



**"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.

### Contact Information:

#### Telephone

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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.<sup>1</sup>

#### **One-year Calibration (where applicable)**

- One N.I.S.T. traceable calibration on the first-year anniversary of the product ship date.<sup>2</sup>
- 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**.<sup>3</sup>

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.<sup>1</sup>

#### **Three-Year Calibration Contract (where applicable)**

Extended calibration is available through the **Three-Year Calibration Contract**.<sup>4</sup>

Features:

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

### Disclaimer of Warranties and Other Terms and Conditions

<sup>1</sup> 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.

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

<sup>3</sup> You must purchase the extended warranty at the time of purchase or during the initial warranty period.

<sup>4</sup> 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](http://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+, and VDSL2 chip/modem/DSLAM testing out to 9,000 m in very small increments. Optional noise modules may be ordered that add in AWGN on the CO and/or CPE side with common or independent noise levels on both sides.

This 30-MHz local loop simulator is plugged into our Model 458-3SLB (3-Slot) or 458-CC-16/458-CM (16 Slot) chassis where settings are controlled by a convenient keypad located on the front, RS-232, Ethernet, IEEE-488(GPIB) or the 458 Universal Graphical User Interface. 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.



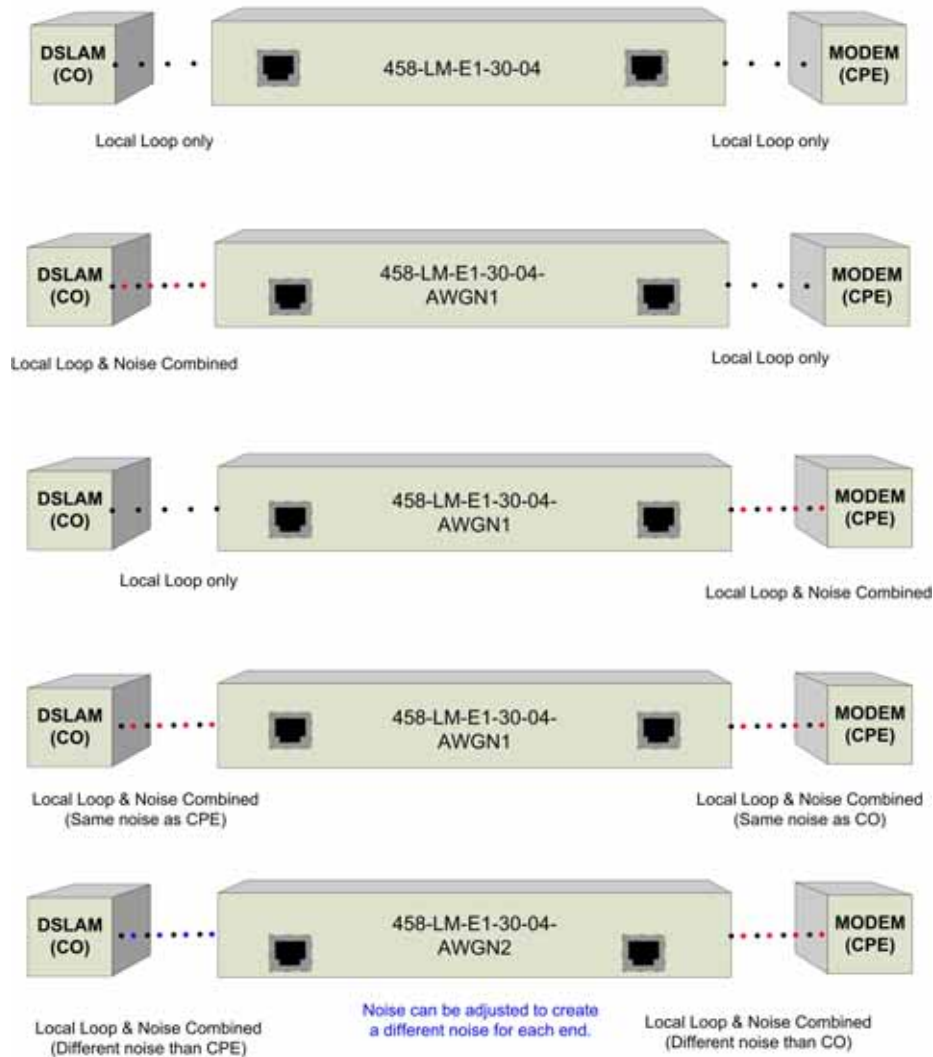
The diagram above shows a sample test configuration where independent AWGN may be added to the near and far end of the loop. Variable noise levels provide uncorrelated, simultaneous injection where desired.



Please note the 458-3SLA 3-Slot Chassis or newer is required for this line module.

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 two independent noise sources at the CO <b>and/or</b> CPE end

### 458-LM-E1-30-04 (AWGN1,2) Variety of Configurations





## 2.0 Specifications

### 2.1 458-LM-E1-30-04

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

### 2.2 458-3SLB

Product Specifications (Chassis and Control Module)	
<b>Controls</b>	Keypad for setting loop lengths and IEEE-488 address, RS-232, or Ethernet communication parameters.
<b>Indicators</b>	Backlit LCD display of line length and set up parameters.
<b>Power</b>	88 to 264 VAC, 50 or 60 Hz
<b>Size</b>	[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)
<b>Environmental</b>	Operating: +32 F to +122 F (0 to +50 degrees C) Storage: 0 to 95% relative humidity (non-condensing)
<b>Remote Control Connectors</b>	RS-232: DB9 female (DCE); GPIB:IEEE488 24-pin connector. Ethernet: RJ-45
<b>Plug-In Compatibility</b>	Accepts one, two or three 458 Line Modules or one 458-RT





### 2.3 458-CC-16/458-CM

<b>Product Specifications 458-CC-16 (16-Slot Chassis) &amp; 458-CM (sold separately)</b>	
<b>Controls</b>	Keypad for setting loop lengths and IEEE-488 address, RS-232, or Ethernet communication parameters.
<b>Indicators</b>	Backlit LCD display of line length and set up parameters.
<b>Power</b>	100 - 240 VAC, 50 or 60 Hz
<b>Size</b>	[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)
<b>Environmental</b>	Operating: +32 F to +122 F (0 to +50 degrees C) Storage: 0 to 95% relative humidity (non-condensing)
<b>Remote Control Connectors</b>	RS-232: DB9 female (DCE); GPIB:IEEE488 24-pin connector. Ethernet: RJ-45
<b>Plug-In Compatibility</b>	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.



## 3.0 Control

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

### 3.1 Remote Commands

Please refer to the manuals for the 458-3SLB or 458-CC-16/458-CM for remote commands common to many line modules, including the 458-LM-E1-30-04. This manual contains commands unique to this module.

#### 3.1.1 RS-232 (Serial Port) Remote Commands

##### Set Noise Mode

Set Noise Mode/Level Command Values: SL:M:NOISE:CPE:V or SL:M:NOISE:CO:V

Where,

SL = set length

M = module (slot) number 01 – 16 (458-CM) or 01-03 (458-3SLB)

NOISE = noise mode

CPE or CO = set noise for CPE or CO side of loop

V = AWGN values allowed – OFF or -90.00 to -145.00 (in 0.25 dBm/Hz steps)

Examples :

SL:02:NOISE:CPE:-123.75	=	Set CPE noise source -123.75 dBm/Hz
SL:02:NOISE:CO:-95.00	=	Set CO noise source to -95.00 dBm/Hz
SL:02:NOISE:CPE:OFF	=	Set CPE noise source to off
SL:02:NOISE:CO:OFF	=	Set CO noise source to off

Note: Upper or lower case text may be used



## Read Noise Levels

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

Where,

RL = read length

M = module (slot) number 01 – 16 (458-CM) or 01-03 (458-3SLB)

NOISE = noise mode

CPE or CO = read noise for CPE or CO side of loop

### 3.1.2 IEEE 488 (GPIB) Remote Commands

#### Set Noise Mode/Level Command Values:

:SETCARD:LENGTH:M:NOISE:CO:V1,2 Or :SETCARD:LENGTH:M:NOISE:CPE:V1,2

Where,

M = Module (slot) number 01 – 16 (458-CM), 01-03 (458-3SLB)

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

Examples:

:SETCARD:LENGTH:02:NOISE:CPE:-123.75  
= Set CPE noise source to -123.75 dBm/Hz.

:SETCARD:LENGTH:02:NOISE:CO:-95.00  
= Set CO noise source to -95.00 dBm/Hz.

:SETCARD:LENGTH:02:NOISE:CPE:OFF  
= Set CPE noise source to off.

:SETCARD:LENGTH:02:NOISE:CO:OFF  
= Set CO noise source to off.

Note: Upper and lower case text can be used.



### Read Noise Mode/Level Command Values:

READCARD:LENGTH:M:NOISE:CO Or READCARD:LENGTH:M:NOISE:CPE

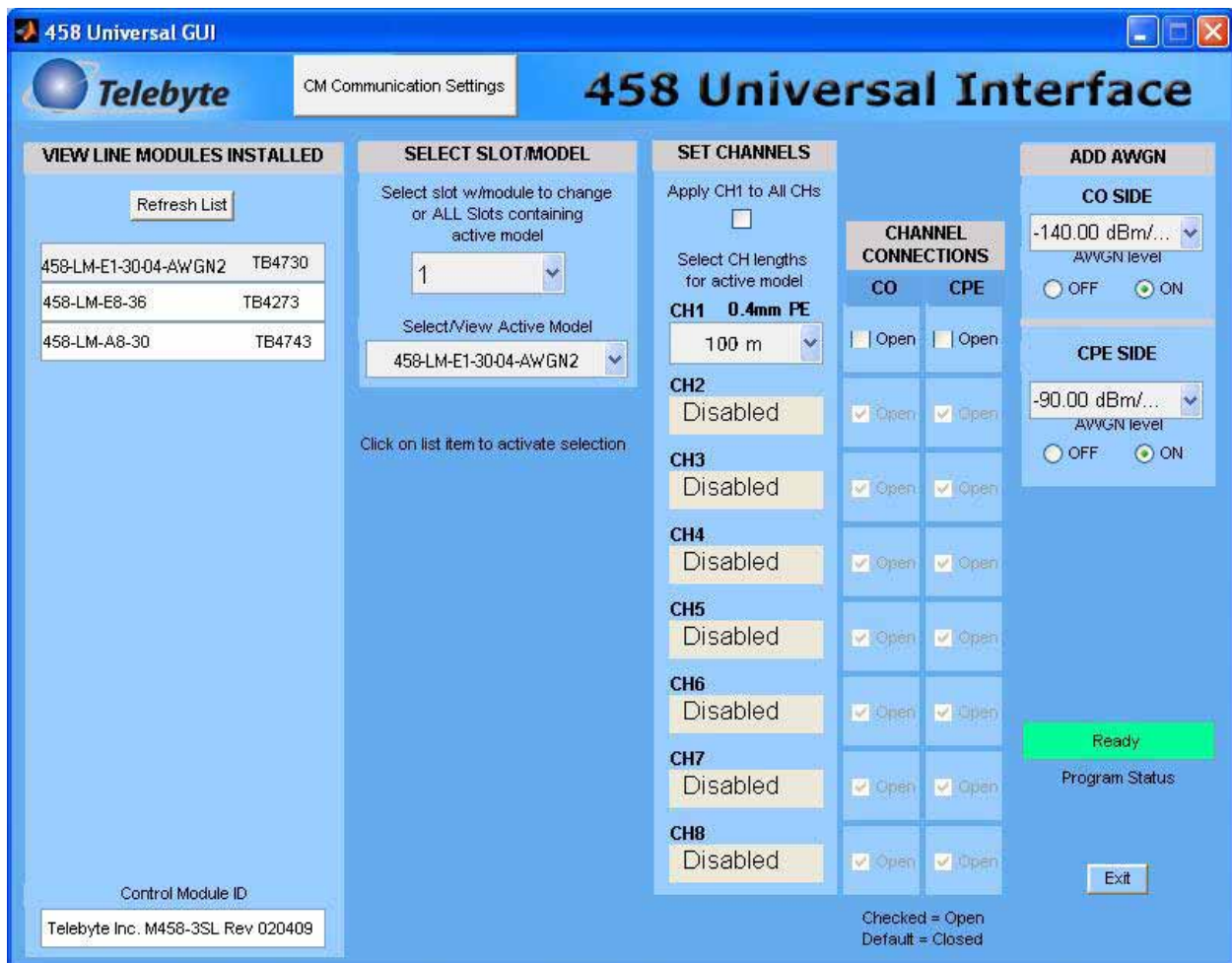
Where,

M = Module (slot) number 01 – 16 (458-CM), 01-03 (458-3SLB)

Example:

READCARD:LENGTH:02:NOISE:CO = Read CO noise level of module in slot 2

### 3.2 Graphical User Interface



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



### 3.3 LCD Display/Front Panel

#### Basic Operation

Make selections by pushing the UP, DOWN, LEFT and RIGHT arrow buttons on the front panel. The LCD Display shows the choices made. Refer to the chassis manual for additional details.

#### Step One – Select Slot

- Navigate to the desired slot in the 458-3SLx (3-Slot) Chassis or 458-CC16/458-CM (16-Slot) Chassis using the UP or DOWN arrows.

#### Step Two – Select Increment

- Step through the allowable lengths for the current slot using the LEFT or RIGHT arrow buttons. The length will increment in 10-m steps.

#### Step Three – Select Noise Levels

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