

MXS-9100 Optical Switch Rackmount

(Hardware Revision B) Operation Manual



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1. Safety Information

General Safety Information

WARNING

- Do not install or terminate fibers while a light source is active. Never look directly into a live fiber and ensure that your eyes are protected at all times.
- To use of controls, adjustments and procedures other than those specified herein may result in exposure to hazardous situations or impair the protection provided by this unit.

IMPORTANT



When you see the following symbol on your unit , make sure that you understand and meet the required condition before using your product.

Electrical Safety Information

WARNING

- Ensure that your power supply is properly grounded and that the power cable and power supply are compatible with the unit.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- All wiring and installation must be in accordance with local building and electrical codes acceptable to the authorities in the countries where the equipment is installed and used.
- Use only the certified power cord that is suitable rated for the country where the unit is sold.
- Use this unit indoors only.
- Operation of any electrical instrument around flammable gases or fumes constitutes a major safety hazard.
- To avoid electrical shock, do not operate the unit if any part of the outer surface (cover, panels, etc.) is damaged.
- Consideration should be given to the connection of the unit to the supply circuit and the effect that overloading of the circuits might have on over-current protection and supply wiring. Appropriate consideration of equipment nameplate rating should be used when addressing this concern.
- *To avoid the potential for an electrical shock hazard, you must reliably connect an earth ground conductor to the unit. Ensure to ground the unit using a grounding method that complies with your local regulations.*

2. Product Overview

Introduction

Optimized for use with EXFO systems and software control via SCPI over ethernet, the MXS-9100 utilizes DiCon Fiberoptics' industry proven MEMS optical switch technology to reliably connect fibers together in a fully automated maner.

Available as a MxN matrix optical switch, or as an array of multiple 1xN optical switches, the MXS-9100 is the perfect solution for sharing centralized instruments or automated tests in manufacturing.

Electrical Specifications

Parameter	Specification
Supply Voltage	AC 100-240V, 50/60Hz
Switch Latching Type	Non-latching
Control Type	Ethernet Interface and SCPI Command Set
Ethernet Interface	Control via the Perle IOLAN DS1 Device Server, RJ45 receptacle on the rear panel
Front Panel Power Status LED	LED will be lit up when power is turned on

Equipment Ratings

Parameter	Specification
Operation Temperature	0 °C to 50°C (32 °F to 122 °F)
Storage Temperature	-20 °C to 60 °C (-4 °F to 140 °F)
Relative Humidity	0% to 80% non-condensing
Maximum Operation Altitude	2,000 m (6,561.68 ft)
Pollution Degree	2
Overvoltage Category	II
Input Power	AC 100-240 V (Not exceeding $\pm 10\%$ of the nominal voltage); 50/60 Hz; 2 A/1 A

Mechanical Specifications

Chassis Size	Rating
1U	Height: 44.0 mm Width: 483 mm (19") Depth: 342 mm
2U	Height: 88.0 mm Width: 483 mm (19") Depth: 434.5 mm
4U	Height: 177 mm Width: 483 mm (19") Depth: 434.5 mm

MxN Matrix, MXS-9100 Chassis Size

Matrix Switch Size	2x8 to 16x16	24x24 to 32x32	48x48 to 96x96
Chassis Size	1U	2U	4U

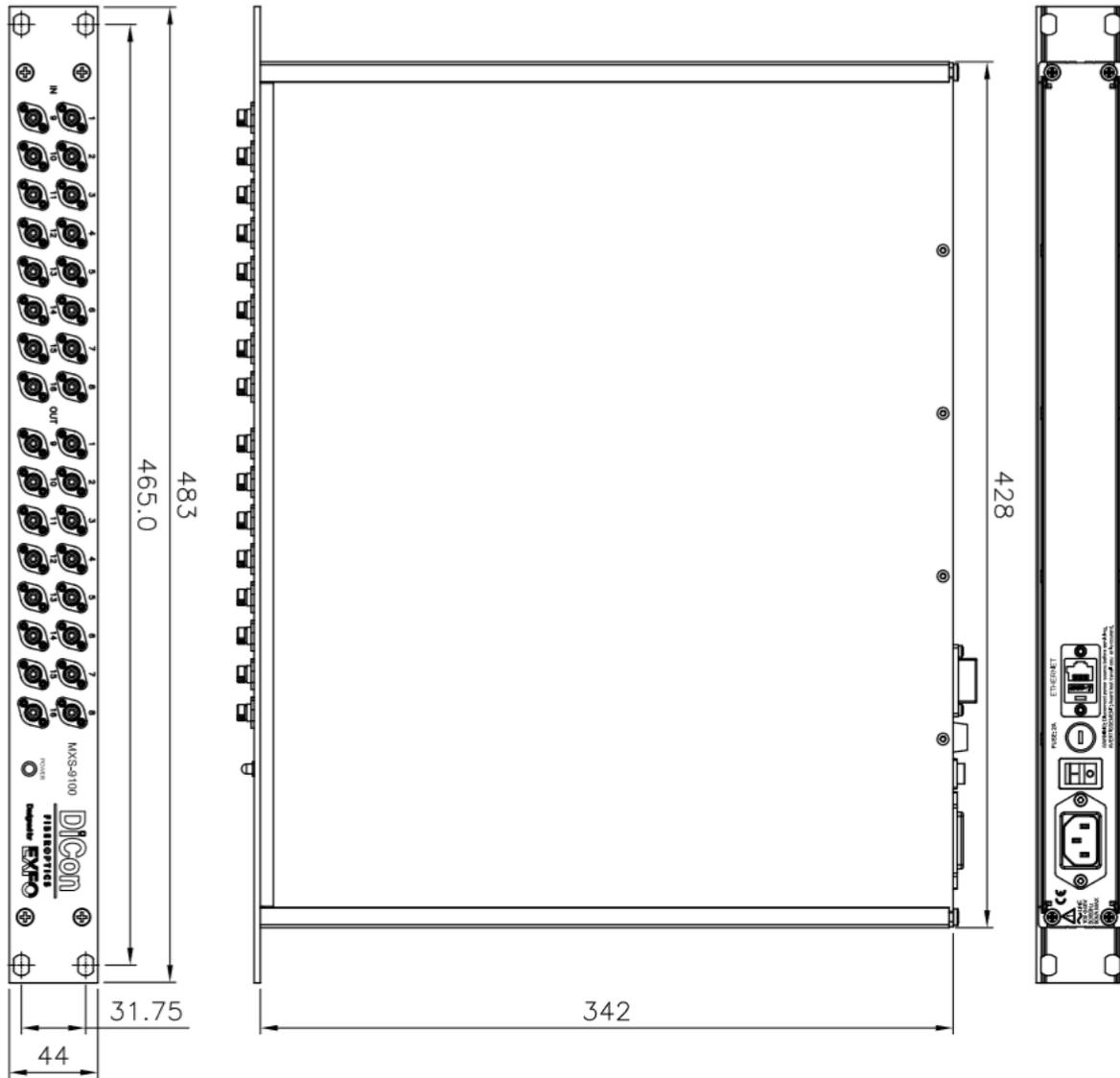
Singlemode 1xN, MXS-9100 Chassis Size

Number of Switches	1x4			1x8		
	FC/APC FC/UPC	LC/APC LC/UPC	SC/APC SC/UPC	FC/APC FC/UPC	LC/APC LC/UPC	SC/APC SC/UPC
1	1U	1U	1U	1U	1U	1U
2	1U	1U	1U	1U	1U	1U
4	1U	1U	1U	1U	1U	1U
6	1U	1U	1U	2U	1U	2U
8	2U	1U	2U	4U	1U	2U

Multimode 1xN, MXS-9100 Chassis Size

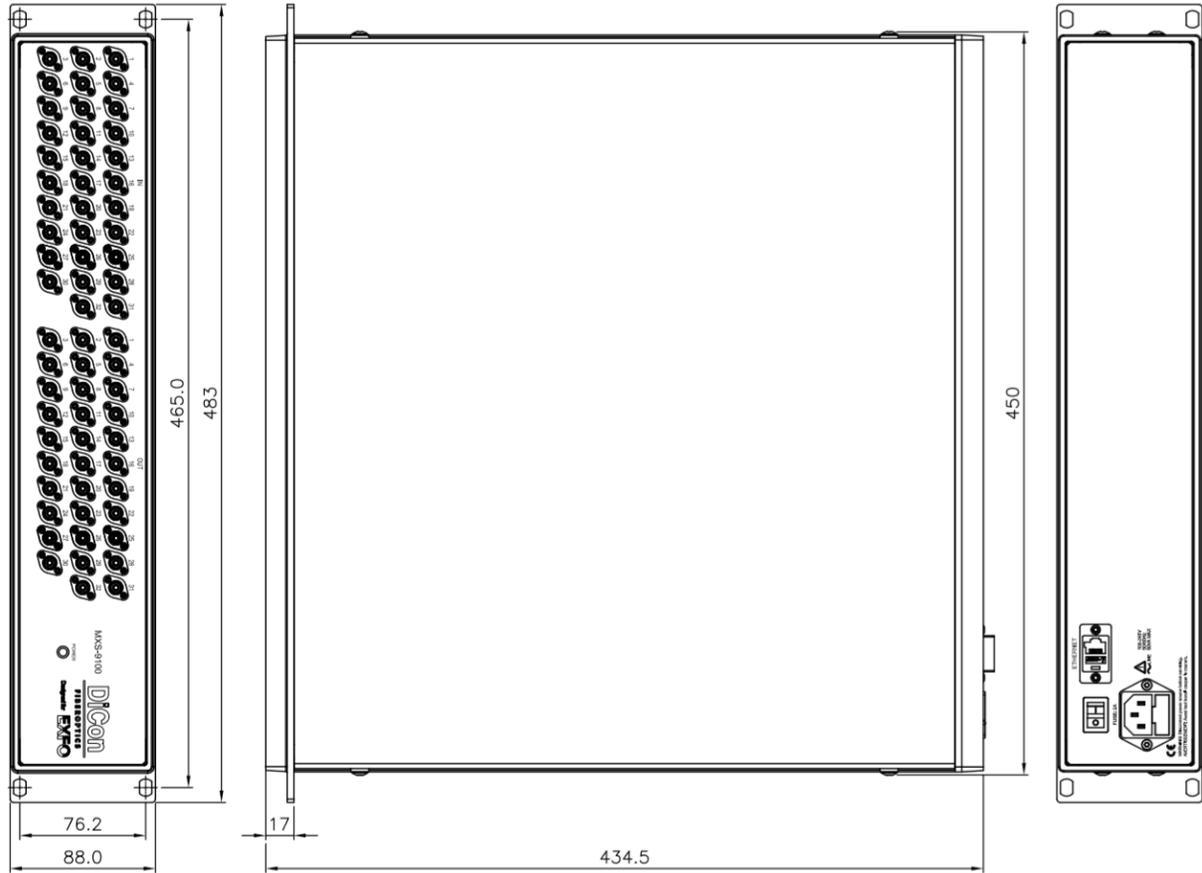
Number of Switches	1x4		1x8		1x12	
	FC	SC	FC	SC	FC	SC
1	1U	1U	1U	1U	1U	1U
2	1U	1U	1U	1U	1U	1U
4	1U	1U	1U	1U	2U	2U
6	1U	1U	2U	2U	-	-
8	2U	2U	4U	2U	-	-

Mechanical Dimensions – 1U



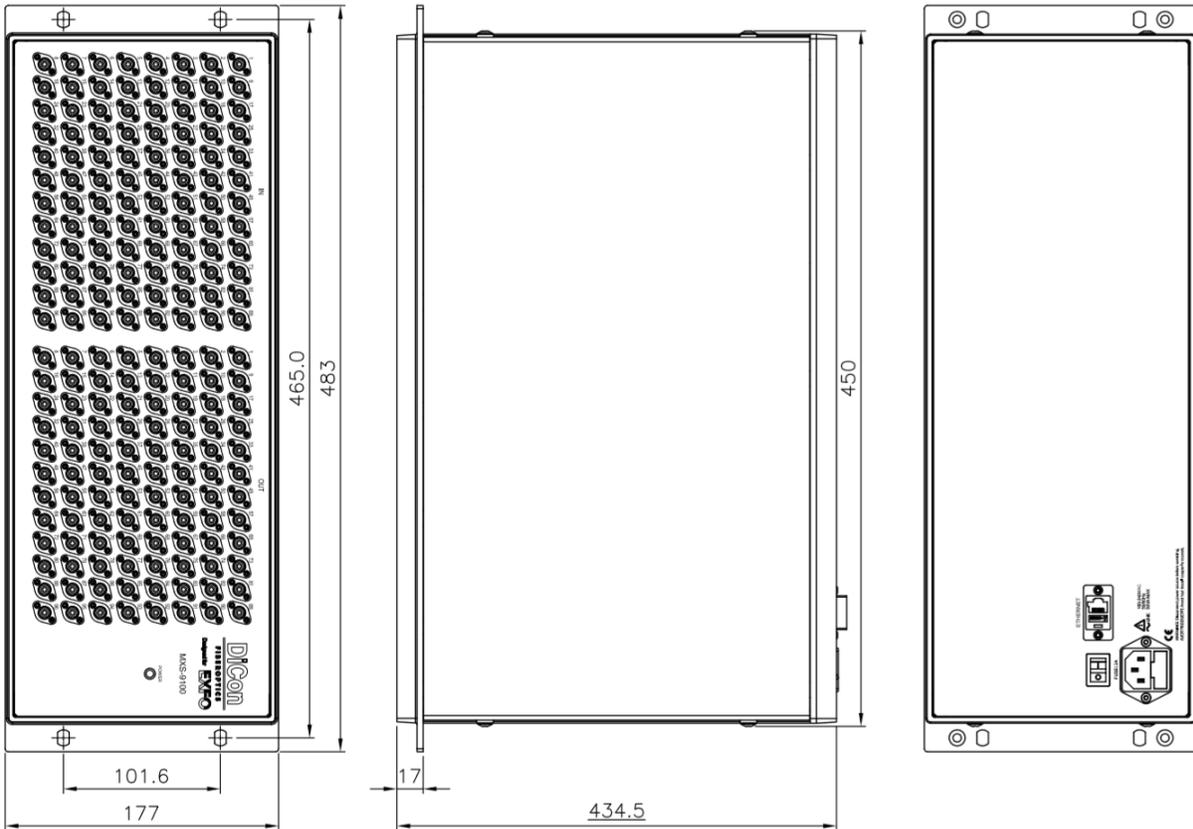
For illustrative purposes an MXS-9100 MEMS 16x16 Matrix Switch is shown (Unit: mm)

Mechanical Dimensions – 2U



For illustrative purposes an MXS-9100 MEMS 32x32 Matrix Switch is shown (Unit: mm)

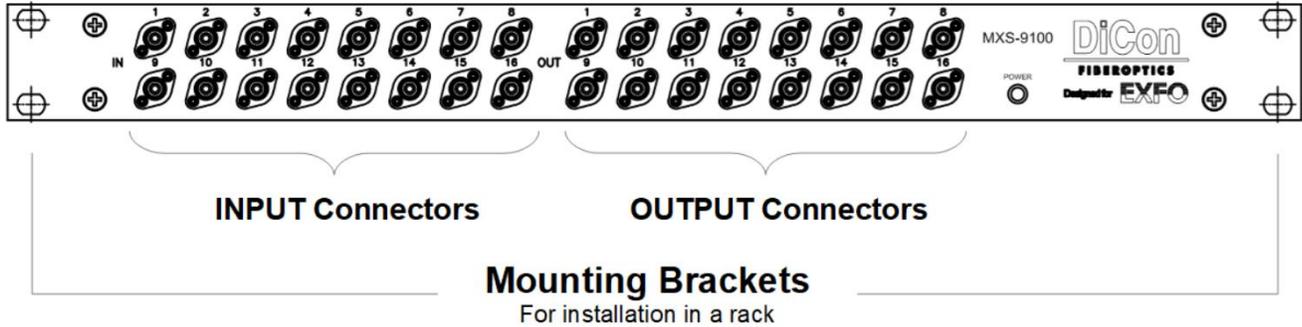
Mechanical Dimensions – 4U



For illustrative purposes an MXS-9100 MEMS 96x96 Matrix Switch is shown (Unit: mm)

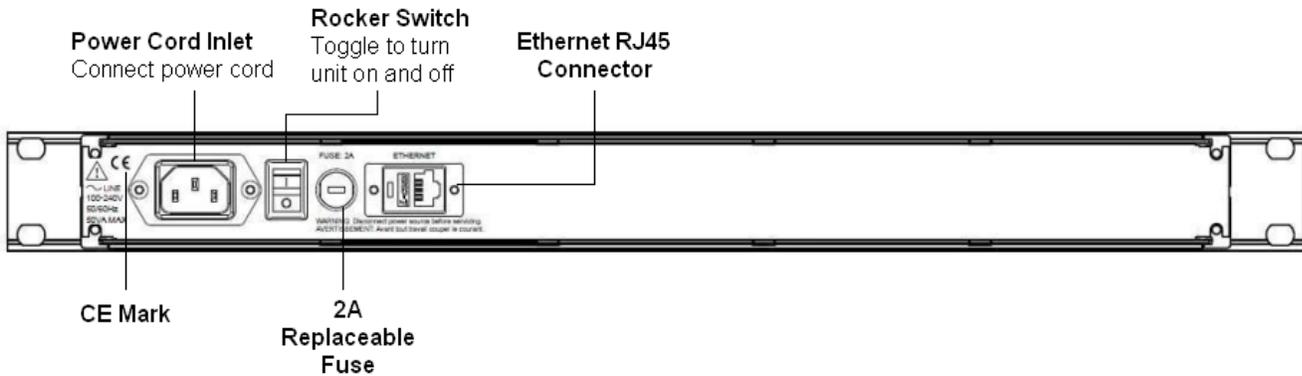
Panel Labeling – 1U

Front Panel Labeling



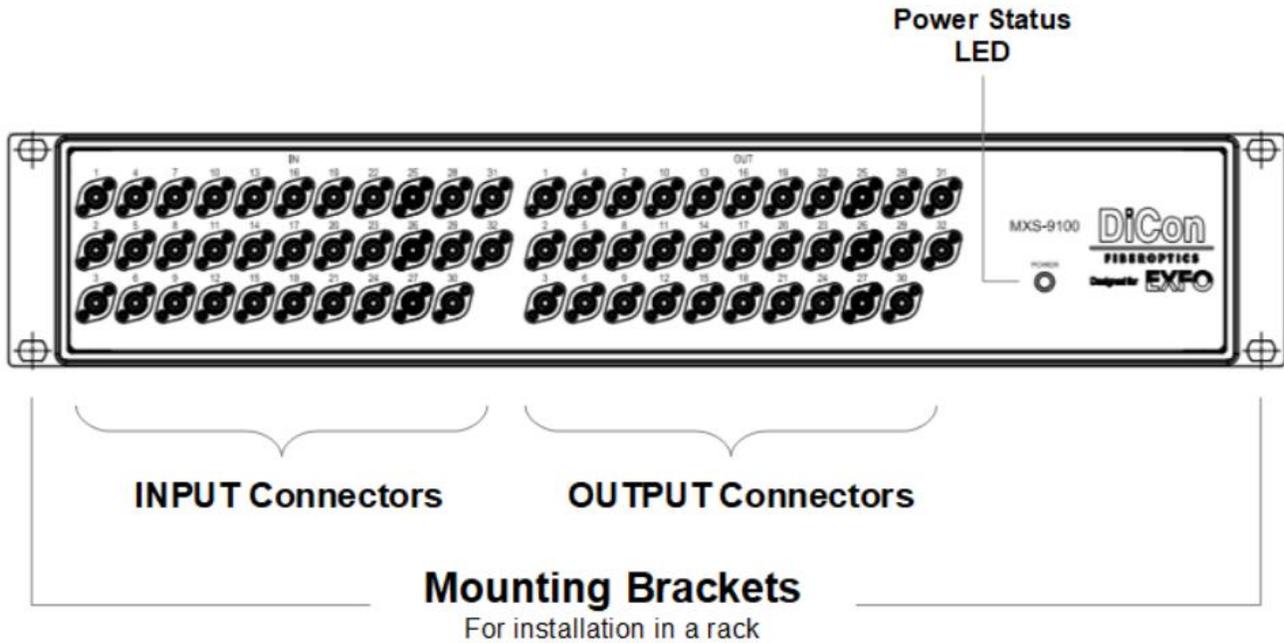
For illustrative purposes labeling shown for MXS-9100 MEMS 16x16 Matrix Switch

Rear Panel Labeling



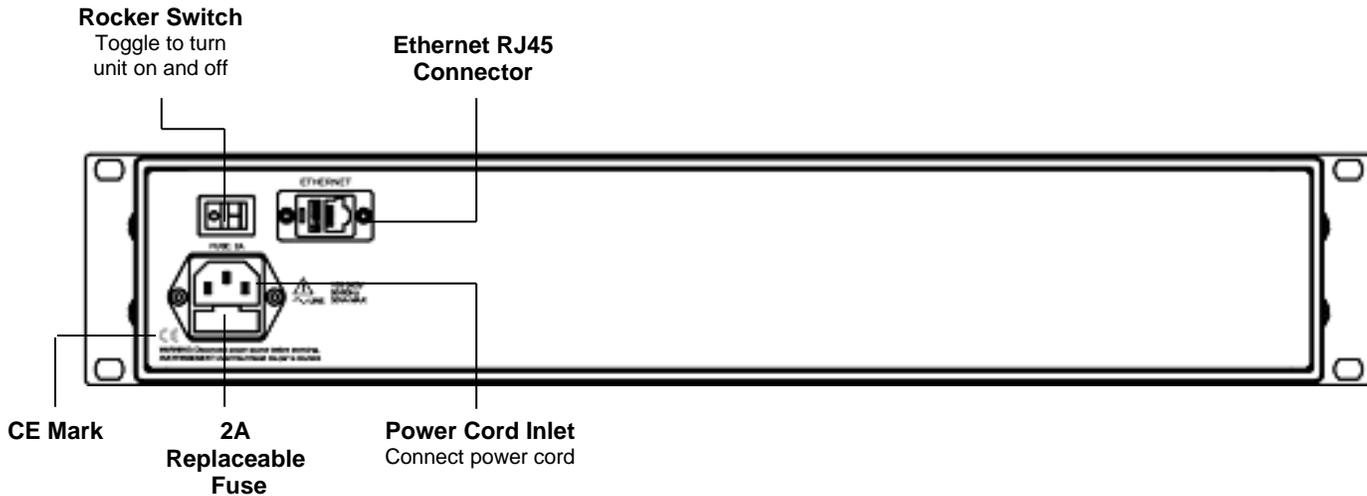
Panel Labeling – 2U

Front Panel Labeling



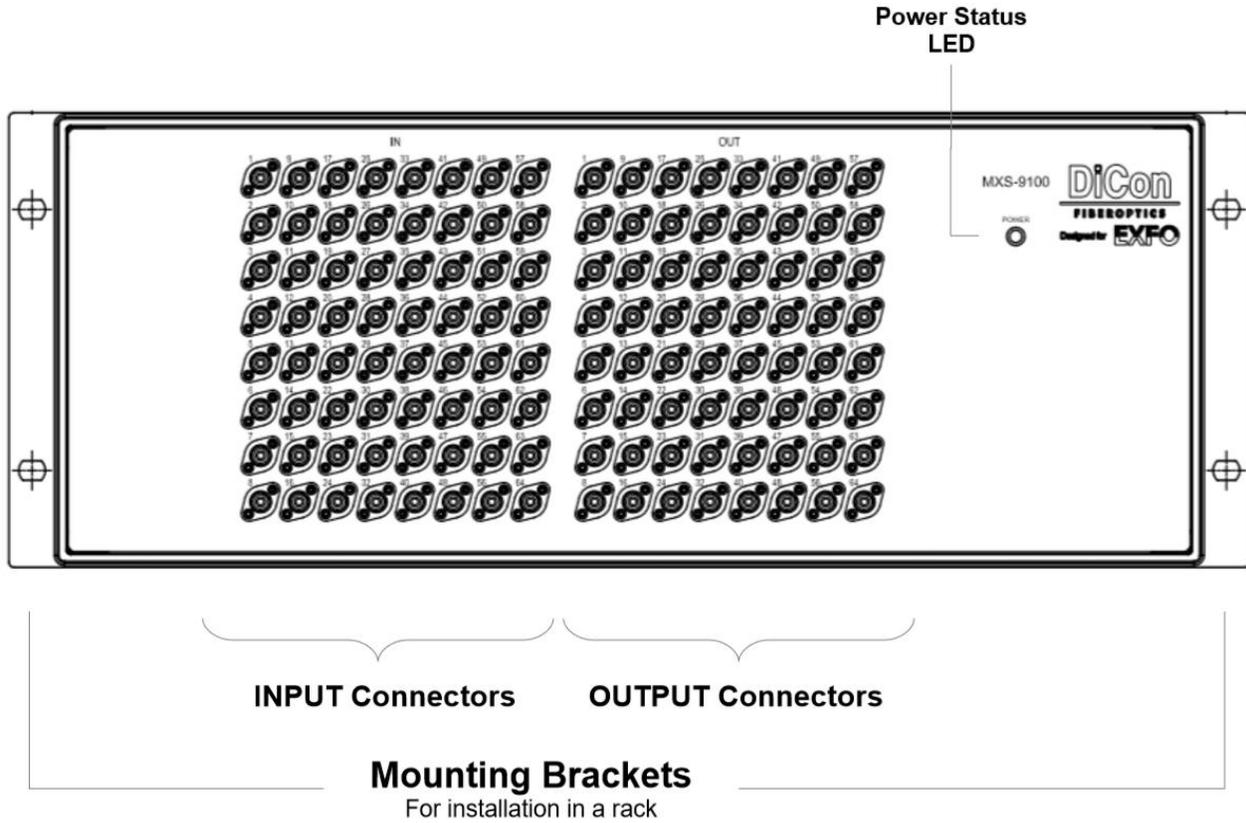
For illustrative purposes labeling shown for MXS-9100 MEMS 32x32 Matrix Switch

Rear Panel Labeling



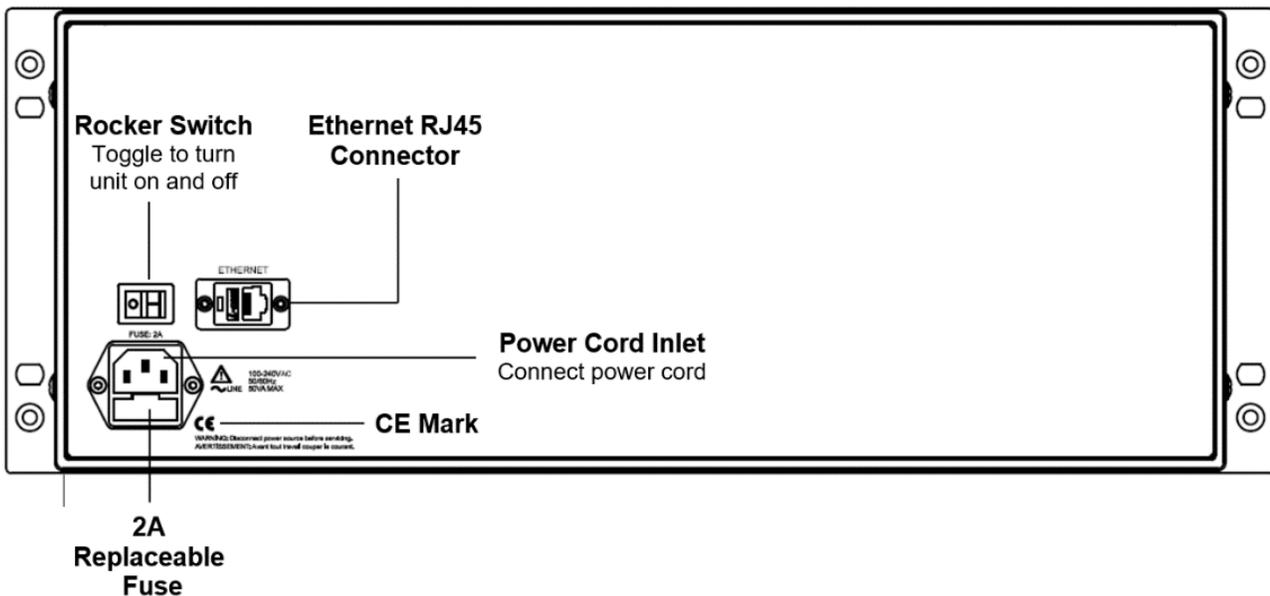
Panel Labeling – 4U

Front Panel Labeling



For illustrative purposes labeling shown for MXS-9100 MEMS 64x64 Matrix Switch

Rear Panel Labeling



Items included in Shipping Box

- MXS-9100 MEMS Rackmount Optical Switch
- Power Cords, one each for use in the following:
 - North America (DiCon P/N: 50302-000 or equivalent)
 - Europe (DiCon P/N: 5040095-001 or equivalent)
 - UK (DiCon P/N: 5040096-001 or equivalent)
 - Japan (DiCon P/N: 50303-001 or equivalent)
 - China (DiCon P/N: 50304-001 or equivalent)
- Software CD: Includes Manual in PDF form & Device Server Installation Software, DiCon P/N 97064-001
- Printed test report

3. Remote Operation

Overview

The MXS-9100 can be controlled remotely over the network via the Ethernet interface.

NOTE: The MXS-9100 has an integrated Perle IOLAN DS1 Device Server to enable network access to the native RS232 interface of the switch module inside the chassis. For simple setups, follow the steps described below. For more advanced setups and troubleshooting, the Perle IOLAN DS1 User Guide is provided in the Perle IOLAN DS1 Device Server Software CD.

Ethernet Setup

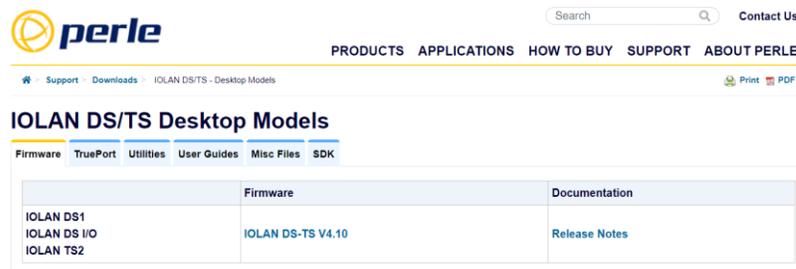
Follow the steps described below to set up the MXS-9100 for remote operation.

Getting Started

1. Connect an Ethernet cable from the network to the RJ45 port on the rear panel.
2. Turn on the unit using the rocker switch on the rear panel.

Installing the DeviceManager Program

3. Insert the Perle IOLAN DS1 Device Server Software CD into your CD-ROM drive. If the CD does not launch automatically, browse the CD and start the installation program **device_manager/IOLAN_DeviceManager_v4.9.0.0.exe** (version may vary) manually.
4. Or download from:
https://www.perle.com/downloads/server_ds_ts.shtml#utilities

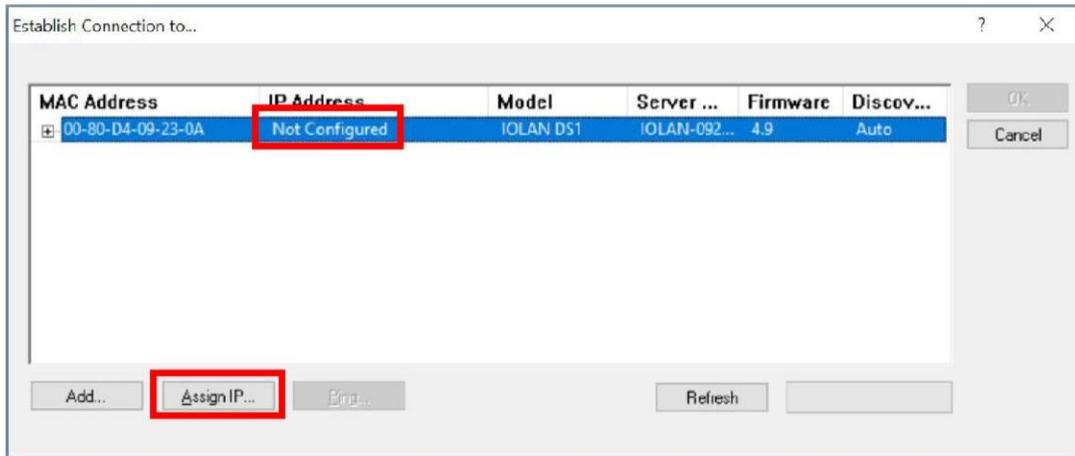


5. Follow the prompts to install the DeviceManager program.

Assigning an IP Address using the DeviceManager

Type the following credentials to access the Configuration Session:
Password: superuser

6. Start the DeviceManager program.
7. To find the device, make sure the “EXFO Rackmount” is plugged in and powered on, then click the Refresh button. DeviceManager locates the unit and adds it to the list.
8. All discovered IOLAN devices (such as the MXS-9100 or MOA-3800) will be displayed on the list along with their name and IP address. When a new IOLAN device is discovered on the network, that has not yet been assigned an IP address, it will be displayed with an IP Address of Not Configured.
9. To configure the IP address, click on the device and then click the Assign IP button.

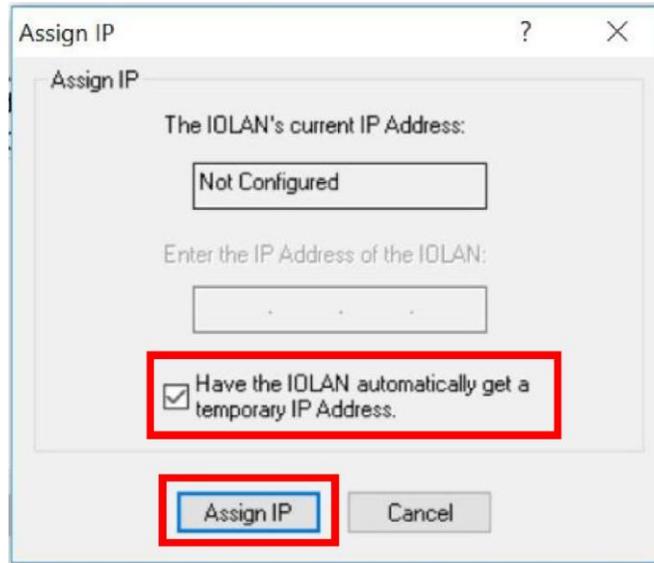


See the Manual (Chapter 3) on the CD drive for more details if needed.

10. There are two ways to assign IP:
 - a. Type in the IP address that you want to assign to the device



- b. Automatically have the device server assign a temporary IP address, this is done by checking the box with “Have the Device Server automatically get a temporary IP Address”.



Checking the box will turn on the DHCP/BOOTP server, DeviceManager will assign a temporarily IP address within the range of 169.254.0.1-169.254.255.255 that will be used only for the duration of the DeviceManager/IOLAN communication

- 11. Once an IP address has been typed in or assign automatically, click on Assign IP, you will be prompt on keying in credentials.



Type the following credentials to access the Configuration Session:

Password: superuser

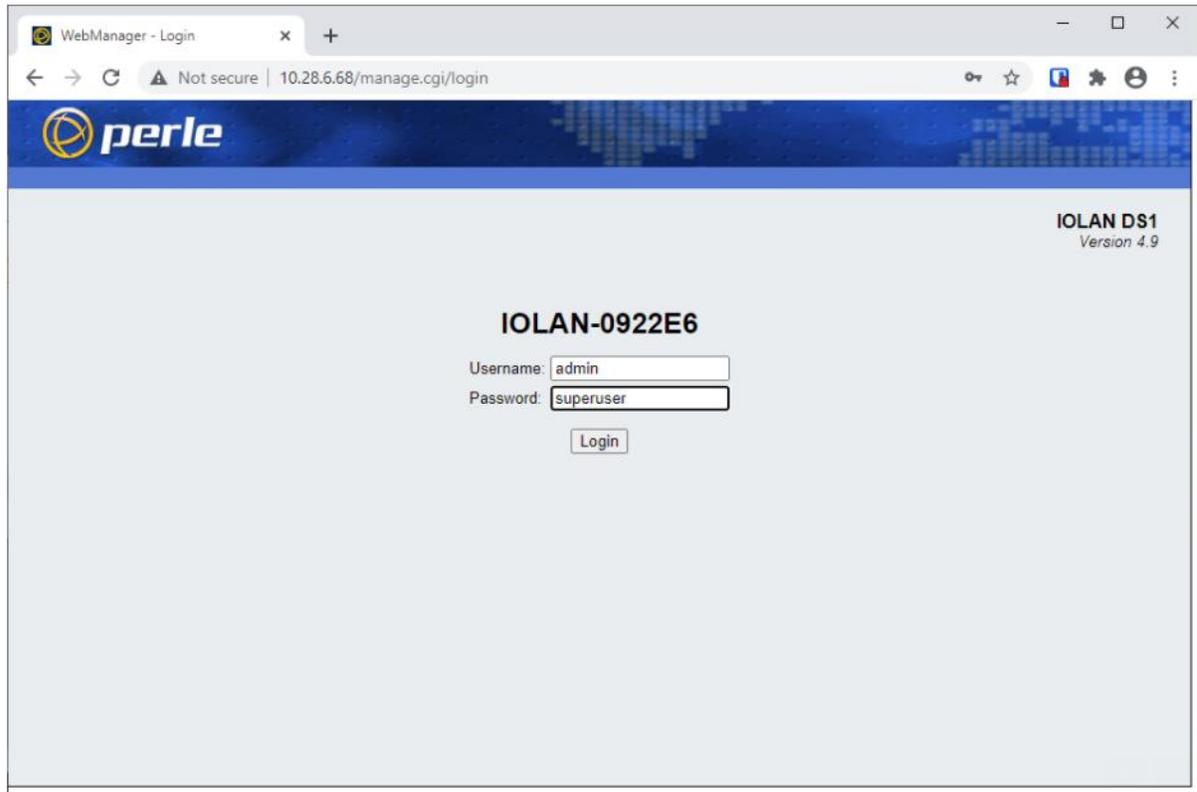
NOTE: Once the Perle Device Server has an IP, it can be configured. The default serial configuration is set at the factory and should not be changed. The DeviceManager program should normally be used only to find and set the IP address of the MXS-9100. Changing the serial configuration may cause communication problems.

Using the Perle WebManager

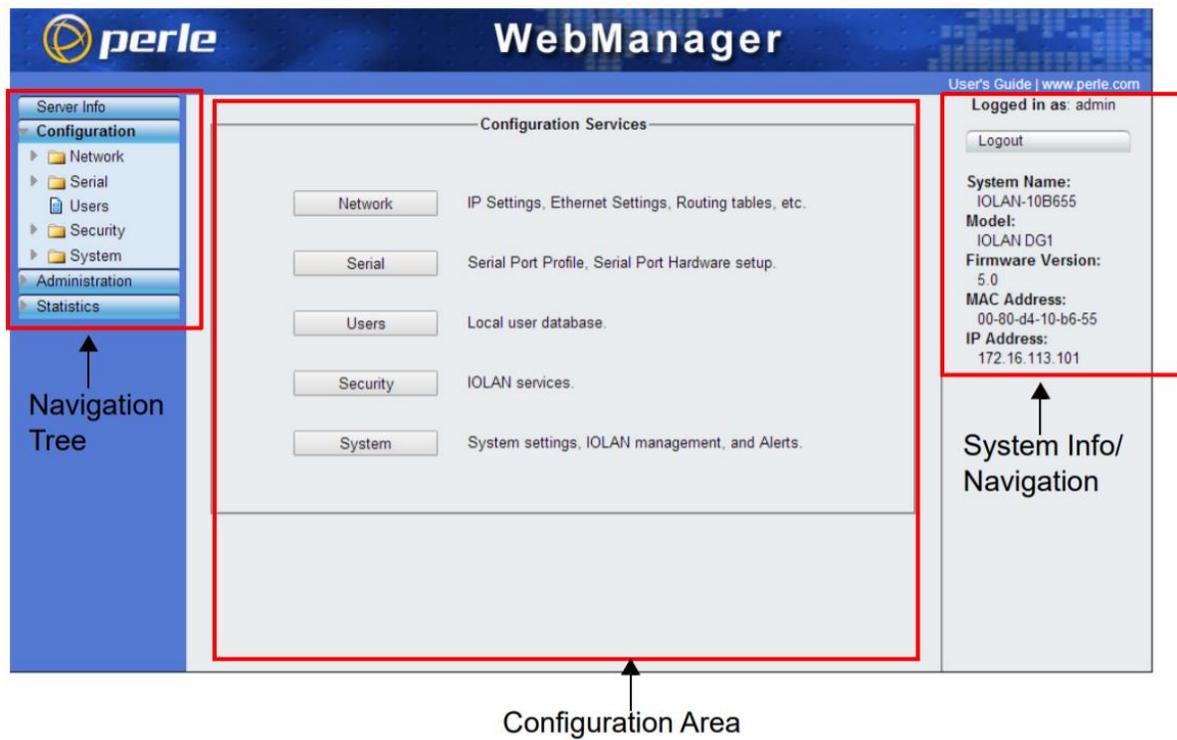
The Perle WebManager allows user to configure IP address.

To use the Perle WebManager, you must already have the MXS-9100 configured with an IP address via the DeviceManager.

To access the Perle WebManager, key in the assigned IP address into your browser (such as 164.254.192.18) and press ENTER, the following window would appear.



Key in the Username: admin and Password: superuser to access the WebManager interface below:



All settings from the Perle WebManager will be automatically downloaded when you select the apply button on each page however a reboot of the MXS-9100 is required for settings to take effect.

Communicating with the MXS-9100

After the IP address has been assigned, you can open a TCP/IP connection with the MXS-9100 over the network. To start sending and receiving commands, initialize a connection with the MXS-9100 using the IP address and port 10001. A terminal program can be used to verify the connection and send commands manually.

Command Conventions

The MXS-9100 remote commands are described below.

Command Interface Notes

- Tokens enclosed in square brackets [] represent input parameters. Replace these tokens with data specific to the task.
- Portions of commands that are lowercase are optional. The uppercase portions are required.

For example, the following commands are identical:

```
ROUTE2:OPEN:STATE?  
ROUT2:OPEN:STAT?  
ROUTE2:OPEN:STAT?  
ROUT2:OPEN:STATE?
```

- Commands do not send replies unless noted otherwise.
- Commands that reply with multiple data items separate each item with a comma and a space.
- Commands and replies are terminated with a Carriage Return character (ASCII #13).
- Commands may be combined with other commands using a semicolon character (“;”).

Example:

```
ROUT6:SCAN 2;ROUT7:SCAN 3  
ROUT6:SCAN:NEXT;ROUT7:SCAN:NEXT
```

- For SCPI commands, the module will remember the portion of a command up to and including the last colon character. Subsequent commands may optionally omit that portion of the command to achieve a shorter command string. In order to avoid ambiguity between commands, you may precede a command with a colon character (‘:’), which will cause the module to disregard the stored portion of the preceding command.

Example:

ROUT6:SCAN 2	Sets input channel 6 to output channel 2.
SCAN?	Returns “2”
SCAN:NEXT	Sets input channel 6 to output channel 3.
NEXT	Sets input channel 6 to output channel 4.
NEXT	Sets input channel 6 to output channel 5.
ROUT7:SCAN 1	Sets input channel 7 to output channel 1.

SCPI Commands

SCPI Command Set

SCPI Command	Description
:ROUte[1...n]:CLOSe	This command will park the indicated input to the off position.
:ROUte[1...n]:OPeN	This command will open the selected input port, setting it back to the position it had before being closed
:ROUte[1...n]:OPeN:STATe?	This command will indicate if a requested input is optically open.
:ROUte[1...n]:PATH:CATalog?	This command will return the dimensions of the switch(es) in use (ex. 8x1x4).
:ROUte[1...n]:SCAN	This command will set the specified input channel to the specified output channel.
:ROUte[1...n]:SCAN?	Queries to which output channel the specified input channel is set.
:ROUte:SCAN:ALL?	This command will return a list of all the output channels currently connected to each input channel.
:ROUte[1...n]:SCAN:NEXT	This command increments the output channel number to which the specified input channel is connected.
:ROUte:SCAN:OUT? n	This command will return the input channel for any given output, 'n'.
:ROUte[1...]:SCAN:PREV	This command decrements the output channel number to which the specified input channel is connected.
:ROUte[j]:SCAN:SYNChronous?	Always returns "ON".
:SNUMber?	Returns the module serial number.
:STATus?	Returns the module status string according to the IQS-9100 manual, page 87. This will almost always be "READY".
:SYSTem:ERRor?	Error query
:SYSTem:VERSion?	SCPI version query
*CLS	Clear Status
*ESE	Standard Event Status Enable
*ESE?	Query Standard Event Status Enable
*ESR?	Query Event Status Register
*IDN?	Query Identification
*OPC	Operation Complete
*OPC?	Operation Complete Query
*RST	Reset
*SRE	Service Request Enable
*SRE?	Query Service Request Enable
*STB?	Query Status Byte
*TST?	Self-Test
*WAI	Wait-to-Continue
QCT?	Query the total number of times that switch states have been recorded.
WEN n	This command will either enable or disable an auto-save switch state feature. The default for this command is set to disabled.
WEN?	Query if the WEN command is enabled or disabled
WL n ¹	Sets the wavelength of calibration.
WL n? ¹	Queries the value of 'n' used in the wavelength set command.
WL? ¹	Queries the value of the variable 'n' used in the 'WL n' command. .

1. WL n, WL n?, WL? Commands are for matrix switches larger than 16x16

ROUTE [i] : CLOSE

This command positions input channel *i* to the park position. In the park position there is no optical continuity.

Examples:

ROUT4 : CLOS	Closes input channel 4.
ROUTE5 : CLOS	Closes input channel 5.
ROUT2 : CLOSE	Closes input channel 2.

ROUTE [i] : OPEN

This command restores input channel *i* from the park position (no optical continuity) to the channel position in effect when the switch was closed.

Examples:

ROUTE4 : OPEN	Opens input channel 4.
ROUT5 : OPEN	Opens input channel 5.
ROUT1 : OPEN	Opens input channel 1.

ROUTE [i] : OPEN : STATE?

This command returns the connected/parked state of input channel *i*. It will return 0 if closed (“parked,” no optical continuity), or 1 if opened.

Examples:

ROUT4 : OPEN : STAT?	Queries whether input channel 4 is open or closed. It will return 0 if closed, and 1 if opened.
ROUTE6 : OPEN : STAT?	Queries whether input channel 6 is open or closed. It will return 0 if closed, and 1 if opened.
ROUT8 : OPEN : STATE?	Queries whether input channel 8 is open or closed. It will return 0 if closed, and 1 if opened.

ROUTE [i] : PATH : CATALOG?

This command returns the dimensions of input channel *i* in the format 1xN, where N is the number of output channels. [*i*] can be omitted in which case the whole rackmount dimension in the format ix1xN will be returned. If the switch is a 3D Matrix Switch it will return in the format MxN, where M is the number of input channels and N is the number of output channels.

Examples:

ROUT2 : PATH : CAT?	For an array switch with multiple 1x8 switches, this command will return with the string “1x8”.
ROUTE : PATH : CAT?	For an array switch with four 1x4 switches, this command will return the string “4x1x4”.
ROUT : PATH : CATALOG?	For a 3D switch with sixteen input channels and sixteen output channels, this command will return the string “16x16”.

ROUTE [i] : SCAN [output]

This command sets input channel *i* to the specified output channel.

Example:

ROUT4 : SCAN 5	Sets input channel 4 to output channel 5.
ROUT1 : SCAN 2	Sets input channel 1 to output channel 2.
ROUT2 : SCAN 1	Sets input channel 2 to output channel 1.
ROUT2 : SCAN 5	Sets input channel 2 to output channel 5.

ROUTE [i] : SCAN?

This command returns the current output channel for input channel *i*.

Example:

ROUT4 : SCAN?	Queries the output channel of input channel 4.
ROUT3 : SCAN?	Queries the output channel of input channel 3.
ROUT2 : SCAN?	Queries the output channel of input channel 2.

ROUTE : SCAN : ALL?

This command will return a list of all the output channels currently connected to each input channel.

Example:

ROUTE : SCAN : ALL?	Queries all output channels for each input. If an input is not connected to an output a 0 will be returned for that given input. 8x8 example with only input channel 2 connected to output 3: "0 3 0 0 0 0 0"
---------------------	---

ROUTE [i] : SCAN : NEXT

This command sets input channel *i* to the next sequential output channel.

If the input channel is already positioned at its maximum output channel, this command will generate a device error.

Examples:

ROUT5 : SCAN : NEXT	If input channel 5 is connected to output channel 2, this command connects input channel 5 to output channel 3.
ROUTE6 : SCAN : NEXT	If input channel 6 is connected to output channel 2, this command connects input channel 6 to output channel 3.
ROUT7 : SCAN : NEXT	If input channel 7 is connected to output channel 1, this command connects input channel 7 to output channel 2.

ROUTE : SCAN : OUT? [n]

This command will return the input channel for any given output, [n].

Examples:

ROUTE : SCAN : OUT? 1	If output channel 1 is connected to input channel 2, this command will return 2.
ROUTE : SCAN : OUT? 2	If output channel 2 is connected to input channel 4, this command will return 4.
ROUTE : SCAN : OUT? 3	If output channel 4 is connected to input channel 1, this command will return 1.

ROUTE [i] : SCAN : PREV

This command sets input channel *i* to the previous sequential output channel.

If the input channel is already positioned at output channel 0, this command will generate a device error.

Examples:

ROUTE3 : SCAN : PREV	If input channel 3 is connected to output channel 2, this command connects input channel 3 to output channel 1.
ROUTE2 : SCAN : PREV	If input channel 2 is connected to output channel 1, this command connects input channel 2 to output channel 0 (parked).
ROUTE1 : SCAN : PREV	If input channel 1 is connected to output channel 9, this command connects input channel 2 to output channel 8.

ROUTE [i] : SCAN : SYNChronous?

This command always returns "ON." This switch module always changes position synchronously.

ROUTE [1 . . n] : SCAN : SYNChronous

This command is not supported. This switch module does not support asynchronous operations.

SNUMBER?

This command returns the switch module serial number.

Examples:

SNUM?	Both examples query the serial number of the switch module.
SNUMBER?	

STATus?

This command returns the module status string according to table below.

Table 1. Module Status Description

Status Value	Description
UNINITIALIZED	The module is not initialized.
INITINPROGRESS	The module initialization is in progress.
READY	The module is ready.
BUSY	The module is busy.
DISCONNECTED	The module is disconnected.
DEFECTIVE	The module is defective.
UNCONFIGURED	The module is not configured.

Examples:

STAT?	Both examples query the status of the switch module.
STATUS?	

SYSTEM:ERROR?

Error query. This command returns the error from the front of the module's error queue and removes that error from the queue.

The error is reported as two values. The first value is the numeric code of the error. The second value is a short string description of the error.

If the error queue is empty, it returns error 0, indicating no error.

The maximum error queue size is 8. When the error queue is full, the module will not record new errors until there is space available in the error queue.

SYSTEM:VERSION?

SCPI version query

IEEE 488.2 Commands

*CLS

Clear Status. This command clears the Standard Event Status Register and the Status Byte Register.

*ESE [mask]

Standard Event Status Enable. This command assigns the value of mask to the Standard Event Status Enable Register. Every bit in the Standard Event Status Enable Register corresponds to a specific event. The events are defined in Table 2 below. When an enabled event takes place, the Event Summary Bit (ESB) of the Status Byte Register is set to 1. To enable an event bit, set the bit to 1. Set disabled bits to 0.

To determine if an enabled event has occurred, execute a Status Byte Query command (*STB?) and evaluate the ESB. To determine which event took place, execute an Event Status Register Query command (*ESR?). See Section **IEEE488.2 Status Registers** for more details.

Table 2. Standard Event Status Enable Register

Name	Description	Bit	Decimal
OPC	Operation Complete	0	1
RQC	Request Control (N/A, always 0)	1	2
QYE	Query Error	2	4
DDE	Device Dependent Error	3	8
EXE	Execution Error	4	16
CME	Command Error	5	32
URQ	User Request	6	64
PON	Power On	7	128

*ESE?

Query Standard Event Status Enable. This query returns the contents of the Standard Event Status Enable Register. The events are defined in the table above. Enabled event bits are set to 1. Disabled bits are set to 0.

*ESR?

Query Event Status Register. This query returns and clears the contents of the Standard Event Status Register.

When an event takes place, the corresponding Standard Event Status Register bit is set. If you have enabled the corresponding bit in the Standard Event Status Enable Register using the Event Status Enable command (*ESE), the Event Summary Bit (ESB) of the Status Byte Register is also set to 1. See Section **IEEE488.2 Status Registers** for more details.

*IDN?

Query Identification. This query returns the module's identification string. The command returns `DiCon Fiberoptics Inc, MG4, [serial], [revision]` where *serial* is the control module's serial number and *revision* is the firmware revision level.

***OPC**

Operation Complete. This command sets the Operation Complete (OPC) bit of the Standard Event Status Register when all pending device operations are complete.

Note that the Operation Complete Query (***OPC?**) is fundamentally different from the Operation Complete command (***OPC**). While the ***OPC** command sets a bit in the Event Status Register when pending operations complete, the ***OPC?** query sends a response directly to the output queue when pending operations complete.

***OPC?**

Operation Complete Query. This query returns "1" when all pending module operations are complete.

Note that the Operation Complete Query command (***OPC?**) is fundamentally different from the Operation Complete command (***OPC**). While the ***OPC** command sets a bit in the Event Status Register when pending operations complete, the ***OPC?** query sends a response directly to the output queue when pending operations complete.

***RCL [register]**

Recall saved state. This command restores the module to the saved state specified by register. User-configurable memory registers store the output channel for every input channel.

Recalling state 0 (***RCL 0**) sets the all input channels to output channel 0 (parked, no optical continuity). ***RCL 0** is equivalent to ***RST**.

***RST**

Reset. This command sets the all input channels to output channel 0 (parked, no optical continuity). The ***RST** command is equivalent to ***RCL 0**.

***SAV [register]**

Save current state. The ***SAV** command saves the current state of the module into memory register number *register*. User-configurable memory registers store the output channel for every input channel.

***SRE [mask]**

Service Request Enable. This command assigns the value of mask to the Service Request Enable Register. The bits in the Service Request Enable Register correspond to events in **Table 2**. To enable an event bit, set the bit to 1. Set disabled bits to 0.

When an enabled event takes place the module sets the RQS bit in the Status Byte Register. To determine which event took place, use the ***STB?** query. See Section **IEEE488.2 Status Registers** for more details.

***SRE?**

Query Service Request Enable. This query returns the contents of the Service Request Enable Register. The bits in the Service Request Enable Register correspond to events in **Table 2**. Enabled event bits are set to 1. Disabled bits are set to 0.

When an enabled event takes place the module sets the RQS bit in the Status Byte Register. To determine which event took place, use the ***STB?** query. See Section **IEEE488.2 Status Registers** for more details.

*STB?

Query Status Byte. This query returns the contents of the Status Byte Register. The Status Byte is defined in the table below. See Section **IEEE488.2 Status Registers** for more details.

Table 3. Status Byte Register

Name	Event	Bit	Decimal
MAV	0 - No messages in the output queue. 1 - There is a message in the output queue.	4	16
ESB	0 - No standard event occurred. 1 - A standard event occurred.	5	32
RQS	0 - No enabled service request occurred. 1 - An enabled service request occurred.	6	64

*TST?

Self-Test. This command performs a self-test and returns the result of the self-test. A return value of 0 indicates that the self-test passed and the module is functioning normally. Any other return value indicates the self-test failed.

*WAI

Wait-to-Continue. This command causes the module to wait until all pending operations are complete before executing the next remote command.

System Commands

QCT?

This query returns the cumulative total number of times that the switch states have been recorded for the auto-save state feature.

WEN [n]

Write Channel State Enable. This command will either enable (n = 1) or disable (n = 0) the auto-save state feature. With this command enabled the matrix switch will automatically save the current switch state, so if power to the switch is interrupted the switch will automatically return the last switch state once power is restored. The default state for this command is set to disabled.

Warning: A maximum of 1,024,000,000 switch states can be permanently recorded before the memory is full. Once the memory is full, it cannot be erased.

Examples:

WEN 0	Disable auto-save state feature.
WEN 1	Enable auto-save state feature.

WEN?

Query Write Channel State Enable Status. This command queries if the WEN command (auto-save state feature) is enabled or disabled. It will return 0 if not enabled, or 1 if enabled.

WL n *Command is for matrix switches larger than 16x16*

Set Wavelength Calibration. Sets the wavelength calibration for matrix switches larger than 16x16. 'n' is variable with three possible values:

0 = 1310 nm

1 = 1550 nm

2 = 1590 nm

Examples:

WL 0	Sets the wavelength calibration to 1310 nm
WL 1	Sets the wavelength calibration to 1550 nm

WL n? *Command is for matrix switches larger than 16x16*

Queries Wavelength Calibration Value. Queries the value of 'n' used in the wavelength set command. Will return the wavelength in units of nm, with two decimal points.

Examples:

WL 0?	1310.00 nm
WL 1?	1550.00 nm

WL? *Command is for matrix switches larger than 16x16*

Queries Set Wavelength Calibration. Queries the value of the variable 'n' used in the 'WL n' command.

Examples:

WL?	0 (Wavelength is currently set to 1310 nm)
WL?	1 (Wavelength is currently set to 1550 nm)

IEEE488.2 Status Registers

The MXS-9100 supports four status registers.

Table 4. IEEE488.2 Status Registers

Acronym	Name	Description
ESE	Event Status Enable Register	Event flags that trigger ESB in the Status Byte Register. This register is user-set.
ESR	Event Status Register	Event flags that have occurred. This register is set by the module.
SRE	Service Request Enable Register	Status Byte flags that trigger RQS. This registers is user-set.
STB	Status Byte Register	Status flags that have occurred. This register is set by the module.

Each bit in these registers is a flag that represents a condition or event.

In pseudo code, the following rules apply.

1. IF (ESE & ESR) THEN STB |= ESB
2. IF (SRE & STB) THEN STB |= RQS

Note: The above rules use bit-wise AND.

Note: The values of the ESB and RQS bits are defined with the ***STB?** command.

4. Handling Fiberoptic Components and Cables

Fiber optic components require special handling. Follow these guidelines when handling the cables and connectors.

Handling Fiber Optic Cables

To avoid cable damage and to minimize optical loss, follow these guidelines when handling fiber optic cables.

- Handle the fiber pigtail outputs carefully.
- The minimum bend radius for most optical cables is 35mm. Never bend an optical cable more sharply than this specification. Optical performance will degrade, and the cable might break.
- Avoid bending the optical cable near a cable strain relief boot. Bending an optical cable near a strain relief boot is one of the easiest ways to permanently damage the optical fiber.
- Avoid bending the optical cable over a sharp edge.
- Avoid using cable tie wraps to hold optical cable. Tie wraps when tightened can create micro-bends or break an optical cable. Microbends can cause a dramatic reduction in optical performance.
- Do not pull on the bare fiber as this can break the fiber inside the component.
- Avoid using soldering irons near optical cables. Accidental damage can easily occur when a soldering iron is used near an optical cable. In addition, solder splatter can contaminate and permanently damage optical fiber connectors.
- To assure the most stable, repeatable optical performance after the optical cables have been connected, immobilize the cables using wide pieces of tape or another form of mechanical cushion.

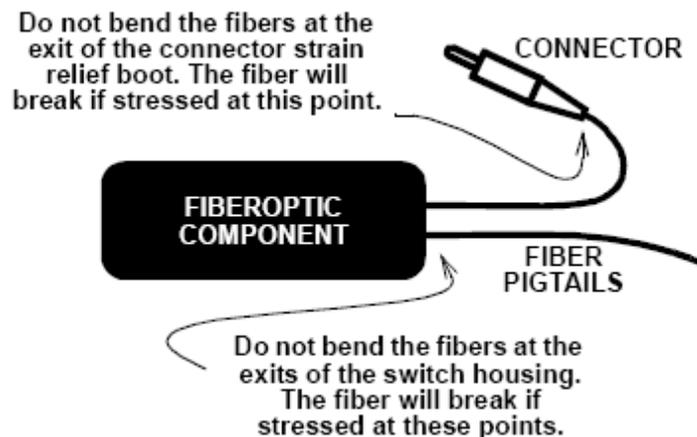


Figure 1. Optical Component Handling

Storing Optical Connectors

All switches that include optical connectors are shipped with dust caps covering those optical connectors. Optical connectors should remain covered at all times when the instrument is not in use.

Cleaning Optical Connectors

Clean any exposed connector using a cleaning kit supplied by the connector manufacturer or high-grade isopropyl alcohol and a cotton swab. To clean with alcohol and a swab, dab the tip of a cotton swab in alcohol and then shake off any excess alcohol. The tip should be moist, not dripping wet. Stroke the swab tip gently across the surface of the connector and around the connector ferrule. Either allow the connector a minute to dry, or blow-dry the connector using compressed air. Be careful when using compressed air: improper use may deposit a spray residue on the connector.

Mating Optical Connectors

Follow these instructions when mating optical connectors.

- Clean both connectors prior to mating. Any small particles trapped during the mating process can permanently damage the connector.
- Smoothly insert the appropriate connector ferrule into the adapter. Do not allow the fiber tip to contact any surface. If the tip accidentally contacts a surface before mating, stop. Re-clean the connector and try again.
- Tighten the connector until it is finger tight or to the torque specified by the connector manufacturer. Do not over-tighten the connector as this can lead to optical loss and connector damage.
- Check the optical insertion loss. If the loss is unacceptable, remove the connector, re-clean both ends of the mate, and reconnect them. You may have to repeat this process several times before a low-loss connection is made.
- After you make the connection, monitor the stability of the optical throughput for a few minutes. Optical power trending (slowly increasing or decreasing) is caused by the slow evaporation of alcohol trapped in the connector. Continue to monitor optical power until it stabilizes. If the loss is unacceptable, re-clean the connectors and start again.



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