VIAVI

LASER COMPONENTS

MAP Optical Power Meter Module mOPM-C1

The multiple application platform (MAP-200) optical power meter module (mOPM-C1) is a third-generation power meter that brings a range of panel-mount and remote-head configurations to the Viavi Solutions MAP-200 platform.

The MAP-200 is the first photonic layer lab and manufacturing platform to be LAN Extensions for Instrumentation (LXI)-compliant, bringing the full power of Ethernet connectivity and ease of use of interchangeable virtual instrument (IVI) drivers to the optical test environment. The MAP-200 platform's industry-leading density and configurability lets test engineers meet specific application requirements with the smallest possible footprint.

The MAP optical power meter module extends the optical power measurement capability of the MAP-200 by offering four grades of optical performance in panel-mount or remote-head configurations with 1, 2, or 4 inputs per module.

Optical Performance

All four performance grades are based on indium gallium arsenide (InGaAs) detectors and are suitable for applications using single-mode (SM) or multimode (MM) fiber. All versions feature high accuracy, high linearity, and extremely low polarization dependant loss (PDL). The high- and ultra-high-performance grades feature enhanced thermal stabilization. This enhances the wavelength range, enabling 90 dB dynamic range for the high-performance grade and 110 dB dynamic range for the ultra-high-performance grade. The high-power grade extends high-power measurement capability to +27 dBm.

Features and Benefits

- Panel-mount or remote-head configuration
- Single-, dual-, or quad-channel configurations available
- 250 kHz sampling rate for high-speed applications
- 750 to 1700 nm operating wavelength range
- 110 dB dynamic range and high-power options
- Compatible with single-mode and multimode fiber
- Ability to store up to 100,000 data points per channel

Applications

- Amplifier characterization
- Receiver and transmitter testing
- Absolute power measurement
- Optical switching time measurement

Compliance

- CE, CSA/UL/IEC61010-1, and LXI Class C requirements (when installed in a MAP chassis)

Light Direct

Packaging Options

The mOPM-C1 comes factory-configured with panel-mounted detectors or as an interface module with 1, 2, or 4 electrical connections for remote heads. Remote heads facilitate positioning the detector close to the device under test (DUT) and away from other test equipment. The interface module is compatible with all performance grades of remote heads and can accommodate a mix of performance grades. For example, an application requiring a general purpose optical power measurement (OPM) and a high-power OPM could be connected to the same remote head base module, thereby reducing the number of slots used in the MAP-200 chassis.

Chassis Options

The mOPM-C1 is a member of the LightDirect family of photonic test tools. It can be used with the full range of MAP-200 chassis, including the MAP-220C (2 slot), MAP-230B (3 slot), and MAP-280 (8 slot) chassis.

Enhanced Functionality

All mOPM-C1 configurations support array capture with memory depth of 100,000 points per optical sensor. This feature, when combined with an adjustable sampling frequency (up to 250 kHz), is ideal for data-logging applications or for capturing transient events.

Accessories

For ultimate flexibility, the detector heads offer Viavi AC series interchangeable detector adapters that are available for most connector types, as well as a fiber holder that permits bare-fiber measurements. The mOPM-C1 is supplied with a detector cover and fixed-connection (FC) detector adapter as standard accessories. As an option for remote head users, a 1.8 m (6 ft) extension cable is available.

GUI

Figure 1. mOPM main user interface

Super Application: OPMscope

The OPMscope is a super application designed for use with the mOPM-C1 line of power meters on the MAP-200 platform. This software feature is an intuitive tool geared for designers and allows graphical representation of optical signals, much like a digital sampling scope, but in the optical domain. This tool can be used to trigger on rising or falling edges, with the ability to see history using pre-trigger data points. It lets users pan and zoom to see details and monitor transients and exports up to 100,000 captured data for extended analysis from up to four optical heads simultaneously.

Additional Applications

- DUT settling time, cross talk, rise and fall times
- measures synchronization and insertion loss stability
- measures link recovery time
- allows for performance comparison (for example, comparing sequential switching to random switching)
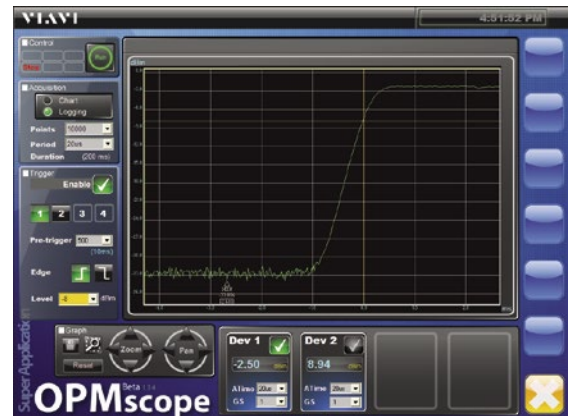

Figure 2. OPMscope main user interface

The OPMscope is an advanced software application that requires the power of the MAP-230B or MAP-280 chassis.

Specifications

Parameters	General Purpose	Premium Performance	Ultra Performance	High Power
Detector type	InGaAs	TEC InGaAs	TEC InGaAs	Filtered InGaAs
Detector size	2 mm	3 mm	3 mm	2 mm
Wavelength range	800 – 1650 nm	750 – 1700 nm	750 – 1700 nm	800 – 1630 nm
Fiber type[1]		SMF and MMF with NA 0.27 (maximum core size 62.5 µm)	SMF and MMF with NA 0.27 (maximum core size 62.5 µm)	
Dynamic range	+11 dBm to –70 dBm	+11 dBm to –80 dBm	+11 dBm to –100 dBm	+27 dBm to –45 dBm
Uncertainty at reference condition[2]	±2.5% (800 – 1510 nm) ±2.4% (1510 – 1600 nm) ±2.7% (1600 – 1635 nm)	±2.2% (800 – 1510 nm) ±2.3% (1510 – 1600 nm) ±2.5% (1600 – 1635 nm)	±2.2% (800 – 1510 nm) ±2.3% (1510 – 1600 nm) ±2.5% (1600 – 1635 nm)	±3.9% (800 – 960 nm) ±3.6% (960 – 1300 nm) ±3.7% (1300 – 1510 nm) ±3.8% (1510 – 1600 nm) ±4.0% (1600 – 1635 nm)
Total uncertainty[3]	±3.2 % ±5 pW (800 – 900 nm) ±5.2 % ±5 pW (900 – 960 nm) ±3.1 % ±5 pW (960 – 1510 nm) ±3.1 % ±5 pW (1510 – 1600 nm) ±3.8 % ±5 pW (1600 – 1635 nm)	±3.0% ±1 pW (800 – 1510 nm) ±3.1% ±1 pW (1510 – 1600 nm) ±3.4% ±1 pW (1600 – 1635 nm)	±3.0% ±0.2 pW (800 – 1510 nm) ±3.1% ±0.2 pW (1510 – 1600 nm) ±3.4% ±0.2 pW (1600 – 1635 nm)	±4.6% ±100 pW (800 – 900 nm) ±7.9% ±100 pW[6] (900 – 960nm) ±3.9% ±100 pW (960 – 1300 nm) ±4.4% ±100 pW (1300 – 1510 nm) ±4.5% ±100 pW (1510 – 1600 nm) ±5.2% ±100 pW (1600 – 1635 nm)
Linearity (at 23 ±5°C)	± 0.010 dB ±5 pW	± 0.010 dB ±1 pW	± 0.010 dB ±0.1 pW	±0.010 dB ±100 pW (for –45 dBm to +10 dBm) ±0.03 dB (for +10 dBm to +27 dBm)
Noise (peak to peak)[4]	2 pW	1 pW	<0.1 pW	50 pW
Return loss	>55 dB typ			
Relative uncertainty due to polarization[5]	±0.015 dB	±0.01 dB	±0.01 dB	±0.07 dB
Maximum number of channels (Panel mount)	1,2, or 4			
Sampling time	4 µs (250 kHz)			
Averaging time	20 µs to 5 s			
Buffer size	100000 points			
Supported connectors[7]	FC, ST, LC, E2000, MU, MTP, bare fiber			
Recalibration period	1 yr			
Warm-up time	30 min			
Operating temperature	5 to 40°C	5 to 40°C	5 to 33°C	5 to 40°C
Humidity	15 – 80% Relative humidity, non-condensing			
Module				
Dimension (W x H x D)	4.06 x 13.26 x 37.03 cm (1.6 x 5.22 x 14.58 in)			
Weight	1.2 kg (2.65 lb)			
Remote Head				
Cable length	1.4 m (4.5 ft)			
Dimension	13.8 cm x 5 cm x 5 cm (5.4 in x 2 in x 2 in) excluding cable			
Weight	0.6 kg (1.3 lb)			

1. For 62.5 µm core fiber, additional uncertainty of 1% (PC) or 2% (APC) must be added due to overfill of 2 mm detector.
2. Fiber SMF-28, T= 23 ±5°C, spectral width of source <6 nm, optical power on detector = -20 dBm.
3. SMF 28, N/A of fiber ≤0.27, temperature, humidity, and power range per table.
4. 1 second averaging time, 300 consecutive measurements (300s), T = 23 ±5°C.
5. All states of polarization, constant power, straight connector, T = 23 ±5°C, WL = 1550 nm ±30 nm, MPMHP at WL = 1310 nm.
6. For 900 – 960 nm only, uncertainty indicated is for 15 – 35°C.
7. Note that MT connector size prevents the use of adjacent channels. Therefore, a 4-channel cassette only allows 2 MT input at a time.

Ordering Information

Description		Part Number
Panel-Mount Base Module Options (required: panel-mount detector types cannot be mixed and matched)		
Panel-mount head module		MOPM-C1PMH
Panel-Mount Detector Options (select type and specify quantity)		
2 mm InGaAs panel-mount head general purpose	Qty 1, 2, or 4 per module	MPMGP
2 mm InGaAs panel-mount head high power	Qty 1, 2, or 4 per module	MPMHP
3 mm InGaAs panel-mount head premium performance	Qty 1, 2, or 4 per module	MPMPP
3 mm InGaAs panel-mount head ultra performance	Qty 1, 2, or 4 per module	MPMUP
Remote Head Base Module Options (required: select one)		
Single-channel remote head module		MOPM-C1RH1
Dual-channel remote head module		MOPM-C1RH2
Quad-channel remote head module		MOPM-C1RH4
Remote Head Options (select type and specify quantity)		
2 mm InGaAs remote head general purpose	1 detector per head	MOPM-C1RHGP
2 mm InGaAs remote head high power	1 detector per head	MOPM-C1RHHP
3 mm InGaAs remote head premium performance	1 detector per head	MOPM-C1RHPP
Applications		
Optical scope licensed super application for MOPM-B1 power meters		MSUP-OPMSCOPE

Sample Configurations for Panel Mount

Type of Detector	Single Channel	Dual Channel	Quad Channel
General purpose	MOPM-C1PMH MPMGPx1	MOPM-C1PMH MPMGPx2	MOPM-C1PMH MPMGPx4
High power	MOPM-C1PMH MPMHPx1	MOPM-C1PMH MPMHPx2	MOPM-C1PMH MPMHPx4
Premium performance	MOPM-C1PMH MPMPPx1	MOPM-C1PMH MPMPPx2	MOPM-C1PMH MPMPPx4