LINEEYE®

10 Gigabit Ethernet Measurement

LE-8600X / LE-8600XR

1 Gigabit Ethernet / PoE++ Measurement

LE-8500X / LE-8500XR

Gigabit Ethernet supported, stand-alone LAN analyzer
With easy-to-use touch panel operation

NEW

MULTI PROTOCOL ANALYZER
LE-8600X / LE-8600XR
234(W) x 186(D) x 44(H)mm, about 990g CE **10Gbit supported**

NEW

MULTI PROTOCOL ANALYZER
LE-8500X / LE-8500XR
234(W) x 186(D) x 44(H)mm, about 990g CE **1Gbit supported**

LINEEYE®

MULTI PROTOCOL ANALYZER

Supports various measurement interfaces of Gbit LAN

LE-8600X / LE-8600XR

SFP module port | External input/output | GPS antenna connector | PPS signal connector

The LE-8600X/LE-8600XR have two measurement ports that support SFP/SFP+ modules such as 10GBASE-T and 10GBASE-SR. As a stand-alone unit, it supports high-speed LAN measurement tests that use single-mode or multi-mode of optical fiber cables.

[10GBASE-LR SFP+ module]
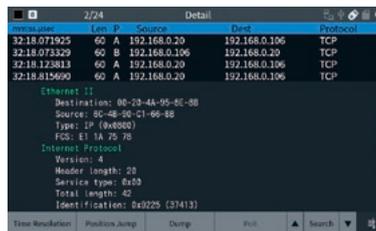

[10GBASE-T SFP+ module]

LE-8500X / LE-8500XR

LAN measurement port | External input/output | GPS antenna connector | PPS signal connector

The LE-8500X/LE-8500XR have four measurement LAN ports capable of 1GbE measurement and can simultaneously measure two channels of Ethernet packets flowing on a LAN cable that is branched and connected between ports A and B and between ports C and D. As it also supports simultaneous measurement of Ethernet packets and PoE power between ports A and B, you can measure and record packets of 2 Ethernet channels (up to 1GbE) and 1 PoE channel at the same time.

Stand-alone measurement of high-speed Ethernet from 10 Gbit to 1 Gbit

LE-8600X/LE-8600XR can measure and record 10Gbit / 1Gbit Ethernet, and LE-8500X / LE-8500XR can measure and record 1Gbit Ethernet communication independently without using a PC. The packet measurement data can be monitored in real time and displayed on the 7-inch wide color LCD, and can be saved into a 500GB internal SSD (LE-8600X/LE-8600XR) or an external storage such as a USB memory or SSD connected via USB3.0. In addition, a statistical analysis function that can check the tendency of communication traffic for each time zone, and a delay time measurement function (LE-8500XR/LE-8500X) that can measure the reception time difference of the received packets of each port, are also available. It can be widely used from network systems to development testing and maintenance of embedded communication equipment.

[Translation display]

[Statistical analysis graph display]

Frame counter type:
Total number of received frames, number of normal frames, number of broadcasts, number of multicasts, number of pause frames, number of each frame of 0-63 byte length / 64 byte length / 65-127 byte length / 128-255 byte length / 256-511 byte length / 512-1023 byte length / 1024-1518 byte length / 1519 bytes length, number of FCS error frames, number of FCS error frames less than 64 byte length

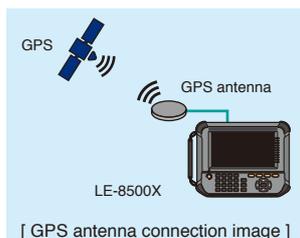## Pass/fail judgment and long-time power recording for PoE/PoE+/PoE++

In addition to PoE and PoE+, it can measure up to 4.5 hours recording of power consumption, voltage, and current, and supports appropriate judgment, graph display, and dump display of PoE++ (IEEE802.3bt) - a new standard that supports high-power supply by 4 pairs of twisted paired cables. This unit is ideal for developing and analyzing the latest equipment that uses PoE++. Furthermore, for between ports A-B, it supports simultaneous measurement of Ethernet packets and PoE power. It is useful when checking the transition of power changes of PoE devices such as an Web camera, in response to LAN packet control commands. It can be used in a wide range of scenes where PoE measurement is required.
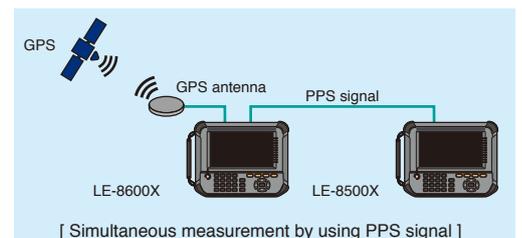

[PoE measurement graph display]

Timestamp which can be time-synchronized by GNSS (PPS) signal

The time synchronization function by GNSS/GPS realizes more accurate timestamping compared to the timestamping using a general crystal oscillator. If you measure for a long period of time at two points where communication failure rarely occurs by using two analyzers at the same time, you can compare and verify each measurement data from the analyzers based on the timestamps.

[GPS antenna connection image]

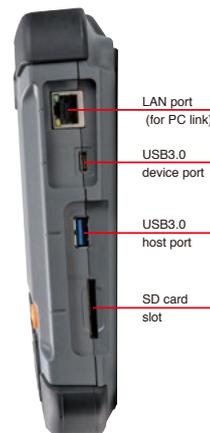[Simultaneous measurement by using PPS signal]

Outputs test packets at the line-rate

The LE-8500X/LE-8500XR can output Ethernet packets of arbitrary test data from ports C or D, or both ports at the same time, and the LE-8600 can output it from SFP+ ports A/B. Test data can be set to 16 transmission data tables, and the transfer rate can be adjusted by specifying the IFG (Inter Frame Gap) for each table. It can be used for network load testing.

Automatically records communication logs to a large-capacity external storage via USB 3.0

While recording the measurement data in the capture memory, this unit can automatically save it continuously for a long time into external storage such as USB memory or SSD. As the communication log file can be divided into multiple files of the specified size and saved, the communication log before and after the failure can be narrowed down from the time stamp of the file.

LAN port
(for PC link)

USB3.0
device port

USB3.0
host port

SD card
slot

[External storage connection]

Newly designed battery-powered lightweight housing - ideal for on-site measurement

Uses a new battery-powered housing that weighs less than 1 kg, B5 size. The measurement data can be displayed directly on the 7-inch wide color LCD, and all measurement tests can be performed without using a PC. Not only can you execute setting operations and smooth data scroll display by touching the screen or swiping, but also you can operate with key switches as with the conventional model so that you can operate even at the site where you need to wear gloves. This product is ideal for on-site measurement at customer sites where the carry-on of a PC is restricted.

Save data as PcapNG files that can be analyzed by Wireshark

With the file management function, you can save, read, and delete measurement data, setting data, and a screenshot into external storage such as a USB memory or SDHC card. It can also be saved as a PcapNG file that can be read by the analysis software, Wireshark.

Transfer measurement data to PC via Ethernet, USB, or Wi-Fi (XR only) connection

High-speed data transfer via G-bit Ethernet or USB 3.0 is supported for remote connection and data transfer to a PC. The Wi-Fi compatible model LE-8600XR/LE-8500XR can connect to a PC via Wi-Fi.

Supports high-speed serial communication of up to 20 Mbps by using the expansion option

Supports RS-232C, RS-530, RS-422/485, and TTL serial communication measurement by changing the standard measurement board to the optional SB-R2TS1 measurement board. Communication data can be recorded without data loss even in the monitoring of a 20Mbps high-speed SPI communication or a 10Mbps CC-Link test. It also supports legacy interfaces such as V.35 and X.20/21 by using the RS-530 measurement port.

[Expansion kit for serial communications "SB-R2TS1"]

[Options]

Model	Description	Applicable Model
LE-1G-BT-45	1000BASE-T SFP module	LE-8600X, LE-8600XR
LE-1G-SX-85	1000BASE-SX SFP module	LE-8600X, LE-8600XR
LE-1G-LX-31	1000BASE-LX/LH SFP module	LE-8600X, LE-8600XR
LE-10G-BT-45	10GBASE-T SFP+ module	LE-8600X, LE-8600XR
LE-10G-SR-85	10GBASE-SR SFP+ module	LE-8600X, LE-8600XR
LE-10G-LR-31	10GBASE-LR SFP+ module	LE-8600X, LE-8600XR
SB-GE2	Expansion kit for Gbit LAN communication	LE-8600X, LE-8600XR, LE-8500X-RT, LE-8500XR-RT * Standard measurement board of LE-8500X/LE-8500XR
SB-R2TS1	Expansion kit for RS-232C/530/422/485/TTL communication	LE-8600X, LE-8600XR, LE-8500X, LE-8500XR * Standard measurement board of LE-8500X-RT/LE-8500XR-RT
LE-25Y15	X.21 monitor cable	SB-R2TS1, LE-8500X-RT, LE-8500XR-RT
LE-25Y37	RS-449 monitor cable	SB-R2TS1, LE-8500X-RT, LE-8500XR-RT
LE-25M34	V.35 monitor cable	SB-R2TS1, LE-8500X-RT, LE-8500XR-RT
LE-25S530	RS-530 cable	SB-R2TS1, LE-8500X-RT, LE-8500XR-RT
EB-SL-AA170	GPS active antenna	LE-8600X, LE-8600XR, LE-8500X, LE-8500XR, LE-8500X-RT, LE-8500XR-RT
LE-SMA-MM-2	Coaxial cable for PPS synchronization	LE-8600X, LE-8600XR, LE-8500X, LE-8500XR
P-26LW2	Lithium ion battery pack	LE-8600X, LE-8600XR, LE-8500X, LE-8500XR, LE-8500X-RT, LE-8500XR-RT (Spare or replacement parts)

Specification

Model	LE-8600X / LE-8600XR	LE-8500X / LE-8500XR
Interface	SFP+ 2 ports. A and B（SFP/SFP+ modules to be connected）10GBASE-T/SR/LR/ER、1000BASE-T/SX/LX/EX etc.	RJ-45 connectors. Port A, B, C, D: 1000BASE-T/100BASE-TX/10BASE-T Port A – B is failsafe tap[1]
Capture Memory	Capacity: 1Gbyte (96byte to 10560byte for 1 frame) 2 divided use, accidental-erasure protection, and selection of ring buffer and fixed size buffer are available.	
Backup Memory	Measurement conditions and part of the latest data (about 16 Mbytes) can be saved automatically[2]	
Internal Storage	500Gbyte SSD	–
Online Monitor Function	Recording and real-time display of Ethernet frames flowing between ports A-B	Simultaneous recording and real-time display of 2 channels of Ethernet frames flowing between ports A-B and C-D[3]
Frame Size	60 byte to 9Kbyte	
Timestamps	The reception time is added as timestamp data for each received frame. Resolution: 8n seconds / 1u seconds / 10u seconds can be selected Time synchronization by GNSS PPS signal or external PPS signal is available[4]	
Data Display/Control	Scroll display, 2-split comparison display, jump operation to specified screen, mark jump operation	
Translation	Supported protocols: IPv4, ARP, ICMP, TCP, UDP, DHCP, EtherCAT	
PcapNG Conversion	Measurement data can be converted and saved to a PcapNG format file[5]	
Filter Function	Can monitor only the specific frames that match one or two specified conditions.	
Trigger Function	When a specific frame that matches the specified conditions is received or when the external TTL signal changes, it can automatically stop monitoring, count how many times the conditions are matched, or output the external TTL signal.	
Filter/Trigger Condition	Layer 2 type (IPv4, ARP, NetBIOS, IPv6, EtherCAT, type number specified), Layer 2 source address, Layer 2 destination address, IPv4 protocol (ICMP, IGMP, TCP, UDP, protocol number specified), source port number / address, destination port number / address, subnet mask	
Search Function	From the measured data, it can search, cue and display, or count only the specific frames that match the specified conditions Search conditions: Error frame, specified frame size, measurement port, and specific frame that can be specified in the same way as the trigger condition	
Delay Time Measurement Function	–	Can measure the time difference between the two specified reception timings among Port A-B Tx, Port A-B Rx, Port C-D Tx, and Port C-D Rx in u seconds, and calculate the current value, maximum value, minimum value, average value, and display them as delay time.
Statistical Analysis Function	Statistics of two frame counter values can be collected and displayed in a graph at specified intervals (1 to 240 minutes), and all frame counter values can be displayed in real time.	
PoE Measurement Function	–	Measurement, recording, appropriateness judgment, graph display, and dump display for the power consumption, voltage, current, power supply type (Alternative A / B, polarity) of PoE/PoE+/PoE++ (IEEE802.3af/at/bt) between the devices connected to ports A and B. Simultaneous measurement with Ethernet frames is available. Recording interval: 1 msec to 1 sec, maximum number of recordings: 16.77 million times, voltage: 0 to 60 V (accuracy: ±1% F.S.), current: 0 to ±900mA (accuracy: ±1% F.S.)[6]
PG Function	Can output arbitrary packets at the wire rate from ports C and D (LE-8500X(R)) and SFP+ ports A and B (LE-8600X(R)). Up to 16 types of packets set in the 16 transmission data tables (total 32k data) of each port can be transmitted sequentially from each port for a specified number of times or continuously. Frame gap (interval until the next packet is transmitted) can be set for each transmission data table.	
Ping Function	Transmits a PING command from port C (LE-8500X (R)), SFP+ port A (LE-8600X (R)) to display the number of responses and response time (current value, maximum value, minimum value, average value).	
Port Blink Function	–	Blinks the link LED on the port of the hub connected to port C
Auto Save Function	The contents of the capture memory (monitored data) can be automatically saved as a communication log file in the storage of the built-in SSD (LE-8600X(R)), USB memory / SDHC, etc.[7]	
Auto Save Mode	Re-recording mode, append mode, Max stop (records up to specified capacity and stop) mode can be selected	
File Size	Capture memory size, 4M bytes, 16M bytes, 64M bytes, 256M bytes	
Max File Number	2048	
Time-specified Auto RUN/STOP Function	Measurement operation can be started and stopped at a specified time and at a specified repetition cycle (selectable from monthly, daily, and hourly).	
Power-on Auto RUN Function	Measurement operation can be started automatically after the power is turned on.	
File Management Function	Measurement data and measurement conditions can be saved in an external storage such as USB memory / SDHC card in a format that can be read by a PC.	
File Type	Measurement data (.DT), all measurement conditions (.SU), auto save data (#nnnnnnn.DT), screenshot (.PNG), PcapNG format file (.PCAPNG)	
File Control	Normal file display, file display and sorting by specified type, save, load, delete, delete all files	
Display	7 inch TFT color LCD with capacitive touch panel	
Line Status LED	11 LEDs always display the connection status of measurement ports	
USB Device Port	Type-C connector, SuperSpeed transfer supported. For PC connection	
USB Host Port	Standard A connector, SuperSpeed transfer supported. For external storage (USB memory / SSD)	
SD Card Slot	For standard size SD / SDHC memory cards, compliant with SD Association standard	
External I/O terminal	4-pin connector for TTL level trigger input/output signals	
GPS Antenna Connector	SMA (female) connector for active GPS antenna connection	
PPS Signal Connector	SMA (female) connector for TTL level PPS I/O signals	
Wi-Fi Connection[8]	IEEE802.11b/g/n frequency range: 2412MHz to 2484MHz Transmission power 802.11b: +18.5dBm, 802.11g: +18.0dBm, 802.11n: +17.0dBm	
Power	Attached AC adapter Input: AC100-240V 50/60Hz Output: DC9V 2A	
Battery	Lithium-ion rechargeable battery (model number: P-26LW2) Battery drive time: 2 hours[9] Charging time: Approximately 3.5 hours when using the AC adapter, approximately 4.5 hours when using the USB Type-C cable (when using a Type-C charger that can supply 2A or more)	
Ambient Temperatures	In operation : 0 to 40 degree Celsius, In storage : -20 to 50 degree Celsius	
Ambient Humidity	20 to 85%RH (No condensation)	
Standard	CE (Class A)	
Size and Weight	234(W) x 186(D) x 44(H)mm, about 990g	
Accessories	LAN cable (LE-8500X(R): 2 pcs, LE-8600X(R): 1 pcs), USB cable (standard A-Type-C), external signal input/output cable (LE-4TG), AC adapter (6A-181WP09), carrying bag (LEB-01), utility CD, quick start guide, warranty card	

* 1 When the power of this unit is turned off, ports A and B are connected through in this unit, and the link between the devices connected between A and B is maintained. The link may be temporarily disconnected during the startup period and shutdown period of this unit. * 2 Uses a part of eMMC for saving measurement firmware * 3 As data can be recorded in the capture memory at a maximum of approximately 3Gbps, it is possible to record without packet loss when measuring 1000BASE-T on one channel. When measuring two channels of 1000BASE-T high traffic lines at the same time, some packet loss may occur. * 4 A GPS antenna (sold separately) is required for GNSS synchronization. External PPS synchronization requires another unit to which a GPS antenna is connected and an SMA coaxial cable (sold separately). * 5 LINEEYE will provide a PC software that can convert the measurement data file of this unit to a PcapNG format file on a PC. * 6 Cannot be used to measure PoE lines in which a current exceeding 720mA flows continuously for 3 seconds or longer. * 7 Not all frames may be recorded in the storage depending on the high traffic line or the performance of the external storage. The maximum recording speed is about 1Gbps (according to our measurement test using USB3.0 connected SSD) * 8 LE-8500XR/LE-8600XR only. For PC connection * 9 According to our test conditions assuming a normal usage situation

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SAFETY WARNING

Read the instruction manual provided with the product before use and use the product as explained in that manual. Using the product in ways not guaranteed in the manual, connecting it to systems outside of the specified ranges and remodeling can all cause trouble and damage. LINEEYE CO. LTD. will assume no responsibility whatsoever for trouble or damage arising because of unauthorized ways of use.

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Sister product **LE-8500X-RT / LE-8500XR-RT**

Supports RS-232C, RS-530, RS-422 / 485, TTL Maximum measurement speed 20Mbps

To be released in October 2022

RS-232C/RS-530 Measurement por | TTL measurement port / External trigger terminal | RS-422/485 Measurement port | GPS antenna connector

LINEEYE CO., LTD.