Constructing the Motor Assemblies – R4 031215

Remember: When using this step by step guide, you do not have to stick to it verbatim. If you wish to change or modify something, please do. The idea is to lay out a simple and inexpensive way to get this program on the road. This design will provide a standard Roboxsumo electrical harness with two motors and two connectors for the accessories. Please see Table 3 on the Roboxsumo Components List.

SAFETY

CAUTION: Use caution when using hand tools.
The utility knife is very sharp. Use cut resistant gloves when possible to reduce the possibility of cuts or scrapes.
The soldering iron is very hot. Take care to rest the iron in a safe place between uses and work over a surface that will not be damaged by the heat.
The hot glue gun is hot. The glue takes a long time to cool and you may need to hold glues items in place for some time till the glue cools. Take care to avoid the glue till it has completely cooled.

TOOL LIST

See Table 4 on Roboxsumo Components List for additional details.

- Tape measure or ruler
- Sharpie marker
- Utility Knife
- Wire cutters
- Wire stripper suitable for 24 AWG wire
- Molex crimper
- Hot Glue Gun, Glue Sticks
- Soldering Iron, solder

Step One – Purchase a short CAT 5E LAN cable and cut it as shown. You can recycle an old cable or even buy short cables for this project. A 3' LAN jumper cable makes two wire assemblies and you can't beat the price. Use the wire cutters to cut to a 17" length of LAN cable. If you use an existing piece of LAN cable then you save time by using the existing molded end.
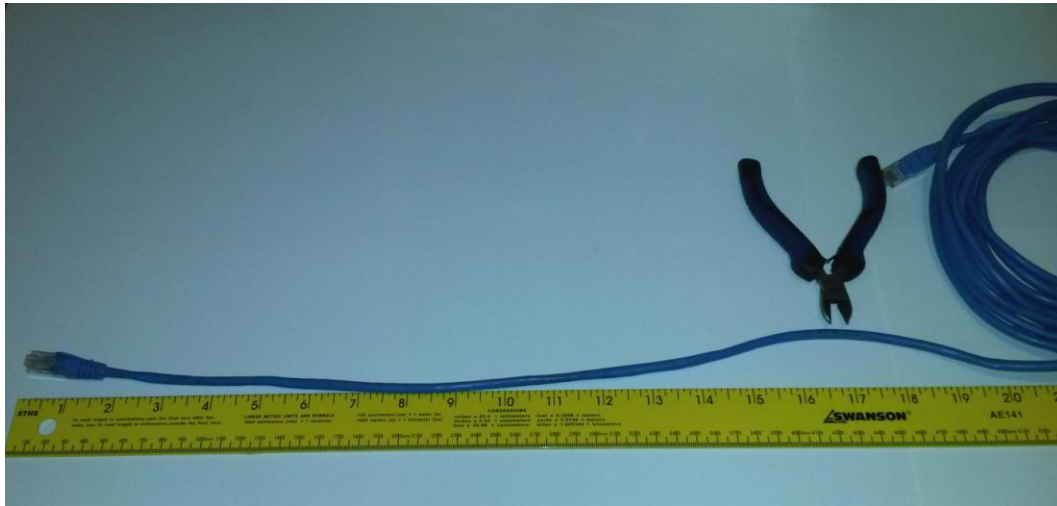

Step Two – Use the utility knife to remove approximately 9 ½ " of insulation (blue in this case) from the end that does not have the RJ45 molded connector. Leave a 7" strip of insulation on the cable.
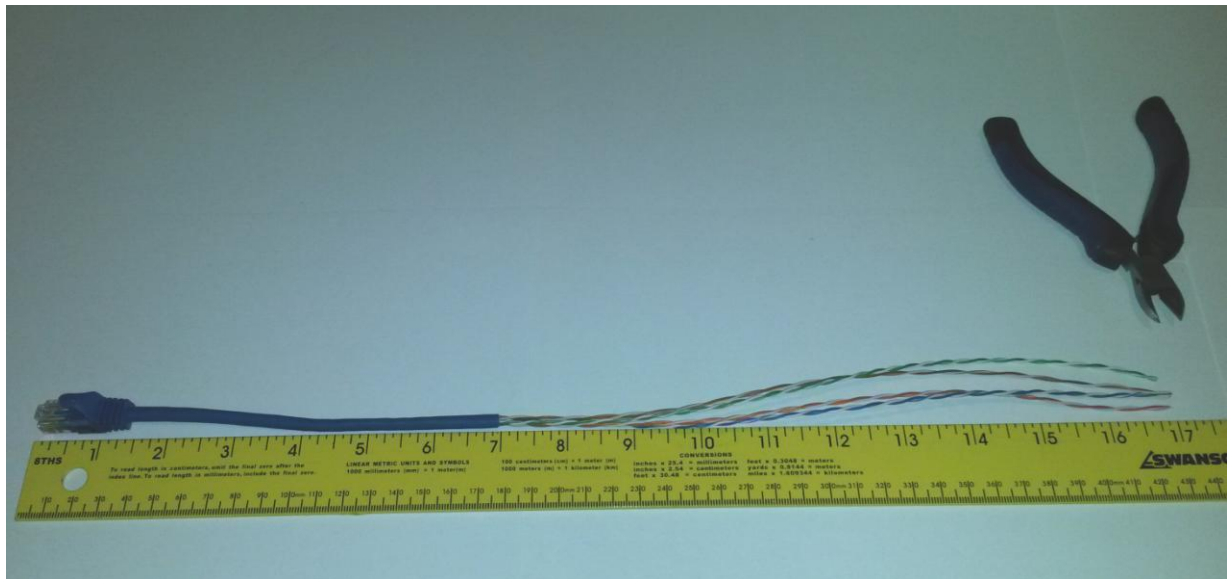
Step Three – Splay the ends of the exposed inner cables to spread out the conductors.
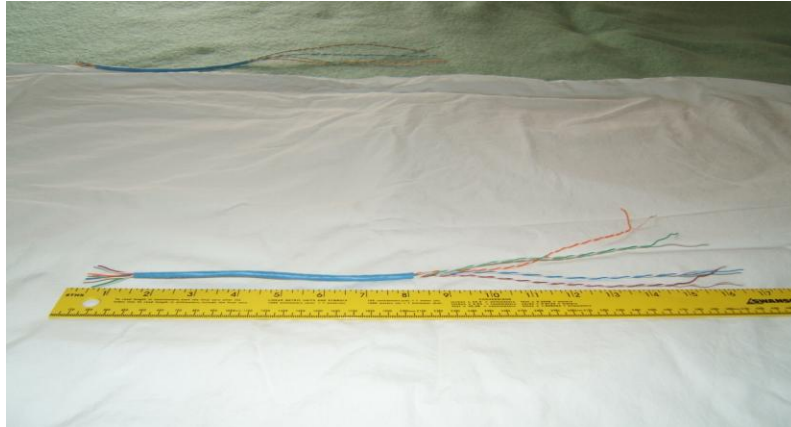

Step Four – Strip about 5-8 mm from the ends off all eight of the wires on the 9" exposed section using the wire strippers. Twist the conductors to keep them pulled together in to a tight bundle. This makes them easier to insert in the motors and pins.
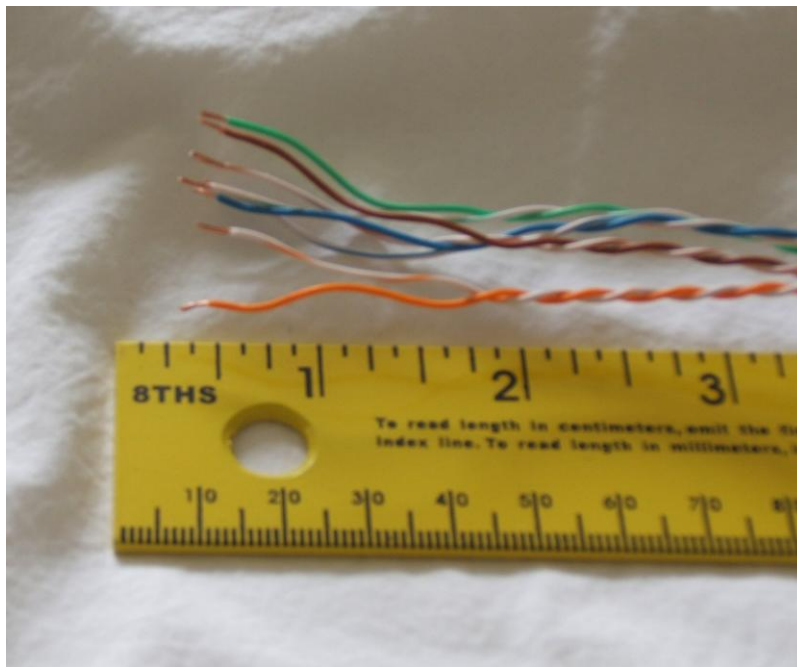

NOTE: The installation of the Molex connectors is only needed if you plan to use these harnesses for the 4 motor Roboxsumo program. Basic Roboxsumo uses only two motors connected to the blue and green wires. The orange and brown wires can be wrapped up or simply cut off if not needed and skip steps 5 and 6. This simplifies and reduces the cost of the harness assembly.

Step Five – Crimp a Molex pins to the end of each of the orange, orange/white, brown and brown/white wires. Do not install terminals on the green, green/white blue and blue/white wires.
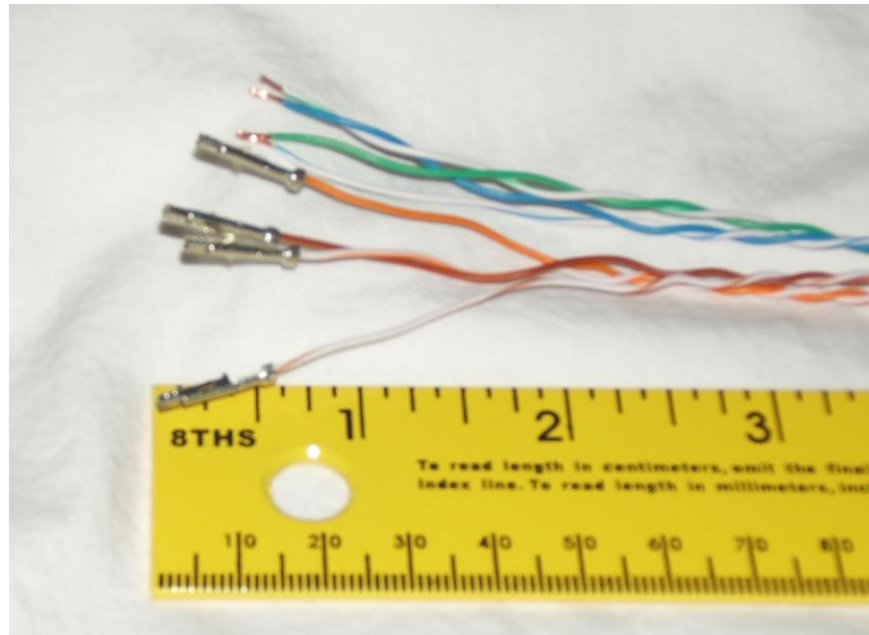
Step Six – Attach a Molex connector to the end of the wires that have the pins. Orange and orange/white go to one connector, brown and brown/white to the other. At this point the wiring has been set up so that the solid wires, orange and brown, should be next to the clip and the same with the brown and brown/white.
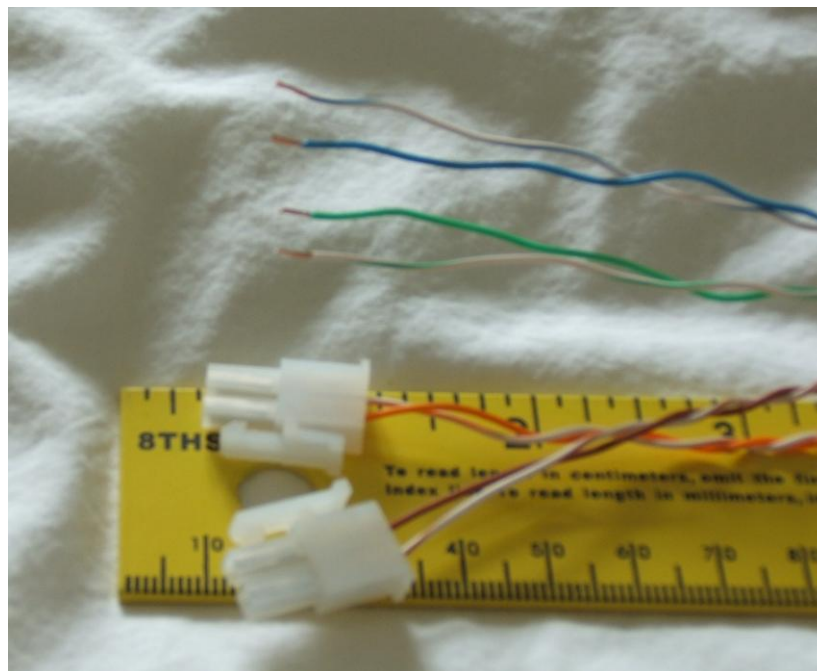
Step Seven – At this step you will be attaching the leads to the motor first using solder and then hot glue. If you look closely at the two terminals on the motor, you will see that one of them has a blue mark. This is the terminal that will connect to the solid colored (blue or green) wire. Which motor you attach which wire to is important and is discussed next. The hot glue will be used to provide electrical insulation and strain relief.
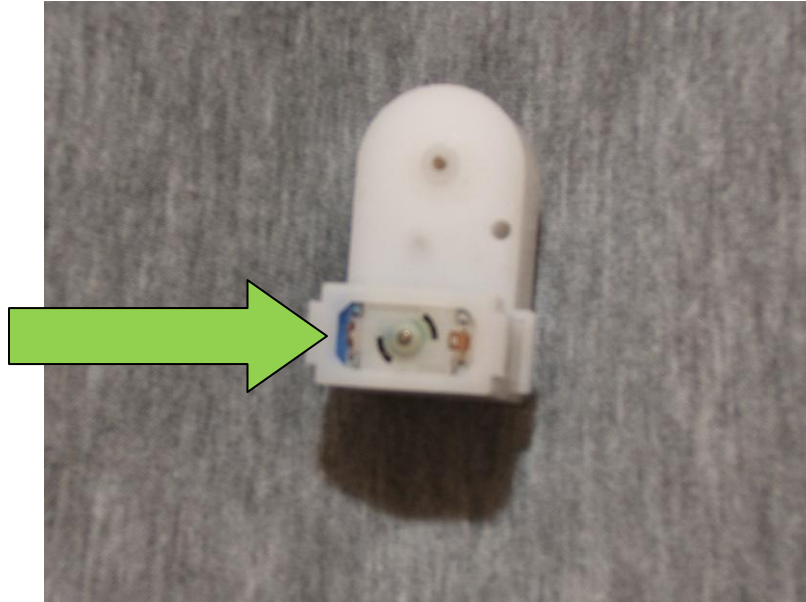
Step Eight – In many cases, the motor terminals can be bent or folded when they come out of the packaging. Unfold the terminals very carefully and make sure they are standing straight out of the back of the motor. There should be a small, oval, opening in each of the terminals. Sometimes the utility knife or needle nose pliers can be used to help unfold or straighten the terminals.
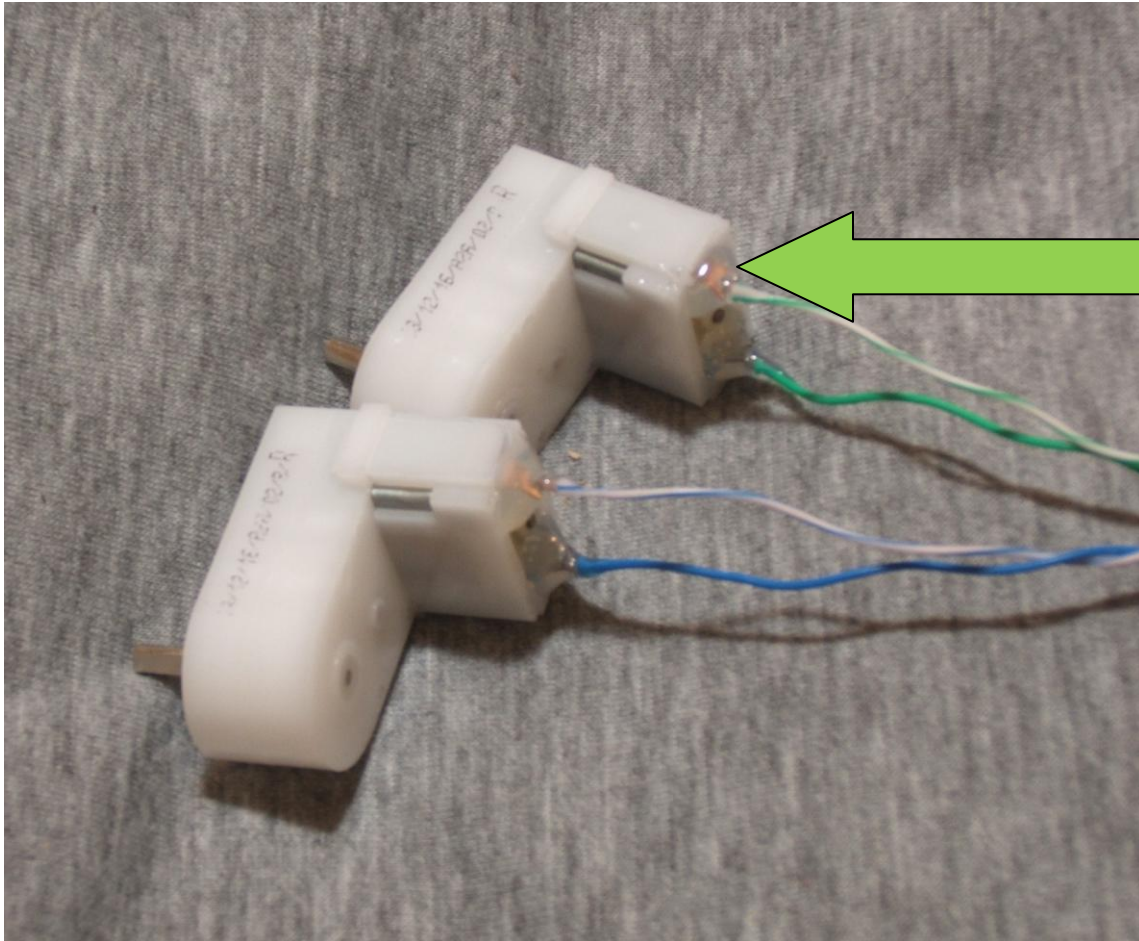
CAUTION: The motor terminals are very delicate. Pull gently on the terminals. Do not bend the terminals back and forth repeatedly or they can break off.

Step Nine – Establish which motor is the right, and which is the left. A wooden block with two holes (1/8" diameter) in it can be used to support the motors (as shown) while they are being soldered. The blue and blue/white wires will attach to the left motor. The solid blue wire is connected to the terminal with the blue mark. The green and green/white wires should connect to the right motor. The solid green wire connects to the terminal with the blue mark. Slide the stripped portion of the wire into the hole on each terminal and solder it in place.
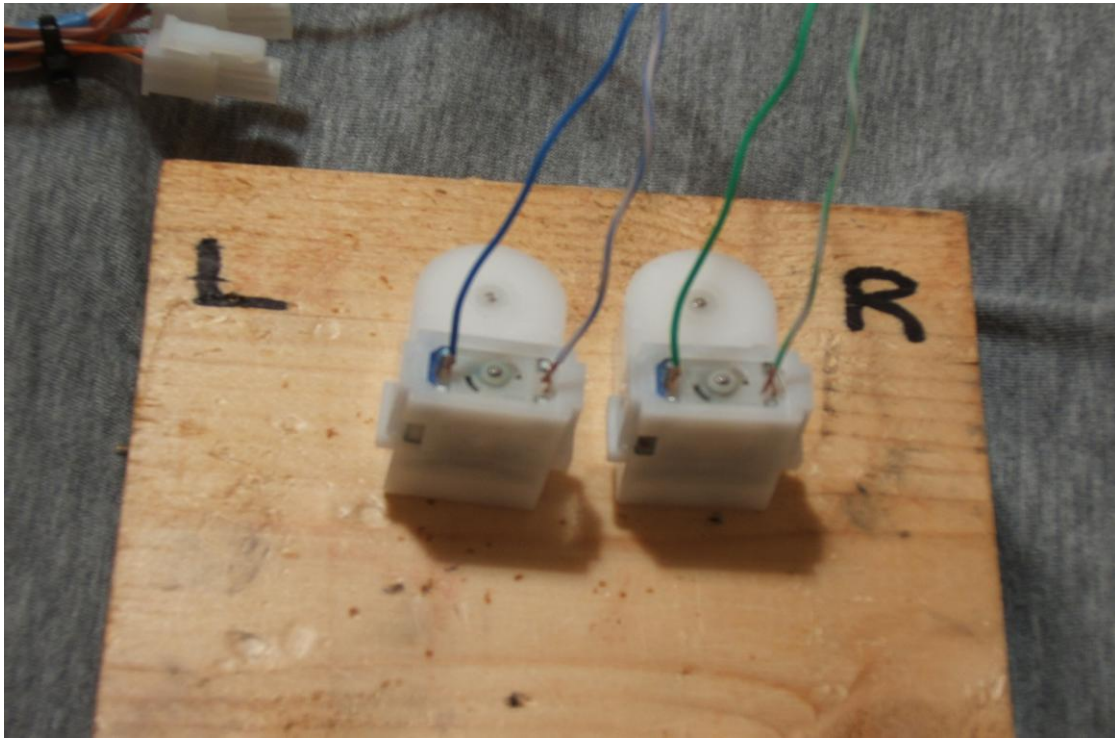
CAUTION: There are small, steel, tabs on the back of the motor near the terminals. Make certain that the wires do not make contact with the steel tabs. This can cause a short during operation. Be careful when soldering the wires in place. Use a medium power (30-40 watt) soldering iron and solder the wire connections quickly to prevent heat damage to the motors.

Step Ten – Allow the solder to cool on the motor connections. Use the hot glue gun to apply glue around both terminals of each motor. The glue should cover the terminal, all the way up to the wire insulation. This prevents a short of the wire terminals and provides strain relief to prevent the wires from being pulled off the motor. Do not put glue on or around the motor shaft on the back side. It can prevent the motor from turning properly.

Step Eleven – Label the motors using a sharpie marker as shown in the diagram below. Test the assembly to make sure all of the motors operate and turn in the correct direction.

The provided diagram on the next page describes the harness if you made it from scratch.

CABLE assembly details

1 2 3 4 5 6 7 8

Hook
Is
Under-
neath

O/ O G/ B B/ G Br/ Br

Install RJ45 Connector on
end with 1" exposed wires

Cut a piece of CAT5E cable 17"
long to begin.

Leave 7" of cable housing
on wires

Orange

Orange/White

Coil and zip tie extra cable to
accessory connectors here.

Brown

Brown/White

Expose 9" of wire to
connect to motors and
accessory connectors.

LEFT MOTOR - Forward

RIGHT MOTOR - Forward

Blue/White

Green

Blue

Green/White