USB & ETHERNET & DAISY-CHAIN

Solid-State Switch ZTS-1SP64T-852

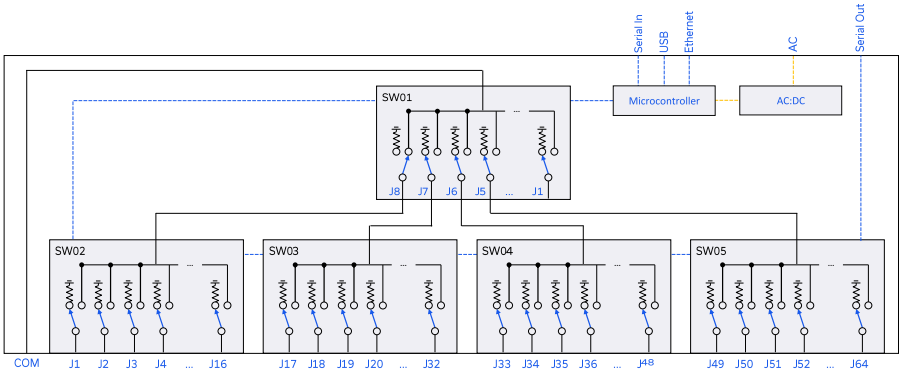
50 Ω 10 to 8500 MHz SP64T Rack-Mount N-type & SMA Female

THE BIG DEAL

- Solid-state switch with high port count (1 to 64)
- Convenient rack-mountable chassis
- SSH secure Ethernet communication
- Daisy-chain control stacking of multiple switch racks
- Software control & automation

Generic photo used for illustration purposes only

FUNCTIONAL BLOCK DIAGRAM



APPLICATIONS

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

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-1SP64T-852 provides a 64 path bi-directional switch, operating from 10 MHz to 8.5 GHz with fast switching and high isolation.

The system is housed in a compact 19-inch rack chassis with all RF connectors (N-type COM port and SMA female J1-J64 ports) on the front panel and power and control connections out of the way on the rear panel.

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.

The daisy-chain control interface further simplifies control integration by allowing multiple switch racks to be interconnected via their respective serial in and out connections. The complete set of daisy-chained switches can then be independently controlled through a single USB / Ethernet connection.

KEY FEATURES

Feature	Advantages
Solid-state switches	Long-term reliability in the most demanding automated test applications
Excellent RF performance	High isolation and exceptional switching speeds support applications requiring rapid signal transitions and minimal interference such as semi-conductor and telecoms testing.
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	Slim 2U height, 19" rack-mountable 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.
Integrated control & power	Easy to use on the lab bench or integrate into larger automated test systems without the need to develop custom control systems.

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ECO-025823
ZTS-1SP64T-852
MCL NY
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ELECTRICAL SPECIFICATIONS AT +25°C

Parameter	Conditions	Min.	Typ.	Max.	Units
Frequency Range	-	10		8500	MHz
Insertion Loss	10 – 3000 MHz		10	14	dB
	3000 – 6000 MHz		14	17	
	6000 – 8500 MHz		19	21	
Isolation (Between Outputs)[1]	10 – 3000 MHz	85	90		dB
	3000 – 6000 MHz	75	85		
	6000 – 8500 MHz	65	75		
Isolation (Inactive Paths)[2]	10 – 3000 MHz	80	90		dB
	3000 – 6000 MHz	65	75		
	6000 – 8500 MHz	55	65		
Return Loss (COM Active)[3]	10 – 3000 MHz		18		dB
	3000 – 6000 MHz		15		
	6000 – 8500 MHz		10		
Return Loss (J1-J64 Active)[4] J-Ports when connected to COM	10 – 3000 MHz		19		dB
	3000 – 6000 MHz		15		
	6000 – 8500 MHz		13		
Return Loss (J1-J64 Terminated)[5]	10 – 3000 MHz		20		dB
	3000 – 6000 MHz		17		
	6000 – 8500 MHz		15		
Input Power	Cold Switching			+30	dBm
	Hot Switching			+20	
	Into Termination			+24	

1. Isolation measured between any pair of ports J1 to J64
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 when connected to any output J1-J64
4. Return loss into any of ports J1-J64 when connected to COM
5. Return loss into any of ports J1-J64 when not connected to COM (internally terminated)

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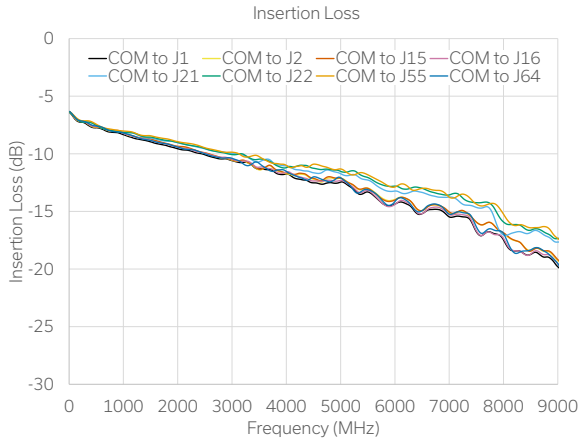
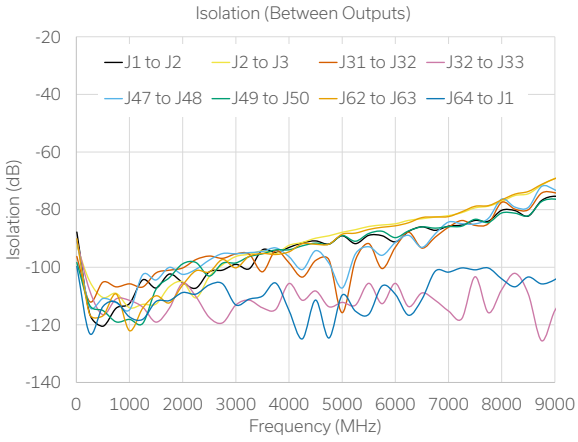
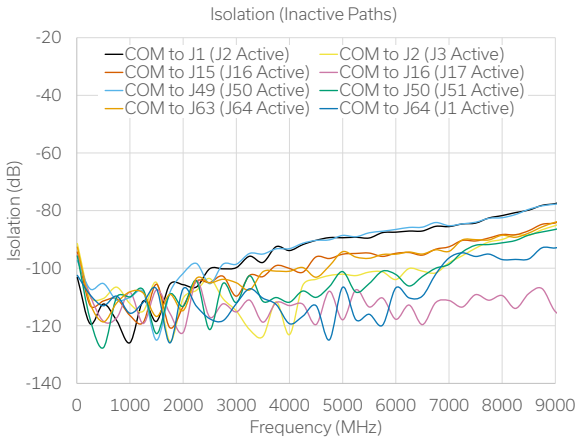
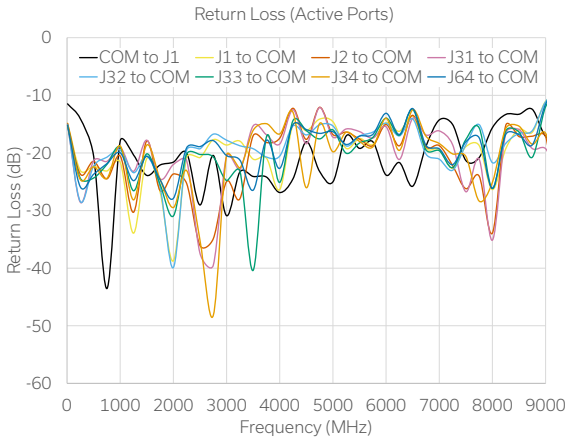
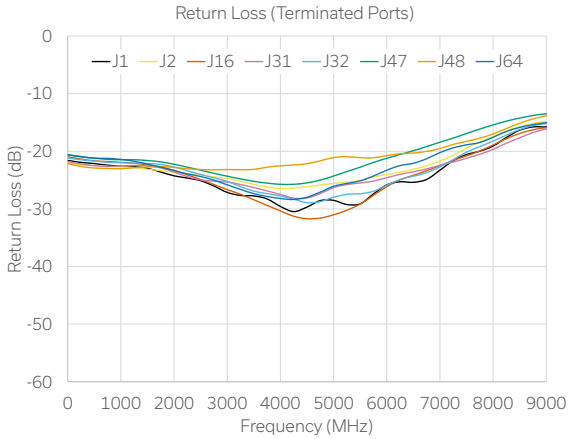
TYPICAL PERFORMANCE GRAPHS











CONTROL INTERFACES

Ethernet Control	Supported Protocols	TCP / IP, SSH, HTTP, Telnet, DHCP, UDP (limited)
	Max Data Rate	100 Mbps (100 Base-T Full Duplex)
USB Control	Supported Protocols	HID – High Speed
	Min Communication Time	400 µs typ[1]

1. Based on the polling interval of the USB HID protocol (125 µs 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 for support

MINIMUM SYSTEM REQUIREMENTS

Hardware	Intel i3 (or equivalent) or later
GUI (USB or Ethernet Control)	Windows 7 or later
USB API DLL	Windows 7 or later with support for Microsoft .Net Framework or ActiveX
USB Direct Programming	Windows 7 or later; Linux
Ethernet	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
:[sw_type]:[sw_address]:STATE:[port]	Set switch path: • [sw_type] = SP8T or SP16T • [sw_address] = 01 to 05 • [port] = 1 to 8 (SP8T switches) or 0 to 16 (SP16T switches) Example: • :SP8T:01:STATE:8 Multiple commands can be concatenated with semi-colon, example: • :SP8T:01:STATE:8;:SP16T:01:STATE:1
:[sw_type]:[sw_address]:STATE?	Query switch path: • [sw_type] = SP8T or SP16T • [sw_address] = 01 to 05 Example: • :SP8T:01:STATE?

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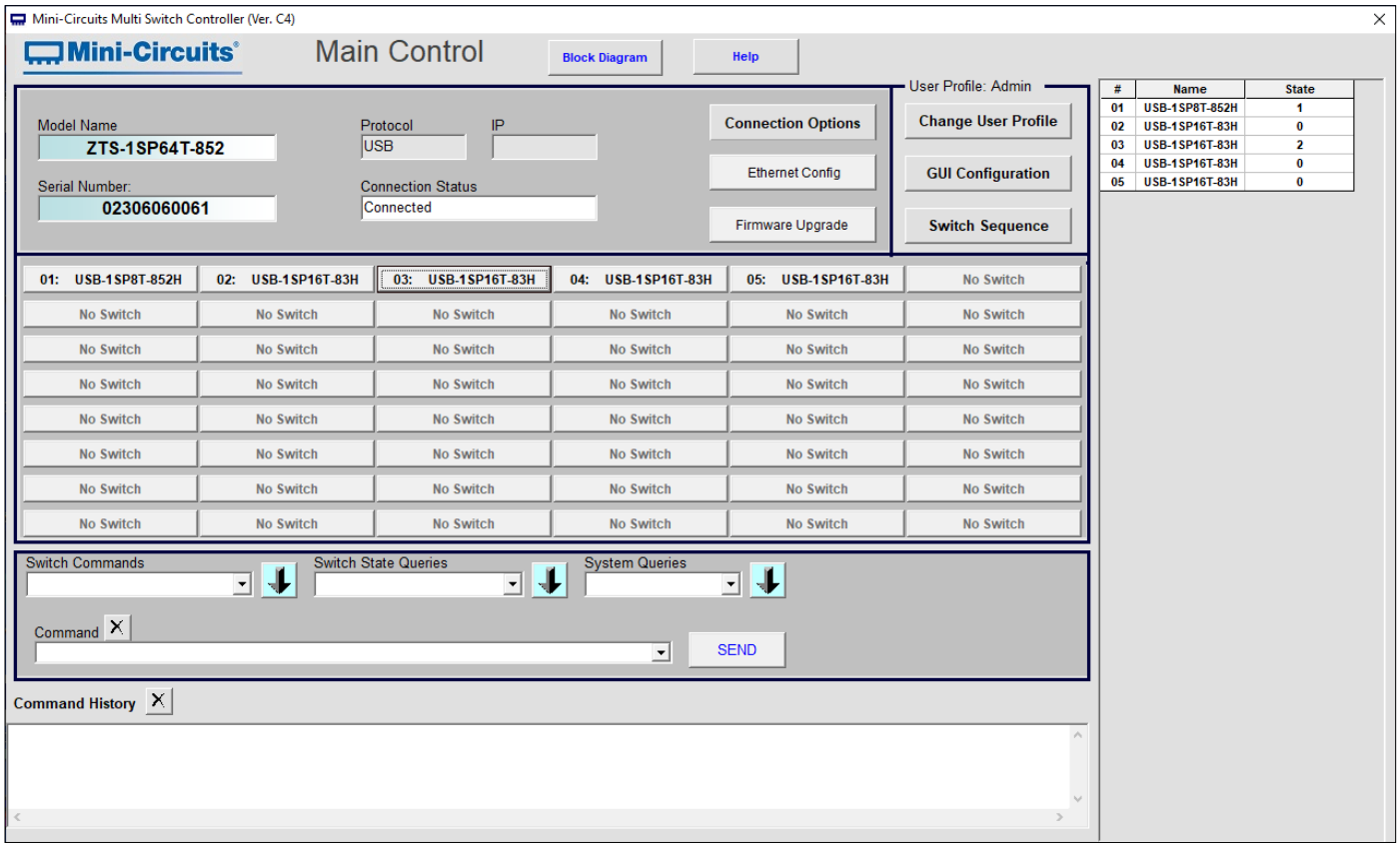
GRAPHICAL USER INTERFACE (GUI) FOR WINDOWS - KEY FEATURES

- 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



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ABSOLUTE MAXIMUM RATINGS

Parameter	Conditions	Limits	Units
Temperature	Operating	0 to +50	°C
	Storage	-20 to +60	
Input Power (No Damage)	Hot Switching	+20	dBm
	Cold Switching	+30	
	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

Switch Path	SW01 State	SW02 State	SW03 State	SW04 State	SW05 State
All ports disconnected[1]	1	0	0	0	0
COM to J1	8	1	0	0	0
COM to J2	8	2	0	0	0
COM to J3	8	3	0	0	0
...	8	...	0	0	0
COM to J16	8	16	0	0	0
COM to J17	7	0	1	0	0
COM to J18	7	0	2	0	0
COM to J19	7	0	3	0	0
...	7	0	...	0	0
COM to J32	7	0	16	0	0
COM to J33	6	0	0	1	0
COM to J34	6	0	0	2	0
COM to J35	6	0	0	3	0
...	6	0	0	...	0
COM to J48	6	0	0	16	0
COM to J49	5	0	0	0	1
COM to J50	5	0	0	0	2
COM to J51	5	0	0	0	3
...	5	0	0	0	...
COM to J64	5	0	0	0	16

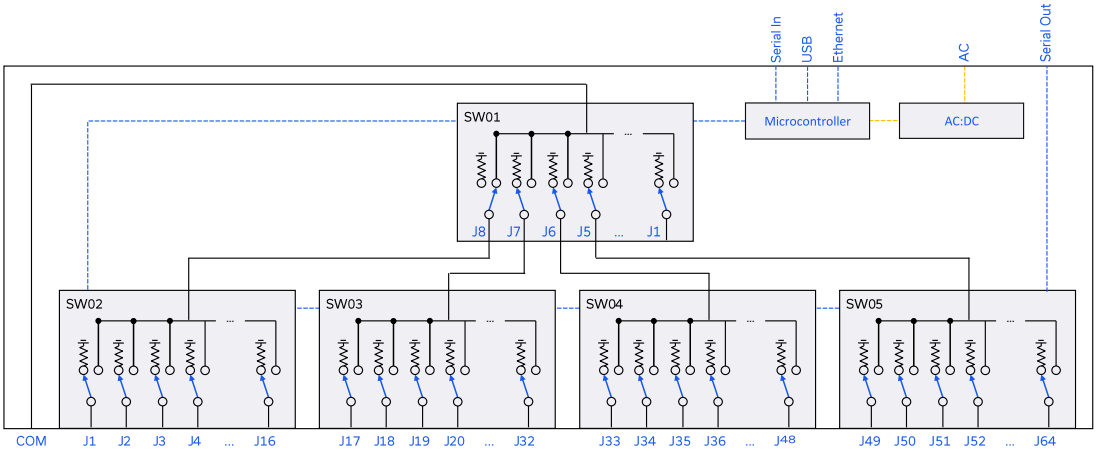
Com is open with ports J1-J64 internally terminated in 50 ohms

CONNECTIONS

Port	Connector
COM	N-type female
J1-J64	SMA female
USB	USB type B
Ethernet / LAN	RJ45
Serial In & Out	D-Sub 9-pin
AC Input	IEC C14 inlet

COM = Common port
J1-J64 = Input / output port

FUNCTIONAL BLOCK DIAGRAM



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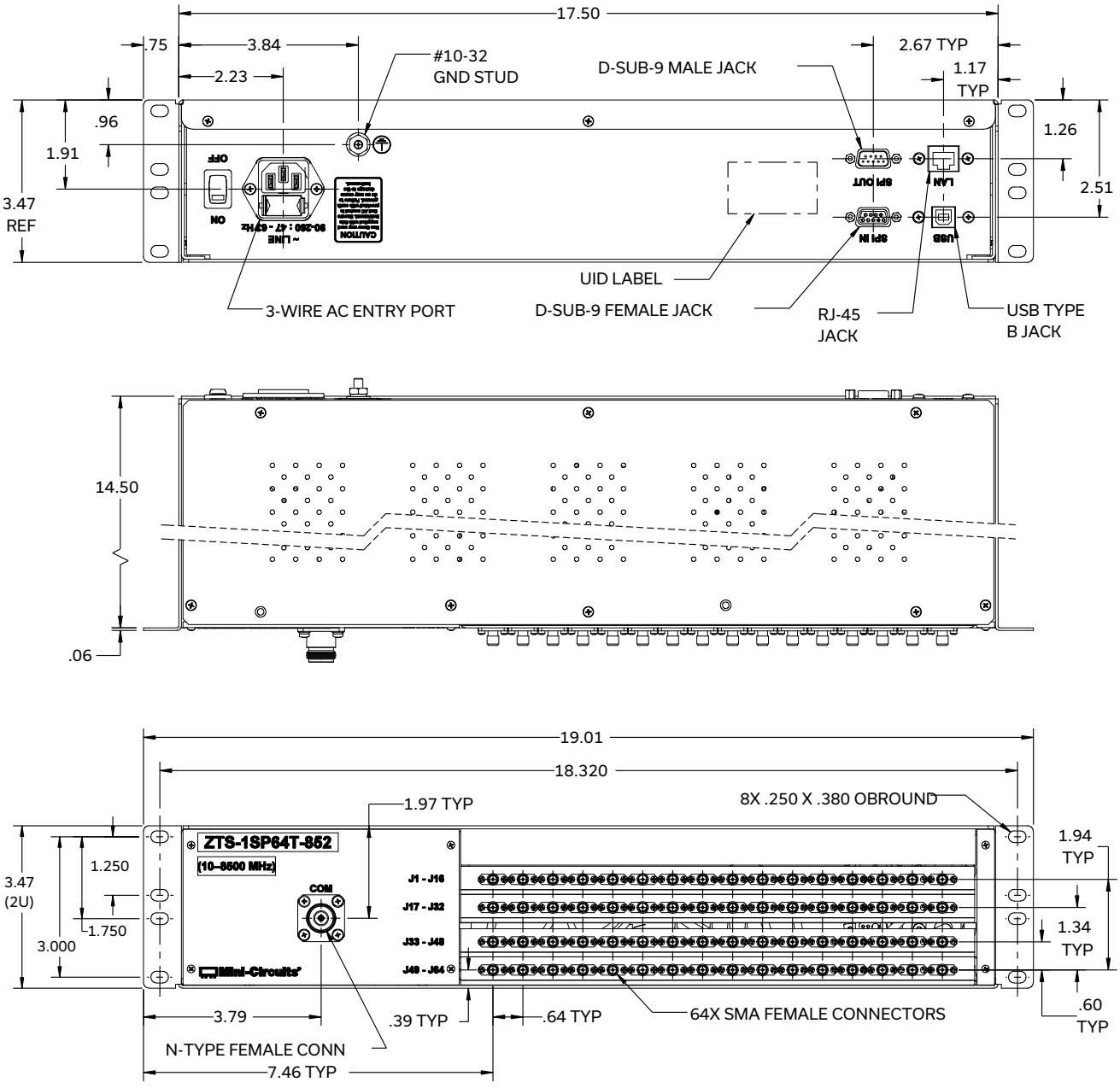
CASE STYLE DRAWING



PRODUCT MARKING*

Product Marking: ZTS-1SP64T-852
Product Frequency: 10-8500 MHz
Unit ID Label: Serial number and other identification marks
*Marking may contain other features or characters for internal lot control

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DETAILED MODEL INFORMATION IS AVAILABLE ON OUR WEBSITE CLICK HERE

Case Style	99-01-3694
Software, User Guide & Programming Manual	www.minicircuits.com/softwaredownload/multissw.html
Environmental Rating	ENV55
Regulatory Compliance	Refer to our website for compliance methodologies and qualifications CE UKCA www.minicircuits.com/quality/environmental_introduction.html

Contact Us: 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 testsolutions@minicircuits.com if your region 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)
	D-SUB9-MF-6+	D-Sub (9-pin) serial cable (6 ft)

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

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