

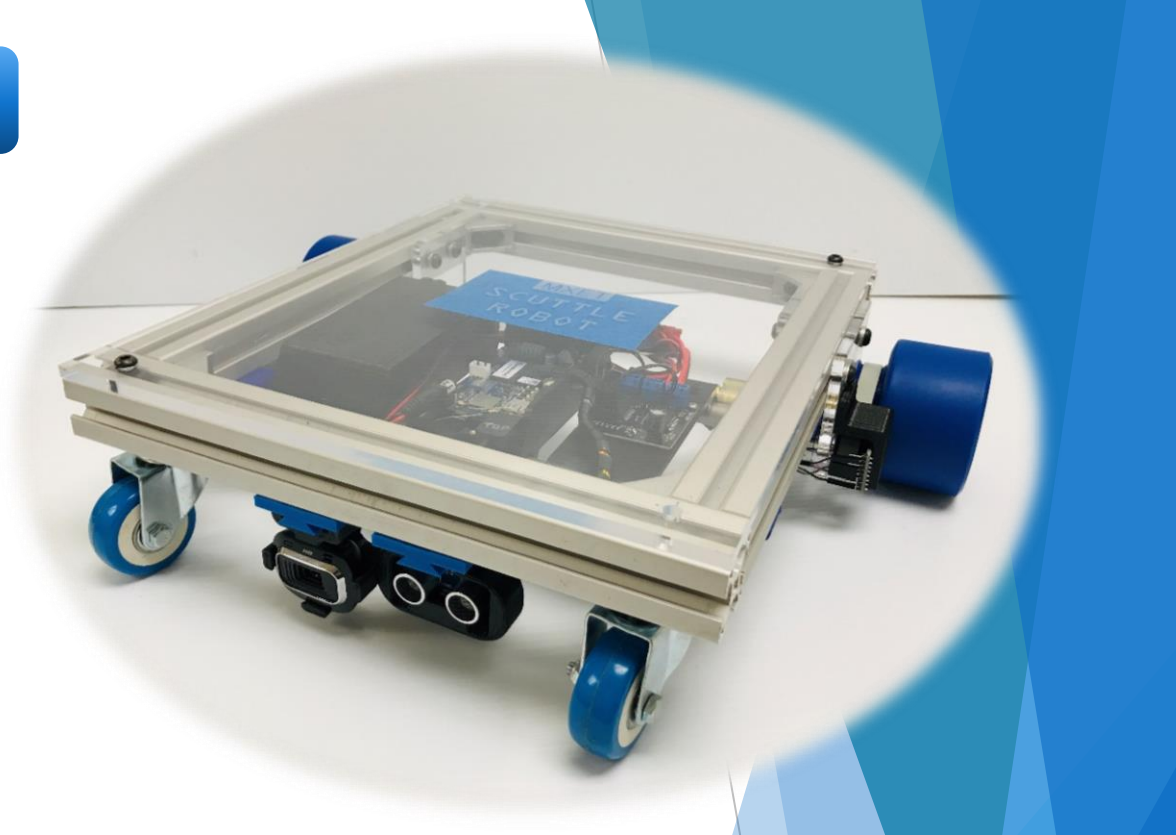
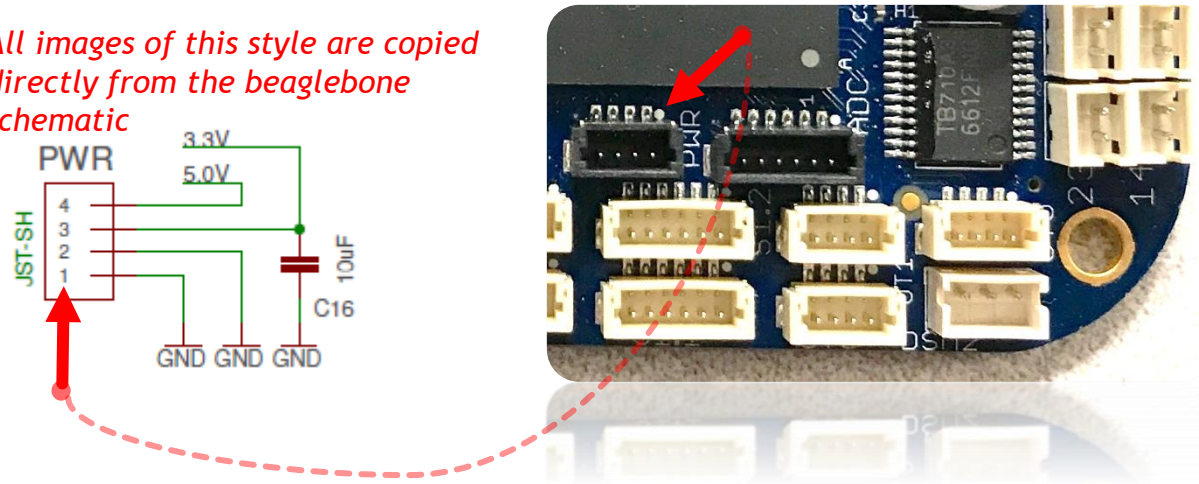
Scuttle robot Wiring Guide (rev 2020.08.20)

Important Info:

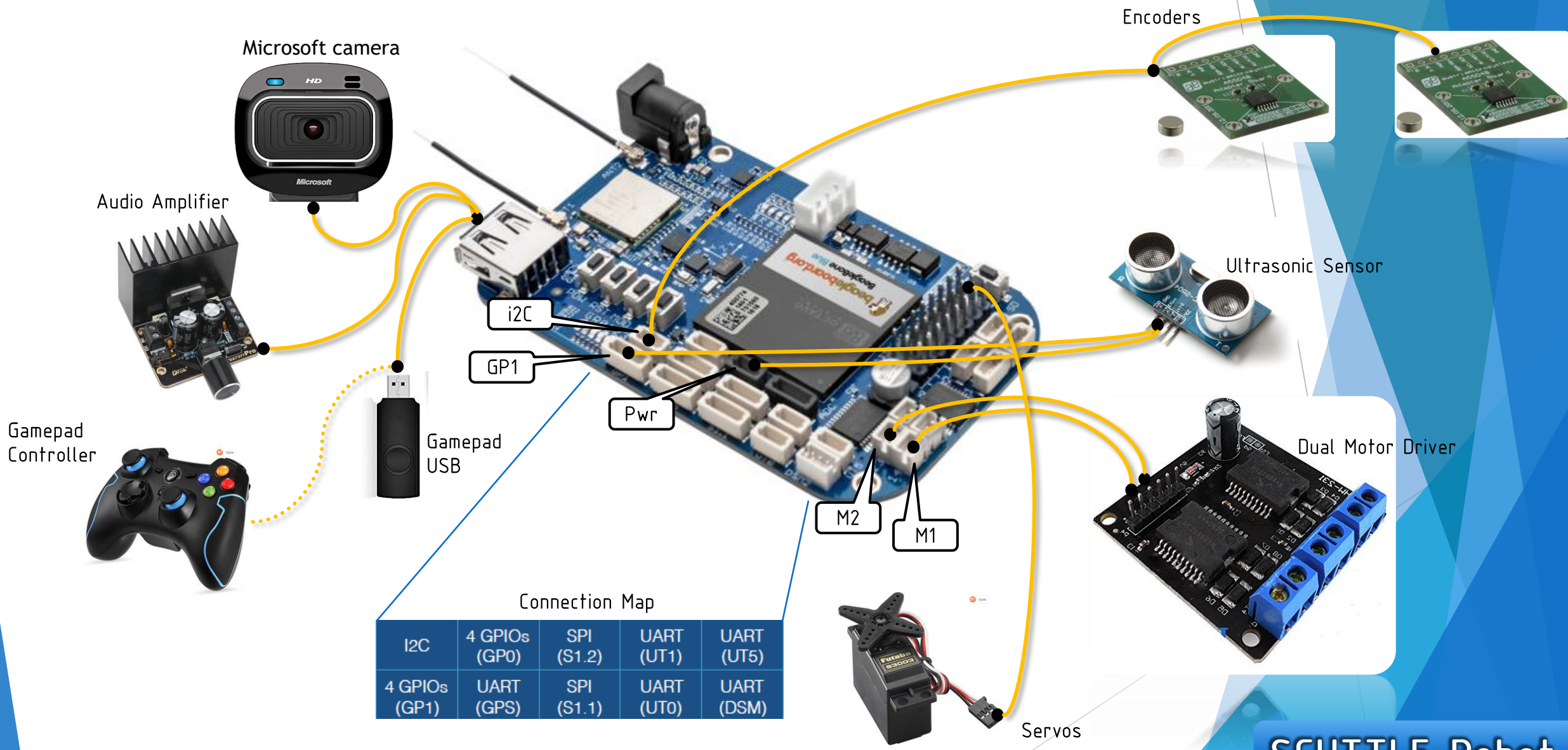
To match the beaglebone pins to the pin numbers on the diagram:

The tiny white circle on the silkscreen at each connector indicates “pin1”

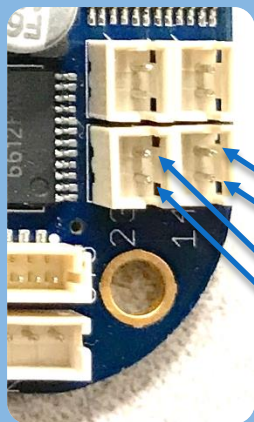
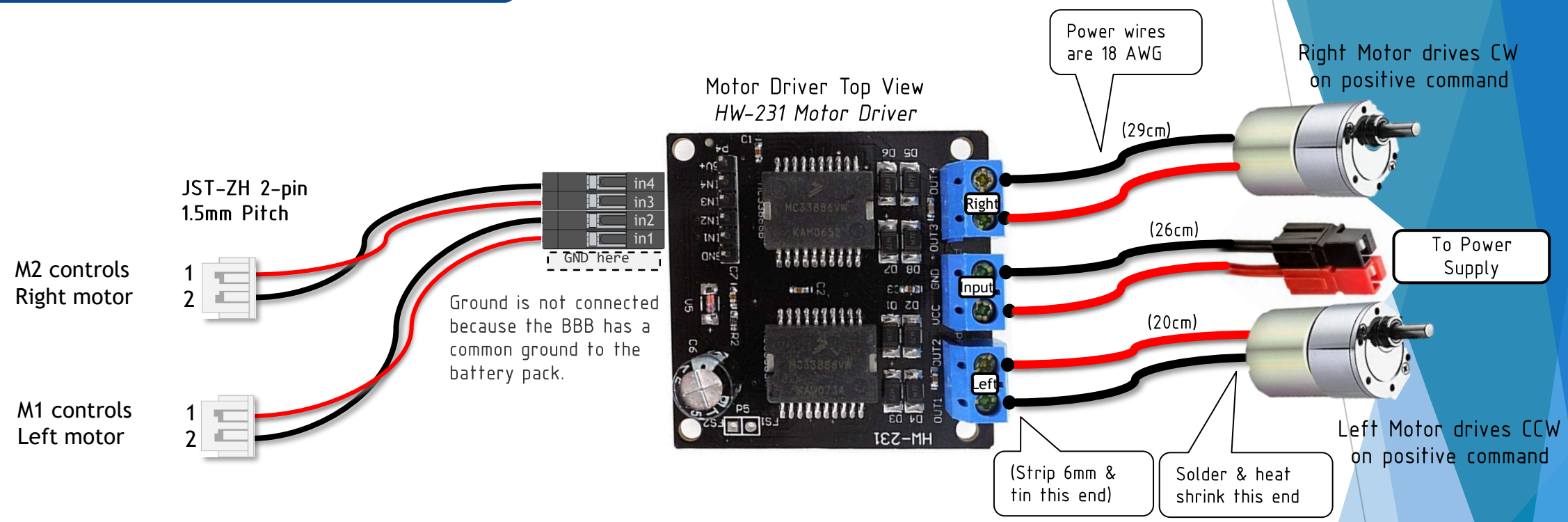
All images of this style are copied directly from the beaglebone schematic



Verified Sensors & Actuators



Motor Driver Signal Cables

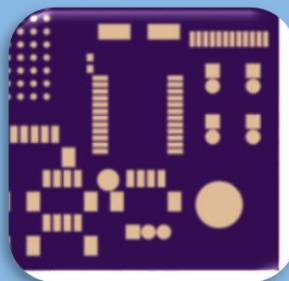


Pin 1 should be HIGH when motor is driven FORWARD

Motor1 Pin1
Motor1 Pin2

Motor2 Pin1
Motor2 Pin2

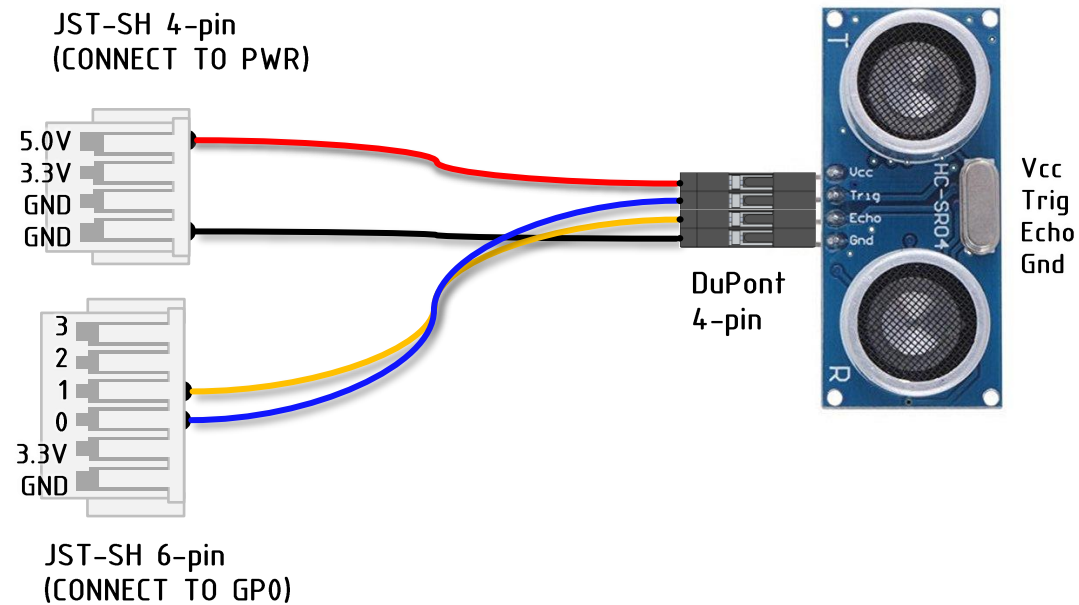
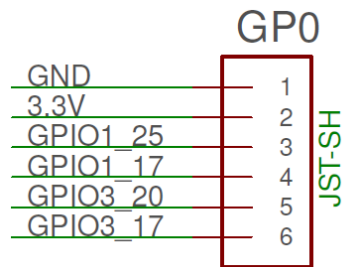
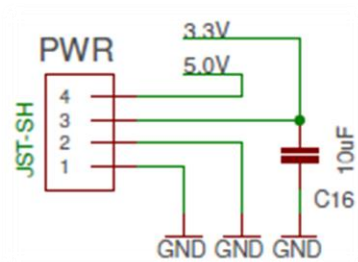
Hardware design convention:
Pin 1 uses the square solder pad.



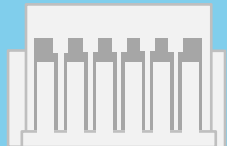
Connector vector image reserved.



Ultrasonic Distance Sensor (GP0)



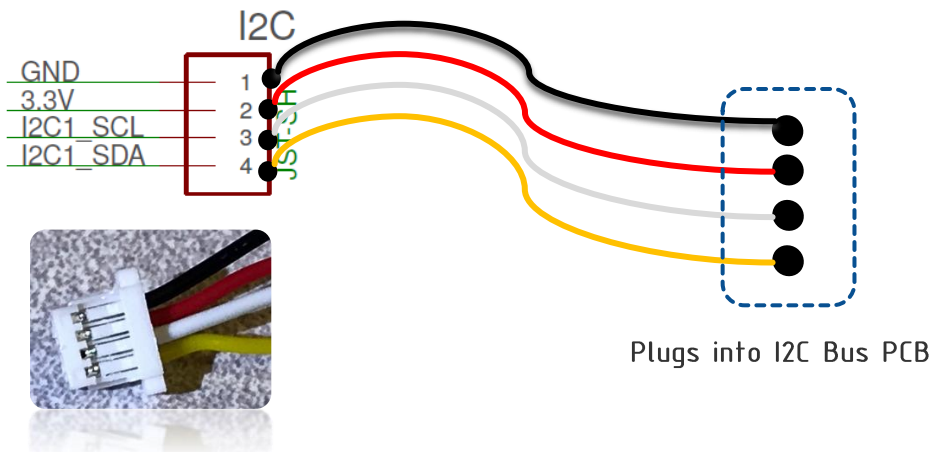
NOTE: For JST connectors out-of-box, the colors are not in the correct order. You need to rearrange them.



Beaglebone to I2C bus cable

Diagram

BeagleBone I2C Connector
Style: JST-SH 4-pin



Cable Design

(I2C port on Beagle)
Style: JST-SH 4-pin

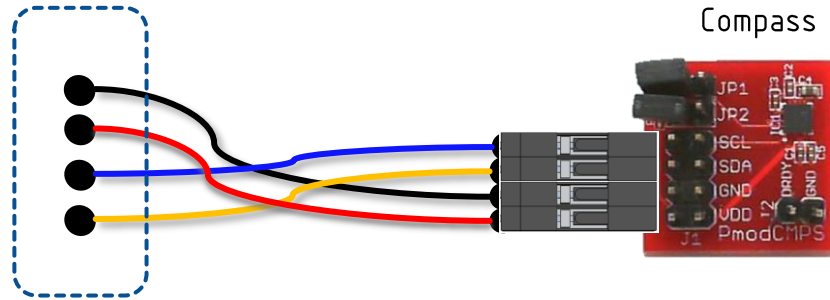


DuPont style
2.54mm female 4-pin
(plugs into bus board)



Compass CMPS or CMPS2 (I2C)

Plugs into I2C Bus Board

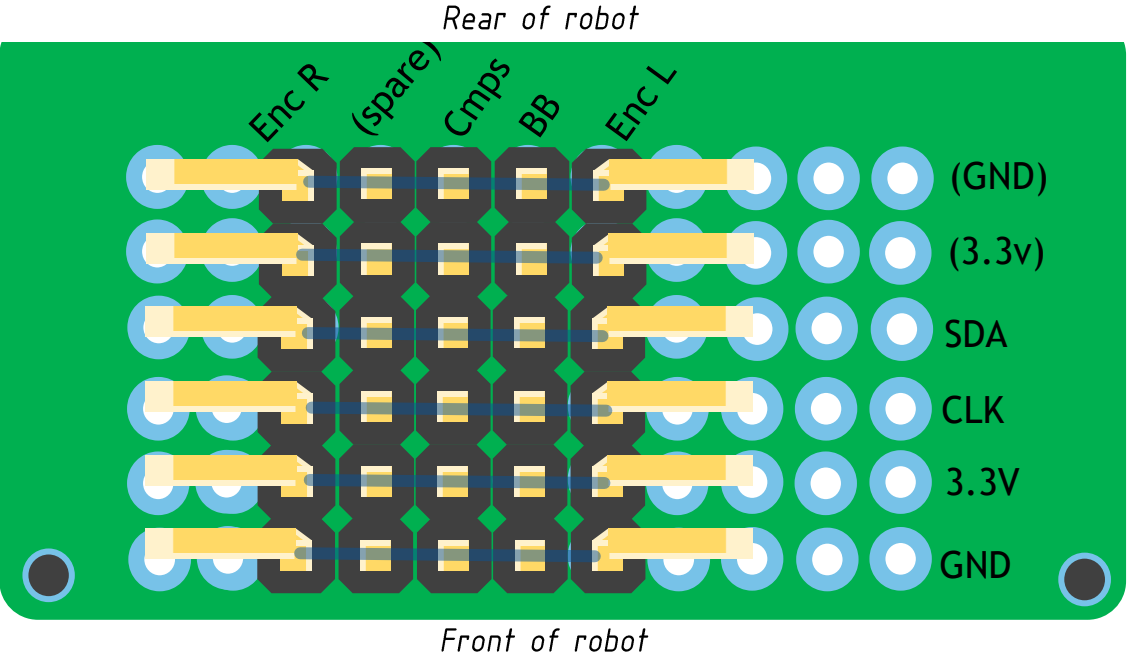
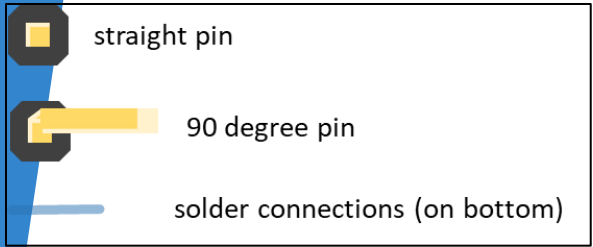


This compass is not necessary since you can access the compass on the beaglebone blue. Be sure to calibrate the compass on the blue since it lies within close proximity of magnetic hardware on the robot.



I2C Bus Board

The board is made from a breadboard and soldered manually. The board can be cut between rows J & K. The solder bridges all pins from left to right.

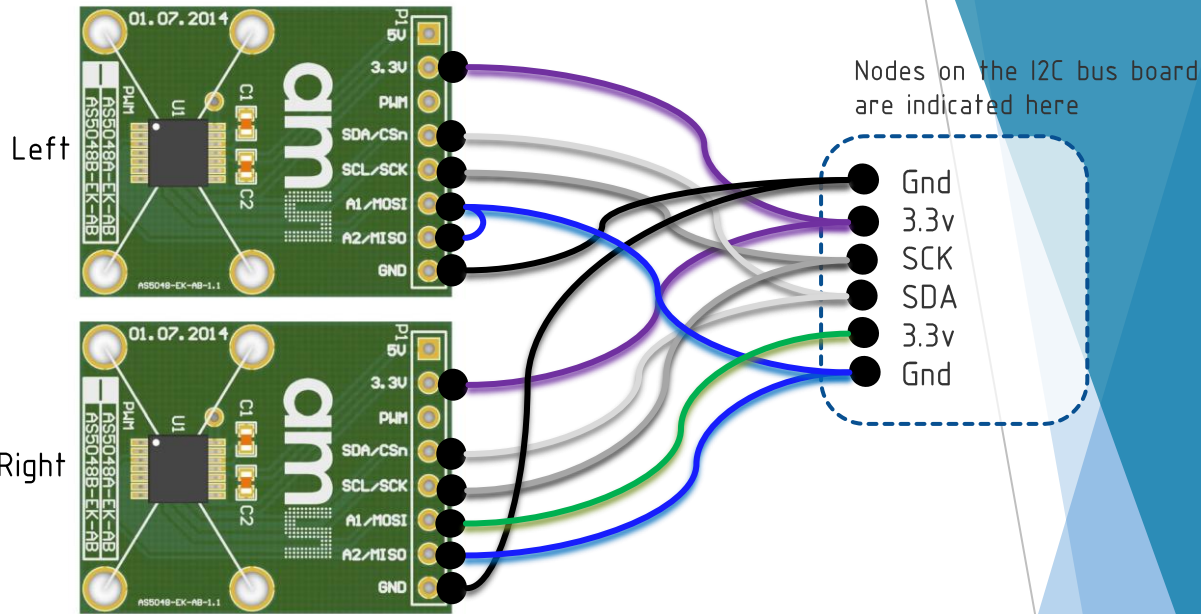


Screw Hole

Encoder AS5048 (I2C)

Left Hand Encoder
A1 is pulled **down** to GND
I2C address is 0x40

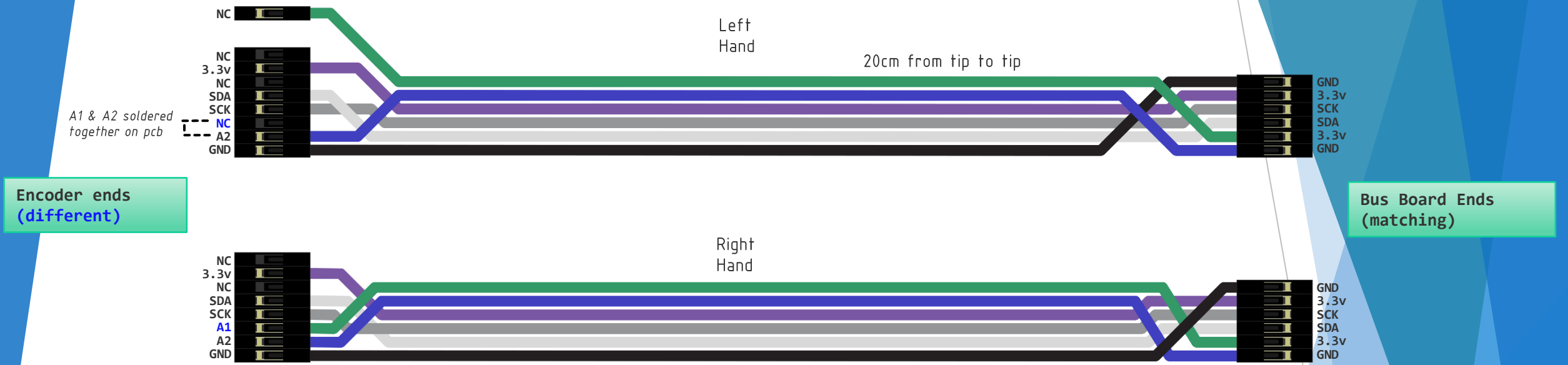
Right Hand Encoder
A1 is pulled **up** to 3.3v
I2C address is 0x41



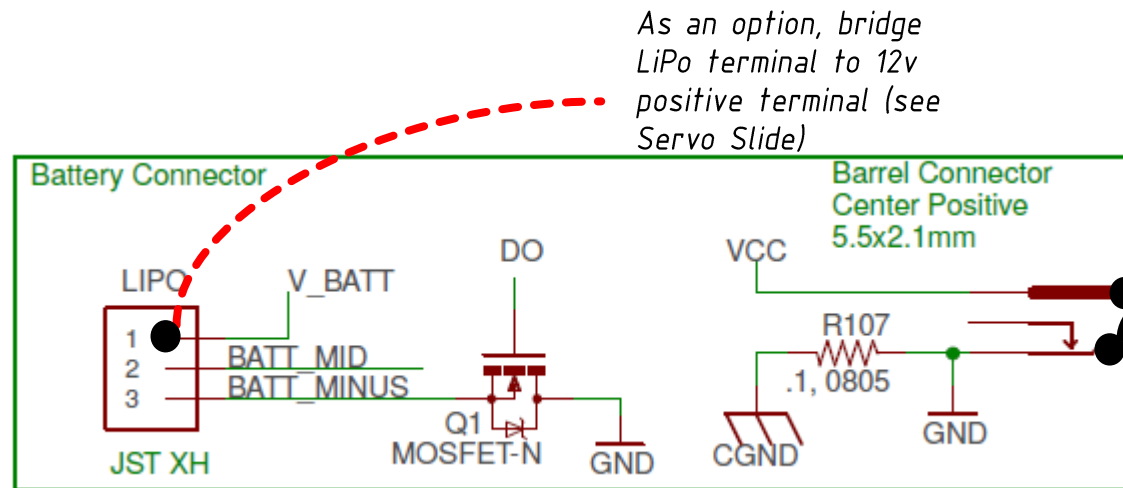
PIN	Left	Right
A1	0 (low)	1 (high)
A2	0 (low)	0 (low)
i2C Address	0x40	0x41

On the Left Hand Encoder PCB, bridge the pins A1 and A2 using solder, to each other.

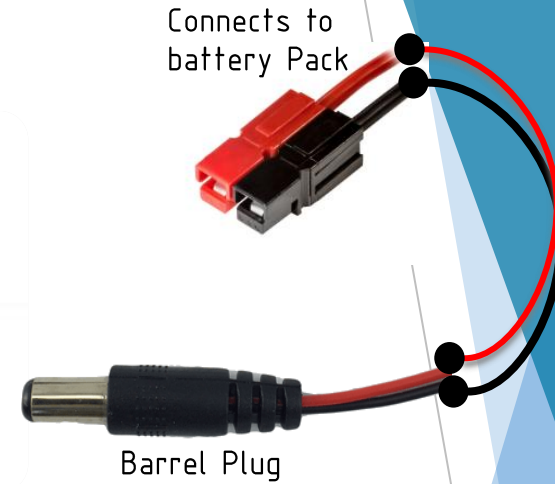
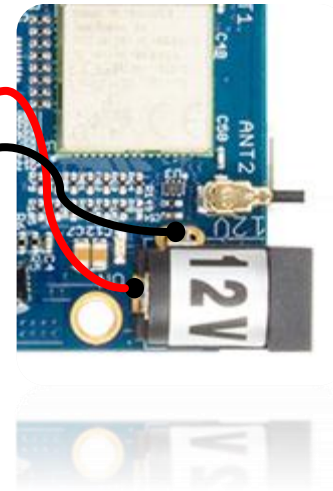
Encoder Cables



Battery

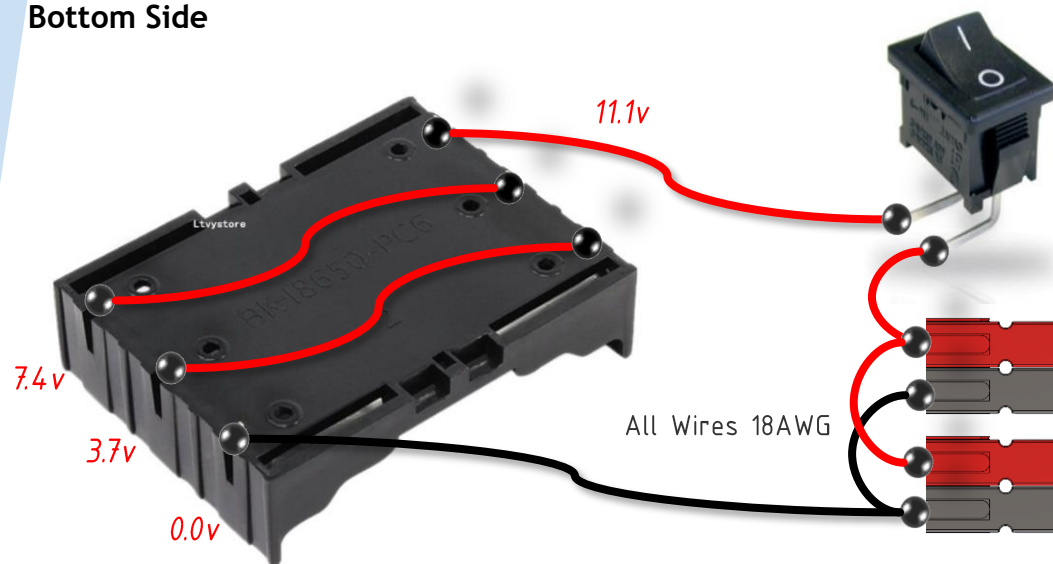


The "Battery Connector" is disconnected. Actual battery uses Barrel Connector.



Battery Pack

Bottom Side



Switch PN:SRB22A2FBBNN
Carries 10A max

Two pairs of Anderson
connectors are attached here.

All Wires 18AWG

3-Cell 18650 holder

LIDAR

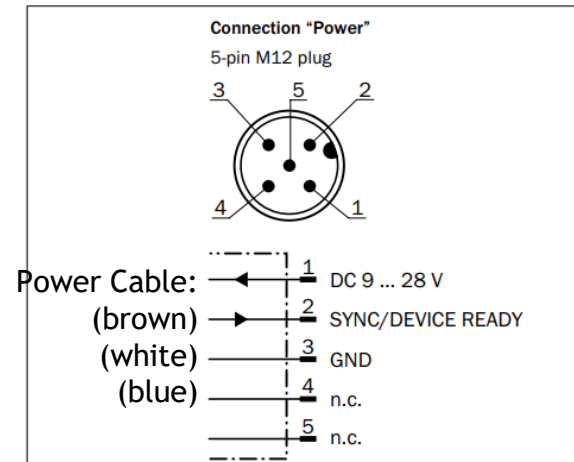
Lidar Device



TiM 561

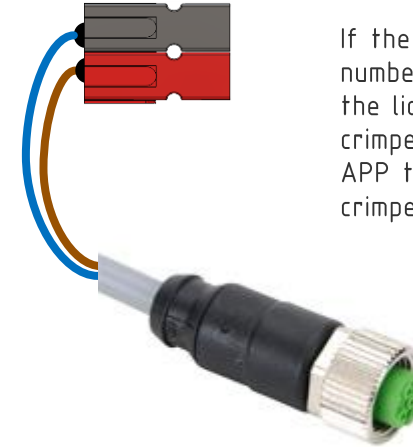
Power Connector Diagram (lidar side)

POWER connection (supply voltage)



LIDAR-side connector (male pins)

Power Cable Diagram (plugs into lidar)



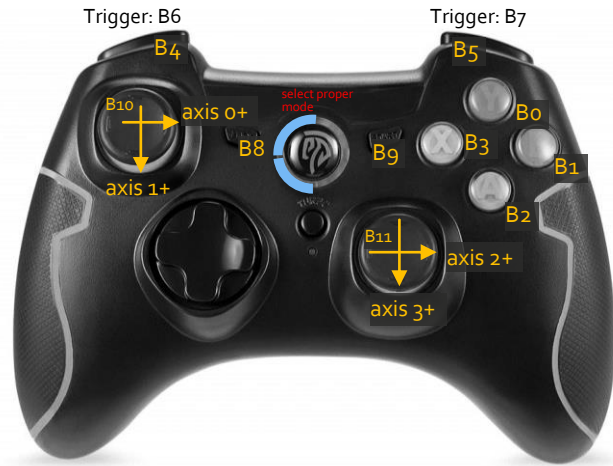
If the indicated cable part number is used for power to the lidar, brown will be crimped into the 12v positive APP terminal and blue is crimped into the negative.

Cable: 7000-12241-2150300

Cable-side connector (female pins)

Typical Lidar power consumption: 2.1w

Gamepad Controls Mapping



Button Behavior:

- not pressed: 0
- Pressed: 1

Axis behavior:

- Right returns positive values
- down returns positive values

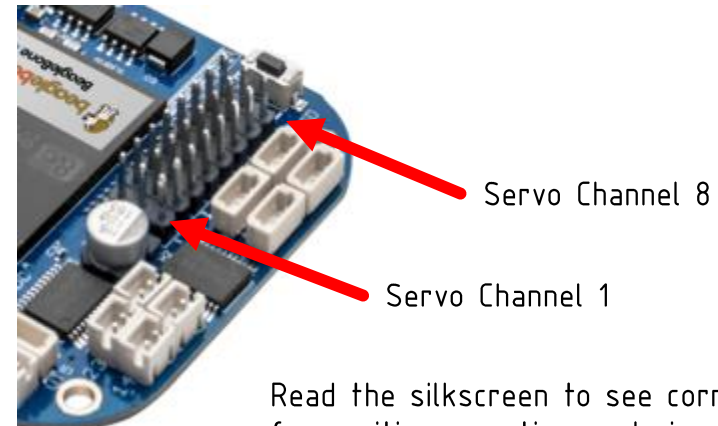
Servos

Bridge Power to the LiPo connector



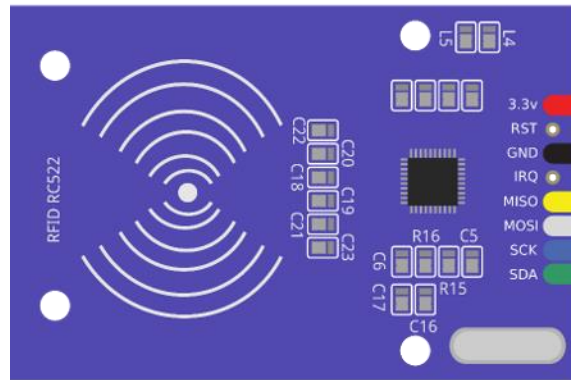
Without a power source available at the positive (third pin) input of the LiPo connector, the board has insufficient current available to the servos to drive servos at full torque or to drive multiple servos.

A safe fix is to solder the positive terminal of the DC jack to the third pin of the connector shown. When a battery is connected, the pins correspond to 0.0v, 3.7v, and 7.2v terminals of a 2-cell lipo.

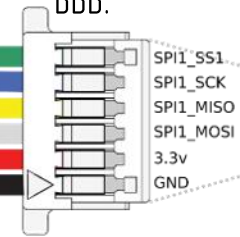


RFID reader

RC522 low-cost
RFID Scanner



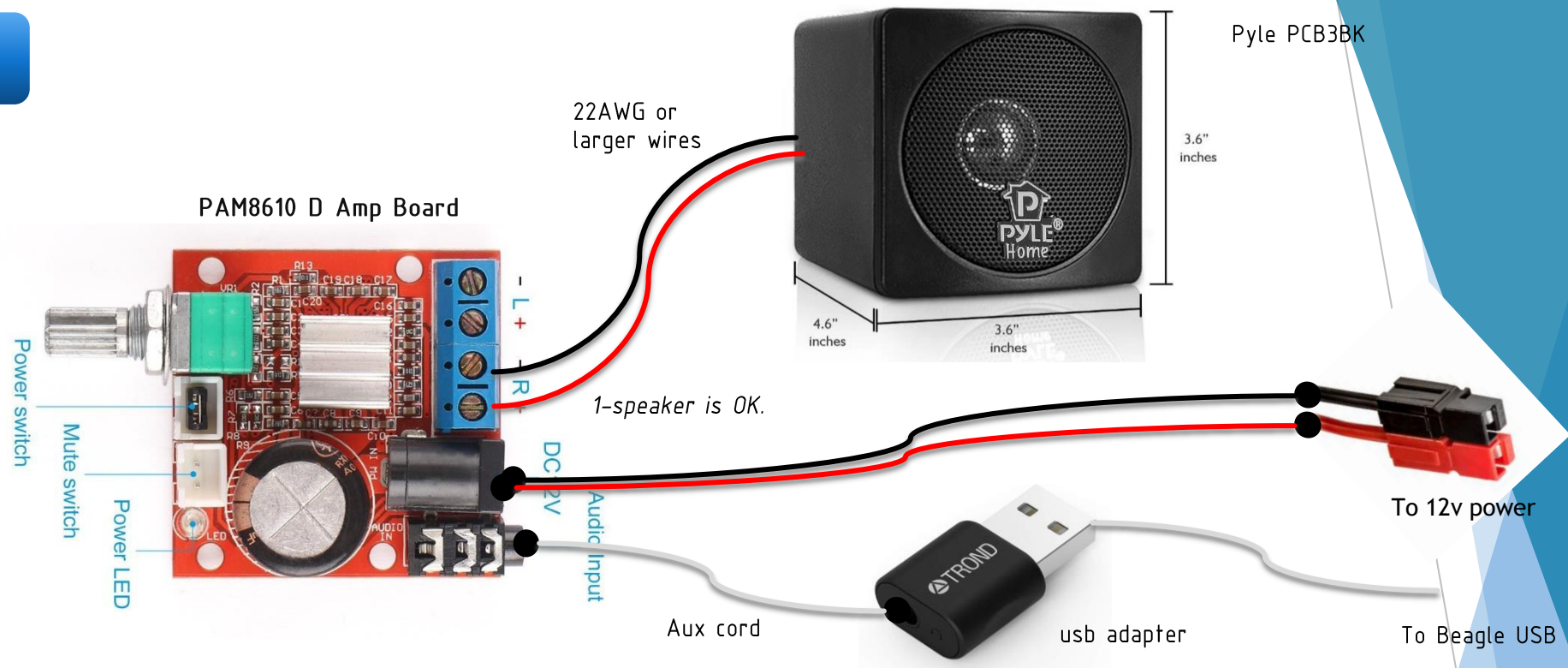
Plug into 6-pin
JST-SH port on
bbb.



SPI1_SS1
SPI1_SCK
SPI1_MISO
SPI1_MOSI
3.3v
GND



Audio Amp



Alternative:

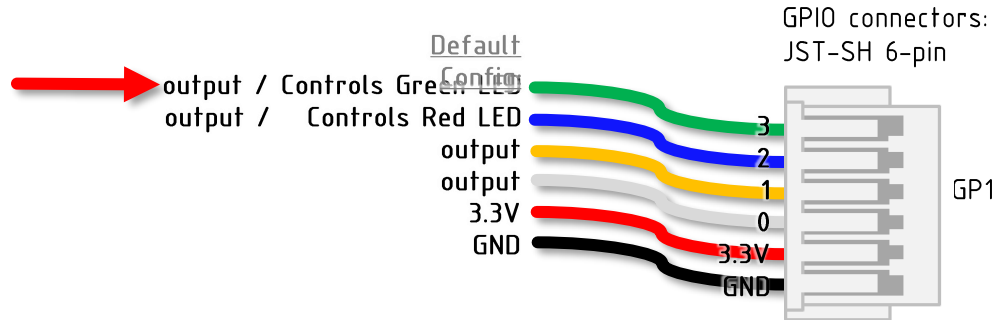
The above setup will support at least 10 watts (this is actually quite loud – easy to hear in a crowded room).

It is also possible to find a speaker which receives BOTH power AND signal over USB. These will be more compact but less powerful. (The speaker shown is 3w max)

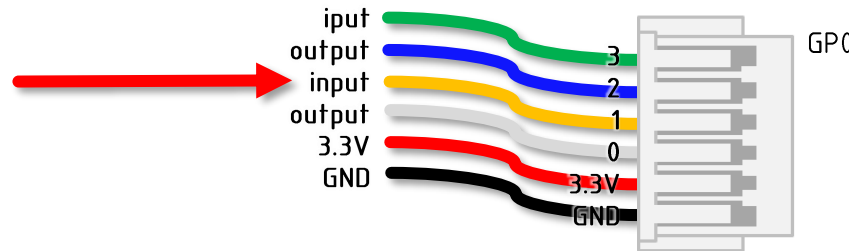


GPIO Connections

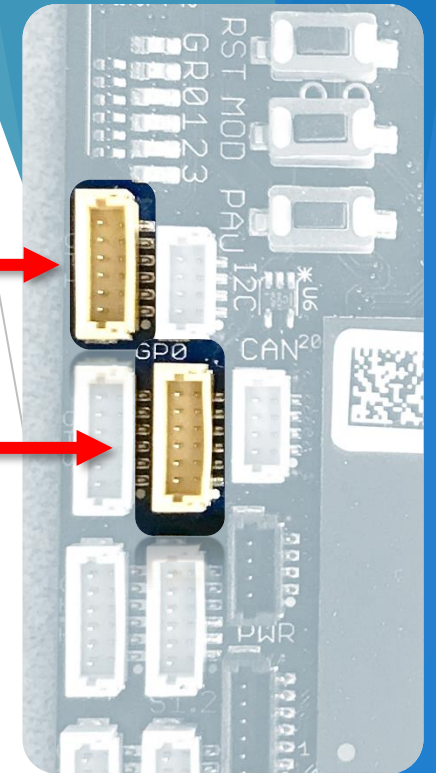
Example call for writing to this pin:
`write(1,3,1) # arguments: port, pin, state`



Example call for reading this pin:
`read(0, 1) #arguments: port, pin`



SCUTTLE naming convention
(used in L1_gpio.py)

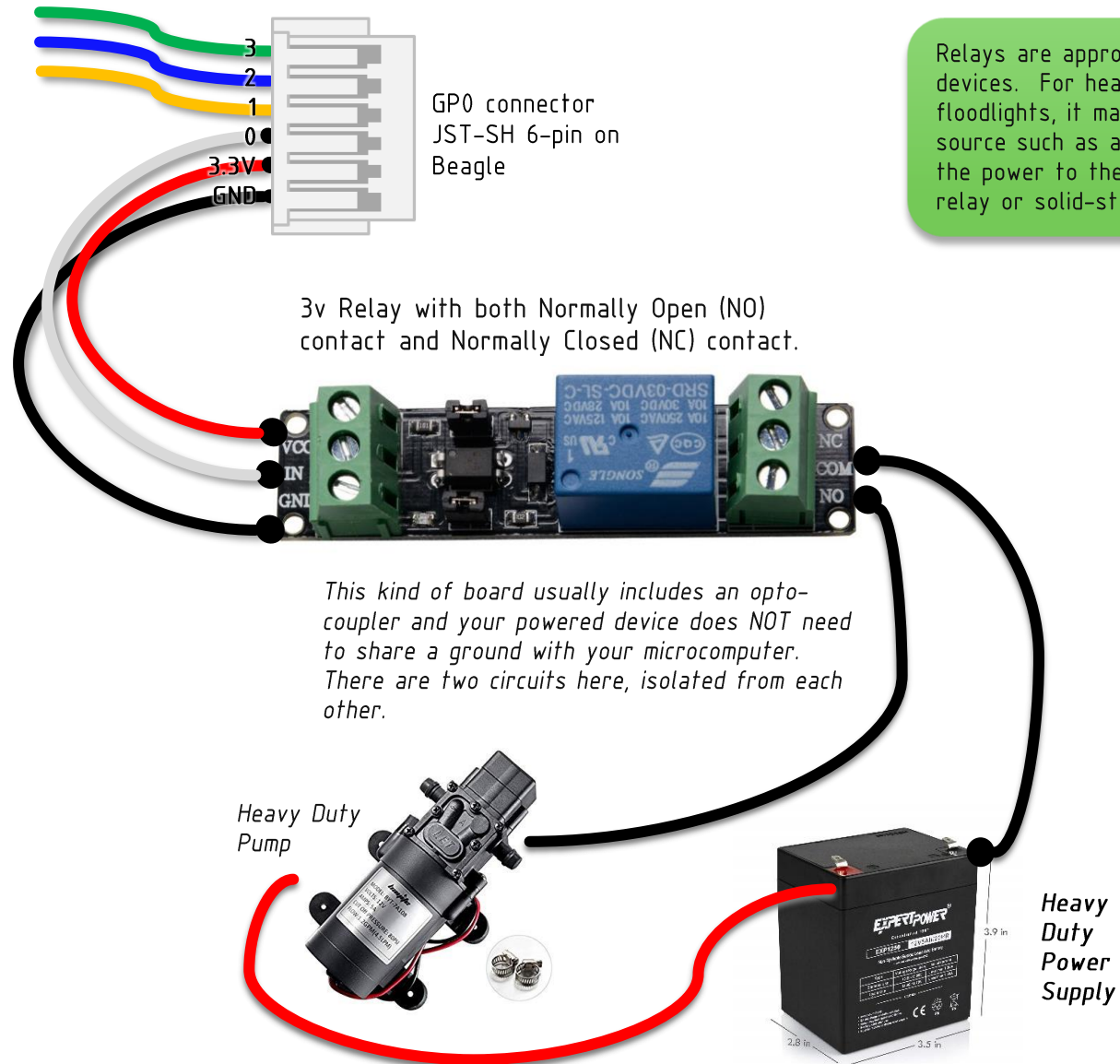


Connector vector image
preserved for later use.



Note: JST wires don't come with the proper color sequence. They must be rearranged.

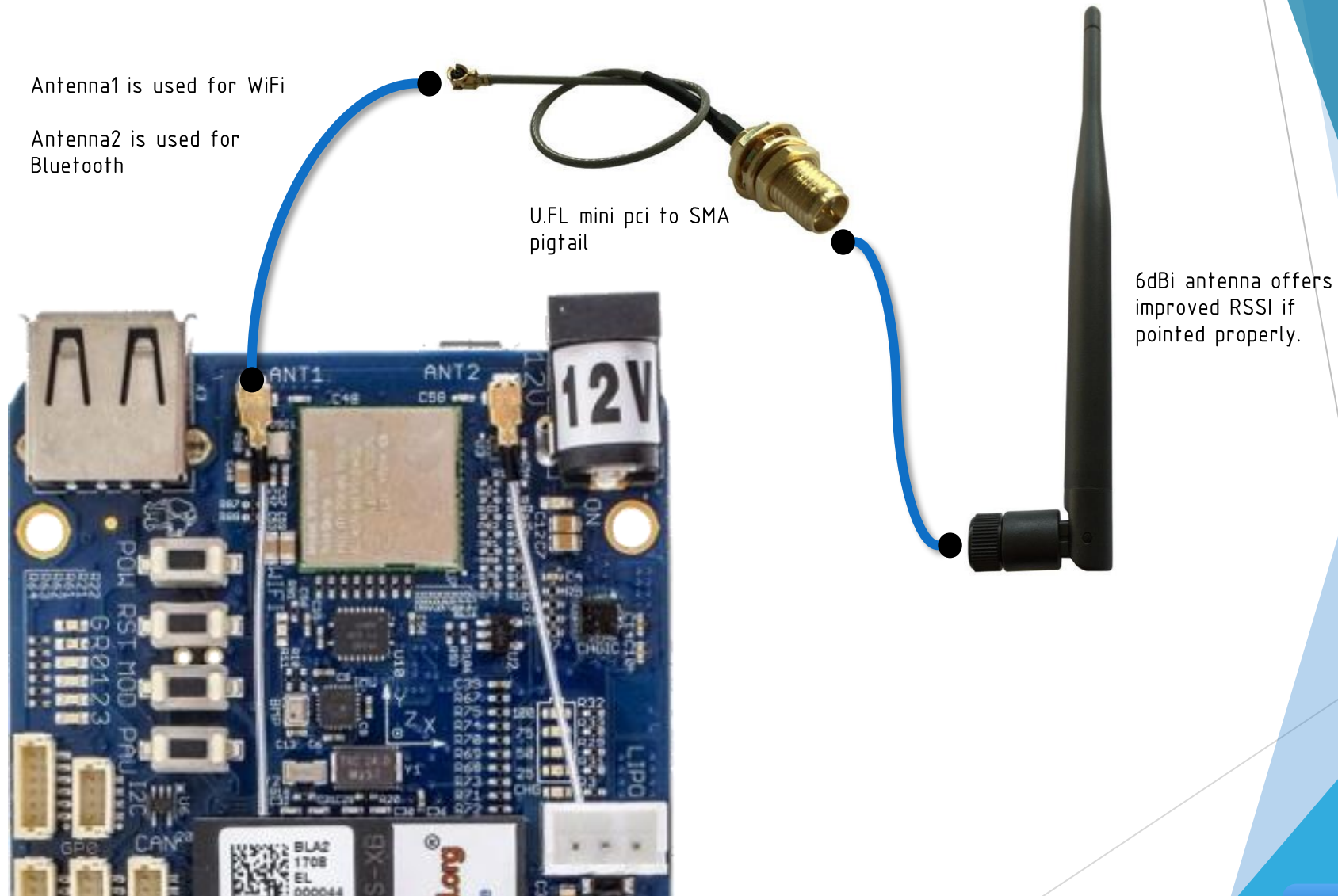
GPIO Example - Relay



Relays are appropriate for switching of high powered devices. For heavy pumps, motors, fans, or floodlights, it may be best to add a dedicated power source such as an ancilliary battery. Then, control the power to the device using logic-level signals and a relay or solid-state relay.

Wifi Antenna

Users can replace the small onboard antenna with their own selected antenna.



SCUTTLE Wire Routing

