

Product Overview

Mini-Circuits' ZTMN series mesh networks covering are multiport test systems with independently variable attenuation on every internal path. This concept allows simulation of a “real-world” mesh communication network within the confined space of a production environment. Path loss can be varied independently between any pair of devices on the network without affecting any other combination of devices, allowing simulation of a complex range of test cases.

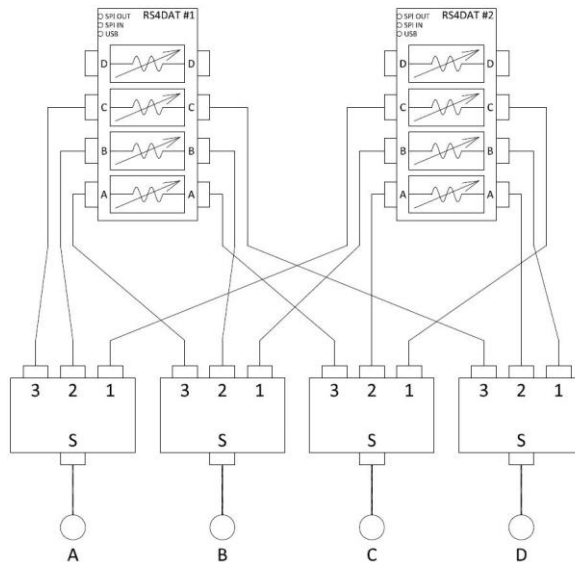
ZTMN-0495AS is a 4-port mesh covering the 350-6000 MHz bands, with 0 to 95 dB attenuation range on each path. The model is housed in a compact 2U height, 19-inch rack chassis with all SMA RF connectors on the front panel. The ZTMN series also supports larger mesh network combinations, with custom attenuation and frequency ranges available on request.

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).

Key Features

| Feature | Advantages |
|----------------------------------|--|
| Wide attenuation range | Independently controllable 0-95 dB attenuators on each path allow simulation of a wide range of test scenarios including receiver sensitivity, device / base-station hand-overs, device failures, interference effects. |
| Ethernet / LAN control | Remote control from any computer or device with a network connection (SSH, HTTP or Telnet protocols). |
| USB HID (Human Interface Device) | Local control via USB connection. Plug-and-Play, no driver required. Compatible with Windows® or Linux® operating systems using 32 and 64 bit architectures. |
| Full software support | The user friendly Windows GUI (graphical user interface automation) allows manual control straight out of the box. A full API (application programming interface), programming examples and manuals are provided to allow automation in most programming environments. |

Block Diagram



Attenuator / Path Map

- The mesh is constructed using two multi-channel attenuator blocks, addressed 01 to 02
- Each of the 3 channels within a block controls the path loss between a pair of ports, as shown below

| | Channel 1 (A) | Channel 2 (B) | Channel 3 (C) |
|--------|---------------|---------------|---------------|
| Att 01 | B <> C | A <> B | A <> D |
| Att 02 | C <> D | B <> D | A <> C |

Mechanical Specifications

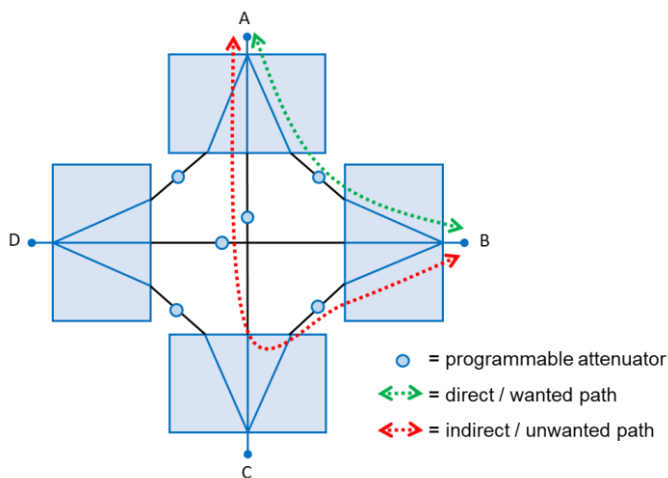
| | | | | |
|-------------------------|---|------------------|-----------------|--|
| Dimensions | 19" (W) x 2U (H) x 20" (D) | | | |
| Case Drawing | 99-01-2370 | | | |
| Case Material | Aluminum (with protective coating to prevent corrosion) | | | |
| RF Connectors | Panel | Connector | Quantity | Port Labels |
| | Front | SMA female | 4 | A – D |
| Panel Items | Front Panel | | | Rear Panel |
| Other Connectors | | | | <ul style="list-style-type: none"> • AC mains power input (IEC C14 inlet) • USB type B socket • RJ45 (LAN) socket |
| Other | <ul style="list-style-type: none"> • Power on / off switch with LED • Carry handles | | | |
| Power Supply | AC mains power input (90-260 V, 47-63 Hz) | | | |
| Fuse | 2A, 250V rating | | | |
| Temperature | Operating: 0 to +50 °C | | | |

Electrical Specifications at 25°C

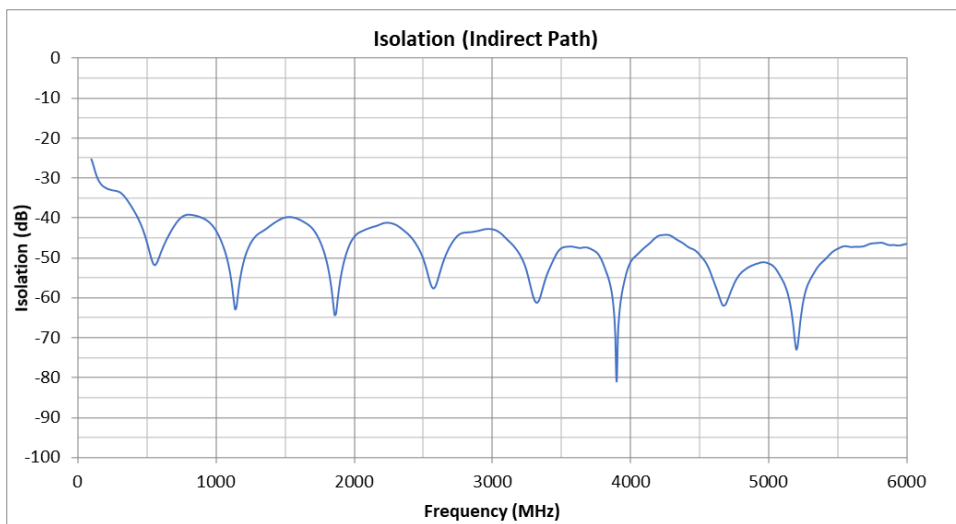
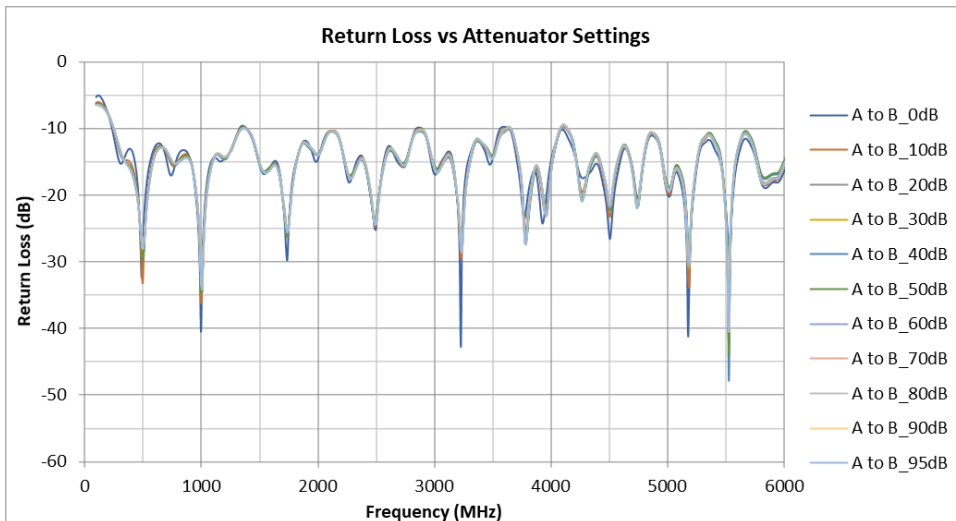
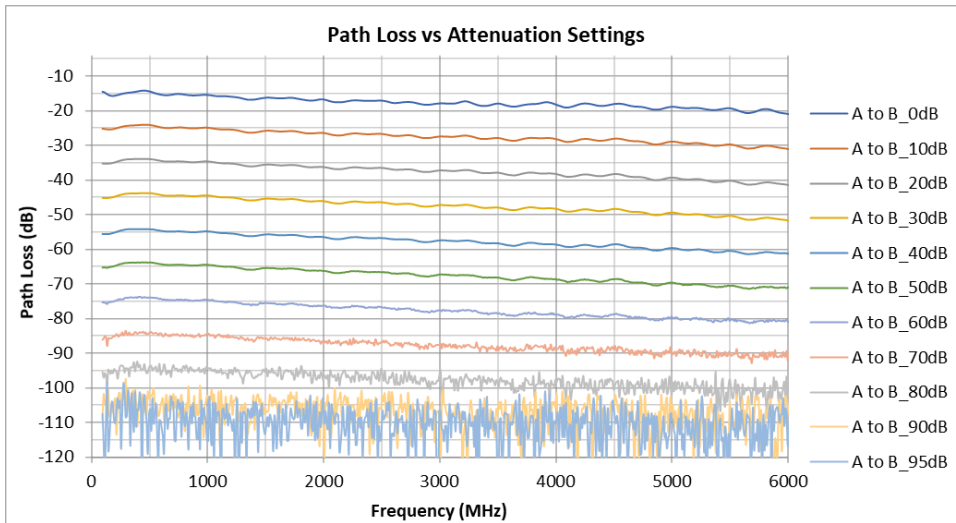
| Parameter | Conditions | Min | Typical | Max | Unit |
|----------------------|--|-----|---------|------|------|
| Frequency | | 350 | | 6000 | MHz |
| Insertion Loss | 350 - 2000 MHz | | 17 | 19 | dB |
| | 2000 - 6000 MHz | | 20 | 24 | |
| Isolation | Direct path @ max attenuation ¹ | - | 110 | - | dB |
| | Indirect path ² | - | 45 | - | |
| Return Loss | | | 12 | | dB |
| Attenuation Range | 0.25 dB steps | 0 | | 90 | dB |
| | 0.5 dB steps | 90 | | 95 | |
| Attenuation Accuracy | (Refer to RC4DAT-6G-95 datasheet) | | +/- 0.5 | | dB |
| Input Power | Per path | | | +27 | dBm |

Notes:

1. Path loss on the direct path between 2 ports when the attenuator in path is at 95 dB
2. Path loss on the indirect / unwanted path between 2 ports when all attenuators are at 0 dB



Typical Performance



Software Specifications

Software & Documentation Download:

- Mini-Circuits' full software and support package including user guide, Windows GUI, DLL files, programming manual and examples are available for download from: <https://www.minicircuits.com/softwaredownload/multiatt.html>
- Please contact testsolutions@minicircuits.com for support

Minimum System Requirements:

| Parameter | Requirements | |
|---------------------|-------------------------------------|--|
| Interface | USB HID & Ethernet (HTTP & Telnet) | |
| System Requirements | GUI | Windows 98 or later |
| | USB API DLL | Windows 98 or later and programming environment with ActiveX or .NET support |
| | USB Direct Programming | Linux; Windows 98 or later |
| | Ethernet | Windows, Linux or Mac computer with a network port and Ethernet TCP / IP support |
| Hardware | Pentium II or later with 256 MB RAM | |

Application Programming Interface (API)

Ethernet Support:

- Simple ASCII / SCPI command set for attenuator control
- Communication via HTTP or Telnet
- Supported by most common programming environments

USB Support (Windows):

- ActiveX COM DLL file for creation of 32-bit programs
- .NET library DLL file for creation of 32 / 64-bit programs
- Supported by most common programming environments (refer to application note [AN-49-001](#) for summary of supported environments)

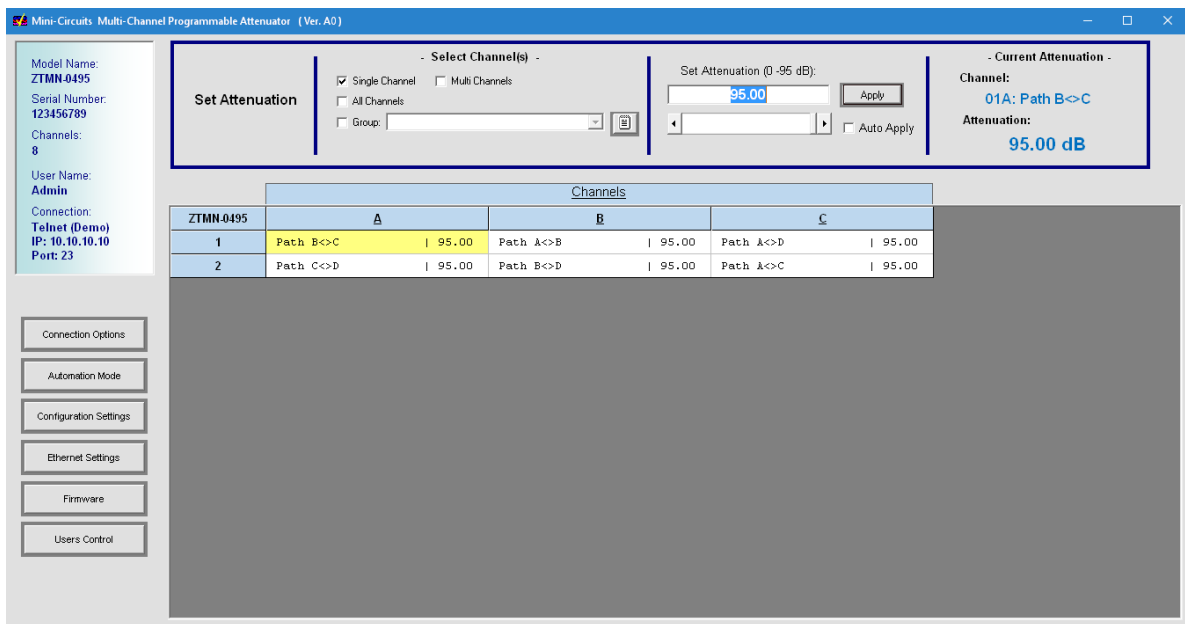
USB Support (Linux):

- Direct USB programming using a series of USB interrupt codes

Full programming instructions and examples available for a wide range of programming environments / languages.

Graphical User Interface (GUI) for Windows - Key Features

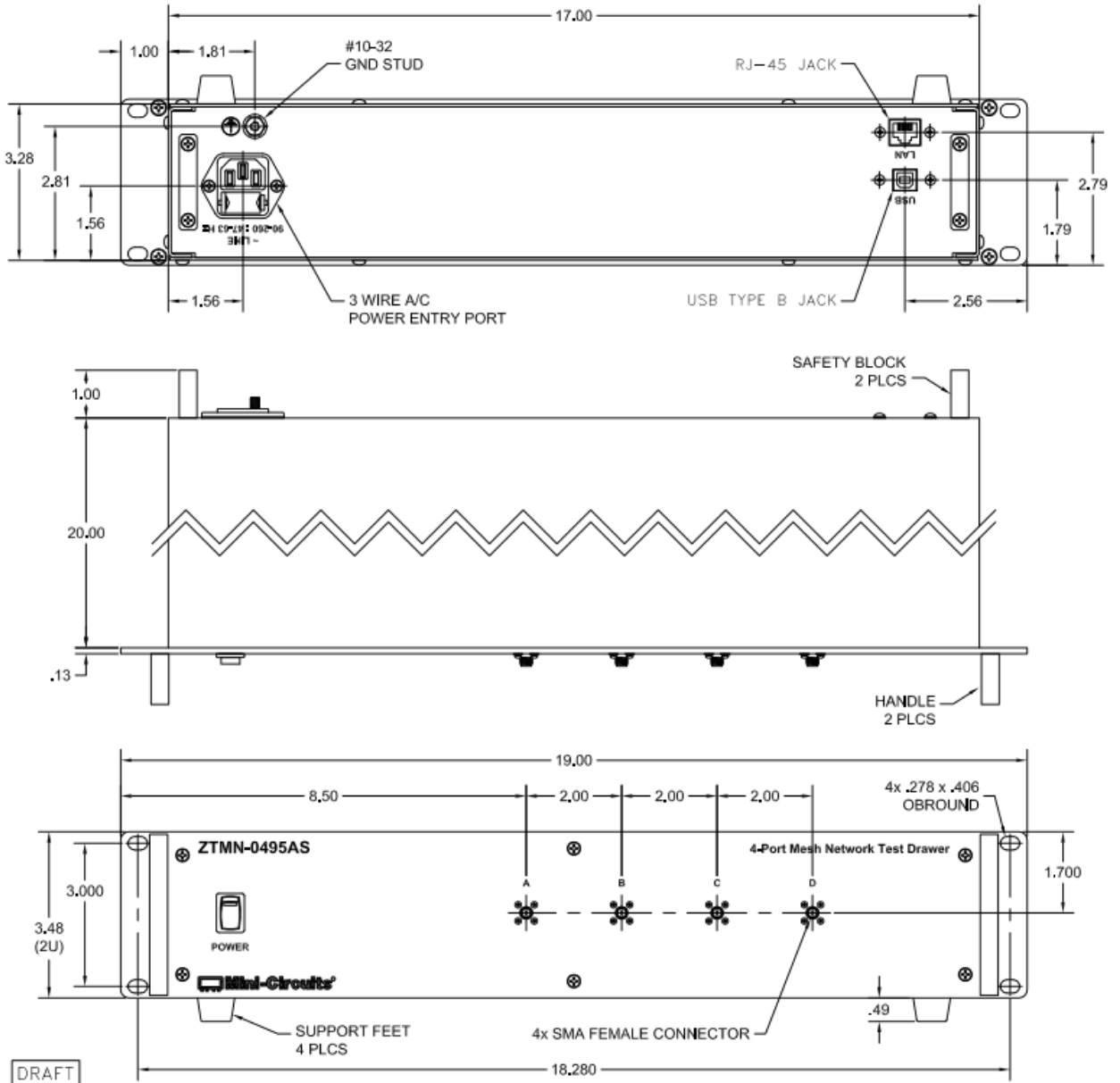
- Connect via USB or Ethernet
- Run GUI in “demo mode” to evaluate software without a hardware connection
- View and set all attenuation channels independently or in groups
- Configure automated attenuation sweep or hop sequences for groups of channels
- Configure Ethernet settings
- Upgrade firmware



4-Port Mesh Network

ZTMN-0495AS

Case Drawing (99-01-2370)



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) |

| 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

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- 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