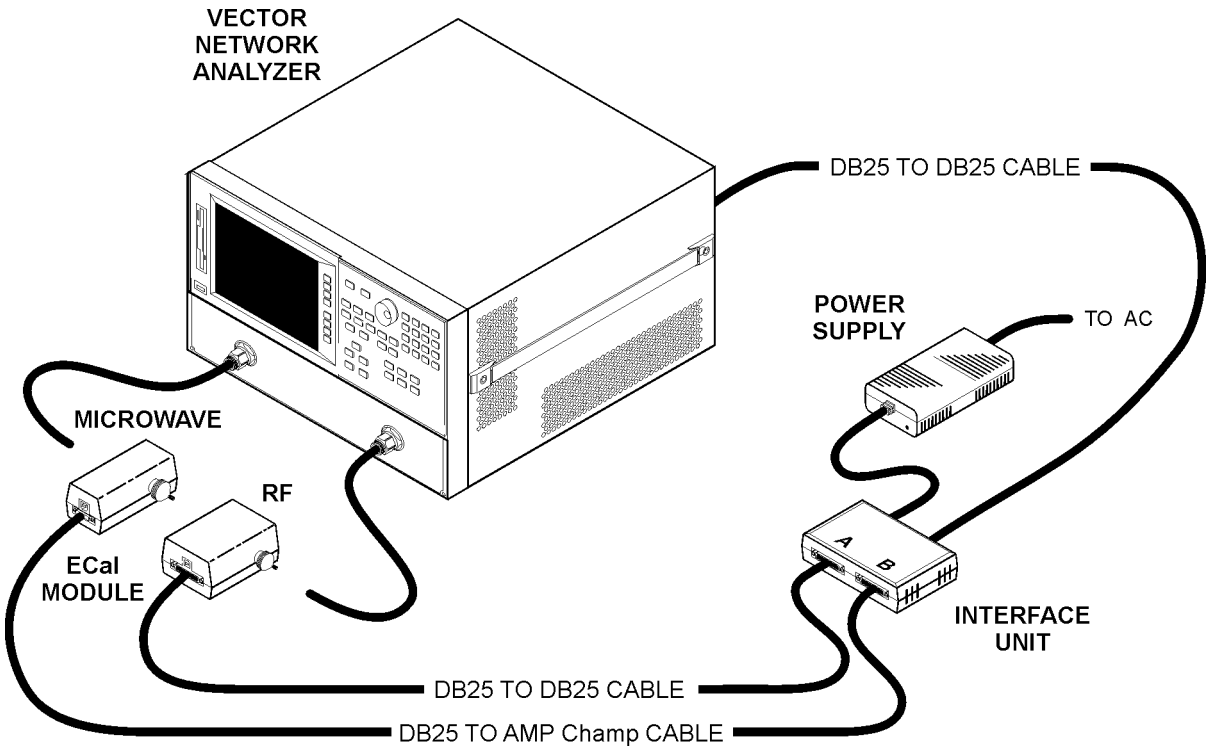


Figure 1-3 VNA-Based ECal System



- ECal modules can be connected (or disconnected) when the analyzer is turned on or off, but must remain connected while data transfer is in progress.
- After completing a calibration, the ECal module or modules can remain connected to the interface unit.
- With the appropriate interface cable, RF or microwave ECal modules can be connected to position A or B of the interface unit.

VNA Interface Kit Characteristics

CAUTION This product is designed for use in INSTALLATION CATEGORY II and POLLUTION DEGREE 2, per IEC 1010 and 664 respectively. Enclosure protection according to IEC 529, IP Code 2 0.

Environmental Requirements

CAUTION When installing the product in a cabinet, the convection in and out of the product must not be restricted. The ambient temperature (outside the cabinet) must be less than the maximum operating temperature of the system by 4 °C for every 100 watts dissipated in the cabinet. If the total power dissipated in the cabinet is greater than 800 watts, then forced convection must be used.

CAUTION Install the instrument according to the enclosure protection provided. This instrument does not protect against the ingress of water. This instrument protects against finger access to hazardous parts within the enclosure.

Table 1-3 Environmental Requirements (indoor use only)

Characteristics	Limits
Altitude:	up to 3000 meters (10,000 feet)
Temperature:	5 °C to 40 °C (41 °F to 104 °F)
Maximum Relative Humidity: decreasing linearly to	80% for temperatures up to 31 °C (88 °F) 50% for temperatures to 40 °C (104 °F)

Electrical and Mechanical Characteristics

CAUTION The power supply has auto-ranging line voltage input; be sure the supply voltage is within the specified range.

Table 1-4 Power Supply Electrical and Mechanical Characteristics

Characteristics	Limits
Power Requirements:	
Line Voltage	100 to 240 Vac
Line Frequency	50 to 60 Hz
Power Output:	24 Vdc
	1 A
Power Dissipation:	192 VA Maximum
Safety:	IEC 950
Weights:	
Net Weight	0.7 kg (1.5 lbs)
Shipping Weight	3 kg (6.5 lbs)
Dimensions:	
Height	41 mm (1.6 in)
Width	158 mm (6.2 in)
Length	97 mm (3.8 in)

Electrostatic Discharge

Protection against ESD (electrostatic discharge) is essential while connecting, inspecting, or cleaning connectors attached to a static-sensitive circuit (such as those found in test sets).

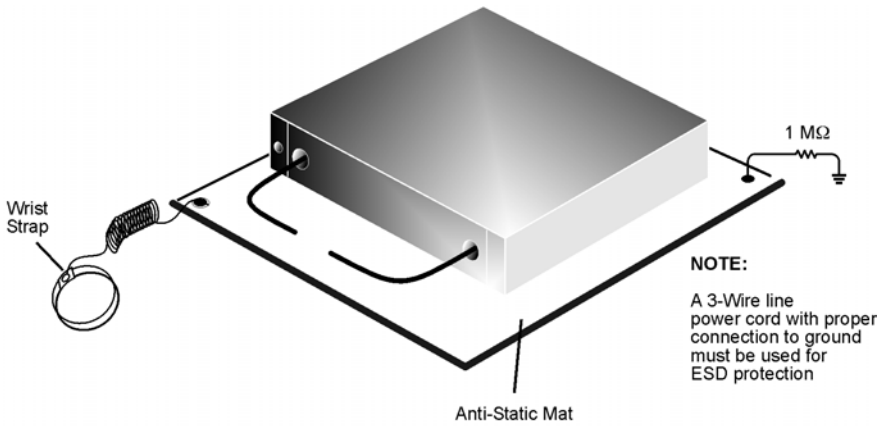
Static electricity can build up on your body and can easily damage sensitive internal circuit elements when discharged. Static discharges too small to be felt can cause permanent damage. Devices such as calibration components and devices under test (DUTs), can also carry an electrostatic charge. To prevent damage to the test set, components, and devices:

- *always* wear a grounded wrist strap having a 1 MΩ resistor in series with it when handling components and devices or when making connections to the test set.
- *always* use a grounded, conductive table mat while making connections.
- *always* wear a heel strap when working in an area with a conductive floor. If you are uncertain about the conductivity of your floor, wear a heel strap.
- *always* ground yourself before you clean, inspect, or make a connection to a static-sensitive device or test port. You can, for example, grasp the grounded outer shell of the test port or cable connector briefly.
- *always* ground the center conductor of a test cable before making a connection to the analyzer test port or other static-sensitive device. This can be done as follows:

  1. Connect a short (from your calibration kit) to one end of the cable to short the center conductor to the outer conductor.
  2. While wearing a grounded wrist strap, grasp the outer shell of the cable connector.
  3. Connect the other end of the cable to the test port.
  4. Remove the short from the cable.

Figure 1-4 shows a typical ESD protection setup using a grounded mat and wrist strap. For parts numbers of ESD protection supplies, refer to “Replaceable Parts” in chapter 6 of the *Electronic Calibration Module Reference Guide*.

Figure 1-4 ESD Protection Setup



2 Troubleshooting

General Information

WARNING **No operator serviceable parts inside. Refer servicing to qualified personnel.**

If you suspect a bad calibration, or if your VNA does not pass the performance verification, follow the steps as shown in Figure 2-1..

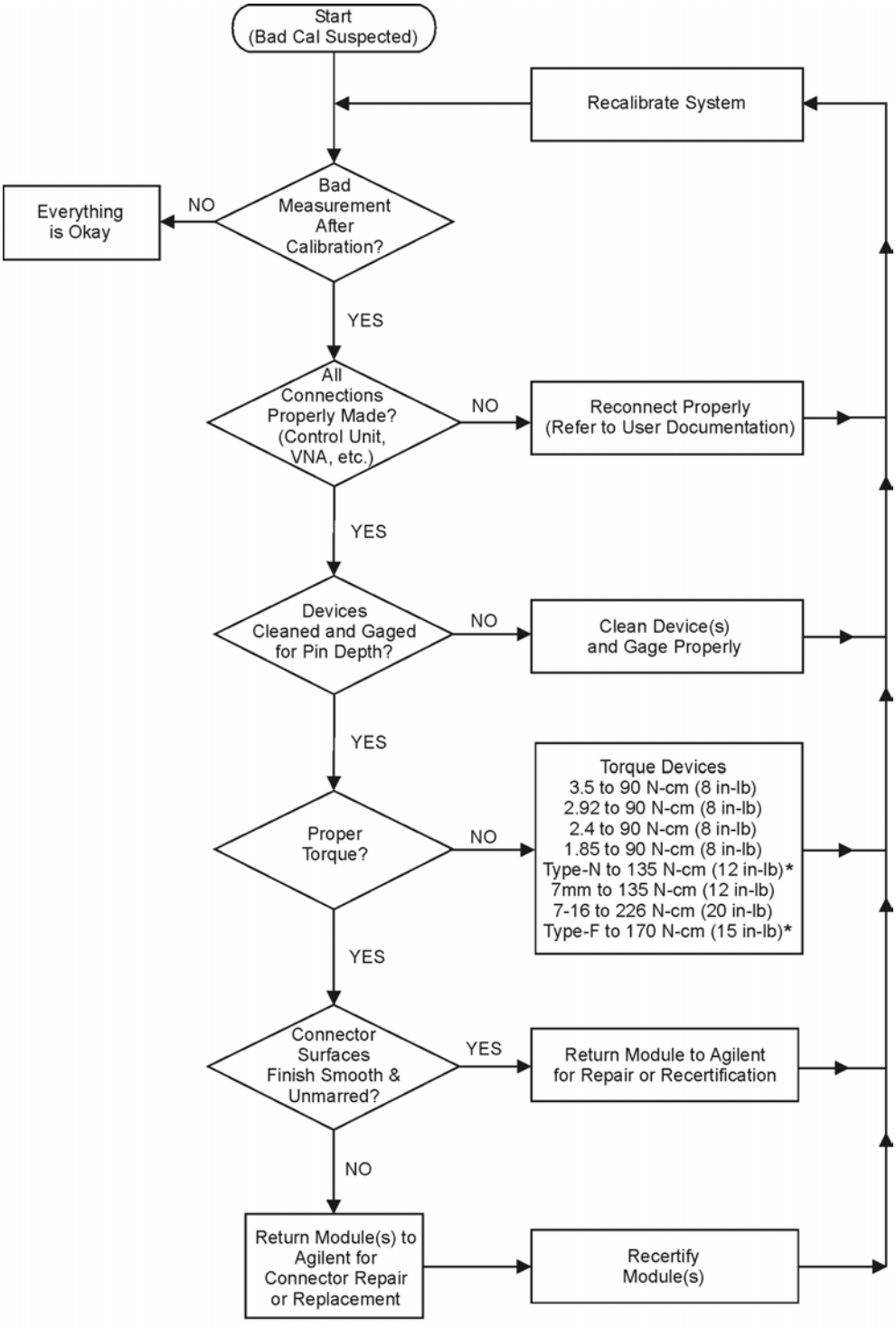
NOTE This manual contains limited information about VNA system operation. For information about the VNA's operation, refer to the VNA's documentation. If you need additional information, contact Agilent. See "Contacting Agilent" on page 2-4.

Returning a VNA Interface Kit to Agilent

If any device in the interface kit requires service, contact Agilent for information on where to send it. See "Contacting Agilent" on page 2-4. When transporting the kit, use original or comparable packaging. Please include the following information with your returned interface kit.

- your company name and address
- a technical contact person within your company, and the person's complete telephone number including country code and area code
- the model number and serial number of the interface kit
- the part number and serial number of each device
- type of service required
- a detailed description of the problem and how the device was being used when the problem occurred (such as calibration or measurement)

Figure 2-1. Troubleshooting Flowchart



* Agilent does not supply torque wrenches for 75 Ω type-N or Type-F connectors. Finger tighten if no torque wrench is available.

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Contacting Agilent

Assistance with test and measurements needs and information on finding a local Agilent office are available on the Web at:
http://www.agilent.com/find/assist

If you do not have access to the Internet, please contact your Agilent field engineer.

NOTE In any correspondence or telephone conversation, refer to the Agilent product by its model number and full serial number. With this information, the Agilent representative can determine whether your product is still within its warranty period.

3 Safety and Regulatory Information

Safety Information

Review this product and related documentation to familiarize yourself with safety markings and instructions before you operate the instrument. This product has been designed and tested in accordance with international standards.

WARNING	**The WARNING notice denotes a hazard. It calls attention to a procedure, practice, or the like, that, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.**

CAUTION	The CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

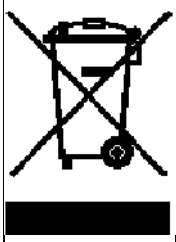
Before Applying Power

Verify that the product is configured to match the available main power source as described in Table 1-4 on page 1-9. If this product is to be powered by autotransformer, make sure the common terminal is connected to the neutral (grounded) side of the ac power supply.

WARNING	**Install the instrument so that the detachable power cord is readily identifiable and is easily reached by the operator. The detachable power cord is the instrument disconnecting device. It disconnects the mains circuit from the mains supply before other parts of the instrument.**

WARNING	**If this product is not used as specified, the protection provided by the equipment could be impaired. This product must be used in a normal condition (in which all means for protection are intact) only.**

Instrument Markings

	When you see this symbol on your instrument, you should refer to the instrument's instruction manual for important information.
	This symbol indicates hazardous voltages.
	The laser radiation symbol is marked on products that have a laser output.
	This symbol indicates that the instrument requires alternating current (ac) input.
	The CE mark is a registered trademark of the European Community. If it is accompanied by a year, it indicates the year the design was proven.
	The CSA mark is a registered trademark of the Canadian Standards Association.
1SM1-A	This text indicates that the instrument is an Industrial Scientific and Medical Group 1 Class A product (CISPER 11, Clause 4).
	This symbol indicates that the power line switch is ON.
	This symbol indicates that the power line switch is OFF or in STANDBY position.
 jc84a	The C-Tick mark is a registered trademark of the Australian Spectrum Management Agency.
	This product complies with the WEEE Directive (2002/96/EC) marking requirements. The affixed label indicates that you must not discard this electrical/ electronic product in domestic household waste. Product Category: With reference to the equipment types in the WEEE Directive Annex I, this product is classed as a "Monitoring and Control instrumentation" product. Do not dispose in domestic household waste. To return unwanted products, contact your local Agilent office, or see http://www.agilent.com/environment/product/ for more information.

Safety Earth Ground

WARNING **This is a Safety Class 1 Product (provided with a protective earthing ground incorporated in the power cord). The mains shall only be inserted in a socket outlet provided with a protective earth contact. Any interruption of the protective conductor inside or outside of the product is likely to make the product dangerous. Intentional interruption is prohibited.**

NOTE This product has been designed and tested in accordance with IEC Publication 1010, Safety Requirements for Electronic Measuring Apparatus, and has been supplied in a safe condition. The instruction documentation contains information and warnings which must be followed by the user to ensure safe operation and to maintain the product in a safe condition.

Regulatory Information

Compliance Notices

This product has been designated and tested in accordance with the standards listed on the Manufacturer's Declaration of Conformity, and has been supplied in a safe condition. The documentation contains information and warnings that must be followed by the user to ensure sate operation and to maintain the product in a safe conditions.

Compliance with Canadian EMC Requirements

This ISM device complies with Canadian ICES-001.

Cet appareil ISM est conforme a la norme NMB du Canada.

Compliance With EEC Directives

See the declaration of conformity on the following page.

Declaration of Conformity

A declaration of conformity is on file for the PNA models, and a copy is available upon request.

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