

## Experiment HH-10: 12-Lead Electrocardiograms (ECGs)

### Equipment Required

PC or Mac Computer

IWX/214, USB cable, IWX/214 power supply

C- AAMI-504 ECG cable

Electrode lead wires

C-WT-100 Wilson Terminal

C-ISO-256 3-lead isolated cable

Alcohol swabs

Disposable ECG electrodes (12)

### Start the Software

1. Click on LabScribe
2. Click Settings → Human Heart → 12Lead-ECG
3. Once the settings file has been loaded, click the **Experiment** button on the toolbar to open any of the following documents:
  - Appendix
  - Background
  - Labs
  - Setup (opens automatically)

***Note:** It is suggested that students dress appropriately for these exercises. A button-down shirt will make it easier to move the chest lead into correct position.*

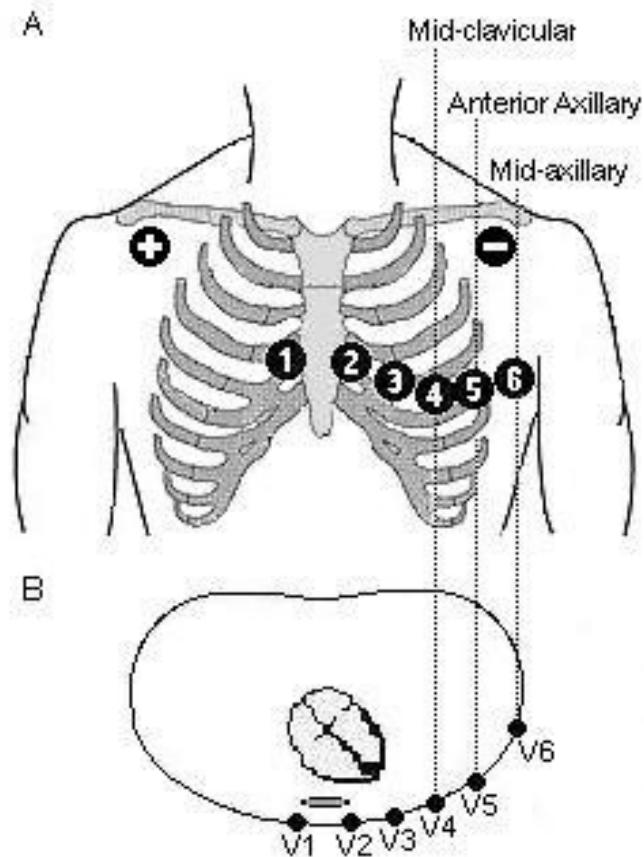
### Electrode Placement

1. The subject should remove all jewelry from his or her neck, wrists, and ankles. Cell phones should be removed from pockets.
2. Use an alcohol swab to clean and scrub regions on each wrist and ankle, under the lateral end of each clavicle and, on the chest ([Figure HH-10-S1](#)). Let the areas dry.

3. Obtain 12 disposable electrodes. Remove each electrode from its protective plastic sheet and apply it to one of the following scrubbed areas on the subject's body:
  - under the lateral ends of each clavicle; for use as the positive and negative electrodes of Lead I.
  - on each wrist and each ankle; for use as the ground and the three electrodes that form the indifferent point for the chest leads.
  - over the right border of the sternum at the 4th intercostal space; for use as the active electrode of the V1 chest lead.
  - over the left border of the sternum at the 4th intercostal space; for use as the active electrode of the V2 chest lead.
  - on the left mid-clavicular line at the 5th intercostal space; for use as the active electrode of the V4 chest lead.
  - halfway between V2 and V4; for use as the active electrode of the V3 chest lead.
  - on the anterior axillary line at the same horizontal level as V4; for use as the active electrode of the V5 chest lead.
  - on the mid-axillary line at the 5th intercostal space; for use as the active electrode of the V6 chest lead.

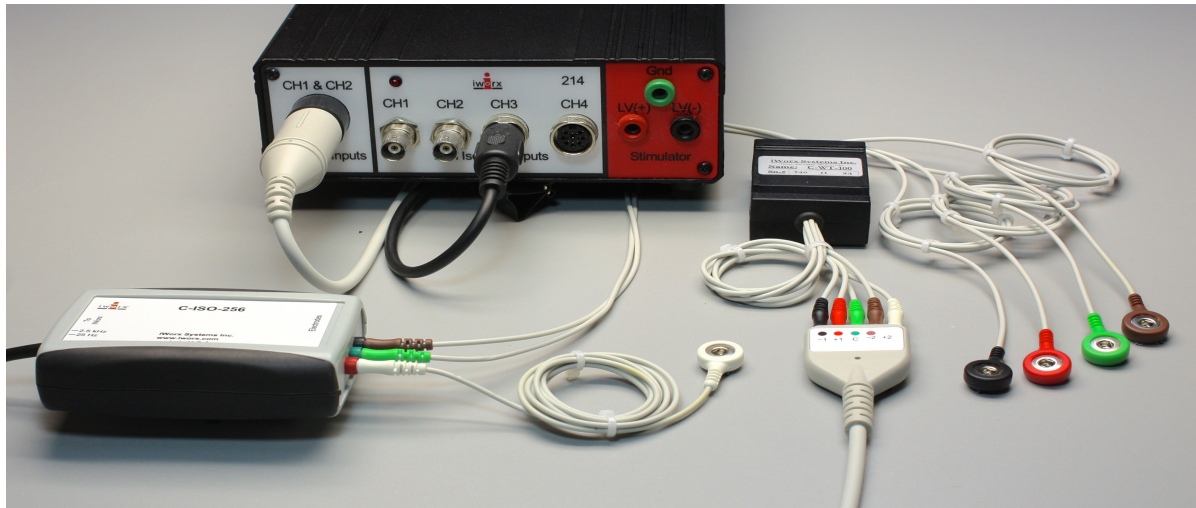
### **ECG Cable Setup**

1. Locate the C-AAMI-504 ECG cable, the C-ISO-256 cable and the C-WT-100 Wilson Terminal ([Figure HH-10-S2](#)).
2. Insert the black AAMI connector on the end of the ECG cable into the isolated inputs of Channels 1 and 2 of the IWX/214.
3. Plug the DIN8 connector from the C-ISO-256 cable into Channel 3 of the IWX/214.
4. Attach the five color-coded wires from the Wilson Terminal into the sockets of lead pedestal of the gray patient cable.
5. Attach four color-coded (red, black, green, brown) single electrode lead wires to the sockets on the Wilson Terminal. Snap the other ends of the lead cables to the electrodes on the subject, so that:
  - the black “-1” lead wire is connected to the electrode below the left clavicle,
  - the red “+1” lead wire is connected to the electrode below the right clavicle,
  - the green “C” lead wire is connected to the electrode on the right ankle,
  - the brown “-2” lead wire is connected to the electrode on the left leg.



*Figure HH-10-S1: A: Frontal view of the electrode positions for Lead I and the six chest leads. B: Top view of the electrode positions for the chest leads.*

6. Attach the green and brown lead wires from the Wilson Terminal into the correct sockets on the C-ISO-256 cable ([Figure HH-10-S3](#)).
  - the green “ground” lead wire connects to the GND socket.
  - the brown “-1” lead wire connects to the NEG(-) socket.
7. Attach the white electrode snap lead to the POS(+) input on the C-ISO-256 cable. Snap the other end of this cable to the first chest lead (V1). This will be the lead that is moved to the other chest electrodes during this lab in order to record all of the 6 chest leads ([Figure HH-10-S3](#)).



*Figure HH-10-S2: C-AAMI-504 cable with the Wilson Terminal, the C-ISO-256, and the electrode cables attached to an IWX/214 for recording limb and chest lead ECG.*



*Figure HH-10-S3: C-ISO-256 3-lead cable connected to the Wilson Terminal and the C-AAMI cable.*