

BEACON LINE
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taskit GmbH

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1. Introduction

1.1 Scope of the document

The scope of the present document is to describe a taskit serial protocol implemented in the taskit BLE module. The taskit serial protocol is used to communicate with taskit BLE modules. This document presents the command set for BEACON LINE, Release 04.100.

More information is available at beacon-line.com

2. Communication Between Application And Gateway

2.1 Gateway

Routes the data between the nodes and the WiFi or ethernet network.

WiFi gateway

Configurable as access point or station.

Ether Gateway

DHCP client in the network.

Connection details

Zeroconf address
[Gateway Serial Number].local

Example
gw01234807b466e265ee.local

Note

Under Windows a zeroconf implementation (Bonjour) is required. Under linux and macOS this is already installed by default. For the Android OS there is no implementation.

Setting the gateway

The gateway can be configured with a WebGUI.

2.2 MQTT broker

The gateway uses the Mosquitto broker to communicate between application and the nodes.

MQTT

is an ISO standard (ISO/IEC PRF 20922) publish-subscribe-based "lightweight" messaging protocol for use on top of the TCP/IP protocol. It is designed for connections with remote locations where a "small code footprint" is required or the network bandwidth is limited. The publish-subscribe messaging pattern requires a message broker. The broker is responsible for distributing messages to interested clients based on the topic of a message.

Connection details

TCP/IP port: 1883

Note

The communication is not encrypted. A future update will allow an encrypted connection.

MQTT Rx channel

To receive the node's data, the channel has to be subscribed.

Topic	[gateway sn]/r/bline/[node nr]/a
Message	taskit serial packet
QoS	0

MQTT Tx channel

Data will be published to the node via that channel.

Topic	[gateway sn]/t/bline/[node nr]/a
Message	taskit serial packet
QoS	0

3. Taskit Serial Packet Protocol

3.1 Frame structure

All information transmitted between the module and the application is based on a frame, that has the following frame structure.

Flag	Type	Length	Data	CRC
1 octet	1 octet	1 octet	Unspecified	1 octet

Flag octet

Each frame begins with a flag octet defined as 0x00.

Type octet

Type	Description
0x11	BLE module

Length octet

This octet specified the length of the data and CRC fields. The maximum value of length octet is 252.

Data

The data field is the payload of the frame and carries the user data. Every byte equal to the flag octet (0x00) must be doubled.

CRC octet

The CRC is calculated over all fields of the frame.

Order	8Bit
Polynom	0x07
Init	0x00

Example

Set tx power to -21 dBm.

Flag	Type	Length	Data				CRC
0x00	0x11	0x05	0x62	0x01	0x00	0x00	0x48

3.2 Data Field

The data field based on TLV (Type-Length-Value) format.

Type octet

A binary code, which indicates the function and the kind of data.

Is formatted as follow

7	6	5	4	3	2	1	0
RW	Type						

RW

The RW (Read, Write) bit identifies the data field as either a read or a write command.

	Direction	RW value
Read command	Application to module	1
Write command	Application to module	0
Read write response	Module to application	1
Notification	Module to application	0

Length octet

The size of the value field. The maximum value of the length octet is 250.

Value

Variable-sized series of bytes which contains data for this part of the message.

4. Configuration Commands

The commands described in this chapter allow the external application to determine the BLE module behaviour under various conditions.

4.1 Reset BLE module

Controls BLE module functionality level. It can also be used to reset the module.

Type	Length	Value
0x51	1	0x01

4.2 Store Config

Stores the configuration on the flash memory.

Type	Length	Value
0x50	1	0x00 0x01

Value

0x00: Factory reset of the configuration.

0x01: Stores the changes of the configuration.

5. Broadcaster Commands

The commands described in this chapter allow the external application to control the module's broadcast role.

5.1 Status

Controls the broadcast status. You can enable or disable the cyclical broadcasting.
Default to 0x00.

Type	Length	Value
0x60	1	0x00 0x01

Value

0x00: Disables the broadcasting.

0x01: Enables the broadcasting.

5.2 Packet

The value contains a BLE packet to be broadcasted. When the cyclical broadcasting is disabled this packet is broadcasted once otherwise it is broadcasted continuously corresponding to the broadcast interval.

Type	Length	Value
0x40	Unspecified	Unspecified

Length

The maximum length of a BLE broadcast packet is 31 Bytes.

5.3 Interval

Controls the broadcast interval that the packet is sent cyclically.
Default to 1000 ms.

Type	Length	Value (ms)
0x61	1 2	20 - 65535

Example

Set interval to 3000 ms.

Type	Length	Value	
0x61	0x02	0xB8	0x0B

Get interval value.

Type	Length
0xE1	0x00

5.4 Tx Power

Changes the transmission power of the module. Store config and then reset is required.
Default to 0x07 (0 dBm).

Type	Length	Value
0x62	1	0 - 12

Permitted values

Value	Description (dBm)
0x00	-21
0x01	-18
0x02	-15
0x03	-12
0x04	-9
0x05	-6
0x06	-3
0x07	0
0x08	1
0x09	2
0x0A	3
0x0B	4
0x0C	5

6. Observer Commands

The commands described in this chapter allow the external application to control the module's observ role.

6.1 Status

Controls the observ status. You can enable or disable the observing.

Default to 0x00.

Type	Length	Value
0x70	1	0x00 0x01

Value

0x00: Disables the observing.

0x01: Enables the observing.

6.2 Packet

The data observed by the BLE module.

Type	Description	Length	Value
0x30	Raw	Unspecified	Unspecified
0x31	MAC+RSSI	7	Unspecified
0x32	MAC+RSSI+iBeacon	30	Unspecified

Length

The maximum value of the length is 31 Bytes.

Example

Flag	Type	Length	Type	Length	Data	CRC
0x00	0x11	0x21	0x32	0x1E	...	

6.3 Data type

Defines the observer datatype.
Default to 0x02.

Type	Length	Value
0x71	1	Unspecified

Permitted values

Description	Value
All	0x01
iBeacon	0x02

6.4 Filter duplicate

Enabled or disabled the filter duplicate advertising reports.
Default to 0x01.

Type	Length	Value
0x72	1	0x00 0x01

7. Identification Commands

The commands described in this chapter allow the external application to obtain various identification information related to the BLE module and linked entities.

7.1 MAC Address

Delivers or sets the MAC address of the device.

Possible values: 0x000000000000 - 0xFFFFFFFFFFFFE.

To restore the initialized address of the device stored in flash, issue this command with an invalid address (0xFFFFFFFFFFFF).

Type	Length
0x52	6

7.2 Serial Number

Delivers the serial number of the device.

Type	Length
0x53	9

7.3 Version Number

Delivers the version number of the device.

Type	Length
0x54	5

8. List of Commands

- + Supported
- Not supported

Command	Read Notification	Write
Configuration		
Reset BLE module	-	+
Store config	-	+
Broadcaster		
Status	+	+
Packet	+	+
Interval	+	+
Transmitter power	+	+
Observer		
Status	+	+
Packet	+	-
Data type	+	+
Filter duplicate	+	+
Identification		
MAC address	+	+
Serial number	+	-
Version number	+	-