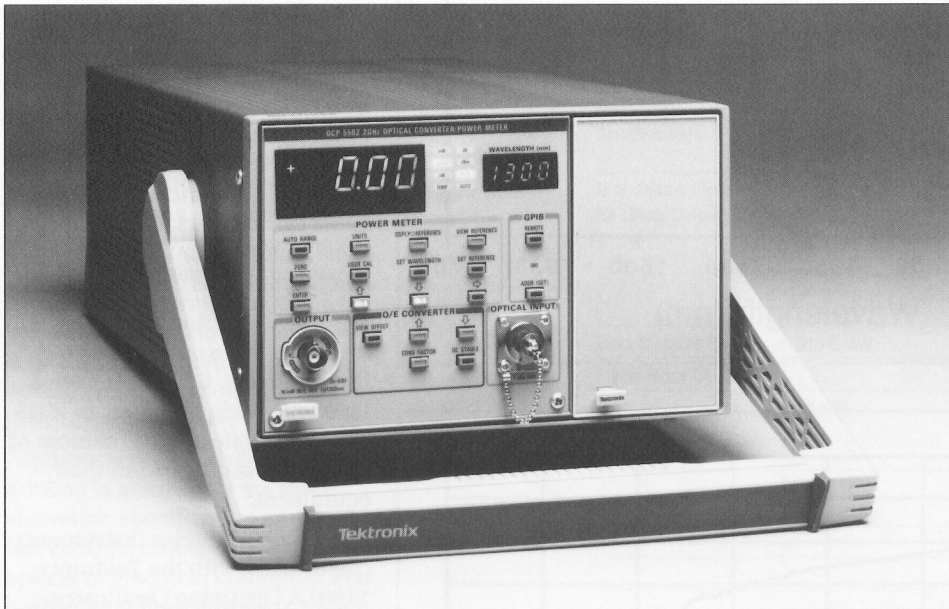


OCP5002/OCP5502 Optical Converter Power Meter



The OCP5002 and OCP5502 are instruments that combine a DC to 2 GHz optical-to-electrical converter and a power meter into one convenient, easy-to-use package.

FEATURES

DC to 2 GHz
optical to
electrical
conversion

Extremely low
drift

Low equivalent
input noise

High optical
return loss

Average reading
optical power
meter

GPIO IEEE 488.2
controllable

TEKPROBE
Interface

APPLICATIONS

Accurate
extinction ratio
measurements

Optical eye-
pattern analysis

LED and laser
transmitter
characterization

FDDI and SONET
standards
verification

High sensitivity
optical reflection
testing

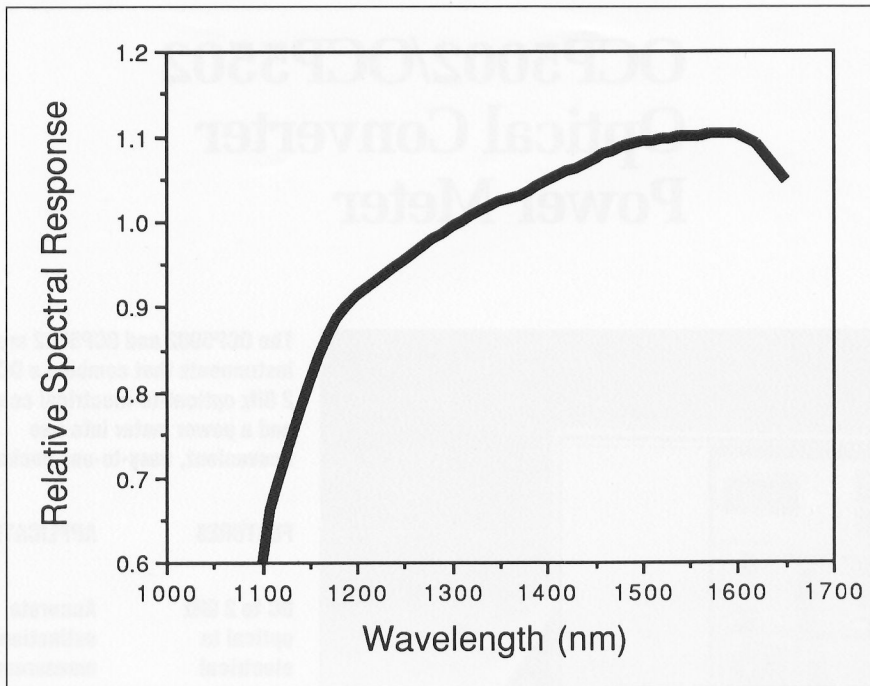
Product
Description

The OCP5000 Series instruments are optical-to-electrical converters with an average power meter integrated into their design. This combination eliminates the need to use two separate instruments to make parametric measurements on optical signals.

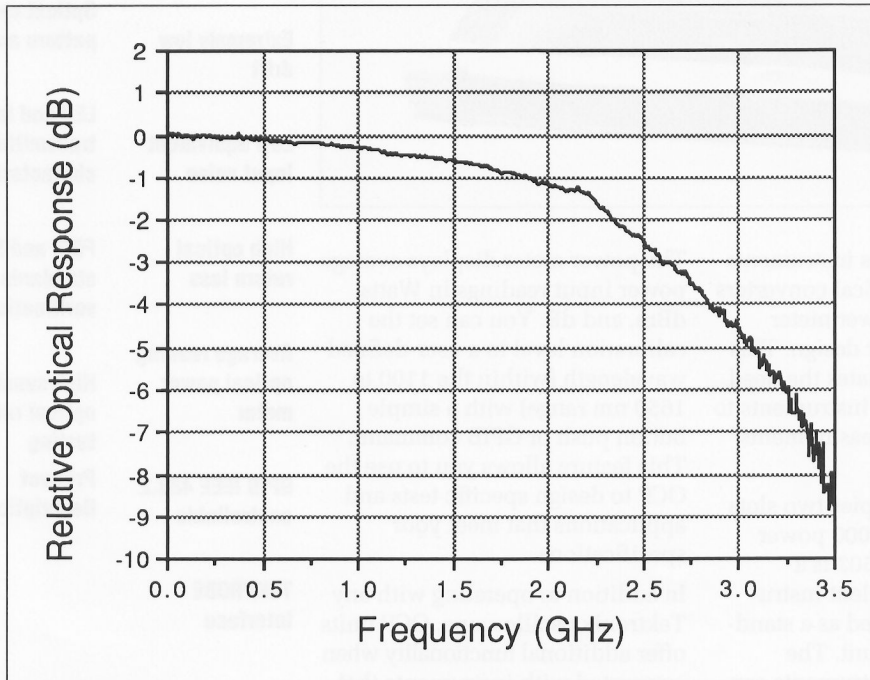
The OCP5002 occupies two slots in a Tektronix TM5000 power module. The OCP5502 is a functionally-equivalent instrument that is packaged as a stand-alone, monolithic unit. The OCP5000 Series instruments can be operated either from the front panel keypad or from a GPIB controller. The GPIB interface meets IEEE 488.2 standard. The front panel controls are all matched over the bus and all readings can be communicated over the GPIB interface.

The power meter displays average power input readings in Watts, dBm, and dB. You can set the calibration level to a user-defined wavelength (within the 1100 to 1650 nm range) with a simple button push or GPIB command. This feature allows you to use the OCP to design specific tests and applications that meet your specifications.

In addition to operating with any Tektronix oscilloscope, OCP units offer additional functionality when connected with instruments that have a TEKPROBE interface. With the optional TEKPROBE cable, users can read the optical power units directly on the oscilloscope.



Wavelength Response.



Frequency Response.

Typical applications

The OCP units can be used for many applications, including:

- Optical Reflection Tests
- Optical Digital Communication Tests
- Optical Component Characterizations

Optical reflection tests

Optical reflections in fiber optic systems can seriously degrade transmission performance, especially in communications links using laser sources. Characterization of the reflective performance of optical connectors and components can be crucial to assuring signal integrity in fiber optic communications equipment.

Multiple reflections can occur throughout the optical pathway in these systems. Often it is useful for engineering designers to identify and isolate specific sources of optical reflection within their equipment.

The OCP5000 Series instruments can be used with the Tektronix 11801A Digitizing Oscilloscope, CSA803, or other 11000 Series Oscilloscopes to evaluate optical reflections measured to ≤ 50 dB and with a fully resolved spatial resolution of < 2.3 cm.

Optical digital communication tests.

The OCP5000 Series instruments, with their 2 GHz bandwidth, are excellent optical-to-electrical converters for characterization of the FDDI and SONET tests. When combined with other Tektronix instruments, the OCP5000 instruments can be used for mask test verification for the FDDI and SONET waveform standards.

The OCP5000 Series instruments, when coupled with the Tektronix CSA803 Communication Signal Analyzer, can perform onboard optical eye-pattern analysis even at the low signal levels characteristic of LED transmitters.

When the OCP is coupled with Tektronix 11000 Series oscilloscopes that are equipped with the TEKPROBE interface, users can evaluate very complex time domain optical signals in order to determine the performance of the optical communication network. Accurate extinction ratio measurements are made possible by the low (<500 nW) DC drift of the optical-to-electrical converter when the instrument is in the "DC Stable" mode.

Optical component characterizations

The combination, in one instrument, of an Optical Average Power Meter and a 2 GHz optical-to-electrical converter is unique in the optical measurement industry. This combination allows users to perform most of the optical characterization requirements for optical components with a single instrument.

Accurate analog waveform reproduction is assured by the low aberration specification and the fast risetime characteristic of the optical to electrical converter. The low noise characteristics (<1 μ W) allow faithful reproduction of even low level input signals. This low noise level can be reduced even further on repetitive signals to less than 50 nanowatts. The noise reduction is done by using the waveform averaging capability provided by associated Tektronix equipment. This noise reduction is achievable at the full 2 GHz optical-to-electrical converter bandwidth.

The OCP5000 Series instruments meet or exceed performance specifications for characterizing many of the latest optical components, such as lasers and LEDs.

Specifications at 25°C, $\pm 5^\circ\text{C}$

OCP5002 & OCP5502 Performance

Instrument calibrated for use with 62.5 micron fiber input (Tektronix part number 174-2322-00) at 1300 nm.

Optical to Electrical Converter Function

Optical		Electrical	
Characteristic	Performance	Characteristic	Performance
Detector	InGaAs	Conversion Gain	1 V/mW $\pm 8\%$ at DC & 1300 nm
Wavelength Range	1100 to 1650 nm	Bandwidth	DC to 2 GHz -3 dB optical -6 dB electrical
Optical Input	Accepts fiber up to 62.5 μ m core diameter NA ≤ 0.29	Noise Equivalent Power	$\leq 1 \mu\text{W RMS}$ (referenced to input)
Input Offset Compensation	0 to 1 mW	Rise Time	<260 ps (10%-90% response to optical input pulse)
Max. Optical Input for Linear Output	2 mW (with offset) 1 mW (no offset)	Aberrations	<15% p-p total, < $\pm 10\%$ peak (within 1st ns) <5% p-p total (within 1 ns-4 ns), <1.0% (after 4 ns)
Input Dynamic Range	0 to 2 mW	Output Zero Drift	< ± 0.5 mV (DC)
Stable Mode On			
Absolute Maximum Nondestructive Optical Input	10 mW	Output Dynamic Range	-0.25 to 1 V
		Output Load Requirement	50 ohms $\pm 1\%$
		Output Impedance	50 ohms $\pm 5\%$
		Output VSWR	$\leq 3:1$ to 2 GHz

Optical Power Meter Function

Optical		Electrical	
Maximum Optical Linear Input	5 mW (+7 dBm)	Update Rate	Readout: 5 Hz Bargraph: 20 Hz
Input Dynamic Range	-80 dBm to +7 dBm	Absolute Accuracy	$\pm 5\%$ of reading ± 0.1 nW
Absolute Nondestructive Optical Input	10 mW	Linearity	1% (1 nW to 5 mW)
Measurement Resolution	0.01 dBm, 10 pW (to -60 dBm)	Noise Equivalent Power	0.1 nW (-70 dBm) (referenced to input)

Environmental Characteristics

Operating Temperature — 0 to +50°C.

Nonoperating Temperature — -40 to +70°C.

Humidity — Five cycles, 120 hours, 90-95% RH at +30 to +60°C.

Vibration (Operating) — 5-55 Hz, 0.38-mm, 75 minutes total.

Shock (Operating) — 30 g, half sine, 11 ms, 18 shocks.

Transportation — Qualifies under National Safe Transit Association Preshipment Test Procedures, Project 1A-B1 Package Drop, 30-inches.

EMI — Complies under test limits specified in FCC, Part 15J and VDE-0871, Class B.

Physical Characteristics

Dimensions	OCP5002	OCP5502
Height:	14.0 cm	14.0 cm
Width:	13.4 cm	23.4 cm
Length:	29.2 cm	44.4 cm
Weight:	1.3 kg	4.5 kg

Ordering Information

OCP5002
OCP5502

OCP5002 Optical Converter/ Power Meter

Includes: OCP5002 Optical Converter/Power Meter; Instruction Manual (070-7817-00); FC/PC Optical Power Input Connector [installed] (131-4802-00); FC Connector Dust Cap [installed] (200-3091-00); DIN Optical Power Input Connector (131-4803-00); DIN Connector Dust Cap (200-3120-00); ST Optical Power Input Connector (131-4801-00); ST Connector Dust Cap (200-3659-01); SC Optical Power Input Connector (131-5494-00); SC Connector Dust Cap (200-4031-00).

OCP5502 Optical Converter/ Power Meter

Includes: OCP5502 Optical Converter/Power Meter (Monolithic); Instruction Manual (070-7817-00); Power Cord (161-0066-00); FC/PC Optical Power Input Connector [installed] (131-4802-00); FC Connector Dust Cap [installed] (200-3091-00); DIN Optical Power Input Connector (131-4803-00); DIN Connector Dust Cap (200-3120-00); ST Optical Power Input Connector (131-4801-00); ST Connector Dust Cap (200-3659-01); SC Optical Power Input Connector (131-5494-00); SC Connector Dust Cap (200-4031-00).

Optional Accessories

Optical Cables — 2 meter, 62.5 micron fiber, multimode
FC/PC-to-Biconic (174-2323-00)
FC/PC-to-SMA 906 (174-2324-00)
FC/PC-to-FC/PC (174-2322-00)

Electrical Cable — TEKPROBE (012-1372-00)

OCP5502 Power Cord Options

- A1** — Universal Euro (161-0066-09)
- A2** — UK (161-0066-10)
- A3** — Australian (161-0066-11)
- A4** — North American (161-0066-12)
- A5** — Switzerland (161-0154-00)

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