Mountain Engineering & Technology ME-1002

# Short Line Simulator

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# ME-1002
## Short Line Simulator

## Features

- Simulates #22AWG (0.7mm) PIC/ABAM unshielded twisted-pair (UTP) and 75W coaxial transmission line
- Selectable line length for DSX-1/E1 pulse mask testing: 131, 262, 393, 524, and 655 feet
- Selectable attenuations from 0dB to -18dB for input sensitivity testing
- Simulates over 1200m of 75W coax in 40m increments
- Dedicated 50W oscilloscope signal output
- Smart Trigger™ output for stable viewing of both positive and negative data pulses
- Remote control of all functions via standard RS-232 port
- Accepts Bantam, 310 , RJ-48 and coaxial connectors

## Applications

- Facilitates fast, easy, and accurate ANSI/CCITT pulse mask testing
- Enhances design, test, and troubleshooting productivity by eliminating spools of wire and patch panels
- Allows automated testing of office repeaters, DSX channel banks, and other telecom equipment

## Compatibility

- US and European AMI-PCM codes

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DSX-1/T1 - 1.544Mb/s
DS1C/T1C - 3.152Mb/s
DS2/T2 - 6.312Mb/s
CEPT/E1 - 2.048Mb/s
CEPT - 8.448Mb/s

- ISDN primary rate standards, 1.544Mb/s and 2.048Mb/s
- Manchester coded data from 100kb/s to 10Mb/s

2.048Mb/s data rates.

In addition to simulating transmission lines, the ME-1002 provides a dedicated 50w signal output and a corresponding Smart Trigger™ output for easy and accurate oscilloscope viewing and mask verification of individual data pulses. To facilitate use in automated test environments, all ME-1002 functions can be operated either by front panel controls or through computer control via a standard RS-232 serial port. Options include a rack-mount chassis, battery back-up and an internal noise mixer.

## Operating Specifications

(Valid at all attenuation settings, test signal ($f_o$)=772kHz and 5°C < $T_{ambient}$ < 40°C unless otherwise stated)

### Input

Terminating Impedance ..... 100w/120w/75w, ±5%

Recommended Frequency Range..... 10kHz to 10MHz

Maximum Balanced Input Voltage,
100w/120w Inputs, Zero to Peak ..... ±6V
75w Input, Zero to Peak ..... ±5.4V
Maximum Balanced DC Input Current,
Input Center-Tap to Output Center-Tap .. 70mA

### Output

Sourcing Impedance ..... 100w/120w/75w/50w, ±5%

Maximum Rise/Fall Time At 0dB,
$V_{IN}$ = 3$V_{PEAK}$ ,10% to 90% ..... < 40nsec

Maximum Overshoot At 0dB,
$V_{IN}$ = 3$V_{PEAK}$ ..... < 5%

Maximum OSC Output Voltage,
RTERM = 50w ..... ±5V

Short Circuit Tolerance ..... Continuous

### Length/Attenuation Settings

Output Pulse Mask Testing
(100w/120w Line, $f_o$=772kHz)

| Min Length (ft) | Max Length (ft) | Step Size (ft) | Accuracy (ft) |
|---|---|---|---|
| 0 | 655 | 131 | ± 30 |

Input Sensitivity Testing
(100w/120w Line, $f_o$ =772kHz)

| Min Atten. | Max Atten. | Step Size | Accuracy |
|---|---|---|---|

### Length/Attenuation Accuracy

Length/Attenuation tolerance at $f_o$ with display settings:

100w/120w Line
(Except 0 to 655ft. See Length/Attn Setting Table)
dB ($f_o$ = 772kHz/1024kHz)..... ± 0.25dB
Feet ($f_o$ = 772kHz)..... ± 50ft
Meters ($f_o$ = 1024kHz) ..... ± 15m

75w Line
dB ($f_o$ = 772kHz/1024kHz) ..... ± 0.25dB
Feet ($f_o$ = 772kHz) ..... ± 70ft
Meters ($f_o$ = 1024kHz) ..... ± 20m

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| (dB) | (dB) | (dB) | (dB) |
|---|---|---|---|
| 0 | 18.0 | 0.58 | ± 0.25 |

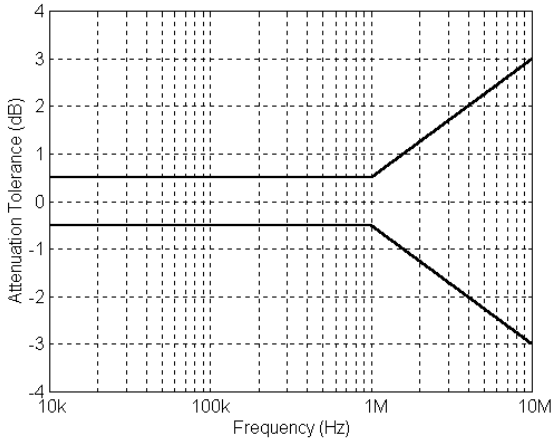
75W Simulation ( $f_o$ = 1.024MHz )

| Min Length (m) | Max Length (m) | Step Size (m) | Accuracy (m) |
|---|---|---|---|
| 0 | 1240 | 40 | ± 20 |

All line settings may be displayed as dB of Attenuation (at 772kHz or 1024kHz), Feet,or Meters.

Displayed length settings are rounded to the nearest foot or meter. Displayed attenuation setting are rounded to the nearest 0.1 dB.

Attenuation tolerance at all other frequencies (100w/120w and 75w lines) relative $f_o$ to is given by the following graph:



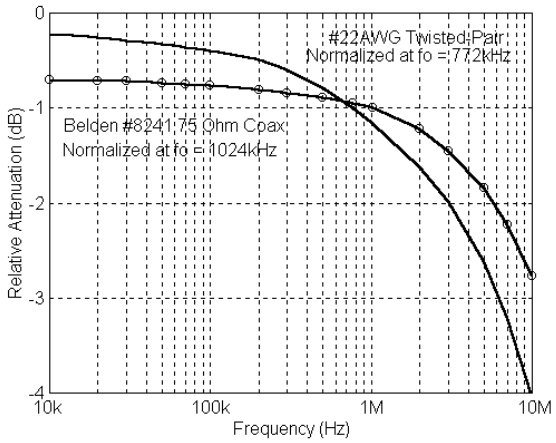

## Attenuation Characteristics

Frequency dependent attenuation of the 100w/120w line simulates #22AWG (0.7mm) PIC (ABAM) unshielded twisted-pair wire at 20°C. The following table shows relative attenuation $A_{Rel}$ versus frequency normalized at $f_o$ = 772kHz.

| Freq.(kHz) | 10 | 20 | 30 | 50 | 70 | 100 | 200 | 300 |
|---|---|---|---|---|---|---|---|---|
| $A_{Rel}$ (dB) | .225 | .260 | .291 | .332 | .359 | .393 | .495 | .602 |
| Freq. (MHz) | .500 | .772 | 1.024 | 2.0 | 3.0 | 5.0 | 7.0 | 10.0 |
| $A_{Rel}$ (dB) | .785 | 1.0 | 1.16 | 1.62 | 1.98 | 2.62 | 3.21 | 4.04 |

Frequency dependent attenuation of the 75W line simulates Belden # 8241 coaxial cable at 20°C. The following table shows the relative attenuation $A_{Rel}$ versus frequency normalized at $f_o$ = 1024kHz.

| Freq. (kHz) | 10 | 20 | 30 | 50 | 70 | 100 | 200 | 300 |
|---|---|---|---|---|---|---|---|---|
| $A_{Rel}$ (dB) | .700 | .712 | .720 | .736 | .748 | .762 | .810 | .846 |
| Freq. (MHz) | .500 | .772 | 1.024 | 2.0 | 3.0 | 5.0 | 7.0 | 10.0 |
| $A_{Rel}$ (dB) | .890 | .946 | 1.0 | 1.22 | 1.45 | 1.85 | 2.23 | 2.77 |




# Typical Applications

## Available Options

Power Supply: Available for 100V, 120V or 240V power supplies.
Chassis: Available in Bench-Top or 19" Rack-Mount chassis.
Battery Back-Up: Allows the ME-1002 to return to its last operating front panel settings on power-up.
Noise Mixer: Allows a noise signal to be mixed with the input signal at -18dB relative to the input signal. The noise mixer satisfies CCITT G.703 Section 6 requirements.

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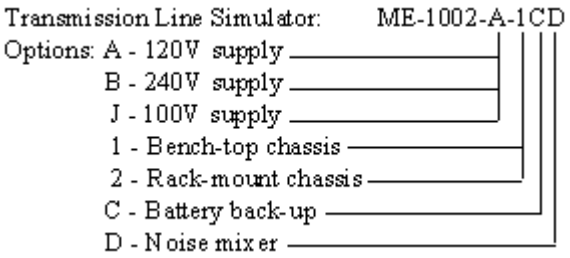
## General Specifications

Power input voltage:
- Option A ..... 105V to 130V
- Option B ..... 210V to 250V
- Option J ..... 90V to 110V

Power input frequency .....45Hz to 66Hz
Power consumption ..... 10W
Dimensions (w x h x d in inches) ..... 17 x 3.5 x 14
Weight ..... 13 lbs
Storage temperature ..... -40°C to 85°C

## Ordering Information

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