

SNAP Connect Robot Arm Example – Hardware Description



Parts List:

Robotic Arm Edge OWI-535

Robotic Arm USB Interface OWI-535-USB

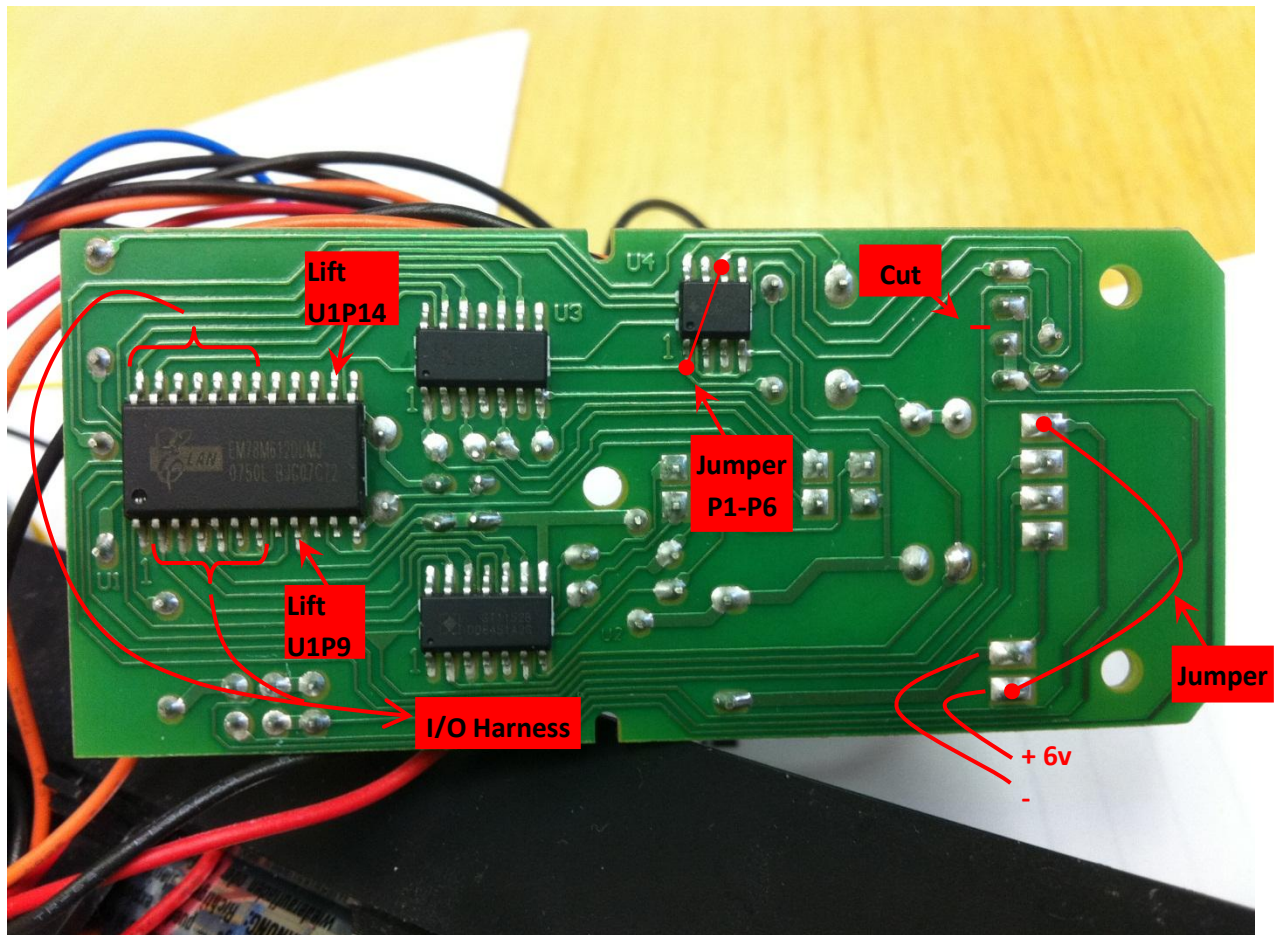
Synapse SN171 Protoboard

Synapse RF Engine (RF100 or RF200)

Modifying the OWI USB interface for connection to the Synapse Protoboard:

For this example, we will be connecting the protoboard directly to the Robot Arm. The Robot Arm has 4 D-cell batteries in the base together providing 6v, which is sufficient to power the protoboard. We will be mounting the protoboard on the back of the Robot Arm, with a wiring-harness connecting power and I/O signals between them. The Robot Arm does not inherently provide a digital interface. Instead it exposes direct connections to battery voltage and motor terminals for simple mechanical switch control. The common way to interface digital logic to bidirectional DC motors is with an H-Bridge circuit. There are a number of integrated circuits from various vendors which would do the job. In this case we have 5 motors to control: grip, wrist, elbow, shoulder, and base. That will require 5 H-Bridges. Fortunately, there is an interface board available which already has what we need – it is the OWI-535-USB board. It also has a microcontroller to provide a USB connection, but we won't be needing that! (In fact, the procedure below will remove the USB capability)

Here's how to modify the OWI-535-USB board, and connect it to your SNAP Protoboard:



1. Modify board as shown above: Lift 2 pins on U1, cut trace as shown, add 2 jumpers
2. Wire the +6v power leads to the protoboard VEXT/GND terminals.
3. Wire the following connections between U1 pins and protoboard (I/O harness)

GRIP1 = U1P6 = GPIO_15
GRIP2 = U1P2 = GPIO_11
WRIST1 = U1P3 = GPIO_12
WRIST2 = U1P4 = GPIO_13
LAMP = U1P5 = GPIO_14
ELBOW1 = U1P23 = GPIO_16
ELBOW2 = U1P24 = GPIO_17
SHOULDER1 = U1P22 = GPIO_4
SHOULDER2 = U1P21 = GPIO_3
BASE1 = U1P18 = GPIO_10
BASE2 = U1P7 = GPIO_9