

Agilent N7744A
4-Channel Optical Multiport Power Meter
Agilent N7745A
8-Channel Optical Multiport Power Meter

Getting Started



Agilent Technologies

Notices

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Produced to ISO 9001 international quality system standard as part of our objective of continually increasing customer satisfaction through improved process control.

Safety Notices

CAUTION

A **CAUTION** notice calls attention to an operating procedure, practice, or the like that, 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.

WARNING

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

Safety Considerations

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 elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Agilent Technologies Inc. assumes no liability for the customer's failure to comply with these requirements.

This product has been designed and tested in accordance with IEC Publication 61010-1, Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory, and has been supplied in a safe condition. The instruction documentation contains information and warnings that must be followed by the user to ensure safe operation and to maintain the product in a safe condition.

Safety Symbols

CAUTION

The *caution* sign denotes a hazard. It calls attention to a procedure which, if not correctly performed or adhered to, could result in damage to or destruction of the product. Do not proceed beyond a caution sign until the indicated conditions are fully understood and met.

WARNING

The *warning* sign denotes a hazard. It calls attention to a procedure which, if not correctly performed or adhered to, could result in injury or loss of life. Do not proceed beyond a warning sign until the indicated conditions are fully understood and met.

General

This is a Safety Class 1 instrument (provided with a protective earth terminal) and has been manufactured and tested according to international safety standards.

Before operation, you should review the instrument and manual for safety markings and instructions. You must follow these to ensure safe operation and to maintain the instrument in safe condition.

Some Agilent N7744/5A circuits are powered whenever the instrument is connected to the AC power source. To disconnect from the line power, disconnect the power cord either at the rear power inlet or at the AC line power source (receptacle).

One of these must always be accessible. If the instrument is in a cabinet, it must be disconnected from the line power by the system's line power switch.

WARNING

To avoid hazardous electrical shock, do not perform electrical tests when there are signs of shipping damage to any portion of the outer enclosure (covers, panels, and so on).

Operating Environment

WARNING

The Agilent N7744/5A Optical Multiport Power Meter is not designed for outdoor use. To prevent potential fire or shock hazard, do not expose the instrument to rain or other excessive moisture.

Line Power Requirements

CAUTION

The Agilent N7744/5A Optical Multiport Power Meter complies with overvoltage category II and can operate from the single-phase AC power source that supplies between 100 V and 240 V at a frequency in the range 50 to 60 Hz. The maximum power consumption is 60 VA with all options installed.

Input/Output Signals

CAUTION

There is one input BNC connector: Trigger In (see "[Input and Output Connectors](#)" on page 15). This is a TTL input. A maximum of 5 V can be applied as an external voltage to this input connector.

There is one output BNC connector: Trigger Out (see "[Input and Output Connectors](#)" on page 15). This is a TTL output. Do not apply an external voltage to this connector.

Line Power Connectors

In accordance with international safety standards, the instrument has a three-wire power cable. When connected to an appropriate AC power receptacle, this cable earths the instrument cabinet. The type of power cable shipped with each instrument depends on the country of destination. Please refer to "[Accessories](#)" in the User Guide for the part numbers of available power cables.

WARNING

To avoid the possibility of injury or death, you must observe the following precautions before switching on the instrument.

- **Insert the power cable plug only into a socket outlet provided with a protective earth contact. Do not negate this protective action by using an extension cord without a protective conductor.**
- **Do not interrupt the protective earth connection intentionally.**
- **Do not remove protective covers. Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made only by qualified service personnel.**
- **Instruments that appear damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by qualified service personnel.**
- **Defective, damaged, or malfunctioning laser sources must be returned to an Agilent Technologies Service Center.**

Do not operate the instrument in the presence of flammable gases or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.

Instrument Markings



The instruction manual symbol. The product is marked with this warning symbol when it is necessary for the user to refer to the instructions in the manual.



Conformity Mark of the European Union.



Conformity Mark of the Canadian Standards Association, including Agilent Technologies' Registration Number.



Conformity Mark of the Australian ACA for EMC compliance, including Agilent Technologies' Registration Number.



General Recycling Mark for plastic parts used in the product.



Do not dispose in domestic household waste.



To return unwanted products, contact your local Agilent office, or see www.agilent.com/environment/product/ for more information.

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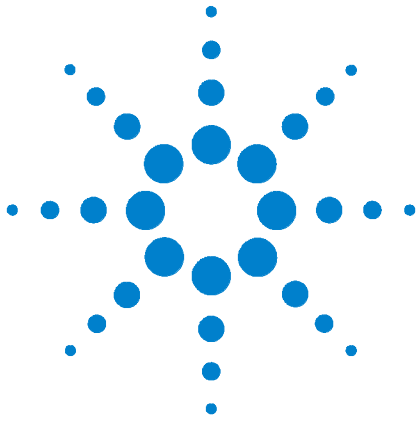
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1 Getting Started

This document helps you start using your Agilent N7744/5A Optical Multiport Power Meter.

The full user and programming documentation for the Agilent N7744/5A Optical Multiport Power Meter is on the CD supplied with the instrument and on www.agilent.com. Refer to it for details on using the Optical Multiport Power Meter.



Initial Inspection

Inspect the shipping container for damage. If there is damage to the container or cushioning, keep them until you have checked the contents of the shipment for completeness and verified the instrument both mechanically and electrically.

The Function Tests in the User's Guide give a procedure for checking the operation of the instrument. If the contents are incomplete, mechanical damage or defect is apparent, or if an instrument does not pass the operator's checks, notify the nearest Agilent Technologies Sales/Service Office.

WARNING

To avoid hazardous electrical shock, do not perform electrical tests when there are signs of shipping damage to any portion of the outer enclosure (covers, panels, and so on).

AC Line Power Supply Requirements

Line Power Requirements

The Agilent N7744/5A Optical Multiport Power Meter complies with overvoltage category II and can operate from the single-phase AC power source that supplies between 100 V and 240 V at a frequency in the range 50 to 60 Hz. The maximum power consumption is 60 VA with all options installed.

Line Power Cable

In accordance with international safety standards, the instrument has a three-wire power cable. When connected to an appropriate AC power receptacle, this cable earths the instrument cabinet. For the part number of the power cable for your country and instrument see the “Accessories” chapter in the User Guide.

CAUTION

Please note that the switch on the front panel of the Agilent N7744/5A Optical Multiport Power Meter does not stop the flow of power to the instrument.

If you need to turn off the power, unplug the instrument at the mains or remove the power cable connector from the appliance coupler at the rear of the instrument. For this reason, the power cable connection should be easily accessible - allowing you to turn off the power quickly. If the instrument is in a cabinet, it must be disconnected from the line power by the system’s line power switch.

The power switch allows you to switch between stand-by mode and power-on mode..

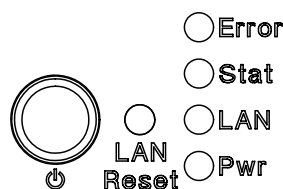


Figure 1 Agilent N7744/5A Optical Multiport Power Meter Switch

When the instrument is in stand-by mode, the Pwr LED is orange.

When the instrument is powered-on, the Pwr LED is green.

WARNING

To avoid the possibility of injury or death, you must observe the following precautions before switching on the instrument.

- Insert the power cable plug only into a socket outlet provided with a protective earth contact. Do not negate this protective action by using an extension cord without a protective conductor.
- Do not interrupt the protective earth connection intentionally.

The AC power requirements are summarized on the rear panel of the instrument.

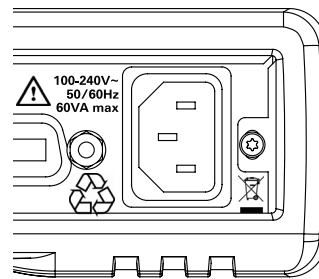


Figure 2 AC Power Requirement Markings - Agilent N7744/5A

Operating and Storage Environment

The following summarizes the operating environment ranges. In order for the Agilent N7744/5A Optical Multiport Power Meter to meet specifications, the operating environment must be within these limits.

WARNING

The Agilent N7744/5A Optical Multiport Power Meter is not designed for outdoor use. To prevent potential fire or shock hazard, do not expose the instrument to rain or other excessive moisture.

Temperature

The instrument should be protected from temperature extremes and changes in temperature that may cause condensation within it.

The operating temperature for the Agilent N7744/5A Optical Multiport Power Meter is from 5°C to +40°C.

The storage temperature for the Agilent N7744/5A Optical Multiport Power Meter is from -40°C to +70°C.

Humidity

The operating humidity for the Agilent N7744/5A Optical Multiport Power Meter is 15 to 80%, non-condensing.

Altitude

The maximum operating altitude of the Agilent N7744/5A Optical Multiport Power Meter is 2000 m.

Pollution Protection

The Agilent N7744/5A Optical Multiport Power Meter is designed for pollution degree 2.

Instrument Cooling

The Agilent N7744/5A Optical Multiport Power Meter has a cooling fan mounted internally.

Mount or position your instrument upright and horizontally, as shown in Figure 3 so that air can circulate through it freely.

Operating Position

When operating the Agilent N7744/5A Optical Multiport Power Meter choose a location that provides at least 75 mm (3 inches) of clearance at the rear, and at least 25 mm (1 inch) of clearance at each side. Failure to provide adequate air clearance may result in excessive internal temperature, reducing instrument reliability. The instrument should not be operated when resting on its rear or side panels.

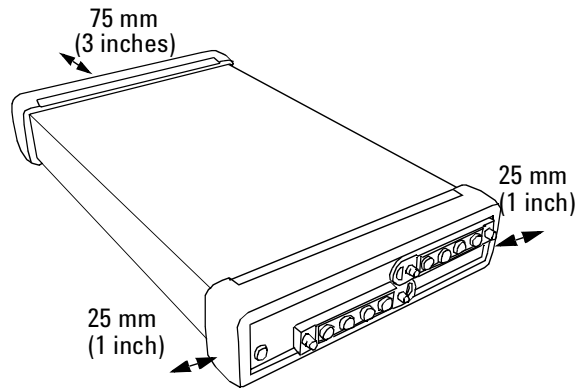


Figure 3 Correct Operating Position of the Agilent N7744/5A

Input and Output Connectors

Front and Rear Panels

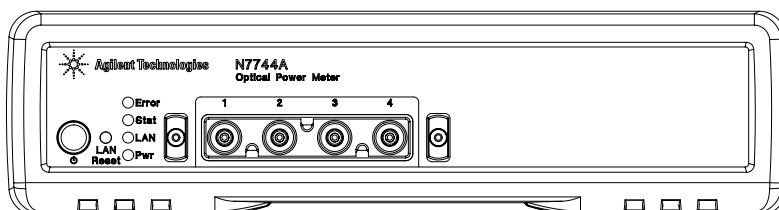


Figure 4 The Agilent N7744A 4-Channel Optical Multiport Power Meter front panel

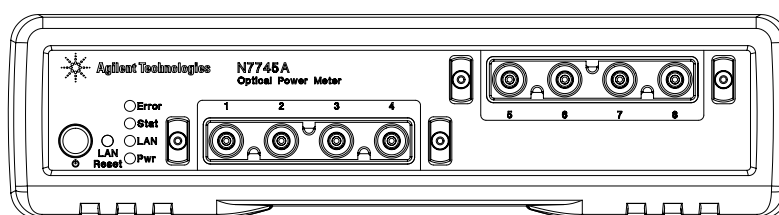


Figure 5 The Agilent N7745A 8-Channel Optical Multiport Power Meter front panel

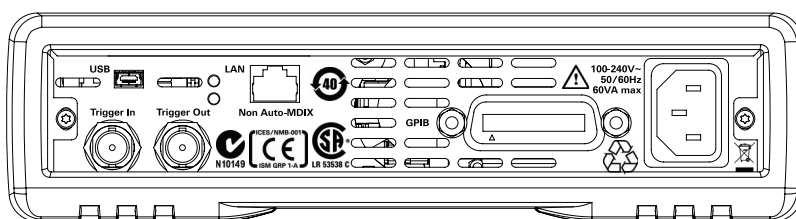


Figure 6 The Agilent N7744/5A Optical Multiport Power Meter rear panel

Making Optical Connections

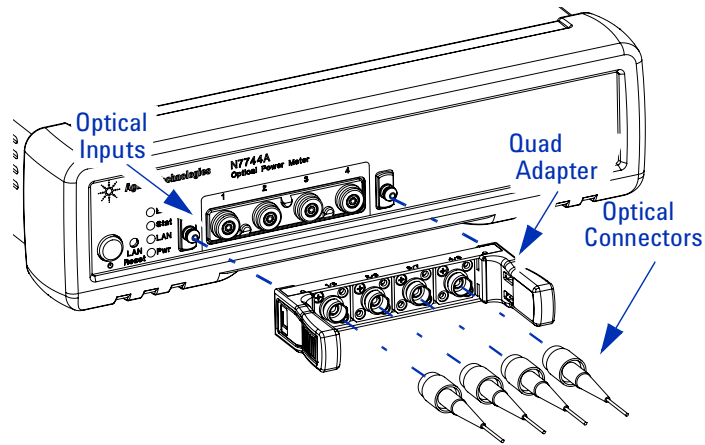


Figure 7 Connecting Optical Fibers

NOTE

Before you attach a quad-adapter or fiber, you should make sure they are clean. This is important for accurate measurements.

The fibers do not contact the optical inputs (all contact with the optical inputs should be avoided). Usually the only cleaning necessary for the optical inputs is the gentle removal of dust with pressurized, dry air.

For further information see [“Cleaning Instructions”](#) in the User’s Guide.

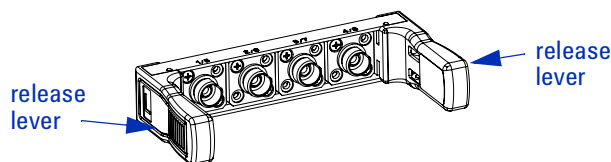
To use a quad-adapter to connect optical fibers to the power meter inputs:

- 1 Select the quad-adapter that suits the optical connector that your optical fiber is terminated with.
- 2 Attach the optical connectors to the quad-adapter. You can attach up to 4 fibers to the quad-adapter at the same time.
- 3 Make sure the number labels on the quad-adapter are at the top.
- 4 Connect the quad-adapter to the optical inputs, see Figure 7, by pressing it on until it clicks securely into place.

Removing Optical Interfaces

NOTE

There are release levers on both sides of the quad-adapter for removing it from the optical inputs.



- 1 Press the release levers on both sides of the quad-adapter to release it from the front panel of the power meter.
- 2 You can now remove the optical connectors from the quad-adapter.

NOTE

Always place the dust cap on unused connector interfaces.

You can use the quad-adapter dust caps to protect the four power meter inputs and the rear of the quad-adapter, for example, when fibers are attached.

Electrical Connectors

There are two BNC connectors on the rear panel of your instrument. These are the Trigger Out and the Trigger In connectors.

CAUTION

The Trigger In, see Figure 6, is a TTL input. A maximum of 5 V can be applied as an external voltage to this input connector.

The Trigger Output, see Figure 6, is the only output BNC connector. This is a TTL output. Do not apply an external voltage to this connector.

LAN Interface

Selecting a LAN Network

For the purposes of this guide, a private (isolated) LAN network is defined as a network configuration in which instrument access is a direct connection between the computer and the instrument, or to multiple instruments connected via a *dedicated* router or switch. A site (company-wide) LAN is defined as a network in which instrument access is available to

many users at on-site and remote locations. The instrument's application and/or your company's IT (Information Technology) department may have guidelines that help decide the type of network (private or site) used. If a network configuration has not been determined, refer to the following considerations concerning each type.

Private LAN Considerations

Among the basic parameters of a private LAN network to consider are security, performance, reliability, and IP address availability.

Security A private network generally involves a direct connection between the computer and the instrument, or to multiple instruments using switches or routers. Access to the instrument is limited to users on the private network, as opposed to users on a site network that could locate and access the instrument from any location.

Private networks can reduce the possibility of tests being disrupted by unplanned or unauthorized access. Code generation for test systems on a private network is often simplified, as provisions against unauthorized users may not be required.

Performance Test systems where large amounts of data are transferred usually have faster throughput on a private network. On a site network, heavy and unpredictable LAN traffic affects each instrument (node) on the network.

The impact on a test system is that repeatability is difficult to achieve as latencies are difficult to account for.

Reliability Private networks are fundamentally more reliable than site networks as they host fewer users and are less complex than site networks.

Private networks are isolated from conditions that could bring down (crash) a site network.

IP Address Availability Every instrument (node) on a LAN (private or site) has an IP (Internet Protocol) address. Due to the expanding use of the internet, the number of site network IP addresses available is limited. By using a router with Dynamic Host Configuration Protocol (DHCP) capability on a private network, the router can assign an IP address to each instrument thus creating a sub-network (subnet) that does not consume site IP addresses.

Site LAN Considerations

For applications requiring access by many users or by users at distributed sites, a site LAN network is required. In addition to supporting multiple users, site LANs often offer the advantage of being maintained by IT departments. When using a site LAN, consult your IT department regarding LAN configuration and security issues.

Connecting the LAN Cable

LAN cables are connected between the LAN terminal on the instrument and the computer, or between the instrument and a router or switch if included in your network.

Private Network Connections Figure 8 shows typical LAN cable connections for a private network.

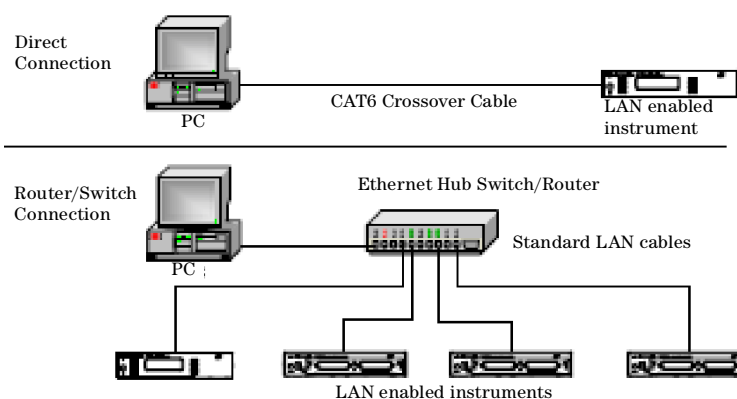


Figure 8 Typical Private (isolated) LAN Network Connections.

If the Agilent N7744/5A power meter is connected directly to the PC, use a LAN crossover cable, as provided with the instrument. If your computer supports Auto-MDIX or contains a LAN card with gigabit data transfer rates, the (blue) crossover cable is not required. A standard LAN cable can be used instead.

For private LAN networks that include a switch or router, use standard LAN cables for all network connections. Do not use a crossover cable.

Site Network Connections Figure 9 shows a typical LAN cable connection for a site network.

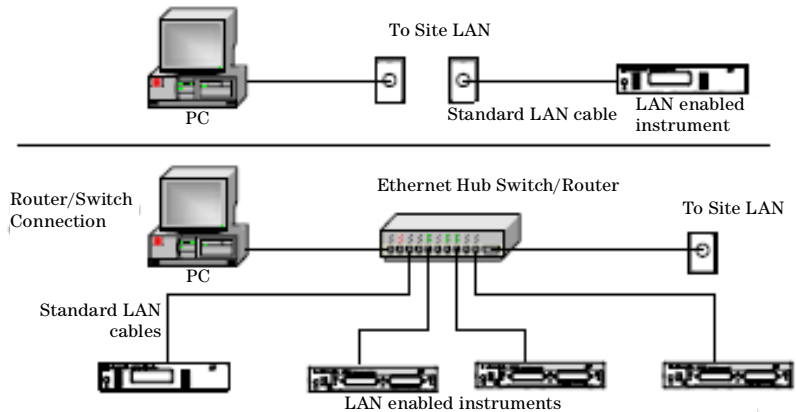


Figure 9 Typical Site LAN Network Connections.

On site networks, the Agilent N7744/5A and the computer are connected directly to site LAN ports, or are connected to the site LAN through a switch. In each site network configuration, standard LAN cables are used.

The LAN LED As the LAN connection is made, the DHCP server assigns an address and the LXI device identification proceeds you will see the following indicators;

No LAN link	LAN link No IP Address	LAN link	LXI Device identification
Red LAN	Yellow LAN	Green LAN	Green LAN blink

There may be a delay between making the LAN link (yellow status) and getting the IP address (green status). This delay may be longer if there is no DHCP server, for example when the Agilent N7744/5A is connected directly to a PC.

GPIB Interface

You can connect your GPIB interface into a star network, a linear network, or a combination star and linear network. The limitations imposed on this network are as follows:

- The total cable length cannot exceed 20 meters
- The maximum cable length between devices is 4 meters, with an average separation of 2m between devices over the whole bus.
- No more than 15 devices may be interconnected on one bus.

USB Interface

NOTE

Before connecting the instrument over USB, install the Agilent I/O Libraries Suite, which is included on a CD with the instrument.

The power meter is a USB device, with a mini-USB connector.

Powering Up the Instrument

When you switch on the power meter, the LEDs on the front panel show the various stages of booting.

Standby	Power On	FPGAs loaded	Analog Board 1 loaded	Analog Board 2 loaded
Error	Yellow Error	Green Error	Green Error	Green Error
Stat	Yellow Stat	Yellow Stat	Green Stat	Green Stat
LAN	Yellow LAN	Yellow LAN	Yellow LAN	Green LAN
Yellow Pwr	Green Pwr	Green Pwr	Green Pwr	Green Pwr

Front Panel Indicators

During operation, you may notice the following LED indicators:

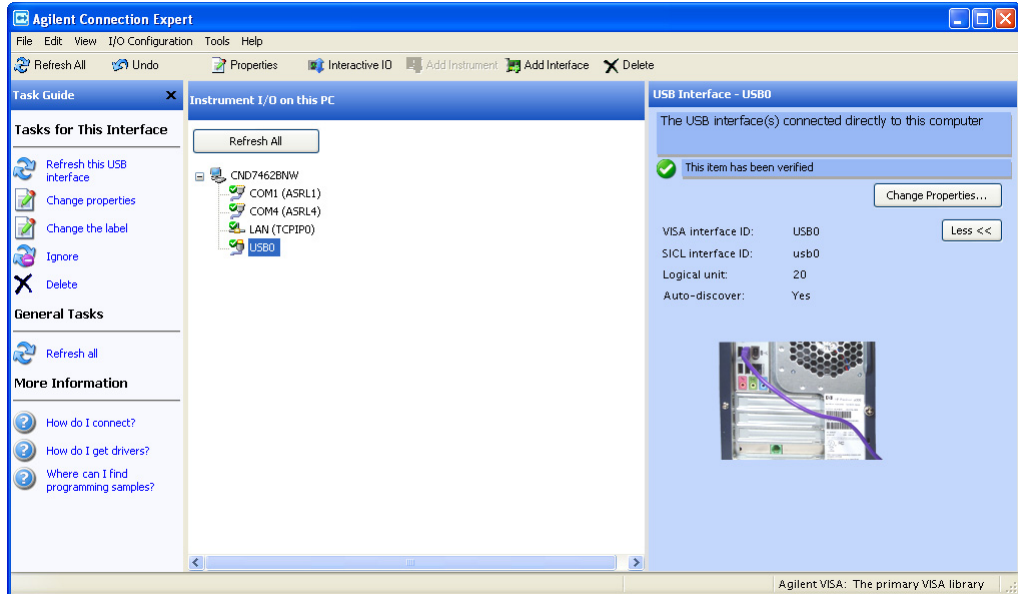
Hardware defect	Red Error
LAN, USB or GPIB communication	Green blink Stat
Zeroing	Yellow Stat

Connecting to the Instrument

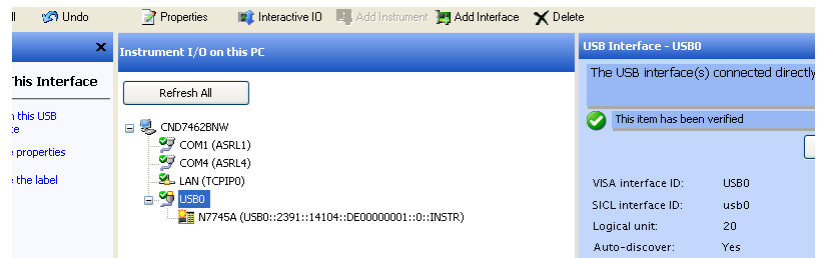
When you are first connecting the instrument, we recommend you use the Agilent Connection Expert included with the Agilent I/O libraries (available on the CD supplied with the instrument, or from www.agilent.com).

Connecting over USB

- 1 If it is not already running, start the Agilent Connection Expert software.



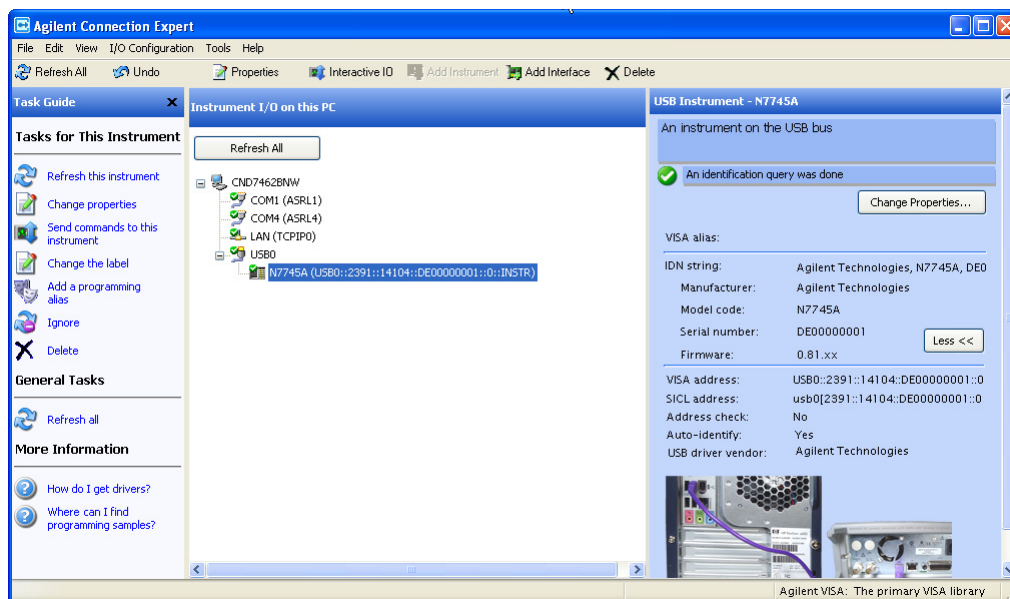
- 2 Attach the instrument to the USB.
The first time you attach an Agilent N7744A or Agilent N7745A Optical Multiport Power Meter, follow the instructions on the screen to select the driver for this instrument.
When the instrument is connected, it is shown in the list.



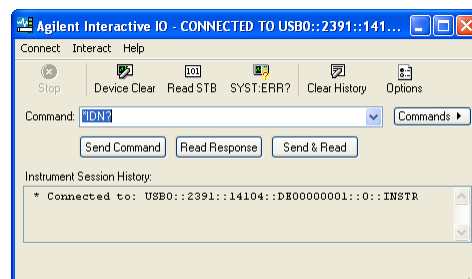
- 3 Select the instrument in the list to see the associated tasks (in the Task Guide on the left) and information (on the right).

Finding the IP Address of an instrument

- 1 Connect to the instrument over USB.
- 2 Select the instrument in the list.

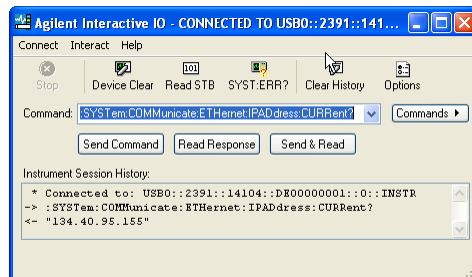


- 3 Click on “Send commands to this instrument”.
The default command is the *IDN? query.



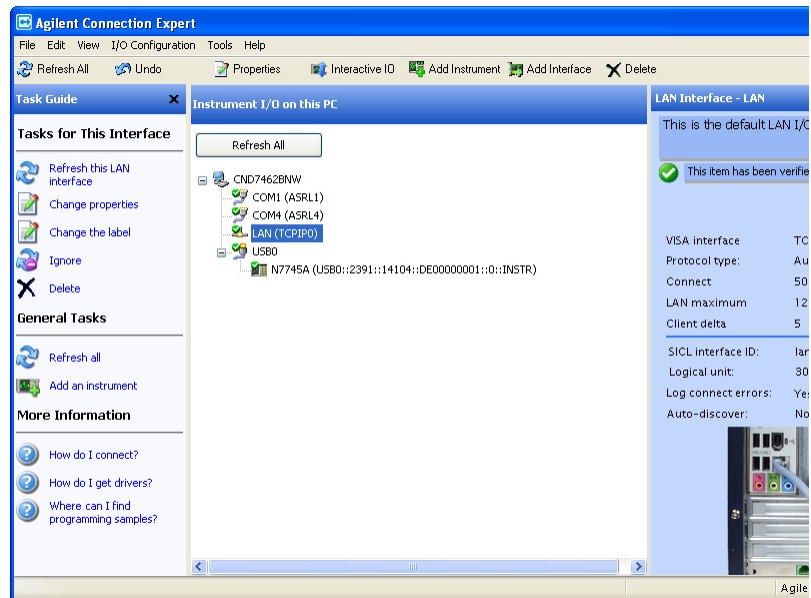
- 4 Enter the command
:SYSTem:COMMunicate:ETHeRnet:IPADdress:CURRent?
then click on [Send & Read].

The instrument returns its current IP address.



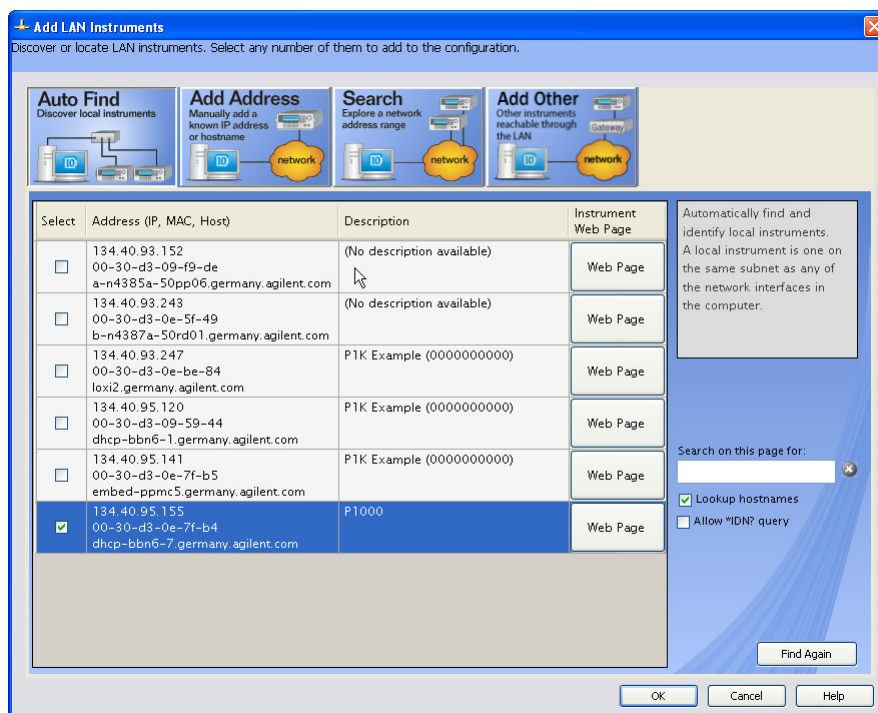
Connecting over LAN

- 1 Make sure the instrument is connected to the LAN, and that the LAN LED on the front panel is green.
See “[LAN Interface](#)” on page 17 for more information to connecting over LAN.
- 2 If it is not already running, start the Agilent Connection Expert software.
- 3 Select “LAN (TCPIP0)” in the list.



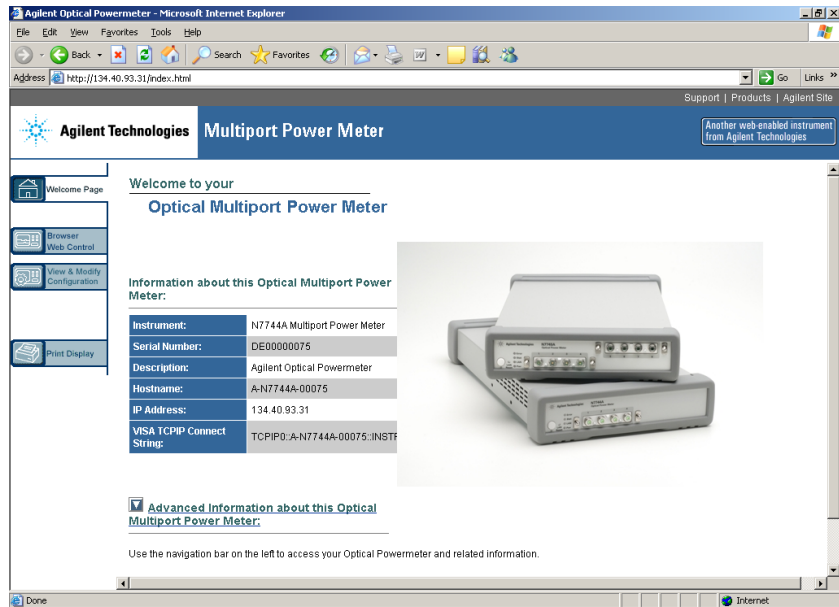
- 4 Click on “Add an instrument” in the Task Guide.
- 5 Wait for the scan to finish.

6 Select the instrument in the list.



7 Select the instrument in the list to see the associated tasks (in the Task Guide on the left) and information (on the right).

Click on [Instrument Web Interface] to control the instrument directly.



If it is not already installed, you will need to install a Java run-time engine to use this page.

Basic configuration and functionality are available from this web page.

More advanced functionality is available through programming with SCPI commands (described in the Programming Guide available on the CD supplied with the instrument or from www.agilent.com), or using the VXI plug&play Driver version 4.1.5 (or higher) for 816x power meters.

Claims and Repackaging

If physical damage is evident or if the instrument does not meet specification when received, notify the carrier and the nearest Agilent Technologies Sales/Service Office. The Agilent Technologies Sales/Service Office will arrange for repair or replacement of the unit without waiting for settlement of the claim against the carrier.

Return Shipments to Agilent Technologies

If the instrument is to be shipped to an Agilent Technologies Sales/Service Office, attach a tag showing owner, return address, model number and full serial number and the type of service required.

The original shipping carton and packing material may be reusable, but the Agilent Technologies Sales/Service Office will provide information and recommendations on materials to be used if the original packing is no longer available or reusable. General instructions for repackaging are as follows:

- Wrap instrument in heavy paper or plastic.
- Use strong shipping container. A double wall carton made of 350-pound test material is adequate.
- Use enough shock absorbing material (3 to 4 inch layer) around all sides of the instrument to provide a firm cushion and prevent movement inside container. Protect control panel with cardboard.
- Seal shipping container securely.
- Mark shipping container FRAGILE to encourage careful handling.
- In any correspondence, refer to instrument by model number and serial number.

1 Getting Started



2 Regulations Compliance

The Agilent N7744/5A Optical Multiport Power Meter is produced to the ISO 9001 international quality system standard as part of Agilent Technologies' commitment to continually increasing customer satisfaction through improved quality control.



Declarations of Conformity

 Agilent Technologies	DECLARATION OF CONFORMITY According to ISO/IEC Guide 22 and CEN/CENELEC EN 45014	
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Manufacturer's Name: Agilent Technologies International sarl
Manufacturer's Address: Rue de la Gare 29
 CH-1110 Morges
 Switzerland

Declares under sole responsibility that the product as originally delivered

Product Name: **Optical Multiport Power Meter**
Product Number: **N7744A** 4 Channels
N7745A 8 Channels
Product Options: *This declaration covers all options of the above system.*

complies with the essential requirements of the following applicable European Directives, and carries the CE marking accordingly:

- The Low Voltage Directive 2006/95/EC
- The EMC Directive 2004/108/EC

and conforms with the following product standards:

EMC	Standard	Limit
	IEC 61326-1:2005 / EN 61326-1:2006	Group 1 Class A
	CISPR 11:2003 / EN 55011:1998+A1:1999+A2 :2002	4 kV CD, 8 kV AD
	IEC 61000-4-2:1995+A1:1998+A2 :2000 /	
	EN 61000-4-2:1995+A1:1998+A2:2001	
	IEC 61000-4-3:2002+A1:2002 / EN 61000-4-3:2002+A1:2002	3 V/m, 80-1000 MHz
	IEC 61000-4-4:2004 / EN 61000-4-4:2004	0.5 kV signal lines, 1 kV power lines
	IEC 61000-4-5:1995+A1:2000 / EN 61000-4-5:1995+A1:2001	0.5 kV line-line, 1 kV line-ground
	IEC 61000-4-6:2003 / EN 61000-4-6:1996+A1:2001	3 V, 0.15-80 MHz
	IEC 61000-4-11:2004 / EN 61000-4-11:2004	0% for 1/0.5 (0°, 180°) cycle
		0% for 250/300 cycles
		70% for 25/30 cycles
	Canada: ICES/NMB-001:2004	
	Australia/New Zealand: AS/NZS CISPR 11:2004	
Safety	IEC 61010-1:2001 / EN 61010-1:2001	
	Canada: CAN/CSA-C22.2 No. 61010-1:2004	

Supplementary Information:

The products were tested in a typical configuration with Agilent Technologies test systems.

This DoC applies to above-listed products placed on the EU market after:

2008-April-01
 Date


 Hans-Martin Fischer
 Name
 Product Quality & Compliance
 Agilent Technologies
 Title

For further information, please contact your local Agilent Technologies sales office, agent or distributor.

Regulations Information

EMC Canada

These ISM devices comply with Canadian ICES-001.
Ces appareils ISM sont conformes à la norme NMB-001 du
Canada.

Acoustic Noise Information Germany

ISO 7779

$L_{pA} < 70$ dB(A), normal operation, operator position.

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