USB & ETHERNET CONTROLLED

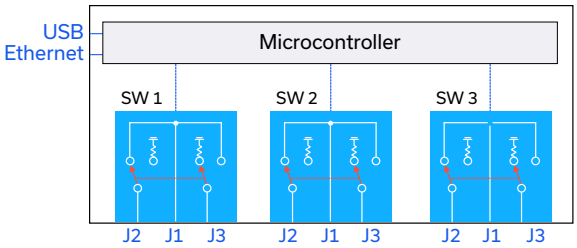
3x SP2T Mechanical Switch Assembly RCM-3SPDT-75F

75Ω DC to 2150 MHz F-Type Female

THE BIG DEAL

- 3 x mechanical SPDT absorptive switches
- Ethernet & USB control
- High isolation, 70 dB typ
- Fail-safe / redundancy switching
- 75Ω F-type connectors

FUNCTIONAL BLOCK DIAGRAM



APPLICATIONS

- Automated test & measurement systems
- L-band satellite communications infrastructure
- CATV / MoCA test systems
- DOCSIS 4.0
- Switch matrices

PRODUCT OVERVIEW

Mini-Circuits' RCM-3SPDT-75F houses 3 independently controlled electro-mechanical SPDT switches. Each switch operates over a wide bandwidth, from DC to 2150 MHz with high isolation and low insertion loss. The absorptive switches are fail-safe, with a break before make configuration, and excellent 75Ω impedance match.

The switch box is constructed in a compact, rugged metal case with all F-type (female) RF connectors on the front panel to enable easy access on a test bench. The switch box can be controlled via USB or Ethernet (supporting both HTTP and Telnet network protocols). 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.

KEY FEATURES

Feature	Advantages
Mechanical switches	Mechanical absorptive switches provide low loss, high isolation, high reliability, repeatable performance and internal termination of input signals on the disconnected paths
75Ω characteristic impedance	Route or test 75Ω signals in their characteristic impedance for optimal performance, rather than working with 50Ω equipment and impedance matching
Fail-safe 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
Compact benchtop chassis	Compact chassis allows for flexible operation, both in lab and production test environments
Ethernet & USB control	USB HID and Ethernet (HTTP / Telnet) interfaces ensure compatibility with most software environments and connection requirements.

REV. A
ECO-017289
RCM-3SPDT-75F
MCL NY
230330

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ELECTRICAL SPECIFICATIONS @ +25°C (EACH SWITCH)

Parameter	Conditions	Min.	Typ.	Max.	Units
Frequency Range		DC		2150	MHz
Insertion Loss	DC – 950 MHz 950 – 1850 MHz 1850 – 2150 MHz		0.25 0.60 0.75	1.25 1.50 1.50	dB
Isolation	DC – 950 MHz 950 – 1850 MHz 1850 – 2150 MHz	50 45 45	77 71 62		dB
Return Loss	DC – 950 MHz 950 – 1850 MHz 1850 – 2150 MHz		17 12 12		dB
Switching Time			25		ms
RF Input Power	Hot & cold switching Into internal termination			+20 +20	dBm

CONTROL INTERFACES

Ethernet Control	Supported Protocols	TCP / IP, HTTP, Telnet, DHCP, UDP (limited)
	Max Data Rate	10 Mbps (10Base-T Half Duplex)
USB Control	Supported Protocols	HID – Full Speed
	Min Communication Time[1]	3 ms typ

1. Based on the polling interval of the USB HID protocol (1 ms 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

	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
:SPDT:[sw_number]:STATE:[port]	Set a single switch state: • [sw_number] = 1 to 3 • [port] = 1 (J1 to J2) or 2 (J1 to J3) • Example :SPDT:1:STATE:2 (set SPDT 1 with J1 to J3)
:SPDT:[sw_number]:STATE?	Return a single switch state: • [sw_number] = 1 to 3 • Example :SPDT:1:STATE? (return the state of SPDT 1)

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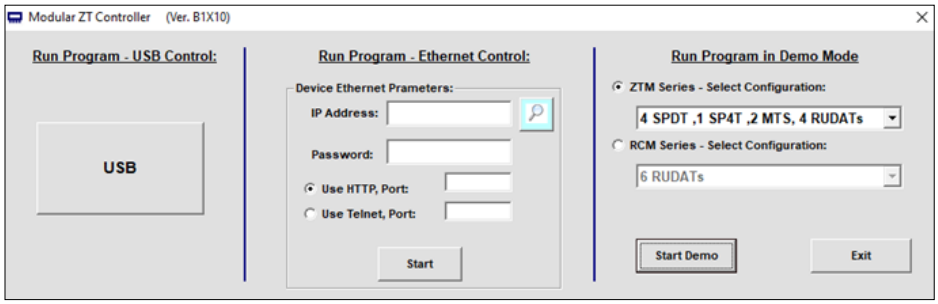
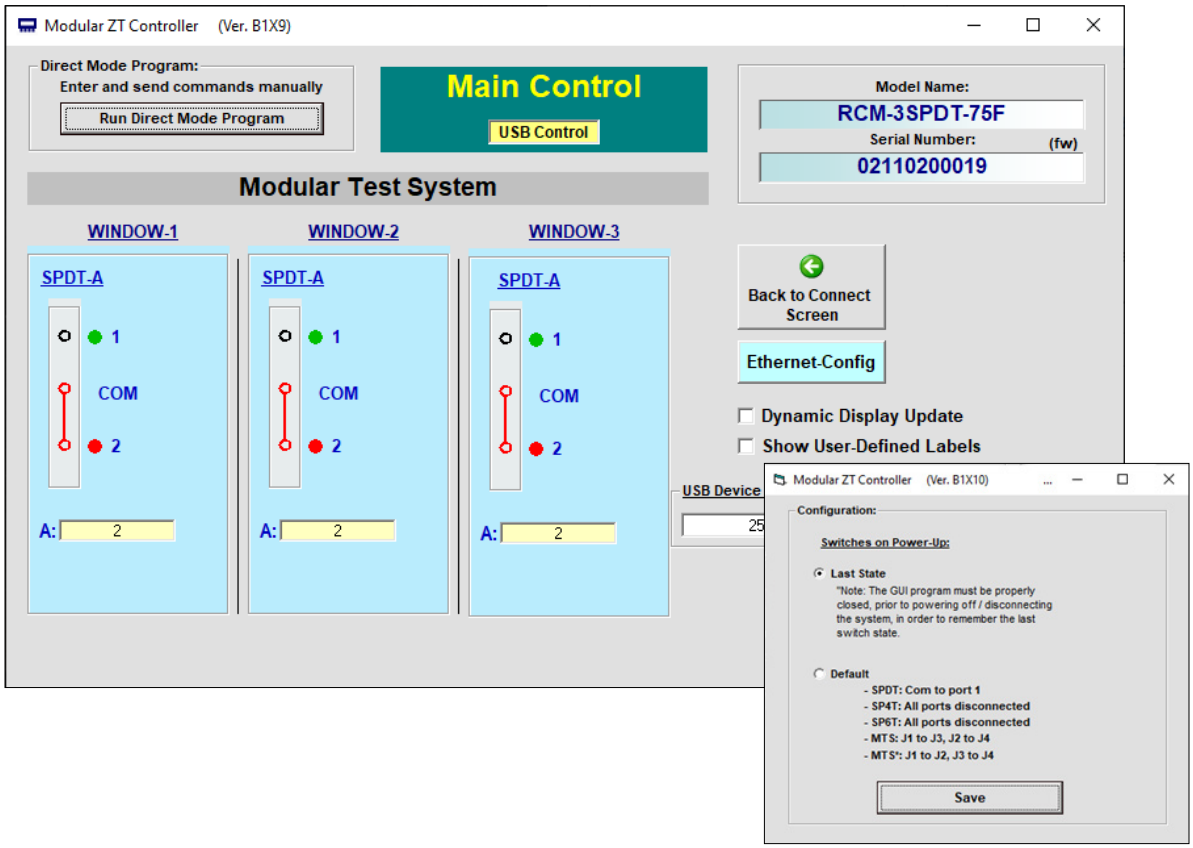
GRAPHICAL USER INTERFACE (GUI) FOR WINDOWS

- Connect via USB or Ethernet
- Run GUI in “demo mode” to evaluate software without a hardware connection



- View and set all switch states at the click of a button
- Update firmware



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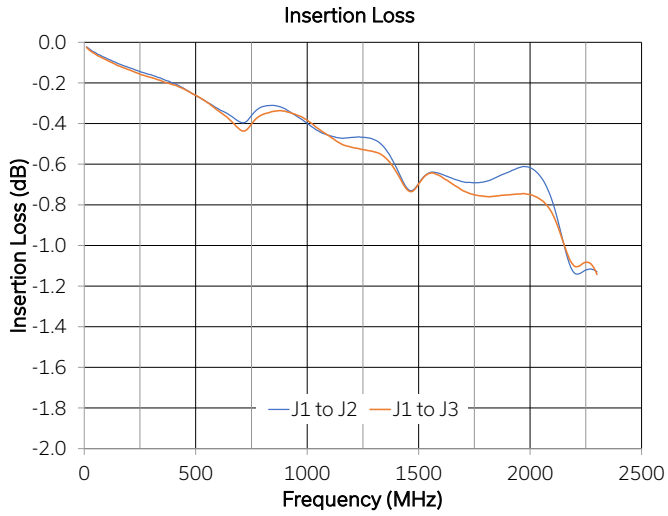
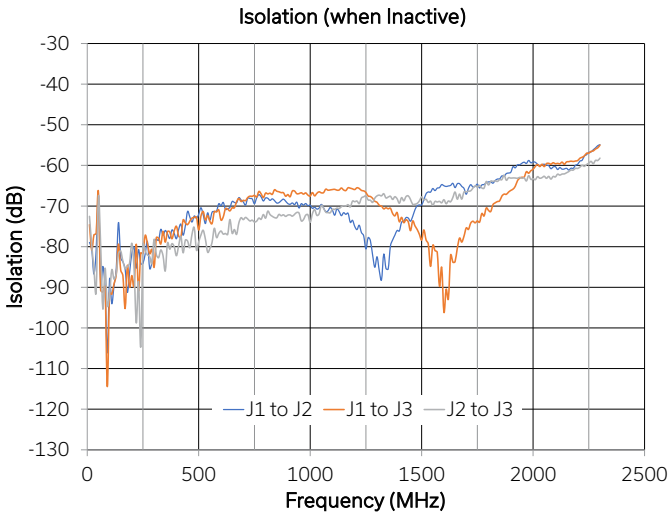
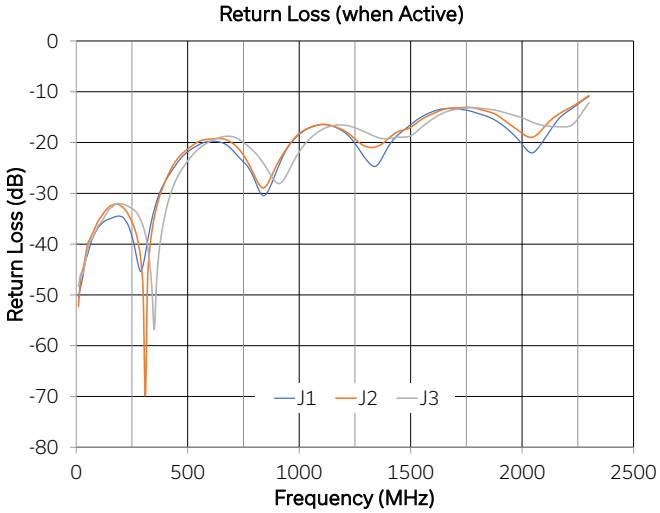
TYPICAL PERFORMANCE GRAPHS







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ABSOLUTE MAXIMUM RATINGS[2]

Parameter	Conditions	Limits	Units
Temperature	Operating	0 to +40	°C
	Storage	-15 to +85	
DC Supply Voltage		26	V
Input Power (No Damage)	Cold switching	+20	dBm
	Hot switching	+20	
	Into internal termination	+20	

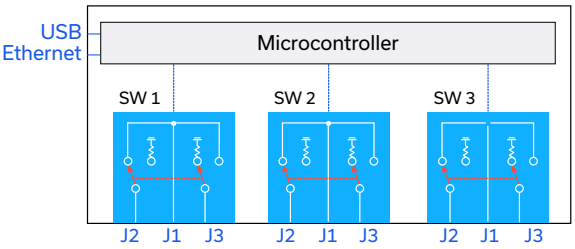
2. Permanent damage may occur if any of these limits are exceeded. Operating in the range between operating power limits and absolute maximum ratings for extended periods of time may result in reduced life and reliability.

POWER SUPPLY

DC Voltage Input[3]	+24V DC

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

FUNCTIONAL BLOCK DIAGRAM



CONNECTIONS

Port	Connector
SW 1 – J1, J2 & J3	F-type female
SW 2 – J1, J2 & J3	F-type female
SW 3 – J1, J2 & J3	F-type female
USB	USB type B
Ethernet / LAN	RJ45
24V DC Input	2.1mm center positive DC socket

J1 = Common port
J2, J3 = Input / output ports

SWITCH CONTROL LOGIC

Switch Command	1	2	3
:SPDT:1:STATE:1	J1 to J2	x	x
:SPDT:1:STATE:2	J1 to J3	x	x
:SPDT:2:STATE:1	x	J1 to J2	x
:SPDT:2:STATE:2	x	J1 to J3	x
:SPDT:3:STATE:1	x	x	J1 to J2
:SPDT:3:STATE:2	x	x	J1 to J3

x = Switch state not affected by this switch command

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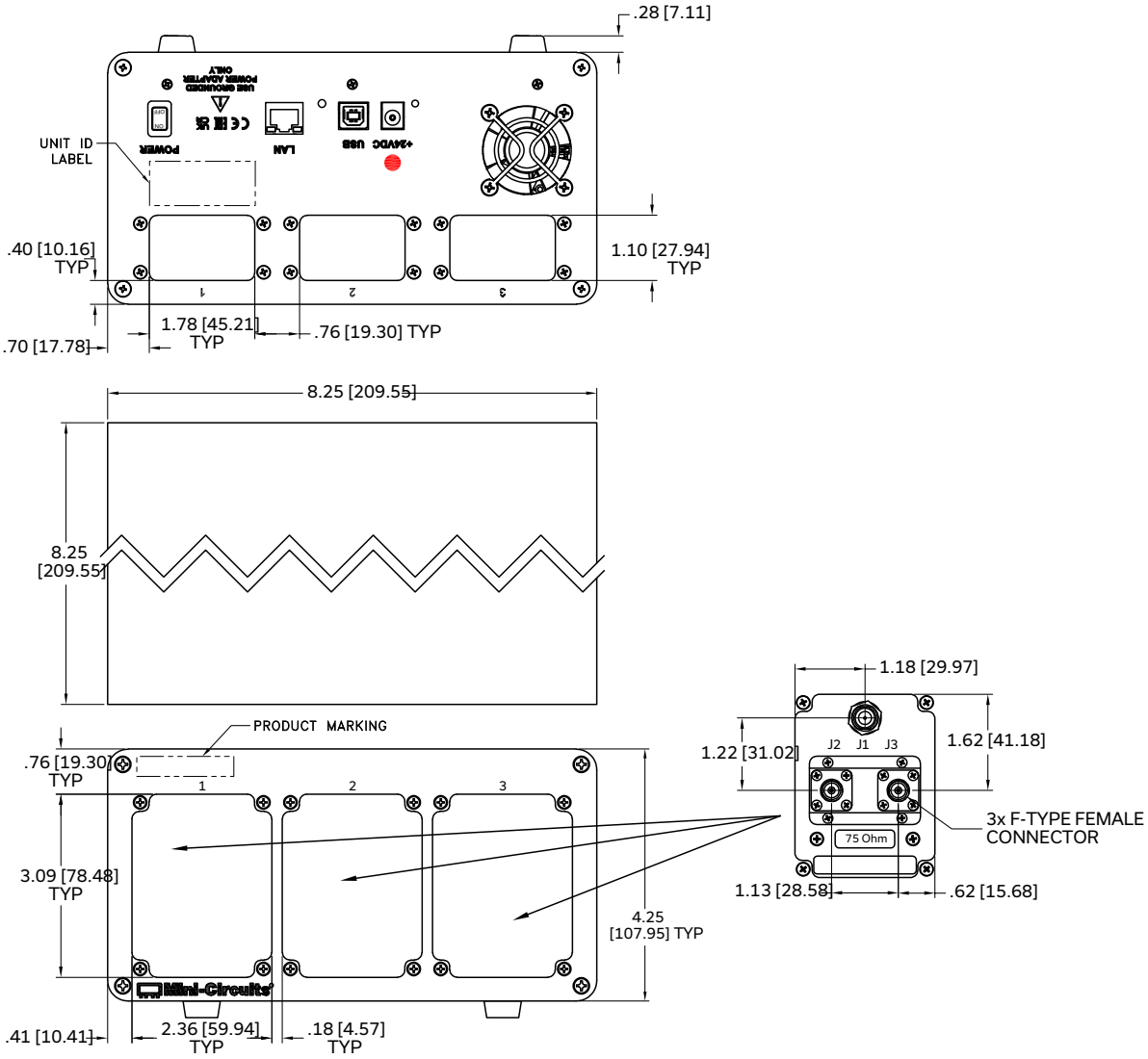
CASE STYLE DRAWING



Weight: 2350 grams.

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

PRODUCT MARKING

Product Marking: RCM-3SPDT-75F
Product Frequency: DC – 2150 MHz
Product ID: Contains product marking, regulatory compliance, bar code and serial number
Marking may contain other features or characters for internal lot control

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DETAILED MODEL INFORMATION IS AVAILABLE ON OUR WEBSITE CLICK HERE

Case Style	UV2068
Software, User Guide & Programming Manual	www.minicircuits.com/softwaredownload/ztm_rcm.html
Environmental Rating	ENV56
Regulatory Compliance	Refer to our website for compliance methodologies and qualifications CE FC 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-7+	USB cable (6.8ft) 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 C13 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