Oscilloscope Summary

This document is a companion to a web-based document on simple usage of an oscilloscope, which is at:

http://www.upscale.utoronto.ca/GeneralInterest/Harrison/Oscilloscope/Oscilloscope.html

Since this is a *summary*, we do not duplicate the more complete discussion contained in that web-document.

We shall re-emphasise here, however, that although the location and labels of the various controls are different for different manufacturers and models, the functionality for basic usage is identical.

We shall also remind you that beginning by spending a few moments to find the location and functionality of the major controls will be well worth the time.

The Display

- Usually the scope shows voltage versus time.
- Voltage is the vertical axis; time is the horizontal one.
- Most scopes can display two input voltages at once. These are called *Dual Beam Oscilloscopes*.
  - There is a control for which beam or beams are to be displayed.
- The solid rules on the face of the screen define **divisions**. These are usually spaced one centimeter apart.
- The **intensity** and **focus** of the beam can be controlled.
  - Adjust for the minimum clearly visible **intensity** and the sharpest possible **focus**.

Timebase Control

- Controls the scale of the horizontal time axis.
- Lower values for the control means the beam sweeps at a faster rate.
- At high sweep rates, the beam appears to be a solid line but is not: it is still sweeping from left to right.
- Usually should be used in the **calibrated** mode.
- Usually near the control is another one to determine the horizontal position of the beam.

Voltage Control

- One for each beam.
- Controls the scale of the vertical voltage axis.
- Lower values for the control increases the height of the display of a particular voltage.

- ➢ Usually should be used in the **calibrated** mode.
- ➢ The input for the beam is usually near the corresponding control.
- ➢ Usually near the control is another one to determine the type of voltage being displayed:
  - **Ground**: turns off the input voltage.
  - **DC**: displays the input voltage unchanged.
  - **AC**: filters out any DC component of the input voltage.
- ➢ Usually near the control is another one to determine the vertical position of the corresponding beam.

The Trigger

- ➢ Makes the display *stable*.
- ➢ Determines the point in the voltage when the sweep of the beam begins.
- ➢ Can be set to trigger on either of the beams or on an external signal.
- ➢ Usually we trigger on one of the beams.
- ➢ A **level** control adjusts the value of the trigger signal that triggers the next sweep of the beam.

When Stuck

- ➢ Consult a local "expert" and/or
- ➢ Read the manual for the instrument and/or
- ➢ Go to the manufacturer's web site.

Finding a Missing Beam

1. Make sure the scope is set up to display the beam you are trying to find.
2. Set the trigger to automatic.
3. Set the input signal to ground if possible.
4. Set the *Voltage Control* to the least sensitive value possible. This is the largest value of the voltage per division.
5. Set the *Timebase Control* to a value approximately in the middle of the range of possible values.
6. Adjust the controls for horizontal and vertical position of the beam. If all goes well you will eventually end up with a beam spread out across the screen horizontally and centered in the middle of the vertical axis.

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