



## THE BIG DEAL

- 6 x solid-state SP8T absorptive switches
- Rear panel RF connectors
- SSH secure Ethernet communication

## APPLICATIONS

- RF test automation & signal routing
- 5G FR1, Bluetooth & WiFi signal distribution
- MIMO antenna testing
- C-band radar & satcom
- Switch matrices



Generic photo used for illustration purposes only

## PRODUCT OVERVIEW

Mini-Circuits' ZTS series platform allows multiple solid-state switch types to be combined and integrated into a single rack-mount package with software control via USB and Ethernet. ZTS-6SP8T-852R integrates 6 solid-state SP8T switches into a chassis, operating from 10 MHz to 8.5 GHz with fast switching and high isolation.

The system is housed in a compact 3U height, 19-inch rack chassis, with all RF connectors (SMA female) and power / control connections on the rear panel, for convenient access from the rear of a rack cabinet.

The switch is controlled via USB or Ethernet (supporting SSH, HTTP & Telnet protocols). Full software support is provided, including our user-friendly GUI application for Windows, flexible API, and programming instructions for Windows and Linux environments.

## KEY FEATURES

Feature	Advantages
Solid-state switches	Fast switching and high isolation switch, well suited to automated test setups with large numbers of devices or channels under test
Wide bandwidth	Operation from 10 MHz to 8.5 GHz incorporates most of the key commercial wireless mesh network applications, including WiFi 6E, 5G FR1 and Zigbee.
Rack-mount chassis	3U height 19" rack-chassis minimizes the rack space required in crowded production test environments.
Secure Ethernet communication	Support for SSH (Secure Shell protocol) provides a means for secure communication over Ethernet networks with strict security policies. HTTP & Telnet communication via Ethernet are also supported.



## ELECTRICAL SPECIFICATIONS @ 25°C

Parameter	Conditions	Min	Typ	Max	Units
Frequency		10		8500	MHz
Insertion Loss	10 – 700 MHz		3.2	4.5	dB
	700 – 2500 MHz		3.9	5.5	
	2500 – 5000 MHz		5.2	6.5	
	5000 – 6000 MHz		5.8	7.5	
	6000 – 7200 MHz		6.0	8.0	
	7200 – 8000 MHz		6.5	8.5	
	8000 – 8500 MHz		7.0	9.0	
Isolation (Between Outputs) <sup>1</sup>	10 – 700 MHz	80	100		dB
	700 – 2500 MHz	70	87		
	2500 – 5000 MHz	52	69		
	5000 – 6000 MHz	50	60		
	6000 – 800 MHz	50	57		
	800 – 8500 MHz	49	55		
Isolation (Inactive Paths) <sup>2</sup>	10 – 700 MHz	78	100		dB
	700 – 2500 MHz	73	98		
	2500 – 5000 MHz	58	76		
	5000 – 6000 MHz	54	65		
	6000 – 800 MHz	54	63		
	800 – 8500 MHz	52	60		
Return Loss (COM Port) <sup>3</sup>	10 – 700 MHz		15.5		dB
	700 – 5000 MHz		19.0		
	5000 – 6000 MHz		19.0		
	6000 – 7200 MHz		18.0		
	7200 – 8000 MHz		15.0		
	8000 – 8500 MHz		12.0		
Return Loss (Active Ports) <sup>4</sup>	10 – 700 MHz		14.5		dB
	700 – 5000 MHz		19.0		
	5000 – 6000 MHz		19.0		
	6000 – 7200 MHz		16.0		
	7200 – 8500 MHz		13.0		
Return Loss (Terminated Ports) <sup>5</sup>	10 – 700 MHz		23.0		dB
	700 – 5000 MHz		23.0		
	5000 – 8000 MHz		21.0		
	8000 – 8500 MHz		16.0		
Input Power	Hot switching			+24	dBm
	Into internal terminations			+24	
	Cold switching, 10-40 MHz			+25	
	Cold switching, 40-8500 MHz			+29	

1. Isolation measured between any pair of ports J1 to J8

2. Isolation measured between Com and any disconnected port. Example: Isolation for COM to J1 is the leakage measured at port J1 from a signal input at COM when the active switch path is set COM to J2.

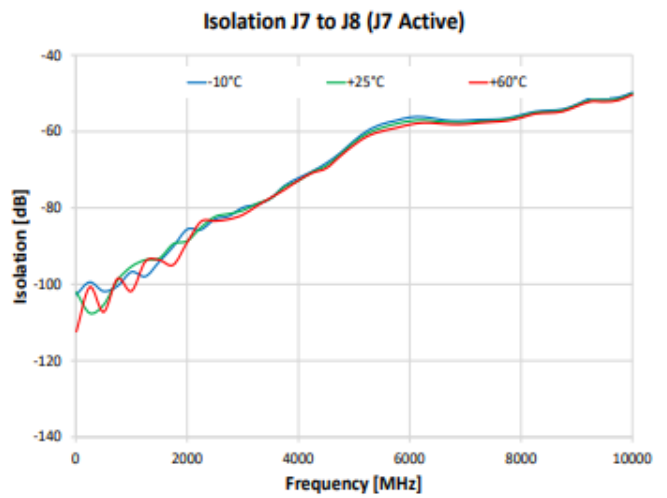
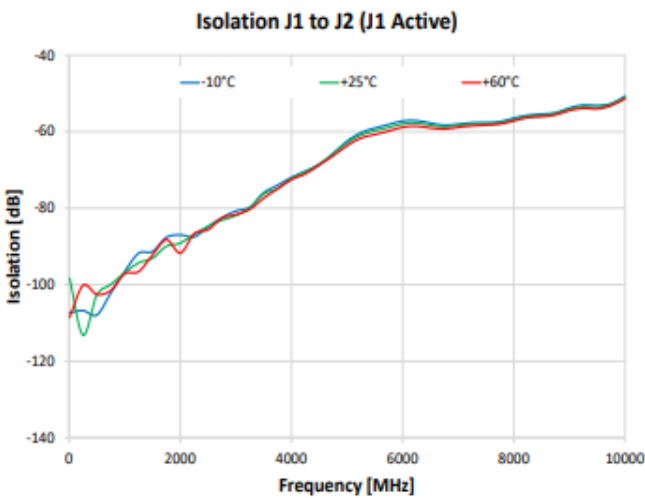
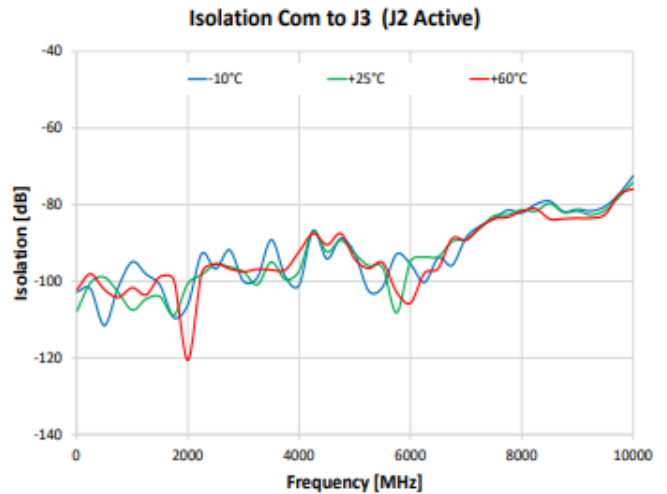
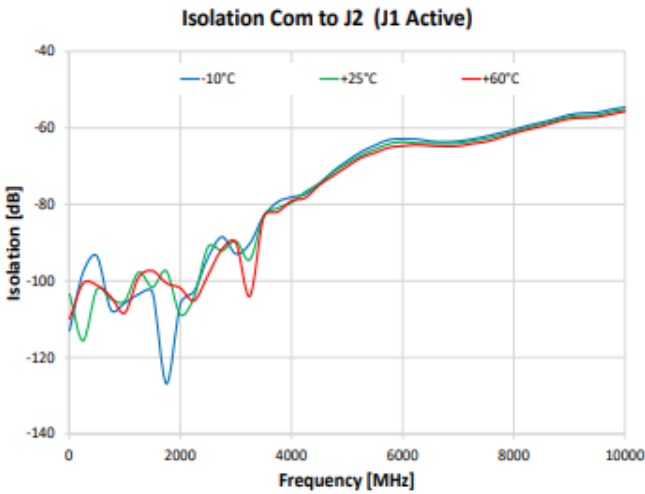
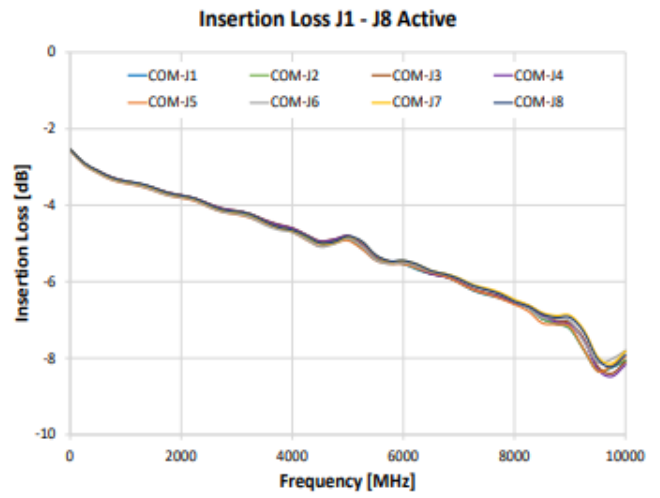
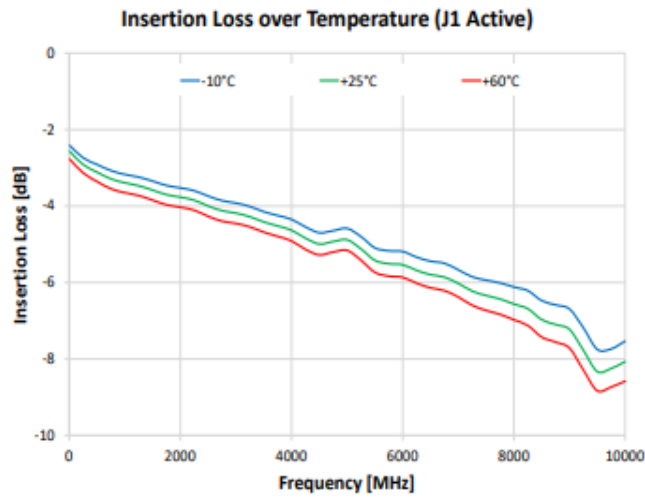
3. Return loss into COM port in all states

4. Return loss into any of ports J1-J8 when connected to COM

5. Return loss into any of ports J1-J8 when internally terminated (disconnected from COM)



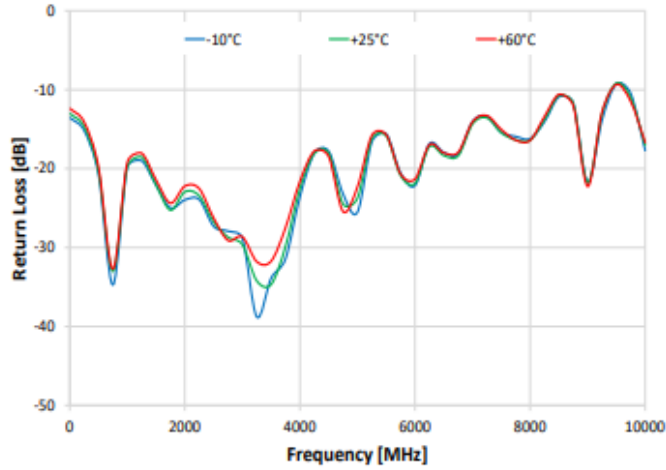
## TYPICAL PERFORMANCE DATA



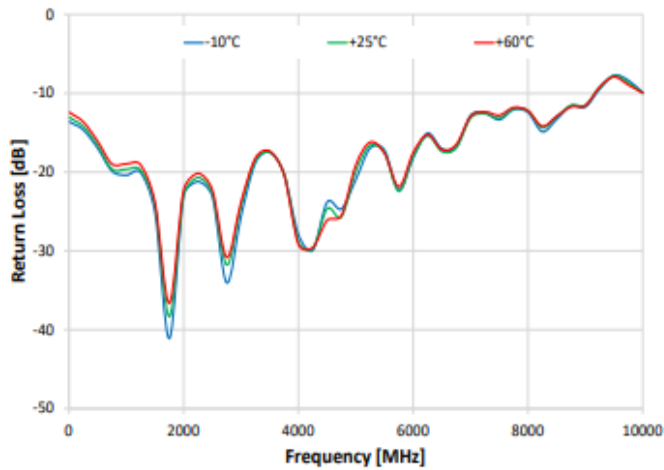


### TYPICAL PERFORMANCE DATA

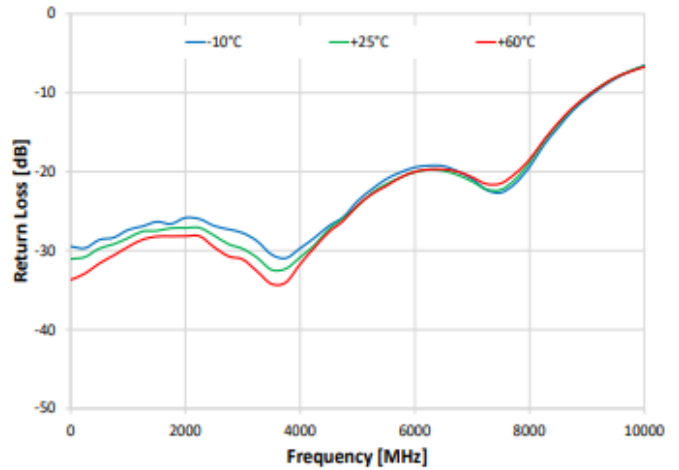
Return Loss @ COM over Temperature (J1 Active)



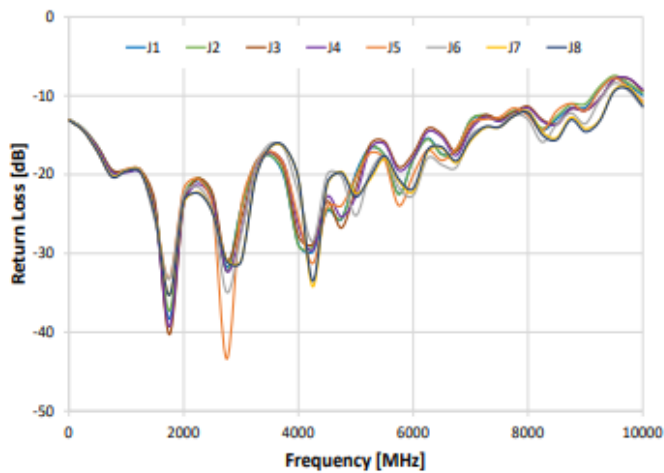
Return Loss @ J1 over Temperature (J1 Active)



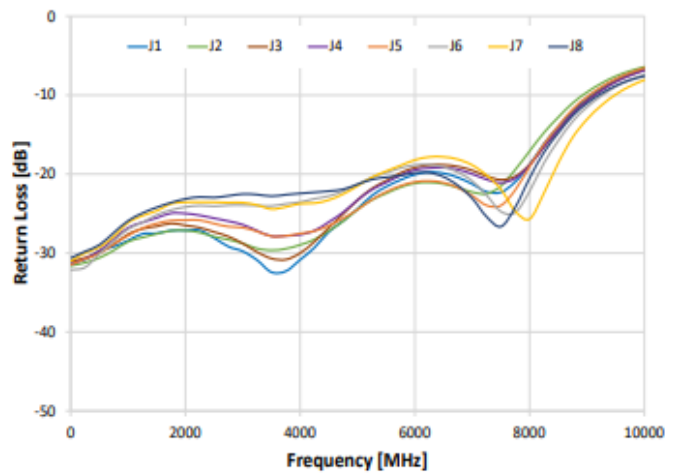
Return Loss @ J1 over Temperature (J1 Terminated)



Return Loss @ Active ports (J1 - J8 Active)



Return Loss @ Terminated ports (J1 - J8 Terminated)





## CONTROL INTERFACES

<b>Ethernet Control</b>	<b>Supported Protocols</b>	TCP / IP, SSH, HTTP, Telnet, DHCP, UDP
	<b>Max Data Rate</b>	100 Mbps (100Base-T Full Duplex)
<b>USB Control</b>	<b>Supported Protocols</b>	HID - High Speed
	<b>Min Communication Time</b>	400 $\mu$ s typ <sup>1</sup>

1. Based on the polling interval of the USB HID protocol (125  $\mu$ s with 64 bytes per packet) and no other significant CPU or USB activity

## SOFTWARE & DOCUMENTATION

Mini-Circuits' full software and support package including user guide, Windows GUI, API, programming manual and examples can be downloaded free of charge (refer to the last page for the download path).

A comprehensive set of software control options is provided:

- GUI for Windows – Simple software interface for control via Ethernet and USB
- Programming / automation via Ethernet
  - Complete set of control commands which can be sent via any supported protocol – simple to implement in the majority of modern programming environments
- Programming / automation via USB
  - DLL files provide a full API for Windows with a set of intuitive functions which can be implemented in any programming environment supporting .Net Framework or ActiveX
  - Direct USB programming is possible in any other environment (not supporting .Net or ActiveX)

Please contact [testsolutions@minicircuits.com](mailto:testsolutions@minicircuits.com) for support

## MINIMUM SYSTEM REQUIREMENTS

<b>Hardware</b>	Intel i3 (or equivalent) or later
<b>GUI (USB or Ethernet Control)</b>	Windows 7 or later
<b>USB API DLL</b>	Windows 7 or later with support for Microsoft .Net Framework or ActiveX
<b>USB Direct Programming</b>	Windows 7 or later; Linux
<b>Ethernet</b>	Windows, Linux or macOS with Ethernet TCP / IP support

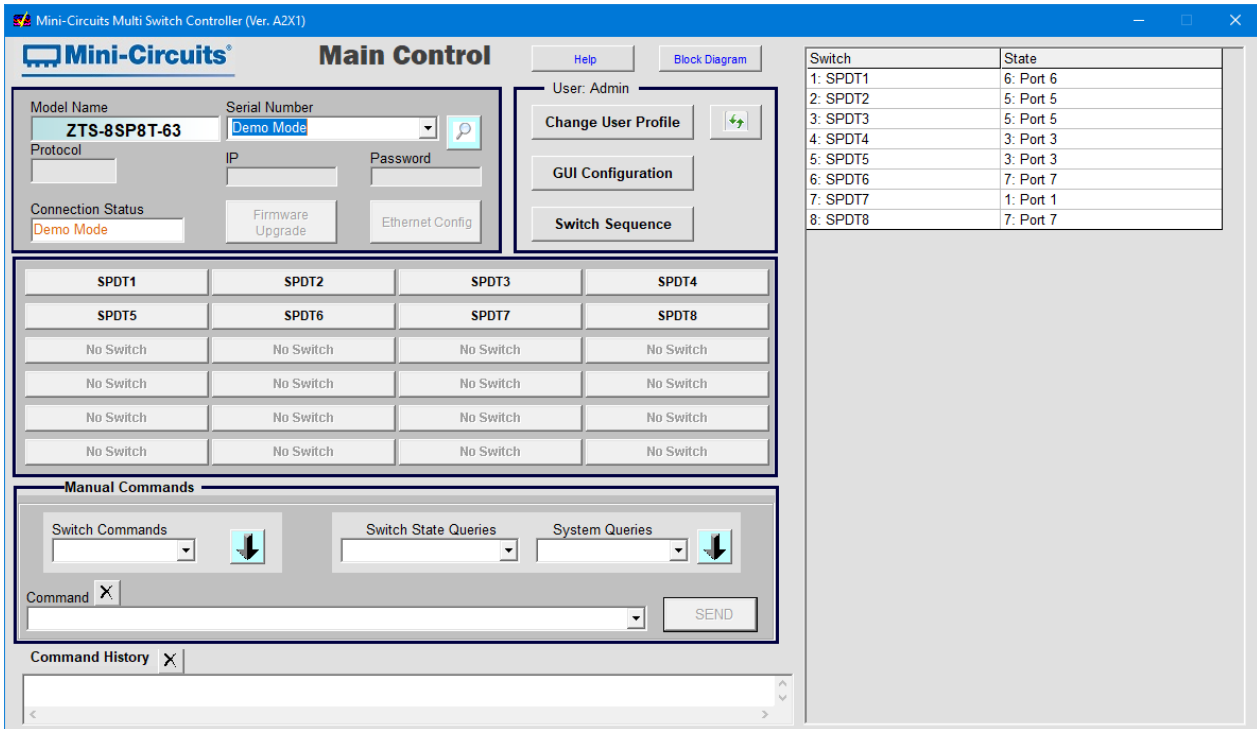
## PROGRAMMING COMMANDS

The key ASCII / SCPI commands for control of the system for control via the Ethernet or USB API are summarized below (refer to the programming manual for full details):

Command / Query	Description
:MN?	Read model name
:SN?	Read serial number
:FIRMWARE?	Read firmware version
:address:SP8T:STATE:port	Set a switch state: • address = switch number (01-06) • port = the switch state to set Example: :01:SP8T:STATE:8 (set the switch to state 8)
:address:SP8T:STATE?	Get a switch state • address = switch number (01-06) Example: :01:SP8T:STATE?



## GRAPHICAL USER INTERFACE (GUI) FOR WINDOWS



- Connect via USB or Ethernet
- Run GUI in demo mode to evaluate the software without a hardware connection
- View and set the switch state at the click of a button
- Configure automated switch sequences
- Update Ethernet settings and firmware



### ABSOLUTE MAXIMUM RATINGS

Parameter	Conditions	Limits	Units
Temperature	Operating	0 to +50	°C
	Storage	-20 to +60	
Input Power (No Damage)	Hot Switching	+24	dBm
	Cold Switching 10-40 MHz	+25	
	Cold Switching 40 - 8500 MHz	+29	
	Into internal termination	+24	

Permanent damage may occur if any of these limits are exceeded. Operating in the range between operating power limits and absolute maximum ratings for extended periods of time may result in reduced life and reliability.

### POWER SUPPLY

Power Supply	AC mains input: 100-240 V, 50 / 60 Hz
Fuse	2A, 250V rating
Power Consumption	150W maximum

### SWITCH STATE TABLE

Command	Switch Path
:xx:SP8T:STATE:1	COM to port J1
:xx:SP8T:STATE:2	COM to port J2
:xx:SP8T:STATE:3	COM to port J3
:xx:SP8T:STATE:4	COM to port J4
:xx:SP8T:STATE:5	COM to port J5
:xx:SP8T:STATE:6	COM to port J6
:xx:SP8T:STATE:7	COM to port J7
:xx:SP8T:STATE:8	COM to port J8

xx = Switch number (01-06)

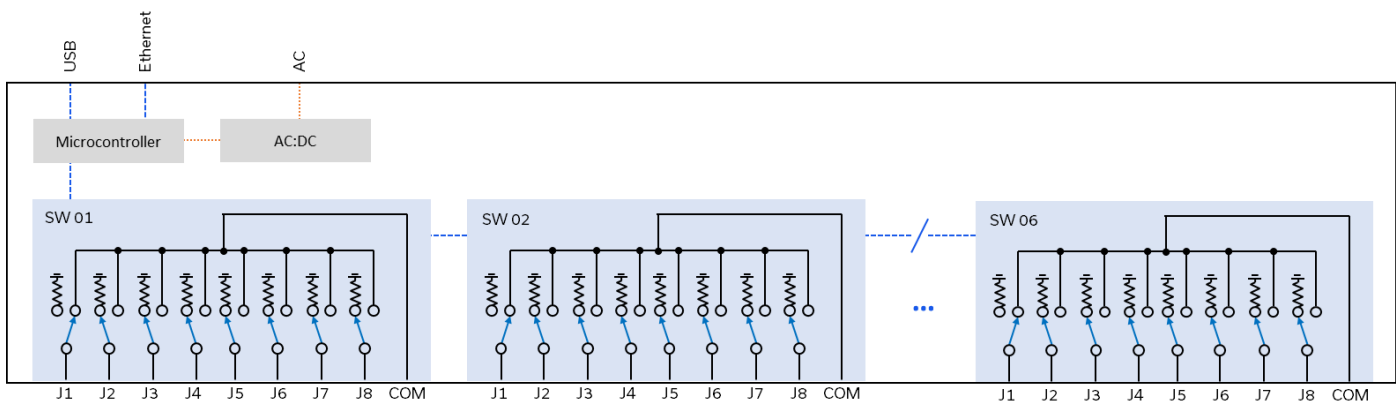
COM = Common port

J1-J8 = Input / output port

### CONNECTIONS

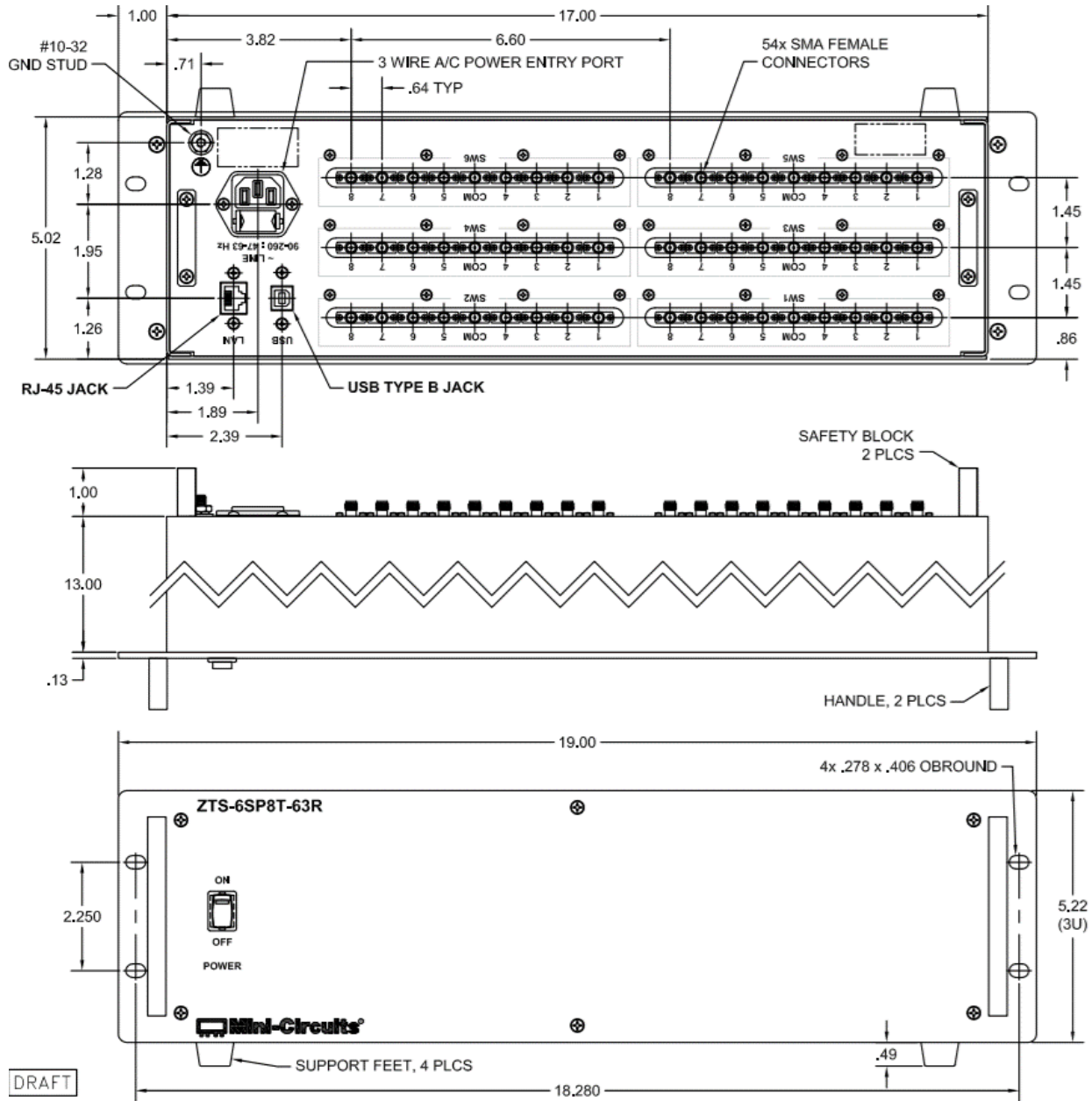
Port	Connector
SW1 - SW6, COM & 1-8	SMA female
USB	USB type B
Ethernet / LAN	RJ45
AC Input	IEC C14 inlet

### FUNCTIONAL BLOCK DIAGRAM





## OUTLINE DRAWING



## PRODUCT MARKING\*

Product Marking: ZTS-6SP8T-852R  
 Unit ID Label: Serial number and other identification marks  
 \*Marking may contain other features or characters for internal lot control





DETAILED MODEL INFORMATION IS AVAILABLE ON OUR WEBSITE

<b>Case Style</b>	99-01-2483
<b>Software, User Guide &amp; Programming Manual</b>	<a href="http://www.minicircuits.com/softwaredownload/multissw.html">www.minicircuits.com/softwaredownload/multissw.html</a>
<b>Environmental Rating</b>	ENV55
<b>Regulatory Compliance</b>	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; font-size: 8px; margin-right: 10px;">             Refer to our website for compliance methodologies and qualifications  </div> <a href="http://www.minicircuits.com/quality/environmental_introduction.html">www.minicircuits.com/quality/environmental_introduction.html</a> </div>

Contact Us: [testsolutions@minicircuits.com](mailto:testsolutions@minicircuits.com)

Included Accessories	Part Number	Description
	CBL-3W-xx	AC power cord (IEC C13 connector to local plug) Select one option from the list below. Please contact <a href="mailto:testsolutions@minicircuits.com">testsolutions@minicircuits.com</a> if your regions is not listed.
	USB-CBL-AB-7+	USB cable (6.8ft) type A to type B
	CBL-RJ45-MM-5+	Ethernet cable (5 ft)
	HT-4-SMA	SMA connector wrench (4" length)

AC Power Cord Options	Part Number	Description
	CBL-3W-US	USA NEMA 5-15 plug (type B) to IEC C13 connector
	CBL-3W-EU	Europe CEE 7/7 plug (type E/F) to IEC C13 connector
	CBL-3W-UK	UK BS-1363 plug (type G) to IEC C13 connector
	CBL-3W-AU	Australia & China AS/NZS 3112 plug (type I) to IEC C13 connector
	CBL-3W-IL	Israel SI-32 plug (type H) to IEC C13 connector

Revision	Updates	Date	Creator	Reviewer
1	Initial datasheet	24-Oct-19	LW	N/A
2	Updated frequency	28-Aug-24	LW	WT

**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](http://www.minicircuits.com/MCLStore/terms.jsp)