

USB &amp; Ethernet Controlled

# Mechanical Switch System (12 x SP6T)

**ZT-12SP6T-12R**

50Ω DC to 12 GHz



## Typical Applications

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

## Product Overview

ZT-12SP6T-12R is part of Mini-Circuits' flexible series of rack-mounted mechanical switch systems, offering high performance and fast turnaround for automated test setups. This design consists of a 19" rack chassis (4U height) with 12 x SP6T high reliability mechanical switches mounted on the rear panel.

With the use of Mini-Circuits' low cost Hand-Flex™ interconnect cables, multiple matrix configurations can be created easily 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, 4U 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

## Configuration

Row	Slot	Model Name	Frequency	Connectors	Description
Top	1	MSP6TA-12+	DC to 12 GHz	SMA (f)	SP6T Switch (Absorptive)
Top	3	MSP6TA-12+	DC to 12 GHz	SMA (f)	SP6T Switch (Absorptive)
Top	5	MSP6TA-12+	DC to 12 GHz	SMA (f)	SP6T Switch (Absorptive)
Top	7	MSP6TA-12+	DC to 12 GHz	SMA (f)	SP6T Switch (Absorptive)
Top	9	MSP6TA-12+	DC to 12 GHz	SMA (f)	SP6T Switch (Absorptive)
Top	11	MSP6TA-12+	DC to 12 GHz	SMA (f)	SP6T Switch (Absorptive)
Bottom	1	MSP6TA-12+	DC to 12 GHz	SMA (f)	SP6T Switch (Absorptive)
Bottom	3	MSP6TA-12+	DC to 12 GHz	SMA (f)	SP6T Switch (Absorptive)
Bottom	5	MSP6TA-12+	DC to 12 GHz	SMA (f)	SP6T Switch (Absorptive)
Bottom	7	MSP6TA-12+	DC to 12 GHz	SMA (f)	SP6T Switch (Absorptive)
Bottom	9	MSP6TA-12+	DC to 12 GHz	SMA (f)	SP6T Switch (Absorptive)
Bottom	11	MSP6TA-12+	DC to 12 GHz	SMA (f)	SP6T Switch (Absorptive)

## Electrical Specifications @ 25°C (per Switch)

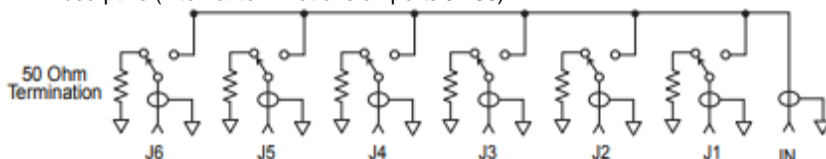
Parameter	Conditions	Min	Typ	Max	Units
Frequency Range		DC		12	GHz
Insertion Loss	DC – 6 GHz		0.15	0.25	dB
	6 – 8 GHz		0.20	0.30	
	8 – 12 GHz		0.25	0.45	
Isolation	DC – 6 GHz	80	95		dB
	6 – 8 GHz	80	90		
	8 – 12 GHz	80	90		
VSWR	DC – 6 GHz		1.20		:1
	6 – 8 GHz		1.20		
	8 – 12 GHz		1.20		
Switching Time			25		ms
RF Input Power (Cold Switching) <sup>1</sup>	DC – 12 GHz			20	W
Switch Lifetime (per Switch)	100 mW hot switching <sup>2</sup>	10			million cycles
	1W hot switching		1		

Notes:

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

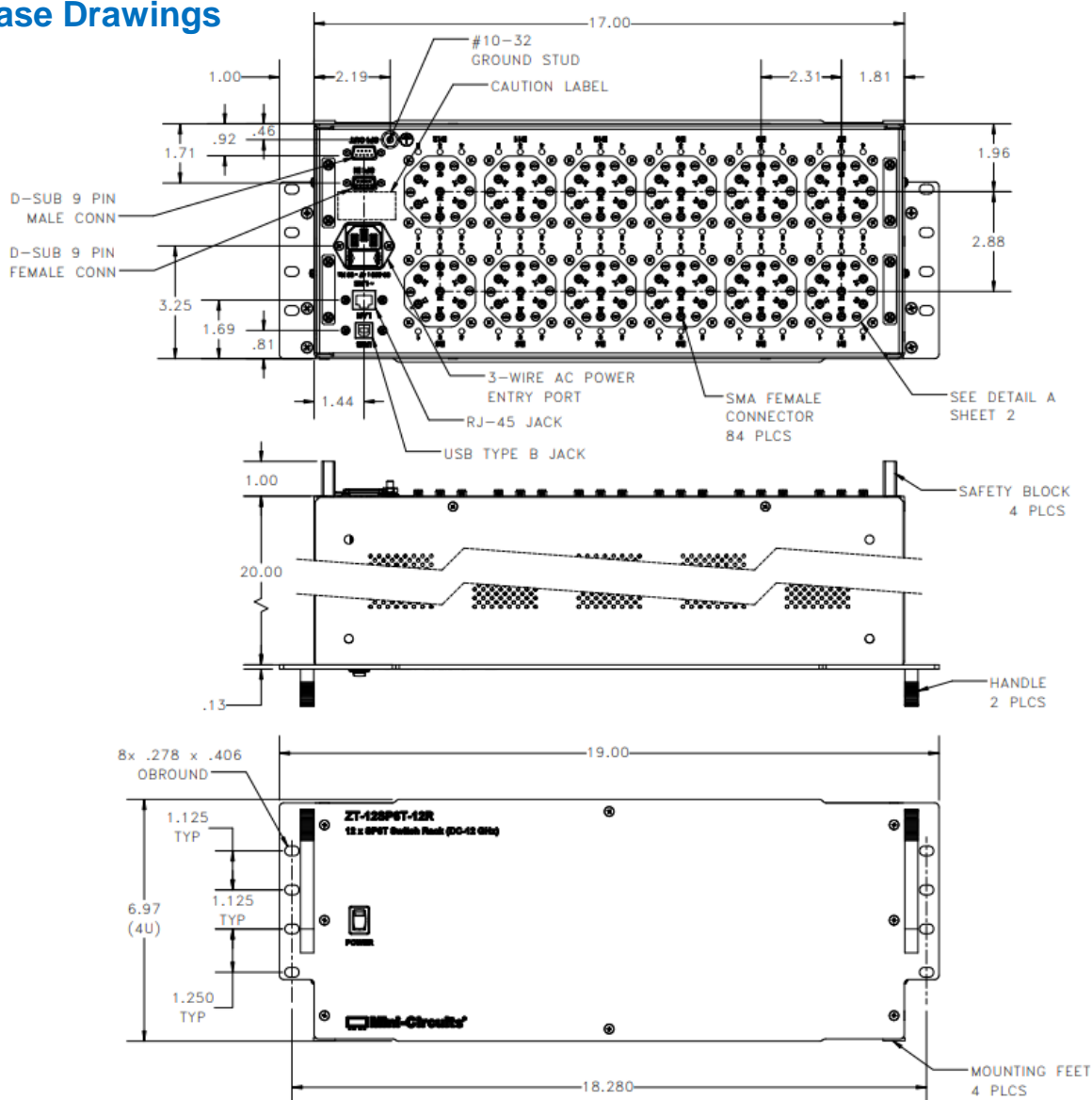
### Switch Configuration:

- Normally open (all ports disconnected)
- Absorptive (internal terminations on ports J1-J6)



**Mechanical / Environmental Specifications**

<b>Dimensions</b>	19" (w) x 4U (h) x 20" (d); mounting feet add 0.5" height
<b>Case Material</b>	Aluminum (with protective coatings to prevent corrosion)
<b>Case Drawing</b>	99-01-2573
<b>RF Connectors</b>	SMA female
<b>Front Panel</b>	a) Power ON/OFF switch with indicator light
<b>Rear Panel</b>	a) All RF ports b) LED switch position indicators c) AC mains power input (IEC C14 inlet) d) USB & RJ45 control connections
<b>Control Interface</b>	USB and Ethernet TCP/IP supporting HTTP and TELNET protocols
<b>Power Supply</b>	AC mains power input (90-260 V, 47-63 Hz) with 2A, 250V fuse rating
<b>Operating Temperature</b>	0° to +50° C

**Case Drawings**

## Software Specifications

### Software & Documentation Download:

- Mini-Circuits' full software and support package including user guide, Windows GUI, DLL files, programming manual and examples is available free of charge
- Please contact [testsolutions@minicircuits.com](mailto: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.

**Graphical User Interface (GUI) for Windows - Key Features**

- Connect via USB or Ethernet
- Run GUI in demo mode to preview functionality without hardware
- View and set all switch states at the click of a button
- View system status
- Configure user profiles to label switches and control access
- Send programmatic commands
- Configure Ethernet IP settings

Mini-Circuits Multi Switch Controller (Ver. X1)

**Mini-Circuits Main Control**

Help Block Diagram

User: Admin

Change User Profile GUI Configuration

Model Name: ZT-12SP6T-12R Serial Number: Demo Mode

Protocol: IP: Password:

Connection Status: Demo Mode Firmware Upgrade Ethernet Config

Switch	State
1: Switch 1	0: Disconnected
2: Switch 2	0: Disconnected
3: Switch 3	0: Disconnected
4: Switch 4	0: Disconnected
5: Switch 5	0: Disconnected
6: Switch 6	0: Disconnected
7: Switch 7	0: Disconnected
8: Switch 8	0: Disconnected
9: Switch 9	0: Disconnected
10: Switch 10	0: Disconnected
11: Switch 11	0: Disconnected
12: Switch 12	0: Disconnected

Manual Commands

Switch Commands Switch State Queries System Queries

Command X SEND

Command History X

# USB & Ethernet Controlled Mechanical Switch System (12 x SP6T)

## ZT-12SP6T-12R

### Ordering Information

Please contact Mini-Circuits' Test Solutions department for price and availability:

[testsolutions@minicircuits.com](mailto: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

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- 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](http://www.minicircuits.com/MCLStore/terms.jsp)

