

# BCI-AF Protocol (v1.0)

-----For Bluetooth & USB Oximeter

## 1、Bluetooth Service Information (UUIDs):

Comm Service: 49535343-FE7D-4AE5-8FA9-9FAFD205E455  
Send Characteristic: 49535343-1E4D-4BD9-BA61-23C647249616  
Receive Characteristic: 49535343-8841-43F4-A8D4-ECBE34729BB3  
Rename Characteristic: 00005343-0000-1000-8000-00805F9B34FB  
MAC Address Characteristic: 00005344-0000-1000-8000-00805F9B34FB

PS: Host application should use the notification of the 'Send Characteristic' for package fetching.

## 2、USB-Com Port Settings:

Baud Rate: 115200, Bits: 8, Stop bits: 1, Parity bit: none

## 3、Package Format (Device to Host):

Package Length: 8 bytes

Package Rate: 100 Hz

Package Content:

Byte	Bit	Description
1	0~3	Bits 0-3 of Byte1 are the lower 4 bits of the Perfusion Index (1~200, invalid value = 0)
	4	1=no signal, 0=OK
	5	1=probe unplugged, 0=OK
	6	1=pulse beep (Pulse beat found)
	7	Sync bit = 1 (Package header)
2	0~6	Pleth (1-100, invalid value = 0)
	7	Sync bit = 0
3	0~3	Bits 0-3 of Byte3 are the higher 4 bits of the Perfusion Index (1~200, invalid value = 0)
	4	1=No finger, 0=OK
	5	1=Searching for pulse, 0=OK
	6	Bit 6 of Byte 3 is bit 7 of the Pulse Rate (25~250 bpm, invalid value = 0xFF)

	7	Sync bit = 0
4	0~6	Bits 0-6 of Byte 4 are bits 0-6 of the Pulse Rate (25~250 bpm, invalid value = 0xFF)
	7	Sync bit = 0
5	0~6	SpO2 (35-100%, invalid value = 0x7F)
	7	Sync bit = 0
6	0~6	Battery Percentage (0-100%)
	7	Sync bit = 0
7	0~6	Bits 0-6 of Byte 7 are bits 0-6 of the Number of Atrial Fibrillation (0-999 times)
	7	Sync bit = 0
8	0~5	Bits 0-5 of Byte 8 are bits 7-12 of the Number of Atrial Fibrillation (0-999 times)
	6	1 = Atrial Fibrillation found
	7	Sync bit = 0

Tips:

Invalid Perfusion Index = 0,      Invalid Pleth = 0,      Invalid Pulse Rate = 0xFF,  
Invalid SpO2 = 0x7F

#### 4、Host Command (Host to Device):

Command length: 1 byte

Command type:

0xff ----- Get Software Version

0xfe ----- Get Hardware Version

For example:

(1). Assuming the software version string is “V1.00.00.00”, the device will return three consecutive 5 bytes response packets after a single byte command 0xff is sent by the host.

The 1st 5 bytes response packet: 0xff 0x56 0x31 0x2e 0x30 (ASCII string for "V1.0")

The 2nd 5 bytes response packet: 0xff 0x30 0x2e 0x30 0x30 (ASCII string for ".00")

The 3rd 5 bytes response packet: 0xff 0x2e 0x30 0x30 0x00 (ASCII string for ".00")

(2). Assuming the hardware version string is “V1.0”, the device will return only one 5 byte response packet after a single byte command 0xfe is sent by the host.

The 5 bytes response packet: 0xfe 0x56 0x31 0x2e 0x30 (ASCII string for "V1.0")

## Demo:

Android:

BLE demo: <https://github.com/zh2x/SpO2-BLE-for-Android> \*

Classic Bluetooth demo: <https://github.com/zh2x/SpO2-Bluetooth-for-Android> \*

iOS:

Swift demo: <https://github.com/zhuchengji-berry/BluetoothDemo> \*

Objective-C demo: <https://github.com/zh2x/SpO2-BLE-for-iOS> \*

## Change Log:

history	content	date
V1.0	The first edition is released.	2022-08-19