

Experiment HE-12: Targeted Exercise with iWire ROAM (ECG)

“Get Your Cardio On”

iWire-ROAM Setup

1. Locate the iWire-ROAM.

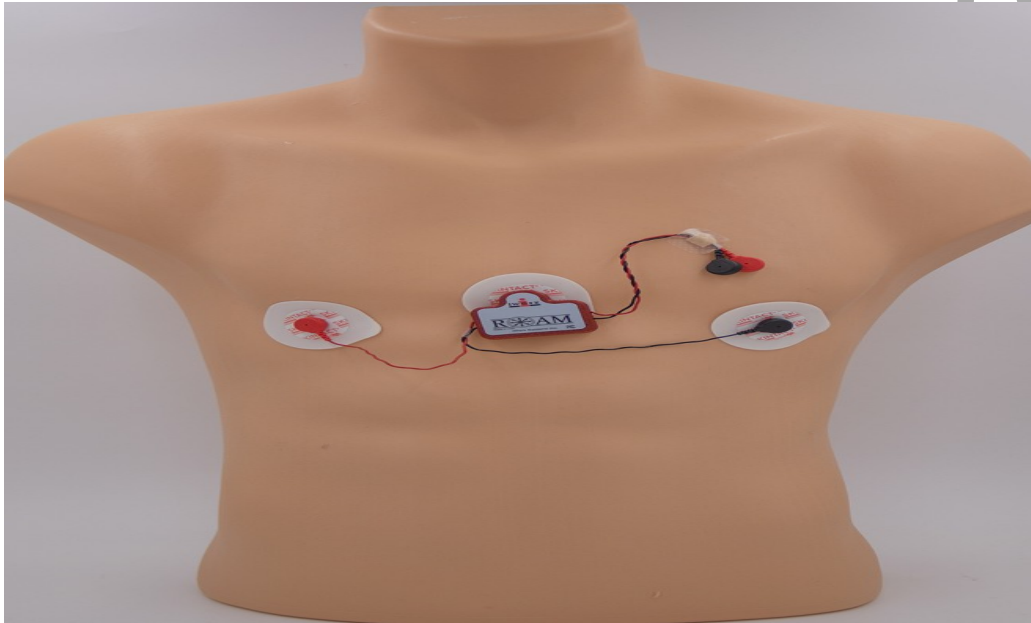


Figure HE-12-S1: The iWire ROAM – IXR-ECG.

2. Connect the ROAM receiver to the iWire1 port on the front of the IX-TA. Turn the ROAM transmitter on by tapping on it.
3. Turn the IX-TA on.
 - The LED on the receiver will blink while it looks for the transmitter
 - Once the transmitter is found, the light will stay steady to show that the connection has been made.



Figure HE-12-S2: The ROAM receiver connected to the IX-TA.

IMPORTANT INFORMATION

- If the ROAM device is not being recognized by the TA – go to TOOLS → FIND HARDWARE after tapping the transmitter to wake it up.
- The transmitter must be connected to the individual and awake.
- Place the ROAM on the chest as shown in the image above (black electrode on the right, red electrode on the left, the unit itself is the ground).

Optional Equipment Needed for Additional Experimentation

If testing Aerobic Fitness, VO2Max, RER, or other labs such as EMG activity while exercising, you will also need these equipment plus the equipment shown in each of those labs. You will need to open the other lab exercises.

Experiment HE-12: Targeted Exercise with iWire ROAM (ECG)

“Get Your Cardio On”

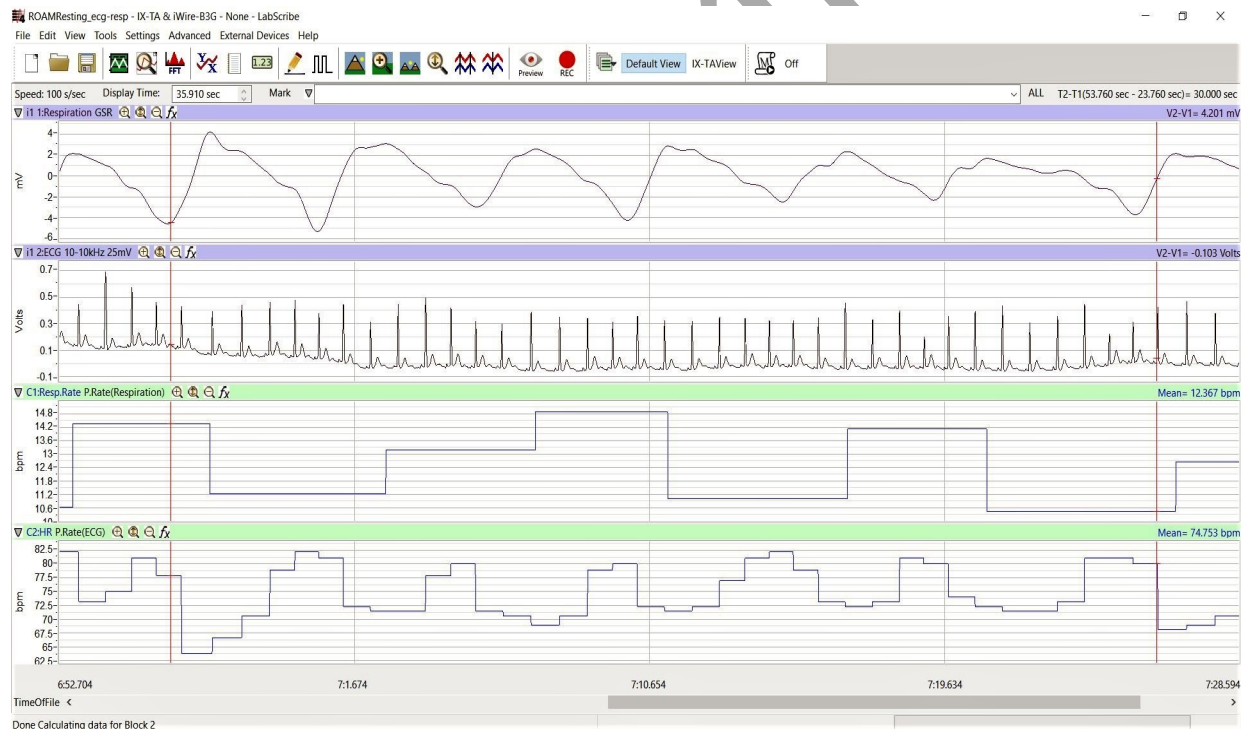
Exercise 1: Wireless ECG and Heart Rate

Aim: To measure the heart rate of a resting subject.

Approximate Time: 30-60 minutes depending on the exercise chosen

Procedure

1. Click on the Record button.
2. Click on the AutoScale All button. Your recording should look similar to the image below.
3. When you have a suitable trace, type **Resting** in the Mark box to the right of the Mark button. Click the mark button. Record for at least 5 minutes.
 - Immediately after the start time, have the subject sit still for 10 minutes and record a good, resting ECG.
4. After the 10 minutes of recording a resting ECG and heart rate, have the subject begin the chosen exercise protocol/routine to be recorded. This is the time to “Get Your Cardio On” and get active.



5. As the subject exercises, have them periodically take their pulse and record heart rate. A partner should write down the time, physical activity being performed, and the subject's heart rate at that point. Heart rate should be taken at least three (3) times during the recording of data.
 - This is just to keep an eye on the subject and make sure they are exercising properly.
6. Click Stop to halt recording.
7. Select Save As in the File menu, type a name for the file. Click on the Save button to save the data file.

Data Analysis

1. Scroll through the recording and find at least sixty seconds of data with exemplary ECG waves. Since the subject is resting and breathing normally, the trace on the Heart Rate channel may cycle, which demonstrates normal respiratory sinus arrhythmia. The data should show ECG and Heart Rate Channels, as well as channels for respiration if you choose to use them.
2. Use the Display Time icons to adjust the Display Time of the Main window to show the complete heart rate cycles on the Main window.
3. Click on the Analysis window icon.

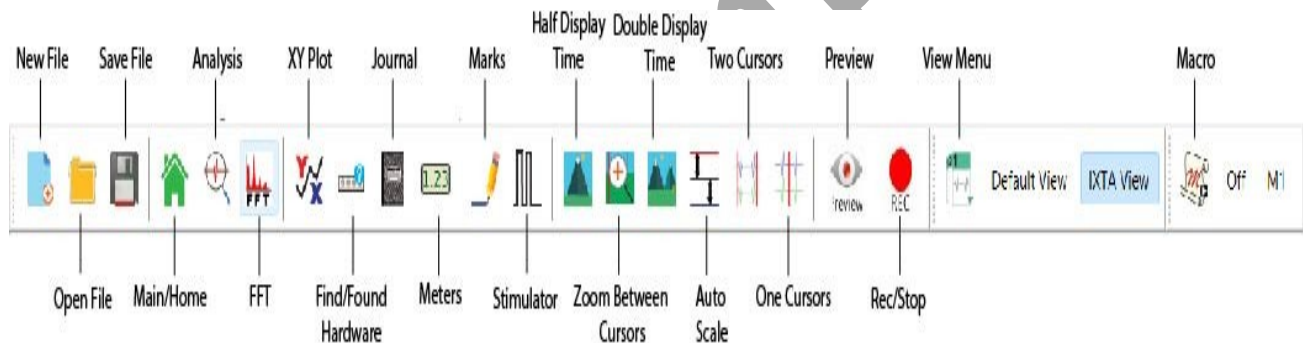


Figure HH-5-L2: The LabScribe Toolbar.

4. Look at the Function Table that is above the uppermost channel displayed in the Analysis window. The names of the mathematical functions used in the analysis, Max, Min, and Mean, appear in this table. The values for these three parameters on each channel are seen in the table across the top margin of each channel.
5. Once the cursors are placed in the correct positions for determining the maximum, minimum, and mean heart rates in the section of data displayed in the Analysis window, the values of these parameters can be recorded in the on-line notebook of LabScribe by typing their names and values directly into the Journal, or on a separate data table.

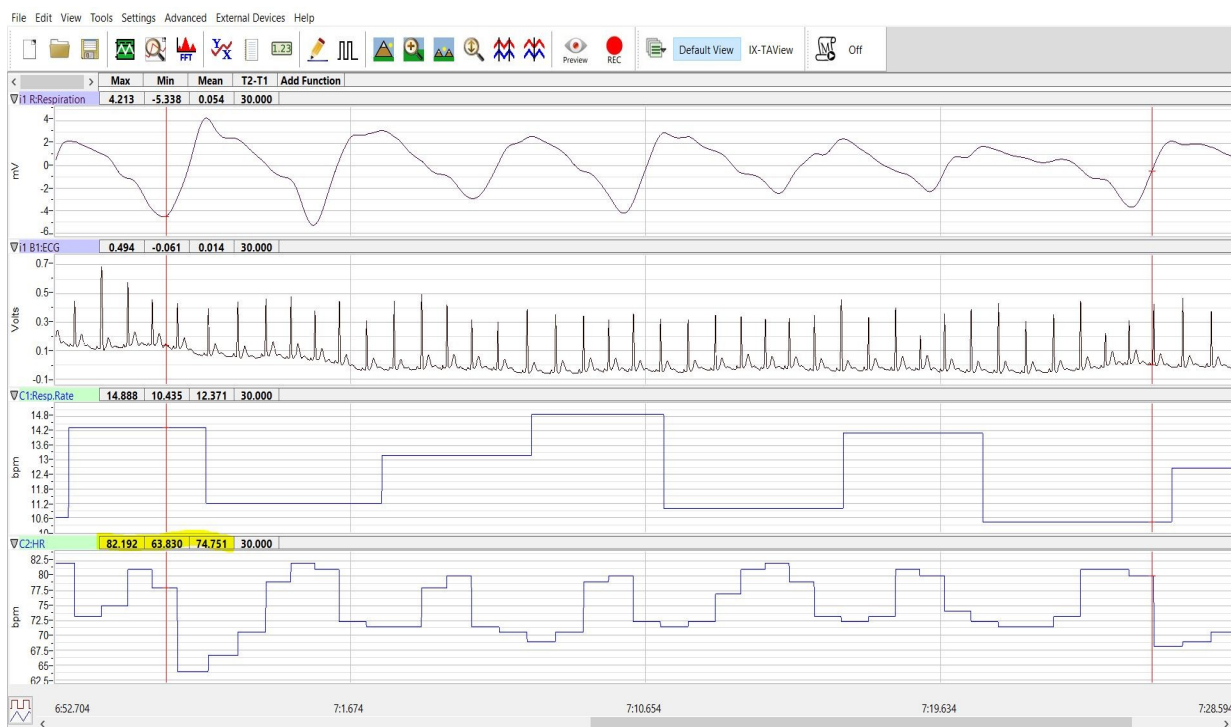


Figure HE-12-L3: The Heart Rate as shown in the Analysis window.

5. Click on and move the two vertical cursors to different areas of interest in the data recording.
 - Move the cursors to the first few minutes of the recording to determine the subject's Resting Heart Rate.
 - The scroll through the recording and place the cursors at least two minutes (120 seconds) apart by doubling the display time and moving the cursors to either side of the recording. The value **Mean**, will state the subject's mean heart rate in beats per minute (bpm) as bracketed by the cursors. **Max** and **Min** will show the subject's max and min Hrs during that time as well.
 - Continue to scroll through the recording while the subject was actively exercising. Periodically, approximately every 2-3 minutes of recording, repeat the analysis of Heart Rate and Resp Rate if desired. If the exercise routine was longer than 30 minutes, data can be taken every 5-10 minutes.
7. Fill in the data table below for the subject's heart rate and activity levels at each time interval.

Questions:

1. What was the subject's resting heart rate? Did the resting heart rate calculated by the ROAM match the subject's measured resting heart rate? If not, what could be a factor contributing to this?

2. What is the subject's maximum heart rate based on age and fitness level?
3. What is the subject's target heart rate? Remember this is 50-85% of maximum heart rate. Keep in mind that if the subject is not physically fit, the level should be closer to 50%; if the subject is very fit, it should be closer to 85%.
4. What was the subject's heart rate at the beginning of the exercise routine?
5. What was the subject's heart rate 3-5 minutes into the exercise routine? 6-10 min? 9-15min? Etc...
6. Did the subject reach his or her target heart rate? Could the subject stay within the target heart level while doing the exercise routine that was chosen?
7. How did this exercise routine compare to a different type of exercise?
8. Do these different types of exercise allow the person to maintain their target heart throughout the entire exercise routine or does the heart rate fluctuate?
9. How does keeping to a target heart rate improve exercise quality compared to a heart rate that moves in and out of range?
10. Is there one exercise routine that does this better than others?

Table HE-12-L1: Heart Rate and Activity Level while Resting and Exercising

Time Interval	Mean Heart Rate (BPM)	Max Heart Rate (BPM)	Min Heart Rate (BPM)
Resting			
Beginning Exercise			
Exercise 3 min			
Exercise 6 min			
Exercise 9 min			
Exercise 12 min			
Exercise 15 min			
Exercise 18 min			
Exercise 21 min			
Exercise 24 min			
Exercise 27 min			