Mechanical Switch System (24 x SPDT)

ZTM-205

50Ω   DC to 18 GHz

Typical Applications

- 5G node / device testing
- Automated test equipment
- Fail-safe / redundancy switching
- Modular switch matrices

CE & RoHS Compliant
See our website for RoHS compliance
methodologies and qualifications

Product Overview

ZTM-205 is part of Mini-Circuits' ZTM2 series modular switch range, which offers flexibility and fast turnaround for automated test setups. The design consists of a 19" rack chassis (5U height) which can be populated with your choice of mechanical switches on the front panel, with options up to SP8T and 40 GHz.

With the use of Mini-Circuits' low cost Hand-Flex™ interconnect cables, multiple matrix configurations can be easily created by the user. The switches are controlled via USB or Ethernet, allowing control directly from a PC, or remotely over a network. Full software support is provided, including our user-friendly GUI application for Windows and a full API with programming instructions for Windows and Linux environments (both 32-bit and 64-bit systems).

Key Features

Feature	Advantages
Flexible mechanical switch options	Mechanical absorptive switches provide high reliability, repeatable high performance and internal terminations of input signals on the disconnected paths
Fast turnaround time	Rapid applications support allows test configurations to be quickly developed without causing production delays.
Rack-mount chassis	5U height 19" rack-chassis suits integration in automated production test environments
USB & Ethernet control	USB HID and Ethernet (HTTP / Telnet) interfaces provide easy compatibility with a wide range of software setups and programming environments

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Electrical Specifications at 25°C (per switch)

Parameter	Conditions	Min	Typ	Max	Units
Frequency Range		DC		18	GHz
Insertion Loss	DC – 8 GHz		0.15	0.30	dB
	8 – 12 GHz		0.25	0.40	
	12 – 18 GHz		0.30	0.50	
Isolation	DC – 8 GHz	75	90		dB
	8 – 12 GHz	70	80		
	12 – 18 GHz	60	66		
VSWR	DC – 8 GHz		1.20		:1
	8 – 12 GHz		1.20		
	12 – 18 GHz		1.15		
Switching Time			25		ms
RF Input Power[1]	Cold switching			20	W
Switch Lifetime	100 mW hot switching[2]		10		million cycles
	1W hot switching		3		

[1] Maximum power for any connected through path as stated; maximum power into any internal termination is 1W
[2] Hot switching power above this level will degrade the switch lifetime
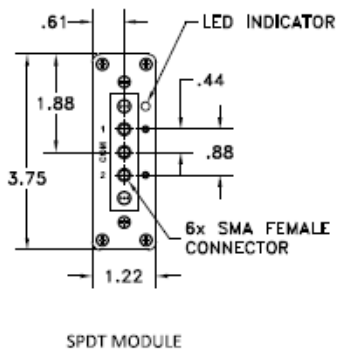
Configuration

Row	Slot	Model Name	Frequency	Connectors	Description
Top	1	MSP2TA-18XL+	DC to 18 GHz	SMA (f)	SPDT Switch (Absorptive)
Top	2	MSP2TA-18XL+	DC to 18 GHz	SMA (f)	SPDT Switch (Absorptive)
Top	3	MSP2TA-18XL+	DC to 18 GHz	SMA (f)	SPDT Switch (Absorptive)
Top	4	MSP2TA-18XL+	DC to 18 GHz	SMA (f)	SPDT Switch (Absorptive)
Top	5	MSP2TA-18XL+	DC to 18 GHz	SMA (f)	SPDT Switch (Absorptive)
Top	6	MSP2TA-18XL+	DC to 18 GHz	SMA (f)	SPDT Switch (Absorptive)
Top	7	MSP2TA-18XL+	DC to 18 GHz	SMA (f)	SPDT Switch (Absorptive)
Top	8	MSP2TA-18XL+	DC to 18 GHz	SMA (f)	SPDT Switch (Absorptive)
Top	9	MSP2TA-18XL+	DC to 18 GHz	SMA (f)	SPDT Switch (Absorptive)
Top	10	MSP2TA-18XL+	DC to 18 GHz	SMA (f)	SPDT Switch (Absorptive)
Top	11	MSP2TA-18XL+	DC to 18 GHz	SMA (f)	SPDT Switch (Absorptive)
Top	12	MSP2TA-18XL+	DC to 18 GHz	SMA (f)	SPDT Switch (Absorptive)
Bottom	1	MSP2TA-18XL+	DC to 18 GHz	SMA (f)	SPDT Switch (Absorptive)
Bottom	2	MSP2TA-18XL+	DC to 18 GHz	SMA (f)	SPDT Switch (Absorptive)
Bottom	3	MSP2TA-18XL+	DC to 18 GHz	SMA (f)	SPDT Switch (Absorptive)
Bottom	4	MSP2TA-18XL+	DC to 18 GHz	SMA (f)	SPDT Switch (Absorptive)
Bottom	5	MSP2TA-18XL+	DC to 18 GHz	SMA (f)	SPDT Switch (Absorptive)
Bottom	6	MSP2TA-18XL+	DC to 18 GHz	SMA (f)	SPDT Switch (Absorptive)
Bottom	7	MSP2TA-18XL+	DC to 18 GHz	SMA (f)	SPDT Switch (Absorptive)
Bottom	8	MSP2TA-18XL+	DC to 18 GHz	SMA (f)	SPDT Switch (Absorptive)
Bottom	9	MSP2TA-18XL+	DC to 18 GHz	SMA (f)	SPDT Switch (Absorptive)
Bottom	10	MSP2TA-18XL+	DC to 18 GHz	SMA (f)	SPDT Switch (Absorptive)
Bottom	11	MSP2TA-18XL+	DC to 18 GHz	SMA (f)	SPDT Switch (Absorptive)
Bottom	12	MSP2TA-18XL+	DC to 18 GHz	SMA (f)	SPDT Switch (Absorptive)

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Mechanical Switch System (24 x SPDT)   ZTM-205

Mechanical Specifications

Dimensions	19" (W) x 5U (H) x 20" (D)			
Case Drawing	99-01-2891			
Case Material	Aluminum (with protective coating to prevent corrosion)			
RF Connectors	**Panel**	**Connector**	**Quantity**	**Port Labels**
	Front	SMA female	72	COM & 1-2 per switch
Panel Items	**Front Panel**		**Rear Panel**	
Panel Marking	• ZTM-205 • Modular Test System		• CE • EAC • Serial number / date code / model name	
Other Connectors			• AC mains power input (IEC C14 inlet) • USB type B socket • RJ45 (LAN) socket	
Other	• Power on / off switch with LED • LED switch path indicators • Carry handles		• Cooling vents	
Power Supply	AC mains power input (90-260 V, 47-63 Hz)			
Fuse	2A, 250V rating			
Temperature	Operating: 0 to +50 ºC			

Case Drawings

24 x SPDT switches:

SPDT MODULE

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Case Drawings

Front, rear & top panels:

THIRD ANGLE PROJECTION
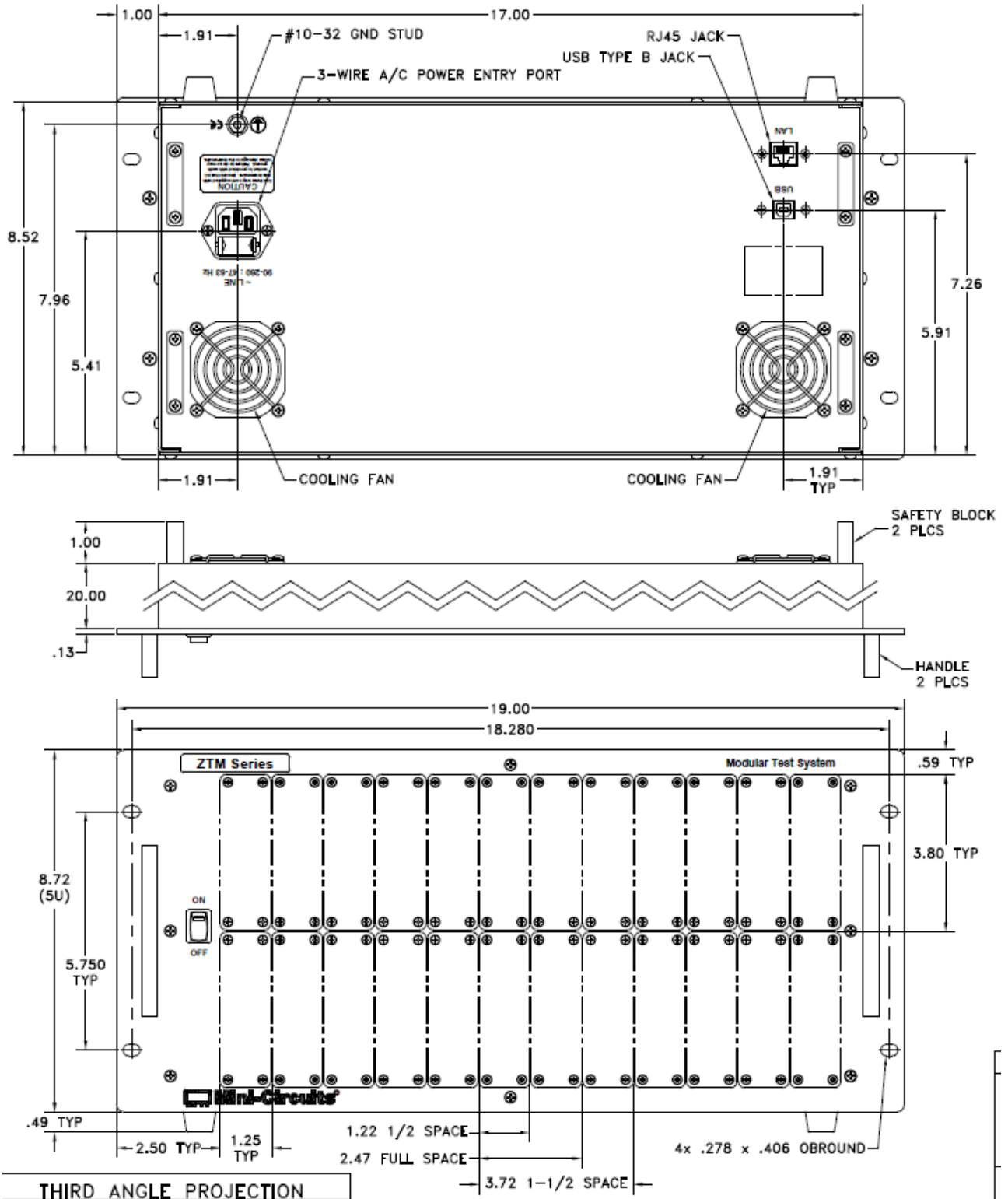
Software Specifications

• Please contact testsolutions@minicircuits.com for support

| Ethernet Control	Supported Protocols	TCP / IP, HTTP, Telnet, DHCP, UDP
	Max Data Rate	10 Mbps (10Base-T Half Duplex)
USB Control	Supported Protocols	HID - Full Speed
	Min Communication Time	3 ms typ
Software Support	• Mini-Circuits' Universal GUI for USB & LAN control (Windows only) • ASCII / SCPI command syntax for LAN programming (all OS) • ActiveX / .Net DLL APIs for USB programming (Windows only) • Interrupt codes for direct USB programming (all OS) • Full programming instructions and examples for a wide range of languages	
Downloads	Software & Documentation	https://www.minicircuits.com/softwaredownload/ztm2.html

Programming Commands

• The key ASCII / SCPI commands for control of the system are summarized below
• These can be sent via the USB or Ethernet API
• Please refer to the programming manual for full details

Command / Query	Description
:MN?	Read model name
:SN?	Read serial number
:FIRMWARE?	Read firmware version
:sw_type:sw_number:STATE:port	Set a single switch state: • sw_type = MTS or SPDT or SP4T or SP6T or SP8T • sw_number = 1 to n (refer to block diagram) • port = the switch state to set • Example: :SPDT:1:STATE:2 (set SPDT switch 1 to state 2)
:Csw_number=port	Short-hand to set a single switch state: • sw_number = 1 to n (refer to block diagram) • port = the switch state to set • Example: C1=2 (set switch 1 to state 2)
:sw_type:sw_number:STATE?	Get the state of a single switch: • sw_type = MTS or SPDT or SP4T or SP6T or SP8T • sw_number = 1 to n (refer to block diagram) • Example: :SPDT:1:STATE? (get the state of SPDT switch 1)

Graphical User Interface (GUI) for Windows - Key Features

- Connect via USB or Ethernet
- Run GUI in "demo mode" to evaluate software without a hardware connection
- View and set all switch states
- Configure Ethernet settings
- Upgrade firmware
- Send SCPI commands
- View temperature & fan status
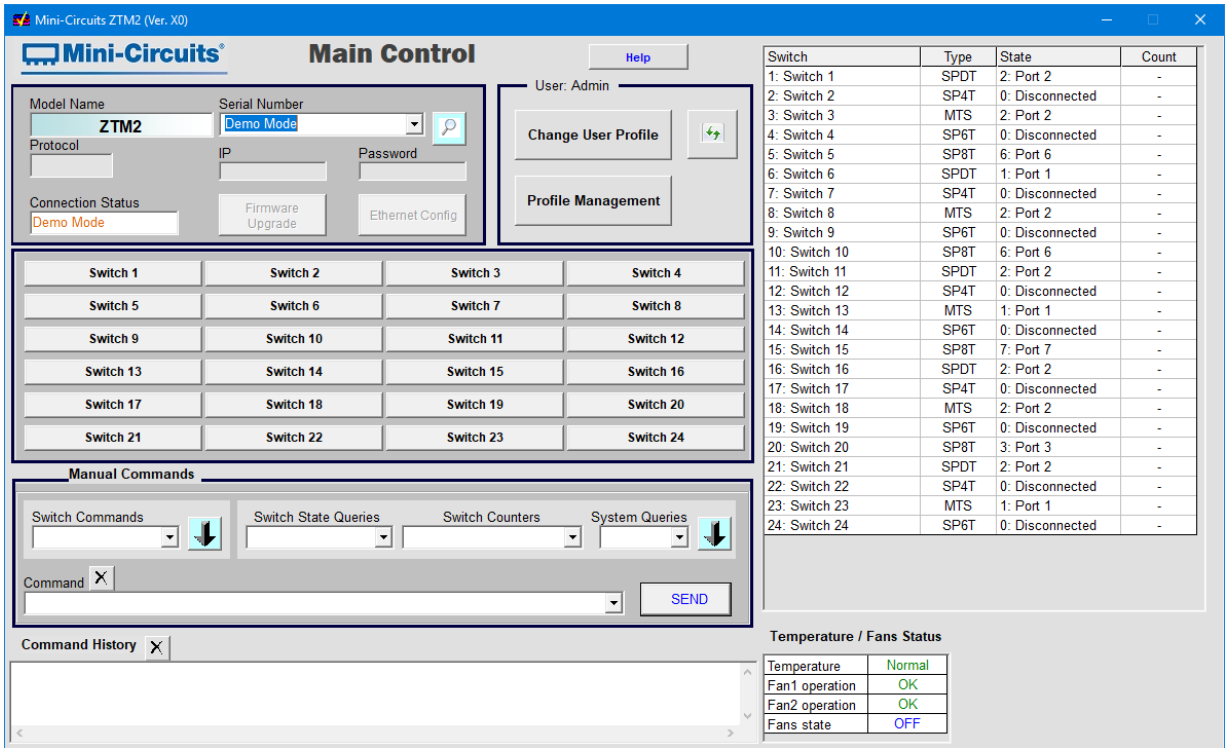
Ordering Information

Please contact Mini-Circuits' Test Solutions department for price and availability:
testsolutions@minicircuits.com

Included Accessories

Model Name	Quantity	Description
CBL-3W-xx*	1	AC power cord (IEC C13 connector to local plug)
USB-CBL-AB-7+	1	USB cable (6.8 ft)
CBL-RJ45-MM-5+	1	Ethernet cable (5 ft)
HT-4-SMA	1	SMA Cable Wrench (4 in)

*Please specify one option on the purchase order, at no charge

Cable Model	Region
CBL-3W-US	USA
CBL-3W-EU	Europe
CBL-3W-IL	Israel
CBL-3W-UK	UK
CBL-3W-AU	Australia / China

Additional Notes

A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.

B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.

C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp

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