Introduction to Soldering

Choosing a Soldering Iron

Basic Irons:

There are many basic pencil style irons that are suitable for lab use. But you will need one that can heat the joints quickly enough. Choose an iron with 25 watts at a minimum.

Better Irons:

An adjustable temperature iron with a little more power will give you a bit more control and allow you to work faster.

Essential Tools and Supplies:

These tools are the bare-minimum essentials required for soldering:

Stand:

If your soldering iron does not have a built-in stand, you will need a safe place to rest the hot iron between uses. A Soldering Iron Stand will keep your iron from rolling around and protect both you and your work surface from burns. Most stand holders come with a sponge and tray for cleaning your soldering iron.

Solder:

Standard 60/40 lead/tin Rosin Core Solder is the easiest type to work with.

Solder Sucker:

A Solder Sucker is a very helpful tools for removing excess solder or when you need to de-solder a joint. As the name implies, this device literally sucks the solder out of the joint.

Solder Wick:

Solder Wick is another way to clean excess solder from a joint. Unlike the solder sucker, the wick soaks up the molten solder.

Preparation

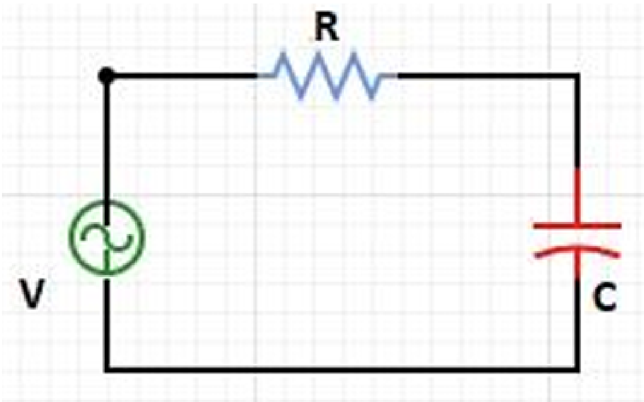
1. Heat the Iron Plug and/or turn on your soldering iron to warm up. If you are using a temperature-controlled iron, set it to 700F/370C for 60/40 or 750F/400C for lead-free solder. While the iron is heating dampens the sponge with a little bit of water.
2. Wipe the tip of the hot iron on the damp sponge to clean off any oxidation. Do not use files or abrasives to clean the tip. It will damage the plating and ruin the tip.
3. **Tin the Tip:** Apply a small amount of solder to the tip and wipe again to tin the tip. You should have a thin, shiny layer of molten solder on the tip of your iron. If the tip is badly oxidized and difficult to tin, it can usually be reconditioned with some tip-tinning paste.
4. **Make sure that the joint is clean:** Dirt, oxidation and oily fingerprints can prevent the solder from wetting the solder-pad to create a solid joint. All Adafruit boards are plated to prevent oxidation, but if your board appears dirty from storage or handling, wipe it down with a little isopropyl alcohol.
5. **Immobilize the Joint:** This is very important! The parts being joined must not move during the soldering process. If there is any movement as the molten solder is solidifying, you will end up with an unreliable 'cold joint'. Most through-hole components can be immobilized by simply bending the leads on the solder-side of the hole.
6. **Heat the joint:** Heat the joint with the tip of the iron. Be sure to heat both the solder pad and the component lead or pin. A small drop of solder on the tip will help to transfer the heat to the joint quickly.
7. **Apply the solder:** Touch the end of the solder to the joint so that it contacts both the solder pad and the component lead or pin. It should melt and flow smoothly onto both the pin and the pad. If the solder does not flow, heat the joint for another second or two and try again.
8. **Let It Flow:** Keep heating the solder and allow it to flow into the joint. It should fill the hole and flow smoothly onto both the solder pad and the pin or component lead.
9. **Let It Cool:** Once enough solder has been added to the joint and it has flowed well onto both the component lead and the solder pad, remove the iron from the joint and allow it to cool

undisturbed.

10. **Trim the Lead:** Use your diagonal cutters to trim the lead close to the board. Note: This step applies only to components with wire leads. It is not necessary to trim the pins on Integrated circuit chips or sockets.

Implementing the RC Circuit on PCB

1. **Identify Components:** Before starting, identify all the components of your RC circuit: resistor(s), capacitor(s), and any input/output connections.
2. **Place Components:** Place the components on the PCB according to the circuit diagram. Make sure the polarized components (like electrolytic capacitors) are oriented correctly.
3. **Solder Components:** Following the soldering process described above, solder each component to the PCB. Start with the lowest profile components (usually resistors) and work your way up to taller components.
4. **Check Connections:** After soldering, visually inspect each joint. Look for good, shiny connections and make sure there are no solder bridges between adjacent pads.
5. **Test the Circuit:** Once all components are soldered, use a multimeter to check for continuity and correct resistance values. Then, connect the circuit to your function generator and oscilloscope as you did with the breadboard version to verify its operation.
6. **Troubleshoot if Necessary:** If the circuit doesn't work as expected, recheck your connections and component values. Use the oscilloscope to trace the signal through the circuit and identify where any issues might be occurring.



Observation and Result

Sr No	R (Ω)	C (μF)	Theoretical Time Constant (τ)	Practical Time Constant (τ)	Theoretical Cutoff Freq. (f_c)	Practical Cutoff Freq. (f_c)

Table 1: Observation Table format

Also, compare the results with the result you got from the experiment you performed on breadboard.