USB & ETHERNET & DAISY-CHAIN

Non-Blocking Switch Matrix ZT-30X10NB

50Ω 600 to 6000 MHz 30 x 10 Rack-Mount SMA-Female

THE BIG DEAL

- Bi-directional, 30 x 10 non-blocking switch matrix
- One-to-many / many-to-one switch paths
- Connect multiple inputs to the same output
- High isolation between disconnected ports
- Software automation via Ethernet & USB
- Convenient rack-mountable chassis

Front View

Rear View

Generic photo used for illustration purposes only

APPLICATIONS

- 5G FR1, Bluetooth & WiFi signal distribution
- L-band satcom (satellite communications)
- GNSS (GPS, Galileo, GLONASS) signal distribution
- High throughput production testing
- RF test automation & signal routing
- MIMO antenna testing

PRODUCT OVERVIEW

Mini-Circuits' ZT-30X10NB is a high performance 30 by 10 non-blocking switch matrix, operating over a wide bandwidth from 600 MHz to 6 GHz. The system is integrated into a 19-inch rack-mountable chassis with 10 RF ports (B1 to B10) on the front panel and 30 RF ports (A1 to A30) on the rear, all SMA female.

The non-blocking configuration supports up to 10 active switch paths at any time, with a single "A" port able to connect to any combination of "B" ports, including all 10 at the same time. The matrix is bi-directional so the "A" and "B" ports can be used interchangeably as both inputs and outputs.

The switch matrix can be controlled via USB or Ethernet (supporting HTTP & Telnet protocols). Full software support is provided, including our user-friendly GUI application for Windows and a flexible API with programming instructions for Windows and Linux environments.

The daisy-chain control interface further simplifies control integration by allowing multiple switch racks to be interconnected via their respective serial in and out connections. The complete set of daisy-chained matrices can then be independently controlled through a single USB / Ethernet connection.

KEY FEATURES

Feature	Advantages
High port count	Bi-directional operation from 30 to 10 ports facilitates a wide range of switching applications with integration of a large number of test systems and devices.
Non-blocking matrix	One-to-many and many-to-one switch paths, allowing multiple external devices or systems to be connected to the same port.
Daisy-chain control	Control multiple switch racks through a single USB or Ethernet connection, simplifying control systems and switch automation.
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.

REV. B
ECO-025823
ZT-30X10NB
MCL NY
250611

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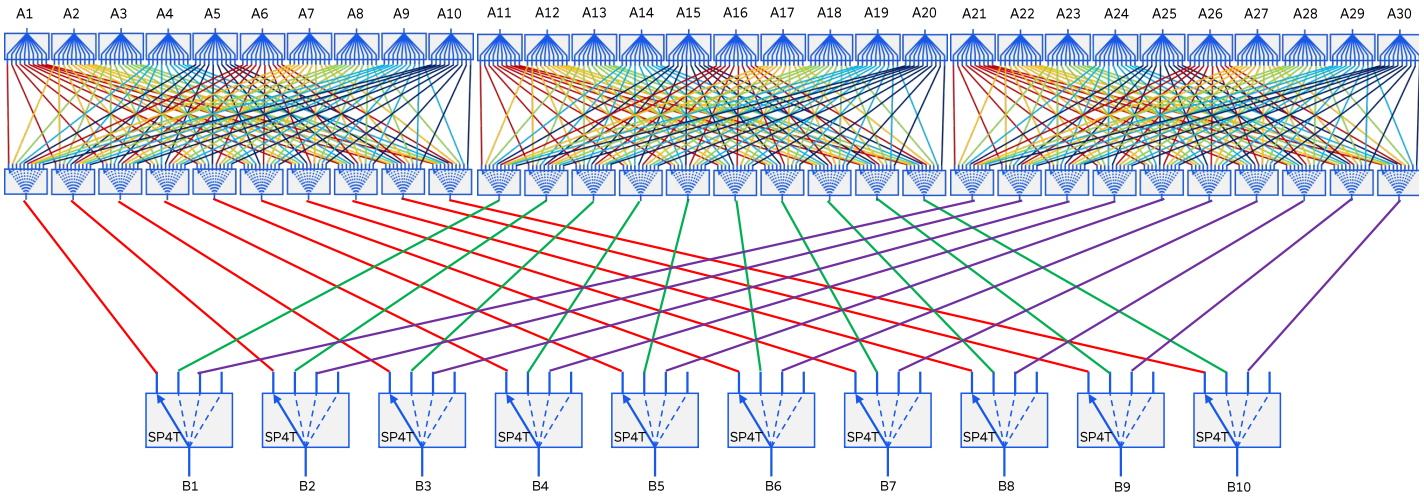
ELECTRICAL SPECIFICATIONS AT +25°C

Parameter	Conditions	Frequency	Min.	Typ.	Max.	Units
Frequency Range	-		600		6000	MHz
Insertion Loss	Active paths	600 – 3000 MHz 3000 – 6000 MHz		19 21	22 24	dB
Isolation	Inactive paths[1]	600 – 3000 MHz 3000 – 6000 MHz	85 75	90 80		dB
	Between A ports[2] Between non-converging B ports[3] Between converging B ports[4]	600-6000 MHz 600-6000 MHz 600-6000 MHz		80 80 30		dB
Return Loss[5]		600 – 6000 MHz		15		dB
Input Power	All ports	Cold switching Hot switching			+18 +18	dBm

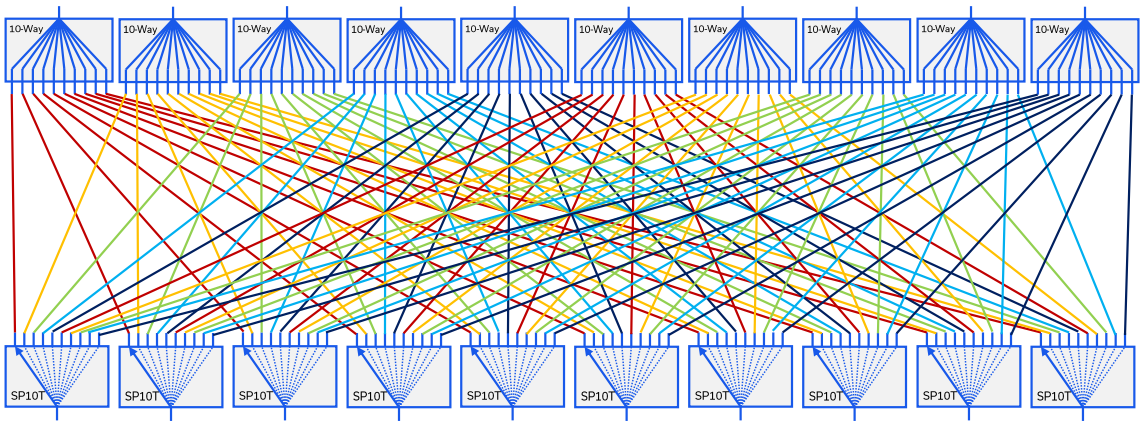
1. Isolation from input to output on a disconnected switch path. Example: A1 to B1 isolation is the leakage measured at B1 from a signal input at A1 when the switch in path is disconnected.
2. Isolation between any pair of A ports for any combination of connected switch paths. This parameter is influenced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

FUNCTIONAL BLOCK DIAGRAMS

Complete system:



Enlarged diagram of the 10 x 10 section:



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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[7]	3 ms typ
Daisy-Chain	Supported Protocols	Mini-Circuits proprietary
	Requirements	Additional ZT-30X10NB switch matrices with one unit to be controlled using USB or Ethernet

7. 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:[Ax]: [By]	Set a single path: • [Ax] = "A" port name (eg: A1) • [Bx] = "B" port name (eg: B1) • Example :PATH:A1:B1
:PATH:[Ax]?	Return the list of B ports connected to the specified A port • [Ax] = "A" port name (eg: A1) • Example :PATH:A1?
:PATH:[Bx]?	Return the A port connected to the specified B port • [Bx] = "B" port name (eg: B1) • Example :PATH:B1?

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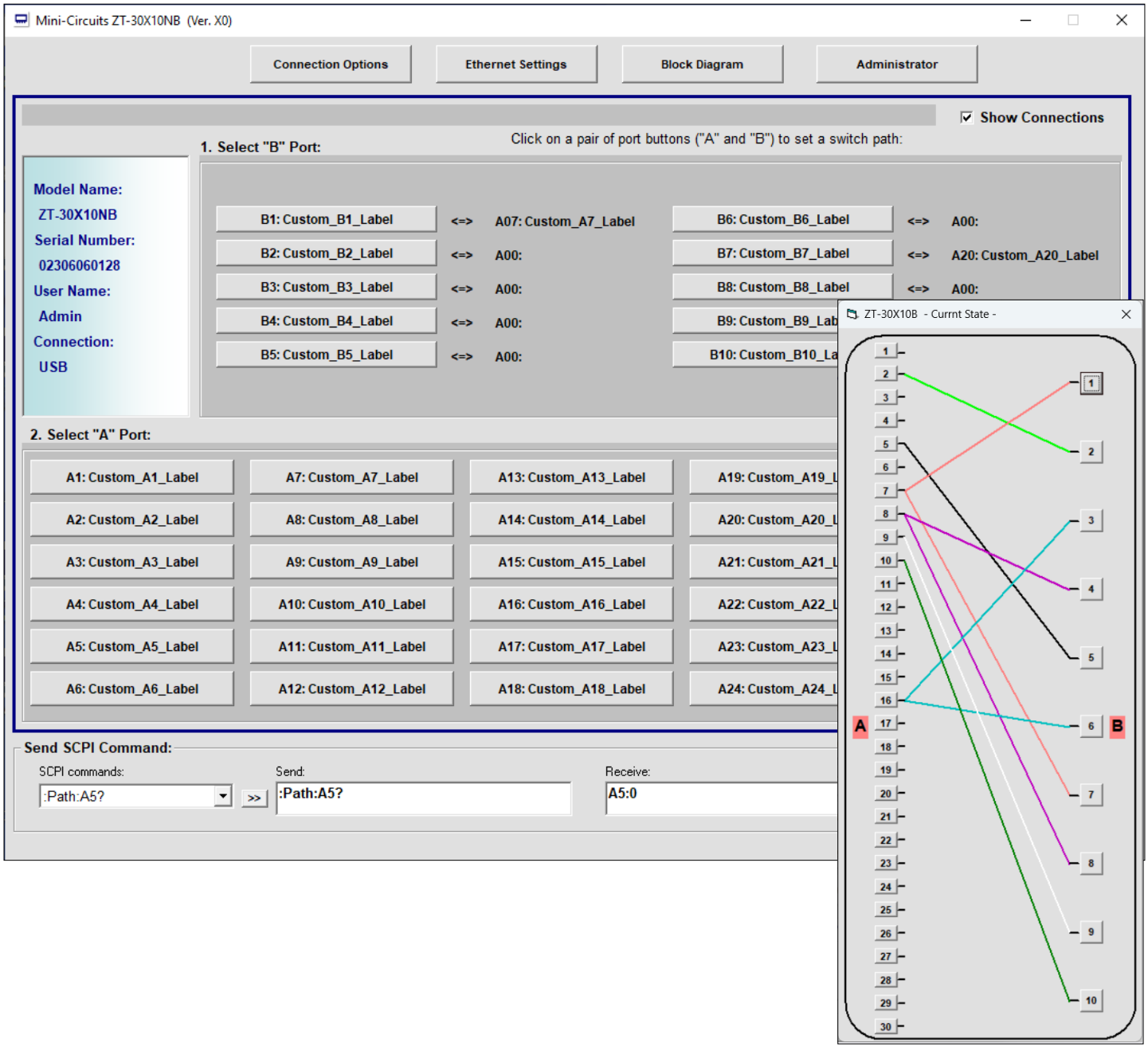
GRAPHICAL USER INTERFACE (GUI) FOR WINDOWS

- 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
- Set switch power-up states
- Configure Ethernet settings
- Update firmware



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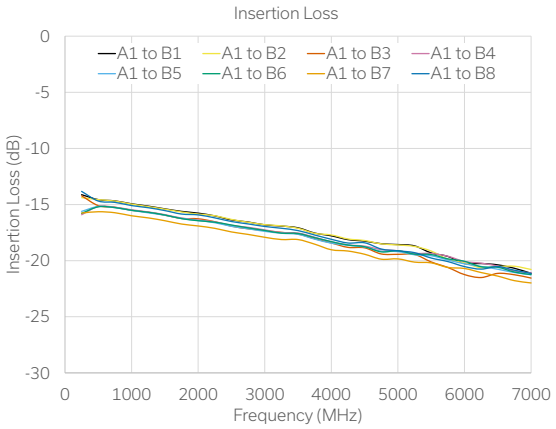
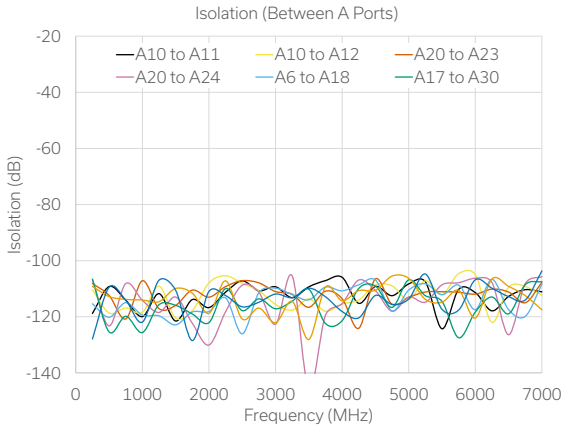
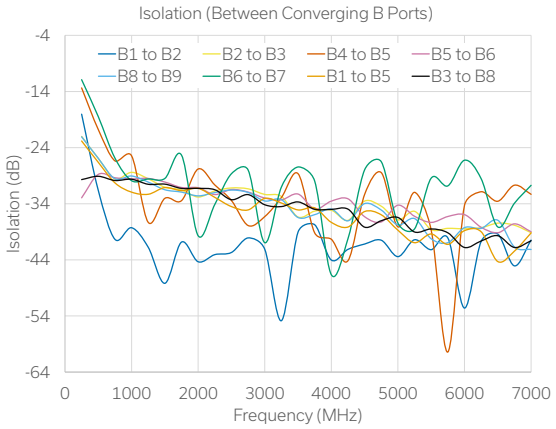
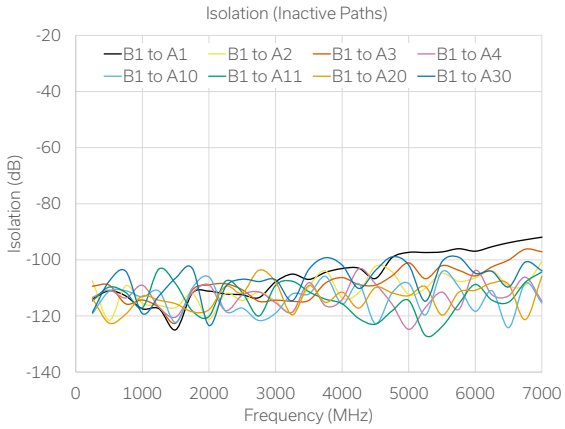
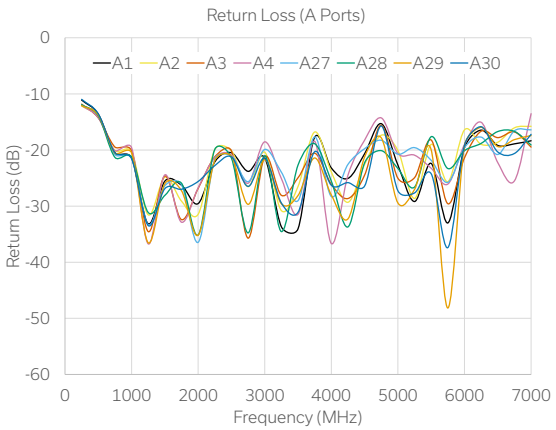
TYPICAL PERFORMANCE GRAPHS

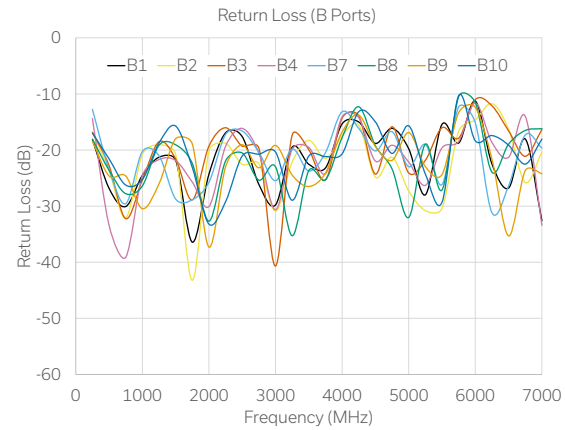












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ABSOLUTE MAXIMUM RATINGS

Parameter	Conditions	Limits	Units
Temperature	Operating	0 to +50	°C
	Storage	-20 to +60	
Input Power (No Damage)	Cold switching	+18	dBm
	Hot switching	+18	

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	2 A, 250 V rating
Power Consumption	150 W maximum

CONNECTIONS

Port	Connector
A1 to A30 & B1 to B10	SMA female
USB	USB type B
Ethernet / LAN	RJ45
Serial In & Serial Out	D-sub 9-pin
AC Input	IEC C14 inlet

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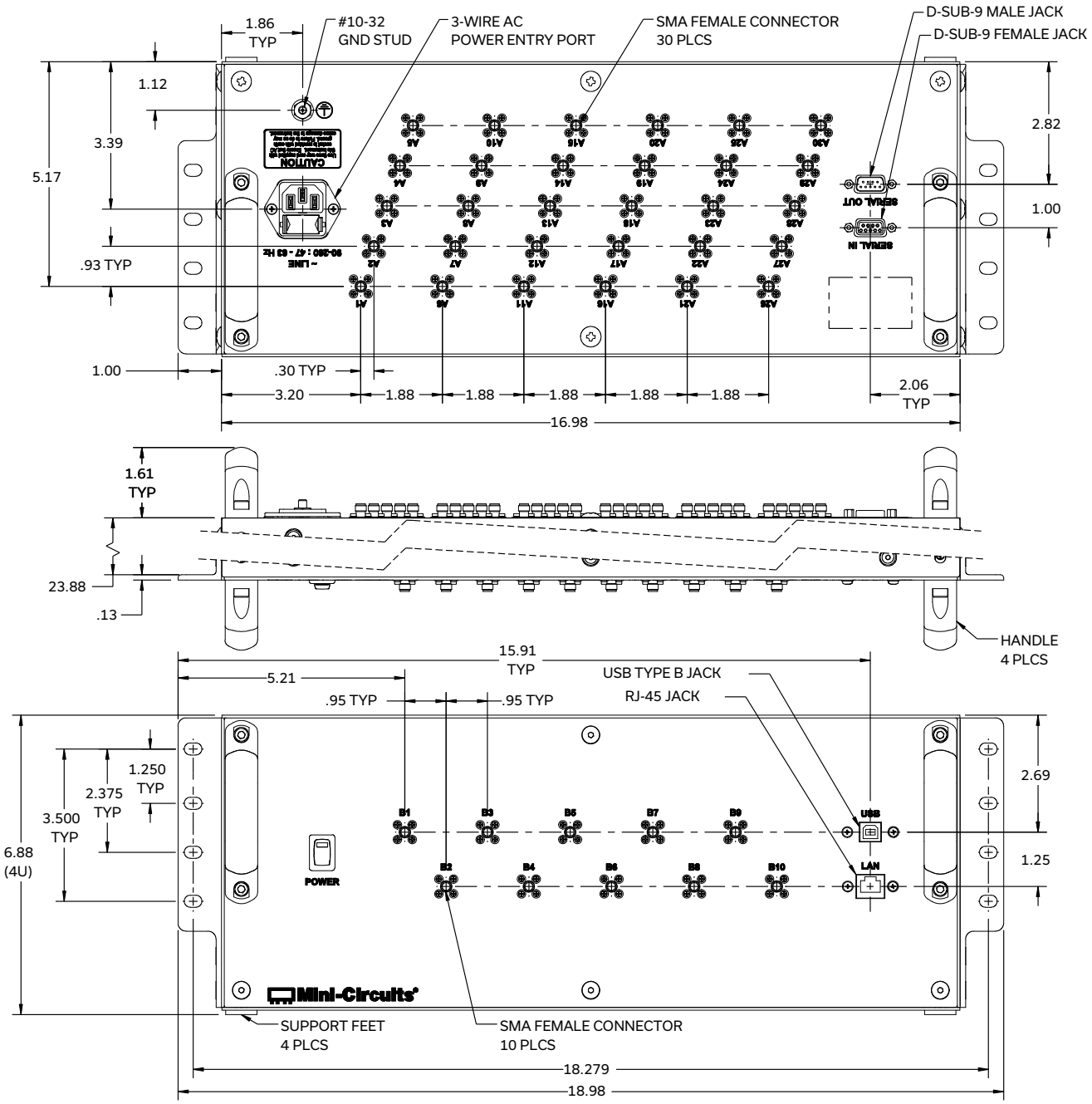
CASE STYLE DRAWING



PRODUCT MARKING*

Product Marking: ZT-30X10NB
Product Label: 30 x 10 Non-Blocking Switch Matrix (600 – 6000 MHz)
Unit ID Label: Serial number and other identification marks
*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	99-01-3247
Software, User Guide & Programming Manual	www.minicircuits.com/softwaredownload/zt/ZT30X10NB_Setup_X0.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)
	D-SUB9-MF-6+	Serial daisy-chain control cable (6") with D-sub 9-pin connectors
	HT-4-SMA	SMA connector wrench (4" length)
	B13-345-08+	Pair of rack-mounting support angles
	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

Mini-Circuits

Environmental Specifications **ENV55**

All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-0° to 50° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-20° to 60° C Ambient Environment	Individual Model Data Sheet
Operating and Storage Humidity	5% to 85% RH (non-condensing)	Ambient
Bench Handling Test	Bench Top Tip 45° & Drop	MIL-PRF-28800F
Transit Drop Test	Free Fall Drop, 20 cm (7.9 inches)	MIL-PRF-28800F Class 3