

# Sound Lab

## Post Processing (PPS)

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# Overview

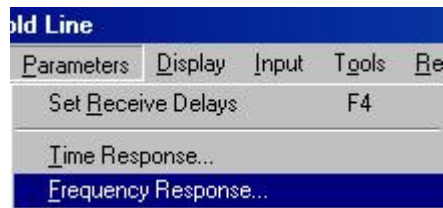
The Post Processing module is an advanced analysis tool that permits you to create several types of frequency and time related measurements from a single test. Although this might sound similar to what you can accomplish using MLS (maximum length sequence), both the results and the types of information available is greatly different. Post Processing can also generate the type of data and displays returned from a 3-D TDS measurement. Additional measurements become available when Post Processing is combined with other modules.

## ENHANCEMENTS:

The Post Processing module has been updated to be able to work offline. Although it is a memory and processor intensive module, it is now compatible with concurrent operations and should not interfere with RTA, MLS, NLA or the media player (on most systems).

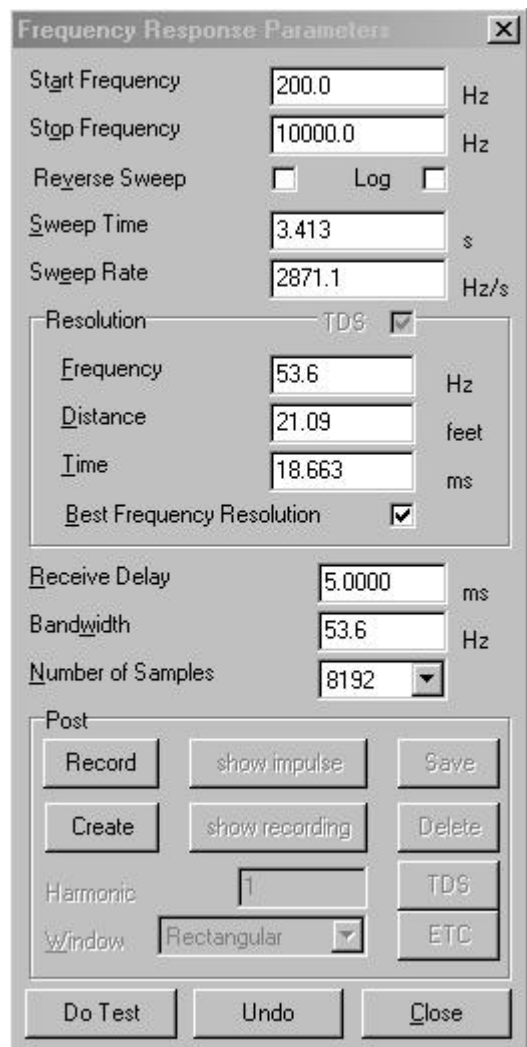
## GETTING STARTED:

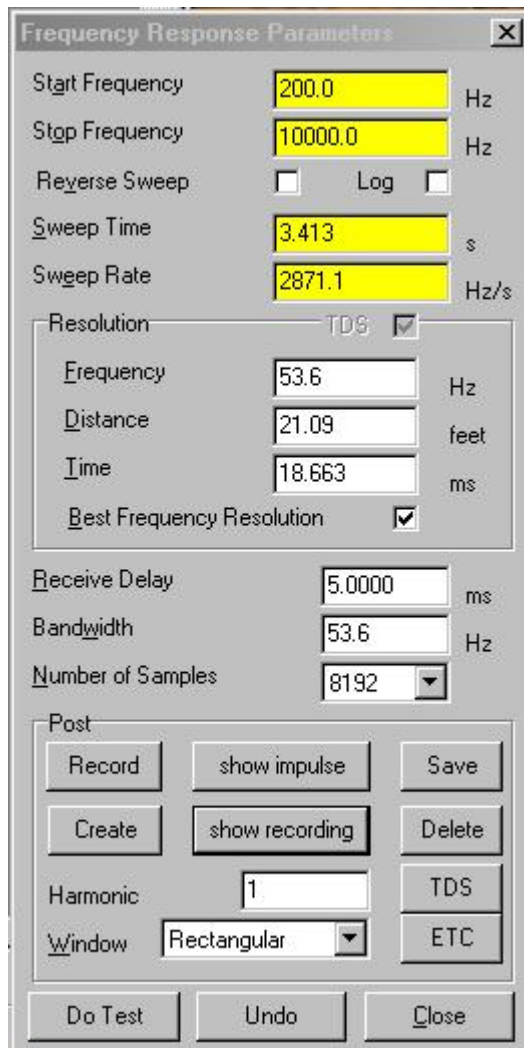
There are two parts to using the Post Processing Module: taking the initial measurement and



processing the results.

All of the controls for Post Processing appear in the Frequency Response Parameters dialog. This is accessed by selecting Parameters, Frequency Response from the main menu.





The Frequency Response Parameters dialog is changed when Post Processing is active. New buttons are added to let you work with Post Processing. The buttons are “Record”, “Create”, “show impulse”, “show recording”, “Save”, “Delete”, “TDS” and “ETC”. Two additional controls named Harmonic and Window are also added.



You can make the initial measurement by selecting “Post” in the test-type pull down menu and clicking on the “W” key. This will generate and record a TDS sweep using the current Frequency Response Parameters. The display of a WAV recording can be viewed by pressing “show recording”.

An alternate method is to open the Frequency Response Parameters dialog in the Parameters menu and press the “Record” button. Initially, only the Record and Create buttons are active. The “Record” button will run a test and activate additional buttons

when pressed. This has the same effect as if you had pressed the “W” key.

### WORKING WITH THE DATA:

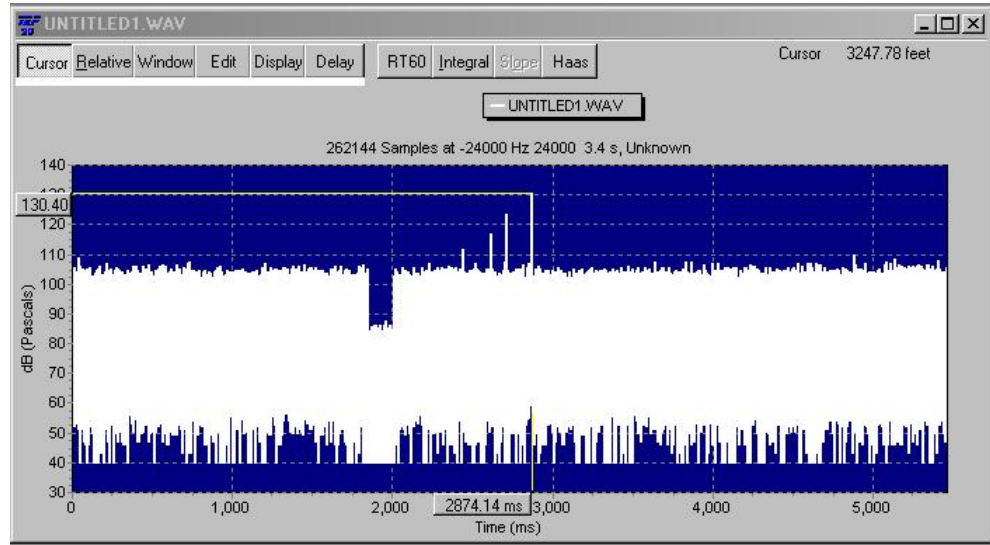
The entire measurement is saved exactly as it arrives at the microphone when a Post Processing measurement is made. There is no filtering or windowing applied.

The parameters shown in yellow represent the basis of the test and cannot be altered. All of the other parameter can be changed. This will cause the recorded information, which was stored as raw wave data to be reprocessed with the changed filtering values. This allows you to extract information that would normally need additional sweeps to accomplish.

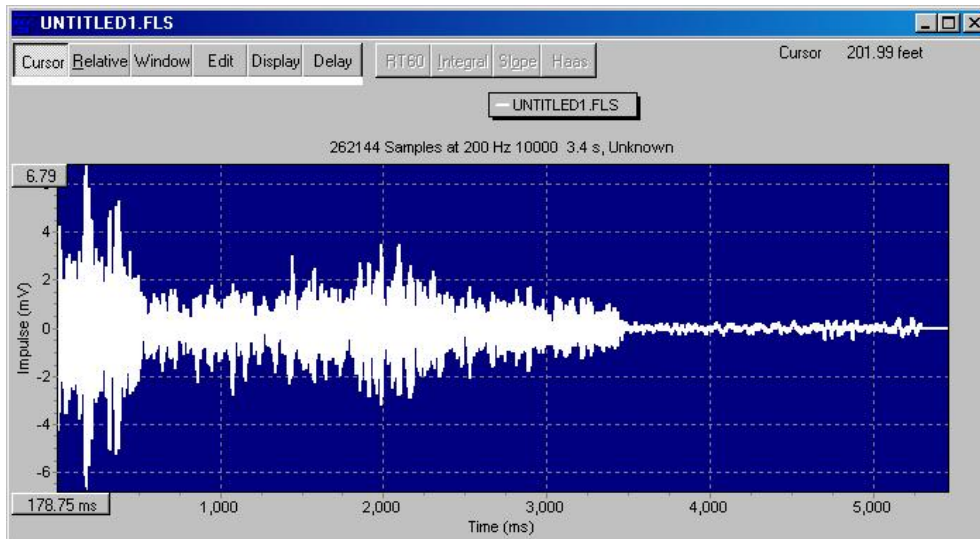
The “show impulse” button will display the data that you have measured. You normally have no need to view this data. You can tell that you have data preset when the ETC and TDS buttons are not grayed (disabled). You do not need to view the data from these two buttons, but

some useful information can be gathered using these displays. Please allow some time to display the data since it is composed of several hundred thousands points and requires additional processing time.

The first two buttons of interest are named “show impulse” and “show recording”. The “show impulse” button will display the measured wave file as a cross-



correlated impulse response. This is normally displayed as an ETC (Energy Time Curve) in a wave window, similar to what MLS would produce. All of the standard display modes for MLS are available at this point by clicking on Display.

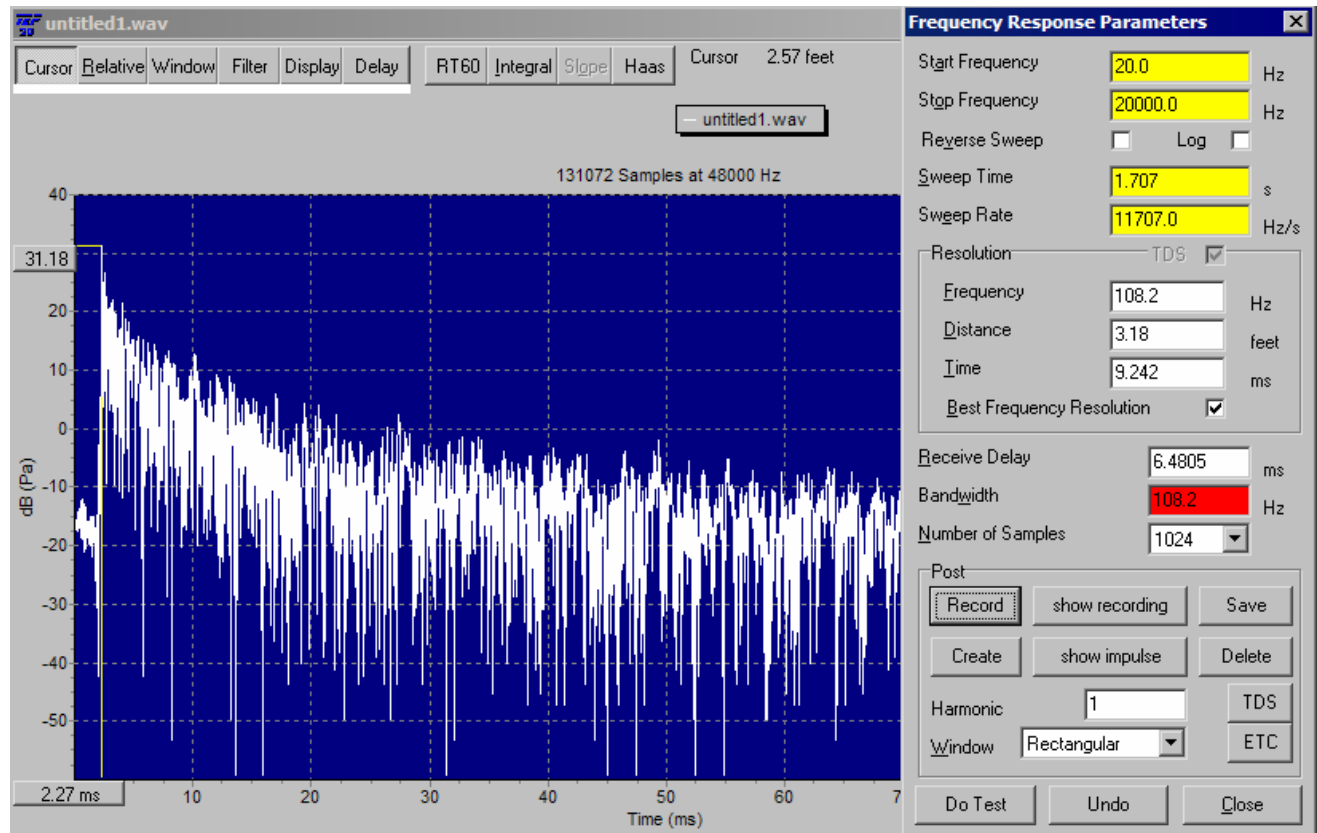


The second button is named “show recording” and will display the measurement as an impulse in a wave window, similar to what MLS would produce.

All of the standard display modes for MLS are available at this point by clicking on Display.

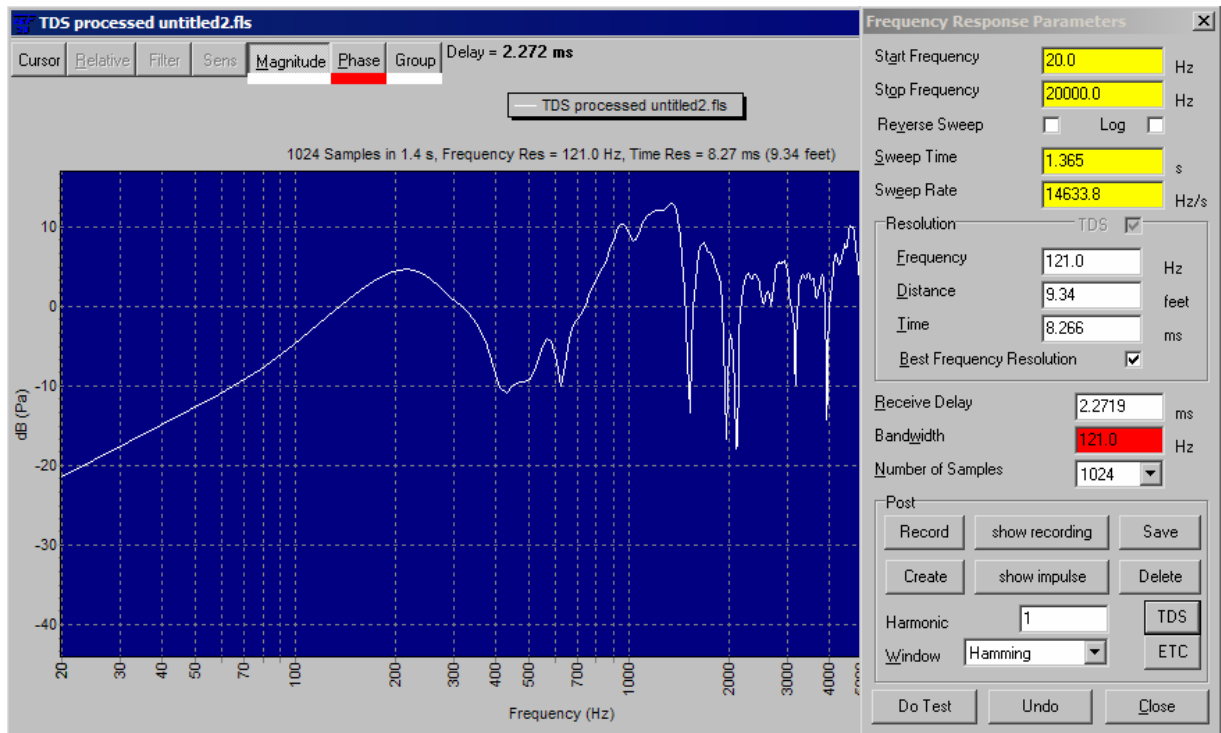
The primary value of post processing is the ability to derive ETC and TDS data from a single measurement. The value of this type of measurement can be seen where you have previously taken a TDS measurement and realize, later, that you had incorrectly set the delay time. A change in the delay time can cause apparent phase distortion or a completely invalid TDS curve, especially if the delay is off by a large amount. This is solved by using post processing.

The data for post processing is contained in two files, a WAV file and a FLS file. These two files are used together to determine the ETC and TDS data. The WAV file contains the raw data measured during the test. The FLS file contains information about the data (metadata).



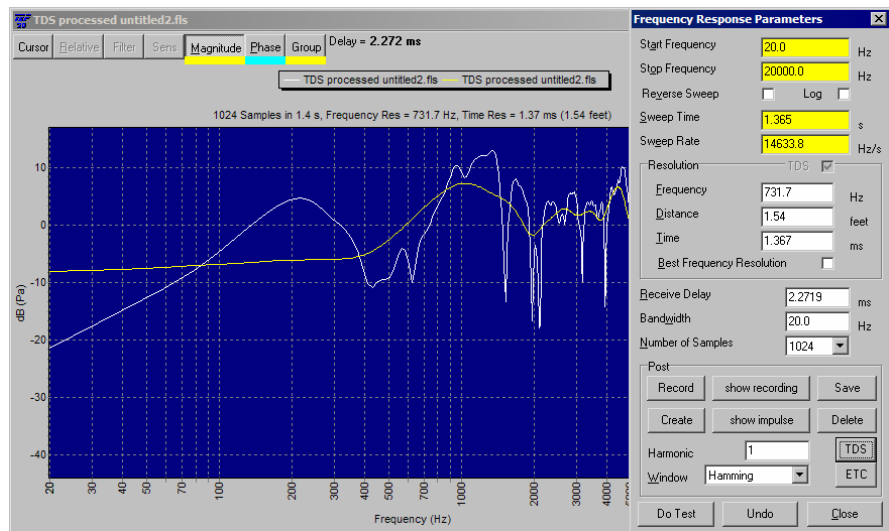
This is an ETC data view of the post processing measurement. This is created by taking a reverse FFT from the original WAV file.

This shows the original arriving wave front at 2.27 mSec. The time delay for the direct sound measurement can be set by moving the cursor to 2.27 mSec and pressing “Delay”. This information can be used to generate the direct sound reading in the TDS display. This could also be done to determine the frequency response for the reflection occurring at 10.21 mSec. RT60 information can be derived from this data window by pressing the “RT60” button.



A view of the frequency response can be generated by pressing the “TDS” button. This uses the time arrival, set in the ETC window (the “Delay Time”), to select the direct sound frequency response.

The delay for this TDS measurement was set to 2.27 mS and the bandwidth was 121 Hz. A different result can be obtained by changing the bandwidth to 20 Hz, shown here.

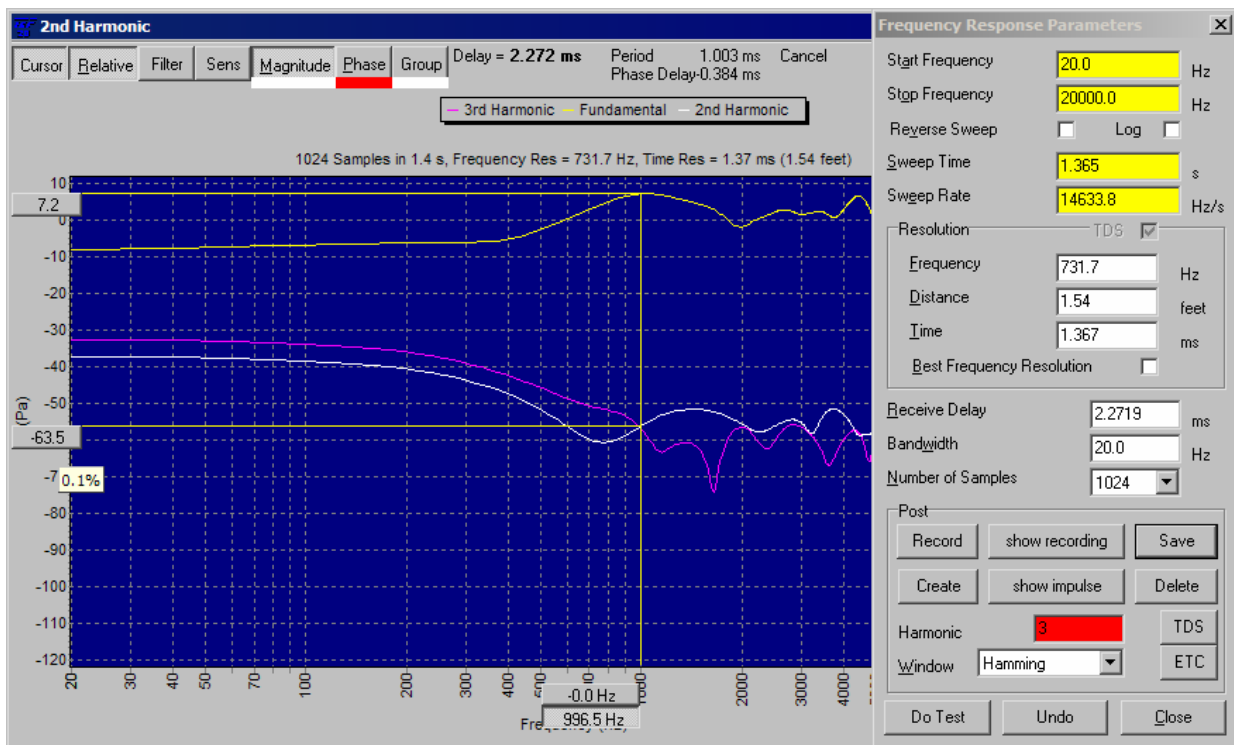


The delay value can be changed and a new TDS curve can be generated by pressing the TDS button after changing the value. A new TDS window would show the corrected data. This can be used for inspecting the frequency response of a reflection, as well as the direct sound. A simple way to set this value is to use the time cursor and “Delay” button in the ETC window.

A frequency response of one of the later reflections could have been obtained by setting the time cursor to the point where to reflection occurred. This would be set on the ETC window, by moving the cursor to the desired time and pressing “Delay”.

You would usually have the Harmonic value set to 1. This means that when a TDS sweep is derived, the filter is set to 1 kHz during the time that the 1 kHz signal is arriving. An incorrect setting of the delay time could have the filter for a particular frequency to be looking at the wrong time, which would cause the desired information to be rejected.

There is an instance where you would use a different value for the harmonic tracking. For example, placing the number 3 in the harmonic tracking tells the software to look for 3 kHz while the 1 kHz signal is arriving. This will change the display to show the 3rd harmonic, which could be used to identify distortion in a speaker / power amplifier system.



The use of overlay mode can be used with the Harmonic setting to make measurement at increasing harmonics. This can be used to analyze distortion problems in a sound system. You can move between the distortion curves by pressing the Page Up and Page Down keys.