QUANTIFI PHOTONICS®
A Teradyne Company

# Switch

## AUTOMATED OPTICAL SWITCH

SPECIFICATION SHEET

AVAILABLE IN PXI

AVAILABLE IN MATRIQ

quantifiphotonics.com

# 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)

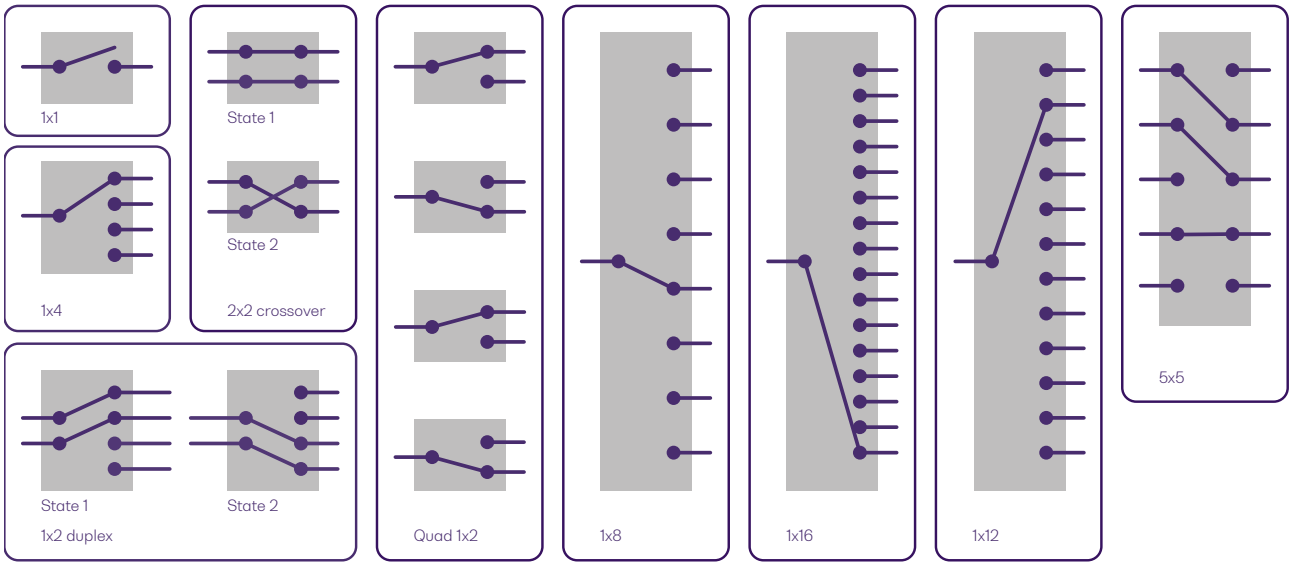
## Supports single and multi-mode applications

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.

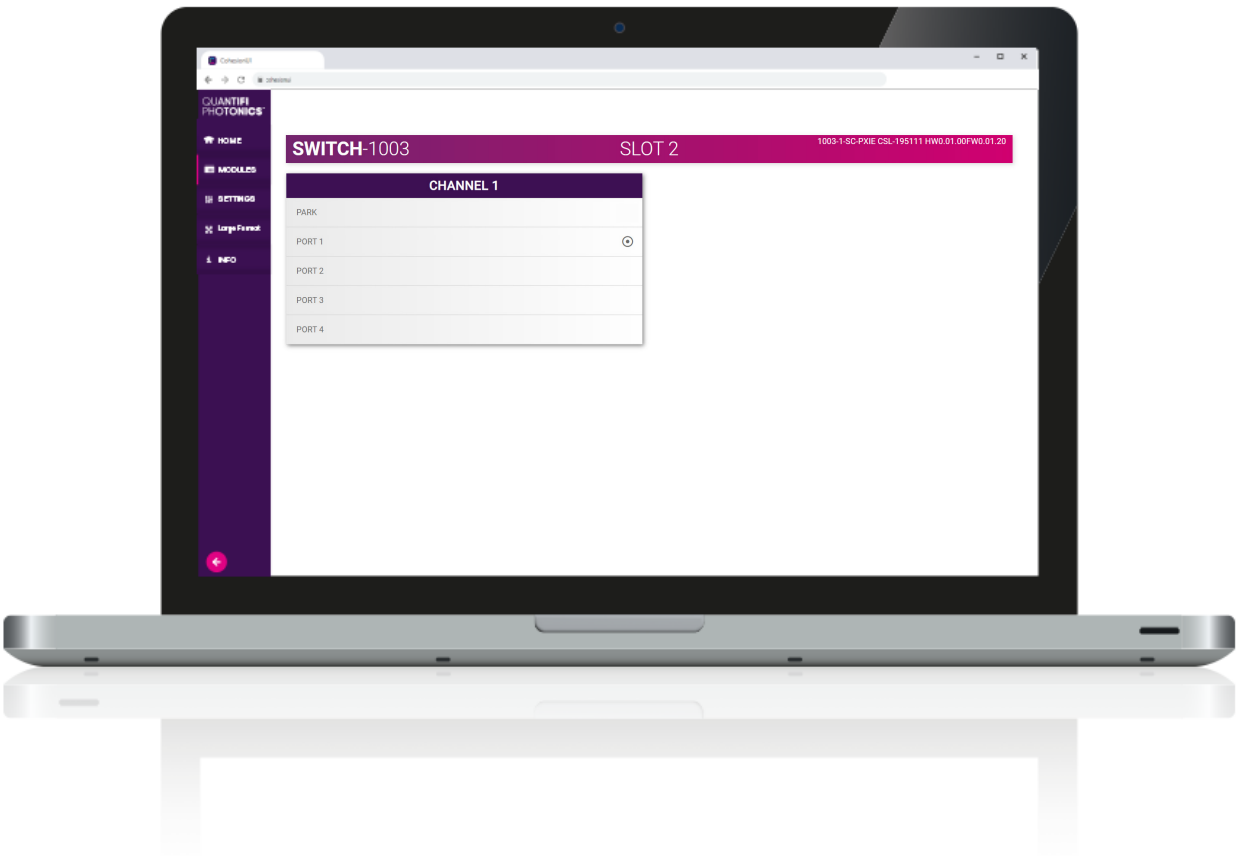
## CONFIGURATIONS




## 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.

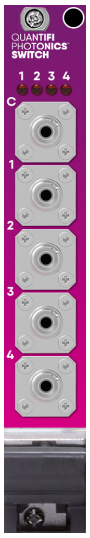


# The Switch is highly customizable.

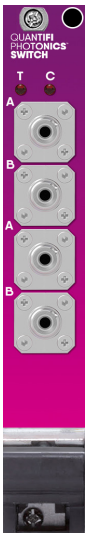
It comes with a wide range of switch configurations, fiber types and connectors. If you don't see what you need, please contact us to discuss your requirements.

| Model number | Fiber type | Configuration | Connector | Wavelength | Slot count | Park state |
|---|---|---|---|---|---|---|
| 1001 | SMF-28 | 1 x 1 | FC/PC, SC/PC, FC/APC, SC/APC | 1260 to 1650 nm | 1 | No |
| 1003 | SMF-28 | 1 x 4 | FC/PC, SC/PC, FC/APC, SC/APC | 1260 to 1650 nm | 1 | Yes |
| 1004 | SMF-28 | 2 x 2 crossover | FC/PC, SC/PC, FC/APC, SC/APC | 1260 to 1650 nm | 1 | No |
| 1005 | SMF-28 | 1 x 2 duplex | FC/PC, SC/PC, FC/APC, SC/APC | 1260 to 1650 nm | 2 | No |
| 1006 | SMF-28 | 1 x 16 | SC/PC, SC/APC | 1260 to 1650 nm | 2 | Yes |
| 1008 | SMF-28 | Quad 1 x 2 | SC/PC, SC/APC | 1260 to 1650 nm | 2 | Yes |
| 1009 | SMF-28 | 1 x 8 | FC/PC, SC/PC, FC/APC, SC/APC | 1260 to 1650 nm | 2 | Yes |
| 1010 | SMF-28 | 1 x 8 MT connector | FC/PC, SC/PC, FC/APC and SC/APC on common port; USCONEC Elite MT on 8 channel port | 1260 to 1650 nm | 1 | Yes |
| 1012 | SMF-28 | 1 x 12 MT connector | FC/PC, SC/PC, FC/APC and SC/APC on common PORT USCONEC Elite MT MALE APC on 12 channel port | 1260 to 1650nm | 1 | Yes |
| 1013 | SMF-28 | 1 x 24 MT connector | FC/PC,SC/PC, FC/APC and SC/APC on common PORT USCONEC Elite MT MALE APC on 24 channel port | 1260 to 1650nm | 1 | Yes |
| 1101 | 50µ core MMF OM3 | 1 x 1 | FC/PC, SC/PC, FC/APC, SC/APC | 800 to 1420 nm | 1 | No |
| 1103 | 50µ core MMF OM3 | 1 x 4 | FC/PC, SC/PC, FC/APC, SC/APC | 800 to 1420 nm | 1 | Yes |
| 1104 | 50µ core MMF OM3 | 2 x 2 crossover | FC/PC, SC/PC, FC/APC, SC/APC | 800 to 1420 nm | 1 | No |
| 1105 | 50µ core MMF OM3 | 1 x 2 duplex | FC/PC, SC/PC, FC/APC, SC/APC | 800 to 1420 nm | 2 | No |
| 1106 | 50µ core MMF OM3 | 1 x 16 | SC/PC, SC/APC | 800 to 1420 nm | 2 | Yes |
| 1107 | 50µ core MMF OM3 | 1 x 12 MT connector | FC/PC, SC/PC, FC/APC and SC/APC on common PORT USCONEC Elite MT MALE APC on 12 channel port | 800 to 1420 nm | 1 | Yes |
| 1108 | 50µ core MMF OM3 | Quad 1 x 2 | SC/PC, SC/APC | 800 to 1420 nm | 2 | Yes |
| 1403 | 62.5µ core MMF OM1 | 1 x 4 | FC/PC, SC/PC, FC/APC, SC/APC | 800 to 1420 nm | 1 | Yes |
| 1405 | 62.5µ core MMF OM1 | 1 x 2 duplex | FC/PC, SC/PC, FC/APC, SC/APC | 800 to 1420 nm | 2 | No |
| 1406 | 62.5µ core MMF OM1 | 1 x 16 | SC/PC, SC/APC | 800 to 1420 nm | 2 | Yes |
| 1408 | 62.5µ core MMF OM1 | Quad 1 x 2 | SC/PC, SC/APC | 800 to 1420 nm | 2 | Yes |
| 1409 | 62.5µ core MMF OM1 | 1 x 8 | FC/PC, SC/PC, FC/APC, SC/APC | 800 to 1420 nm | 2 | Yes |
| 1303 | PM Panda 1550 | 1 x 4 | FC/PC, SC/PC, FC/APC, SC/APC | 1522 to 1570 nm | 1 | Yes |
| 1304 | PM Panda 1310 | 1 x 4 | FC/PC, SC/PC, FC/APC, SC/APC | 1290 to 1330 nm | 1 | Yes |
| 1305 | PM Panda 1310 | 2 x 2 crossover | FC/PC, SC/PC, FC/APC, SC/APC | 1270 to 1350 nm | 1 | No |
| 1306 | PM Panda 1550 | 2 x 2 crossover | FC/PC, SC/PC, FC/APC, SC/APC | 1510 to 1590 nm | 1 | No |
| 1307 | PM Panda 1310 | 1 x 16 | SC/PC, SC/APC | 1250 to 1350 nm | 2 | Yes |
| 1309 | PM Panda 1300 | 5 x 5 grid | FC/PC, SC/PC, FC/APC, SC/APC | 1290 to 1330 nm | 3 | Yes |
| 1310 | PM Panda 1300 | 1 x 8 | FC/PC, SC/PC, FC/APC, SC/APC | 1290 to 1330 nm | 2 | Yes |

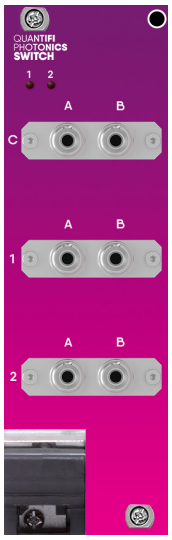
Models: 1001, 1101



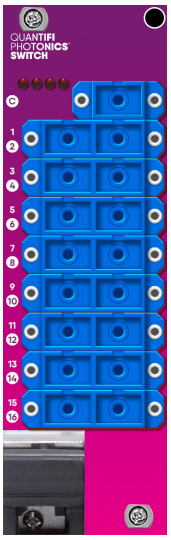

Models: 1003, 1103, 1303, 1304, 1403



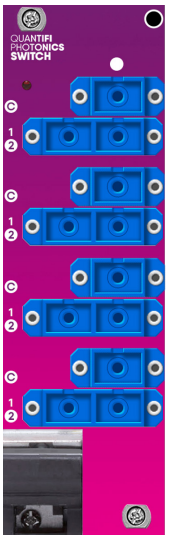

Models: 1004, 1104, 1305, 1306



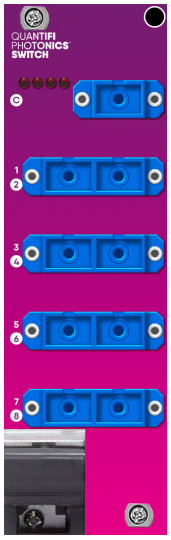

Models: 1005, 1105, 1405



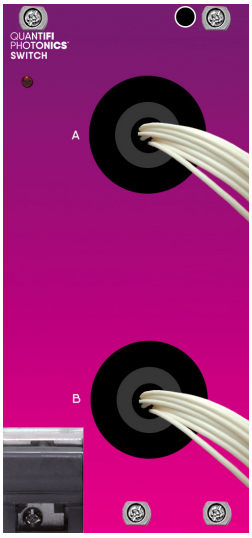

Models: 1006, 1106, 1307, 1406



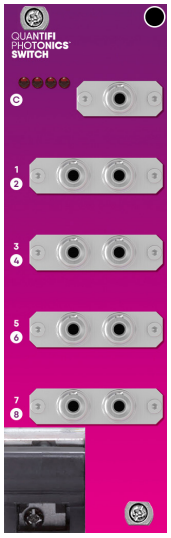

Models: 1008, 1108, 1408




Model: 1409




Model: 1309




Model: 1310

Models: 1010, 1012, 1013, 1107

## 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

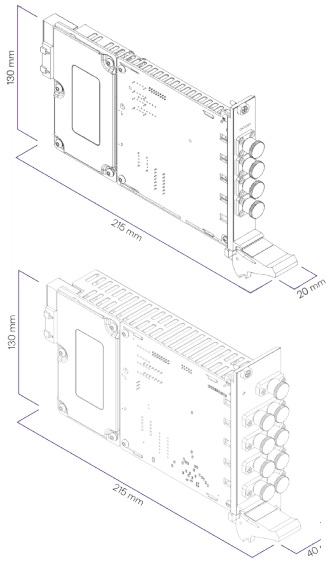
### MATRIQ – COMPACT & PORTABLE

# 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

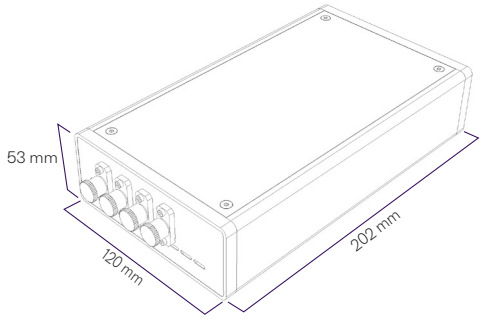
## PXI – MODULAR

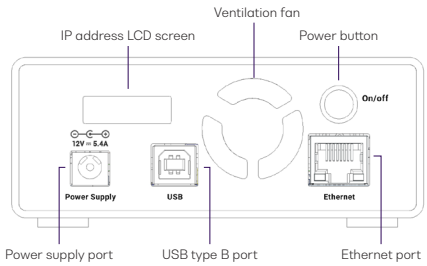
SWITCH-1003-1-FC-PXIE




## MATRIQ – COMPACT & PORTABLE

SWITCH-1003-1-FC-MTRQ



| General specifications | PXI | MATRIQ |
|---|---|---|
| Bus connection | PXIe | USB and Ethernet |
| Optical connectors | FC/PC, FC/APC, SC/PC, SC/APC<br>(1006, 1008, 1106, 1108, 1307, 1310, 1406, 1408: SC/PC, SC/APC only)<br>(1010, 1107: MT only) | |
| Slot count | **1 slot:** 1001, 1003, 1004, 1010, 1012, 1013, 1101, 1103, 1104, 1107, 1111, 1303, 1304, 1005, 1306, 1403<br>**2 slots:** 1005, 1006, 1008, 1009, 1105, 1106, 1108, 1112, 1307, 1310, 1405, 1406, 1409<br>**3 slots:** 1309 | - |
| Dimensions (HxWxD) | 130 mm x 20mm x 215 mm (5.1" x 0.8" x 8.5")<br>130 mm x 40mm x 215 mm (5.1" x 1.6" x 8.5")<br>130 mm x 60mm x 215 mm (5.1" x 2.4" 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

| 1x1 optical switch | 1001[9] \| SMF-28 | | | 1001[9] \| SMF-28 | | |
|---|---|---|---|---|---|---|
| | Minimum | Typical | Maximum | Minimum | Typical | Maximum |
| Wavelength range | 1260 to 1650 nm | | | 1260 to 1650 nm | | |
| Insertion loss [2,7] | | 0.5 dB | 1.0 dB | | 0.5 dB | 1.0 dB |
| Return loss [8] | | 50 dB | | | 50 dB | |
| Polarization dependent loss [2] | | | < 0.1 dB | | | < 0.1 dB |
| Wavelength dependent loss | | | <0.3 dB | | | <0.3 dB |
| Crosstalk | | -80 dB | | | -80 dB | |
| Repeatability [4] | | | ±0.1 dB | | | ±0.1 dB |
| Damage level | | | +27 dBm | | | +27 dBm |
| Durability | $3x10^7$ cycles | | | $3x10^7$ cycles | | |

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

## SWITCH TECHNICAL SPECIFICATIONS

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

| 1x2 duplex optical switch<br>( 2 x (1x2) switching channels) | 1005[9] \| SMF-28 | | | 1005[9] \| SMF-28 | | |
|---|---|---|---|---|---|---|
| | Minimum | Typical | Maximum | Minimum | Typical | Maximum |
| Wavelength range | 1260 to 1650 nm | | | 1260 to 1650 nm | | |
| Insertion loss [2,7] | | 0.5 dB | 1.0 dB | | 0.5 dB | 1.0 dB |
| Return loss [8] | | 50 dB | | | 50 dB | |
| Polarization dependent loss [2] | | | < 0.1 dB | | | < 0.1 dB |
| Wavelength dependent loss | | | < 0.3 dB | | | < 0.3 dB |
| Crosstalk | | -80 dB | | | -80 dB | |
| Repeatability [4] | | | ±0.1 dB | | | ±0.1 dB |
| Damage level | | | +27 dBm | | | +27 dBm |
| Durability | $3x10^7$ cycles | | | $3x10^7$ cycles | | |

| 1x16 optical switch | 1006[9] \| SMF-28 | | | 1006[9] \| SMF-28 | | |
|---|---|---|---|---|---|---|
| | Minimum | Typical | Maximum | Minimum | Typical | Maximum |
| Wavelength range | 1260 to 1650 nm | | | 1260 to 1650 nm | | |
| Insertion loss [2,7] | | 0.7 dB | 1.0 dB | | 0.7 dB | 1.0 dB |
| Return loss [8] | 50 dB | | | 50 dB | | |
| Polarization dependent loss [2] | | | 0.15 dB | | | 0.15 dB |
| Wavelength dependent loss | | | 0.30 dB | | | 0.30 dB |
| Crosstalk | | | -50 dB | | | -50 dB |
| Repeatability [4] | | | ±0.05 dB | | | ±0.05 dB |
| Damage level | | | +27 dBm | | | +27 dBm |

| Quad (1x2) optical switch | 1008[9] \| SMF-28 | | | 1008[9] \| SMF-28 | | |
|---|---|---|---|---|---|---|
| | Minimum | Typical | Maximum | Minimum | Typical | Maximum |
| Wavelength range | 1260 to 1650 nm | | | 1260 to 1650 nm | | |
| Insertion loss [2,7] | | 0.5 dB | 0.8 dB | | 0.5 dB | 0.8 dB |
| Return loss [8] | 50 dB | | | 50 dB | 55 dB | |
| Polarization dependent loss [2] | | | < 0.1 dB | | | < 0.1 dB |
| Wavelength dependent loss | | | < 0.2 dB | | | < 0.2 dB |
| Crosstalk | | | -50 dB | | -55 dB | -50 dB |
| Repeatability [4] | | | ±0.02 dB | | | ±0.02 dB |
| Damage level | | | +27 dBm | | | +27 dBm |
| Durability | $1x10^9$ cycles | | | $1x10^9$ cycles | | |

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

| 1x8 optical switch (MT connector) | 1010 \| SMF-28 | | | 1010 \| SMF-28 | | |
|---|---|---|---|---|---|---|
| | Minimum | Typical | Maximum | Minimum | Typical | Maximum |
| Wavelength range | 1260 to 1650 nm | | | 1260 to 1650 nm | | |
| Insertion loss [2,7] | | 0.9 dB | 1.2 dB | | 0.9 dB | 1.2 dB |
| Return loss [8] | 50 dB | | | 50 dB | | |
| Polarization dependent loss [2] | | | < 0.10 dB | | | < 0.10 dB |
| Wavelength dependent loss | | | < 0.20 dB | | | < 0.20 dB |
| Crosstalk | | | -50 dB | | | -50 dB |
| Repeatability [4] | | | ±0.05 dB | | | ±0.05 dB |
| Damage level | | | +27 dBm | | | +27 dBm |
| Durability | $1x10^9$ cycles | | | $1x10^9$ cycles | | |
| Connector type | (FC/PC, FC/APC, SC/PC, or SC/APC) and (MTP-8/PC or MTP-8/APC) | | | | | |

| 1x12 optical switch (MT connector) | 1012 \| SMF-28 | | | 1012 \| SMF-28 | | |
|---|---|---|---|---|---|---|
| | Minimum | Typical | Maximum | Minimum | Typical | Maximum |
| Wavelength range | 1260 to 1650 nm | | | 1260 to 1650 nm | | |
| Insertion loss [2,7] | | 0.9 dB | 1.2 dB | | 0.5 dB | 0.8 dB |
| Return loss [8] | 50 dB | | | 50 dB | 55 dB | |
| Polarization dependent loss [2] | | | < 0.1 dB | | | < 0.1 dB |
| Wavelength dependent loss | | | < 0.2 dB | | | < 0.2 dB |
| Crosstalk | | | -50 dB | | -55 dB | -50 dB |
| Repeatability [4] | | | ±0.05 dB | | | ±0.02 dB |
| Damage level | | | +27 dBm | | | +27 dBm |
| Durability | $1x10^9$ cycles | | | $1x10^9$ cycles | | |
| Connector type | (FC/PC, FC/APC, SC/PC, or SC/APC) and (MTP-12/PC or MTP-12/APC) | | | | | |

| 1x24 optical switch (MT connector) | 1013 \| SMF-28 | | | 1013 \| SMF-28 | | |
|---|---|---|---|---|---|---|
| | Minimum | Typical | Maximum | Minimum | Typical | Maximum |
| Wavelength range | 1260 to 1650 nm | | | 1260 to 1650 nm | | |
| Insertion loss [2,7] | | 0.7 dB | 1.0 dB | | 0.7 dB | 1.0 dB |
| Return loss [8] | 50 dB | | | 50 dB | 55 dB | |
| Polarization dependent loss [2] | | | 0.15 dB | | | < 0.1 dB |
| Wavelength dependent loss | | | 0.3 dB | | | 0.3 dB |
| Crosstalk | | | -50 dB | | -55 dB | -50 dB |
| Repeatability [4] | | | ±0.05 dB | | | ±0.02 dB |
| Damage level | | | +27 dBm | | | +27 dBm |
| Durability | $1x10^9$ cycles | | | $1x10^9$ cycles | | |
| Connector type | (FC/PC, FC/APC, SC/PC, or SC/APC) and (MTP-24/PC or MTP-24/APC) | | | | | |

# Multi-mode fiber optical switches

| 1x1 optical switch | 1101[9] \| 50 µm Core MMF OM3 | | | 1101[9] \| 50 µm Core MMF OM3 | | |
|---|---|---|---|---|---|---|
| | Minimum | Typical | Maximum | Minimum | Typical | Maximum |
| Wavelength range | 800 to 1420 nm | | | 800 to 1420 nm | | |
| Insertion loss [2,7] | | 0.3 dB | 0.6 dB | | 0.3 dB | 0.6 dB |
| Return loss [8] | | TBD | | | TBD | |
| Polarization dependent loss [2] | | TBD | | | TBD | |
| Wavelength dependent loss | | TBD | | | TBD | |
| Crosstalk | | -80 dB | | | -80 dB | |
| Repeatability [4] | | | ±0.1 dB | | | ±0.1 dB |
| Damage level | | | +27 dBm | | | +27 dBm |
| Durability | $3x10^7$ cycles | | | $3x10^7$ cycles | | |

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

| 2x2 optical switch | 1104[9] \| 50 µm Core MMF OM3 | | | 1104[9] \| 50 µm Core MMF OM3 | | |
|---|---|---|---|---|---|---|
| | Minimum | Typical | Maximum | Minimum | Typical | Maximum |
| Wavelength range | 800 to 1420 nm | | | 800 to 1420 nm | | |
| Insertion loss [2,5,7] | | 0.8 dB[5] | 1.0 dB[5] | | 0.8 dB[5] | 1.0 dB[5] |
| Return loss [8] | | TBD | | | TBD | |
| Polarization dependent loss [2] | | TBD | | | TBD | |
| Wavelength dependent loss | | TBD | | | TBD | |
| Crosstalk | | -50 dB | | | -50 dB | |
| Repeatability [4] | | | ±0.02dB | | | ±0.02dB |
| Damage level | | | +27 dBm | | | +27 dBm |
| Durability | $3x10^7$ cycles | | | $3x10^7$ cycles | | |

| 1x2 duplex optical switch<br>( 2 x (1x2) switching channels) | 1105[9] \| 50 µm Core MMF OM3 | | | 1105[9] \| 50 µm Core MMF OM3 | | |
|---|---|---|---|---|---|---|
| | Minimum | Typical | Maximum | Minimum | Typical | Maximum |
| Wavelength range | 800 to 1420 nm | | | 800 to 1420 nm | | |
| Insertion loss [2,5,7] | | 0.3 dB[5] | 0.6 dB[5] | | 0.3 dB[5] | 0.6 dB[5] |
| Return loss [8] | | TBD | | | TBD | |
| Polarization dependent loss [2] | | TBD | | | TBD | |
| Wavelength dependent loss | | TBD | | | TBD | |
| Crosstalk | | -80 dB | | | -80 dB | |
| Repeatability [4] | | | ±0.1 dB | | | ±0.1 dB |
| Damage level | | | +27 dBm | | | +27 dBm |
| Durability | $3x10^7$ cycles | | | $3x10^7$ cycles | | |

| 1x16 optical switch | 1106 \| 50 µm Core MMF OM3 | | | 1106 \| 50 µm Core MMF OM3 | | |
|---|---|---|---|---|---|---|
| | Minimum | Typical | Maximum | Minimum | Typical | Maximum |
| Wavelength range | 800 to 1420 nm | | | 800 to 1420 nm | | |
| Insertion loss [2,5,7] | | | 1.6 dB[5] | | | 1.6 dB[5] |
| Return loss [8] | 20 dB | | | 20 dB | | |
| Polarization dependent loss [2] | | TBD | | | TBD | |
| Wavelength dependent loss | | TBD | | | TBD | |
| Crosstalk | | | -25 dB | | | -25 dB |
| Repeatability [4] | | | ±0.04 dB | | | ±0.04 dB |
| Damage level | | | +27 dBm | | | +27 dBm |
| Durability | $1x10^9$ cycles | | | $1x10^9$ cycles | | |

| 1x12 optical switch (MT connector) | 1107 \| 50 µm Core MMF OM3 | | | 1107 \| 50 µm Core MMF OM3 | | |
|---|---|---|---|---|---|---|
| | Minimum | Typical | Maximum | Minimum | Typical | Maximum |
| Wavelength range | 800 to 1420 nm | | | 800 to 1420 nm | | |
| Insertion loss [2,5,7] | | | 1.7 dB[5] | | | 1.7 dB[5] |
| Return loss [8] | 20 dB | | | 20 dB | | |
| Polarization dependent loss [2] | | TBD | | | TBD | |
| Wavelength dependent loss | | TBD | | | TBD | |
| Crosstalk | | | -25 dB | | | -25 dB |
| Repeatability [4] | | | ±0.04 dB | | | ±0.04 dB |
| Damage level | | | +27 dBm | | | +27 dBm |
| Durability | $1x10^9$ cycles | | | $1x10^9$ cycles | | |
| Connector type | (FC/PC, FC/APC, SC/PC, or SC/APC) and (MTP-12/PC or MTP-12/APC) | | | | | |

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

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

| 1x2 duplex optical switch<br>( 2 x (1x2) switching channels) | 1405[9] \| 62.5µ Core MMF OM1 | | | 1405[9] \| 62.5µ Core MMF OM1 | | |
|---|---|---|---|---|---|---|
| | Minimum | Typical | Maximum | Minimum | Typical | Maximum |
| Wavelength range | 800 to 1420 nm | | | 800 to 1420 nm | | |
| Insertion loss [2,5,7] | | 0.3 dB [5] | 0.6 dB [5] | | 0.3 dB [5] | 0.6 dB [5] |
| Return loss [8] | | TBD | | | TBD | |
| Polarization dependent loss [2] | | TBD | | | TBD | |
| Wavelength dependent loss | | TBD | | | TBD | |
| Crosstalk | | -80 dB | | | -80 dB | |
| Repeatability [4] | | | ±0.1 dB | | | ±0.1 dB |
| Damage level | | | +27 dBm | | | +27 dBm |
| Durability | $3x10^7$ cycles | | | $3x10^7$ cycles | | |

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

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

| 1x8 optical switch | 1409 \| 62.5µ Core MMF OM1 | | | 1409 \| 62.5µ Core MMF OM1 | | |
|---|---|---|---|---|---|---|
| | Minimum | Typical | Maximum | Minimum | Typical | Maximum |
| Wavelength range | 800 to 1420 nm | | | 800 to 1420 nm | | |
| Insertion loss [2,5,7] | | 1.0 dB | 1.4 dB[5] | | 1.0 dB | 1.4 dB[5] |
| Return loss [8] | 20 dB | | | 20 dB | | |
| Polarization dependent loss [2] | | TBD | | | TBD | |
| Wavelength dependent loss | | TBD | | | TBD | |
| Crosstalk | | | -20 dB | | | -20 dB |
| Repeatability [4] | | | ±0.02 dB | | | ±0.02 dB |
| Damage level | | | +27 dBm | | | +27 dBm |
| Durability | $1x10^9$ cycles | | | $1x10^9$ cycles | | |

# Polarization maintaining optical fiber switches

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

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

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

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

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

| 5x5 grid optical switch | 1309 \| PM Panda 1300 | | | 1309 \| PM Panda 1300 |
|---|---|---|---|---|
| | Minimum | Typical | Maximum | |
| Wavelength range | 1290 to 1330 nm | | | This model is not available in MATRIQ form factor. |
| Insertion loss [2,7] | | | 0.8 dB | |
| Return loss [8] | 50 dB | | | |
| Wavelength dependent loss | | | 0.3 dB | |
| Crosstalk | | -60 dB | -50 dB | |
| Repeatability [4] | | | ± 0.03 dB | |
| Damage level | | | +27 dBm | |
| Durability | $1x10^9$ cycles | | | |
| PER | 16 dB | 18 dB | | |

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

**SWITCH - XXXX - X - XX - PXIE**
**SWITCH - XXXX - X - XX - MTRQ**

**Connector type**
**FC** = FC/PC
**FA** = FC/APC
**SC** = SC/PC
**SA** = SC/APC
**[ ]** = For models with MT connectors, refer to the MT connector types table below*

**Number of switches**
**1** = 1 switch
**2** = 2 switches (only available for models 1001 and 1101)
**4** = 4 switches (only available for models 1008, 1108 & 1408)

**Model number**

**SINGLE-MODE FIBER**
**1001** = 1x1 switch, single-mode, SMF-28
**1003** = 1x4 switch, single-mode, SMF-28
**1004** = 2x2 crossover switch,single-mode, SMF-28
**1005** = 1x2 duplex 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
**1010**[1] = 1x8 switch, single-mode, SMF-28,
**1012**[1] = 1x12 switch, single-mode, SMF-28
**1013**[1] = 1x24 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
**1309** = 5 x 5 grid switch, PM Panda 1300
**1310** = 1x8 switch, PM Panda 1300

**MULTI-MODE FIBER**
**1101** = 1x1 switch, multi-mode, 50 µm core OM3
**1103** = 1x4 switch, multi-mode, 50 µm core OM3
**1104** = 2x2 crossover switch, multi-mode, 50 µm core OM3
**1105** = 1x2 duplex switch, multi-mode, 50 µm core OM3
**1106**[2] = 1x16 switch, multi-mode, 50 µm core OM3
**1107**[1] = 1x12 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
**1405** = 1x2 duplex 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
**1409** = 1x8 switch, multi-mode, 62.5 µm core OM1

1. MT connector only
2. SC/PC, SC/APC only

***MT Connector types**

| | | | | |
|---|---|---|---|---|
| **AA =** FC/PC + MTP-8/PC | **BA =** FC/PC + MTP-12/PC | **CA =** FC/PC + MTP-16/PC | **DA =** FC/PC + MTP-24/PC | **EA =** FC/PC + MTP-36/PC |
| **AB =** FC/APC + MTP-8/PC | **BB =** FC/APC + MTP-12/PC | **CB =** FC/APC + MTP-16/PC | **DB =** FC/APC + MTP-24/PC | **EB =** FC/APC + MTP-36/PC |
| **AC =** SC/PC + MTP-8/PC | **BC =** SC/PC + MTP-12/PC | **CC =** SC/PC + MTP-16/PC | **DC =** SC/PC + MTP-24/PC | **EC =** SC/PC + MTP-36/PC |
| **AD =** SC/APC + MTP-8/PC | **BD =** SC/APC + MTP-12/PC | **CD =** SC/APC + MTP-16/PC | **DD =** SC/APC + MTP-24/PC | **ED =** SC/APC + MTP-36/PC |
| **AE =** FC/PC + MTP-8/APC | **BE =** FC/PC + MTP-12/APC | **CE =** FC/PC + MTP-16/APC | **DE =** FC/PC + MTP-24/APC | **EE =** FC/PC + MTP-36/APC |
| **AF =** FC/APC + MTP-8/APC | **BF =** FC/APC + MTP-12/APC | **CF =** FC/APC + MTP-16/APC | **DF =** FC/APC + MTP-24/APC | **EF =** FC/APC + MTP-36/APC |
| **AG =** SC/PC + MTP-8/APC | **BG =** SC/PC + MTP-12/APC | **CG =** SC/PC + MTP-16/APC | **DG =** SC/PC + MTP-24/APC | **EG =** SC/PC + MTP-36/APC |
| **AH =** SC/APC + MTP-8/APC | **BH =** SC/APC + MTP-12/APC | **CH =** SC/APC + MTP-16/APC | **DH =** SC/APC + MTP-24/APC | **EH =** SC/APC + MTP-36/APC |

## WARRANTY INFORMATION

This product comes with a standard 1 year warranty.

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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

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