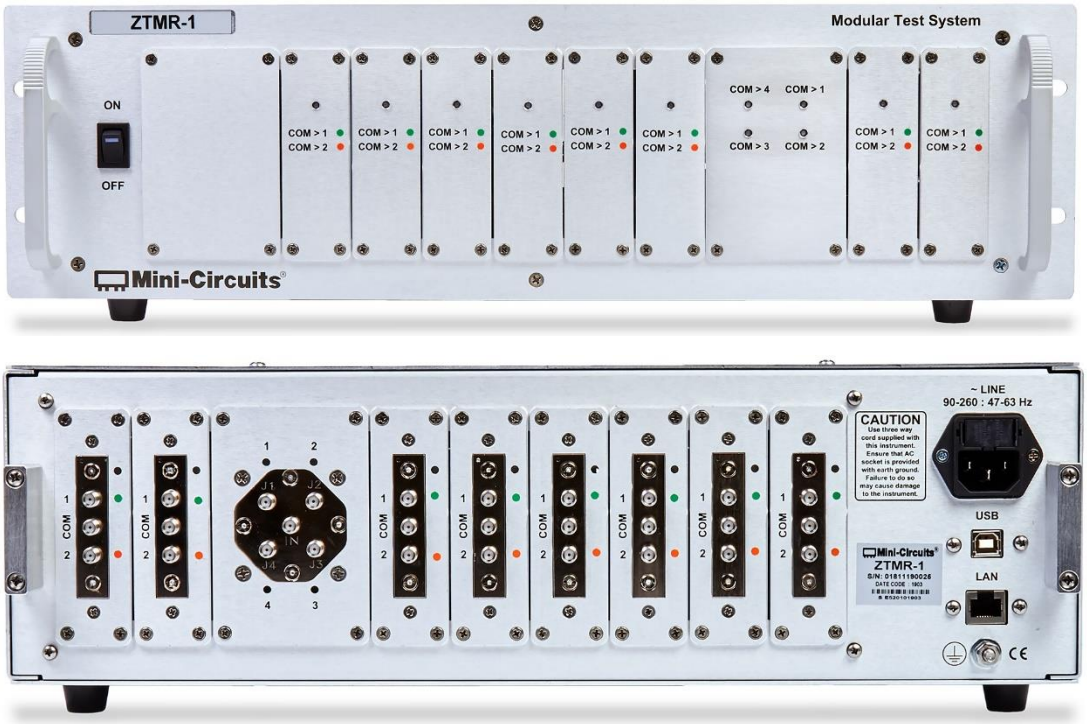
USB & Ethernet Controlled

Mechanical Switch System

ZTMR-1

50Ω DC to 18 GHz



Product Overview

ZTMR-1 is part of Mini-Circuits' ZTMR series modular switch range, which offers flexibility and fast turnaround for automated test setups. The design consists of a 19" rack chassis (3U height), populated with 8 x SPDT and 1 x SP4T mechanical switches on the rear panel, with switch position indicators on the front panel. Each high reliability switch operates over a wide bandwidth, from DC-18 GHz with low insertion loss and exceptional isolation.

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	Compact, 3U height 19" rack-chassis with all connections on the rear, 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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Configuration

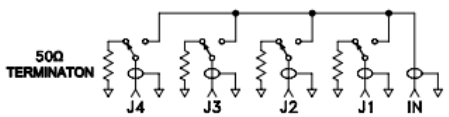
Row	Slot	Model Name	Frequency	Connectors	Description
Top	1	MSP2TA-18XL+	DC to 18 GHz	SMA (f)	SPDT Switch (Absorptive)
Top	2	MSP2TA-18XL+	DC to 18 GHz	SMA (f)	SPDT Switch (Absorptive)
Top	3	MSP4TA-18+	DC to 18 GHz	SMA (f)	SP4T Switch (Absorptive)
Top	5	MSP2TA-18XL+	DC to 18 GHz	SMA (f)	SPDT Switch (Absorptive)
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)

Electrical Specifications @ 25ºC (per SP4T 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		0.20	0.40	
	12 – 18 GHz		0.50	0.80	
Isolation	DC – 8 GHz	80	100		dB
	8 – 12 GHz	75	95		
	12 – 18 GHz	60	80		
VSWR	DC – 8 GHz		1.20		:1
	8 – 12 GHz		1.20		
	12 – 18 GHz		1.30		
Switching Time			25		ms
RF Input Power (Cold Switching)[1]	DC – 18 GHz			20	W
Switch Lifetime (per Switch)	100 mW hot switching [2]	10			million cycles
	1W hot switching		1		

Notes:
1. Maximum power for any connected through path as stated; maximum power into any internal termination is 1W per port
2. Hot switching powers above this level will degrade the switch lifetime

Switch Configuration:
- Normally open (all ports disconnected)
- Absorptive (internal terminations on ports J1-J4)

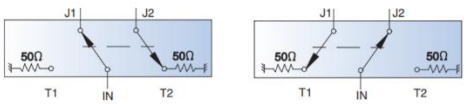


Electrical Specifications @ 25ºC (per SPDT Switch)

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 (Cold Switching)[1]	DC – 18 GHz			20	W
Switch Lifetime (per Switch)	100 mW hot switching [2]	10			million cycles
	1W hot switching		3		

Notes:
1. Maximum power for any connected through path as stated; maximum power into any internal termination is 1W per port
2. Hot switching powers above this level will degrade the switch lifetime

Switch Configuration:
- Fail-safe
- Absorptive



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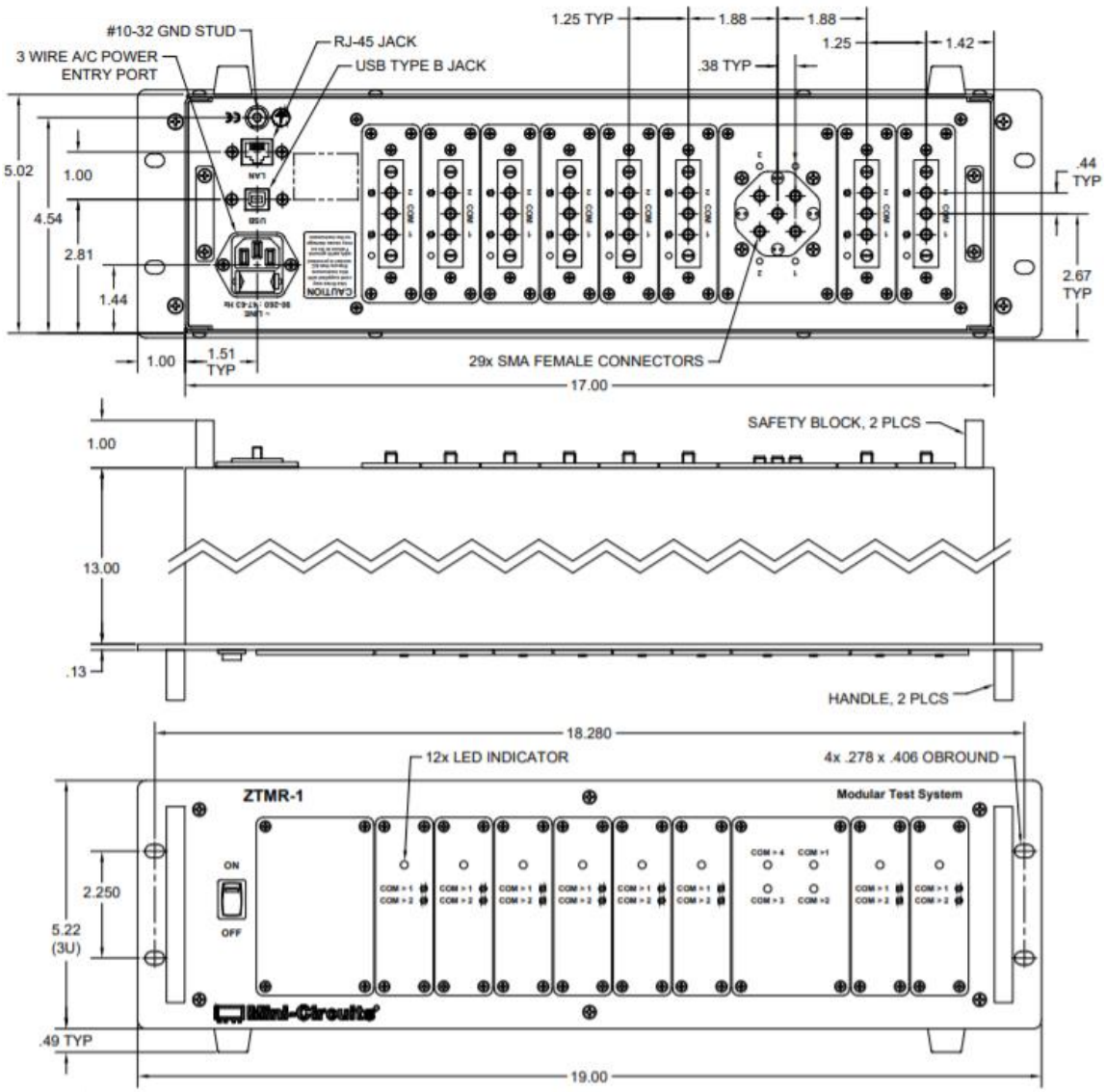
Mechanical / Environmental Specifications

Dimensions	19” (w) x 3U (h) x 13” (d); mounting feet add 0.5” height
Case Material	Aluminum (with protective coatings to prevent corrosion)
Case Drawing	99-01-2824
RF Connectors	SMA female
Front Panel	a) Power ON/OFF switch with indicator light b) LED switch position indicators
Rear Panel	a) All RF ports b) AC mains power input (IEC C14 inlet) c) USB & RJ45 control connections
Control Interface	USB and Ethernet TCP/IP supporting HTTP and TELNET protocols
Power Supply	AC mains power input (90-260 V, 47-63 Hz) with 2A, 250V fuse rating
Operating Temperature	0° to +50° C

Case Drawings



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Software Specifications

Software & Documentation Download:

- Mini-Circuits' full software and support package including user guide, Windows GUI, DLL files, programming manual and examples can be downloaded free of charge from https://www.minicircuits.com/softwaredownload/ztm_rcm.html
- Please contact testsolutions@minicircuits.com for support

Minimum System Requirements:

Parameter	Requirements	
Interface	USB HID & Ethernet (HTTP & Telnet)	
System Requirements	GUI	Windows 98 or later
	USB API DLL	Windows 98 or later and programming environment with ActiveX or .NET support
	USB Direct Programming	Linux; Windows 98 or later
	Ethernet	Windows, Linux or Mac computer with a network port and Ethernet TCP / IP support
Hardware	Pentium II or later with 256 MB RAM	

Application Programming Interface (API)

Ethernet Support:
- Simple ASCII / SCPI command set for switch & attenuator control
- Communication via HTTP or Telnet
- Supported by most common programming environments

USB Support (Windows):
- ActiveX COM DLL file for creation of 32-bit programs
- .NET library DLL file for creation of 32 / 64-bit programs
- Supported by most common programming environments (refer to application note AN-49-001 for summary of supported environments)

USB Support (Linux):
- Direct USB programming using a series of USB interrupt codes

Full programming instructions and examples available for a wide range of programming environments / languages.

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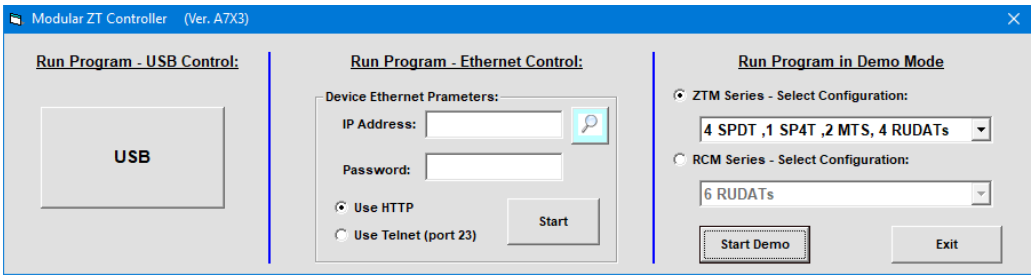
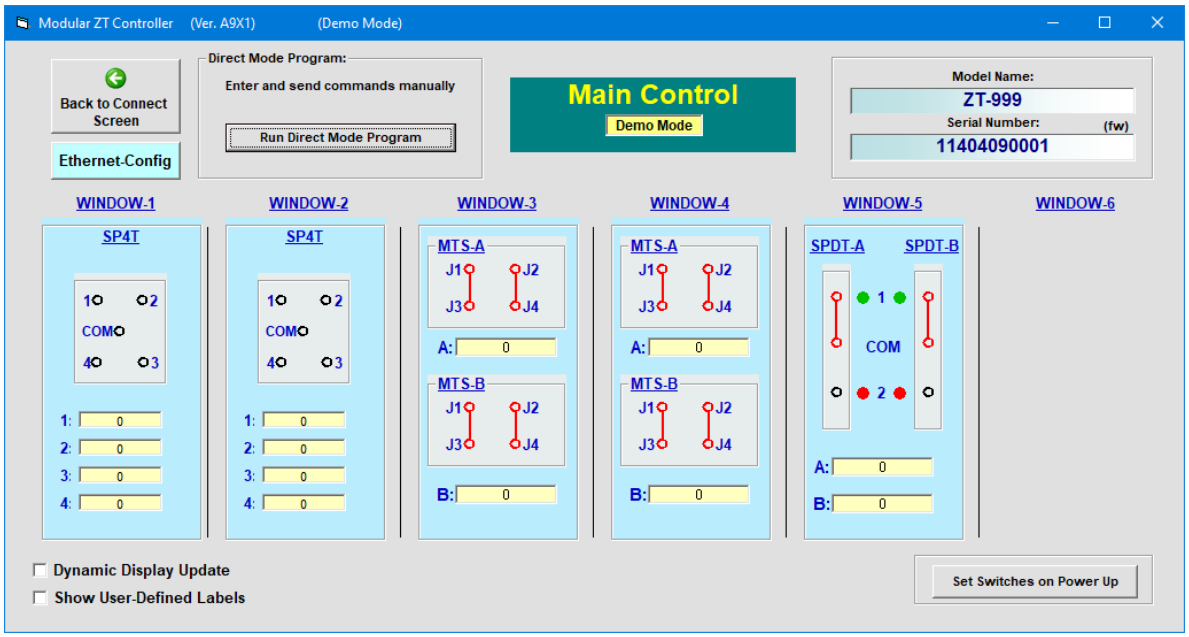
Graphical User Interface (GUI) for Windows - Key Features

- Connect via USB or Ethernet
- Run GUI in “demo mode” to evaluate software without a hardware connection



- View and set switch / attenuator states at the click of a button
- Configure and run timed sequences
- Set start-up states
- View switch position counters
- Configure Ethernet IP settings



* GUI pictured for similar model

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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)
B13-67-11+	2	Rear safety block
B18-DD-125+	4	Pan-head screw

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

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

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