USB & ETHERNET

Full Fan Out Switch Matrix

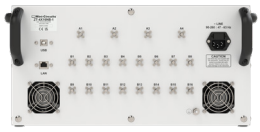
ZT-4X16NB-1

50Ω 900 to 2150 MHz 4 x 16 Rack-Mount SMA Female

THE BIG DEAL

- Completely flexible 4 x 16 switch matrix
- Fully non-blocking / full fan-out configuration
- Combine any combination of input & output ports
- High isolation between disconnected ports
- Software automation via Ethernet & USB
- Convenient rack-mountable chassis

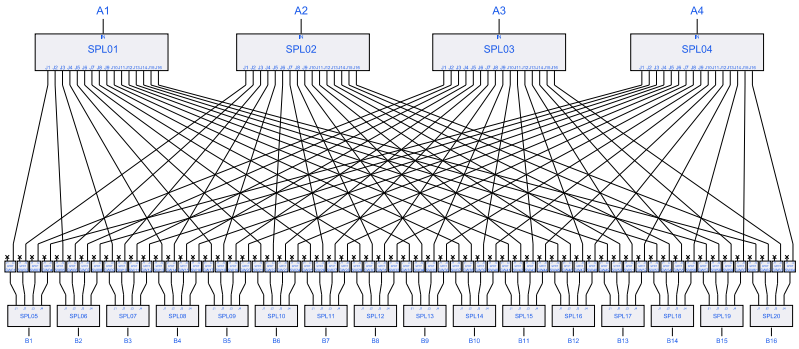
Frot View



Rear View

Generic photo used for illustration purposes only

FUNCTIONAL BLOCK DIAGRAM



APPLICATIONS

- L-band satcom (satellite communications)
- GNSS (GPS, Galileo, GLONASS) signal distribution
- RF test automation & signal routing
- DECT NR+ verification

PRODUCT OVERVIEW

Mini-Circuits' ZT-4X16NB-1 is a "full fan out" or "fully non blocking" switch matrix. These systems use a combination of mechanical switches and splitter/combiners to provide a completely flexible set of paths between the input and output ports. The matrix comprises 64 bi-directional paths, allowing all inputs to connect simultaneously to all outputs, with the option to switch each path on or off independently.

The system is housed in a 5U height, 19-inch rack chassis, with the SMA female RF connections and AC power input on the rear panel. Removable carry handles are included on the front, rear and side panels to aid installation.

The switch matrix can be controlled via USB or Ethernet (supporting 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
Fully non-blocking	Completely flexible, allowing any combination of inputs to connect to any combination of outputs, including all 64 paths active at the same time.
Mechanical switches	Mechanical switches provide high isolation between disconnected ports with minimal added insertion loss.
Wide bandwidth	Operation over 900-2150 MHz supports L-band satellite communications and GNSS applications.
Ethernet & USB control	USB HID and Ethernet (HTTP & Telnet) interfaces ensure compatibility with most software environments and connection requirements.
Rack-mount chassis	5U height, 19" rack-mountable chassis suits integration in automated production test environments.

Full Fan Out Switch Matrix ZT-4X16NB-1

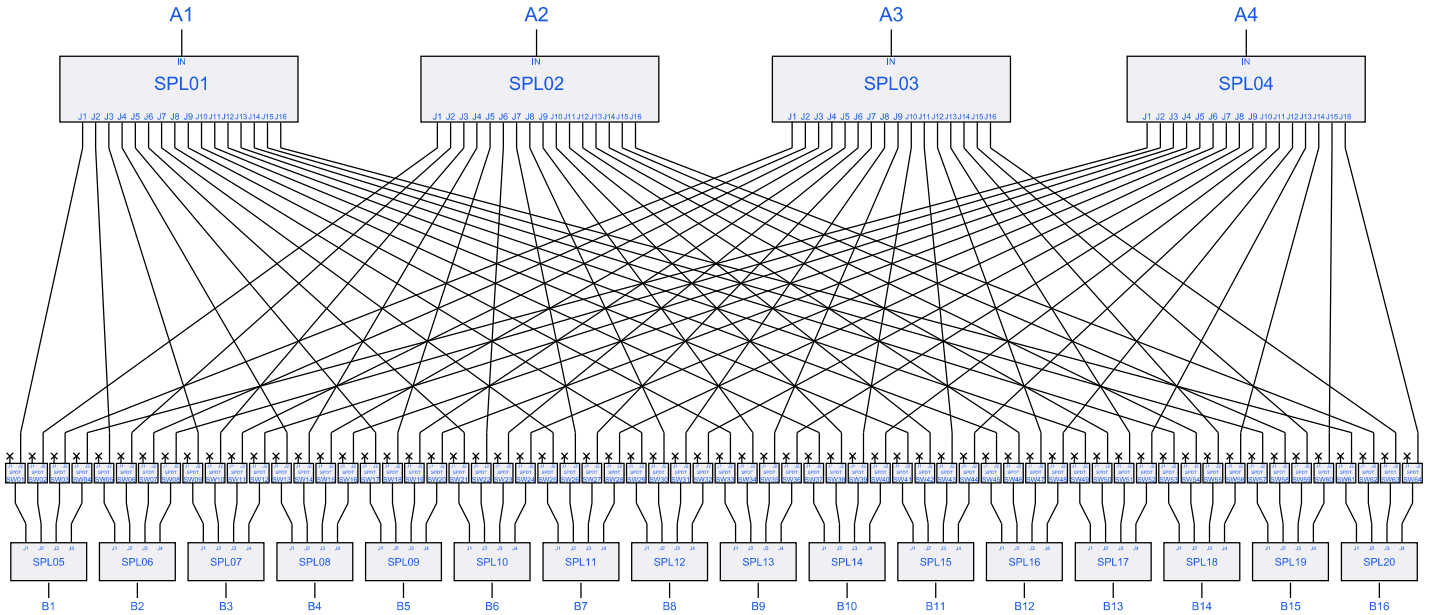
50Ω 900 to 2150 MHz 4 x 16 Rack-Mount SMA Female

ELECTRICAL SPECIFICATIONS AT +25°C

Parameter	Conditions	Min.	Typ.	Max.	Units
Frequency		900		2150	MHz
Insertion Loss			20.5	23.0	dB
Isolation (Inactive Paths)[1]		80	100		dB
Isolation (Adjacent Active Ports)[2]	A_x to A_y B_x to B_y	40 30	50 40		dB
Isolation (Adjacent Inactive Ports)[3]	A_x to A_y or B_x to B_y	80	100		dB
Return Loss[4]	A-Ports B-Ports		18 18		dB
Input Power	All ports			+24	dBm

1. Isolation from input to output on a disconnected switch path. Example: A1 to B1 isolation is the leakage measured at B1 from a signal input at A1 when the switch in path is disconnected.
2. Isolation between any pair of A or B ports with all internal switch paths connected. This parameter is influenced by the isolation of the power splitter / combiner opposite.
3. Isolation between any pair of A or B ports with all internal switch paths disconnected. This parameter is influenced by the isolation of the mechanical switches.
4. Return loss into all ports in all states

FUNCTIONAL BLOCK DIAGRAM

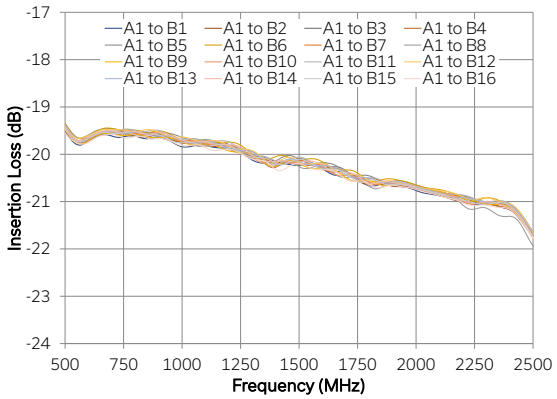


Full Fan Out Switch Matrix ZT-4X16NB-1

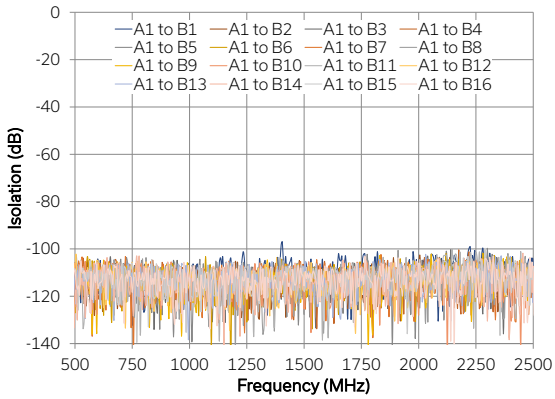
50Ω 900 to 2150 MHz 4 x 16 Rack-Mount SMA Female

TYPICAL PERFORMANCE CURVES

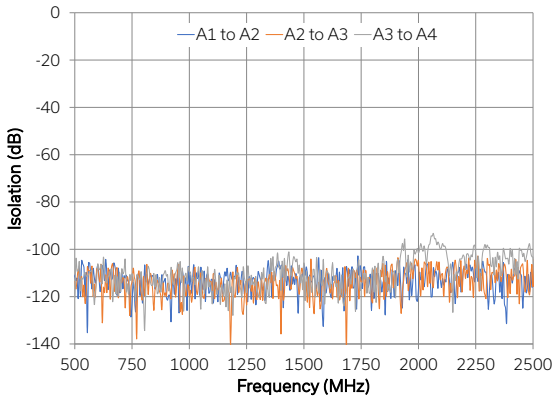
Insertion Loss



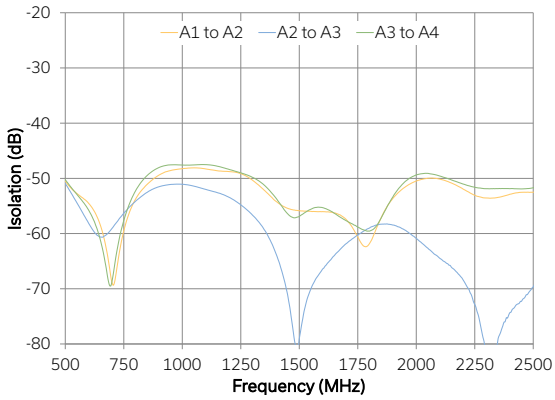
Isolation (Inactive Paths)



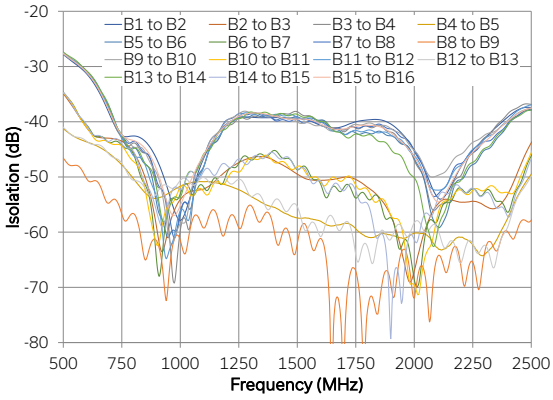
Isolation (Between Inactive Ax Ports)



Isolation (Between Active Ax Ports)



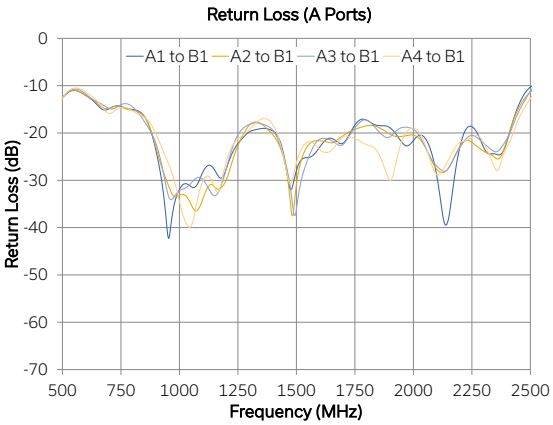
Isolation (Between Active Bx Ports)

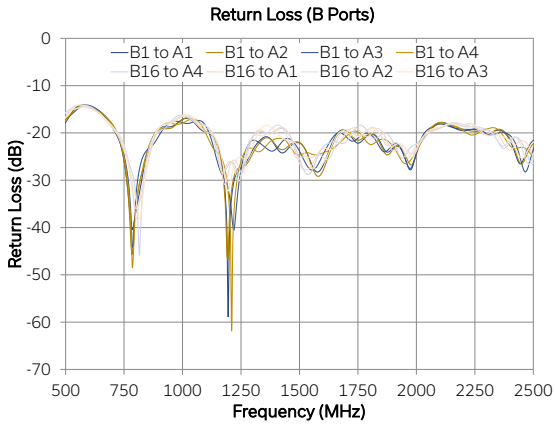


Full Fan Out Switch Matrix ZT-4X16NB-1

50Ω 900 to 2150 MHz 4 x 16 Rack-Mount SMA Female

TYPICAL PERFORMANCE CURVES





Full Fan Out Switch Matrix ZT-4X16NB-1

50Ω 900 to 2150 MHz 4 x 16 Rack-Mount SMA Female

CONTROL INTERFACES

Ethernet Control	Supported Protocols	TCP / IP, HTTP, Telnet, DHCP, UDP (limited)
	Max Data Rate	10 Mbps (10 Base-T Half Duplex)
USB Control	Supported Protocols	HID – Full Speed
	Min Communication Time[5]	3 ms typ

5. 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

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):

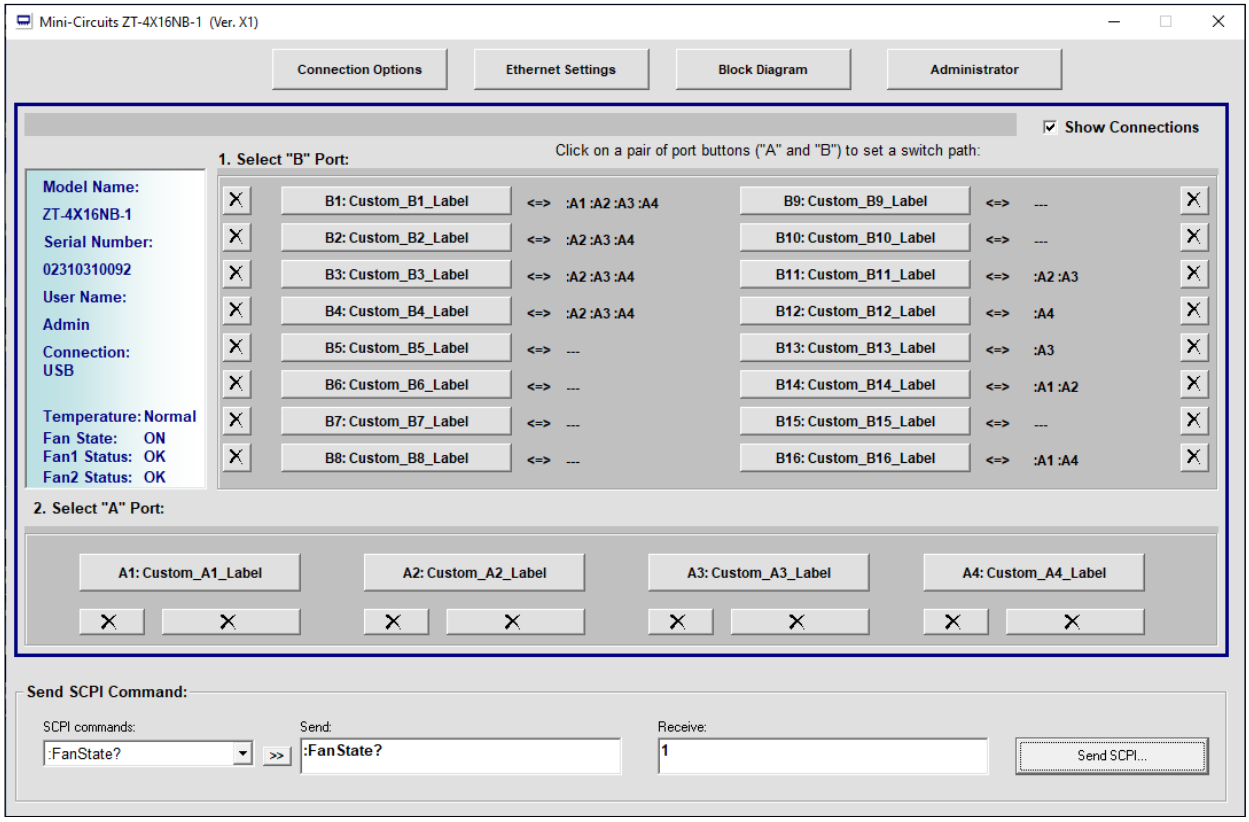
Command / Query	Description
:MN?	Read model name
:SN?	Read serial number
:FIRMWARE?	Read firmware version
:PATH:[A_port]:[B_port]	Set a single path: • [A_port] = The "A" port name to connect (A1 to A4) • [B_port] = The "B" port name to connect (B1 to B16) • Example :PATH:A1:B16
:PATH:[input_port]?	Get the "output" port connected to the specified "input port": • [input_port] = The "A" or "B" port name to check (A1 to A4 or B1 to B16) • Example :PATH:B16:?
PATH:[input_port]:DIST	Disconnect all paths to the a specific port: • [input_port] = The "A" or "B" port name to disconnect (A1 to A4 or B1 to B16) • Example :PATH:A1:DIST
:DIST:[A_port]:[B_port]	Disconnect a single path between 2 named ports: • [A_port] = The "A" port name (A1 to A4) • [B_port] = The "B" port name (B1 to B16) • Example :DIST:A1:B16

Full Fan Out Switch Matrix ZT-4X16NB-1

50Ω 900 to 2150 MHz 4 x 16 Rack-Mount SMA Female

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 paths at the click of a button
- Define custom port labels
- Configure Ethernet settings
- Update firmware



Full Fan Out Switch Matrix ZT-4X16NB-1

50Ω 900 to 2150 MHz 4 x 16 Rack-Mount SMA Female

ABSOLUTE MAXIMUM RATINGS

Parameter	Conditions	Limits	Units
Temperature	Operating	0 to +50	°C
	Storage	-20 to +60	
Input Power	No damage	+24	dBm

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

Power Supply	AC mains input: 100-240 V, 50 / 60 Hz
Fuse	2A, 250V rating
Power Consumption	480W maximum

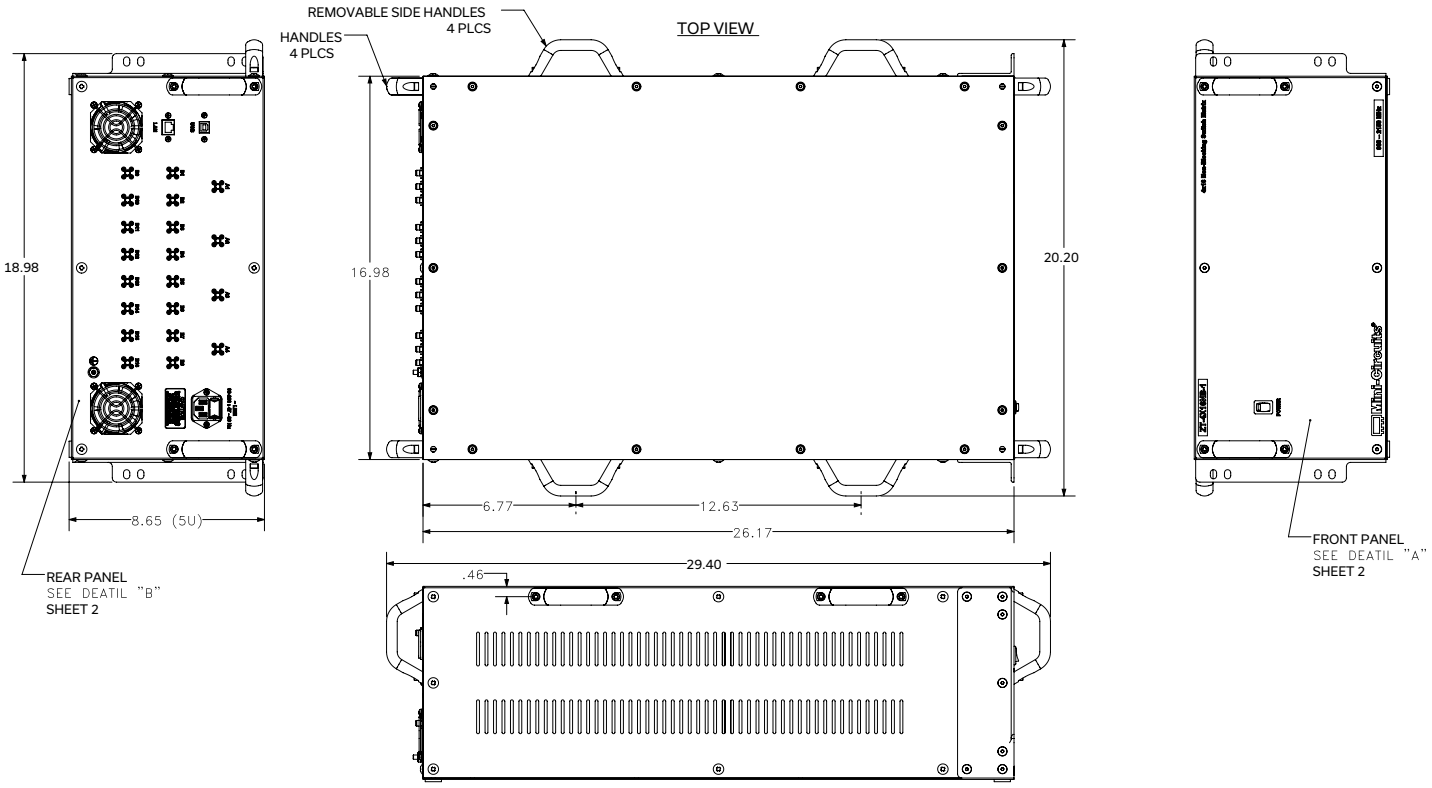
CONNECTIONS

Port	Connector
A1-A4 & B1-B16	SMA female
USB	USB type B
Ethernet / LAN	RJ45
AC Input	IEC C14 inlet

Full Fan Out Switch Matrix ZT-4X16NB-1

50Ω 900 to 2150 MHz 4 x 16 Rack-Mount SMA Female

CASE STYLE DRAWING



PRODUCT MARKING*

Product Marking: ZT-4X16NB-1
Product Description: 4 x 16 Non-Blocking Switch Matrix
Product Frequency: 900-2150 MHz
Unit ID Label: Serial number and other identification marks
*Marking may contain other features or characters for internal lot control

Full Fan Out Switch Matrix ZT-4X16NB-1

50Ω 900 to 2150 MHz 4 x 16 Rack-Mount SMA Female

DETAILED MODEL INFORMATION IS AVAILABLE ON OUR WEBSITE CLICK HERE

Case Style	99-01-3632
Software, User Guide & Programming Manual	https://www.minicircuits.com/softwaredownload/zt/MCL_ZT_4X16NB-1_UG_setup_X1.zip
Environmental Rating	ENV55
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
	USB-CBL-AB-7+	USB cable (6.8ft) type A to type B
	CBL-RJ45-MM-5+	Ethernet cable (5 ft)
	HT-4-SMA	SMA connector wrench (4" length)
	B13-345-08+	Rack-mounting support kit
	CBL-3W-xx	AC power cord (IEC C13 connector to local plug) Select one option from the list below. Please contact testsolutions@minicircuits.com if your region is not listed.

AC Power Cord Options	Part Number	Description
	CBL-3W-US	USA NEMA 5-15 plug (type B) to IEC C13 connector
	CBL-3W-EU	Europe CEE 7/7 plug (type E/F) to IEC C13 connector
	CBL-3W-UK	UK BS-1363 plug (type G) to IEC C13 connector
	CBL-3W-AU	Australia & China AS/NZS 3112 plug (type I) to IEC C13 connector
	CBL-3W-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/terms/viewterm.html