



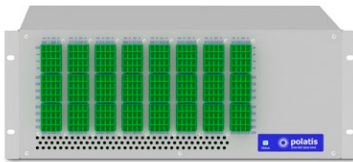
SERIES 6000i

Instrument Optical Matrix Switch

SINGLE MODE INSTRUMENT OPTICAL SWITCH FROM 4x4 TO 192x192 PORTS



Series 6000 Ultra 32x32 Optical Switch



Series 6000 192x192 Optical Switch

The Polatis Series 6000i Instrument optical switch is a high-performance, fully non-blocking all-optical matrix switch available in sizes from 4x4 up to 192x192. It is designed to meet the highest performance needs of the most demanding test and measurement applications with exceptionally low optical loss, superior connection stability and repeatability in a compact form factor. With support of Software-Defined Networks (SDNs) via embedded OpenFlow, NETCONF and RESTCONF control interfaces, the Series 6000i interfaces directly with cutting edge cloud-based network and infrastructure testing applications. The Series 6000i is based on Polatis' patented DirectLight® optical switching technology that has been proven in the most challenging defense, data center and telecom applications and is exclusively used by major network equipment manufacturers to automate testing of optical components and subsystems.

KEY FEATURES

- Non-blocking matrix switch sizes from 4x4 to 192x192
- Ultra-low insertion loss and superior optical specifications
- Exceptional optical stability and repeatability
- Dark fiber all-band single mode connectivity
- Fully bidirectional optics
- Available in NxN, MxN single-sided and customer configurable (NxCC) any-to-any port configurations
- Protocol and bit-rate agnostic up to 400Gbps and beyond
- Optional Optical Power Monitoring (OPMs) with user configurable optical power alarms
- Optional Variable Optical Attenuation (VOAs) on every switch connection
- Programmable port shutter for fiber break simulation
- SDN enabled with OpenFlow, NETCONF and RESTCONF command interfaces
- Configurable interface options with SNMP, TL1 and SCPI control languages
- Built-in user-friendly web GUI
- High reliability distributed architecture
- High density switching in a compact chassis
- Eco-friendly energy efficiency

DIRECTLIGHT TECHNOLOGY

The Series 6000i 4x4 to 192x192 switch leverages Polatis' patented, highly reliable piezoelectric DirectLight beam-steering technology that sets the industry standard for lowest optical loss and highest optical performance. Polatis' beam-steering technology can be switched without light being present on the fiber. This allows operators to pre-provision paths as well as switch intermittent and variable-power test signals test over lit or dark fiber. The Polatis DirectLight technology can also switch bi-directional optical test signals for PON, FTTx, and other types of transmission systems.

SDN ENABLED WITH USER FRIENDLY INTERFACES

Polatis offers a full complement of Software Defined (SDN) interfaces including OpenFlow, NETCONF and RESTCONF. Optical switching with SDN allows infrastructure vendors and system test operators to dynamically and cost effectively setup, monitor and operate cloud-based manufacturing and network test configurations. Polatis also works closely with leading SDN companies and research organizations to provide leading edge SDN solutions. Polatis also offers traditional SNMP, TL1, GPIB and SCPI command languages that allow for seamless integration with test equipment controller systems. Each switch also has a user-friendly secure web browser GUI interface that can be used to provision, monitor and control the switch and the switch software can be easily upgraded in the field without affecting in-service switch operations.

FLEXIBLE SWITCH MATRIX SIZE OPTIONS

The Series 6000i switch is available in symmetric (NxN), asymmetric (MxN) and a single-sided (NxCC) customer configurable switch with any-to-any port connectivity. Matrix sizes from 4x4 to 192x192 are available allowing designers to select the optimum size for each application. Polatis offers three different size versions of the Series 6000i. The 4x4 to 32x32 high-performance 6000i-Ultra, with under 1.0dB max loss and superior stability and repeatability, is designed for the most demanding applications and fits in a compact 1RU size. The 36x36 to 48x48 6000i-Lite, with under 1.9dB max loss, is designed for applications that need larger matrix sizes that still fit into a compact 1RU form factor. The larger 60x60 to 192x192 6000i, also with under 1.9dB loss, is designed for applications that a need larger matrix sizes while still maintaining instrument grade specifications.

OPTIONAL POWER MONITORS AND OPTICAL TAPS

Polatis switches can be customized to incorporate a wide variety of passive and active components to suit individual customer testing needs. Polatis Series 6000i switches include options for integrated Optical Power Monitors (OPMs) and optical taps on every connection. The power monitoring can also be used to provide Variable Optical Attenuation (VOA) on every connection. The power monitors and VOA can be used together to adjust signal test levels to test dynamic range, protect sensitive test equipment along with many other testing applications.

BENEFITS OF POLATIS SWITCHING

- Low optical loss minimizes impact on equipment and system optical power budgets
- Exceptional stability and repeatability increase measurement consistency, accuracy and precision
- OpenFlow, NETCONF and RESTCONF SDN interfaces communicate directly to cloud-based manufacturing and network test configurations.
- Remote operation and fast switching times speed up and simplify testbed setup and reconfiguration
- Signal format, wavelength, direction and bitrate independence with minimal signal impairment provides truly transparent connections
- Dark fiber switching enables pre-provisioning and use with intermittent signals or variable power signals
- Low power usage and compact physical size fits into applications other switches cannot
- Interoperate with popular third-party test software (Quali Systems, Spirent)

APPLICATIONS

- Centralized test equipment sharing and automated network testing
- Component, transponder, line card, and subsystem testing
- Automated regression testing for new product releases
- Cloud-based SDN test configurations
- Satellite uplink and RFoF testing
- System and network testbed reconfiguration
- PON and FTTx system testbeds

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Performance Parameters	Polatis 6000i-Ultra Up to 32x32 ¹ and 64xCC	6000i-Lite and 6000i Up to 192x192 ¹ and 192xCC
Typical Insertion Loss ²	0.5dB	0.9dB
Maximum Insertion Loss ²	1.0dB	1.9dB
Maximum Insertion Loss with single OPM ²	1.3dB	2.2dB
Loss Repeatability ³	+/-0.05dB	+/-0.1dB
Connection Stability ³	+/-0.05dB	+/-0.1dB

For All Switch Sizes	
Operating Wavelength Range	1260-1675nm
Return Loss (with APC connectors)	>50dB
Max Switching Time	25ms
Crosstalk	<-55dB
Polarization Dependent Loss (PDL)	<0.1dB (C+L Bands) <0.3dB with optional OPM (1510-1610nm)
Dark Fiber Switching	Yes
Bi-Direction Optics	Yes
Wavelength Dependent Loss (WDL)	<0.3 dB (C+L Band)
Optional Optical Power Monitoring (OPM)	Calibrated wavelength range 1290-1330nm and 1450-1640nm Dynamic range -40dBm to +24dBm Accuracy +/-0.5dBm
Maximum Optical Input Power	+27dBm
Switch Lifetime	>10 ⁹ Cycles
Operating Temperature	+10°C to +40°C <85% RH non-condensing
Storage Temperature	-40°C to +70°C <40% RH non-condensing

Electrical and Mechanical	For All Switch Sizes
Fiber Type	Single Mode
Single Fiber Connectors	LC, LC-HD, SC, FC and Diamond E-2000 Connectors Angled (APC) or Ultra (UPC) variants available
Array Connector Types	MTP-8 or MTP-12 Elite Array Connectors
Control Languages	SCPI (default), NETCONF, RESTCONF, OpenFlow, SNMP and TL1
User Interfaces	Dual Gigabit Ethernet Optional GPIB
Craft Interface	RS232 Serial and USB
Power Options	Hot Swappable Dual Redundant 100-240 VAC 50/60 Hz Hot Swappable Dual Redundant -48 VDC
Power Consumption	25-75W

Switch Chassis Height ⁴	Polatis 6000i-Ultra 4x4 to 32x32 Size	Polatis 6000i-Lite 36x36 to 48x48 Size	Polatis 6000i 60x60 to 144x144 Size	Polatis 6000i 160x160 to 192x192 Size
	MTP or LC-HD	1RU	3RU	3RU
LC	2RU	4RU	4RU	6RU
SC or E2000	3RU	6RU	6RU	8RU

The low-loss Series 6000i-Ultra and the high-density Series 6000i-Lite Secure switches fit into a compact 1RU chassis height with high-density connectors. The larger Series 6000i switch fits into a 3RU chassis height with up to 144x144 ports and a 4RU chassis height with up to 192x192 ports with high-density connectors.

All parameters are measured excluding connectors at 1550nm and 20°C with an unpolarized source after thermal equalization unless otherwise noted.

1. Asymmetric MxN switches and single-sided NxCC customer-configurable switches with any-to-any port connectivity are also available
2. Measured using the 3 patch-cord method as defined in ANSI/TIA/EIA-526-7-1998
3. Stability and repeatability are measured at maximum transmission
4. The switch chassis width is 19" and the depth is 22" for all Series 6000 switches