

C21-LOCATE

C21 Systems Ltd launches a new state-of-the-art intelligent location device for the monitoring of a variety of mobile and static assets. Designed to make maximum use of long life primary cell batteries, with multiple sensor and interface capabilities, a comprehensive management portal, and remotely configurable by the user.

- A versatile asset location device particularly suited to high value portable equipment where an unpowered stand-alone device is required
- Ideal for asset monitoring where an external power source is not available.
- GPS tracking capability utilising an M2M SIM for reliable GPRS based data reporting
- A configurable accelerometer is included for both motion and shock detection.
- Temperature, atmospheric pressure and humidity measurements are reported, allowing for environmental monitoring of local ambient conditions, ideal for applications where the asset is sensitive to heat, humidity, and shock
- Over air changes to both configuration and downloadable firmware, mean that the device's functionality can be altered to suit a wide range of end-user applications
- Full battery status data is supported along with an advanced power management system, allowing for the device to announce when the batteries require attention
- An advanced and fully featured mapping, status and alerting portal is available for end-to-end control and monitoring
- The device's hardware and/or firmware can be tailored to customer's specific application requirements



SENSORS



Dimensions 135 x 60 x 29 mm

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SPECIFICATION

Key Features:

- Very low power chipset providing 5 years of operation off single set of batteries.
- Configurable modes of operation tailored to perfectly meet the applications requirements.
- Environmental sensors to monitor movement, shock, temperature, humidity and pressure in addition to position (includes position via cell location failover).
- Buffered message delivery (reports positioning and environmental information after leaving black-spot).
- Rugged, compact, waterproof enclosure.
- User serviceable power source (primary cells).
- Remotely configurable (over air) with full firmware upgrade facility.
- Full featured asset management and positioning platform front end.
- Designed and manufactured in the UK.

Physical Characteristics:

Dimensions : Length 135mm, Width 60mm, Height 29mm.

Weight : 210g including batteries.

Enclosure : Plastic ABS. IP65 with breathable membrane for environmental sensors.

Security : Access to battery compartment from rear. May be front mounted using appropriate bolts.

Power: User serviceable primary cells, 3 x AA, 4.5v.

Typical battery operating lifetime

One alive per week	- 6+ year
One alive notification per day	- 3 to 4 years
One alive plus 2 locations/day	- 2 years
One alive plus 10 locations /day	- 6 months
One alive plus 75 locations /day	- 1 month

Environmental:

Operating Temperature :	-20°C to +75°C
Storage Temperature :	-40°C to +85°C

Internal:

SIM Format :	Mini SIM. (FF2)
CPU :	Very low power microcontroller.
Memory :	4MB flash (internal).

Sensors :

Accelerometer :	3 axis accelerometer provides movement and shock detection. Sensitivity can be configured to measure acceleration up to 16g.
Temperature:	-40°C to +85°C (resolution 0.01°C Accuracy 0.5).
Humidity :	Relative Humidity 0 to 100% (Accuracy +/- 3%)
Pressure :	300 to 1100 hPa (resolution 0.002 hPa)

Comms :

GSM: Quad band 850/900/1800/1900MHz Class 4(2W@850/900MHz Class1(1W @1800/1900MHz).

GPS:

Sensitivity:	
Tracking:	-165 dBm
Reacquisition:	-160 dBm
Cold starts:	-147 dBm
Time-To-First-Fix:	
Cold starts:	31 s (typical)
Warm starts:	30s
Hot starts:	<1s
EPO Assist:	13s (CTTFF)
Accuracy:	
Automatic Position:	2.5m CEP
Speed:	0.1 m/s
Operation temp:	-40 to +85

Protocols :

IP TCP/UDP, SMS, RS232

Antenna:

Internal combined GSM antenna +3dB.
Internal micro SMA connector for external antenna.

I/O Connectivity:

I/O : 1 x Serial, 2 x Analogue In, 4 x Digital I/O.
Note base unit does not provide access to this I/O. Requires external signal conditioning.

Indicator LED :

Two colour (red/green) for activity/status. LED operation may be disabled.

C21 has relied on representations made by its suppliers in certifying this product as RoHS compliant. Specifications subject to change without notice.

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Physical

Size	Length 135mm, Width 60mm, Height 29mm
Weight	210g (including batteries)
Mounting Options	Two M4 screws on 120mm centres. Can be supplied with adaptor which houses 4 x 6kg magnets for magnetic mounting.
Casing	Material - ABS/PC composite material and designed for UL-V0 flame retardant Water and dust - IP 65
Battery Compartment	4 x M3.5 screws

Battery

Size	3 off AA										
Recommended Type ¹	Primary Cells - Energiser Ultimate Lithium.										
Life Expectancy ²	<table border="0"> <tr> <td>One alive per week</td> <td>- 6+ years</td> </tr> <tr> <td>One alive notification per day</td> <td>- 3 to 4 years</td> </tr> <tr> <td>One alive plus 2 locations/day</td> <td>- 2 years</td> </tr> <tr> <td>One alive plus 10 Locations /day</td> <td>- 6 months</td> </tr> <tr> <td>One alive plus 75 Locations /day</td> <td>- 1 month</td> </tr> </table>	One alive per week	- 6+ years	One alive notification per day	- 3 to 4 years	One alive plus 2 locations/day	- 2 years	One alive plus 10 Locations /day	- 6 months	One alive plus 75 Locations /day	- 1 month
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One alive plus 75 Locations /day	- 1 month										

¹Life expectancy calculations are based on using the recommended primary cells. Alternatives will affect operating life expectancy.

²There are many operational variables that affect battery life. The unit calculates and reports used battery percentage to the portal on an ongoing basis.

Network

Cellular Network	Utilises 2G GPRS M2M technology. The device can be configured to work with most M2M SIM providers many of which provide network agnostic network connectivity.
SIM plans ³	SIM providers and associated SIM plans may be matched to customer's specific needs depending on reporting interval and coverage required.

³When devices are supplied for use with a customer managed SIM plan, a monthly per device fee will be charged to cover the costs associated with using the estate management, mapping, status and alerting portal.

Modes of Operation

Motion	In this mode the unit behaves like a conventional asset locator. Depending on the intervals set, the unit will announce immediately when it detects motion, followed by position information as it moves. When the unit comes to a stop it will announce its final location. Whilst at rest the unit will report 'alive' events to confirm that the unit is still operational.
Immobile	In this mode the unit will announce its position when it first detects motion. While there is continued motion the unit will NOT announce further positions until it has been stationary for the duration of the defined interval. This allows for situations where only the final location is required and not the positions in between starting and stopping. This dramatically improves battery life. "alive" events indicate that the unit is still operational during long periods of inactivity.
Airplane Mode	This is a preset mode (based on the Immobile mode) that configures the device for travel in aircraft and ensures that no transmissions are made whilst in air transit.
Hibernation	In this mode the unit will do nothing for a preset duration or until it is woken by the mapping, status and alerting portal.

Location Methodology

GPS	The device incorporates a sensitive state of the art GPS receiver. A variety of position optimisation algorithms are employed.
GPRS Secondary Location	In the event that a GPS location cannot be achieved, a secondary (though less accurate) GSM cell based location fix is utilised. The operation of this fall-back location is configurable.

SMS Listening

SMS listening	The device is capable of receiving SMS instructions from the mapping, status and alerting portal. These instructions can provide the unit with a variety of instructions. Because the device spends much of its life in deep sleep mode, it needs to wake up to "listen" for SMS instruction. The frequency and duration of these wake up events can be configured at the portal to suit the application.
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Sensors

Accelerometer	The unit incorporates motion detection by virtue of an accelerometer. Sensitivity and movement parameters are configurable so that different motion profiles can be detected as required. A secondary use of the accelerometer is to detect shock movement exerted on the device. Shock detection sensitivity is configurable and fully independent of motion detection.
Temperature	Ambient temperature is reported.
Relative Humidity	The unit reports relative humidity and can therefore be used in applications where detection of conditions that might cause condensation is important.
Dew point	The dew point is automatically calculated (from the temperature and humidity) and reported by the device to the portal, making it well suited to applications where condensation monitoring is important.
Pressure	Absolute atmospheric pressure is measured with sufficient sensitivity such that a change in height equivalent to walking up/down a few stairs can be detected.
Connectivity	Although not available on the standard device, there is capability for the following: 1 x Serial (Rx/Tx) i.e. RS232/485 4 x Digital I/O 2 x Analogue In Bluetooth Connectivity

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LED Indicator

status and activity information about the	A two colour (red/green) LED provides LED device. For covert operation the LED can be suppressed via portal.
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Data Logging

Logging	<p>Some applications do not require information to be transmitted in real time. Similarly devices may be located for extended periods of time in conditions where there is no GSM signal available. The configurable data logging functionality ensures that the device can be operational even when there is no GSM signal, and report this off-line information next time it is able to connect to the portal or at pre defined intervals.</p> <p>The unit has sufficient flash memory storage capacity to record up to 25 thousand data records.</p>
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Alarms

General	<p>Alarm warnings generated by the device are managed by the portal and can be escalated and distributed by email and/or SMS to pre-configured locations/individuals. Above maximum and below minimum triggers can be set on the variables listed below.</p> <p>A first motion alarm can be set to raise an alarm condition, should a device moves that is expected to remain stationary.</p>
Alarm Triggers	<p>Motion</p> <p>Temperature (°C), Relative Humidity (RH%), Atmospheric Pressure (absolute mbar)</p>



Shock

Shock detection	When a shock is recorded above a pre-defined level, the unit will report the event to the portal. The pre-set level of shock measured in "g" and is configurable.
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Over-Air Configuration

Configuration	All configuration changes are made over-air via the portal. This gives the ability to make refined configuration changes to devices in the field, as required.
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Over-Air Firmware

Firmware	As with device configuration, over-air firmware changes can be made as required. This has obvious benefits should it be necessary.
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GAP Platform

General	Any device of this type is only as good as the management platform it runs on. In order to provide a fully integrated end-to-end solution, C21-Locate incorporates a standard firmware that delivers its data to the GAP platform. This is a sophisticated, well established professional portal providing the end user with a fully featured mapping and estate management solution.
Integration to other platforms	Integration into mapping and estate management platforms of other partners is feasible and would be considered on an individual basis. Please contact C21 Systems for further information.