Experiment HN-1: Auditory and Visual Reflexes with Macros

Equipment Required

PC or Mac Computer

IXTA, USB cable, IXTA power supply

EM-220 Event marker

Headphones or personal earbuds for listening to sounds

Event Marker Setup

1. Locate the EM-220 event marker.
2. Plug the connector to the EM-220 event marker into the EM1 Channel input on the back of the IXTA.
3. Plug headphones or earbuds into the “Audio” port on the back of the IXTA.

Figure HN-1A-S2: The IXTA with the EM-220 event marker. Headphones or earbuds will be attached to the “Audio” port shown by the yellow arrow.

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Experiment HN-1: Auditory and Visual Reflexes with Macros

Exercise 1: Reaction Time and Visual Signals

Aim: To measure the reaction time of a subject to a visual signal.

Approximate Time: 15 minutes

Procedure

1. Read all instructions carefully before beginning to record.
2. Information for the subject:
   - Instruct the subject to sit in a chair and face the IXTA box.
   - Watch the LCD screen and quickly press the event marker when screen flashes a white square.
   - Note – the screen will alternate between black and white. Only click when you see a white square.
   - The subject will perform ten trials.
4. Choose the "Visual" macro from the Macros panel.

Figure HN-1-L1: Macros panel.

5. Choose Visual from the Views Panel.

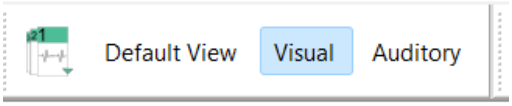

Figure HN-1-L2: Views panel

This is now set for Visual Reflexes

6. Instruct the subject to press the event marker as soon as he or she sees a white square on the LCD screen.
7. The signals should will be no less than one second or more than five seconds apart.
8. Click on the Record button. The macro will start automatically.
9. After the tenth response, click Stop to halt recording.

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10. Select Save As in the File menu, type a name for the file. Click on the Save button to save the data file.

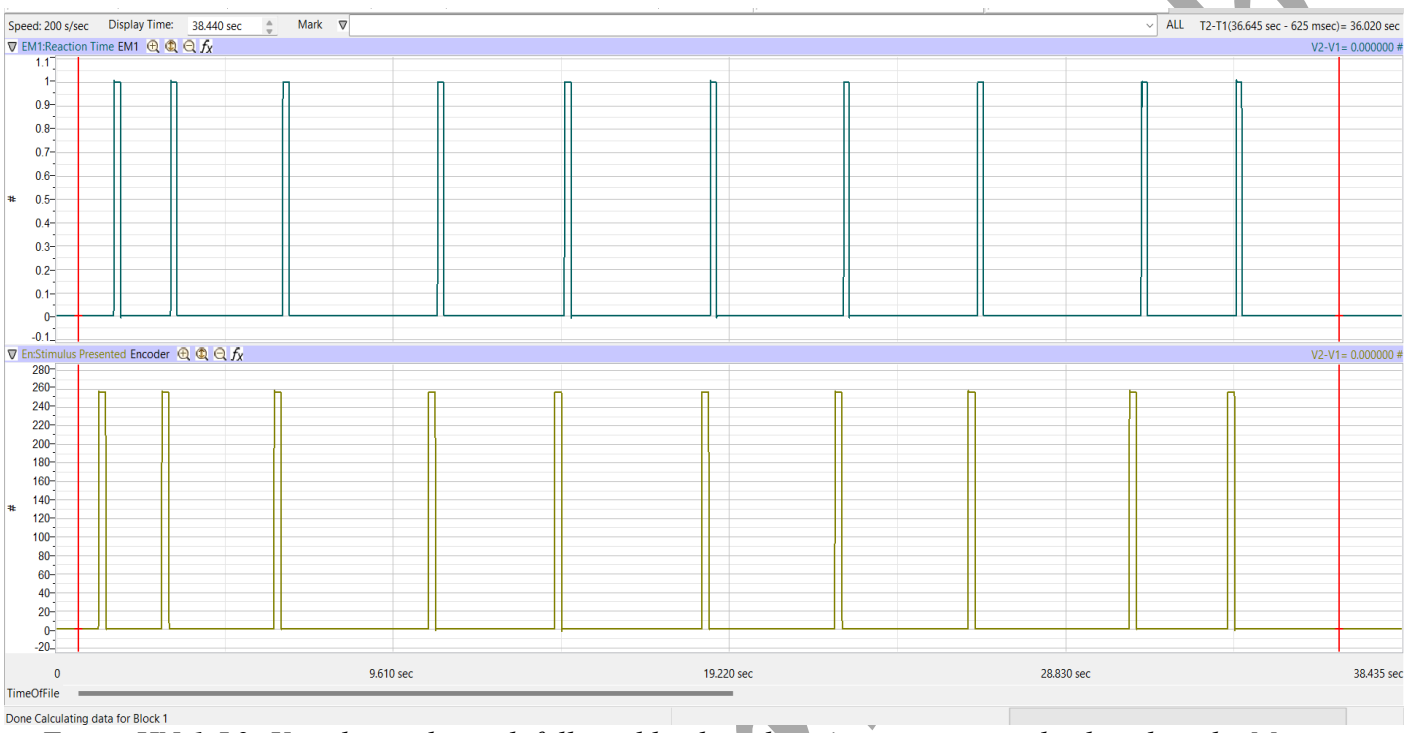

Figure HN-1-L2: Visual signals, each followed by the subject's response, are displayed on the Main window. Each visual signal is marked by a square wave in the lower graph; each response mark is made by the subject pushing the event marker in the upper graph.

Data Analysis

1. Scroll to the beginning of the data recorded for Exercise 1 to display the trials on the Main window.
2. Use the Display Time icons to adjust the Display Time of the Main window to show both the visual signal made with the event marker and the mark made by the subject's response on the Main window. Double the display time to show all the responses.

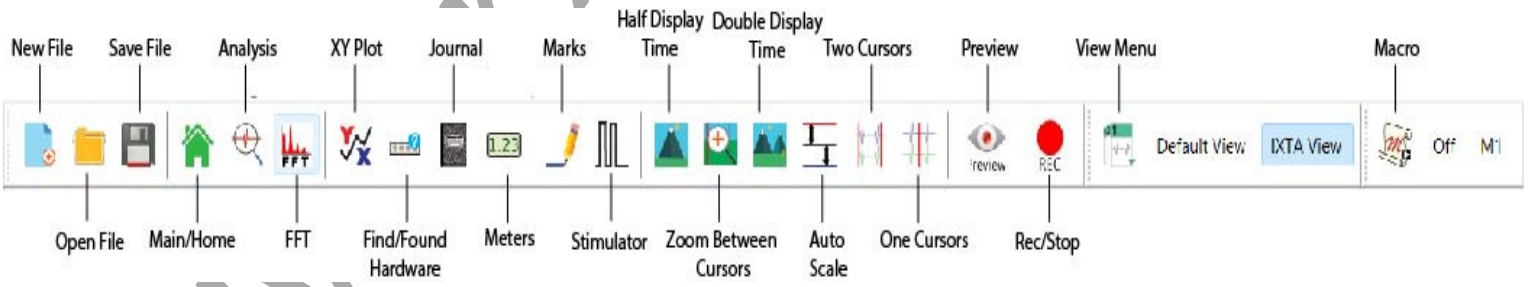

Figure HN-1-L3: The LabScribe toolbar.

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3. Data can be collected from the Main window or the Analysis window. If you choose to use the Analysis window, click on the Analysis window icon in the toolbar.
4. The mathematical functions, T2-T1 should appear on screen. The value T2-T1 is shown in the upper right of the Main window or on the top of the left side of the graph in the Analysis window.
5. Use the mouse to click on and drag a cursor to the onset of the visual signal – the left peak of the "Encoder" square wave. Drag the other cursor over to the onset of the mark made by the subject clicking the event mark responding to the signal.
6. Once the cursors are placed in the correct positions for determining the reaction time, record the value for T2-T1 on a separate data table or in Table 1.
7. Once the reaction time in the first trial is measured and recorded, repeat Steps 5 and 6 on the data from the second trial. Continue for all 10 trials.
    - Record the mean reaction times for all 10 trials.

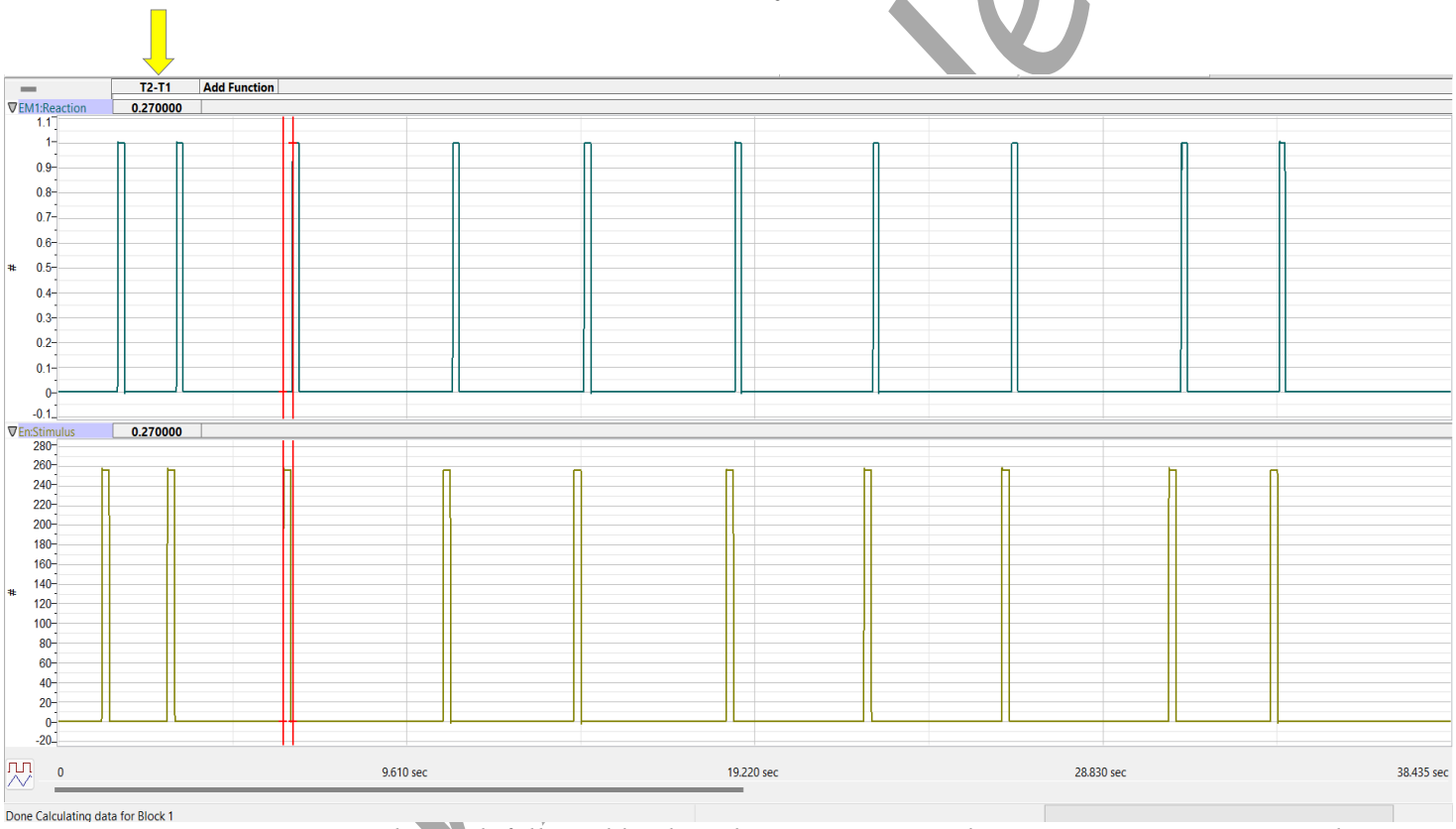

Figure HN-1-L4: A visual signal, followed by the subject's response. The two cursors are positioned at the beginning of the visual signal and on the mark for measurement of the subject's reaction time (T2-T1) in this trial = 270 msec.

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Exercise 2: Reaction Time and Auditory Signals

Aim: To measure the reaction time of a subject to an auditory signal.

Approximate Time: 15 minutes

Procedure

1. Put on the headphones or use your own earbuds, plugged into the Audio port of the back of the IXTA.
2. Instruct the subject to sit in a chair near the IXTA and listen carefully for the "chime" to sound.
3. Choose the "Auditory1" macro from the Macros panel.
4. Choose Auditory from the Views panel.

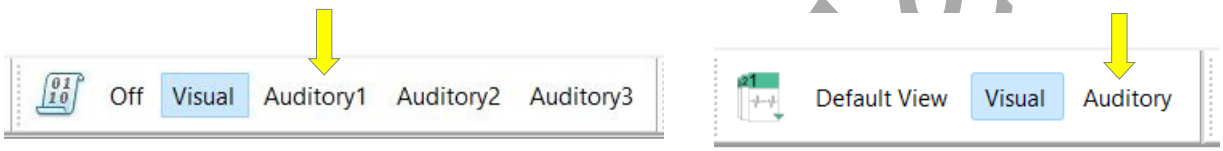

Figure HN-1-L5: Macro and View Panel for Auditory test.

This is now set for Auditory Reflexes

5. A "chime" sound will play. The sounds will not be less than one second nor more than five seconds apart.
6. Have the subject press the event marker as soon as they hear the "chime".
7. Click on the Record button. The macro will begin automatically.
8. After the tenth response, click Stop to halt recording.
9. Select Save in the File menu.

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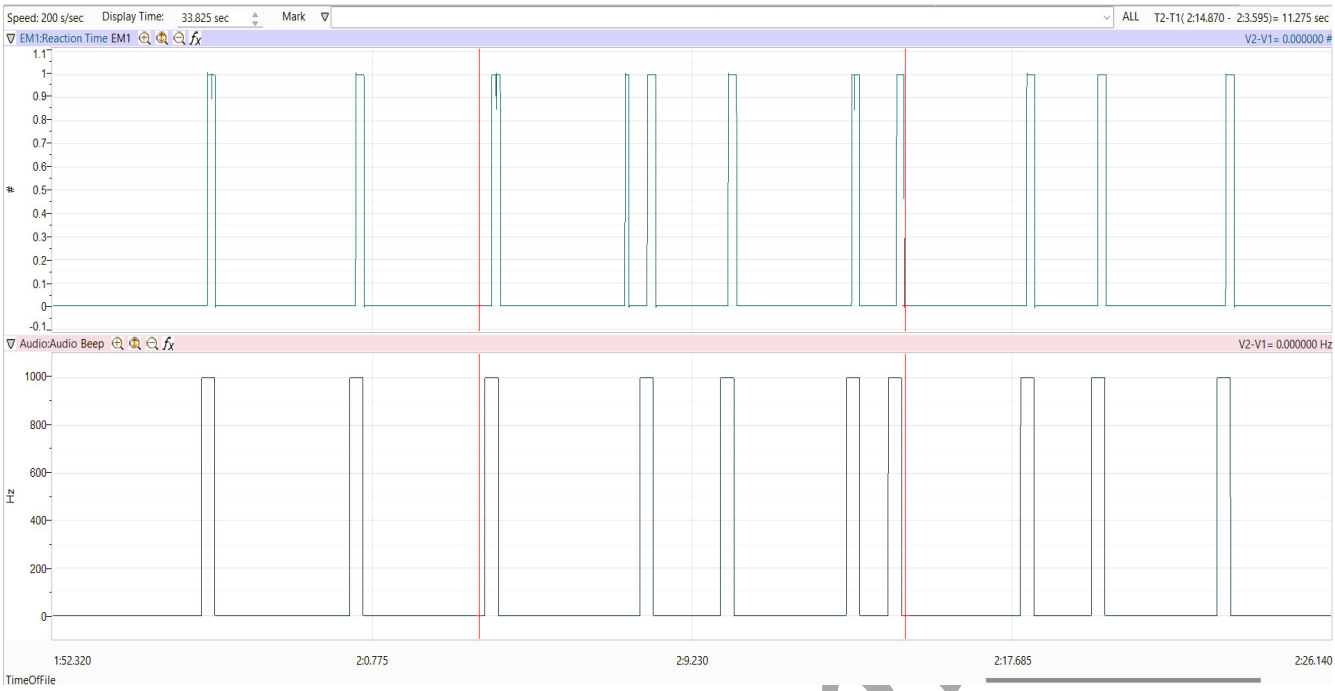

Figure HN-1-L6: Auditory signals, each followed by the subject's response, are displayed on the Main window. Each Auditory signal is marked by a square wave in the lower graph; each response mark is made by the subject pushing the event marker in the upper graph.

Data Analysis

1. Use the same technique explained in Exercise 1 to measure and record the reaction times of the subject presented with auditory signals.
2. Enter the mean reaction time for this exercise in Table 1.

Questions Exercise 1 and 2

1. How does the subject's mean reaction time to visual signals compare to his or her mean reaction time to auditory signals?
2. What would cause a longer reaction time to one type of signal as compared to another?
3. How do your subject's mean reaction times compare to those of other subjects?
4. Do all subjects respond more quickly to the same signal?

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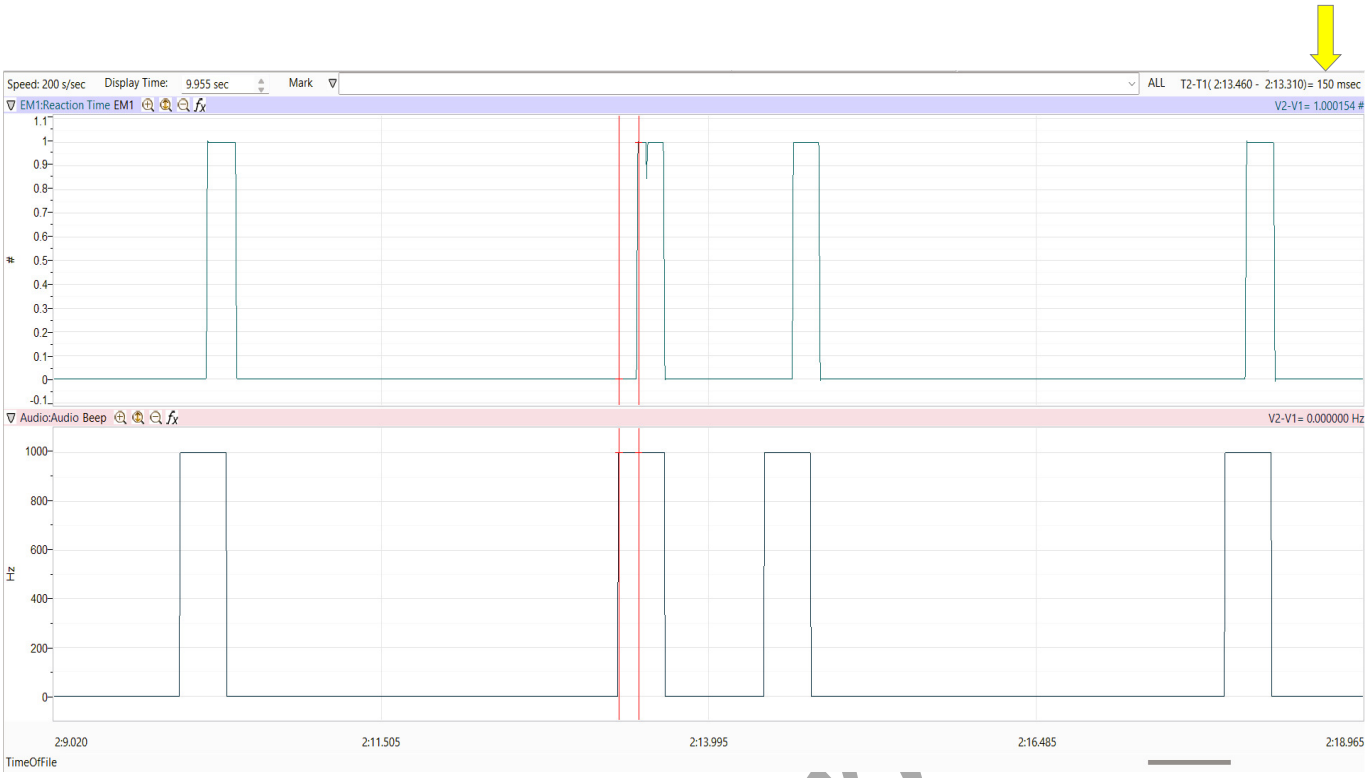

Figure HN-1-L7: An auditory signal, followed by the subject's response. The two cursors are positioned at the beginning of the auditory signal and on the mark for measurement of the subject's reaction time (T2-T1) in this trial = 150 msec.

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Exercise 3: Reaction Time and Prompted Auditory Signals

Aim: To measure the reaction time of a subject to an auditory signal delivered immediately after a verbal prompt.

Approximate Time: 15 minutes

Procedure

1. Choose the "Auditory2" macro from the Macros panel.
2. Remain on the Auditory View panel.
3. Before each "chime" sound is played, the subject will hear a different deeper toned sound. The sounds will be no less than 1 second or more than five seconds apart.
4. Have the subject press the event marker as soon as they hear the "chime".
   - The "chime" sound will be the same one they heard in Exercise 2.
5. Click on the Record button. The macro will begin automatically.
6. After the tenth response, click Stop to halt recording.
7. Select Save in the File menu.

Data Analysis

1. Use the same technique explained in Exercise 2 to measure and record the reaction times of the subject presented with prompted auditory signals.
2. Enter the mean reaction time for this exercise in Table 1.

Exercise 4: Reaction Time and Predictable Auditory Signals

Aim: To measure the reaction time of a subject to auditory signals delivered at a predictable interval.

Approximate Time: 15 minutes

Procedure

1. Choose the "Auditory3" macro from the Macros panel.
2. Remain on the Auditory View panel.
3. Have the subject press the event marker as soon as they hear the "chime". The "chimes" will sound in a predictable pattern and will no longer be random.
4. The "chime" will be the same sound they heard in Exercise 2.
5. Click on the Record button. The macro will begin automatically.
6. After the tenth response, click Stop to halt recording.
7. Select Save in the File menu.

Data Analysis

1. Use the same technique explained in Exercise 2 to measure and record the reaction times of the subject presented with predictable auditory signals.
2. Enter the mean reaction time for this exercise in Table 1.

Questions Exercise 3 and 4

1. To which auditory signal did your subject respond most quickly?
2. To which auditory signal did your subject respond to most slowly? For what reasons?
3. Did your subject respond more quickly or more slowly to same auditory signal as the other members of the class?

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Table HN-1-L1: Mean Reaction Times for Different Signals.

Signal	Mean Reaction Time of Your Subject (ms)	Mean Reaction Time of All Subjects (ms)	Shortest Mean Reaction Time in Class (ms)	Longest Mean Reaction Time in Class (ms)
Visual				
Auditory1				
Prompted Auditory2				
Predictable Auditory3				

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