MUTIMETER FUNTIONALITY

Multimeter is a tool used to check small voltage and current, determine resistance of a resistor, check continuity and to test Bipolar Transistor. There exist two types of multimeter: analog and digital. This report specify only about digital multimeter as they are the once used widely.

Connection of Testing Terminals

-> Plug the black probe into the COM port on your multimeter.

-> Plug the red probe into the VΩmA port (It is connected to 10A port only if the source we are testing has current rating more than 200mA and less than 10A)

MODES OF MULTIMETER

1. Continuity mode

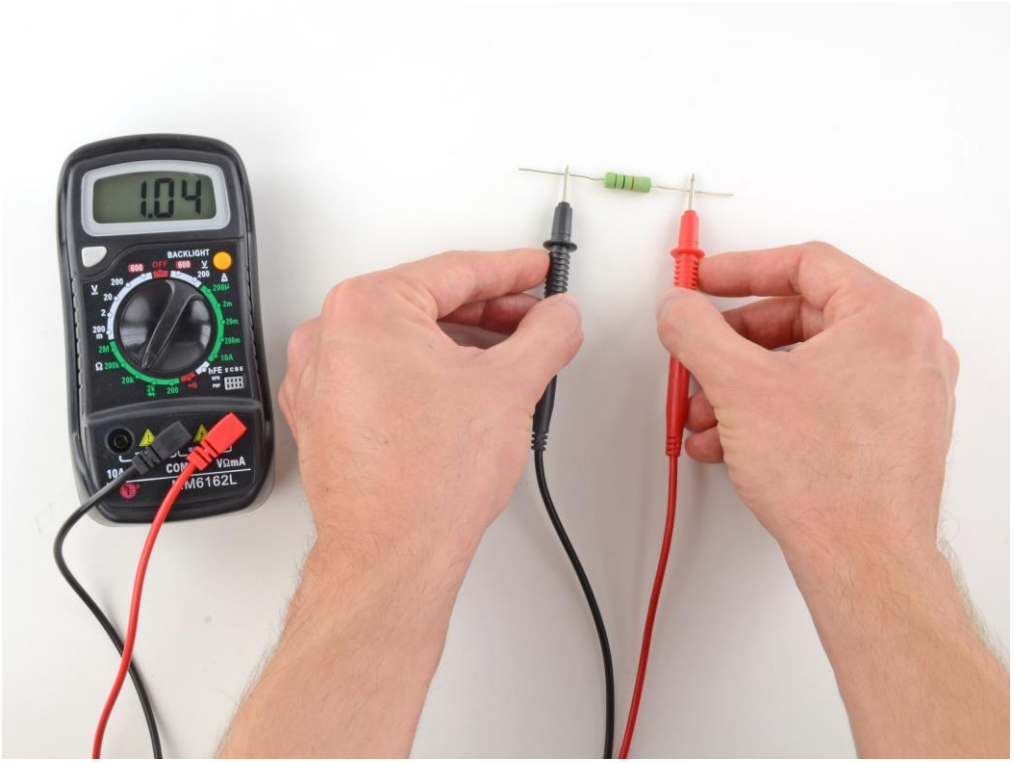
A continuity test tells us whether two things are electrically connected: if something is continuous, an electric current can flow freely from one end to the other. If there's no continuity, it means there is a break somewhere in the circuit. This could indicate anything from a blown fuse or bad solder joint to an incorrectly wired circuit. If continuous buzzer will blow otherwise not. If we don't have continuity mode in our multimeter then set the dial to least resistance mode. This will work the same as in continuity mode.

2. Testing voltage

Set the dial to DC voltage mode (indicated by a V with a straight line, or the symbol ⎓). Most multimeters are not autoranging, meaning we need to set the correct range for the voltage you expect to measure. Each setting on the dial lists the maximum voltage it can measure. So for example, if we expect to measure more than 2 volts but less than 20, use the 20 volt setting. If we are not sure, start with the highest setting.

3. Testing Resistance

Switch on your multimeter, and set the dial to resistance mode. To begin, make sure no current is running through the circuit or component we want to test. Set the correct range for the resistance we expect to measure. If not sure, start with the highest setting. Place one probe at each end of the circuit or component we want to test and the value of resistance will be displayed.



Source: https://www.ifixit.com

4. Testing transistor

Using a multimeter to get a basic pass/fail reading from a suspected faulty NPN or PNP bipoloar transistor. Some multimeters have a built-in transistor testing function. Simply insert your transistor into the socket on the multimeter and set the meter to the correct mode and get information such as the gain (hFE) that could be checked against the datasheet as well as a pass/fail reading. If our meter does not have a transistor testing function, transistors can easily be checked with the “Diode” testing setting.

Steps to test transistor using diode setting:

NPN Transistor

1. Hook the positive lead from the multimeter to the BASE (B) of the transistor. Hook the negative meter lead to the EMITTER (E) of the transistor. For a good NPN transistor, the meter should show a voltage drop between 0.45V and 0.9V. If you are testing PNP transistor, you should see “OL” (Over Limit).

2. Keep the positive lead on the BASE (B) and place the negative lead to the COLLECTOR (C).

For a good NPN transistor, the meter should show a voltage drop between 0.45V and 0.9V. If you are testing PNP transistor, you should see "OL" (Over Limit).

PNP Transistor

3. Hook the positive lead from the multimeter to the EMITTER (E) of the transistor. Hook the negative meter lead to the BASE (B) of the transistor.

For a good NPN transistor, you should see “OL” (Over Limit).If you are testing PNP transistor, the meter should show a voltage drop between 0.45V and 0.9V.

4. Hook the positive lead from the multimeter to the COLLECTOR (C) of the transistor. Hook the negative meter lead to the BASE (B) of the transistor.

For an good NPN transistor, you should see “OL” (Over Limit).If you are testing PNP transistor, the meter should show a voltage drop between 0.45V and 0.9V.

5. Hook the positive meter lead to the COLLECTOR (C) and the negative meter lead to the EMITTER (E) – A good NPN or PNP transistor will read "OL"/Over Limit on the meter. Swap the leads (Positive to Emitter and Negative to Collector) – Once again, a good NPN or PNP transistor should read “OL”.