



PART NUMBER DESCRIPTION

The Modular Test System (MTS) is a flexible and extendable switch matrix, designed for remote switching of microwave signals across multiple 50Ω switch configurations; optional terminations provide an impedance match for the unselected ports.

The MTS Series is designed to allow the remote operation of individual switches housed in removable modules. The main unit contains 8 modules, with the possibility of connecting 8 additional auxiliary units to expand to up to 72 modules. Each module can house 1 to 4 SPDT Switches, 1 to 2 Transfer Switches, or 1 SP6T Switch. Remote operation is accomplished via TCP/IP commands to the Matrix's Ethernet interface or via a USB virtual serial port, using the provided command set.

Through these interfaces, the Coax Switches can be switched to the desired position and their positions can be read for verification. The default switch positions at power up can be set by the user. The MTS features a graphical user interface (GUI), which enables the user to control switches through graphical icons and visual feedback.

The command API is fully documented and can be integrated into any Automated Test Environment or scripting language, on the OS of your choice. Flexibility in the choice of coax switches and in the methods of control is the core of the Modular Test System's design philosophy.



ENVIRONMENTAL AND PHYSICAL CHARACTERISTICS

Operating Temperature	-25°C to 65°C
Standard Actuator Life	5,000,000 cycles
Connector Type	SMA, 2.92mm, 2.4mm, N, TNC
Module Weight	1-2 lbs.
Rack Weight	6 lbs.

ELECTRICAL CHARACTERISTICS (SWITCHES ONLY)

Form Factor	SPDT, DPDT, SP6T break before make
Frequency Range	Up to DC-40 GHz
Characteristic Impedance	50 Ohms
Operate Time	15 ms (max.)
Release Time	15 ms (max.)
Actuation Voltage	24Vdc
Actuation Current, max. @ ambient	Varies

ADDITIONAL INFORMATION

Interface	USB & 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	

Modular Test System: MTS Series

Controlled with USB/Ethernet



SELECT YOUR MODULE

QTY	Part Number	Description	Switches Used
	MTS-1A-18S	One SPDT SMA 18GHz	1x CCR-33S40-S
	MTS-1A-26S	One SPDT SMA 26.5GHz	1x CCR-53S40-S
	MTS-1A-40K	One SPDT K 40GHz	1x CCR-40K40-S
	MTS-1A-12N	One SPDT Type N 12GHz	1x CCS-32N40-S
	MTS-1A-11T	One SPDT TNC 11GHz	1x CCS-32T40-S
	MTS-1A-18S-T	One SPDT SMA 18GHz 50Ω Terminated	1x CCRT-33S40-S
	MTS-1A-26S-T	One SPDT SMA 26.5GHz 50Ω Terminated	1x CCRT-53S40-S
	MTS-1A-40S-T	One SPDT K 40GHz 50Ω Terminated	1x CCRT-40K40-S
	MTS-2A-18S	Two SPDT SMA 18GHz	2x CCR-33S40-S
	MTS-2A-26S	Two SPDT SMA 26.5GHz	2x CCR-53S40-S
	MTS-2A-40S	Two SPDT K 40GHz	2x CCR-40K40-S
	MTS-2A-18S-T	Two SPDT SMA 18GHz 50Ω Terminated	2x CCRT-33S40-S
	MTS-2A-26S-T	Two SPDT SMA 26.5GHz 50Ω Terminated	2x CCRT-53S40-S
	MTS-2A-40S-T	Two SPDT K 40GHz 50Ω Terminated	2x CCRT-40K40-S
	MTS-4A-18S	Four SPDT SMA 18GHz	4x CCR-33S40-S
	MTS-4A-26S	Four SPDT SMA 26.5GHz	4x CCR-53S40-S
	MTS-4A-40K	Four SPDT K 40GHz	4x CCR-40K40-S
	MTS-1T-18S	One TRANSFER SMA 18GHz	1x CCS-37S40-S
	MTS-1T-40K	One TRANSFER K 40GHz	1x CCS-37K40-S
	MTS-2T-18S	Two TRANSFER SMA 18GHz	2x CCS-37S40-S
	MTS-2T-40K	Two TRANSFER K 40GHz	2x CCS-37K40-S
	MTS-1F-18S	One SP6T Normally Open SMA 18GHz	1x CCR-38S460-S
	MTS-1F-26S	One SP6T Normally Open SMA 26.5GHz	1x CCR-58S460-S
	MTS-1F-40K	One SP6T Normally Open K 40GHz	1x CCR-48K460-S

Total Modules	Modules	Included Chasis
	1 - 8	MTS-MAIN
	9 - 16	MTS-MAIN + 1x MTS-AUX
	17 - 24	MTS-MAIN + 2x MTS-AUX
	25 - 32	MTS-MAIN + 3x MTS-AUX
	33 - 40	MTS-MAIN + 4x MTS-AUX
	41 - 48	MTS-MAIN + 5x MTS-AUX
	49 - 56	MTS-MAIN + 6x MTS-AUX
	57 - 64	MTS-MAIN + 7x MTS-AUX
	65 - 72	MTS-MAIN + 8x MTS-AUX

SWITCH CONFIGURATION SHOWING 1 TRANSFER, 2 TRANSFER, and 1 SPDT SWITCHES

Teledyne Coax Switches (Modular Coax Switch Matrix System Control Panel)

SCAN MAIN AUX-0 AUX-1 AUX-2 AUX-3 AUX-4 AUX-5 AUX-6 AUX-7 TCP/IP Scan Status Scan Exit

TELEDYNE COAX SWITCHES *Main Controller Unit*

Module - 1	Module - 2	Module - 3	Module - 4	Module - 5	Module - 6	Module - 7	Module - 8
00000001	00000000				00000000		
ONE TRANSFER F/5 SWITCH-A: J1 TO J3, J2 TO J4	TWO TRANSFER F/5 SWITCH-A: J1 TO J2, J3 TO J4 SWITCH-B: J1 TO J2, J3 TO J4	NO MODULE	NO MODULE	NO MODULE	ONE SPDT F/5 SWITCH-A: RESET	NO MODULE	NO MODULE
00- Switch Panel	00- Switch Panel				00- Switch Panel		
M1-Cont.	M2-Cont.	M3-Cont.	M4-Cont.	M5-Cont.	M6-Cont.	M7-Cont.	M8-Cont.
MTS MODEL: MTS-M01 MAIN-UNIT Add: 11101111 Teledyne COAX Switches							

SWITCH CONFIGURATION SHOWING 1 SP6T, 4 SPDT, and 2 TRANSFER SWITCHES

Teledyne Coax Switches (Modular Coax Switch Matrix System Control Panel)

SCAN MAIN AUX-0 AUX-1 AUX-2 AUX-3 AUX-4 AUX-5 AUX-6 AUX-7 TCP/IP Scan Status Scan Exit

TELEDYNE COAX SWITCHES *Auxiliary-0 Controller Unit*

Module - 1	Module - 2	Module - 3	Module - 4	Module - 5	Module - 6	Module - 7	Module - 8
00000000				00000000	00000000		
SP6T F/5 (OPEN POS.)	NO MODULE	NO MODULE	NO MODULE	FOUR SPDT F/5 SWITCH-A: RESET SWITCH-B: RESET SWITCH-C: RESET SWITCH-D: RESET	TWO SPDT F/5 SWITCH-A: RESET SWITCH-B: RESET	NO MODULE	NO MODULE
00- Switch Panel				00- Switch Panel	00- Switch Panel		
0_M1-C	0_M2-C	0_M3-C	0_M4-C	0_M5-C	0_M6-C	0_M7-C	0_M8-C
MTS MODEL: MTS-A01 AUX-UNIT Add: 11110000 Teledyne COAX Switches							

Modular Test System: MTS Series Controlled with USB/Ethernet



MODULE SPECIFIC VIEW OF GUI SUB-PANEL

Model_NO
4A18S*

Device Short Name
4A-18S

Serial Number
N/A

Teledyne Coax Switches

SA,B,C,D RELAYS Status

Real-Time Status-> 00000000

11/15/2016

SA

N.O.
2

IN
IN

N.C.
1

SET

RST

SB

N.O.
2

IN
IN

N.C.
1

SET

RST

SC

N.O.
2

IN
IN

N.C.
1

SET

RST

SD

N.O.
2

IN
IN

N.C.
1

SET

RST

COMMANDS LIST
(ATT)

CMD LIST

ATT
GDP
DPU, 1,?
HELP
INFO
GCNTRS
GUSN
WUSN
CLRC-A:B:C:D
CLRCS
SDPU
GSS
A:B:C:DSP1:2
OK

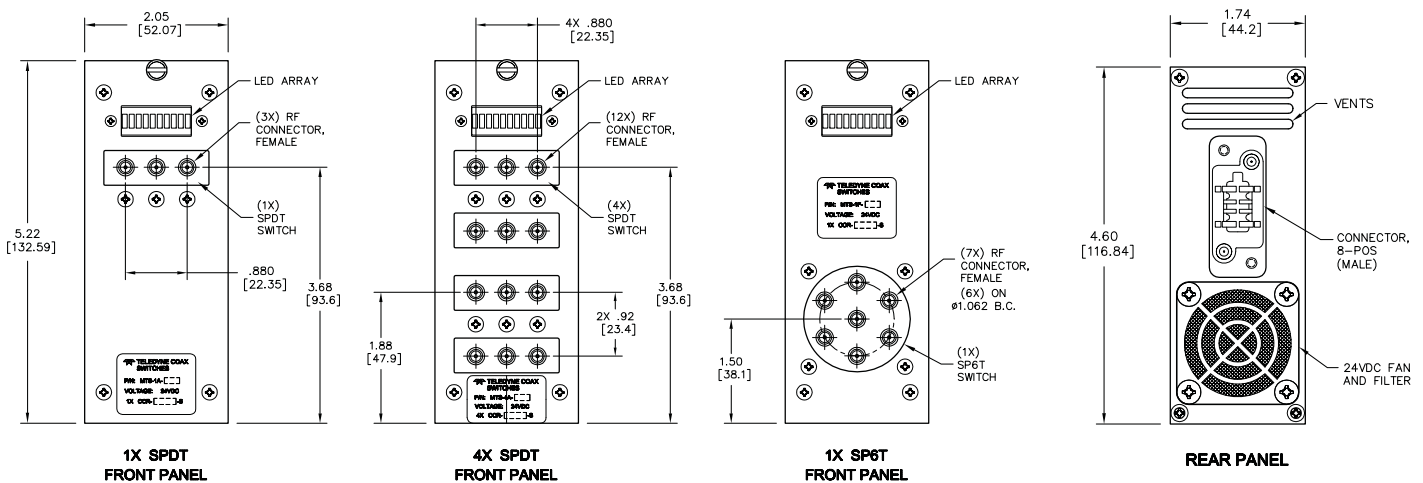
AUX-0 Unit, Module-5

Software Ver. 1.0.4 Rev. B

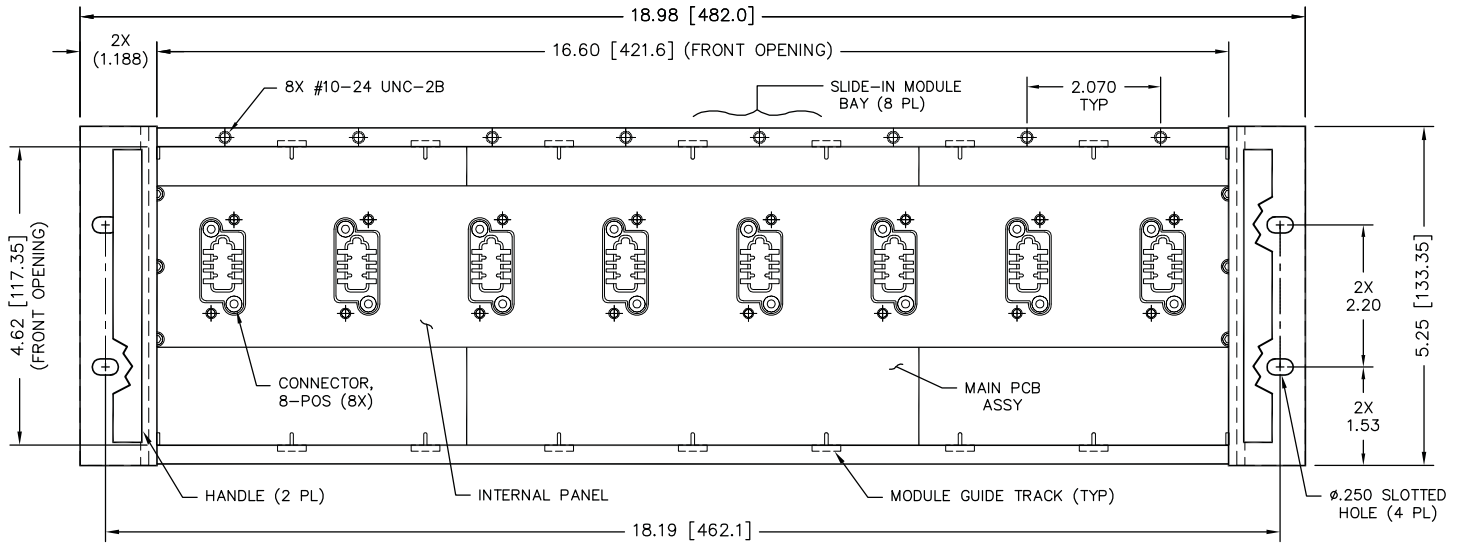
To Set or Reset: Click On SET or RST of SA,B,C,D

Switches PN: 4xCCR-33S40-S

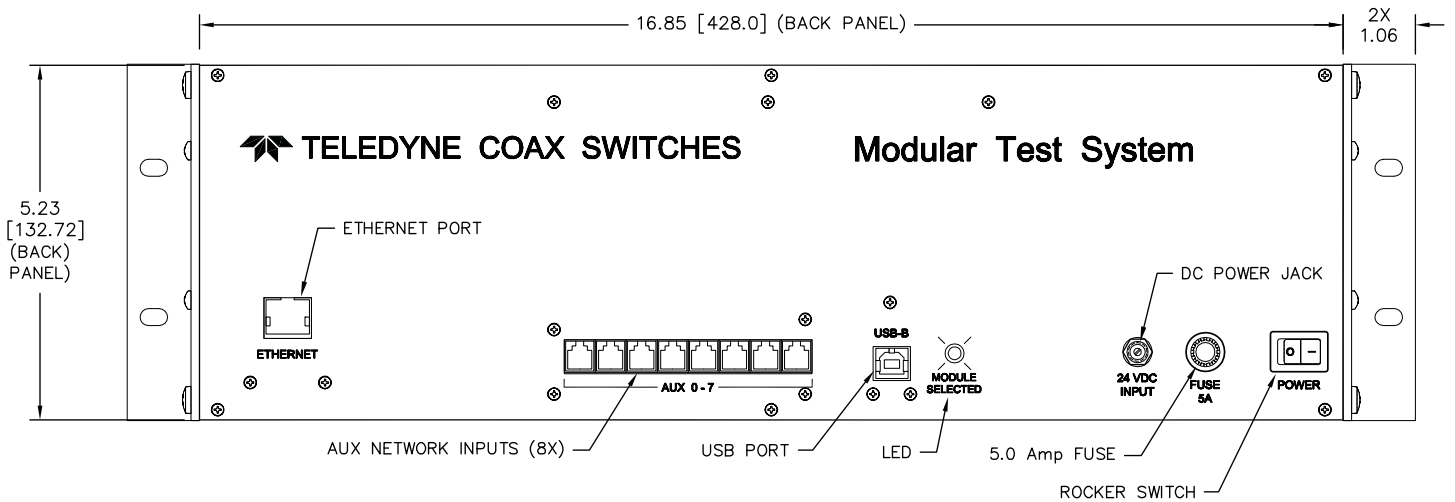
MECHANICAL OUTLINE FOR MTS MODULE



MECHANICAL OUTLINE FOR MTS MAIN ENCLOSURE



FRONT VIEW

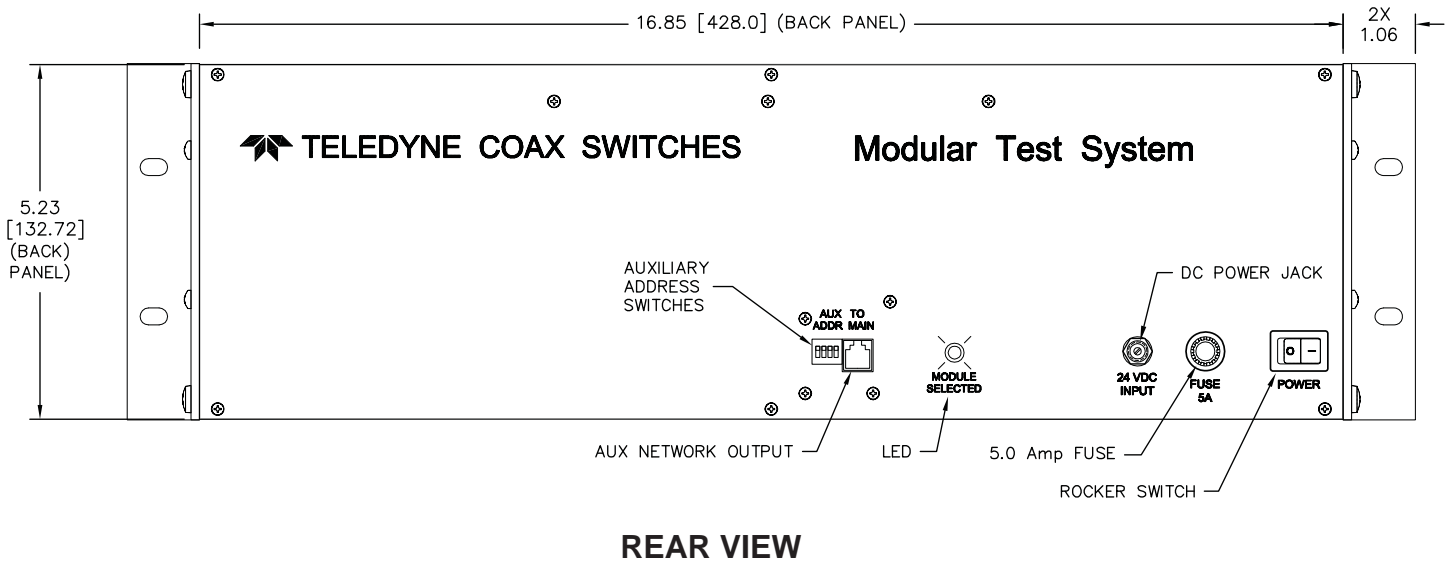


REAR VIEW

Modular Test System: MTS Series Controlled with USB/Ethernet



MECHANICAL OUTLINE FOR MTS AUXILIARY ENCLOSURE



REAR VIEW

GLOSSARY

Actuator

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

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.**

Termination

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

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.

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.

Multi-Throw Switch

A multi-throw switch is a switch with one input and three or more output ports. The SPMT can switch a microwave signal to any of 2, 3, 4, 5, 6, 7 or 8 outputs from a single common input

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.

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.

Switch Specification List

Type	Connector	Frequency	Series	Link
SPDT	2.92mm	DC-40GHz	CCR-40K	http://www.teledynecoax.com/Datasheets/CCR-40K%20FAILSAFE.pdf
SPDT	SMA	DC-26.5GHz	CCR-53S	http://www.teledynecoax.com/Datasheets/CCR-53S_CR-53S%20FAILSAFE.pdf
SPDT	SMA	DC-26.5GHz	CCRT-53S	http://www.teledynecoax.com/Datasheets/CCRT-53S_CRT-53S%20FAILSAFE.pdf
SPDT	SMA	DC-18GHz	CCR-33S	http://www.teledynecoax.com/Datasheets/CCR-33S_CR-33S%20FAILSAFE.pdf
SPDT	SMA	DC-18GHz	CCRT-33S	http://www.teledynecoax.com/Datasheets/CCRT-33S_CRT-33S%20FAILSAFE.pdf
SPDT	N	DC-12GHz	CCS-32N	http://www.teledynecoax.com/Datasheets/CCS-32_CS-32%20FAILSAFE.pdf
SPDT	TNC	DC-12GHz	CCS-32T	http://www.teledynecoax.com/Datasheets/CCS-32_CS-32%20FAILSAFE.pdf
SP6T	2.92mm	DC-40GHz	CCR-48K	http://www.teledynecoax.com/Datasheets/CCR-48K_NORMALLY_OPEN.pdf
SP6T	SMA	DC-26.5GHz	CCR-58S	http://www.teledynecoax.com/Datasheets/CCR-58S%20NORMALLY%20OPEN.pdf
SP6T	SMA	DC-18GHz	CCR-38S	http://www.teledynecoax.com/Datasheets/CCR-38S%20NORMALLY%20OPEN.pdf
Transfer	2.92mm	DC-40GHz	CCS-37K	http://www.teledynecoax.com/Datasheets/CCS-37K%20FAILSAFE%20-%2006082018.pdf
Transfer	SMA	DC-18GHz	CCS-37S	http://www.teledynecoax.com/Datasheets/CCS-37S_FAILSAFE_SHORT.pdf