HxM2 Application Developer Guide

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# Document Version Control

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| --- | --- | --- |
| **Version** | **Date** | **Description** |
| 1.0 | 13th Aug 2012 | Initial Version |
| 1.1 | 27th Aug 2012 | Added details of Test Mode data to HxM2 custom service |

# References

|  |  |  |
| --- | --- | --- |
| **Ref #** | **ID** | **Description** |
|  | HRS\_SPEC V10r00 | Heart Rate Service Specification |
|  | BAS\_SPEC V10r00 | Battery Service Specification |
|  | DIS\_SPEC V11r00 | Device Information Service Specification |

# Definitions, Abbreviations and Glossary

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| --- | --- |
| **Abbreviation** | **Description** |
| BLE | Bluetooth Low Energy |
|  |  |

# Overview

This guide is aimed at developers of applications which interact with the HxM2 via Bluetooth Low Energy (BLE).

# BLE Services

The HxM2 supports a number of different services which are defined by the Bluetooth SIG as listed in Table 4‑1.

|  |  |
| --- | --- |
| **Service Name** | **Adopted Ver** |
| Heart Rate Service | 1.0 |
| Battery Service | 1.0 |
| Device Information Service | 1.1 |

Table 4‑1 Available services in HxM2

## UUID’s

Each service is identified by a 128-bit UUID and each service is a collection of characteristics which are also identified by UUID’s. However services and characteristics that have been adopted by the Bluetooth SIG use 16-bit UUIDs which are aliases that actually represent 128-bit values derived from the Bluetooth Base UUID:

128\_bit\_value = 16\_bit\_value \* 296 + Bluetooth\_Base\_UUID

Bluetooth Base UUID = 0000**0000**-0000-1000-8000-00805F9B34FB

Therefore the 2 bytes underlined above are replaced by the 16-bit UUID.

For any custom services, a full 128-bit UUID must be used and because of this, an HxM2 128-bit UUID has been declared:

HxM2 Base UUID = BEFD**0000**-C979-11E1-9B21-0800200C9A66

All HxM2 custom services use UUID’s based on this UUID where the 2 bytes underlined above are changed to create a unique UUID for each custom service & characteristic.

Therefore whenever a 16-bit UUID is used it is assumed to be based upon the 128-bit Bluetooth Base UUID so anytime a custom service or characteristic is used, the full 128-bit UUID must be used.

## Standard Services

For details of all standard services refer to the specific documents from Bluetooth.org.

### Heart Rate Service

The Heart Rate Service is implemented within the HxM2 as documented in [1]. Energy Expended is not calculated by the HxM2 and therefore the Energy Expended field is not included. When the Client Characteristic Configuration descriptor is configured for notification, the Heart Rate Measurement characteristic is notified on average 1 time per second. The Heart Rate Measurement characteristic is notified on average 1 time per second.

### Battery Service

The battery service as specified in [2] is implemented within the HxM2. As well as supporting the Mandatory Read property, the HxM2 also supports the optional Notify property.

### Device Information Service

All characteristics of the Device Information service are supported as specified in [3]. Because the device contains 4 separate pieces of firmware (BLE Microcontroller Bootloader & Application Firmware + Host Microcontroller Bootloader & Application Firmware), the Firmware Revision & Software Revision strings are written as follows so that all version details can be communicated:

Firmware Revision String: BLE Firmware / BLE Bootloader (E.g. “v1.0.2.0/1.0.0.0”)

Software Revision String: Host Firmware / Host Bootloader (E.g. “v1.2.0.0/1.3.0.0”)