

### PART NUMBER DESCRIPTION

The MMB Series is an ideal solution that consists of Transfer, electromechanical coaxial switches designed to switch a microwave signals in a DPDT configuration. The characteristic impedance is 50 Ohms.

The MMB Series is designed to allow the remote operation of 1 to 4 Transfer 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.



### ENVIRONMENTAL AND PHYSICAL CHARACTERISTICS

Operating Temperature	-40°C to 65°C
Standard Actuator Life	5,000,000 cycles
Connector Type	SMA
Weight Enclosure A	
1 Switch	22 oz. (624 g) (max.)
2 Switches	24 oz. (680 g) (max.)
Weight Enclosure B	
4 Switches	64 oz. (1814 g) (max.)

### ELECTRICAL CHARACTERISTICS (SWITCHES ONLY)

Form Factor	DPDT, break before make
Frequency Range	DC-18GHz
Characteristic Impedance	50 Ohms
Operate Time	15 ms (max.)
Release Time	15 ms (max.)
Actuation Voltage	24 Vdc
Actuation Current, max. @ ambient	250mA/switch

### PERFORMANCE LIMITS

Frequency	DC-6 GHz	6-12 GHz	12-18 GHz
Insertion Loss, dB, max.	0.20	0.40	0.50
Isolation, dB, min.	70	60	60
VSWR, max.	1.25:1	1.40:1	1.50:1

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):

ENCLOSURE A	ENCLOSURE B
<input type="checkbox"/> 1	<input type="checkbox"/> 4
<input type="checkbox"/> 2	

#### Actuation Type (Select One):

<input type="checkbox"/> Failsafe	<input type="checkbox"/> Latching
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#### Remote Control (Select One):

<input type="checkbox"/> USB Only	<input type="checkbox"/> USB & Ethernet
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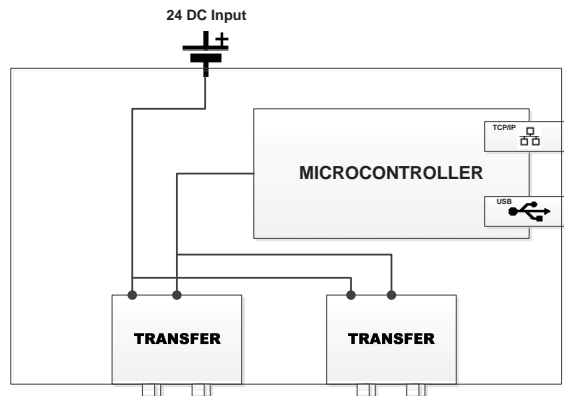
#### Frequency Range (Select One):

<input type="checkbox"/> DC-18GHz
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See Page 4, for Part Number List for switches used  
**For additional options, please contact factory.**

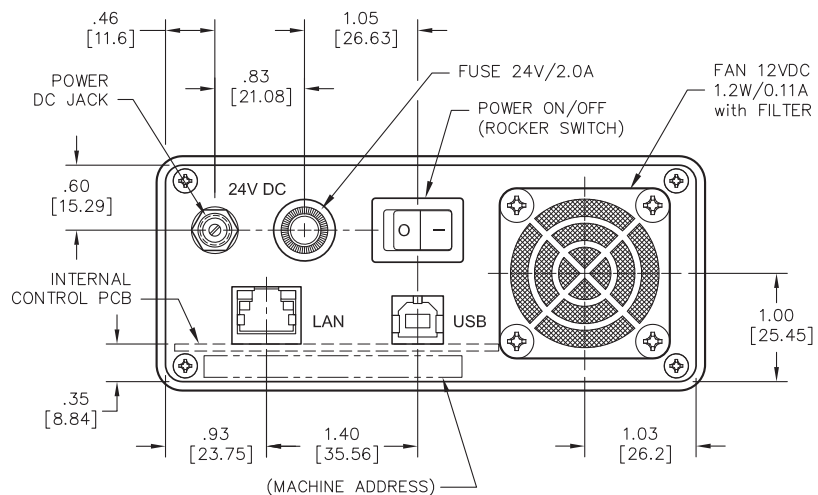
# Miniature Matrix: MMB Series Controlled with USB or Ethernet

## BLOCK DIAGRAM EXAMPLE

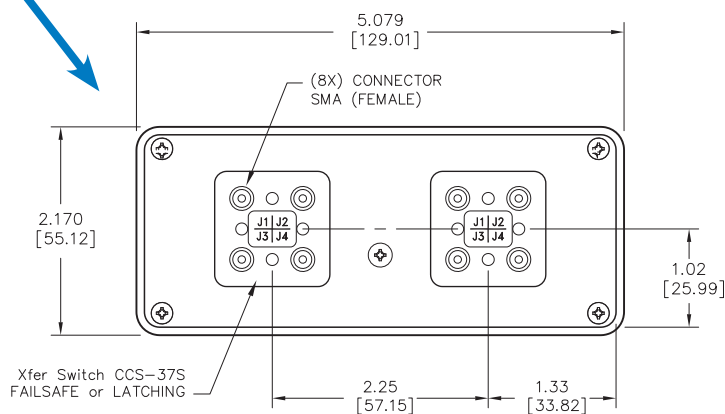


## MECHANICAL OUTLINE FOR ENCLOSURE A

Max. Length with Switches= 7.75 (196.85)

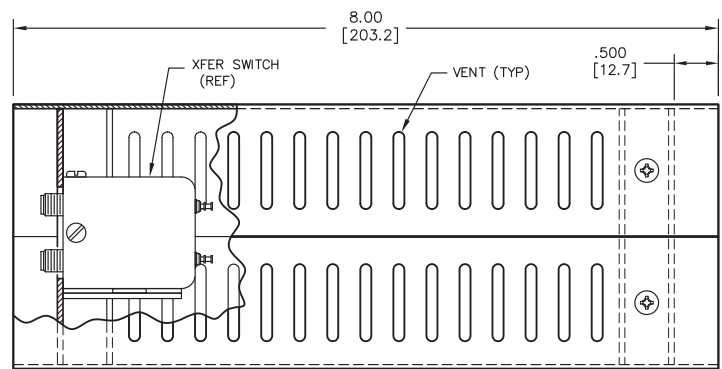
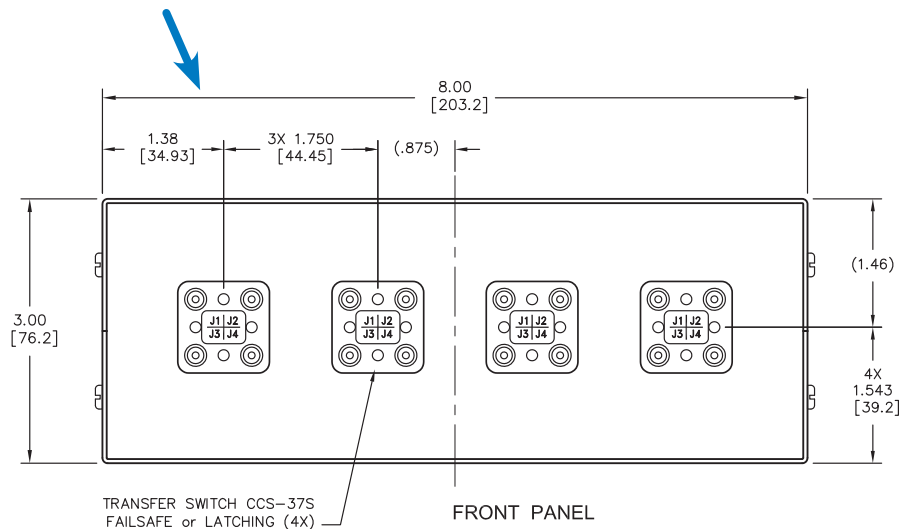


## Enclosure A: UP TO 2 TRANSFER SWITCHES

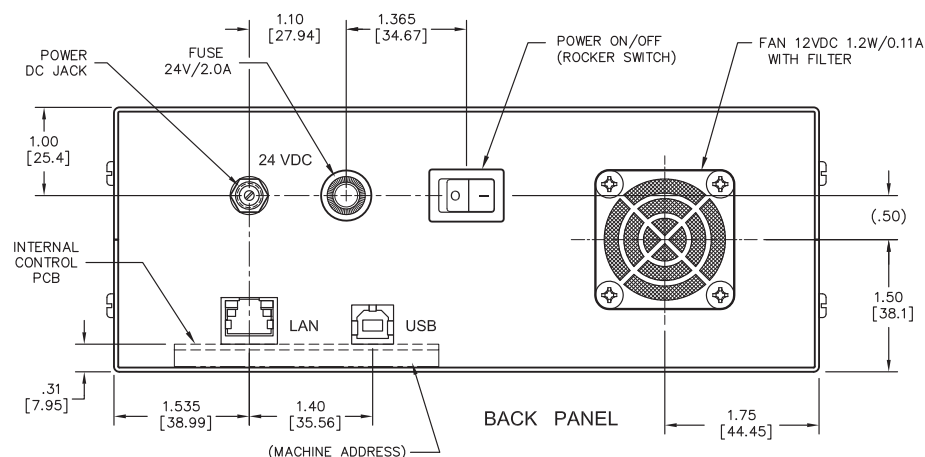


**MECHANICAL OUTLINE FOR ENCLOSURE B**

**Enclosure B: UP TO 4 TRANSFER SWITCHES**



SIDE VIEW



# Miniature Matrix: MMB Series Controlled with USB or Ethernet



## 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.

### 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.

### TRANSFER Switch

A four-port switch consisting of two independent pairs of RF paths. These pairs are actuated simultaneously. This actuation is similar to that of a double-pole double-throw switch.

## Part Number List

Frequency	Series	Link
DC-18GHz	CCS-37S	<a href="http://www.teledynecoax.com/pdf/coaxialswitches/CCS-37S_CS-37S%20FAILSAFE.pdf">http://www.teledynecoax.com/pdf/coaxialswitches/CCS-37S_CS-37S%20FAILSAFE.pdf</a>

## 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