E-Log – Environmental Data Logger

www.lsi-lastem.com

Highlights

- N.8/16 analog inputs, 4 digital inputs, n.1 RS232 input;
- Inputs extension using MASTER/SLAVE units;
- Available with built-in ZigBee radio;
- Very low power consumption (< 4 mW);
- N.99 channels for acquisition or calculation;
- 8 MB Flash data memory;
- LSI-LASTEM, Modbus RTU, TTY communication protocols;
- Modbus RTU Master feature;
- Spontaneous data transmission in ASCII format by TCP protocol;
- N.2 RS232 serial ports;
- Built-in calculation library for derived quantities;
- Built-in mathematical calculations library;
- Outputs actuation over programmable events to activate external devices;
- Sampling rate 1 sec. to 12 hrs;
- Elaboration time-base 1 sec. to 24 hrs;
- PC connection via RS232/radio/modem PSTN/GSM/GPRS/Ethernet;
- Display and keyboard;
- Compatibility with CommNET, GIDAS and XPanel programs.

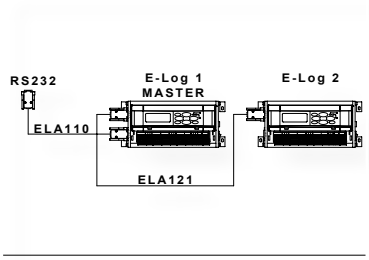
LSI Lastem E-LOG has been explicitly designed for environmental applications. It features specific inputs and calculations for environmental sensors while maintaining an all-time-low power consumption. E-LOG stores data sampled from connected sensors and supports a wide range of communication protocols.
Rugged and durable, E-LOG ensures prolonged data-logging in even the most severe environments, while the 16-bit design of the A/D converter ensures data accuracy and reliability of measurements in meteorological and hydrological applications, for air quality and outdoor environmental monitoring.

Main Features

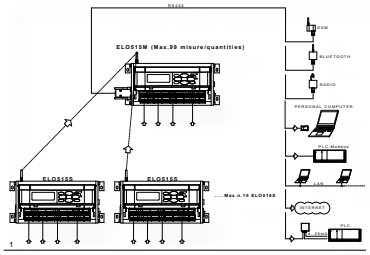
Inputs
N.8 differential (n.16 single-ended) inputs for analog signals (voltage, current and resistance).
N.4 digital inputs programmable as frequency or on/off digital inputs
N.1 RS 232 input for sensors with serial interface.
The number of inputs can be increased using MASTER/SLAVE design. MASTER E-Log can manage up to 99 total channels.

Built-in radio
The ELO515 series is equipped with a built-in ZigBee radio. The Zigbee Radio network allows connecting of several LSI LASTEM devices, including E-Logs, radio sensors (S-Log) and R-Log-SLAVE units.

Derived environmental and mathematical calculations
E-Log has an internal library of derived environmental quantities. These calculated quantities can use inputs from monitoring measures, user-defined constants and other derived quantities This library also includes mathematical calculations. (see *Calculated Quantities*)



Inputs extension: MASTER/SLAVE units by cable



Inputs extension: MASTER/SLAVE units by radio

Data storage
E-Log stores inside its 8 Mb Flash EEPROM memory statistical elaborations with time bases from 1 sec. to 24 hrs:
-instant values;
-arithmetical average, minimum, maximum, standard deviation;
-totalization and integration time measurements;
-wind elaborations:
resulting/prevailing direction, resulting speed, direction standard deviation (sigma-theta), calm %.
Memory structure is circular.

Output actuation at event/time
E-Log has seven digital outputs to power up external systems or alarm devices. Outputs are activated according to user-defined actuation logics:
- Greater/less than, within a range;
- Wind alarm;
- Alarm for beginning of precipitations;
- Flood Alarm;
- Scheduled event;
- Snow level alarm;
- Error state of the unit.

Sampling rate
Programmable for each sensor (1 sec -12 hrs). E-Log manages up to n.12 channels from sensors and n.8 derived quantities in 1 sec

Sensors power supply actuation
E-Log can feed sensors requiring power supply for their operation, with user-defined warm-up time.

Battery
Batteries are normally included in ELF enclosures (see Accessories). LSI-LASTEM supplies 2-15-40 Ah rechargeable battery packs and 1.5-Volt, D-shaped disposable battery packs. Batteries can be recharged using main power supply or solar panels.
Models ELO310 and ELO515 come with an internal 1.2 Ah battery.

Power supply
E-Log runs at 12 Vdc input voltage power supply. It has an extremely low power consumption (< 4 mW).
LSI-LASTEM offers a wide range of power supply systems and battery packs according to the requested power source and autonomy.

Serial ports for data communication
E-Log is equipped with two RS232 serial ports. Both of them can be used for local or remote communication for data download or real-time update of instantan eous and diagnostic values.
COM2 port can also be used to connect sensors with RS232 output.
In models equipped with built-in radio, COM2 port is not available.

Direct connection to PC
E-Log can be directly connected to a PC with the following interfaces:
- USB: using included adapter;
- RS485: distances up to 1 km, using DEA504 converter;
- Ethernet: using DEA550 converter;
- Bluetooth: using DEA300 adapter.

Remote connection to PC
E-Log can be remotely connected to a PC with the following interfaces:
- Telephone System: GSM modem;
- GPRS net: GSM/GPRS modem;
- Long distances UHF radio communications.

CommNetEG program can help managing both direct and remote connections with automatic/ scheduled communications.

Data communication in ASCII format using GPRS and TCP/IP protocols
E-Log can send ASCII data using programmable scheduled time in spontaneous mode by GPRS modem and FTP protocol or by TCP/IP converter (over LAN or WAN). See “Data communications and protocols types”

Installation
E-Log is normally installed in IP65 protection portable or fix box wall or pole mounting (see ELF series in Accessories part) for protection against shocks, water, dust and atmospheric agents; the IP65 box normally hosts also power supply systems, communication devices, additional batteries and, when present, barometric sensors.

RS-232 ports
E-Log has two RS-232 communication ports. COM1 is used to connect the unit to a local or remote PC (using different communication systems) for its setup (using 3DOM program) or for data communication. Even COM2 can be used for data communication using LSI LASTEM protocol (CISS) or sending out instant values using MODBUS RTU and TTY protocols. Furthermore using COM 2 it is possible to receive signals from sensors having RS232 output. Communication protocols are described in the “Protocols” table.

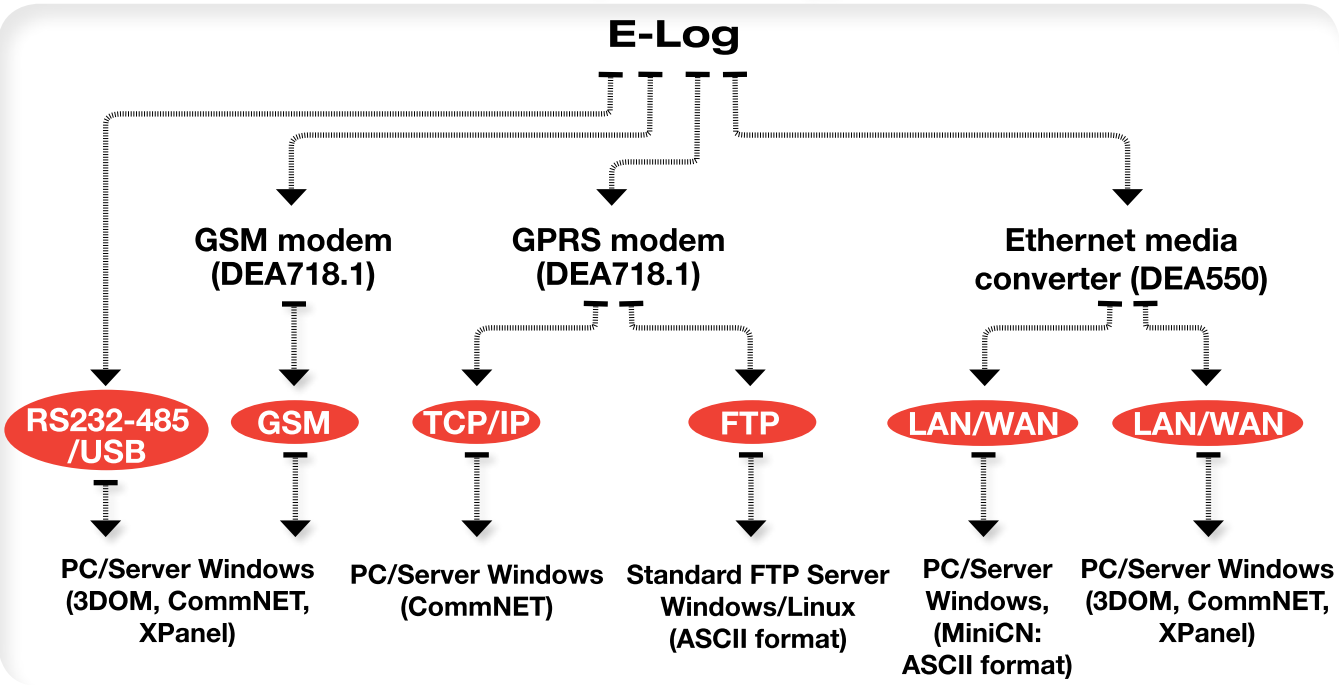
Modbus RTU Master
E-log specific versions (see “Protocols” table) support input of MODBUS RTU protocol. This feature permits to connect sensors having serial output using MODBUS RTU protocol.

Modbus RTU Slave
E-Log specific versions (See “Protocols” table) support output of MODBUS RTU protocol. This feature permits to obtain instant or statistical (ave/min/max/tot) values in entire format or floating points over a running statistical base.

Order numb.	ELO105	ELO305	ELO310	ELO515
Built-in 2.4 GHz radio		NO		YES
RS232 port		N. 2		N.1
LCD 4 x 20 chars. display	NO		YES	
n.8 keys keyboard	NO		YES	
Tripod use		NO		YES
Internal 1.2 Ah battery		NO		YES

Protocols		ELO105 ELO305 ELO310	ELO515	ELO305	ELO305
Protocol	**Description**	**Standard vers.**	**Standard vers.**	**P1 vers.**	**P2 vers.**
Input (data input):					
CISS	LSI LASTEM property	Com.1+2	Com.1+2	Com.1+2	Com.1+2
ZigBee	IEEE 802.15.4		Com.2 (radio Master)		
Modbus RTU Master	Modicon Modbus RTU mode	Com.2		Com.2	Com.2
GILL	Gill format, polar, continuous	Com.2		Com.2	Com.2
Climatronic	AIO weather station Terminal mode	Com.2			
Biral	SWS050 – SWS100 SWS200 –SWS250	Com.2			
Hydrolab				Com.2	
Aeroqual	AQM binary			Com.2	
Lufft	UMB binary				Com.2
Output (data output)					
CISS	LSI LASTEM property	Com.1+2	Com.1+2	Com.1+2	Com.1+2
ZigBee	IEEE 802.15.4		Com.2 (radio Slave)		
Modbus RTU Slave	Modicon Modbus RTU mode	Com.2		Com.2	Com.2
GPRS / FTP (ASCII)	CSV ASCII format	Com.1	Com.1	Com.1	Com.1
TTY ASCII	CSV ASCII format	Com.2		Com.2	Com.2

Data communications and protocols types



Common features		Range	Resolution	Accuracy (@ 25°C)
Analogue inputs	*Voltage*	-300 ÷ 1200 mV	40 µV	±160 µV
		±78 mV	3 µV	±30 µV
		±39 mV	1.5 µV	±15 µV
	Pt100	-50 ÷ 70 °C	0.003 °C	±0.1°C
		-50 ÷ 600 °C	0.011 °C	±0.3°C
		0 ÷ 6000 Ω	0.1 Ω	±1.5 Ω
	Thermocouples	E-IPTS 68	< 0.1 °C	±0.6 °C
		J-IPTS 68	< 0.1 °C	±0.6 °C
		J - DIN	< 0.1 °C	±0.6 °C
		K-IPTS 68	< 0.1 °C	±0.5 °C
		S-IPTS 68	0.22 °C	±2.0 °C
		T-IPTS 68	< 0.1 °C	±0.5 °C
	Inputs number	N. 8 (n. 16 single-ended)		
	ESD protections	±8 kV contact discharge IEC 1000–4-2		
	Max input signal	1.2 V		
	EMC filters	on all inputs		
	Temperature error (@ -10÷30°C)	300 ÷ 1200 mV < ±0.01% FSR; ±39 mV < ±0.01% FSR ±78 mV < ±0.01% FSR		
Digital inputs	*Inputs number*	n.4		
	Programmable functions	N. 2 frequency inputs (optoelectronic sensors, max 10 kHz) N. 2 frequency inputs (max 1 kHz) N. 4 logic state inputs ON/OFF (0 ÷ 3 Vdc signals)		
	Max error	3 Hz @ 5 kHz		
	Protection	Transient voltage suppressor 600 W, <10 µs		
Digital outputs	*Output number*	N. 7 (n. 4 sensors power-up, n.3 on events)		
	Max current on each output	150 mA		
	Protection	Thermal and over current (> 0.15 A)		
Power supply	*Power supply*	8 ÷ 14 Vdc		
	Power consumption	Display ON: 60 mA, OFF: 20 mA		
	Power consumption (Stand-by)	Stand-by: 0.2 mA		
	Protections	Transient voltage suppressor: 600 W, t = 10 µs; on polarity inversion		
Radio (see MODELS)	*Type*	ZigBee		
	Frequency	ISM 2.4 GHz direct sequence channels		
	Power	10 mW (+10 dBm)		
Other features	*Internal clock*	Accuracy 30 s/month (T=25°C)		
	Display (see MODELS)	LCD 4 x 20 car		
	Keyboard (see MODELS)	n.8 keys		
	Processor	1 RISC 8 bit, clock 16 MHz		
	ADC resolution	16 bit		
	Sampling time	80 ms (rejection 50 Hz)		
	Data memory	Flash EEPROM 8 Mb		
	Environmental limits	-20 ÷ 60 °C, 15 ÷ 100 % RH (not condensing)		
	Protection	IP 40		
	Weight	500 g		
	Dimensions	140 x 120 x 50 mm		
RS232 ports (see MODELS)	*Speed*	1200 ÷ 115200 bps		
	Type	9 pins/Female/Male/DTE/DCE		