BE87 FRESHMAN SEMINAR

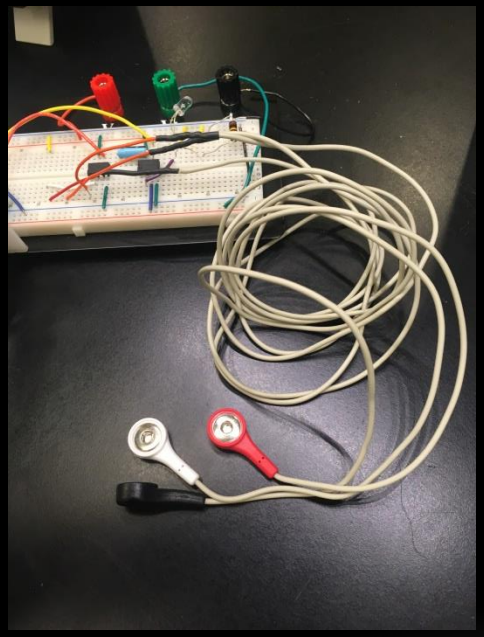
WEEK 5: VIEWING A REAL-TIME ECG

Goals for this session:

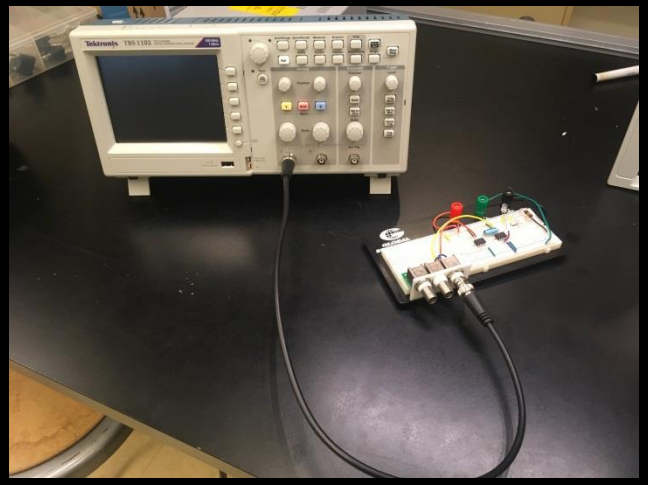
- Finish bread board wiring of amplifier circuit
- Check connections and wiring for the ECG amplifier system
- Set up oscilloscope to view voltage
- Use skin electrodes to acquire and display an ECG on your partner

INTERCONNECTS FOR BIOAMPLIFIER

- 3 ECG wires from amplifier to subject
- BNC wire from amplifier output to oscilloscope



3 ECG wires connect directly to breadboard



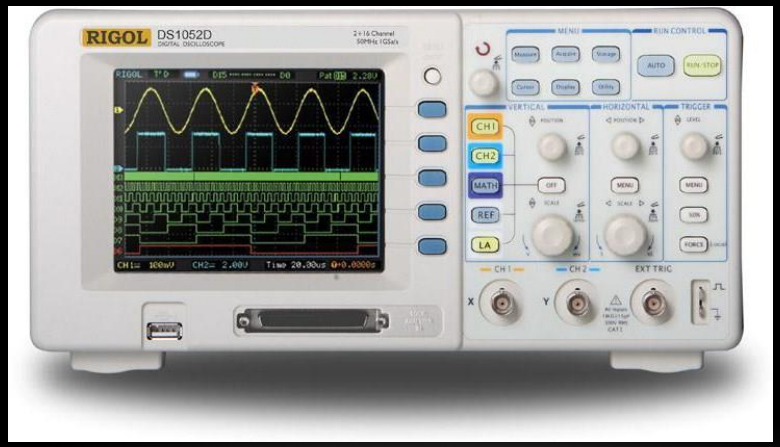
Amplifier output to o-scope for viewing

ECG ELECTRODES

- Greatly reduce skin resistance, thus increase signal strength
- Silver/silver-chloride electrodes, with contact gel
- Electrode uses a chemical reactions to covert ionic movement in the biological specimen to electron movement in the wires/instrument
- Gel reduces resistance between electrode and skin

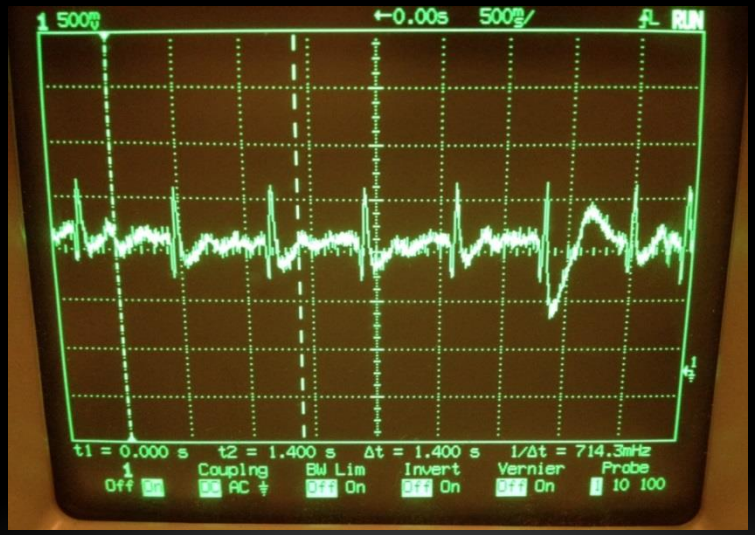
THE OSCILLOSCOPE

- Used to measure time-varying electrical voltages
- Display plot of voltage vs. time
- Since heart rate is relatively slow, need to have a large time-scale in the o-scope, around 500ms.



O-SCOPE ADJUSTMENT TO VISUALIZE AN ECG

- Input wire from ECG amp into Channel 1 input
- Volts/division: 1V
- Sec/Division: 500 ms
- Tigger menu: Trigger source: Channel 1; Mode-auto

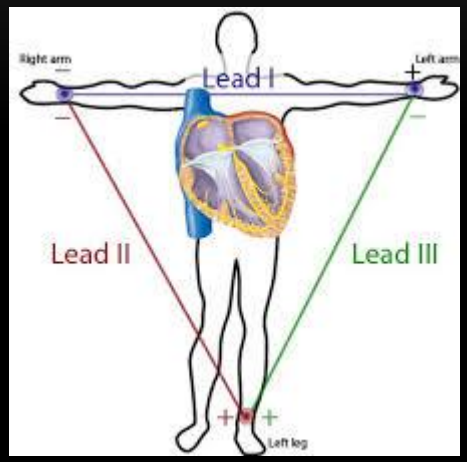


SAFETY ISSUES FOR HUMAN-ECG MEASURES

- Previous precautions will prevent any exposure to dangerous AC voltages (use of battery power, input diodes)
- Do not touch any devices or electronics while attached to an ECG recording machine
- Avoid contact with any metal such as the table frame

ECG PROPERTIES

Typical frontal-plane system records from a triangle of directions around the heart



In our system, place the 2 recording electrodes on the wrists. Ground can be anywhere on the body (even a wrist, closer to the body). This recording will be analogous to a Lead I measurement from a clinical ECG system

WEEK 5 TOPICS FOR FINAL REPORT

- Skin electrodes: function
- Oscilloscope: function
- Safety issues with the human-device interface
- Picture of an ECG signal from the oscilloscope screen
- Clinical analogy to our ECG measurement (Lead I)