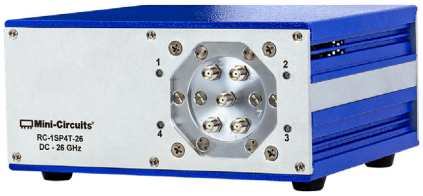
USB & ETHERNET

Mechanical Switch Assembly RC-1SP4T-26

50Ω DC to 26.5 GHz 1 x SP4T SMA-Female

THE BIG DEAL

- Mechanical SP4T absorptive switch
- Software control & automation
- High reliability, millions of cycles
- SSH secure Ethernet communication
- LED switch state indicators



CASE STYLE: MR2935

DOWNLOAD SOFTWARE PACKAGE

RoHS Compliant
See our website for RoHS Compliance methodologies and qualifications

APPLICATIONS

- Benchtop and rack-mounted automated test systems
- 5G FR1 & FR3, WiFi 6E MIMO, UWB, Bluetooth
- Quantum computing
- Military radio, radar & electronic warfare
- Switch matrices

PRODUCT OVERVIEW

Mini-Circuits' RC-1SP4T-26 is an electro-mechanical SP4T switch operating over an extremely wide bandwidth, from DC to 26.5 GHz, with high isolation and low insertion loss. The absorptive switch is of a failsafe and break-before-make-configuration, with a switching lifetime of 2 million cycles when used within the noted specifications.

The switch box is constructed in a compact, rugged metal case (5.5 x 6.0 x 2.75") with all SMA (f) RF connectors 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
Mechanical SP4T switch	Mechanical absorptive switches provide high reliability, repeatable high performance and internal terminations of input signals on the disconnected paths
Fail-safe / normally open 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
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.
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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ECO-024239
RC-1SP4T-26
MCL NY
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ELECTRICAL SPECIFICATIONS AT +25°C

Parameter	Conditions	Min.	Typ.	Max.	Units
Frequency Range		DC		26.5	GHz
Insertion Loss	DC – 8 GHz		0.10	0.30	dB
	8 – 18 GHz		0.20	0.50	
	18 – 26.5 GHz		0.30	0.70	
Isolation[1]	DC – 8 GHz	70	90		dB
	8 – 18 GHz	60	80		
	18 – 26.5 GHz	55	70		
Return Loss[2]	DC – 8 GHz		20		:1
	8 – 18 GHz		16		
	18 – 26.5 GHz		14		
Switching Time			25		ms
RF Input Power (Cold Switching)	DC – 8 GHz			20	W
	8 – 18 GHz			10	
	18 – 26.5 GHz			5	
	Into internal termination[3]			1	
Switch Lifetime (per Switch)	100 mW hot switching[4]	2			million cycles
	1W hot switching		1		

1. Isolation measured between Com and any disconnected port. Example: Isolation for Com to 1 is the leakage measured at port 1 from a signal input at Com when the active switch path is set to Com to 2
2. Return loss into Com when active or ports 1-4 in any state; Com is reflective when disconnected
3. Maximum power into any internal termination is 1W per port, 3W total per switch
4. Hot switching power above this level will degrade the switch lifetime

ABSOLUTE MAXIMUM RATINGS

Parameters	Ratings	Limits	Units
Temperature	Operating	0 to +40	°C
	Storage	-15 to +85	
DC Supply Voltage		+26	V
Input Power (No Damage	Cold switching:		W
	DC – 8 GHz	20	
	8 – 18 GHz	10	
	18 – 26.5 GHz	5	
	Into internal termination	1	

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

Parameter	Conditions	Typ	Max	Units
DC Voltage		+24	+26	V
DC Current Consumption	Com disconnected	100		mA
	Com to any port (1-4)	300		

Using included AC/DC-24-3W1 power supply adapter (110 / 240 V AC input)

SWITCH CONTROL LOGIC

Command	Switch Path
:SP4TA:STATE:0	All ports disconnected
:SP4TA:STATE:1	COM to 1
:SP4TA:STATE:2	COM to 2
:SP4TA:STATE:3	COM to 3
:SP4TA:STATE:4	COM to 4

POWER-UP OPTIONS

Mode	Initial Switch Paths
Default	Switches power up in the default state (all ports disconnected)
Last State	Switches resume the previous state from the point of last power supply disconnection

Switches revert to the default state when the power supply is turned off or disconnected

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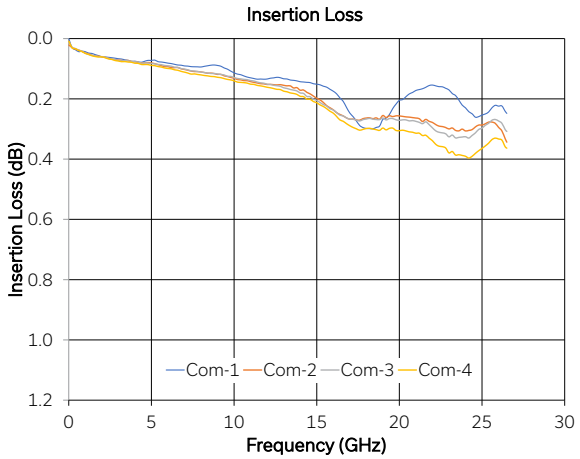
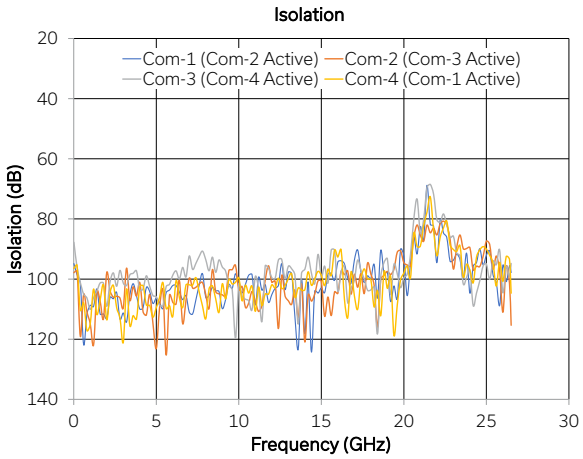
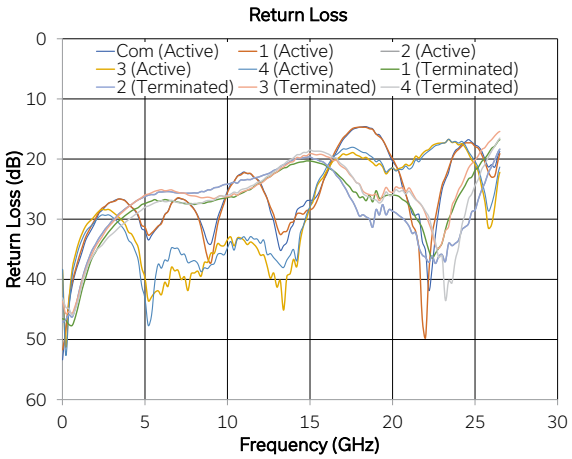
TYPICAL PERFORMANCE GRAPHS (PER SWITCH)







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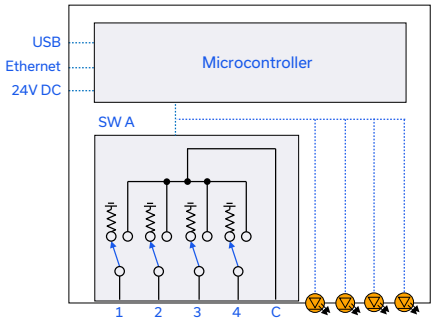
CONNECTIONS

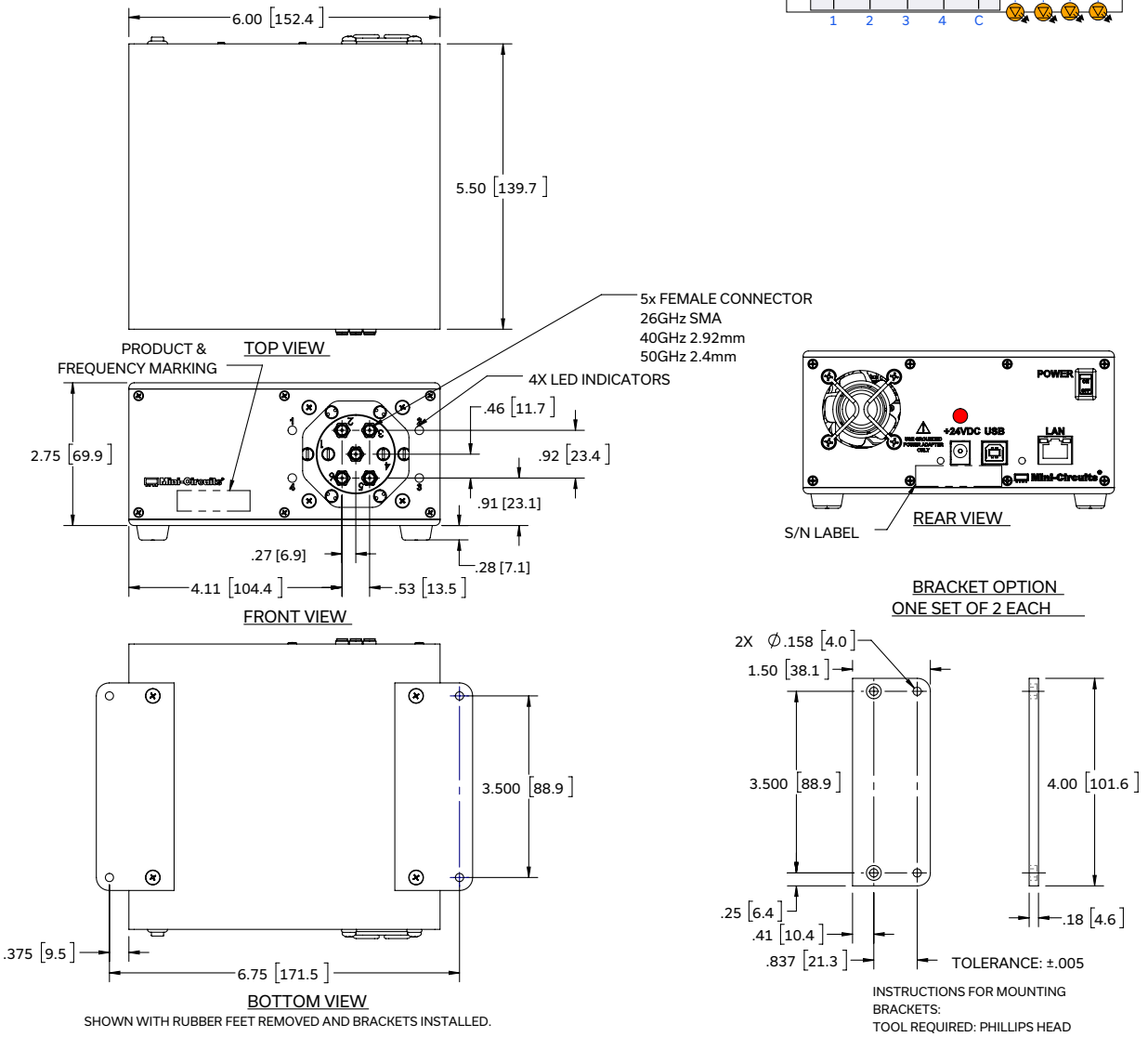
Port Name	Connector Type
RF Switch A (Com, 1, 2, 3 & 4)	SMA female
USB	USB type-B
Ethernet / LAN	RJ45
24V $_{DC}$ Input	2.1mm center positive DC socket

SWITCHING CONFIGURATION:

- Normally open (all port disconnected)
- Absorptive (internal terminations on ports J1-J4)



OUTLINE DRAWING (MR2935)



INSTRUCTIONS FOR MOUNTING BRACKETS:
TOOL REQUIRED: PHILLIPS HEAD SCREWDRIVER
STEP 1: REMOVE RUBBER FEET FROM THE BOTTOM OF THE UNIT, DO NOT DISCARD THE FASTENERS.
STEP 2: MOUNT THE BRACKETS WITH THE FASTENERS REMOVED IN STEP 1, USING THE COUNTER BORE HOLES IN THE BRACKET.

Weight: 1060 grams.
Dimensions are in inches [mm]. Tolerances: 2 Pl.±.03 inch; 3 Pl.±.015 inch

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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[5]	400 µs typ

5. 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
:SP4TA:STATE:[port]	Set the switch state: • [port] = 0 to 4
:SP4TA:STATE?	Return the switch state

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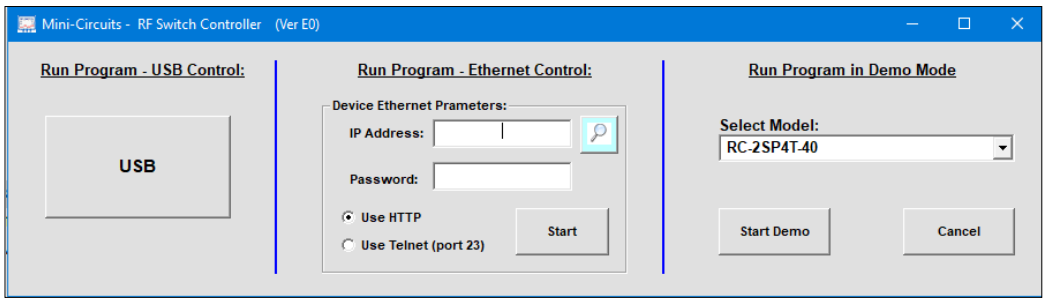
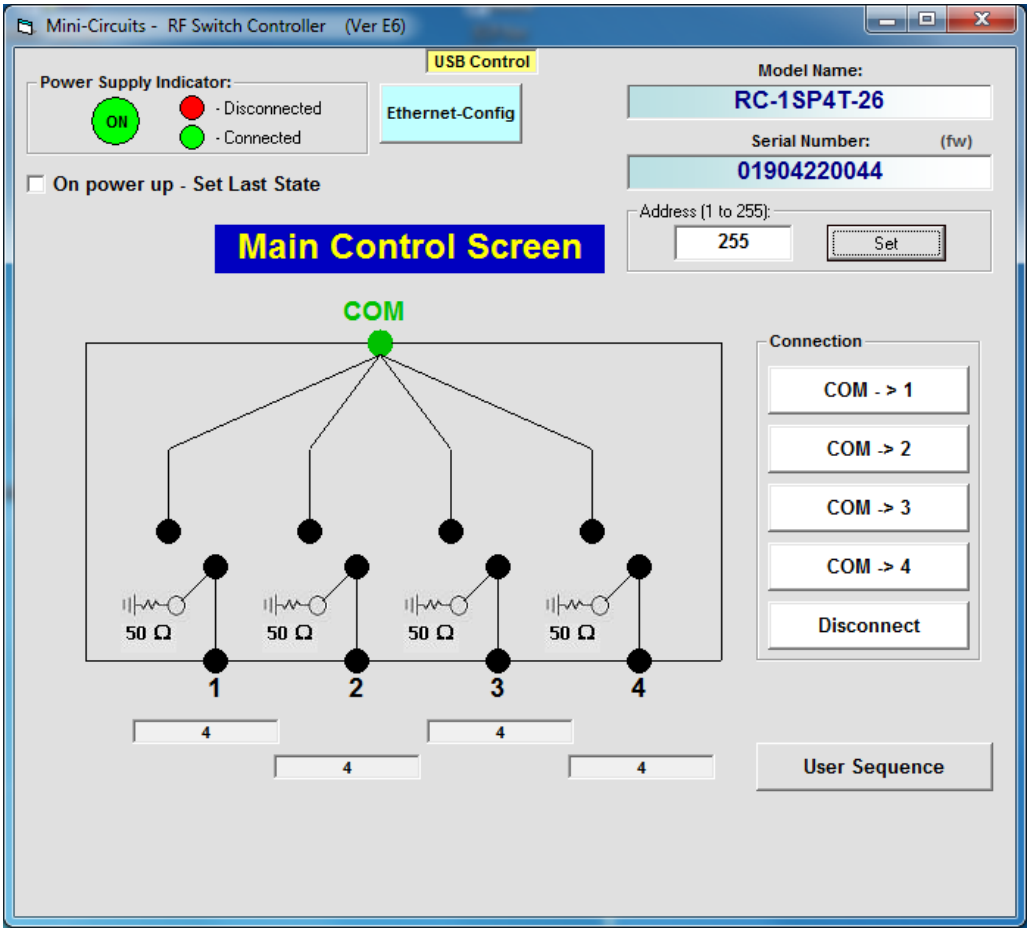
GRAPHICAL USER INTERFACE (GUI) FOR WINDOWS - KEY FEATURES

- Connect via USB or Ethernet
- Run GUI in "demo mode" to evaluate 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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DETAILED MODEL INFORMATION IS AVAILABLE ON OUR WEBSITE CLICK HERE

Case Style	MR2935
Software, User Guide & Programming Manual	www.minicircuits.com/softwaredownload/rfswitchcontroller.html
Environmental Rating	ENV104
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
	AC/DC-24-3W1	AC/DC 24V DC grounded power adaptor. Operating temperature 0 to +40˚C, max current 2.5A, IEC C6 AC inlet.
	CBL-3W1-xx	AC power cord (IEC C5 connector to local plug) Select one option from the list below. Please contact testsolutions@minicircuits.com if your regions is not listed.
	USB-CBL-AB-3+	USB cable (2.7 ft) type A to type B
	CBL-RJ45-MM-5+	Ethernet cable (5 ft)

AC Power Cord Options	Part Number	Description
	CBL-3W1-US	USA NEMA 5-15 plug (type B) to IEC C5 connector
	CBL-3W1-EU	Europe CEE 7/7 plug (type E/F) to IEC C5 connector
	CBL-3W1-UK	UK BS-1363 plug (type G) to IEC C5 connector
	CBL-3W1-AU	Australia & China AS/NZS 3112 plug (type I) to IEC C5 connector
	CBL-3W1-IL	Israel SI-32 plug (type H) to IEC C5 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