

Xtra Long Life 10 million cycles

USB/Ethernet RF Switch Matrix

RC-1SP6T-A12

50Ω DC to 12 GHz

The Big Deal

- **USB or Ethernet-TCP/IP** (HTTP and Telnet protocols) control
- **SP6T** electromechanical, absorptive RF switch (90 dB typ. isolation)
- **Plug-and-Play** usable with Windows®, Mac®, and Linux® computers



Case Style: PF2320

Product Overview

Mini-Circuits' RC-1SP6T-A12 is a general purpose RF switch matrix controlled via either USB or Ethernet-TCP/IP (supports HTTP and Telnet protocols). The model contains an electromechanical SP6T, absorptive fail-safe RF switch constructed in break-before-make configuration and powered by +24VDC with switching time of 25 ms typical. The RF switch operates over a wide frequency band from DC to 12 GHz, has low insertion loss (0.2 dB typical) and high isolation (90 dB typical) making the switch matrix perfectly suitable for a wide variety of RF applications.

The RC-1SP6T-A12 is constructed in a compact, rugged metal case (5.5" x 6.0" x 2.75") with 7 SMA (f) connectors (COM and ports 1 to 6), USB type B port, standard RJ45 network socket and DC power input. Full software support is provided and can be downloaded from our website any time at <https://www.minicircuits.com/softwaredownload/rfswitchcontroller.html>. The package includes 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). Also included is a 2.7 ft USB cable and AC/DC power adaptor. Longer USB cables, Ethernet cables and a mounting bracket are available as optional accessories.

Key Features

Feature	Advantages
Ethernet-TCP/IP- HTTP and Telnet Protocols (Supports DHCP and Static IP)	The RC-1SP6T-A12 switch matrix can be controlled from any Windows®, Mac®, or Linux® computer, or even a mobile device with a network connection and Ethernet-TCP/IP (HTTP or Telnet protocols) support. Using a VPN would allow remote control from anywhere in the world.
USB HID (Human Interface Device)	User may also control the switch matrix via USB connection. Plug-and-Play, no driver required. Compatible with Windows® or Linux® operating systems using 32 and 64 bit architecture.
RF SP6T absorptive electromechanical switch	Wideband (DC to 12 GHz) with low insertion loss (0.2 dB typ.), very high isolation (90 dB typ.), and high power rating (20W cold switching).
24VDC operating voltage	The RC-1SP6T-A12 requires 24V / 230 mA to power the RF switch, supplied from the power adaptor (included).
Switch Cycle Counters	Allows user to monitor exact switch path usage and plan test requirements accordingly.

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USB/Ethernet RF Switch Matrix RC-1SP6T-A12

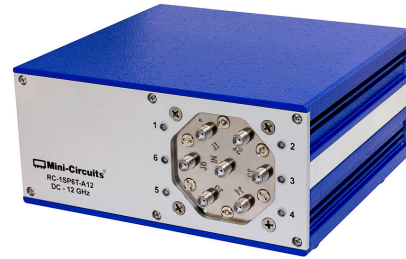
50Ω DC to 12 GHz

Features

- DC to 12 GHz SP6T absorptive fail-safe RF switch in break-before-make configuration
- Electromechanical switching (Isolation 90 dB typ.)
- High power handling, 20W
- USB or Ethernet-TCP/IP (HTTP and Telnet) control
- Switch Cycle Counters
- Easy installation and operation
- Supports a wide range of programming environments (See [AN-49-001](#) for details)
- Mounting bracket (Optional)
- Protected by US Patents 5,272,458; 6,414,577; 6,650,210; 7,633,361 and 7,843,289

Applications

- R&D
- Automated Test equipment
- Controlling RF signal paths



Software Package

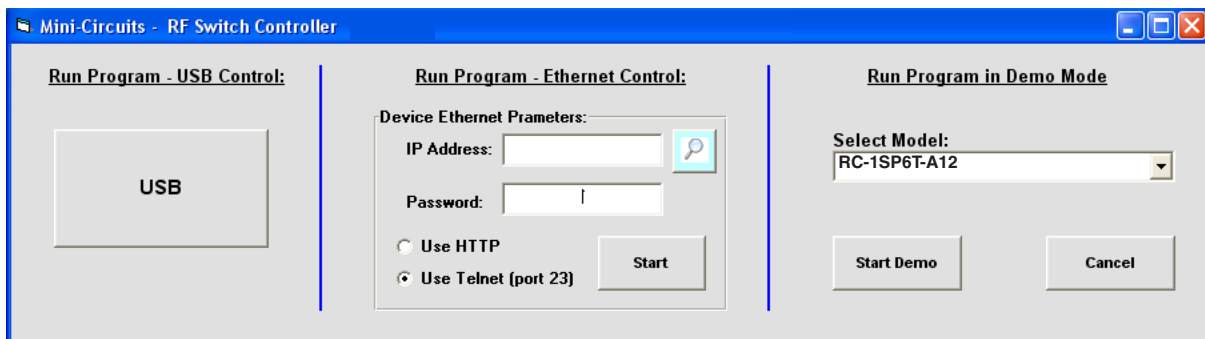
Case Style: PF2320

Model No.	Description	Qty.
RC-1SP6T-A12	USB/Ethernet RF Switch	1
Included Accessories		
AC/DC-24-3W1	AC/DC 24V Adapter (see Ordering Information)	1
CBL-3W1-XX	AC Power Cord (see Ordering Information)	1
USB-CBL-AB-3+	2.7 ft USB cable	1

RoHS Compliant

See our web site for RoHS Compliance methodologies and qualifications

Mini-Circuits RF Switch Control Program for **USB/Ethernet** RF Switch Matrix



Steps to start RC-1SP6T-A12 GUI via USB

- Click on USB button.
- If more than one unit is connected select S/N from list and click OK.
- Start working.

Steps to start RC-1SP6T-A12 GUI via Ethernet

- Click on search icon.
- Select unit from list of IP addresses and click select
- The selected IP will appear in the IP Address field.
- Select communication protocol (Telnet or HTTP)
- Click on Start and begin working.

- For Demo mode of any Switch Matrix model select the model name from the drop box and click 'Start Demo' (See [user guide](#) for details)
- For programming instructions of the switch matrix see [programming guide](#) and [AN-49-001](#) on Mini-Circuits' website

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	-	
Power On Sequence: Connect the 24V power, followed by the USB control and/or Ethernet cable before turning on the Switch Matrix.						
Rated Current	24V _{DC} IN	COM -> 1,2,3,4,5 or 6 state	-	160	230	mA
		RF Switch @ Disconnect state	-	60	90	
	USB Port	COM -> 1,2,3,4,5 or 6 state	-	10	20	
		RF Switch @ Disconnect state	-	10	20	
Switching Time		-	-	25	-	ms
Life (per switch)		@ 100 mW (hot switching) ¹	10	-	-	million switching cycles
		@ 1 W (hot switching) ¹	-	1	-	
RF Power (cold switching) ²			-	-	20	W
RF VSWR ³		DC to 1 GHz	-	1.05	1.10	:1
		1 GHz to 6 GHz	-	1.10	1.25	
		6 GHz to 8 GHz	-	1.20	1.35	
		8 GHz to 12 GHz	-	1.20	1.35	
RF Insertion Loss (per switch)		DC to 1 GHz	-	0.10	0.15	dB
		1 GHz to 6 GHz	-	0.15	0.25	
		6 GHz to 8 GHz	-	0.20	0.30	
		8 GHz to 12 GHz	-	0.25	0.35	
RF Isolation (per switch)		DC to 1 GHz	85	100	-	dB
		1 GHz to 6 GHz	80	95	-	
		6 GHz to 8 GHz	80	90	-	
		8 GHz to 12 GHz	80	90	-	

¹ Exceeding these limits will result in reduced life.

² Power handling is specified with RF applied to the COM port and output load connected to 1,2,3, 4, 5 or 6 ports.

³ For COM port only when connected to port 1,2,3,4,5 or 6. For ports 1,2,3, 4, 5 or 6 only when connected to COM port.

Minimum System Requirements

Interface	USB HID or HTTP Get/Post or Telnet protocols
Host operating system - USB Control	Windows 32/64 Bit operating system: Windows 98®, Windows XP®, Windows Vista®, Windows 7®, Windows 8® Linux® support: 32/64 Bit operating system
Host operating system - Ethernet Control	Any Windows®, Mac®, or Linux® computer with a network port and Ethernet-TCP/IP (HTTP or Telnet protocols) support
Hardware	Pentium® II or better

Connections

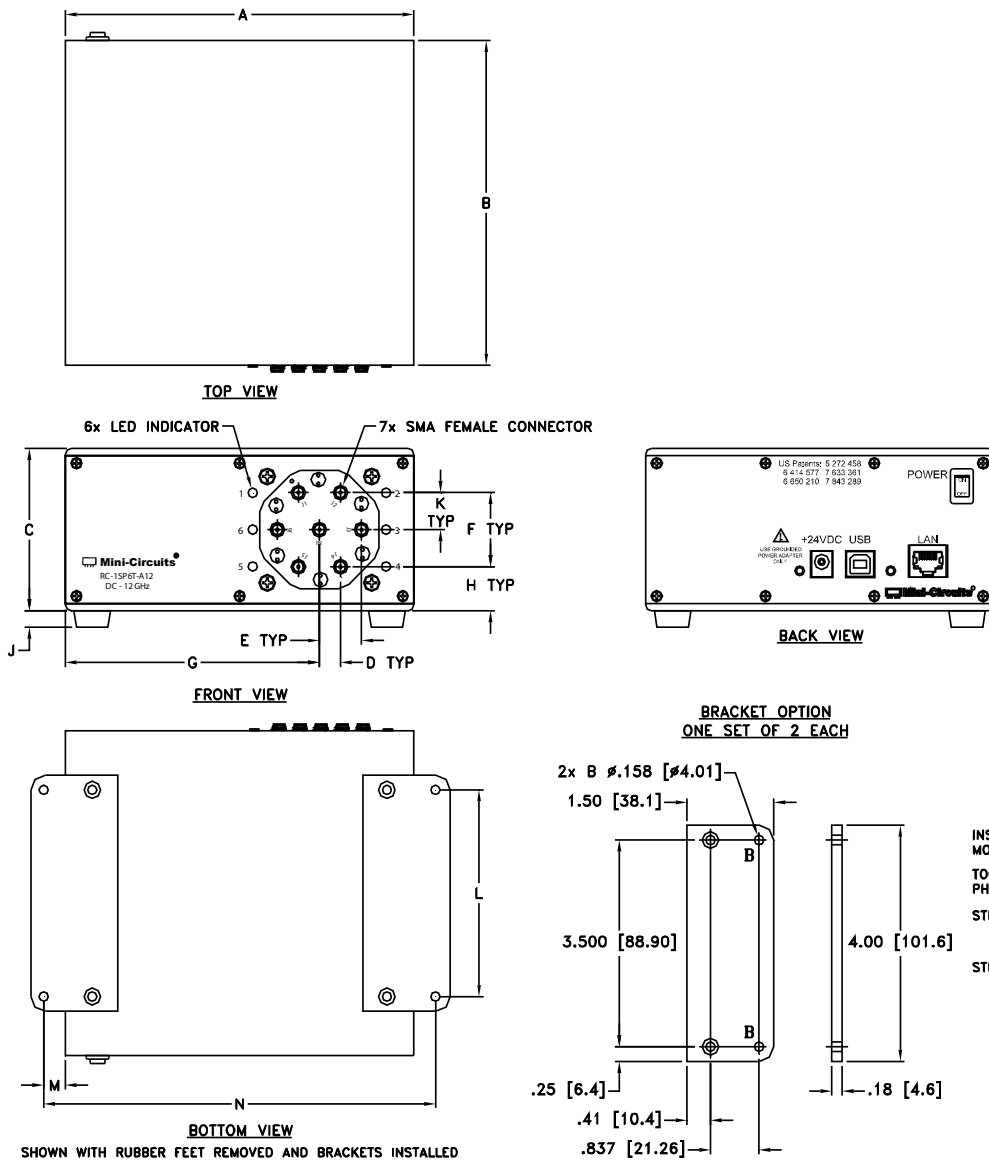
24V _{DC} IN	2.1 mm center positive DC Socket
RF Ports	SMA female
USB	USB type B receptacle
Network (Ethernet/LAN)	RJ45 socket

Absolute Maximum Ratings

Operating Temperature	0°C to 40°C
Storage Temperature	-15°C to 85°C
DC Voltage max.	26V
RF power (through path)	20W
RF power (into internal termination)	1W

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

Outline Drawing (PF2320)



Outline Dimensions (inch mm)

A	B	C	D	E	F	G	H	J	K	L	M	N	P	wt
6.00	5.50	2.75	0.36	0.73	1.26	2.75	0.75	0.28	0.63	3.50	0.38	6.720	--	grams
152.40	139.70	69.85	9.14	18.54	32.00	69.85	19.05	7.11	16.00	88.90	9.53	170.69	--	1150




Main Software Control Screen: Independent control of one SP6T switch






- Power handling is specified with RF applied to the COM port and output load connected to either 1,2,3,4,5 or 6 of the respective switch.
- When connecting a coaxial semi flex cable, tighten connectors alternately using an 8in/lb torque wrench to insure proper contact at each end.

Step	SW A	dwell Time	Units	Exec Program
Step 1	COM->1	500	mSec	
Step 2	COM->2	600	mSec	
Step 3	COM->3	670	mSec	
Step 4	COM->4	1020	mSec	
Step 5	COM->5	1400	mSec	
Step 6	COM->6	804	mSec	
Step 7	COM->2	1200	mSec	
Step 8	COM->3	1500	mSec	

Ordering, Pricing & Availability Information see our web site

Model	Description
RC-1SP6T-A12	USB/Ethernet RF SP6T Switch Matrix

Included Accessories	Part No.	Description
	AC/DC-24-3W1	AC/DC 24V _{DC} Grounded Power Adaptor. Operating temperature: 0°C to +40°C, I _{Max} =2.5A
	CBL-3W1-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 ⁴	Part No.	Description
	CBL-3W1-US	Power Cord for United States
	CBL-3W1-EU	Power Cord for Europe
	CBL-3W1-UK	Power Cord for United Kingdom
	CBL-3W1-AU	Power Cord for Australia and China
	CBL-3W1-IL	Power Cord for Israel

⁴ If you need a Power cord for a country not listed please contact testsolutions@minicircuits.com

Optional Accessories	Description
USB-CBL-AB-3+	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
BKT-272-08+	Bracket (One set of 2 each)
RFSW-CD ⁵	Software CD

⁵ To receive the CD at no extra cost, request when placing order. CD contents can also be downloaded from Mini-Circuits website at: <https://www.minicircuits.com/softwaredownload/rfswitchcontroller.html>

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

