



"Results You Can Count On"

Model 458-LM-E1-30-04+
Multi-Standard Local Loop Simulator
w/ Optional AWGN Generator

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Customer Support

Thank you for your purchase of the Telebyte Model 458-LM-E1-30-04+ Multi-Standard Local Loop Simulator with Optional AWGN Generator. This one-channel product simulates 0.4mm PE as specified in ETSI TS 101 388 or PE04 as specified in G.991.2 Annex B (G.shdsl) or ETSI TS 101 524.

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Warranty

Included With Your Purchase

One-year Warranty

- Telebyte will furnish parts and labor for the repair or replacement of products found by Telebyte to be defective in material or workmanship during the warranty period.¹

One-year Calibration (where applicable)

- One N.I.S.T. traceable calibration on the first-year anniversary of the product ship date.²
- Calibration report to ensure traceability.

Extended Customer Care

There are two options available. Our three-year extended warranty extends the original warranty by an additional 36 months and the three-year calibration contract provides 36 additional months of calibration.

Three-Year Extended Warranty

You can extend the original one-year warranty that comes with your product by purchasing the **Three-Year Extended Warranty**.³

Features:

- Telebyte will furnish parts and labor for the repair or replacement of products found by Telebyte to be defective in material or workmanship during the warranty period.¹

Three-Year Calibration Contract (where applicable)

Extended calibration is available through the **Three-Year Calibration Contract**.⁴

Features:

- Yearly N.I.S.T. traceable calibrations, each on the second, third and fourth anniversary of the ship date.²
- Report to ensure traceability.

Disclaimer of Warranties and Other Terms and Conditions

¹ TELEBYTE, INC. warrants its broadband simulation equipment to be free from defects in material and workmanship, under normal and proper use and in its unmodified condition, for 12-months, starting on the date it is delivered for use. TELEBYTE'S sole obligation under this warranty shall be to furnish parts and labor for the repair or replacement of products found by TELEBYTE to be defective in material or workmanship during the warranty period. Warranty repairs will be performed at the point of manufacture. Equipment approved for return for warranty service shall be returned F.O.B. TELEBYTE factory and will be redelivered by TELEBYTE freight prepaid, except for non-continental U.S.A. locations. These deliveries will be sent COD freight and import/export charges.

² The customer is responsible for freight and customs charges when shipping products to and from Telebyte for calibration services.

³ You must purchase the extended warranty at the time of purchase or during the initial warranty period.

⁴ You must purchase the calibration contract at the time of purchase or during the initial warranty period. The above warranty is in lieu of all other warranties, expressed or implied, statutory or otherwise, including any implied warranty of merchantability or fitness for a particular purpose. TELEBYTE shall not be liable for any damages sustained by reseller or any other party arising from or relating to any equipment failure, including but not limited to consequential damages, nor shall TELEBYTE have any liability for delays in replacement or repair of equipment.



Equipment Returns

Out of warranty equipment may be returned, prepaid, to the Hauppauge, N.Y. customer service facility. Return shipping charges will be billed to the customer. The repaired unit will have a 90-day warranty. In those cases where "no trouble" is found, a reduced charge will be billed to cover handling, testing, and packaging. Whether in or out of warranty, a Return Material Authorization number (RMA) is required and may be obtained by going to www.telebytebroadband.com and opening a technical support case.

Please be sure to reference the RMA number on the outside container.



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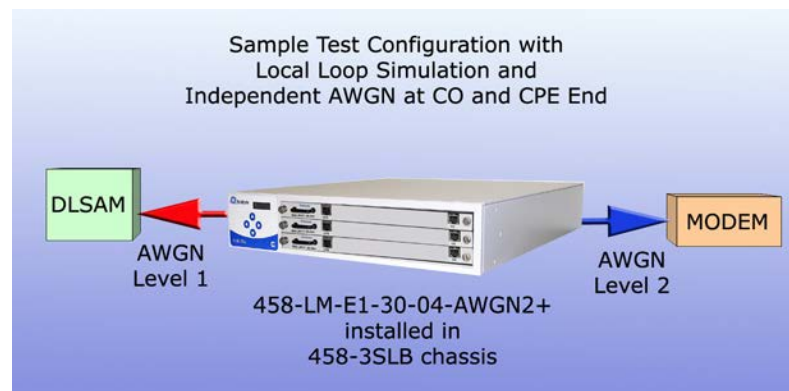


1.0 Introduction

The Model 458-LM-E1-30-04+ Multi-Standard Local Loop Simulator is the ideal solution for ADSL, ADSL2, ADSL2+, G.shdsl and VDSL2 chip/modem/DSLAM testing. This single-pair loop simulator can simulate either 0.4mm PE for ADSL, ADSL2, ADSL2+ and VDSL2 or PE04 for G.shdsl. Optional noise sources may be ordered that add in AWGN on the CO and CPE side that may be independently controlled.

	Wire Type	Standard	Ideal For	Length/Increments	BW
OR	0.4 mm PE	ETSI TS 101 388	ADSL, ADSL2, ADSL2+, VDSL2	0 – 9,000 m/10-m steps	DC - 30 MHz
	PE04	G.991.2 Annex B or ETSI TS 101 524	G.shdsl	0 – 8,000 m/50-m steps	5 KHz – 2 MHz

This versatile local loop simulator is plugged into our Model 458-3SLB (3-Slot) or 458-CC-16 (16-Slot) chassis where settings are controlled by a convenient keypad located on the front, RS-232, Ethernet or IEEE-488(GPIB). In addition, the user-friendly 458 Universal GUI may be used for remote control. The modular design of Telebyte's products allows the 458-LM-E1-30-04+ to be combined with other line modules for a wide variety of test configurations.

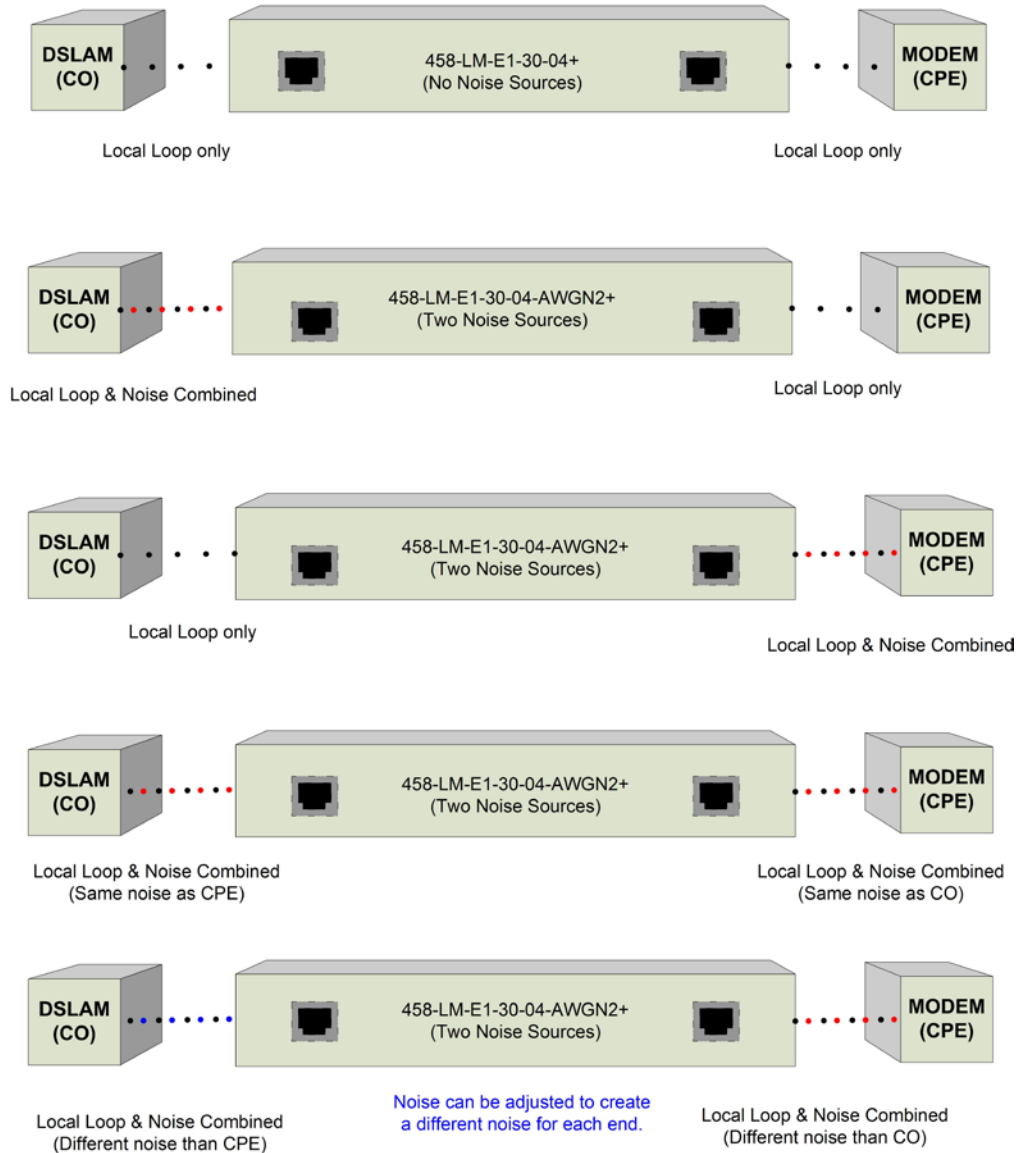


The diagram above shows a sample test configuration where independent AWGN may be added to the near and far end of the loop. Variable noise levels provide uncorrelated, simultaneous injection where desired.



Ordering Options		
458-LM-E1-30-04+	Multi-Standard Local Loop Simulator	Local Loop without noise
458-LM-E1-30-04-AWGN2+	Multi-Standard Local Loop Simulator with (2) AWGN Generator Modules	Local Loop with independent noise sources at the CO and CPE end

458-LM-E1-30-04+ (No Noise Sources)
458-LM-E1-30-04-AWGN2+ (Two Noise Sources)
 Variety of Configurations





2.0 Specifications

2.1 458-LM-E1-30-04+

Product Specifications	
Simulation	<ul style="list-style-type: none"> • Accurately simulates attenuation and impedance • Full bidirectional operation at all specified frequencies • 0.4mm PE as specified in ETSI TS 101 388 or PE04 as specified in G.991.2 Annex B (G.shdsl) and ETSI TS 101 524 • Optional White Noise (AWGN) Generator
Bandwidth	0.4mm PE: DC to 30 MHz PE04: 5 KHz to 2 MHz
Attenuation Accuracy	0.4mm PE: MAE < 1 dB 20 kHz to 30 MHz (when source and load impedances are 100 ohms) PE04: MAE < 1 dB 5 KHz to 2 MHz (when source and load impedances are 135 ohms)
Maximum Attenuation	> 90 dB
Impedance Accuracy	Typically +/- 10%
Maximum Voltage Tip – Ring	200 V
Maximum Current	130 mA
Connectors	2 RJ-45's on front
Optional White Noise (AWGN) Generator (factory-installed sub-module)	-90 dBm/Hz to -145 dBm/Hz in 0.25 dBm increments

2.2 458-3SLB

458-3SLB Product Specifications (Chassis and Control Module)	
Controls	Keypad for setting loop lengths and IEEE-488 address, RS-232, or Ethernet communication parameters.
Indicators	Backlit LCD display of line length and set up parameters.
Power	88 to 264 VAC, 50 or 60 Hz
Size	[2U] 19 in W x 22 in D x 3.47 in H (482.6 mm W x 558.8 mm D x 88.1 mm H)
Environmental	Operating: +32 F to +122 F (0 to +50 degrees C) Storage: 0 to 95% relative humidity (non-condensing)
Remote Control Connectors	RS-232: DB9 female (DCE); GPIB: IEEE488 24-pin connector. Ethernet: RJ-45
Plug-In Compatibility	Accepts one, two or three 458 plug-in modules.



2.3 458-CC-16/458-CM

Product Specifications 458-CC-16 (16-Slot Chassis) & 458-CM (sold separately)	
Controls	Keypad for setting loop lengths and IEEE-488 address, RS-232, or Ethernet communication parameters.
Indicators	Backlit LCD display of line length and set up parameters.
Power	100 - 240 VAC, 50 or 60 Hz
Size	[7U] 19 in W x 22 in D x 12.22 in H (482.6 mm W x 558.8 mm D x 310.4 mm H)
Environmental	Operating: +32 F to +122 F (0 to +50 degrees C) Storage: 0 to 95% relative humidity (non-condensing)
Remote Control Connectors	RS-232: DB9 female (DCE); GPIB:IEEE488 24-pin connector. Ethernet: RJ-45
Plug-In Compatibility	Accepts 1-16 458 Line Modules

Specifications are subject to change without notice. Made in USA.

- Detailed information about the operation of the 458-3SLB and 458-CC-16/458-CM can be found in the reference manuals for those products. Only information specific to the 458-LM-E1-30-04+ is provided in this manual.
- The 458-3SLA may also be used with this module.



3.0 Control

The Model 458-LM-E1-30-04+ can be controlled three ways: via RS-232 and IEEE488 Remote Commands, our GUI interface or the LCD display on the front panel of our 458-3SLB or 458-CM.

3.1 Remote Commands

3.1.1 RS-232 (Serial Port) Remote Commands

LENGTH SETTINGS:

Set Length command **SL:M:LE,C**

Read length command **RL:M**

M = Module number 01 - 16, 01 - 02, 01-03

LE = 0 - 9000 in steps of 10m ESTI or G0 - G8000 in steps of 50m G.SHDSL

C = Connect mode;

N = connect both CO and CPE ends.

P = connect CPE only CO open.

O = connect CO only CPE open.

Z = open both CO and CPE ends.

Example; **SL:02:8970,N** - Set length of module 02 to ESTI 8970m with both CO and CPE connected.

Example; **RL:02**

Response 02:8970,N

Example; **SL:02:G6750,N** - Set length of module 02 to G.SHDSL 6750m with both CO and CPE connected,

Example; **RL:02**

Response 02:G6750,N



SET NOISE MODE:

Set noise mode/level command **SL:M:NOISE:CPE:V1** or **SL:M:NOISE:CO:V2**

V1,2 = OFF or -90.00 to -145.00 level in 0.25 dBm/Hz steps.

Examples;

SL:02:NOISE:CPE:OFF - Set CPE noise source to off

SL:02:NOISE:CO:OFF - Set CO noise source to off

SL:02:NOISE:CO:-95.00 - Set CO noise source to -95.00 dBm/hz

SL:02:NOISE:CPE:-123.75 - Set CPE noise source -123.75 dBm/Hz

Note: With both CPE and CO noise sources ON, the levels can be different or the same.

Read noise levels settings command **RL:M:NOISE:CO** or **RL:M:NOISE:CPE**



3.1.2 IEEE 488 (GPIB) Remote Commands

LENGTH SETTINGS:

Set Length command :**SETCARD:LENGTH:M:LE,C**

Read length command :**READCARD:LENGTH:M**

M = Module number 01 - 16, 01 - 02, 01-03

LE = 0 - 9000 in steps of 10m ESTI or G0 - G8000 in steps of 50m G.SHDSL

C = Connect mode;

N = connect both CO and CPE ends.

P = connect CPE only CO open.

O = connect CO only CPE open.

Z = open both CO and CPE ends.

Example; :**SETCARD:LENGTH:02:G6750,N** - Set length of module 02 to G.SHDSL 6750m with both CO and CPE connected.

Example; :**READCARD:LENGTH:02**

Response 02:G6750,N

SET NOISE MODE:

Set noise mode/level command :**SETCARD:LENGTH:M:NOISE:CO:V1,2**

V1,2 = OFF or -90.00 to -145.00 level in 0.25 dBm/Hz steps.

Examples;

:**SETCARD:LENGTH:02:NOISE:CPE:OFF** - Set CPE noise source to off

:**SETCARD:LENGTH:02:NOISE:CO:OFF** - Set CO noise source to off

:**SETCARD:LENGTH:02:NOISE:CO:-95.00** - Set CO noise source to -95.00 dBm/hz

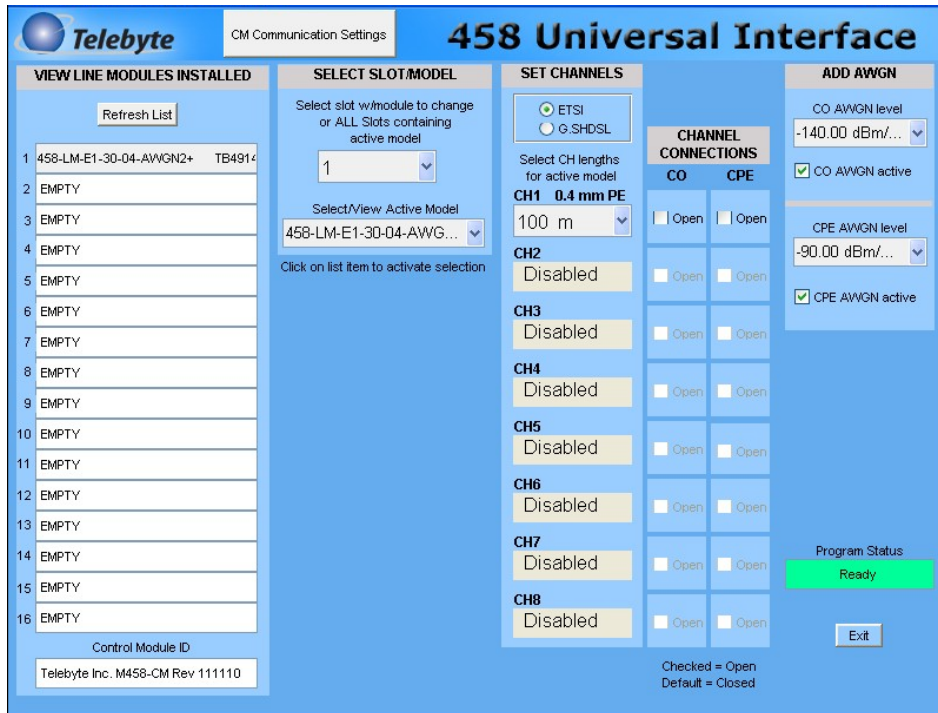
:**SETCARD:LENGTH:02:NOISE:CPE:-123.75** - Set CPE noise source -123.75 dBm/Hz

Note: With both CPE and CO noise sources ON, the levels can be different or the same.

Read noise levels settings command :**READCARD:LENGTH:M:NOISE:CO** or
:**READCARD:LENGTH:M:NOISE:CPE**



3.2 Graphical User Interface



Refer to the 458 Universal Graphical User Interface Reference Manual for more information.

3.3 LCD Display

Step One – select slot, length and mode

- Select the slot in the 458-3SLx (3-Slot) Chassis or 458-CC16/458-CM (16-Slot) Chassis using the UP or DOWN arrows on the LCD display (e.g., when using our 3-slot chassis: slot 1 top, slot 2 middle, slot 3 bottom).
- Select the length for the current slot using LEFT or RIGHT arrow buttons. The length will increment in 10-meter or 50-meter steps depending on the current mode of ETSI or G.SHDSL.
- To move from ETSI to G.SHDSL mode (or vice versa), press the LEFT or RIGHT arrow buttons until the length reaches the maximum or minimum value. The next arrow press switches the unit to the opposite mode and applicable line increments.

Step Two – select noise location and level

- Use Up arrow to select the CO or CPE noise.
- Adjust the noise level using LEFT and RIGHT arrow buttons.