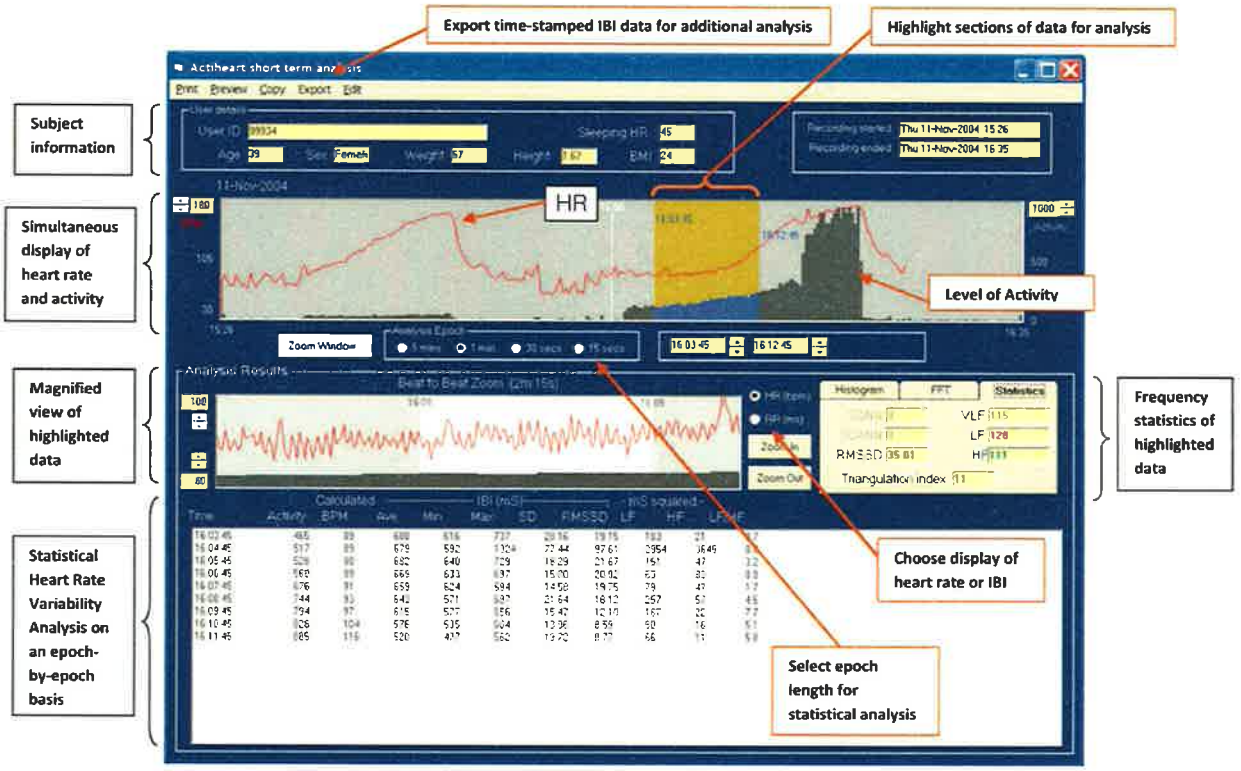
Heart Rate Variability (HRV) and Inter-Beat Interval (IBI) with Actiheart®

The Actiheart is ideally suited for Heart Rate Variability (HRV) and Inter-beat Interval (IBI) measurements in ambulatory settings. The Actiheart monitor can record heart rate and activity for up to 21 days or IBI with 1mS resolution for 440,000 beats (approx. 3.5 days @ 76bpm). The data is transferred to the Actiheart software which performs the Heart Rate Variability analysis. The statistics calculated by the Actiheart software are based on 'Heart Rate Variability, Standards of Measurement, Physiological Interpretation and Clinical Use.' Task Force of the European Society of Cardiology and the North American Society of Pacing and Electrophysiology[1]. Some selected statistics include:

IBI Ave	Average Inter-beat Interval (IBI) for the analysis epoch
IBI Min, IBI Max	Minimum and maximum IBI in the epoch
SD	Standard Deviation of the IBI data
LF, HF	The low and high frequency component of the IBI, derived using an FFT
Histogram	Occurrence distribution of IBI intervals



Example Heart Rate Variability and IBI analysis window from Actiheart Software

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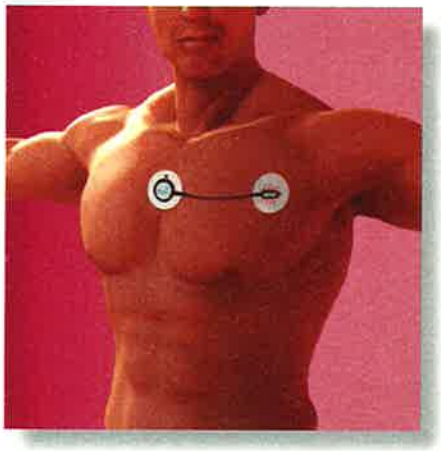
How does it work?



The Actiheart has two clips which attach directly to standard ECG electrodes. Usually one electrode is adhered at V1 or V2 (4th intercostals), and the second electrode is placed approximately 10cm away on the left side at V4 or V5 although this placement can be adjusted to be comfortable for the subject. The R-waves are detected and the time between them is recorded. Simultaneously, an internal accelerometer senses the frequency and intensity of the subject's torso movements.

The researcher can choose to record every R-R interval or record the number of R-waves detected in 15, 30, or 60sec epochs. Recording every R-R interval is best suited for evaluating the impact of a particular event on the instantaneous IBI and for calculating detailed statistics such as RMSSD, SDNN, HF/LF, etc. Recording the number of R-waves per epoch length is better suited for applications where the average maximum and minimum IBIs are sufficient for analysing data over longer periods of time. After a recording session, the data is transferred to the PC via a MultiReader and USB cable. The Actiheart software displays the heart rate and activity data vs. time, and calculates the appropriate statistics.

Actiheart advantages

- Extremely small, light-weight recording device. With a diameter of 32mm, thickness of 6mm and total weight of 10g, the Actiheart is ideal for ambulatory data collection. The Actiheart has been used on infants, toddlers, children, non-athletic, and athletic adults with success.
- Simultaneous collection of heart rate and accelerometry data allows the researcher to discern increased heart rate due to activity from increased heart rate caused by stress, or other psychological stimulus. The intensity of activity is recorded epoch by epoch along with the heart rate.
- Easy attachment using ECG electrodes keeps the Actiheart unobtrusive.
- Data and epoch length can be easily selected for statistical analysis.
- Automatic heart rate variability analysis using Actiheart Software.

Additional Information

See our website at www.camntech.com for more information regarding these products.

References

1 *European Heart Journal*, (1996), 17, 354 - 381.

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