

N7744C and N7745C Optical Multiport Power Meters



General Information

Up to 8 power meter channels in a small package

Keysight Technologies' new N7744C and N7745C optical power meters with four or eight power-sensor channels provide manufacturing customers with further increased throughput and operational efficiency to meet today's challenges in multiple-device and multiport testing. A family-wide, common trigger concept, and a modern, browser-accessible user interface, make it convenient to configure the instrument's functionality.

Designed for optical multiport applications

Successor to Keysight's popular N7744A optical power meters, the N7744C has been further optimized for high measurement throughput when characterizing optical multiport components, for example multiplexers, PON splitters, wavelength selective switches (WSS) and ROADMs, as well as for simultaneous testing of multiple single-port devices.

High-speed measurement data acquisition, faster data interfaces, the use of dual-ported RAM for uninterrupted simultaneous measurement and readout, and the new faster power range switching help avoid unnecessary delays in the measurement process as well as in post-processing. Transient measurements are now supported with power threshold triggering

Save significant rack space

These power meters achieve a level of space-saving channel density that simplifies fiber handling for many-port device testing. This is complemented by the ease of integrating multiple instruments into a single setup with parallel programming over the LAN or USB connections.

A single N7744C/ N7745C is only one rack unit high and a half rack unit wide.



Web User Interface but no LAN?

Connect instrument and PC via USB. The instrument shows up as a new drive: double-click the shortcut on that drive. This lets the default browser open an RNDIS connection to the instrument: the graphical user interface appears. It's as simple as that!

Key Benefits

High-speed measurement data acquisition for swept-wavelength and transient measurements

- Short minimum averaging time of 1 μ s and up to 250 kHz bandwidth
- Data acquisition with up to 1 Million samples per second and per port
- Memory for 1 M samples/port plus 1 M/port buffer for continuous logging with up to 3x faster data transfer
- Frequency response matched to averaging time and stable dark-current zeroing provide high dynamic range without distorting filter shapes at high sweep speed

Unprecedented device connectivity (patented)

- Industry-leading solution to separate the connecting task from the measuring task
- Fibers can be comfortably attached to the quad-adapter away from the power meter
- The quad-adapter supports MU, FC, SC and LC connectors, as well as bare fiber connectors

Flexibility

- The instrument can be controlled via LAN and USB
- The comprehensive hardware and trigger concept along with its large memory storage gives the flexibility to adapt the power meter to many test needs
- The instrument programming code is compatible to the Lightwave solution platform

Faster swept-wavelength measurements with high dynamic range

The new N7744C and N7745C, combined with Keysight tunable lasers and a Keysight polarization synthesizer and controlled by the photonic application software suite, perform spectral measurements of insertion loss, polarization dependent loss and polarization mode dispersion. Accelerated concurrent power ranging and bi-directional wavelength sweeping enable high-throughput testing and fast update rates in alignment and adjustment processes. The photonic application software suite has a measurement engine for IL and PDL that can combine the sweeps of up to 3 tunable laser wavelength ranges. See the photonic application software suite brochure for details. www.keysight.com/find/n7700

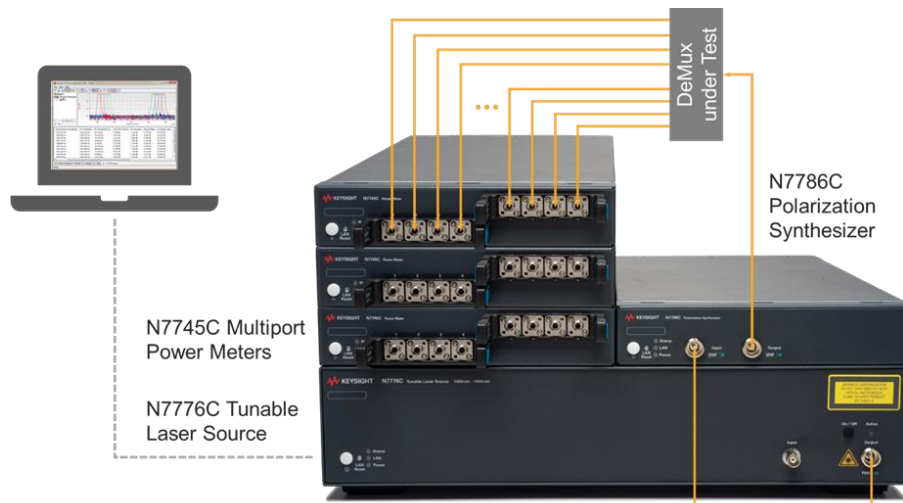


Figure 1: Test setup for swept-wavelength, IL/PDL measurements of a demultiplexer

A reliable four-port optical connection with the trusted one-click quad-adapter

With this new power meter comes the trusted N7740 fiber connectivity concept, which is a quadruple adapter with a snap-on quick-locking mechanism. The device to be tested can be connected to the quad-adapters in a comfortable ergonomic working position, even while the instrument is measuring another device.

The quad-adapters can be quickly snapped on to the instrument, to provide reliable and repeatable high-precision connections. Use of the quad-adapters simplifies aligning connector keys, especially for rack-mounted instruments and makes it easier to connect ports in the desired order, helping to avoid errors and connector damage.

A bare fiber version of the quad-adapter, N7740BI, can host up to four bare fiber holders. Two types of bare fiber holder kits with four holders each are available for fiber diameters up to 400 μm (81004BM) and between 400 μm and 900 μm (81009BM). The one-click zeroing adapter N7740ZI allows quick and reliable 4-port zeroing of the power meters.



Figure 2: N7745C with N7740FI FC/PC quad-adapter

Definitions

Generally, all specifications are valid at the stated operating and measurement conditions and settings, with uninterrupted line voltage.

Specifications (guaranteed)

Describes warranted product performance that is valid under the specified conditions. Specifications include guard bands to account for the expected statistical performance distribution, measurement uncertainties changes in performance due to environmental changes and aging of components.

Typical values (characteristics)

Characteristics describe the product performance that is usually met but not guaranteed. Typical values are based on data from a representative set of instruments.

General characteristics

Give additional information for using the instrument. These are general descriptive terms that do not imply a level of performance.

Optical Multiport Power Meter Specifications

	N7744C, N7745C
Sensor element	InGaAs
Wavelength range	1250 nm to 1650 nm
Specification wavelength range	1250 nm to 1625 nm (if not stated differently)
Power range	-80 dBm to +10 dBm
Maximum safe input power	+16 dBm
Data logging capability	2 buffers per port, each with capacity for 1 M measurement points
Averaging time	1 μ s to 10 s
Applicable fiber type	Standard SM and MM \leq 62.5 μ m core diameter, NA \leq 0.24

Optical Multiport Power Meter Specifications, continued

	N7744C, N7745C		
Uncertainty at reference conditions ^{1, 3}	± 2.5%		
Total uncertainty ^{2, 5, 6}	± 4.5%		
Relative port to port uncertainty ^{1, 3, 4, 10}	Typical ± 0.05 dB		
Linearity ^{5, 6}	± 0.02 dB ± 3 pW at (23 ± 5) °C ± 0.04 dB ± 5 pW over operating temperature range		
Polarization dependent responsivity ^{3, 7}	< ± 0.015 dB (1520 nm to 1580 nm) Typical < ± 0.01 dB (1250 nm to 1580 nm)		
Spectral ripple (due to interference) ⁹	< ± 0.01 dB (1520 nm to 1625 nm) Typical < ± 0.01 dB (1250 nm to 1520 nm)		
Drift ⁴	± 9 pW		
Noise peak-to-peak (dark) ³	< 7 pW (1 s averaging time, 300 s observation time)		
Noise 2σ ³ (100,000 samples)	Averaging time: 1 μs	25 μs	1 ms
PM range	Typical	Typical	Typical
–30 dBm	<0.1 nW	<0.025 nW	<0.005 nW
–20 dBm	<1.5 nW	<0.15 nW	<0.02 nW
–10 dBm	<6 nW	<0.5 nW	<0.08 nW
0 dBm	<60 nW	<4 nW	<0.8 nW
+10 dBm	<600 nW	<40 nW	<8 nW

- 1 Reference conditions:
Single mode fiber SMF 9 μm.
Power level: –20 dBm to 0 dBm.
On day of calibration (add ± 0.3% for aging over one year; add ± 0.6% for aging over two years).
Spectral width of source < 10 nm full width half maximum (FWHM).
Wavelength setting of power sensor corresponds to source wavelength ± 0.4 nm.
- 2 Operating conditions:
Single mode fiber SMF. For multimode fiber, typical.
Within one year of calibration; add ± 0.3% for second year.
Spectral width < 10 nm FWHM.
Wavelength setting of power sensor corresponds to source wavelength ± 0.4 nm.
- 3 Ambient temperature (23 ± 5) °C.
- 4 Temperature constant within ±1 K after zeroing.
- 5 Excluding noise and offset drift.
- 6 Power range –60 dBm to +10 dBm.
- 7 Straight connector, SMF.
- 8 Connector 8° angled, ceramic ferrule, SMF.
- 9 For constant state of polarization, source linewidth < 100 MHz, angled connector 8°, wavelength range 1520 nm to 1625 nm.
Typical for 1250 nm to 1520 nm. Add ± 0.01 dB typical within specification wavelength range for straight connector with ceramic ferrule.
- 10 Same 4-detector block, same wavelength.

Optical Multiport Power Meter Specifications, continued

	N7744C, N7745C		
Dynamic range ^{3, 4} (logging mode)	Averaging time: 1 μ s	25 μ s	1 ms
PM range	Typical	Typical	Typical
–30 dBm	> 43 dB	> 49 dB	>57 dB
–20 dBm	> 43 dB	>54 dB	>62 dB
–10 dBm	> 46 dB	>57 dB	>64 dB
0 dBm	> 46 dB	>57 dB	>63 dB
+10 dBm	> 43 dB	>54 dB	>60 dB
Port separation ⁵	> 85 dB (CW, one neighbor port with 0 dBm)		
Port separation, dynamic ⁵	Typical > 70 dB (one neighbor port with 0 dBm in 0 dBm power meter range)		
Frequency response	3 dB cutoff frequency at 1 μ s averaging time, typical		
–30 dBm range	10 kHz		
–20 dBm range	130 kHz		
–10 to +10 dBm range	250 kHz		
Return loss ⁸	> 50 dB (1520 nm to 1580 nm) Typical > 57 dB (1280 nm to 1580 nm)		

- 1 Reference conditions:
Single mode fiber SMF 9 μ m.
Power level: –20 dBm to 0 dBm.
On day of calibration (add \pm 0.3% for aging over one year; add \pm 0.6% for aging over two years).
Spectral width of source < 10 nm full width half maximum (FWHM).
Wavelength setting of power sensor corresponds to source wavelength \pm 0.4 nm.
- 2 Operating conditions:
Single mode fiber SMF. For multimode fiber, typical.
Within one year of calibration; add \pm 0.3% for second year.
Spectral width < 10 nm FWHM.
Wavelength setting of power sensor corresponds to source wavelength \pm 0.4 nm.
- 3 Ambient temperature (23 \pm 5) $^{\circ}$ C.
- 4 Temperature constant within \pm 1 K after zeroing.
- 5 Excluding noise and offset drift.
- 6 Power range –60 dBm to +10 dBm.
- 7 Straight connector, SMF.
- 8 Connector 8 $^{\circ}$ angled, ceramic ferrule, SMF.
- 9 For constant state of polarization, source linewidth < 100 MHz, angled connector 8 $^{\circ}$, wavelength range 1520 nm to 1625 nm.
Typical for 1250 nm to 1520 nm. Add \pm 0.01 dB typical within specification wavelength range for straight connector with ceramic ferrule.
- 10 Same 4-detector block, same wavelength.

General Specifications

Line power	AC 100 to 240 V \pm 10%, 50/60 Hz, 60 VA max.
Operating temperature	+5°C to +40°C
Operating humidity	15% to 90%, non-condensing
Storage temperature	–40°C to +70°C
Warm-up time	20 minutes
Recommended recalibration period	2 years
Dimensions	372 mm \times 212 mm \times 43 mm (excluding front and back rubber cushions)
Weight	3 kg (6 lb)
User Interface	N7744C, N7745C
LAN Access	IP address or host name via browser
USB Access	Remote NDIS access via browser

Ordering Information

Option	Description
N7744C	Optical Multiport Power Meter (4 channels)
N7745C	Optical Multiport Power Meter (8 channels)

Option	Recommended Accessories
N7740FI	FC connector adapter for Optical Multiport Power Meter
N7740KI	SC connector adapter for Optical Multiport Power Meter
N7740LI	LC connector adapter for Optical Multiport Power Meter
N7740MI	MU connector adapter for Optical Multiport Power Meter
N7740ZI	Blank zeroing connector adapter for Optical Multiport Power Meter
N7740BI	Bare fiber connector adapter for Optical Multiport Power Meter
81004BM	Bare fiber holder set for 0 to 400 μm fibers (4 each with gauge)
81009BM	Bare fiber holder set for 400 to 900 μm fibers (4 each with gauge)
N7799C-1CM	Rack Mount Kit for 1 Rack Height Unit (1 or 2 Instruments)
N7799C-DOC	Documentation of N77xxC Platform, Physical Medium

Optical Instruments Online Information

Optical test instruments: www.keysight.com/find/oct

Optical multiport power meters: www.keysight.com/find/MPPM

Polarization solutions: www.keysight.com/find/pol

Optical test instruments accessories: www.keysight.com/comms/oct-accessories

Firmware and driver download: www.keysight.com/comms/octfirmware

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