

Berry Protocol (v1.5)

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、Device Packet (Device to Host):

Packet length:

20 bytes

Packet rate:

Adjustable (Default is 100Hz)

Packet Format:

Byte0: 0xff	Head mark1
Byte1: 0xaa	Head mark2
Byte2: PktIndex	Packet index
Byte3: Status	Measurement status info
Byte4: SpO2Sat	Averaged blood oxygen saturation
Byte5: SpO2SatReal	Real time blood oxygen saturation
Byte6: PulseRate	Averaged pulse rate (i.e. heart rate)
Byte7: PulseRateReal	Real time pulse rate (i.e. heart rate)
Byte8: rrInterval	Low byte of rrInterval
Byte9: rrInterval	High byte of rrInterval
Byte10: PerfuIndex	Averaged blood perfusion index
Byte11: PerfuIndexReal	Real time blood perfusion index
Byte12: PlethWave	Plethysmography wave of blood oxygen
Byte13: ADCSample	Lowest byte of signed int32 ADCSample
Byte14: ADCSample	Lower byte of signed int32 ADCSample
Byte15: ADCSample	Higher byte of signed int32 ADCSample
Byte16: ADCSample	Highest byte of signed int32 ADCSample
Byte17: Battery	Battery power in percent
Byte18: PacketFreq	Current packets sending frequency
Byte19: Checksum	Checksum of the whole packet

PktIndex: Range (0~255), the index of the current packet

Status:	0x01	SpO2 Sensor Off
	0x02	No finger
	0x04	No pulse signal
	0x08	Pulse Beat Tips

SpO2Sat:	Range (35~100, invalid value=127), unit: %
SpO2SatReal:	Range (35~100, invalid value=127), unit: %
PulseRate:	Range (25~250, invalid value=255), unit: bpm
PulseRateReal:	Range (25~250, invalid value=255), unit: bpm
rrInterval:	RR Interval (heart beat interval), Range (40~600, invalid value=0), Unit: number of samples rrInterval(ms) = rrInterval * 5ms
PerfuIndex:	Range (1~200, invalid value=0), unit: %
PerfuIndexReal:	Range (1~200, invalid value=0), unit: %
PlethWave:	Range (1~100, invalid value=0)
ADCSample:	Range (-2^31~2^31), signed int32, Infrared light adc sample
Battery:	Range (0~100), unit: %
PacketFreq:	Current packets sending frequency valid values: 1, 50, 100, 200, means 1Hz, 50Hz, 100Hz, 200Hz
Checksum	Range (0~255) Formula: Checksum = (Byte0+Byte1+...+Byte18) % 256 , % is mod operator

3、 Host Command (Host to Device):

Command length: 1 byte

Command type:

0xf0 -----	50 Hz Package rate
0xf1 -----	100 Hz Package rate (Default)
0xf2 -----	200 Hz Package rate
0xf3 -----	1 Hz Package rate
0xf4 -----	ADCSample is Original sampling waveform
0xf5 -----	ADCSample is Filtered sampling waveform
0xf6 -----	Stop sending packet
0xff -----	Get Software Version
0xfe -----	Get Hardware Version

Software Version Package Example (20 bytes):

0xff 0xaa 0x53 0x56 0x31 0x2e 0x30 0x34 0x2e 0x30 0x30 0x2e 0x33 0x36 0x00
 0x00 0x00 0x00 0x00 0x3a
 0xff 0xaa ----- Packet head mark
 0x53 ----- ASCII ‘S’, mark of software version
 0x56 0x31 0x2e 0x30 0x34 0x2e 0x30 0x30 0x2e 0x33 0x36 ----- ASCII string
 ‘V1.04.00.36’, current software version content
 0x00 0x00 0x00 0x00 ----- Padding bytes of packet
 0x3a ----- Checksum byte

Hardware Version Package Example:

0xff 0xaa 0x48 0x56 0x32 0x2e 0x30 0x00 0x00 0x00 0x00 0x00 0x00
0x00 0x00 0x00 0x00 0xd7
0xff 0xaa ----- Packet head mark
0x48 ----- ASCII ‘H’, mark of hardware version
0x56 0x32 0x2e 0x30 ----- ASCII string ‘V2.0’, current hardware version content
0x00 ----- Padding
bytes of packet
0xd7 ----- Checksum byte

Demo source code:

Android:

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

iOS:

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

Flutter:

Dart demo: https://github.com/mz-myfc/bci_demo