

USING THE OSCILLOSCOPE AND FUNCTION GENERATOR

OBJECTIVE

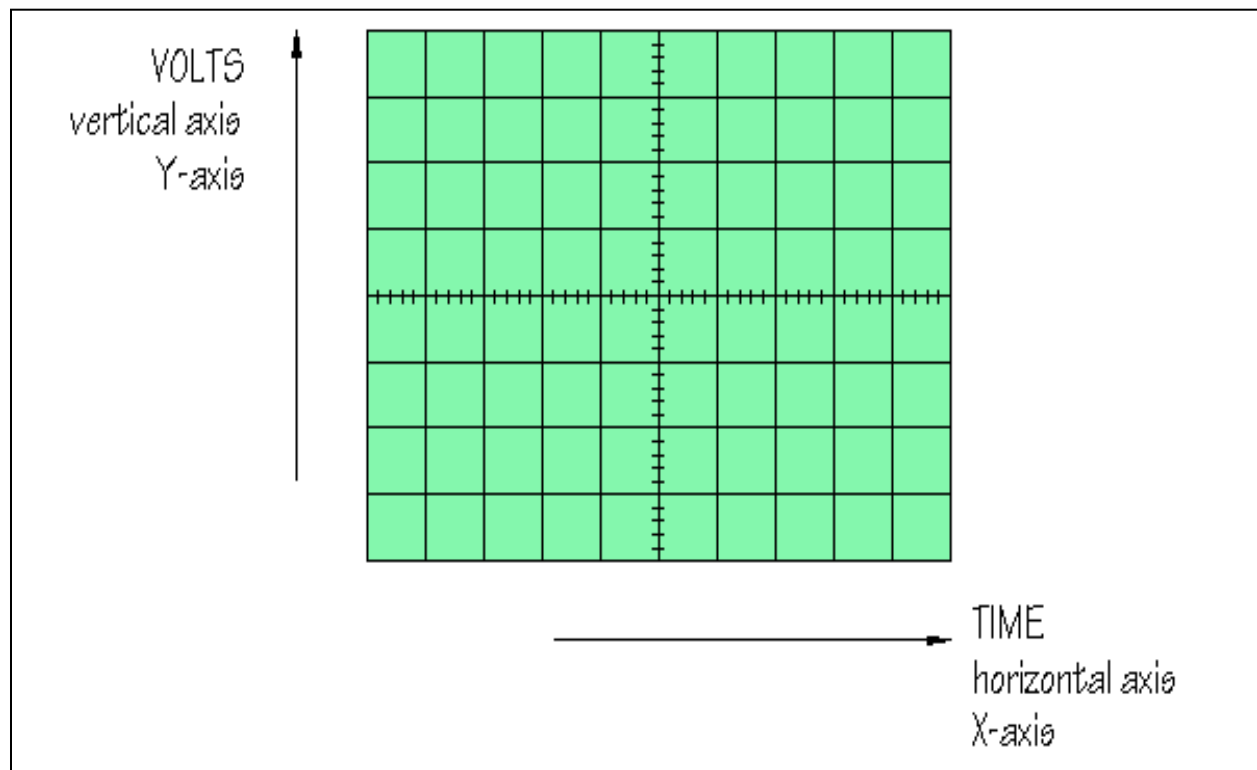
1. To learn how to use an oscilloscope to measure and analyze voltage signals.
2. To learn how to use the Function Generator to output voltage signals and analyze the signals with an oscilloscope.

THEORY(???)

Oscilloscope

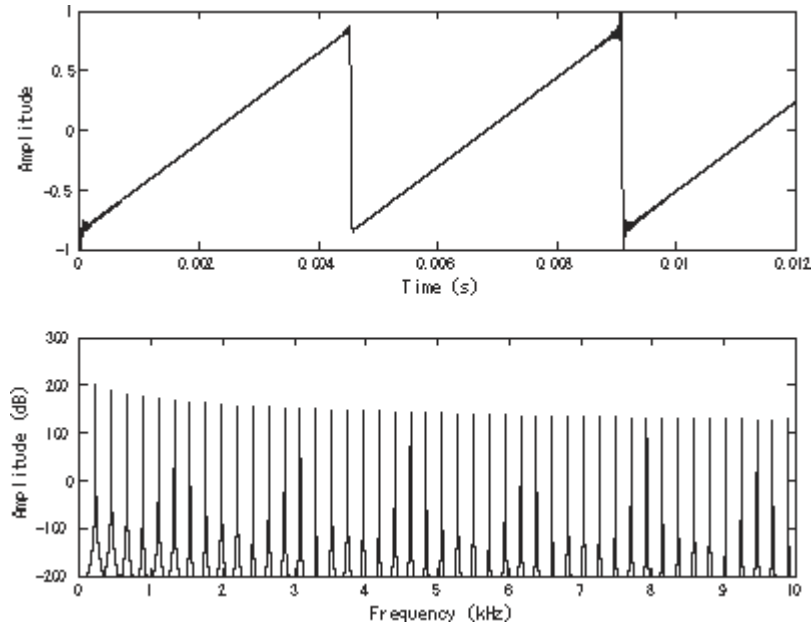
An oscilloscope is a very important instrument in electronics where its main function is to measure potential differences (voltage) in a circuit. Simply stated an oscilloscope is just another voltmeter.

An oscilloscope will measure voltage as a function of time. It can be set to measure voltage vs. voltage for two different signals. For our purpose we will be measuring Voltage vs. time.



Function Generator

As the name indicates, a function generator generates a function (signal). A particular signal can be important in different types of circuits and thus its important that you can analyze any particular signal. If the signal is periodic then its important that we can analyze the signal in terms of its period, frequency, and amplitude.



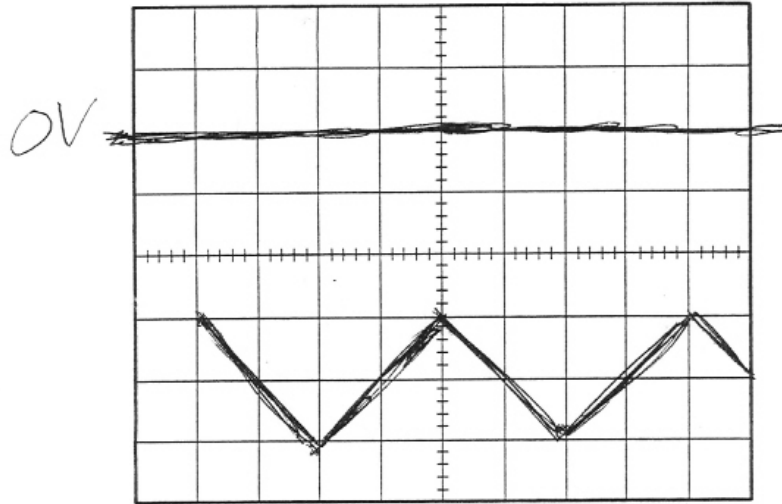
EQUIPMENT

1. Fluke Analog Oscilloscope
2. BNC-to-BNC cables
3. HP Function Generator
4. 2 dry cell batteries

PROCEDURE

1. Select an oscilloscope.
2. On the PHYSICS 4B MANUAL read "EXPERIMENT 6: THE FLUKE PM 3084 ANALOG OSCILLOSCOPE".
3. Follow the procedure to understand how to analyze and display the calibration signal of oscilloscope.
4. Calculate the period, frequency, and amplitude of the calibration signal. Calculate the % error for the frequency and amplitude.
5. Measure the voltage across two dry cell batteries using the oscilloscope and a voltmeter. Compare results.
6. Read the handout "EXPERIMENT 7: EVALUATION OF THE HP FUNCTION GENERATOR" to learn how to use the Function Generator and analyze the output signal using the oscilloscope. Output a sine signal of approximate amplitude of 10V with a frequency of 1 KHz. Calculate the period, frequency, and amplitude using the oscilloscope. Calculate the % error for the frequency.
7. Take the Oscilloscope Quiz and check your answers with solution!

Name _____



Volts/cm = $\frac{1\text{mV}}{\text{cm}}$

Seconds/cm = $\frac{5\mu\text{s}}{\text{cm}}$

ground position: SHOWN

V_{p-p} = _____

Period (T) = _____

frequency (f) = _____

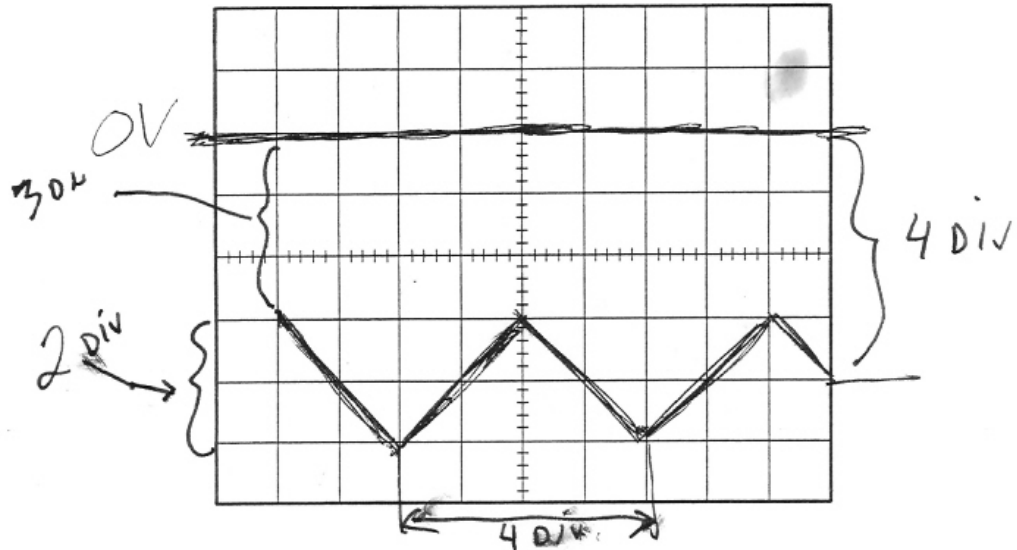
DC offset = _____

trigger level = _____

slope: _____

signal form: _____

Name I. Newton



Volts/cm = $\frac{1\text{mV}}{\text{cm}}$

Seconds/cm = $\frac{5\mu\text{s}}{\text{cm}}$

ground position: SHOWN

$V_{p-p} = \underline{2\text{mV}}$

Period (T) = $\underline{20\mu\text{s}}$

frequency (f) = $\underline{50\text{kHz}}$

DC offset = $\underline{-4\text{mV}}$

trigger level = $\underline{-3\text{mV}}$

slope: $\underline{-}$

signal form: triangle