



## Soldering 101: For the beginner

by [robmawe91](#) on October 2, 2016

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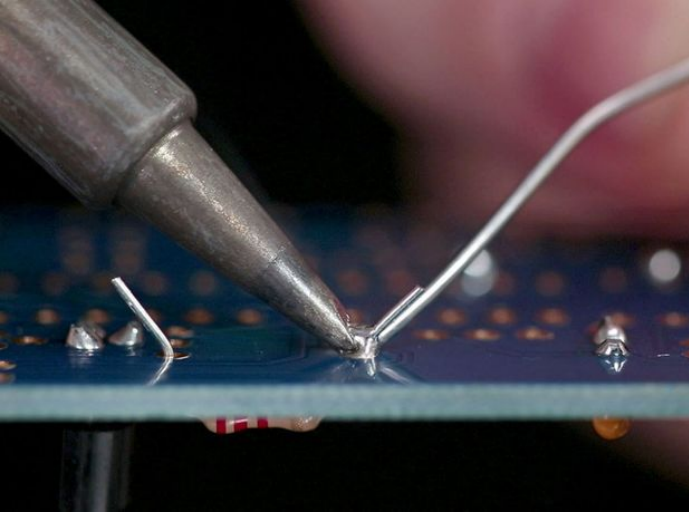
## Intro: Soldering 101: For the beginner

In this instructable I will try to teach you the basics of soldering.

I have been soldering for about 14 years. I have soldered everything from 0 gauge wire to the smallest SMD connectors.

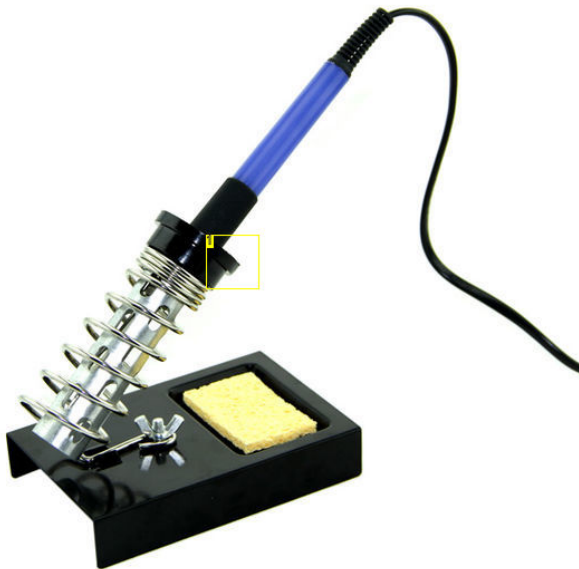
Things I will go over

1. Things you will need
2. Solder irons
3. Solder
4. Getting your solder iron ready
5. Making your first solder connection
6. Clean up



## Step 1: Things you will need

1. Soldering iron (Read Step 2)
2. Solder (Read Step 3)
3. Soldering iron tip cleaner. Some soldering irons come with either a sponge and or a cleaning wire
4. Something to solder If you are just starting out I would try to solder some wires (cheap and easy)



### Image Notes

1. Basic soldering iron.



### Image Notes

1. thermostatically controlled soldering iron.



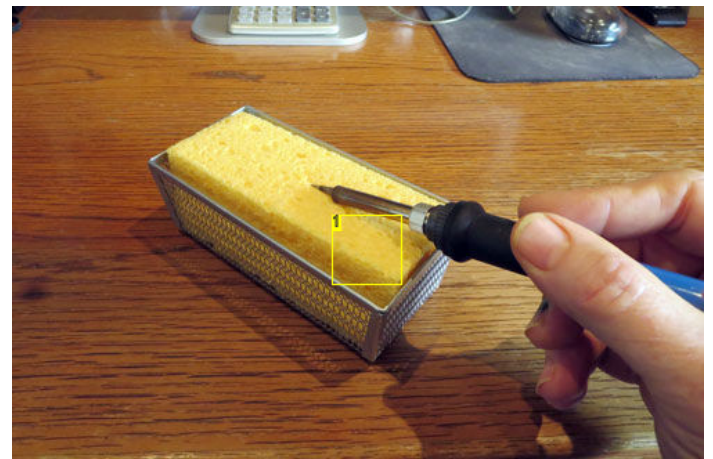
**Image Notes**

1. thermostatically controlled soldering iron
2. Hot air for SMD work
3. Looks like this one even has a built in power supply.



**Image Notes**

1. Lead free solder



**Image Notes**

1. Sponge for cleaning tip.

**Image Notes**

<http://www.instructables.com/id/Soldering-101-for-the-Beginner/>

1. Rosin Core solder.



**Image Notes**  
1. Cleaning wire.

## Step 2: Soldering Irons

There are many different types out there, I will cover the basics here

20 - 30 Watts for PCB (Printed circuit boards), IC (Integrated circuit)...

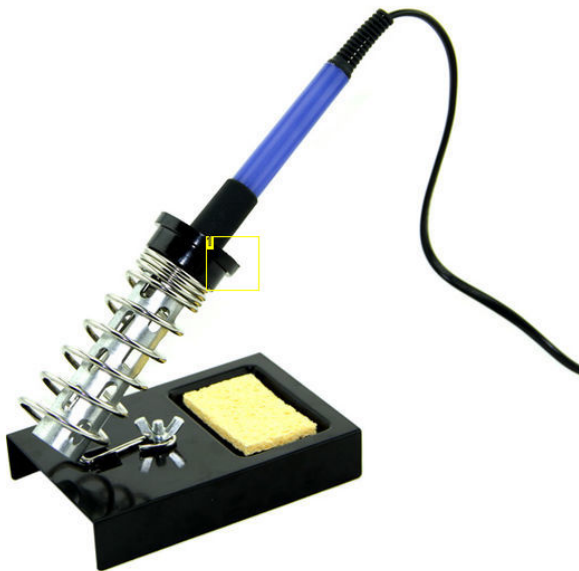
40 - 60 Watts for Speakers, switches, wires...

70 - 100 Watts when a large heat capacity is needed (Large wires, big connections...)

If you have one or you are buying a soldering iron that is thermostatically controlled you don't have to worry as much, get at least a 60 Watt unless you plan on soldering large wires.

A thermostatically controlled soldering iron can be set to a temperature just above the melting point of solder (About 188C 370F) although I have mine set at 350C 662F.

NOTE: If you have a regular soldering iron that is more than 40 Watts you may damage your small delicate parts on a PCB.



**Image Notes**  
1. Basic soldering iron.



**Image Notes**  
1. thermostatically controlled soldering iron.



#### Image Notes

1. I bought one of these. It comes with a nice soldering iron.



#### Image Notes

1. thermostatically controlled soldering iron
2. Hot air for SMD work
3. Looks like this one even has a built in power supply.

### Step 3: Solder

Some of the common types of solder

1. Lead Based
2. Lead Free
3. Rosin core/flux core

Lead Based:

Solder based on lead was universally used in the past. It was made of a mixture of tin and lead. Usually a 60/40 (tin/lead) mix, that melts at around 180-190C degrees.

Because lead has some damaging effects to our health, the industry is moving away from lead and towards lead-free solder.

Lead based solder works better in high heat. Example the PS3 red light of death caused from the PS3 over heating and cracking the lead free solder causing a bad connection.

Lead Free:

Lead-free solder is solder without lead. EU requires commercially available electronics to use lead-free solder (RHoS) because of the health hazards of lead.

It has a higher melting point, so it is a bit harder to work with, but usually not a problem.

Comes in many different mixtures.

Rosin core/Flux core

Solder wires usually have a core inside the wire containing flux. Flux is designed to improve electrical contact and mechanical strength in solder joints.

There are mainly two types of flux cores. Acid core and rosin core. Acid core is used for plumbing and rosin core is used for electronics.

**DO NOT USE ACID CORE FOR ELECTRONICS!!!**

I think Rosin core would be the easiest to learn with and Lead free should be your next and only choice.

If you do use lead based solder make sure you have GOOD ventilation. They make special air purifiers to remove lead fumes. Also Make sure you get tested for lead poisoning periodically.



**Image Notes**

1. Rosin Core solder.



**Image Notes**

1. Lead free solder

**Step 4: Getting your soldering iron ready and solder you first connection.**

First thing you will need to do it make a clean area with room to work. You don't want to burn anything.

Plug in or turn on you soldering iron and wait a few minutes or until you soldering iron reaches the set temp.

Once you soldering iron is hot clean your tip either with you sponge or your wire cleaner

Sponge:

Get sponge wet and rub you tip on both sides to remove any solder and or dirt

Wire Cleaner:

Stick your soldering tip in the cleaning wire a few times until clean.

When ever possible make a good mechanical connection before soldering. This will make a stronger connection.

Tin you tip, Do this by applying a small amount of solder on the tip of the soldering iron before trying to solder anything. Once you have tinned the tip you will want to make you solder connection as quick as possible. The longer you wait the harder it will be to solder. worst comes to worst re clean the tip and tin again. Tinning the tip will increase the surface space and the connectivity allowing more heat to be transferred to the metal you trying to solder.

After you have tinned the tip you want to touch the tip to the metal you trying to solder. As the tip is on the metal you want to slowly add some solder until you see the solder run to the metal. Once you see the solder moving on the metal you can add the solder a little faster until you have a good amount of solder and the connection is made.

Once you have made the solder connection you want to remove the soldering iron and do not move your connection until to solder has hardened. If you move your connection right away you connection will either fall apart or you will cause a cold solder joint. A cold solder joint is a bad connection and you will want to resolder it.

Once you have made a good solder connection and you done with the soldering iron you need to clean up...



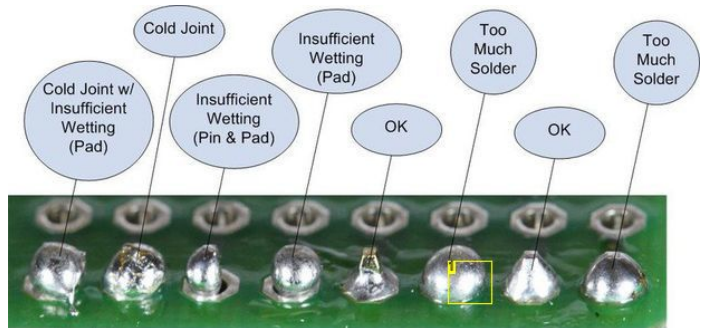
**Image Notes**  
1. Striped Wires



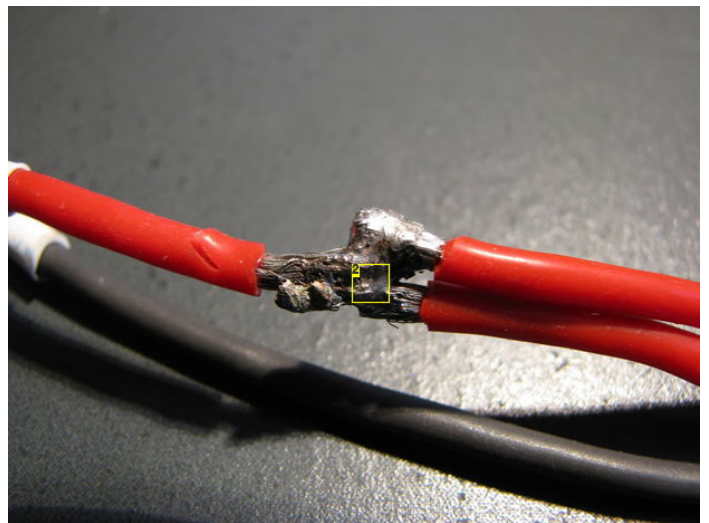
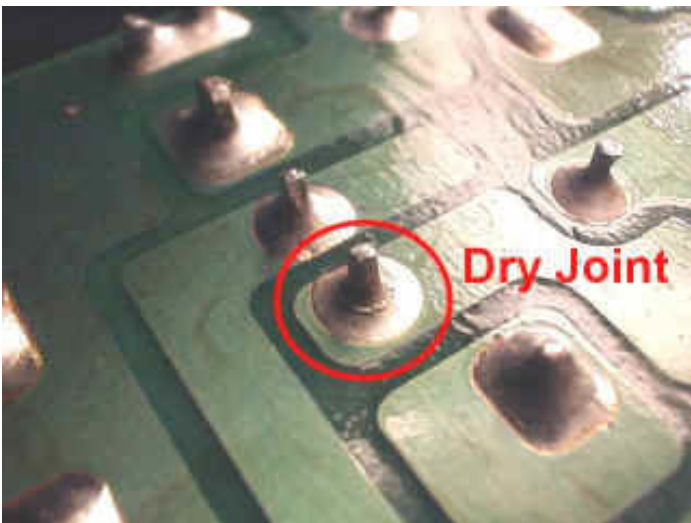
**Image Notes**  
1. Mechanical connection.



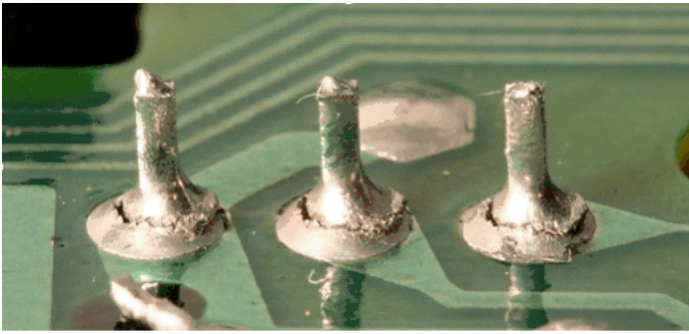
**Image Notes**  
1. Soldered.



**Image Notes**  
1. Too much solder isn't always a bad thing, Just make sure your not shorting anything out.



**Image Notes**  
1. Cold solder joint. Wire wasn't heated enough.  
2. Cold solder joint. Wire wasn't heated enough.



### Step 5: Cleaning up

Just like before when you started clean your tip either with your sponge or your wire cleaner

Sponge:

Get sponge wet and rub your tip on both sides to remove any solder and or dirt.

Wire Cleaner:

Stick your soldering tip in the cleaning wire a few times until clean.

Then put your soldering iron in the stand.

Turn off the power and or unplug the soldering iron

NOTE: Even though you have turned off and unplugged your soldering iron It will still be hot for some time. Never leave a hot soldering iron unattended.

Once you soldering iron is cool you can either leave it out if you going to be using it often or you can store it in a case.



#### Image Notes

1. Sponge for cleaning tip.



#### Image Notes

1. Cleaning wire.





### Related Instructables



**How to Solder - Basic Soldering Guide** by soldering iron



**How to Solder - The Quick, Thorough Guide** by IoTalabs



**Soldering for Beginners** by Zanovat



**How to Solder** by noahw



**Tutorial on how to solder bend points to a SK-1** by thebetatesters



**Soldering is NOT Rocket Science!** by gizmologist

### Comments