HEXOSKIN™
WEARABLE BODY METRICS

Hexoskin Bluetooth Smart Specifications

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1 Purpose

This document presents the current Bluetooth Low Energy (BLE) specification for the HxSmart module.

The HxSmart device is a BLE device that acts as a peripheral server. The device is seen by a central client device with the following name structure: HX-XXXXXXXX. Where XXXXXXXX is the serial number of the device.

2 Device Services and Characteristics

2.1 Battery Service

Battery Service (BAS) : 0x180F				
Characteristics	**Description**	**Address**	**Types**	**Permissions**
Battery Level	Battery level in percentage from 0% to 100%. It is represented on a uint8 from 0 to 100.	0x2A19	uint8	Read, Notify

2.2 Heart Rate Service

Heart Rate Service (HRS) : 0x180D				
Characteristics	**Description**	**Address**	**Types**	**Permissions**
Heart Rate Measurement	Heart rate value on 8 bit with RR-interval values if present.	0x2A37	uint32	Notify
Body Sensor Location	Sensor location : Chest	0x2A38	uint8	Read
Heart Rate Control Point	Reset energy expended	0x2A39	uint8	Write

Note : RR intervals are represented in 1/1024 s. One heart rate packet could contain more than one RR interval value.

2.3 Device Information Service

Device Information Service (DIS) : 0x180A				
Characteristics	**Description**	**Address**	**Types**	**Permissions**
Hardware Revision	Assembly hardware revision	0x2A27	UTF-8 String	Read
Serial Number	Device serial number	0x2A25	UTF-8 String	Read
Model Number	Device model number	0x2A24	UTF-8 String	Read
Manufacturer Name	Manufacturer name	0x2A29	UTF-8 String	Read
Firmware Revision	Device firmware revision	0x2A26	UTF-8 String	Read
Software Revision	BLE stack revision	0x2A28	UTF-8 String	Read

2.4 Respiration Service

Status Service : 0x3b55c581-bc19-48f0-bd8c-b522796f8e24				
Characteristics	**Description**	**Address**	**Types**	**Permissions**
Respiration Rate Measurement	Respiration Rate value with inspiration/expiration detection value if present	0x9bc730c3-8cc0-4d87-85bc-573d6304403c	uint8 array	Notify

(Design similar to Heart Rate Service)

Respiration Rate Measurement value formatting:

LSB		MSB
Flags [1B] : mandatory	Respiration Rate Value [1B or 2B] : Mandatory	Inspiration/Expiration Value [n x 2B] : Optional

Respiration Rate Measurement Flags should be as follow:

- 0: Respiration Format bit (0: 8 bits, 1:16 bits)
- 1: Inspiration/Expiration interval bit (0:not present, 1: present)
- 2: First data type present (0: Inspiration, 1: Expiration)
- (3:7): Reserved / Sensor Quality

Note: Inspiration and expiration values are time intervals since the last Insp/Exp event, and are represented in 1/32 s. The principle is similar to the RR intervals from the Heart Rate Service.

- *e.g. For a inspiration value of 0x00EA, we read a inspiration of 234/32 s = 7.3125 s*

3 Peripheral Preferred Connection Parameters

These parameters are currently static.

- **Connection Interval**
  - Minimum : 30mS
  - Maximum : 50mS
- **Slave Latency**
  - 0
- **Connection Supervision Timeout**
  - 300 mS

4 Advertisement Settings, Security Settings and Bonding Procedure

4.1 Advertisement Settings

- **Discovery mode**
  - General
- **Advertising Type**
  - Connectable undirected advertising
- **Filter Policy**
  - Scan Request : Any
  - Connect Request : Any
- **Advertising channel**
  - Channel 37, 38 and 39
- **Fast Advertising interval**
  - Minimum : 20mS
  - Maximum : 100mS
  - Timeout : 60 000mS
- **Slow Advertising interval**
  - Minimum : 1022.5mS
  - Maximum : 1285mS
  - Timeout : 120 000mS

4.2 Security Settings

- **Security Mode**
  - Mode 1
- **Security Level**
  - Unauthenticated pairing with encryption
- **I/O capabilities**
  - No Input, No Output
- **Bonding Requirement**
  - Yes
- **Encyption Key Size**
  - 16 Bytes