Firmware Interface Document

Model No.: i7-6004A

Version: V1.0.0

Date: 8th April 2017

DESCRIPTION

The document is only used for the 2nd development such as iOS and Android application based on the standard i7 accelerometer beacon hardware.

BROADCAST DATA FORMAT

Offset	Length	Type	Data	Details
0	1	Data Length	2	/
1	1	Flag data type	1	/
2	1	Flag data	0x06	/
3	1	Data Length	3	/
4	1	Complete list of 16-bit Service UUIDs	0x03	/
5	2	UUID data	0xE1FF	(little-endian) 0xFFE1
7	1	Data Length	16	/
8	1	Service data	0x16	/
9	2	UUID data	0xE1FF	(little-endian) 0xFFE1
11	1	Frame Type	0xA1	0xA1
12	1	Product Model	0x03	/
13	1	Battery level	0x64	Battery level is 100%
14	2	X-axis	0x0000	signed 8.8 fixed-point (0.00g)
16	2	Y-axis	0xFF80	signed 8.8 fixed-point (-0.5g)
18	2	Z-axis	0x013B	signed 8.8 fixed-point (1.23g)
20	6	Mac address	0xB00000 00A1EE	(little-endian) AC:23:3F:00:00:0B

Note：

1. For the signed 8.8 fixed-point, please see the appendix;
2. The format is only a single broadcasting format without any scan-response packet;
3. The format can be customized / changed as customer’s requirement.

SERVICES AND CHARACTERISTIC

Service Definition	
Name	Device Information
Service UUID	0x180A

Characteristic	
Name	Manufacturer Name String
Characteristic UUID	0x2A29
Properties	READ
Description	Manufacturer information, the default information is Shenzhen Minew Tech Co., Ltd.
Characteristic	
Name	Model Number String
Characteristic UUID	0x2A24
Properties	READ
Description	Device model number, E.g. I7
Characteristic	
Name	Serial Number String
Characteristic UUID	0x2A25
Properties	READ
Description	MAC address of device
Characteristic	
Name	Firmware Revision String
Characteristic UUID	0x2A26
Properties	READ
Description	Firmware version
Characteristic	
Name	Hardware Revision String
Characteristic UUID	0x2A27
Properties	READ
Description	PCB version
Characteristic	
Name	Software Revision String
Characteristic UUID	0x2A28
Properties	READ
Description	Software and chipset information

Service Definition	
Name	User Define Service
Service UUID	7f280004-8204-f393-e0a9-e50e24dcca9e
Characteristic	
Name	Parameter Configuration
Characteristic UUID	7f280002-8204-f393-e0a9-e50e24dcca9e
Properties	READ
Descriptors	Client Characteristic Configuration
Description	Please refer to the commands.
Characteristic	
Name	Date Time
Characteristic UUID	0x2A08
Properties	READ, WRITE
Descriptors	Client Characteristic Configuration
Description	Please refer to the commands.
Description	Please do calibrate / update the “date time” (calendar) after the i7 be connected by the external device;

Command Instruction

Command	Command Head	Command Data	Data Type	Default Parameter
Set Tx Power	0x01	Tx Power Data	int8_t	0dBm
Set Into OTA mode	0x02	0x00	uint8_t	/
Set Advertising Interval	0x03	Example:1000(ms)	uint16_t	900ms
Set Sampling Interval(Sensor)	0x04	Example:1000(ms)	uint16_t	900ms
Set ALL Default	0x06	0x00	uint8_t	/

Set Tx Power:

The Bluetooth master such as an APP sends the command “0x01, 0x00” to the i7, the Tx power of i7 will be set to 0dBm after the connection disconnected.

For example: set Tx to -4dBm, the command is 0x01 0xFC.

Set Into OTA mode:

The i7 will enter into the OTA mode after received this command. Please refer to the upgrade document if needed.

Set Advertising Interval:

It is a sampling interval of sensor. The data type is unit16_t and unit of time is ms, the range of time is 500ms to 10,000ms.

For example, send the command 0x03 500 to the i7, the advertising interval of i7 will be set to the 500ms after the connection disconnected.

Set Sampling Interval (Sensor):

The data type is unit16_t and unit of time is ms, the range of time is 500ms to 10,000ms.

The proposed accelerometer sampling interval should be greater than Advertising Interval.

Set All Default:

Restore to the factory settings.

The i7 device will return the string "SUC CMD" (notify) after received the command successfully. Otherwise, it will return the string "ERR CMD".

Development Note

1. Please do calibrate / update the "date time" (calendar) after the i7 be connected by the external device;
2. After completed the data receiving or parameter modification, the Bluetooth master should to disconnect from the i7 device immediately

Appendix

1. Time Format

name: date time

Type: org.bluetooth.characteristic.date_time Download / View

Assigned Number: 0x2A08

Abstract:

The Date Time characteristic is used to represent time.

Summary:

The Date Time characteristic contains fields for year, month, day, hours, minutes and seconds. Calendar days in Date Time are represented using Gregorian calendar. Hours in Date Time are represented in the 24h system.

Names	Field Requirement	Format	Minimum Value	Maximum Value	Additional Information
Year **Information:** Year as defined by the Gregorian calendar. **Unit:** org.bluetooth.unit.time.year	Mandatory	uint16	1582	9999	None Additional Values Key: 0 — Value: Year is not known
Month **Information:** Month of the year as defined by the Gregorian calendar. **Unit:** org.bluetooth.unit.time.month	Mandatory	uint8	0	12	Enumerations 0: Month is not known 1: January 2: February 3: March 4: April 5: May 6: June 7: July 8: August 9: September 10: October 11: November 12: December
Day **Information:** Day of the month as defined by the Gregorian calendar. **Unit:** org.bluetooth.unit.time.day	Mandatory	uint8	1	31	None Additional Values Key: 0 — Value: Day of Month is not known
Hours **Information:** Number of hours past midnight. **Unit:** org.bluetooth.unit.time.hour	Mandatory	uint8	0	23	None
Minutes **Information:** Number of minutes since the start of the hour. **Unit:** org.bluetooth.unit.time.minute	Mandatory	uint8	0	59	None
Seconds **Information:** Number of seconds since the start of the minute. **Unit:** org.bluetooth.unit.time.second	Mandatory	uint8	0	59	None

2. Signed 8.8 fixed-point

The firmware of I7 complies with the signed 8.8 fixed-point regulation.

Reference: http://www.hugi.scene.org/online/coding/hugi%2015%20-%20cmtadfix.htm
http://fileadmin.cs.lth.se/cs/Education/EDA075/notes/mgh_appA_fixed.pdf