

BLUEPYC

Unconventional.
Smart. Wireless.



WHO we are

BluePyc is the Business Unit of Softwork Group – Value Added Technology Provider, focused on **wireless technologies, above all Bluetooth Low Energy (BLE)**, a wireless technology based on a standard and developed to meet the IoT interoperability need; its main features are the wireless communication range up to 100 meter or more and the low energy consumption between the connected devices due to the small quantity of data to send.

BluePyc guarantees advanced wireless solutions, producing its own family of customized devices designed by the R&D Dept. and developed by an experienced project managers team and a network of certified resellers.

Our technologies

The BluePyc family of BLE devices is composed by Gateways, EchoBeacons and Beacons available in different housing: each device has specific technical features and ideal performances for different scenarios.

- ❖ **BluePyc BLE Cloud Gateway Reader** is an elegant and small size device, with web server on board, CPU & I/O; with a reading range up to 100 meters, it's able to receive and manage data coming from Beacons or EchoBeacon via Ethernet, Wi-Fi or GPRS;
- ❖ **BluePyc BLE EchoBeacon** is a BLE signal repeater, allowing to build BLE systems for wide indoor area, where detailed data capture, easy installation and low cost are required: it receives Beacon's data and forward them to the Gateway within a distance up to 100 mt.
- ❖ **BluePyc BLE Tag Beacon**: a wide Beacon range, even custom designed (upon request) by the R&D Dept., based on the specific requirements and needs of the project: to be fixed on items and wearable.



Our way of thinking

We believe innovation creates value not only thanks to a smart technology, but also using an original way of thinking: *unconventional* means not accept the first solution, it means avoid shortcuts and be brave in looking always for new paths.

How is our “unconventional way of thinking” related to BLE technology?

The standard BLE architecture is typically composed by fixed Beacons and mobile devices (e.g. smart phone), which receive data from Beacons and managed by an App.

Our **unconventional** vision is based on a reverse concept approach, in order to **create in an easy and competitive way an active RFID system suitable for automatic identification and localization of persons and objects.**

With respect to the traditional concept, our unconventional BLE architecture works in an opposite logic, where moving person or object are equipped with tag/Beacon and the fixed readers/Gateways are installed in the monitoring area, detecting data from different tags.



Our Engineering Services

In addition to this dynamic technology and through our services, we are able and willing to help you in the development of YOUR new and advanced device.

Which main steps do we follow to realize your product, satisfying your requirements, optimizing the Time to Market and reducing the production costs?



❖ **Technical and Functional Consultancy: Product Specifications Analysis** ->

we gather all the information, analyze and study the needs of your project, followed by a feasibility study

❖ **PCB Design – prototypes and final pcb realization** ->

datasheets analysis, certified components selection and electrical schematic design are the main activities in this phase; according to your needs, we can realize some fast prototypes to put under test.

❖ **Firmware Development** ->

sometimes the same PCB with different firmware can execute different tasks and so be used for different purposes/application: in BluEpyc we develop, debug and test your custom firmware, taking into account your specification

❖ **Product release** ->

once both hardware and firmware of your product have been developed, tested and produced, we deliver you a complete and ready-to-use solution!

Scenarios

- ❖ Access control (vehicle & person)
- ❖ Home Automation & Building Management (hospitality, industrial etc.)
- ❖ Process Automation & Monitoring. Maintenance
- ❖ Safety (e.g. in hospital, construction site)
- ❖ Asset & Facility Management: traceability, positioning, monitoring, sensor management (asset & people)
- ❖ Smart City: transportation, ticketing, waste management, citizen service, car-parking
- ❖ Tourism and Leisure: museum, exhibition, village & resort, amusement park etc





BluePyc BLE Gateway Family

Bluetooth® Low Energy Cloud Gateway Reader
with CPU & I/O



Highlight

- ❖ Elegant, small size, easy installation, low cost & intelligent Bluetooth Gateway Smart Cloud.
- ❖ Read/Write standard Beacon Tag, Apple iBeacon & Tag. On Board Web Server.
- ❖ Host Interfaces: Ethernet / Wi-Fi / Mobile GPRS quad-band. RTC. CPU & I/O
- ❖ IoT & Active RFID application. Real Time Location System & Indoor Positioning System.
- ❖ Inventory, track & trace for people, animals & goods, etc...
- ❖ Some **application scenarios**: vehicle & people access control (also stand alone), home & building management, safety (hospital, construction site, etc...), process automation, asset & facility management, smart city (parking, leisure & tourism, etc...)

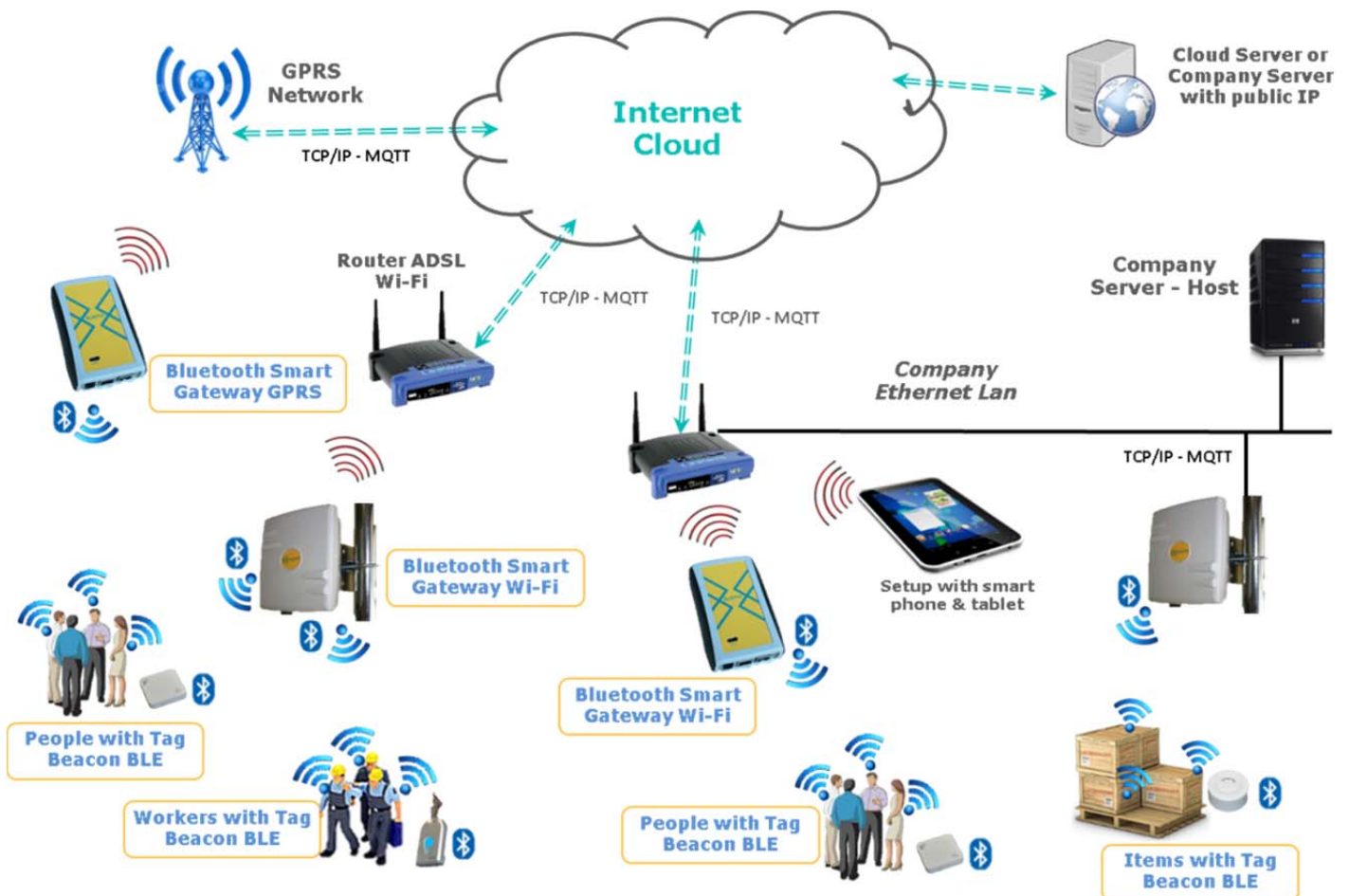


General Features

BluePyc BLE Beacon Gateway Family

- ❖ Operation Frequency: 2,4 GHz. IEEE Standard: 802.15.1 (Bluetooth 4.x Low Energy)
- ❖ Bluetooth integrated antenna or SMA connector for external antenna.
- ❖ Reading Range: up to 100 meters (depending on environment, configuration, Bluetooth antenna & tag beacon feature). Anti-collision Beacons reading.
- ❖ Data Rate: 1 Mbit/s. Security 128-bit AES. Transmit power: +3 dBm. RX sensitivity: -85dBm to -91dBm.
- ❖ CPU Feature - Low Power 16 Bit 16Mips microcontroller.
- ❖ Host Interfaces: Lan Ethernet or Wi-Fi or Mobile GPRS quad band.
- ❖ I/O on external plug (8 wire): 3 x digital input, 4 x digital output. Internal interface: 1 x buzzer, 1 x Led bicolor, 1 x I2C Interface.
- ❖ Real Time Clock/Calendar with battery. Slot for Micro SD memory card & SIM Card.
- ❖ Web Cloud Device: Web Server for configuration via Internet browser (Ethernet & Wi-Fi versions).
- ❖ Firmware Feature: on board BLE management protocol, anti-collision, read BLE Advertising & RSSI, Lan/Internet notification mode (TCP), read/write BLE parameter, filtering on RSSI Level, filtering on beacons mask. Dataset: Beacon Advertising, Time, RSSI & I/O status. Trigger wake-up (2 inputs), Tag on presence output.
- ❖ Possibility of custom applications (on request)

Scenario & connectivity IoT/Cloud





Technical Data

BluePyc BLE Beacon Gateway Family

Desktop Gateway



Desktop Case – ABS (UL 94 HB). Protection class IP40.

Dimensions (HxWxD): 121.9 x 78.7 x 33 mm.

Weight: About 150 g. Colour: Gray with Dark Gray Rubber Sides.

I/O on external RJ45 (8 wire): 3 x digital input, 4 x digital output. 1 x Led bicolour.

Slot for Micro SD memory card. 1 x buzzer, 1 x Led bicolour, 1 x I2C Interface

- ❖ BE-BLEG-D-E - Ethernet
- ❖ BE-BLEG-D-W - Wi-Fi
- ❖ BE-BLEG-D-M - GPRS

Indoor Wall Mount Gateway



Indoor Wall Mount Case – ABS (UL 94 HB). Protection Class IP40

Dimension: ø 110 x 38 mm. + spacer.

Weight: About 150 g. Colour: off-white (RAL 9002).

I/O (internal): 2 x digital input, 2 x digital output, 1 x Output Relè max. 24 V DC / 1 A, 1 x Led bicolour.

- ❖ BE-BLEG-WE - Ethernet
- ❖ BE-BLEG-WW - Wi-Fi

Industrial Wall Mount Gateway



Indoor & Outdoor Case - Radom Plastic (UV rating). Protection class IP67.

Dimensions (HxWxD): 185 x 185 x 56 mm.

Weight: About 450 g. Colour: White

Wall, Ceiling & Pole Mount. Aluminium Mounting kit included.

I/O on external connector: 2 x digital input, 2 x Output Relè max. 24 V DC / 1 A.

Slot for Micro SD memory card. 1 x buzzer, 1 x Led bicolour, 1 x I2C Interface

- ❖ BE-BLEG-WM-E - Ethernet
- ❖ BE-BLEG-WM-W - Wi-Fi
- ❖ BE-BLEG-WM-M - GPRS

Common Features

Host Communication (*)	Ethernet RJ45 (10/100). Wi-Fi Wireless Ethernet 802.11 b/g/n Mobile GPRS quad band
CPU	Low Power 16 bits, 16 MIPS, PIC 24FJ256GB206 processor Memory: 256K Flash, 96K Ram, 16Mbit Flash (for web server), 64Kbit EEPROM. Real Time Clock/Calendar with battery (*).
Operating frequency	2,4 GHz. IEEE Standard: 802.15.1. Integrated Bluetooth RF ceramic antenna
Reading Features	Anti-collision Beacons reading. Read Performance: about 80 tags per second Read Range: up to 100 meters (depending on environment, configuration, Bluetooth antenna and beacon feature).
Data Rate & RF Power	1 Mbit/s. Security 128-bit AES. Transmit power: +3 dBm. RX sensitivity: to -91dBm.
Power supply	12 VDC (+/- 5 %) external power supply (not included). Consumption: Typical 400 mA - Max 2 Amp
Temperature range	Operation: -20° C up to 65° C - Storage: -20° C up to 85° C
Standard Firmware & Reader modes	On board BLE management protocol, anti-collision, read BLE Advertising & RSSI, Lan/Internet notification mode (TCP), read/write BLE parameter, filtering on RSSI level, filtering beacons mask. Dataset: Beacon Advertising, Time, RSSI & I/O status. Trigger wake-up (2 inputs), Tag on presence (3 Outputs). Possibility of custom applications (on request)
Configuration mode	Ethernet & Wi-Fi: Low-level commands, Client Application or via On Board Web Server (Internet Browser). Mobile GPRS: Pre-set in lab or Mobile SMS

(*) Depending on model



BluePyc BLE EchoBeacon Family

Bluetooth® Low Energy Beacon Repeater



How it works

- ❖ Tag Beacons linked to person/item transmit the data with limited power & energy consumption.
- ❖ **EchoBeacon** receives Beacon's data (monitoring area based on Beacons power transmission).
- ❖ **EchoBeacons** re-transmit the collected Beacon's data to the BLE Gateway, distance up to 100 mt.

Highlight

- ❖ **Unplug connection.** USB power supply (*). Desktop, ceiling & wall mount easy installation (*).
- ❖ **Responsive:** customizable firmware, memory for associated beacons, **beacon ID white & black list**, adjustable parameters, etc...
- ❖ **Interactive:** integrated relè & led, integrated digital inputs, UART interface (*)
- ❖ **Low cost device** to implement micro localization & track position of people & objects wearing Beacons.
- ❖ **IoT & Active RFID application.** Real Time Location System & Indoor Positioning System (zone method).
- ❖ Some **application scenarios:** vehicle & people access control (also stand alone), home & building management, safety (hospital, construction site, etc...), process automation, asset & facility management, smart city (parking, leisure & tourism, etc...)

(*) Depending on model



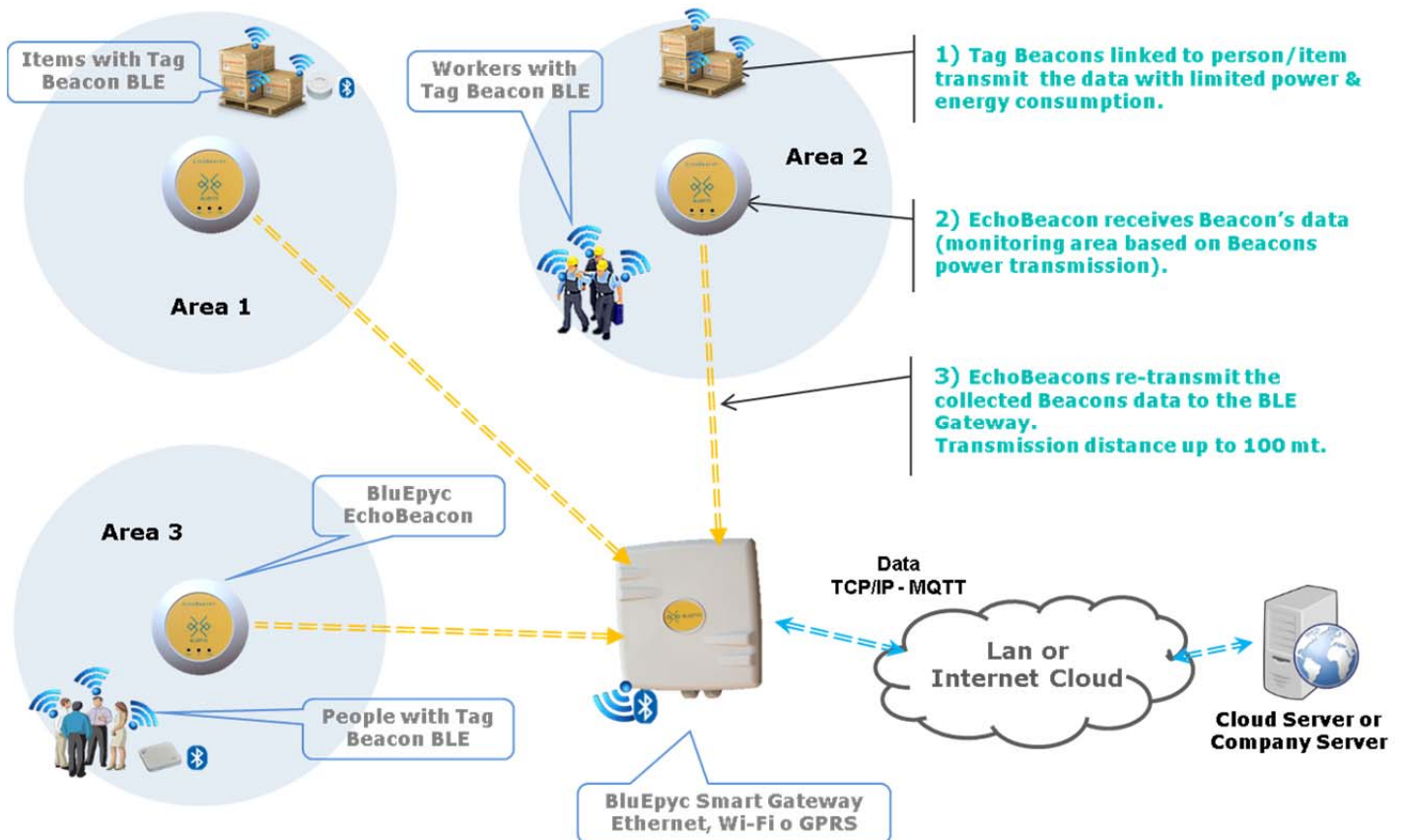
General Features

BluEpyc BLE EchoBeacon Family

- ❖ Operation Frequency: 2,4 GHz. IEEE Standard: 802.15.1 (Bluetooth 4.x Low Energy). Bluetooth integrated antenna.
- ❖ Reading range: depends on the beacon's transmission power and on RSSI filtering.
- ❖ Transmission Range: up to 100 meters (depending on environment & configuration).
- ❖ Input: 3 x Digital Input. Output: 2 x output relè, 3 x Leds. (*)
- ❖ Standard Firmware Feature: EchoBeacon ID (2 byte); anti-collision (multi Beacons reading with buffer); read Beacons Advertising & RSSI; BLE notification; filtering on beacons mask & RSSI Level, output relé on beacon presence (according to setup and model).
- ❖ **On Board Beacon ID white & black list** (up to 180 Beacon UID) for conditional parametric action (adv transmission & output activation), useful for **stand alone application** (e.g. access control, alarms, hospital safety, etc...).
- ❖ Adjustable parameters through BLE service & mobile APP (included): EchoBeacon ID, Reading Time, Transmission Time, Watch Dog Time, filtering parameter (adv mask & RSSI), Transmission Power (16 step), output relé (*).
- ❖ Possibility of custom applications on-board (on request)
- ❖ Temperature range: Operation: -20° C up to 65° C - Storage: -25° C up to 85° C

(*) Depending on model

EchoBeacon Data Flow



**Technical Data****BluePyc BLE EchoBeacon Family**

Low cost & unplug device to implement micro localization & change of position of people & objects equipped with Bluetooth Low Energy Beacons.

Responsive to specific application needs: customizable firmware, memory for associated beacons, adjustable parameters, stand alone applications, white list on board, ...

BE-EBS-U

BluePyc BLE EchoBeacon USB
with sensors.



- ❖ Easy USB dongle installation
- ❖ Temperatures and humidity sensors.
- ❖ ABS. Protection class IP 30. Led bicolour
- ❖ Dimensions: 58 x 25 x 9 mm. Colour: off-white & gray.
- ❖ Power supply 5 VDC via USB (plug supply or PC).

BE-EBL-D

BluePyc BLE EchoBeacon
Repeater Desktop light μ -USB



- ❖ Desktop Indoor Case
- ❖ ABS (UL 94 HB). Protection class IP 30.
- ❖ Dimensions (HxWxD): 93 x 62 x 27 mm.
- ❖ Weight: About 120 g. Colour: Gray with Dark Gray Rubber Sides.
- ❖ Power supply 5 VDC via micro-USB (cable not included).

BE-EB3-W

BluePyc BLE EchoBeacon
Repeater R3 Wall Mount & I/O



- ❖ Indoor Case Wall & Ceiling Mount
- ❖ ABS (UL 94 HB). Protection class IP 40.
- ❖ Dimensions: \varnothing 110 x 56 mm. + spacer
- ❖ Weight: About 200 g. Colour: off-white (RAL 9002).
- ❖ 3 x Digital Input. Output: 2 x output relè, 3 x Leds. Internal UART interface
- ❖ Power Supply 12-24 Volt DC (not included).

BE-EB3-IND

BluePyc BLE EchoBeacon
Repeater Industrial IP 66



- ❖ Outdoor Case Wall & Ceiling Mount
- ❖ ABS (UL 94 HB). Protection class IP 66.
- ❖ Dimensions: 140 x 110 x 60 mm.
- ❖ Weight: About 200 g. Colour: off-white (RAL 9002).
- ❖ 3 x Digital Input. Output: 2 x output relè, 3 x Leds. Internal UART interface
- ❖ Power Supply 12-24 Volt DC (not included).



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BluEpyc BLE Smart KeyBeacon

Fully configurable Bluetooth® Low Energy Beacon with 3 action push buttons



The device brings together the ability of the BLE to automatically transmit data and user's voluntary activities: the three buttons are designed to transmit different types of information such as location based services or voluntary events (automation, access control, help, safety at work...).

Suitable to communicate different user status/needs (notify presence, emergency alerts sending, area access, etc.).

IoT & Active RFID application. Real Time Location System & Indoor Positioning System (zone method).

Highlight

- ❖ Through the on/off button it is possible to switch on and off the KeyBeacon; in **deep-sleep state** a considerable energy saving is achieved.
- ❖ KeyBeacon is able to manage the different advertising modes: **standard BLE, Apple iBeacon, Google Eddystone or custom advertising.**
- ❖ When KeyBeacon works, it transmits fully configurable **watch-dog advertising**; when one of the three action keys is pressed, **3 different special advertisings** are transmitted (**each fully configurable**).
- ❖ Protection rating suitable for outdoor use (IP 65). Replaceable battery. Battery life up to 2 years.
- ❖ **Responsive** to specific application: the possibility of custom on-board applications (special firmware) allows to adapt the device to specific and custom uses.
- ❖ Some **application scenarios**: vehicle & people access control (also stand alone), home & building management, safety (hospital, construction site, etc...), process automation, asset & facility management, smart city (parking, leisure & tourism, etc...)



Technical Data

BluEpyc BLE Smart KeyBeacon



BE-KB3

BluEpyc BLE Smart KeyBeacon with 3 customizable function buttons and bi-color led for visual info activity

CPU	Low Power High Performance 32-bit 38.4 MHz ARM Cortex [®] -M4 with DSP instruction and floating-point unit for efficient signal processing, 256 kB flash program memory, 32 kB RAM data memory.
Operating frequency	2,4 GHz. IEEE Standard: 802.15.1 (Bluetooth 4.x Low Energy). Bluetooth integrated antenna.
Transmission	Data Rate up to 1 Mbit/s. Transmission Power up to +8 dBm. Range: up to 80 meters in open air (depending on environment & configuration setting).
Sensitivity	-90 dBm sensitivity @ 1 Mbit/s GFSK (2.4 GHz).
Transmission Security	General Purpose CRC. Random Number Generator. Hardware Cryptographic Acceleration for AES 128/256, SHA-1, SHA-2 (SHA-224 and SHA-256) and ECC
Power supply	Replaceable battery CR2032 3V Li (220mAh). Battery life up to 2 years (depends on environment, interval and transmission power).
Low Energy Consumption	8.7 mA RX current at 2.4 GHz. 8.2 mA TX current @ 0 dBm output power at 2.4 GHz. 63 µA/MHz in Active Mode (EM0). 2.5 µA EM2 Deep Sleep current (full RAM retention and RTCC running). 2.1 µA EM3 Stop current (State/RAM retention)
Input/Output	Led bi-color (Red & Green) for status indication. 3 x push buttons for On/Off (Button 1) and special action advertising (fully configurable).
Case	Colour: Dark grey RAL 7046 / Black RAL 9004. Class Protection: IP65. Dimensions: 56.8 (L) x 44 (W) x 14.5 (H) mm.
Temperature range	Operation: -25° C up to 75° C - Storage: -25° C up to 85° C
Customization	Operating parameters and customization through Bluetooth Low Energy GATT services (On the Air) using mobile phones (Android App), BluEpyc BLE USB dongle or BluEpyc BLE Smart Gateway.
Standard Firmware	Different advertising modes: standard BLE, Apple iBeacon, Google Eddystone or custom advertising. Fully configurable watch-dog advertising. Commissioning mode. 3 Action push button fully configurable with different special advertising. Upgradable Firmware. Possibility of custom applications on-board (on request)



Firmware Functionality

BluEpyc BLE Smart KeyBeacon

The BluEpyc BLE Smart KeyBeacon firmware exposes configuration services via BLE OTA (Android App).

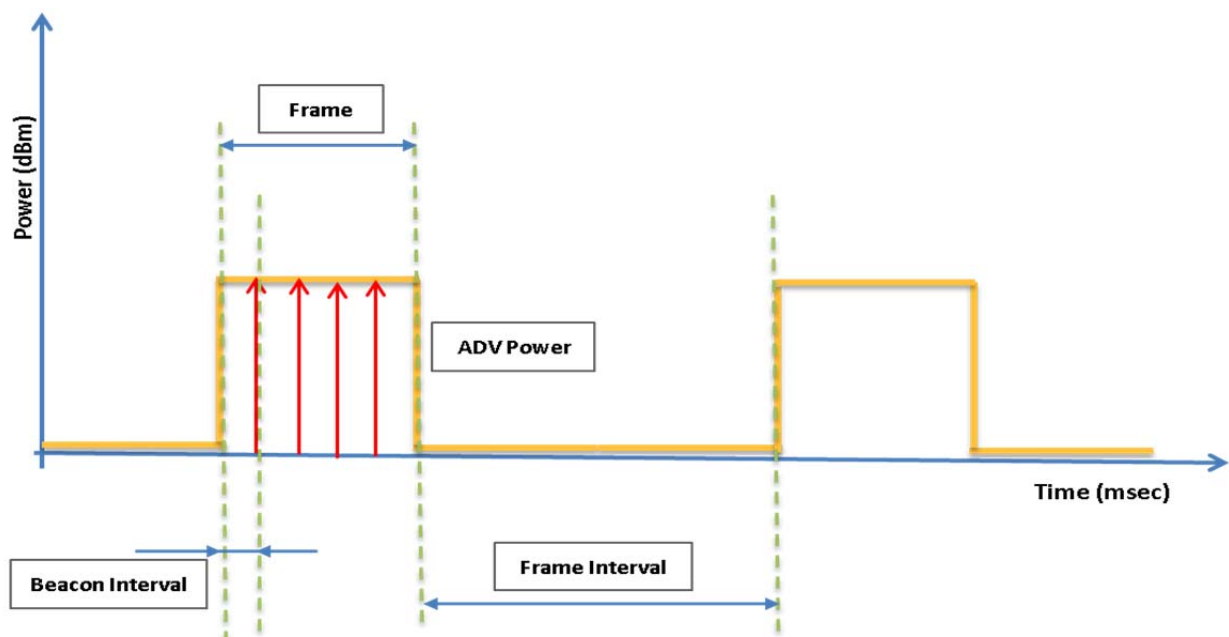
- ❖ **Power on/off button (Button 1):** if pressed for more than 2 seconds, the status switches from deep-sleep to operational or vice versa.
- ❖ **Commissioning phase:** when the KeyBeacon is switched on, it transmits a connectable advertising frame of duration, beacon interval and preset power useful for connection and customization of operating parameters (see table below); the advertising package contains, besides other information, also the version of the installed firmware.
- ❖ **Presence or Watch Dog:** when the KeyBeacon works, it transmits (if enabled) advertising frames with customizable characteristics and format specified in the parameters (see table below).
- ❖ **Button 1 to 3 (Action):** they can be configured to transmit advertising packages, called "Action", with different format, timing, power and sending parameters (see table below).

Configurable Parameters

BluEpyc BLE Smart KeyBeacon

Configurable parameters for advertsing packages – for both presence type ADV (Watch Dog) and Action type ADV (3 push buttons)

Parameter	Options / Range
Advertising status	Active or inactive
Advertising Type	Standard, Apple iBeacon, Google Eddystone UID/URL, Custom
Connettibile ADV	Yes or Not
Frame interval	From 100 ms to 100 min. (only presence type)
Frame Number	From 1 to 65535
Beacon interval	From 100 ms to 10000 ms (10 secs)
ADV Power	From -10 dBm to +8 dBm





BLE Beacon Family

Bluetooth® Low Energy Beacons



How it works

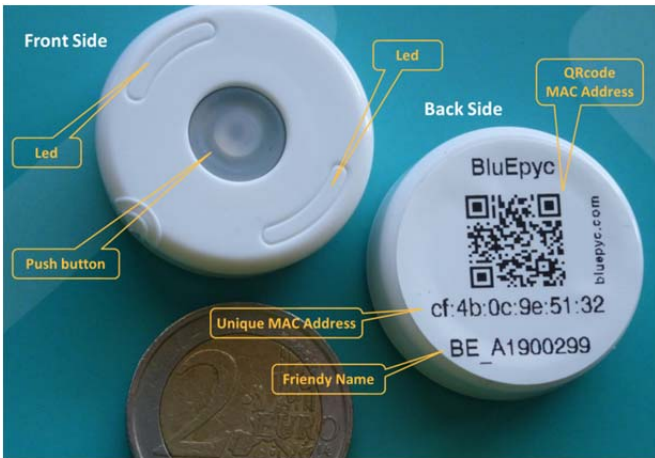
- ❖ Tag Beacon linked to person/item transmits the data with limited power & energy consumption.
- ❖ Advertising Interval and Transmission Power (communication distance) can be set via software.
- ❖ Beacons are also available with accelerometer, temperature and humidity sensors.

Highlight

- ❖ **Low cost devices** to implement micro localization & track position of people & objects wearing Beacons.
- ❖ **IoT & Active RFID application.** Real Time Location System & Indoor Positioning System (zone method).
- ❖ **Battery** can be easily replaced thanks to the interlocking open/close system of the ABS/plastic case.
- ❖ **Reading distance** can reach 100 meters in open spaces.
- ❖ **Small dimensions** and **mounting accessories** allow easy use in both indoor and outdoor situations
- ❖ Some **application scenarios**: vehicle & people access control (also stand alone), home & building management, safety (hospital, construction site, etc...), process automation, asset & facility management, smart city (parking, leisure & tourism, etc...)



BE Disk Family R2



BE-DSK2-BLE	BLE Disk Beacon R2 standard
BE-DSK2-A-BLE	BLE Disk Beacon R2 with accelerometer Sensor
BE-DSK2-TH-BLE	BLE Disk Beacon R2 with temperature and humidity Sensor
BE-DSK2-ATH-BLE	BLE Disk Beacon R2 with accelerometer, temperature and humidity Sensor

Common Features

- ❖ **ON/OFF push button (additional functions: reset, alarm). 2 Led: blue & red.**
- ❖ **Label with Mac Address (QRcode) & Friendly Name (easy association and coding).**
- ❖ **Waterproof with seal and easy open/close system.**
- ❖ Operation Frequency: 2400-2483,5MHz - IEEE Standard: 802.15.1 (Bluetooth Low Energy)
- ❖ Transmission distance: up to 120 meters (in open air).
- ❖ Transmission Power: 4 different levels can be set via OTA (-23dB, -6dB, 0dB, 4dB)
- ❖ Transmission interval can be set via software OTA (from 100 msec. to 10 sec. in step of 100ms).
- ❖ Battery: Panasonic replaceable CR2032 3V Li. Battery life: 1 year based on broadcasting rate 1 sec. @ 0dB RF power. Accurate digital RSSI
- ❖ Operating System Supported: iOS and Android. iBeacon or Eddystone standard.
- ❖ Size: 31 mm diameter, 10 mm thickness. Weight: 4,2 gr. Material: PC (Polycarbonate)
- ❖ Mounting accessories IP67 available for outdoor use
- ❖ Different colors available. Customizable with color printing of logos
- ❖ **Accelerometer, temperature and humidity sensors available**

Silicone Accessories - IP67



- BE-PC-ACC** - Silicone 'Protection Case' Accessory
- BE-WS-ACC** - Silicone 'Wristband' Accessory.
- BE-WM-ACC** - Silicone 'Wall Mount' Accessory
- BE-KF-ACC** - Silicone 'Keyfob' Accessory



EM Beacon Family



EMBC01 EM proximity Beacon with Button & Led.

Selectable standard mode beaoning: Off (7 years storage battery life); Short Range (15 m range); Medium Range (30 m range); Long Range (75 m range).

EMBC02 EM proximity Beacon with Accelerometer Sensor, Button & Led.

Selectable standard mode beaoning: Off; Sensor Mode (60 m range, 1 sec. beacon interval); Moving Mode (30 m range, 100ms beacon interval); Fall Mode (120 m range, 100ms beacon interval).

Common Features

- ❖ Operation Frequency: 2400-2483,5MHz - IEEE Standard: 802.15.1 (Bluetooth Low Energy).
- ❖ Integrated push-button with LED indicators.
- ❖ Transmission distance: up to 100 meters. Accurate digital RSSI. Customizable mode beaoning (ask).
- ❖ Battery: replaceable CR2032 3V Li. Battery life: One year (with ping rate: 1 second)
- ❖ Operating System Supported: iOS and Android
- ❖ Unique Identification (guaranteed). Serial number ID embedded in printed QR Code
- ❖ Size: 30mm diameter, 10 mm thickness. Weight: 7 gr. Material: PC (Polycarbonate)
- ❖ Weatherproof Enclosure IP64 rating.
- ❖ FCC, IC, and CE certified, RoHS, Reach and halogen free compliant.
- ❖ **Accelerometer sensors available**

EM Accessories



WMA-H0 - Wall Mount accessory for Bluetooth LE Proximity Beacons EMBC01 & EMBC02, color natural.

KFA-H2 - Key Fob Accessory for Bluetooth LE Proximity Beacons EMBC01 & EMBC02, color Blue.

WBA-H2 - Wrist Band Accessory assembled with strap for Bluetooth LE Proximity Beacons EMBC01 & EMBC02, color Blue.

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