Gold Line / TEF

Sound Lab
Enhancements to RTA
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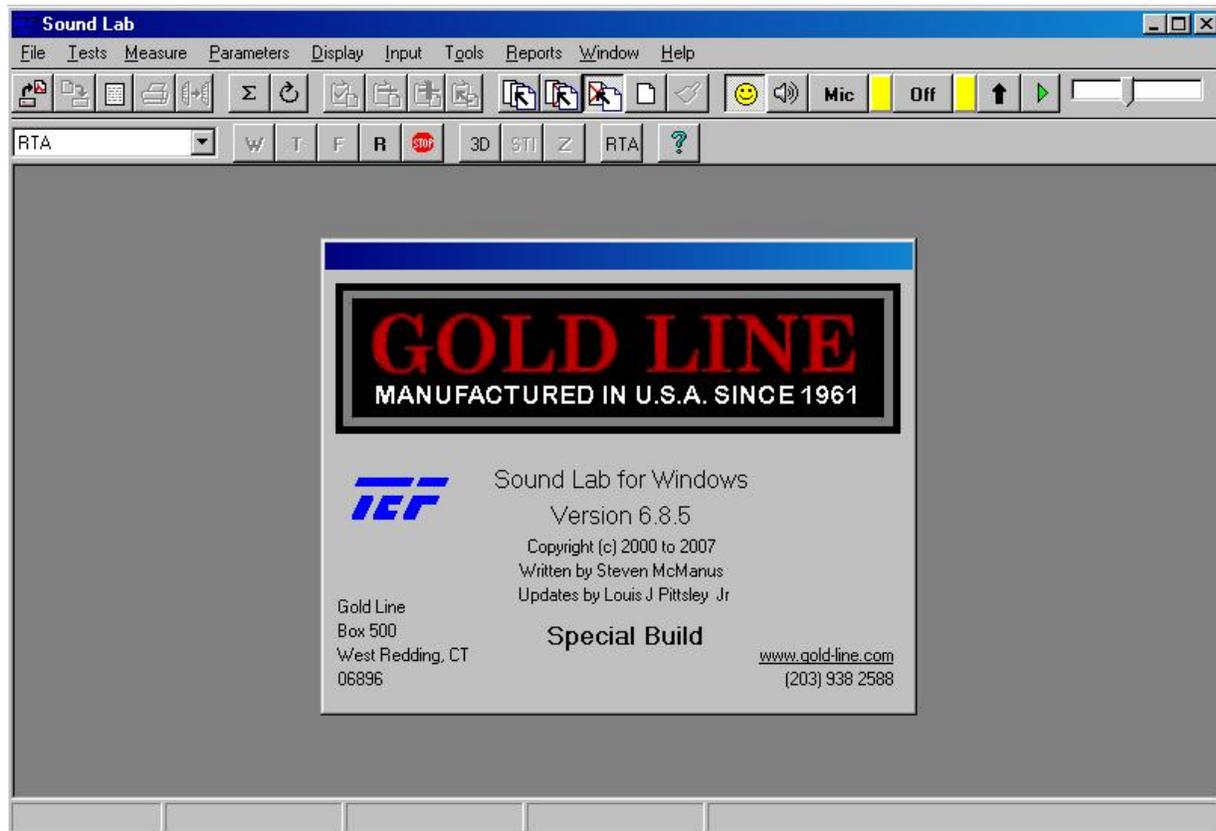
6) Normalize SPL to show relative difference

Overview

The new release of RTA for the TEF platform (Real Time Analysis) module has a number of improvements in appearance, functionality and ease of use. The thought behind this series of changes was to customize the operation of the product with the end user in mind; the most commonly used settings are located conveniently on-screen and the data is presented in a format that is easily interpreted.

This package now contains many enhancements that previously did not exist in our product. This includes a two channel difference mode with adjustable time delay, a high resolution FFT and an alternative display mode which provides the ability to manage and compare RTA data in a more efficient manner.

Several common controls have been added onscreen in order to simplify the process of making measurements and to eliminate the need to hunt through menus and dialog boxes in order to control the display. We have also produced an attractive and updated look that includes gradients and textures, while retaining the original screen style as a selectable option for the traditional TEF user.
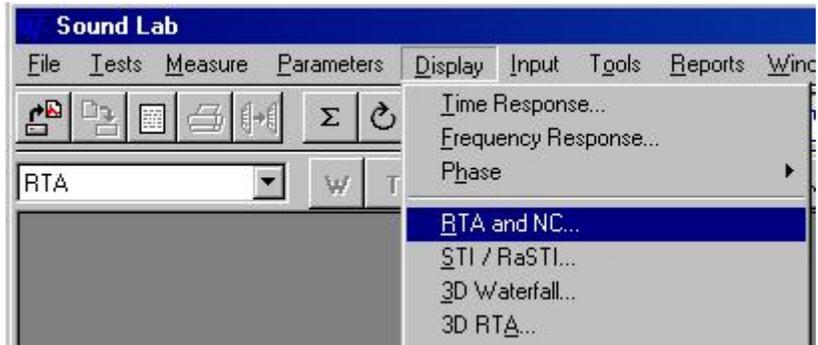
A demo version of the program is available

Goals and design

The new RTA module was developed to meet three design goals. The first goal was the arrangement and addition of new controls to allow the software to efficiently manage the data

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and allow the user to access common tasks with easily accessed controls. The previous version of RTA required you to use a split screen control to manage how many data windows were open you would use the input control toolbar to control if you had one or two data channels.

The second goal was the creation of an alternative and more attractive RTA display form that could display two live RTA channels, input level meters and difference data without requiring a split screen or multiple data windows. The original RTA display was a scientific instrument, in both looks and operation. The updated appearance uses a combination of textured skins, new fonts, 3D effects and different colors to bring a modern look to a well-known product.

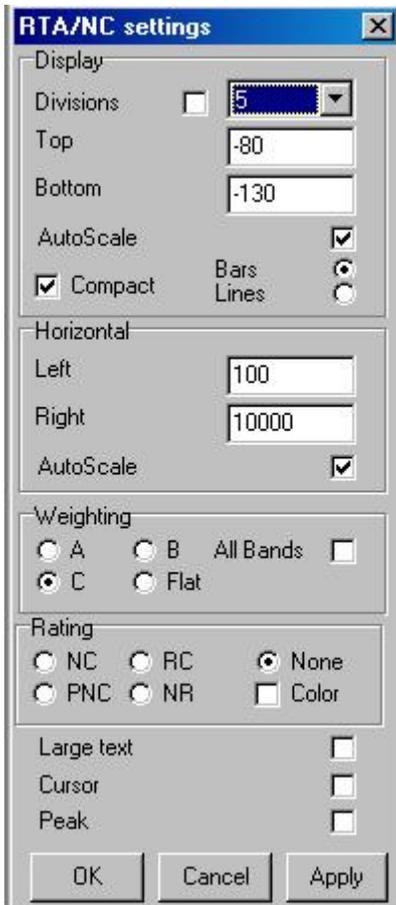The third goal was to add new functionality to RTA by including a two channel RTA data display in the same window, a live two channel difference, with adjustable delay and a high resolution FFT measure that extends from 6 Hz to 23.9 kHz with a resolution of 0.2 Hz.

RTA display parameters

The new RTA display window is accessed by a control on the RTA Display Parameters dialog box. This dialog is accessed by selecting Display, RTA and NC. The control is labeled 'Compact'; the new RTA window will be display when this control is checked. The 'Compact' control is checked by default but can be unchecked, which will cause the RTA window to revert to the standard display.
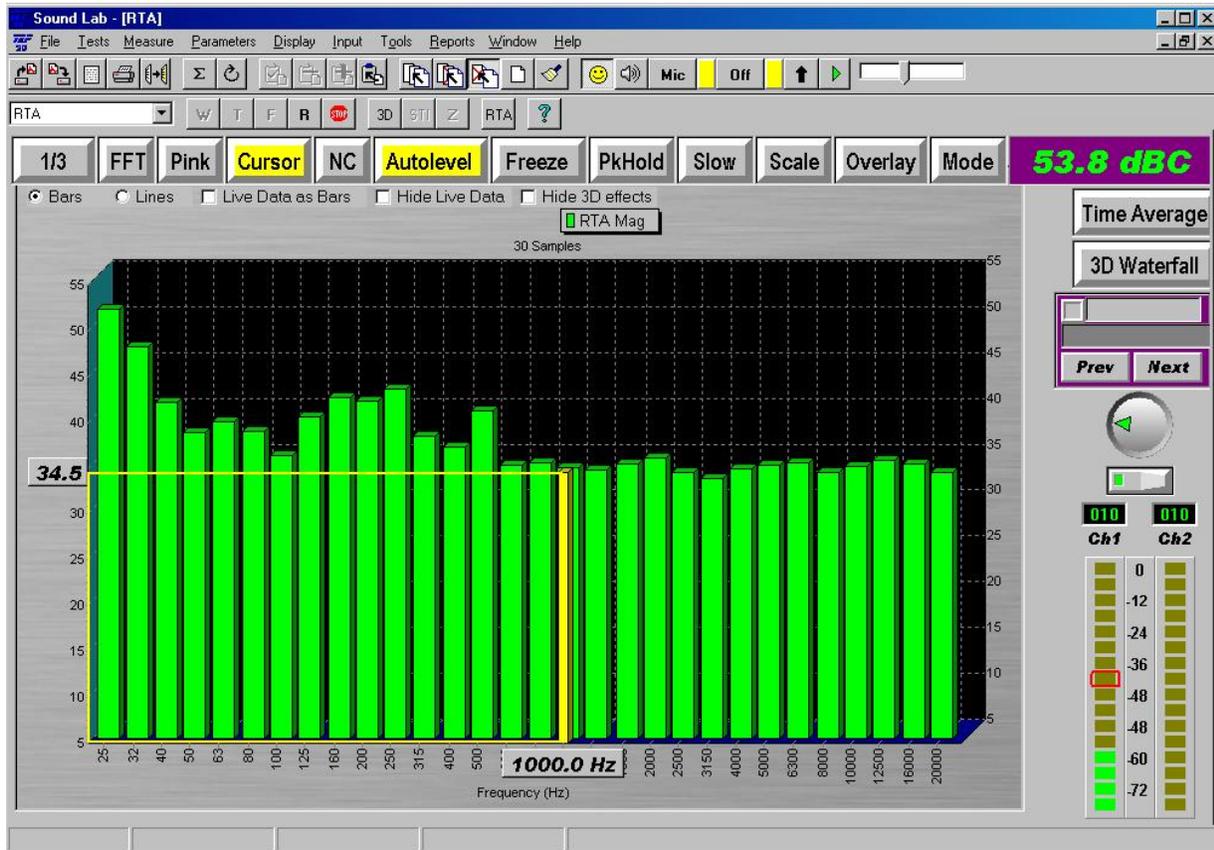
There are several differences between the ways data is displayed when the new display style is selected. The standard RTA display uses several MDI (Multiple Document Interface) windows to be displayed, each with independent and possibly unrelated data. Each window displaying RTA data shows the same buttons and readouts as the other windows. The new style RTA display dominates the display and shows all RTA data in a single or dual display window.

Buttons for frequently used functions

There is only one button for each function, which is a more efficient use of space. The previously wasted space has been used to implement a set of useful functions to give the user more control over the operation of the RTA. This results in less time spent searching for the control in an unfamiliar menu or parameter box.
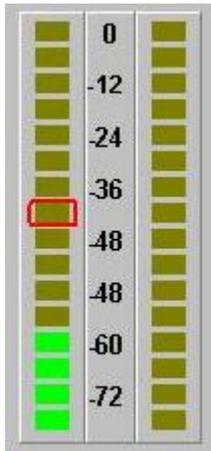

Appearance

The appearance of the RTA is normally controlled by settings in the RTA Display Parameters dialog box, which is accessed by right-clicking on the data window and selcting Display or in the Display menu selection. A large number of the controls from RTA Display Parameters dialog box have been moved onscreen for ease of use. The "Cursor", "PkHold" and "Autolevel" controls mirror the Cursor, Peak and AutoScale check boxes in the RTA Display Parameters. The buttons change color to let you know that they are active. The cursor readouts have larger and more visible fonts to improve readability.
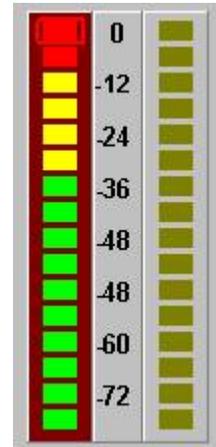
The SPL readout has also been increased in size and placed where it does not interfere with the RTA display. A new added feature is that the weighting of the SPL measurement can

be changed by clicking on it, causing the weight type to cycle between Flat, ANSI A and ANSI C weighting. The color sets and fonts were chosen for visibility and readability.
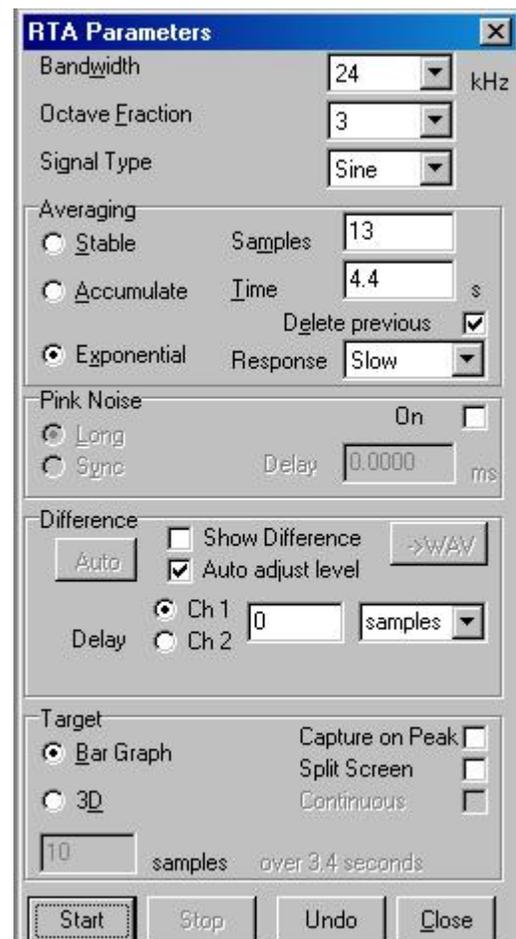
Controls and Meters

A handy and visually appealing addition is the Input Level VU meters. They indicate which inputs are active and the level of the signals relative to full scale. This information is important in determining whether a input is likely to clip. A floating "peak" indicator keeps track of what signal levels have been seen recently. It decays slowly after several seconds delay. A hardware clip condition is indicated when the background of the meter changes from gray to dark red. It is impossible to make a correct measurement while a "hardware clip" condition is occurring.

The only practical way to eliminate an input "clip" condition is to reduce the gain of the TEF25. The input gain setting is normally controlled by a panel that is accessed through the main menu "Input, Settings" but this is not always convenient. Also, opening this control panel will also stop any existing signal that is currently being generated by the TEF25. We have provided this onscreen control to allow you to quickly correct an input gain problem and remove a hardware clip condition.
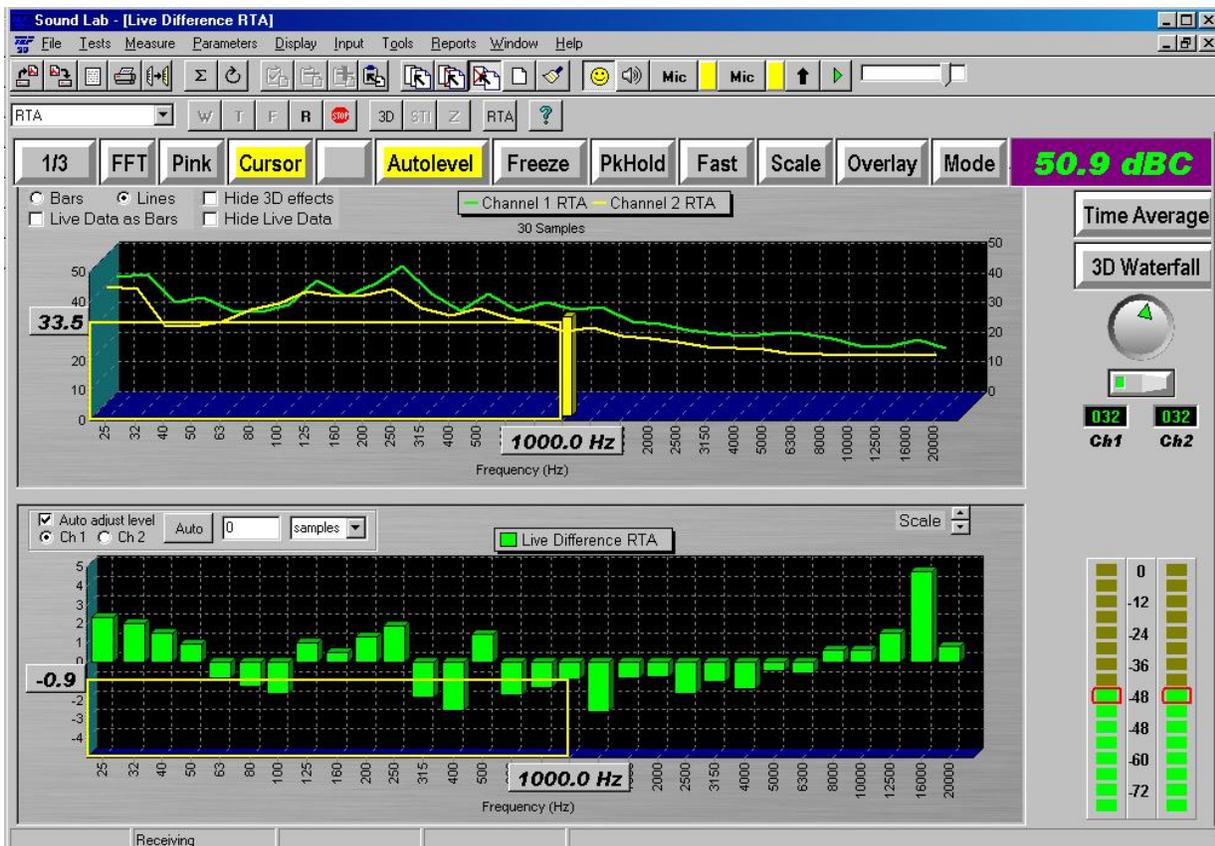
One of the new features is a two channel differential RTA. This is an advanced version of the existing RTA that you all have used in the past. The RTA module previously had the capability to do the sum of the two channels, the difference between a channel and a reference signal, the difference between two signals arriving at the same time and the display of
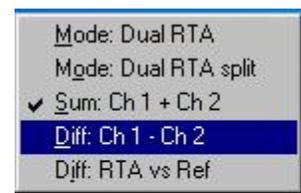
two channels arriving at the same time in a split screen. The new RTA software allows you to delay one channel up for more than 3/4 second and subtract the difference between the two channels in real time. It can display absolute difference or it can normalize the signals to the same SPL level and show you the relative difference.

Mode designation

Several changes have been made to Sound Lab in order to accomplish this. A signal history is running that buffers several seconds of data from both channels. A control has been added that allow you to select which channel will be delayed and the length of the delay, expressed in samples, milliseconds, feet or meters. A control has been added to show relative or absolute difference. A control has been added that causes an ETC sweep to occur in order to set the delay automatically.

The RTA display function now allows three simultaneous windows to be displayed. The initial display is Channel 1, Channel 2 and Difference. The Channel 1 & Channel 2 display windows are normal RTA windows and are affected by the standard RTA display settings. The Difference RTA

window is set to have a zero dB center line and a display range of +/- 40 dB. A special control on that window allows the display range to be reduced in 10 dB increments. The Enhanced RTA control named "Mode" will set all these parameters simultaneously.
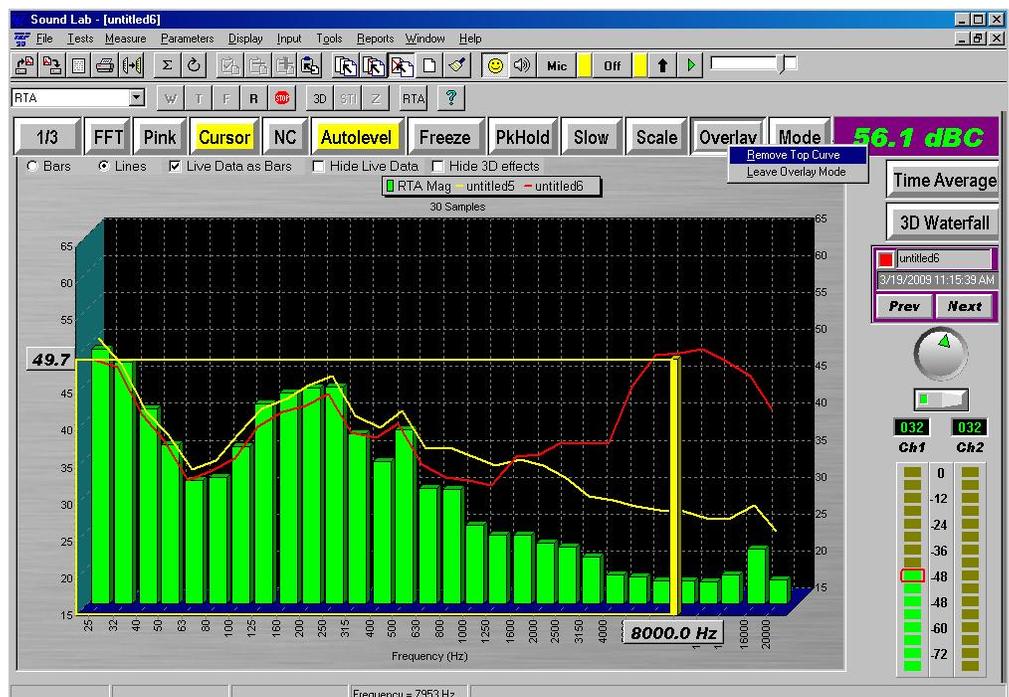
compare and store live data as Overlay

The Enhanced RTA allows you to manage the capture of live data with the new Overlay button. A simple click on the button will capture the current RTA data as a curve, and assign it an arbitrary name. The information on the currently active top curve shows up in the curve identifier box on the right. Previously captured curves can be selected by clicking on their name in the title bar, or by clicking on the "Prev" or "Next" buttons, which will bring each subsequent curve to the foreground and rearrange the curve order in the title bar. The cursor, when active, tracks the current foreground curve and shows the value at that point.

The name of the curve can be modified by clicking in the name section of the identification box, which shows the name, curve color and the time the data was captured. The box changes color to indicate that the name is being edited. The edit is completed by pressing the Enter or Tab keys. The identifier will then be updated in the title bar, shown above the collection of curves.

The appearance of the overlay mode can be managed by several option boxes located in the data window. The "Live Data as Bars" function is selected here. All of the overlay data and live data can be displayed as lines, bars or a combination of both. The live data
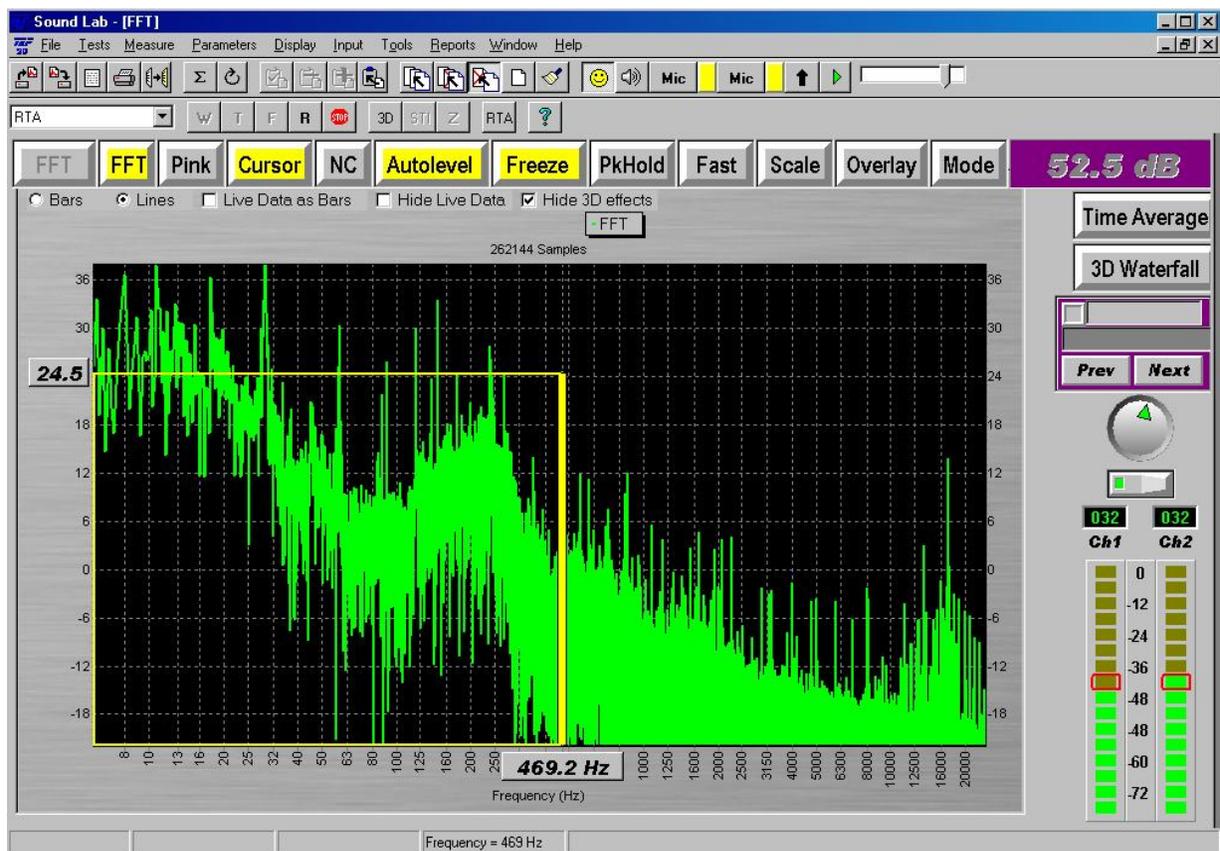
can be hidden, but will still be capture when the Overlay button is pressed.

      The Overlay button has an additional function, in addition to being used to capture data. A popup menu appears when the button is right-clicked. This menu gives you options to manage the existing overlay. The "Remove Top Curve" function will allow you to discard the top curve, which can be selected by pressing the "Prev" or "Next" buttons, pressing Page Up or Page Down, which does the same thing, or by clicking on the curve name in the title bar, which brings the curve to the top. The "Remove Top Curve" function can also be activated by pressing on the Delete key on

the keyboard.

256K FFT for.2Hz low frequency meaurements

A new feature of the Enhanced RTA is the ability to make a single high resolution FFT measurement, which starts at 6.0 Hz and has a 0.2 Hz interval between each point. The results are derived from a 256K FFT and this measurement is intended to allow the customer to get a picture of the room response in the very low frequencies, which extend much lower than is available for the standard RTA display. The FFT measurement function was previously only available in the Sound Lab SLX module.

The FFT measurement is not live data and requires several seconds to measure and display the data. The is a short processing time required to rescale the display or to move the window up an down, but the readout cursor can be moved quickly to any point by clicking on it. The cursor will stop at the nearest data point relative to the mouse click. Some refinement of the cursor position can be accomplished by using the right and left arrow keys on the keyboard.