ML-2013 Ultra Low Power Data Logger

- **GPRS Modem Data Logger**
- **Battery & Solar Powered**
- **Analogue & Digital Inputs**
- **Counter Inputs**
- **RS232, RS485 & SDI-12**
- **ASCII, MODBUS & NMEA**
- **TCP, FTP, email & SMS**
- **Optional Camera**
- **Optional GPS & Satellite**
- **Wheatstone Bridge**
- **IP67/68**

Applications

- **Environmental monitoring**
- **Pressure & Flow Monitoring**
- **Security**
- **Flood Detection**
- **Pyranometers**
- **Moisture Monitoring**
- **Level Detection**
- **Energy Monitoring**
- **Crop Monitoring**
- **Loadcells**

The ML-2013 data logger is a small, ultra low power, high-end data logger with built-in QUAD-band GPRS-modem. This small data logger, is further provided with an internal temperature sensor, 2 GB micro SD card and a 2FF SIM card slot. The logger can be powered by an internal 3.6 Volt Lithium battery that will last for years when the logger is configured in a low-power mode. It is also possible to power the data logger using an optional integrated 3xAA NiMH solar panel.

The data logger can acquire physical signals by 4 current loop inputs, 4 digital inputs and 2 hires amplified differential voltage inputs, which can be used to connect pyranometers or in combination with a stable excitation voltage to connect “Wheatstone resistive bridge sensors” like loadcells. The data logger is provided with generic serial port drivers to capture measurements from ASCII, MODBUS/RTU, NMEA or SDI-12 transponders, custom drivers can be developed on request. External sensors/transponders can be powered by the data logger itself, to prevent them to consume power while the data logger is a sleep. The excitation voltage is switched off during sleep as well. Up to 8 mathematical channels are available to calculate meaningful engineering values derived from sensed values (e.g. a polynomial to calculate a flow from a stream level).

Logged data can be pushed to a central host by FTP, e-mail(SMTP) or secure TCP (CHAP) at configurable intervals When equipped with the integrated solar panel this provides a complete standalone remote monitoring station, all you need are the applicable sensor(s). This complete GPRS logger is costs effective, because you don’t need: a) solar panels, b) big batteries, c) cellular modem and d) encapsulating cabinet

Data logging

1 second to 1 day intervals

Regular, alarm and independent intervals

Daily operation time bracket (e.g. 07:00AM to 20:00PM or 21:00PM – 06:00AM)

I/O

4 x analog inputs (0/4..20mA 12bit resolution, accuracy <0.1%FS)

1 x differential input (±250/500/1000/2000mV, 16bit resolution) a/o to connect pyranometers

1 x differential input (±10/20/40/80mV, 16bit resolution) a/o to connect load cells

4 x digital inputs or pulse counters

- 3 x status or counter (pulse) a/o to connect a rain gauge
- 1 x counter (waveform) to connect a flow meter

1x digital 5V alarm output to switch on a relay in case a parameter value is outside its limits (e.g. a high water level)

8 x calculation channels, to derive engineering values from sensed values using mathematical operators and functions (a/o cos, sin, atan2, ln, sqrt)

Communication

2 x serial ports for external serial sensors/probes

- 1x RS-232 or RS-485 (ASCII, MODBUS/RTU, NMEA-183 or custom serial protocols)
- 1x RS-232 or SDI-12 (ASCII, MODBUS/RTU, SDI-12, NMEA-183 or custom serial protocols)#

Serial port drivers

ASCII: Sensors autonomously outputting readable lines of numeric values

MODBUS/RTU: Read–out value registers from MODBUS/RTU slave devices

NMEA–0183: GGA (GPS) , DBT (Depth), HDG(Heading) en MWV (Wind)

SDI–12: Read–out of up to 16 devices with up to 20 parameters per device using aC!, aM!, aCx! or aMx! commands

SBD: To output data by Iridium satellite modems (960x)

Modem

Built–in QUAD–band GPRS modem

2FF (Class B) SIM–CARD slot

Data Storage

2GB SD–CARD

Power

100mA@3.6V average operating[1)] current during a duty cycle of less than 1 sec[2)] per log interval.
250mA@3.6V average operating current during 20-.60 sec. 3G data transfer

100uA@3.6V sleep current

12V@100mA switchable power outlet to power external sensors

5V@80mA stable excitation voltage suitable for connecting Wheatstone resistive bridge sensors

Power supply

3.6V DC input for internal Lithium battery[3)]

Optional 3xAA NiMH[3)] solar charger integrated in cover

Optional 8-30V DC–Adapter integrated in cover

Data push

1 minute to 1 day intervals

Regular and alarm intervals (direct push on alarm raise or fall)

Daily operation time bracket (e.g. 07:00AM to 20:00PM or 21:00PM – 06:00AM)

Native log files by TCP, FTP and e–Mail (SMTP)

JPG pictures by TCP, FTP and e–Mail (SMTP)

CSV log files by FTP and e–Mail (SMTP)

Alerts by SMS

Configuration by:

USB (local)

TCP (remote, in cooperation with the central data collector)

Web–browser (remote, in combination with the yDocInsights webserver)

Enclosure

Rugged and waterproof enclosure (130x120x75mm)

IP68 [4)] (LI & DC models) IP67 (PV model) IP54 (TFT model)

Optional pole mounting bracket, Integrated GSM antenna, external GSM antenna optional

Temperature

Wide temperature operating range –30°C +75°C

1) 100mA if no external sensors to be powered.

2) 1 sec. if external sensors are responsive and don't require time to warm up

3) Lithium batteries not included

4) IP68 testing carried out in a depth of 2m for 2 hours

Use our online Data logger power consumption calculator to estimate the battery life of your application

Logger Variants

The ML-2013 low power GPRS data logger is available in several editions. All editions are sharing the same ML-2013 main PCB, but differ depending on the chosen enclosure cover option. The cover can be a blind cover, a cover with integrated solar panel or a cover with integrated touch color display. The cover is used to mount a PCB (Power Board) with the power supply provision of the ML-2013. This Power Board contains the (printed) GPRS antenna of the ML-2013 as well. The Power Board is available in several editions a/o to battery, DC or solar power the ML-2013.

The different covers combined with different Power Boards are giving the following ML-2013 Editions:

ML–2013 A D–Size 3.6V Lithium battery powered ML–2013 with blind cover (Using a SAFT–LSH20 battery is recommended)

ML–2013–PV A ML–2013 with cover with integrated 1Wp tiny solar panel charging 3x AA 2100mAh NiMH batteries (Using LSD NiMH batteries like GP Recyko+ is recommended)

ML–2013-DC An externally 8-30V DC powered ML–2013 with blind cover and charging circuit for 3x AA NiMH (backup) batteries. This edition is very suitable to connect to a non continues external DC source

Optional Extras

Cameras

CAM-D13M

CAM-SO3M

Optional JPEG camera solar powered remote JPEG camera CAM–D13M (1.3M) or remote JPG camera CAM–S03M (0.3M)

CMOS image sensor

IP66 Weatherproof enclosure

Satellite Communication

ITAS-5SP

The Iridium ITAS-5SP with embedded antenna has global data coverage and is a very suitable satellite transceiver for low power data logging applications.

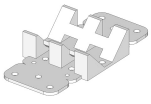
GPS Position

The GPS-E3329 with embedded GPS antenna is very suitable GPS receiver for low power data logging applications.

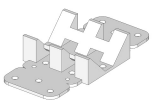
GPS-E3329

The GPS-E3329 is based on the high performance features of the MediaTek 3329 single-chip architecture and has a 'Fast time to first fix', which is obviously a very important property in low power data logging applications. The GPS-E3329 has an excellent -148dBm acquisition sensitivity, it can track 22 channels with a -165 dBm sensitivity, it supports common GPS as well as AAS/EGNOS/MSAS and GAGAN.

Mounting



PMB



PMK

The PBM is a pole mounting bracket made of tough UV-resistant polycarbonate, which is better than using a metal bracket as the metal can have a negative impact on the performance of integrated antennas (poor antenna performance causes more power consumption).

The PMK is a pole mounting kit existing out of a polycarbonate bracket (PMB), two 12mm width stainless steel (A2/W4/304) worm gear clamps to fix the bracket to a pole with a diameter ranging from 40 (1 5/8") to 60mm (2 3/8").The kit is including 4x M4 bolts (16mm), nuts and washers of stainless steel as well. The bracket can be used to mount an ML-315, ML-2013, CAM-D13M & CAM-SO3M

The bracket is excluding mounting accessories like clamps, nuts, bolts and washers.