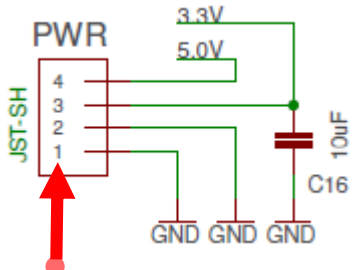
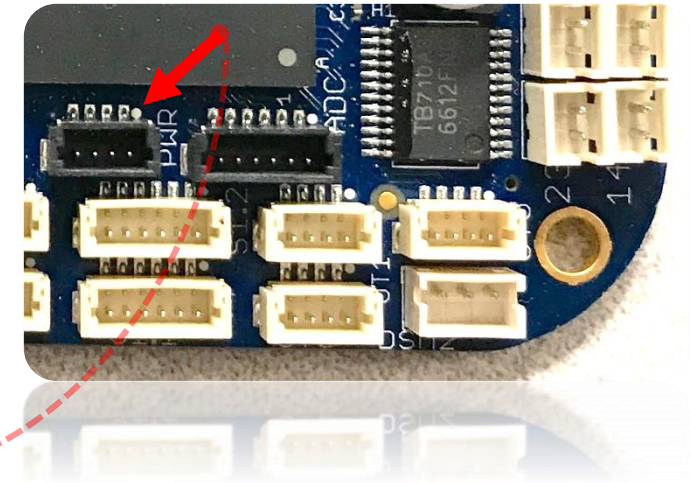
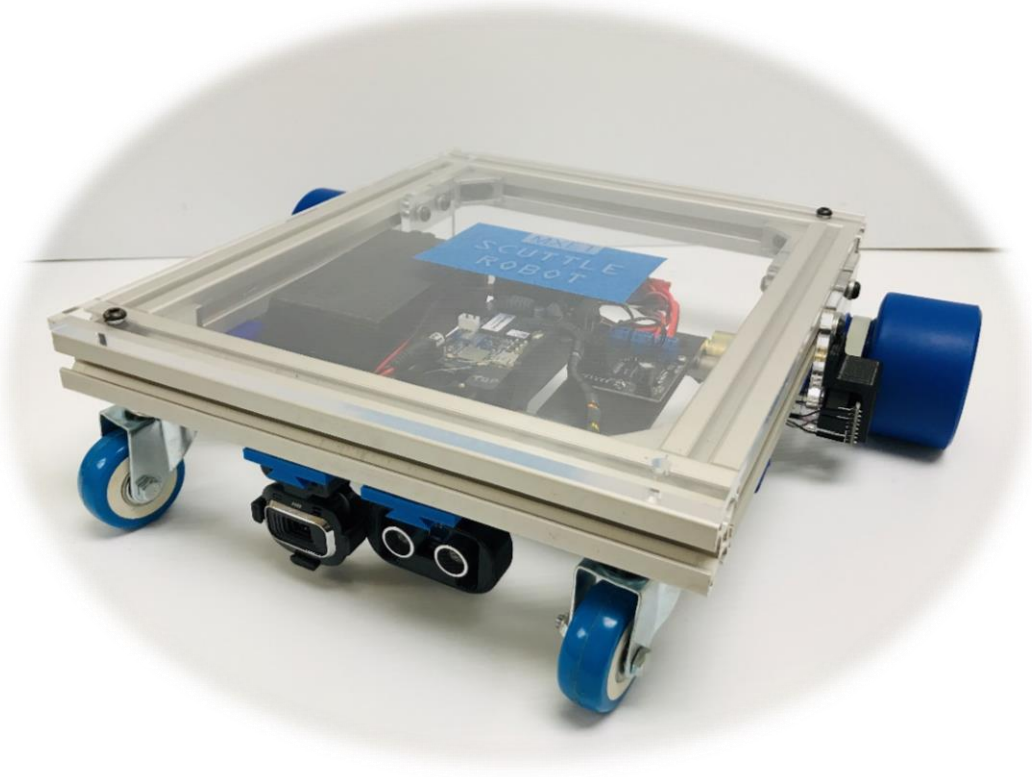
Scuttle robot Wiring Guide (rev 2019.09.26)

<u>Important Info:</u>
To match the beaglebone pins to the pin numbers on the diagram:
The tiny white circle on the silkscreen at each connector indicates “pin1”

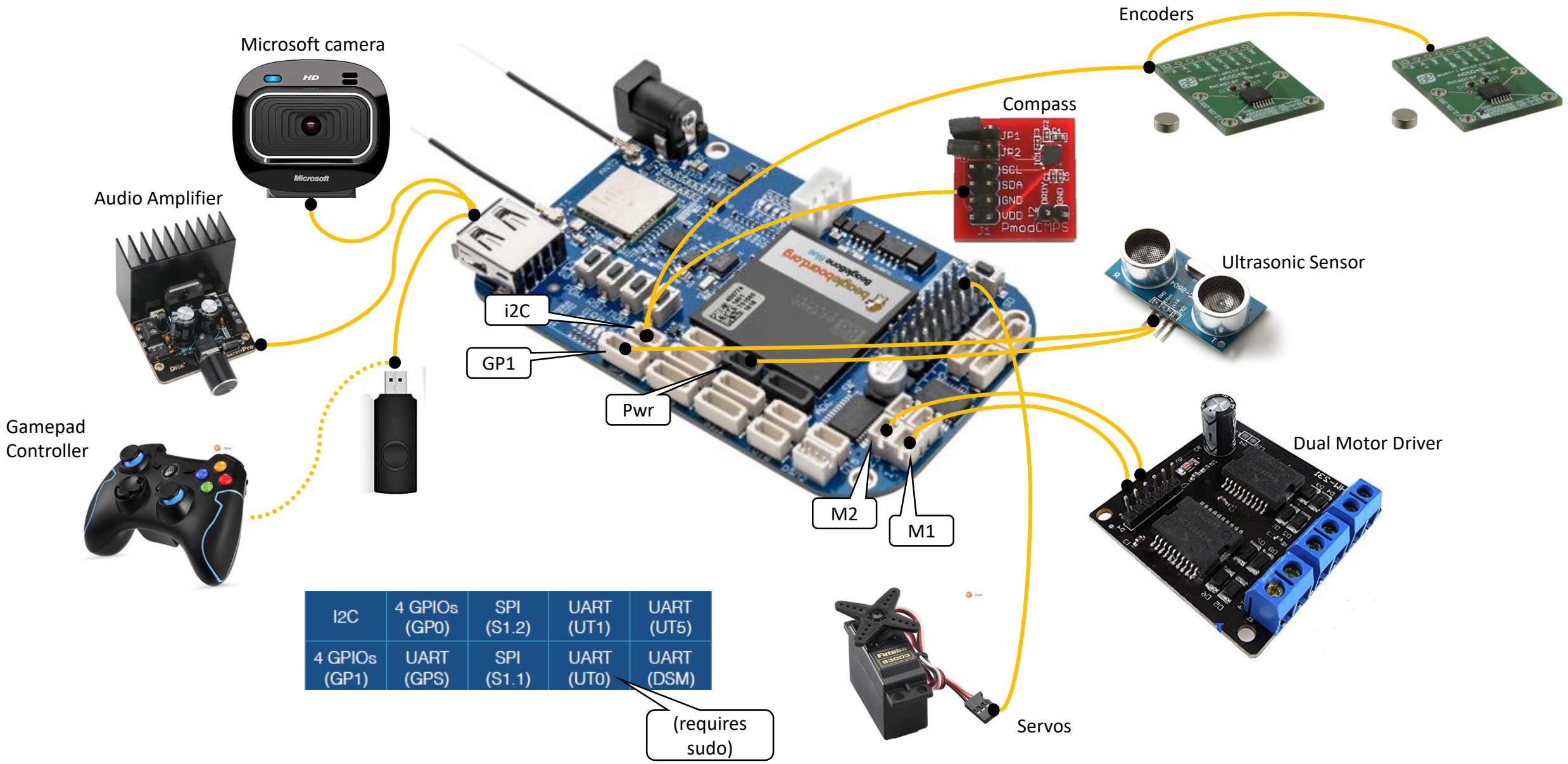
All images of this style are copied directly from the beaglebone schematic







All Sensors & Actuators

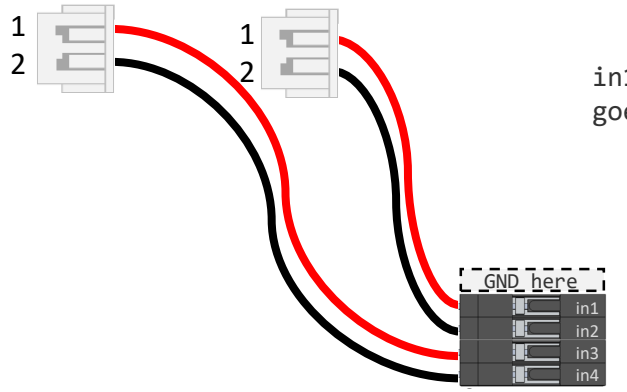


I2C	4 GPIOs (GP0)	SPI (S1.2)	UART (UT1)	UART (UT5)
4 GPIOs (GP1)	UART (GPS)	SPI (S1.1)	UART (UT0)	UART (DSM)

Motor Driver Signal Cables

M2 controls
Right motor

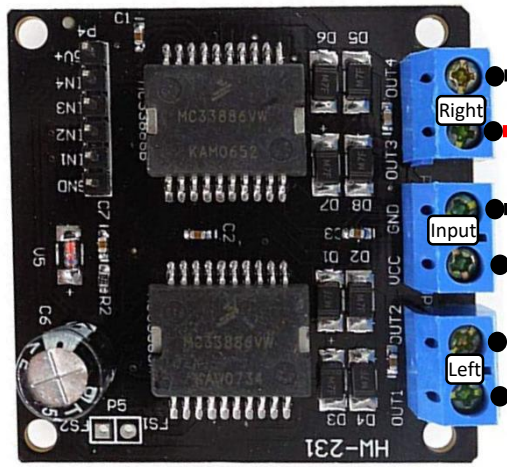
M1 controls
Left motor



Ground is not connected because the BBB has a common ground to the battery pack.

in1 on DuPont connector goes to in1 on driver

Motor Driver Top View
HW-231 Motor Driver



Power wires are 18 AWG

(29cm)

(26cm)

(20cm)

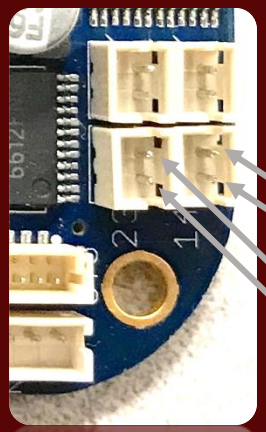
Right Motor drives CW on positive command

Power Supply

Left Motor drives CCW on positive command

(Strip 6mm & tin this end)

Solder & heat shrink this end

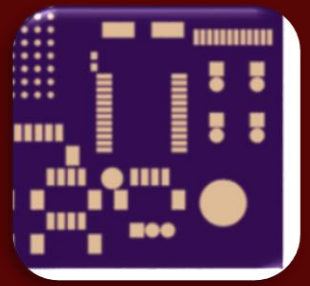


Pin 1 should be HIGH when motor is driven FORWARD

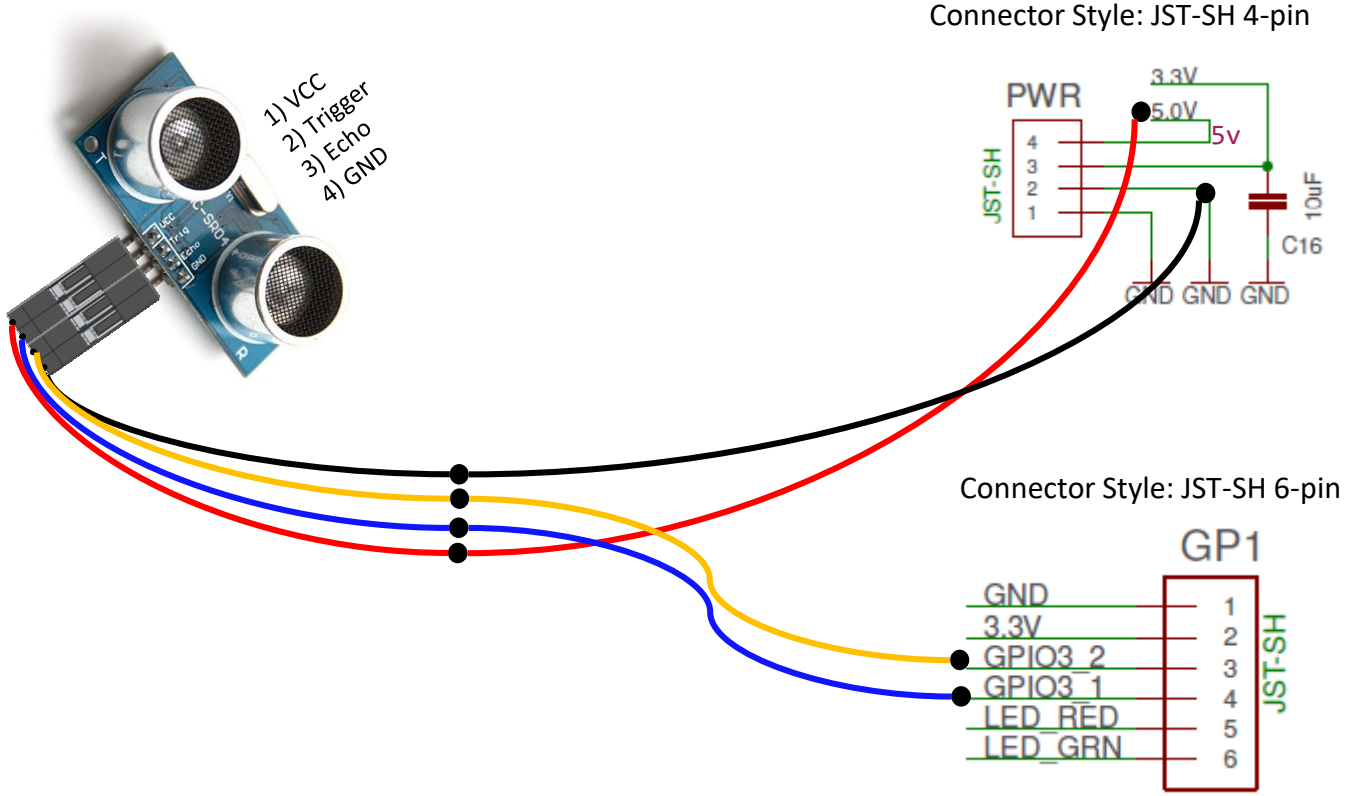
Motor1 Pin1
Motor1 Pin2

Motor2 Pin1
Motor2 Pin2

The hardware design convention is pin 1 gets the square solder pad.



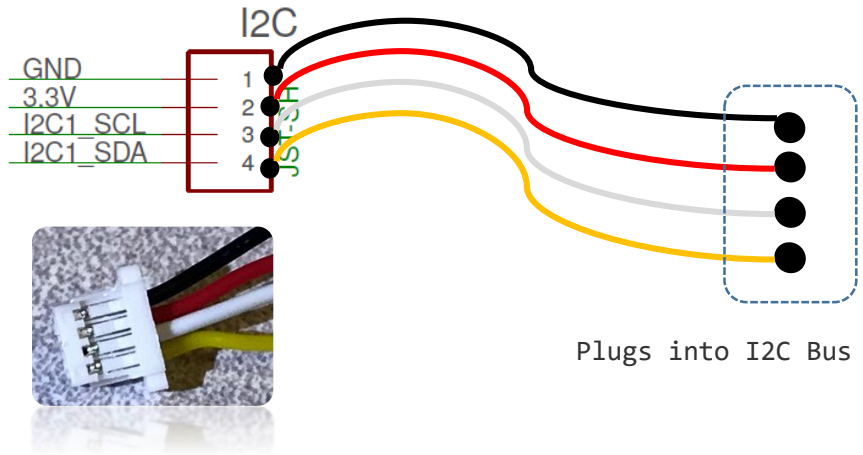
Ultrasonic Distance Sensor (GPIO)



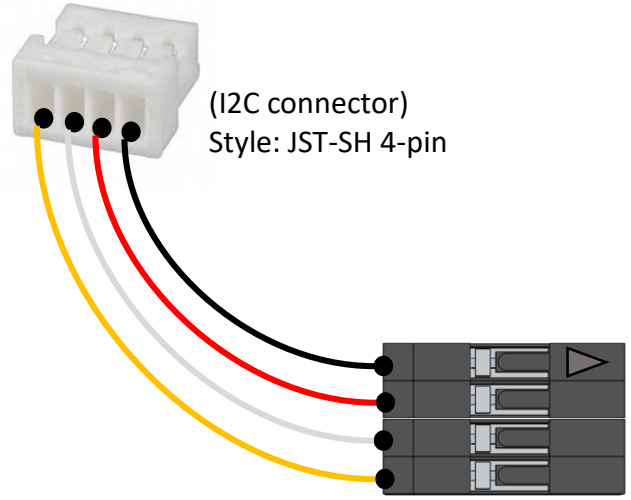
Beaglebone to I2C bus cable

Diagram

BeagleBone I2C Connector
Style: JST-SH 4-pin



Cable Design

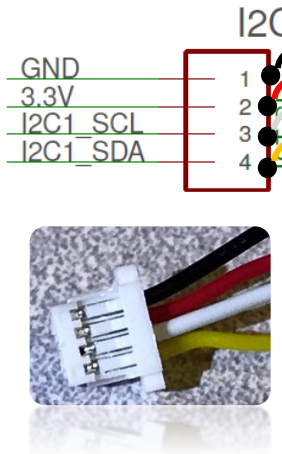


(I2C connector)
Style: JST-SH 4-pin

DuPont style
2.54mm female
4-pin

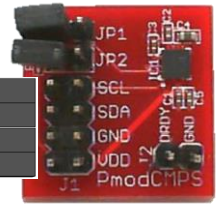
Compass CMPS or CMPS2 (I2C)

BeagleBone I2C Connector
Style: JST-SH 4-pin



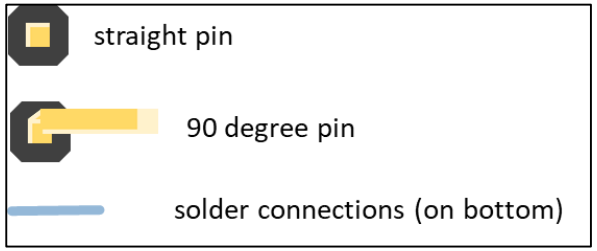
Nodes on the I2C bus
board are indicated here

Compass

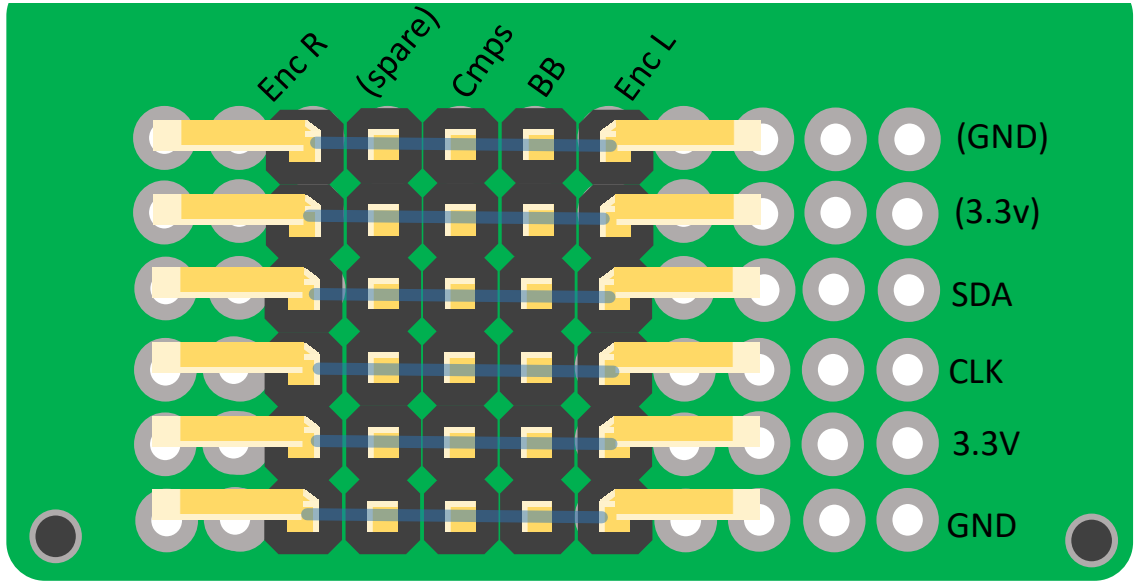


I2C Bus Board

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.



Rear of robot



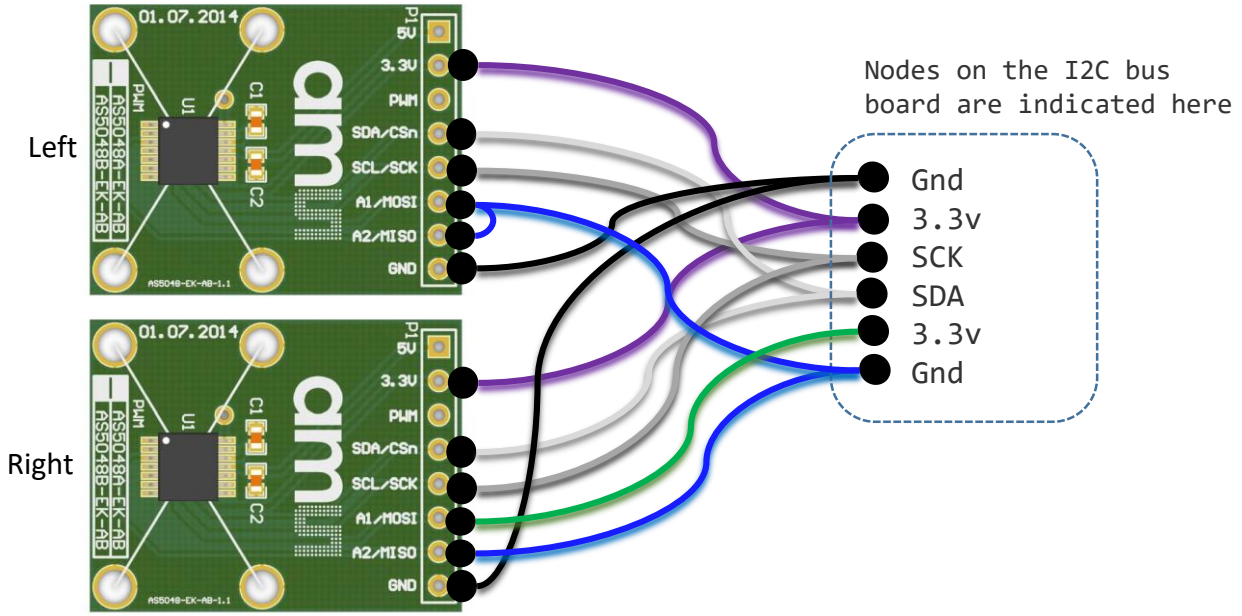
Front of robot

Screw Hole

Encoder AS5048 (I2C)

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

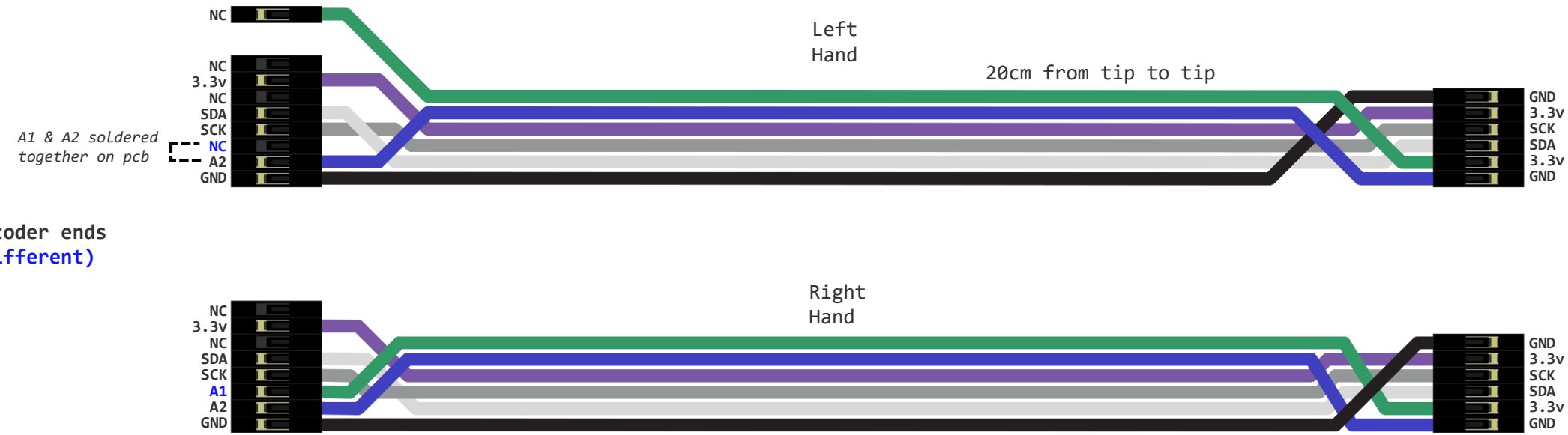
Right Hand Encoder
A1 is pulled **up** to 3.3v
I2C address is 0x41



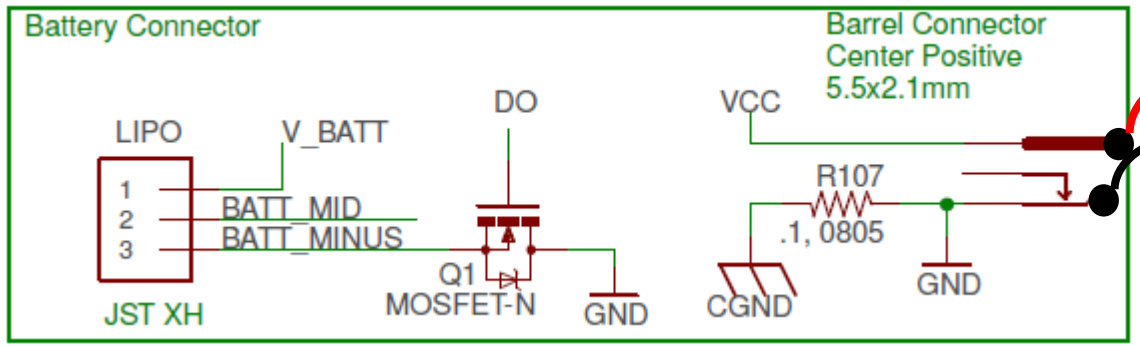
PIN	Left	Right
A1	0 (low)	1 (high)
A2	0 (low)	0 (low)
i2C Address	0x40	0x41

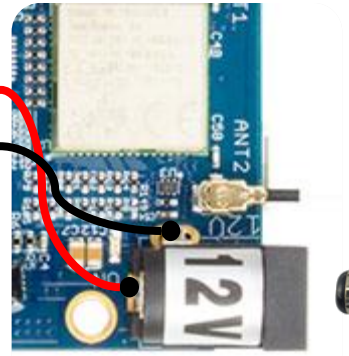
On the Left Hand Encoder PCB, bridge the pins A1 and A2 using solder, to each other.

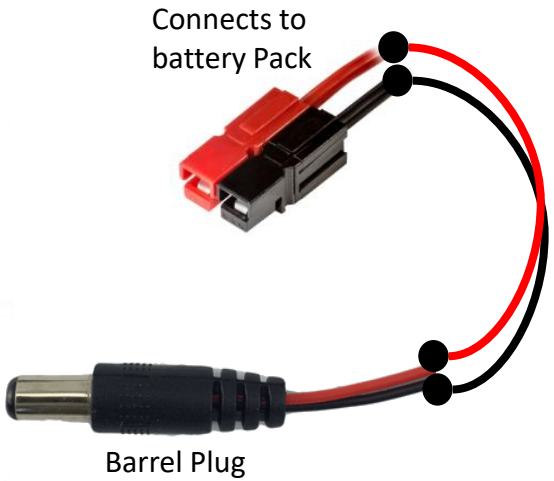
Encoder Cables



Battery



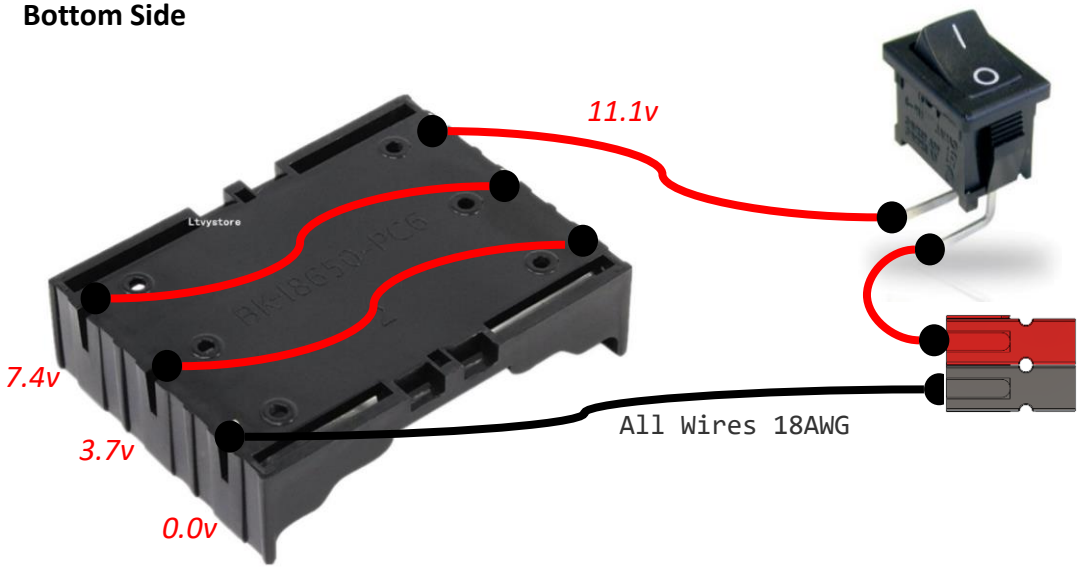




The "Battery Connector" is disconnected. Actual battery uses Barrel Connector.

Battery Pack

Bottom Side



3-Cell 18650 holder

Switch PN:SRB22A2FBBNN
Carries 10A max

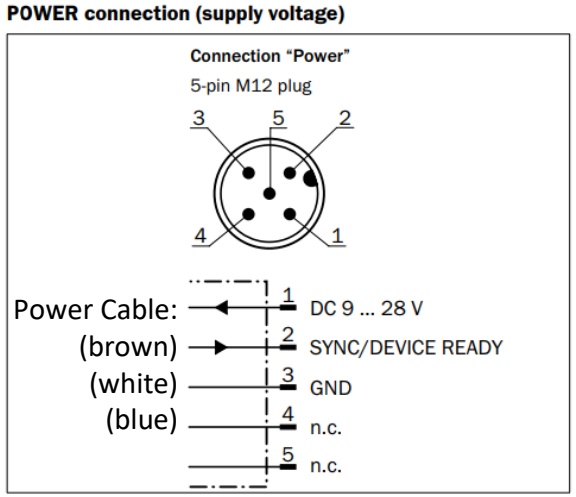
Two pairs of Anderson connectors are attached here.

LIDAR

Lidar Device

TiM 561

Power Connector Diagram (lidar side)



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)

GamePad

Button Behavior:

- not pressed: 0
- Pressed: 1

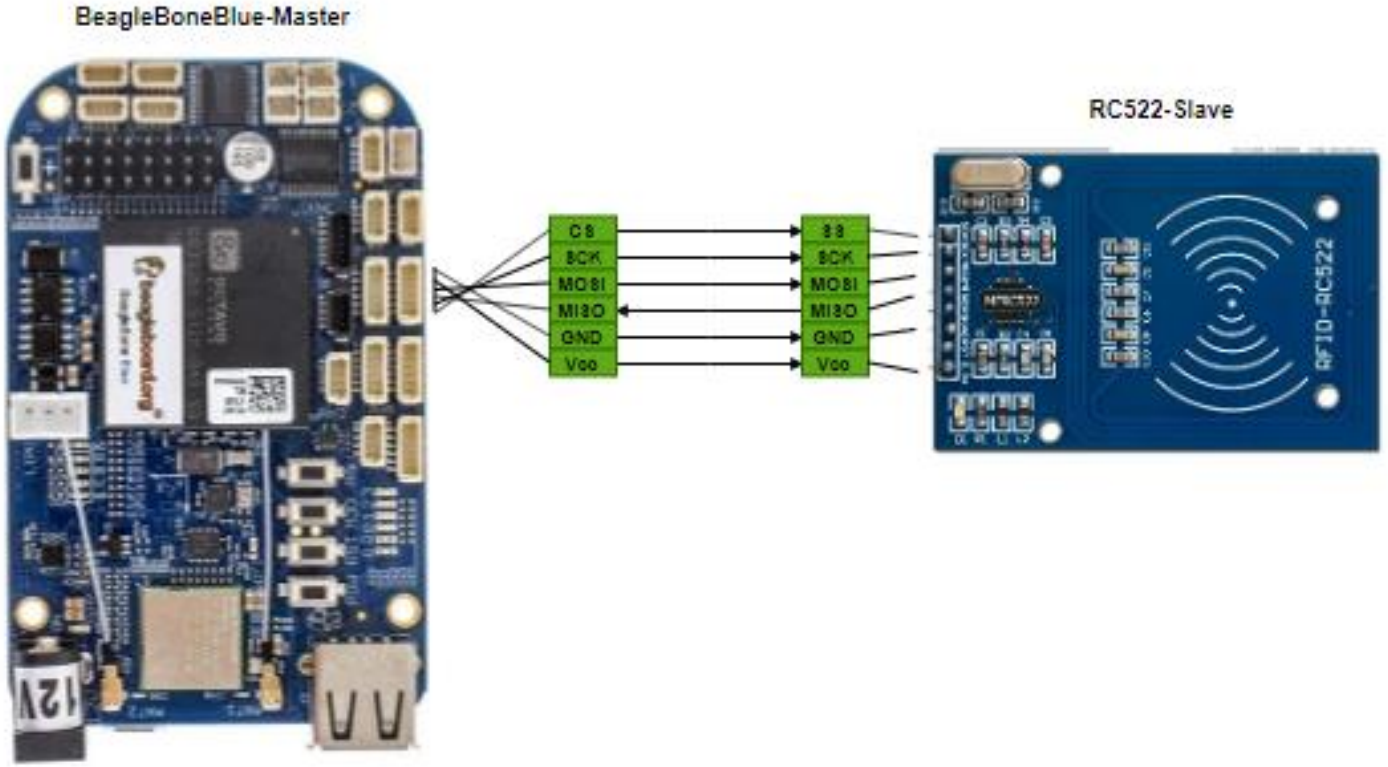
Axis behavior:

- Right returns positive values
- down returns positive values

```
# Get Button States
x_button = joystick.get_button( 3 )
l_button = joystick.get_button( 6 )
r_button = joystick.get_button( 7 )
```

```
l_joy_x = joystick.get_axis( 0 )
l_joy_y = joystick.get_axis( 1 )
```

RFID reader


BeagleBoneBlue-Master
CS
SCK
MOSI
MISO
GND
Vcc
SS
SCK
MOSI
MISO
GND
Vcc
RC522-Slave
RFID-RC522