6x3 Blocking Switch Matrix

ZT-6X3B

50Ω  DC to 12 GHz

<table>
<thead>
<tr>
<th>Model Name</th>
<th>Connector Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZT-6X3BB-S</td>
<td>SMA female</td>
</tr>
<tr>
<td>ZT-6X3BB-N</td>
<td>N-type female</td>
</tr>
<tr>
<td>ZT-6X3BB-T</td>
<td>TNC female</td>
</tr>
</tbody>
</table>

Product Overview

Mini-Circuits' ZT-6X3B is a high performance, 6 by 3 blocking switch matrix, operating over a wide bandwidth from DC to 12 GHz. The system is housed in a compact, 3U height, 19-inch rack-mountable chassis with the 6 RF “input” ports and 3 RF “output” ports on the rear panel. The front panel includes LED indicators representing the active switch paths.

This bi-directional, blocking configuration allows the 6 “input” ports to be connected to any combination of the 3 “output” ports in a one to one arrangement. Additionally, all 6 input ports can be internally terminated within the matrix.

The system includes both USB and Ethernet control interfaces, providing a range of flexible control options. Software support is provided through our easy-to-use GUI application for remote control over a network, or local control through USB. ActiveX and .NET API objects (for Windows environments) and HTTP / Telnet support ensure compatibility with most common programming environments.

Key Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Advantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 x 3 matrix</td>
<td>3 active paths at any time between any combination of input and output ports, supports flexible automated test systems.</td>
</tr>
<tr>
<td>Rack-mount chassis</td>
<td>Compact, 3U height 19” rack-chassis with all connections on the rear, suits integration in automated production test environments</td>
</tr>
<tr>
<td>USB &amp; Ethernet control</td>
<td>USB HID and Ethernet (HTTP / Telnet / SSH) interfaces provide easy compatibility with a wide range of software setups and programming environments</td>
</tr>
</tbody>
</table>
Mechanical Specifications

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>19&quot; (W) x 3U (H) x 16&quot; (D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case Drawing</td>
<td>99-01-2812</td>
</tr>
<tr>
<td>Case Material</td>
<td>Aluminum (with protective coating to prevent corrosion)</td>
</tr>
</tbody>
</table>

### RF Connectors

<table>
<thead>
<tr>
<th>Panel</th>
<th>Connector</th>
<th>Quantity</th>
<th>Port Labels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rear</td>
<td>SMA \ N-type \ TNC female</td>
<td>9</td>
<td>IN1-6; OUT1-3</td>
</tr>
</tbody>
</table>

### Panel Items

#### Front Panel
- Model name
- 6 x 3 Blocking Switch Matrix
- DC-12 GHz
- Power on / off switch with LED
- LED switch path indicators
- Carry handles
- AC mains power input (IEC C14 inlet)
- USB type B socket
- RJ45 (LAN) socket
- Cooling fans

#### Rear Panel
- CE
- EAC
- Serial number / date code / model name

### Power Supply
- AC mains power input (90-260 V, 47-63 Hz)

### Fuse
- 2A, 250V rating

### Temperature
- Operating: 0 to +50 ºC

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Electrical Specifications at 25°C

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>DC</td>
<td>12</td>
<td></td>
<td></td>
<td>GHz</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>DC - 6 GHz</td>
<td>0.8</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td></td>
<td>6-12 GHz</td>
<td>1.5</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>Return Loss</td>
<td>In Ports</td>
<td>15</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td></td>
<td>Out Ports</td>
<td>17</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>Isolation</td>
<td></td>
<td>80</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>Input Power</td>
<td>Per port, hot switching</td>
<td></td>
<td>+20</td>
<td></td>
<td>dBm</td>
</tr>
</tbody>
</table>

---

Functional Block Diagram
Typical Performance Data

INSERTION LOSS (Input-Output)

Frequency (MHz)

0.1
0.2
0.3
0.35
0.4
0.45
0.5
0.55
0.6
0.65
0.7
0.75
0.8
0.85
0.9
0.95
1.0
1.05
1.1
1.15
1.2
1.25
1.3
1.35
1.4
1.45
1.5
1.55
1.6
1.65
1.7
1.75

500 1,000 1,500 2,000 2,500 3,000 3,500 4,000 4,500 5,000 5,500 6,000 6,500 7,000 7,500 8,000 8,500 9,000 9,500 10,000 10,500 11,000 11,500 12,000
Typical Performance Data

RETURN LOSS (IN/ON)

RETURN LOSS (OUT/ON)
Outline Drawing
Software Specifications

- Please contact testsolutions@minicircuits.com for support

<table>
<thead>
<tr>
<th>Ethernet Control</th>
<th>Supported Protocols</th>
<th>TCP / IP, HTTP, Telnet, DHCP, UDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max Data Rate</td>
<td></td>
<td>10 Mbps (10Base-T Half Duplex)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>USB Control</th>
<th>Supported Protocols</th>
<th>HID - Full Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min Communication Time</td>
<td></td>
<td>3 ms typ</td>
</tr>
</tbody>
</table>

**Software Support**

- Mini-Circuits’ Universal GUI for USB & LAN control (Windows only)
- ASCII / SCPI command syntax for LAN programming (all OS)
- ActiveX / .Net DLL APIs for USB programming (Windows only)
- Interrupt codes for direct USB programming (all OS)
- Full programming instructions and examples for a wide range of languages

Programming Commands

- The key ASCII / SCPI commands for control of the system are summarized below
- These can be sent via the USB or Ethernet API
- Please refer to the programming manual for full details

<table>
<thead>
<tr>
<th>Command / Query</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>:MN?</td>
<td>Read model name</td>
</tr>
<tr>
<td>:SN?</td>
<td>Read serial number</td>
</tr>
<tr>
<td>:FIRMWARE?</td>
<td>Read firmware version</td>
</tr>
</tbody>
</table>

:sw_type:sw_number:STATE:port

Set a single switch state:
- sw_type = MTS or SPDT or SP4T or SP6T or SP8T
- sw_number = 1 to n (refer to block diagram)
- port = the switch state to set
- Example: :SPDT:1:STATE:2 (set SPDT switch 1 to state 2)

Csw_number=port

Short-hand to set a single switch state:
- sw_number = 1 to n (refer to block diagram)
- port = the switch state to set
- Example: C1=2 (set switch 1 to state 2)

:sw_type:sw_number:STATE?

Get the state of a single switch:
- sw_type = MTS or SPDT or SP4T or SP6T or SP8T
- sw_number = 1 to n (refer to block diagram)
- Example: :SPDT:1:STATE? (get the state of SPDT switch 1)

:PATH:input?

Check which output is connected to the specified input_port

:PATH:A1:B1

Set a specific switch path between 2 ports
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 all switch states
- Configure Ethernet settings
- Upgrade firmware
- Send SCPI commands
- View temperature & fan status
Ordering Information

Please contact Mini-Circuits’ Test Solutions department for price and availability:

testsolutions@minicircuits.com

Included Accessories

<table>
<thead>
<tr>
<th>Model Name</th>
<th>Quantity</th>
<th>Description</th>
<th>Cable Model</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBL-3W-xx*</td>
<td>1</td>
<td>AC power cord (IEC C13 connector to local plug)</td>
<td>CBL-3W-US</td>
<td>USA</td>
</tr>
<tr>
<td>USB-CBL-AB-7+</td>
<td>1</td>
<td>USB cable (6.8 ft)</td>
<td>CBL-3W-EU</td>
<td>Europe</td>
</tr>
<tr>
<td>CBL-RJ45-MM-5+</td>
<td>1</td>
<td>Ethernet cable (5 ft)</td>
<td>CBL-3W-IL</td>
<td>Israel</td>
</tr>
<tr>
<td>HT-4-SMA</td>
<td>1</td>
<td>SMA Cable Wrench (4 in)</td>
<td>CBL-3W-UK</td>
<td>UK</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CBL-3W-AU</td>
<td>Australia / China</td>
</tr>
</tbody>
</table>

*Please specify one option on the purchase order, at no charge

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Additional 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.

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