

# Point Orange IoT

IP68 rated, low powered Remote Telemetry Unit with software configurable I/O



Point Orange IoT is a compact Logger/RTU device with integrated battery, a 4G modem for connections to LTE-M and NB-IoT networks, internal and/or external antenna, flexible I/O options, Modbus and SDI-12 master capability and a submersion sensor.

## Key Functionality:

- Real-time remote monitoring of up to 5 programmable I/O channels, allowing over 100 possible combinations of digital, counter, analogue and serial inputs.
- IP68 enclosure suitable for submersion to 4m for 4 days with a range of mounting options for in-field deployment
- Patented integrated submersion sensor able to detect when the unit is submerged
- Communicates with Medina or DNP3 Telemetry Masters
- Multiband 4G modem supporting LTE-M and NB-IoT networks
- Internal antenna and optional external antenna with automatic switching
- Internal lithium battery with an expected life of 5+ years based on site configuration and operation
- Flexible integrated installation bracket
- External power source support with automatic power source detection
- Local diagnostic points, such as Comms signal strength, Temperature, Battery Voltage
- Capable of communicating with Modbus and SDI-12 slave devices
- Easy to configure and re-configure using free Poco+ software

## EXTERNAL I/O

Point Orange IoT provides real time remote monitoring of up to 5 programmable sensors. It has software programmable I/O functionality for hundreds of configurable combinations and includes support for analogue, digital, counter and serial inputs.

The following table lists the available I/O:

Type	Max No.	Range	Notes
Digital input	5	0-1	Volt-free, includes a debounce filter
Counter input	4	32-bit	Volt-free, up to 100 Hz, includes a debounce filter
Active loop	2	4-22mA	Independent settle time, 12V 80mA supply
Passive loop	2	4-22mA	
Active voltage	2	0-2V	Independent settle time, 12V 80mA supply
Passive voltage	4	0-2V	
Serial	1	N/A	Supports connection to various serial slave devices via interfaces such as SDI-12, RS232 and RS485

The active loop and active voltage I/O options supply power to the external sensor whereas the passive loop and passive voltage I/O options do not power the external sensor, and require a secondary power supply for the sensor, or the sensor is self-powered.

## COMMS

The Point Orange IoT is a 4G device and supports the LTE network technologies LTE-M and NB-IoT. The modem on the Point Orange IoT is paired with a software switchable antenna offering internal and external options to facilitate communication with the Telemetry Master. The Point Orange IoT provides the following functionality with regards to communication:

- Multiband 4G modem supporting LTE-M or NB-IoT networks (configurable)
- High gain multi-band customised internal cellular antenna
- Support for a third party external antenna
- Automatic selection between the internal and external antenna
- Configurable periodic scheduled dialback (useful to minimise battery usage)
- Dynamic Dial-in – Allows for two configurable dial back schedules, normal and under alarm conditions
- Global RF band support
  - B1 (2100MHz), B2 (1900MHz), B3 (1800MHz), B5 (850MHz), B8 (900MHz), B12 (700MHz), B18 (800MHz), B19 (800 MHz), B20 (800MHz), B26 (850MHz), B28 (700MHz), B39 (1900MHz)
- Trigger dial in using magnetic reed switch

## INTERNAL MONITORING

In addition to external sensor reading the Point Orange IoT can monitor and report information about itself. Some of the parameters monitored include:

- Internal battery voltage
- External supply voltage
- Temperature
- External sensor supply voltage (for use with serial and loop powered sensors)
- Cellular signal strength (for the external and internal antenna)
- Modem error code
- No. of successful and unsuccessful calls to the Telemetry Master
- Cell information including, Cell ID, Location Area code, Mobile Country Code and Mobile Network Code
- Submersion sensor
- Datalogger/RTU device serial number and SIM card number

All these internal values can be accessed remotely as points on the Telemetry Master and can be configured with trends and events.

## DNP3 PROTOCOL

The Point Orange IoT can be configured as a DNP3 slave device, capable of the following:

- DNP Level 2 + parts of level 3 and level 4
- Class 1, 2 and 3 Events
- Two event models for analogue inputs (value change and level change)
- Contactable events (Alarms)
- Periodic events (Trends)
- Dynamic Trending - Allows for two configurable data logging schedules, normal & under alarm conditions
- Object Group 0 device attributes
- File transfer and activation
- Time synchronisation with Telemetry Master
- Object 20 (Counter) writes
- Object 110 (string) points
- Supports unsolicited reporting
- Frozen counters

## MEDINA PROTOCOL

The Point Orange IoT can be configured as a Medina slave device, capable of the following:

- Deployment on our Palette web-hosted telemetry system
- Monitoring of inputs
- Eventing and Alarming
- Logging sensor measurements (Trending)
- File transfer
- Time synchronisation with Telemetry Master

## MEMORY

### Volatile Memory

The Point Orange IoT has low power static RAM that is used for storing trend and event data. With a common trend configuration (see example below), the Point Orange IoT can store Medina trend data for up to 45 days (configuration dependent). For DNP3 event data, approx. 15,000 events, which equates to ~120 days.

- Counter -15 mins
- Internal battery voltage - 60 mins
- Cellular signal strength - 24 hours
- Modem error code - 24 hours
- Dial back success -24 hours
- Dial back failure - 24 hours

### Non-Volatile Memory

The Point Orange IoT also has 256MB of non-volatile memory which is used to store diagnostic, firmware and configuration files.

## CONFIGURATION

The Point Orange IoT configuration is stored in non-volatile memory meaning that it is retained after a power reset.

The Point Orange IoT can be configured locally by connecting over USB to a Microsoft Windows PC running the MetaspHERE application, Poco+. The RTU can also be configured remotely via Medina or DNP3.

## FIRMWARE UPGRADE

Point Orange IoT supports firmware upgrades, either over-the-air using the DNP3 file transfer or locally via the USB cable from Poco+.

Users should be aware that remote firmware upgrade may take a long time to complete due to the limited bandwidth available using LTE-M and in particular NB-IoT networks.

## ACCESSORIES

A number of standard Point Orange IoT accessories are available:

- USB configuration cable
- Test box
- Connector cap (To maintain the IP68 rating of the RTU when no external sensors are used)
- Antenna cap (cap should always be used unless an external antenna is fitted)
- Off-the-shelf I/O cables (these cables are pre-wired for some common applications)
- Secure bracket
- External battery pack

## POWER

The Point Orange IoT can be powered by an internal battery or by a suitable external DC source. If the external source fails, the Point Orange IoT automatically switches to the internal battery without any interruption to the operation of the unit.

- Internal Lithium Thionyl Chloride (LTC) battery pack (tested to UN38.3 and IEC 60086-4 standards)
- Internal battery has a life of 5+ years for many applications
- Support for external DC source (5V DC to 8V DC, minimum 7.5W)
- Automatic switching between internal and external DC sources
- No power supply interruption during switching

## SPECIFICATIONS

Analogue Inputs	<p>Up to 4 channels</p> <p>Type: Active current, passive current, active voltage, passive voltage</p> <p>Current range: 0-20mA, Voltage range: 0-2V</p> <p>Active AI power supply (12V DC, 80mA)</p> <p>Input impedance: 10.2kΩ</p> <p>Accuracy typically: ±0.5% (Max ±2%)</p> <p>Absolute maximum ratings: ±5VDC</p> <p>Resolution: 16-bits</p>
Counter inputs	<p>Up to 4 channels</p> <p>Volt free, Impedance: 50kΩ</p> <p>32-bit counter support up to 100Hz</p>
Digital inputs	<p>Up to 5 channels</p> <p>Volt free, Impedance: 50kΩ</p>
Power	<p>Internal lithium battery pack</p> <p>Optional external battery pack</p> <p>DC power input (5-8V DC)</p>
WAN Protocols	<p>Medina</p> <p>DNP3 (Level 2+ elements of level 3 and 4)</p>
Serial Protocols	<p>Modbus master (RS232, RS485 full and half duplex)</p> <p>SDI-12 master (up to 10 sensors)</p> <p>Mainstream</p>
Memory	256MB flash memory and 512kB static RAM
Comms	<p>Multi-band NB-IoT/ LTE-M modem</p> <p>Auto switching internal and external antenna</p>
Local monitoring	<p>Ambient temperature sensor (± 1°C)</p> <p>Integrated submersion sensor</p> <p>Battery, loop, and external supply voltages (± 2%)</p> <p>Automatic external power source detection and switching</p> <p>Antenna selection and performance</p>
Remote management	<p>Remote firmware upgrade</p> <p>Remote configuration</p>
Dimensions	<p>156mm × 110mm × 112mm (excluding mating cables)</p> <p>0.6 Kg (fully assembled)</p>
Environmental	<p>Operating temperature -20°C to +80°C</p> <p>Relative Humidity up to 95% non-condensing</p> <p>Protection classification: IP68 4m for 4 days</p>



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