Proper Soldering & Desoldering Techniques of a MaxBotix Sensor

Materials Needed for Soldering

- Goggles
- Hands-free clamp
- Wire stripper
- Soldering iron with stand
- Soldering iron tip
- Lead free solder ~.031
- Clean sponge
- Brass sponge
- Tip tinner
- Liquid flux
- Exhaust fan

Materials Needed for Soldering

- Soldering iron
- Soldering wick
- Solder vacuum (Solder sucker)
- Isopropyl alcohol
- Soft tooth brush

Soldering is a skill anyone working or experimenting with electronics needs to know. Proper soldering takes practice, patience, and persistence, but this article should guide you on the right path. This article outlines proper technique and safety precautions that are essential for individuals who are new to soldering.

> Solder is a metallic “glue” that holds the parts together and forms a connection that allows electrical current to flow.

Anyone who frequently solders can tell you proper precautions should be taken before soldering. Liquid solder can drip and pop, so eye protection and appropriate clothing (i.e., not shorts and sleeveless shirts) should be worn when soldering. Soldering produces some harmful fumes, so you should also have an exhaust fan at your soldering station.

The first tool you need is a good soldering iron. Soldering irons can be purchased at most local hardware stores or online. A 15 to 40-watt soldering iron, or one with a variable temperature control, is best for soldering electrical components.

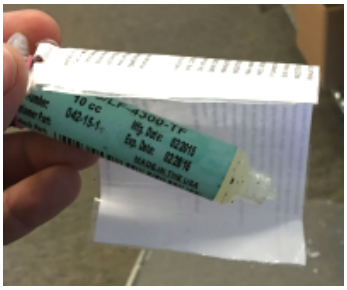
You will need a good tip for your iron. Soldering tips come in a wide variety of shapes and sizes from screwdriver, wedge, and flat tips to pencil, cone, and precision tip. Choose a tip that is small enough to work easily around the board and components.

Whether you are soldering on a header, connector, or wires directly to the board, the soldering technique is the same. When soldering wire it is easier to tin the wire before soldering. You will need to gather your soldering materials from the list above.

How to Tin a Wire

1. You will need to gather your soldering tools from the list above. Take your wire stripper and strip the outer insulation of the wire.

2. Add a small amount of liquid flux to the bare wire.

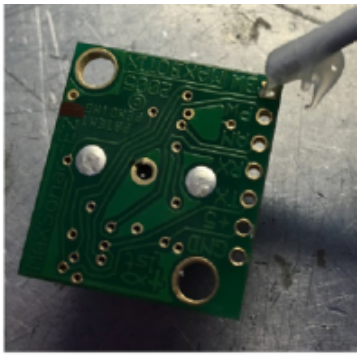


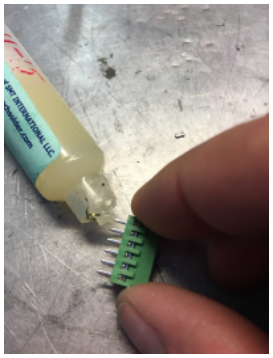
3. With the soldering iron hot, use the side (not the tip) of the soldering iron to heat the wire and melt the flux. Your flux will start to smoke and sizzle.

3. (cont.) Take your solder and touch at the point where the iron and the wire make contact. The solder should become liquid. Move the solder along the bare wire. The heated flux will evenly pull the melted solder into the wire. Now that your wire has been properly tinned, it can be soldered to the sensor the same way as the connector below.

Soldering a Connector onto a Sensor

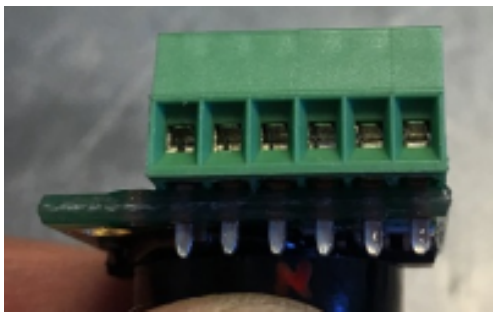
1. Heat your soldering iron. While your iron is heating up, you can place the sensor board into your hands-free clip holder.

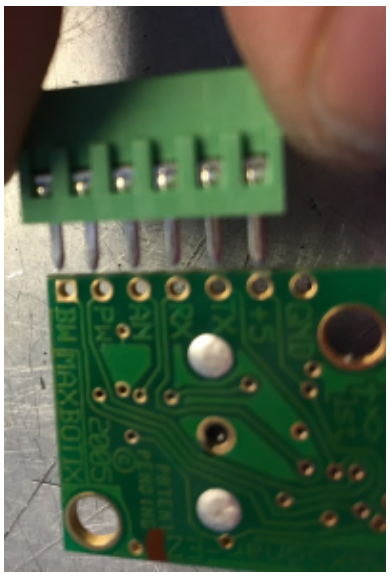




2. Add a little flux to the legs of the connector and the holes of sensor board.

3. Line up the legs of the connector to the proper output holes on the sensor board. You can then insert the connector legs into the sensor output holes.





4. Apply heat evenly to the leg and pad with the side of the soldering iron.

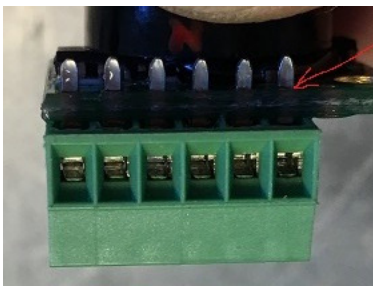
5. Apply the solder where the output pad, leg, and iron meet. Watch the liquid solder to make sure it flows around the leg and into the output holes.

6. Once the solder is in place, remove the solder away from the board followed by the iron. If you remove the iron first, the liquid solder could cool leaving your solder stuck to the board.

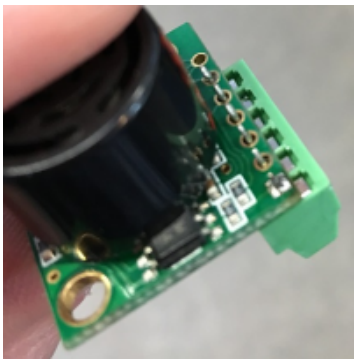
7. If more solder is needed, you can pull the liquid solder with the iron to make sure the pad and leg are completely soldered with no spaces or gaps.

8. Add more solder if needed. Again, you can pull the liquid solder with the iron to make sure the pads and legs are fully soldered with no spaces or gaps.

9. Now that one leg is soldered to the board, you can adjust the connector placement by reheating the solder.

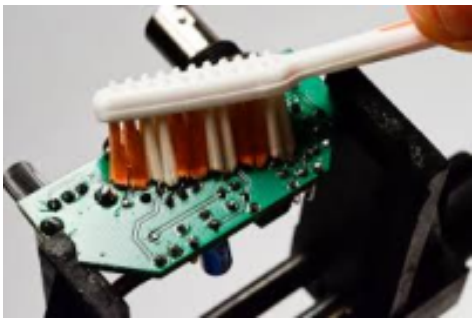


10. Once the connector is flat and level on the board, remove your iron and let the liquid solder cool for a second.



11. Finish soldering the remaining legs into the sensor outputs on the board. The same soldering method is used when soldering wires to the sensor instead of a connector. Just think of the tinned wire as the leg of a connector.

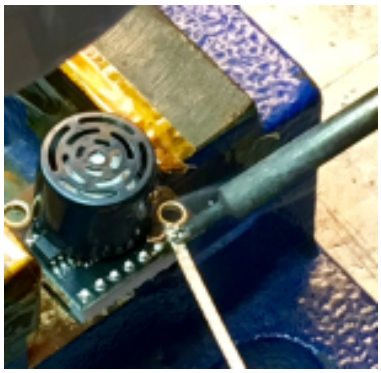
12. You can now use a soft bristle toothbrush and isopropyl alcohol to gently scrub the excess burnt flux off of the sensor board. You need to remove the active flux because it may damage the board if not removed.

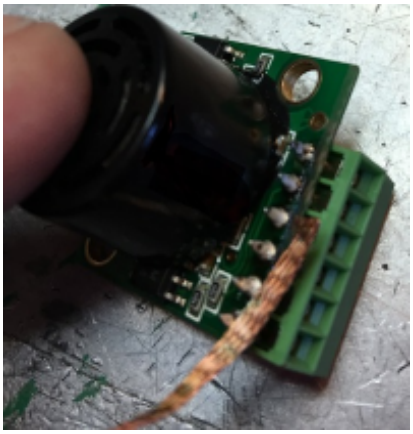


Properly Desoldering a Sensor

After learning to solder, you will eventually need to desolder a component. Knowing how to properly desolder is almost as important as knowing how to solder. Desoldering is removing the solder from a component on a circuit board, If not done carefully, you risk the possibility of damaging the pad or circuit pathways on board. You will need to gather your soldering materials again from the list above.

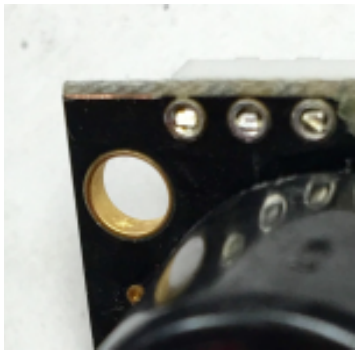
1. Heat your soldering iron. While the iron heats up, place the sensor in a vice or a hands-free circuit board holder. Once soldering iron becomes hot, place the solder wick with excess at the base of the pin where output pad and pin meet. Place iron on the solder wick. As wick heats, the solder becomes liquid and is drawn up into the wick.





2. As liquid solder begins to be drawn up the wick, slowly pull wick along pad until all solder is gone, do not push against the pad or you may damage or rip the pad of the board.

3. Once the solder is removed from around the pin and the output pad, you can remove the wick from the board. Remove the wick first, then remove the iron. This prevents the wick from becoming stuck to pad. If the wick does become stuck, reheat it with the iron to melt the solder that is holding the wick. Do not try to pull the wick without melting the solder as this can damage the pad and possibly the circuit pathway.



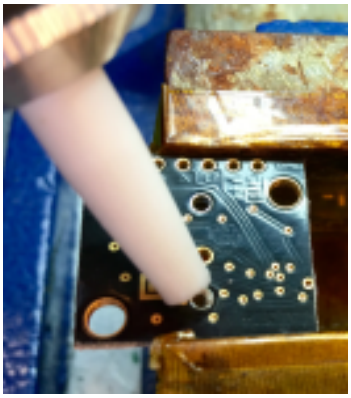
4. When the solder is removed, place the tip of iron against the pin or wire and gently push the pin from side to side. This ensures the pin is not free from the board. If no visible solder is present but component still feels attached, heat and repeat. Do not force it because doing so can cause damage. Remove all of the remaining solder from the component pins and gently remove the connector from the board.

5. Using a soft bristle toothbrush and isopropyl alcohol, gently scrub the sensor board to ensure the board is clean.

Using a Solder Vacuum to Remove Solder

1. Apply the iron tip to the area between the pin and pad.

2. The vacuum is ready to use when the bottom of the vacuum is pushed in. Keep the tip of the vacuum close to the pin. As soon as the solder becomes liquid, make one quick motion: remove the iron, place the vacuum tip over the pin, press the button on the side of the vacuum.



3. If done quickly and carefully, the vacuum should draw up the liquid solder. If not, repeat the process until the solder is removed.

4. Remove the component and clean the board with a toothbrush and isopropyl alcohol to ensure the board is clean.

While there are many intricacies to soldering, it is a great feeling to look back at a finished electrical project and know it's working properly because you took the time to learn a new skill to complete your project the right way.

Please, contact our technical support team at techsupport@maxbotix.com if you need any additional help or have any questions about soldering or desoldering. We are here to help you succeed.