TELEDYNE COAX SWITCHES
Everywhere**you**look™

RoHS Compliant

PART NUMBER   DESCRIPTION

The MMA Series is an ideal solution that consists of SPDT, electromechanical coaxial switches designed to switch a microwave signal from a common input to either of two outputs. The characteristic impedance is 50 Ohms. The terminated option provides an impedance match for the unselected port.

The MMA Series is designed to allow the remote operation of 1 to 4 Single Pole Double 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 MMA will feature a graphical user interface (GUI), which will enable user to control switches through graphical icons and visuals.
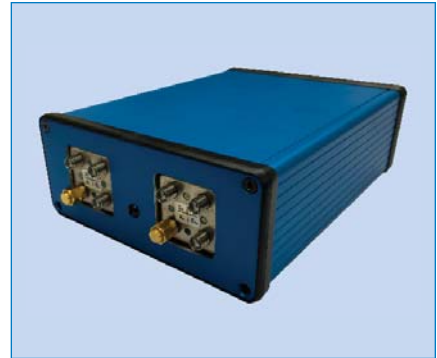
ENVIRONMENTAL AND PHYSICAL CHARACTERISTICS

Operating Temperature	−40°C to 65°C
Standard Actuator Life	5,000,000 cycles
Connector Type	SMA, 2.92mm, N, TNC, SMB
Weight Non-Terminated 1 Switch 2 Switches 4 Switches	18 oz. (510 g) (max.) 20 oz. (567 g) (max.) 23 oz. (652 g) (max.)
Weight Terminated 1 Switch 2 Switches 4 Switches	60 oz. (1701 g) (max.) 62 oz. (1758 g) (max.) 64 oz. (1814 g) (max.)

ELECTRICAL CHARACTERISTICS (SWITCHES ONLY)

Form Factor	SPDT, break before make
Frequency Range	Up to DC-40 GHz
Characteristic Impedance	50 Ohms, 75 Ohms (SMB only)
Operate Time	15 ms (max.)
Release Time	15 ms (max.)
Actuation Voltage	24Vdc
Actuation Current, max. @ ambient	Varies

ADDITIONAL INFORMATION

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

INCLUDED ITEMS

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

BUILD YOUR BOX

Number of Switches *(Select One)*:

Non-Terminated		Terminated	
	1 *(Enclosure A)*		1 *(Enclosure A)*
	2 *(Enclosure A or B)*		2 *(Enclosure A)*
	4 *(Enclosure A or B)*		4 *(Enclosure B)*

Actuation Type *(Select One)*:

	Failsafe		Latching

Connector *(Select One)*:

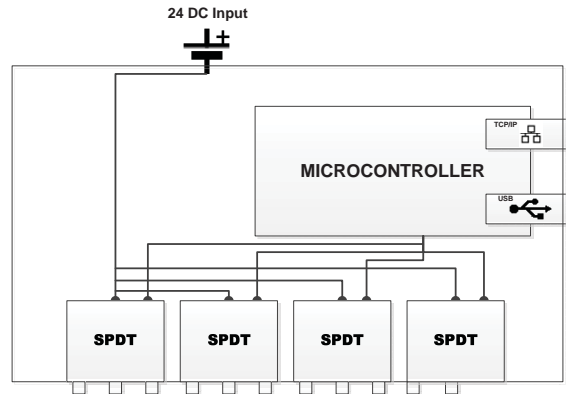|	SMA (DC-18GHz)	SMA (DC-26.5GHz)
	SMB (DC-3GHz)	N (DC-12GHz)
	TNC (DC-11GHz)	K (DC-33GHz)
	K (DC-40GHz)	

Remote Control *(Select One)*:

	USB Only		USB & Ethernet

For additional options, please contact factory.

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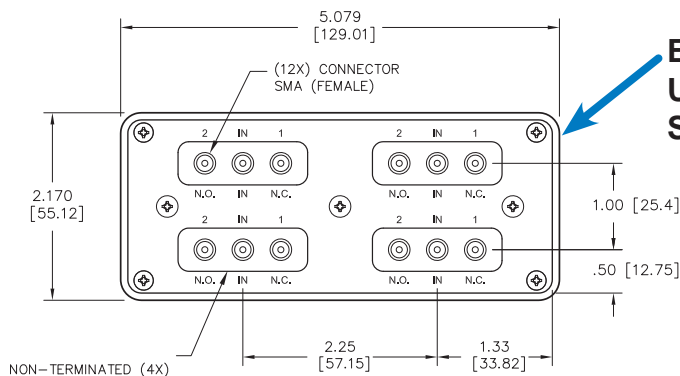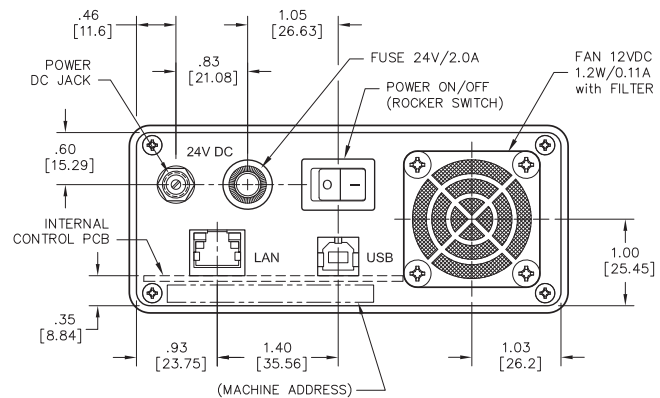See Page 4, for Part Number List for switches used

Miniature Matrix: MMA Series
Controlled with USB or Ethernet

TELEDYNE
COAX SWITCHES
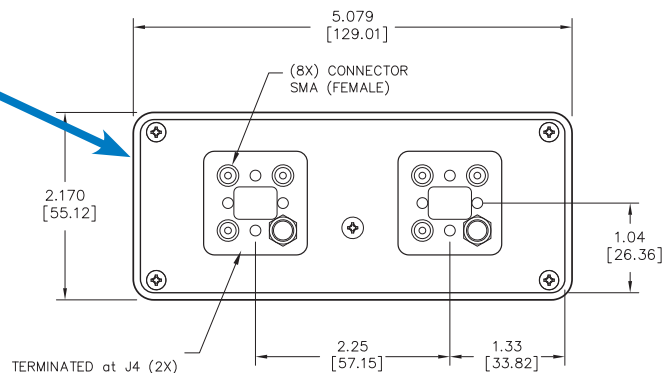Everywhere**you**look™

BLOCK DIAGRAM EXAMPLE

24 DC Input

MICROCONTROLLER

TCP/IP

USB

SPDT SPDT SPDT SPDT

MECHANICAL OUTLINE FOR ENCLOSURE A

Max. Length with Switches= 7.75 (196.85)

.46
[11.6]

1.05
[26.63]

.83
[21.08]

FUSE 24V/2.0A

FAN 12VDC
1.2W/0.11A
with FILTER

POWER
DC JACK

POWER ON/OFF
(ROCKER SWITCH)

.60
[15.29]

24V DC

INTERNAL
CONTROL PCB

LAN   USB

1.00
[25.45]

.35
[8.84]

.93
[23.75]

1.40
[35.56]

1.03
[26.2]

(MACHINE ADDRESS)

5.079
[129.01]

(12X) CONNECTOR
SMA (FEMALE)

2 IN 1   2 IN 1

N.O. IN N.C.   N.O. IN N.C.

2 IN 1   2 IN 1

N.O. IN N.C.   N.O. IN N.C.

2.170
[55.12]
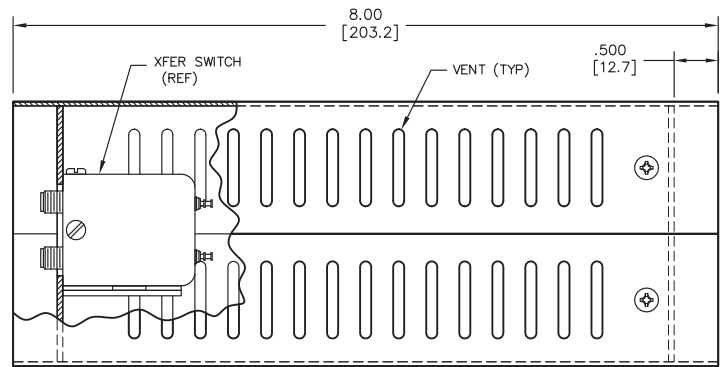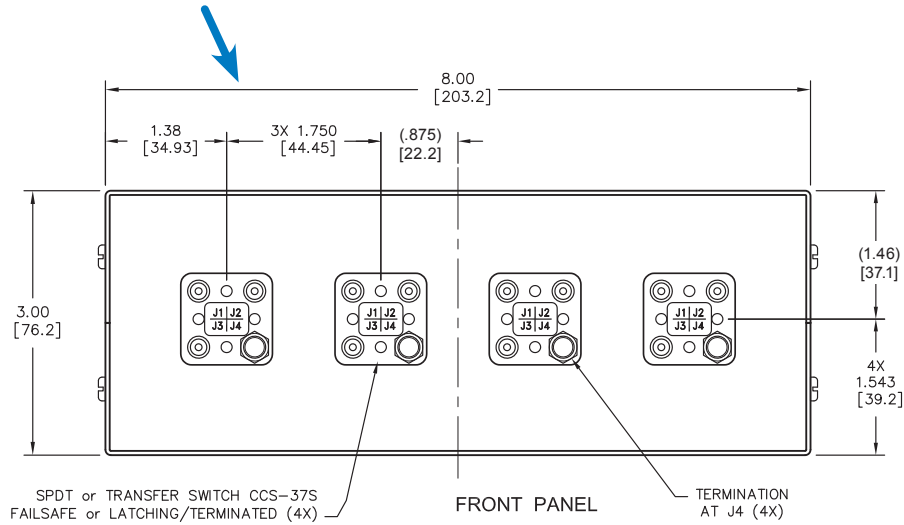
1.00 [25.4]

.50 [12.75]

NON-TERMINATED (4X)

2.25
[57.15]

1.33
[33.82]

**Enclosure A :
UP TO 4 NON-TERMINATED SPDT
SWITCHES (SMA, K, SMB)**
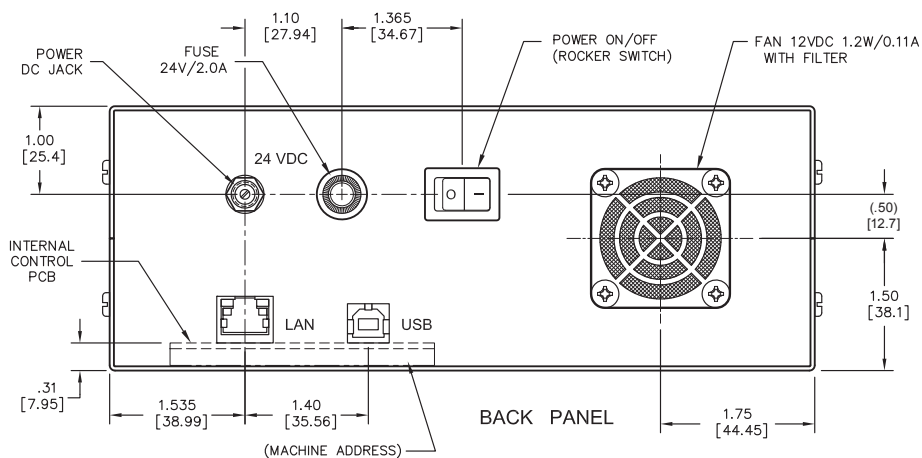
**Enclosure A :
UP TO 2 TERMINATED SPDT SWITCHES
(SMA-T)**

5.079
[129.01]

(8X) CONNECTOR
SMA (FEMALE)

2.170
[55.12]

1.04
[26.36]

TERMINATED at J4 (2X)

2.25
[57.15]

1.33
[33.82]

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MECHANICAL OUTLINE FOR ENCLOSURE B

Enclosure B: UP TO 4 TERMINATED SPDT SWITCHES (SMA-T Only)

FRONT PANEL

SPDT or TRANSFER SWITCH CCS–37S
FAILSAFE or LATCHING/TERMINATED (4X)

TERMINATION AT J4 (4X)

SIDE VIEW

BACK PANEL

Enclosure B: UP TO 4 TERMINATED SPDT SWITCHES (SMA Only)

8.00 [203.2]

1.37 [34.8]   4X 1.760 [44.7]   (.870)   (1.750)

3.00 [76.2]

(1.5

4
.9
[24

FAILSAFE SPDT SWITCH CCRT—53S
HI—FREQUENCY, TERMINATED
D—Sub and SMA Connectors (4X)

FRONT PANEL

Enclosure B: UP TO 4 TERMINATED SPDT SWITCHES (Type N Connector Only)

8.00 [203.2]

1.37 [34.8]   4X 1.760 [44.7]   (.870)   (1.750)

3.00 [76.2]

(1.5

4X .
[20

LATCHING SPDT SWITCH CCS—32N
D—Sub and "N" Connectors (4X)

FRONT PANEL
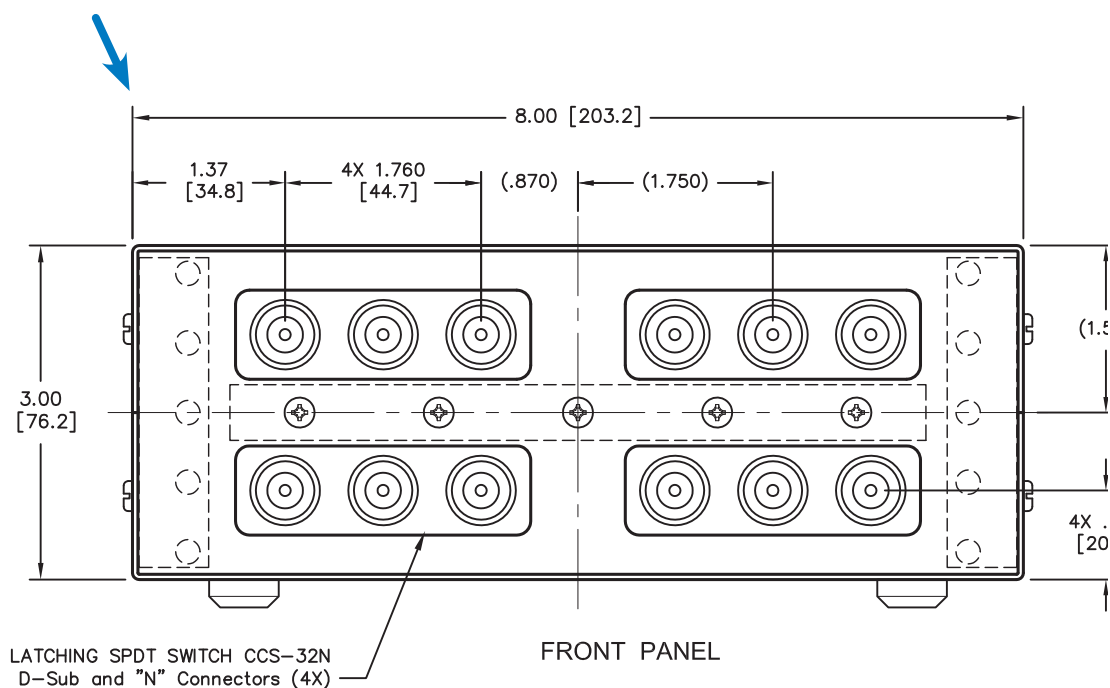
GLOSSARY

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. DHCP or Static IP can be configured through a web interface.

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.

SPDT Switch
A single-pole double-throw, bi-directional switch that can be used as having one input and two outputs or two inputs and one output.

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. VCP Driver available for Windows OS, Mac OS, and Linux.

Termination
When not connected to the common port, RF ports are shunted to ground via a 50Ω path, rated for 1W.

Switch Specification List

Connector	Frequency	Series	Link
SMA	DC-18GHz	CCR-33S	http://www.teledynecoax.com/Datasheets/CCR-33S_CR-33S%20FAILSAFE.pdf
SMA	DC-18GHz	CCS-37S	http://www.teledynecoax.com/Datasheets/CCS-37S_FAILSAFE_SHORT.pdf
SMA	DC-26.5GHz	CCR-53S	http://www.teledynecoax.com/Datasheets/CCR-53S_CR-53S%20FAILSAFE.pdf
SMA	DC-26.5GHz	CCRT-53S	http://www.teledynecoax.com/Datasheets/CCRT-53S_CRT-53S%20FAILSAFE.pdf
2.92mm	DC-33GHz	CCR-33K	http://www.teledynecoax.com/Datasheets/CCR-33K_CR-33K%20FAILSAFE.pdf
2.92mm	DC-40GHz	CCR-40K	http://www.teledynecoax.com/Datasheets/CCR-40K%20FAILSAFE.pdf
SMB	DC-3GHz	CCR-33M	http://www.teledynecoax.com/Datasheets/CCR-33M_CR-33M%20FAILSAFE.pdf
N, TNC	DC-12GHz	CCS-32	http://www.teledynecoax.com/Datasheets/CCS-32_CS-32%20FAILSAFE.pdf