U16PRO airbag micro electric pump blood pressure watch
Bluetooth wireless communication protocol V20250122
[Note Version of Serial Port Assistant]
Version: 1.0.02

edition	Modification point	Modified by
1.0.01-241218	establish	Li Jiaming
1.0.02-250113	Modify the protocol for reading blood pressure measurement data	Li Jiaming

catalogue

1. Protocol Description

This agreement is only valid for interpreting the communication protocol of U16PRO Bluetooth airbag micro electric pump blood pressure watch

2 BLE Profile Description

Service UU ID: 6E40FFF0-B5A3-F393-E0A9-E50E24DCCA9E can be used for service retrieval feature UU ID:
Write UU ID: 6E400002-B5A3-F393-E0A9-E50E24DCCA9E Send data to blood pressure watch on mobile phone
Reading UU ID: 6E400003-B5A3-F393-E0A9-E50E24DCCA9E Sending data from blood pressure watch to mobile phone BLE communication only involves interaction between two characteristic UU IDs. The specific protocol format is described in Section 3.

Reference Tools&Instructions:
When using a Bluetooth adapter to connect a Bluetooth blood pressure watch for debugging,
first write UUIDS, N, W!!!!!
AT+SCAN=1
AT+AUTO_MAC=CABF448F00B5
AT+AUTO_CFG=1
AT+DEV?
AT+UUIDS=6E40FFF0B5A3F393E0A9E50E24DCCA9E
AT+UUIDN=6E400003B5A3F393E0A9E50E24DCCA9E
AT+UUIDW=6E400002B5A3F393E0A9E50E24DCCA9E
AT+UUIDS?
AT+UUIDN?
AT+UUIDW?

3 BLE Protocol

A) The upper computer sends a 16 byte data packet to the lower computer, and then the lower computer sends back a 16 byte data packet. Except for a few commands, this communication method is used.

B) The format of the 16 byte data packet sent by the upper computer is as follows:

B1	B2 --------------- B15	B16
command	Payload bytes, 14 bytes	CRC

B1: Command, value range 0x00->0x7F; Bit7 is always 0
B16: CRC. The calculation of CRC is simply adding up all the first 15 bytes and taking the lowest 8 bits.
For example, if the data packet is: A1 A2 A3 A4... A13 A14 A15 CRC, then
CRC = (A1 + A2 + A3 + A4+……+ A13 + A14 + A15) & 0xFF

C) After receiving the data packet, the lower computer returns a 16 byte response packet in the following format:

B1	B2 --------------- B15	B16
command	Payload bytes, 14 bytes	CRC

B1: Reply to the received command, Value range 0x00->0xFF
If the received packet command is 0x14 and the execution is successful, then B1=0x14, return:
0x14+0x00+...+0x000+CRC
If the received packet command is 0x14, there is a verification error or execution failure, then set B1 Bit7 to 1, that is, B1=0x94, Return: 0x94+0x00+...+0x000+CRC

If the received packet command is 0x14 and the 0x14 command is undefined, set B1 Bit7 to 1, B2 = 0XEE, Return: 0x94+0xEE+0x00+...+0x00+CRC

B16: CRC. The calculation of CRC is simply adding up all the first 15 bytes and taking the lowest 8 bits. For example, if the data packet is: A1 A2 A3 A4... A13 A14 A15 CRC, then

CRC = (A1 + A2 + A3 + A4+……+ A13 + A14 + A15) & 0xFF

CRC verification reference tool: CheckSum8 website CheckSum8 Modulus 256
https://www.scadacore.com/tools/programming-calculators/online-checksum-calculator/
73 01 00 00 00 00 00 00 00 00 00 00 00 00 00 74
73 01 00 00 00 00 00 00 00 00 00 00 00 00 00
74
Choose the second option
CheckSum8 Modulo 256
Sum of Bytes % 256
Normal
74

4 BLE Data Format

4.1 Set blood pressure watch time/language

Command format: 0x01 AA BB CC DD EE FF GG 00 00 00 00 00 00 00 CRC
Function: Write the current time of the phone to the blood pressure watch, and set the language of the blood pressure watch

Description: AA: Year, BB: Month, CC: Day, DD: Hour, EE: Minute, FF: Second; The format is BCD format, In 2024, AA = 0x24

GG: System language, 0x00=Simplified Chinese, 0x01=English Command reply:
Correct verification and OK execution return: 0x01 00 00 00 00 00 00 00 00 00 00 00 CRC
verification error or Fail execution return: 0x81 00 00 00 00 00 00 00 00 00 00 00 CRC

give an example:
1) Set the time as 14:02:55 on January 21, 2025&in Chinese
[2025-01-21 22:02:24.321]# SEND HEX>
01 25 01 21 14 02 55 00 00 00 00 00 00 00 00 48
[2025-01-21 22:02:24.469]# RECV HEX>
01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 01
2) Set the time as 14:02:55 on January 21, 2025&in English
[2025-01-21 22:02:24.321]# SEND HEX>
01 25 01 21 14 02 55 01 00 00 00 00 00 00 00 48
[2025-01-21 22:02:24.469]# RECV HEX>
01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 01

4.2 Reading the battery level of the blood pressure watch

Command format: 0x03 00 00 00 00 00 00 00 00 00 00 00 00 00 CRC
Function: Read the percentage of battery on the blood pressure watch
Command reply:
Verification is correct and OK is executed. Return: 0x03 AA 00 00 00 00 00 00 00 00 00 00 CRC
Reply description: AA: Electricity percentage, ranging from 0x00 to 0x64 (i.e. 100),
0x64 is the highest battery level, 0x00 is the minimum battery level
Verification error or fail execution returns: 0x83 00 00 00 00 00 00 00 00 00 CRC
give an example:
[2025-01-21 22:07:55.663]# SEND HEX>
03 00 00 00 00 00 00 00 00 00 00 00 00 00 00 03
[2025-01-21 22:07:55.815]# RECV HEX>
03 1E 00 00 00 00 00 00 00 00 00 00 00 00 00 21

Reference tool: Convert hexadecimal to decimal
https://www.sojson.com/hexconvert/16to10.html

4.3 Reading exercise/sleep information for a certain day

Command format: 0x07 AA 00 00 00 00 00 00 00 00 00 00 00 00 00 CRC

Function: Read information about a certain day: steps, calories, standing, distance, sleep, exercise duration

Description: AA=0, indicating the request for information on the current day; AA = 10, Request information from 10 days ago

Command reply:

Verify correct and execute OK Return: 0x07 AA BB CC DD EE FF GG HH II JJ KK LL MM NN CRC Reply Description:

There are two replies in total, and the first 5 bytes of the data in both replies have the same meaning:

AA: represents the index value of the command, which will reply with two entries.

The first entry has an index value of 0, and the second entry has an index value of 1.

BB: represents the data from the previous few days

CC DD EE: indicates year, month, day. First reply:

FF GG HH: represents the total number of steps, with high bytes coming first

II JJ: Total calories, with high byte count first. (Unit: Card)

KK: is the total standing time. (Unit: Hour)

LL MM NN: It is a 3-byte walking distance, with high bytes coming first. (Unit: meters)

00 indicates no data. Second reply:

FF GG is the total sleep duration of 2 bytes, with higher bytes coming first. HH II is a 2-byte deep sleep time, with higher bytes coming first. (Unit: minutes) JJ KK is a 2-byte light sleep time, with high bytes coming first. (Unit: minutes) LL MM is the exercise time of 2 bytes, with high bytes coming first. (Unit: minutes)

NN reserved

00 indicates no data

Verification error or fail execution returns: 0x87 00 00 00 00 00 00 00 00 00 CRC

give an example:

[2025-01-21 22:10:39.618]# SEND HEX>

07 00 00 00 00 00 00 00 00 00 00 00 00 00 00 07

[2025-01-21 22:10:39.789]# RECV HEX>

07 00 00 25 01 21 00 00 59 0C 2B 00 00 00 00 DE

Year Month Day Step Count Total Calories Standing H Walking Distance

59=89hex ok

C2B=3115/10=3K calories!

07 01 00 25 01 21 01 D5 00 6D 01 56 00 03 00 EC

Year Month Day Sleep Total Deep Sleep Light Sleep Exercise Time Retention

7.49 1.49 5.42 3 calories

1D5=469=420+49

6D=109=60+49

156=342=300+42

4.4 Setting Time Format/Metric/Imperial/User Parameters

Command format: 0x0A AA BB CC DD EE FF GG HH II 00 00 00 00 CRC

Function: Set 12/24-hour display system, metric system, and user parameters

Description: AA: Read/Write Control Bit, 0x01=Read Blood Pressure Watch Parameters on Phone, 0x02=Set Blood Pressure Watch Parameters on Phone (AA is not 0x01)

Everyone thinks it's a writing operation

BB: 12/24-hour display system, 0x00=24-hour system, 0x01=12 hour system (BB not set to 0 will be considered as 12 hour system)

CC: metric system, 0x00=metric system, 0x01=imperial system (not yet used) DD: gender, 0x00=male, 0x01=female

EE: Age (years)

FF: Height (cm)

GG: Weight (kg)

HH: Strap size

II: Heart rate alarm value

(bpm) command reply:

Correct verification and OK execution return: 0x0A AA BB CC DD EE FF GG HH II 00 00 00 00 CRC verification error or Fail execution return: 0x8A 00 00 00 00 00 00 00 00 00 00 00 00 CRC

give an example:

[2025-01-21 22:13:08.684]# SEND HEX>
0A 01 00 00 00 00 00 00 00 00 00 00 00 00 00 0A
[2025-01-21 22:13:08.836]# RECV HEX>
0A 01 00 00 00 1E AA 41 0C 78 00 00 00 00 00 98
0A 01 00 00 00 1E AA 41 0C 00 00 00 00 00 00 20
Read 24 year old male high weight belt
        30 170 65 12

4.5 Reading blood pressure measurement data

Command format: 0x14 AA AA AA BB CC 00 00 00 00 00 00 00 00 CRC

Function: Read the historical blood pressure data measured by the user, and retrieve up to 50 records at a time

Description: AA: Timestamp, small format

BB: Data backtracking direction, BB=0 means backtracking from the AAAAAAAA timestamp to the history, returning the latest CC pieces of data;

BB=1 means to backtrack from the latest data to the historical level, stopping at the AAAAAAAA timestamp, and returning the latest CC pieces of data

CC: Number of requests

If AAAAAAAA=0x0000000, BB=0 or 1 both indicate a request for the latest CC

blood pressure data command reply:

Verify correctly and execute OK, return:

Data available: 0x14 AA AA AA AA BB CC DD 00 00 00 00 00 00

CRC AA: timestamp, BB: low voltage, CC: high voltage, DD: pulse

No data: 0x14 AA AA AA 00 00 00 00 00 00 00 CRC AA: When the data does not exist, the timestamp is 0xFFFFFFFF

Error checking or Fail execution returns: 0x94 00 00 00 00 00 00 00 00 00 00 00 CRC

reading method:

When reading blood pressure data for the first time, use timestamp=0, backtracking direction=d, and number of records=N to request N blood pressure data. If 3 blood pressure records are requested for the first time and all 3 records exist, three consecutive successful blood pressure data replies will be returned. If 3 records are requested but only 1 record exists on the blood pressure watch end, the blood pressure watch will first return the existing record and then return a failure reply (timestamp is 0xFFFFFFFF) and end the transmission. Subsequent requests will continue to request data using the timestamp of the obtained record

give an example:

[2025-01-21 22:13:58.812]# SEND HEX>
14 00 00 00 00 01 32 00 00 00 00 00 00 00 00 0A

[2025-01-21 22:13:58.998]# RECV HEX>
14 F3 B5 8E 67 61 86 73 00 00 00 00 00 00 00 0B
        134-97-115
14 87 65 8E 67 5B 8A 67 00 00 00 00 00 00 00 41
        138-91-103
14 41 B2 20 67 52 77 6F 00 00 00 00 00 00 00 C6
        118-92-111
14 FF FF FF FF 00 00 00 00 00 00 00 00 00 00 10
===
14 87 65 8E 67 5B 8A 67 00 00 00 00 00 00 00 41
        138-91-103
  87 65 8E 67
87 65 8E 67
Small end mode reversed
678E6587
https://tool.oschina.net/hexconvert/
1737385351
http://www.daokeyou.top/
2022-01-20 23:02:31-->This result is -8 hours equals the current time!!!!
Current actual time
2025-01-20 15:02:31
===

4.6 Reading Automatic Heart Rate Measurement Data

Command format: 0x15 AA AA AA 00 00 00 00 00 00 00 00 CRC

Function: Read heart rate data automatically measured by the blood pressure watch

Description: AA: Timestamp, the mobile phone converts the year, month, day, and time into a timestamp and sends it to the blood pressure watch. The blood pressure watch reads the entire day's data corresponding to the timestamp;

The data is stored in small format and there is no data filling. Command reply:

Verify correctly and execute OK, return:

There is data: return index package+data package (multiple)

No data: Return 0x15 FF 00 00 00 00 00 00 00 00 00 00 00 00 00 00 CRC

with data reply example:

Index package: 0x15 AA BB CC 00 00 00 00 00 00 00 00 00 00 CRC

For example: 0x15 00 18 05 00 00 00 00 00 00 00 00 00 00 00 CRC, representing

AA=0x00: Packet sequence

BB=0x18: Total number of packages, 24

(including index packages) CC=0x05:

Measurement interval, 5 minutes

Data packet: 0x15 AA BB CC DD EE FF GG HH II JJ KK LL MM NN

CRC such as: 0x15 01 FD 40 65 67 5A 50... 48 CRC

AA=0x01: Packet sequence

BB CC DD EE=FD 40 65 67: Timestamp, small end mode, i.e. 0x676540FD=1734689021

FF=0x5A: 00:00 Heart rate

value=90   GG=0x50:0:05

Heart rate value=80

NN=0x48:0:40 Heart rate

value=72 0x15 02 4A... 60 CRC

AA=0x02: Packet sequence

BB=0x4A: 0:45 Heart rate

value=74

NN=0x60:1:45 Heart rate

value=96 0x15 03

…

0x15 17 … 55 00 00 00 00 00 00 00 00 CRC

AA=0x17: Packet
sequence
GG=0x55:23:55 Heart rate value=85

Verification error or fail execution returns: 0x95 00 00 00 00 00 00 00 00 00 CRC

give an example:
[2025-01-21 22:16:29.272]# SEND HEX>
15 A6 07 8F 67 00 00 00 00 00 00 00 00 00 00 B8
[2025-01-21 22:16:29.778]# RECV HEX>
15 00 18 05 00 00 00 00 00 00 00 00 00 00 00 32 15 01 A6 07 8F 67 00 00 00 00 00 00 00 00 B9 15 02 00 00 00 00 00 00 00 00 00 00 00 00 00 17 15 03 00 00 00 00 00 00 00 00 00 00 00 00 00 18 15 04 00 00 00 00 00 00 00 00 00 00 00 00 00 19 15 05 00 00 00 00 00 00 00 00 00 00 00 00 00 1A 15 06 00 00 00 00 00 00 00 00 00 00 00 00 00 1B 15 07 00 00 00 00 00 00 00 00 00 00 00 00 00 1C 15 08 00 00 00 00 00 00 00 00 00 00 00 00 00 1D 15 09 00 00 00 00 00 00 00 00 00 00 00 00 00 1E 15 0A 00 00 00 00 00 00 00 00 00 00 00 00 00 1F 15 0B 00 00 00 00 00 00 00 00 00 00 00 00 00 20 15 0C 00 00 00 00 00 00 00 00 00 00 00 00 00 21 15 0D 00 00 00 00 00 00 00 00 00 00 00 00 00 22 15 0E 00 00 00 00 56 4F 5C 00 00 00 00 00 00 24 15 0F 00 00 00 00 00 00 00 00 00 00 00 00 00 24 15 10 00 00 00 00 00 00 00 00 00 00 00 00 00 25 15 11 00 00 00 00 00 00 00 00 00 00 00 00 00 26 15 12 00 00 00 00 00 00 00 00 00 00 00 00 00 27 15 13 00 00 00 00 00 00 00 00 00 00 00 00 00 28 15 14 00 00 00 00 00 00 00 00 00 00 00 00 00 29 15 15 00 00 00 00 00 00 00 00 00 00 00 00 00 2A 15 16 00 00 00 00 00 00 00 00 00 00 00 00 00 2B 15 17 00 00 00 00 00 00 00 00 00 00 00 00 00 2C

==
15 00 18   05   00 00 00 00 00 00 00 00 00 00 32
Package sequence: Total package quantity: 24 pieces, 5 minutes
15 01 A6 07 8F 67 52 52 52 50 52 4B 52 53 51 92
Nine heart rate values with a timestamp, each lasting 5 minutes.
9 * 17=153 pieces for 5 minutes=

A6 07 8F 67
678F07A6
https://tool.oschina.net/hexconvert/
1737426854
http://www.daokeyou.top
2025-01-21 10:34:14

9*1=9
13*22=286
Total 295 * 5=1475
24 * 60=1440 minutes

15 02 5A 52 52 52 53 56 54 53 5A 54 51 57 54 61
15 03 56 58 53 53 57 55 54 56 56 54 56 56 57 6F
15 04 59 56 58 57 5D 59 64 5B 5C 5B 5C 5B 59 B3
15 05 59 5A 5F 56 5F 5D 5D 5C 5C 62 5F 5B 5C CB
15 06 5D 5C 5D 5C 61 5C 5D 5E 5B 5C 64 56 5F D5
15 07 5D 61 61 60 5E 60 5F 5D 5C 5C 61 63 5A EB
15 08 00 00 00 00 00 59 67 65 63 46 6A 4E 49 EC
15 09 5F 63 68 63 55 60 54 53 59 48 4A 47 5A 93
15 0A 57 6B 58 5A 56 4B 59 6C 58 64 69 71 5E ED
15 0B 60 63 56 00 00 00 00 00 00 00 00 00 00 39
15 0C 00 00 00 00 00 00 00 00 00 00 00 00 00 21
15 0D 00 00 00 00 00 00 00 00 00 00 00 00 00 22
15 0E 00 00 00 00 00 00 00 00 00 00 00 00 00 23
15 0F 00 00 00 00 00 00 00 00 00 00 00 00 00 24
15 10 00 00 00 00 00 00 00 00 00 00 00 00 00 25
15 11 00 00 00 00 00 00 00 00 00 00 00 00 00 26
15 12 00 00 00 00 00 00 00 00 00 00 00 00 00 27
15 13 00 00 00 00 00 00 00 00 00 00 00 00 00 28
15 14 00 00 00 00 00 00 00 00 00 00 00 00 00 29
15 15 00 00 00 00 00 00 00 00 00 00 00 00 00 2A
15 16 00 00 00 00 00 00 00 00 00 00 00 00 00 2B
15 17 00 00 00 00 00 00 00 00 00 00 00 00 00 2C
23:55 Last one.

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4.7 Automatic heart rate measurement function with switch

Command format: 0x16 AA BB 00 00 00 00 00 00 00 00 00 00 00 CRC
Function: Read the status of the automatic heart rate function switch, turn on or
off the automatic heart rate measurement function. Description: AA: When
AA=0x01, it means read the status of the automatic heart rate function. At this
time, BB is 0x00,

When AA=0x02, it indicates that the automatic heart rate function is set to be turned on or off, while
BB indicates it is turned on or off

BB: 0x01=enable,

0x02=disable Command reply:

Correct verification and OK execution return: 0x16 AA BB 00 00 00 00 00 00 00 00 00 CRC
verification error or Fail execution return: 0x96 AA BB 00 00 00 00 00 00 00 00 00 CRC

give an example:
1) Search
[2025-01-21 22:18:03.473]# SEND HEX>
16 01 00 00 00 00 00 00 00 00 00 00 00 00 00 0A
[2025-01-21 22:18:03.637]# RECV HEX>
16 01 01 00 00 00 00 00 00 00 00 00 00 00 00 19
2 open
16 02 01 00 00 00 00 00 00 00 00 00 00 00 00 0A
3 shut
16 02 02 00 00 00 00 00 00 00 00 00 00 00 00 0A

4.8 Setting the automatic off time of the blood pressure watch

Command format: 0x1F AA BB 00 00 00 00 00 00 00 00 00 00 00 CRC
Function: Read or set the screen off time
Description: AA: When AA=0x01, it means reading the screen off time, and BB is 0x00 at this time

When AA=0x02, it indicates setting the screen off time, and at this time BB indicates the screen off
time

BB: Off screen time, legal value of 1-20

seconds. Command reply:

Correct verification and OK execution return: 0x1F AA BB 00 00 00 00 00 00 00 00 00 CRC
verification error or Fail execution return: 0x9F AA BB 00 00 00 00 00 00 00 00 00 CRC

give an example:
1) Search
[2025-01-21 22:21:04.538]# SEND HEX>
1F 01 00 00 00 00 00 00 00 00 00 00 00 00 00 0A
[2025-01-21 22:21:04.691]# RECV HEX>
1F 01 0A 00 00 00 00 00 00 00 00 00 00 00 00 2A

2 Set for 10 seconds
1F 02 0A 00 00 00 00 00 00 00 00 00 00 00 00 0A
[2025-01-21 22:22:31.660]# SEND HEX>
1F 02 0A 00 00 00 00 00 00 00 00 00 00 00 00 0A
[2025-01-21 22:22:31.806]# RECV HEX>
1F 02 0A 00 00 00 00 00 00 00 00 00 00 00 00 2B

3 Set for 20 seconds
1F 02 14 00 00 00 00 00 00 00 00 00 00 00 00 0A
[2025-01-21 22:22:42.051]# SEND HEX>
1F 02 14 00 00 00 00 00 00 00 00 00 00 00 00 0A
[2025-01-21 22:22:42.212]# RECV HEX>
1F 02 14 00 00 00 00 00 00 00 00 00 00 00 00 35

4.9 Setting Target Parameters

Command format: 0x21 AA BB CC DD EE FF GG HH II JJ KK LL MM NN CRC

Function: Set user motion and sleep target parameters

Description: AA: When AA=0x01, it means reading the target
parameter. At this time, BB~NN is 0x00. When
AA=0x02, it means setting the target parameter

BB CC DD: Step target (unit: step, small end mode, example: 01 00 00=1 step,
the same below) EE FF: Calorie target (unit: card)

GG: Standing target (unit: hour)

HH II JJ: Distance from target (unit: meters)

KK LL: Sleep duration target (unit: minutes)

MM NN: Target duration of exercise

(unit: minutes) Command reply:

Verify correct and execute OK Return: 0x21 AA BB CC DD EE FF GG HH II JJ KK LL
MM NN CRC Check error or execute Fail Return: 0xA1 AA BB CC DD EE FF GG HH II JJ
KK LL MM NN CRC

give an example:

1 query

[2025-01-21 22:23:29.783]# SEND HEX>

21 01 00 00 00 00 00 00 00 00 00 00 00 00 00 0A

[2025-01-21 22:23:29.945]# RECV HEX>

21 01 70 17 00 E0 93 0A B8 0B 00 E0 01 78 00 42

21 01 70 17 00   E0 93   0A B8 0B 00   E0 01   78 00 42

Read C B A B A C B A B A

Read steps, target calories, standing distance, target sleep, exercise duration

2 After setting, the progress percentage of the circular ring in today's activity is different! 1000
steps/50001000/10000

21 02 70 17 00 E0 93 0A B8 0B 00 E0 01 78 00 42

[2025-01-21 22:24:46.140]# SEND HEX>

21 02 70 17 00 E0 93 0A B8 0B 00 E0 01 78 00 42

[2025-01-21 22:24:46.292]# RECV HEX>

21 02 70 17 00 E0 93 0A B8 0B 00 E0 01 78 00 43

4.10 Automatic blood oxygen measurement function with switch

Command format: 0x2C AA BB 00 00 00 00 00 00 00 00 00 00 00 CRC

Function: Read the status of the automatic blood oxygen function switch, turn
on or off the automatic blood oxygen measurement function. Description: AA:
When AA=0x01, it means read the status of the automatic blood oxygen
function. At this time, BB is 0x00,

When AA=0x02, it indicates that the automatic blood oxygen function is set to be turned on or off,
while BB indicates it is turned on or off

BB: 0x01=enable,

0x02=disable Command reply:

Correct verification and OK execution return: 0x2C AA BB 00 00 00 00 00 00 00 00 00 CRC

verification error or Fail execution return: 0xAC AA BB 00 00 00 00 00 00 00 00 00 CRC

give an example:

1 query
[2025-01-21 22:25:41.688]# SEND HEX>
2C 01 00 00 00 00 00 00 00 00 00 00 00 00 00 0A
[2025-01-21 22:25:41.858]# RECV HEX>
2C 01 01 00 00 00 00 00 00 00 00 00 00 00 00 2E
2 Set on
2C 02 01 00 00 00 00 00 00 00 00 00 00 00 00 2E
3 Set Off
2C 02 02 00 00 00 00 00 00 00 00 00 00 00 00 2E

4.11 Reading Automatic Blood Oxygen Measurement Data

Command format: 0x2D AA AA AA 00 00 00 00 00 00 00 CRC function:
Read blood oxygen data automatically measured by the blood pressure watch

Description: AA: Timestamp. The mobile phone converts the year, month, day, and time into a timestamp and sends it to the blood pressure watch. The blood pressure watch reads the entire day's data corresponding to the timestamp.

The data is stored in small format and there is no data padding of 0. Command reply:

Verify correctly and execute OK, return:

There is data: return index package+data package (multiple)

No data: Return: 0x2D FF 00 00 00 00 00 00 00 00 00 00 00 00 00 CRC with data. Reply description:

Index package: 0x2D AA BB CC 00 00 00 00 00 00 00 00 00 00 00 CRC

For example: 0x2D 00 05 3C 00 00 00 00 00 00 00 00 00 00 00 CRC

AA=0x00: Packet sequence

BB=0x05: Total number of packages, 5

CC=0x3C: Measurement interval, 60 minutes

Data packet: 0x2D AA BB CC DD EE FF GG HH II JJ KK LL MM NN CRC

For example: 0x2D 01 FD 40 65 67 63 62 64 61 63 62 CRC

AA=0x01: Packet sequence

BB CC DD EE=FD 40 65 67: Timestamp, small end mode, i.e.:
0x6765440FD=1734689021 FF=0x63:0 Maximum blood oxygen value of 99,

GG=0x62:0 Minimum blood oxygen value of 98

give an example:

When HH=0x64:1, the maximum blood oxygen value is 100, When
II=0x61:1, the minimum blood oxygen value is 97
When NN=0x62:4, the maximum blood oxygen value is 98

0x2D 02 62 61 62 62 62 62 64 64 64 62 CRC AA=0x02:

Packet sequence
When BB=0x61:4, the minimum
blood oxygen value is 98

0x2D 04 62 61 61 62 62 62 62 64 64 64 62 62 CRC …

When NN=62:23, the minimum blood oxygen value is 98

Verification error or execution fail returns: 0xAD 00 00 00 00 00 00 00 00 00 00 CRC

give an example:
[2025-01-21 22:27:01.392]# SEND HEX>
2D A6 07 8F 67 00 00 00 00 00 00 00 00 00 00 0A
[2025-01-21 22:27:01.559]# RECV HEX>
2D 00 05 3C 00 00 00 00 00 00 00 00 00 00 00 6E
2D 01 A6 07 8F 67 61 61   61 61 62 62 63 63 63 42
At 1AB, the lowest height is 2AB, 3AB, 4AB, and 5A. Next, let's go together
A6 07 8F 67
678F07A6
https://tool.oschina.net/hexconvert/

2D 02 63 61 61 62 62 00 00 63 63 62 62 62 62 66
    5B 6A 6B 7A 7B....
2D 03 63 63 61 61 00 00 00 00 00 00 00 00 00 B8

2D 04 00 00 00 00 00 00 00 00 00 00 00 00 00 31

2D 00 05 3C   00 00 00 00 00 00 00 00 00 00 00 6E
Order 5 for 60 minutes
2D 01 25 01 20 18 00 00 00 00 00 00 00 00 00 8C
2D 02 00 00 00 00 00 00 00 00 00 00 00 00 00 2F
2D 03 00 00 00 00 00 00 00 00 00 00 00 00 00 30
2D 04 00 00 00 00 00 00 00 00 00 00 00 00 00 31

4.12 Search for Blood Pressure Watch

Command format: 0x50 AA BB 00 00 00 00 00 00 00 00 00 00 00 CRC
Function: Find blood pressure watch
Description: AA BB: Must be 55 AA, instruction confirmation
          When the blood pressure watch receives a
command, the blood pressure watch vibrates and the
UI interface prompts a command reply:
          Correct verification and OK execution return: 0x50 00 00 00 00 00 00 00 00 00 00 CRC
          verification error or Fail execution return: 0xD0 00 00 00 00 00 00 00 00 00 00 00 CRC
give an example:
[2025-01-21 22:29:22.520]# SEND HEX>
50 55 AA 00 00 00 00 00 00 00 00 00 00 00 00 AF
[2025-01-21 22:29:22.685]# RECV HEX>
50 00 00 00 00 00 00 00 00 00 00 00 00 00 00 50
The watch starts to vibrate for 15 seconds.

4.13 Blood pressure watch notification app has new data changes

Command format: 0x73 AA 00 00 00 00 00 00 00 00 00 00 00 CRC
Function: The blood pressure watch will send this notification to the app if there are any data changes after
each measurement is completed
          The APP receives the corresponding instruction to obtain data and refresh the interface
Description: AA: Represents data changes
          0x01: Heart rate
          0x02: Blood pressure
          0x03: Blood oxygen
          0x04: Step counting
          0x05: Body temperature (not yet used)
          0x06: Sleep (not yet used)
          0x07: Sports record
          0x08: Alarm clock (not yet used)
          0x09: Do not disturb setting
          0x0A: Recording (not yet used)
          0x0B: 12/24-hour clock (not yet used)
          0x0C: Change in battery level
give an example:
[2025-01-21 22:30:09.565]# RECV HEX>
73 01 00 00 00 00 00 00 00 00 00 00 00 00 00 74

73 02 00 00 00 00 00 00 00 00 00 00 00 00 00 74
73 03 00 00 00 00 00 00 00 00 00 00 00 00 00 74
73 04 00 00 00 00 00 00 00 00 00 00 00 00 00 74
73 07 00 00 00 00 00 00 00 00 00 00 00 00 00 74
73 09 00 00 00 00 00 00 00 00 00 00 00 00 00 74
73 0C 00 00 00 00 00 00 00 00 00 00 00 00 00 74

4.14 Factory reset command

Command format: 0xFF AA BB 00 00 00 00 00 00 00 00 00 00 CRC
Function: Erase all data in the blood pressure watch and restore it to its factory state
Description: The AA BB verification function is only valid when it is equal to 0x66
Command reply: No reply, disconnect Bluetooth and automatically perform flash erase operation
Sending example: 0xFF 66 00 00 00 00 00 00 00 00 00 00 00 CB

give an example:
[2025-01-21 22:31:57.204]# SEND HEX>
FF 66 66 00 00 00 00 00 00 00 00 00 00 00 00 CB
There will be language selection in both Chinese and English, as well as QR code information. After scanning the QR code and synchronizing the time, the QR code menu will no longer appear
If the Bluetooth adapter is connected, the following message will appear:
[2025-01-21 22:32:00.309]# RECV HEX>
2B 44 49 53 43 4F 4E 4E 3A 30 2C 43 41 42 46 34 34 38 46 30 30 42 35 0D 0A
Convert hexadecimal to text string.
https://www.bejson.com/convert/ox2str/
2B 44 49 53 43 4F 4E 4E 3A 30 2C 43 41 42 46 34 34 38 46 30 30 42 35 0D 0A
+DISCONN:0,CABF448F00B5

Reference restart command:
08 is a restart command. If the system time is after November 2024, the time will not reset to zero; Otherwise, time will reset to zero.
[2025-01-21 22:34:49.197]# SEND HEX>
08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 08
[2025-01-21 22:34:49.388]# RECV HEX>
2B 44 49 53 43 4F 4E 4E 3A 30 2C 43 41 42 46 34 34 38 46 30 30 42 35 0D 0A

enclosure:

1： Related online conversion tool address

1 CRC Check CheckSum8 URL

CheckSum8 Modulo 256

https://www.scadacore.com/tools/programming-calculators/online-checksum-calculator/

73 01 00 00 00 00 00 00 00 00 00 00 00 00 00 74

73 01 00 00 00 00 00 00 00 00 00 00 00 00 00

74

Choose the second option

CheckSum8 Modulo 256

Sum of Bytes % 256

Normal

74

2) Hexadecimal conversion&timestamp conversion URL

FD 40 65 67: timestamp, small end mode,

676540FD=1734689021

676540FD

2.1) hexadecimal conversion [to timestamp]

https://tool.oschina.net/hexconvert/

1734689021

2.2) Timestamp Conversion

http://www.daokeyou.top/

[Select seconds]

2024-12-20 18:03:41

3) Convert hexadecimal to text string.

https://www.bejson.com/convert/ox2str/

2B 44 49 53 43 4F 4E 4E 3A 30 2C 43 41 42 46 34 34 38 46 30 30 42 35 0D 0A

+DISCONN:0,CABF448F00B5

2B 43 4F 4E 4E 45 43 54 45 44 3A 30 2C 43 41 42 46 34 34 38 46 30 30 42 35 0D 0A

+CONNECTED:0,CABF448F00B5

4) Convert hexadecimal to decimal, hexadecimal to decimal

https://www.sojson.com/hexconvert/16to10.html

https://tool.oschina.net/hexconvert/

https://tool.ip138.com/hexconvert/

5) Complete list of AI tools

http://www.daokeyou.top/common/ai

2：External Memorandum

1 The uploaded hexadecimal timestamp small end needs to be inverted to obtain the numerical value, then converted to decimal, and then converted to standard time to select seconds;

2 Select CHECK SUB-8 for CRC check value in the serial port assistant;

3 When using a Bluetooth adapter to connect a Bluetooth blood pressure watch, first write UUIDS, N, W!!!!!

AT+SCAN=1
AT+AUTO_MAC=CABF448F00B5
AT+AUTO_CFG=1
AT+DEV?
AT+UUIDS=6E40FFF0B5A3F393E0A9E50E24DCCA9E
AT+UUIDN=6E400003B5A3F393E0A9E50E24DCCA9E
AT+UUIDW=6E400002B5A3F393E0A9E50E24DCCA9E
AT+UUIDS?
AT+UUIDN?
AT+UUIDW?
Convert hexadecimal to text string.
https://www.bejson.com/convert/ox2str/
2B 44 49 53 43 4F 4E 4E 3A 30 2C 43 41 42 46 34 34 38 46 30 30 42 35 0D 0A
+DISCONN:0,CABF448F00B5
2B 43 4F 4E 4E 45 43 54 45 44 3A 30 2C 43 41 42 46 34 34 38 46 30 30 42 35 0D 0A
+CONNECTED:0,CABF448F00B5