Lab #3A - DSO

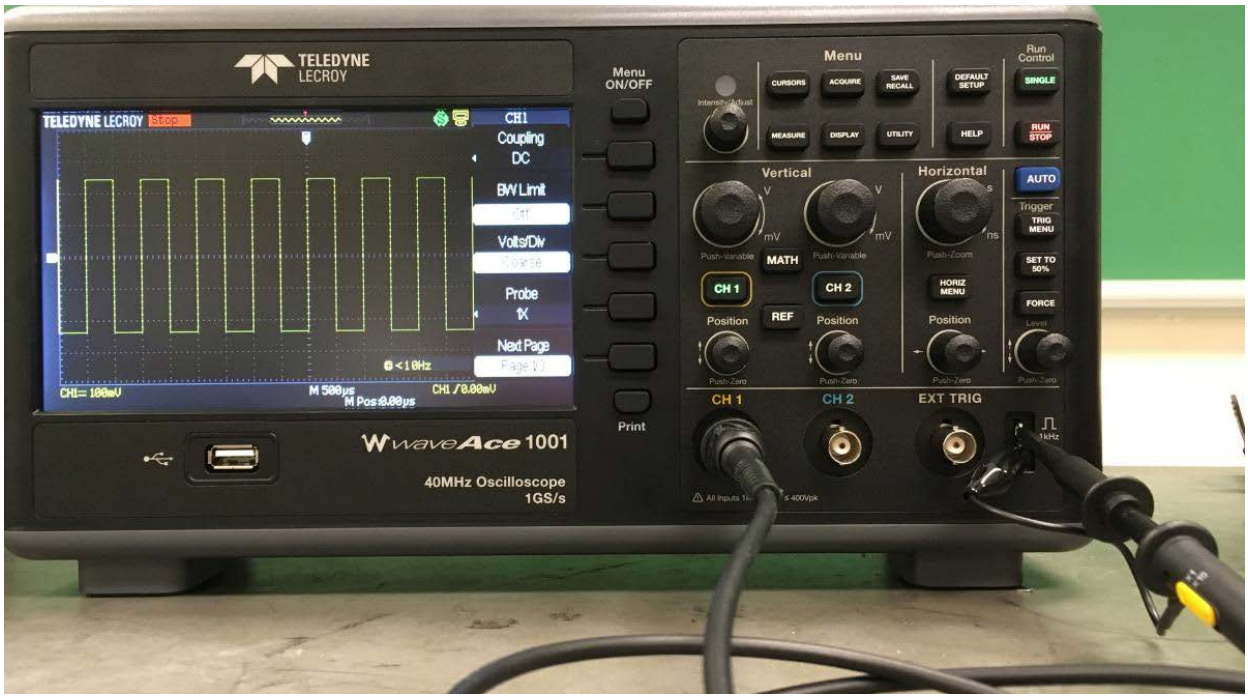
Lab #3A (*Digital Storage Oscilloscope*) is set up in Rockefeller 402 while Lab #3B (*E/M for the Electron*) is set up in Rockefeller 403.

Midway through the 3 hour lab period, you will switch rooms to work on the other experiment.

This lab requires only that you hand in a worksheet, which you can find in the back of your lab manual. Scan this worksheet so that you know what you must accomplish during the lab.

Section C.1

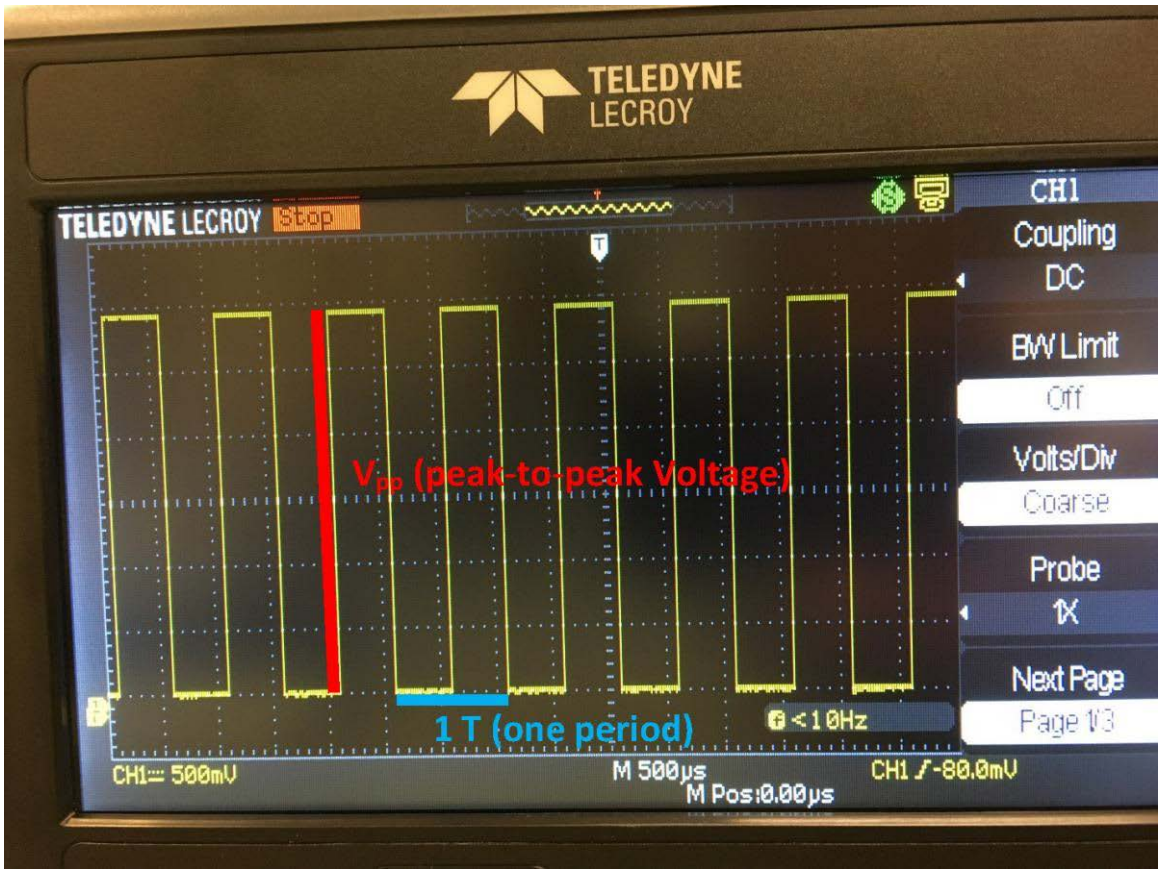
The picture below shows the scope probe connected to the calibration tab, with the coax connector of the probe connected to the CHANNEL 1 BNC input.



A 'DIV' on the scope, as in VOLTS/DIV or TIME/DIV, is a cm and the major gridlines on the scope face cover an area 8 cm tall by 15 cm long. Subdivisions are marked every 2 mm.

A lot of people have trouble reading the scope. The picture below may be helpful. It shows the trace for the CAL setup as well as the scope settings for the horizontal axis (*TIME/DIV = "M 500 μs"*) and vertical axis (*VOLTS/DIV ="CH1=500 mV"*). The blue line superimposed on this picture indicates the length of a period (*the horizontal line, which is about 2 cm or 2 DIV long, a*

period being measured over the time a signal takes to repeat itself) and the red line indicates the peak-to-peak amplitude (voltage) of the signal (*the vertical line which is also about 6.0 cm or 6 DIV tall*). So the period of this signal is 2 DIV times 500 μs/DIV = 1 msec. The frequency of the signal is the reciprocal of the period or 1/1 ms = 1000 Hz. The amplitude of the signal is 6.0 DIV times 500 mV/DIV = 3 V.

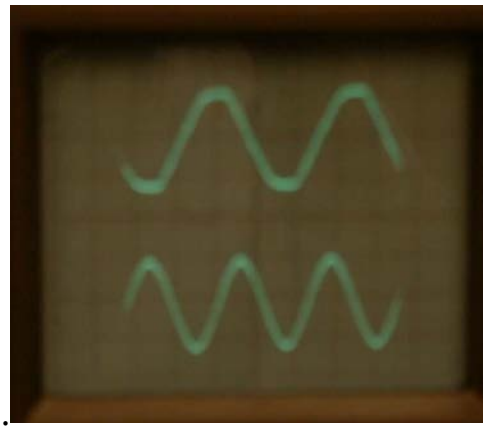


Section C.1.2

Peak-to-peak means maximum to minimum or from the top to the bottom of the trace on the scope. In this section you are asked to compare your measurement with '*the expected value*' which is 3.0 V.

Section C.2

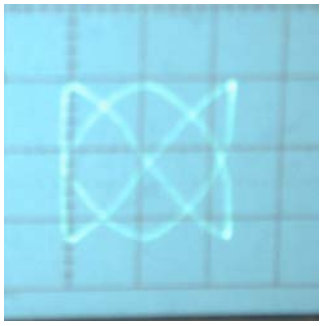
The picture below shows the scope trace you should have when BOTH the doorbell transformer and signal generator are connected. The transformer signal is on the top and the signal generator provides the bottom trace. Only part of each trace is visible in the photo.



Section C.3

To help you find the Lissajous pattern at 120 Hz, look for something that resembles the following picture.

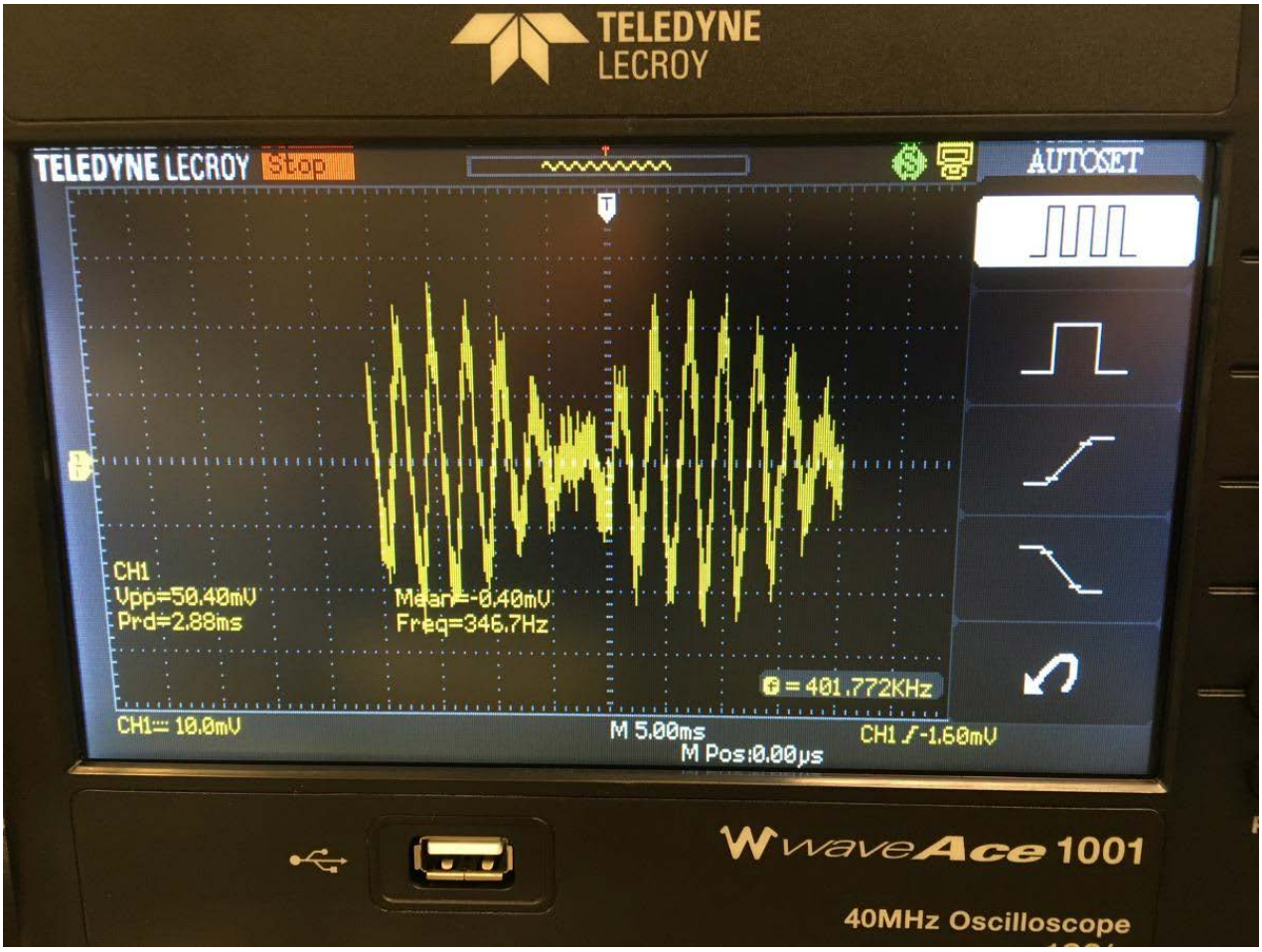
There are many Lissajous patterns between 60 and 120 Hz. However, you should try to find the simplest one, which should resemble the following picture.



Section C.4

The mallet is a rubber stopper on a rod. Hit the tuning fork with a moderately strong impulse striking with the **RUBBER** end of the drumstick, not the metal end, and remember that the loudest sound emanates from the open end of the wooden box, not from the fork itself.

Below is the image you should obtain when you strike two tuning forks with close frequencies.


TELEDYNE
LECROY
TELEDYNE LECROY
Stop
AUTOSET
CH1
Vpp=50.40mV
Prd=2.88ms
Mean=-0.40mV
Freq=346.7Hz
f = 401.772KHz
CH1 10.0mV
M 5.00ms
M Pos:0.00µs
CH1 -1.60mV
WaveAce 1001
40MHz Oscilloscope