Module 1, Add on lesson –Soldering practice

Student

45 minutes

Purpose of this lesson

- Wire stripping
- Soldering practice
- Preparation of a thermistor

Background and discussion

Soldering involves a soft metal alloy called solder which melts when heated near a soldering iron. Solder is highly conductive and so is used to create an electrical connection between two objects, such as a wire and a thermistor. When the melted solder cools, it forms a bond between two items. The simple rule of soldering is “Heat the metal, not the solder”.

- You should always make a mechanical connection before making a solder connection. E.g. twisting two wires together before soldering them. This will ensure that your soldering goes quickly and smoothly, and that the connection will not break easily when in use.
- If your solder looks like a clump of wadded-up aluminum foil, or if it is dull grey and grainy looking, you've soldered it incorrectly. This is sometimes called a “cold-soldered” joint. It often happens if the two wires being soldered together are moved before the solder has fully cooled. The solder should look smooth and shiny and must cling to both items.
- The simple rule of soldering is “Heat the metal, not the solder”. Do not melt solder onto the iron and then try and scrape it off onto the wires you are sodering together. Instead, touch the iron to the wires to heat them up. Then touch the solder to the heated wires - the solder will melt and flow smoothly onto the wires forming a good connection.
- Be careful not to apply your soldering iron for long periods of time. Otherwise, you can damage sensitive components. You should solder quickly so that your components do not stay hot for too long.

Soldering practice

Rotate through the three stations to gain experience in the steps involved with soldering.

Station 1 – Wire stripping

1) Cut two 6 inch lengths of wire.

2) Using a set of wire strippers, insert the wire into the matching slot for the gauge of wire, or set the adjustment screw for the gauge of wire. Holding the wire firmly in one hand with your thumb extended toward the end of the wire, position the strippers on the wire at an angle with your other hand and press the handles together.

3) Rock the strippers back and forth until the insulation is severed and can be pulled off the wire in one quick motion. Be careful not to nick the wire when stripping its insulation. A nicked wire can break easily. If you do nick a wire, snip off the damaged wire end and begin again.

4) Strip the second length of wire.

5) Take your stripped wires with you to Station 2.

Station 2 – Soldering two wires

1) Create a physical connection between the two wires by gently twisting the stripped ends together.

2) Cut a 3 inch long strip of solder.

3) Lightly touch the hot soldering iron to the twisted ends, heating the wires for 10-20 seconds.

4) Keep the iron in contact with the wires. Touch the solder to the opposite side of the heated wires (the wires should lie between the iron and your solder) and allow the solder to melt and flow onto the wires.

5) Remove the iron, taking care not to jog or move the soldered connection. Leave the connection to cool for at least 30 seconds, making sure that the wires are not moved.

6) Check to see if the connection is solid by gently wiggling the wires. If the solder is still molten and moves, you will have spoiled the connection (risking a cold-soldered joint). Reheat the connection and add more solder.

7) Continue to practice until you are able to easily connect both wire ends with a smooth and shiny connection.

Station 3

1) Create a physical connection between a wire end and a thermistor by gently twisting the wire end around one of the thermistor contact wires.

2) Lightly touch the hot soldering iron to the twisted ends, heating the wires for about 10 seconds.

3) Keep the iron in contact with the wires. Touch the solder to the heated wires and allow the solder strip to melt onto the wires.

4) Allow the connection to cool for at least 30 seconds, taking care not to disturb the connection while the solder is hardening.

5) Check to see if the connection is solid, if not, reheat and add more solder.

6) Ensure a good connection between the wire and thermistor, you will need it in the next lesson.