**Oviphone Technology Limited Company: W200PL device LORAWAN protocol**

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# 

# Overview

This agreement is applicable to the Oviphone W200P LoRaWAN watch. If downlink confirmation (full duplex mode) or other protocols are required, please consult with Oviphone Communication (Oviphone Communication has other customized protocol applications).

This protocol use for Oviphone W200P LoRaWAN wristband) .

If you need downlink confirmation (full-duplex mode) or other protocols, please check with Oviphone.

With the continuous improvement and enrichment of device functions, this agreement will be constantly updated. Please download the latest version from the server. This document will continue updape, please download the newest version. http://aiday.com.cn/Help/api/Device/LORA/

The module over there:

Wristband register network method for watches:

1: Activation by Personalization (OTAA-CLASSA activation method)

Default APPSKEY： 2B7E151628AED2A6ABF7158809CF4F3C

If you need special KEY, please contact with Oviphone

2: Another ABP network access mode

CAPPSKEY - EF6D6E2503F57AE2FA151CDA87455F18

CNWKSKEY - 2E8C8650B4041672BBB9A399F2DEB427

# Protocol Data Packet Structure

A basic protocol data packet structure is shown in Figure 1.：



**Figure1**

## Data Header

Each data packet begins with a 1-byte Header or token (in some response messages, a timestamp is used instead):

Currently, the token for Eurofins devices is fixed as BD

Header: 0xBD

Timestamp: 32 bits, generated by the server

## Message ID

MessageId represents the content as described in Chapter 3.

## Token Generation Mechanism

Currently fixed to BD

## Payload

The payload below refers to the effective content of the protocol, excluding the head token and checksum. The length of the content is indicated afterwards.

The data formats used in the payload are shown in the following table:

[U-unsigned; I-signed; X-bitfield; number-bytes occupied]

In the protocol below, little-endian is used for all data types except for ch, u8, i8, and x8.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Short** | **peTypeType** | **Size(Bytes)** | **Min/max** | **Resolution** | **explain** |
| CH | ASCII/ISO 8859.1 | 1 | - | - | char |
| u8 | Unsigned Char | 1 | 0..255 | 1 | unsigned short |
| i8 | Signed Char | 1 | -128..127 | 1 | short |
| x8 | Bitfield | 1 | - | - | bit |
| u16 | Unsigned Short | 2 | 0..65，535 | 1 | unsigned int |
| i16 | Unsigned Short | 2 | -32,768..32,767 | 1 | int |
| x16 | Bitfield | 2 | - | - | （bit）2 |
| u32 | Unsigned Long | 4 | 0..4,294,967,295 | 1 | unsigned long |
| i32 | Signed Long | 4 | -2,147,483,648..2,147,483,647 | 1 | long |
| u64 | Uint64\_t | 8 | 0..18,446,744,073,709,551,616 | 1 | uint64\_t |
| float | float | 4 | -3.44\*10e38..3.4\*10e38 | - | float |

## Checksum

The content to be added to the checksum includes the payload, as shown in Figure 1. The algorithm is as follows, where Buffer[N] represents the data to be accumulated.

Ck\_sum = 0

For(i=0; i<N; i++)

{

ck\_sum = ck\_sum + Buffer[i]

ck\_sum = ck\_sum % 0x100

}

ck\_sum = 0xFF – ck\_sum

Return ck\_sum

Where ck\_sum cannot exceed 0xFF, so after each loop, it must be modulo 0x100 and then taken the remainder.

# **3.**messages

## Equipment information related

### 3.1.1 Power quantity and step counting report protocol (0xF9)

After the terminal connects to the server, it uploads a heartbeat packet to the server at fixed intervals.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Message | MSG\_HTB\_UPL | | | |
| Decription | heartbeat packet | | | |
| Firmware | -/- | | | |
| Payload Length | 15 bytes | | | |
| Message structure | Hearer | Message ID | Payload | Checksum |
| token | 0xF9 | 见下方定义 | CK\_sum |

payload contents

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Byte offset | Format | Name | Scale | Unit | Decription |
| 1 | U8 | Bat\_type |  |  | Battery Type  0: 4-level  1: 5-level  2: Percentage  3: Voltage |
| 2 | u16 | Bat\_volt |  | -/- | Battery Level  If Bat\_type is 0:  The battery level ranges from 0 to 3  (0 for 25%, 3 for 100%)  If Bat\_type is 1:  The battery level ranges from 0 to 4  (0 for 20%, 4 for 100%)  If Bat\_type is 2:  The battery level ranges from 0 to 100 |
| 1 | U8 | Signal\_type |  |  | Signal Type  0: Percentage  1: 5-level  2: CSQ value |
| 2 | I16 | Signal\_strength |  |  | Signal\_strength |
| 1 | U8 | Other\_type |  |  | Extension Type  0: Full Step Count  1: Incremental Step Count  2: Vibration |
| 4 | U32 | Num |  |  | Extended value |
| 4 | U32 | Timestamp | -/- | -/- | Utc Timestamp |

## 3.2 Positioning related reporting

### 3.2.1GPS/BDS Position Reporting: Location Data Reporting (0x03)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Message | MSG\_UPL\_GPS | | | |
| Decription | 回馈GPS/BDS定位数据 | | | |
| Firmware | -/- | | | |
| Payload Length | 23 bytes | | | |
| Message structure | Hearer | Message ID | Payload | Checksum |
| token | 0x03 | See below | CK\_sum |

payload contents

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Byte offset | Format | Name | Scale | Unit | Decription |
| 8 | Double | lon |  | -/- | longitude |
| 8 | Double | lat |  |  | latitude |
| 1 | U8 | north\_south |  |  | /\*N or S\*/ |
| 1 | U8 | east\_west |  |  | /\*E or W\*/ |
| 1 | U8 | status |  |  | /\*A or V\*/ |
| 4 | U32 | Timestamp |  |  | Timestamp |

Example： BD03000000C0424C5E4000000000A5DC3C404E4541E62C616078

Lon: 000000C0424C5E40Lat: 00000000A5DC3C40 4E –N 45-E 41-A Time E62C6160

Lon:121.191574Lat: 28.861893

Status = A indicates that the information content is accurate. It can be resolved to V and can be abandoned.

Example of GPS parsing (JAVA)：

DBDBDBDB037d9f84ac81815c40e766926b1d8936404e4541749d695f0b

//DBDBDBDB03 7d9f84ac81815c40 e766926b1d893640 4e 45 41 749d695f 0b

public static void main(String[] args){

//eg:7d9f84ac81815c40 -->405c8181ac849f7d

Double.longBitsToDouble(Long.parseLong("405c8181ac849f7d",16))); //114.02353966666665

//message e766926b1d893640 actual value 4036891d6b9266e7

Double.longBitsToDouble(Long.parseLong("4036891d6b9266e7", 16))) ;//22.535605166666667

HexToStr(data.Substring(“4e”)); //N

HexToStr(data.Substring(“45”));//E

HexToStr(data.Substring(“41”));//AA represents data "OK", V represents a warning

//Message 749d695f actual value 5f699d74

Date date=new Date();

date.setTime(Long.parseLong(“5f699d74",16)\*1000);

SimpleDateFormatsdf = new SimpleDateFormat("yyyyMMddHHmmss");

System.out.println(sdf.format(date)); //2020-09-22 14:45:08

### 3.2.2 Bluetooth positioning information(LBE Location)（MsgId=0xD6）

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Message | MSG\_HTB\_UPL | | | |
| Decription | LBE Location | | | |
| Firmware | -/- | | | |
| Payload Length | 1 bytes +n | | | |
| Message structure | Hearer | Message ID | Payload | Checksum |
| token | 0xD6 | See below | checksum |

Payload:

|  |  |  |  |
| --- | --- | --- | --- |
| Format | Name | Scale | Description |
| U8 | Type | 1 | Currently fixed to0 (Fix value 0) |
| U8 | Total\_groups | 1 | Total number of assemblies, there may be multiple sets of information, and each set may contain multiple items.  ibeacon (The total number of groups, there may be multiple groups of information, and there may be multiple ibeacons in each group) |
| Int32 | Utc | 4 | Utctimestamp (the UTC timestamp of the first group) |
| U8 | Total\_PackCount | 1 | Total number of packages at the current time: (the ibeacon’s count of the first group) |
| U16 | Major0 | 2 | Major |
| U16 | Minor0 | 2 | Minor |
| S8 | Rssi0 | 1 | Rssi |
| U16 | MajorN | 2 | Major |
| U16 | MinorN | 2 | Minor |
| S8 | RssiN] | 1 | Rssi |
| Int32 | Utc | 4 | Utc timestamp (UTC timestamp of the second group) |
| U8 | Total\_PackCount | 1 | Total number of packages at the current time (the ibeacon’s count of current group) |
| U16 | Major0 | 2 | Major |
| U16 | Minor0 | 2 | Minor |
| S8 | Rssi0 | 1 | Rssi |
| U16 | MajorN | 2 | Major |
| U16 | MinorN | 2 | Minor |
| S8 | RssiN] | 1 | Rssi |

Example：

BDd60001be20315f0443271794ac43273094aa4327b956a54327fe94a56a

**BD - header**

**d6 - msgID**

**00 - type**

**01 -- Only one set of iBeacon data（total groups of beacons data :1）**

be20315f -- The first group’s timestamp: 0x5f3120be=1597055166

There are 4 beacon information in the first group.4327 --- major : 0x2743 = 10051

1794--- minor: 0x9417 = 37911

ac--- rssi: 0xac = -84

4327 --- major: 0x2743 = 10051

3094--- minor:0x9430 = 37936

aa--- rssi:-86

4327 --- major: 0x2743 = 10051

b956--- minor:0x56b9 = 22201

a5--- rssi:-91

4327 --- major: 0x2743 = 10051

fe94--- minor:0x94fe=38142

a5--- rssi:-91

6a --checksum

**3.3：Alarm related reporting**

### 3.3.1Alarm data upload (0x02)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Message | LNK-WRN | | | |
| Description | Terminal uploads its warnings to terminal server. | | | |
| Firmware |  | | | |
| Direction | Terminal => Terminal Server | | | |
| Payload length | 6 bytes | | | |
| Message structure | Header | Message ID | Payload | Checksum |
| Token | 0x02 | See below | CK\_sum |

Payload contents

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Byte Offset | Format | | Name | Scale | Unit | Drscription |
| 2 | x16 | | Upl\_warn | - | - | Bitfield see below(Little-endian) |
| 4 | | U32 | Timestamp |  |  | Timestamp (timestamp will be added afterwards for supplementary upload) |
|  |  | |  |  |  |  |

Bitfield WRN:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 15 |  |  |  |  |  |  |  |  |  |  | 4 |  |  | 1 | 0 |

Below is the corresponding definition table for when the bit is 1 and the current alarm. Multiple alarms may also be present simultaneously.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| bit | Name | Description | Code | 调整后的16进制 | 十进制 |
| 15 | Gas alarm（- special equipment support） | Gas alarm（- special equipment support） | 0 | 8000 |  |
| 14 | Drop the alarm | Drop the alarm | 1 | 4000 | 4\*4096=16384 |
| 13 | Fence alarm（- special equipment support） | Fence alarm (away from the beacon) （- special equipment support）） | 2 | 2000 | 2\*4096=8192 |
| 12 | Strap damage（- special equipment support） | Strap damage（- special equipment support） | 3 | 1000 | 1\*4096=4096 |
| 11 | Lock open（- special equipment support） | Lock open（- special equipment support） | 4 | 0800 | 8\*256=2048 |
| 10 | Approaching beacon point (125K) （- special equipment support） | Approaching beacon point (125K) （- special equipment support） | 5 | 0400 | 4\*256=1024 |
| 9 | Release key  （- special equipment support） |  | 6 | 0200 | 2\*256=512 |
| 8 | Wearing device | Wearing device | 7 | 0100 | 1\*256=256 |
| 7 | Cancel SOS | Cancel SOS | 8 | 0080 | 8\*16=128 |
| 6 | Vibration alarm（- special equipment support） | Vibration alarm（- special equipment support） | 9 | 0040 | 4\*16=64 |
| 5 | Sedentary alarm | Sedentary alarm | 10 | 0020 | 2\*16=32 |
| 4 | Remove device | Remove device | 11 | 0010 | 1\*16=16 |
| 3 | Open box alarm（- special equipment support） | Open box alarm（- special equipment support） | 12 | 0008 | 8 |
| 2 | Shutdown | Shutdown | 13 | 0004 | 4 |
| 1 | SOS |  | 14 | 0002 | 2 |
| 0 | Low Battery | Low Battery | 15 | 0001 | 1 |

BD02020007FD8860E7 true value 0002—0000 0000 0000 0010 SOS alarm

Timestamp = 07FD8860 is equal to 6088FD07 = 1619590407. This represents the time when 1619590407 seconds have elapsed since 1970-01-01 00:00:00. This corresponds to the device reporting the time as 2021/4/28 6:13:27.

Alarm 02 and each independent, the status of the corresponding bit is not associated in the context of non-related alarms, only the current bit alarm with a value of 1 is processed, and the corresponding processing is performed.

### 3.3.2 Alarm data upload(0x21) (supplement to 0x02)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Message | LNK-WRN | | | |
| Description | Terminal uploads its warnings to terminal server. | | | |
| Firmware |  | | | |
| Direction | Terminal => Terminal Server | | | |
| Payload length | 8 bytes | | | |
| Message structure | Header | Message ID | Payload | Checksum |
| Token | 0x21 | See below | CK\_sum |

Payload contents

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Byte Offset | Format | | Name | | Scale | Unit | Drscription | |
| 2 | U16 | | type | |  |  | Type of alarm | |
| 4 | U32 | | Upl\_warn | | - | - | Bitfield see below(Small end priority) | |
| 4 | U32 | Timestamp | |  | |  | | Timestamp (timestamp will be added afterwards for supplementary upload) |
|  |  | |  | |  |  |  | |

Alarm type =1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 2 | Device is charging and powered off (firmware functionality support required) |  | 29 | 0004 | 4 |
| 1 | Device low on power, powered off (firmware functionality support required) |  | 30 | 0002 | 2 |
| 0 | Device powered off manually (firmware functionality support required) |  | 31 | 0001 | 1 |

BD21010001000000ECFFBE65DA

### 3.3.3upload alarm information（0x16）

Special Note: This is a supplement to 0x02. The original 0x02 is limited by the number of digits and cannot represent these combinations of alarms.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Message | MSG\_NB\_SOS | | | |
| Decription | Upload SOS information, including temperature and heart rate alarms. | | | |
| Firmware | -/- | | | |
| Payload Length | 7+4 bytes | | | |
| Message structure | Hearer | Message ID | Payload | Checksum |
| token | 0x16 | See below | CK\_sum |

payload contents

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Byte offset | Format | Name | Scale | Unit | Decription |
| 1 | U8 | Type | -/- | -/- | Alarm types (  0: heart rate alarm  1:temperature alarm) |
| 2 | U16 | Heart | -/- | -/- | heart rate |
| 2 | U16 | temperature | -/- | -/- | temperature |
| 2 | U16 | Pa | -/- | -/- | pressure |
| 4 | 4\*U8 or U32 | expand | -/- | -/- | 4-byte extension for other sensors. |

Currently, the last four bytes of the isolated wristband are used as a timestamp.

**3.4Equipment information and status reporting**

### 3.4.1 Device charging status upload (0xC3)--Special version to use

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Message | MSG\_HRD\_DATA | | | |
| Decription | Device charging status upload ，Terminal=>Terminal Server | | | |
| Firmware | -/- | | | |
| Payload Length | 5 bytes | | | |
| Message structure | Hearer | Message ID | Payload | Checksum |
| token | 0xC3 | See below | CK\_sum |

payload contents

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Byte offset | Format | Name | Scale | Unit | Decription |
| 0 | U8 | Status | / | / | 0start，  1end，  2 fully charged |
| 1 | U32 | Timestamp |  |  | Timestamp |

Eg:

BDC301DB4D2F668A The device is charged at the end

BDC300DB4D2F668A The device starts charging

BDC302DB4D2F668A The equipment is fully charged

**3.5 Downstream feedback report**

### 3.5.1Downlink feedback(MSGID=0xC0)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Message | MSG\_HRD\_DATA | | | |
| Decription | Terminal =>Server | | | |
| Firmware | -/- | | | |
| Payload Length | 1 +n bytes | | | |
| Message structure | Hearer | Message ID | Payload | Checksum |
| token | 0xC0 | See below | CK\_sum |

payload contents

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Byte offset | Format | Name | Scale | Unit | Decription |
| 1 | U8 | length | -/- |  | Message ID length |
| N | n\*U8 | type | -/- |  | N Message ID |
|  |  |  |  |  |  |

This command is used for the feedback of downlink commands, returning the Message ID(s) received earlier (multiple Message ID can be returned collectively).

### 3.5.2Message status reporting(MSGID=0x28)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Message | MSG\_HRD\_DATA | | | |
| Decription | Terminal =>Server | | | |
| Firmware | -/- | | | |
| Payload Length | 1 bytes | | | |
| Message structure | Hearer | Message ID | Payload | Checksum |
| token | 0x28 | See below | CK\_sum |

payload contents

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Bytes | Format | Name | Scale | Unit | Decription |
| 4 | U32 | timestamp | -/- | -/- | Time stamp |
| 1 | U8 | type | -/- | -/- | Type (corresponding to 0X28 downlink), currently 0x03 |
| 1 | U8 | status | -/- | -/- | Message status  1: Read, received |
| 4 | U32 | serial number | -/- | -/- | (corresponding to 0X28 downlink) |
|  |  |  |  |  |  |

## 3.6Health related reports

### 3.6.1Health Data (MSGID = 0 x 32)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1. Message | MSG\_HRD\_DATA | | | |
| Decription | Heart rate data upload，Terminal=>Terminal Server | | | |
| Firmware | -/- | | | |
| Payload Length | 8+3n bytes | | | |
| Message structure | Hearer | Message ID | Payload | Checksum |
| token | 0x32 | See below | CK\_sum |

payload contents

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Byte offset | Format | Name | Scale | Unit | Decription |
| 1 | U8 | bp\_high | - | - | systolic pressure |
| 1 | U8 | bp\_low | - | - | diastolic pressure |
| 1 | U8 | Hrs |  |  | heart |
| 1 | U8 | Spo2 |  |  | blood oxygen |
| 2 | U16 | wrist Temp | - | - | Wrist temperature：2byte |
| 2 | U16 | Body Temp. |  |  | (body) temperature：2byte |
| 4 | U32 | Step |  |  | Step：4byte |
| 1 | U8 | Bat |  |  | Power level |
| 1 | U8 | sign |  |  | signal |
| 4 | Int32 | timestamp |  |  | Time stamp, small end |

Example：bd32 74 51 53 62 4b01 6d01 04040000 04 64 049ed361 96

32 : MSGID；

74: systolic pressure 116

51 : diastolic pressure 81

53： heart 83

62： blood oxygen 98

4b01 : littele Endian，Wrist temperature 33.1

6d01： littele Endian，(body) temperature 36.5

04040000： step 1028

04： Power level level 4

Value 0 - 4 Mean 20% - 100% (20% 40% 60% 80% 100%)

64 : signal intensity 100%

049ed361： Timestamp: Beijing time2022-01-04 09:08:20

96: check

The new version is used:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Byte offset | Format | Name | Scale | Unit | Decription |
| 1 | U8 | Type |  |  | 00 |
| 4 | U32 | Timestamp |  |  | Time stamp |
| 2 | U16 | contentLength |  |  | the total length of the following content |
| 1 | U8 | ID |  |  | ID (Type (5) + Reported Value Length (3)) |
| 2 | U16 | Val1 |  |  | Reported value of ID |
|  |  |  |  |  |  |
| 1 | U8 | ID |  |  | ID (Type (5) + Reported Value Length (3)) |
| 2 | U16 | Val1 |  |  | Reported value of IDn |

BD32 00 7A 89 0F 60 06 00 0A 32 10 12 04 00 03

The timestamp in the protocol is 7A 89 0F 60, type 00 mixed type single data reported content full length 06 00.

The ID is 0A, where 0A corresponds to 00001010 00001 010 (the first 5 bits are 01, and the following represent a reported length of 2 bytes). The last 2 digits behind the step count represent the number of steps.

The ID codes are as follows (the protocol defines the high 5 bits of the ID):

01 Step count

02 Heart rate

03 Body temperature

04 Wrist temperature

05 Blood sugar

06 Diastolic pressure

07 Systolic pressure

08 Blood oxygen

10 Number of sit-ups

11 Running pace and distance

12 Skipping speed and count

Eg1:

BD3200B3C4F2630F000A1E00114B314A39711A4A0122BC0012

B3C4F263: 63f2c4b3(Hexadecimal timestamp)

0F00 :Total length excluding the last byte (checksum)

0A1E00：0x0A=00001 010. The first five bits are 00001, representing the data ID for step counting (0x01). The last three bits are 010, indicating that the length of the step count data is 2 bytes. 0x001E represents step count data, totaling 30 steps.

114B：0x11=00010001. The first five bits are 00010, representing the data ID for heart rate (0x02). The last three bits are 001, indicating that the length of the heart rate data is 1 byte. 0x4B represents the heart rate data, with a heart rate of 75.

314A：0x31=00110001. The first five bits are 00110, representing the data ID for diastolic blood pressure (0x06). The last three bits are 001, indicating that the length of the diastolic blood pressure data is 1 byte. 0x4A represents the diastolic blood pressure data, which is 74.

3971：0x39=00111 001. The first five bits are 00111, representing the data ID for systolic blood pressure (0x07). The last three bits are 001, indicating that the length of the systolic blood pressure data is 1 byte. 0x71 represents the systolic blood pressure data, which is 113.

1A4A01：0x1A=00011 010. The first five bits are 00011, representing the data ID for temperature (0x03). The last three bits are 010, indicating that the length of the temperature data is 2 bytes. 0x014A represents the temperature data, which is 330.

22BC00 ：0x22=00100 010. The first five bits are 00100, representing the data ID for wrist temperature (0x04). The last three bits are 010, indicating that the length of the wrist temperature data is 2 bytes. 0x00BC represents the wrist temperature data, which is 188.

### 3.6.2Upload of device sleep analysis data (0xC5)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Message | MSG\_HTB\_UPL | | | |
| Decription | AnalyseSlepp Data；Report time: 21:00-08:00 | | | |
| Firmware | -/- | | | |
| Payload Length | 14 bytes | | | |
| Message structure | Hearer | Message ID | Payload |  |
| token | 0xC5 | See below | -/- |

payload contents

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Byte offset | Format | Name | Scale | Unit | Decription |
| 4 | Int32 | DateTime |  | -/- | Upload UTC start time |
| 4 | Int32 | DateTime |  |  | Upload UTC end time |
| 2 | Int16 | Sleepminute |  |  | Upload minutes of sleep time |
| 4 | Int32 | Type |  |  | Upload type, 1 for deep sleep, 2 for light sleep, 3 for awake duration |
|  |  |  |  |  |  |

BDC5AC338860693B8860210001000000D1

It indicates 1 for deep sleep, start time 2021/4/27 23:54:20, end time 2021/4/28 0:27:21, duration 33 minutes.

# **4.Setting**

## 4.1 Downward instructions

### Set periodic upload（0x17）

The platform sets 1-4 time slots to send to the terminal. After the terminal receives the data, it uploads the data within the specified time slot.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Message | MSG\_NB\_SLT | | | |
| Decription | downlink | | | |
| Firmware | -/- | | | |
| Payload Length | 28 bytes | | | |
| Message structure | Hearer | Message ID | Payload | Checksum |
| token | 0x17 | See below | CK\_sum |

payload contents

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Byte offset** | **Format** | **Name** | **Scale** | **Unit** | **Decription** |  |
| 1 | u8 | enable | -/- | -/- | Enabled? | Time Slot 1 |
| 1 | U16 | Interval |  |  | Time interval (minutes) |
| 1 | u8 | time\_start\_h |  |  | -h |
| 1 | u8 | time\_start\_m |  |  | -m |
| 1 | u8 | time\_end\_h |  |  | -h |
| 1 | u8 | time\_end\_m |  |  | -m |
| 1 | u8 | enable | -/- | -/- | Enabled? | Time Slot 2 |
| 1 | U16 | Interval |  |  | Time interval (minutes) |
| 1 | u8 | time\_start\_h |  |  | -h |
| 1 | u8 | time\_start\_m |  |  | -m |
| 1 | u8 | time\_end\_h |  |  | -h |
| 1 | u8 | time\_end\_m |  |  | -m |
| 1 | u8 | enable | -/- | -/- | Enabled? | Time Slot 3 |
| 1 | U16 | Interval |  |  | Time interval (minutes) |
| 1 | u8 | time\_start\_h |  |  | -h |
| 1 | u8 | time\_start\_m |  |  | -m |
| 1 | u8 | time\_end\_h |  |  | -h |
| 1 | u8 | time\_end\_m |  |  | -n |
| 1 | u8 | enable | -/- | -/- | Enabled? | Time Slot 4 |
| 1 | U16 | Interval |  |  | Time interval (minutes) |
| 1 | u8 | time\_start\_h |  |  | -h |
| 1 | u8 | time\_start\_m |  |  | -m |
| 1 | u8 | time\_end\_h |  |  | -h |
| 1 | u8 | time\_end\_m |  |  | -m |

Example：

bd 17 01 03 00 00 00 13 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 dd

From 0:00 to 19:00, location is updated every 3 minutes.

BD17010A000000173B00000000000000000000000000000000000000000097

From 0:00 to 23:59, location is updated every 10 minutes.

### 4.1.2Message Send（MSGID=0X28）

|  |  |  |  |
| --- | --- | --- | --- |
| Byte size | Format | Name | Decription |
| 1 | U8 | type | (Message type, if it is downlink information, the fixed value is 03) |
| 4 | Uint32 | seqID | （Information id, uniqueness） |
| 1 | U8 | CONTENT LEN | Length (Contect Length) |
| N | N | CONTENT | (content, Chinese is GB2312 code, English is ascii code) |

Example： bd 28 03 03 00 00 00 0b 68 65 6c 6c 6f 2c 77 6f 72 6c 64dd

Type: 03

seqId:03 00 00 00

CONTENT LEN: 0b (10)

CONTENT :68 65 6c 6c 6f 2c 77 6f 72 6c 64 ( hello,world)

### 4.1.3Setting（0XCE）---See detailed instructions-Important Downside

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Message | MSG\_HRD\_DATA | | | |
| Decription | setting，Server => Terminal downlink | | | |
| Firmware | -/- | | | |
| Payload Length | 4+n bytes | | | |
| Message structure | Header | Message ID | Payload | Checksum |
| token | 0xCE | See below | CK\_sum |

payload contents

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Byte offset | Format | Name | Scale | Unit | Decription |
| 0 | u8 | Type | -/- | -/- | Type see below |
| 1 | u8 | Valid | -/- | -/- | Temporary valid, always valid |
| 2 | U16 | Len | -/- | -/- | Length of the following instruction |
| 4 | n |  | -/- | -/- | Main text |
|  |  |  |  |  |  |

Type 01 Positioning 02 health 03 Alarm (not reserved yet) 04 Local storage (not reserved yet)

05Bluetooth radio switch 06Position and health data reporting switch 07 Fall alarm switch 08 Stay alarm switch, expandable at the back

Valid 00 Always valid 01 Effective this time 02 Off

Length Length of the following instruction

Main text:

Type

01 Positioning function The main text can only be the basic class 01 - gps 02 - wifi 03 - Bluetooth beacon 04 - LBS base station 05 - 125k and later expanded basic class The main text can be a combination of 01 or 010204;

Such as 010203 means using gps wifi Bluetooth beacon;The lora device does not support wifi

Example: wifi positioning priority ( Bluetooth> gps): BDCE0100030003010033

gps positioning priority (gps> Bluetooth): BDCE0100030001030033

**4.2 Server time synchronization**

### 4.2.1 Request time calibration data command

|  |  |  |  |
| --- | --- | --- | --- |
| Byte offset | Format | Name | Decription |
| 1 | U8 | HEADER | 0xFF |
| 1 | U8 | SeqId | 0x00 |
| 1 | U8 | End | 0xFF |

Example：FF00FF

### 4.2.2 Time calibration request data reply format

|  |  |  |  |
| --- | --- | --- | --- |
| Byte offset | Format | Name | Decription |
| 1 | U8 | HEADER | 0xFF |
| 1 | U8 | SeqId | 0x10 |
| 2 | U16 | years | years |
| 1 | U8 | month | month |
| 1 | U8 | Day | Day |
| 1 | U8 | time | time |
| 1 | U8 | Minute | Minute |
| 1 | U8 | Seconds | Seconds |
| 1 | U8 | End | 0xFF |

Example：FF1007E409020B1B28FF

FF : Header

10 : Seqid

07E4: Year（2020）

09 : Month，（09）

02 : Day，（02）

0B : Hour，（11）

1B : Minitus，（27）

28 : Second，（40）

FF : End

Note：After the device is turned on, it will automatically send a request time synchronization command. Need to reply to the synchronization time data frame after receiving the synchronization instruction to synchronize the device time