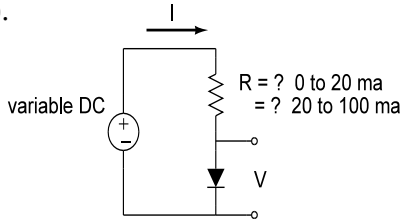
ENGR-356 Lab #4
Diode Applications

Goals: Experimentally learn about diode operation
Design simple circuits

Diodes have many applications. You will investigate two of these in this laboratory design exercise. Neatly document your investigation in your lab notebook. After you complete the lab make a zerox copy (not a photograph) of these lab pages to turn in next lab period (Renee in the engineering office can make the copy for you).

1) Measure the voltage across a diode for a range of current 0 to 100ma. The circuit below can be used. Create an I-V graph (current versus voltage).
Use two values of resistors depending on desired current range. For 0 to 20ma pick a resistor with about 10 volts drop at 20ma. For 20 to 100 ma pick a resistor with about 2.5 volts drop (why 2.5volts @ 100ma?).



2) Design a diode clipper circuit that clips at about 1.4 volts on positive peaks and at -0.7 volts on negative peaks. Apply a sine wave and determine out how high in frequency your circuit continues to work. You will need to have a resistor in series with the signal source over which voltage from the source will appear (drop) when clipping occurs (1k ohm suggested).

3) Design an absolute value circuit whose input is a time dependant signal (sine, triangle, square, etc) and the output is a DC voltage equal to the absolute peak voltage of the incoming waveform (absolute here means the mathematical absolute, i.e. considers both polarities). This circuit should work for voltages with magnitude greater than 0.7 volts. Build it, and make notes on how well it works. Measurements should be made over its useful input voltage range (up to 10v p-p) and a range of frequencies, say at 100hz and up by powers of 10..

The 1N4148 diode is a good choice for this lab.

Notes:

1) When working with high frequency circuits it becomes important to impedance match a circuit to the impedance of the signal source and or cabling that delivers the signal (or another way to put it, the cable bringing the high frequency signal to your circuit needs to be terminated in its characteristic impedance, typically 50 ohms).

2) Circuit two above is performing a rectification on the signal.

3) Documentation in your lab book should be:
Neat. It should show the as-built schematic for the circuits; list and discuss the measured performance; comment on things observed or learned. Due next lab period.