Lab 1 – Logic Levels

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The purpose of this lab is to:

Learn how to create logic levels for digital circuits using switches and resistors.

Select four 10kohm resistors.

Measure and record the resistance of each resistor.

Equipment needed:

1 – Digital Multimeter

4 – 10Kohm

1 – 4 position dip switch

Using Multisim simulate Figure 1 for each voltage level and record in Table 1. The build and test and measure each voltage level and record in Table 1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Simulated | | Test | |
|  | Open | Closed | Open | Closed |
| VA | 5 V | 0 V | 5.015V | .0000V |
| VB | 5 V | 0 V | 5.0154V | .0002V |
| VC | 0 V | 5 V | .0044V | 5.0125V |
| VD | 0 V | 5 V | .0001V | 5.0127V |



Table 1 (Simulation vs Test)

Figure 1- Lab 1 Schematic

Observations:\_In this lab, we discovered that the measurements with the breadboard and the multimeter were more accurate the Multisim simulation results. We connected 5V DC to the ‘blue’ constant on the breadboard and grounded the ‘red’ constant. With a 4 flip switch in the middle, two 10 KΩ resistors on the load side of the switch, and two 10 KΩ resistors on the ground side of the switch. With the switches open, the load side resistors had ≈ 5V and the ground side had ≈ 0V. With the switches closed the values switched. The load side resistors were ≈ 0V and the ground side were ≈ 5V. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_