MIDAS 400

MIDAS 400 is the name given to Valeport's customised logging technology. Utilising our unique distributed processing technique, a MIDAS 400 system starts with our low power logging package, to which is added your choice of sensors, each of which has its own dedicated processor controlling sampling and calibration. Finally, choose a housing - we offer everything from simple pcb racks to 6000m pressure housings. The whole system then runs with our standard software, DataLog 400. MIDAS 400 - one technology, a thousand applications.

System Architecture

In line with many of our latest products, the MIDAS 400 system uses Valeport's unique distributed processing technique. The idea is that one central processor is responsible for overall system function, including data logging, overall sampling pattern, and communications with the outside world. Each fitted sensor or digital input then has a separate processor on a separate pcb. This processor samples the sensor when instructed, and calibrates the input into engineering units; the data is then passed to the main processor on request.

Communications between the main processor and the sensor pcbs are via I²C bus, which can accommodate a total of 20 different sensor modules - in fact each sensor module can control up to 3 different sensors, depending on type.

There are two key advantages to distributed processing:

1) The system operation is effectively independent of the sensors that are fitted - this means common operating software, and the ability to add, remove or replace sensors at will.
2) because each sensor has its own processor, all the sensors can be sampled at precisely the same instant rather than in sequence, using global commands to all the processors. This means that it is very easy to correlate data from different sensors in such applications as sediment transport studies, or rapid profiling deployments.

The MIDAS 400 takes a similar approach to communications. It always has a choice of digital outputs as standard, but further output options can be added to the I²C bus as necessary. Examples include telemetry modules, or multiple RS232 output channels, each configured for interface to different third party ,devices such as display units or acoustic modems.

The back of this brochure shows a diagram of the architecture, which helps to explain all this - the important thing to remember is that the MIDAS 400 offers you an off the shelf logging package, customised to suit your specific application.

Standard Inputs

The MIDAS 400 system has already been used with the following sensors:

Conductivity, PRT Temperature, Strain Gauge Pressure, Resonant Quartz Pressure, Turbidity, Dissolved Oxygen, PAR, pH, Redox (ORP), Transmissometer, Fluorometer, Sound Velocity, Altimeter, Gyrocompass, Motion Sensor, Current Flow, Compass, Wind Speed, Wind Direction, Rain Gauge, Air Temperature, Air Pressure.

Many of the above have simple RS232 digital or voltage, current or frequency analogue inputs, so even if the sensor you want is not mentioned, we have probably interfaced to something similar already.

Our analogue sensing electronics typically have a resolution of 1:40000, with linearity and stability of ±1 count.

For digital (RS232) interfaces, the system breaks down the data string into separate parameters, and may perform calibration or calculation on any of them. Each module can handle three such parameters, so if the string is longer than this, multiple modules will be required. The module will continually read the incoming string, but will only output the last valid reading when the "sample" command is received.

Hardware

Where possible, we offer our standard instrumentation housings, but we can modify any of these suit the application. Typical styles include:

- OEM pcb rack
- Stainless steel IP67 surface enclosure
- Acetal (500m) housing
- Titanium (5000m / 6000m) housing

Logging

The MIDAS 400 uses non-volatile Flash memory. It comes with 8, 16, 24 or 32Mb - each parameter uses 2 or 4 bytes per sample, depending on sensor type. A typical system with 6 "2 byte" and 2 "4 byte" sensors would therefore use 20 bytes per sample. 32Mbyte memory therefore gives over 1.6 million records.

Power

The system accepts 9 - 30vDC input. The MIDAS 400 itself uses 0.6W when sampling, and <1mW when sleeping. Power is also supplied to all fitted sensors (if required), so overall consumption depends on configuration. Most simple oceanographic sensors draw <0.1W

Data Acquisition

The MIDAS 400 offers a variety of sampling regimes:

Continuous:	Regular output from all sensors at 1, 2, 4 or 8Hz.
Burst:	Regular sampling pattern, where instrument takes a number of readings, then sleeps for a defined time.
Trip/Profile:	Data is output as a chosen parameter changes by a set value, usually Pressure for profiling.
Conditional:	Instrument sleeps until a selected parameter reaches a set value.
Delay:	Instrument sleeps until predefined start time

Communications

The instrument will operate autonomously, with setup and data extraction performed by direct communications with PC before and after deployment. It also operates in real time, with a choice of communication protocols for a variety of cable lengths, all fitted as standard and selected by pin choice on the output connector:

Standard	
RS232	Up to 200m cable, direct to serial port.
RS485	Up to 1000m cable, addressable half duplex comms
RS422	Up to 1500m cable, addressable full duplex comms
Options	
FSK	2 wire power & comms up to 6000m cable
USB	For rapid upload or laptops without serial port
Baud Rate:	2400 - 115200 (FSK fixed at 19200, USB 460800)
Protocol:	8 data bits, 1 stop bit, No parity, No flow control

Software

System supplied with DataLog 400 Windows based PC software, for instrument setup, data extraction and display.

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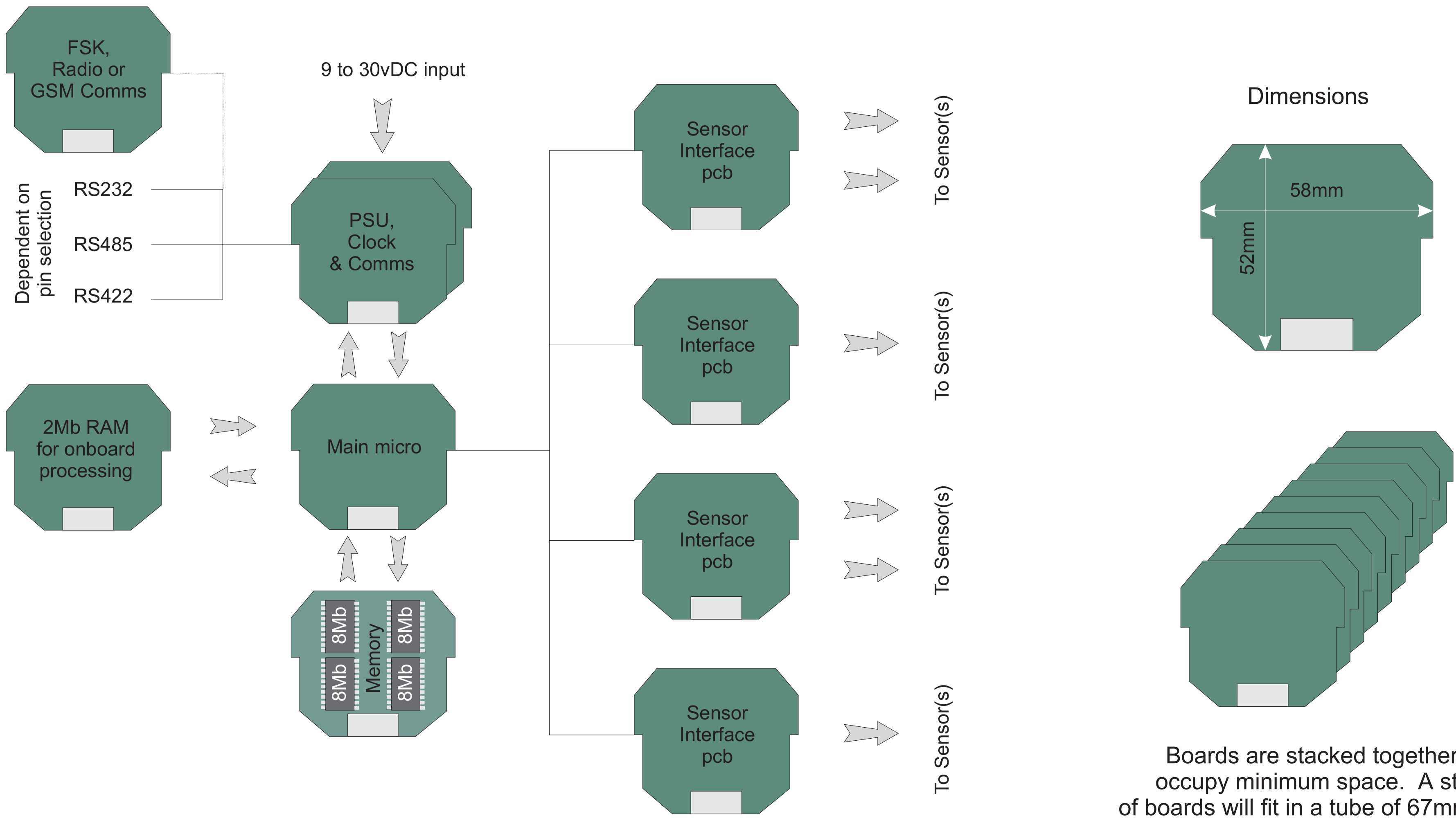
Typical Instrument Configuration



Boards are stacked together to occupy minimum space. A stack of boards will fit in a tube of 67mm bore.