

TerraLink

Audio Toolbox Link Software

PC User Manual

Version 1.5



TerraSonde
2434 30th Street

(303) 545-5848
fax: (303) 545-6066

TerraSonde reserves the right to make changes in specifications and other information contained in this publication without prior notice, and the reader should in all cases consult TerraSonde to determine whether any such changes have been made. This manual may not be reproduced, and is intended for the exclusive use of TerraSonde customers.

The terms and conditions governing the sale and use of the TerraLink software program consist solely of those set forth in the written contracts between TerraSonde and its customers. No statement contained in this publication, including statements regarding capacity, suitability for use, or performance of products, shall be considered a warranty by TerraSonde for any purpose or give rise to any liability of TerraSonde.

In no event will TerraSonde be liable for any incidental, indirect, special, or consequential damages (including lost profits) arising out of or relating to this publication or the information contained in it, even TerraSonde has been advised, knew, or should have known of the possibility of such damages.

The TerraLink program described in this document is copyrighted and is confidential information and a proprietary product of TerraSonde. The copyright laws prohibit the copying of this manual or any of the support software programs without the written consent of TerraSonde, except in the normal use of the product, or to make a backup copy. This exception does not allow a copy to be made for others. Copying, under the law, includes translating into another language or format.

(c) Copyright 2002-2003 All Rights Reserved

TerraSonde
2434 30th Street
Boulder, CO 80301
USA
(303) 545-5848 FAX (303) 545-6066
www.terraSONDE.com

All rights reserved.

Printed in USA

Revised: March, 03

General Notice: some of the product names used herein have been used for identification purposes only and may be trademarks of their respective companies.

The Audio Toolbox is a trademark of TerraSonde.

Table of Contents

QUICK START	5
SETUP.....	7
COMPUTER REQUIREMENTS	7
REGISTRATION CODES.....	7
PREFERENCES	7
<i>Personal Information</i>	8
<i>Serial Connection</i>	8
OVERVIEW.....	9
STANDARD TOOLS	9
<i>New Tool</i>	9
<i>Open Tool</i>	9
<i>Save Tool</i>	9
<i>Print Tool</i>	9
GLOBAL GRAPH TOOLS	10
<i>Drag Up & Down Tool</i>	10
<i>Readout Cursor Tool</i>	10
GLOBAL GRAPH SETTINGS.....	10
<i>Colors</i>	10
<i>Scale Resize</i>	11
<i>Grid Combo Box</i>	11
PROJECT FILES.....	12
THE PROJECT DATA BOX	12
<i>Importing Memories</i>	12
<i>Copying Memories</i>	13
<i>Moving Memories</i>	13
<i>Composite Project Files</i>	13
<i>Exporting Memories</i>	13
<i>Project Data Box Button</i>	13
THE GRAPH WINDOW	13
<i>Graph Combo Box</i>	13
<i>Memory Menu</i>	14
<i>Real Time Analyzer (RTA)</i>	15
<i>FFT Analyzer (FFT)</i>	16
<i>Sound Study Graph</i>	17
<i>Energy Time Graph</i>	18
<i>Amplitude Sweep</i>	19
<i>Impedance Sweep</i>	20
REAL TIME INTERFACE.....	22
REAL TIME INTERFACE CONTROLS.....	22
<i>Rti Button</i>	22
<i>Play Button</i>	22
<i>Pause Button</i>	22

Quick Start

No time for manuals? Read this section to jump-start TerraLink!

- **Install the software:** If installing from a CD, insert the TerraLink CD into your CD-Rom. Double-click the CD icon. In the window that opens, double-click the file 'TerraLink Setup.exe' and follow the onscreen instructions. If installing from a downloaded or emailed .exe file, copy the file to your desktop, double-click it, and follow the instructions.
- **Connect the Toolbox:** Plug the Toolbox computer interface cable into the MIDI In and Out ports on the Toolbox, and the opposite end into the computer's serial port. If your computer does not have a serial port, a USB-serial interface device is required. We recommend Belkin single-port USB-serial adapters. Most RS232 ports should work, although you may have to experiment to find one that is available. From the TerraLink *Edit* menu, select *Preferences* to choose from the available COM ports.
- **Run TerraLink:** From the *Start* menu, select *Program Files> TerraLink 1.2> TerraLink*
- **Enter the Registration code:** A registration code is required to fully use TerraLink. From the *Edit* menu, select *Registration Codes*. In the dialog box that appears, select **New**, enter your registration code, and select **OK**. If you do not have a registration code, you will be able to run the program as a viewer. To purchase a registration code, contact TerraSonde at 888-433-2821.
- **Explore:** Open a new project, put the Toolbox in Computer Interface mode, and upload the memories from the Toolbox. Or, if you don't have a registration code, just open the example file. For the Real Time Interface, just click the **Rti** button on the Toolbar after selecting a port. The Toolbox will need to be in the RTA, FFT, or Energy-Time Graph function to view the results in real time.
- **Want more?** Well, read on. You will learn how to cut and paste project files, save multiple project files, store them back into the Toolbox, do advanced graphing and math tricks, and print graphs.

Setup

Computer Requirements

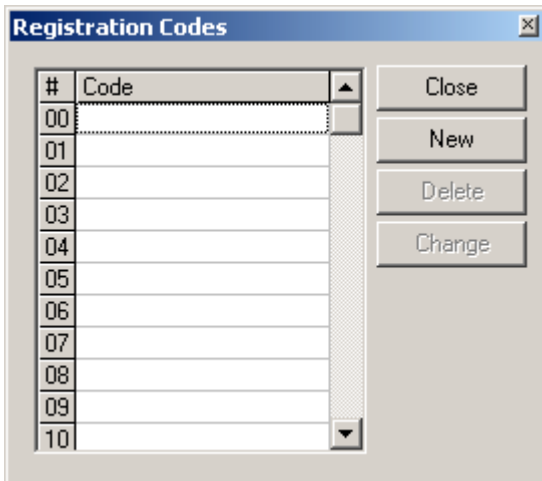
An IBM compatible PC running Windows 98, 2000, Me or XP is required. Also, an available serial port or USB-serial adapter is needed for communication with an Audio Toolbox.

Registration Codes

TerraLink uses Registration Codes as a means of licensing the software. Without a Registration Code, you will be able to open Project Files, examine graphs, and print. However, you will not be able to create or save Project Files, or communicate with a Toolbox (upload/download memories or use the Real Time Interface). You can send the TerraLink program to a client with your Project File so that the client can view and print data without the need for a Registration Code.

Also, the functions that interact with a Toolbox will only work if a Registration Code was purchased for that Toolbox. Separate Registration Codes are required for every Toolbox that you wish to work with.

You can purchase as many Registration Codes as you wish, if you need to work with more than one Toolbox. You can install TerraLink on as many computers as you like, and as long as you have the correct Registration Codes it will communicate with the connected Toolbox.



From the *Edit* menu, select *Registration Codes*. In the dialog box that appears, select **New**, enter your registration code, and select **OK**.

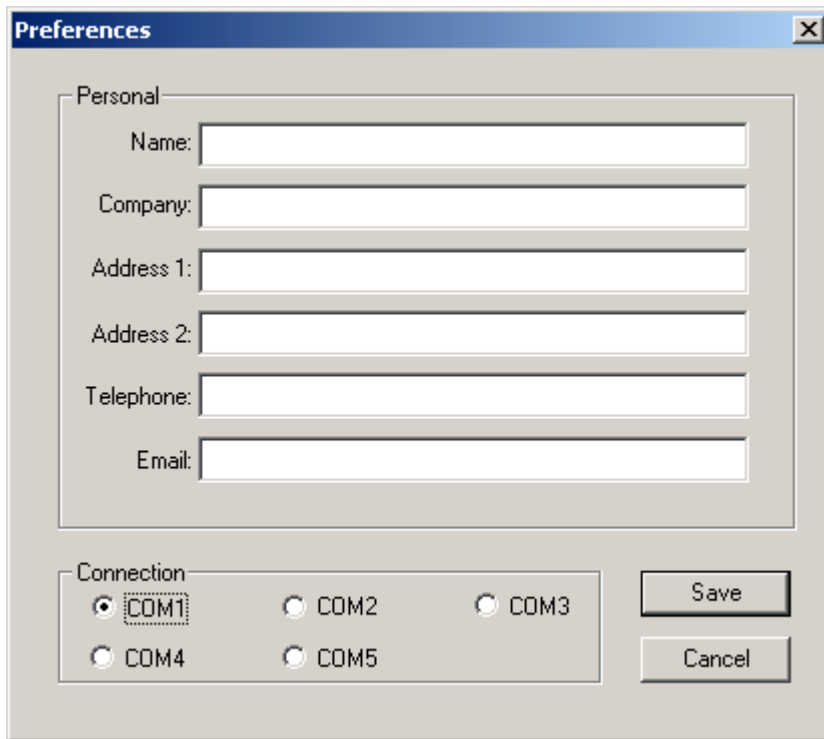
Preferences

TerraLink stores a set of preferences on your computer.

Personal Information

Select the *Preferences* function on the *Edit* Menu to enter information about your company and the project that will be printed on each graph.

You can enter Name, Company, Address, Telephone, Email, and Graph Title information.



The screenshot shows a dialog box titled "Preferences" with a close button (X) in the top right corner. The dialog is divided into two main sections: "Personal" and "Connection".

The "Personal" section contains six text input fields, each with a label to its left:

- Name: []
- Company: []
- Address 1: []
- Address 2: []
- Telephone: []
- Email: []

The "Connection" section contains five radio button options for COM ports:

- COM1
- COM2
- COM3
- COM4
- COM5

To the right of the radio buttons are two buttons: "Save" and "Cancel".

Serial Connection

The serial connection needs to be set before using TerraLink. In the *Preferences* box, you can select the appropriate COM port. If you do not set it, you will be prompted to set it. This setting will be stored so that you do not need to re-enter it the next time you run the program.

Overview

TerraLink operates in two distinct, but integrated, environments: the Project File and the Real Time Interface (RTI.) The RTI is simply an extension of the Toolbox screen for the supported functions. The Project File is where most of TerraLink's operations take place. Graphs that are created in the RTI can be saved as a memory in a Project File and later manipulated just like a memory that originated in the Toolbox.

TerraLink provides Standard tools for handling Project Files and some Global settings and tools for manipulating all graph types. Other tools may be available to individual graph types and are described in the Graph Window section of the manual.

Standard Tools



New Tool

Clicking on the New tool opens a new Project File. This can also be accomplished by selecting *File> New* on the Menu bar.



Open Tool

Clicking on the Open tool opens a saved Project File. This can also be accomplished by selecting *File> Open* on the Menu bar. In the Open dialog box that appears, select a previously saved Project File and click **OK**.

Save Tool



Clicking on the Save tool saves the currently selected Project File. This can also be accomplished by selecting *File> Save* on the Menu bar. Project Files are saved with a '.tlk' file extension.



Print Tool

Clicking on the Print tool prints the graph of the currently selected Project File. This can also be accomplished by selecting *File> Print* on the Menu bar. Any information entered in the *Preferences* box will appear below the graph on the printed page.

Global Graph Tools

The following tools are available to all graphs:

Drag Up & Down Tool



This tool allows you to vertically center a graph by dragging its' position up or down. Left-click and hold to drag. This does not alter any values of the graph and is simply a display tool.

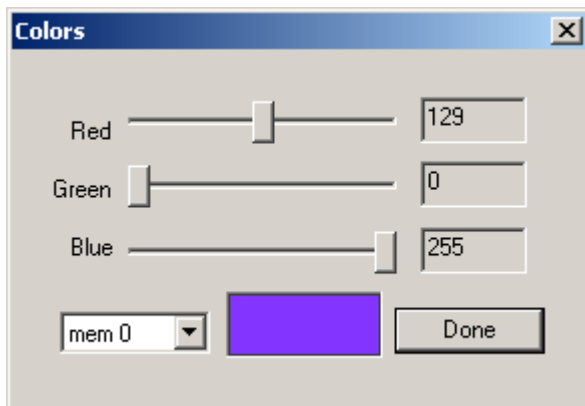
Readout Cursor Tool



The Readout Cursor tool allows you to select points on the graph and display the actual values of those points.

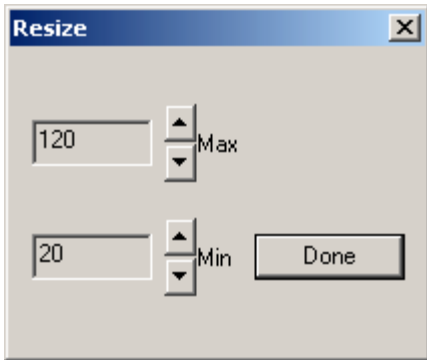
Global Graph Settings

The following settings are available to all graphs:



Colors

To change the color of a specific graph, right-click inside the Graph window and select *Colors* from the drop-down menu (or from the Menu bar, select *Graph> Colors*). In the Colors box, select the memory you wish to adjust from the *mem* combo box. Then adjust the color using the *color sliders*. You can adjust the color of each memory on the graph as desired, then click **Done**.



Scale Resize

To resize the Graph window's y-axis scale, right-click anywhere inside the Graph window and select *Scale*. In the Resize box, set the desired Min dB and Max dB values and click **Done**. This will re-scale the vertical axis to your settings.



Grid Combo Box

You can also adjust the grid to show lines every 10 dB, 5 dB, or 1 dB. To do this, select the desired grid from the Grid combo box. The default is 10 dB.

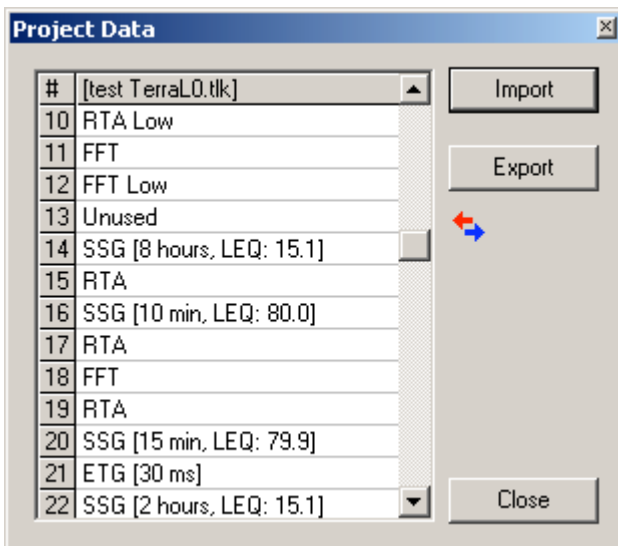
Project Files

The main operating environment of TerraLink is the Project File. A Project File can hold 40 memories (just like a Toolbox.) Usually, you will start a new Project File, load the memories from a Toolbox, and go from there. You can save the file to your hard disk, email it to someone else, and store it back into your Toolbox or a different Toolbox.

Project Files utilize a Graph window and the Project Data box. Each open Project File has its own Graph window, so there can be several Project File Graph windows on the screen at once, while the Project Data box is global and displays only the 40 memories of the currently selected Project File.

The Project Data Box

The Project Data box is where you modify the Project File's contents.



Importing Memories

The first thing you will probably want to do is to get the memories from the Toolbox into TerraLink. To do this, put the Audio Toolbox into Computer Interface mode. In TerraLink, create a new Project File (*File> New*), and click the **Import** button in the Project Data box to transfer the Toolbox memories to the computer.

Once the Toolbox memories are imported, you can rename, re-order, and delete individual memories. To make it easier to work with multiple Project Files, there is only one Project Data box displayed at a time for the *selected* Project File. The name of the currently selected Project File is displayed at the top of the Data Table in the Project Data box and its' Graph window will be highlighted. There are as many Graph windows displayed as there are Project Files open and these can be minimized to free up valuable desktop space. To select another Project File, click anywhere inside that Project's Graph window and the Project Data box will display all 40 memories of that Project.

Copying Memories

To copy memories from one Project File to another, just open both Project Files (to get two Graph windows), and select the Project containing the memory you wish to copy. On the Data Table in the Project Data box, right-click the cell of the memory. From the drop-down menu that appears, select *Copy*, then select the Graph window of the Project File that you wish to copy the memory to. Now right-click on any unused cell in the Project Data box to open the drop-down menu, and select *Paste*. Note that it is possible to overwrite a memory by pasting a new memory into its' cell.

Moving Memories

To move memories from one Project File to another, just open both Project Files (to get two Graph windows), and select the Project containing the memory you wish to move. On the Data Table in the Project Data box, right-click the cell of the memory. From the drop-down menu that appears, select *Cut*, then select the Graph window of the Project File that you wish to move the memory to. Now right-click on any unused cell in the Project Data box to open the drop-down menu, and select *Paste*. Note that it is possible to overwrite a memory by pasting a new memory into its' cell.

Composite Project Files

You can open several Project Files at once, and cut, copy and paste memories from one to another, creating a Project File that is a composite of memories created at different times, even from different Toolboxes.

In some cases you can sum several graphs of the same type and store the results back into the Project File as a new memory. This memory can then be used as the basis for a difference mode display.

Exporting Memories

The memories from any Project File can be transferred to a Toolbox by using the **Export** button in the Project Data box.



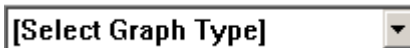
Project Data Box Button

This button can be used to open the Project Data Box when at least one Project File is open.

The Graph Window

The Graph window is where all memory data is displayed. To access the various graph types, use the following tools:

Graph Combo Box

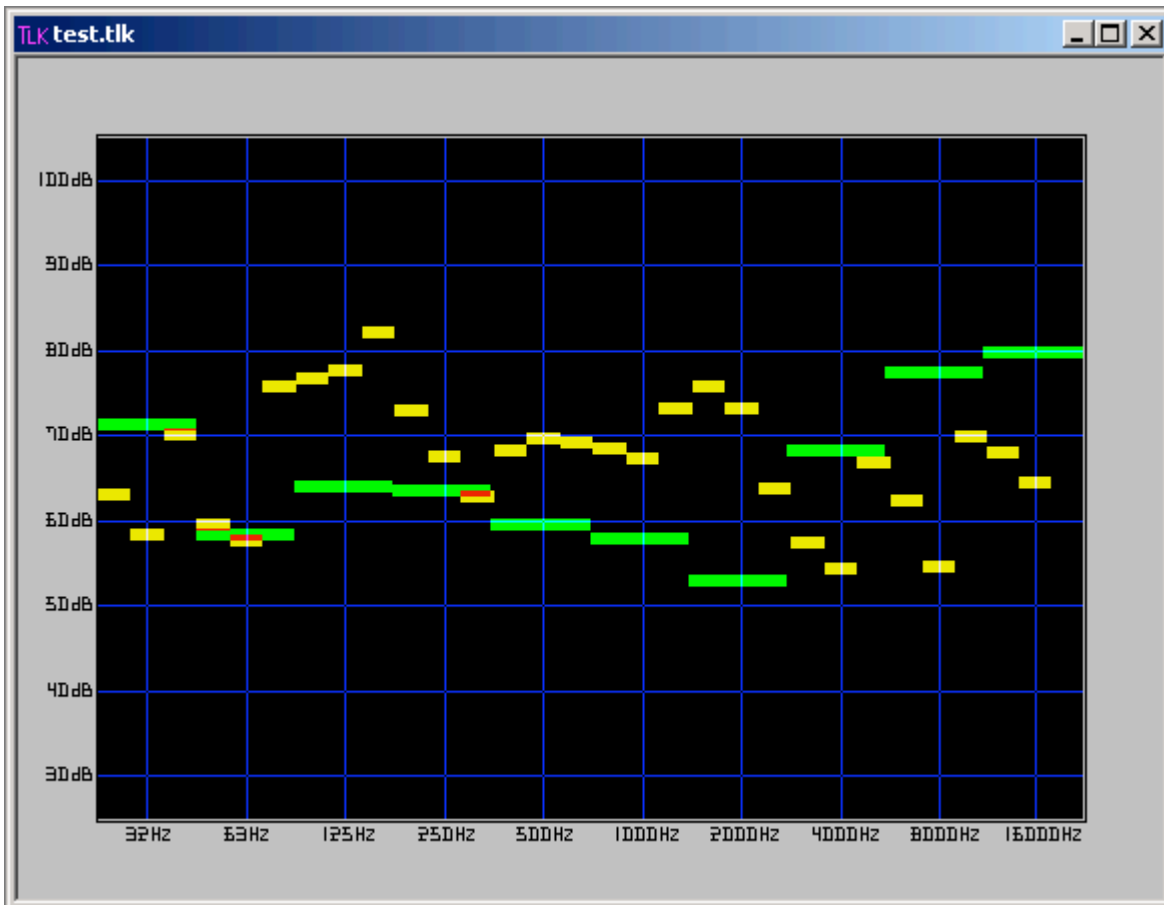


This menu allows you to select the type of graph to display in the Graph window. Click on the drop-down arrow and select the type of graph you wish to work with. That type will now be displayed in the Graph combo box.

Memory Menu

M

Once you have selected the type of graph you wish to work with in the Graph combo box, click on the **M** button to open the Memory Menu and choose from the available memories of that graph type. Clicking on a memory name will display it in the Graph window and place a check next to the memory name, indicating that it has been selected. For all graph types except ETG and SSG, you can select and display as many memories as are available in the Project File.



Real Time Analyzer (RTA)

You can display as many RTA graphs as you like on the screen. Each will show up in a new color. RTA memories are displayed and remain in the original frequency band resolution (octave or 1/3-octave) they were created in. RTA memories of different resolutions can be displayed in the Graph window simultaneously.

Average Tool



Select the Average Tool to algebraically average all of the graphs currently being displayed. [Note that this is a true algebraic average. For example, 60 dB and 80 dB do NOT average to 70 dB.] The resulting average curve may be stored as a new memory by using the *Copy* function.

Difference Tool



Select the Difference Tool to see how one or more graphs compare to a reference graph. The reference (baseline) graph is selected from the drop-down menu by right-clicking inside the Graph window. [In this case, the difference is in dB. So, for example, 70 dB minus 60 dB is 10 dB.]

FFT Analyzer (FFT)

You can display as many FFT graphs as you like in the Graph window. Each will show up in a new color.

[INSERT SPLINE PIC]

On the Menu bar, select *Graph> FFT*. Here you can select between 7 different graph formats for viewing the FFT data. These include the normal octave, 1/3-octave, 1/6-octave, and 1/12-octave bars that are the same as the bars seen on the Toolbox screen. You can also view the data as octave, 1/3-octave, and 1/12-octave graphs that have been curve-fit and smoothed. The curve-fit algorithm used is a spline, with as many output points as are on the fully zoomed-out screen.

The bars are created using algebraic summing (as on the Toolbox). As you consolidate the data more, the level of the bars will rise. For example, if you were measuring wide-band pink noise, as you switch from 1/12-octave to 1/6-octave to 1/3-octave to octave-band resolution, the level of the bars will rise. In contrast, the curve graphs that are drawn always use the 1/12-octave data, so they do not rise as the smoothing is increased.

Average Tool



Select the Average Tool to algebraically average all of the graphs currently being displayed. [Note that this is a true algebraic average. For example, 60 dB and 80 dB do NOT average to 70 dB.] The resulting average curve may be stored as a new memory by using the *Copy* function.

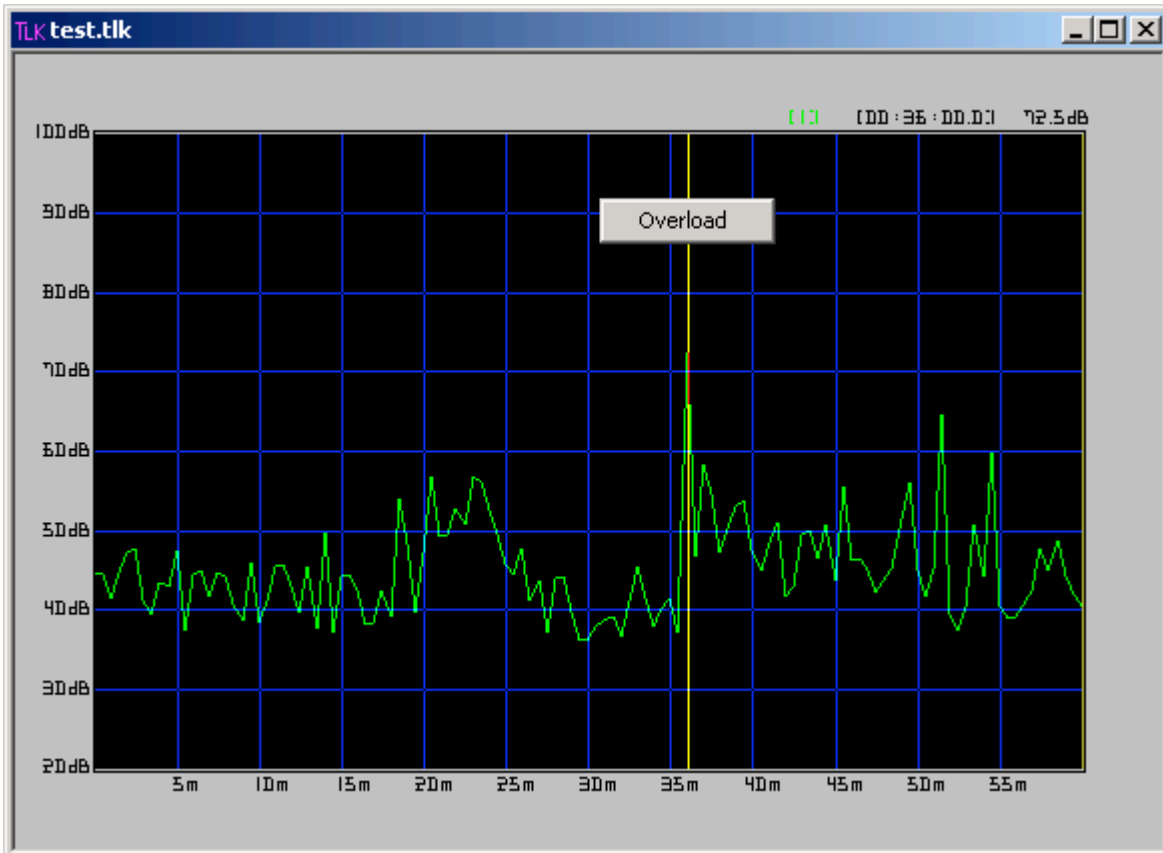
Difference Tool



Select the Difference Tool to see how one or more graphs compare to a reference graph. The reference (baseline) graph is selected from the drop-down menu by right-clicking inside the Graph window. [In this case, the difference is in dB. So, for example, 70 dB minus 60 dB is 10 dB.]

Sound Study Graph

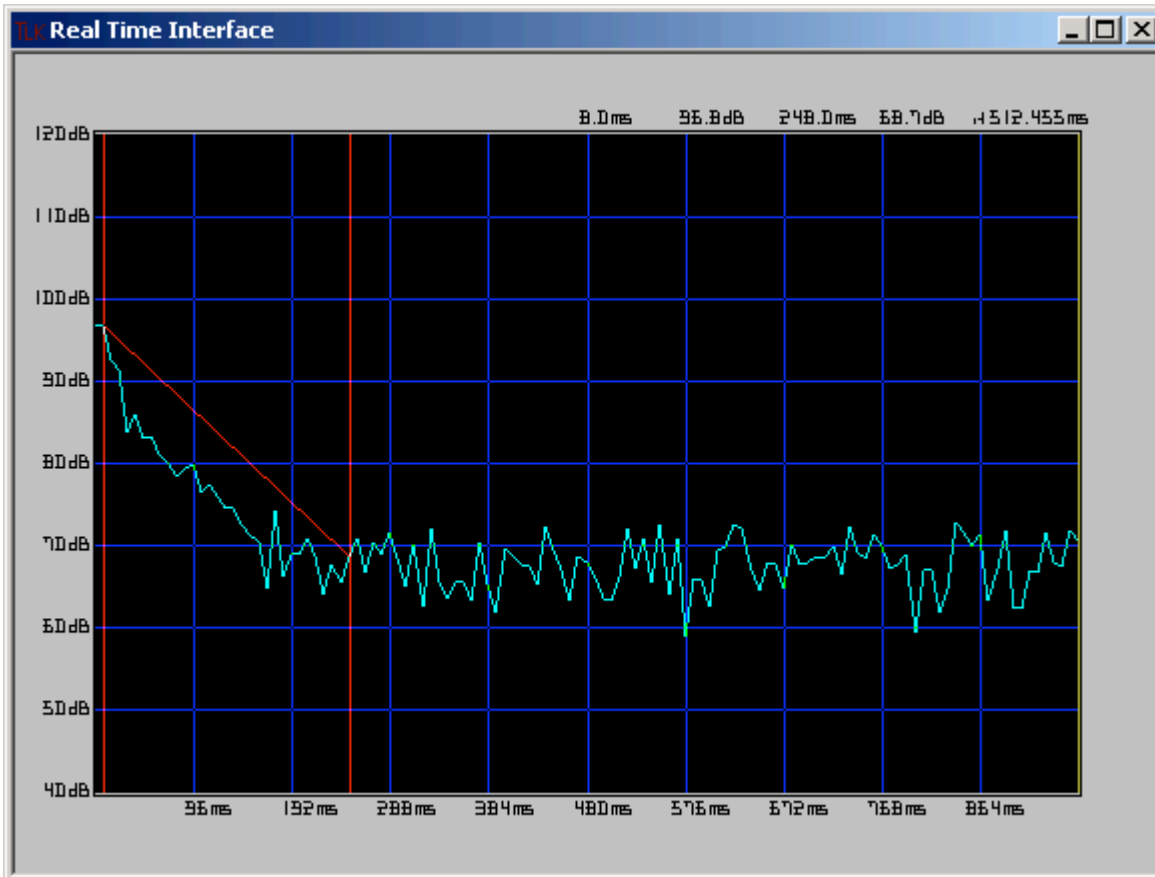
Only one Sound Study Graph can be viewed at a time. If a particular point in time overloaded the Toolbox, the *Overload* indicator will be shown as the cursor moves across the screen.



There are no special tools that are used with the Sound Study Graph.

Energy Time Graph

Only one ETG can be viewed at a time. There is one special tool available.



RT60 Tool



If you select the RT60 Tool, you can set the 2 endpoints of a line that represents a slope on the ETG. This slope is translated to an equivalent RT60 time, which is displayed in the upper right corner of the Graph window.

The x-axis of the Energy-Time Graph can be viewed in milliseconds (ms), feet (ft), or meters (m). To adjust this setting, click *Graph* on the Menu bar, scroll down to *ETG* and select one of the three options. The default is ms.

Amplitude Sweep

You can view multiple Amplitude graphs at the same time on the screen. Amplitude memories are displayed and remain in the original frequency band resolution (1/3-octave or 1/12-octave) they were created in.

Average Tool



Select the Average Tool to algebraically average all of the graphs currently being displayed. [Note that this is a true algebraic average. For example, 60 dB and 80 dB do NOT average to 70 dB.] The resulting average curve may be stored as a new memory by using the *Copy* function.

Difference Tool



Select the Difference Tool to see how one or more graphs compare to a reference graph. The reference (baseline) graph is selected from the drop-down menu by right-clicking inside the Graph window. [In this case, the difference is in dB. So, for example, 70 dB minus 60 dB is 10 dB.]

Impedance Sweep

You can view multiple Impedance Sweep graphs at the same time on the screen. Impedance memories are displayed and remain in the original frequency band resolution (1/3-octave or 1/12-octave) they were created in.

The Grid combo box has no effect on the Impedance graphs and the Scale Resize box has different settings than those for all other graph types. Here you can select a number of different y-axis settings from 0-20 Ohms to 0-8000 Ohms.

Average Tool



Select the Average Tool to algebraically average all of the graphs currently being displayed. [Note that this is a true algebraic average. For example, 60 dB and 80 dB do NOT average to 70 dB.] The resulting average curve may be stored as a new memory by using the *Copy* function.

Difference Tool



Select the Difference Tool to see how one or more graphs compare to a reference graph. The reference (baseline) graph is selected from the drop-down menu by right-clicking inside the Graph window. [In this case, the difference is in dB. So, for example, 70 dB minus 60 dB is 10 dB.]

Real Time Interface

TerraLink provides a Real Time Interface that displays the RTA, FFT, and Energy-Time graphs on the computer screen as the function is running on the Toolbox.

Real Time Interface Controls

The Real Time Interface is used to display result from the Toolbox on the PC screen. Use these buttons to operate the Real Time Interface:



Rti Button

With the Toolbox powered on and connected to the computer, open the Real Time Interface window by clicking on the **Rti** button in the center of the Toolbar.

Play Button

With the RTA, FFT, or ETG running on the Toolbox, click the **Play** button.



You should now see the computer graph dynamically displaying the graphical data from the Toolbox. The Real Time Interface screen and the Toolbox screen are updated simultaneously.

Pause Button

To freeze the display, click the **Pause** button.



You can use the *Copy* function at any time (paused or running) to store the current memory data on the clipboard. Then you can switch to any open Project File's Project Data box and use the *Paste* function to paste the current memory into one of the 40 available cells of that Project File.