



USB & ETHERNET CONTROLLED

Millimeter Wave Switch Matrix **RC-2SPDT-50**

Mini-Circuits

50Ω DC to 50 GHz

THE BIG DEAL

- Millimeter wave switching (up to 50 GHz)
- 2 x mechanical reflective switches
- High reliability, 2 million switch cycles
- 3W power rating (cold switching)

APPLICATIONS

- 5G node / device testing
- Automated test equipment
- Fail-safe / redundancy switching

PRODUCT OVERVIEW

Mini-Circuits' RC-2SPDT-50 houses a pair of electro-mechanical SPDT switches operating over an extremely wide bandwidth, from DC to 50 GHz with high isolation and low insertion loss. The reflective switches are of a failsafe and break-before-make-configuration, with a minimum lifetime of 2 million switching cycles per switch position, when used within the noted specifications.

The switch box is constructed in a compact, rugged metal case (6.0 x 4.5 x 2.25") with all 2.4 mm (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).



CASE STYLE: LM3149

[DOWNLOAD](#) SOFTWARE PACKAGE

RoHS Compliant

See our web site for RoHS Compliance methodologies and qualifications

KEY FEATURES

| Feature | Advantages |
|---------------------------------|--|
| Mechanical SPDT switches | Mechanical reflective switches provide high reliability and repeatable performance |
| Operation from DC to 50 GHz | Supports a wide range of RF test and signal routing applications, including 2G, 3G, 4G and 5G, with a single device. |
| 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 |

REV. A
ECO-008050
RC-2SPDT-50
MCLNY
210817





ELECTRICAL SPECIFICATIONS AT 25°C

| Parameter | Conditions (GHz) | Min. | Typ. | Max. | Units |
|---------------------------------|----------------------------------|------|------|------|----------------|
| Frequency Range | | DC | | 50 | GHz |
| Path Loss | DC - 12 | — | 0.2 | 0.4 | dB |
| | 12 - 26 | — | 0.3 | 0.7 | |
| | 26 - 40 | — | 0.3 | 0.8 | |
| | 40 - 50 | — | 0.4 | 1.1 | |
| Isolation | DC - 12 | 60 | 100 | — | dB |
| | 12 - 26 | 55 | 90 | — | |
| | 26 - 50 | 50 | 80 | — | |
| VSWR | DC - 12 | — | 1.15 | — | :1 |
| | 12 - 26 | — | 1.30 | — | |
| | 26 - 50 | — | 1.35 | — | |
| Switching Time | — | — | 25 | — | ms |
| RF Input Power (Cold Switching) | DC - 12 | — | — | 20 | W |
| | 12 - 26 | — | — | 10 | |
| | 26 - 40 | — | — | 5 | |
| | 40 - 50 | — | — | 3 | |
| Switch Lifetime (per Switch) | 100mW hot switching ¹ | 2 | — | — | million cycles |
| | 1W hot switching | — | 1 | — | |
| Rated Current (24V DC Input) | All switches COM<>2 | — | 330 | — | mA |
| | All switches COM<>1 | — | 90 | 120 | |
| Rated Current (USB) | | — | 10 | 20 | mA |

1. Hot switching powers above this level will degrade the switch lifetime

MAXIMUM RATINGS

| Parameters | Ratings |
|-----------------------|---------------|
| Operating Temperature | 0°C to 40°C |
| Storage Temperature | -15°C to 85°C |
| Supply Voltage | 26V |

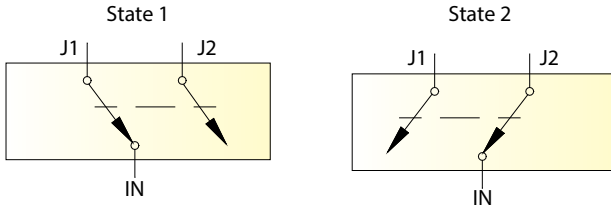


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SWITCHING CONFIGURATION:

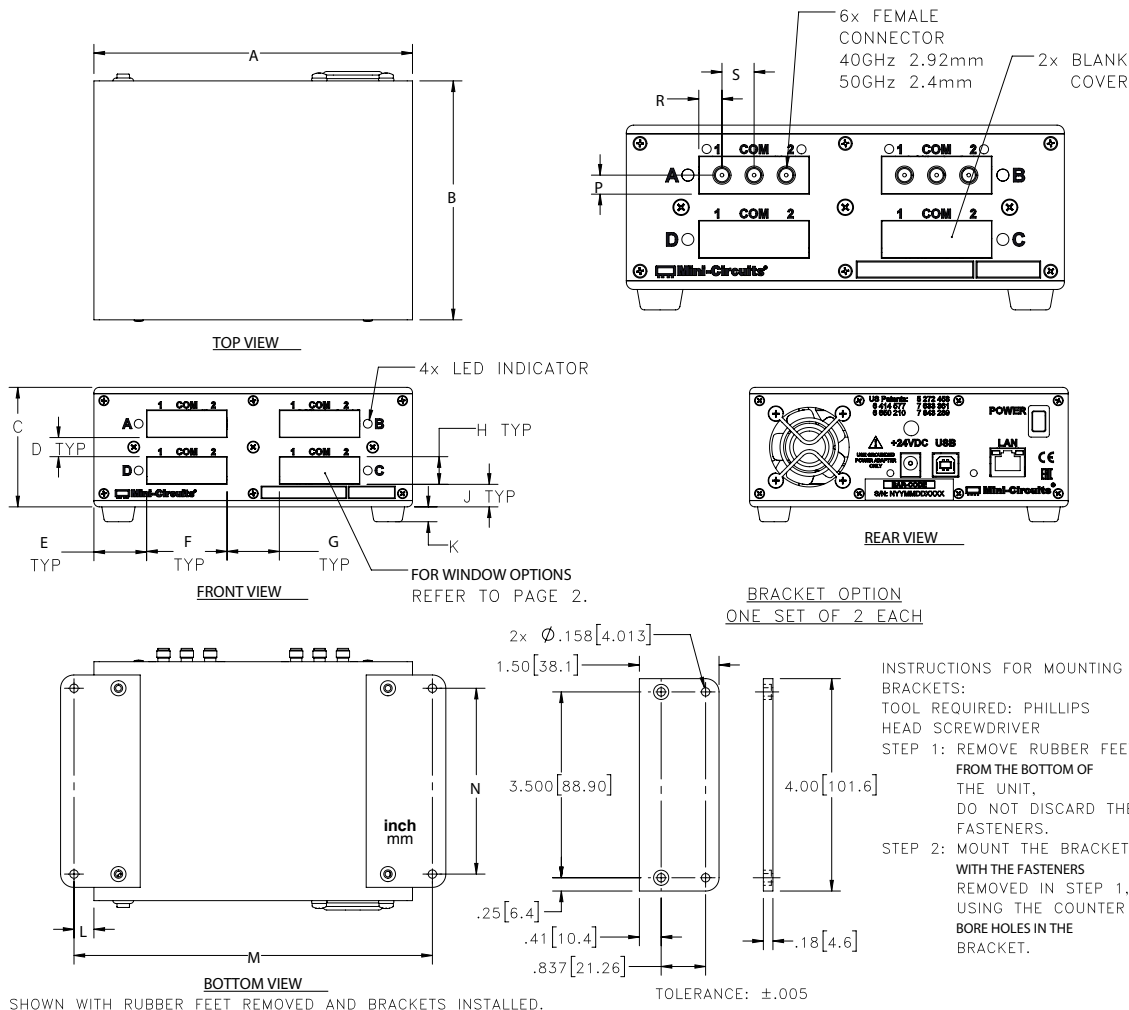
- Fail-safe
- Reflective



CONNECTIONS

| Port Name | Connector Type |
|----------------------------------|---------------------------------|
| RF Switch A & B (COM & 1-2 each) | 2.4 mm female |
| USB | USB type-B |
| Ethernet / LAN | RJ45 |
| 24V DC Input | 2.1mm center positive DC socket |

OUTLINE DRAWING (LM3149)



OUTLINE DIMENSIONS (INCH/MM)

| A | B | C | D | E | F | G | H | J | K | L | M | N | P | R | S | wt |
|-------|-------|------|------|------|------|------|------|------|------|-------|--------|------|------|------|------|-------|
| 6.00 | 4.50 | 2.25 | 0.36 | 0.99 | 1.52 | 0.99 | 0.52 | 0.43 | 0.28 | 0.375 | 6.75 | 3.50 | 0.26 | 0.32 | 0.44 | grams |
| 152.4 | 114.3 | 57.2 | 9.1 | 25.1 | 38.6 | 25.1 | 13.2 | 10.9 | 7.1 | 9.5 | 171.45 | 88.9 | 6.6 | 8.1 | 11.2 | 880 |





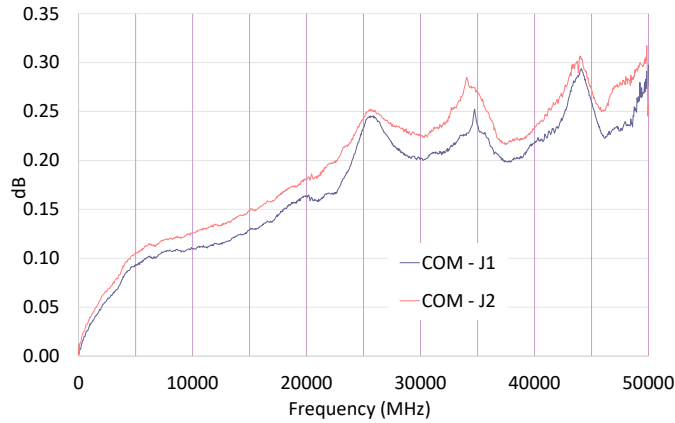
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Millimeter Wave Switch Matrix **RC-2SPDT-50**

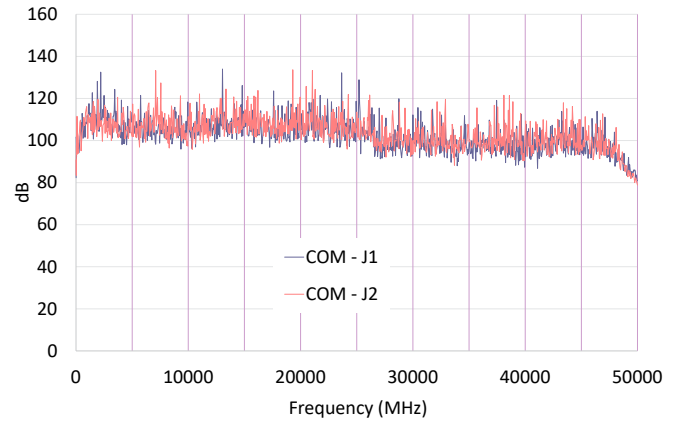
Mini-Circuits

TYPICAL PERFORMANCE DATA (PER SWITCH)

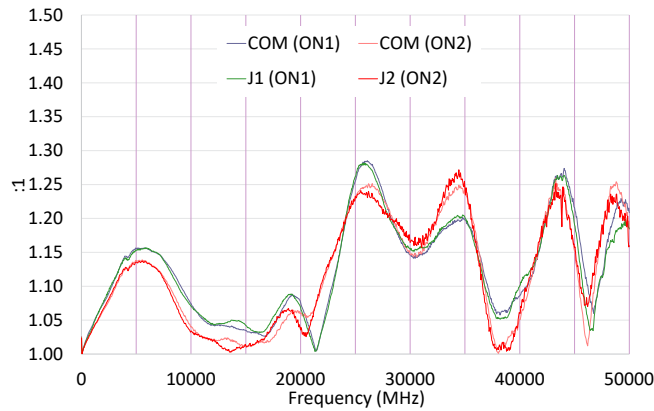
Insertion Loss



Isolation (Disconnected Paths)



VSWR (Active Paths)





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.

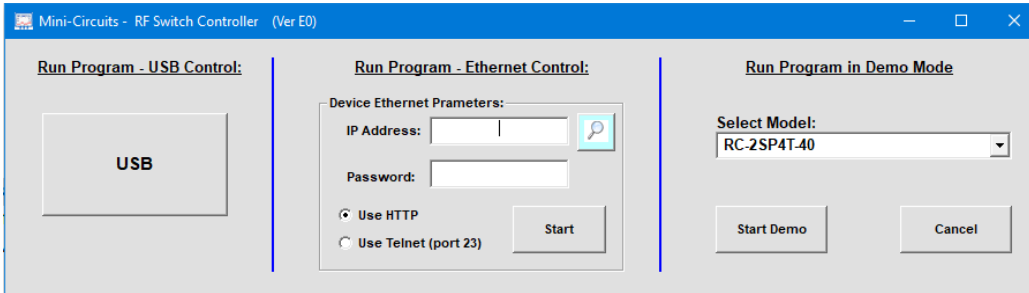


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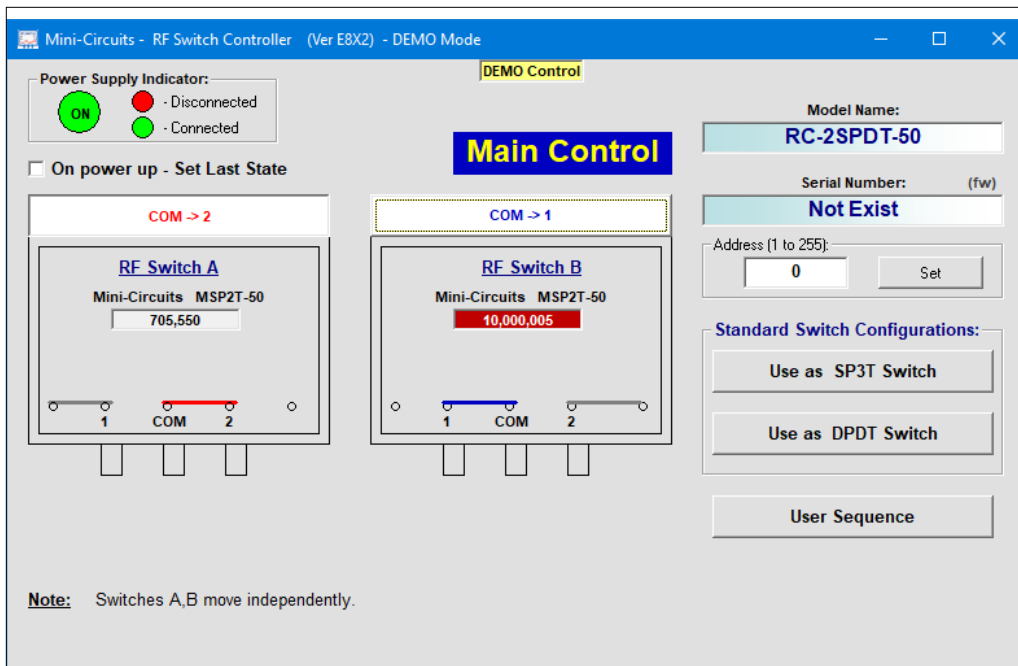
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GRAPHICAL USER INTERFACE (GUI) FOR WINDOWS - KEY FEATURES

- 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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Millimeter Wave Switch Matrix **RC-2SPDT-50**

ORDERING INFORMATION

Please contact Mini-Circuits' Test Solutions department for price and availability: testsolutions@minicircuits.com

| Model | Description |
|-------------|--|
| RC-2SPDT-50 | USB & Ethernet controlled SPDT 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 |
| See Below | 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 ⁵ | 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 |

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

OPTIONAL ACCESSORIES

| | |
|----------------|---|
| 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) |

- 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

