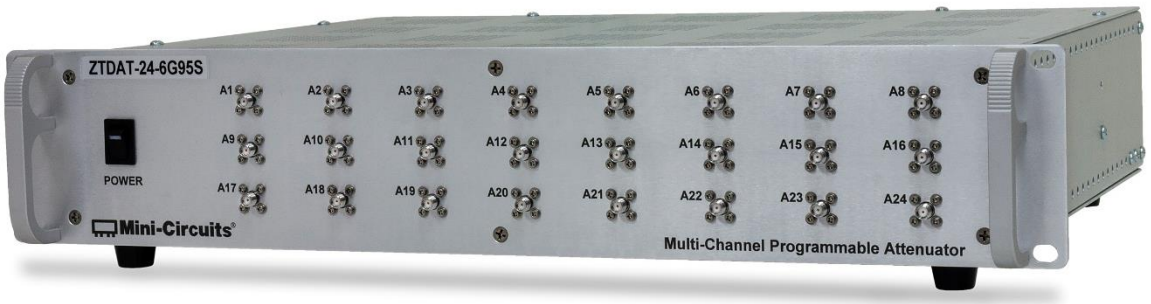
Rack-Mounted | USB & Ethernet Control

Multi-Channel Attenuator ZTDAT-24-6G95S

50Ω 1 to 6000 MHz



Product Overview

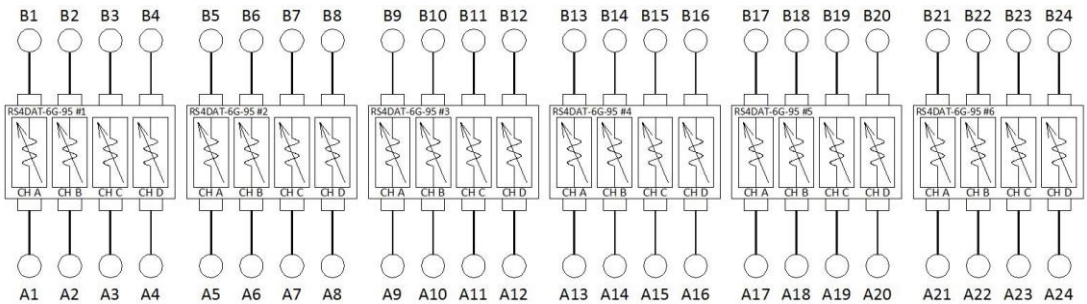
Mini-Circuits' ZTDAT series multi-channel programmable attenuator systems are ideal for a wide range of signal level control applications including transmission loss simulation, signal fading and MIMO measurements. The 1-6000 MHz operating bandwidth incorporates most of the common communications bands,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

Each of the 24 independently controlled attenuator channels within ZTDAT-24-6G95S provides 0 to 95 dB attenuation with more than 100 dB isolation between channels. The system is housed in a compact, 2U 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 2U 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).

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Mechanical Specifications

Dimensions	19” (W) x 2U (H) x 13” (D)			
Case Drawing	99-01-2629			
Case Material	• Aluminum (with protective coating to prevent corrosion)			
RF Connectors	**Panel**	**Connector**	**Quantity**	**Port Labels**
	Front	SMA female	24	A1-A24
	Rear		24	B1-B24
Panel Items	**Front Panel**			**Rear Panel**
Panel Marking	• Model name • Multi-Channel Programmable Attenuator			• CE • EAC • Serial number / date code / model name
Other	• Power on / off switch with LED • Carry handles			• AC mains power input (IEC C14 inlet) • USB type B socket • RJ45 (LAN) socket • 2 x D-Sub 9-pin (serial daisy-chain in & out)
Power Supply	AC mains power input (90-260 V, 47-63 Hz)			
Fuse	2A, 250V rating			
Temperature	Operating: 0 to +50 ºC			

Electrical Specifications per Channel at 25ºC

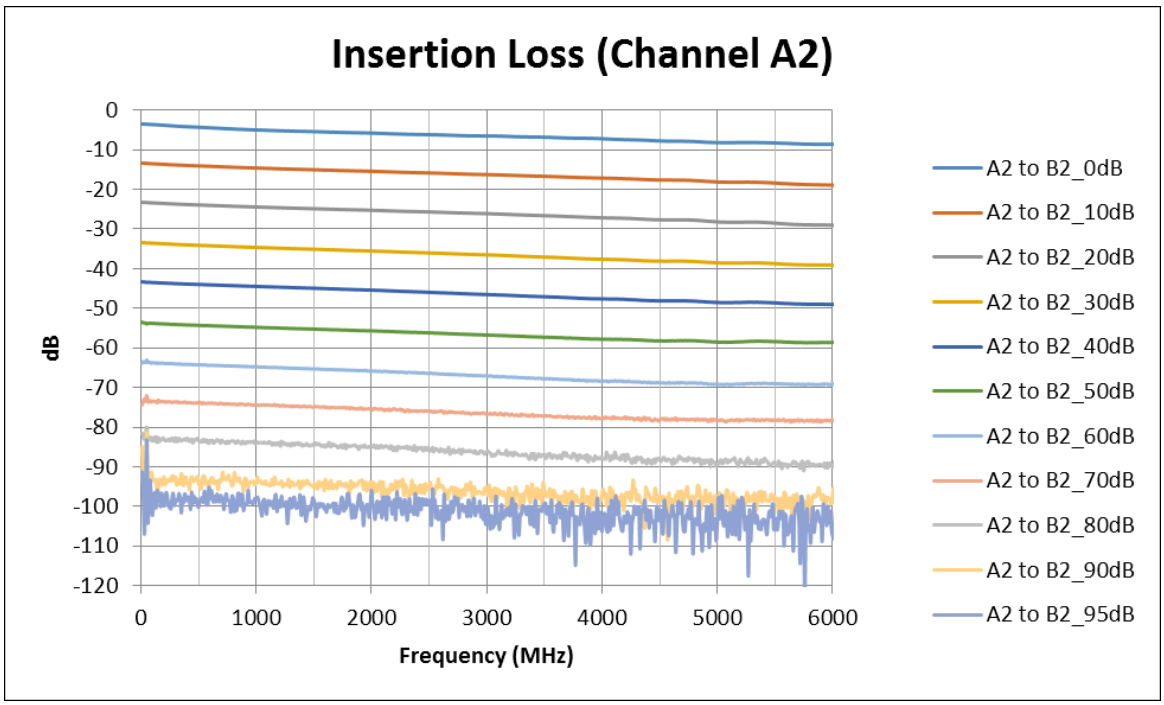
Parameter	Conditions	Min	Typ	Max	Units
Frequency Range		1		6000	MHz
Attenuation Range	0.25 dB steps	0		90	dB
	0.5 dB steps	0		95	
Insertion Loss	1 – 2000 MHz		5.5		dB
	2000 – 4000 MHz		7.0		
	4000 – 6000 MHz		8.5		
Isolation	A <> B @ max attenuation		100		dB
	Between channels		100		
Input Operating Power [2,3]	1 MHz			+12	dBm
	50 – 6000 MHz			+23	
Return Loss	1 – 6000 MHz		15		dB

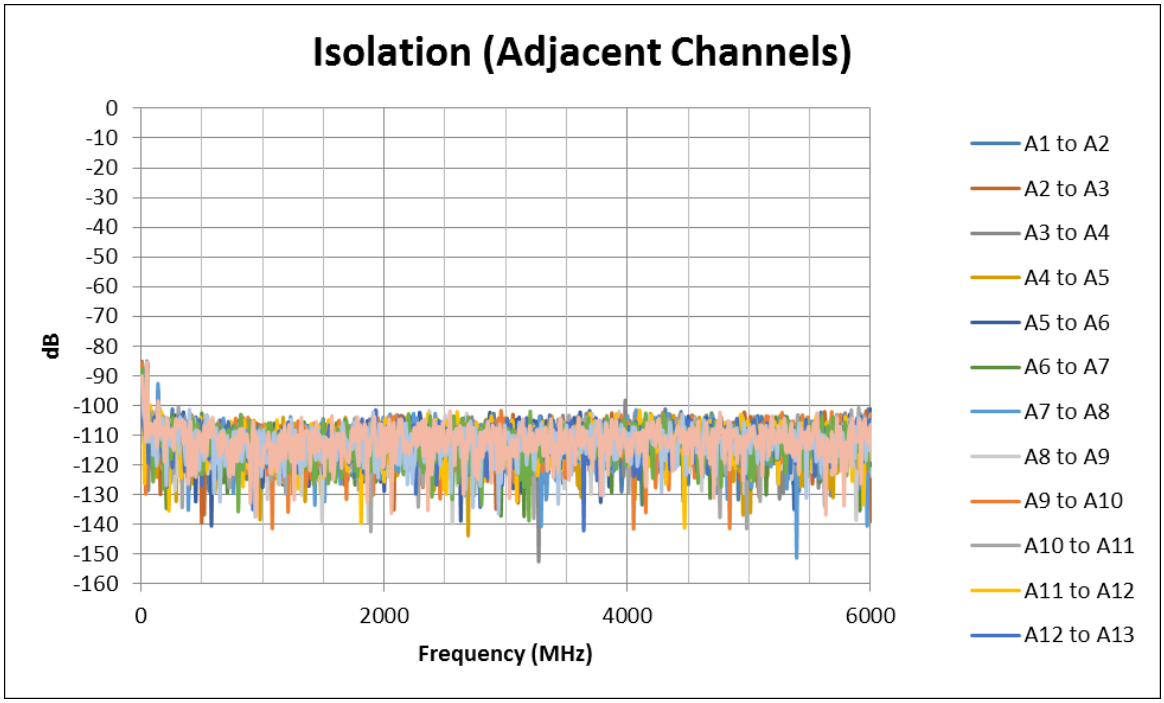
Attenuation Accuracy:

Frequency Range	Attenuation Range	Typ	Max	Units
1 - 2000 MHz	0.25 - 20 dB	±0.25	±(5.5% of nominal value + 0.25)	dB
	20.25 - 60 dB	±0.50	±(2% of nominal value + 0.90)	
	60.25 - 90 dB	±0.75	±(3.5% of nominal value + 0.70)	
2000 - 4000 MHz	0.25 - 20 dB	±0.20	±(5.5% of nominal value + 0.25)	dB
	20.25 - 60 dB	±0.30	±(2% of nominal value + 0.7)	
	60.25 - 90 dB	±0.40	±(3% of nominal value + 0.90)	
4000 - 6000 MHz	0.25 - 20 dB	±0.15	±(6.5% of nominal value + 0.15)	dB
	20.25 - 60 dB	±0.35	±(3.5% of nominal value + 0.45)	
	60.25 - 90 dB	±0.65	±(3.5% of nominal value + 0.90)	
1 - 6000 MHz	90.5 - 95 dB	±0.90	±(6% of nominal value - 1.35)	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 +12 dBm at 1 MHz

Typical Performance Data





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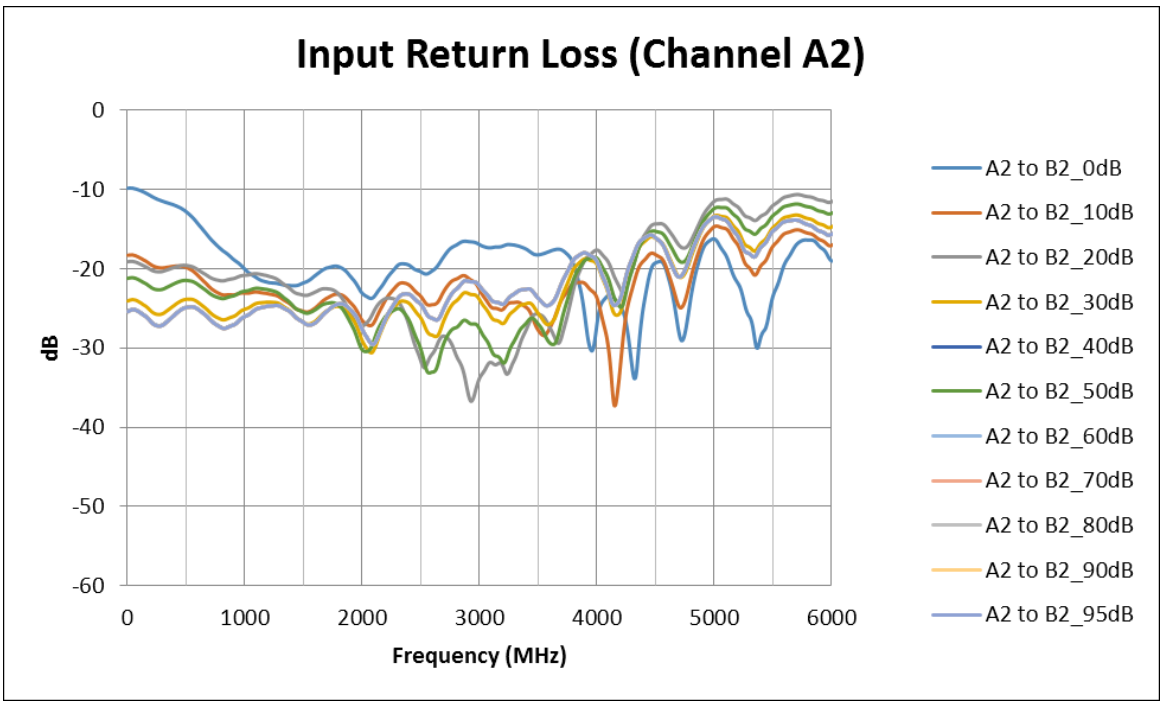

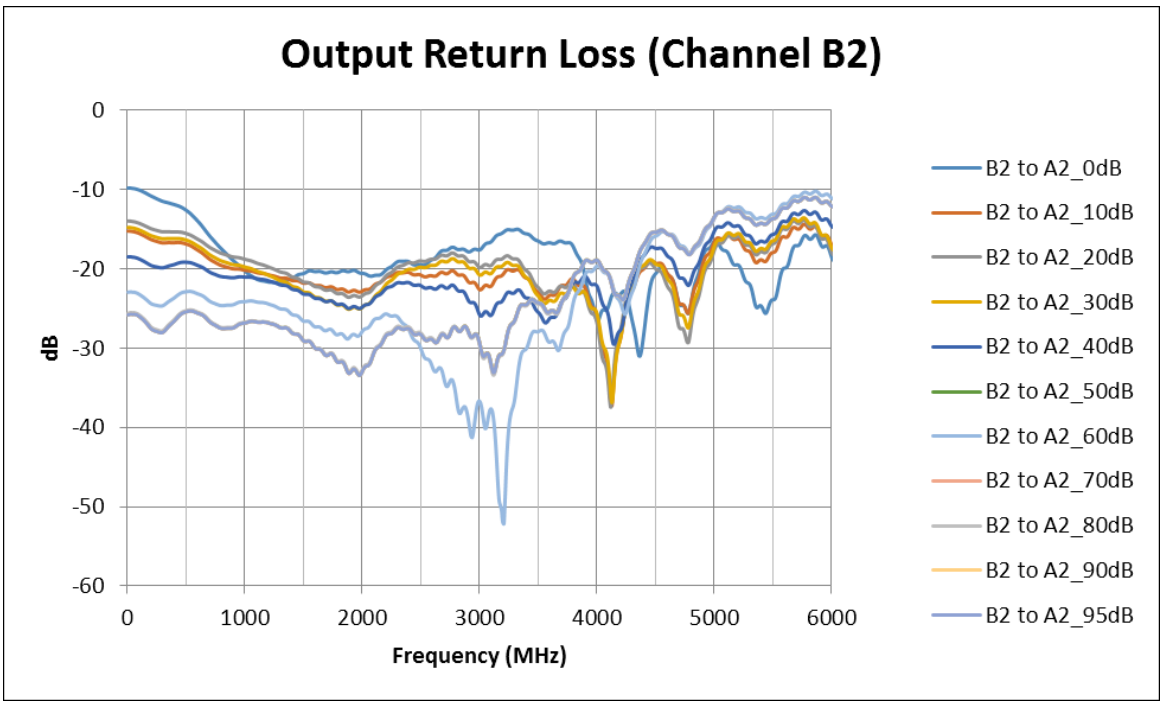

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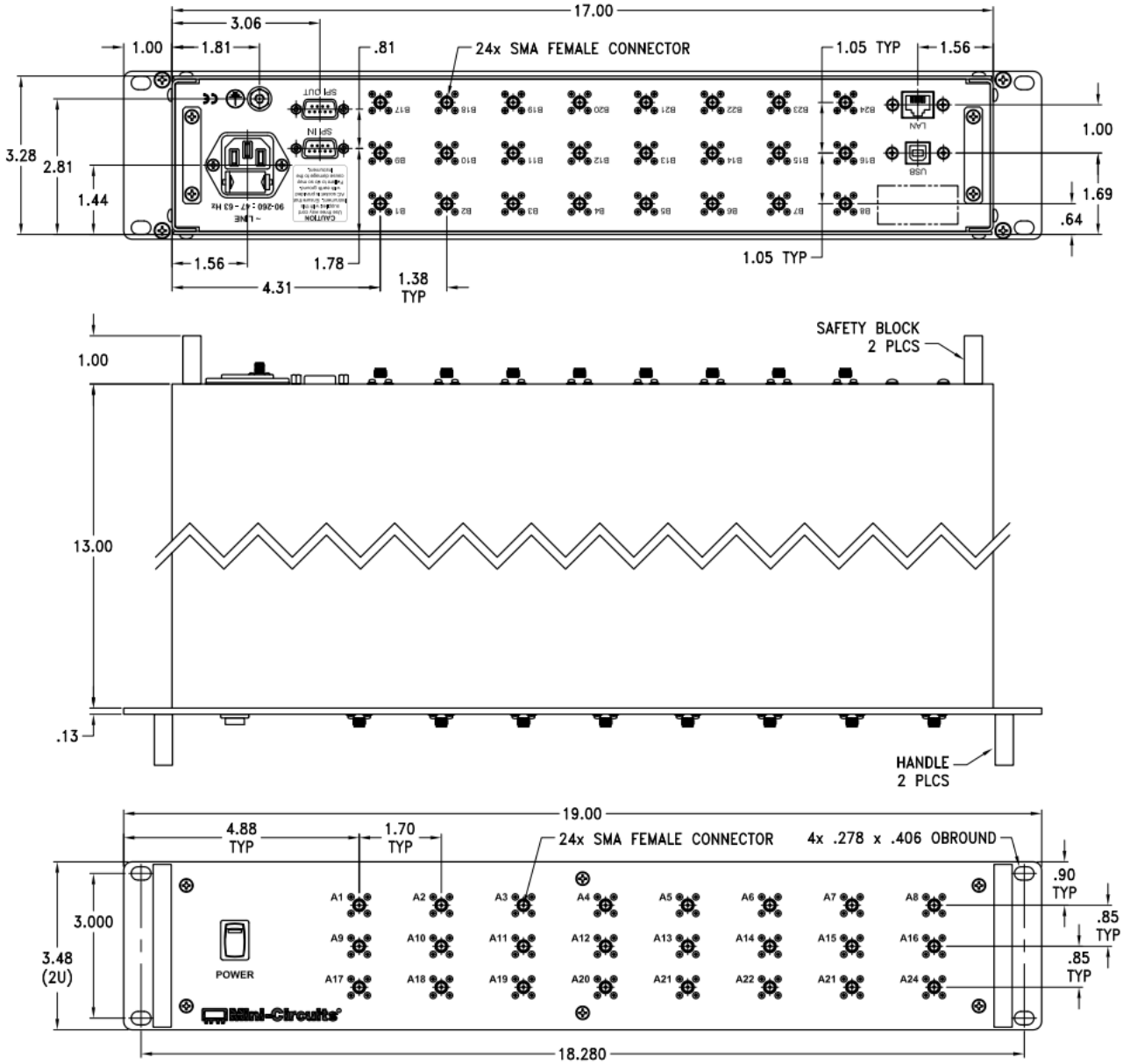
Outline Drawing



Software Specifications

• Please contact testsolutions@minicircuits.com for support

Ethernet Control	**Supported Protocols**	TCP / IP, SSH, HTTP, Telnet, DHCP, UDP
	Max Data Rate	100 Mbps (100Base-T Full Duplex)
USB Control	**Supported Protocols**	HID - High Speed
	Min Communication Time	400 µs typ
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	
Downloads	**Software & Documentation**	https://www.minicircuits.com/softwaredownload/multiatt.html

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: • address = address of the 4-channel attenuator block (01 to 04), refer to block diagram • channel = individual channel within the attenuator block (1 to 4) • att = the attenuation value to set • Example: `:01:CHAN:1:SETATT:10.25` (set RS4DAT 01, channel 1 to 10.25 dB)
`:address:CHAN:channel:ATT?`	Read a single channel's attenuation: • address = address of the 4-channel attenuator block (01 to 04), refer to block diagram • channel = individual channel within the attenuator block (1 to 4) • Example: `:01:CHAN:1:ATT?10.25` (get attenuation of RS4DAT 01, channel 1)

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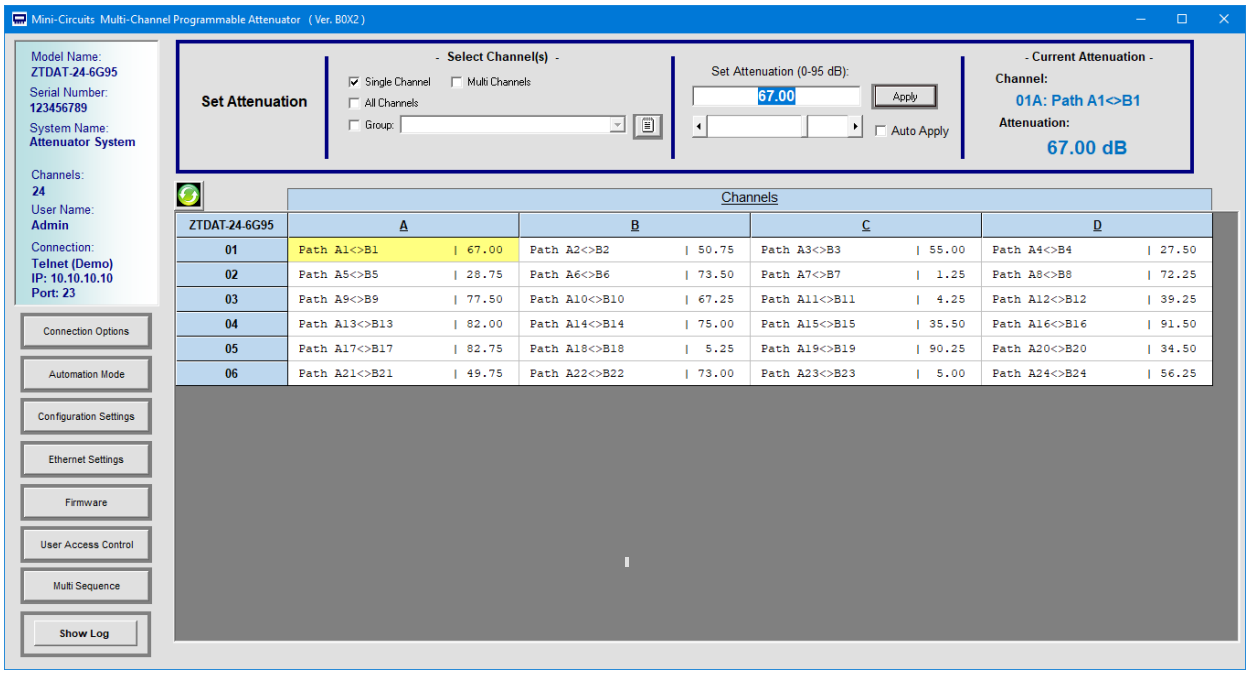
Graphical User Interface (GUI) for Windows - Key Features

- 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



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

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)

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

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

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