

- 1) Build the circuit shown in figure, preferably on your solderless breadboard. On most LEDs the longer pin is the positive end and the shorter is the negative end – the negative end should be connected to ground.

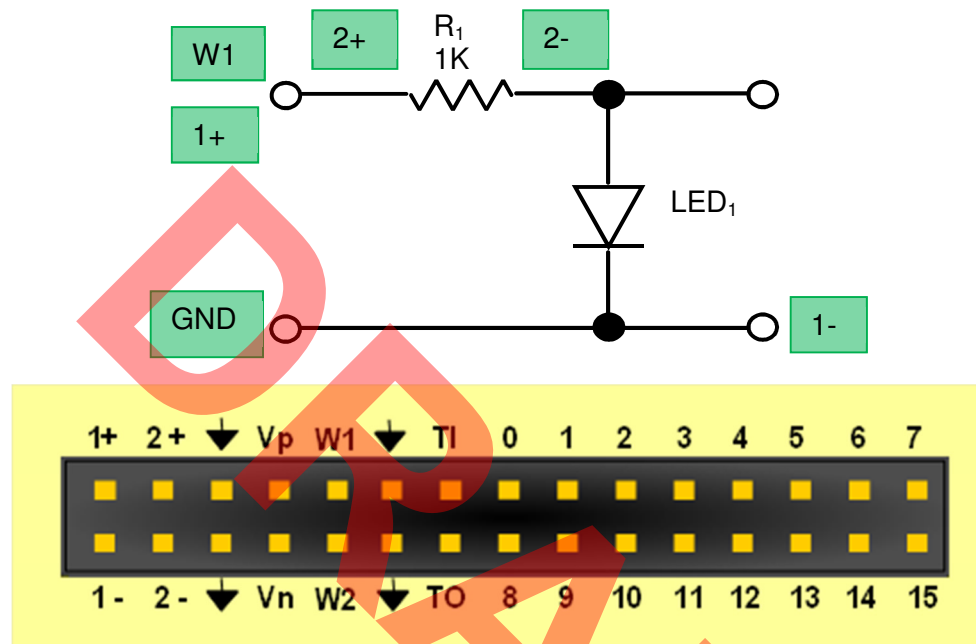
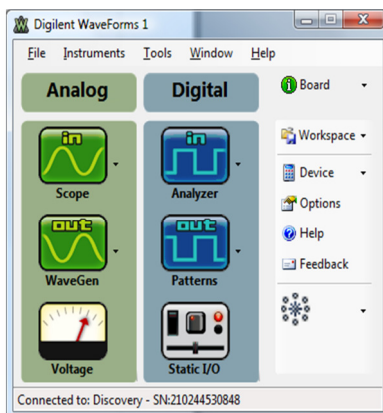


Figure 1 LED circuit

- 2) Connect waveform generator 1 and the two scope channels to the LED circuit as shown.
- 3) Start the Waveforms software.

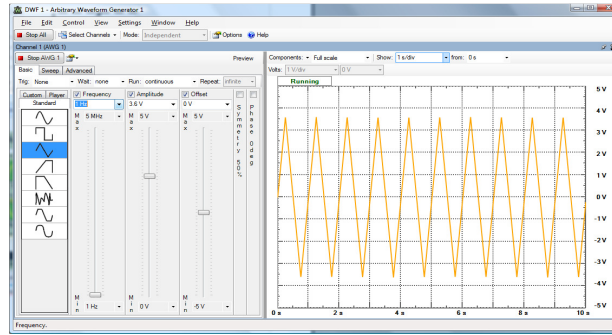


Note: When closing, the WaveForms software stores the last configuration (if set to do so). This tutorial assumes the factory default settings are used. To make sure that you have the factory default settings (even if somebody previously saved a different WaveForms configuration on your machine), click “Options” in the WaveForms main window, then “Erase configuration” in the Options window. Close the Options window.

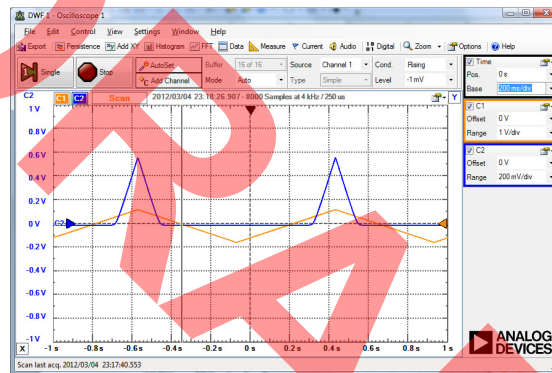
- 4) Start the WaveGen tool, set channel 1 to produce a triangle wave at 1Hz with an amplitude of 4V and an offset of 0V, and hit the RUN all button. Observe that the physical LED will start to blink on and off with a period of 1 second.

Real Analog Lab Module

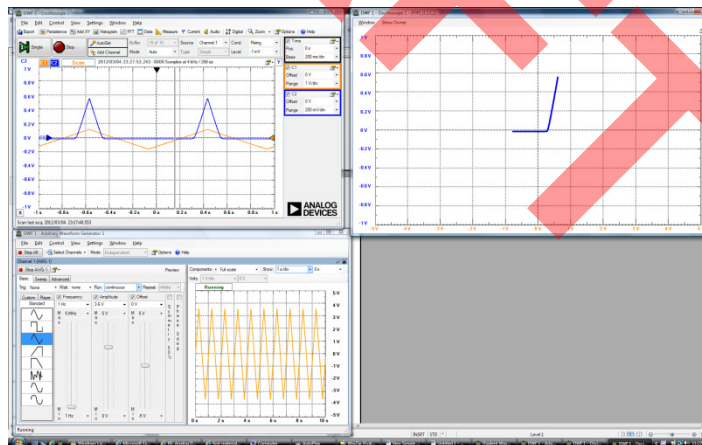
Simple LED Drive



- 5) Start the Scope tool and turn on channels 1 and 2. Set the time base for 200ms/div, set the vertical range of each channel 1 to 1V/div, and of channel 2 to 200mV/div. Hit the green Run button, and observe the voltage across the entire circuit and the current through the diode (the diode current can be calculated from the voltage across the resistor – you may want to change channel 2's V/div setting to see the waveform better).



- 6) Add an X/Y Plot, to see the relationship between voltage and current through the LED.



- 7) Congratulations – you have made your first X/Y (voltage vs. current) measurement with the Analog Discovery!
- 8) Change the waveform (Speed, shape, amplitude, offset, etc, and see if the LED changes, or if the relationship between the voltage and current changes. If you have both red and green LEDs, try connecting them in parallel, in the same direction and in opposite directions. What happens?