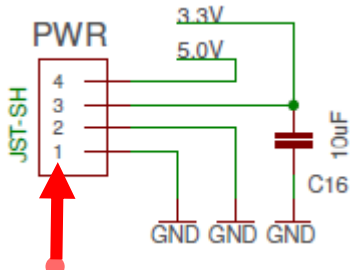
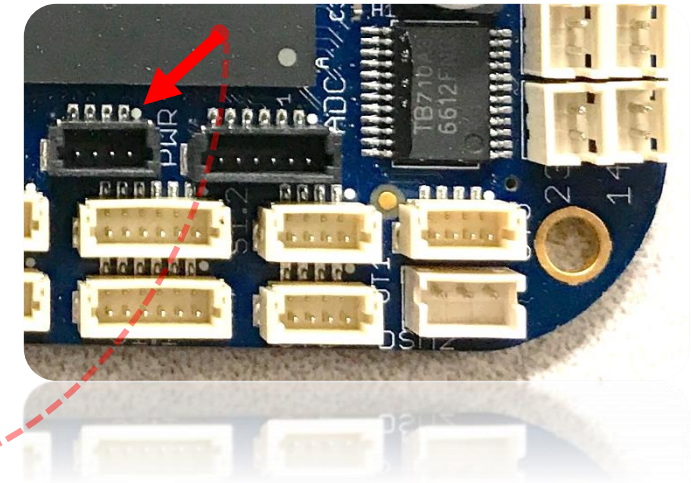
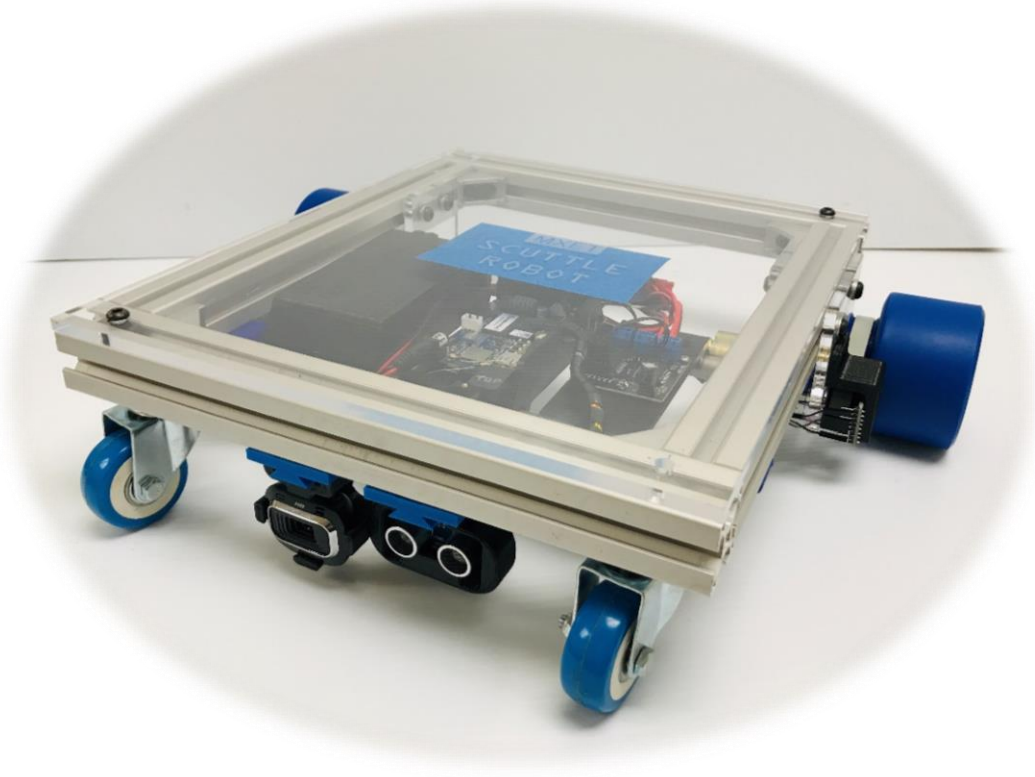
Scuttle robot Wiring Guide (rev 2019.08.27)

<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”

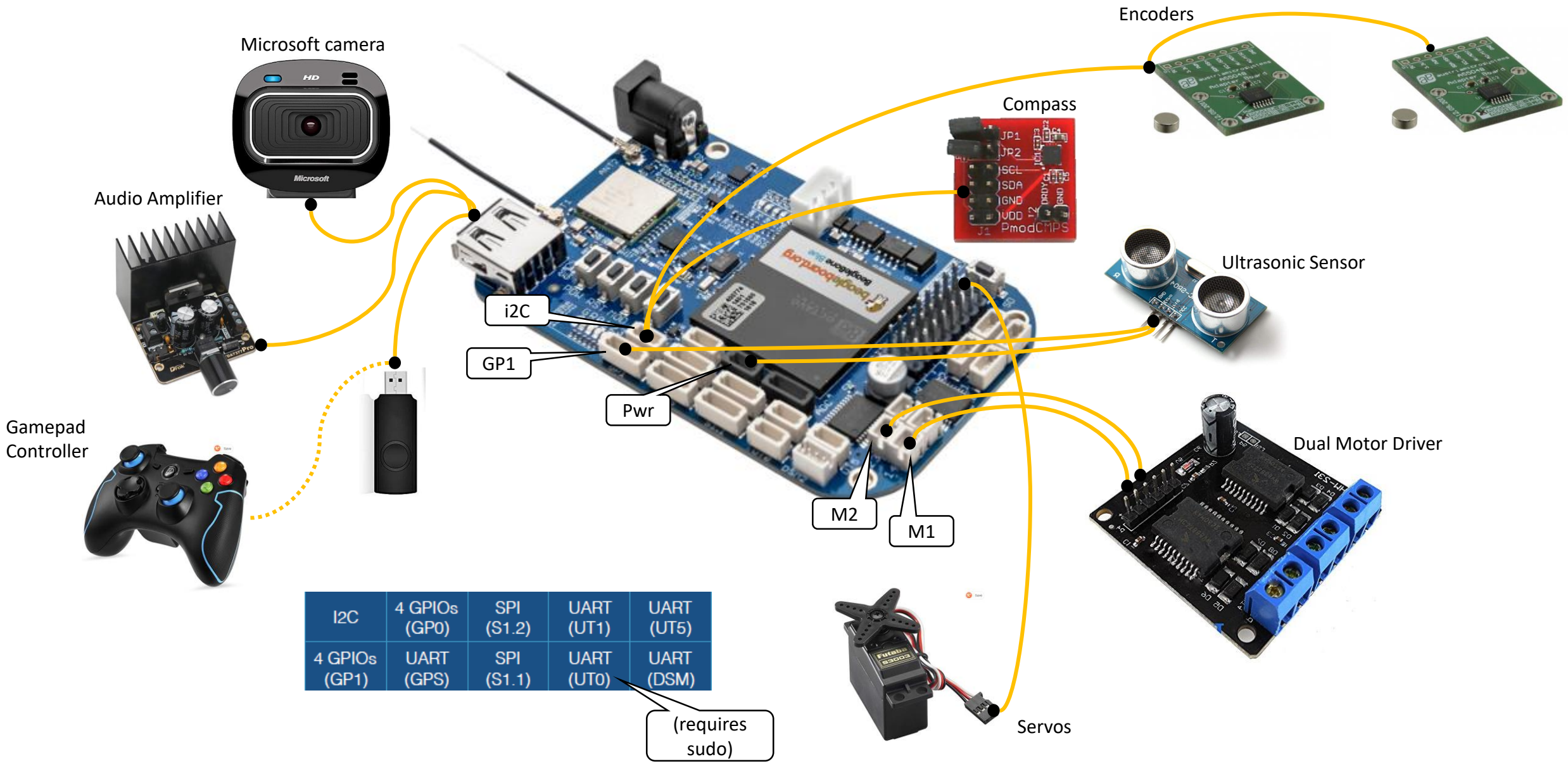
All images of this style are copied directly from the beaglebone schematic







All Sensors & Actuators



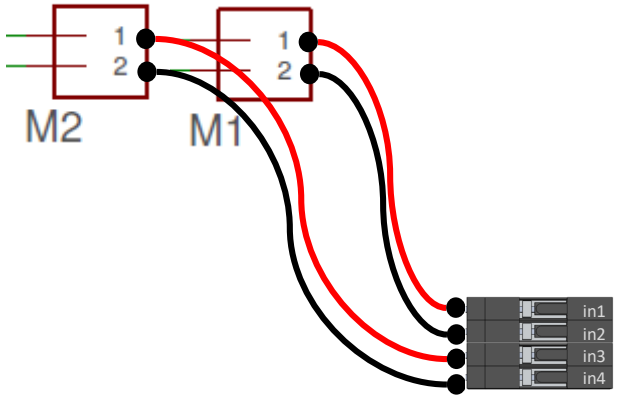
I2C	4 GPIOs (GP0)	SPI (S1.2)	UART (UT1)	UART (UT5)
4 GPIOs (GP1)	UART (GPS)	SPI (S1.1)	UART (UT0)	UART (DSM)

(requires sudo)

BeagleBone to Motor Driver (PWM)

M2 controls Right motor

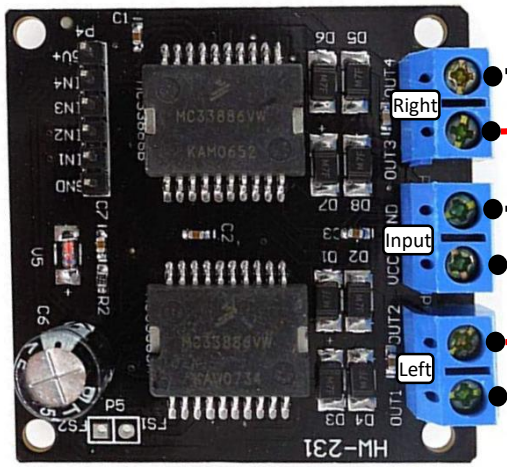
M1 controls Left motor



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

in1 on DuPont connector goes to in1 on driver

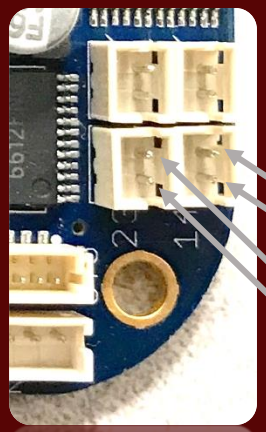
Motor Driver Top View



Motor R drives CW on positive command

Power Supply

Motor L drives CCW on positive command



Pin 1 should be HIGH when motor is driven FORWARD

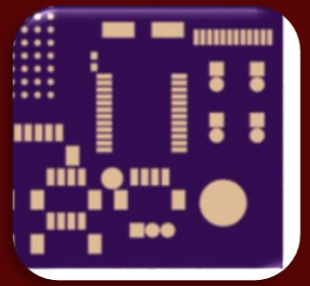
Motor1 Pin1

Motor1 Pin2

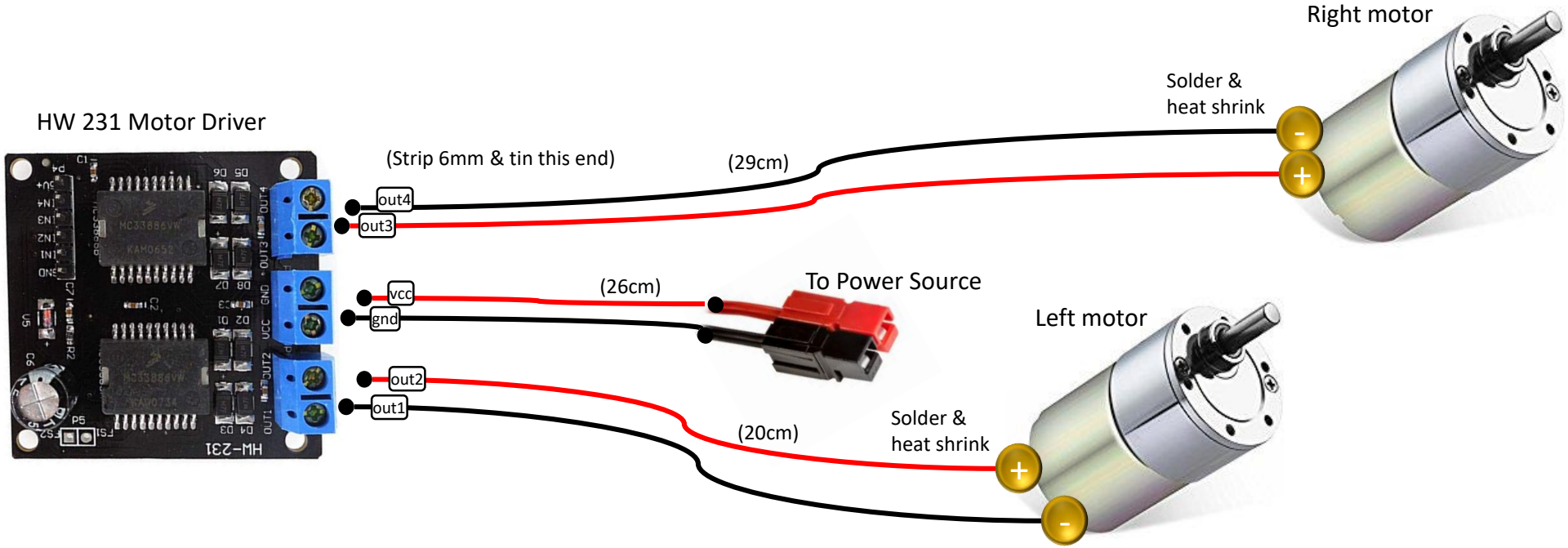
Motor2 Pin1

Motor2 Pin2

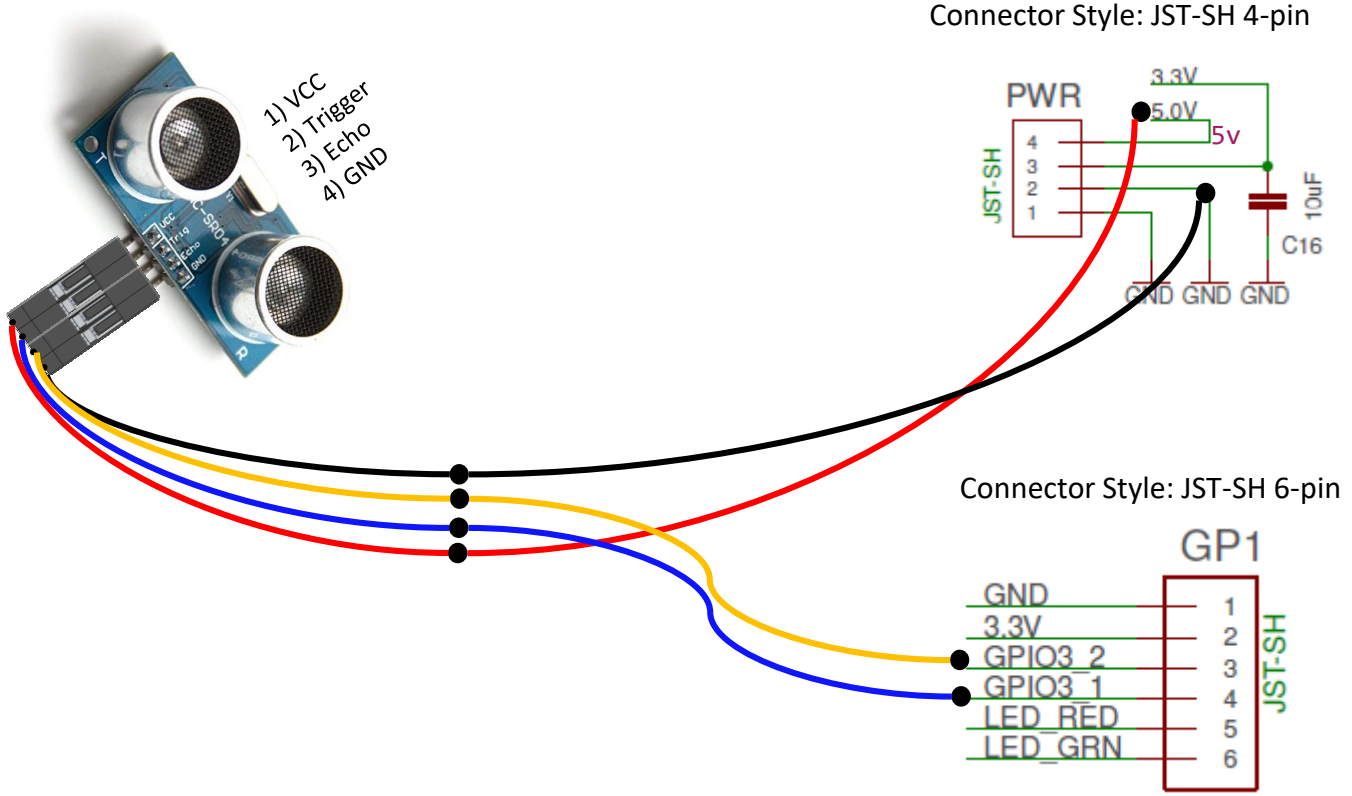
The hardware design convention is pin 1 gets the square solder pad.



Motor Driver Power Cables (18awg)



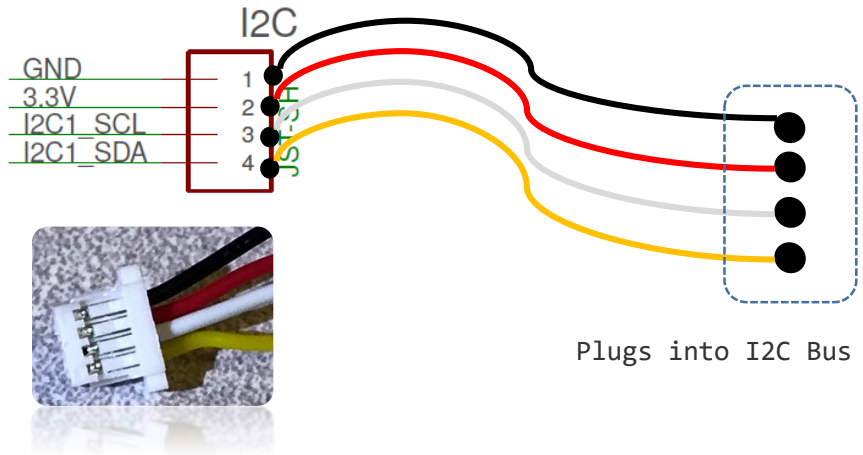
Ultrasonic Distance Sensor (GPIO)



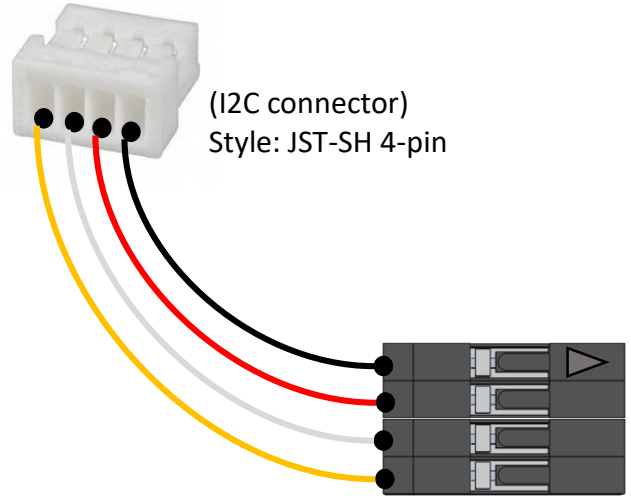
Beaglebone to I2C bus cable

Diagram

BeagleBone I2C Connector
Style: JST-SH 4-pin



Cable Design

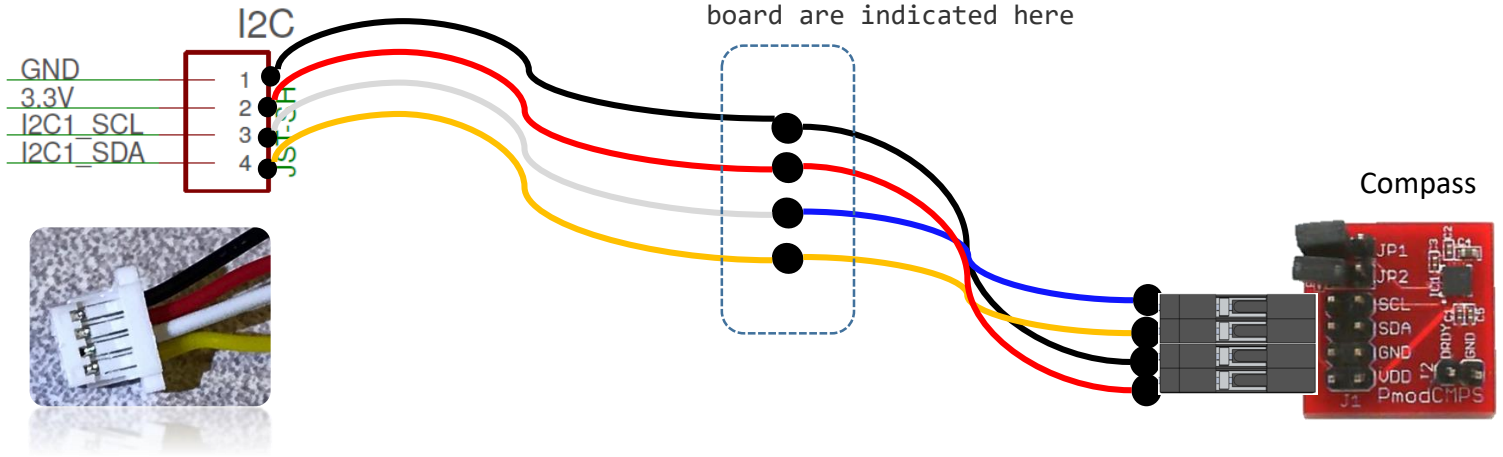


(I2C connector)
Style: JST-SH 4-pin

DuPont style
2.54mm female
4-pin

Compass CMPS or CMPS2 (I2C)

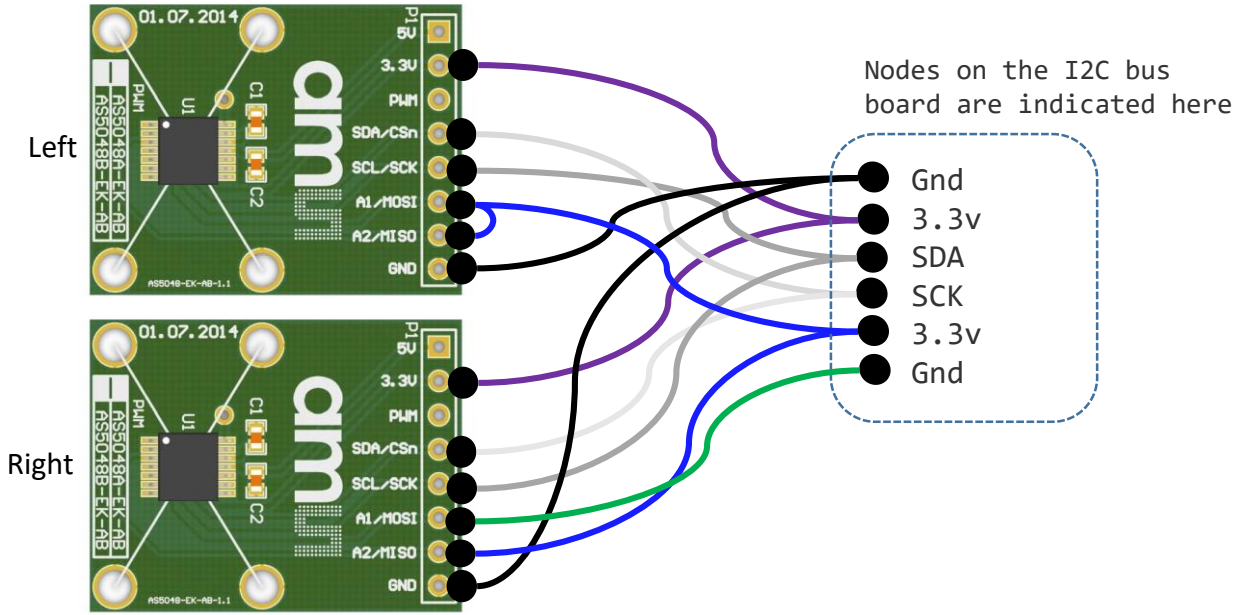
BeagleBone I2C Connector
Style: JST-SH 4-pin



Encoder AS5048 (I2C)

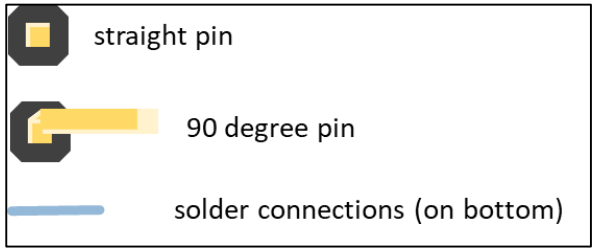
Left Hand Encoder
A1 is pulled **down** to GND
I2C address is 0x40

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

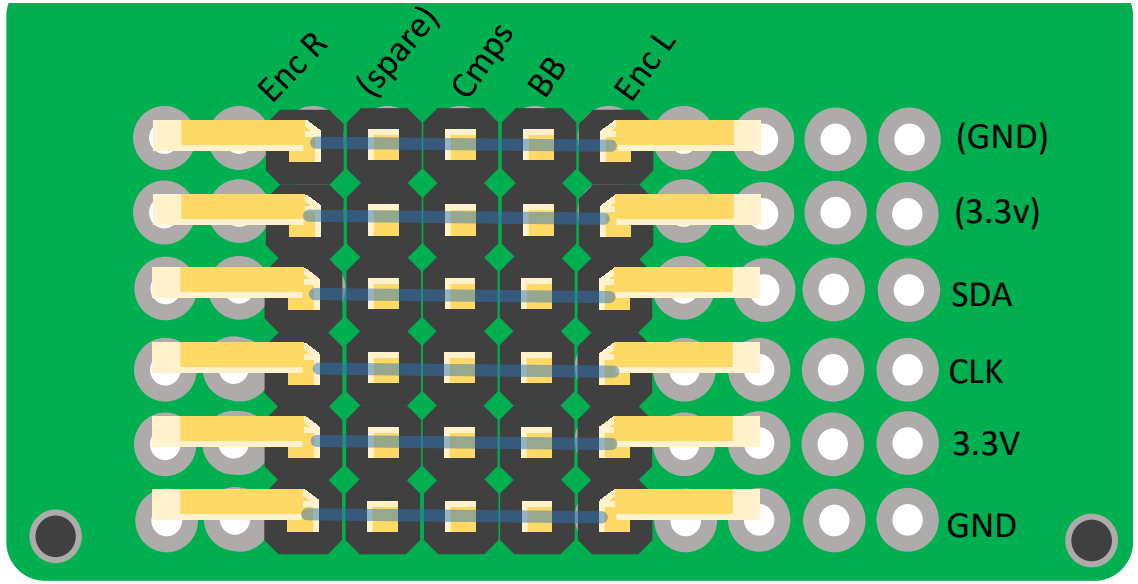


I2C Bus Board

The board is made from a breadboard and soldered manually. The board can be cut between rows J & K



Rear of robot



Front of robot

Screw Hole

Left	Left	Right
A1	0	1
A2	0	0
Address	0x40	0x41

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

Encoder Cables

Bus Board Ends
(matching)

Encoder ends

Left Hand

NC
3.3v
NC
SCK
SDA
NC
A1
GND

Gnd
3.3v
SDA
SCK
3.3v
Gnd

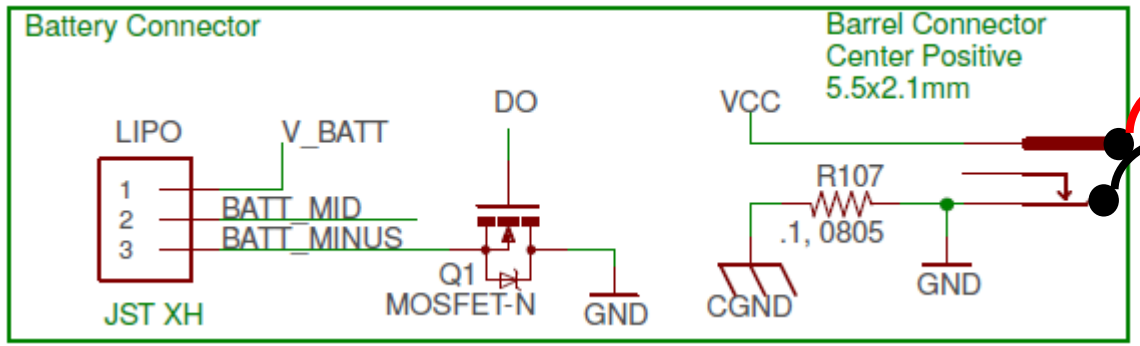
Right Hand

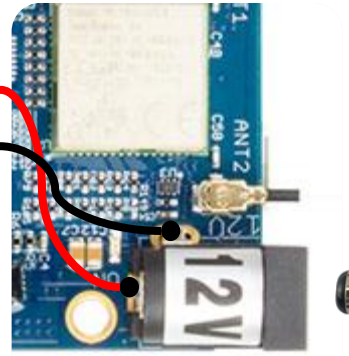
NC
3.3v
NC
SCK
SDA
A2
A1
GND

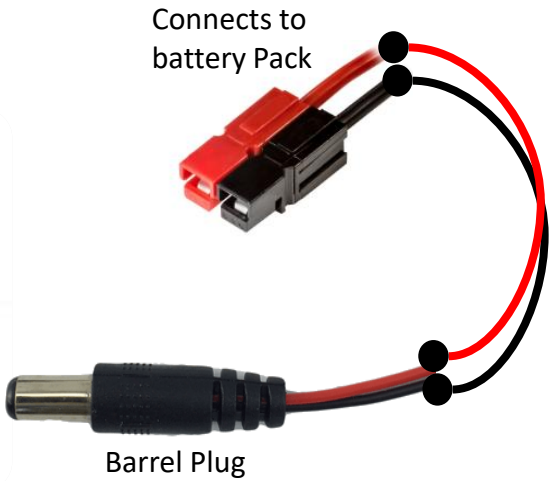
Left	Left	Right
A1	0	1
A2	0	0
Address	0x40	0x41

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

Battery







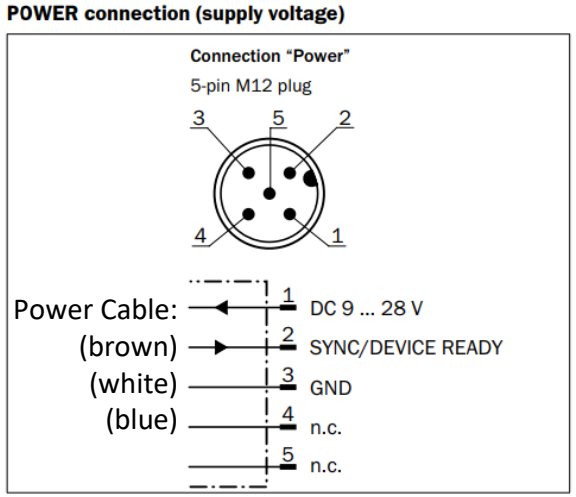
The "Battery Connector" is disconnected. Actual battery uses Barrel Connector.

LIDAR

Lidar Device

TiM 561

Connector Diagram (lidar side)



LIDAR-side connector (male pins)

Power Wire 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

Gamepad Controls Mapping

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 )
```