

EYE SENSOR / BTSMP1

[Main Page](#) > [Sensors](#) > **EYE SENSOR / BTSMP1**



Contents

- [1 Introduction](#)
- [2 About BTSMP1](#)
- [3 Product Specification](#)
 - [3.1 Features](#)
 - [3.2 Dimensions](#)
- [4 Value-adding Features](#)
 - [4.1 Hibernate mode](#)
 - [4.1.1 Value of hibernate mode](#)
 - [4.1.2 How to activate hibernated eye device?](#)
 - [4.1.3 How to send the device to hibernate mode?](#)
 - [4.1.4 Can All devices hibernate?](#)
- [5 Mounting recomendations](#)
- [6 EYE App Configuration](#)
 - [6.1 Eye App Overview](#)
 - [6.1.1 Devices in view](#)
 - [6.1.2 Overview window](#)
 - [6.1.3 Configure window](#)
 - [6.1.4 Advanced configuration window](#)
 - [6.1.4.1 Advanced configuration: Beacon Settings](#)
 - [6.1.4.2 Advanced configuration: Sensor reading and events](#)
- [7 FM Tracker Configuration](#)
 - [7.1 Teltonika configurator \(Base firmware / advanced mode\)](#)
 - [7.2 Teltonika configurator new functionalities \(Evaluation firmware / EYE Sensor filtering by name\)](#)
- [8 Sensor advertising](#)
 - [8.1 Beacon and sensors data](#)
 - [8.2 Protocol description](#)
 - [8.3 GATT Characteristics](#)
 - [8.4 Command characteristic](#)
 - [8.5 EYE Sensor Bluetooth® frame parsing example](#)
 - [8.6 FM Packet parsing example \(Base firmware / Advanced mode\)](#)
 - [8.7 FM EYE Sensor record parsing example with the new firmware \(Evaluation firmware / EYE Sensor filtering by name\)](#)
 - [8.8 Parsing AVL ID 11317 data](#)
- [9 Safety information](#)
- [10 Certification & Approvals](#)
- [11 Nomenclature & Classification codes](#)
- [12 Memberships](#)
- [13 External Links](#)
 - [13.1 Product Page](#)
 - [13.2 Product Change Notifications](#)

- [13.3 Software Errata](#)
- [13.4 Promotional Material](#)
- [13.5 Compatibilty with other Teltonika Devices](#)
- [13.6 Partner Providers Supporting Software](#)
- [13.7 Frequently asked questions \(FAQ\)](#)
- [13.8 Documents](#)

Introduction

Wireless solutions open up new horizons for your business and help to keep an eye on your assets. Discover our brand-new and certified Bluetooth® Low Energy ID sensor model from Teltonika with robust waterproof casing and a long-lifetime battery. The model is designed for a low-cost fast and easy configuration and integration to save precious time, resources, and ensure accountability.



About BTSMMP1

Perfect for traceability use cases, delivery tracking, monitoring of various movable objects in logistics (trailers, containers), agriculture (tractor attachments), and constructions (tools and inventory). Sensors data makes it especially suitable for cold chain refrigerator use cases. The built-in accelerometer can detect item movement, pitch and roll of the device. Magnet detection can be used for wireless open/close detection and notifications such as trailer door events, etc. EYE sensor supports iBeacon and Eddystone protocols. The device is fully compatible with the Teltonika firmware platform which provides extended functionality. Configure, scan, and update anytime anywhere with a dedicated Teltonika mobile app

Product Specification

Features

Functionalities

Beacon ID, LED, Temperature, Humidity, Accelerometer, Magnet detection

Dimensions and weight

Dimensions	56,6 mm x 38 mm x 13 mm
Weight	18g
Battery and power	
Model	CR2450
Type	Type Lithium, Manganese Dioxide
Total Capacity	600 mAh
Replaceable	No
Battery life (Tx=2 dBm; interval: 3 s)	2.5+ years
Battery life (Tx=2 dBm; interval: 5 s), default	4+ years
Battery life (Tx=2 dBm; interval: 10 s)	5+ years
Connectivity	
Bluetooth®	Bluetooth® 4.2 compliant, Bluetooth® 5.2 certified
Range	80 m
Available transmission power levels	Up to 8 dBm
Sensitivity	-88 dBm
Casing	
Protection	IP67
Mounting	Two holes to screw/leash/strip, tape
Customization	Custom logo upon request (Special conditions)
Environmental Requirements	
Humidity (non-condensing)	From 0% to 100%
Operational temperature	-20°C / +60°C (-4°F / +140°F)
Protocols compatibility	
iBeacon	Yes *iOS doesn't show devices with iBeacon protocol
Eddystone	Yes
EYE Sensor	Yes

Dimensions



Value-adding Features

Hibernate mode

Hibernated mode means that the EYE device is OFF when shipping from the factory, preserving battery life. PLEASE NOTE that EYE devices are available in two modes: factory-activated (ON) or Hibernated (OFF). You may order the device version which better suits your needs. Order codes are described on [eye page](#)

Value of hibernate mode

Hibernated versions of EYE devices simplify stock management for our partners while maximizing battery life.

1. Accelerated delivery times:

By stocking up on hibernated EYE devices, you ensure readiness to deploy EYE devices with full battery capacity at any moment. This proactive approach provides fastest possible service, increases your reputation for efficiency and positions you as an industry frontrunner, enhancing your competitive edge.

2. Mitigated project risks:

In scenarios where projects encounter unforeseen challenges, our hibernated EYE devices offer a buffer. Hibernate feature allows to safeguard your investments and potential revenue streams. This means that even if projects encounter delays or complications, you can still deploy EYE devices with full battery capacity, ensuring optimal performance when the time is right.

How to activate hibernated eye device?

Attach any magnet to sleeping device and wait for LED to blink.

NOTE: ANY MAGNET CAN BE USED

1. TAKE A MAGNET



Now device is discoverable, scannable, connectable via BLE.

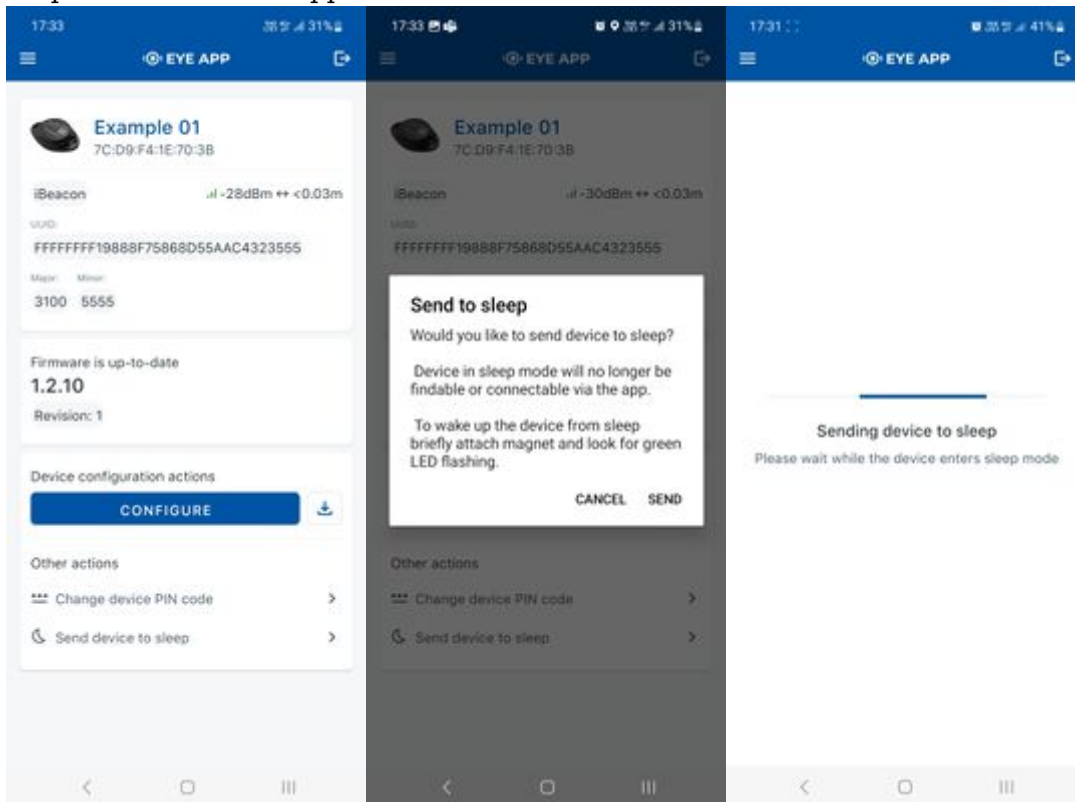
How to send the device to hibernate mode?

If you want to put the EYE device back to hibernate mode after accidental activation or simply pause its use, you may do that following steps below:

Step 1. While connected and in overview tap "Send device to sleep":

Step 2. Confirm your selection:

Step 3. Wait for EYE App to disconnect:



Can All devices hibernate?

1. All EYE Sensors with firmware version starting from 1.2.9.R.8 can hibernate.
2. Only new EYE Beacons bought with order codes that have hardware modification can hibernate standard codes are available in [eye page](#), for special order codes consult your sales manager.

Mounting recommendations



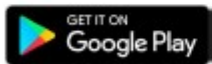
EYE App Configuration

Devices work constantly and are ready to perform out of the box. Default basic Sensor settings are set to:

- Transmitting at 2 dBm power.
- Data advertising at 1 second intervals.
- Eddystone and Sensors protocol

If you would like to change these settings you will need to:

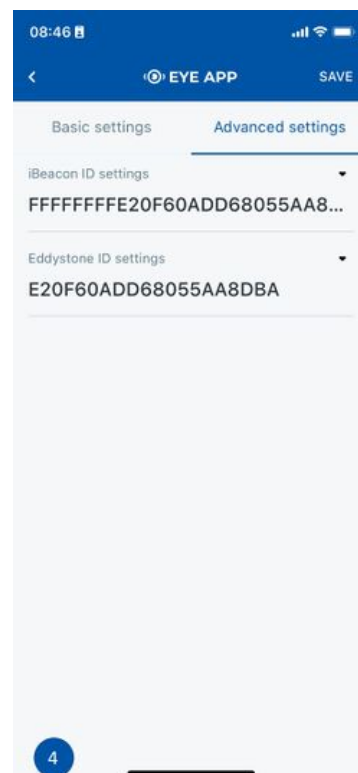
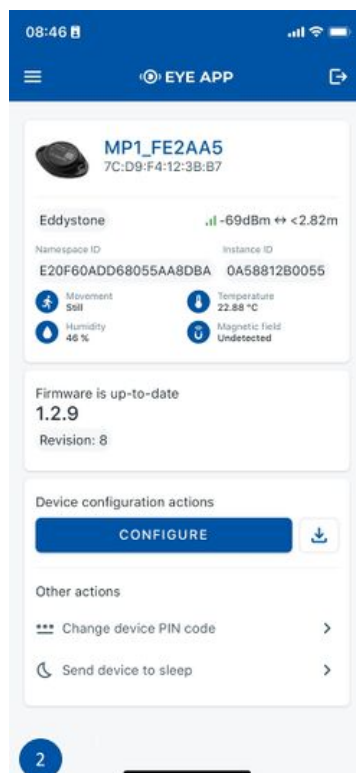
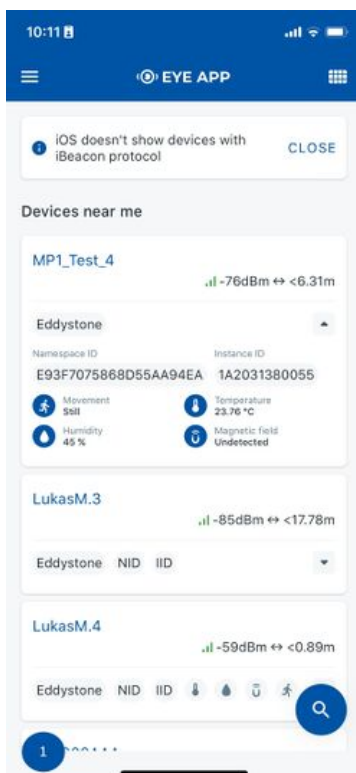
1) Download and install EYE APP - Teltonika application to change sensor settings.






*iOS doesn't show devices with iBeacon protocol

Eye App Overview

With the application you will be able to scan for visible Teltonika EYE devices, check their statuses or connect for configuration or firmware update.



Devices in view

In this window you will see all visible devices. You have options to see devices in Short list  or in default list. When looking at devices in default list you will be able to open Detailed view  of devices and check transmitted data statuses. Additionally if you are looking for specific devices you will be able to use Search  function to filter search options. When in this window select a device of your choice to connect and after passing pin code (default pin code is 123456) you will go to device overview window.

Overview window

In overview window you can see device details, check firmware version and update if available, go to device configuration settings and download the configuration. If you select to Configure device new window will open with Basic and Advanced settings. Other actions include changing the device PIN code and putting the device to sleep. A device in sleep mode will no longer be findable or connectable via the app. To wake it up, you need to attach a magnet and look for a green LED flashing.

Configure window

In this window you can check and change device configuration settings. In main tab Basic Settings you can change main settings. Change Device name, Power signal strength, Advertising interval and Packet transmission type*. For more settings go to Advanced settings tab to enable various events.

Advanced configuration window

Advanced configuration: Beacon Settings



In Advanced settings tab you can configure EYE beacon sensor parameters: Beacon information (iBeacon ID*, Eddystone ID). UUID/MINOR/MAJOR parameter can be changed for iBeacon ID*. Namespace ID/Instance ID can be changed for Eddystone ID. If you scroll down you will be able to adjust Sensor reading interval and event settings of the EYE Sensor **Note:** iOS doesn't show devices with iBeacon protocol

Advanced configuration: Sensor reading and events

!NOTE: These settings are no longer available after EYE APP 1.2.0-60 update.



Magnetic field event

- adjust if the device generates events based on detection or exit (loss) of the magnet.



Maximum event duration - how long will one event be advertised

Humidity event

- adjust if the device generates events based on entrance or exit to selected humidity range



Event advertising settings - advertising period after event detection

Temperature event

- adjust if the device generates events based on entrance or exit to selected temperature range



Sensor reading interval - how often values are updated by the device

Movement event

- adjust movement/stop detection and timeouts it takes to register movement / stopping

FM Tracker Configuration

Teltonika configurator (Base firmware / advanced mode)

If you have firmware / configurator which does not support EYE sensor tab in Bluetooth® 4.0 section, then you can still use Advanced BLE configuration to connect with EYE Sensors.

To configure FM with BTSMP1 EYE Sensor:

Requirements:

Firmware/configurator version with multiple custom IO fields per sensor, we recommend:

FMBXXX: 03.27.07.Rev.00/1.7.22_B.3.27_R.21 or newer

FMX640: 01.02.03/1.7.24_B.FM64_R.34 or newer (FMB640 does not support for BLE functionality)

Step 1: Check EYE App Settings:

1. Make sure that name of the sensor is default length (10 symbols) in [EYE App Basic Configuration window](#)
2. Note what Packet settings you have set in [EYE App Basic Configuration window](#)

Step 2: Configure FM device using Teltonika configurator:

1. In [System settings](#) Enable [Codec8 Extended](#);
2. In [GPRS settings](#) Configure [GPRS Settings and Server Settings](#)
3. In [Bluetooth®](#) settings Enable Bluetooth®, set this setting as either "Enable (hidden)" or "Enable (visible)", otherwise Bluetooth® will be disabled;
4. In [Bluetooth® 4.0](#) settings:

1. set Non Stop Scan to "Disable", configure "Update Frequency" and "Scan duration" as 30 seconds. These settings will bring the best results for BLE scanning with our device;
2. In [Bluetooth® 4.0 settings Advanced Mode Settings](#) Load EYE Sensor preset according to packet settings in EYE app(if you do not have preset you can download them from below table)
3. Configure MAC address of the sensor
5. To receive data to server enable corresponding IO elements in [FMB120 I/O settings](#)

Advanced mode configuration:

The image shows three screenshots of the 'Packet settings' menu in the EYE app. Each screenshot has a title 'Packet settings' and a list of radio button options. Below the options are download links for various presets.

- Screenshot 1:** 'EYE Sensors' is selected. Presets listed: EYE Sensors, FMBXXX, FMBXXX Configuration example, FMX640.
- Screenshot 2:** 'iBeacon and EYE Sensors' is selected. Presets listed: EYE iBeacon, FMBXXX, FMBXXX Configuration example, FMX640.
- Screenshot 3:** 'Eddystone and EYE Sensors' is selected. Presets listed: EYE Eddystone, FMBXXX, FMBXXX Configuration example, FMX640.

At the bottom of the first screenshot, there is a link: 'Instructions how you can manually add a preset: [link](#)'

Preset Configuration:

If EYE Sensor Packet Settings is EYE Sensors or Eddystone and EYE Sensors:



If EYE Sensor Packet Settings is EYE Sensors or iBeacon and EYE Sensors:



IO element value descriptions:

NAME	DESCRIPTION
Custom1	Flags (not supported with current FMX640 preset)
Temperature	Ambient temperature in Celsius
Humidity	Ambient humidity in percent
Custom2	Movement and movement events count
Custom3	Angle
Custom4	Battery voltage (2000 + (VALUE * 10)) in mV

Property ID in AVL packet	Property name	Bytes	Type	Min	Max	Multiplier	Units	Description
---------------------------	---------------	-------	------	-----	-----	------------	-------	-------------

25	BLE Temperature #1	2	Signed	-4000	12500	0.01*	°C	Degrees (°C), -40 - +125; Error codes: 4000 - abnormal sensor state 3000 - sensor not found 2000 - failed sensor data parsing
26	BLE Temperature #2	2	Signed	-4000	12500	0.01*	°C	Degrees (°C), -40 - +125; Error codes: 4000 - abnormal sensor state 3000 - sensor not found 2000 - failed sensor data parsing
27	BLE Temperature #3	2	Signed	-4000	12500	0.01*	°C	Degrees (°C), -40 - +125; Error codes: 4000 - abnormal sensor state 3000 - sensor not found 2000 - failed sensor data parsing
28	BLE Temperature #4	2	Signed	-4000	12500	0.01*	°C	Degrees (°C), -40 - +125; Error codes: 4000 - abnormal sensor state 3000 - sensor not found 2000 - failed sensor data parsing
86	BLE Humidity #1	2	Unsigned	0	1000	0.1*	%RH	Humidity
104	BLE Humidity #2	2	Unsigned	0	1000	0.1*	%RH	Humidity
106	BLE Humidity #3	2	Unsigned	0	1000	0.1*	%RH	Humidity
108	BLE Humidity #4	2	Unsigned	0	1000	0.1*	%RH	Humidity
331	BLE 1 Custom #1	Variable	HEX	0	-	-	-	Custom IO element for BLE sensor
463	BLE 1 Custom #2	8	UNSIGNED LONG INT	0	4294967295	-	-	Custom IO element for BLE sensor
464	BLE 1 Custom #3	8	UNSIGNED LONG INT	0	4294967295	-	-	Custom IO element for BLE sensor
465	BLE 1 Custom #4	8	UNSIGNED LONG INT	0	4294967295	-	-	Custom IO element for BLE sensor
466	BLE 1 Custom #5	8	UNSIGNED LONG INT	0	4294967295	-	-	Custom IO element for BLE sensor
332	BLE 2 Custom #1	Variable	HEX	0	-	-	-	Custom IO element for BLE sensor
467	BLE 2 Custom #2	8	UNSIGNED LONG INT	0	4294967295	-	-	Custom IO element for BLE sensor
468	BLE 2 Custom #3	8	UNSIGNED LONG INT	0	4294967295	-	-	Custom IO element for BLE sensor
469	BLE 2 Custom #4	8	UNSIGNED LONG INT	0	4294967295	-	-	Custom IO element for BLE sensor
470	BLE 2 Custom #5	8	UNSIGNED LONG INT	0	4294967295	-	-	Custom IO element for BLE sensor
333	BLE 3 Custom #1	Variable	HEX	0	-	-	-	Custom IO element for BLE sensor
471	BLE 3 Custom #2	8	UNSIGNED LONG INT	0	4294967295	-	-	Custom IO element for BLE sensor

472	BLE 3 Custom #3	8	UNSIGNED LONG INT	0	4294967295	-	-	Custom IO element for BLE sensor
473	BLE 3 Custom #4	8	UNSIGNED LONG INT	0	4294967295	-	-	Custom IO element for BLE sensor
474	BLE 3 Custom #5	8	UNSIGNED LONG INT	0	4294967295	-	-	Custom IO element for BLE sensor
334	BLE 4 Custom #1	Variable	HEX	0	-	-	-	Custom IO element for BLE sensor
475	BLE 4 Custom #2	8	UNSIGNED LONG INT	0	4294967295	-	-	Custom IO element for BLE sensor
476	BLE 4 Custom #3	8	UNSIGNED LONG INT	0	4294967295	-	-	Custom IO element for BLE sensor
477	BLE 4 Custom #4	8	UNSIGNED LONG INT	0	4294967295	-	-	Custom IO element for BLE sensor
478	BLE 4 Custom #5	8	UNSIGNED LONG INT	0	4294967295	-	-	Custom IO element for BLE sensor

Teltonika configurator new functionalities (Evaluation firmware / EYE Sensor filtering by name)

Starting with firmware **03.28.04.Rev.207** there is additional tabs available in Bluetooth® 4.0 section that allow for easier configuration to connect FM and EYE sensor or beacon.

It's now possible to connect up to 100 sensors at once just by entering one name in the configurator name list. It's required to enter at least 3 characters(case sensitive) in the name for FM to scan the sensors. Super easy to set up!

For example, the you may order Sensors with special configuration from factory where the EYE Sensor names would be TRAILER_1,TRAILER_2,...,TRAILER_99 and so on.

If you would enter TRAILERS in the EYE Firmware FM configurator then sensors who meet this name condition, for example TRAILER_1, TRAILER_21, TRAILER_17, would be scanned, while other sensors named Tools, MP1_123546, etc. will not be scanned. With this option, you can upload one configuration to FOTA web and it doesn't matter which sensor from the list end user will mount, it will be scanned and sent to the server as long as it meets the name criteria.

Bluetooth® 4.0

Functionalities were reorganized and transferred to Bluetooth® 4.0 configuration tab with additional horizontal tabs selection for specific settings:

- **Global** - Parameters responsible for device scanning ability like power and durations.
- **EYE** - Parameters to configure data reading from EYE sensors.

Common settings

- **Non Stop Scan** - Enable Non Stop Scan feature, the device will try to scan for the sensors all the time if any of them are configured.
- **Sensors and Beacons Update frequency** - changes sensors temperature/humidity/battery voltage data update frequency. Minimum value: 30s, maximum value: 65535s. Recommended

value 30.

- **BLE Scan Duration** - Sensors data reading time. Recommended value 30.
- **Scan retries until error** - Scan retries count, till start to show the value as Error '3000' - sensor disconnected. Recommended value 30.
- **BT Power Level** - Telematics device Bluetooth® power level setting.
- **BLE Broadcasting service ID** - Telematics device can broadcast configured ID.
- **BLE connection control** - Connection mode settings. If broadcasting ID is configured, parameter should be set to Prohibit.



Sensors

Sensor Configuration can be set to Custom Sensors, Eye Sensors or both. With the Custom Sensors setting enabled, [any BLE sensor can be configured.](#)

When **EYE Sensors** is selected, Eye Sensor connectionless functionalities or EYE list search window will appear, depending on the selected EYE Sensor filter.



Name

When EYE Sensors Filter is set to **Name**, the Eye List search window will appear on the configurator. With this setting, separate EYE Sensor records (AVL ID: 11317) will be generated according to the configured parameters, which are described below:

- **Data Clear period**- defines how long the FM tracker waits when the Eye sensor is not detected before removing it from the Eye Sensor list and not sending the sensor values. If Data Clear Period is set to 0, then the EYE Sensor will not be removed from the EYE Sensor list and it will always be included in the periodic records.
- **RSSI**- Parameter defines the dBm threshold value of when the EYE sensor will be added to the sensor list. If the FM tracker detects the RSSI lower than the configured value, it will not be added to the EYE Sensor list.
- **Record period** - Defines how often the EYE Sensor record (AVL ID: 11317) will be generated when the FM tracker is operating On Stop or On Move modes, according to the configured [movement source.](#)
- **EYE Sensor Settings** - Define what sensor readings data is included in to the EYE Sensor Records. Sensor readings which are not needed can be disabled, to reduce data consumption.
- **EYE Name list** - Defines what EYE sensors will be added to EYE Sensor list. For EYE Sensors to be added to the list, only the beginning part of the EYE Sensor local name has to match. For example, if in the EYE name list “EYE_SENSOR” is added and the FM tracker detects EYE_SENSOR1, EYE_SENSOR2, EYE_SENSORXYZ, all these EYE Sensors will be added to EYE Sensor list. If the EYE name list is left empty, all the detected EYE Sensors will be included in the EYE Sensor list. **NOTE:** If EYE Sensor has a name that matches configured one in EYE Name List and if it has a MAC address, that matches configured one in EYE Sensors filtered by MAC address, then such sensor will not be added to EYE Sensor list, but it’s data will be added according EYE Sensor filtered by MAC IO elements.



Once Eye Sensor filtering by name list is selected, EYE Sensor records containing the AVL ID:11317 will start being generated. Below is an example of how EYE Sensor data is packed into AVL ID 11317
AVL ID 11317 structure

Eye Sensor #1

EYE Sensor #1 Data length 1 byte
1st Parameter ID 1 byte
1st Parameter Data Length 1 byte
1st Parameter Data variable
2nd Parameter ID 1 byte
2nd Parameter Data Length 1 byte
2nd Parameter Data variable
<...>
Nth Parameter ID 1 byte
Nth Parameter Data Length 1 byte
Nth Parameter Data variable

Eye Sensor #2

Eye Sensor #2 Data length 1 byte
1st Parameter ID 1 byte
1st Parameter Data Length 1 byte
1st Parameter Data variable
2nd Parameter ID 1 byte
2nd Parameter Data Length 1 byte
2nd Parameter Data variable
<...>
Nth Parameter ID 1 byte
Nth Parameter Data Length 1 byte
Nth Parameter Data variable

Eye Sensor #N

... ..

Parameter IDs are used to identify what type of EYE Sensor information is included in the packet. Below is the table describing the possible EYE Sensor parameter IDs, along with their data type and data length.

Table 1. EYE Sensor Parameter IDs

Parameter ID	Name	Data type	Description
5	Eye Sensor Device Name	Array	Device's name from Device Name List tab
6	EYE Sensor Temperature	2 byte signed integer	Temperature value measured by EYE Sensor from List Values from -32768 to +32768 with 0.01 C delta
7	EYE Sensor Humidity	1 byte unsigned integer	Humidity measured by EYE Sensor from List Values from 0 to 100%
8	EYE Sensor Magnet presence	1 byte unsigned integer	Magnet measured by EYE Sensor from List Values from 0 to 1
9	EYE Sensor Movement presence	1 byte unsigned integer	Movement measured by Eye Sensor from List Values
10	EYE Sensor Movement count	2 byte unsigned integer	Movement counts measured by EYE Sensor from List Values
11	EYE Sensor Pitch	1 byte signed integer	Pitch angle measured by Eye Sensor from list Values
12	EYE Sensor Angle Roll	2 byte signed integer	Roll Angle measured by EYE Sensor from List Values

13	EYE Sensor Low battery indicator	1 byte unsigned integer	Low battery state measured by EYE Sensor from List Values from 0 to1
14	EYE Sensor Battery voltage	2 byte unsigned integer	Low battery state measured by EYE Sensor from List Values from 0 to1
15	EYE Sensor MAC address	6 byte unsigned integer	Device's MAC address
16	EYE Sensor Magnet trigger count*	2 byte unsigned integer	Magnet trigger counts measured by EYE Sensor from List Values *Only available with evaluation firmware BTSX.1.2.8.magcounter.R.0 of EYE Devices



MAC

IF EYE Sensors are selected to be filtered by **MAC address**, separate EYE sensor records will not be generated; EYE sensor values will be included into regular records with their corresponding IO elements. Up to 4 EYE Sensors can be configured with different MAC Addresses. In the case of filtering by MAC Address, more advanced configuration is possible, as EYE Sensors' IOs' Low, High level, Event Only and Operand parameters can also be configured separately for each IO.

- **Working Mode** - parameter has 2 options - Disabled and EYE Sensor. When it is disabled, EYE Sensor IO values will not be included into the records. When EYE Sensor is selected, EYE Sensor IO values will be included into records.
- **MAC Settings** - parameter specifies the MAC address of the EYE Sensor for the FM tracker to read, parse its data and put to corresponding IO elements. If the sensor is not found for set amount of scan retries, error values will be stored into IO elements.
- **I/O elements** - allows for advanced EYE sensor [I/O elements configuration](#).



EYE Sensor AVL IDs

Table below describes I/O elements which were added for EYE sensor with the new functionalities release.

Property ID in AVL packet	Property name	Bytes	Type	Min	Max	Multiplier	Units	Description
11317	EYE Sensor List	variable length	HEX	0 bytes	1024 bytes	-	-	EYE Sensor List
10800	EYE Temperature 1	2	Signed	-32768	32768	0,01	°C	Temperature measured by EYE sensor 1
10801	EYE Temperature 2	2	Signed	-32768	32768	0,01	°C	Temperature measured by EYE sensor 2
10802	EYE Temperature 3	2	Signed	-32768	32768	0,01	°C	Temperature measured by EYE sensor 3
10803	EYE Temperature 4	2	Signed	-32768	32768	0,01	°C	Temperature measured by EYE sensor 4
10804	EYE Humidity 1	1	Unsigned	0	100	-	%	Humidity measured by EYE sensor 1
10805	EYE Humidity 2	1	Unsigned	0	100	-	%	Humidity measured by EYE sensor 2
10806	EYE Humidity 3	1	Unsigned	0	100	-	%	Humidity measured by EYE sensor 3
10807	EYE Humidity 4	1	Unsigned	0	100	-	%	Humidity measured by EYE sensor 4

10808	EYE Magnet 1	1	Unsigned	0	1	-	-	Magnet measured by EYE sensor 1
10809	EYE Magnet 2	1	Unsigned	0	1	-	-	Magnet measured by EYE sensor 2
10810	EYE Magnet 3	1	Unsigned	0	1	-	-	Magnet measured by EYE sensor 3
10811	EYE Magnet 4	1	Unsigned	0	1	-	-	Magnet measured by EYE sensor 4
10812	EYE Movement 1	1	Unsigned	0	1	-	-	Movement state and count measured by EYE sensor 1
10813	EYE Movement 2	1	Unsigned	0	1	-	-	Movement state and count measured by EYE sensor 2
10814	EYE Movement 3	1	Unsigned	0	1	-	-	Movement state and count measured by EYE sensor 3
10815	EYE Movement 4	1	Unsigned	0	1	-	-	Movement state and count measured by EYE sensor 4
10816	EYE Pitch 1	1	signed	-90	90	-	-	Pitch and Roll angles measured by EYE sensor 1
10817	EYE Pitch 2	1	signed	-90	90	-	-	Pitch and Roll angles measured by EYE sensor 2
10818	EYE Pitch 3	1	signed	-90	90	-	-	Pitch and Roll angles measured by EYE sensor 3
10819	EYE Pitch 4	1	signed	-90	90	-	-	Pitch and Roll angles measured by EYE sensor 4
10820	EYE Low Battery 1	1	Unsigned	0	1	-	-	Low Battery indication EYE sensor 1
10821	EYE Low Battery 2	1	Unsigned	0	1	-	-	Low Battery indication EYE sensor 2
10822	EYE Low Battery 3	1	Unsigned	0	1	-	-	Low Battery indication EYE sensor 3
10823	EYE Low Battery 4	1	Unsigned	0	1	-	-	Low Battery indication EYE sensor 4
10824	EYE Battery Voltage 1	2	Unsigned	0	65535	-	-	Battery Voltage of EYE sensor 1
10825	EYE Battery Voltage 2	2	Unsigned	0	65535	-	-	Battery Voltage of EYE sensor 2
10826	EYE Battery Voltage 3	2	Unsigned	0	65535	-	-	Battery Voltage of EYE sensor 3
10827	EYE Battery Voltage 4	2	Unsigned	0	65535	-	-	Battery Voltage of EYE sensor 4
10832	EYE Roll 1	2	signed	-180	180	-	-	Roll value of EYE Sensor 1
10833	EYE Roll 2	2	signed	-180	180	-	-	Roll value of EYE Sensor 2
10834	EYE Roll 3	2	signed	-180	180	-	-	Roll value of EYE Sensor 3
10835	EYE Roll 4	2	signed	-180	180	-	-	Roll value of EYE Sensor 4

10836	EYE Movement Count 1	2	unsigned	0	65535	-	-	Movement count value of EYE Sensor 1
10837	EYE Movement Count 2	2	unsigned	0	65535	-	-	Movement count value of EYE Sensor 2
10838	EYE Movement Count 3	2	unsigned	0	65535	-	-	Movement count value of EYE Sensor 3
10839	EYE Movement Count 4	2	unsigned	0	65535	-	-	Movement count value of EYE Sensor 4

Eye sensor parameters have error code values, which will be written to the I/O value if parameter data is not received. From the error code value, it is possible to distinguish whether the issue is on the FM tracker side or the EYE Sensor. Below is a table describing these values.

Eye Sensor Error Values

Parameter	Data length (bytes)	Data type	Error codes		Additional Notes
			Data Not Received by FM tracker	EYE Sensor indicates error	
Temperature	2	signed	25000	25001	
Humidity	1	unsigned	250	251	
Magnet	1	unsigned	250	251	
Magnet trigger count	2	unsigned	65000	65001	Only available with evaluation firmware BTSX.1.2.8.magcounter.R.0 of EYE Devices
Movement	1	unsigned	250	251	
Movement counter	2	unsigned	65000	65001	
Pitch	1	signed	120	121	
Roll	2	signed	250	251	
Low battery status	1	unsigned	250	251	
Battery voltage	1	unsigned	250	251	

Note: If you are using presets (firmware/configurator without EYE product support), then refer to [BLE Sensors I/O elements](#) table instead.

EYE Sensor Protocol overview

Sensor advertising



Beacon and sensors data



Protocol description

At the highest-level Bluetooth® LE advertising packet consists of Advertising Indication and Scan Response. Both packets can be maximum of 31 bytes in size. Advertising Indication packet is always broadcasted when Scan Response is broadcasted only if Observer device requests it by using Active Scan.

BTSMP1 uses Advertising Indication to send beacon data which can be configured to select between iBeacon and Eddystone protocols or to be disabled at all. In that case, data which is shown as Scan Response in protocol overview will be sent as Advertising Indication without Scan Response following it.

Scan Response is used to send device name and manufacturer specific data. Manufacturer specific data includes Teltonika Company ID (0x089A) and protocol version (0x01). It is followed by Flag Encoded Data (Table 1) and Extended Data (Table 2). Later on, protocol will be highly configurable in and will allow to disable/enable sending of device name or any sensor value allowing to reduce size of the packet being sent.

Teltonika BTSX devices are transmitting one or two packets depending on the selected protocol. Broadcast packet + Scan response packet.

A scan response packet is sent when an active scan is used, within the BLE layer of communication. The default for our FM devices and many other applications for example our EYE Application or nRF connect Application is an active scan.

There are three protocols, with the following packets:

1.iBeacon + EYE Sensors

2.Eddystone + EYE Sensors

For **iBeacon + EYE Sensors** and **Eddystone + EYE Sensors** protocols only iBeacon/Eddystone packet is broadcasted and will be seen by both active and passive scans, to see the EYE Sensors packet you need to use an active scan. In other words in an environment where no BLE devices are scanning with an active scan or in case when there are no scanning devices at all, only the iBeacon/Eddystone packet will be sent by the BTS device to conserve energy.

3. EYE Sensors

With **EYE Sensors** protocol, the EYE Sensor packet becomes broadcast. In other words, in an

environment where no BLE devices are scanning with an active scan or in case when there are no scanning devices at all EYE Sensors packet will be sent by the BTS device.

More Information on [Active vs passive scans](#)

Device Name has the following default value for Beacon - ID1_XXXXXXX

Table 1. Flag Encoded Data

Data	Size (Bytes)	Description
		Each set bit (0-7) means the presence of value (0-7). Bits:
		0 - Temperature value presence
		1 - Humidity value presence
		2 - Magnetic sensor presence
Flags	1	3 - Magnetic sensor state (1 magnetic field is detected/0 magnetic field is not detected) Valid value is present only if bit 2 flag is set.
		4 - Movement sensor counter
		5 - Movement sensor angle
		6 - Low Battery indication (if set to 1 low battery voltage detected)
		7 - Battery voltage value presence
		Temperature
Value 0	2	Value in Celsius / 100 NOTE: present only if bit 0 is set, otherwise is not being sent
		Humidity
Value 1	1	Value in percent NOTE: present only if bit 1 is set, otherwise is not being sent
		Movement Sensor counter
Value 2	2	Most significant bit indicates movement state and 15 least significant bits represent count of movement events. NOTE: present only if bit 4 is set, otherwise is not being sent
		Movement sensor angle
Value 3	3	Most significant byte - pitch (-90/+90) Two least significant bytes - roll (-180/+180) NOTE: present only if bit 5 is set, otherwise is not being sent
		Battery Voltage
Value 4	1	Battery voltage in mV = 2000 + VALUE * 10 NOTE: present only if bit 7 is set, otherwise is not being sent

GATT Characteristics

Name	Service UUID	Characteristic UUID	Data Type	Min	Max	Default Value	Notes
Device Name	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c0016-7df2-4d4e-8e6d-c611745b92e9	ASCII	0	12	Unique for each device	-
Tx Power Lever	1804	2a07	SINT8	-14	8	2	Possible values: -14, -11, -8, -5, -2, 2, 4, 8
Protocol Type	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c0001-7df2-4d4e-8e6d-c611745b92e9	UINT8	0	4*	1 for EYE_Beacon, 4 for EYE_Sensor*	0 - iBeacon 1 - Eddystone 2 - EYE Sensor 3 - iBeacon + EYE Sensor* 4 - Eddystone + EYE Sensor*
					*Max 2 with 01.02.10+ firmware	*with 01.02.10+ firmware 1 for both EYE_Beacon & EYE_Sensor	*01.02.10+ sensors are enabled over Activate / Deactivate Sensors

Activate / Deactivate Sensors*	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c0021-7df2-4d4e-8e6d-c611745b92e9	UINT8	0	15 (0b1111)	4 (0b0100) for EYE_Beacon, 15 (0b1111) for EYE_Sensor	(LSb) bit 0 - Temperature Bit 1 - Humidity Bit 2 - Magnetic Bit 3 - Movement E.g. EYE_Sensor disabled movement & enabled temperature, humidity, magnetic sensors 7 (0b0111)	
*from 01.02.10+ firmware								
Advertising Interval	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c0002-7df2-4d4e-8e6d-c611745b92e9	UINT16	1000	10000	5000	milliseconds	
Sub Advertising Interval	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c0003-7df2-4d4e-8e6d-c611745b92e9	UINT16	20	1000	100	Used by repeats, milliseconds	
Advertising Repeats	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c0004-7df2-4d4e-8e6d-c611745b92e9	UINT16	1	10	1	Repeats work only if Advertising Interval is more than 2000 ms and Repeats set to more than 1	
iBeacon ID	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c0005-7df2-4d4e-8e6d-c611745b92e9	BYTE ARRAY	20 bytes	20 bytes	Unique for each device	16 B - UUID 2 B - major 2 B - minor	
Eddystone ID	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c0006-7df2-4d4e-8e6d-c611745b92e9	BYTE ARRAY	16 bytes	16 bytes	Unique for each device	10 B - Namespace 6 B - Instance	
Command	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c0007-7df2-4d4e-8e6d-c611745b92e9	Command characteristic					
Password	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c0008-7df2-4d4e-8e6d-c611745b92e9	BYTE ARRAY	6 bytes	6 bytes	123456	Always 6 Digits	
Sensor Interval	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c0009-7df2-4d4e-8e6d-c611745b92e9	UINT16	0	10000	1000	milliseconds	
Event Interval	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c000a-7df2-4d4e-8e6d-c611745b92e9	UINT16	0	10000	1000	milliseconds	
Event Duration	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c000b-7df2-4d4e-8e6d-c611745b92e9	UINT8	0	30	30	seconds	
Temperature Event	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c000c-7df2-4d4e-8e6d-c611745b92e9	UINT8	0	2	2	0 - on entrance 1 - on exit 2 - no event	
Temperature Low	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c000d-7df2-4d4e-8e6d-c611745b92e9	INT8	-40	85	-20	celsius	
Temperature High	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c000e-7df2-4d4e-8e6d-c611745b92e9	INT8	-40	85	50	celsius	
Humidity Event	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c000f-7df2-4d4e-8e6d-c611745b92e9	UINT8	0	2	2	0 - on entrance 1 - on exit 2 - no event	
Humidity Low	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c0010-7df2-4d4e-8e6d-c611745b92e9	UINT8	0	100	15	%	
Humidity High	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c0011-7df2-4d4e-8e6d-c611745b92e9	UINT8	0	100	50	%	
Movement Event	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c0012-7df2-4d4e-8e6d-c611745b92e9	UINT8	0	2	2	0 - on entrance 1 - on exit 2 - no event	
Movement Start	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c0013-7df2-4d4e-8e6d-c611745b92e9	UINT16	0	300	5	seconds	
Movement Stop	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c0014-7df2-4d4e-8e6d-c611745b92e9	UINT16	0	300	5	seconds	
Magnetic Event	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c0015-7df2-4d4e-8e6d-c611745b92e9	UINT8	0	2	2	0 - on entrance 1 - on exit 2 - no event	
Password Counter	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c0019-7df2-4d4e-8e6d-c611745b92e9	UINT8	0 (counter)	10 (counter)	0	Byte 0 - counter, Byte 1 and 2 - timeout	
Master Password (PUK)	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c0020-7df2-4d4e-8e6d-c611745b92e9	UINT8	8 bytes	8 bytes	MAC address dependency	Byte array	
Manufacturer sleep (Hibernate mode)	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c0018-7df2-4d4e-8e6d-c611745b92e9	UINT8	0	1	1	0 - sleep disabled, 1 - sleep enabled	
User ADV Spam Duration	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c0022-7df2-4d4e-8e6d-c611745b92e9	UINT16	1	300	30	WakeUp Advertising Spam Duration in seconds	
RSSI Calibration Value	e61c0000-7df2-4d4e-8e6d-c611745b92e9	e61c0023-7df2-4d4e-8e6d-c611745b92e9	INT8	-100	127	127	RSSI value in dBm 127 - Use default calib. table	
Manufacturer 180A		2A29	BYTE ARRAY	-	-	Not Configurable	Read Only. Ex. "Teltonika"	

Model	180A	2A24	BYTE ARRAY	-	-	Not Configurable	Read Only. Ex. "BTSID1"
Serial	180A	2A25	BYTE ARRAY	-	-	Not Configurable	Not used
Hardware	180A	2A27	BYTE ARRAY	-	-	Not Configurable	Read Only. Ex. "Table:1 Volt:325"
Firmware	180A	2A26	BYTE ARRAY	-	-	Not Configurable	Read Only. Ex. "1.1.0-beta"
System ID	180A	2A23	BYTE ARRAY	-	-	Not Configurable	Not used
MAC	180A	652143dc-dec6-4fb1-bd46-3e919d2410a6	BYTE ARRAY	6	6	Not Configurable	Read Only. ex. 112233445566 -> 11:22:33:44:55:66
Scan Response Data	e61c0000-7df3-4d4e-8e6d-c611745b92e9	e61c0001-7df3-4d4e-8e6d-c611745b92e9	BYTE ARRAY	17	17	Not Configurable	Scan Response Data, see picture for detail view of data structure

UUID: e61c0000-7df3-4d4e-8e6d-c611745b92e9

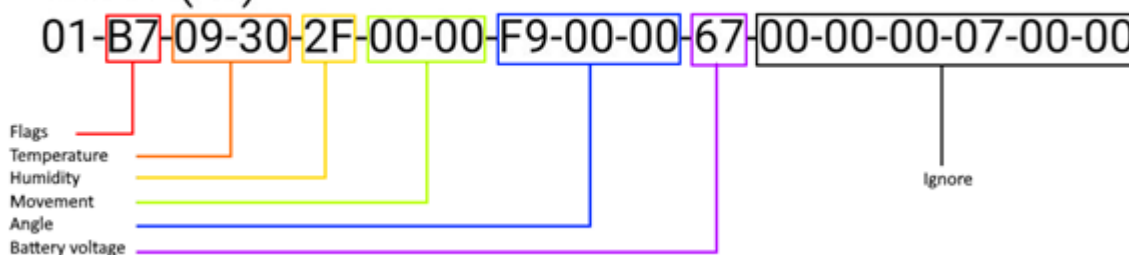
PRIMARY SERVICE

Unknown Characteristic

UUID: e61c0001-7df3-4d4e-8e6d-c611745b92e9

Properties: READ

Value: (0x)



Command characteristic

Command's name	Data to send	Description
Write to flash	0x0010	Writes set parameters to flash
General boot	0x0011	Enter boot mode
Instant reset	0x0012	Software reset
Reset after connection	0x0013	Reset after disconnect
Get hw voltage	0x0014	Sets detected hw voltage in response data
Keep connection alive	0x0015	Resets disconnect timer
Restore defaults	0x0016	Sets all configurable parameters to default values

EYE Sensor Bluetooth® frame parsing example

Unparsed data

0201061AFF4C000215FFFFFFFF0B8C404510C655AAB636EBEFBB700055020C094D50315F313233343536370EFF9A0801B708B4120CCB0BF7C767

Parsed data

Parameter	HEX Code Part	Actual Value
-----------	---------------	--------------

Length	02
Type	01
Flags	06
Length	1A
Type	FF
Apple company identifier (big endian)	4C00
Beacon type	0215
UUID	FFFFFFFF0B8C404510C655AAB636EBEF
Major	BB70
Minor	0055
Power	02
Length	0C
Type	09
Device name	4D50315F31323334353637
Length	0E
Type	FF
Teltonika company ID (big endian)	9A08
Protocol version	01

Raw value example 0xB7. Data has to be interpreted as binary value. In this example would be (MSB) 1011 0111 (LSB) and is parsed from least significant byte (LSB).

- 0 - Temperature value presence. 1 Means device is reading and transmitting temperature value.
- 1 - Humidity value presence. 1 Means device is reading and transmitting humidity value.
- 2 - Magnetic sensor presence. 1 Means device is reading and transmitting Magnetic sensor value.
- 3 - Magnetic sensor state (1 magnetic field is detected/0 magnetic field is not detected) Valid value is present only if bit 2 flag is set.
- 4 - Movement sensor counter. 1 Means device is reading and transmitting movement state and count values.
- 5 - Movement sensor angle. 1 Means device is reading and transmitting angle roll and pitch values.
- 6 - Low Battery indication. 0 - Means device battery is from 100 to 15 % (When value changes to 1 Battery level is lower than 15 %).
- 7 - Battery voltage value presence. 1 Means device is reading and transmitting battery voltage value.

Flags	B7
Temperature	08B4
Humidity	12
Movement	0CCB
Angle	0BFFC7
Battery voltage	67

Raw value example 0x08B4 hex, 2228 dec. Raw value needs to be divided by 100. **Real temperature** is 22,28 Celsius.

Raw value example 0x12 hex, 18 dec. Decimal value is humidity in percent. Humidity 18 %

(MSB)0000 1100 1100 1011(LSB) binary
 0 - Most significant byte(MSB) represents **Movement status**. In this case device is not moving 0. If it was 1 device is moving.
 000 1100 1100 1011 - represent detected movements count 3275 decimal value means device has detected total 3275 movement events,
 0B - Most significant byte represents **device pitch**. Device pitch can be from -90 to 90 degrees.
 In this example device pitch is 0000 1011 (2's complement) = 11° degrees.

FFC7- Two least significant bytes represent **device roll**. Device roll can be from -180 to 180 degrees.
 In this example device Roll is 1111 1111 1100 0111 (2's complement) = -57° degrees

Battery voltage - raw value example 0x67 hex. Decimal value of parameter 103. To calculate battery voltage need to use calculation 2000 + (VALUE * 10). In this case battery voltage value 2000+(103x10)= 3030 mV

FM Packet parsing example (Base firmware / Advanced mode)

Unparsed data

Received data in hexadecimal stream:

0000000000000000488E010000017CA6B6BFD8010F0E5188209AB482008600A80F0000000
00006000000020019090400560024000301CF0000001601D00000FF4D01D10000006D00000001014B0001B6010000CF7D

AVL Data Packet

AVL Data Packet Part	HEX Code Part
Zero Bytes	00 00 00 00
Data Field Length	00 00 00 48
Codec ID	8E (Codec8 Extended)
Number of Data 1 (Number of Total Records)	01

	Timestamp	00 00 01 7C A6 B6 BF D8 (GMT: Friday, 22 October 2021 06:36:07)
	Priority	01
	Longitude	0F 0E 51 88
	Latitude	20 9A B4 82
	Altitude	00 86
	Angle	00 0A
	Satellites	0E
	Speed	00 00
	Event IO ID	00 00
	N of Total IO	00 06
	N1 of One Byte IO	00 00
	N2 of Two Bytes IO	00 02
	ID	00 19 (25 = BLE Temperature #1)
	Value	09 04 (2308=23.08°C)
	ID	00 56 (86 = BLE Humidity #1)
	Value	00 36 (24 %RHT)
	N4 of Four Bytes IO	00 03
	ID	01 CF (463 - BLE 1 Custom #2 = Movement status and movement events count)
	Value	00 00 00 16 (Currently not moving events count 22)
	ID	01 D0 (464 - BLE 1 Custom #3 = Angle)
	Value	00 00 FF 4D (Pitch = 0°, Roll = -179°)
	ID	01 D1 (465 - BLE 1 Custom #4 = Battery Voltage)
	Value	00 00 00 6D (109 = 2000 + 109 * 10 mV = 3090 mV)
	N8 of Eight Bytes IO	00 00
	NX of X Bytes IO	00 01
	N'th IO ID - AVL ID.	01 4B (331 - BLE 1 Custom #1 = Flags)
AVL Data	Length of Variable Length IO	00 01
		B7 = (MSB)1011 0111(LSB) It's parsed from least significant byte(LSB):
		Bit 0 - Temperature value presence. 1 Means device is reading and transmitting temperature value.
		Bit 1 - Humidity value presence. 1 Means device is reading and transmitting humidity value.
		Bit 2 - Magnetic sensor presence. 1 Means device is reading and transmitting Magnetic sensor value.
		Bit 3 - Magnetic sensor state 1 magnetic field is detected/0 magnetic field is not detected) Valid value is present only if bit 2 flag is set.
	Value of Variable Length IO	Bit 4 - Movement sensor counter. 1 Means device is reading and transmitting movement state and count values.
		Bit 5 - Movement sensor angle. 1 Means device is reading and transmitting angle roll and pitch values.
		Bit 6 - Low Battery indication. 0 - Means device battery is from 100 to 15 % (When value changes to 1 Battery level is lower than 15 %.
		7 - Battery voltage value presence. 1 Means device is reading and transmitting battery voltage value.
	Number of Data 2 (Number of Total Records)	01
	CRC-16	00 00 CF 7D

FM EYE Sensor record parsing example with the new firmware (Evaluation firmware / EYE Sensor filtering by name)

Parsing EYE Sensor records example

Below You will find an example on how to parse EYE Sensor record with two EYE Sensors present.

Unparsed data

Received data in hexadecimal stream: 0000000000000908E0100000183407a2beb000f0e3fe3209ab40e008801290d00002c350001000000000000000012c3500630130050f4d50315f42453241413500000000000602d60807012f0801000901000a024e000b01f90c025aff0d01000e020bcc30050f4d50315f33464539414100000000000602cb080701300801000901000a0263000b01000c02af000d01000e020b90010000fef4

AVL Data Packet

AVL Data Packet Part	HEX Code Part
Zero Bytes	00 00 00 00
Data Field Length	00 00 00 90
Codec ID	8E (Codec8 Extended)
Number of Data 1 (Number of Total Records)	01
Timestamp	00 00 01 83 40 7a 2b eb(GMT: Tuesday, 18 June 2019 08:25:22.001)
Priority	00
Longitude	0f 0e 3f e3
Latitude	20 9a b4 0e
Altitude	00 88
Angle	01 29
Satellites	0d
Speed	00 00
Event IO ID	2c 35 (11317)
N of Total ID	00 01
N1 of One Byte IO	00 00
N2 of Two Bytes IO	00 00
N4 of Four Bytes IO	00 00
N8 of Eight Bytes IO	00 00
NX of X Bytes IO	00 01
N'th IO ID - AVL ID.	2c 35 (11317)
Length of Variable Length IO	00 63 (99 bytes)
Value of Variable Length IO 11317	0130050f4d50315f42453241413500000000000602d60807012f0801000901000a024e000b01f90c025aff0d01000e020bcc1000e020bcc30050f4d50315f33464539414100000000000602cb080701300801000901000a0263000b01000c02af000d01000e020b90
Number of Data 2 (Number of Total Records)	01
CRC-16	00 00 fe f4

Parsing AVL ID 11317 data

AVL ID 11317 Unparsed data

0130050f4d50315f42453241413500000000000602d60807012f0801000901000a024e000b01f90c025aff0d01000e020bcc30050f4d50315f33464539414100000000000602cb080701300801000901000a0263000b01000c02af000d01000e020b90

Parsing the data

AVL Data packet part	HEX Code Part
Constant	01
Eye Sensor #1 data length	30 (48 bytes)
Parameter ID	05 (Eye Sensor Device name)

	Parameter data length	0f (15 bytes)
	Parameter data	4d 50 31 5f 42 45 32 41 41 35 00 00 00 00 00
	Parameter ID	06 (Eye Sensor #1 temperature)
	Parameter data length	02 (2 bytes)
	Parameter data	d6 08 (With firmware 03.28.04.rev.203 the value is little endian, converted to decimal and multiplied by 0.01C = 22.42C. With firmware 03.28.04.rev.204 the value is big endian)
	Parameter ID	07 (Eye Sensor #1 Humidity)
	Parameter data length	01 (1 byte)
	Parameter data	2f (converted to decimal = 47%)
	Parameter ID	08 (Eye Sensor #1 Magnet)
	Parameter data length	01 (1 byte)
	Parameter Data	00 (no magnet detected)
	Parameter ID	09 (EYE Sensor #1 Movement presence)
	Parameter data length	01 (1 byte)
	Parameter data	00 (none detected)
	Parameter ID	0a (parameter ID #10, EYE Sensor #1 Movement count)
	Parameter Data length	02 (2 bytes)
	Parameter data	4e 00 (converted to dec = 19968)
	Parameter ID	0b (Parameter ID #11 Eye Sensor #1 Pitch)
	Parameter Data length	01 (1 byte)
	Parameter data	f9 (converted to decimal = 159 degrees)
	Parameter ID	0c (Parameter ID #12 Eye sensor #1 Roll)
	Parameter data length	02 (2 bytes)
	Parameter data	5a ff (With firmware 03.28.04.rev.203 the value is Little endian, converted to decimal signed 2's complement = -166 degrees With firmware 03.28.04.rev.204 the value is Big Endian)
	Parameter ID	0d (parameter ID #13 low battery voltage indicator)
	Parameter data length	01 (1 byte)
	Parameter data	00 (low battery voltage not detected)
	Parameter ID	0e (Eye Sensor #1 battery voltage)
	Parameter data length	02 (2 bytes)
	Parameter data	0b cc (Converted to decimal = 3020 mV)
	Eye Sensor #2 data length	30 (48 bytes)
	Parameter ID	05 (Eye Sensor Device name)
	Parameter data length	0f (15 bytes)
	Parameter Data	09 (EYE Sensor #1 Movement presence)
	Parameter ID	06 (Eye Sensor #1 temperature)
	Parameter data length	02 (2 bytes)
	Parameter Data	cb 08 (little endian, converted to decimal and multiplied by 0.01C = 22.51C)
	Parameter ID	07 (Eye Sensor #1 Humidity)
	Parameter data length	01 (1 byte)
	Parameter Data	30 (converted to decimal = 48%)
	Parameter ID	08 (Eye Sensor #1 Magnet)
	Parameter data length	01 (1 byte)
	Parameter Data	00 (no magnet presence detected)
	Parameter ID	09 (EYE Sensor #1 Movement presence)
	Parameter data length	01 (1 byte)
	Parameter Data	00 (no movement presence detected)
	Parameter ID	0a (parameter ID #10, EYE Sensor #1 Movement count)
	Parameter data length	02 (2 bytes)
	Parameter Data	63 00 (converted to decimal = 25344)
	Parameter ID	0b (Parameter ID #11 Eye Sensor #1 Pitch)
	Parameter data length	01 (1 byte)
	Parameter Data	00 (converted to dec = 0 degrees)
	Parameter ID	0c (Parameter ID #12 Eye sensor #1 Roll)
	Parameter data length	02 (2 bytes)
	Parameter Data	af 00 (Little endian, converted to decimal signed 2's complement = 175 degrees)
	Parameter ID	0d (parameter ID #13 low battery voltage indicator)
	Parameter data length	01 (1 byte)
	Parameter Data	00 (low battery voltage not detected)
	Parameter ID	0e (Eye Sensor #1 battery voltage)
	Parameter data length	02 (2 bytes)
	Parameter Data	0b 90 (Converted to decimal = 2960mV)

AVL Data

Safety information

This message contains information on how to operate BTSID1 safely. By following these requirements and recommendations, you will avoid dangerous situations. You must read these instructions carefully and follow them strictly before operating the device!

1. To avoid mechanical damage, it is advised to transport the device in an impact-proof package.
2. In case of malfunction contact your Teltonika account manager or write to the technical support team over the Helpdesk.



Opening and self fixing devices is strictly forbidden



The device must be firmly fastened in a predefined location.



All wireless data transferring devices produce interference that may affect other devices which are placed nearby.



Installation and/or handling during a lightning storm is prohibited.



The device must be connected only by qualified personnel.



Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.



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This marking on the product, accessories or literature indicates that product and its electronic accessories should not be disposed of with other household waste.



This Marking on the battery, manual or packaging indicates that batteries in this product should not be disposed with other household waste.

Certification & Approvals

Certificates

E-Mark (EU)

Links

[Yes](#)

FCC (USA)	Yes
CE/RED (EU)	Yes
RoHS (EU)	Yes
REACH (EU)	Yes
Anatel (EU) (PR)	Yes
IP rating	Yes
SIRIM QAS	Yes
SDPPI POSTEL	Yes
TELEC	Yes
ATEX	Yes

Nomenclature & Classification codes

Name	Links
EAN	Yes
HS	Yes

Memberships

Name	Links
Bluetooth® SIG	Yes
WEEE	Yes

External Links

Product Page

<https://teltonika-gps.com/eye/>

Product Change Notifications

The latest Product Change Notifications can be found: [Product Change Notifications](#)

Software Errata

Firmware Errata: [BTS firmware errata](#)

EYE App Errata: [BTS APP errata](#)

Promotional Material

[EYE Sensor Promotional Material](#)

Compatibilty with other Teltonika Devices

Teltonika Networks:

https://wiki.teltonika-networks.com/view/Bluetooth_EYE_Sensor_and_EYE_Beacon_support




Partner Providers Supporting Software

- [3Dtracking](#)
- [GPS-server](#)
- [Wialon](#)
- [Mapon](#)
- [WhiteLabel Tracking](#)

[Frequently asked questions \(FAQ\)](#)

- [Questions about Power and Electrical characteristics](#)
- [Questions about EYE Accessory configuration \(EYE APP\)](#)
- [Questions about FMBxxx compatibility with EYE Accessories](#)
- [Questions about Protocols](#)
- [Other questions \(Questions without category\)](#)

Documents

 Datasheet PDF (EN)	(Updated on: 2024-01-16)	 BTSM P1 Quick Manual (EN)	(Updated on: 2024-01-17)	 North America Flyer	(Updated on: 2023-03-13)
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