M-Log – Mini Data Logger

www.lsi-lastem.com

Highlights

- N.4/8 analog inputs, n.1 digital input, n.1 RS232 input;
- Very low power consumption (< 4 mW);
- N.50 total channels for acquisition and calculations;
- 2 MB Flash data memory;
- LSI-LASTEM, Modbus RTU, TTY communication protocols;
- N.2 RS232 serial ports (1200 bps to 115.2 kbps);
- Built-in calculation library for derived quantities;
- Built-in mathematical calculations library;
- Digital outputs for external device activation over programmable logics and/or events;
- 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 softwares.

M-Log is a compact data logger for environmental monitoring, suitable for both indoor and outdoor purposes. It can be mounted on a tripod for portable applications or installed inside an IP65 box for long-term outdoor applications. Small and flexible, while powerful and durable, M-Log can be used in virtually unlimited environmental applications.

Main Features

Inputs

N. 4 (8 single-ended) inputs for analogue signals (voltage, current and resistance).
N. 1 digital input. It can be configured for frequency or digital on/off signals.
N.1 input for RS232 sensors

Models with mini-Din inputs and sensors self-recognition feature and models with terminal input board are available

Derived environmental and mathematical calculations

M-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 - p. 22*)

Sampling rate

Programmable for each sensor (1 sec -12 hrs). M-Log manages up to n.4 channels from sensors and n.16 derived quantities in 1 sec.

Data storage

M-Log stores 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 percentage.

Memory structure is circular.

Output actuation at event/time

M-Log (ELO007-008) has three 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.

Sensors power supply actuation

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

Battery

M-Log comes with an internal (2 Ah, 4.2 V) Lithium rechargeable battery. For long-term operation, additional batteries are normally included in ELF enclosures (see Accessories). LSI-LASTEM supplies 2-15-40 Ah rechargeable battery packs and 1,5-V, D-shaped disposable battery packs. Batteries can be recharged using main power supply or solar panels.

Power supply

M-Log runs at 12 Vdc input voltage power supply and features an extremely low power consumption (< 4 mW).

Serial ports for data communication

M-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 instantaneous and diagnostic values.
Serial Port n. 2 can also be used to connect sensors with RS232 output (*see "Protocols" table).*

Direct connection to PC
M-Log can be directly connected to a PC with the following interfaces:
- USB, using included adapter;
- RS485 line drivers: distances up to 1 km, using DEA504 converter;
- Ethernet, using DEA550 converter (ELO007 features a built-in RJ45 port);
- Bluetooth, using DEA300 adapter.

Remote connection to PC
M-Log can be remotely connected to a PC with the following interfaces:
- Telephone network: GSM and GPRS: GSM/GPRS modem;
-Long distances UHF radio communication;
CommNetEG software can help managing both direct and remote connections with automatic/ scheduled communications.

Data communication in ASCII format using GPRS/ FTP and TCP/IP protocols
M-Log can send instant or statistical 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" scheme.

Installation
M-Log can be easily mounted on stands, placed on portable tripods or wall-arm for indoor applications.

For outdoor applications M-Log is normally installed in IP65 protection box, either LSI LASTEM ELF series (see Accessories) or third party's, 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
M-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.

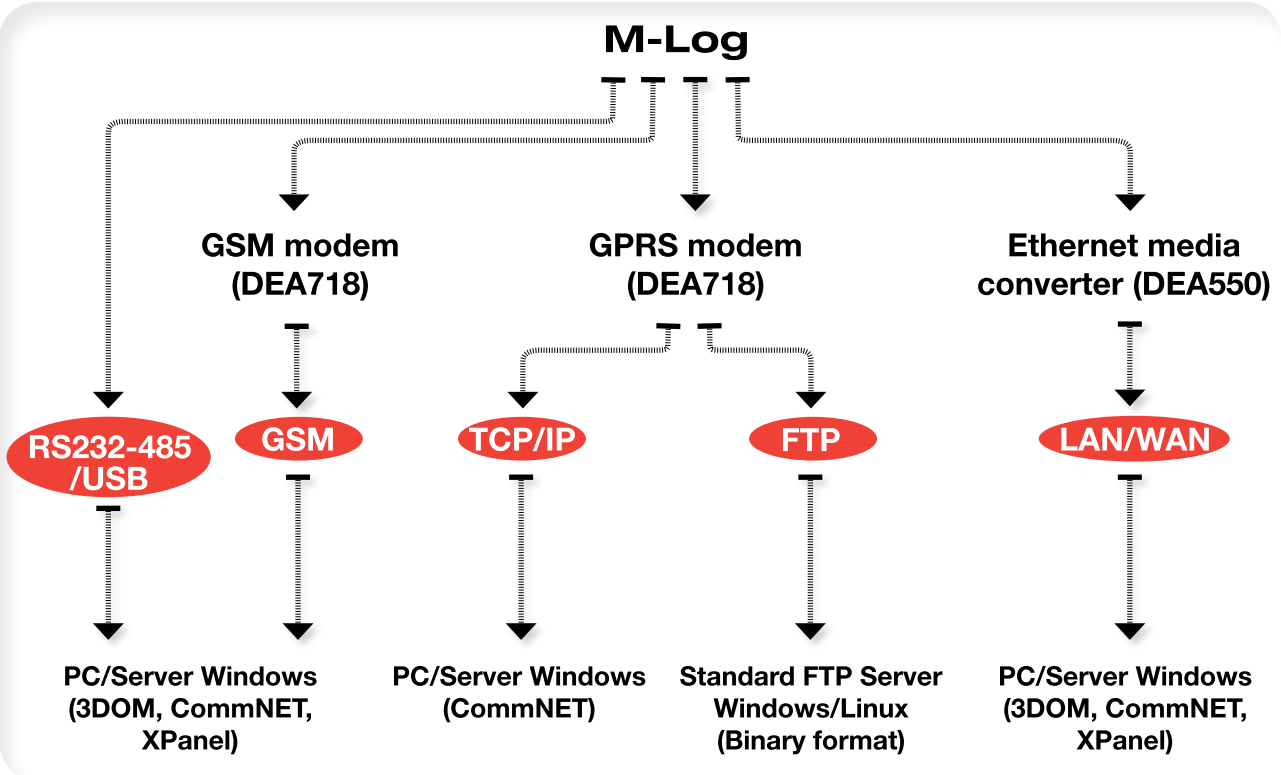
Modbus RTU Master
Mlog specific versions (see "Protocols" table) support input of MODBUS RTU protocol. This feature permits to connect sensors having serial output using MODBUS RTU protocol.

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

Order numb.	ELO007	ELO008	ELO009	ELO010
Inputs	Terminals		Mini-Din	
Analog inputs	N. 4 (n. 8 single ended)		N. 4	
Digital input	N. 1 (on/off or frequency/counter)			
Sensors self-recognizing	NO		YES	
Digital output actuation on event	YES		NO	
RS232 ports	N. 1	N. 2	N. 2	N. 1
Ethernet port RJ45 connector, TCP/IP socket server	N. 1	-	-	N. 1
Display back-light	NO		YES	
Tripod use	NO		YES	
GPRS communication	NO	YES	NO	

Protocols		ELO007 ELO008 ELO009	ELO008	ELO008
Protocol	**Description**	**Standard vers.**	**P1 vers.**	**P2 vers.**
Input (data input):				
CISS	LSI LASTEM property	Com.1+2	Com.1+2	Com.1+2
Modbus RTU Master	Modicon Modbus RTU mode	Com.2		
GILL	Gill format, polar, continuous	Com.2		
Climatronic	AIO weather station Terminal mode	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
Modbus RTU Slave	Modicon Modbus RTU mode	Com.2		
GPRS / FTP (Binary)	Binary format	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	±100 µV
		±78 mV	3 µV	±35 µV
		±39 mV	1.5 µV	±25 µV
	Pt100	-50 ÷ 125°C	0.003°C	±0.05°C
		-50 ÷ 600°C	0.013°C	±0.11°C
		0 ÷ 6000 Ω	0.19 Ω	±1.5 Ω
	Thermocouples	E-IPTS 68	< 0.1°C	±1.5°C
		J-IPTS 68	< 0.1°C	±1.2°C
		J - DIN	< 0.1°C	±0.1.2°C
		K-IPTS 68	< 0.1°C	±1.9°C
		S-IPTS 68	0.22°C	±4.9°C
		T-IPTS 68	< 0.1°C	±1.4°C
	Inputs number (see MODELS)	N. 4 (n. 8 single-ended)		
	ESD protections	±8 kV contact discharge IEC 1000–4-2		
	Max input signal	1.2 Vdc		
	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. 1		
	Functions	Frequency (Max 5 kHz); ON/OFF (0 ÷ 3 Vdc)		
	Max error	3 Hz @ 5 kHz		
	Protection	Transient voltage suppressor 600 W, <10 µs		
Digital outputs (see MODELS)	Outputs number	N. 3 (n. 1 sensors power-up, n. 2 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 (n.9 months battery life)		
	Protections	Transient voltage suppressor: 600 W, t = 10 µs; on polarity inversion		
Battery	Type	2 A (4.2 V) Lithium rechargeable		
	Recharging time	~ 8 hrs		
Other features	Internal clock	Accuracy 30 s/month (T=25°C)		
	Display	LCD 4 x 20 car		
	Keyboard	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 2 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 pin/Female/Male/DTE/DCE		