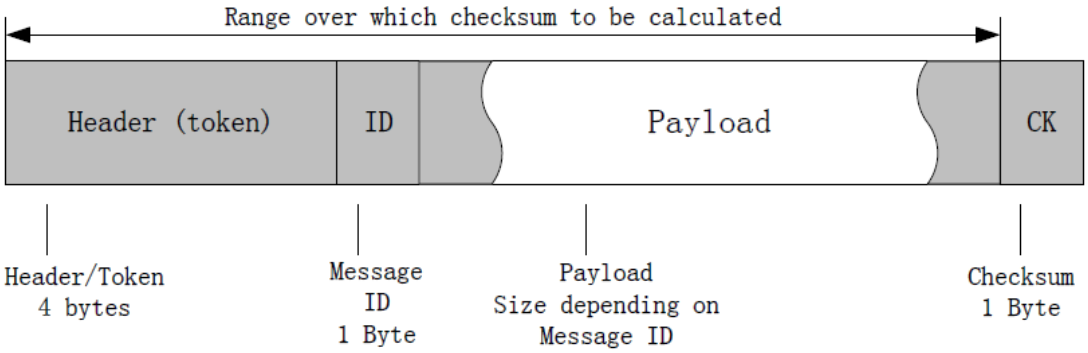
1.Protocol packet structure

A common protocol data packet structure is shown as below:



Description：
hearder is fix value of BDBDBDBD
messageID ： protocol ID
payload: detailed message content, all are Little Endian mode

CK:Checksum include payload. The algorithm is as follows，and Buffer[N] indicate 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
```

※Description：This data message is Little Endian mode

2.Datagram

2.1 Battery voltage upload（MSGID=0XF6）

payload contents

Byte offset	Format	Name	Scale	Unit	Description
2	u16	Bat_volt		-/-	Battery voltage
4	U32	Step_num			Step numbers
1	U8	Signal_strength			Signal strength

For example： bdbdbdbdf605009e000000046e

F6 --- MSGID

0500 --- Little Endian，0x0050 signal strength is 5 bars， battery voltage upload 0 - 5 correspond to 0% - 100% (0% 20% 40% 60% 80% 100%)；

9e000000 --- Little Endian，0x0000009e, step number are 158；

04 --- Signal strength is 4 bars；

6e --- checksum

2.2 GPS Location upload（MSGID=0X03）

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			Time stamp

For example：bdbdbdbd0360e0b9f7707a5c408697cd09c79536404e4541cddcb5603b

03 ---MSGID

60e0b9f7707a5c40 --- Little Endian representation ，0x405c7a70f7b9e060，data is double type，need to be converted to floating point，longitude value：113.9131450000000 （dd.dddd format）；

8697cd09c7953640 --- Little Endian representation，0x403695c709cd9786，data is double type，need to be converted to floating point，latitude value：22.5850683333333（dd.dddd format）；

4E --- ASCII encoding representation，South and North latitudes, the range is/*N or S*/，expressed：N（North latitude）；

45 --- ASCII encoding representation，East and west longitude，the range is/*E or W*/，expressed：E（East longitude）；

41 --- ASCII encoding representation，location status，the range is/*A or V*/，expressed：A（effective）；

cddcb560 --- Little Endian representation，0x60b5dccd，converted to：1622531277，after Unix time stamp conversion, the time value is：2021-06-01 15:07:57；

3b --- check；

2.3 health message(0xD8)

Payload format

Message	MSG_HEALTH_UPL			
Description	Upload health data			
Firmware	-/-			
Payload Length	6 bytes			
Message structure	Hearer	Message ID	Payload	Checksum
	token	0xD8	见下方定义	CK_sum

payload contents

Byte offset	Format	Name	Scale	Unit	Description

2	U16	bp_high	-	-	High blood pressure：2byte
2	U16	bp_low	-	-	Low blood pressure：2byte
2	U16	Bp_heart	-	-	Heart rate：2byte
2	U16	temp			Temp:2byte(real value is 10 times)
4	U32	Timestamp			Time stamp

For example：bdbdbdbdd874004c004600610146d1b5609f

D8 --- MSGID；

7400 --- Little Endian representation，0x0074，systolic blood pressure:116；

4C00 --- Little Endian representation，0x004C，Diastolic blood pressure:76；

4600 --- Little Endian representation，0x0046，heart rate 70；

6101 --- Little Endian representation，0x0161，temperature :353 = 35.3℃；

46d1b560 --- Little Endian representation，0x60b5d146，converted to：1622528326 ，after Unix time stamp conversion, time is 2021-06-01 14:18:46；

9F --- check

2.4 Set periodic positioning（MSGID=0X17）

Byte offset	Format	Name	Scale	Unit	Decription	
1	u8	enable	-/-	-/-	enable	Time interval 1
2	U16	Interval			interval（min）	
1	u8	time_start_h			-hour	
1	u8	time_start_m			-min	
1	u8	time_end_h			-hour	
1	u8	time_end_m			-min	
1	u8	enable	-/-	-/-	enable	Time interval 2
2	U16	Interval			interval（min）	
1	u8	time_start_h			-hour	
1	u8	time_start_m			-min	
1	u8	time_end_h			-hour	
1	u8	time_end_m			-min	
1	u8	enable	-/-	-/-	enable	Time interval 3
1	U16	Interval			interval（min）	
1	u8	time_start_h			-hour	
1	u8	time_start_m			-min	
1	u8	time_end_h			-hour	
1	u8	time_end_m			-min	
1	u8	enable	-/-	-/-	enable	Time interval 4
1	U16	Interval			interval（min）	
1	u8	time_start_h			-hour	
1	u8	time_start_m			-min	
1	u8	time_end_h			-hour	
1	u8	time_end_m			-min	

For example：bdbdbdbd1701030000001300000000000000000000000000000000000000000000dd

0 o'clock to 19 o'clock, positioning every 3 minutes

17 --- MSGID；

01030000001300 --- set Time interval 1 cycle plan

01 --- enable，01 set to enable

0300 --- Interval，Little Endian representation，0x0030，indicate that time interval is 3 minutes.

00 --- time_start_h，0x00，cycle time start，0 o'clock. unit：hour

00 --- time_start_m，0x00，cycle time start，0 minute. unit：minute

13 --- time_start_h，0x13，cycle time end，19o'clock.　unit：hour.

00 --- time_start_m，0x00，cycle time end，0 minute. unit：minute.

000000000000000000000000000000000000000000 --- set cycle time interval 2,3,4 ，same as timer interval 1；

dd --- check

2.5 message down link（MSGID=0X20）

Byte offset	Format	Name	Description
1	U32	SerialNo	Serial No.
1	U8	totalPacket	Total packets
1	U8	currentPacketNo	Currwent Packet No. （begin with 0）
1	U8	type	Message type ： 0.normal ; 1.urgent
2	U16	TitleLen	Title length
N	u8	TITLE	Title content（UCS2 coding）
2	U16	CONTENT LEN	Content length
N	u8	CONTENT	Title content（UCS2 coding）

For example：

BDBDBDBD2046d1b5610100010a00480065006c006c006f00180047006f006f00640020006d006f0072006e006900

6e006700ab

Title is ：about （480065006c006c006f00），length 0a00(0x000a)

Content is：Good morning（47006f006f00640020006d006f0072006e0069006e006700），length is 1800(0x0018)

20 --- MSGID

46d1b560 --- seqid, message down link ID，unique. suggest to use the time suffix value issued by the current message, which is easy to identify and distinguish

01 --- totalPacket，indicate current message donwnlink total packets numbers, 01 is one packet；

00 --- currentPacketNo，indicate current packet No., start with 0, which indicate the first packet, 01indicate the second packet, and so on；

01 --- message type，00 is common message，01 is urgent message. Under the urgent status, the watch will vibrate to notify；

0a00 --- TitleLen，title length, Little Endian representation，0x000a is 10 bytes；

480065006c006c006f00 --- TITLE，title content，Little Endian representation，is 0x00480065006c006c006f，convert with UCS2 font encoding，one character is 10 bytes, and the content is: "Hello";

1800 --- CONTENT LEN，content length，Little Endian representation，is 0x0018，has 24bytes；

47006f006f00640020006d006f0072006e0069006e006700 --- CONTENT, Little Endian representation 0x0047006f00640020006d006f0072006e0069006e0067，convert with UCS2 font encoding，One character has 24 bytes，the content after conversion is“Good morning”

ab --- check

Note: The length of each down link data packet should not exceed 40 bytes. Each package header needs to be filled with the same content when subcontracting. The total length of each short message should not exceed 120 characters

2.6 message status upload（MSGID=0X21）

Byte offset	Format	Name	Decription
4	U32	seqId	Message id，same with down link's
1	U8	Status	status： 0. received the message confirmation 1.message has been read

For example：BDBDBDBD21010000000186 （ message has been read)

2.7 SOS upload（MSGID=0XB5）

Byte offset	Format	Name	Decription
1	U8	Status	status： 1:SOS

For example：bdbdbdbdb50155

2.8 upload warn message（0x16）

Payload format

Message	MSG_WARN			
Decription	Upload warn message, including temperature and heart rate alert.			
Firmware	-/-			
Payload Length	11 bytes			
Message structure	Hearer	Message ID	Payload	
	token	0x16	Below definition	-/-

payload contents

Byte offset	Format	Name	Scale	Unit	Decription
1	U8	Type	-/-	-/-	Alert type（ 0：heart rate alert 1：temperature alert）

2	U16	Value	-/-	-/-	temperature(real value is 10 times or heart rate value
4	U32	Timestamp	4	-/-	Time stamp

For example：bdbdbdbd16017a01f6fab56074

16 --- MSGID

01 --- Type，warn type，including:heart rate alert 0x00; temperature alert 0x01;

7a01 --- Value，heart rate value or temperature value, Little Endian representation, 0x017a，indicate temperature value 378 = 37.8℃；

f6fab560 --- Timestamp，time stamp ，Little Endian representation，0x60b5faf6，value after conversion ：1622538998,after Unix time stamp conversion, time is 2021-06-01 17:16:38；

74 --- check0

2.9 positioning（MSGID=0X23）

payload contents

Byte offset	Format	Name	Decription
1	U8	MSGID	Watch get GPS location at once.

For example：bdbdbdbd2355

2.10 no location package（MSGID=0xC7）

payload contents

Byte offset	Format	Name	Decription
1	U16	Status	no location, value is 0x0020

For example：BDBDBDBDC72000AB

3.Server time synchronization message

3.1 Request time calibration data command （The device initiates）

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

For example：FF00FF

3.2 time calibration request data reply format（server send down link）

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

For example：FF1007E409020B1B28FF

FF --- Header
10 --- Seqid

07E4 --- year，value ：2020

09 --- month，value ：09

02 --- day ，value：02

0B --- hour, value ：11

1B --- minute，value：27

28 --- second，value：40

FF --- End

※Note: After the watch 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 watch time.