

## Experiment HH-9: ECG and Heart Sounds using an Electronic Stethoscope

### Equipment Required

PC Computer

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

C-AAMI-504 ECG cable and electrode lead wires

ES-300 electronic stethoscope

Alcohol swabs

Disposable ECG electrodes

### Start the Software

1. Click on LabScribe
2. Click Settings → Human Heart → ECG-Stethoscope
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)

### ECG Cable and Electronic Stethoscope Setup

1. Locate the C-AAMI-504 ECG cable and electrode lead wires ([Figure HH-9-S1](#)), and ES-300 electronic stethoscope ([Figure HH-9-S2](#)), in the iWorx kit.



*Figure HH-9-S1: The C-AAMI-504 ECG cable with three lead wires attached.*



*Figure HH-9-S2: The ES-300 electronic stethoscope with Phono-DIN8 cable.*

2. Locate the Phono-DIN8 cable that is packaged with the ES-300 electronic stethoscope. Plug the small phono jack into the side port of the stethoscope.
3. Plug the DIN8 connector of the ES-300 Phono-DIN8 cable into Channel 3 of the IWX/214 ([Figure HH-9-S3](#)).
4. 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 ([Figure HH-9-S3](#)).
5. Insert the connectors on the red, black, and green electrode lead wires into the matching sockets on the lead pedestal of the ECG cable.
6. Instruct the subject to remove all jewelry from their wrists and ankles. Other electrode locations can be just under each clavicle and the abdomen. This will give a better recording.
7. Use an alcohol swab to clean a region of skin on the inside of the subject's right wrist/clavicle. Let the area dry. Then, rough up the skin in that area with an emery board. this improves the conductivity of the electrodes.



*Figure HH-9-S3: The ECG cable and electronic stethoscope connected to an IWX/214.*

8. Remove a disposable ECG electrode from its plastic shield, and apply the electrode to the scrubbed area on the wrist/clavicle.
9. Repeat Steps 6 and 7 for the inside of the left wrist/clavicle and the inside of the right ankle/abdomen.
10. Snap the lead wires onto the electrodes, so that:
  - the red (+1) lead is attached to the right wrist or under the right clavicle,
  - the black (-1) lead is connected to the left wrist or under the left clavicle,
  - the green (C or ground) lead is connected to the right leg or on the abdomen.
11. Instruct the subject to sit quietly with their hands in their lap. If the subject moves, the ECG trace will move off the top or bottom of the screen. If the subject moves any muscles in the arms or upper body, electromyograms (EMGs) from the muscles will appear on the ECG recording as noise.
12. Press the Power button on the ES-300 electronic stethoscope so that the blue power light on the bell of the stethoscope is lit.

**Note:** The ES-300 electronic stethoscope automatically shuts off after 2 minutes. Push the Power button to turn the stethoscope back on. The stethoscope can be programmed for 5 minutes by Pushing and Holding the Power button until all LED lights are lit. See the Tech Note for the ES-300.