

# VOA

## VARIABLE OPTICAL ATTENUATOR

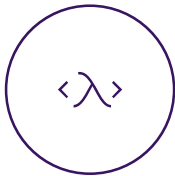
SPECIFICATION SHEET

AVAILABLE IN PXI

AVAILABLE IN MATRIQ

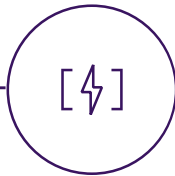
[quantifiphotonics.com](http://quantifiphotonics.com)

The VOA's built-in power meter and power stabilization function lets you set and maintain the output power stability even when the input power fluctuates. You'll get reliable and repeatable test results, each and every time.



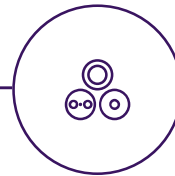
**Wide coverage of operational wavelengths**

One versatile tool to cover a wide variety of applications.



**Built in power monitoring capability**

Eliminate the need for an extra power meter with built-in power monitoring capability.



**SM, PM and Multimode options**

Available in your choice of fiber types to fit into your existing optical setup



**Constant power output mode**

With the built-in closed-loop power monitoring, the VOA can operate in the constant power output mode to stabilize fluctuating input power.



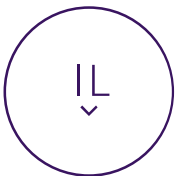
**Fast attenuation speed**

Fast attenuation speed minimizes the down time during changes in attenuation settings to shorten your overall test time.



**Simple, intuitive operation with COHESIONUI™**

cohesionUI makes it simple to control the VOAPXle from your PC or mobile device. Its cutting-edge design offers a sleek modern interface, cross device compatibility, customizable views and remote network access.



**Low insertion loss**

Maximise your power budget with low insertion loss.



**Seamless PXI integration**

Take advantage of PXI's integrated triggering and synchronization capabilities across electrical and optical instruments.

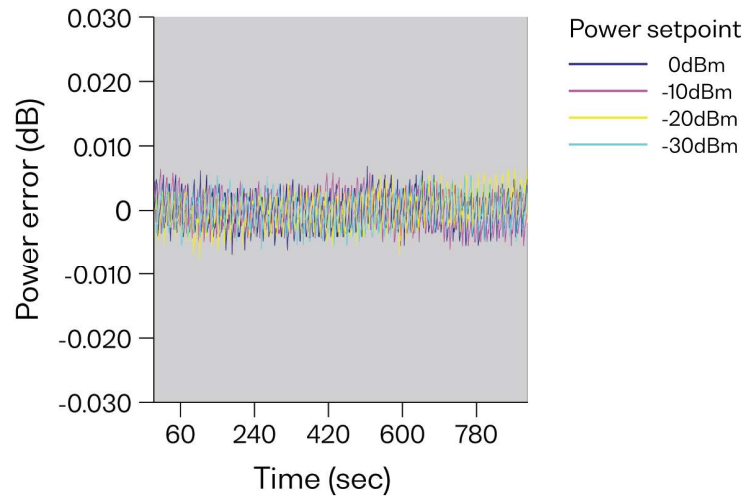
## TARGET APPLICATIONS

- Transceiver stress testing
- Receiver sensitivity testing
- Loss simulation
- Optical power budget analysis
- Instrument power calibration
- EDFA gain linearity test

## POWER MODE

### Power stability

This graph illustrates the power output stability of < 0.005 dB RMS at various power setpoints.



## CHOOSE YOUR FORM FACTOR

### PXIe – MODULAR

Our expanding range of PXIe optical test solutions are used by customers in mixed-signal test and measurement systems, reducing complexity, lowering the cost of test and accelerating time to market.

- Multi vendor, open standard with over 2500 PXI modules available
- Advanced timing and synchronization capabilities across instruments
- Low latency, high performance processing and fast data throughput
- Design and build scalable, high channel count systems
- Small footprint and lower power consumption



### MATRIQ – COMPACT & PORTABLE

The MATRIQ series provides the same high-performance test capabilities of our PXIe modules in an compact benchtop design. MATRIQ instruments are simple to setup and easy to operate, making them the perfect choice for your optical lab or test bench.

- Same performance and control as our PXIe modules
- Plug and play with USB or Ethernet connectivity
- Control via the web-based GUI, COHESIONUI or SCPI commands
- Compact and portable design saves benchtop space

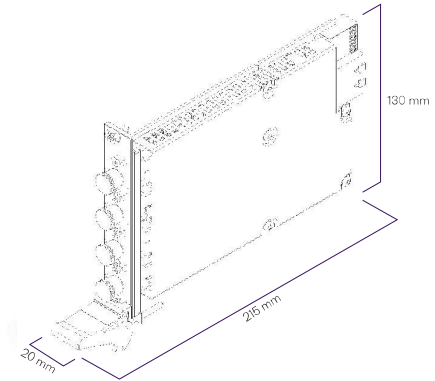


## VOA TECHNICAL SPECIFICATIONS

### PXI - MODULAR



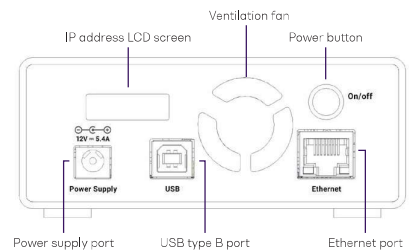
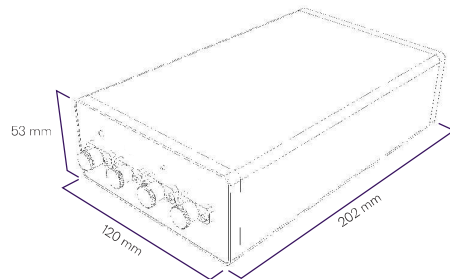
VOA-1001-2-FC-PXIE



### MATRIQ - COMPACT & PORTABLE



VOA-1001-2-FC-MTRQ



## VOA TECHNICAL SPECIFICATIONS

General Specifications	PXI	MATRIQ
Bus connection	PXIe	USB and Ethernet
Slot count	1	-
Optical connector type	FC/PC, SC/PC, FC/APC, SC/APC	FC/PC, SC/PC, FC/APC, SC/APC
Number of channels	2	2
Dimensions (HxWxD)	130 x 20 x 215 mm   5.1 x 0.8 x 8.5 inches	53 x 120 x 202 mm   2.1 x 4.7 x 8.0 inches
Weight	1 kg   ~2.2 lbs	~ 1.1 kg   ~ 2.4 lbs
Operating temperature range	5 °C to 45 °C   41 °F to 113 °F	5 °C to 45 °C   41 °F to 113 °F
Storage temperature range	-40 °C to 70 °C   -40 °F to 158 °F	-40 °C to 70 °C   -40 °F to 158 °F

Power Specifications	PXI	MATRIQ
AC input voltage range	Please refer to the latest PXI Express Hardware Specifications published by the PXI Systems Alliance.	90 to 264 VAC
AC input current		1.3A (115Vac), 0.9A (230Vac)
AC frequency range		47 to 63 Hz
DC output voltage		12V
DC output current max		5.41A
Dimensions (LxWxH)		4.58 x 2.06 x 1.23" (116.3 x 52.4 x 31.3 mm)

## Single mode fiber

Model Number	1001	1002	1001	1002
	CWDM8	Broadband	CWDM8	Broadband
Wavelength range	1260 nm to 1650 nm	1260 nm to 1650 nm	1260 nm to 1650 nm	1260 nm to 1650 nm
Fiber type	SMF-28	SMF-28	SMF-28	SMF-28
Power control range	-50 to +20 dBm	-50 to +20 dBm	-50 to +20 dBm	-50 to +20 dBm
Damage level	+23 dBm	+23 dBm	+23 dBm	+23 dBm
Insertion loss <sup>3</sup>	< 1.3 dB at 1310nm < 2.0 dB for all others	< 2.0 dB	< 1.3 dB at 1310nm < 2.0 dB for all others	< 2.0 dB
WDL	< 0.02 dB/nm	< 0.02 dB/nm	< 0.02 dB/nm	< 0.02 dB/nm
Return loss <sup>3</sup>	> 45 dB	> 45 dB	> 45 dB	> 45 dB
Warm-up time	< 20 mins	< 20 mins	< 20 mins	< 20 mins

Attenuator	1001	1002	1001	1002
Calibration wavelengths	1271 nm, 1291 nm, 1311 nm, 1331 nm, 1351 nm, 1371 nm, 1391 nm, 1411 nm, 1490 nm, 1550 nm	1310 nm, 1490 nm, 1550 nm	1271 nm, 1291 nm, 1311 nm, 1331 nm, 1351 nm, 1371 nm, 1391 nm, 1411 nm, 1490 nm, 1550 nm	1310 nm, 1490 nm, 1550 nm
Attenuation range (Typical) <sup>5</sup>	> 46 dB	> 46 dB	> 46 dB	> 46 dB
Attenuation range (Guaranteed) <sup>5</sup>	> 40 dB	> 40 dB	> 40 dB	> 40 dB
Resolution	0.01 dB	0.01 dB	0.01 dB	0.01 dB
Attenuation speed	0.1 to 1000 dB/s	0.1 to 1000 dB/s	0.1 to 1000 dB/s	0.1 to 1000 dB/s

## VOA TECHNICAL SPECIFICATIONS

Power meter	1001	1002	1001	1002
Calibration wavelengths	1271 nm, 1291 nm, 1311 nm 1331 nm, 1351 nm, 1371 nm 1391 nm, 1411 nm, 1490 nm 1550 nm	1310 nm 1490 nm 1550 nm	1271 nm, 1291 nm, 1311 nm 1331 nm, 1351 nm, 1371 nm 1391 nm, 1411 nm, 1490 nm 1550 nm	1310 nm 1490 nm 1550 nm
Polarization dependent responsivity <sup>2,3</sup>	< 0.2 dB	< 0.2 dB	< 0.2 dB	< 0.2 dB
Linearity <sup>2,5</sup>	± 0.1 dB	± 0.1 dB	± 0.1 dB	± 0.1 dB
Total uncertainty <sup>2,3,5</sup>	± 0.34 dB (Typical) ± 0.55 dB (Max)	± 0.34 dB (Typical) ± 0.55 dB (Max)	± 0.34 dB (Typical) ± 0.55 dB (Max)	± 0.34 dB (Typical) ± 0.55 dB (Max)
Averaging time	100 µs to 10 s	100 µs to 10 s	100 µs to 10 s	100 µs to 10 s
Resolution	0.01 dB	0.01 dB	0.01 dB	0.01 dB
Number of trace points	1 to 1024 points per channel	1 to 1024 points per channel	1 to 1024 points per channel	1 to 1024 points per channel
Sample rate for trace	0.01 Hz to 12 kHz	0.01 Hz to 12 kHz	0.01 Hz to 12 kHz	0.01 Hz to 12 kHz

Model Number	1003	1004	1003	1004
	1310 nm	1490 nm	1310 nm	1490 nm
Wavelength range	1260 nm to 1360 nm	1440 nm to 1530 nm	1260 nm to 1360 nm	1440 nm to 1530 nm
Fiber type	SMF-28	SMF-28	SMF-28	SMF-28
Power control range	-50 to +20 dBm	-50 to +20 dBm	-50 to +20 dBm	-50 to +20 dBm
Damage level	+23 dBm	+23 dBm	+23 dBm	+23 dBm
Insertion loss <sup>3</sup>	< 1.3 dB at 1310 nm	< 1.8 dB	< 1.3 dB at 1310 nm	< 1.8 dB
WDL	< 0.02 dB/nm	< 0.02 dB/nm	< 0.02 dB/nm	< 0.02 dB/nm
Return loss <sup>3</sup>	> 45 dB	> 45 dB	> 45 dB	> 45 dB
Warm-up time	< 20 mins	< 20 mins	< 20 mins	< 20 mins

Attenuator	1003	1004	1003	1004
Calibration wavelengths	1310 nm	1490 nm	1310 nm	1490 nm
Attenuation range (Typical) <sup>5</sup>	> 46 dB	> 46 dB	> 46 dB	> 46 dB
Attenuation range (Guaranteed) <sup>5</sup>	> 40 dB	> 40 dB	> 40 dB	> 40 dB
Resolution	0.01 dB	0.01 dB	0.01 dB	0.01 dB
Attenuation speed	0.1 to 1000 dB/s	0.1 to 1000 dB/s	0.1 to 1000 dB/s	0.1 to 1000 dB/s

Power meter	1003	1004	1003	1004
Calibration wavelengths	1310 nm	1490 nm	1310 nm	1490 nm
Polarization dependent responsivity <sup>2,3</sup>	< 0.2 dB	< 0.2 dB	< 0.2 dB	< 0.2 dB
Linearity <sup>2,5</sup>	± 0.1 dB	± 0.1 dB	± 0.1 dB	± 0.1 dB
Total uncertainty <sup>2,3,5</sup>	± 0.34 dB (Typical) ± 0.55 dB (Max)	± 0.34 dB (Typical) ± 0.55 dB (Max)	± 0.34 dB (Typical) ± 0.55 dB (Max)	± 0.34 dB (Typical) ± 0.55 dB (Max)
Averaging time	100 µs to 10 s	100 µs to 10 s	100 µs to 10 s	100 µs to 10 s
Resolution	0.01 dB	0.01 dB	0.01 dB	0.01 dB
Number of trace points	1 to 1024 points per channel	1 to 1024 points per channel	1 to 1024 points per channel	1 to 1024 points per channel
Sample rate for trace	0.01 Hz to 12 kHz	0.01 Hz to 12 kHz	0.01 Hz to 12 kHz	0.01 Hz to 12 kHz

## VOA TECHNICAL SPECIFICATIONS

Model Number	1005	1005
Calibration Wavelengths	1550 nm	1550 nm
Wavelength range	1520 nm to 1650 nm	1520 nm to 1650 nm
Fiber type	SMF-28	SMF-28
Power control range	-50 to +20 dBm	-50 to +20 dBm
Damage level	+23 dBm	+23 dBm
Insertion loss <sup>3</sup>	< 1.3 dB at 1310 nm	< 1.3 dB at 1310 nm
WDL	< 0.02 dB/nm	< 0.02 dB/nm
Return loss <sup>3</sup>	> 45 dB	> 45 dB
Warm-up time	< 20 mins	< 20 mins

Attenuator	1005	1005
Calibration wavelengths	1550 nm	1550 nm
Attenuation range (Typical) <sup>5</sup>	> 46 dB	> 46 dB
Attenuation range (Guaranteed) <sup>5</sup>	> 40 dB	> 40 dB
Resolution	0.01 dB	0.01 dB
Attenuation speed	0.1 to 1000 dB/s	0.1 to 1000 dB/s

Power meter	1005	1005
Calibration wavelengths	1550 nm	1550 nm
Polarization dependent responsivity <sup>2,3</sup>	< 0.2 dB	< 0.2 dB
Linearity <sup>2,5</sup>	± 0.1 dB	± 0.1 dB
Total uncertainty <sup>2,3,5</sup>	± 0.34 dB (Typical) ± 0.55 dB (Max)	± 0.34 dB (Typical) ± 0.55 dB (Max)
Averaging time	100 μs to 10 s	100 μs to 10 s
Resolution	0.01 dB	0.01 dB
Number of trace points	1 to 1024 points per channel	1 to 1024 points per channel
Sample rate for trace	0.01 Hz to 12 kHz	0.01 Hz to 12 kHz



## Multi mode fiber

Model Number	1102 <sup>6</sup>	1102 <sup>6</sup>
Wavelength range	800 to 900 nm	800 to 900 nm
Fiber type	MM 50µm core (OM3)	MM 50 µm core (OM3)
Power control range	-50 to +20 dBm	-50 to +20 dBm
Damage level	+22 dBm	+22 dBm
Insertion loss <sup>3</sup>	< 4.5 dB at 850 nm	< 4.5 dB at 850 nm
WDL	TBC	TBC
Return loss <sup>3</sup>	> 20 dB	> 20 dB
Warm-up time	< 20 mins	< 20 mins

Attenuator	1102 <sup>6</sup>	1102 <sup>6</sup>
Calibration wavelengths	850 nm	850 nm
Attenuation range (Typical) <sup>5</sup>	53 dB	>53 dB
Attenuation range (Guaranteed) <sup>5</sup>	>40 dB	>40 dB
Resolution	0.01 dB	0.01 dB
Attenuation speed	0.1 to 1000 dB/s	0.1 to 1000 dB/s
Modal dependence (multimode only)	<0.4 dB at 10 dB attenuation	<0.4 dB at 10 dB attenuation

Power meter	1102 <sup>6</sup>	1102 <sup>6</sup>
Calibration wavelengths	850 nm	850 nm
Polarization dependent responsivity <sup>2,3</sup>	< 0.4 dB at 10 dB attenuation	< 0.4 dB at 10 dB attenuation
Linearity <sup>2,5</sup>	± 0.25 dB (0 to -30 dBm)	± 0.25 dB (0 to -30 dBm)
Total uncertainty <sup>2,3,5</sup>	TBD	TBD
Averaging time	100 µs to 10 s	100 µs to 10 s
Resolution	0.01 dB	0.01 dB
Number of trace points	1 to 1024 points per channel	1 to 1024 points per channel
Sample rate for trace	0.01 Hz to 12 kHz	0.01 Hz to 12 kHz

## Polarization maintaining fiber

Model Number	1301 <sup>6</sup>	1302 <sup>6</sup>	1301 <sup>6</sup>	1302 <sup>6</sup>
Wavelength range	1520 to 1670 nm	1290 to 1330 nm	1520 to 1670 nm	1290 to 1330 nm
Fiber type	PM1550	PM1310	PM1550	PM1310
Power control range	-50 to +20 dBm	-50 to +20 dBm	-50 to +20 dBm	-50 to +20 dBm
Damage level	+23 dBm	+23 dBm	+23 dBm	+23 dBm
Insertion loss <sup>3</sup>	< 2.0 dB	< 2.0 dB	< 2.0 dB	< 2.0 dB
WDL	< 0.02 dB/nm	< 0.02 dB/nm	< 0.02 dB/nm	< 0.02 dB/nm
Return loss <sup>3</sup>	> 45 dB	> 45 dB	> 45 dB	> 45 dB
Warm-up time	< 20 mins	< 20 mins	< 20 mins	< 20 mins

Attenuator	1301 <sup>6</sup>	1302 <sup>6</sup>	1301 <sup>6</sup>	1302 <sup>6</sup>
Calibration wavelengths	1550 nm	1310 nm	1550 nm	1310 nm
Attenuation range (Typical) <sup>5</sup>	> 40 dB	> 40 dB	> 40 dB	> 40 dB
Attenuation range (Guaranteed) <sup>5</sup>	> 35 dB	> 35 dB	> 35 dB	> 35 dB
Resolution	0.01 dB	0.01 dB	0.01 dB	0.01 dB
Attenuation speed	0.1 to 1000 dB/s	0.1 to 1000 dB/s	0.1 to 1000 dB/s	0.1 to 1000 dB/s

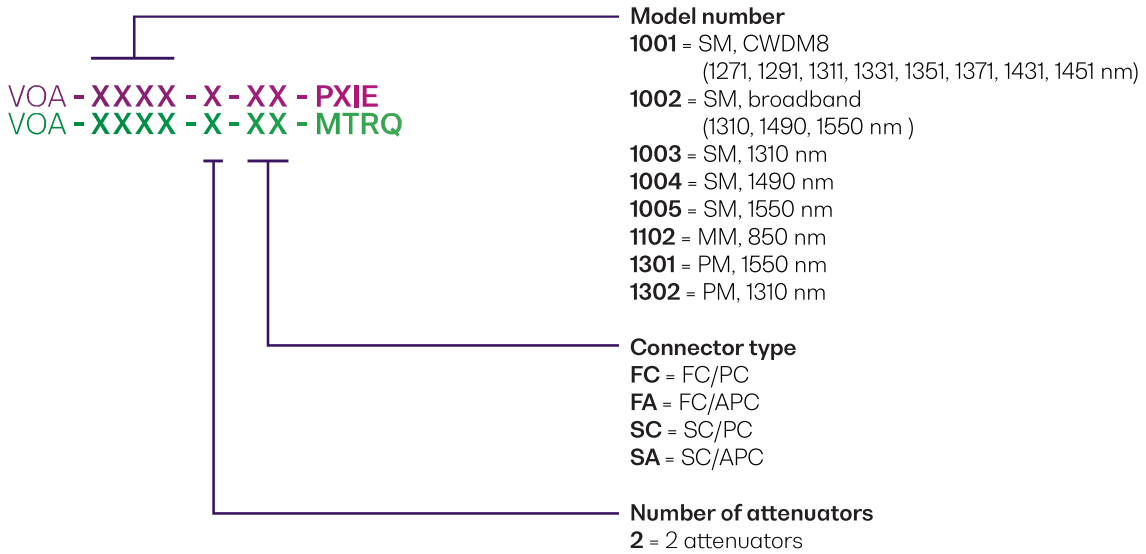
Power meter	1301 <sup>6</sup>	1302 <sup>6</sup>	1301 <sup>6</sup>	1302 <sup>6</sup>
Calibration wavelengths	1550 nm	1310 nm	1550 nm	1310 nm
Polarization dependent responsivity <sup>2,3</sup>	< 0.4 dB at 10 dB attenuation	< 0.4 dB at 10 dB attenuation	< 0.4 dB at 10 dB attenuation	< 0.4 dB at 10 dB attenuation
Linearity <sup>2,5</sup>	± 0.25 dB (0 to -30 dBm)	± 0.25 dB (0 to -30 dBm)	± 0.25 dB (0 to -30 dBm)	± 0.25 dB (0 to -30 dBm)
Total uncertainty <sup>2,3,5</sup>	TBD	TBD	TBD	TBD
Averaging time	100 µs to 10 s	100 µs to 10 s	100 µs to 10 s	100 µs to 10 s
Resolution	0.01 dB	0.01 dB	0.01 dB	0.01 dB
Number of trace points	1 to 1024 points per channel	1 to 1024 points per channel	1 to 1024 points per channel	1 to 1024 points per channel
Sample rate for trace	0.01 Hz to 12 kHz	0.01 Hz to 12 kHz	0.01 Hz to 12 kHz	0.01 Hz to 12 kHz

## Notes

- Specifications are valid at 23 °C ± 3 °C.
- +10 dBm to -40 dBm, 23 °C.
- Excluding connectors.
- < 10 dB attenuation.

- At calibration wavelengths.
- Preliminary specs.
- Quantifi Photonics multimode products are tested and calibrated using mode-conditioning setups defined in TIA EIA-455-43 FOTP-43 for Output Near-Field Radiation Patterns.

## ORDERING INFORMATION



## WARRANTY INFORMATION

This product comes with a standard 1 year warranty.

## EXTENDED WARRANTIES AND CALIBRATION PLANS

With an Extended Warranty and Calibration Plan you can spend more time focused on your priorities and less time worrying about maintenance.

Over time and with regular use, all optical parts and connectors require re-calibration and maintenance to guarantee accurate and reliable performance.

Add a 3 or 5 year Extended Warranty at the time of purchase.

### Guarantee peak performance

Ensure your equipment is operating at its best for reliable and accurate results.

### Lower cost of ownership

Lock in savings and maximise your budget with a lower cost of ownership.

### Peace of mind

Spend less time worrying about maintenance and more on generating results.

## CALIBRATION PLANS FOR ADDITIONAL DISCOUNTS

Order a Calibration Plan when you purchase your Quantifi Photonics' test instruments and qualify for additional discounts.

### 10% Discount

On calibrations ordered at the time of purchase.

### 25% Discount

Add on an extended warranty and receive a 25% discount on calibrations.

With an instrument calibration performed by Quantifi Photonics technicians you receive.

- Comprehensive calibration to factory specifications.
- End-to-end inspection to ensure all instrument functions are working and connectors are clean.
- Firmware, software and documentation updates.
- Certificate of Calibration which includes detailed test results.

We recommend Quantifi Photonics optical instruments are re-calibrated every 12 months.

## How to purchase

Contact your Quantifi Photonics sales representative about our Extended Warranty or Calibration Plans or email [sales@quantifiphotonics.com](mailto:sales@quantifiphotonics.com).

Extended Warranties and Calibration Plans must be ordered at the time of purchase and are available only for Quantifi Photonics' products. The 25% calibration discount only applies to calibrations while the product is covered by the Extended Warranty period.

Our portfolio of optical and electrical test modules is rapidly expanding to meet a wide range of customer requirements and applications.

#### Tunable Laser Sources

Versatile telecom laser sources with full tunability across C or L bands. Narrow 100 kHz linewidth, up to 16.5 dBm of power, optional whisper mode to disable frequency dither.

#### Erbium-Doped Fiber Amplifier (EDFA)

High power Erbium-Doped Fiber Amplifier for signal power amplification in C and L bands with various control modes, including automatic gain control.

#### Fixed Wavelength Laser Sources

Highly customizable DFB or FP laser sources available in a wide range of wavelengths and powers. Models support SMF, MMF and PMF.

#### Variable Optical Attenuator (VOA)

Fast attenuation speed with low insertion loss and built-in power monitoring. Operates in fixed attenuation or constant output power modes. Models support SMF, MMF and PMF.

#### Optical Power Meters

Fast terminating or inline monitoring of optical signal power from -60 to +10 dBm across 750 – 1700 nm wavelengths. Model with logarithmic analog output for applications such as silicon photonics fiber alignment.

#### Optical Spectrum Analyzer (OSA)

Low cost, fast spectral measurement in a compact module with built-in analysis including SMSR, OSNR and spectral width. Targeted wavelengths for specific applications in O band, C band and L band.

#### Optical-to-Electrical Converter

High bandwidth, broadband O-to-E converter. Available in a range of configurations; choose from 1 or 2 channels, AC or DC coupling and various conversion gain and operating wavelength ranges.

#### Bit Error Rate Tester (BERT)

2 or 4-channel Pulse Pattern Generator and Error Detector at rates up to 29 Gbps for the design, characterization and production of optical transceivers and opto-electrical components.

#### Pulse Pattern Generator (PPG)

4 channel Pulse Pattern Generator from 0.3 to 30 Gbps for high-density multichannel applications. With integrated clock synthesizer and programmable de-emphasis and CTLE processor.

#### Optical Switch

Proven reliability and fast switching time. Wide variety of switch configurations: 1x4, 1x16, 16x16 and more. Models support SMF, MMF and PMF.

#### Polarization Controller & Scrambler

High-speed automated polarization control with broad wavelength coverage from 1260nm to 1650nm, low insertion loss and back reflection. Full remote control via intuitive GUI, LabVIEW or SCPI.

#### Photonic Doppler Velocimeter (PDV)

Purpose-built module for Photonic Doppler Velocimetry (PDV). A circulator, two VOAs and a passive coupler all built into one compact module.

#### Passive Component Integration

Integrate passive optical components of your choice such as WDM couplers, splitters, band-pass filters, PM beamsplitters and circulators. Models support SMF, MMF and PMF.

#### Passive Component Storage

Protect and store your own passive fiber optic components such as splitters, connector adaptor patchcords, WDM couplers, and isolators in one handy module.

PXI – TEST MODULES

MATRIQ – TEST MODULES

We provide these products as PXIe modules and compact MATRIQ benchtop instruments.

See our website for more details  
[quantifiphotonics.com/products](https://www.quantifiphotonics.com/products)

# Test. Measure. Solve.

Quantifi Photonics is transforming the world of photonics test and measurement. Our portfolio of optical and electrical test instruments is rapidly expanding to meet the needs of engineers and scientists around the globe. From enabling ground-breaking experiments to driving highly efficient production testing, you'll find us working with customers to solve complex problems with experience and innovation.

To find out more, get in touch with us today.

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**QUANTIFI  
PHOTONICS™**