The Logical Interface

TLI CRO

INSTRUCTION MANUAL

A computer interface for experiments in Senior Physics

Table of Contents

Introduction

TLI CRO is made in Australia by The Logical Interface It is designed to record sound from your PC sound card and provide an interface that works in the same way as a traditional oscilloscope.

Through the TLI CRO software you can

- control Time Base
- control Voltage and DC Offset
- save recorded info as a wave file.

To use the **TLI CRO** you require Windows ME or higher and a sound card.

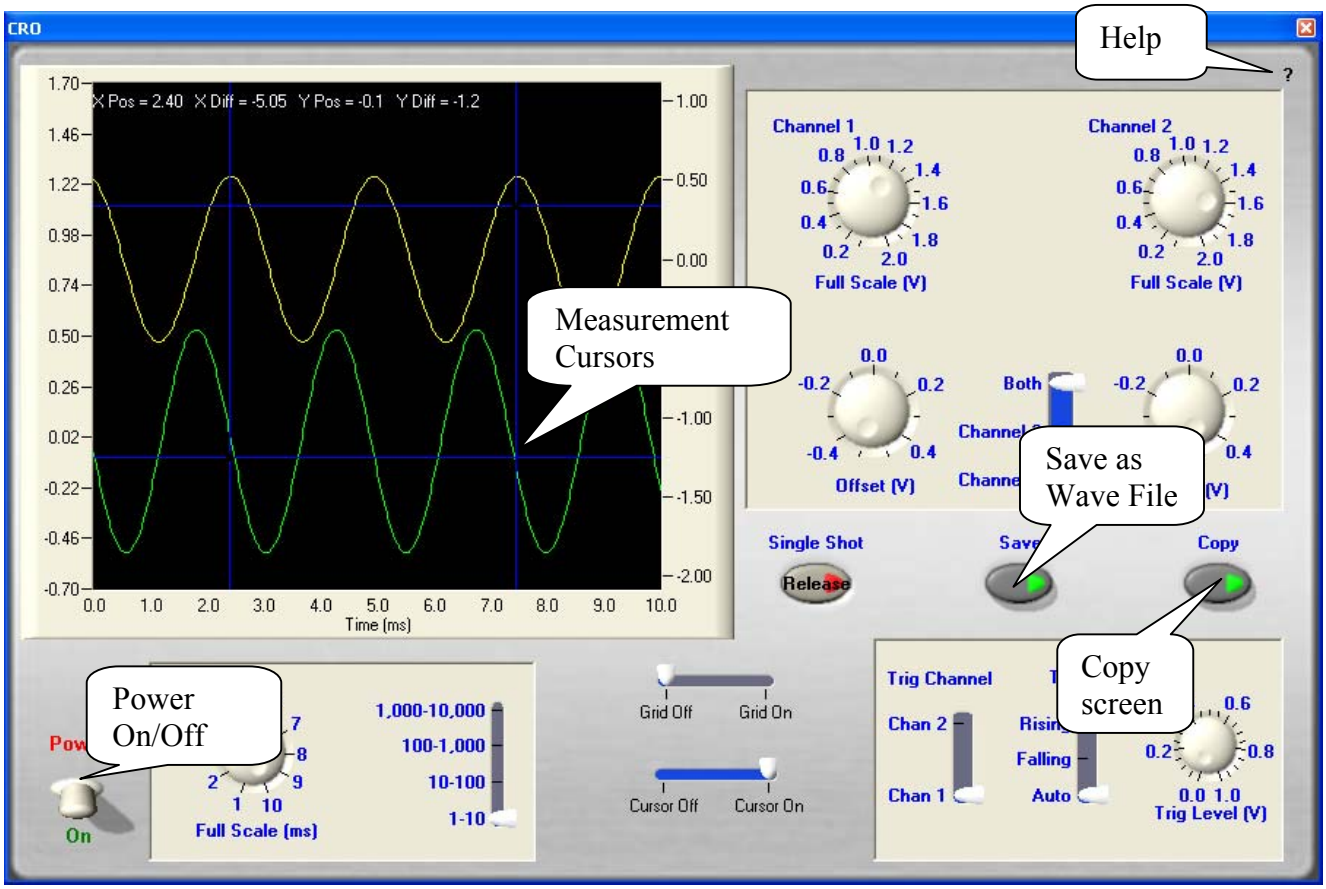
Note: To record from two channels you need to use your computer's line-in. Most PC microphone inputs are mono, or single channel.

Use the Table of Contents to obtain help on any of the listed topics.

Getting Started

To start the TLI CRO software

1. Mouse click the Start button
2. Select All Programs
3. Select and click TLI CRO
4. The screen below will appear. Switch the power on using the power switch (see below)

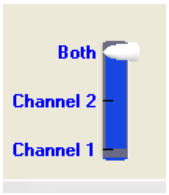


Features

1. View either channel, or both channels.
2. You can generate one single snapshop using the “Snapshot button.
3. You can control the CRO trigger using either channel and while the signal is rising, or falling.
4. You can save your input as a .wav file by selecting the Save button.
5. You can Copy the screen to the clipboard by selecting the Copy button.

The two cursors on the CRO screen are designed to allow you to take measurements on the time and voltage axis. The voltage axis measurement is associated with Channel 1 and the left axis scale. Please note that in this version of TLI CRO the input voltage is not calibrated. The cursors are controlled by placing the mouse pointer on the cross point of the cursor and with the mouse left button depressed dragging the cursor to the first point you wish to measure. Repeat this for the second cursor. The time difference (X Diff), the Y difference and the frequency are displayed at the top left corner. The Y Pos and X Pos give the positions of the last cursor to be moved.

Viewing either channel, or both channels.

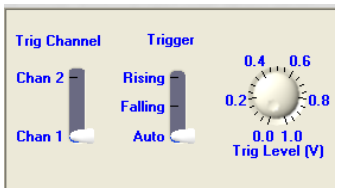


The slider at right allows you to select Channel 1, Channel 2, or both channels.
Note that if you are using a mono PC microphone then both Channel 1 and Channel 2 will show the same response. To view different waveforms on different channels you will need to connect a suitable device to the Line In of your PC.

Generating a single snapshop using the "Snapshot button.

A single snapshot freezes the input and makes it easier to take measurements using the cursors. Simply click the Snapshot button to freeze the input. Click again to unfreeze.

Controlling the CRO trigger



The trigger works like a CRO trigger. You can trigger off Channel 1, or Channel 2 and rising or falling. To adjust the Trigger Level simply rotate the Trig Level nobe.

Save your input as a .wav file by selecting the Save button.

To save as a wave file click the Save button. Wait until you have recorded enough data and then click the button again. A dialog box will appear asking you for the name of the file. Assign a name and the file will be saved. This file can be replayed using any Windows media played that supports .wav format.

Copy the screen to the clipboard.

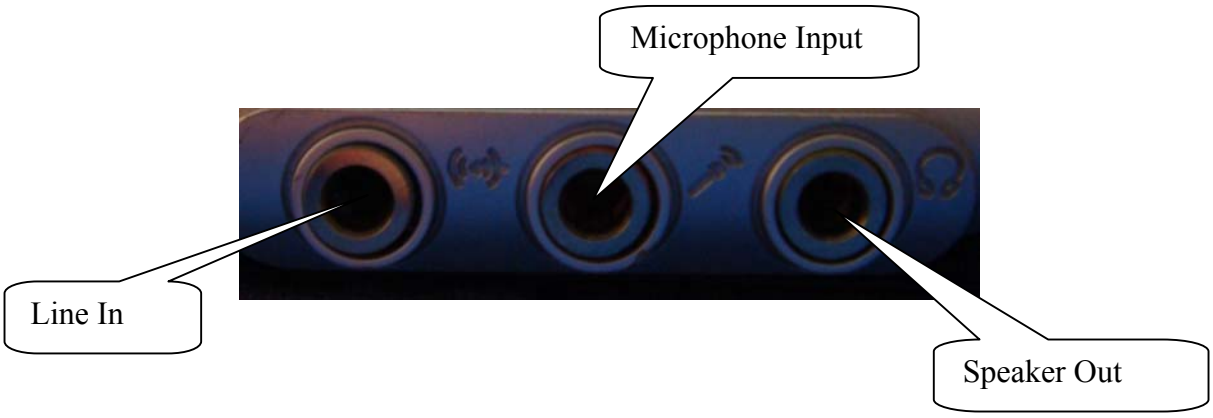
You can copy the CRO display to the clipboard and then from the clipboard to an application such as MS Word etc. Simply click the Copy button and then open the application you wish to copy to. Then paste the screen into this application.

Using TLI CRO with the TLI Wave Lab

There are two ways by which you can use TLI CRO to record the waves generated by TLI Wave Lab.

1. By generating the waves through a speaker and recording them with a microphone.
2. By connecting the speaker output to the Line In of your PC.

The Line In and Microphone sockets on your PCs provide the two ways by which you can input a signal to the TLI CRO software. The Line In socket is generally dual channel, while the Microphone In is a single channel input so there will be no difference between the signal in the two channels when using a typical PC microphone. Ensure you are able to identify the three sockets on your computer. The image below shows these three sockets on a typical notebook computer. Take some time to read your computer manual so you are familiar with the capabilities o your sound card.



To view both channels from the TLI Wave Lab connect the output from the speaker out to the Line In using the TLI Wave Lab cable. Adjust the frequencies, amplitude and phase of the two waves in the TLI Wave Lab software.

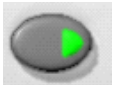
While you can run both sets of software on the one computer for clarity it is desirable to run the TLI CRO on one computer, the TLI Wavelab on a second computer and connect the Speaker Out on the “WaveLab computer” to the Line In on the “TLI CRO computer”. This reproduces the situation we would have if we were using a traditional CRO and signal generator.

Example 1: Demonstrating Beats

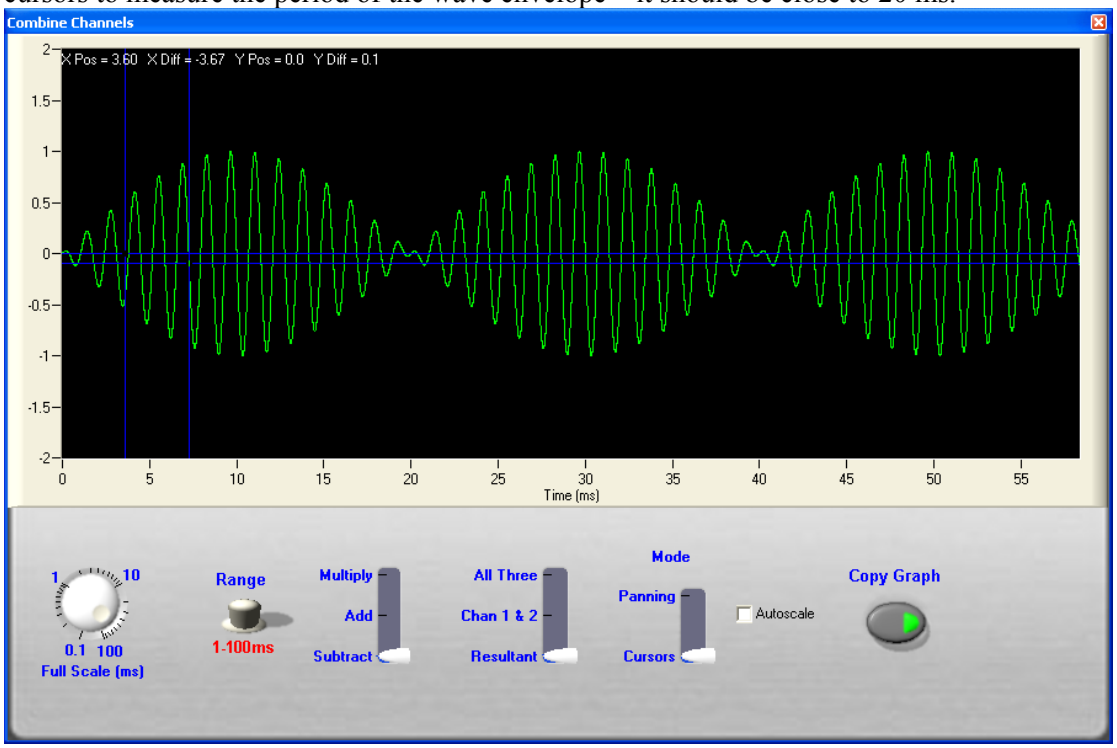
Connect the TLI WaveLab to the TLI CRO using the WaveLab cable.

1. Start the Wave Lab software
2. With the Wave Type set to Sine set the following frequencies and amplitudes

   Channel 1: Frequency : 710 Hz, Amplitude: 0.5
   Channel 2: Frequency : 700 Hz, Amplitude: 0.5

3. Click the Combine Graphs button 

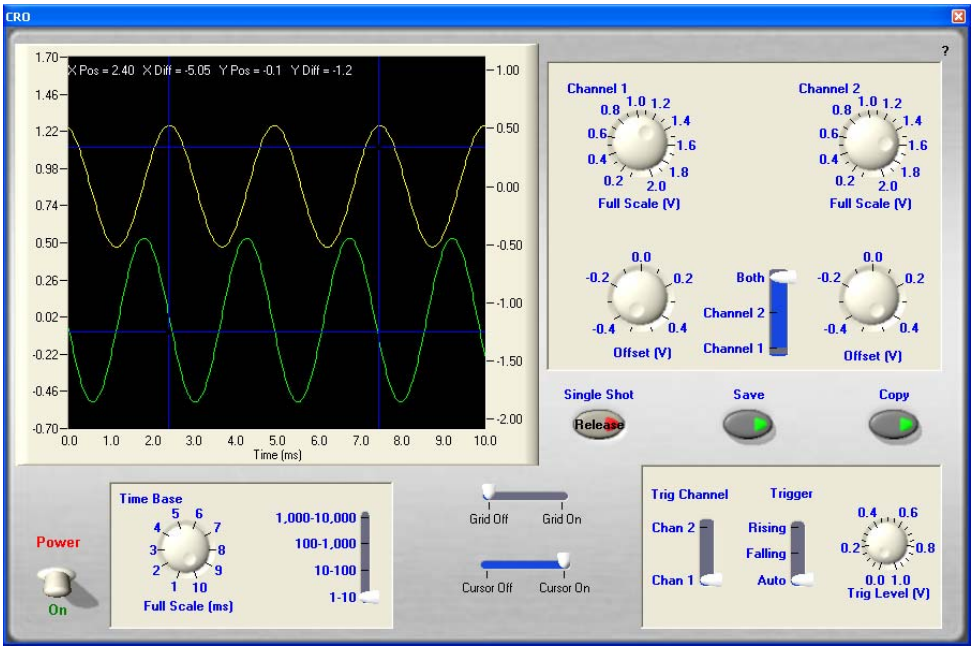
4. In the Combine Channels Window move the central slide to Add and view the result. Adjust the two cursors to measure the period of the wave envelope – it should be close to 20 ms.



5. Return to the main WaveLab screen and output the two waves to your computer's speakers and listen for the beats.

6. Start the TLI Virtual CRO – note that the quality of the waves will depend upon your computer's sound card.

7. Switch the power on. Adjust the voltage, DC offset and time base to show both waves (see below). Use the screen cursors to measure period and frequency.

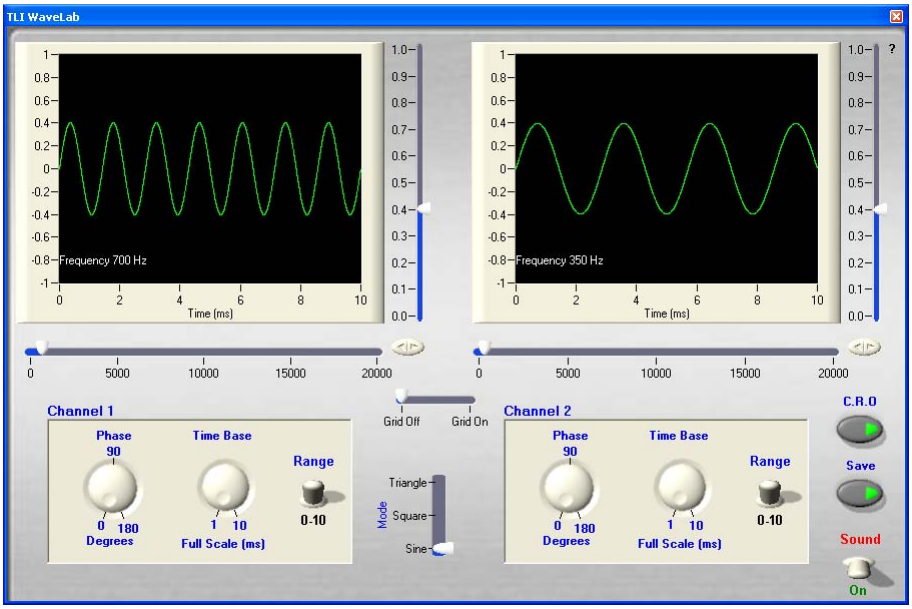


Example 2: Lissajou Figures

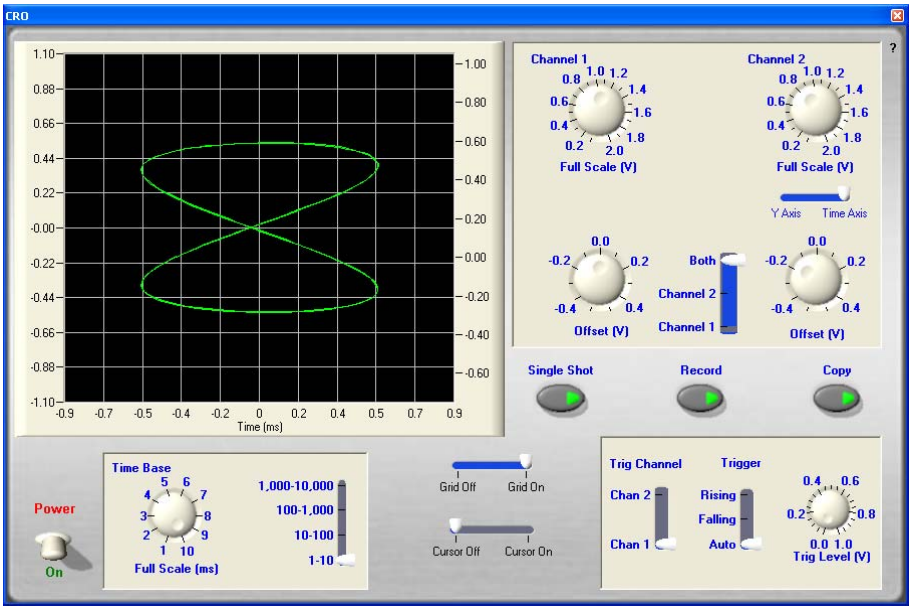
Connect the TLI WaveLab to the TLI CRO using the WaveLab cable.

1. Start the Wave Lab software
2. With the Wave Type set to Sine set the following frequencies and amplitudes

    i. Channel 1: Frequency : 700 Hz, Amplitude: 0.5
    ii. Channel 2: Frequency : 350 Hz, Amplitude: 0.5



3. Start the TLI Virtual CRO – note that the quality of the waves will depend upon your computer's sound card.
4. Switch the power on and move the slide control under Channel 2 to Time Axis. Channel 2 is now switched to the X or Time axis.



A Lissajou figure like that above will appear on the screen

.

Getting Help

Limited support is available for the Computer Wave Lab by contacting

The Logical Interface
Phone (612) 9541 0367 Fax: (612) 954 10535
Email: info@logint.com.au
http:/www.logint.com.au/
.