

## Applications

The BioHarness Telemetry System can be used in any application that requires wireless physiological monitoring of human subjects including research, training and real-time response situations. Typical applications include:

- Teaching
- Research
- Sports Medicine
- Exercise Physiology
- Defense/Military Exercises

## Features and Benefits

### 1) Simultaneous monitoring of multiple parameters including, but not limited to:

- a. Heart rate
- b. Respiratory Rate
- c. Skin temperature
- d. Physical Activity Levels
- e. Posture

### 2) All parameters are recorded from a single garment

- a. Elimination of multiple devices provides a cost-effective solution

### 3) Patented Smart Fabric-based, dry contact strap

- a. Unobtrusive – no impediment to wearer
- b. Comfortable over long periods
- c. Washable

### 4) Robust Product Design

- a. Durable casing protects sensors during exercise
- b. Signal and data quality is maintained while undertaking extreme movements

### 5) Real-time (data transmission) or logged (data logging, “offline”) monitoring

- a. Allows genuine field-based studies
- b. Provides status information for real-time decision making
- c. Long-term data recording enables new research avenues to be explored

### 6) Wireless Data Transfer (wireless connectivity)

- a. Eliminates electrode/wire tethers
- b. Free range-of-movement for subject during study

## 7) All measurements are collected using one device

- a. Data is obtained in an identical format for all signals
- b. Eliminates hassle of time synchronization requirements when using separate devices
- c. Allows measurement or analysis between multiple physiological signals

## 8) Eight hour battery life during continuous use in Data-Logging mode

## 9) Five hour battery life during continuous use in Data-Transmission mode (with LabChart)

## 10) Simple USB re-charging

## 11) On-line analysis using LabChart's ECG Analysis Module (Optional).

### BioHarness Extension Software

17 channels are seen in the BioHarness Chart View (preset by the BioHarness Extension) in LabChart when the USB dongle/receiver is connected. Some channel settings can be changed, but it is restricted to renaming the channel title or setting up a Units Conversion. The sampling rate and range cannot be changed. The channel settings are described below:

#### Channel 1

ECG Data, mV

Indicative ECG only; amplification, filtering, and processing is applied to the output from the ECG sensor; minimum value 0, maximum value 4095; parameter only available in RF transmitting mode.

#### Channel 2

Breathing Wave, ACD (analog-to-digital converter unit); this value is just a raw number

Raw bit output of breathing sensor; unfiltered, unprocessed; minimum value 0, maximum value 4095

#### Channel 3

R-R Period, ms (milliseconds)

Time interval between successive heart contractions; calculated from ECG data; minimum value 250 (= 240 BPM), maximum value 1000 (= 60 BPM)

#### Channel 4

Heart Rate, BPM (beats per minute)

ECG data is filtered and processed to produce heart rate value; minimum value 0, maximum value 240

#### Channel 5

Respiration Rate, BPM (breaths per minute)

Respiration rate, takes 30-45 seconds from start of data processing to stabilize

## Channel 6

Skin Temperature, °C (degrees Celsius)

Skin temperature as measured by infrared sensor in apex of device; minimum value 10, maximum value 60



*Channels 1- 6 seen in the BioHarness Chart View*

## Channel 7

Posture, ° (degrees from vertical)

Degrees off vertical in any orientation; positive value indicates an anterior (lean forward) component, negative is a posterior component; minimum value - 90, maximum value + 90

## Channel 8

Vector Magnitude, Vector Magnitude Units (VMU), measured in g seconds

Average vector magnitude achieved in previous 1 second epoch; minimum value 0, maximum value 5.7

## Channel 9

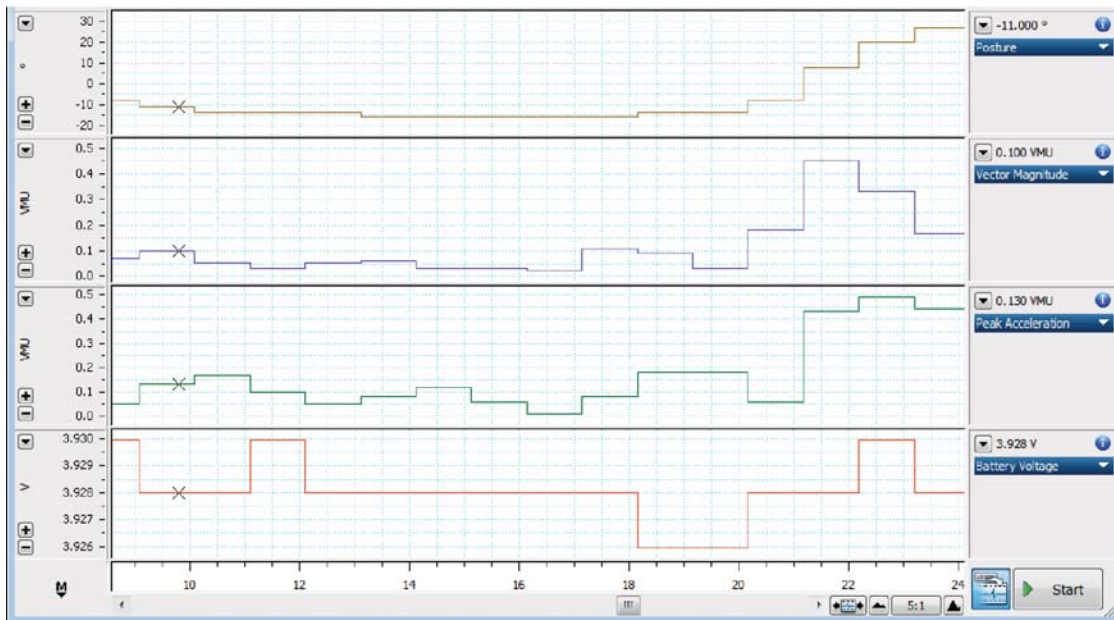
Peak Acceleration, Vector Magnitude Units (VMU), measured in g seconds

Maximum 3-axis acceleration magnitude achieved during previous 1 second epoch; minimum value 0, maximum value 5.7

## Channel 10

Battery Voltage, V (volts)

Voltage level of the battery; minimum value ~ 3.6, maximum value ~ 4.2



*Channels 7- 10 seen in the BioHarness Chart View*

## Channel 11

X Acceleration Min, g (gravitational force)

Smallest acceleration value recorded during the previous 1 second epoch; could be negative if there is acceleration in a negative direction or positive if all accelerations during that period are positive; minimum value - 3.3, maximum value + 3.3

## Channel 12

X Acceleration Max, g (gravitational force)

Largest acceleration value recorded during the previous 1 second epoch; could be negative if there is acceleration in a negative direction or positive if all accelerations during that period are positive; minimum value - 3.3, maximum value + 3.3

## Channel 13

Y Acceleration Min, g (gravitational force)

Smallest acceleration value recorded during the previous 1 second epoch; could be negative if there is acceleration in a negative direction or positive if all accelerations during that period are positive; minimum value - 3.3, maximum value + 3.3

## Channel 14

Y Acceleration Max, g (gravitational force)

Largest acceleration value recorded during the previous 1 second epoch; could be negative if there is acceleration in a negative direction or positive if all accelerations during that period are positive; minimum value - 3.3, maximum value + 3.3

## Channel 15

Z Acceleration Min, g (gravitational force)

Smallest acceleration value recorded during the previous 1 second epoch; could be negative if there is acceleration in a negative direction or positive if all accelerations during that period are positive; minimum value - 3.3, maximum value + 3.3

## Channel 16

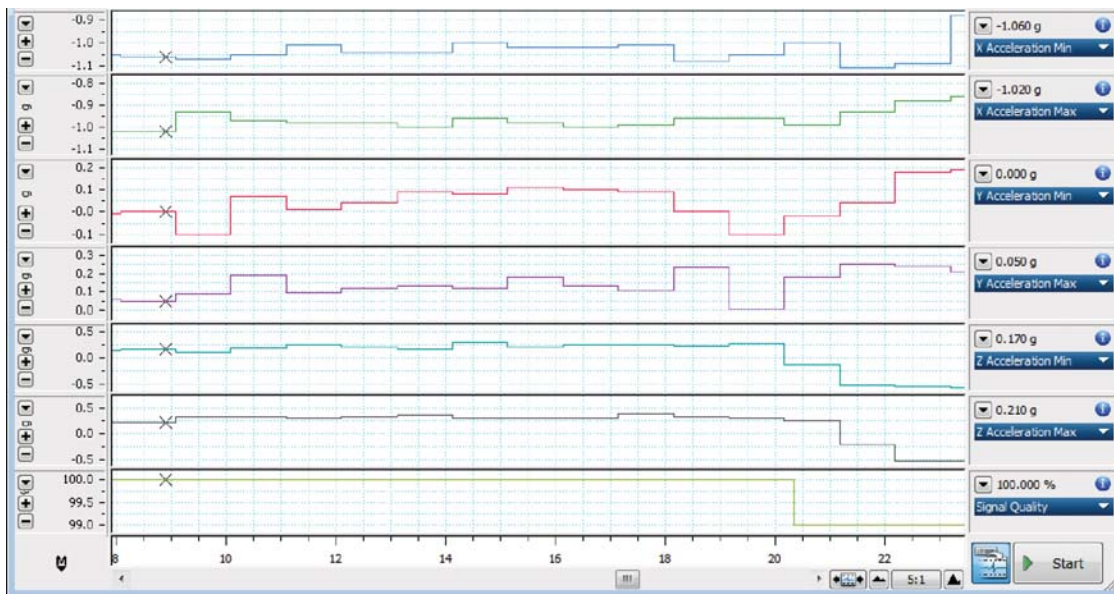
Z Acceleration Max, g (gravitational force)

Largest acceleration value recorded during the previous 1 second epoch; could be negative if there is acceleration in a negative direction or positive if all accelerations during that period are positive; minimum value - 3.3, maximum value + 3.3

## Channel 17 (parameter only available in RF transmitting mode)

Signal Quality, %

Representation of the percentage of data packets that are getting through from the device to the software;



*Channels 7-17 seen in the BioHarness Chart View*