

Xtra Long Life 100 million cycles

USB RF-SP4T Switch Matrix

USB-1SP4T-A18

50Ω DC to 18 GHz

The Big Deal

- Capable of 100 million cycles
- Wide frequency, DC to 18 GHz
- Extremely low loss, 0.2 dB typ.
- High ON/OFF Isolation, 85 dB typ.
- Easy to control USB interface
- Ideal for any test lab application



Case Style: MR1778

Installation CD



Product Overview

Mini-Circuits' USB-1SP4T-A18 is a general purpose USB controlled SP4T electro mechanical absorptive fail-safe RF switch constructed in break-before-make configuration and powered by +24V_{DC} with a switching time of 25 mSec typical. The RF switch can be operated remotely using the supplied GUI program, or programmed by the user using the included API DLL com object. The RF switches operate over a wide frequency band from DC to 18GHz, have low insertion loss (0.2 dB typical) and high isolation (85dB typical) making the switch matrix perfectly suitable for a wide variety of RF applications.

The USB-1SP4T-A18 is constructed in a metal case (size of 4.5" X 6.0" X 2.25") with 5 SMA(F) connectors (COM, 1, 2, 3, and 4), a 2.1mm DC socket, and a USB type B port. The model is supplied along with a CD containing a graphical user interface program featuring an API DLL com object. Also included is a 2.7 ft USB cable, a power adapter suitable for US, EU and other power systems. See page 16 for details. Longer USB cables, and a mounting bracket are available as additional accessories.

Key Features

Feature	Advantages
USB HID (Human Interface Device)	Plug-and-Play (no need to install a driver for the device).
RF SP4T Electromechanical switch	Wideband (DC to 18 GHz) with low insertion loss (0.2 dB typ.), very high isolation (85dB typ.), and high power rating (2W switching)
24V _{DC} Operating voltage	The USB-1SP4T-A18 requires 24V/300mA to power the RF switches, supplied from the included power adapter.
32/64 Bit operating systems	Compatible with Windows® and Linux® operating systems using 32 and 64 bit architecture.
Software CD, USB cable, and 24V _{DC} Power adapter included	A CD containing a programming manual for Linux® and Windows® operating systems (32 and 64 bit systems) and a Windows® GUI program containing an API DLL com object is included with the USB-1SP4T-A18. A 2.7 ft USB cable, and a power adapter suitable for US, EU and other power systems are also included.



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Features

- Capable of 100 million cycles
- DC to 18 GHz
- Absorptive fail-safe RF switch in break-before-make configuration
- High isolation, 85 dB typ.
- High power handling, 2W
- Easy installation and operation
- Compatible with 32/64-bit Windows® or Linux® systems
- ActiveX com object and .Net class library for use with other software: C++, C#, CVI®, Delphi®, LabVIEW® 8 or newer, MATLAB® 7 or newer, Python, Agilent VEE®, Visual Basic®, Visual Studio® 6 or newer, and more¹
- Mounting bracket (Optional)
- protected by US Patents 5,272,458; 6,414,577; 6,650,210; 7,633,361 and 7,843,289

Applications

- Lab
- Test equipment
- Control systems
- Switching a device in and out of a signal path



Case Style: MR1778

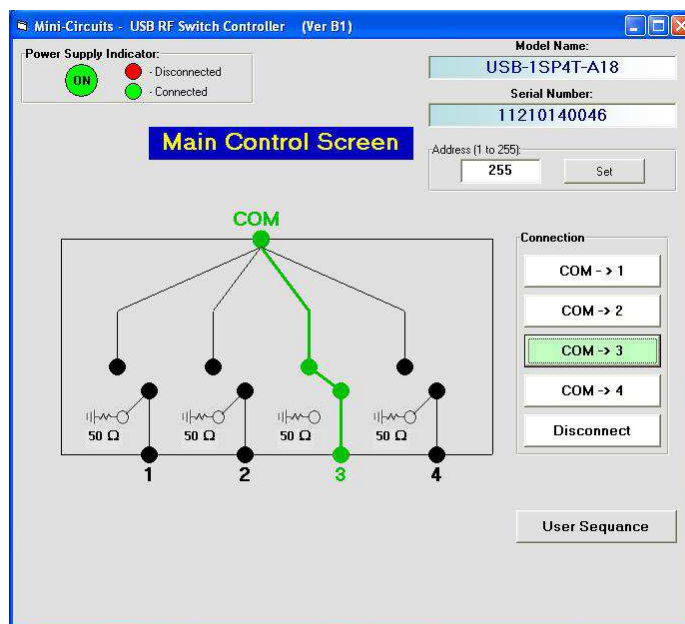
Installation CD

Model No.	Description	Price	Qty.
USB-1SP4T-A18	USB RF SP4T Switch	\$795.00 ea.	(1-9)
Included Accessories			
AC/DC-24-3W1	AC/DC 24V Adapter (<i>see Ordering Information</i>)		1
CBL-3W1-XX	AC Power Cord (<i>see Ordering Information</i>)		1
USB-CBL-AB-3+	2.7 ft USB cable		1
RFSW-CD	Installation CD		1

RoHS Compliant

See our web site for RoHS Compliance methodologies and qualifications

Mini-Circuits RF Switch Control Program for USB RF Switch Matrix



¹ Windows, Visual Basic, and Visual Studio are registered trademarks of Microsoft Corporation in the United States and other countries. Linux is a registered trademark of Linus Torvalds. LabVIEW and CVI are registered trademarks of National Instruments Corp. Delphi is a registered trademark of Codegear LLC. MATLAB is a registered trademark of MathWorks, Inc. Agilent VEE is a registered trademark of Agilent Technologies, Inc. Neither Mini-Circuits nor the Mini-Circuits USB-1SP4T-A18 are affiliated with or endorsed by the owners of the above referenced trademarks.

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Electrical Specifications

Parameter	Port	Conditions	Min.	Typ.	Max.	Units
Frequency	All RF Ports	—	DC		18	GHz
Insertion Loss (per switch)		DC to 1 GHz		0.10	0.20	dB
		1 GHz to 8 GHz		0.15	0.30	
		8 GHz to 12 GHz		0.25	0.40	
		12 GHz to 18 GHz		0.50	0.80	
VSWR ^{2,3}		DC to 1 GHz	—	1.05	1.10	:1
		1 GHz to 8 GHz	—	1.20	1.40	
		8 GHz to 12 GHz	—	1.20	1.40	
		12 GHz to 18 GHz	—	1.30	1.60	
Isolation (per switch)		1 GHz to 8 GHz	85	105	—	dB
		8 GHz to 12 GHz	80	100	—	
		12 GHz to 15 GHz	75	95	—	
		15 GHz to 18 GHz	60	80	—	
Switching Time			—	25	—	ms
RF Power (hot switching)			—	—	2	W
Rated Voltage	24V _{DC} IN	Provided via external power adapter	23	24	25	V
	USB Port	—		5	—	
Rated Current	24V _{DC} IN	Disconnected State	—	30	50	mA
		COM->1,2,3, or 4 states	—	165	195	
	USB Port	Disconnected State	—	50	90	
		COM->1,2,3, or 4 states	—	55	90	
Life ⁴		@ 100 mW (hot switching) ³	10	—	—	million switching cycles
		@ 1 mW (hot switching) ³	—	3	—	

² COM Port only when connected to J1, J2, J3, or J4

³ J1, J2, J3 and J4 only when connected to COM Port

⁴ Capable of 100 million switching cycles with proper maintenance, contact Mini-Circuits.

Minimum System Requirements

Interface	USB HID
Host operating system	32 Bit operating system: Windows 98®, Windows XP®, Windows Vista®, Windows 7® 64 Bit operating system: Windows Vista®, Windows 7® Linux® support: 32/64 Bit operating system
Hardware	Pentium® II or better

Connections

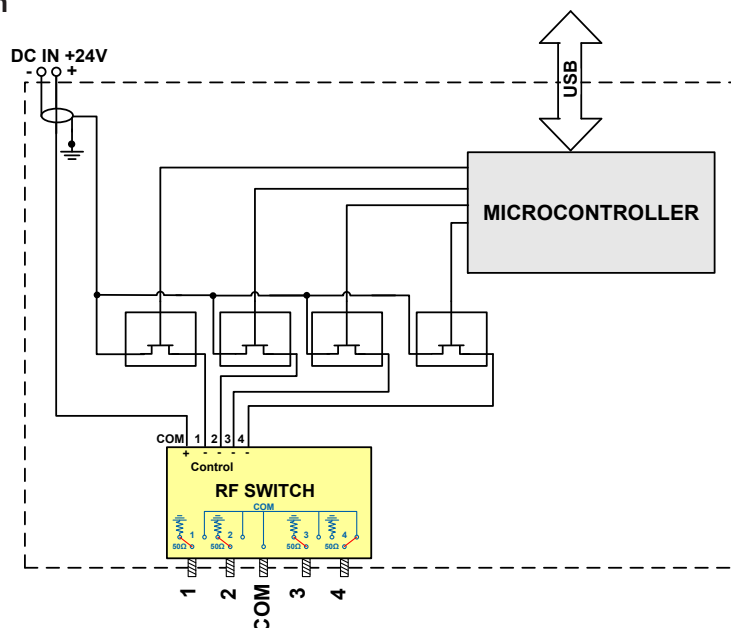
24V _{DC} IN
RF Switch (1, 2, 3 4, COM)
USB

Absolute Maximum Ratings

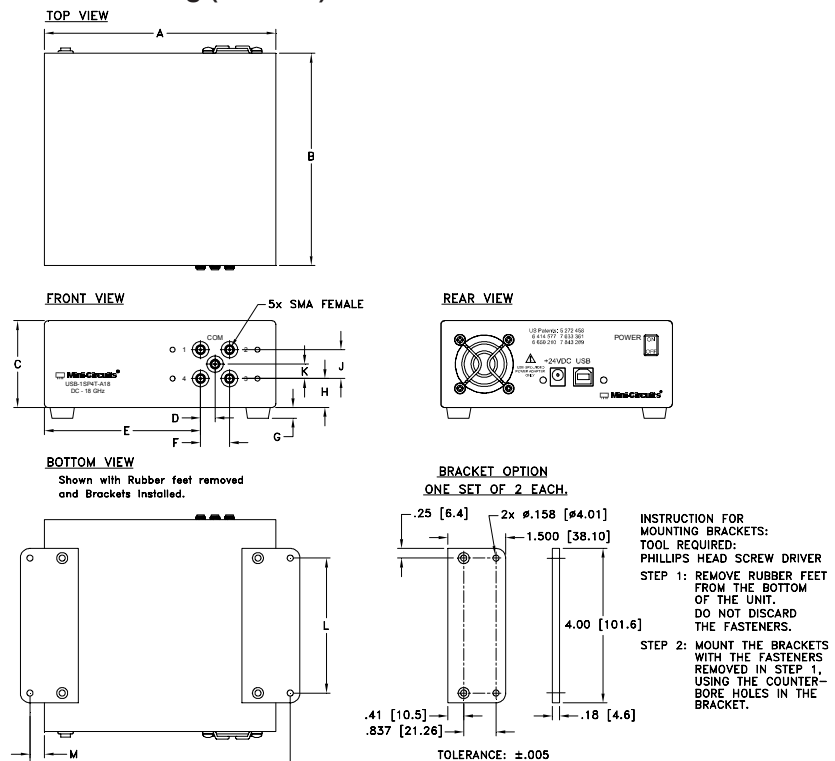
Operating Temperature	0°C to 40°C
Storage Temperature	-15°C to 45°C
DC Voltage max.	26V
RF power	2W

Permanent damage may occur if any of these limits are exceeded.

Block Diagram



Outline Drawing (MR1778)

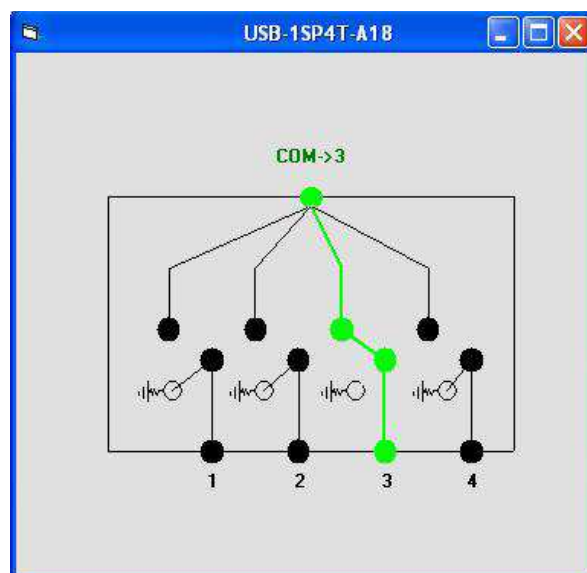
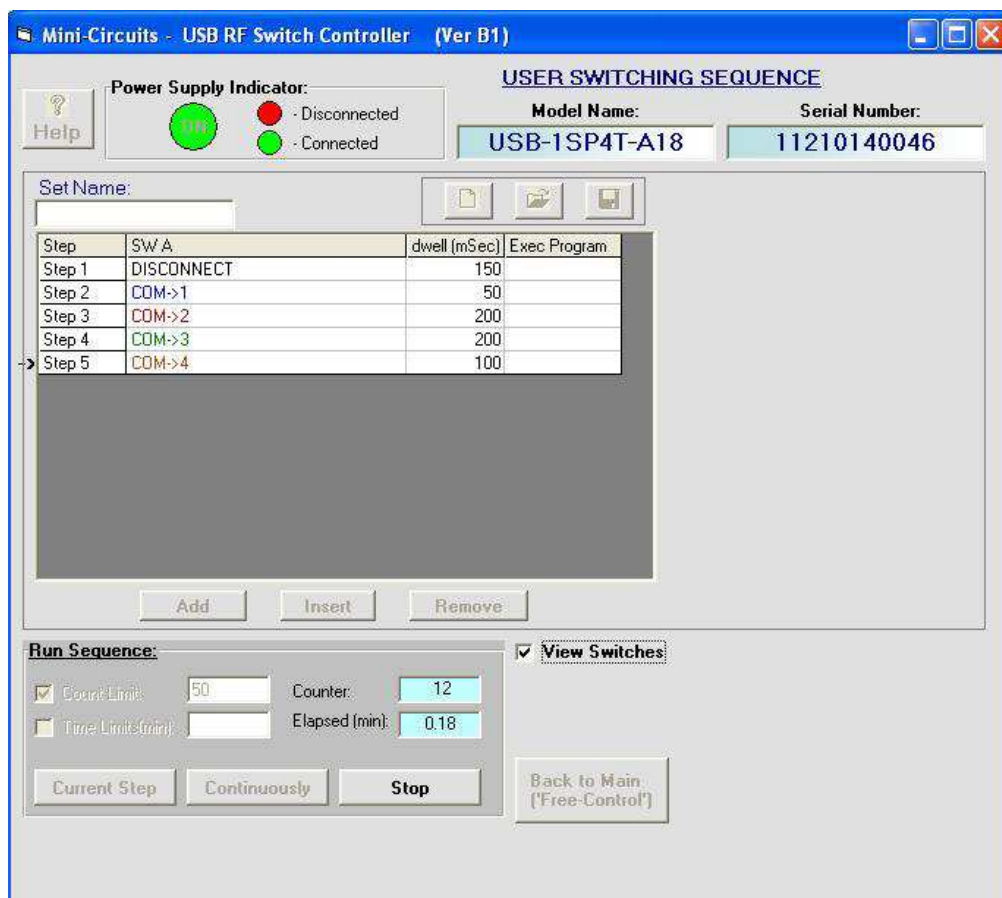


Outline Dimensions (inch mm)

A	B	C	D	E	F	G	H	J	K	L	M	N	wt
6.00	5.50	2.25	.38	4.05	.75	.28	.75	.28	.38	3.500	.375	6.75	grams
152.4	139.7	57.2	9.65	102.9	19.05	7.11	19.05	7.1	9.65	88.90	9.53	171.45	830

User Switching Sequence - for setting any configuration or sequence needed

- When connecting a coaxial cable, tighten connectors alternately using an 8in/lb torque wrench to insure proper contact.



Ordering, Pricing & Availability Information see our web site

Model	Description
USB-1SP4T-A18	USB RF SP4T Switch Matrix

Included Accessories	Description
AC/DC-24-3W1	AC/DC 24V Power Adapter
CBL-3W1-XX	AC Power Cord (<i>Select one power cord from below with each USB Switch Matrix box</i>)
RFSW-CD	Installation CD
USB-CBL-AB-3+	2.7 ft USB cable

AC Power Cords ⁶	Description
CBL-3W1-US	US Power Cord
CBL-3W1-EU	EU Power Cord
CBL-3W1-UK	UK Power Cord
CBL-3W1-AU	AU Power Cord
CBL-3W1-IL	IL Power Cord

Note 6: Power cords for other countries are also available, if you need a power cord for a Country not listed in the table please contact apps@minicircuits.com or check <http://www.minicircuits.com/contact/offices.html> for regional offices e-mail and phone numbers.

Optional Accessories	Description
USB-CBL-AB-3+ (Spare)	2.7 ft (0.8 m) USB cable
USB-CBL-AB-7+	6.8 ft (2.1 m) USB cable
USB-CBL-AB-11+	11 ft (3.4 m) USB cable
BKT-272-08+	Bracket (One set of 2 each)

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