Battery-powered portable communications analyzer in a newly designed compact frame.

**LE-2500**

**LE-3500**

- Standard communications
  - RS-232C
  - RS-422/485 (RS-530)
- Expanded communications
  - TTL/I²C
  - IrDA/ASK
  - CAN/LIN
  - CC-Link
LINEEYE released the first LE-series model in 1986. Since then, LINEEYE has been developing the LE Series in response to the requirements of a large number of customers, and now come to the fruition of the LE-2500 and LE-3500, the newly designed latest models realizing great downsizing with a sharp reduction in weight. The LE-2500 and LE-3500 incorporate versatile analysis functions and excellent portability, thus fully supporting the trouble analysis of communications systems, industrial equipment, and a variety of in-vehicle networks as well as development tests and after-sale services.
A measurement tool inevitable to on-site tests as well as analysis of communications line trouble.

A lightweight unit in A5 size that can be battery driven for 8 hours continuously.

Multi-protocol support

Incorporates RS-232C and RS-422/485 measurement interfaces as standard features and supports a variety of communications protocols. A DSUB 25-pin terminal block and a variety of dedicated cables, such as X.25, RS-499, and V.35 (*) cables, are available.

* LE-3200 does not support V.35 control signals.

Expansion Kits supports TTL, I²C, IrDA, CAN, and LIN

Protocols of differing hardware specifications are supported by simply changing the measurement boards.

<table>
<thead>
<tr>
<th>Protocols</th>
<th>Expansion Kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>TTL, PC</td>
<td>OP-SS6G</td>
</tr>
<tr>
<td>IrDA, ASK</td>
<td>OP-SS6G</td>
</tr>
<tr>
<td>CAN, LIN</td>
<td>OP-SS76GX</td>
</tr>
</tbody>
</table>

See pages 8 and 9 for details.

Logic Analyzer and Signal Voltage Measurement

Communication line timing is analyzed and displayed as a logic analyzer display to a time resolution of max. 50 ns. The new function of signal voltage measurement ensures ease of the voltage measurement of RS-232C signals in places where tester probes cannot reach smoothly.

See page 7 for details.

Mega Speed Measurement

Analysis is possible at any baud rate(*) from low speed to high speed. Margin tests on communication speed deviation are simple.

* Using high precision DPLL technology for speed baud rate support, transmission and reception speeds can be separately set to an effective 4 digits (error within 0.05%).

Auto Save...Long Recording Time

You can record communications data endlessly or stop recording it automatically when the memory is full. Furthermore, an auto save function makes it possible to save the monitored content of captured memory on a CF card. Auto Save continuously saves data into the measurement log of a user-specified file size, using ring recording as long as the card has space. It is useful for identifying rare communication failures of unknown cause.

PC Link

Text conversion software and capturing software for printout data (*), makes it possible to utilize measurement data on the user’s PC. Furthermore, the use of the optional PC Link Software will widen the application range.

See pages 7 for details.

* These software can be downloaded from LI-NET’s website for free.
A monitor function to visualize communications data.

**Supports multi-protocols**
The online monitor feature records communications data in the capture memory and provides an easy-to-understand display for the type of protocol, without affecting the communications line. As a standard feature, LINE EYE protocol analyzers support various communication standards from asynchronous to packet switching systems. Depending on the test, you can select bit transfer sequence and parity, as well as modulation format from X.25, X.28, V.32, FSK, and 8-16PPM. The feature allows to support effective analysis by omitting SYN codes and using SDLC/HDLc address filter.

**Records Time Data with Communication Data**
LINE EYE protocol analyzers record not only communications data but the time (time stamp) of transmissions and receptions as well as idle time; therefore failure time and timeout status can be checked. It is also possible to record the information of changes in control lines at the same time.

**MONITOR Condition Auto Setting**
LINE EYE protocol analyzers can analyze communications data and automatically set basic monitoring conditions, such as communications speed, character framing, data code, synchronization character, BCC/FCFS, etc. This is effective for monitoring lines of unknown communications conditions.

*The auto-setting is not accurate with small volumes of communications data or data that contains many errors.

**Delay time function added with a voltage measurement feature**
A feature to measure the voltage of four RS-232C signal lines has been added to the conventional delay time function used to analyze the delay time of control line changes (e.g., RTS to CTS changes) at resolution of 0.1 ms.

**Statistical Analysis Capabilities**
Statistics can be compiled for transmission and reception data sets, frames and the number of established trigger events, and subsequently displayed, as a graph (Unit: 1-240 min.). This helps to understand communications traffic and error frequency for a specific time period.

**BERT function to measure the occurrence rate of communications errors.**
BERT support enables you to measure transmission quality of communications lines by a loopback or interactive connection. It is possible to measure evaluation parameters (bit error count, block error count) conforming to ITU-T G.821 Notification. Hence enabling bit error rate evaluations and fault point identification. Fast test patterns and functions such as an error forced interface are comparable to dedicated equipment.

**Trigger Feature for Catching User-specified Events**
The trigger feature allows you to specify a communications event as the trigger condition and have measurement operations executed automatically when that condition is satisfied. Up to four pairs of conditions and operations can be set, which is helpful towards identifying frequent intermittent faults that occurs with communications systems. And, the operation of a trigger condition can be specified as the condition for another trigger, making it possible to analyze complicated operations based on sequential triggers.

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MULTI PROTOCOL ANALYZER
LE-3500 / LE-2500

Online Monitoring, Simulation and BERT Support All-in-One

Simulation function to conduct transmission and reception tests in place of target equipment under test.

With the simulation feature, the LINE EYE protocol analyzers act as the counterpart to the target device and perform transmission and reception tests according to protocol. Even in the early stages of development when matching devices are not available, tests can be run at near to actual operating status. After checking the communications protocol step by step in LINE EYE analyzer's own original MANUAL mode, a developer can create a simple program to branch conditions using menu selection and test more complicated communications protocols. Communications speed can be freely set; therefore margins can be evaluated by intentionally shifting communications speed, and error response processing can be checked using test data that matches in data with parity errors. In addition, data transmission can be linked with the changes in the signal lines such as RTS and CTS at the preset timing.

MANUAL mode

The MANUAL mode allows you to send the data registered in transmission table which corresponds to the "0" to "F" keys. The data can be sent with one press of a key. While checking replies from a unit under development with the monitoring feature, you can easily and simply test the communications process. You can also send fixed data by registering it under a key combination of the SHIFT and "0" to "D" keys, as well as turn RTS/CTS and DTR/DCD signal lines on/off with the SHIFT and "EPP" key combinations.

FLOW mode

Flow control can be simulated on the transmission and reception lines using X-on/off flow control or the control line handshaking. In the transmission mode, up to 16 cycles of data from transmission start until a generated interrupt request can be displayed. In the reception mode, you can set the number of received data cycles until a transmission interrupt request is generated, as well as the time until the transmission resume request is generated.

ECHO mode

In the ECHO mode, LINE EYE protocol analyzers internally return received data. Buffer echo to send back data by a reception frame, character echo to send back data by a character and loop back echo that simply loops back data can be selected. It is used to test display terminals and communications terminals.

POLLING mode

The POLLING mode simulates the slave and master units in multi-drop (1N connection) polling protocols. In the slave mode, the LINE EYE protocol analyzers check the number of received frames that are assigned their address and whether errors occur or not, replying with user-set data. In the master mode, they send polling messages to 32 slave units, and check and display replies from each slave.

BUFFER mode

In the BUFFER mode, you can select between transmission and reception, and send transmitted or received data that has been captured in the buffer using the unit's monitoring feature, as simulation data without requiring further manipulation. This mode is effective in conducting reproducibility tests using the same data as that monitored under actual communications conditions.

PROGRAM mode

By creating a purpose-specific command program, the communications protocol can be flexibly simulated alongside condition monitoring. The program is created using the menu selection, so it is easy to master.
Easy-to-Use Handy Functions
Continue to Evolve

Firmware That Evolves

The latest firmware with additional functions and improvements can be found on our website. If you download it with your PC, you can then update to the latest version via a serial USB cable.

Menu-based Simple Operation

Anyone can easily use LINE EYE protocol analyzers owing to the easy menu selection systems handed down from earlier models.

Top menu display (LE-3500)

A backlit LCD makes it easy to view measurement data at night and in dark places (LE-3500).

PC-compatible File Management Specification

Test conditions and results such as measured data can be saved on optional CF cards in the file management format compatible with your PC. Of course, files can be interchangeably used (*) between models. Therefore, measurement data can be saved on-site with the LE-2500, and analyzed or manipulated in greater detail using the LE-3500 back in the office.

* The LE-2500, LE-3500, LE-7500, LE-4200, LE-6200, and LE-1200 are compatible in measurement data file. Part of data is not saved in higher hierarchy models or new models, however, may not be available to lower hierarchy models or conventional models.

Types, names, sizes, and the date/time of files saved in the memory card can be checked.

When many files have been saved, the file filter feature allows you to specify the type of file to be displayed.

Offline Analysis and Data Searches

Measurement data displays can be freely scrolled and paged. A powerful search feature allows you to locate specific data and perform counting.

Search key
- Communications error (individual error type can be specified)
- Communications data string of max. 8 characters (don’t care and bit mask can also be specified)
- Idle time beyond a specified duration, specific time stamp (don’t care can also be specified), external trigger matching data

Search operations
- Find and display, counting

[Example search key setting]

Auto RUN/STOP for Unmanned Measurement

By setting start and end date of measurement start and end, measurement can be done automatically during the specified time period. For example, measurement only for 3 hours from 18:00 to 21:00 every day is possible. Besides, if the power ON auto run function is used, unmanned measurement can be started automatically without pressing the RUN key after turning power ON.

Various Print Formats

Measurement data of a user-specified range can be printed out continuously from any printer, in the text format that corresponds to the display mode. Print data output from the AUX (RS-232C) port can be saved as a text file in the PC using the utility software or HyperTerminal. And, with a dedicated printer, you can print hardcopy of display images, continuous image of logic analyzer waveforms, and results of statistical analyses.

[Example statistical analysis printout]

[Example logic analyzer waveform printout]

[Example print hard copy of display image]

Utility image

Output from the AUX port

The printing image is saved as file.

Dedicated printer

The PC installed the utility software LEPRINT (WIN) to capture print data.

* The software can be downloaded from LINEYE’s website.
LE-PC300G Enhances the Link between Analyzers and your PC

Enables simultaneous control of multiple analyzers from a PC

The LE-PC300G supports serial connections through the COM port, USB connections, and LAN connections via LINEEYE SI-60 converter, thus enabling remote measurement by multiple analyzers connected at the same time. It also allows you to browse measurement data saved in memory cards and convert data.

[Serial connections and memory card]

PC with PC link software installed

Target line

Measurement data

Target line

Measurement data

Target line

Measurement data

1. The PC link software is not provided on a CD-ROM. Purchase a USB disk if you require USB connection. The USB interface card provides the same features as the serial connection.
2. An interface module used with cards is required on the PC side.

[Linking multiple analyzers by serial and LAN connections]

PC

Target line

LAN/10/100BASE-TX

Target line

Target line

1. SI-60 is a LAN-serial converter supplied by LE-PC300G. Target analyzer is identified by specifying IP address of SI-60 in the remote setting protocol of LE-PC300G.
2. Optional AUX cable for 25-pin D-SUB (LE2-BC). Set the DTE/DCE switch at 0 to DCE.

Allows the measurement data to be checked on your large PC screen.

Records communication logs continuously on PC up to a maximum of 16GB

The remote monitor function allows to record the data measured by an analyzer on the hard disk of PC.

The fixed buffer mode in the ring buffer mode are available. The former stops recording when the specified data size is reached, and the latter records data endlessly within the limit of the specified size.

(Standard time for continuous recording on hard disk)

<table>
<thead>
<tr>
<th>Target line speed</th>
<th>When 1 GB is specified</th>
<th>When 2 GB is specified</th>
</tr>
</thead>
<tbody>
<tr>
<td>9600 bps</td>
<td>Approx. 60 hrs</td>
<td>Approx. 60 hrs</td>
</tr>
<tr>
<td>19200 bps</td>
<td>Approx. 30 hrs</td>
<td>Approx. 480 hrs</td>
</tr>
<tr>
<td>38400 bps</td>
<td>Approx. 15 hrs</td>
<td>Approx. 240 hrs</td>
</tr>
</tbody>
</table>

1. In continuous communication, the buffer size is fixed at 1GB per throughput.
2. Maximum communication speed that ensures recording of measurement data without loss will be about 1/10 of serial transfer speed between analyzer and PC.

Changes the System Language Automatically

The system language alternates automatically between English and Japanese according to that of OS. This facilitates introduction of the software to development bases outside Japan.

LE-PC300G Enhancements

- Enables simultaneous control of multiple analyzers from a PC
- Allows the measurement data to be checked on a large PC screen
- Records communication logs continuously on PC up to a maximum of 16GB
- Changes the System Language Automatically

Recommended Kits

LAN RS-232C Converter

SI-60

Used to connect an analyzer to a PC via Ethernet.

- Automatically translates between Ethernet and SI-60 interface
- RS-232C connection via RS-422A-CEC-RSX
- AUX cable for 25-pin D-SUB (LE2-BC)

LE2-BC

This cable connects the AUX (RS-232C) port of the analyzer to the external device such as SI-60 incorporating a D-SUB 25-pin with data terminal equipment (DTE) specific pin assignments.

- Length 1.5m

1. Cannot use LE-F300G together with OPT-FW10, OPT-FW16, OPT-FS/3X, OPT-FS/TX, and OPT-FS/7T at the same time.
**Expanded communications**

**TTL/I²C | IrDA/ASK | CAN/LIN | CC-Link**

Optional measurement cables expand the application range of the LE Series.

---

**TTL/I²C Expansion Kit  OP-SB5G**

This expansion kit supports the clock synchronous communications between LSI chips on printed circuit boards (PCB) besides HDLC communications and UART asynchronous communications at 3 and 5 V TTL signal levels. And this allows the direct probing connection of the communications lines on PCBs. Furthermore, in I²C simulation mode operates as a slave or master to input and output data.

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**Infrared Communications Expansion Kit  OP-SB6G**

This expansion kit is provided with a probe pod for monitoring IrDA (SIR, MIR, and FIR) and ASK infrared communications. The kit has an IrDA monitor function that makes it possible to change communications speed automatically according to the IrAP protocol and allows the seamless monitoring of infrared data, the mode of which changes from SIR (9600 bps) to FIR (4Mbps). The kit has two optical emission levels (high and low levels), either one of which is selectable.

---

**Current Loop Adapter and Expansion Board  OP-1C + SB-25L**

The OP-1C used in combination with the SB-25L (see note 1) supports current loop communications presently used in the FA field. The kit incorporates a communications circuit with photocoupler built in OP-1C insulation and constant-current power supply of insulated type, thus realizing not only monitoring but also easy communications testing with passive or active current loop devices.

Note 1: The dedicated expansion board provided to the OP-SB5G or OP-SB6G can be used in place of the SB-25L. The purchase of the SB-25L is unnecessary if the dedicated expansion board is on hand.

---

**Applicable analyzers**

- LE-3500, LE-2500

**Measurement interface**

- RS-232C, TTL/CV/OS, PC

**Probe signal**

- 100mV, 1mA, 2mA, 5mA, 7mA, 10mA, 15mA, 20mA

**Input impedance**

- 1000Ω

**Input level threshold**

- High: Min. 2.2 V, Low: Max. 0.9 V (Maximum input ±12V)

**Output level voltage**

- High: ±5 V, Low: ±0.5 V

**Input/output communication**

- Built-in microcomputer

**Operating temperature**

- -10°C to +50°C

**Operating humidity**

- 20% to 80% non-condensing

**Power source**

- 100V~240VAC, 50/60Hz, 10W

**Dimensions**

- 180 x 120 x 40mm (W x H x D)

**Weight**

- 0.2kg

**Accessories**

- Dedicated daphne and relay cable
Increases in the efficiency of developing and testing in-vehicle networks.

**CAN/LIN Communications Expansion Kit OP-SB7GX**

This expansion kit makes the measurement of up to 2 channels simultaneously by using Controller Area Network (CAN) communications used widely in FA systems and in-vehicle communications, and Local Interconnect Network (LIN) communications data in flexible connection. This expansion kit allows the simultaneous logic measurement and analog measurement of four-line external signals.

**CAN/LIN Simultaneous Monitoring**

The OP-SB7GX enables the simultaneous measurement of CAN communications data and LIN communications data along with time stamp, thus contributing to the development of bridge units connecting the CAN and LIN. Furthermore, the ID filter can be used for highly efficient analysis.

**CAN Simulation Function**

A frame registered in the CAN data table is transmitted. A part of the data in the frame can be specified as sweep data that can be transmitted with the value of the data automatically changed from the initial value to the third target value, which makes it easy to check the response of the equipment according to the change of communications data.

**LIN Simulation Function**

The OP-SB7GX in master mode can transmit the contents of the LIN data table in the order set in the schedule table repeatedly or according to key manipulation. A parity error, any number of break bits, and any SYNC data can be set to conduct confirmation tests for error data with ease. While in slave mode, the contents of the data table set with an ID conforming to the request of the master will be transmitted. Furthermore, the Wake-up signal (W0) can be transmitted at any time.

**Supports high-speed HDLC communications for FA fields and CC-Link.**

**High-speed HDLC Communications Firmware OP-FW10G**

This expansion firmware increases the baud rates of bit synchronous communications (e.g., HDLC/UDDL/DX, 25, and CC-Link communications) up to 10 Mbps. The firmware processes main measurement items completely with a field programmable gate array (FPGA), thus precisely capturing communications data along with time stamps in 1-μs units.

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**Applicable standard:**

- CAN/ISO 15693

- CAN/ISO 11898

**Interface:**

- CAN: Conforms to ISO 15693 and ISO 11898-2 standards
- LIN: Conforms to ISO 11898-2 standard (with 5-pin connector x 2)

**Caution:**

- The use of the OP-SB7GX is not recommended with a large signal.
# LE-2500 / LE-3500 Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>LE-3500</th>
<th>LE-2500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>RS-232C (V.24)*1</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>RS-422/485 (RS-530)*1</td>
<td>✔</td>
</tr>
<tr>
<td>Expansion measurement interface</td>
<td>X 2021</td>
<td>[LE-25Y16]</td>
</tr>
<tr>
<td></td>
<td>RS-449</td>
<td>[LE-25Y37]</td>
</tr>
<tr>
<td></td>
<td>V 35</td>
<td>[LE-25M34]</td>
</tr>
<tr>
<td></td>
<td>3V5V TTL*/2C</td>
<td>[OP-S85G]</td>
</tr>
<tr>
<td></td>
<td>Infrared communications/IDASBK</td>
<td>[OP-S85G]</td>
</tr>
<tr>
<td></td>
<td>Serial:</td>
<td>[OP-IC = 5 V 2.5%]</td>
</tr>
<tr>
<td></td>
<td>CAN/IN</td>
<td>[OP-S87TX]</td>
</tr>
<tr>
<td>Standard Protocol</td>
<td>ASYN (Asynchronous), ASYN//PP</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Bit synchronous HDLC/HDLC/25</td>
<td>✔</td>
</tr>
<tr>
<td>Optional Protocol</td>
<td>FIAC</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>RS/RSTN*1</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>ISO 11898 (LAP)</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>CO-LINK</td>
<td>Not supported</td>
</tr>
<tr>
<td></td>
<td>CAN</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>DeviceNet</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>LIN</td>
<td>✔</td>
</tr>
</tbody>
</table>

## Synchronous clock
- ST1 (CTE transmission clock), ST2 (DCE transmission clock), RT (DCE reception clock), AR (The synchronous clock extracted from the edge of the transmission and reception data)

## Capture memory
- Memory capacity: 6.4 MB, 2.4 MB
- Battery backup: Approximately 5 years with built-in lithium battery
- Added function with memory: Two divided areas, data protection, and selection between fixed-size buffer and ring buffer

## Baud rate
- Max speed (full-duplex): 1.544Mbaud, 1.000Mbaud
- Max speed (half-duplex): 2.048Mbps, 1.000Mbaud
- Speed setting range: 50bps to 2.048Mbaud, 50bps-1.000Mbaud
- Speed setting step: Freely set to four effective digits, separately for transmission and reception (Margin of error: ± 0.01% or less)

## Data format
- NRZ, NRZI, FM0, FM1, APRM, ASCII

## Data code
- ABCD, EBCDIC, JIS, JISB, Bauder, Transmit, IP/A8S, EBCDIC, EBCDIC = ASCII

## Character Framing
- Asynchronous Data bit 6, 7, 8 = parity bit 0 (0), 1 (1) = stop bit (1, 2)
- Character synchronous Data bit = parity bit (6 or 8 bits in total)
- Bit-oriented synchronous Data bit (8 bits)

## Parity bit
- NONE, ODD, EVEN, MARK, SPACE

## Multi-processor bit
- MP (multiprocessor) bit is used with a special mark

## Bit transmission order
- LSB first or MSB first (exchangeable)

## Polarity inversion
- Normal or inverted (exchangeable)

## Error check
- For all protocols Parity (ODD, EVEN, MARK, SPACE), Framing, Break, BCC (CRC, CRC-4, CRC-12, CRC-16, CRC-32, CRC-40, CRC-E, T) BCC permutation mode.
- For bit-oriented synchronous protocol: Abort, short frame

## Communication log
- Communication log is recorded continuously and displayed in the LCD without affecting the communication lines.
- Time stamp display: Data time stamp: Unit selectable among "Day/Min." "Min/Sec." "Min/Sec/100ms" (OFF or no recording)
- Line status display: Records and displays the waveform of 4 signals (chosen from RS(RTS), CS(CTS), EN(DTR), OR(DSR), CO(DCC), CS(RS), EXIN external trigger input) along with the transmission/reception data.
- Address filter: Records only frames of the specified address. (only when HDLC/HDLC/25)
- Data display and operations: Pause in capture, scroll, paging, jump to the specified screen.
- Bit shift display: Entire frame can be shifted to the right or left in 1 bit increments.
- Protocol transition display: HDLC (modulus 87128), ITU-T X.25 (modulus 87128), LAPD, PPP, BCC, LLC, FIC

## Line status LED
- Two color LEDs of BD, RD, RD/RST, CS(CTS), EN(DTR), OR(DSR), CO(DCC), CS(RS), ST(TX1), ST2(TX2), RT(RX0), RT(POC), ST1(TX1), ST2(TX2)
- Logic ON (red), Logic OFF (green), no connection NC (light off)
- Logic ON (red), Logic OFF or no connection NC (light off)

## Interval timer
- 2minds, Max. count: 999999 (Resolution: 1ms, 10ms, 100ms)

## General-purpose counter
- 2minds, Max. count: 999999

## Data counter
- For BD and RD (1 each): Max. count: 4294967295

## Data search function
- Specification: Retrieves the data with specific condition from capture memory.
- Search condition: Communication error (parity, MP, framing, BCC, break, abort, short frame can be specified individually), communication data stringing up to 8 characters (don’t care and bit mask available), idle time more than the specified duration, matched timecounter value, logic status of Interface signal line and external trigger input.
- Search action: Shows the data in the top or the enumeration display (selectable)

## Monitor conditions auto setting
- Measurement conditions such as protocol transmission speed, (max. 115.2Kbps), data code, synchronous character, and BCC check can be set.

## Auto runtop function
- Enables measurement to start and end at the specified time at the selected repeating cycle (monthly, daily, hourly)

## Power ON, auto run function
- Enables measurement to start automatically after power is turned ON.

## Auto save function
- Specification: Automatically saves the monitored data in the capture memory and saves as communications log file in the CF card
- File size: BUF (capture memory size): 1MB, 2MB, 4MB, 8MB
- Max files: 1024
<table>
<thead>
<tr>
<th>Model</th>
<th>LE-3500</th>
<th>LE-2500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delay line function</td>
<td>Measures and displays the interval of change in the interface signal line. (current 1μS, past average: 0.1μS)</td>
<td></td>
</tr>
<tr>
<td>Signal voltage measuring function</td>
<td>Measures and displays the value of signal amplitude: SD, RO, ER (RT), and CO (DCO) over RS-232C (current/min/max range ±5V, resolution 0.1V)</td>
<td></td>
</tr>
<tr>
<td>Statistical analysis function</td>
<td>Takes statistics and displays graphs of transmission/reception data count, number of frames, and satisfied trigger conditions. Not available</td>
<td></td>
</tr>
</tbody>
</table>

| Specification | Measures the logical change of the interface signal in the sampling clock period, and displays its wave. |
| Trigger condition | Trigger conditions in the ONLINE monitor function. Logical status of interface signal or external signal match. |
| Trigger position | Before, center, after |
| Zoom in/out | dB, 0.1, 0.2, 0.3, 0.5, 1.0, 1.5, 2.0, 3.0, 5.0, 10.0 |
| Other functions | Time measurement by cursor, signal line exchange, signal status search. |
| Communication mode | Synchronous (SYNC), Asynchronous (ASYNC) |
| Measurement speed | 50bps-2.048Mbps, freely set to four effective digits. 500ps±1, 000Mbps, freely set to four effective digits |
| Test pattern | 2^n-1, 2^n-1, MARK, SPACE, ALT, DBL, ALT, 3rd, 4th, 5th, 6th |
| Error bit insertion | Inserts 1-bit or 5-bit error in test pattern by key operation. |
| Measurement range | To be able to measure the parameter of the ITO-T device, 0.01V |
| Transmission data entry | Enables transmission/reception test of any given data in DTE or DCE mode (selectable with pin arrangement). |
| Error data entry | A part of transmission data can be registered as error data such as parity error. |
| Line control mode | Auto Controls transmission timing with RS(DES) C(S)CTS, B(DTR), DOR, CO(DCG) signal lines automatically in 1ms increments or manual (key operation) can be selected. |
| Transmission control | Auto control on/off during a data transmission or manual mode setting with ER (DTR) or CO (DCO) key operation can be selected during simulation of RS-485. |
| FLOW control | (Flow control test) Sends data according to the protocol's preset, whether receiving communications data is the status, or the interface is in the protocol. |
| ECHO control | Sends the received data frame by frame (buffer echo), by data character echo or by loop back. |
| POLLING control | Sends the multi-purpose data transmission frame (buffer echo), by data character echo or by loop back. |
| BUFFER control | Reproduces transmission of selected data (SD or RD) from memory by monitor function. |
| PROGRAM control | Creates a simulation program (max. type: 4, max. steps: 512) using the dedicated commands (32 types) to test the control function. |
| File management function | Measurement data and condition can be saved in the CF card. And the format of the data is compatible in the PC. |
| File types | Measurement data (9), all measurement conditions (9), trigger save data (TS SAVES), OT, and auto save data ( Коинотоото) |
| File operations | Normal file display, file display by specified type, creation data check, save, load, delete all, and format. |
| Max capacity (MB) | 8 MB | 2 GB |
| Print function | Special range of measurement data can be continuously printed on paper corresponding to the display mode. Display ranges are printed in plotters and plotters. |
| LCD | Monochrome: 240 x 64 dots with backlight | Monochrome: 240 x 64 dots with no backlight |
| AUX (RS-232C port) | Provided AC adapter Input: 100 to 240 VAC at 50/60Hz |
| Built-in battery | Nickel metal hydride battery (Model: R-19S). Battery charging time 4 hours. Battery life: About 9 hours. |
| Temperature range | In operation: ±10 to 50 degrees, in storage: -10 to 50 degrees |
| Humidity range | 40% (±10%) max |
| Dimensions | CR(diam.): 32.6 x 200.0 |
| Weight | About 790g | About 760g |

**Standard support:** Supported with option product: [ ]

[1] An optional monitor cable (SIG-B) and terminal block (SIG-2B) are required in the case of monitoring over RS-232C with a D-sub 9-pin connector or RS-422/485 with a unique terminal arrangement. [2] To have the function, optional accessory described in [1] is required. [3] V.C control signal lines are not supported. [4] Mode in which all data is imported with sync clock edge. [5] Transmission/reception data is as timed as the time stamp, and line status consumes 4 types of memory at each capture. [6] Correct auto settings are impossible if the amount of communications data is small or communications data includes a large number of errors. [7] Operation is not guaranteed with memory units not specified by LINE E.Y. [8] The provided AC adapter (3A-181 WP09) with a positive center plug or the conventional AC adapter (2A-161 WP09) with a negative center plug can be used. [9] When LCD backlight is OFF.

### Order Information
- LE-3500 (LE-3500) **E** (Comes with Japanese manaul.)
- LE-3500-E (LE-3500-E) **E** (Comes with English manaul.)

### Standard Set
- Portable communication analyzer
- D SUB 25-pin monitor cable (LE-251M)
- D SUB 9-pin AUX cable (LE-24V)
- External signal I/O cable (LE-4TG)
- AC adapter (3A-181 WP09)
- Carrying bag (LE-B01)
- Utility CD
- Instruction manual
- Warranty

An easy-to-carry transportable carrying bag is provided.
Options for LE-3500 LE-2500

Cables / Terminal blocks / Converter

- Monitor cable for USB 25-pin LE-25M1
  - Branch cable for monitoring communication lines over USB 25-pin.
  - 1.5m 0.1m
  - DB9(Male) DE9(Female)
  - *Same as the cable packed with analyzer.

- Monitor cable for USBl 9-pin LE-259M1
  - Branch cable for monitoring RS-232c over USB 9-pin of PC etc.
  - 1.5m 0.2m
  - DB9(Male) DE9(Female)

- Terminal block for USBl 25-pin LE-25TB
  - Converts parallel RS-485/422 port (USBl 25-pin specification) to terminal block specification.

- X.21 Monitor cable LE-25Y15
  - Branch cable for measuring X.2021 over USBl 15-pin (Shield type)
  - 1.2m
  - DB9(Male) DE9(Female)

- RS-232c cable LE-25S530
  - Shield cable for RS-232c interface

- AUX cable for DPU-414 LE-28P
  - Cable for connection AUX (RS-232c) port of analyzer and serial port of DPU-414 (printer)
  - Length 1.5m

- AUX cable for USBl 9-pin LE-28V
  - Cable for connection AUX (RS-232c) port of an analyzer with USBl 9-pin (DYE specification)
  - Length 2.5m
  - *Same as the cable packed with analyzer.

- RS-530 cable LE-25S530
  - Shield cable for RS-530 interface

- AUX cable for USBl 9-pin LE-25Y37
  - Branch cable for measuring V.35 over USBl 37-pin (Shield type)
  - 1.2m
  - DB9(Male) DE9(Female)

- AUX cable for USBl 9-pin LE-25M34
  - Branch cable for measuring V.35 over MS-34 pin
  - 1.5m
  - DB9(Male) MS-34(Female)

Memory card

- 8G-byte CF card CF-8GX
  - 8G-byte compact flash card, the operation of which has been confirmed on LINEEYE® Analyzer.
  - Applicable model LE-3500 LE-3501

- 2G-byte CF card CF-2GX
  - 2G-byte compact flash card, the operation of which has been confirmed on LINEEYE® Analyzer.
  - Applicable model LE-3500 LE-3501 LE-2500

AC Adapter

- Wide input AC adapter 3A-181 WP09
  - Input AC100-24V, 50/60Hz
  - Output DQ0-3A
  - 2-pin plug connector
  - *Same as the AC adapter packed with analyzer.

Battery pack

- Lithium battery pack for replacement P-19S
  - Rating: 4.8V, 1900mAh
  - *An auxiliary and replacement battery equivalent to the Analyzer built-in battery.

Carrying bag

- Carrying bag LEB-01
  - Bag with pockets for storing and carrying accessories such as AC adapter, cables, etc.
  - *Same as the carrying bag packed with analyzer.

Compact thermal Printer

- DPU-414-31E-B-E
  - Built-in battery, dedicated roll paper (x) included
  - AC adapter and cable are not prepared, provide them separately

- DPU-414-PA
  - Includes printer (LE-2531-B), roll paper x1, AC adapter (PW-4007-JU1-E), and printer case (LE-28-P)

Handy thermal printer for on-site printout of measurements

- High-speed printing of 5.25 char/sec per second
- Incorporates a handy lithium battery
- Supports Centronics parallel and IBM-PC/XT ports
- Dimensions: 150(W) x 86(D) x 80(H)mm
- Weight: Approx. 295g (including built-in battery)

Options

- AC adapter for DPU-414-31E-B-E
  - PW-4007-JU1-E
  - PW-4007-EC-E

Printout of the measured values and instructions

- Continuous printout
- Printout of measured values and instructions

MULTI PROTOCOL ANALYZER

LE-8200

2.4G/10G 10/800 100BASE T 10BASE 100BASE

Safety Warning

Read the instructions provided before use and use the product as instructed in the manual. Using the product in ways not permitted in the manual may cause trouble or damage. LINEEYE CO., LTD. will not assume any responsibility for trouble or damage arising because of unauthorized ways of use.

SAFETY WARNING

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