

Breadboard and Testpoints

ECE 401 - Homework #5

Due: Week #10

ECE 401 Circuit Requirements

- Must operate off of 5VDC
- Must include at least one integrated circuit
- Must include at least one LED with $I_d = 20\text{mA} \pm 5\text{mA}$
- Must include at least one NPN and one PNP transistor

Use a LM7805 regulator to drop 9V to 5V

- Must have a reverse-polarity protection diode
- Must have a 1/4 Watt 1-Ohm resistor in series with the power supply

1. Build your circuit on a breadboard

- Power comes from a 9V battery
- Include a photo in your OneNote document

2. Take measurements to verify your circuit works

Include these measurements in your OneNote document (*Note where you these are recorded on your schematic. These are the test points for your upcoming PCB*)

- DC Measurements (all cases)
 - Vbat (9V)
 - Vreg (5V)
 - Vbe for the NPN transistor when ON
 - Vce for the NPN transistor when OFF
 - Current through the LED when ON
 - Total current draw
- If using a 555 Timer, also provide waveforms (transient response: 2-3 cycles)
 - Waveform @ C1
 - Waveform @ Threshold
 - Waveform @ Discharge
 - Waveform @ Timer Out
- If using an op-amp (MCP602), also provide the following DC measurements:
 - Voltage at inverting input when on and off
 - Voltage at non-inverting input when on and off
 - Voltage at Op-Amp output when on and off
- If using a microcontroller (PIC18F2720)
 - Voltage at uP output when on (5V) and off (0V)
 - DC voltage at the PNP transistor (V_b , V_c , V_e)

3) Parts List

- Parts used in your breadboard
- Vendor & Vendor number
- Description
- Price