

21a1

**Unit Conversion  
LESSON**
**Conversion from one unit to another (Amps to mAmps to uAmps)**

When you use a multimeter, you need to know how to convert from one unit to another. Let's practice with this chart.

**Here is an example:**

Going from right to left, move the decimal point 3 places to the left.

Column 1	Column 2	Column 3
Amps (A)	milliAmps (mA)	microAmps (uA)
0.002 A	2.0 mA	<b>Given: 2000 uA</b>
0.0015 A	1.5 mA	<b>Given: 1500 uA</b>
0.00035 A	0.35 mA	<b>Given: 350 uA</b>

**Following the example fill in the blanks:**

Column 1	Column 2	Column 3
Amps (A)	milliAmps (mA)	microAmps (uA)
		<b>2530 uA</b>
		<b>3225 uA</b>
		<b>754 uA</b>


**Lab #1201**
**OHM'S LAW  
and more!**
**FILL IN BLANKS**

Remember that **1 Amp = 1000 milliamps = 1,000,000 uAmps**

**Instructions:** When you fill in the table, as you move from **right to left**, move the decimal point **3 places to the left** per column, thus 2000 uA becomes 2.0 mA and 0.002 A

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## Conversion from one unit to another (Amps to mAmps to uAmps)

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LESSON

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When you use a multimeter, you need to know how to convert from one unit to another. Let's practice with this chart.

## Here is an example:

Going from left to right, move the decimal point 3 places to the left.

Column 1	Column 2	Column 3
Amps (A)	milliAmps (mA)	microAmps (uA)
Given: 0.5 A	500 mA	500,000 uA
Given: 0.035 A	35 mA	35,000 uA
Given: 0.007 A	7 mA	7,000 uA

## Following the example fill in the blanks:

Column 1	Column 2	Column 3
Amps (A)	milliAmps (mA)	microAmps (uA)
Given: 4 A		
Given: 0.75 A		
Given: 0.001 A		

## FILL IN BLANKS

Remember that 1 Amp = 1000 milliamps = 1,000,000 uAmps

**Instructions:** When you fill in the table, as you move from **left to right**, move the decimal point **3 places to the right** per column, thus 2000 uA becomes 2.0 mA and 0.002 A



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## LESSON 21

### How to measure current

#### Watch video Lesson 21



When we measure the current flowing in a circuit, the MM is connected in series with the other components in the circuit.

The MM adds basically zero Ohms of resistance to the circuit under test.

In the circuit shown, the electrons flow from the negative side of the battery, travel through the wire to the negative side of the LED, then they travel out from the positive side of the LED through the wire to the resistor and then out of the resistor to the positive side of the battery.



Practice Quiz

### Multimeter Setup for current measurement



Before we connect the MM to the circuit, we need to set the MM dial to the correct position.

20 mA

Red

Black

There are **five positions**

1. **200u** (up to 200 microamps)
2. **2000u** (up to 2000 microamps)
3. **20m** (up to 20 milliamps)
4. **200m** (up to 200 milliamps)
5. **5A** (up to 5 Amps)

**Note:** We must be very careful that the current does not to exceed these setting limits or we may permanently damage the MM.

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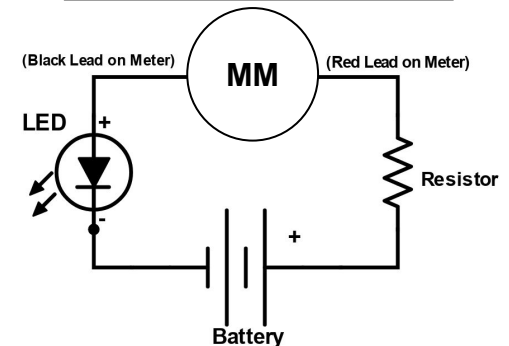
### Schematic showing the MM in the circuit


Since we know the approximate amount of current expected in our circuit is 18 mA, we will set the MM dial to the 20m position.

Then insert the:

- a) Black lead into the **COM** socket and the
- b) Red lead in the **V Ω mA** socket.

Then, to measure the current, you must connect the meter leads in series with the circuit as shown in this schematic.



Answer these questions	Activity Page	How to measure current in a circuit	21b2
<p>(1) When we measure current in a circuit, is the meter connected in series or parallel with the circuit?</p> <p>_____</p> <p>(2) True or False? The multimeter adds a lot of resistance to the circuit you are measuring.</p> <p>_____</p> <p>(3) True or False? To measure current, the black lead on the multimeter is connected to the Anode of the LED?</p> <p>_____</p> <p>(4) How many mAmps generally flows through a red LED? _____</p>	<p>(5) When you check the current flowing in an LED circuit, which current position would you set the dial to?</p> <p>_____</p> <p>(6) When do you set the meter dial to a current position, <u>before or after</u>, you connect the meter into the circuit?</p> <p>_____</p> <p>(7) True or False? The red lead on the multimeter is connected toward the positive of the battery.</p> <p>_____</p> <p>(8) How many ranges or positions does our multimeter have for current?</p> <p>_____</p> <p>Copyright Mr Circuit Technology 2023</p>	 <p>(9) If this is on the 20 mAmps position, how many <b>milliAmps</b> is it showing on this multimeter display?</p> <p>_____</p> <p>(10) How many <b>Amps</b> is it showing on this multimeter display?</p> <p>_____</p>	<p><b>Note:</b> When you finish this page, go back to pages 52 and 53 and fill in the charts on those pages.</p> 