



SH-2 SHTP Reference Manual

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1.0 Introduction

The SH-2 has two high level variants – the chip executable and the library. Both variants of the SH-2 use the Sensor Hub Transport Protocol (SHTP) to communicate with the host. See [1] for details of SHTP. This document supplements the SH-2 Reference Manual [2] with details about the SHTP advertisement response and channel usage.

1.1 Intended Audience

This document is intended for application developers implementing products that use the SH-2.

1.2 Scope

This document describes how the SH-2 uses the SHTP.

1.3 Revision History

Revision	Date	Description
1.5	02/16/2017	Deleted unused reference.
1.4	12/14/2016	Added legal notices.
1.3	11/17/2016	Defined version tag format. Add Gyro-Rotation vector channel.
1.2	07/13/2015	Add force-flush command/response.
1.1	03/30/2015	Minor updates following implementation.
1.0	02/25/2015	Initial issue

Figure 1: Document History

2.0 SH-2's Uses of SHTP

2.1 Host Interrupt and Timestamps

The SH-2 uses the SHTP timestamping feature.

2.2 SH-2 Channel Usage

The SH-2 cargoes consist of predefined messages identified by report ID's. See [2] for details of these messages. To make message handling and identification easier the SH-2 uses certain channels for specific purposes. The SH-2 channel usage is shown in Figure 2. The device channel is used only on the chip executable variants.

Channel	Use	Name	Direction
N	Device commands. The commands are one byte. The cargo for a command is one byte. Sending multiple commands in one cargo is not supported. The defined commands are: 0 – reserved 1 – reset 2 – on 3 – sleep 4-255 – reserved	device	Write
	Device responses. The responses are one byte. The cargo for a response is one byte. Sending multiple responses in one cargo is not supported. The defined responses are: 0 – reserved 1 – reset complete 2-255 – reserved		Read
N+1	All reports sent to the hub. Each report is identified by its report ID. Report lengths are fixed. Set feature reports are defined as report ID = 0xFD followed by the feature report. The full feature report, including its report ID as defined in [2], is sent. Get feature reports are defined as: report ID = 0xFE followed by the ID of the feature report to get. Force-flush reports are defined as: reportID=0xF0 followed by the ID of the sensor to be flushed.	control	Write
	All reports other than sensor data reports. Each report is identified by a report ID. Report lengths are fixed. Get feature responses are defined as: report ID = 0xF2 followed by the ID of the feature report to get. All other reports are sent as they are defined in [2].		Read
N+2	Unused	inputNormal	Write
	Input reports. The cargo consists of one or more input reports. Each report is identified by its report ID. Report lengths are fixed.		Read
N+3	Unused	inputWake	Write
	Input reports for wake sensors. The cargo consists of one or more input reports. Each report is identified by its report ID. Report lengths are fixed.		Read
N+4	Unused	inputGyroRv	Write
	Gyro Rotation Vector data. The cargo consists exclusively of compact Gyro + Rotation Vector reports. See [2] for report format. Gyro + RV reports are sent one at a time: a single SHTP transfer will never contain multiple Gyro + RV reports.		Read

Figure 2: SH-2 Write Channel Usage

2.3 Channel Advertisement

The SH-2 advertises the values listed in Figure 3.

Tag	Tag Name	Value
1	GUID	1
8	AppName	executable
6	NormalChannel	N
9	ChannelName	device
1	GUID	2
8	AppName	sensorhub
6	NormalChannel	N+1
9	ChannelName	control
6	NormalChannel	N+2
8	ChannelName	inputNormal
7	WakeChannel	N+3
9	ChannelName	inputWake
6	NormalChannel	N+4
9	ChannelName	inputGyroRv
0x80	Version	Varies
0x81	Report Lengths	Array of (report ID, length) pairs

Figure 3: SH-2 Advertisement

The value for N may be selected at compile time or run time depending on the specific implementation of SH-2.

The version tag uses the same format as the version tag used by SHTP [1].

The ReportLengths tag is provided to support compatibility between different versions of host and sensor hub. The array provided consists of pairs of unsigned 8 bit integers, in (report ID, length) order. Cargoes received from the hub may consist of multiple reports. The first byte will always be a report ID, and the next report will start a fixed number of bytes after that (the length indicated by the corresponding entry in ReportLengths). The length of a report always includes the report ID itself, as well as the report contents.

3.0 References

1. Hillcrest Laboratories, 1000-3535 Sensor Hub Transport Protocol Reference Manual.
2. Hillcrest Laboratories, 1000-3625 SH-2 Reference Manual.

4.0 Notices

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