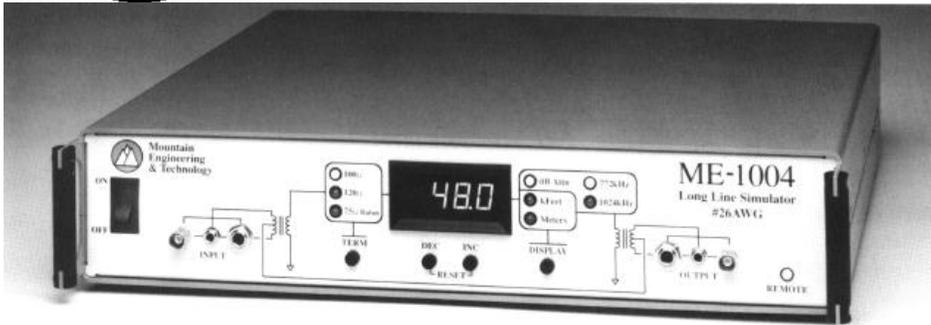
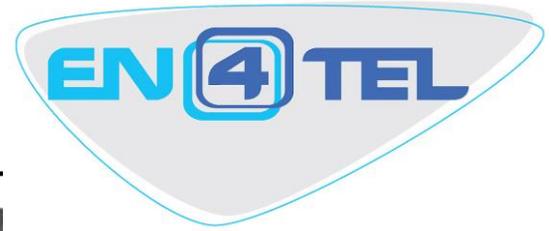




Mountain
Engineering
& Technology

ME-1004
Long Line Simulator, #26AWG



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Features

- Simulates #26AWG (0.41mm) PIC twisted-pair telephone transmission line
- Selectable attenuation levels 0dB to -48dB @ 772kHz (1.544 Mb/s) in 1dB steps and from 0dB to -55.7dB @ 1024kHz (2.048 Mb/s) in 1.16dB steps
- Selectable line impedance: 100Ω, 120Ω, or 75Ω BALUN
- Accurate over a 3 decade frequency range, from 10kHz to 10MHz
- Convenient front panel controls and displays, calibrated in kFeet, Meters, and dB of Attenuation at 772/1024kHz
- Remote control of all functions via standard RS-232 port
- Accepts standard BNC, Bantam, and 310 connectors

Compatibility

- US and European AMI-PCM codes:
 - T1 - 1.544Mb/s
 - T1C - 3.152Mb/s
 - T2 - 6.312Mb/s
 - CEPT - 2.048Mb/s
 - CEPT - 8.448Mb/s
- ISDN primary rate standards, 1.544 Mb/s and 2.048 Mb/s
- Japan's CMI code standard, 2.048 Mb/s
- Manchester coded data from 100 kb/s to 10 Mb/s

Applications

- Design and evaluation of serial data receivers and repeaters
- Replaces 7.2kft (2.2km) of transmission line in laboratory experiments
- Allows automated testing of telecommunications, PBX, and LAN equipment

General Description

The ME-1004 is a highly accurate, programmable filter designed to simulate the attenuation versus frequency characteristics of the #26AWG (0.41mm) unshielded twisted-pair transmission wire commonly used in long distance telephone trunk lines in the US and around the world. The same wire is also found in office buildings and industrial complexes where it forms the backbone of PBX and LAN communication systems. By simulating 7.2kft (2.2km) of transmission line in 150ft (46m) increments, the ME-1004 offers a convenient and practical method of developing and testing communications equipment intended for use on this wire.

Easy to use front panel controls set the ME-1004's simulated line length displayed in kFeet, Meters, or dB of Attenuation at either 772kHz for 1.544Mb/s applications or 1024kHz for 2.048Mb/s applications. Input and output line terminations are also user-selectable to correctly match the characteristic impedances of either 100Ω or 120Ω twisted-pair wire systems. A 75Ω BALUN connection is also provided. All ME-1004 functions can be computer controlled via a standard RS-232 serial port for automated test applications. Options include battery back-up and an internal noise mixer.

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ME-1004

Operating Specifications

(Valid at all attenuation settings, test signal (fo)=772kHz and 0°C < T_{AMBIENT} < 50°C unless otherwise stated)

Input

Terminating Impedance 100Ω/120Ω /75Ω, ±5%
 Recommended Frequency Range 10kHz to 10MHz
 Maximum Balanced Input Voltage
 Zero to Peak ±6V
 Maximum Balanced DC Input Current
 Input Center-Tap to Output Center Tap 70mA

Output

Sourcing Impedance 100Ω/120Ω /75Ω, ±5%
 Maximum Rise/Fall Time At 0dB,
 V_{IN} = 3 V_{PEAK} < 40nsec
 Maximum Overshoot At 0dB
 V_{IN} = 3 V_{PEAK} < 10%
 Short Circuit Tolerance Continuous

Attenuation Characteristics

Attenuation range at f_O with display setting:

f_O = 772kHz 0dB to -48.0dB
 f_O = 1024kHz 0dB to -55.7dB

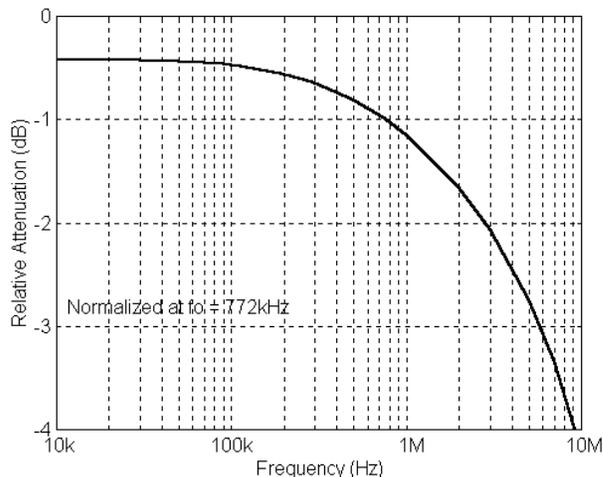
Frequency dependent attenuation simulates that of #26AWG (0.41mm) unshielded twisted-pair wire at 20°C. The following indicates the relative attenuation (A_R) versus frequency normalized at f_O=772kHz.

Freq. (kHz)	10	20	30	50	70	100	200	300
A _R (dB)	.415	.420	.425	.434	.446	.470	.560	.650
Freq. (MHz)	.500	.772	1.024	2.0	3.0	5.0	7.0	10.0
A _R (dB)	.805	1.0	1.16	1.65	2.07	2.74	3.34	4.20

The attenuation at any frequency, A(f), can be calculated as a function of the attenuation setting at f_O = 772kHz as follows:

$$A(f) = A_R(f) \times A(f_O)$$

f_O = 772kHz 1.00dB
 f_O = 1024kHz (Displayed to nearest 0.1dB) ... 1.16dB



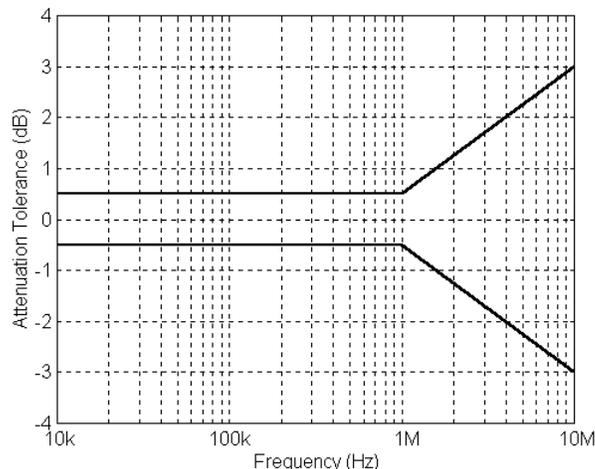
Attenuation adjustment step size with display setting:

Attenuation Accuracy

Attenuation range at fo with display setting:

fo = 772kHz ± 0.25dB
 fo = 1024kHz ± 0.30dB

Attenuation tolerance at all other frequencies relative to is given by the following graph:



General Specifications

Power input voltage: Option A 103V to 132V
 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-1004-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 _____