Xtra Long Life 100 million cycles

USB RF-SPDT Switch

USB-3SPDT-A18XL

50Ω DC to 18GHz

The Big Deal

- Capable of 100 million cycles
- Wide frequency (DC to 18GHz)
- High power, 10W
- 3 SPDT electromechanical, absorptive, RF switches (Isolation 85 dB typ.) configurable into a SP4T switch
- USB HID device, includes control software with an API DLL com object compatible with 32/64 Bit operating systems

Case Style: LM1625

Installation CD with Software included

Product Overview

Mini Circuits' USB-3SPDT-A18XL is a general purpose USB controlled RF switch box containing three electro-mechanical SPDT, absorptive failsafe RF switches constructed in break-before-make configuration and powered by +24V_{DC} with a switching time of 25 mSec typical. The three switches can be set up as: three independent SPDT switches, one SPDT and one SP3T switch, a single SP4T switch, or other configurations (see page 6 for details). The RF switches can be operated in all these configurations 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 box perfectly suitable for a wide variety of RF applications.

The USB-3SPDT-A18XL is constructed in a plastic case (size of 4.26" X 6.08" X 2.25") with 9 SMA(F) connectors (IN, J1, J2 for each switch), 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 2.7ft. USB cable, a power adapter suitable for both US and EU systems and 2 SMA Male/ SMA Male coaxial semiflex cables for configuring the switch box. Longer USB cables are available as an additional option.

Key Features

Feature	Advantages
USB HID (Human Interface Device)	Plug-and-Play (no need to install a driver for the device).
RF SPDT Electromechanical switch	Wideband (DC to 18GHz) with low insertion loss (0.2 dB typ.), very high isolation (85dB typ.), and high power rating (10W cold switching)
24V_{DC} Operating voltage	The USB-3SPDT-A18XL requires 24V/750mA 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, 24V_{DC} Power adapter, and RF cables included	A CD containing a programing 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-3SPDT-A18XL. A 2.7ft. USB cable, a power adapter with both US and EU connectors, and a set of two coaxial semiflex cables are also included.

Xtra Long Life 100 million cycles

USB RF-SPDT Switch

50Ω DC to 18GHz

Features

- Capable of 100 million cycles
- Three DC to 18GHz SPDT absorptive failsafe RF switches in break-before-make configuration
- Configurable into SP4T or SP3T switches
- Electromechanical switching (Isolation 85 dB typ.)
- High power handling, 10W
- Greatly simplifies complex switching and timing setups
- Easy installation and operation
- Compatible with 32/64-bit Windows® or Linux® operating systems, as well as LabVIEW®, Delphi®, C++, C#, Visual Basic®, and .NET software [1]
- Friendly Windows® Graphical User Interface
- Mounting bracket (Optional)
- protected by US Patents 5,272,458; 6,414,577; 6,650,210; 7,633,361 and 7,843,289

Installation CD with Software included

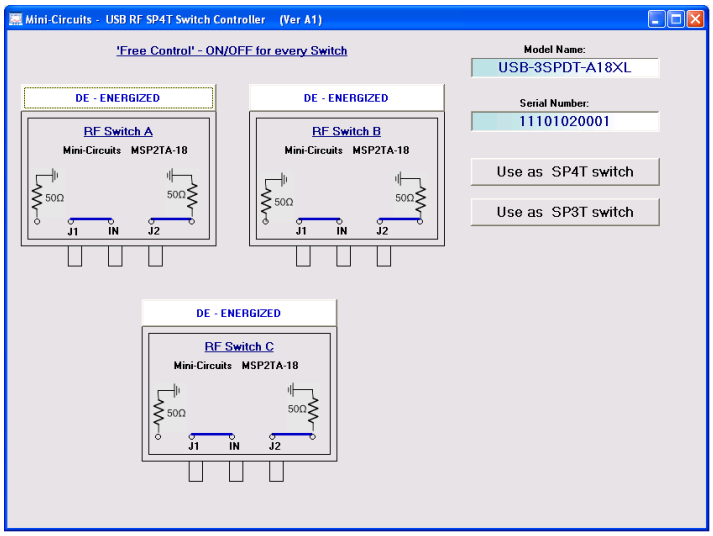
USB-3SPDT-A18XL

Order P/N	Description	Price	Qty.
USB-3SPDT-A18XL	**USB RF SPDT Switch**	**$980.00 ea.**	**(1-9)**
RFSW-CD	Software CD	Included	1
USB-CBL-AB-3+	2.7ft. USB cable	Included	1
AC/DC-24	AC/DC 24V_{DC} Adapter	Included	1
141U-4SM+	4 in. RF cable	Included	2
BKT-301-01+	**Bracket accessory [2]**	**$14.95 ea.**	**(+1)**

Applications

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

Mini-Circuits RF Switch Control Program for USB RF Switch



Note 1: Windows and Visual Basic are registered trademarks of Microsoft Corporation. Linux is a registered trademark of Linus Torvalds. LabVIEW is a registered trademark of National Instruments Corp. Delphi is a registered trademark of Codegear LLC. Neither Mini-Circuits nor the Mini-Circuits USB-3SPDT-A18XL Switch are affiliated with or endorsed by the owners of the above referenced trademarks.
Note 2: Bracket ordered separately.

Electrical Specifications

Parameter	Port	Conditions	Min.	Typ.	Max.	Units
Rated Voltage	$24V_{DC}$ IN	provided via external power adapter	23	24	25	V
	USB Port	–	–	5	–	
Rated Current	$24V_{DC}$ IN	All switches Energized		600	750	mA
		All switches De-Energized	–	15	25	
	USB Port	All switches Energized		50	75	
		All switches De-Energized	–	45	70	
Switching Time	RF Ports	–	–	25	–	mS
Life (per switch)		@ 100 mW (hot switching)	10	–	–	million switching cycles
		@ 1 W (hot switching)	–	3	–	
RF Power (cold switching) [3]		–	–	–	10	W
RF Power (hot switching) [3]			–	–	1	
VSWR		DC to 1 GHz	–	1.05	1.10	:1
		1 GHz to 8 GHz	–	1.20	1.30	
		8 GHz to 12 GHz	–	1.20	1.35	
		12 GHz to 18 GHz	–	1.25	1.40	
Insertion Loss (per switch)		DC to 1 GHz	–	0.10	0.15	dB
		1 GHz to 8 GHz	–	0.15	0.30	
		8 GHz to 12 GHz	–	0.25	0.40	
		12 GHz to 18 GHz	–	0.30	0.50	
Isolation (per switch)		DC to 1 GHz	85	100	–	dB
		1 GHz to 8 GHz	75	90	–	
		8 GHz to 12 GHz	70	80	–	
		12 GHz to 18 GHz	60	66	–	
Insertion Loss (configured as SP3T or SP4T - see page 6 for details)		DC to 1 GHz	–	0.20	0.50	dB
		1 GHz to 8 GHz	–	0.40	1.00	
		8 GHz to 12 GHz	–	0.70	1.35	
		12 GHz to 18 GHz	–	0.90	1.55	

Note 3: Power handling is specified with RF applied to the IN port and output load connected to either J1 or J2 of the respective switch.

Electrical Specifications (Continued)

Minimum System Requirements

Parameter	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

Absolute Maximum Ratings

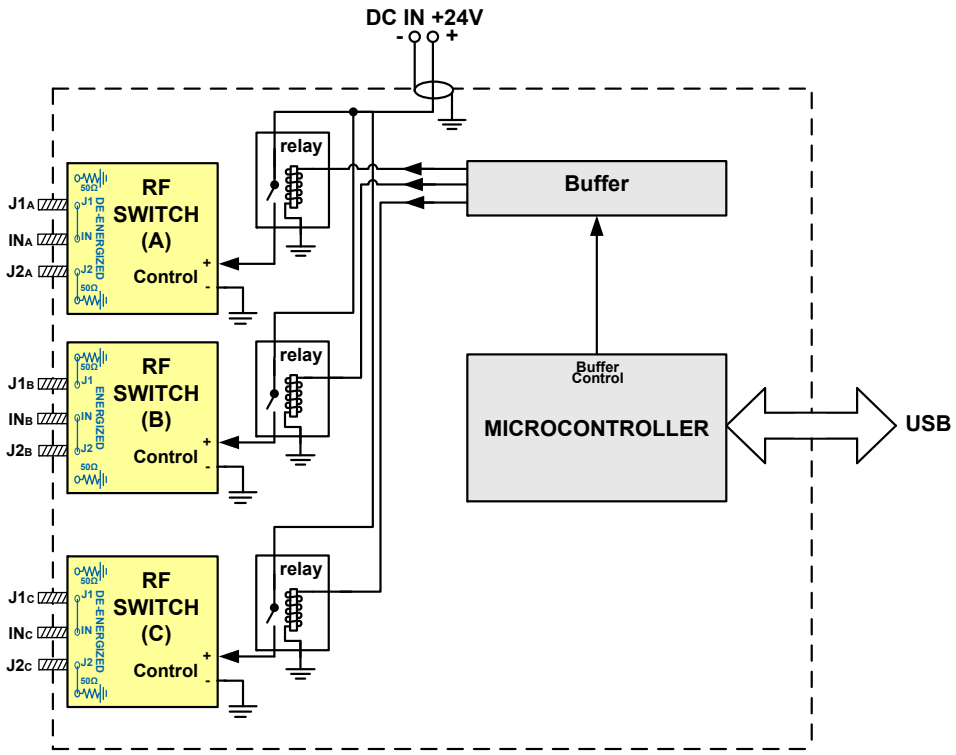
Parameter	Ratings
Operating Temperature	0°C to 45°C
Storage Temperature	-15°C to 45°C
DC Voltage max.	26V
RF power (at IN port of any switch)	10W
RF power (at J1 and J2 of any switch)	1W

Permanent damage may occur if any of these limits are exceeded.
*See page 3 for hot switching life. Exceeding the limits noted will result in reduced life

Connections

$24V_{DC}$ IN	(2.1mm center positive DC Socket)
RF Switch A (J1, IN, J2)	(SMA female)
RF Switch B (J1, IN, J2)	(SMA female)
RF Switch C (J1, IN, J2)	(SMA female)
USB	(USB type B receptacle)

Block Diagram



Accessories Included

USB Cable: USB type A plug to USB type B plug

• MCL P/N: USB-CBL-AB-3+ (2.7ft.)

AC/DC 24V_{DC} Power Adaptor with US and EU two pin power connectors
(I_{max}=0.83A, Operating Temp. 0°C to +40°C)

• MCL P/N: AC/DC-24

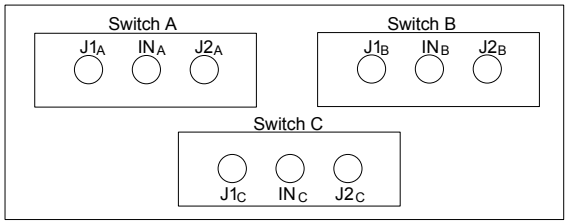
Two 4 inch coaxial SMA(M)- SMA(M) RF semiflex cables (Operating Temp. -55°C to +105°C)

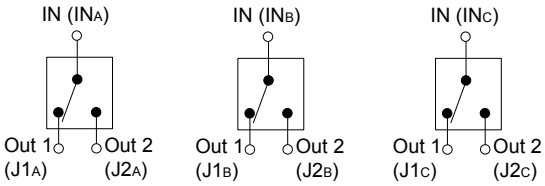
• MCL P/N: 141U-4SM+

Configuration options

- Power handling is specified with RF applied to the IN port and output load connected to either J1 or J2 of the respective switch.
- When connecting a coaxial semiflex cable, tighten connectors alternately using an 8in/lb torque wrench to insure proper contact at each end.

Config. A



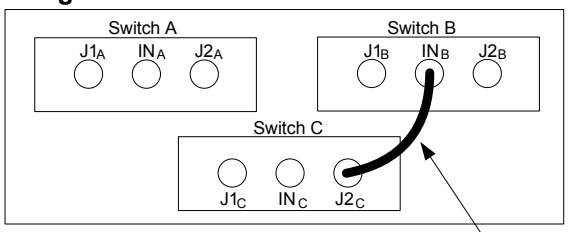


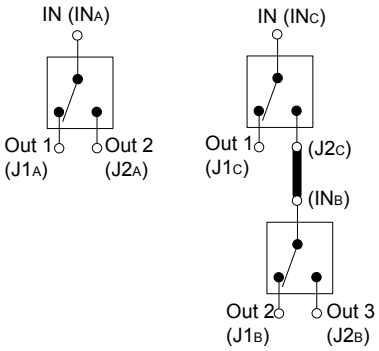
SPDT: Switch A, B or C Logic
IN ←→Out1 : 0
IN ←→Out2 : 1
Switches move independently.

DPDT: Switch A & B Logic
IN ←→Out1 : 0, 0
IN ←→Out2 : 1, 1
Switches A&B move together as one, switch C is separate.

3PDT: Switch A, B & C Logic
IN ←→Out1 : 0, 0, 0
IN ←→Out2 : 1, 1, 1
All three switches move together as one.

Config. B



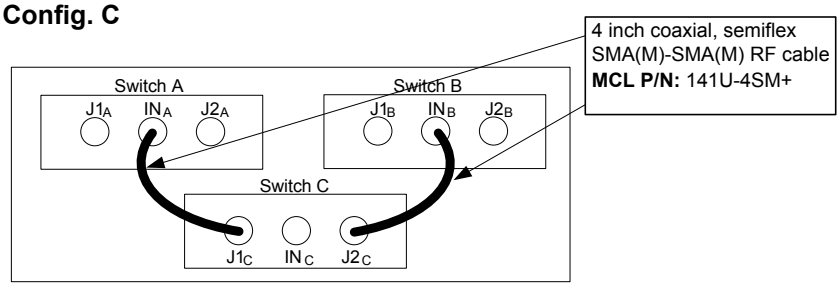


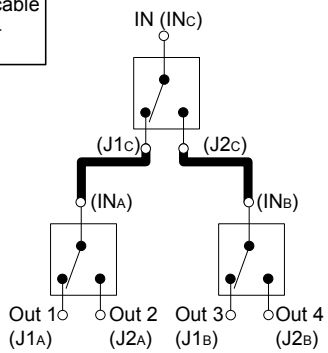
SPDT: Switch A Logic
IN ←→Out1 : 0
IN ←→Out2 : 1

4 inch coaxial, semiflex
SMA(M)-SMA(M) RF cable
MCL P/N: 141U-4SM+

SP3T:
Switch B & C Logic
IN ←→Out1 : Ø, 0
IN ←→Out2 : 1, 0
IN ←→Out3 : 1, 1
Switches B & C move together as one, switch A is separate

Config. C

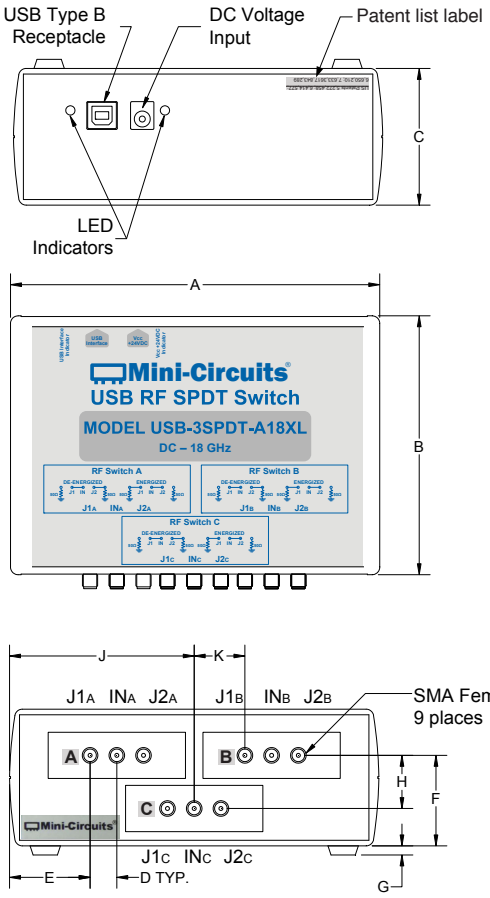




SP4T:
Switch A, B & C Logic
IN ←→Out1 : 0, Ø, 0
IN ←→Out2 : 1, Ø, 0
IN ←→Out3 : Ø, 0, 1
IN ←→Out4 : Ø, 1, 1
All three switches move together as one.

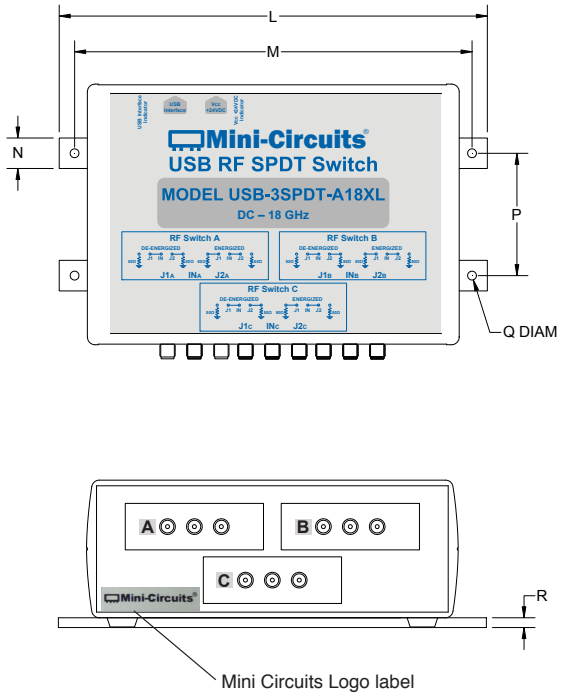
Outline Drawing: LM1625

Standard



With bracket accessory

Bracket ordered separately. For bracket ordering information see Accessories information table on page 8.



Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	WT. GRAMS
6.08	**4.26**	**2.25**	**.440**	**1.32**	**1.49**	**.15**	**.875**	**3.04**	**.835**	**7.00**	**6.500**	**.50**	**2.000**	**.144**	**.160**	800
154.4	108.2	57.2	11.18	33.6	37.8	3.8	22.2	77.2	21.2	177.8	165.1	12.7	50.8	3.66	4.06	

Ordering Information

Model Number	Description	Quantity Min. No. of Units	Price $ Ea.
USB-3SPDT-A18XL	**USB RF SPDT Switch**	**1-9**	**980.00**
USB-CBL-AB-3+	2.7 ft. USB Cable	1	Included
RFSW-CD	Installation CD	1	
AC/DC-24	AC/DC 24V_{DC} power adapter with US and EU two pin power connectors	1	
141U-4SM+ [4]	4 inch coaxial, SMA(M)-SMA(M) RF semiflex cable	2	

Accessories Information

Model Number	Description	Quantity Min. No. of Units	Price $ Ea.
AC/DC-24	AC/DC 24V_{DC} power adapter with US and EU two pin power connectors	1	19.95
141U-4SM+ [4]	4 inch coaxial, SMA(M)-SMA(M) RF semiflex cable	1	8.95
USB-CBL-AB-3+	2.7 ft. USB Cable	1	7.95
USB-CBL-AB-7+	6.8 ft. USB Cable	1	9.95
USB-CBL-AB-11+	11 ft. USB Cable	1	11.95
BKT-301-01+	Bracket	1	14.95

Note 4: RF cables used for additional configurations only, see page 6 for details.