

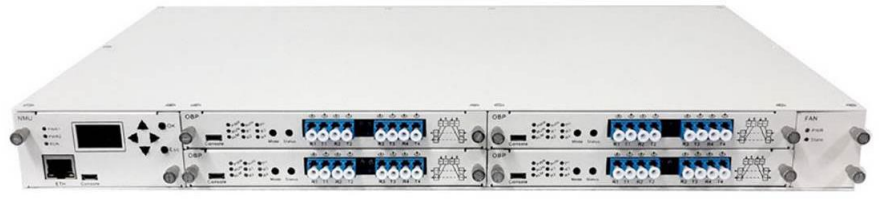
# MEMS 8 x 8 Fiber Optical Switch

(Non-Blocking, Bidirectional, Passive, 850nm, 1260-1620nm)

(Protected by U.S. patents 7224860, 6757101, 6577430 and pending patents)

## Product Description

The MEMS FIBER Optical switches establish optical signal paths passively in milliseconds supporting all data rates, ideally suited to manage and monitor large optical networks intelligently and remotely. It has a unique dual 4x4 function. The MEMS switches are reliable with longevity suited for continuous operation. The control is net-based GUI that is compatible with standard network management protocols. It is housed in a 1U box.



## Features

- Low Cost
- High Reliability
- Low Insertion Loss
- Broad Band
- Compact Design
- Low Voltage

## Performance Specifications

Parameters	Min	Typical	Max	Unit
Operation Wavelength	850	1270-1630		nm
Insertion Loss <sup>[1]</sup> (SM)	0.8	1.5	2.2	dB
Insertion Loss <sup>[1]</sup> (MM)	0.8	1.8	2.8	dB
Dynamic Cross Talk	50			dB
Static Cross Talk	60			dB
Switch Speed (Rise, Fall)		5	20	ms
Durability	10 <sup>9</sup>			cycle
Polarization Dependent Loss		0.04	0.2	dB
Wavelength Dependence Loss <sup>[2]</sup>		0.1	0.3	dB
Return Loss	50 <sup>[6]</sup>			dB
Repeatability		0.3	0.5	dB
Operating Temperature <sup>[3]</sup>	-5		65	°C
Transit Time Delay			0.2	ms
Port to Port Time Delay Difference			0.5	ns
Optical Power Handling (CW) <sup>[4]</sup>		300	500	mW
Storage Temperature	-40		85	°C
Electrical Power Consumption			50 <sup>[5]</sup>	W
Switch type	Non-Latching/Latching			
Package Dimension	1RU/2RU/4RU			

1. Measured without connectors for SM only, each connector adds 0.2-0.3dB
2. Within 50nm bandwidth
3. -25 °C-75°C version is also available.
4. High power version available
5. For the non-latching version
6. For SM fiber, MM fiber is 35dB

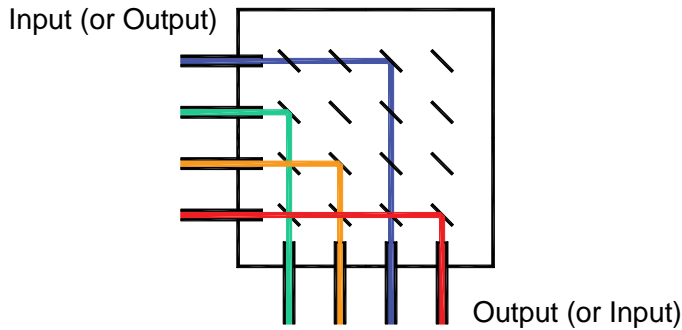
## Applications

- Optical Signal Routing
- Network Protection
- Wavelength Management
- Signal Monitoring
- Instrumentation

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## Optical Path Illustration

### MEMS 4x4 Switch



\*Product dimensions may change without notice. This is sometimes required for non-standard specifications.

## Control & Electric Interface

The switch default control is Ethernet with a GUI.

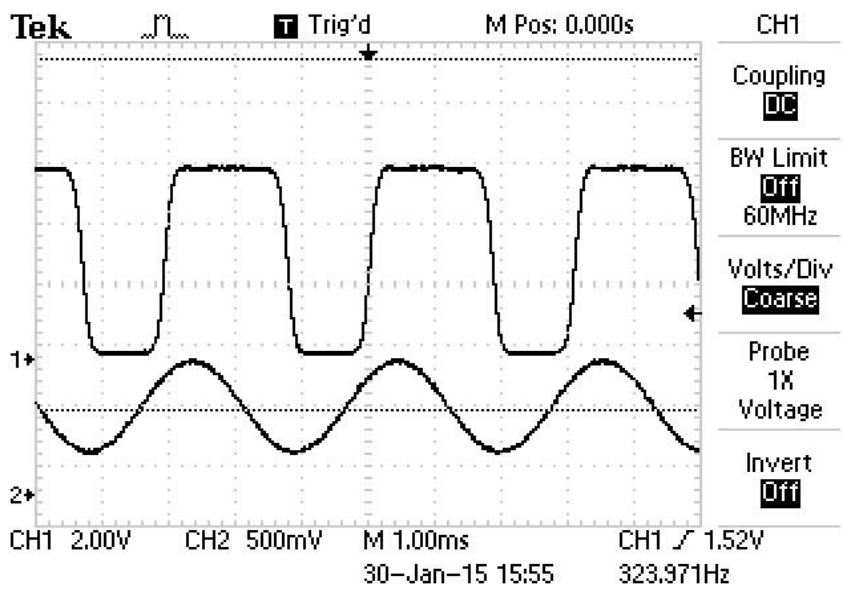
- Physical Layer: 10/100Base-T
- Data Link Layer: Ethernet Protocol per IEEE 802.3
- Network Layer: IPv4
- Transport Layer: UDP
- Application Protocol: SNMP
- Connector Type: RJ-45
- Dual 48V/120-220V Power Input

We provide a command list for customers to write their control code, such as Python

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## 10<sup>9</sup> Switching Cycle Test

We have tested MEMS 1x2 switch at the resonant frequency ~300Hz for more than 40 days, as shown in the attachment, which corresponds over 10<sup>9</sup> switching cycles. The measurements show little changes in Insertion loss, Cross Talk, Return loss, etc, all parameters are within our specs.



## Ordering Information

Prefix	Type	Wavelength <sup>[1]</sup>	Control Interface	Package	Fiber Type	Power Supply	Connector
MEMS-	8x8 = 008 Dual 8x8 = 208 Special = 000	1310 = 3 1410 = 4 1550 = 5 1310/1550 = 2 850 = 8 1060 = 6 Special = 0	Ethernet = 2 Special = 0	1RU=1 1.5U=5 2RU=2 4RU=4 Special=0	SMF-28 = 1 MM 50/125 = 2 Hi1060 = 3 Panda = 5 <sup>[2]</sup> Special = 0	120-220V = 4 48V = 5	None=1 FC/PC=2 FC/APC=3 SC/PC=4 SC/APC=5 LC=7 Duplex LC=8 Special=0

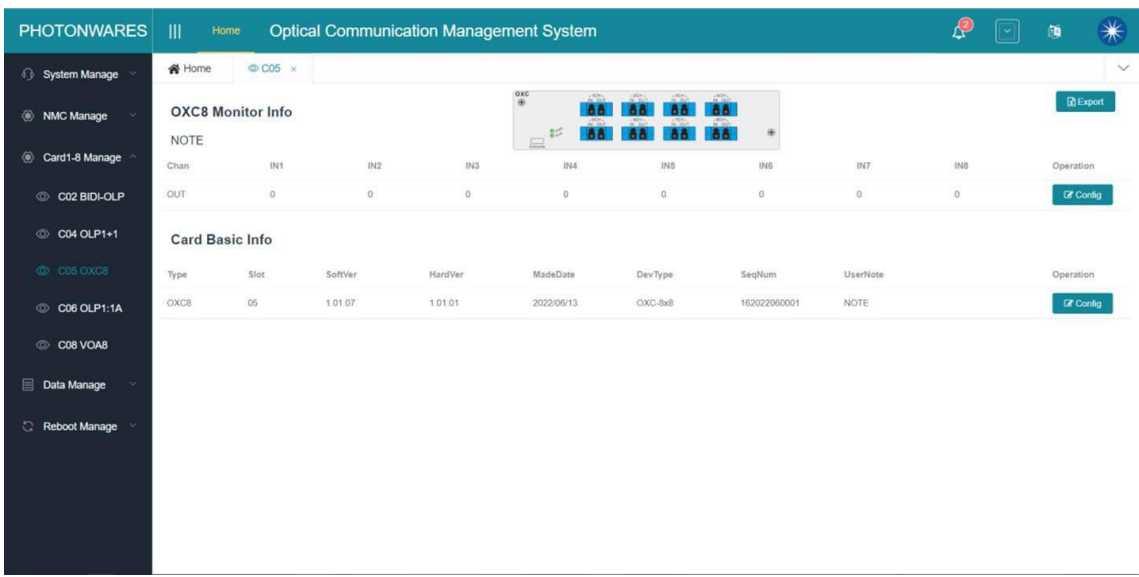
[1]. Measured wavelength. The device has a wider wavelength coverage. Customer can request to measure at several wavelengths.

[2]. For PM fiber version, please call us to get more information.



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## Example of Ethernet Remote Control GUI



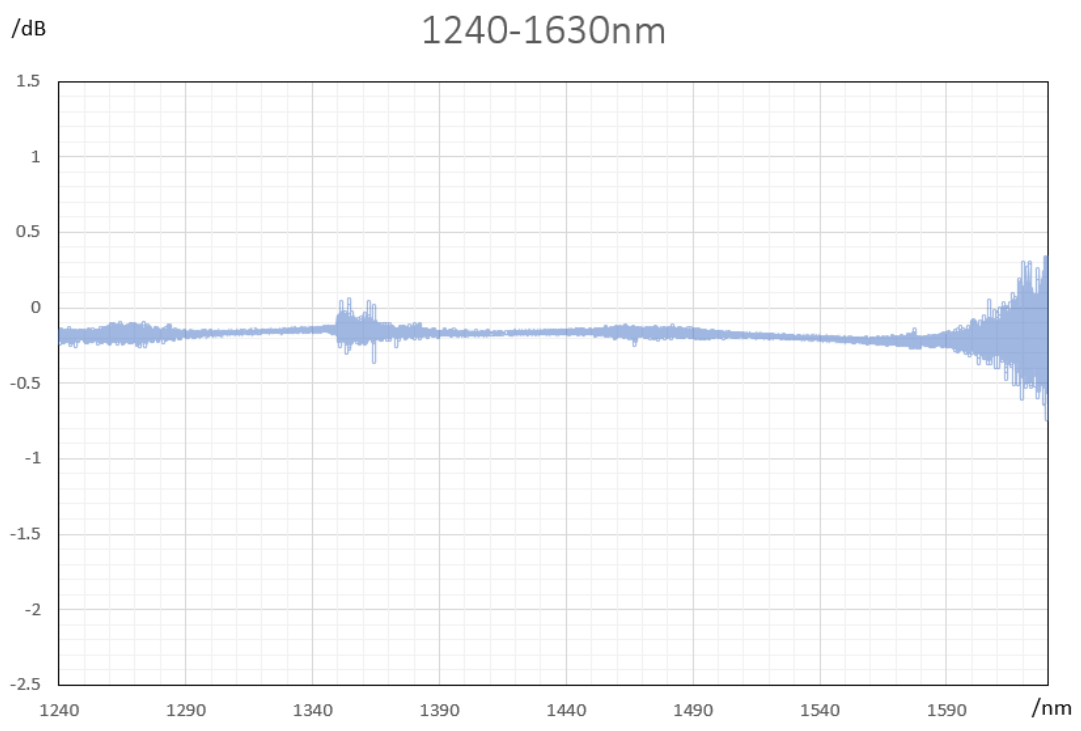
The screenshot shows the PhotonWares Optical Communication Management System interface. The main content area displays 'OXC8 Monitor Info' with a 'NOTE' section and a table of channel status. Below this is the 'Card Basic Info' section with a table of card details.

Chan	IN1	IN2	IN3	IN4	IN5	IN6	IN7	IN8	Operation
OUT	0	0	0	0	0	0	0	0	Config

Type	Slot	SoftVer	HardVer	MadeDate	DevType	SeqNum	UserNote	Operation
OXC8	05	1.01.07	1.01.01	2022/06/13	OXC-8x8	162022050001	NOTE	Config

## Typical Insertion Loss vs Wavelength (1240-1630nm)



# MEMS 8 x 8 Fiber Optical Switch

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## Questions and Answers

**Q:** If the device were to fail, would the switch continue to pass the fiber light through the switch as configured before failure?

**A:** This depends, if one mirror fails, it only affects the light going through that mirror.

**Q:** When power is restored, does the IN/OUT configuration before failure remain in place?

**A:** Yes, when power back up it will go to the previous flightpath

**Q:** If the power to the device were shut off, would the device continue to pass the fiber light as configured before failure?

**A:** This function is called latching. We uniquely offer MEMS latching switches but cost more.

**Q:** With the Ethernet Control Option, does the switch support SNMPv3

**A:** Yes. This internet standard protocol allows user to write their own control code

**Q:** With the Ethernet Control Option, what type of encryption does the SNMPv3 use?

**A:** MD5/DES

**Q:** With the Ethernet Control Option, could this device be controlled by multiple users at different locations and all users will also see the configuration updates?

**A:** Yes

**Q:** With the Ethernet Control Option, does the user need to install any software on their computer other than a web browser?

**A:** No