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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

Compatibility

- US and European AMI-PCM codes
 - 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

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

General Description

The ME-1002 simulates three types of transmission line commonly used in short distance, interoffice digital telephone systems: 100W and 120W twisted-pair and 75W coaxial cable. It simulates the frequency dependent attenuation characteristics of these lines at the lengths recommended for output pulse mask testing by both US and European standards committees. Receiver input sensitivity can also be tested through the RJ-48 connector with simulated line loss ranging from 0dB to 18dB. The ME-1002 also simulates 0m to over 1200m of 75W coaxial cable. All line length settings are addressable in units of Feet, Meters, and dB of Attenuation at both 1.544Mb/s and 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 100Ω/120Ω/75Ω, ±5%

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

Maximum Balanced Input Voltage,
 100Ω/120Ω□Inputs, Zero to Peak ±6V
 75Ω□Input, Zero to Peak
 ±5.4V

Maximum Balanced DC Input Current,
 Input Center-Tap to Output Center-Tap .. 70mA

Output

Sourcing Impedance 100Ω/120Ω/75Ω/50Ω, ±5%

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

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

Maximum OSC Output Voltage,
 RTERM = 50Ω ±5V

Short Circuit Tolerance Continuous

Length/Attenuation Settings

Output Pulse Mask Testing

(100Ω/120Ω Line, f_o=772kHz)

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

Input Sensitivity Testing

(100Ω/120Ω Line, f_o=772kHz)

Min Atten. (dB)	Max Atten. (dB)	Step Size (dB)	Accuracy (dB)
0	18.0	0.58	± 0.25

75Ω 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.

Length/Attenuation Accuracy

Length/Attenuation tolerance at f_o with display settings:

100Ω/120Ω Line

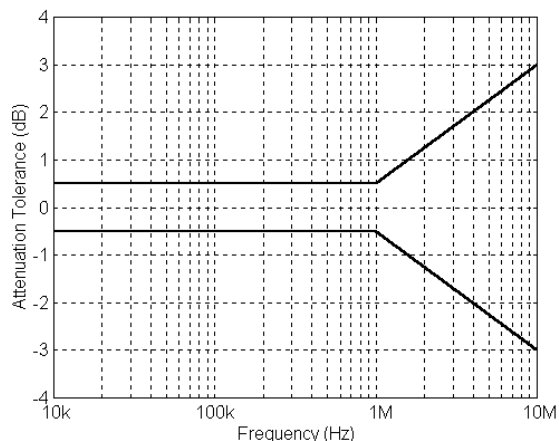
(Except 0 to 655ft. See Length/Attn Setting Table)

dB (f_o = 772kHz/1024kHz)..... ± 0.25dB
 Feet (f_o = 772kHz)..... ± 50ft
 Meters (f_o = 1024kHz) ± 15m

75Ω Line

dB (f_o = 772kHz/1024kHz) ± 0.25dB
 Feet (f_o = 772kHz) ± 70ft
 Meters (f_o = 1024kHz) ± 20m

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



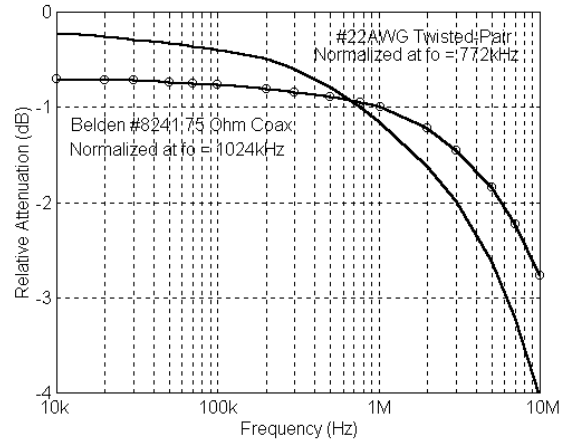
Attenuation Characteristics

Frequency dependent attenuation of the 100Ω/120Ω 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 $f_0 = 772\text{kHz}$.

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 75Ω line simulates Belden # 8241 coaxial cable at 20°C. The following table shows the relative attenuation A_{Rel} versus frequency normalized at $f_0 = 1024\text{kHz}$.

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



[CLICK ON GRAPH TO ENLARGE](#)

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.

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

Transmission Line Simulator: ME-1002-A-1CD
 Options: A - 120V supply _____
 B - 240V supply _____
 J - 100V supply _____
 1 - Bench-top chassis _____
 2 - Rack-mount chassis _____
 C - Battery back-up _____
 D - Noise mixer _____