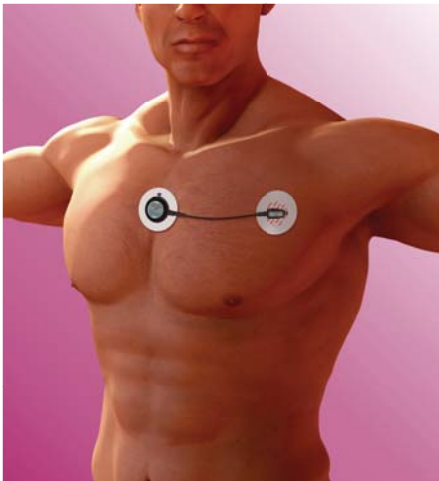


## Physical and Functional Comparison



*Actiheart and Cardio attach directly to standard 4mm ECG electrodes.*

**The Actiheart** measures R-wave inter-beat interval (IBI) and activity. It 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 uniaxial accelerometer senses the frequency and intensity of the subject's torso movements.

**The Actiwave Cardio** looks very similar to the Actiheart and attaches to the body in the same manner as the Actiheart. It measures the ECG waveform and 3-axes of acceleration as well as position. Physiological signals are amplified, sampled and stored in non-volatile flash memory. Sampling rates for the ECG waveform are selectable from 32Hz to 1024Hz, and for the activity waveform from 32Hz to 128Hz.



*Actiwave ECG/EEG recorders have slip-on leads which attach to any electrode with 4mm snaps.*

**Actiwave ECG/EEG Recorders** come in 1, 2, and 4-channel versions. These record ECG or EEG waveforms, and do not have an accelerometer. Sampling rates are selectable from 32Hz to 1024Hz, and resolution is selectable from 8 to 10 bits. The Actiwave monitors have 1mm diameter pins to which slip-on leads are attached.

CamNtech stocks two styles of leads. One lead set has touch-proof contacts on one end and 4mm female snap contacts on the other end. The second lead set has custom 1mm female sockets on one end and spring-loaded clip contacts on the other end. Either lead set will attach directly to any ECG or EEG electrodes that have 4mm male snap contacts.

## Data Storage and Display Comparison

A researcher using the **Actiheart** can choose to record every R-R interval or to 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, FFT analysis, 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.

**Actiwave ECG and Actiwave Cardio** data are stored on the PC in European Data Format (EDF+) files. The Actiwave software transfers data from the recorder to the PC via a dock and USB cable. The researcher may view and analyse the files using several popular third-party software packages, including public domain software (eg. Polyman, EDF browser).

For Cardio recordings which contain both heart rate and activity, optional Cardio Viewer Software may be used to analyse the saved .edf. Cardio Viewer has the capability to calculate the heart rate variability, analyse sleep quality, and calculate energy expenditure.

	<b>Actiheart</b>	<b>Actiwave Cardio</b>	<b>Actiwave ECG</b>
<b>Parameters Recorded</b>			
Heart Rate	Yes, derived from IBI	Yes, derived from ECG	Yes, derived from ECG
IBI	Yes	Yes, derived from ECG	Yes, derived from ECG
Activity per epoch	Yes, uniaxial	x	x
ECG Eaveform	x	Yes	Yes
Activity Waveform	x	Yes, 3-axes of acceleration	x
Recording Length	Up to 440,000 beats in IBI recording mode	31hrs with 128Hz ECG; 32Hz activity	36hrs with 128Hz, 8 bit ECG
Sampling Rate	1ms	ECG: 32Hz to 256Hz Activity: 32Hz to 256Hz	ECG: 32Hz to 1024Hz
Resolution	1ms for IBI 8 bits for activity	8, 9, or 10 bits	8, 9, or 10 bits
Data Format	Proprietary	EDF+	EDF+
Available Software	<i>Actiheart Software</i> transfers data to PC, analyses and displays heart rate	<i>Cardio Viewer</i> transfers data to PC, analyses and displays heart rate	<i>Actiwave Software</i> transfers data to PC for all data collection



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Actiheart	Actiwave Cardio	Actiwave ECG
Heart rate, activity, energy expenditure and heart rate variability.	Variability, sleep quality, and energy expenditure for recordings with both ECG and activity. Actiwave Software transfers data to PC for all data collection to be analysed by third party software including public domain software.	To be analysed by third party software including public domain software.

***Additional Information***

See our website at [www.camntech.com](http://www.camntech.com) for more information regarding these products.




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