BCI Protocol (V1.4)

-----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:	5 bytes
Package Rate:	100 Hz

Package Content:

Byte	Bit	Description
1	0~3	Signal strength (0~8, invalid value = 0x0F)
	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	Bargraph (1-15, 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

Tips:

Invalid Signal strength = 0xF,   Invalid pleth = 0,   Invalid Bargraph = 0,
Invalid Pulse Rate = 0xFF,   Invalid Spo2 = 0x7F

PulseRate parsing c language code as follows：

```
u8 pulseRate  =  ((PKG[2] & 0X40) << 1 )  |  (PKG[3] & 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 "0.00")
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 Source Code:

Android:

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

IOS:

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

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

Flutter:

https://github.com/mz-myfc/bci_demo *

Change Log：

history	content	date
V1.1	Add android and iOS demo source code github link. Add change log.	2015-11-10
V1.2	Add Classic Bluetooth demo.	2017-03-20
V1.3	Add BLE service and version information.	2019-11-26
V1.4	Add Flutter demo source code github link	2024-10-30