

8.13: Stimulus Response Analysis

Introduction

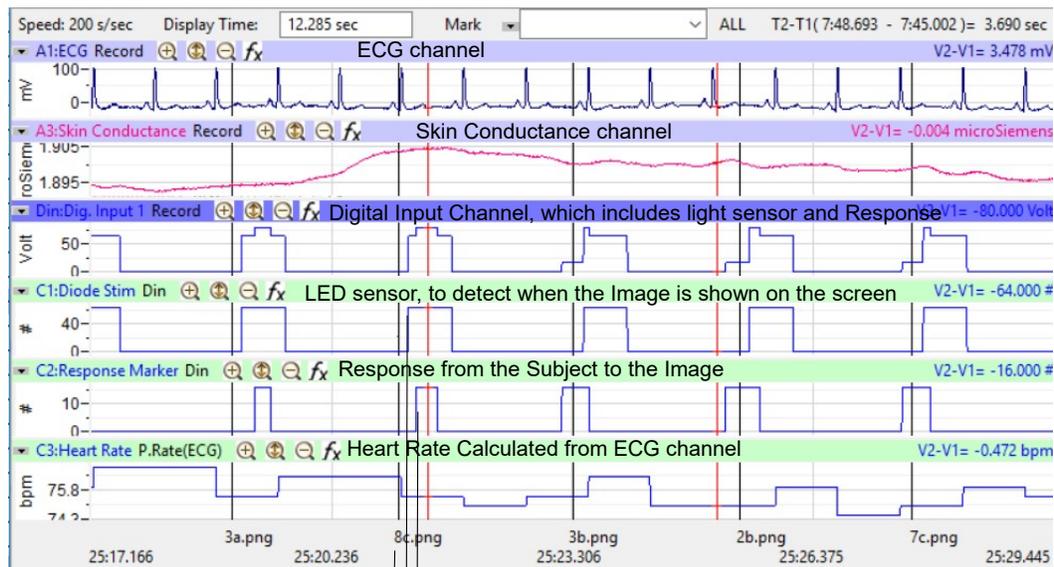
The **Stimulus Response Analysis Module** calculates physiologically relevant parameters from previously recorded respiration pressure and volume data.

This document includes a step by step tutorial for using the features of the *LabScribe Stimulus Response Analysis Module*. To use the step by step guide, you will need a recording of stimulus and response data file.

Stimulus Response Analysis: Step by Step

Sophisticated analysis can be done on a previously recorded data file using the **Stimulus Response Analysis Module**.

A screenshot from a stimulus response file is shown below.

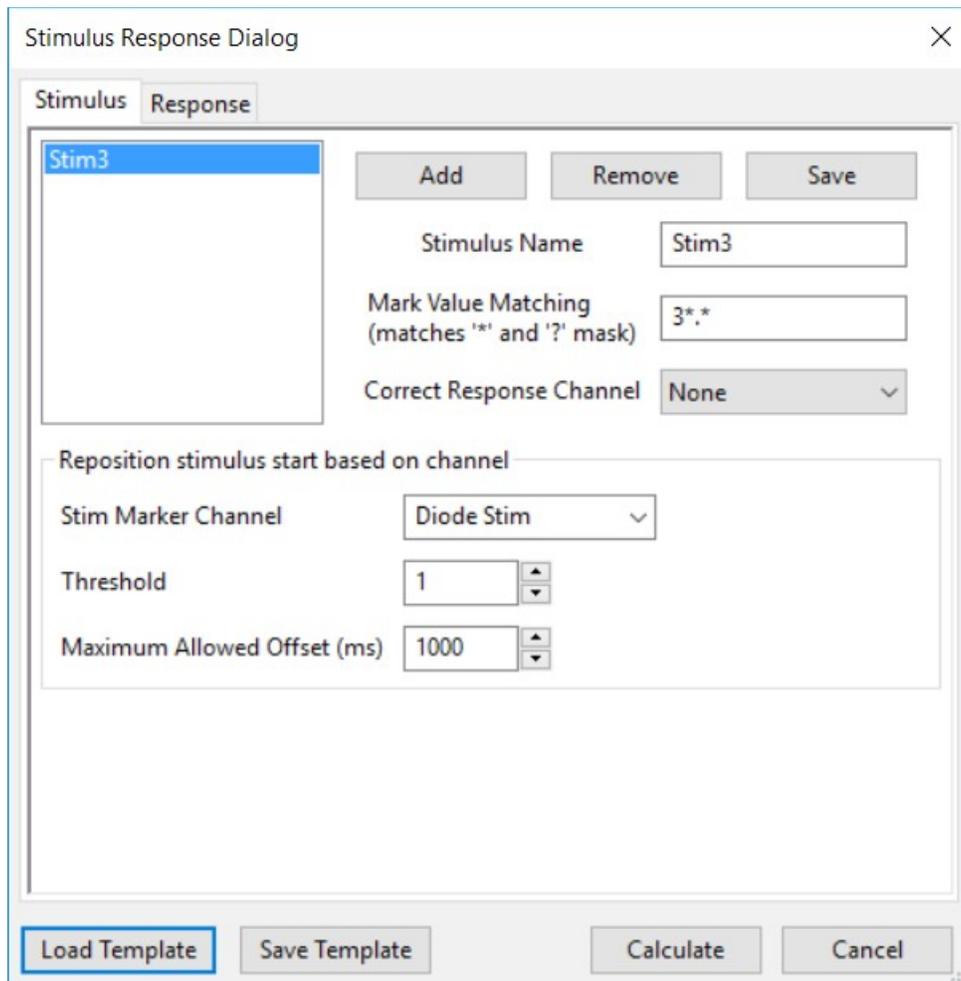


Software thinks the image was shown
when the image is actually shown
when the subject responded to the image

ECG, skin conductance, light sensor and user response are recorded in this file. As you can see there is a time difference between when the software tells the computer to show an image and when the image is actually displayed. The Stimulus Response analysis module can take this into account.

The Stimulus Response Analysis dialog can be launched from the Advanced menu in LabScribe.

When the dialog is launched the first time, it will ask for the Username and License for the Stimulus Response Analysis module. Please contact iWorx Systems for more information.



The Stimulus Response Dialog has 2 tabs:

Stimulus:

This tab is used to define the different stimuli in the file. To add a Stimulus click on the **Add** button.

A sample stimulus will be added, For each Stimulus you can define the following:

- **Stimulus Name.** This makes it easy to identify the stimulus.
- **Mark Value Matching:** Regular Expression and Wildcard capabilities are available for defining a pattern to match Marks in the record. For eg. N*.jpg will find all marks that begin with the letter N and end in .jpg. This can be useful in finding specific marks in the record. If you want to find any mark, just use *.
- **Correct Response Channel** : If there is a channel that corresponds to the correct response for this stimulus enter it here.

Click the Save Button to save the stimulus. Multiple stimuli can be added. To delete a stimulus, select the stimulus from the list on the left and click the delete button.

If a light sensor is being used to determine the exact time when an image is shown, the Stim Marker Channel can be set with the LED sensor channel. Specify the threshold for the light sensor channel, which can be used to determine the time at which the image is shown. To allow for cases when there is a problem, specify the maximum amount of time after the stimulus is presented, that the

program will look for the light sensor, using the **Maximum Allowed Offset** setting

Response:

The screenshot shows the 'Stimulus Response Dialog' window with the 'Response' tab selected. On the left, a list contains 'GSRbefore', 'GSRafter', and 'Response', with 'Response' highlighted. To the right of the list are 'Add', 'Remove', and 'Save' buttons. Below these are input fields for 'Name' (Response), 'Channel' (Response Marker), 'Measurement' (Response Time), 'Threshold' (0.5), 'From (s)' (0), and 'To (s)' (1). At the bottom of the dialog are 'Load Template', 'Save Template', 'Calculate', and 'Cancel' buttons. A note at the bottom of the dialog states: 'Measurement period is wrt to the stimulus Reported Times are in msec'.

Similar to the stimulus tab, multiple Responses can be added in the Response tab.

Click the Add button to add a response measurement.

Specify the following for each measurement:

Name: This will be the column heading in the exported csv file.

Channel: The channel to make the measurement from.

Measurement: The type of measurement that we want to perform on the channel. Some options are Mean, Maximum, Minimum, Time to Maximum, Time to Minimum, Response Time.

Threshold: Used for determining the Response Time.

From (s): The time in seconds with respect to the stimulus presentation, that the selection starts.

To (s): The time in seconds with respect to the stimulus presentation, that the selection ends.

For measurements before the stimulus presentation, negative numbers can be used. For eg to measure the baseline from 5 seconds before the stimulus to the stimulus presentation, set the following:

Measurement: Mean

From (s): -5

LabScribe User's Manual

To (s): 0

The stimulus and response parameters and settings can be save to a template file, by clicking on the **Save Template** button. A previously save template can be loaded with the **Load Template** button.

Click **Calculate**.

The File save dialog box will open up. Choose the folder where you want to save the stimulus response analysis data. Choose the subjects name as a filename, to make it easier to analyse the data later. The module will analyse the datafile and export a file for each stimulus that was defined in the stimulus tab. If the filename chosen was *John* and 2 stimuli were defined with the names *Stim1* and *Stim2*, then there will be 2 files created *John_Stim1.csv* and *John_Stim2.csv*. An example of the exported file is shown below.

	A	B	C	D	E	F	G
1	Time	Mark	Stim Index	Stim Offset	GSRbefore	GSRafter	Response
2	2017-01-13 11:11:39.322	3c.png	218701	28	0.371448	0.371535	340
3	2017-01-13 11:11:50.027	3b.png	220842	25	0.371805	0.371524	305
4	2017-01-13 11:12:04.967	3a.png	223830	27	0.371386	0.37089	370
5	2017-01-13 11:12:19.937	3b.png	226824	454	0.370621	0.370504	540
6	2017-01-13 11:12:24.237	3a.png	227684	27	0.370531	0.37057	280
7	2017-01-13 11:12:28.542	3c.png	228545	31	0.370525	0.370465	250

