

- Beat by Beat Heart Rate
- IBI cleaning.
- Average Heart Rate
- HR Acceleration / Deceleration
- Second by Second IBI
- Half Second, Quarter Second.
- Heart Rate Variability.

EKG and Heart Rate are measured with our EKG device, which is often combined with Skin Conductance as in the PsychLab SC-EKG shown here. Standard dot snapper electrodes are used to pick up the heart wave-form. They may be positioned at any convenient location either side of the heart, including convenient locations on the right collar bone and left stomach, on the back or on the wrists. The further electrodes are from the heart, the greater the chance of muscle activity interposing on the EKG wave, however EKG is a very strong signal and reliable measurement is usually easy to obtain.

## Beat by Beat Heart Rate

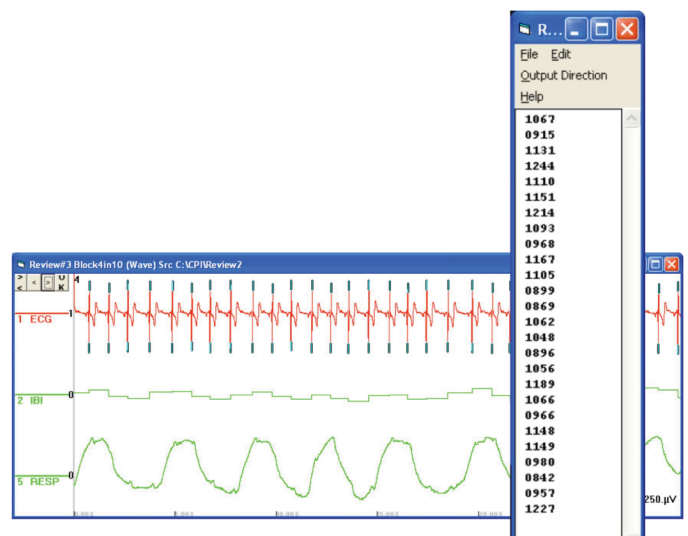
The PsychLab EKG device has an inbuilt IBI detector, however more reliable IBI is obtained by analyzing stored raw EKG wave off-line. Heart rate is directly inversely proportional to IBI. To extract Heart Rate (HR) from raw EKG, each R wave is detected using the PsychLab Wave algorithm.

PsychLab can reliably process the entire recording, or just required trial sections, fully automatically.

## IBI cleaning

PsychLab analysis software allows Results Format Processing (RFP) using intelligent user script processing to work on data before it is expressed as result text. By loading a standard script designed for Heart Rate cleaning, which can easily be modified if required, the following process is performed to check each new detected R wave:

The average of 20 beats is obtained, and then each new beat is checked such that its interval must fall within a given percentage of the average. If the next R wave is outside this window, it is considered as artefact and the next R wave is used. The example below shows a noisy section of EKG, with resulting disruption caused



A recording showing 1) EKG with markers automatically positioned on each R wave and resultant IBI numbers, 2) IBI as measured with the EKG device internal IBI detector, and in channel 5) Respiration.