



Zephyr Firmware Upgrade v2.3.8.0

BioHarness 2.0



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1. Introduction

As part of Zephyr's continuing development strategy, new revisions of device firmware are released periodically. This document provides instructions on how to use the firmware upgrade tool to carry out the update procedure.

A utility for configuring BT devices **Zephyr Config Tool.exe** is included in the firmware upgrade directory for systems using the OmniSense application. It can be used at any time to confirm the existing version of firmware and hardware in any Zephyr device, and to confirm the upgrade has been successful.

The utility used to update the firmware is called **ZUSBUpdater.exe**. This utility requires Microsoft® .NET 3.5 to be installed in your PC in order to function. If your PC already uses any Zephyr application software such as OmniSense, then this framework will already be installed. In order to save disc space the files needed to install .NET3.5 are not duplicated in the Firmware Upgrade directory. They are located on most Zephyr CDs in a directory labelled **DotNetFX35SP1**.

1.1. v2.3.2.0 & v2.3.8.0

v2.3.2.0	v2.3.8.0	
Transmitted Data Packets		
• General	• General	1 Hz summary data
• ECG	• ECG	250 Hz ECG waveform
• Heart RR	• Heart RR	18 Hz resolution RR data
• Breathing	• Breathing	18 Hz breathing sensor output
• Accelerometer	• Accelerometer	50 Hz 3-axis accelerometer data
	• Summary	Summary data (frequency configurable: default 1 Hz); additional parameters over General
	• Event	System, physiological & debugging; per event
Logging Formats		
• General	• General	1 Hz Summary Data + 18 Hz Breathing & RR
• General + ECG	• General + ECG	General + 250 Hz ECG
• General + Accel	• General + Accel	General + 100Hz Accel

The significant difference is the Summary packet. Before upgrading, you should confirm that the application software you are using supports the Summary packet. Zephyr's OmniSense must be v3.x or later. For developers, the SDK Test Application should be v2.

If the application software being used does not support the summary packet, there is little advantage in upgrading to this version of firmware.

The Summary packet provides a number of channels in addition to those supplied by the General packet:

- Breathing rate confidence level
- Heart rate confidence level
- Heart rate variability
- BT Link quality
- RSSI
- Tx Power
- Estimate Subject Core Temperature

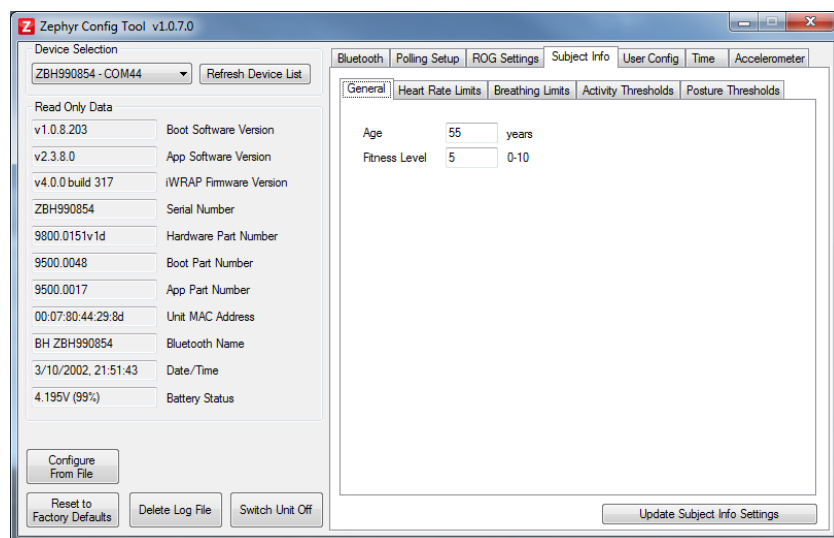
1.2. ROG & ROG2

In addition v2.3.8.0 firmware integrates a more sophisticated version of Zephyr's ROG subject physiological status algorithm. This is called ROG2.

Some parameters from the previous version, such as heart rate and breathing rate high and low thresholds, are now set automatically in the device.

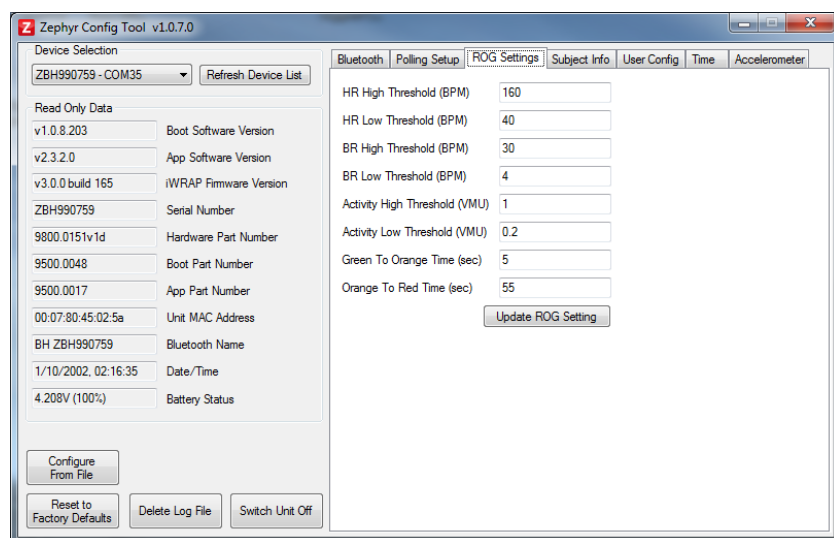
The only parameters which should be changed are subject Age, and Fitness Level on a scale of 1 -10 (default 5). 10 represent an elite athlete.

Fitness Level is at present *only* used in the algorithm which calculates Estimated Subject Core Temperature. It affects no other output channels.



ROG2 configuration settings with v2.3.8.0 firmware

All tabs other than the *General* tab should be left at the default values.



ROG1 configuration settings with v2.3.2.0 firmware

2. Check Existing Firmware & Hardware Version

1. Connect the device in its cradle to a PC.
2. Locate utility **Zephyr Config Tool.exe** and double-click to start.
3. Click the **Refresh Device List** button and use the pull down selector to choose the device you are reading

Zephyr Config Tool v1.0.7.0

Device Selection: ZBH990759 - COM35 [Refresh Device List]

Read Only Data

v1.0.8.203	Boot Software Version
v2.3.2.0	App Software Version
v3.0.0 build 165	iWRAP Firmware Version
ZBH990759	Serial Number
9800.0151v1d	Hardware Part Number
9500.0048	Boot Part Number
9500.0017	App Part Number
00:07:80:45:02:5a	Unit MAC Address
BH ZBH990759	Bluetooth Name
26/1/2012, 15:29:33	Date/Time
4.202V (100%)	Battery Status

Buttons: Configure From File, Reset to Factory Defaults, Delete Log File, Switch Unit Off

Bluetooth | Polling Setup | ROG Settings | Subject Info | User Config | Time | Accelerometer

Network ID: ZBH990759 [Set Net Id] Bluetooth detectable ☒

Link Settings

Link Timeout (ms): 10000 Lifesign Period (ms): 3000 [Update]

Bluetooth Devices to Call

	MAC Address	PIN Code	
BioHarness	Message NAK		[Set BH]
BT Device 0	Message NAK	Message NAK	[Set BT Dev 0]
BT Device 1	Message NAK	Message NAK	[Set BT Dev 1]
BT Device 2	Message NAK	Message NAK	[Set BT Dev 2]
BT Device 3	Message NAK	Message NAK	[Set BT Dev 3]
BT Device 4	Message NAK	Message NAK	[Set BT Dev 4]
BT Device 5	Message NAK	Message NAK	[Set BT Dev 5]
BT Device 6	Message NAK	Message NAK	[Set BT Dev 6]
BT Device 7	Message NAK	Message NAK	[Set BT Dev 7]
BT Device 8	Message NAK	Message NAK	[Set BT Dev 8]

Named Bluetooth Devices to Call

Call	Friendly Name	PIN Code	Class ID	
<input type="checkbox"/> BT Device 0				[Set BT Dev 0]

4. The firmware version is '**App Software Version**' which is 2.3.2.0 for the example ZBH990759 BioHarness BT device above.
5. The hardware version is 9800.0151.v1d. Note this, as the appropriate firmware image should be used.
6. Exit the utility. *Do not change any other values.*
7. Note checked Bluetooth detectable is checked or unchecked (must be checked for discoverability with Android devices or with PC (not required for use with OmniSense)).

3. Record Device Configuration

The default device configuration settings *after* upgrade to v2.3.8.0 firmware may differ from those prior. Record the following in particular:

Bluetooth Polling Setup ROG Settings Subject Info **User Config** Time Accelerometer

☒ Log Enable ☒ Bluetooth Enable ☐ Visual Feedback Enable

☐ Button Enable When Worn ☐ 802.15.4 Enable ☐ Audio Enable

☐ Team System Enable ☐ ECG Polarity Invert

Log Format
General and ECG ▼

Update Configuration

Log Enable

Bluetooth Enable (& Detectable)

Log Format



As a precaution, always download any existing logs from the device you wish to keep. A firmware upgrade may change the logging format to a new default and erase any existing data in device memory (v2.3.8.0 will default to *General* format)

Bluetooth Polling Setup ROG Settings Subject Info User Config Time **Accelerometer**

Accelerometer Axis Mapping

X > Y ▼ ☐ inv Presets
Y > Z ▼ ☐ inv Left Side ▼
Z > X ▼ ☐ inv Set Mapping

Calibrate Accelerometer

Accelerometer axis Mapping (Strap type)

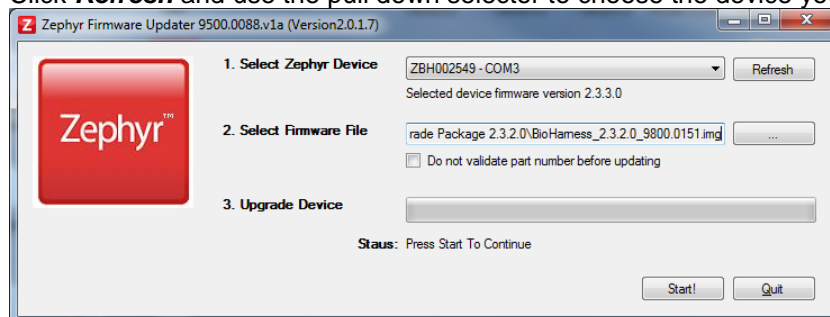


Do *not* use the Calibrate Accelerometer button to recalibrate the device. This should never be necessary once the device has left the factory

Note any existing settings so that you can return the device to its desired configuration.

4. BioHarness Module Firmware Upgrade

1. Connect the device in its cradle, to your PC. Exit any other Zephyr applications or utilities. Disconnect any other Zephyr USB devices from the PC.
2. Locate utility **ZUSBUpdater.exe** and double-click to start
3. Click **Refresh** and use the pull down selector to choose the device you are programming

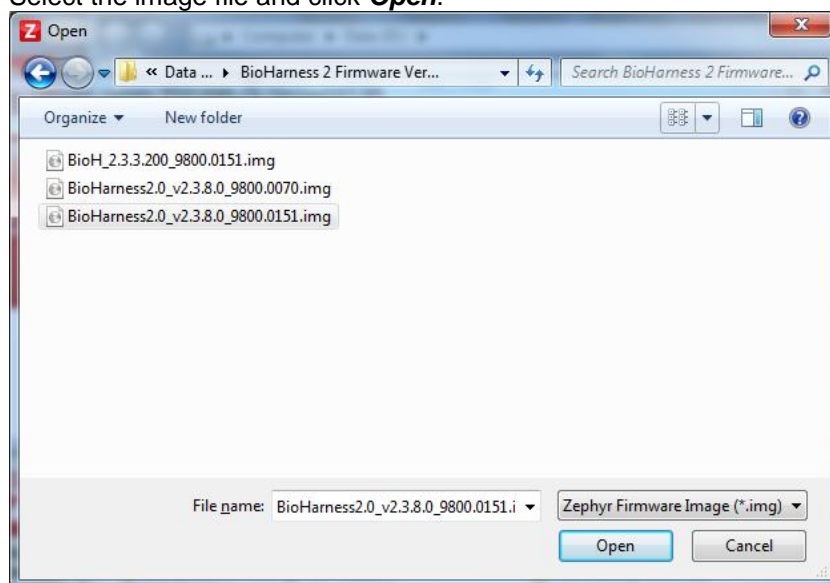


4. Click the button marked '...' and browse to locate the firmware image file.

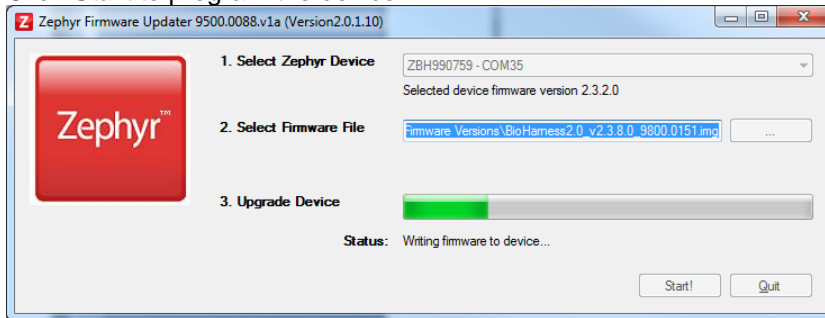
From v2.3.x.x onwards, there are two alternative firmware image files. They should be labelled according to the hardware part number appropriate for your device e.g.

Hardware Part No	Firmware Image
9800.0070v1c	BioH_2.3.8.0_9800.0070.img
9800.0151v1d	BioH_2.3.8.0_9800.0151.img

5. Select the image file and click **Open**.



6. Click **Start** to program the device>



A progress bar will indicate programming.

7. Click **Quit** when the '*Firmware Updated successfully on device ZBH...*' message is displayed.
8. If at any stage programming fails, such as accidental disconnection of the device, the utility will terminate updating. Just repeat the process.

5. Configure Device to Previous Settings

Use the Zephyr Cfg Tool to return the device to its previous configuration if required. This may have changed on upgrading to v2.3.8.0