



Last modification: September 7, 2020

RBE 2001: Unified Robotics I

A-Term 2020-21

Assembling the Romi

Assembling the Romi chassis + 32U4 control board is straightforward, but it does require a fair bit of careful soldering. With exceptions noted below, you will basically follow the instructions from Pololu. Read each step thoroughly before you solder anything – desoldering is a good skill, but it's a pain!

In addition to your kit, you will need to get a small bag of a few extra items (breadboard, sockets, screw terminals) before you start. You can get the parts from the Robotics Lab.

1. Following the [instructions in Section 4](#) of the [Pololu Romi 32U4 Control Board User's Guide](#), solder the control board. Referencing Figure 2, you need to attach:

- (2) Encoder sockets as described in the User's Guide. These are the 1x6 sockets that came with the board (the shorter ones!). Put them in the outer rows, otherwise, your motors won't fit. It is best to solder one pin first and then check to be sure the socket is fully seated in and perpendicular to the control board. Once you've verified that, solder the other five pins. If you don't solder the socket in properly, you'll have trouble fitting the encoder pins from the motor – desoldering one pin is easy; desoldering six is a chore.
- You won't use the LCD in this class, but solder in the 2x7 socket header in the space near the center of the board.
- (3) 1x6 and (2) 1x9 sockets in the corner of the board. Use the taller sockets here. Be sure to solder them all close to each other so that you can plug 3-wire cables in across the rows.
- (1) 1x2 screw terminals to VSW/GND for power for your third motor. **Make sure the wire openings face away from the big capacitor** as shown in Figure 1, otherwise you won't be able to get the wires in! You could also use the 1x2 socket, but you risk having the power wires come out of the sockets.
- You do not need to solder the buzzer in – you may use it someday, but not in this class. If you do solder it in, you'll likely want to cut the buzzer jumper at some point – when you use the servo library, it will cause the buzzer to...well...buzz.

Figure 3 shows the completed board.

2. Assemble the chassis according to [the instructions here](#). When you solder the battery tabs in Step 3 of that document, be sure that the tabs are fully seated – they should protrude about 1/16" from the top of the board. While it is still possible to remove the control board after you solder the battery tabs in, it's a bit of a pain to put the board back in, so be sure to solder all the sockets in the previous step before you solder the battery tabs. It will take some time to completely heat up the battery connections – be patient! Be sure to **screw the board to**

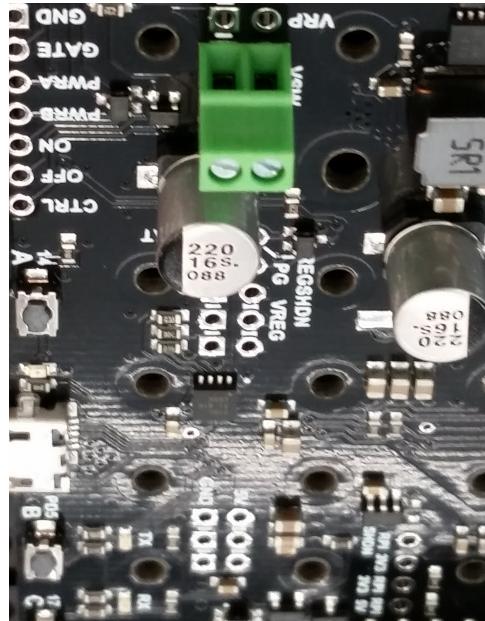


Figure 1: Orientation of the screw terminals.

the chassis plate before you solder the battery terminals – otherwise you risk the motors not lining up well with the motor sockets.

You do not need to solder the encoder boards as shown in Step 5 – yours are already soldered!

3. Solder a 1x9 socket to the line sensor array, as shown in Figure 4. Make sure that the sockets are on the **opposite** side from the sensors (otherwise, you won't be able to get your line sensors close to the line).

Your Romi now has minimal functionality (actually, it has quite a bit of functionality, but you will add a lot more later). You should do some tests to verify that the assembly is correct:

1. Follow the steps in [Section 5](#) of the [User's Guide](#) to install drivers, if needed.
2. **Do not** install the Romi library in Step 6 of the User's Guide. Instead, you'll need to install WPI's modified library, which is found on the [WPIRoboticsEngineering wpi-32u4-library github page](#).
3. Once the library is installed, open and upload the MotorTest example and verify that your motors work correctly. You'll need to select the board as Pololu A-star 32U4.

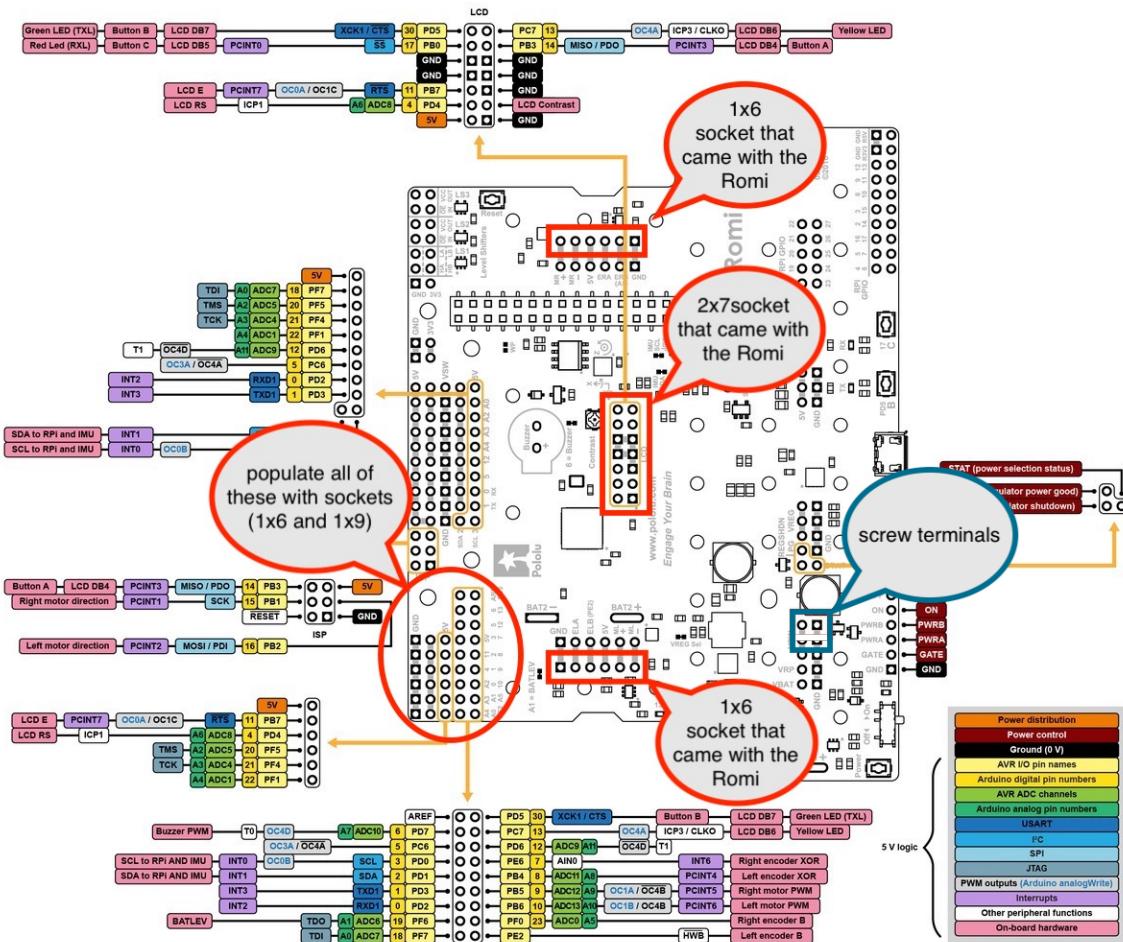


Figure 2: Romi 32U4 control board showing the additional socket locations.

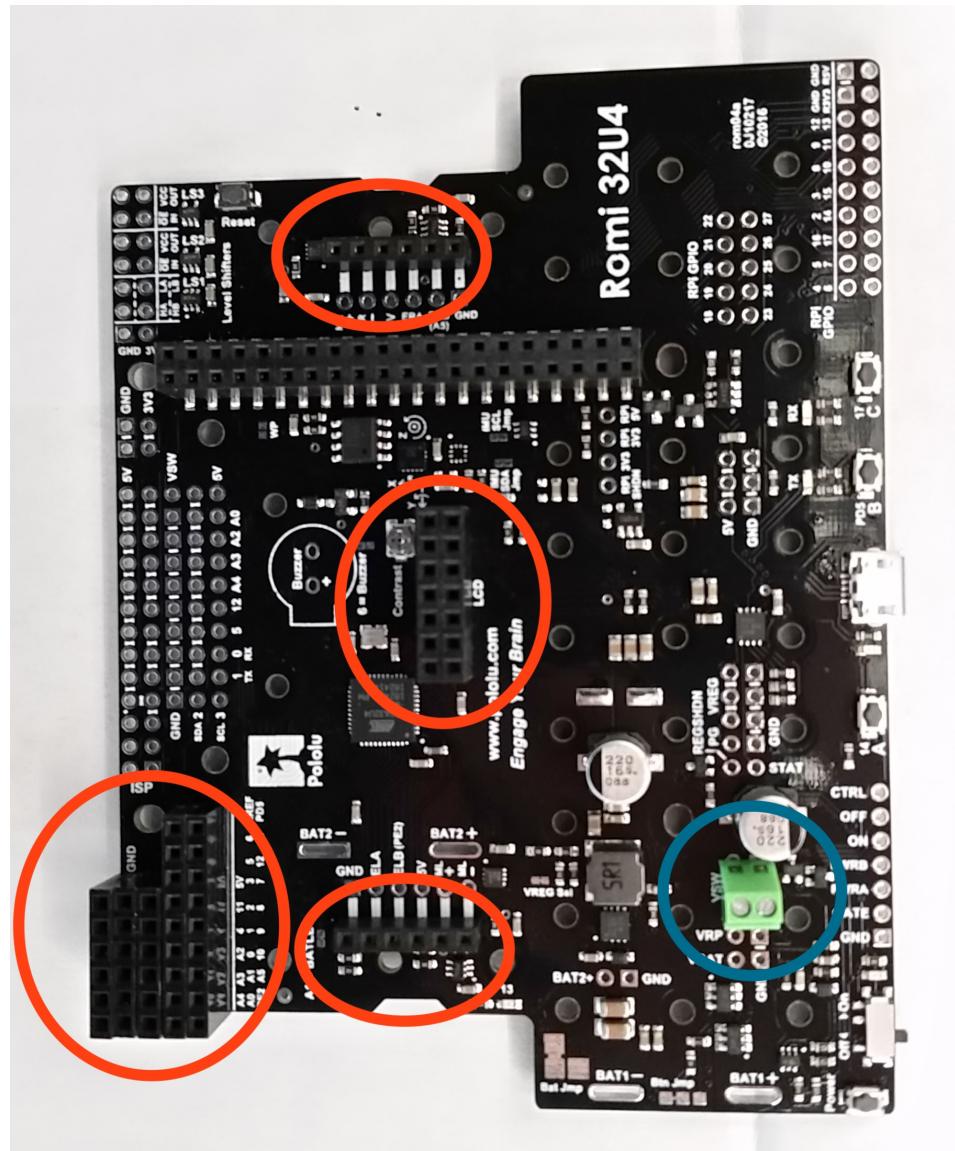


Figure 3: Control board with connectors soldered in. You may want to solder the buzzer in.

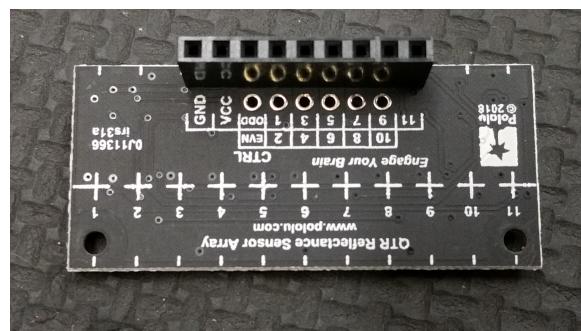


Figure 4: Line sensor array with sockets installed. **The sockets go on the opposite side from the sensors!**