Point Blue IoT

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

DATASHEET

sensor collection storage processing interaction

Point Blue IoT is an intrinsically safe, ATEX and IECEx certified compact Logger/RTU with a multi-band modem supporting NB-IoT and Cat-M1 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 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 Blue 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, 42mA supply
Passive loop	2	4-22mA	
Active voltage	2	0-2V	Independent settle time, 12V, 42mA 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.

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COMMS

The Point Blue IoT is a LTE-M device and supports the network technologies Cat-M1 and NB-IoT. The modem on the Point Blue IoT is paired with a software switchable antenna offering internal and external options to facilitate communication with the Telemetry Master. The Point Blue IoT provides the following functionality with regards to communication:

- Multiband modem supporting Cat-M1 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), B4(1700MHz), B5 (850MHz), B8 (900MHz), B12 (700MHz), B13 (700MHz) B18 (800MHz), B19 (800 MHz), B20 (800MHz), B26 (850MHz), B28 (700MHz),
- Trigger dial in using magnetic reed switch

INTERNAL MONITORING

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

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

CONFIGURATION

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

The Point Blue 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 Blue IoT supports firmware upgrades, either over-the-air using the Medina protocol, 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 Blue 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

There are two versions of the Point Blue IoT, Point Blue IoTi and Point Blue IoTe. The Point Blue IoTi has an internal battery only, whereas the Point Blue IoTe is only powered by an external battery with no internal battery.

- 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
- External LTC battery pack (tested to UN38.3 safe transportation standards)
- External DC source (5V DC to 8V DC, minimum 7.5W)

ATEX/IECEX PARAMETERS

SENSOR INPUT PARAMETERS

- U_o = 13.65 V
- C_i = 306 pF
- C_o = 4.99 uF
- I_o = 42 mA
- L_i = 0
- L_o = 80.62 mH
- P_o = 143 mW

USB IO

A USB IS Barrier, Model 1.0.0, coded Ex II (1) G [Ex ia Ga] IIB and covered by certificate CML18ATEX2418X, may be used to interface between the Point Blue IoT in the hazardous area and unspecified equipment located in the non-hazardous area

- U_o = 7.8 V
- C_i = 306 pF
- C_o = 4.99 uF
- I_o = 42 mA
- L_i = 0
- L_o = 80.62 mH
- P_o = 143 mW

SPECIFICATIONS

Analogue Inputs	Up to 4 channels Type: Active current, passive current, active voltage, passive voltage Current range: 0-20mA, Voltage range: 0-2V Active AI power supply (12V DC, 21mA per channel) Input impedance: 10.2kΩ Accuracy typically: ±0.5% (Max ±2%) Absolute maximum ratings: ±5VDC Resolution: 16-bits
Counter inputs	Up to 4 channels Volt free, Impedance: 50kΩ 32-bit counter support up to 100Hz
Digital inputs	Up to 5 channels Volt free, Impedance: 50kΩ
Power	Internal or external lithium thionyl chloride battery pack
Protocols	Medina DNP3 (Level 2+ elements of level 3 and 4) Modbus master (RS485 full and half duplex) SDI-12 master (up to 10 sensors)
Memory	256MB flash memory and 512kB static RAM
Comms	Multi-band NB-IoT/Cat-M1 modem (Bands 1,2,3,4,5,8,12,13,18, 19,20,26 & 28) Auto switching internal and external antenna
Local monitoring	Ambient temperature sensor (± 1˚C) Integrated submersion sensor Battery, loop, and external supply voltages (± 2%) Antenna selection and performance
Remote management	Remote firmware upgrade and configuration
Dimensions	156mm × 110mm × 112mm (excluding mating cables) 0.6 Kg (fully assembled)
Environmental	Operating temperature -20˚C to +50˚C Relative Humidity up to 95% non-condensing Protection classification: IP68 4m for 4 days
Certification	Ⓔx II 1G Ex ia IIB T4 Ga (-20˚C ≤ Ta ≤ +50˚C) Atex: Baseefa15ATEX0045X IECEx: BAS 15.0027X

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Metasphere provides robust asset monitoring of time critical remote operations for operators to gain competitive advantage and meet regulatory compliance.

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