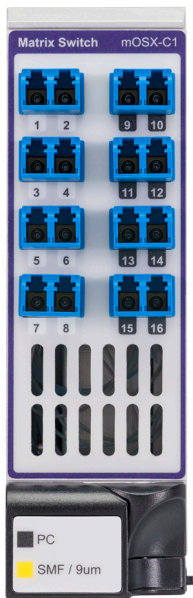# VIAVI

Cross Connect Optical Switch (mOSX-C1)

Optical Matrix Switch for MAP Series

The MAP Series mOSX-C1 optical matrix switch is part of the broader VIAVI test automation switch portfolio. More than just a switch, the mOSX-C1 is a low loss, flexible test path manager. Connecting multiple test paths across the switch fabric enables parallel test processes and dramatically reduce the cost of test.

VIAVI Solutions is the world leader in 1xN optical switches for test and automation applications. For over 30 years VIAVI switches have been a key enabler of test automation strategies to reduce the cost of test. For the first time, cross connect optical switches are being offered as part of the MAP portfolio.

The switch fabric supports a unique any-port to any-port connection fabric and enables both symmetric MxM (for example 8x8), and asymmetric topologies (4x12 for example). This flexibility enables users to reconfigure the switch on demand. Ports can be allocated as needed (input or output) and are not trapped with a connection that cannot be made. All connections may be pre-configured – without light present - and are in a blocking state prior to be being activated. Connections can be made and broken without impact on any other connection.

The mOSX switch adds tremendous test sequence automation flexibility and reduces switch variant requirements across the manufacturing line. The same switch can be used to fill many roles. One switch type can be used in applications ranging from complex manufacturing test sequencing a single DUT, test systems having many independent DUT's or automation of multi-port components.

Benefits

- Increase capital utilization factors, enabling on demand, parallel test architectures
- Replace multi-layer switching architectures, reduces loss and reconfiguration times
- Minimize switching variant
- Drives deeper integration and reduces test set size

Features

- Non-blocking, bidirectional matrix switch
- Wide wavelength range, 1250 to 1675 nm
- 1.0 dB typical insertion loss
- 25ms switching speed
- Flexible SCPI remote interface or MAP Series Graphical User Interface (GUI)
- Connections between ports can be disabled or re-enabled

Applications

- Test system automation for multi-port components, modules and line cards
- Manage complex manufacturing test sequencing
- Can be paired with MAP-Series mOSW modules to create larger more complex switching systems

Safety Information

- When installed in a MAP chassis, MAP optical switches comply with CE, CSA/UL/IEC61010–1, and LXI Class C requirements

When the mOSX is paired with the VIAVI mOSW, large complex switch solutions can be developed, thus minimizing switching costs.

Functional Description

The mOSX switch is a low insertion loss (< 1.0 dB typical and <1.5dB max), fast switching (< 25ms to full specification) and non-blocking matrix switch. The switching engine is based on extremely compact piezo electric actuators that are used to align the signal path using expanded beam optics. Diffraction limited optics connect fiber pairs and ensures industry leading optical performance. A capacitive sensor matrix measures the position of the collimating lens to nanometer accuracy and ensures long term stability and repeatability. Connections are maintained even if light is not present. The simple optical path enables very low PDL and minimizes return loss.

Reflective optics "fold" the switch engine, allowing each fiber to connect to all other fibers. Thus, providing a flexible switch configuration with the same hardware dynamically set up by software. A 16-port switch can be a dual 4x4, 8x8, 7x9, 6x10...or 1x15
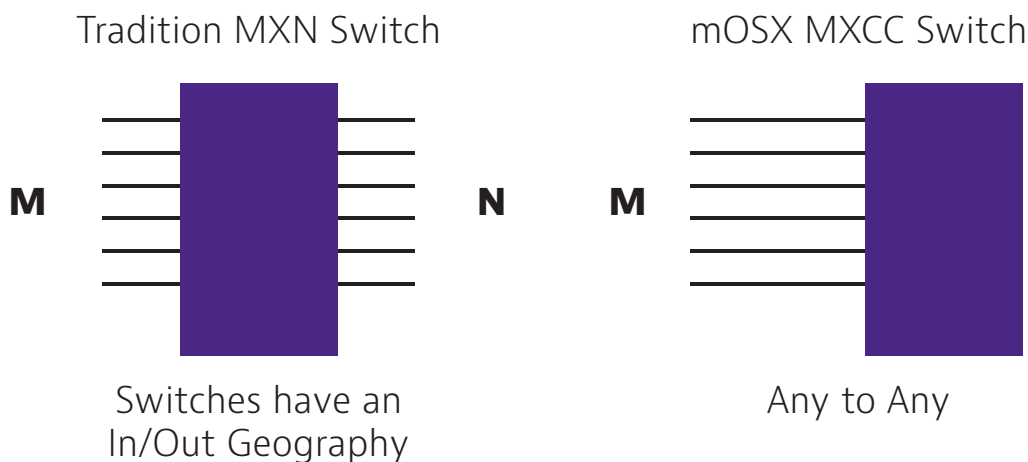

Figure 1. MxN switch topology have an inherent directionality. Ports on the M-side can connect to any N-side port, however M-side ports cannot connect to each other. In an any-to-any or "Common Connection" switch a port can connect to any other port

Making a connection is as simple as identifying the two ports ID's to be connected. As a software option to aid in connection management, it is possible to assign the switch a specific MxN topology (for example 4x12). In this case, connections will only be allowed if they follow the programmed structure. In full any-to-any mode, all connections are possible.
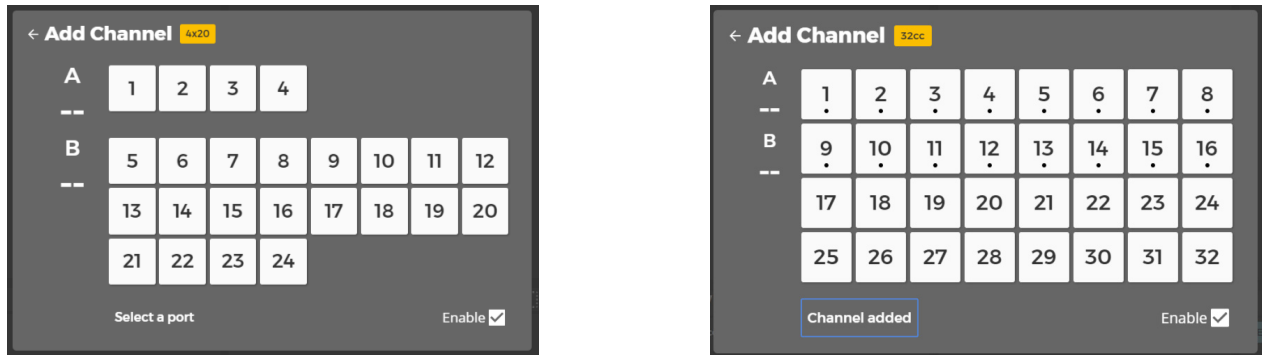

Figure 2. mOSX-C1 MAP-300 add channel dialogue example.
On the left, the switch is set to 4x20 and on the right in full common connection mode.

An intuitive graphic user interface (GUI) is optimized for use in either a laboratory or a manufacturing environment. All ports can be given a logical name to help manage complex systems. Efficient transition between summary and detailed views (figure 2, 3 and 4) allow users to operate at a system level or access the full power of a module.
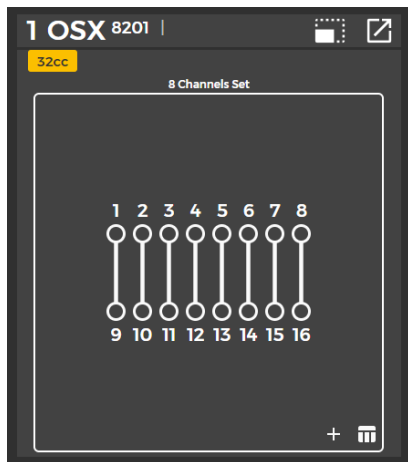

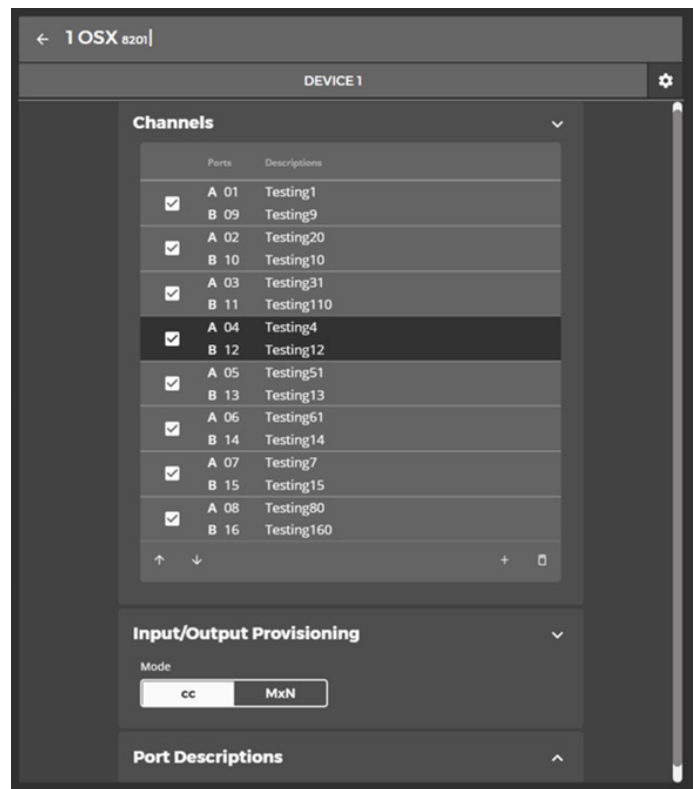Figure 3. mOSX-C1 MAP-300 GUI provides simple visual switch status

Figure 4. mOSX-C1 MAP-300 summary view with port labels.
Active paths shown with check box

Options and Configurations

The mOSX-C1 is offered in a 16-port, 32-port and 48-port variants. The switches are offered in the following configurations.

Number of ports	Connector Type	Slot width
16 ports	LC/APC and LC/PC	Single
	FC/PC, FC/APC, SC/PC and SC/APC	Dual width
32 Ports	LC/APC and LC/PC	Dual Width
48 Ports	LC/APC and LC/ PC	Dual Width

Chassis and Modular Family

The VIAVI Multiple Application Platform (MAP) is a modular, rack mountable or benchtop, optical test and measurement platform with chassis' that can host 2, 3 or 8 application modules. The LightDirect family of modules are characterized by their simple control and single function nature. Individually or together they form the foundation of a diverse array of optical test applications. The web enabled multiuser interface is simple and intuitive. LXI compliant with a full suite of SCPI based automation drivers and PC based management tools, the VIAVI MAP is optimized for both the lab to manufacturing environments.

The mOSX is part of the LightDirect switching modular family. Alongside the many other modules, such as light sources, polarization scramblers, power meters, and spectrum analyzers, the MAP series is the ideal, modular platform for photonic system and module testing.

The mOSX is compatible with all current MAP-300 and MAP-200 chassis.

Specifications

Parameter[1]	Specification	
Matrix Size	16 or 32 ports	48 Ports
Connection Type	Any port to any port	
Operating Wavelength Range	1260 nm to 1675 nm	
Insertion Loss (IL)[2]		
Active Connection Maximum	≤ 1.5 dB	≤ 2.5 dB
Open Port	> 55 dB	
Inactive Connection	> 55 dB	
Return Loss (RL)[3]	> 50 dB	
Polarization Dependent Loss (PDL)[4]	< 0.1 dB	
Repeatability[5](maximum)	± 0.05 dB	± 0.1 dB
IL stability[6]	± 0.05 dB	± 0.1 dB
Wavelength Dependent Loss (WDL)[7]	≤ 0.3 dB	
Temperature Dependent Loss (TDL)[8]	≤ 0.2 dB	≤ 0.5 dB
Crosstalk (maximum)	- 55 dB	-50 dB
Max input power (optical)	500 mW (27 dBm)	
Switching time	≤ 25 ms	
Fiber Type[9]	Single Mode	
Dark Fiber Switching	Yes	
Bi-Direction Optics	Yes	
Lifetime	> 10^9 Cycles	
Warming up Time	60 min	
Operation temperature	10°C to 40°C	
Operation humidity	< 85% RH non-condensing	
Storage temperature	-40°C to +70°C, <40% RH non-condensing	
Dimensions (W x H x D)	Single slot: 4.1 x 13.3 x 37.0 cm (1.6 x 5.22 x 14.58 in)[10]	
	Dual slot: 8.1 x 13.26 x 37.03 cm (3.2 x 5.2 x 5.7 in)	
Weight	Single slot: 1.75 kg (3.75 lb)	
	Dual slot: 3.1 kg (6.8 lb)	
Warranty	1 Year	

1. Unless otherwise stated, all tests done with a depolarized source at 20°C in a temperature-controlled chamber after thermal equalization

2. Including one pair of connectors; tested at 1550 nm

3. Tested with APC connectors at 1550 nm

4. For wavelength range of 1530 nm – 1675 nm. Tested at 1550 nm.

5. Measured between two consecutive readings over 100 cycles

6. Any channel drift relative to reference channel at constant temperature over 15 mins period

7. For wavelength range of 1530 nm – 167 nm

8. Over the temperature range 15 to 35°C at 1550 nm after thermal stabilization

9. For IEC 60793-2-50 Type B1.3/ ISO 11801 OS2 compliant fiber, i.e. Corning SMF-28e

10. MOSX-C1116XCCB0-M100-MLC and MOSX-C1116XCCB0-M100-MLU variants only.

Ordering Information

For more information on this or other products and their availability, please contact your local VIAVI account manager or VIAVI directly at 1-844-GO-VIAVI (1-844-468-4284) or to reach the VIAVI office nearest you, visit viavisolutions.com/contacts.

Order Number	Item Description	Configuration
16-Port Common Connection Optical Matrix Switch		
MOSX-C1116XCCB0-M100-MFA	16 port common connection SMF optical matrix switch FC/APC bulkhead	Dual Slot
MOSX-C1116XCCB0-M100-MFP	16 port common connection SMF optical matrix switch FC/PC bulkhead	
MOSX-C1116XCCB0-M100-MLC	16 port common connection SMF optical matrix switch LC/PC bulkhead	Single Slot
MOSX-C1116XCCB0-M100-MLU	16 port common connection SMF optical matrix switch LC/APC bulkhead	
MOSX-C1116XCCB0-M100-MSC	16 port common connection SMF optical matrix switch SC/PC bulkhead	
MOSX-C1116XCCB0-M100-MSU	16 port common connection SMF optical matrix switch SC/APC bulkhead	
32-Port Common Connection Optical Matrix Switch		
MOSX-C1132XCCB0-M100-MLC	32 port common connection SMF optical matrix switch LC/PC bulkhead	Dual Slot
MOSX-C1132XCCB0-M100-MLU	32 port common connection SMF optical matrix switch LC/APC bulkhead	
48-Port Common Connection Optical Matrix Switch		
MOSX-C1148XCCB0-M100-MLC	48 port common connection SMF optical matrix switch LC/PC bulkhead	Dual Slot
MOSX-C1148XCCB0-M100-MLU	48 port common connection SMF optical matrix switch LC/APC bulkhead	

Accessories

Accessories (Optional)		Product and description
Inspection and cleaning tool	CleanBlast	The patented VIAVI Solutions® CleanBlast fiber end-face cleaning system provides a fast, effective, and cost-efficient solution for removing dirt and debris from connectors in most common applications. It is available in a benchtop and portable version
	FiberChek probe microscope	One-button FiberChek Probe delivers a reliable, fully autonomous, handheld inspection solution for every fiber technician.
	P5000i fiber microscope	Automated Fiber Inspection & Analysis Probe provides PASS/FAIL capability to PC, laptops, mobile devices and VIAVI test solutions.
Replacement Parts	Mating sleeves	AC500;FC/PC-FC/PC Universal Connector Adapter
		AC501;FC/PC-SC/PC Universal Connector Adapter
		AC502;FC/APC-FC/APC Universal Connector Adapter
		AC503;FC/APC-SC/APC Universal Connector Adapter

A wider range of inspection tools are available at VIAVI. More information about the products and accessories can be accessed through our website at www.viavisolutions.com. For further assistant please contact your local VIAVI account manager or VIAVI directly at 1-844-GO-VIAVI (1-844-468-4284) or to reach the VIAVI office nearest you, visit viavisolutions.com/contacts.