QUANTIFI PHOTONICS®
A Teradyne Company



SWITCH

AUTOMATED OPTICAL SWITCH

SPECIFICATION SHEET

quantifiphotonics.com

FEATURES

Add optical switching capability to your test system with Quantifi Photonics' automated optical switches. The fast and reliable optical switch will enable automated sequential testing, saving time and streamlining your test procedures.

Bidirectional

Our optical switches are bidirectional; use it in N x M or M x N configurations for superior versatility.

Convenient park feature

The in-built park feature on applicable models provides the convenient functionality of an optical shutter.

High repeatability

High repeatability ensures that your measurements are reliable and consistent over time.

High durability, > 3 x 10^7 cycles

High switch lifecycle of 30 million operations ensures you get reliable hassle-free usage, for a long time.

Wide coverage of operational wavelengths

One versatile tool to cover a wide variety of applications.

Low insertion loss

Maximise your power budget with the low insertion loss.

Polarization maintaining output

On the polarization maintaining (PM) models, the slow axis of polarization is aligned with the output connector key as per industry standards. The user may choose to use polarization maintaining (PM) fiber or standard singlemode fiber (SMF)

Supports single and multi-mode applications

Available in either single-mode or multi-mode fiber options for a seamless integration into your setup.

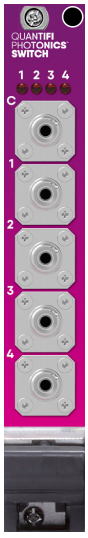
Wide variety of port configurations

Choose the number of ports and switching configuration to suit your specific application.

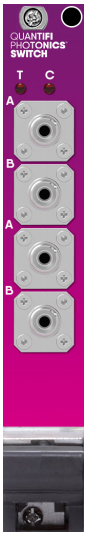
STANDARD SWITCH CONFIGURATIONS

Model number	Fiber type	Configuration	Wavelength	Slot count	Park state
1003	SMF-28	1 x 4	1260 to 1650 nm	1	Yes
1004	SMF-28	2 x 2 crossover	1260 to 1650 nm	1	No
1006	SMF-28	1 x 16	1260 to 1650 nm	2	Yes
1008	SMF-28	Quad 1 x 2	1260 to 1650 nm	2	Yes
1009	SMF-28	1 x 8	1260 to 1650 nm	2	Yes
1103	50µ core MMF OM3	1 x 4	800 to 1420 nm	1	Yes
1108	50µ core MMF OM3	Quad 1 x 2	800 to 1420 nm	2	Yes
1303	PM Panda 1550	1 x 4	1522 to 1570 nm	1	Yes
1304	PM Panda 1310	1 x 4	1290 to 1330 nm	1	Yes
1305	PM Panda 1310	2 x 2 crossover	1270 to 1350 nm	1	No
1306	PM Panda 1550	2 x 2 crossover	1510 to 1590 nm	1	No
1307	PM Panda 1310	1 x 16	1250 to 1350 nm	2	Yes
1310	PM Panda 1300	1 x 8	1290 to 1330 nm	2	Yes
1403	62.5µ core MMF OM1	1 x 4	800 to 1420 nm	1	Yes
1406	62.5µ core MMF OM1	1 x 16	800 to 1420 nm	2	Yes
1408	62.5µ core MMF OM1	Quad 1 x 2	800 to 1420 nm	2	Yes

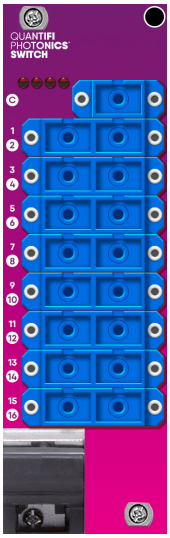
STANDARD SWITCH FRONT PANELS - PXI



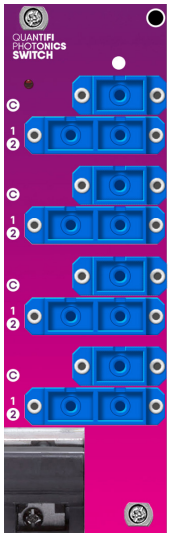
Models: 1003, 1103, 1303, 1304, 1403



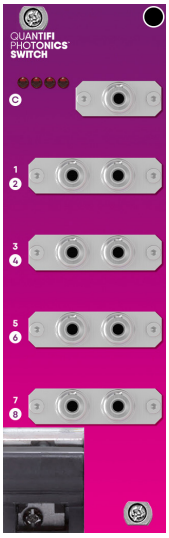
Models: 1004, 1305, 1306



Models: 1006, 1307, 1406

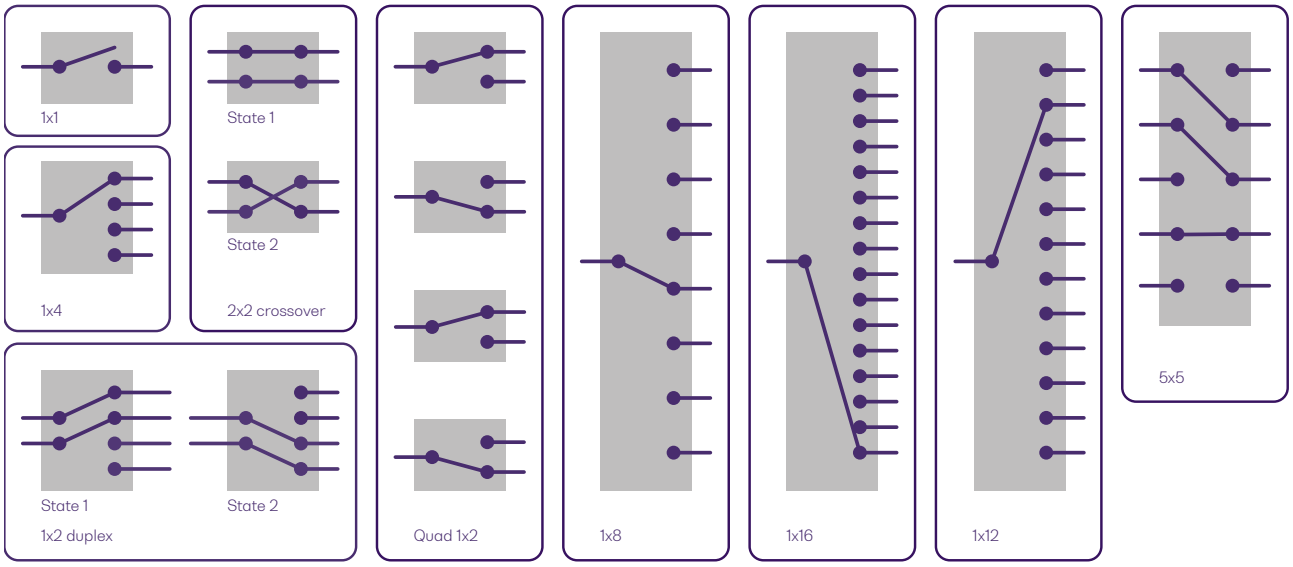


Models: 1008, 1108, 1408



Model: 1310

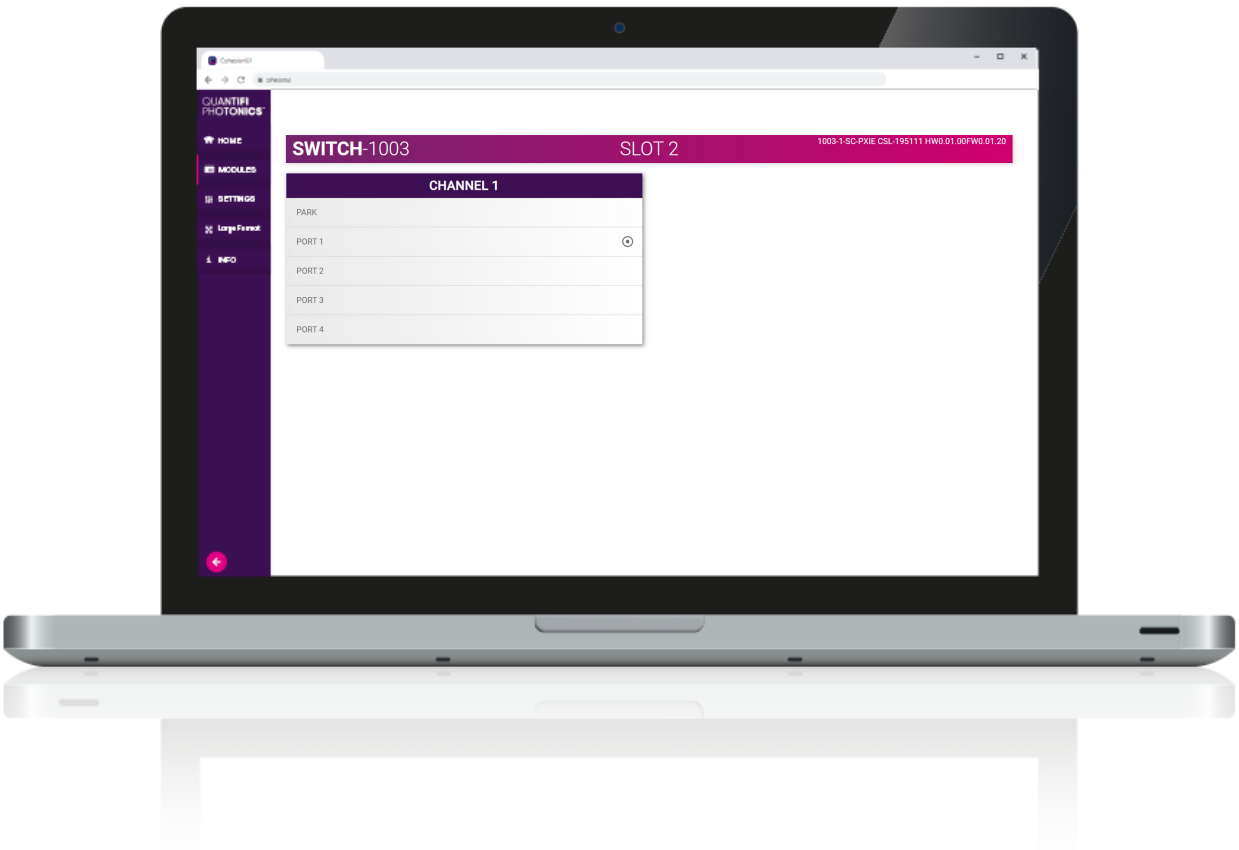
CONFIGURATIONS



COHESION UI - GRAPHICAL USER INTERFACE

Simple, intuitive control with COHESION**UI**™

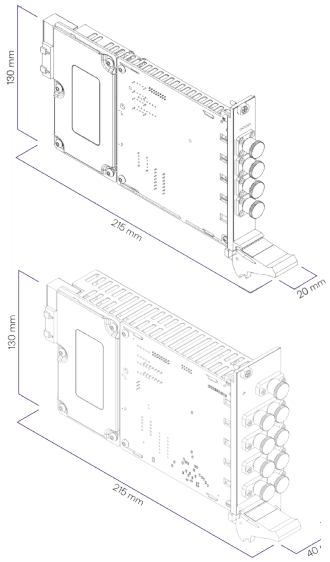
COHESION**UI** makes it simple to control our PXI or MATRIQ instruments from a PC, tablet or smartphone. Its cutting-edge design offers a sleek modern interface, cross device compatibility, customizable views and remote network access.



PXI – MODULAR



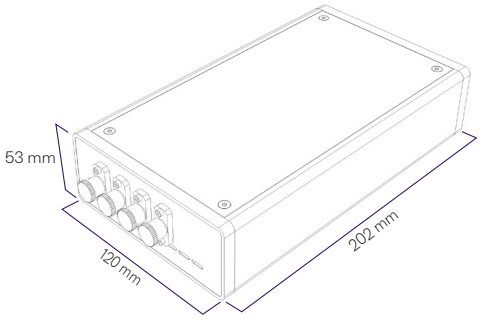
SWITCH-1003-1-FC-PXIE

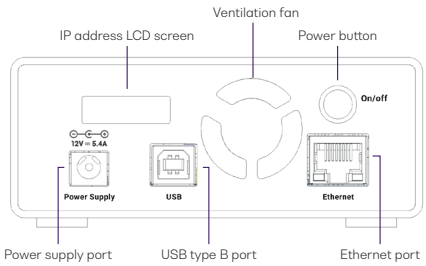


MATRIQ – COMPACT & PORTABLE



SWITCH-1003-1-FC-MTRQ





General specifications	PXI	MATRIQ
Bus connection	PXIe	USB and Ethernet
Slot count	**1 slot:** 1003, 1004, 1103, 1303, 1304, 1306, 1403 **2 slots:** 1006, 1008, 1009, 1108, 1307, 1310, 1406, 1408	-
Dimensions (HxWxD)	130 mm x 20mm x 215 mm (5.1" x 0.8" x 8.5") 130 mm x 40mm x 215 mm (5.1" x 1.6" x 8.5")	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 40 °C | 41 °F to 104 °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.	100 to 240 VAC
AC input current		1.3 A (115 VAC), 0.9 A (230 VAC)
AC frequency range		47 to 63 Hz
DC output voltage		12 V
DC output current max		5.41 A
Dimensions (LxWxH)		4.58 x 2.06 x 1.23" (116.3 x 52.4 x 31.3 mm)

Single-Mode Fiber Optical Switches

	1003[9] | SMF-28		
1x4 optical switch	Minimum	Typical	Maximum
Optical connector type	FC/APC, SC/PC, SC/APC		
Wavelength range	1260 to 1650 nm		
Insertion loss [2,7]		0.6 dB	0.8 dB
Return loss [8]	50 dB		
Polarization dependent loss [2]			< 0.1 dB
Wavelength dependent loss			0.2 dB
Crosstalk			-50 dB
Repeatability [4]			±0.02 dB
Damage level			+27 dBm
Durability	1x10[9] cycles		

SWITCH TECHNICAL SPECIFICATIONS

2x2 optical switch	1004 | SMF-28		
	Minimum	Typical	Maximum
Optical connector type		FC/APC	
Wavelength range		1260 to 1650 nm	
Insertion loss [2,7]		0.8 dB	1.0 dB
Return loss [8]		55 dB	
Polarization dependent loss [2]			< 0.05 dB
Wavelength dependent loss			< 0.25 dB
Crosstalk		-55 dB	
Repeatability [4]			±0.02 dB
Damage level			+27 dBm
Durability	$3x10^7$ cycles		
Damage level			+27 dBm

1x16 optical switch	1006[9] | SMF-28		
	Minimum	Typical	Maximum
Optical connector type		SC/APC	
Wavelength range		1260 to 1650 nm	
Insertion loss [2,7]		0.7 dB	1.0 dB
Return loss [8]	50 dB		
Polarization dependent loss [2]			0.15 dB
Wavelength dependent loss			0.30 dB
Crosstalk			-50 dB
Repeatability [4]			±0.05 dB
Durability	$1x10^9$ cycles		
Damage level			+27 dBm

Quad (1x2) optical switch	1008[9] | SMF-28		
	Minimum	Typical	Maximum
Optical connector type		SC/APC	
Wavelength range		1260 to 1650 nm	
Insertion loss [2,7]		1.2 dB	1.4 dB
Return loss [8]	50 dB		
Polarization dependent loss [2]			< 0.1 dB
Wavelength dependent loss			< 0.2 dB
Crosstalk			-50 dB
Repeatability [4]			±0.02 dB
Damage level			+27 dBm
Durability	$1x10^9$ cycles		

1x8 optical switch	1009[9] | SMF-28		
	Minimum	Typical	Maximum
Optical connector type	FC/APC		
Wavelength range	1260 to 1650 nm		
Insertion loss [2,7]		0.7 dB	1.0 dB
Return loss [8]	50 dB		
Polarization dependent loss [2]			< 0.10 dB
Wavelength dependent loss			< 0.20 dB
Crosstalk			-50 dB
Repeatability [4]			±0.05 dB
Damage level			+27 dBm
Durability	1x10[9] cycles		

Multi-Mode Fiber Optical Switches

1x4 optical switch	1103[9] | 50 µm Core MMF OM3		
	Minimum	Typical	Maximum
Optical connector type	FC/APC		
Wavelength range	800 to 1420 nm		
Insertion loss [2,6,7]		0.8 dB[6]	1.2 dB[6]
Return loss [8]	20 dB		
Polarization dependent loss [2]		TBD	
Wavelength dependent loss		TBD	
Crosstalk		-25 dB	
Repeatability [4]			±0.02 dB
Damage level			+27 dBm
Durability	1x10[9] cycles		

Quad (1x2) optical switch	1108[9] | 50 µm Core MMF OM3		
	Minimum	Typical	Maximum
Optical connector type	SC/APC		
Wavelength range	800 to 1420 nm		
Insertion loss [2,7]		0.9 dB[5]	1.1 dB[5]
Return loss [8]	20 dB		
Polarization dependent loss [2]		TBD	
Wavelength dependent loss		TBD	
Crosstalk			-25 dB
Repeatability [4]			±0.02 dB
Damage level			+27 dBm
Durability	1x10[9] cycles		

SWITCH TECHNICAL SPECIFICATIONS

1x4 optical switch	1403[9] | 62.5u Core MMF OM1		
	Minimum	Typical	Maximum
Optical connector type	SC/PC, SC/APC		
Wavelength range	800 to 1420 nm		
Insertion loss [2,7]		0.8 dB[6]	1.2 dB[6]
Return loss [8]	20 dB		
Polarization dependent loss [2]		TBD	
Wavelength dependent loss		TBD	
Crosstalk			-20 dB
Repeatability [4]			±0.2 dB
Damage level			+27 dBm
Durability	1x10^9 cycles		

1x16 optical switch	1406[9] | 62.5µ Core MMF OM1		
	Minimum	Typical	Maximum
Optical connector type	SC/PC		
Wavelength range	800 to 1420 nm		
Insertion loss [2,5,7]			1.6 dB [5]
Return loss [8]	20 dB		
Polarization dependent loss [2]		TBD	
Wavelength dependent loss		< 0.25 dB	
Crosstalk			-25 dB
Repeatability [4]			±0.04 dB
Damage level			+27 dBm
Durability	1x10^9 cycles		

Quad 1x2 optical switch	1408 | 62.5µ Core MMF OM1		
	Minimum	Typical	Maximum
Optical connector type	SC/APC		
Wavelength range	800 to 1420 nm		
Insertion loss [2,5,7]		0.9 dB	1.1 dB[5]
Return loss [8]	20 dB		
Polarization dependent loss [2]		TBD	
Wavelength dependent loss		TBD	
Crosstalk			-25 dB
Repeatability [4]			±0.02 dB
Damage level			+27 dBm
Durability	1x10^9 cycles		

Polarization maintaining optical fiber switches

1x4 PM optical switch (1550 nm)	1303[9] | PM Panda 1550		
	Minimum	Typical	Maximum
Optical connector type	FC/APC		
Wavelength range	1520 to 1570 nm		
Insertion loss [2,7]			1.5 dB
Return loss [8]	50 dB		
Wavelength dependent loss			0.25 dB
Crosstalk			-50 dB
Repeatability [4]			±0.05 dB
Damage level			+27 dBm
Durability	1x10^9 cycles		

1x4 PM optical switch (1310 nm)	1304[9] | PM Panda 1310		
	Minimum	Typical	Maximum
Optical connector type	FC/APC, SC/APC		
Wavelength range	1290 to1330 nm		
Insertion loss [2,7]			1.5 dB
Return loss [8]	50 dB		
Wavelength dependent loss			0.25 dB
Crosstalk			-50 dB
Repeatability [4]			±0.05 dB
Damage level			+27 dBm
Durability	1x10^9 cycles		

2x2 crossover PM optical switch (1310 nm)	1305[9] | PM Panda 1310		
	Minimum	Typical	Maximum
Optical connector type	FC/APC		
Wavelength range	1270 to1350 nm		
Insertion loss [2,5,7]		1.5 dB	1.8 dB
Return loss [8]		55 dB	
Wavelength dependent loss		< 0.2 dB	
Crosstalk		-60 dB	
Repeatability [4]			±0.02 dB
Damage level			+27 dBm
Durability	1x10^7 cycles		
PER	> 18 dB (20 dB typical)		

SWITCH TECHNICAL SPECIFICATIONS

2x2 crossover PM optical switch (1550 nm)	1306[9] | PM Panda 1550		
	Minimum	Typical	Maximum
Optical connector type		FC/APC	
Wavelength range		1510 to 1590 nm	
Insertion loss [2,7]		0.8 dB	1.2 dB
Return loss [8]		55 dB	
Wavelength dependent loss		< 0.2 dB	
Crosstalk		-60 dB	
Repeatability [4]			±0.02 dB
Damage level			+27 dBm
Durability	1x10^9 cycles		
PER		> 18 dB (20 dB typical)	

1x16 optical switch	1307[9] | PM Panda 1310		
	Minimum	Typical	Maximum
Optical connector type		SC/APC	
Wavelength range		1250 to 1350 nm	
Insertion loss [2,7]			1.5 dB
Return loss [8]	50 dB		
Wavelength dependent loss		<0.3 dB ± 20 nm	
Crosstalk			-50 dB
Repeatability [4]			± 0.04 dB
Damage level			+27 dBm
Durability	1x10^9 cycles		
PER		15 dB	

Quad 1x2 optical switch	1308[9] | PM Panda 1300		
	Minimum	Typical	Maximum
Optical connector type		SC/APC	
Wavelength range		1290 to 1330 nm	
Insertion loss [2,7]			1.0 dB
Return loss [8]	50 dB		
Wavelength dependent loss		<0.3 dB ± 20 nm	
Crosstalk			-50 dB
Repeatability [4]			± 0.04 dB
Damage level			+27 dBm
Durability	1x10^9 cycles		
PER		16 dB	

SWITCH TECHNICAL SPECIFICATIONS

1x8 optical switch	1310[9] | PM Panda 1300		
	Minimum	Typical	Maximum
Optical connector type		FC/APC	
Wavelength range		1290 to 1330 nm	
Insertion loss [2,7]			1.2 dB
Return loss [8]	50 dB		
Wavelength dependent loss			0.3 dB
Crosstalk			-50 dB
Repeatability [4]			± 0.05 dB
Damage level			+27 dBm
Durability	1x10[9] cycles		
PER		18 dB	

Notes

1. Specifications are valid at 23 °C ± 3 °C
2. Excluding connectors. Add 0.2 dB for SMF (0.1 dB for MMF) per connector
3. Power off isolation is same as crosstalk
4. Repeatability is defined after 100 cycles
5. IL is measured at 850 and 1310 nm, 23°
6. IL is measured at 850 and 1270-1411 nm, 23°
7. IL is for single-band. Dual-band option adds 0.3 dB
8. With FC/APC connectors
9. Preliminary specs
10. 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

The switch is available in the standard configurations listed below. If your application requires a different configuration, please contact your sales representative to discuss your requirements.

Available configurations:

SWITCH-1003-1-FA-MTRQ
SWITCH-1003-1-FA-PXIE
SWITCH-1003-1-SA-PXIE
SWITCH-1003-1-SC-PXIE
SWITCH-1004-1-FA-PXIE
SWITCH-1006-1-SA-PXIE
SWITCH-1008-4-SA-PXIE
SWITCH-1009-1-FA-PXIE
SWITCH-1103-1-FA-PXIE
SWITCH-1108-4-SA-PXIE
SWITCH-1303-1-FA-PXIE
SWITCH-1304-1-FA-PXIE
SWITCH-1304-1-SA-PXIE
SWITCH-1305-1-FA-PXIE
SWITCH-1306-1-FA-PXIE
SWITCH-1307-1-SA-PXIE
SWITCH-1308-4-SA-PXIE
SWITCH-1310-1-FA-PXIE
SWITCH-1403-1-SA-PXIE
SWITCH-1403-1-SC-PXIE
SWITCH-1406-1-SC-PXIE
SWITCH-1408-4-SA-MTRQ
SWITCH-1408-4-SA-PXIE

Configuration number format:

SWITCH - XXXX - X - XX - XXXX

Number of switches
1 = 1 switch
2 = 2 switches
4 = 4 switches

Connector type
FC = FC/PC
FA = FC/APC
SC = SC/PC
SA = SC/APC

Form factor
PXIE = PXI module
MTRQ = benchtop instrument

Model number
SINGLE-MODE FIBER
1003 = 1x4 switch, single-mode, SMF-28
1004 = 2x2 crossover switch,single-mode, SMF-28
1006[2] = 1x16 switch, single-mode, SMF-28
1008 = Quad 1x2 switch, single-mode, SMF-28
1009 = 1x8 switch, single-mode, SMF-28

POLARIZATION MAINTAINING FIBER
1303 = 1x4 switch, PM Panda 1550
1304 = 1x4 switch, PM Panda 1310
1305 = 2x2 crossover switch, PM Panda 1310
1306 = 2x2 crossover switch, PM Panda 1550
1307[2] = 1x16 switch, PM Panda 1310
1308 = Quad 1x2 switch, PM Panda 1300
1310 = 1x8 switch, PM Panda 1300

MULTI-MODE FIBER
1103 = 1x4 switch, multi-mode, 50 µm core OM3
1108[1] = Quad 1x2 switch, multi-mode, 50 µm core OM3
1403 = 1x4 switch, multi-mode, 62.5 µm core OM1
1406[2] = 1x16 switch, multi-mode, 62.5 µm core OM1
1408 = Quad 1x2 Switch, multi-mode, 62.5 µm core OM1

WARRANTY INFORMATION

This product comes with a standard 1 year warranty.

EXTENDED WARRANTIES AND CALIBRATION PLANS

With an **extended warranty and calibration plan** you'll spend more time focused on your priorities and less time worrying about maintenance.

Add a **3 or 5 year extended warranty** when you purchase your Quantifi Photonics instruments.



Guarantee performance

Ensure your equipment is operating at the best it can be for reliable and accurate results.

Lower cost of ownership

Lock in savings and maximise your testing budget with a lower base 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 purchasing your Quantifi Photonics instruments and get 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.

Over time and with regular use, all optical parts and connectors require re-calibration and maintenance to guarantee accurate and reliable performance. We recommend Quantifi Photonics optical instruments are re-calibrated every 12 months. 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

How to do I **secure my extended warranty or calibration plan**?

Contact your Quantifi Photonics sales representative or email **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.

Versatile test modules for a wide range of requirements and applications.

Tunable Laser Source



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.

Fixed Wavelength Laser Source



DFB laser sources available in a range of wavelengths and powers up to 24 dBm. Supports SMF, MMF and PMF.

Swept, Tunable Continuous Wave Laser



Swept, tunable continuous wave (CW) laser source with 0.01 dB power stability and 400 nm/s high-speed scan rate for R&D and production testing.

Superluminescent Diode Broadband Light Source



Super-luminescent LED light source with high output power, large bandwidth and low spectral ripple and various wavelengths.

ELSFP-Compliant External Laser Source



Uses ELSFP-compliant pluggable modules to provide 8 channels of CW optical power at 1310 nm up to 24 dBm.

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. Support SMF, MMF and PMF.

Polarization Controller & Scrambler



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

Optical Power Meter



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

Optical Spectrum Analyzer (OSA)



Cost-effective, spectral measurement in a compact module with built-in analysis for: SMSR, OSNR & spectral width. Targeted wavelengths for specific applications in O band, C band & L band.

Optical-to-Electrical Converter



High bandwidth, broadband O-to-E converter. Choose from 1 or 2 channels, AC or DC coupling and various conversion gain and operating wavelength ranges.

Optical Switch



Proven reliability and fast switching time. Wide variety of switch configurations and models support SMF, MMF and PMF.

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. SMF, MMF and PMF.

Digital Sampling Oscilloscope (DSO)



Digital equivalent-time sampling oscilloscope (DSO) with high-quality precision timebase and low jitter mode, available in 1 or 2 channels in a compact benchtop instrument.

Clock Recovery Instrument (CDR)



Clock recovery instrument for the QCA Series. Low jitter design and precise phase-locking provide a reliable, scalable solution for high-speed communication testing.

Coherent Transmitter



Generate high-quality coherent optical signals for transmitter development, testing and advanced modulation research.

Coherent Receiver



High-performance coherent optical receiver for accurate measurement and characterization of coherent modulation formats.

VISIQ Analysis Software

VISIQ

Coherent signal analysis software for intuitive DSP configuration, signal analysis and optimization.

Test. Measure. Solve.™

Quantifi Photonics provides test solutions to help customers unlock scalable and cost-effective high-volume manufacturing of photonic integrated circuits (PICs), co-packaged optics and pluggable optics. The company's portfolio includes a wide range of photonic test instruments, and digital sampling oscilloscopes, available as benchtop or the industry-standard PXI format to support cost-effective, high-throughput design verification testing and high-volume manufacturing.

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

General Enquiries sales@quantifiphotonics.com
Technical Support support@quantifiphotonics.com
Phone - NZ +64 9 478 4849
Phone - USA +1-800-803-8872

quantifiphotonics.com

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