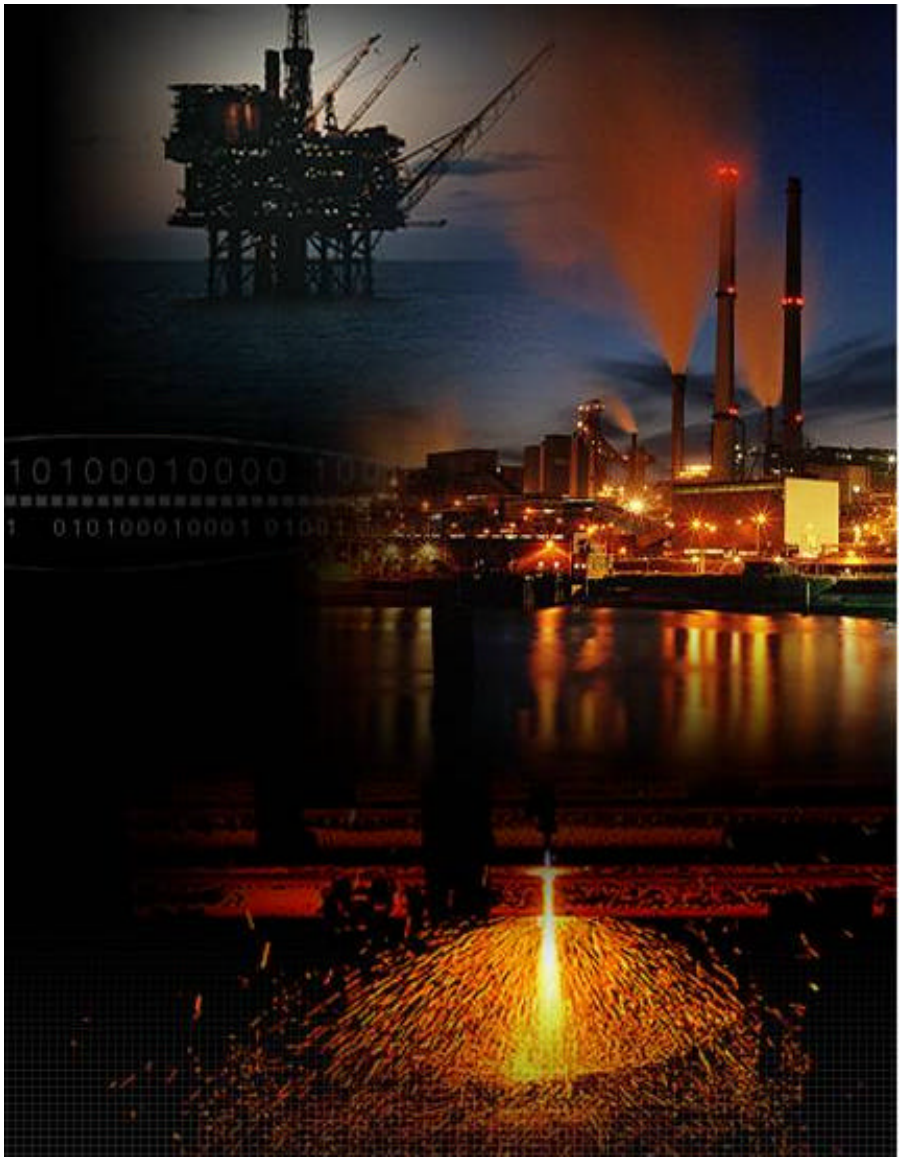
The IN4MA pc



Remote Monitoring Solutions

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IN4MA pc from Powelectrics limited only by your imagination...

The **IN4MA pc** was created as a universal 'wire free' pro-active monitoring device that works across 900 and 1800 GSM mobile phone networks. It was created for mainstream industrial applications, encompassing areas such as process control, instrumentation, and manufacturing. Application possibilities are almost endless, as the **IN4MA pc** has the ability to integrate into third party devices and equipment -communicating directly with sensors, devices and other forms of equipment. It allows operators to become more cost effective in monitoring their daily business activity and it is simple and easy to install.

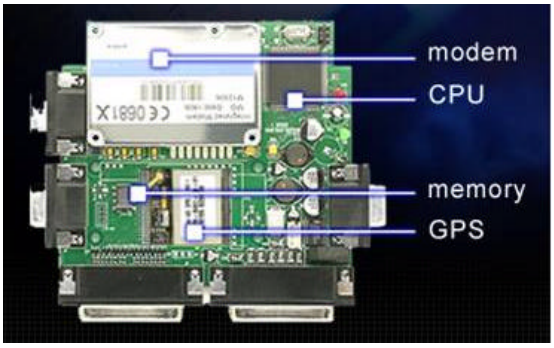
The **IN4MA pc** will report on changes in state and threshold movements, reporting immediate alarms on system faults, failures and change in performance. Alarms can be sent directly to a monitoring station, a PC, laptop and to a mobile phone via a SMS text message - which provides maintenance staff and engineers with real-time reporting.

Features

- Real time monitoring device designed for industrial applications
- Flexible, scalable and easy to install - 'wire-free'
- Live dial in facility to capture data in real-time
- Ease of interfacing capability to other equipment and devices
- Multi-level software with configurable threshold settings
- Offers remote switching capability via digital outputs
- Immediate fault and alarm monitoring
- Offers high level preventative, diagnostic and management monitoring
- No unnecessary site visits for the collection of data
- Data logging facility
- Flexible and visual front-end software for ease of use
- Multi site capability

Benefits

- Accurate and immediate information - in real-time
- Instant fault reporting and diagnostics
- Reduced data collection costs
- Increased productivity and process control
- Integrates into a wide range of equipment, devices and sensors
- Low cost GSM data & SMS text messages, via our easy billing.
- Fast, easy installation



IN4MA pc comprises of a printed circuit board (PCB), incorporating a GSM modem (up-gradable to GPRS, 3G), a 'flash' programmable microprocessor, on-board data logging capability and a number of communication connectors, all housed within a rugged casing designed for commercial and industrial applications.

A GPS (Global Positioning Satellite) engine is available as an additional module to enable satellite tracking of mobile assets, vehicles, locomotives and equipment.

IN4MA pc can also incorporate a Short Range Radio Frequency module that allows the **IN4MA pc** to communicate with **slaveIN4MA** radio devices, using a range of non-licensed radio frequencies (such as 173 MHz, 433 MHz within the UK, for example) as well as licensed radio bands, dependant upon application and range of transmission required.

There are currently three types of **IN4MA pc** *available*:

- **IN4MA pc/h** used typically as a 'hub' unit as well as a communication device that can communicate with **slaveIN4MA** units, using short range radio

- **IN4MA pc/m** the 'master' **IN4MA pc** unit is used typically for stand-alone applications where single point communication is required using the modem (GSM/GPRS etc) to remotely communicate with other remote **IN4MA pc** units as well as fixed land-lines

- **IN4MA pc/t** the 'tracking' IN4MA pc is utilised for mobile applications where GPS satellite positioning is required. This is typically used on vehicles, mobile assets, locomotives, plant equipment etc

Each **IN4MA pc** has 16 analogue inputs (only 12 with GPS version), 16 digital inputs, 8 digital outputs and a 'transparent link' for seamless data transfer.

IN4MA pc has been designed and developed to incorporate a broad range of capability, and can easily be adapted for 'bespoke' or 'tailored' telemetry applications.

IN4MA pc can be programmed remotely, 'wire-free' over air, using a simple and intuitive 'scripting' language to carry out complex monitoring, recording, and alarming and communication instructions.

IN4MA pc general features

- 16 alarm scripts
- 5 dedicated system scripts
  - Power up
  - Incoming ring detection
  - Call connect
  - Call disconnect
  - System timer
- 16 zone geo fencing with in/out alarming
- direct connection/PC port
- daily interval from/to timer with associated scripts
- over/under speed (GPS) alarming
- low /high threshold alarming on analogues
  - programmable hysteresis
- 32 bit coding for pulse counters with pre-scalar
- on board calibration functionality
- flexible multilevel logging
- low power functionality via scripting
- text based commands with acknowledge
- remote firmware upgrade
- >10 years memory retention
- Ibutton/RFID interface with associated scripts
  - 20 user keys
  - 20 manager keys
- 10 priority classified internal phone memory
- daily heart beat timer
- programmable one second pulse on outputs
- Real time clock

IN4MA pc technical features

GSM modem (upgradeable to other types such as GPRS)

- internal with antenna
- dual band GSM900/1800
- output power GSM900 class 4 (1 W)
- output power GSM1800 class 1 (2 W) (gsm 1900 as option)
- AT Hays compatible
- SMS ,voice and data

memory

- 16 Mb flash
- up to 40,000 records

analogue inputs

- 16 dedicated inputs (12 on IN4MA pc/t version)
- max. voltage range 0-12 V
- 10K? input impedance
- resolution 5mV
- linearity < +/- 1%
- drift < +/- 1%

digital inputs

- 8 normally closed inputs with 22K? pullup to supply voltage
- 8 normally open inputs with 22K? pulldown to ground
- trigger threshold level 1.2V
- auto detect for pulse and frequency on each input
- maximum pulse or frequency 6KHz / number of inputs
- maximum voltage +/- 120Vdc

outputs

- 8 open drain with inductive load protection
- 1Hz square wave generators at +/- 1%
- maximum current sink 300mA per output

processor

- 16 bit Motorola micro controller
- flash programmable
- 4.9152 MHz clock

peripherals

- 1 dedicated RS485 interface
- 1 dedicated RS232 interface
- 1 transparent link RS232
- 1 CAN BUS interface

power supply

- switch mode regulator
- +7/+32 volts DC range
- reverse polarity protection
- internal resetable fuse
- current consumption
  - without GPS
    - ??<30 mA with GSM in standby and registered
    - ??<300 mA with GSM in communication
    - ??peak transient current 1000 mA
  - with GPS
    - ??<120 mA with GSM in standby and registered
    - ??<390 mA with GSM in communication
    - ??peak transient current 1100 mA

LED

- GREEN GSM signal strength/online indicator
- RED status indicator microphone input (1k electret)

GPS (IN4MA pc /t only)

- internal with antenna
- 12 channels
- RMS precision 40 meters
- frequency 1575.42 MHz
- impedance 50?
- 1 second update rate

SR-RF (IN4MA pc /h only)

- transmitter (TX) 173.225 MHz unlicensed frequency
- receiver (RX) 173.225 MHz unlicensed frequency

Connection details

JP1 and JP2 are 25 way D type connectors for the power supply, the inputs and the outputs.

Description	connector ref	PIN number	notes
Supply +	JP1	1	9 - 30 Vdc, allow 1 amp
Supply +	JP1	2	
DI#0	JP1	3	to 0v
DI#1	JP1	4	to 0v
DI#2	JP1	5	to 0v
DI#3	JP1	6	to 0v
regulated 5V dc output	JP1	7	
DI#12	JP1	8	programmable
DI#13	JP1	9	programmable
DI#14	JP1	10	programmable
DI#15	JP1	11	programmable
ground	JP1	12	
ground	JP1	13	
AI#8	JP1	14	0-10 Vdc
AI#9	JP1	15	0-10 Vdc
AI#0	JP1	16	0-10 Vdc
AI#1	JP1	17	0-10 Vdc
DO#2	JP1	18	
DO#3	JP1	19	
DO#4	JP1	20	
DO#5	JP1	21	
AI#2	JP1	22	0-10 Vdc
AI#3	JP1	23	0-10 Vdc
AI#10	JP1	24	0-10 Vdc
AI#11	JP1	25	0-10 Vdc
Supply +	JP2	1	
Supply +	JP2	2	
DI #4	JP2	3	to 0v
DI#5	JP2	4	to 0v
DI#6	JP2	5	to 0v
DI#7	JP2	6	to 0v
regulated 5V dc output	JP2	7	
DI#8	JP2	8	programmable
DI#9	JP2	9	programmable

DI#10	JP2	10	programmable
DI#11	JP2	11	programmable
ground	JP2	12	
ground	JP2	13	
AI#12	JP2	14	0-10 Vdc
AI#13	JP2	15	0-10 Vdc
AI#4	JP2	16	0-10 Vdc
AI#5	JP2	17	0-10 Vdc
DO#10	JP2	18	
DO#11	JP2	19	
DO#12	JP2	20	
DO#13	JP2	21	
AI#6	JP2	22	0-10 Vdc
AI#7	JP2	23	0-10 Vdc
AI#14	JP2	24	0-10 Vdc
AI#15	JP2	25	0-10 Vdc

Analogue inputs are referenced to chassis.

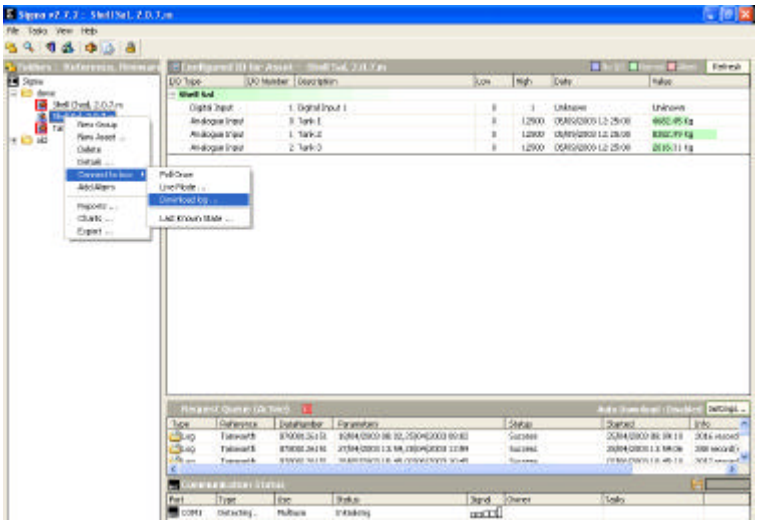
The data presentation software – Sigma

This allows data to be collected from remote and local sites using GSM and radio. The data can be presented graphically and output as reports and exported in various formats, such as Excel.

Two components are installed. Sigma and also a communications utility.

You can set up schedules to Sigma automatically calls up the outstations to gather data, and you can ask Sigma to dial immediately and you can view ‘live’ data.

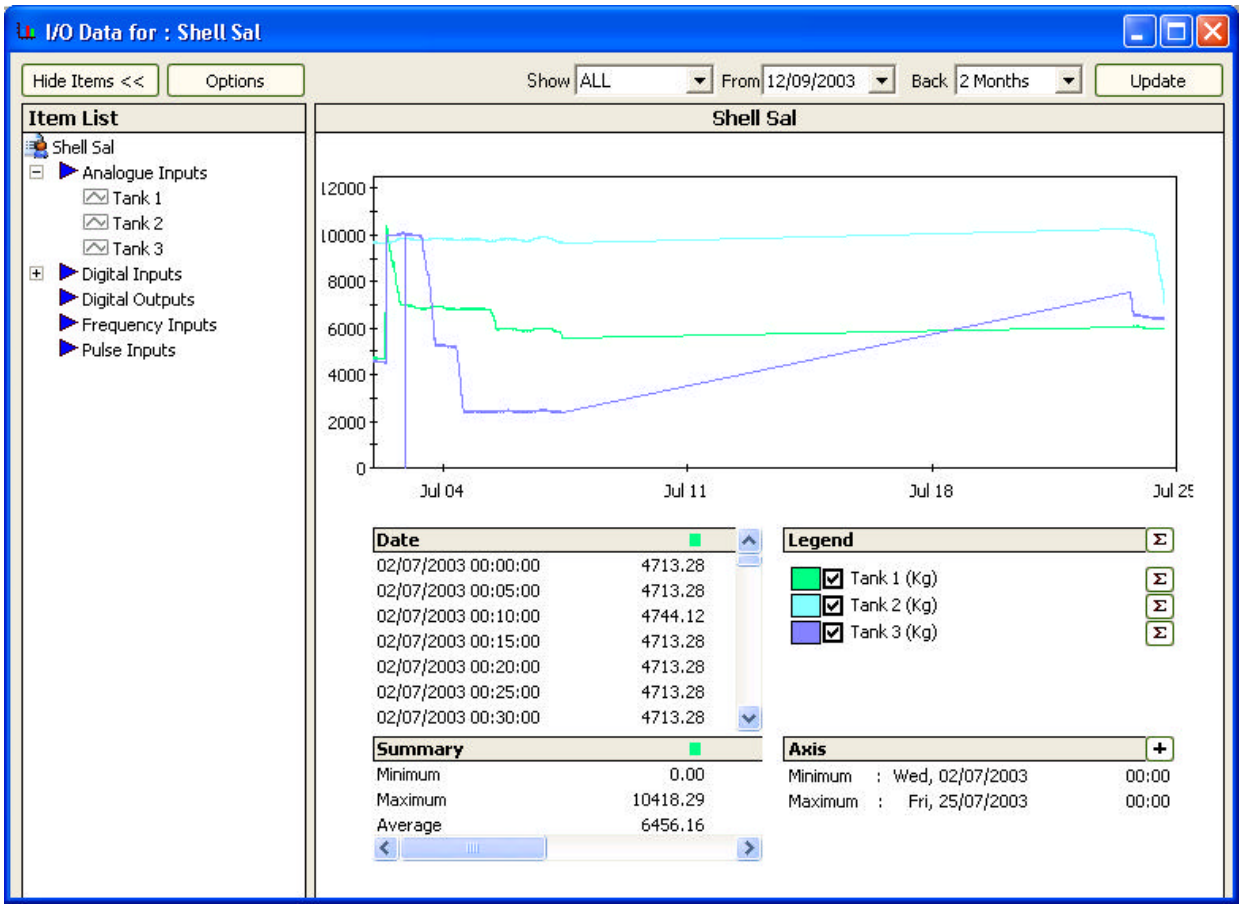
Once you enter Sigma you are presented with the following screen.



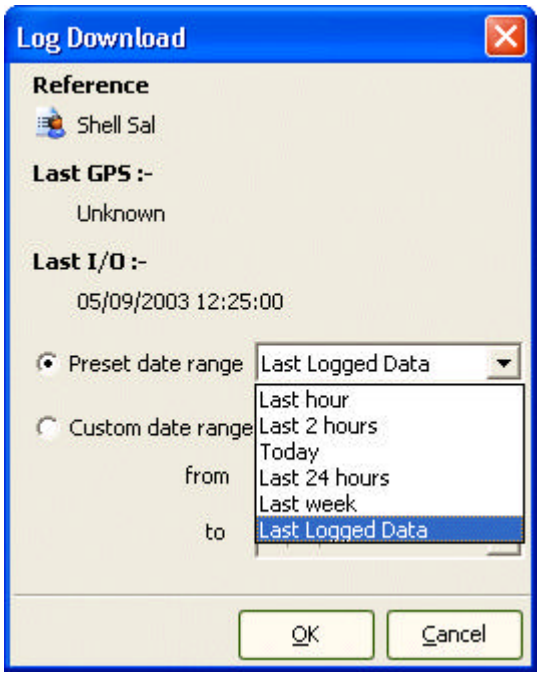
Setting up sites (or ‘assets’) .is straightforward. Create a group and then create an asset using the right mouse button to present menus. The details for each asset can be entered (such as the phone number) and then you set up

which channels you want to look and what they are called (for example analogue channel 0 could be ‘Tank 1 Level.’

From within the software you can view historical data graphically.



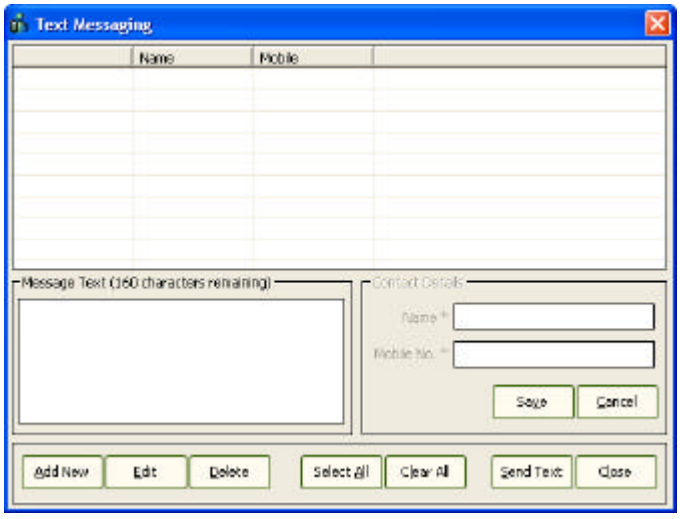
You can also set the unit to gather data periodically:

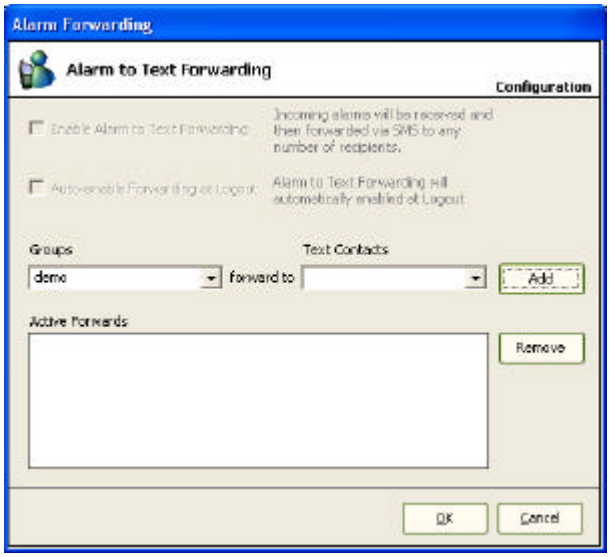


Alarming to mobile phones

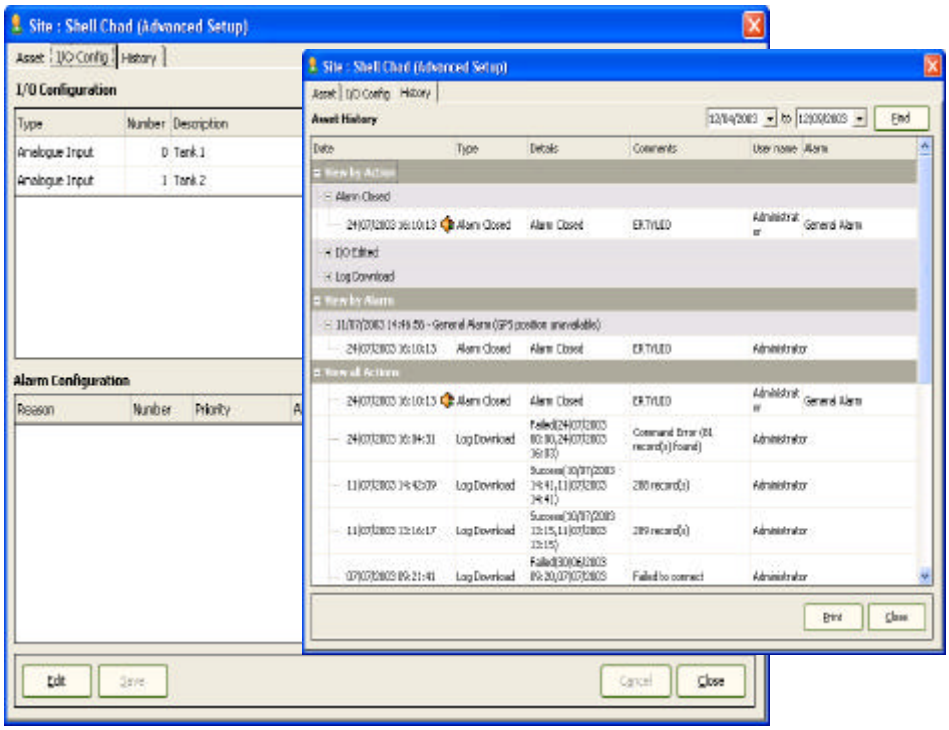
The hardware can be programmed to send text messages when certain conditions occurs. You can also configure the units to respond to requests – i.e. you send a text message asking for data and the IN4MA pc responds. Hysteresis can be configured into the device and you can configure the text message to contain live data as well as free text.

Sigma can be configured to automatically forward alerts to mobile phones:





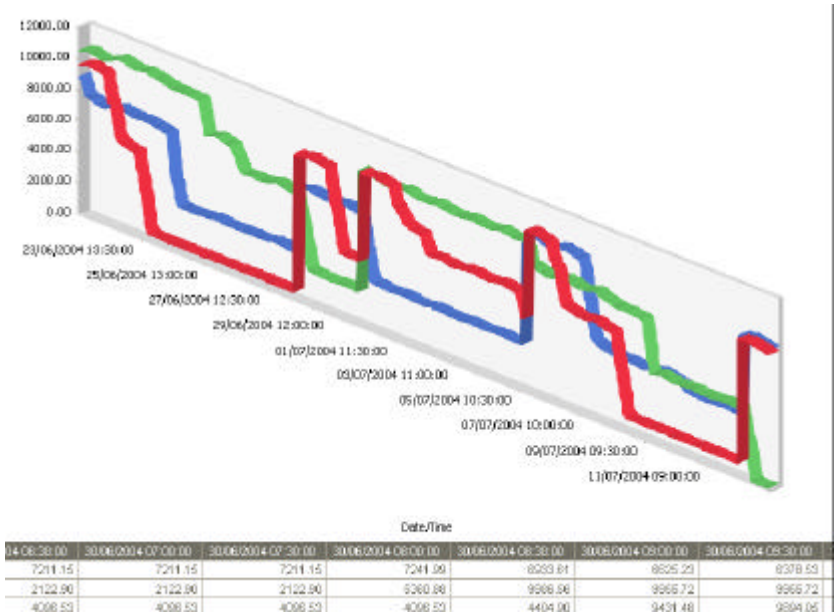
For each asset you have a complete history of actions taken - what alarms occurred and when, when logs were downloaded….

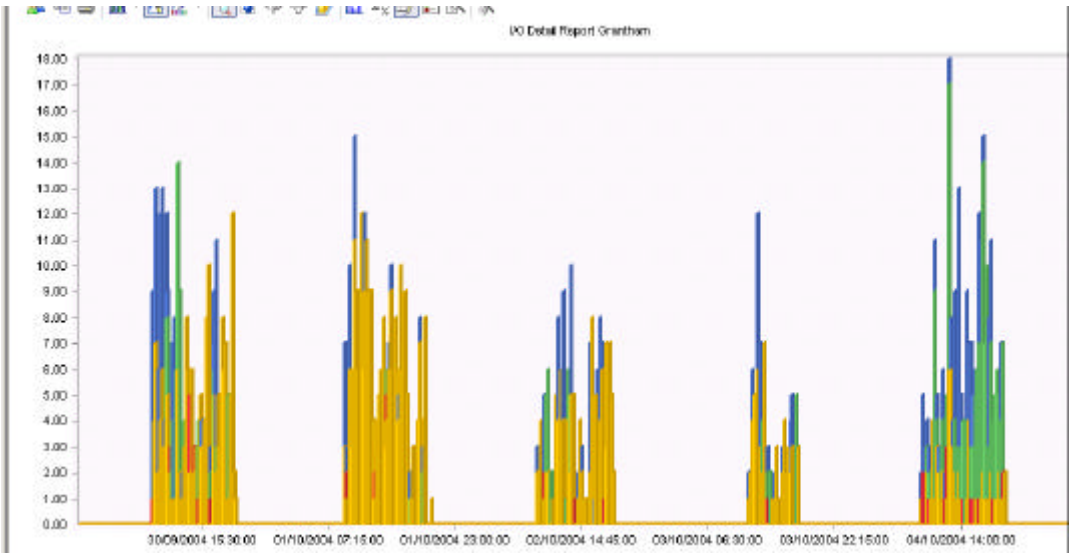


Web enabled data

In a typical application the IN4MA pc will upload 24 hrs of locally stored data via GSM to 'gateway' every 24 hours 7 days a week and 365 days a year. This data be will securely held on fully backed up servers so clients can access this data via the Web with full security, with pre-defined passwords per site or sites to be specified by the client.

'gateway' allows the customer to view data by site or sites and by pre defined dates & times. The data is presented in interactive charts, tabular data in PDF format and CSV file. The 3 different files can by either printed off or saved to file on to local PC.





Data can be export for use by other applications.

Serial communications

We are able to use the serial port to communicate to different devices such as RF tag / ID systems, Bar code readers, specialist microprocessors. We can incorporate customised software within the IN4MA pc to suit a wide range of communication and logging requirement.

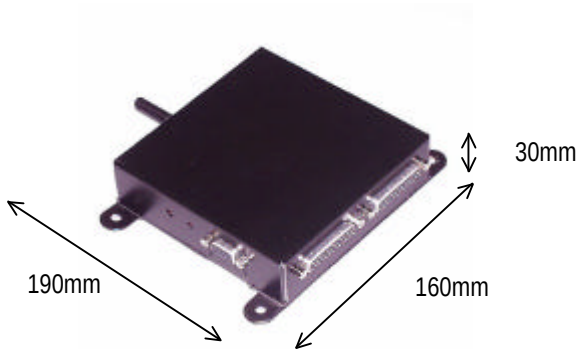
Satellite communications

It is not always possible to use the mobile phone network so we have available devices utilising Immar Sat.

The IN4MA pc is continually evolving and the number features available are increasing all the time. If you want to learn more about the IN4MA and how it can be used to save you time, save you money and increase your productivity then please do not hesitate to contact us.

Dimensions

160mm (width) by 190mm (height) by 30mm deep



PC requirements (for Sigma):

	Minimum	*Recommended*
Processor	Plll 1.0Ghz	P4 2.0Ghz
RAM	256Mb	512Mb
Free Hard Disk Space	10Gb	30Gb
1.4Mb FDD	1	1
CD ROM Drive	20 x	40 x
Graphics Card	16Mb RAM	32Mb RAM
Operating System	Windows 2000	Windows 2000
COM Ports	1 free	2 free
Printer	Laser	Laser
Keyboard	Any UK Version	Any UK Version
Pointing Device	Any	Any
Display	15” SVGA Monitor capable of 1024 by 768 pixels.	17” SVGA Monitor capable of 1024 by 768 pixels.

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