

USB & Ethernet Controlled

Rack-Mount SPDT Switch Matrix

ZTRC-4SPDT-A26

50Ω DC to 26.5 GHz



The Big Deal

- Rack-mount switch system, 4 x SPDT
- High reliability, 10 million switch cycles
- 20W power rating (cold switching)
- High isolation, 85 dB typ



Software Package

Case Style: 99-01-2711

Typical Applications

- Automated test equipment
- Fail-safe / redundancy switching
- Switch matrices

RoHS Compliant

See our website for RoHS compliance methodologies and qualifications

Please contact testsolutions@minicircuits.com for price and delivery information

Product Overview

Mini-Circuits' ZTRC-4SPDT-A26 comprises 4 independently controlled, electro-mechanical SPDT switches. Each switch operates over a wide bandwidth, from DC to 26.5 GHz with high isolation (85 dB typical), low insertion loss (0.25 dB typical) and high input power rating (20W for cold switching). The switches are of a failsafe and break-before-make-configuration using a patented design which ensures long-term reliability, with a minimum lifetime of 10 million switching cycles when used within the noted specifications.

The switch system is housed in a rugged 19" rack chassis, 1U height, with 12 SMA (f) RF connectors and LED switch position indicators on the front panel. 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).

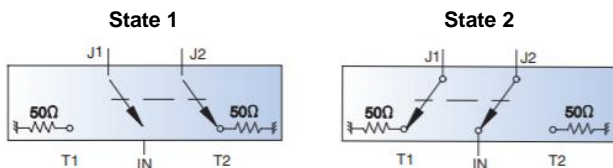
Key Features

Feature	Advantages
4 independent SPDT switches	Flexible front panel switch arrangement in a compact rack-mountable chassis supports a wide range of signal routing applications.
Fail-safe design	The switches revert to a known default state when the DC supply is removed, allowing their use in systems that must continue to operate safely in the event of power failure
Break-before-make configuration	Prevents a momentary connection of the old and new signal paths, reducing the inconsistent transient effects that could otherwise be observed during switching
USB & Ethernet control	USB HID and Ethernet (HTTP / Telnet) interfaces provide easy compatibility with a wide range of software setups and programming environments
Full software support	User friendly Windows GUI (graphical user interface) allows manual control straight out of the box, while the comprehensive API (application programming interface) with examples and instructions allows easy automation in most programming environments

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Rack-Mount SPDT Switch Matrix**ZTRC-4SPDT-A26****Electrical Specifications at 25°C (per Switch)**

Parameter	Conditions	Min	Typ	Max	Units
Frequency Range		DC		26.5	GHz
Insertion Loss	DC – 1 GHz		0.10	0.15	dB
	1 – 8 GHz		0.15	0.30	
	8 – 12 GHz		0.25	0.40	
	12 – 18 GHz		0.30	0.50	
	18 – 26.5 GHz		0.54	0.65	
Isolation	DC – 1 GHz	85	100		dB
	1 – 8 GHz	75	90		
	8 – 12 GHz	70	80		
	12 – 18 GHz	60	66		
	18 – 26.5 GHz	55	65		
VSWR	DC – 1 GHz		1.05	1.10	:1
	1 – 8 GHz		1.20	1.30	
	8 – 12 GHz		1.20	1.35	
	12 – 18 GHz		1.25	1.40	
	18 – 26.5 GHz		1.25	1.50	
Switching Time			25		ms
RF Input Power ^{1,2}	Cold switching			20	W
Switch Lifetime (per Switch) ³	@ 100 mW hot switching	10			million cycles
	@ 1 W hot switching		3		
AC Input		90-260 V, 47-63 Hz			

Switch States (per Switch):**Absolute Maximum Ratings:**

RF Power (Through Path)	20 W
RF Power (Internal Termination)	1 W
Operating Temperature	0°C to 40°C
Storage Temperature	-15°C to 85°C

Notes:

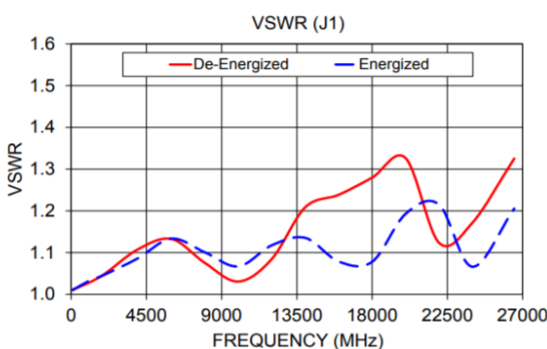
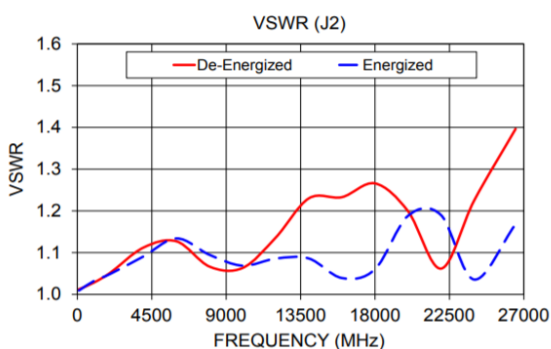
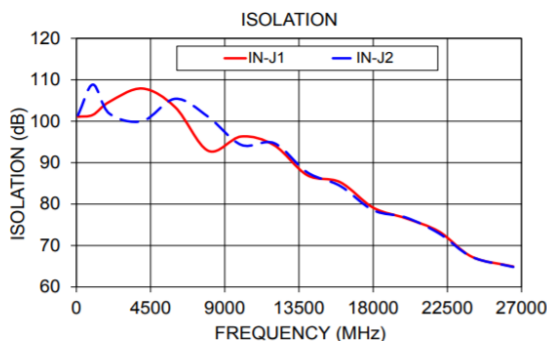
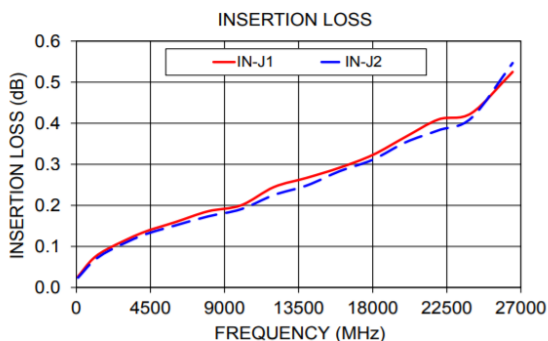
1. Power handling is specified with RF applied to the COM port and external load connected to either 1 or 2 of the respective switch
2. Cold switching describes switch operation where there is no significant user signal present at the moment the switch contacts open or close.
3. Hot switching powers above this level will degrade the switch lifetime

Connections:

Port Name	Connector Type
Switch Ports (Switch A-H, Ports 1-2 per Switch)	12 x SMA female
USB	USB type-B
Ethernet / LAN	RJ45
AC Input	C14 AC mains input

Typical Performance Data (per Switch)

FREQ. (MHz)	ON INSERTION LOSS (dB)		OFF ISOLATION (dB)		VSWR, IN (:1)		VSWR (J2) (:1)		VSWR (J1) (:1)	
	COM-J1	COM-J2	COM-J1	COM-J2	COM-J1	COM-J2	COM-J1	COM-J2	COM-J1	COM-J2
100	0.03	0.02	101.07	101.45	1.01	1.00	1.01	1.01	1.01	1.01
1000	0.07	0.06	101.54	108.83	1.03	1.04	1.03	1.03	1.03	1.03
2000	0.10	0.09	104.68	101.84	1.05	1.06	1.05	1.05	1.05	1.05
4000	0.13	0.13	107.89	100.01	1.09	1.11	1.11	1.09	1.11	1.09
6000	0.16	0.15	103.35	105.41	1.15	1.17	1.13	1.13	1.13	1.13
8000	0.19	0.17	92.85	101.05	1.12	1.12	1.07	1.09	1.08	1.10
10000	0.20	0.19	96.31	94.29	1.05	1.05	1.06	1.07	1.03	1.07
12000	0.24	0.23	94.19	94.70	1.09	1.08	1.14	1.09	1.08	1.12
14000	0.27	0.25	86.97	87.67	1.14	1.13	1.23	1.09	1.21	1.14
16000	0.29	0.28	85.28	84.37	1.11	1.08	1.23	1.04	1.24	1.08
18000	0.32	0.31	79.13	78.52	1.09	1.06	1.27	1.06	1.28	1.08
20000	0.37	0.35	76.54	76.74	1.19	1.18	1.20	1.19	1.33	1.19
22000	0.41	0.38	73.35	72.90	1.28	1.24	1.06	1.19	1.12	1.22
24000	0.42	0.41	67.25	67.23	1.04	1.03	1.23	1.04	1.17	1.07
26500	0.52	0.55	64.92	64.81	1.19	1.22	1.40	1.17	1.33	1.21

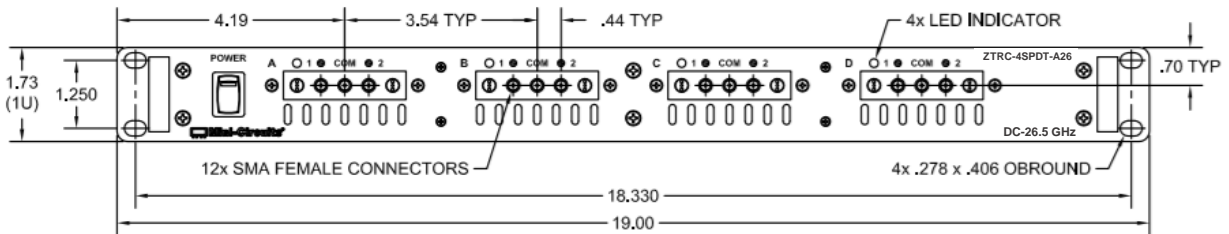
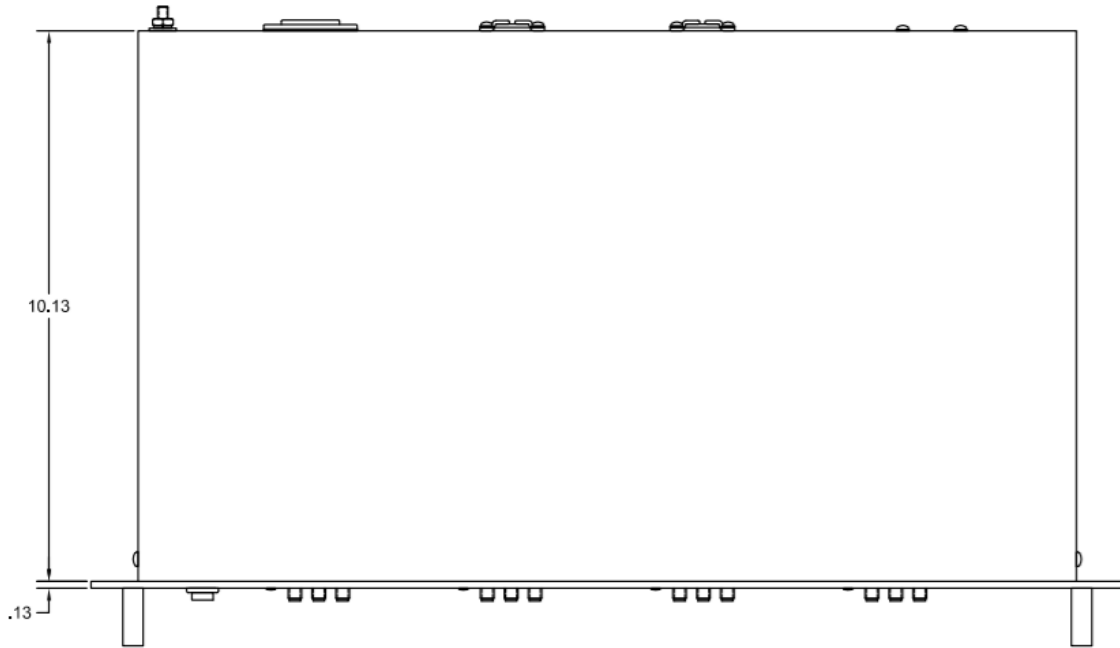
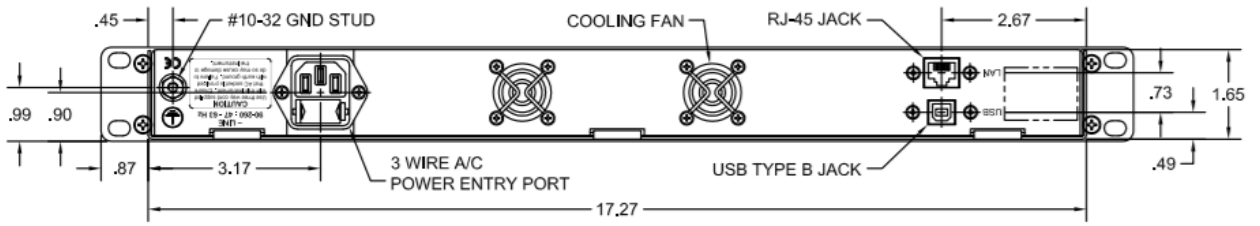


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Outline Drawing / Dimensions (99-01-2711)



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/rfswitchcontroller.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 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)

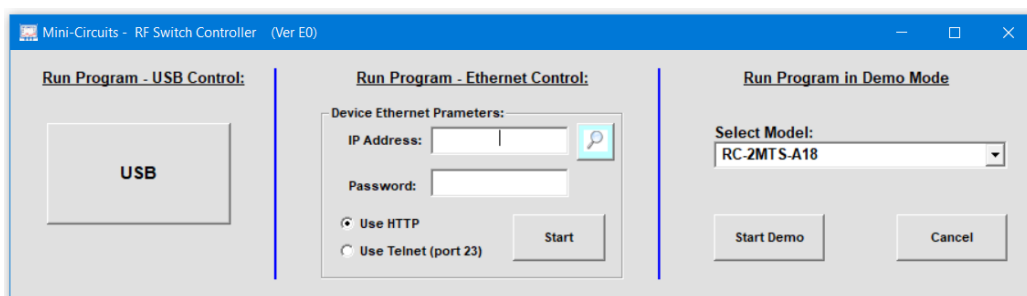
USB Support (Linux):

- Direct USB programming using a series of USB interrupt codes

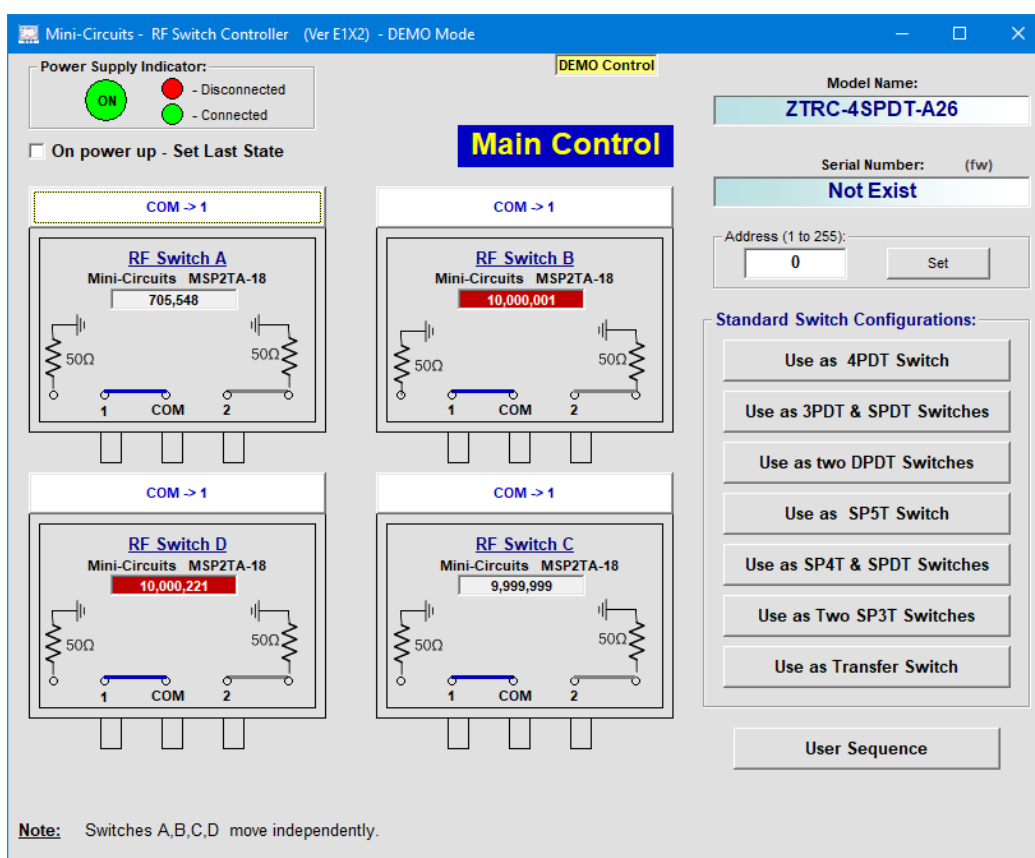
Full programming instructions and examples available for a wide range of programming environments / languages.

Graphical User Interface (GUI) for Windows - Key Features

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



- View and set switch states at the click of a button
- Configure and run timed switching sequences
- Set start-up switch state
- Configure Ethernet IP settings



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Ordering Information

Contact us for pricing and availability information:

testsolutions@minicircuits.com

Model	Description
ZTRC-4SPDT-A26	USB & Ethernet controlled rack-mount SPDT switch matrix

Included Accessories	Part No.	Description
	CBL-3W-XX	AC Power Cord (Select one power cord from below with each Switch Matrix box)
	USB-CBL-AB-3+	2.7 ft (0.8 m) USB Cable: USB type A(Male) to USB type B(Male)

AC Power Cords	Part No.	Description
	CBL-3W-US	Power Cord for United States
	CBL-3W-EU	Power Cord for Europe
	CBL-3W-UK	Power Cord for United Kingdom

Optional Accessories	Description
USB-CBL-AB-3+ (Spare)	2.7 ft (0.8 m) USB Cable: USB type A(Male) to USB type B(Male)
USB-CBL-AB-7+	6.8 ft (2.1 m) USB Cable: USB type A(Male) to USB type B(Male)
USB-CBL-AB-11+	11 ft (3.4 m) USB Cable: USB type A(Male) to USB type B(Male)
CBL-RJ45-MM-5+	5 ft (1.5 m) Ethernet cable: RJ45(Male) to RJ45(Male) Cat 5E cable

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