



Environment Information Technology

Product Release Notification

ML – 20 Mini Data Recorder

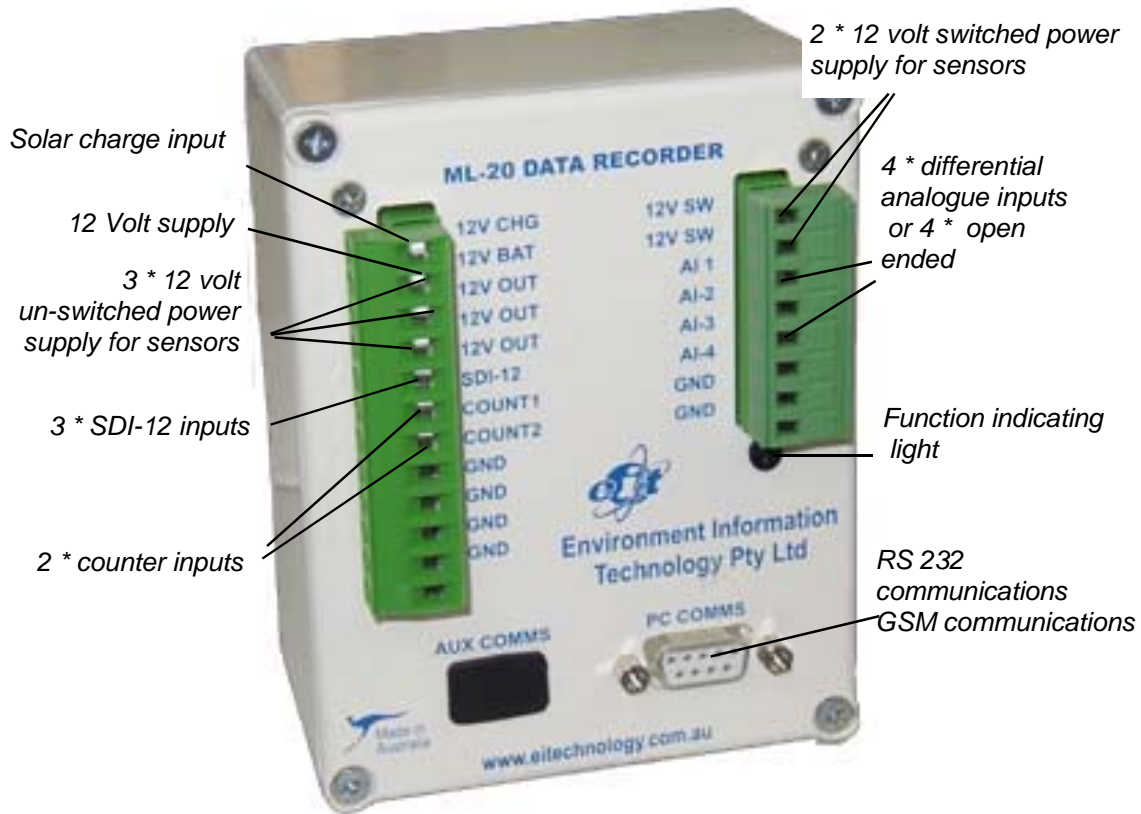
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Environment Information Technology Pty
1/19 Kays Lane
Alstonville.
Australia. 2477

Phone	02 66 283400
International	612 66 283400
Email	info@eitechnology.com.au
Web	www.eitechnology.com.au

Data Recorders

ML 20 Data Recorder



General description

The ML 20 can measure and record a wide range of environmental parameters including temperature, humidity, rainfall, solar radiation, wind speed, wind direction, barometric pressure, water level, soil moisture, and other sensors with analogue, and counter outputs. Sensors connect via terminal connections.

The ML 20 has been specifically designed to support SDI-12 soil moisture measuring devices such as the Sentek EnviroSMART, EasyAg and Triscan probes for monitoring soil moisture and soil salinity.

The ML 20 will also support the JCC series of single point soil moisture and salinity probes distributed in Australia by EIT

Typical applications include, but are not limited to, monitoring weather, environmental conditions, water level and soil moisture.

The ML 20 recorder is supplied with software for collecting, viewing and displaying data and will store up to 30,000 data points.

The ML 20 is ideal for data transfer via digital mobile phone (GSM) network.

ML20 – Mini Data Recorder

Supports

- 2 * differential analogue inputs
- 4 * single ended analogue inputs
- 2 * counter inputs
- 3 * SDI – 12 inputs
- Alarm functions via GSM short message service (SMS).

Enclosures.

The EIT data recorders are designed to be mounted inside a water proof enclosure for field use.



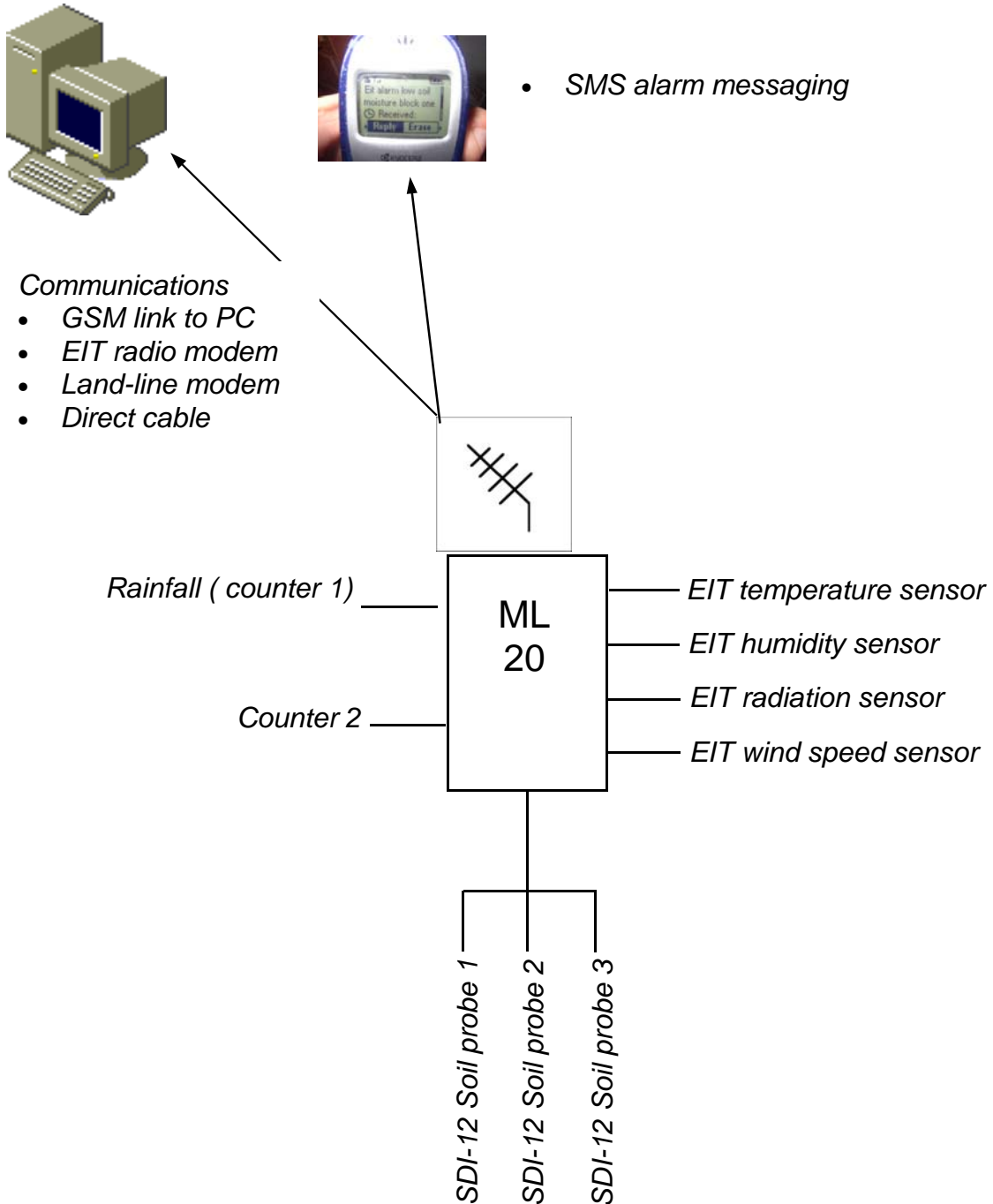
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General specifications

Product description	ML 20
Analogue inputs	2 differential voltage inputs (0-1 VDC)
Analogue inputs	4 open ended analogue inputs (0 – 1 VDC)
Optional analogue input	0 – 2.5 and 0 - 5 VDC
Counter input	2 counter inputs
SDI-12 inputs	supports 3 SDI-12 devices supports Sentek EnviroSMART, EasyAG and Triscan soil probes supports up to 4 JCC soil moisture or soil conductivity sensors
Total number sensors supported	26 (2-4 analogue, 2 * counter , up to soil 16 SDI-12 sensors
Microprocessor type	Rabbit 2000 (Rabbit Semiconductors USA)
Memory capacity std	30,000 data points
Memory expansion (opt)	Factory Upgradeable
Program memory type	Flash
Data storage	NVRAM
Minimum log period	3 seconds
Minimum scan period	3 seconds
Power	Nominal 12 VDC (9 - 15)
Operating current	6 mAmps in sleep mode, 60 mA in wake mode
Communications (COM 1)	Serial RS 232 Modbus ASCII
PC - communication baud rate	1200, 2400, 4800,9600,19200
Communications options	Landline modem GSM EIT spread spectrum radio modems UHF radio
Operating software	Windows 95 and later
Data storage format	dBase IV / Paradox
Export functions	dBase, Paradox, ASCII text, Excel, EnviroSCAN ES 4.0,
Periodic recording	Instantaneous or averaging of sensor values
Sensors supported	air temp, soil temp, water temp, humidity solar radiation, wind speed, wind direction, rainfall, soil moisture, barometric pressure counter inputs SDI -12 sensors (up to three addresses) Sentek soil moisture probes (EnviroSMART) Sentek TriSCAN (combined soil moisture and salinity sensors)
Alarm functions	Supports GSM text messaging for alarms. Up to 10 separate alarm functions

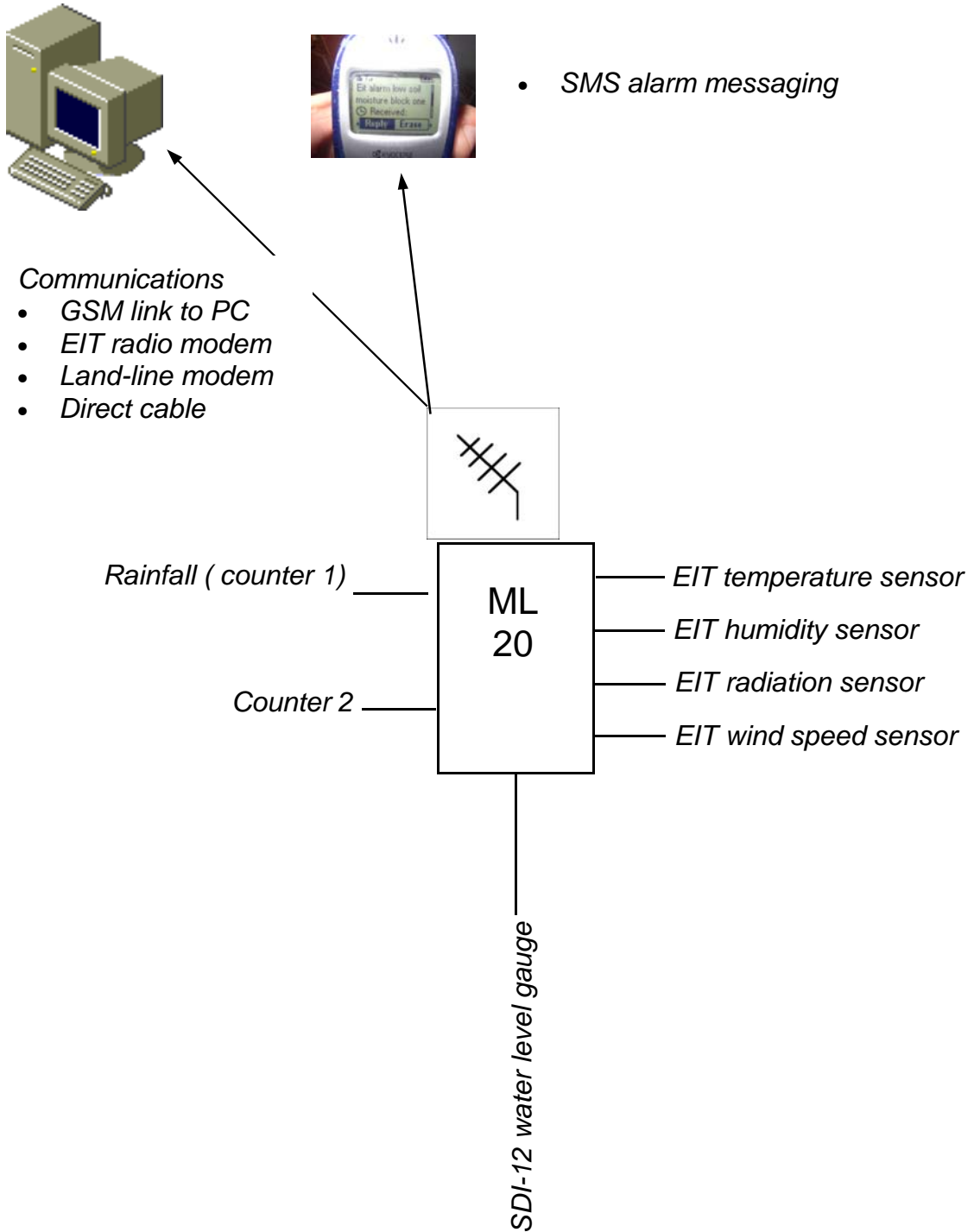
ML 20 Mini Data Recorder

Mini weather station and soil moisture monitoring system



ML 20 Mini Data Recorder

Mini weather station and water level monitoring station



Communications

Communication to the recorder is via RS 232 serial link using Modbus ASCII protocol

- EIT 900 MHz spread spectrum radio modem
- Land line modem
- GSM (Wavecom) modem
- Direct cable connection

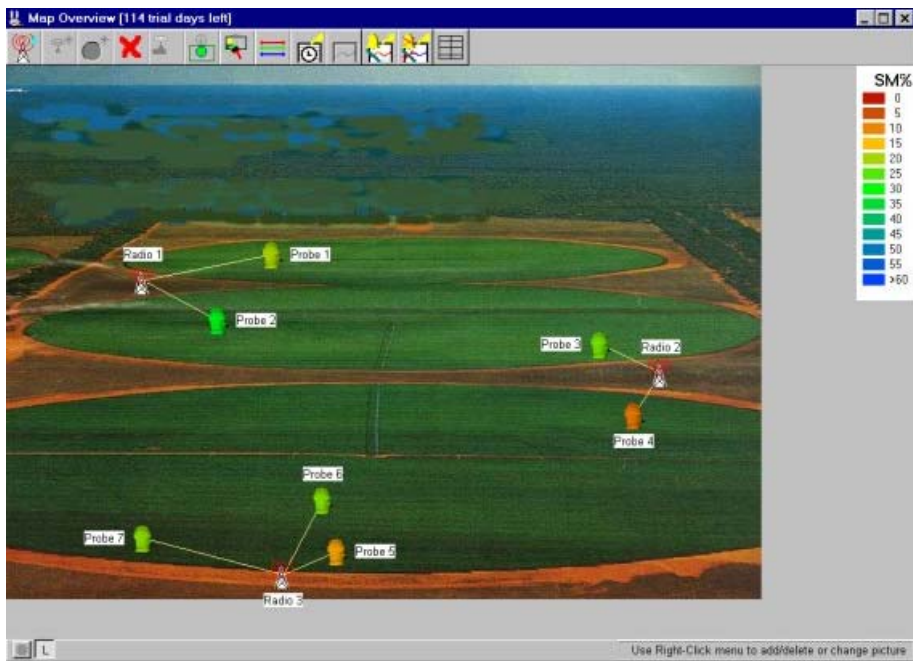
Programming

The ML 20 mini data recorders are supplied with software for programming up the recorder, downloading information, creating reports and graphs.

Data presentation

GIS thematic mapping.

The ML 20 mini data recorder can be optionally supplied with EIT thematic mapping module. This allows the user to 'place' sensors on a map, diagram or image of the monitoring area. This function is used for presenting soil moisture data in irrigated agriculture. Soil moisture sensors are colour coded according to real time soil moisture values.



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Additional engineering comments

The ML-20 has been designed to supplement the range of EIT telemetry and recording products rather than to replace any of them. It is essentially a stand alone data recorder which will handle up to 3 SDI-12 probes, 4 analog inputs and 2 counters. There is an upper limit of 26 sensors, 6 of which are the 4 analog inputs and 2 counters and the remaining 20 can be used up by the SDI-12 probes.

The ML-20 has serial port assessable via a 9 way female D connector. This port is set up as DCE (data communications equipment) so will work when connected directly to a PC communications port via a 9 way serial cable (no cross-overs or null modems). The speed the port operates can be set using the PC software, use On Line / Maintenance.

A radio port will be provided on the ML-20. It is planned that this will support remote SDI-12 probes. However the design of this has not been finished as at October 2003.

All other connections to the ML-20 are via the plug in terminal blocks on the front panel.

12V CHG	12V SW
12V BAT	12V SW
12V OUT	AI 1
12V OUT	AI 2
12V OUT	AI 3
SDI-12	AI 4
COUNT 1	GND
COUNT 2	GND
GND	
GND	
GND	
GND	

12V CHG This connection is used for a solar panel or other battery charge source. A 4 watt regulator is mounted inside the enclosure which provides charge to the battery.

12V BAT Connect the 12 volt rechargeable battery to this terminal

12V OUT A fused, 12 volt output from the battery. This is unswitched and would normally be used to power the counters and the SDI-12 probes.

SDI-12 This is the SDI-12 data line used to communicate with the SD-12 probes. Up to 3 probes with addresses 0,1 and 2 are supported.

COUNT 1
COUNT 2

These are the counter inputs. They are expected to be inputs going from 0 to 12 volts for each count. There is some filtering on the inputs to eliminate switch bounce which limits the count frequency to about 4 Hz.

GND All the GND connections are wired in common and can be used as required to connect battery and sensors.

12V SW This output is switched battery supply, meant for connecting power to the analog sensors. Every time the recorder scans the sensors, as set by the recorder scan time, this output will become active. The sensor is not read until the wait time, settable in the recorder, has expired. When all sensors, including the SDI-12 sensors have been read, the output is shut down.

AI 1 etc These inputs are the analog inputs to the recorder. It is possible to select between differential inputs and common ground inputs. This is done with a matrix header inside the enclosure. As shipped, the recorder is set up for 4 single ended or common ground inputs. It can be reconfigured for 1 differential + 2 single ended or 2 differential and 0 single ended inputs. All inputs are to be 0 to 1 volt full scale.

The PC software recognises that an ML-20 recorder is being used and makes some changes in the way it displays information. This is mainly in the On Line / Maintenance display, where the System Configuration button is used to check for attached SDI-12 sensors instead of an expansion radio system, as in the older RTECH recorder. Any detected SDI-12 sensors are shown with their addresses and the number of sensors at each address.

The ML-20 has been programmed to handle the new Sentek Triscan probe. Because Sentek have currently required the salinity measurements to be handled in floating point format, each salinity sensor takes up the equivalent space of 2 other sensors, to handle the floating point number. For this reason the number of sensors shown when a Triscan probe is detected weights each salinity sensor as two. Hence for a probe with 5 moisture and 5 salinity sensors, the total sensor count will be 15. We are not sure what direction this is going to take, after the probe is fully developed, so

for the moment anyone using the Triscan probe will have to be aware of this feature.

The ML-20 has also been designed to handle the JCC soil moisture and salinity probes. These need special sequencing of the power to the probe to obtain two different measurements from each probe. The moisture and salinity calculations are included in the ML-20. The probes are powered from the 12 volt switched outputs and the voltage output from the probe is connected to the analog inputs of the recorder.

Inquiries

Sales

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PO Box 20
Alstonville.
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International 612 66 283400

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