# LINEEYE ®

Dedicated to Asynchronous Communication
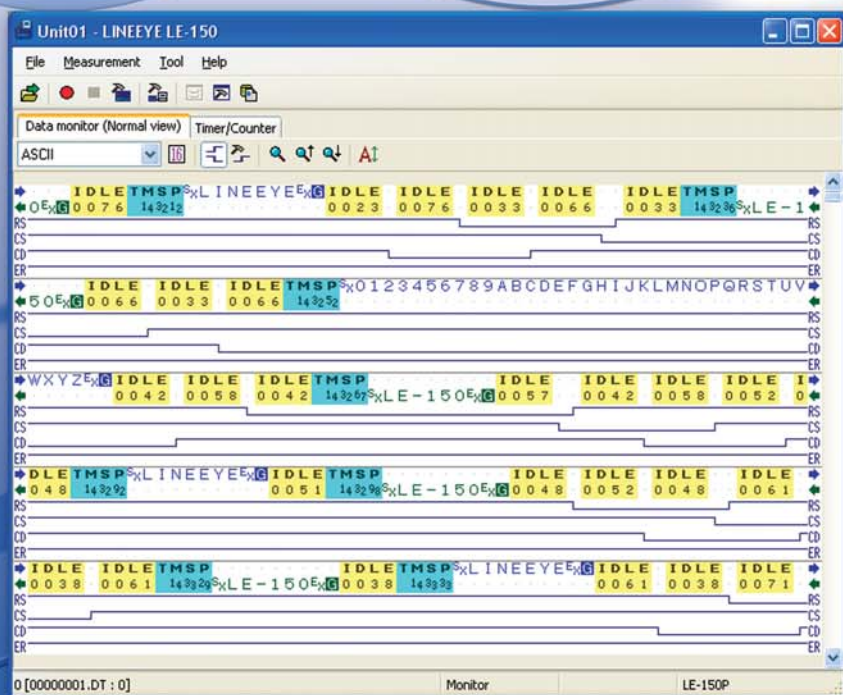
## PC-connectable Communication Protocol Analyzer

# LE-150P

An Entry Model of the PC-connectable Communications Protocol Analyzer Incorporating Substantial Functions (e.g. Continuous HDD Recording) Working in Cooperation with the PC, Offered at a Low Price Affordable for Every Engineer.
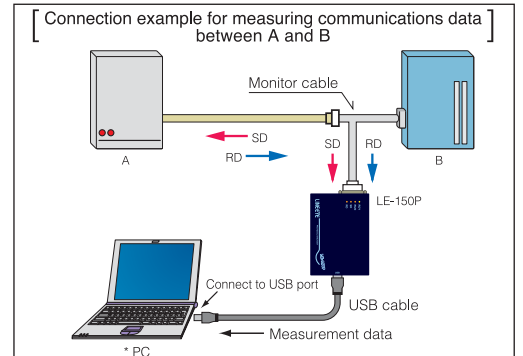
USB Connection Type
**LE-150P**



LINEEYE

# Protocol analyzer for ASYNC which can also analyze PPP communications by the PC at reasonable price.

## USB Connection Type

## LE-150P

The LE-150P is an entry model connected to the PC over USB 2.0 specially for asynchronous communication at full speed. The model incorporates full-fledged analysis features including arbitrary speed settings and point-to-point protocol (PPP) communication, yet offering a low price that is easily affordable.

[ Connection example for measuring communications data between A and B ]

Monitor cable

A    SD    SD    RD    B
RD

LE-150P

Connect to USB port

* PC

USB cable

Measurement data

* A PC with a USB port to which the included analysis software is installed.

## Supports arbitrary speed settings up to 250 kbps.

Analysis is possible at any baud rate from low speed to high speed.[1] For example, a margin test of communication speed is possible at a baud rate of 9,648 bps.
[1]: LINEEYE's patented arbitrary baud rate technology is applied with a maximum setting error of ± 0.01%.

[ Setting Screen for Data Monitoring ]

## Supports RS-232C/422/485 (Standard Feature)

LE-150 Series analyzers come standard with high-use RS-232C and high-speed RS-422/485 measurement interfaces. With the OP-5M (option) used, it is possible to support TTL-level communication at 2.5, 3.3, and 5 V.

[ Signal Definitions for Measurement Interface (DSUB 25-pin) ]

| Pin | Signal | |
|-----|--------|--------|
| 1 | FG | |
| 2 | RS-232C | SD |
| 3 | RS-232C | RD |
| 4 | RS-232C | RS |
| 5 | RS-232C | CS |
| 6 | RS-232C | DR |
| 7 | GND[2] | |
| 8 | RS-232C | CD |
| 9 | +5VDC[1] | |
| 10 | RS-422 | RXDB(+)[2] |
| 11 | RS-422 | RXDA(−)[2] |
| 18 | RS-422/485 | TXDB(+)/TR(+)[2] |
| 19 | RS-422/485 | TXDA(−)/TR(−)[2] |
| 20 | RS-232C | ER |
| 22 | RS-232C | CI |

[1]: Power is supplied when connecting adapters such as OP-5M.
[2]: Signals are obtainable on the terminal block with the LE-5TB used.
Notice: Do not connect RS-232C device to which power supply of more than 6V is allocated in 9, 10, 11, 18 and 19-pin of DSUB 25-pin connector to the analyzer by using the included monitor cable, because it is possible that the analyzer breaks.

[ Image with LE-5TB Used ]

[ Image with OP-5M Used ]

## Continuously Records Communication Logs up to 8 Gbytes

It is possible to continuously record measured data on the hard disk of the PC while displaying the data in real time. The continuous recording of measured data in a specified size is possible. Therefore, it is useful for identifying rare communication failures of unknown causes.
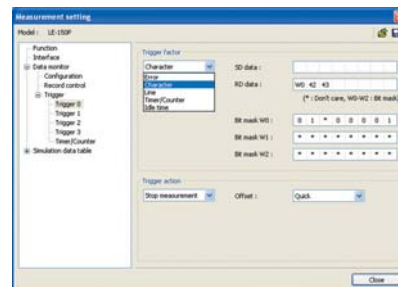
[ Standard Time for Continuous Recording on Hard Disk[1] ]

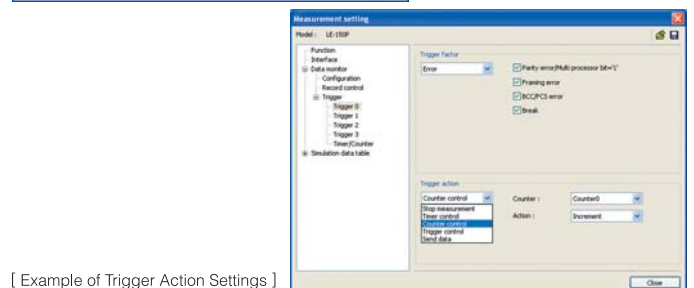| Target line speed | When 1 GB is specified (e.g. 1 MB X 1,000 files) | When 8 GB is specified (e.g. 8 MB X 1,000 files) |
|-------------------|--------------------------------------------------|--------------------------------------------------|
| 9600 bps | Approx. 60 hrs | Approx. 480 hrs |
| 19200 bps | Approx. 30 hrs | Approx. 240 hrs |
| 230.4 Kbps | Approx. 2.5 hrs | Approx. 20 hrs |

[1]: When measuring full-duplex communications line which is transmitted at an 1-ms interval between 1-kbyte data blocks.

## Exactly Catching Target Communication Data

LE-150 Series analyzers have a trigger function, with which up to 4 condition settings can be specified in combination with corresponding actions, and precisely captures target data during measurement. The analyzers incorporate a search function as well, thus quickly retrieving and displaying specified data from large quantities of measured and recorded data items and saving the required time of analysis.

[ Example of Trigger Condition Settings ]

[ Example of Trigger Action Settings ]

## Simultaneous Recording of Time Data and Control Line Data

LE-150 Series analyzers can measure data on idle time, time stamps, and control line changes highly precisely and analyze the data along with communications data. The analyzers internally process such data without being influenced by the load condition of the PC's operating system.

## Compact Size
A Space-saving pocketbook-size Unit Allows Ease of Carrying

## Equipped with Simple Simulation Function

LE-150 Series analyzers incorporate an easy-to-use simulation function that makes it possible to transmit preset transmission data (16 types of data with a total of 16 Kbytes) or fixed data, such as FOX messages, with one click while checking reception data.

[ Setting Screen for Transmission Data Registration ]

■ Data Registration Function
・Switching between hexadecimal input and numeric input
・Parity error settings for specified data
・Multi-processor bit ON/OFF
・BCC (FCS) calculation and addition
・Multi-data filling (bulk input)

[ Example of Simulation ]

Data transmission is possible with the mouse operated while checking the data.

## Converts Measured Data into Standard Data Formats

Communications log files can be converted into text or CSV format at once for use on word processors or spreadsheets. In consideration of data analysis on general-purpose search software, it is possible to delete decorative guides or time data, and to specify conversion of sender or receiver data only.

[ Text-converted Format Example 1 ]

## Automatically Switches between Japanese and English

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.

[ Setting Screen for Communication Conditions (Japanese) ]    [ Setting Screen for Communication Conditions (English) ]

## Compact, Lightweight, and Low Power Consumption Design

LE-150 Series analyzers employ an aluminum casing and a high-density six-layer PCB for a size reduction to a pocketbook size. The LE-150P consumes minimal power, thus operating at USB bus power.

## Expandable FPGA Firmware

Users can download the up-to-date version of the analysis software and firmware for the analyzer and keep the analyzer installed with the latest applications.

# LE-150P

## ■ Nomenclature



150
145
28
90

- RDY
- RUN
- SD
- RD

① RS-232C/422/485
② EX.TRG I/O G
③ (Status indicator LEDs)

USB

④

Unit (mm)

① Measurement interface
② External trigger I/O terminal
③ Status indicator
④ USB connector

## ■ Specifications

| Model | | LE-150P |
|---|---|---|
| Measurement interface | | Standard: RS-232C*1/422/485*2<br>Option: 2.5/3.3/5 V TTL*3 |
| Supporting protocol | | Asynchronous (Async), Async PPP<br>Data (5, 6, 7, and 8 bits) + parity (none, odd, even, mark, space, and MP*4) + stop (1, 1.5 and 2 bits)*5 |
| Data rate | | 50 bps to 250 kbps*6 |
| Data code | | ASCII, EBCDIC, JIS7, JIS8, Baudot, Transcode, IPARS, EBCD, EBCDIK, and HEX |
| Bit transmission order | | LSB first or MSB first |
| Bit polarity | | Normal or inverted |
| Record storage | Capacity | Up to 1,000 files in 1 MB, 2 MB, 4 MB or 8 MB can be specified on HDD of the PC. |
| | Mode | Fixed buffer mode (measurement finished with specified capacity used) or<br>ring buffer mode (endless recording leaving the latest data of the specified capacity) selectable. |
| Error check | | Parity, framing, break, LRC, CRC-16, CRC-ITU-T, CRC-6, and CRC-12 |
| Idle time | | OFF (no recording) or recording in resolution of 100 ms, 10 ms or 1 ms. |
| Time stamp | | OFF (no recording) or selectable "Day/Hr/Min", "Hr/Min/Sec" and "Min/Sec/10 ms." |
| Line status | | Records RS, CS, ER, DR, CD and CI signal logic along with data. |
| Trigger | Condition | Specified types of communication errors, communications data string up to 8 characters (don't care and bit mask available),<br>logic of interface signal line, match timer counter value, idle time more than the specified duration, external signal |
| | Action | Stops measurement (offset can be set), controls timer/counter, enables and disables trigger conditions, sends the specified data string |
| External trigger I/O terminal | | External device and trigger signal I/O (Input: Trigger condition; Output: Active output when conditions satisfied)*8 |
| Search function | | Specified types of communication errors, communications data string up to 8 characters (don't care and bit mask available), idle<br>time more than the specified duration, time stamp at the specified time (don't care can be specified), trigger matching data |
| Simulation function | | Possible to transmit 16 types of transmission data strings registered in advance (total of 16 K data) with one click.<br>DTE/DCE pin specifications selectable, presets line/data timing, inserts parity error |
| Save | | Saving raw data in text or CSV format. |
| LED indicator | | RDY (Ready), RUN (Measuring), SD (Sending data),<br>RD (Receiving data) |
| PC connection interface | | USB 1.1/2.0 (at full speed) |
| Power supply | | USB bus power operation (1.5 W max.) |
| Dimensions and weight | | 90 (W) x 150 (D) x 28 (H) mm, approx. 200 g |
| System requirements | PC | PC/AT compatible (DOS/V) — CPU: Pentium3 1GHz min. with RAM capacity of 256 MB or more recommended.<br>HDD: 5 MB + capacity for communications log recording |
| | | USB port |
| | OS | Windows® 98SE / Me / 2000 / XP / Vista / 7 |
| Accessories | | · Analyzer<br>· Analysis software CD<br>· USB cable (1.8 m)<br>· DSUB 25-pin monitor cable |

*1: Monitor cable LE-259M1 (option) is required if the target RS-232C port is DSUB 9-pin. *2: No connection cable for RS-422/485 is provided. Prepare a cable suitable to the measurement side, or use terminal block adapter LE-5TB (option). *3: TTL monitor probe pod OP-5M (option) is required. *4: The parity can be specified as a multi-processor bit. *5: The number of stop bits can be set to 1.5 only in monitor mode. Transmission data at the time of simulation cannot be set to 1.5 bits. *6: Arbitrary speed setting to 4 effective digits is possible. *7: No data recording is possible while in RS-422/485 communication. *8: No connection cable for the external trigger terminal is provided. Prepare a harness fitting for the terminal connector (HIROSE ELECTRIC's DF1E-3P-2.5DS), or use three-wire probe cable LE-3LP (option).

## ■ Option

### DSUB 9-pin Monitor Cable
**LE-259M1**

A branch cable for measuring RS-232C over DSUB 9-pin.

### TTL Monitor Probe Pod
**OP-5M**

A connection probe for monitoring TTL-level communication lines. (Signals at 2.5/3.3/5V supported.)

*OP-5M cannot be used for the analyzer in simulation mode.

### Terminal Block Adapter
**LE-5TB**

An adapter to convert RS-422/485 signals from the DB connector to the terminal block.

DB25 — Terminal block
18 ∅ —— ∅ TxD+
19 ∅ —— ∅ TxD−
10 ∅ —— ∅ RxD+
11 ∅ —— ∅ RxD−
7 ∅ —— ∅ GND

### Three-wire Probe Cable
**LE-3LP**

A cable with IC clip terminals suitable to the external trigger I/O connector of the Analyzer.

---

# LINEEYE CO., LTD.

Tohmatsu QMS, EMS
QR-00337
ER-00094

MS JAB CM037

PRINTED WITH SOY INK™
Printed with environment-friendly soy ink on used paper.

Printed in Japan

L-10101J/LE②