Oscilloscope

Safety Handout

Last Revised October 1, 2007

The engineering department owns several different models of oscilloscopes:

Make/Model	Type	Location
BK Precision 2522	Analog	F266
BK Precision 2522B	Analog + Digital	F266
Tektronix TDS210	Digital	F256 (portable)
Tektronix TDS220	Digital	F256 (portable)
Tektronix TDS1002	Digital	F256 (portable)
Tektronix TDS1002B	Digital	F256 (portable)

Please observe the following guidelines when operating any oscilloscope:

1) **Do not connect oscilloscope probe ground to a non-grounded portion of your circuit**
2) **Do not attempt to measure higher than the maximum voltage for which the oscilloscope is rated**

The guidelines explained:

1) All these oscilloscopes have two channels plus an external trigger input where probes can connect. The most important safety item to remember about any oscilloscope is that **probe polarity matters**. An oscilloscope probe is not like a multimeter probe. One side of an oscilloscope probe is grounded; the other is not. It is critical that you not connect probe ground to a powered or un-grounded portion of your circuit; if you do your measurement will not work properly and you may damage the circuit.

   Why does an oscilloscope probe not work like a multimeter probe? The reason is that an oscilloscope probe is not electrically isolated from what it measures. The ground of an oscilloscope probe is connected to AC neutral within the oscilloscope. AC neutral, in turn, is usually connected to the ground of the circuit that the oscilloscope is measuring. Thus, when you connect probe ground to a non-grounded portion of your circuit, you effectively short that portion of your circuit to ground. At best, this will simply make your measurement wrong. At worst, shorting a portion of your circuit could cause a power surge which trips a breaker and/or damages your equipment.

2) If you attempt to measure too high a voltage you will apply an over-voltage condition to the oscilloscope and damage the internal circuits of oscilloscope. In short, if you try to measure too much voltage, the oscilloscope is not going to work any more afterwards.