

EE105 Lab Experiments

HP 34401A Digital Multimeter Tutorial

1 Introduction

The DMM is simple; so, this tutorial only contains a few bulleted notes and two examples. In Figure 1, there is an image of the front panel interface.

2 Interface Notes

- To measure DC or AC current or voltage, use the two leftmost buttons in the FUNCTION section. The options for measuring current are in blue, and require use of the Shift key.
- Use the blue “Shift” key to select options labeled in blue. For example, to measure DC current, first press Shift and then press the upper-left button labeled “DC I” in blue.
- To measure voltage or resistance, plug in the probes as in Figure 1. To measure current, you **MUST** switch the red probe to the lower-right input port (labeled “I”); otherwise, the current would not be measured. Also, please remember to switch back to the probe configuration shown in Figure 1 when measuring voltage again.
- When measuring current, never place the probes across a voltage source. The ammeter has a very small internal impedance, and so a voltage source would need to drive a very high current through the ammeter to maintain its voltage output. High currents may damage the DMM.
- **The DMM ground is floating**, so you can always measure voltage differences with the two probes. Note that some other devices are earth-grounded and thus, can only measure a voltage difference from earth-ground.
- As a side note, here are the explanations of some of the buttons found on the HP34401A: the “DC V” button measures DC voltage, the “AC V” button is used to measure V_{rms} , the “ Ω 2W” button measures resistance, and the “Freq” button measures frequency.

3 Examples

3.1 Measuring DC Voltage

Here are all of the steps necessary to measure a DC voltage between nodes.

1. Press the power button on the left.
2. Press the DC V button on the left side of the Function section.
3. Be sure that the probes are plugged into the DMM in the voltage configuration: the black probe should be in the right “LO” port while the red probe should be in the right “HI” port. (Please see Figure 1.)
4. Place the probe tips in parallel with the desired nodes to measure the DC voltage across them.

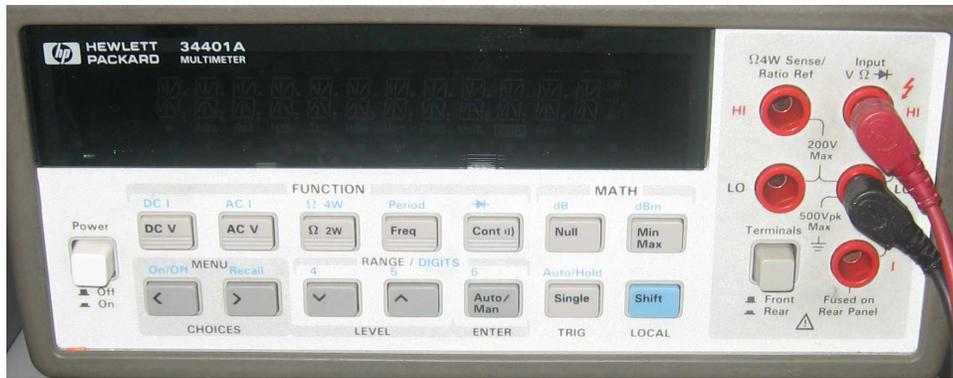


Figure 1: HP34401A front panel. The input cables on the right are set to measure voltage. To measure current, the red cable is moved to the bottom-right port while the connection for the black cable remains unchanged.

3.2 Measuring DC Current

Here are all of the steps necessary to measure a DC current through a branch.

1. Press the power button on the left.
2. Press the Shift button, and then the button labeled with the blue “DC I.”
3. Be sure that the probes are plugged into the DMM in the current configuration: the black probe should be in the right “LO” port while the red probe should be in the bottom-right “I” port.
4. Place the probe tips in series with the branch that you want to measure the DC current.