



PART NUMBER DESCRIPTION

The MMC Series is an ideal solution that consists of multi-throw, electromechanical coaxial switches designed to switch a microwave signal from a common input to any of 3, 4, 5, or 6 outputs. The characteristic impedance is 50 Ohms. With the normally open actuator, all paths are open when the switch is de-energized.

The MMC Series is designed to allow the remote operation of 1 to 2 Single Pole Multi Throw switches. Remote operation is accomplished via TCP/IP commands to the Matrix's Ethernet interface. Switch control is also accessible via the USB virtual serial port, using the provided command set. Through these interfaces the Coax Switch can be switched to the desired position and its position can be read for verification. The default switch position at power up can be set by the user. The MMC will feature a graphical user interface (GUI), which will enable user to control switches through graphical icons and visuals.



ENVIRONMENTAL AND PHYSICAL CHARACTERISTICS

Operating Temperature	-40°C to 65°C
Standard Actuator Life	5,000,000 cycles
Connector Type	SMA
Weight Non-Terminated	
1 Switch	26 oz. (737 g) (max.)
2 Switches	32 oz. (907 g) (max.)
Weight Terminated	
1 Switch	54 oz. (1531 g) (max.)
2 Switches	60 oz. (1701 g) (max.)

ELECTRICAL CHARACTERISTICS (SWITCHES ONLY)

Form Factor	Multi-Throw, break before make
Frequency Range	DC-40 GHz
Characteristic Impedance	50 Ohms
Operate Time	15 ms (max.)
Release Time	15 ms (max.)
Actuation Voltage Available	24 Vdc
Actuation Current, max. @ ambient	170mA/switch

TYPICAL RF CHARACTERISTICS

Frequency	DC-6 GHz	6-12 GHz	12-18 GHz	18-26.5 GHz* (26.5 Option)	26.5-34 GHz** (40 Option)	34-40 GHz** (40 Option)
Insertion Loss, dB, typ.	0.20	0.40	0.50	0.90	1.00	1.50
Isolation, dB, typ..	70	60	60	50	50	50
VSWR, typ.	1.25:1	1.40:1	1.50:1	1.80:1	1.90:1	2.00:1

For additional RF performance data please refer to Coax Switch Part number list in Glossary (page 4)

ADDITIONAL INFORMATION

Interface	USB or TCP/IP
Host Operating System	Windows, MAC, Linux
Operating System	Embedded

INCLUDED ITEMS

• AC/DC Power Adapter	• USB Cable
• Power Cord	• Installation CD
• Ethernet Cable	

BUILD YOUR BOX

Number of Switches (Select One):

Non-Terminated (Enclosure A)		Terminated (Enclosure B)	
<input type="checkbox"/>	1 (Enclosure A)	<input type="checkbox"/>	1 (Enclosure B)
<input type="checkbox"/>	2 (Enclosure A)	<input type="checkbox"/>	2 (Enclosure B)

Number of Throws (Select One):

<input type="checkbox"/>	SP3T	<input type="checkbox"/>	SP5T
<input type="checkbox"/>	SP4T	<input type="checkbox"/>	SP6T

Frequency Range (Select One):

<input type="checkbox"/>	DC-18GHz	<input type="checkbox"/>	DC-26.5GHz
<input type="checkbox"/>	DC-40GHz*		

Remote Control (Select One):

<input type="checkbox"/>	USB Only	<input type="checkbox"/>	USB & Ethernet
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Actuation Type (Select One):

<input type="checkbox"/>	Normally Open	<input type="checkbox"/>	Latching
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For additional options, please contact factory.

* Only available in Non-Terminated Models
See Page 4, for Part Number List for switches used

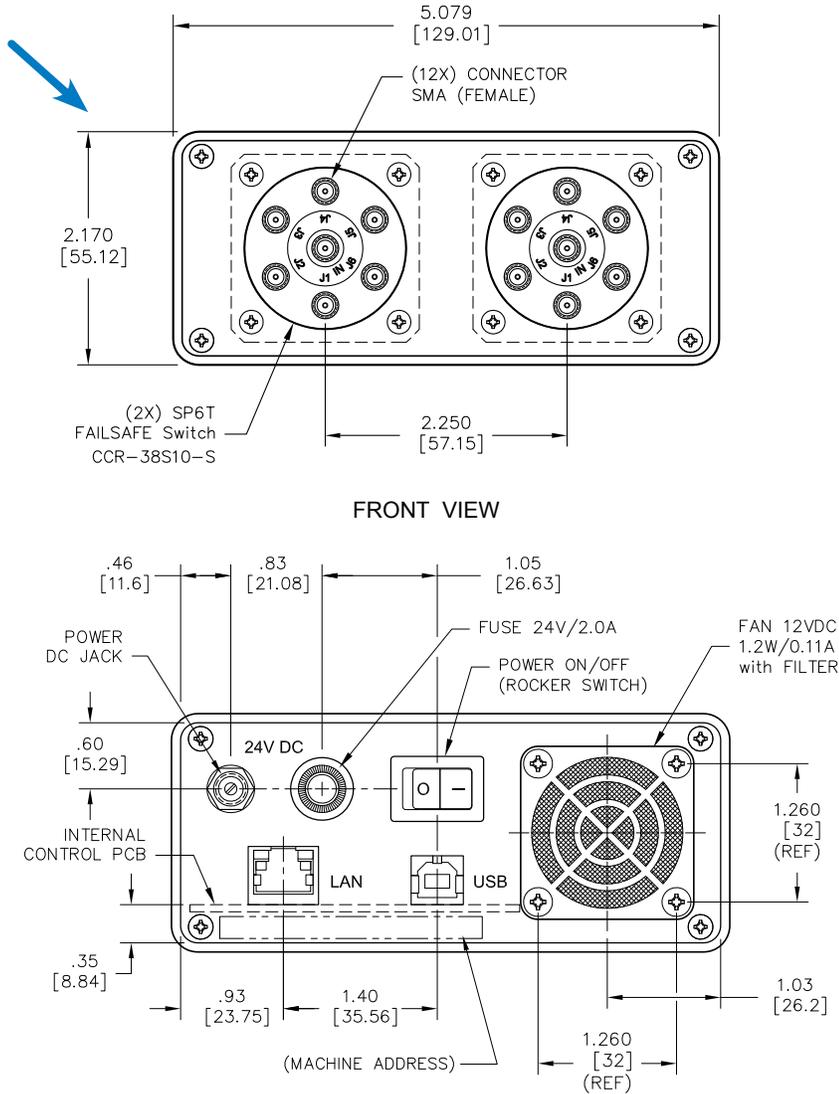
Miniature Matrix: MMC Series Controlled with USB or Ethernet



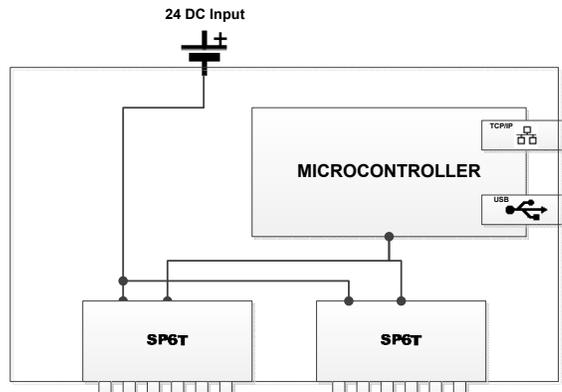
MECHANICAL OUTLINE FOR ENCLUSE A

Max. Length with Switches= 7.75 (196.85)

Enclosure A: UP TO 2 NON-TERMINATED SPMT SWITCHES

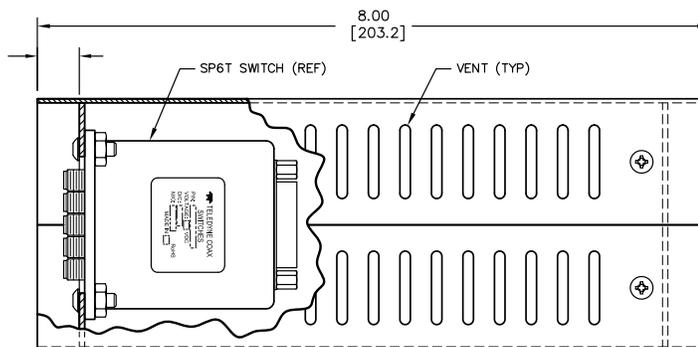
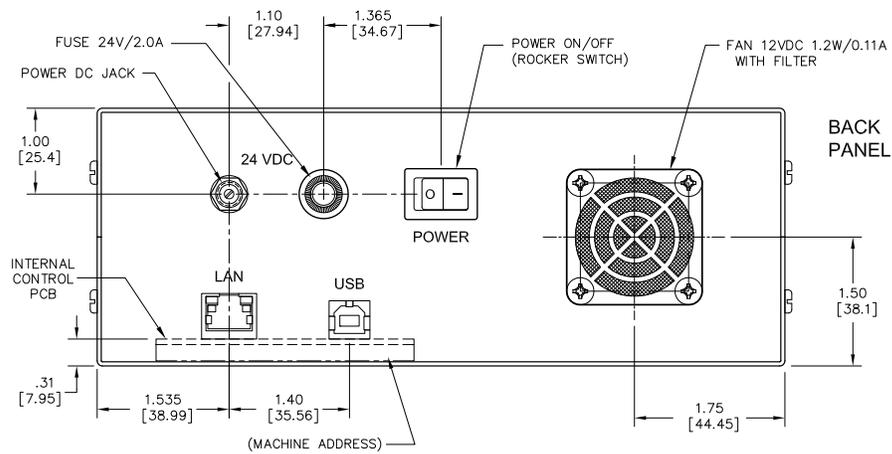
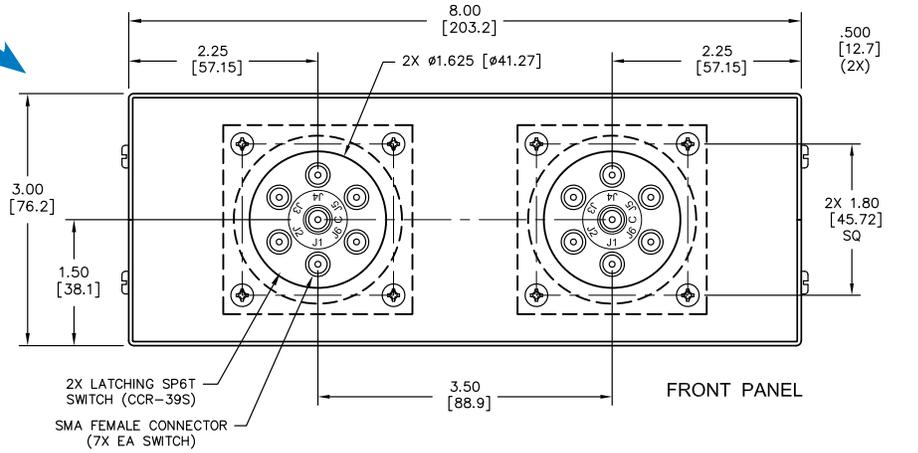


BLOCK DIAGRAM EXAMPLE



MECHANICAL OUTLINE FOR ENCLUSE B

Enclosure B: UP TO 2 TERMINATED SPMT SWITCHES



GLOSSARY

Actuator

An actuator is the electromechanical mechanism that transfers the RF contacts from one position to another upon DC command.

Ethernet

A high-speed interface used in local area networks (LAN). Ethernet is also known as IEEE 802.3 standard.

Isolation

Isolation is the measure of the power level at the output connector of an unconnected RF channel as referenced to the power at the input connector. It is specified in dB below the input power level.

Magnetic Sensitivity

An electro-mechanical switch can be sensitive to ferrous materials and external magnetic fields. Neighboring ferrous materials should be permitted no closer than 0.5 inches and adjacent external magnetic fields should be limited to a flux density of less than 5 Gauss.

Multi-Throw Switch

A multi-throw switch is a switch with one input and three or more output ports. The CCR-38 can switch a microwave signal to any of 2,3,4,5 or 6 output from a single common input.

Performance Parameters vs Frequency

Generally speaking, the RF performance of coaxial switches is frequency dependent. With increasing frequency, VSWR and insertion loss increase while isolation decreases. All data sheets specify these three parameters as “worst case” at the highest operating frequency. If the switch is to be used over a narrow frequency band, better performance can be achieved.

Switching Time

Switching time is the total interval beginning with the arrival of the leading edge of the command pulse at the switch DC input and ending with the completion of the switch transfer, including contact bounce. It consists of three parts: (1) inductive delay in the coil, (2) transfer time of the physical movement of the contacts, and (3) the bounce time of the RF contacts. **This does not include time added by the communication interface, application or operating system.**

Universal Serial Bus (USB)

An industry standard that defines the cables, connectors and communication protocols used in a bus for connection, communication and power supply between computers and electronic devices.

Part Number List (Non-Terminated)

Frequency	Series	Link
DC-18GHz	CCR-38S	http://www.teledynecoax.com/pdf/coaxialswitches/CCR-38S_CR-38S%20NORMALLY%20OPEN.pdf
DC-26.5GHz	CCR-58S	http://www.teledynecoax.com/pdf/coaxialswitches/CCR-58S_CR-58S%20NORMALLY%20OPEN.pdf
DC-40GHz	CCR-48K	http://www.teledynecoax.com/pdf/coaxialswitches/CCR-48K_NORMALLY_OPEN.pdf

Part Number List (Terminated)

Frequency	Series	Link
DC-18GHz	CCT-38S	http://www.teledynecoax.com/pdf/coaxialswitches/CCT-38S_CT-38S%20NORMALLY%20OPEN.pdf
DC-26.5GHz	CCT-58S	http://www.teledynecoax.com/pdf/coaxialswitches/CCT-58S_CT-58S%20NORMALLY%20OPEN.pdf
DC-40GHz	N/A	Not Available

SPECIAL FEATURE

Switching High-Power or Highly Sensitive Signals

Ensure the most linear response with the best galvanically matched contact system in the industry. Extremely low passive intermodulation is standard on all of our switches.

Carrier Frequency 1	Carrier Frequency 2	PIM 3rd Order Frequency	PIM 5th Order Frequency
870 MHz	893 MHz	847 MHz	824 MHz

	3rd Order Intermodulation	5th Order Intermodulation
Multiple Positions	-96 dBm	-115 dBm
	-139 dBc	-158 dBc