The Flexi1 is an ultra low-power data-logger that can interface with a range of sensors, inputs, outputs and GPS, and upload data via a range of communication options.

1. ENABLING THE "INTERNET OF THINGS"

The Flexi1 is designed to perform data logging from a variety of sensors and interfaces, and to have maximum flexibility in data upload options. The Flexi1 has been designed to be ultra-low power and to run on a wide range of battery options or line power depending on your power requirements. The easy access to the screw terminals makes wiring and installation of the various sensors and interfaces easy and accessible. The USB port makes the configuration and in-field testing of the device convenient.

Key features:

- A variety of interfaces to connect sensors, inputs and outputs, plus a built-in GPS for location optional
- An ultra-low power device that can run off a range of battery voltages and sizes, or off line power
- Communication options to suit your application, from free radio links to cellular and satellite
- Easy to install and wire up, simple to configure, test and manage
- Available in kit form – buy only what you need

2. APPLICATIONS

Ideal for remote data logging / telemetry where a compact, battery powered device is required with simple installation

- Equipment tracking and monitoring of run hours
- Temperature monitoring
- Agriculture
  - Soil moisture
  - Temperature
  - Tipping rain gauge
- Weather station
- Fuel levels in bowsers
- Gas levels
- And a huge range of other options

3. INTERFACING OPTIONS

Inputs, Outputs, Switched Power and Sensor Interfaces	
Digital Inputs	3 digital inputs Wake device on input change Internal pull-up and pull-down resistor options 48V maximum input
Analogue Inputs	1 x analogue input reading 0V to 5V Battery voltage: built-in analogue input reading 4V to 16V
Digital Output	1 x switched ground (open collector) output Used to switch relays or trigger other devices
SDI-12	This interface is commonly used in agricultural sensors and measurement devices: • Soil moisture probes • Temperature • Electrical conductivity (EC) of soils • Dissolved salts • Other SDI-12 probes and sensors
I2C Interface	I2C (inter-IC communications) is an interface commonly used in sensor modules. This allows the Flexi1 to talk to a wide range of sensors including: • Temperature • Humidity • Vibration • CO2 gas • And numerous others

RS232 / TTL	The serial interface can be set to operate at either RS232 levels or TTL (3.3V) levels. This allows the Flexi1 to talk to a wide range of external sensors, modems, and other systems.
3.3V Switched Power	Used to control the 3.3V power to external sensors and peripherals. Load limited and short circuit protected.
Vbat Switched Power	Used to control the battery power to external sensors and peripherals. Load limited and short circuit protected. This passes the battery voltage to the external device or sensor.
Optional GPS	The optional GPS module allows the Flexi1 to periodically update its location and time. This is very handy to know the exact position of your sensors.

4. COMMUNICATIONS

The Flexi1 has a single FlexiCard communications slot offering you a unique array of data transfer options depending on the application:

Currently available:

- 2G and 3G cellular
- Iridium SBD data

Currently in testing:

- 4G / LTE cellular
- DMRF - ISM band RF (868MHz and 902-928MHz)
- WiFi (802.11 b/g/n)
- CDMA (Sprint)

In development:

- LoRaWan radio
- SigFox radio
- Bluetooth Smart (Low Energy)

Other communications options can be developed.

Antenna can be mounted inside the housing or can be extended and mounted on the outside of the housing or even up a mast, maximising the options for optimal signal reception.

5. POWER

The Flexi1 has been designed from the ground up to be an ultra-low power device. When the device is not performing its logging or data upload functions it can enter sleep mode where it uses less than 10uA current. This allows the device to be battery powered for most applications.
The Flexi1 has been designed to allow operation over a wide range of input voltages (4V to 16V maximum), resulting in a range of power options:

- Small AAA alkaline battery pack
- Larger alkaline battery packs (AA, C, D)
- AAA or AA Lithium battery packs
- 9V small battery or lantern battery
- 12V sealed lead-acid for higher power operations

- Lithium-thionyl-chloride battery options @ 3.6V per cell (extreme temperature batteries)
- 5V USB wall socket power supply
- 12V wall socket power supply, with optional battery backup
- 12V sealed lead-acid battery with external solar panel and charger

6. CONFIGURATION AND TESTING

6.1. USB Device

The robust USB port on the Flexi1 allows the device to be easily plugged into a laptop, netbook or tablet in order to access the menu on the device whilst in the field.

Using the support menu, a technician can configure, test, and monitor the performance and operations of the device.

6.2. Push Button and Status LEDs

The built-in button can be used to activate the default behaviour (as configured) for the Flexi1. For example, a single press of the button can initiate an SDI-12 sample from a soil moisture probe. A long press of the button can initiate a data transfer via the cellular FlexiCard.
The two status LEDs provide visual feedback on the operation of the device without requiring the USB port to be used.

7. DATA LOGGING

The Flexi1 has sufficient memory to store over 50,000 records in its flash memory. Normally the data will be uploaded immediately but if the device is out of range then there is sufficient space to ensure that data can be stored for many months if required.

The flash memory is also used to store firmware updates, parameters, GPS aiding data and other important information that needs to be securely stored.

8. DEVICE MANAGEMENT – OEM SERVER

All Digital Matter devices are fully managed Over-The-Air (OTA) via our OEM Server web interface. The OEM Server seamlessly manages:

- Device firmware – firmware updates can be done remotely
- Network (administrator) parameters relating to critical communications
- System parameters, including GPS parameters, IO configuration, logging options and general device behaviour settings
- GPS AssistNow Offline aiding data files
- Remote debugging of devices, including being able to trace data, view detailed debug message logs, and view a live trace of the server debug messages
- Remote disconnect and reboot of devices
- Provides a command and message queueing platform to the devices and is incorporated into the remote management and debugging applications

Data Connectors

The OEM Server provides Data Connectors that forward data records on to the software platform of your choice, including Digital Matter's own Telematics Guru platform.

More information on the OEM Server can be found at http://www.digitalmatter.com

If you would like to integrate the Flexi1 into a software system, then please contact Digital Matter for more information on our integration protocols.

8.1. Committed to Quality

We take pride in designing each of our products with the goal of providing the best performance and reliability possible in the price range of that product. "Engineered to outperform".

Not all telematics devices operate with the same level of performance or reliability, especially when exposed to extreme conditions in the field. In addition, we only use the highest quality parts and the latest assembly and quality control techniques to ensure the reliability and long life of our products.

Every device is individually tested at production.

All Digital Matter devices are covered by a one-year manufacturer's warranty.

8.2. Contact Information

For the latest version of this document plus other product information please visit our website at www.digitalmatter.com