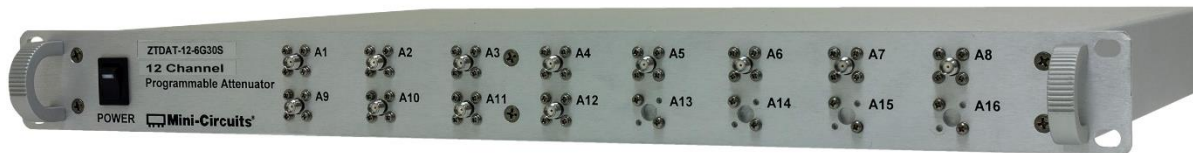


50Ω 1 to 6000 MHz



## Product Overview

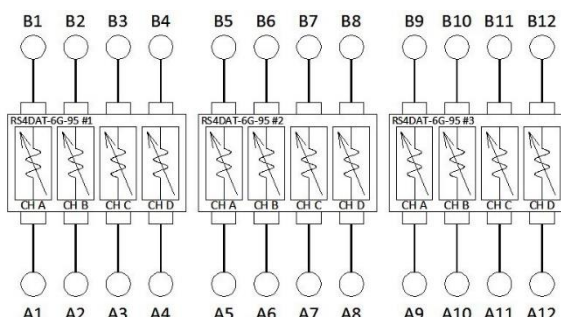
Mini-Circuits' ZTDAT series multi-channel programmable attenuator systems are ideal for a wide range of signal level control applications including transmission loss simulation, signal fading and MIMO measurements. The 1-6000 MHz operating bandwidth incorporates most of the common communications bands, supporting applications in LTE, 4G / 5G, IoT, Bluetooth, Zigbee, WiFi and many more.

Each of the 12 independently controlled attenuator channels within ZTDAT-12-6G30S provides 0 to 30 dB attenuation with more than 100 dB isolation between channels. The system is housed in a compact, 1U height, 19-inch rack chassis, with SMA connectors on the front and rear panels.

The system can be controlled via USB or Ethernet (supporting SSH, HTTP & Telnet 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 (both 32-bit and 64-bit systems). The full software and documentation package can be downloaded from our website at:

<https://www.minicircuits.com/softwaredownload/multiatt.html>.

Mini-Circuits' novel daisy-chaining interface allows multiple ZTDAT attenuator systems to be cascaded together into a Master / Slave chain. The full chain effectively becomes one system with every attenuator channel (from 8 to several hundred) controlled through a single USB or Ethernet connection and software interface.



## Key Features

Feature	Advantages
Integrated attenuator system	Independent control of large numbers of attenuator channels with single power supply and control interface; ideal for testing receiver sensitivity, device / base-station hand-over, interference effects and many more.
Compact package	The compact 1U height chassis minimises rack space requirements.
Ethernet / LAN Control	Remote control from any computer or device with a network connection (SSH, HTTP or Telnet protocols).

**Mechanical Specifications**

<b>Dimensions</b>	19" (W) x 1U (H) x 13" (D)			
<b>Case Drawing</b>	99-01-2519			
<b>Case Material</b>	• Aluminum (with protective coating to prevent corrosion)			
<b>RF Connectors</b>	<b>Panel</b>	<b>Connector</b>	<b>Quantity</b>	<b>Port Labels</b>
	Front	SMA female	12	A1-A12
	Rear		12	B1-B12
<b>Panel Items</b>	<b>Front Panel</b>		<b>Rear Panel</b>	
<b>Panel Marking</b>	<ul style="list-style-type: none"> <li>• Model name</li> <li>• Multi-Channel Programmable Attenuator</li> </ul>		<ul style="list-style-type: none"> <li>• CE</li> <li>• EAC</li> <li>• Serial number / date code / model name</li> </ul>	
<b>Other</b>	<ul style="list-style-type: none"> <li>• Power on / off switch with LED</li> <li>• Carry handles</li> </ul>		<ul style="list-style-type: none"> <li>• AC mains power input (IEC C14 inlet)</li> <li>• USB type B socket</li> <li>• RJ45 (LAN) socket</li> <li>• 2 x D-Sub 9-pin (serial daisy-chain in &amp; out)</li> </ul>	
<b>Power Supply</b>	AC mains power input (90-260 V, 47-63 Hz)			
<b>Fuse</b>	2A, 250V rating			
<b>Temperature</b>	Operating: 0 to +50 °C			

**Electrical Specifications at 25°C**

Parameter	Conditions	Min	Typ	Max	Units
<b>Frequency Range</b>		1		6000	MHz
<b>Attenuation Range</b>	0.25 dB steps	0		30	dB
<b>Insertion Loss</b>	1 – 2000 MHz		2.4		dB
	2000 – 4000 MHz		3.4		
	4000 – 6000 MHz		4.4		
<b>Isolation</b>	A <> B @ max attenuation		34		dB
	Between channels		100		dB
<b>Input Operating Power</b> <sup>2,3</sup>	1 MHz			+9	dBm
	50 – 6000 MHz			+23	
<b>Return Loss</b>	1 – 6000 MHz		12		dB

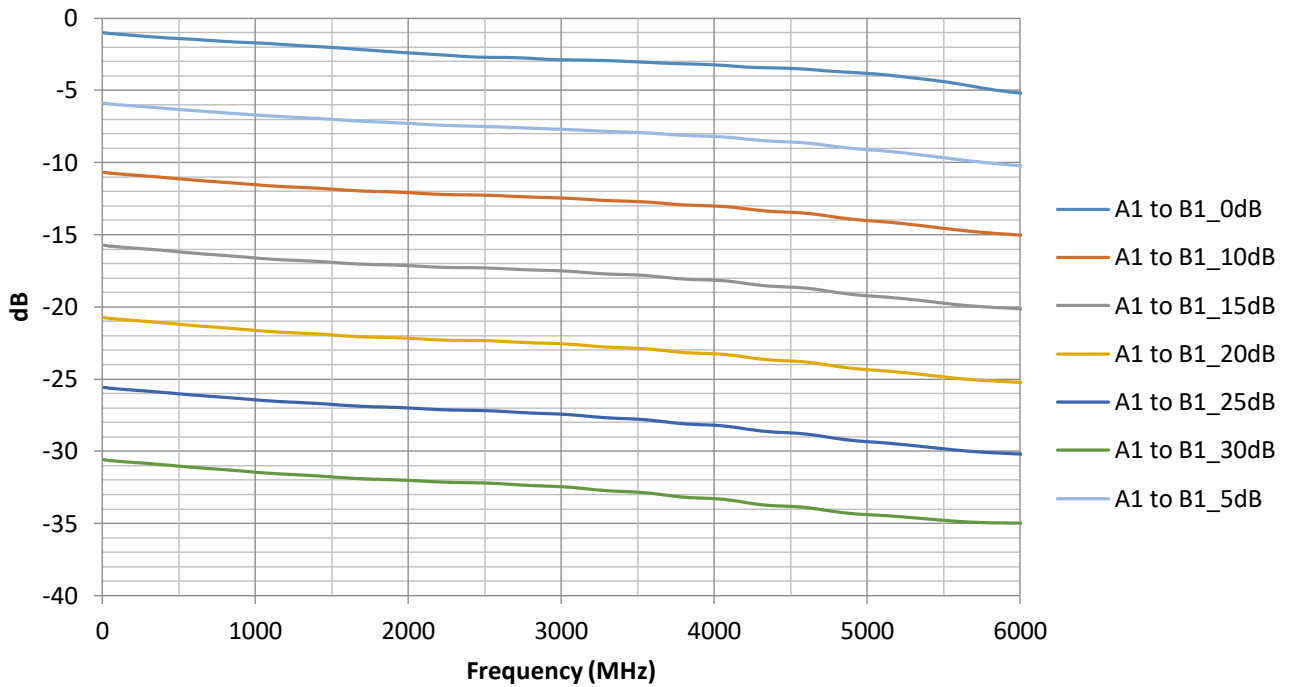
1. Total input power at A and B ports of any channel (channels are bi-directional)
2. De-rate linearly from +23 dBm at 50 MHz to +9 dBm at 1 MHz

**Attenuation Accuracy:**

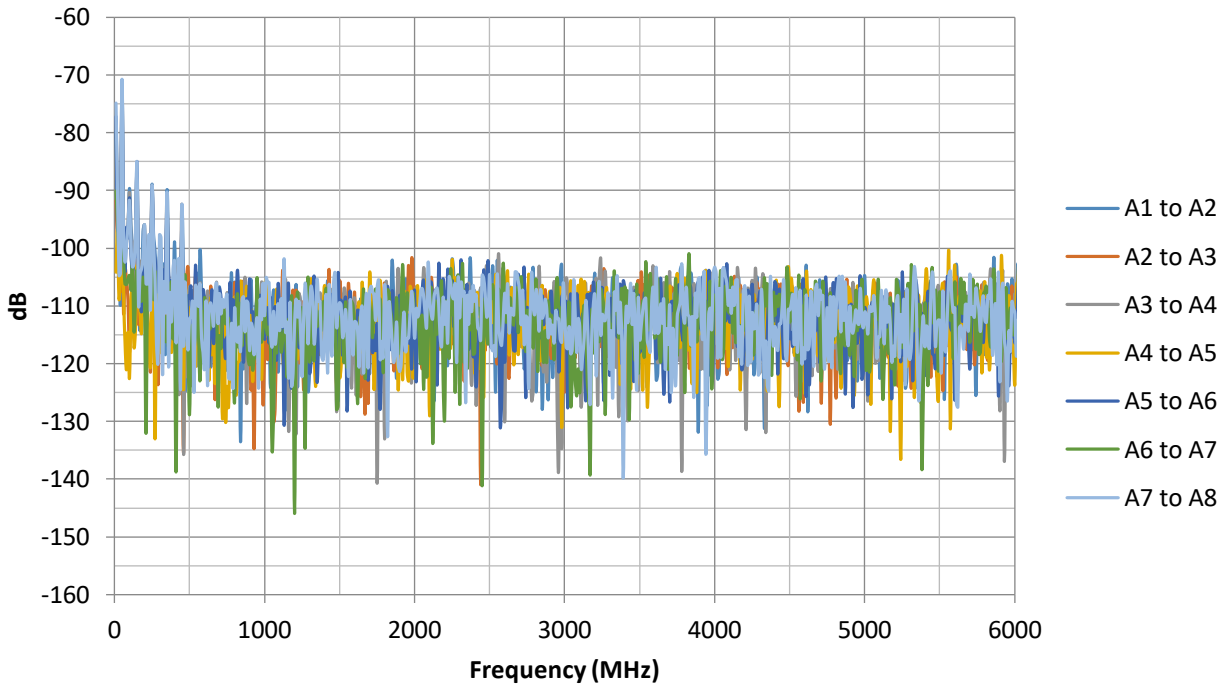
Frequency Range	Attenuation Range	Typ	Max	Units
1 - 2000 MHz	0.25 - 10 dB	±0.30	±(6.0% of attenuation + 0.35)	dB
	10.25 - 30 dB	±0.70	±(1.5% of attenuation + 1.0)	
2000 - 4000 MHz	0.25 - 10 dB	±0.20	±(5.5% of attenuation + 0.4)	dB
	10.25 - 30 dB	±0.45	±(1.5% of attenuation + 0.9)	
4000 - 6000 MHz	0.25 - 10 dB	±0.15	±(9% of attenuation + 0.3)	dB
	10.25 - 30 dB	±0.35	±(2% of attenuation + 0.9)	

**Typical Performance Data**

**Insertion Loss & Attenuation**

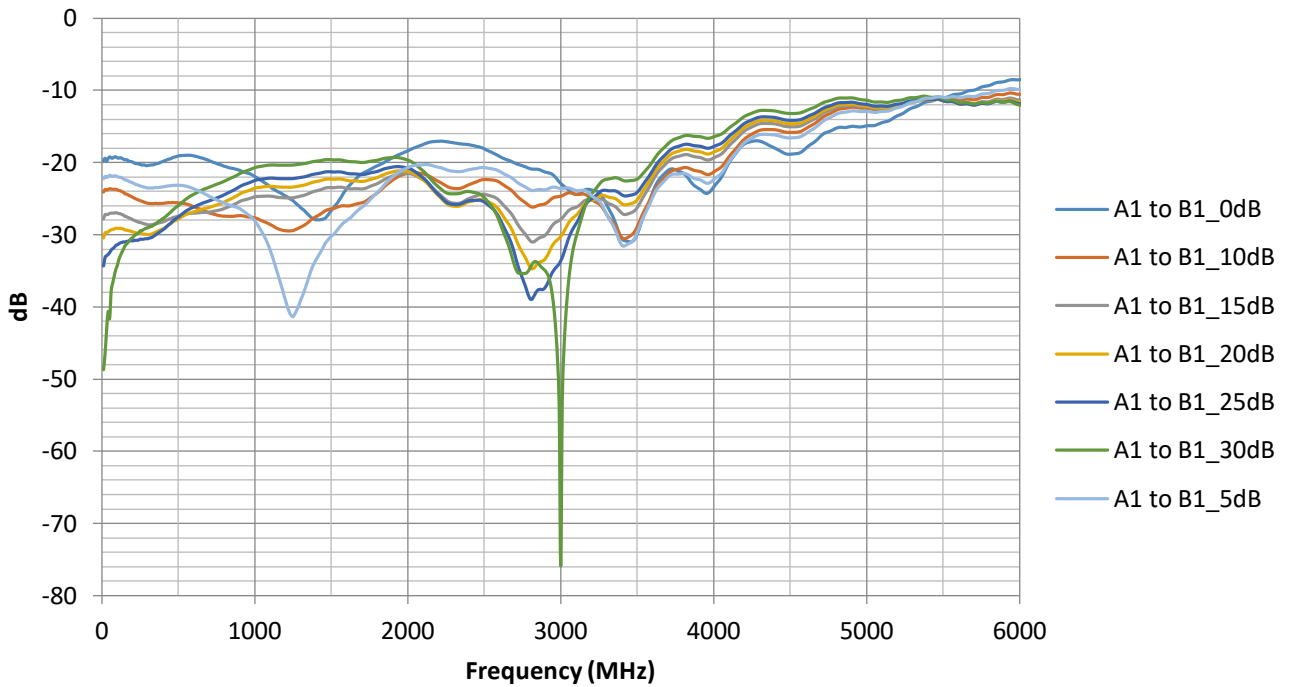


**Adjacent Port Isolation**

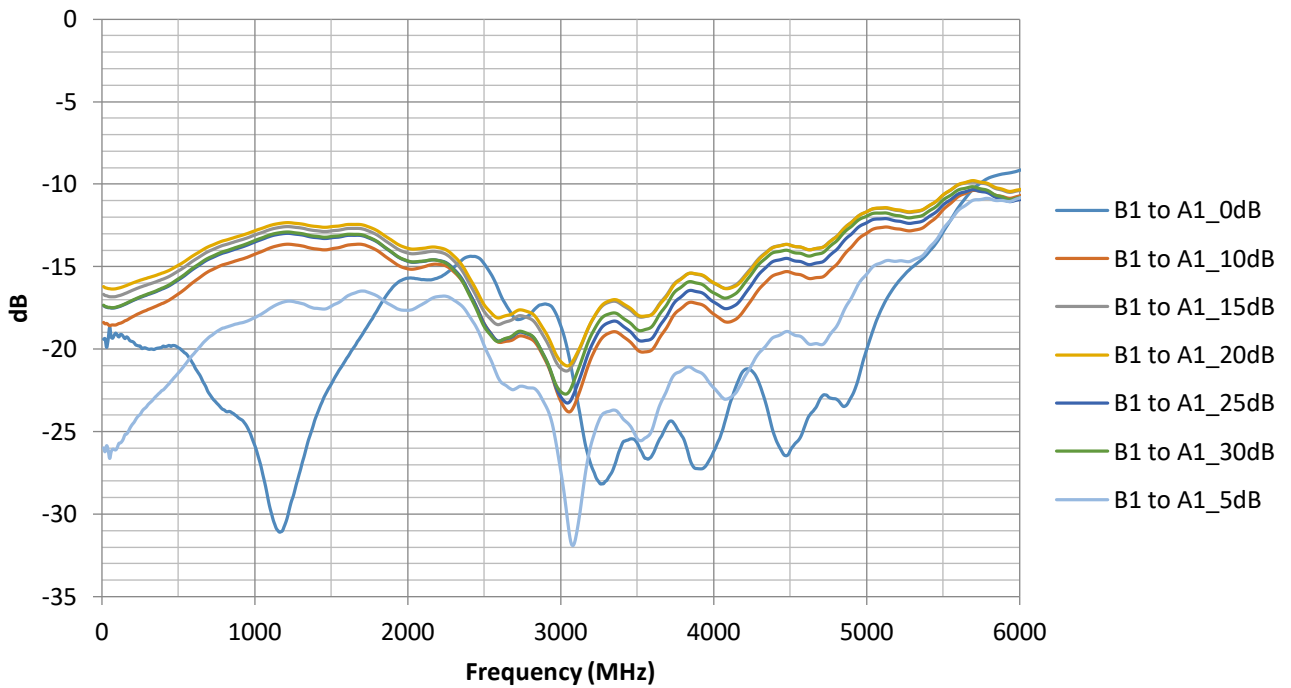


**Typical Performance Data**

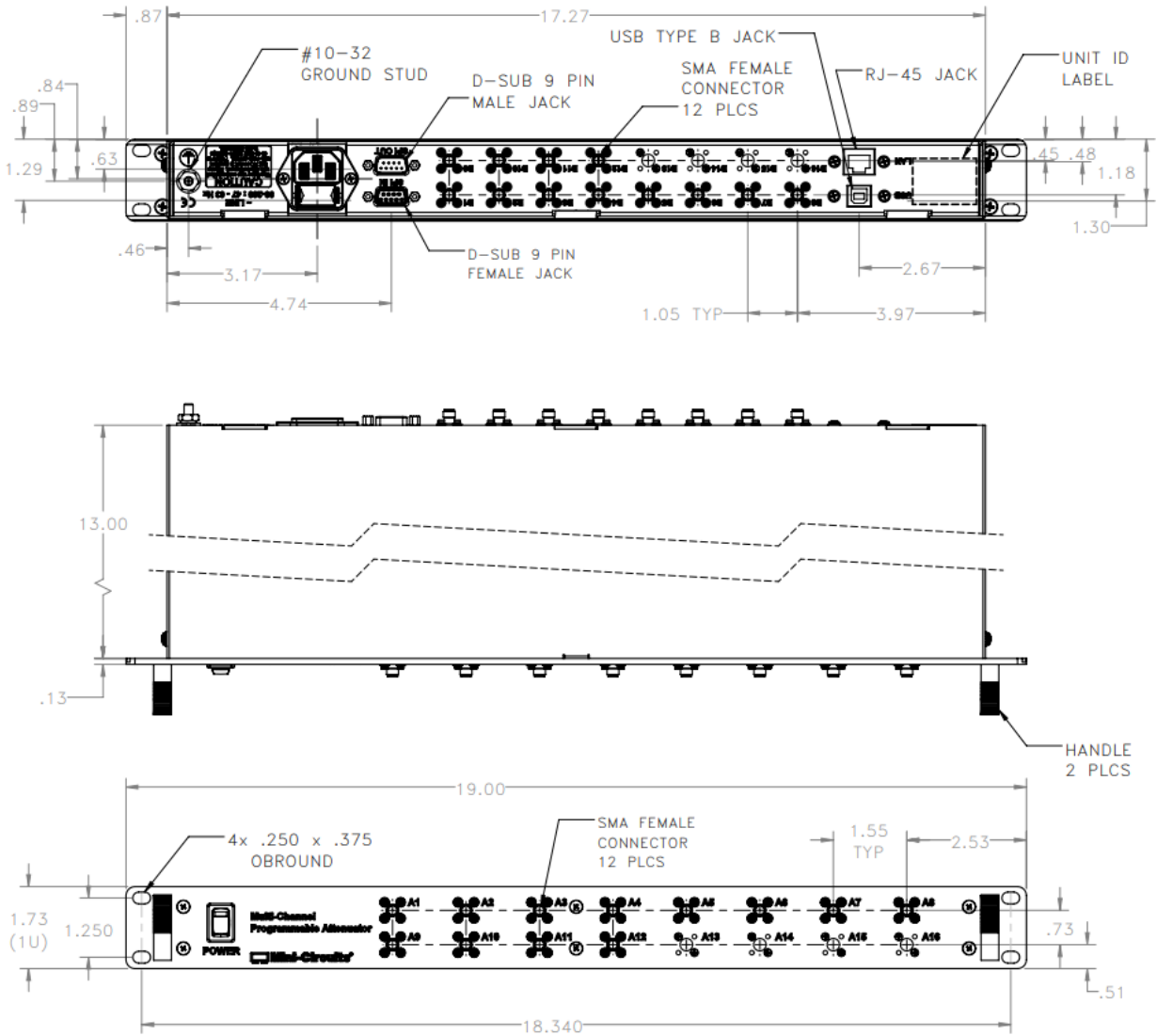
**Input Return Loss (Port A1)**



**Output Return Loss (Port B1)**



**Outline Drawing**



## Software Specifications

- Please contact [testsolutions@minicircuits.com](mailto:testsolutions@minicircuits.com) for support

<b>Ethernet Control</b>	<b>Supported Protocols</b>	TCP / IP, SSH, HTTP, Telnet, DHCP, UDP
	<b>Max Data Rate</b>	100 Mbps (100Base-T Full Duplex)
<b>USB Control</b>	<b>Supported Protocols</b>	HID - High Speed
	<b>Min Communication Time</b>	400 $\mu$ s typ
<b>Software Support</b>	<ul style="list-style-type: none"> <li>• Mini-Circuits' Universal GUI for USB &amp; LAN control (Windows only)</li> <li>• ASCII / SCPI command syntax for LAN programming (all OS)</li> <li>• ActiveX / .Net DLL APIs for USB programming (Windows only)</li> <li>• Interrupt codes for direct USB programming (all OS)</li> <li>• Full programming instructions and examples for a wide range of languages</li> </ul>	
<b>Downloads</b>	<b>Software &amp; Documentation</b>	<a href="https://www.minicircuits.com/softwaredownload/multiatt.html">https://www.minicircuits.com/softwaredownload/multiatt.html</a>

## 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

Command / Query	Description
:MN?	Read model name
:SN?	Read serial number
:FIRMWARE?	Read firmware version
:address:CHAN:channel:SETATT:att	Set a single attenuator channel: <ul style="list-style-type: none"> <li>• <b>address</b> = address of the 4-channel attenuator block (01 to 04), refer to block diagram</li> <li>• <b>channel</b> = individual channel within the attenuator block (1 to 4)</li> <li>• <b>att</b> = the attenuation value to set</li> <li>• Example: :01:CHAN:1:SETATT:10.25 (set RS4DAT 01, channel 1 to 10.25 dB)</li> </ul>
:address:CHAN:channel:ATT?	Read a single channel's attenuation: <ul style="list-style-type: none"> <li>• <b>address</b> = address of the 4-channel attenuator block (01 to 04), refer to block diagram</li> <li>• <b>channel</b> = individual channel within the attenuator block (1 to 4)</li> <li>• Example: :01:CHAN:1:ATT?10.25 (get attenuation of RS4DAT 01, channel 1)</li> </ul>

**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 attenuator channels independently or in groups
- Configure automated attenuation sweep or hop sequences
- Configure Ethernet settings
- Upgrade firmware

**Model Name:** ZTDAT-16-6G95  
**Serial Number:** 123456789  
**System Name:** Attenuator System

**Channels:** 32  
**User Name:** Admin  
**Connection:** Telnet (Demo)  
**IP:** 10.10.10.10  
**Port:** 23

**Set Attenuation**

**Select Channel(s)**

Single Channel  Multi Channels

All Channels

Group: [ ]

**Set Attenuation (0-95 dB):** [ 67.00 ] [ Apply ]

Auto Apply

**Current Attenuation -**  
**Channel:** #1-01A: Path A1<>B1  
**Attenuation:** 67.00 dB

		Channels						
ZTDAT-16-6G95		A	B	C	D			
01	Path A1<>B1	67.00	Path A2<>B2	50.75	Path A3<>B3	55.00	Path A4<>B4	27.50
02	Path A5<>B5	28.75	Path A6<>B6	73.50	Path A7<>B7	1.25	Path A8<>B8	72.25
03	Path A9<>B9	77.50	Path A10<>B10	67.25	Path A11<>B11	4.25	Path A12<>B12	39.25
04	Path A13<>B13	82.00	Path A14<>B14	75.00	Path A15<>B15	35.50	Path A16<>B16	91.50
ZTDAT-16-6G95		A	B	C	D			
06	Path A1<>B1	82.75	Path A2<>B2	5.25	Path A3<>B3	90.25	Path A4<>B4	34.50
07	Path A5<>B5	49.75	Path A6<>B6	73.00	Path A7<>B7	5.00	Path A8<>B8	56.25
08	Path A9<>B9	44.50	Path A10<>B10	28.25	Path A11<>B11	59.25	Path A12<>B12	61.50
09	Path A13<>B13	25.00	Path A14<>B14	26.50	Path A15<>B15	78.75	Path A16<>B16	78.25

**Navigation Buttons:** Connection Options, Automation Mode, Configuration Settings, Ethernet Settings, Firmware, User Access Control, Multi Sequence, Show Log



## Daisy-Chain Control of ZTDAT Systems

Multiple ZTDAT attenuator racks can be combined to form much larger programmable attenuator systems by daisy-chaining the serial control interfaces. This allows large numbers of attenuator channels to be controlled through a single USB or Ethernet connection and software interface. All software commands are issued to the Master unit (the first unit in the chain) which will in turn control all Slave units as required. The process is:

1. Connect the Serial Out port of the first ZTDAT unit to the Serial In port of the next ZTDAT unit
2. Continue connecting additional ZTDAT units in the same manner, as required
3. Connect the AC power inputs for all ZTDAT units in the chain
4. Connect the control connection (USB or Ethernet) to the first ZTDAT in the chain; this becomes the Master unit
5. Each individual attenuator channel within the cascaded chain can now be addressed as if they are part of the Master





## Ordering Information

Please contact Mini-Circuits' Test Solutions department for price and availability:  
[testsolutions@minicircuits.com](mailto:testsolutions@minicircuits.com)

## Included Accessories

Model Name	Quantity	Description
CBL-3W-xx*	1	AC power cord (IEC C13 connector to local plug)
USB-CBL-AB-7+	1	USB cable (6.8 ft)
CBL-RJ45-MM-5+	1	Ethernet cable (5 ft)
HT-4-SMA	1	SMA Cable Wrench (4 in)

Cable Model	Region
CBL-3W-US	USA
CBL-3W-EU	Europe
CBL-3W-IL	Israel
CBL-3W-UK	UK
CBL-3W-AU	Australia / China

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

### 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.
- 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](http://www.minicircuits.com/MCLStore/terms.jsp)