

## Exercise 22 - Activity 11: Measuring Reaction Time Using iWorx

In this activity, the reaction times of the subject will be recorded while stimuli are delivered either randomly or at fixed intervals.

### Equipment Required

- PC Computer
- IWX/214 data acquisition unit
- USB cable
- IWX/214 power supply
- EM-100 Event marker

### Equipment Setup

- 1 Click on the LabScribe shortcut on the computer's desktop to open the program. If a shortcut is not available, click on the Windows Start menu, move the cursor to **All Programs** and then to the listing for **iWorx**. Select **LabScribe** from the **iWorx submenu**. The LabScribe Main window will appear as the program opens.
- 1 On the **Main window**, pull down the **Settings menu** and select **Load Group**.
- 2 Locate the folder that contains the settings group, **Marieb-LS2.iwxgrp**. Select this group and click **Open**.
- 3 Pull down the **Settings menu** again. Select the **ReactionTime22-LS2** settings file.
- 4 After a short time, LabScribe will appear on the computer screen as configured by the **ReactionTime22-LS2** settings.
- 5 For your information, the settings used to configure the LabScribe software and the IWX/214 unit for this experiment are listed in Table 22-1 on page 19. These settings are programmed on the **Preferences Dialog window** which can be viewed by selecting **Preferences** from the **Edit menu** on the LabScribe Main window.

**Table 22-1: Settings on the Channel Window of the Preferences Dialog Used to Configure the iWorx Recording System for Exercise 22 - Activity 11.**

Parameter	Units/Title	Setting	Mode/Function
Acquisition Mode		Chart	
Start		User	
Stop		User	
Display Time	Sec	5	
Speed	Samples/Sec	200	
Channel A3	Reaction Time	√	DIN8

### Event Marker Setup

- 1 Locate the EM-100 event marker (Figure 22-1 on page 19), in the iWorx kit.
- 2 Plug the DIN8 connector to the EM-100 event marker into the Channel 3 input of the IWX/214 (Figure 22-2 on page 19).

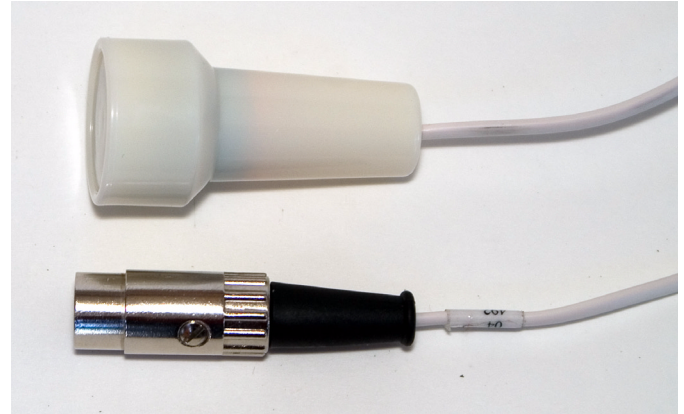


Figure 22-1: The EM-100 event marker.



Figure 22-2: The EM-100 event marker connected to an IWX/214.

**Note:** In this exercise, it is important to press and release the button of the event marker quietly because any sound could be used by the subject as a cue.

### Recording the Data

- 1 Instruct the subject to:
  - Sit in a chair and face the computer screen.
  - Position a hand on the keyboard in a manner that enables the subject to push the **Enter key** as quickly as possible.
  - Watch the right side of the computer screen and quickly press the **Enter key** on the keyboard when the signal generated by the event marker first appears.

- Out of sight of the subject, another student should prepare to quietly press and release the button of the **Event Marker**.
- There are a total of ten trials in each segment of the experiment. In the first two segments, the timing between the stimuli will be random. In the last two segments, the intervals between stimuli will be fixed.
- Tell the subject to relax for a few minutes.

### Segment 1 - Random Trial 1

- Inform the subject that ten stimulus signals will be presented at random intervals.
- Instruct the subject to be ready. Click the **Record** button on the Main window to begin the recording. Present the subject with a total of ten signals delivered in a pattern that is difficult for the subject to predict. One second after the last stimulus signal, click **Stop** to halt recording.

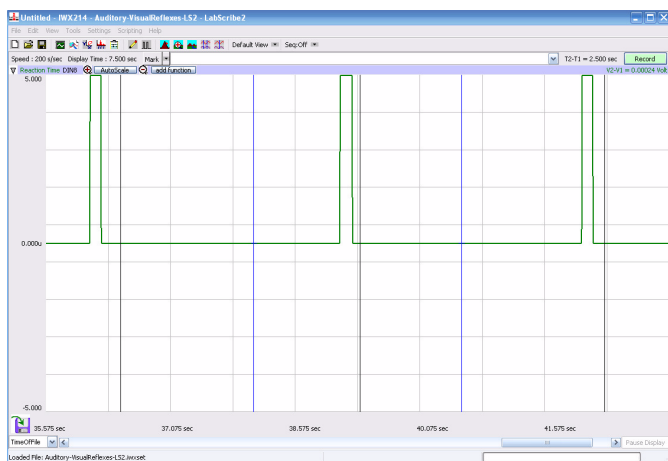


Figure 22-3: Three visual cues, each followed by the subject's response, are displayed on the Main window. Each visual cue is made by pushing the button of the EM-100 event marker momentarily; each response mark is made by the subject pushing the Enter key on the keyboard.

- After the tenth cue, click **Stop** to halt recording.
- Select **Save As** in the **File** menu, type a name for the file. Choose a destination on the computer in which to save the file, like your lab group folder). Designate the file type as **\*.iwxdata**. Click on the **Save** button to save the data file.

### Segment 2 - Random Trial 2

Repeat the steps of Segment 1. Click the **Save** button to save the data in the same file as Segment 1.

### Segment 3 - Fixed Interval Trial 1

- Inform the subject that ten stimulus signals will be presented at a regular interval.
- Instruct the subject to be ready. Click the **Record** button on the Main window to begin the recording. Present the subject with a total of ten signals delivered in a regular pattern (e.g.

one signal every two seconds) One second after the last stimulus signal, click **Stop** to halt recording.

- Click the **Save** button to save the data in the same file as Segments 1 and 2.

### Segment 4 - Fixed Interval Trial 2

- Repeat the steps of Segment 3. Click the **Save** button to save the data in the same file as Segment 1, 2, and 3.
- To record from another subject, click **New** in the **File** menu. Repeat the experiment.

### Data Analysis

- Scroll to the beginning of the data recorded for Segment 1 - Random Trials 1 and display the signal and response in the first trial on the **Main window**.
- Use the **Display Time** icons to adjust the **Display Time** of the **Main window** to show both the visual cue made with the event marker and the mark made by the subject's response on the **Main window**. This trial can also be selected by:
  - Placing one cursor before the beginning of the visual cue and the second cursor after the mark made by the subject; and
  - Clicking the **Zoom between Cursors** button on the **LabScribe** toolbar to expand the complete reaction trial to the width of the **Main window**.

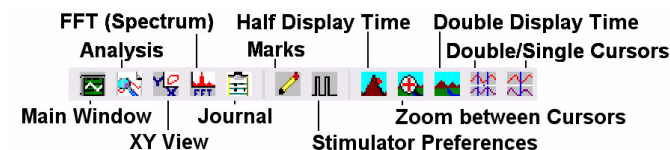


Figure 22-4: The **LabScribe** toolbar.

- Click on the **Analysis window** icon in the toolbar (Figure 22-4 on page 20) or select **Analysis** from the **Windows** menu to transfer the data displayed in the **Main window** to the **Analysis window** (Figure 22-5 on page 21).
- Look at the **Function Table** that is above the display of the **Reaction Time channel** displayed in the **Analysis** window. The mathematical function, **T2-T1**, should appear in this table. The value for **T2-T1** is seen in the table across the top margin of the **Reaction Time channel**.
- Use the mouse to click on and drag a cursor to the onset of the signal used as the visual cue. Drag the other cursor over the mark made by the subject responding to the visual cue. The value for the **T2-T1** on the **Reaction Time channel** is the reaction time for the trial.
- Record the reaction time, which is the value for the **T2-T1** function in Table 22-2 on page 21.
- Repeat Steps 5 and 6 for the other 9 trials in the segment and each of the ten trials in the other three segments. Record the reaction times in Table 22-2 on page 21.

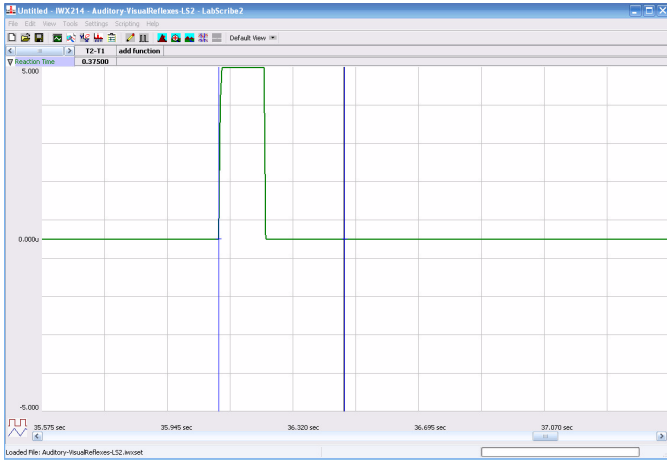


Figure 22-5: A visual cue, followed by the subject's response, are displayed on the Analysis window. The two cursors are positioned at the beginning of the visual cue and on the mark for measurement of the subject's reaction time (T2-T1) in this trial.

**Questions**

- 1 Is the average reaction time from Segment 2 lower than the average from Segment 1? Or is the reverse true? What might account for the difference in the averages, if one exists?
  
- 2 Is the average reaction time from Segment 4 lower than the average from Segment 3? Or is the reverse true? What might account for the difference in the averages, if one exists?

**Table 22-2: Reactions Times for Fixed and Random Intervals between Presentation of Stimuli.**

Stimulus Signal	Reaction Times (seconds)			
	Random Interval		Fixed Interval	
	Segment 1	Segment 2	Segment 3	Segment 4
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
Average				

- 3 How do the reaction times for the random trials compare to the reaction times for the fixed interval trials?