

Detailed Electrical Connections of The Robotic Hydraulic Arm

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Valve Driver Board 1 (VDB1) (Bottom of stack) (Cytron MDD10A Dual 10A Motor Driver)

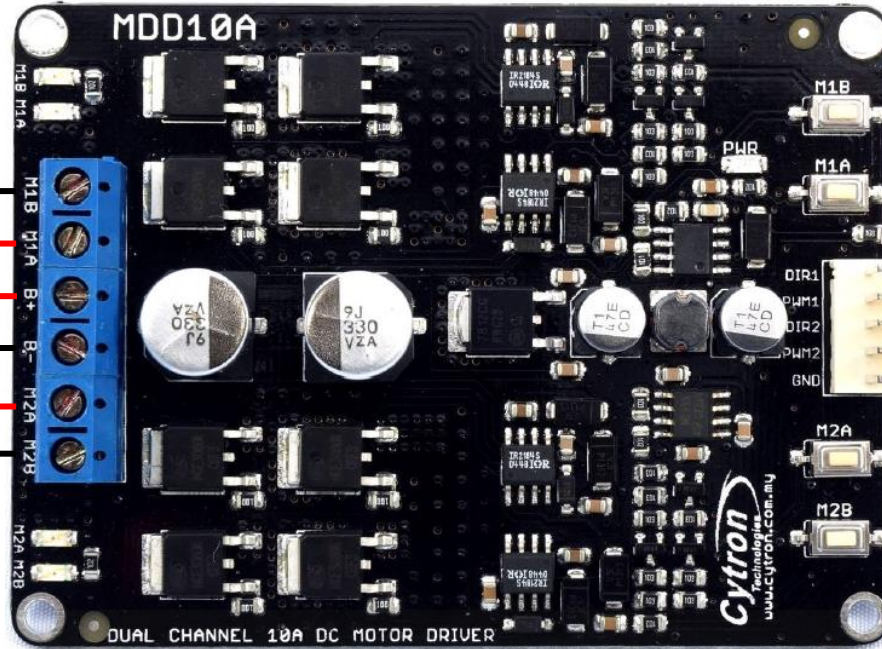
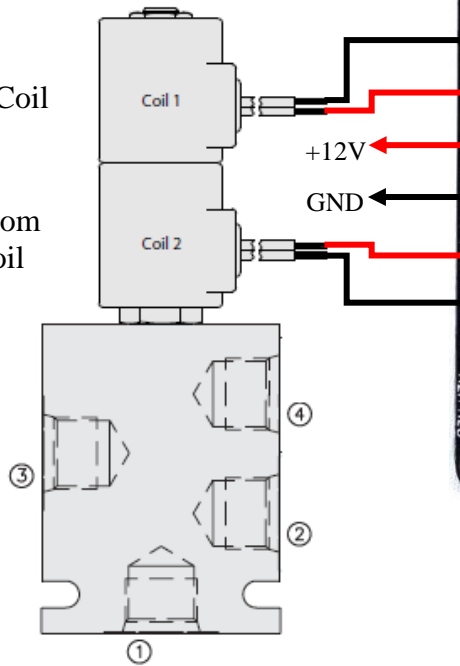
The 1000W 12V AmpFlow Power Supply is used to power MDD10A boards and valves.

MDD10A Input Port Wire Color Code:
 DIR1-blue
 PWM1-purple
 DIR2-grey
 PWM2-white
 GND-black

Directional Flow Control Valve 1 (DFCV1)

Top Coil

Bottom Coil



MDD10A Board input pins connect to Beagle Bone Blue pins.

- To GND of GP0 (green wire) & GND of GPS (blue wire)
- To BLUE-GP0-PIN-6(GPIO3-17) (red wire)
- To GND of GP0 (green wire) & GND of GPS (blue wire)
- To BLUE-GP0-PIN-5(GPIO3-20) (black wire)
- To GND of GP0 (green wire) & GND of GPS (blue wire)

MDD10A Buttons:
 Pressing either M1A or M1B button will turn on coil 1 in the same way.

Pressing either M2A or M2B button will turn on coil 2 in the same way.

Valve Driver Board 2 (VDB2) (Middle of stack) (Cytron MDD10A Dual 10A Motor Driver)

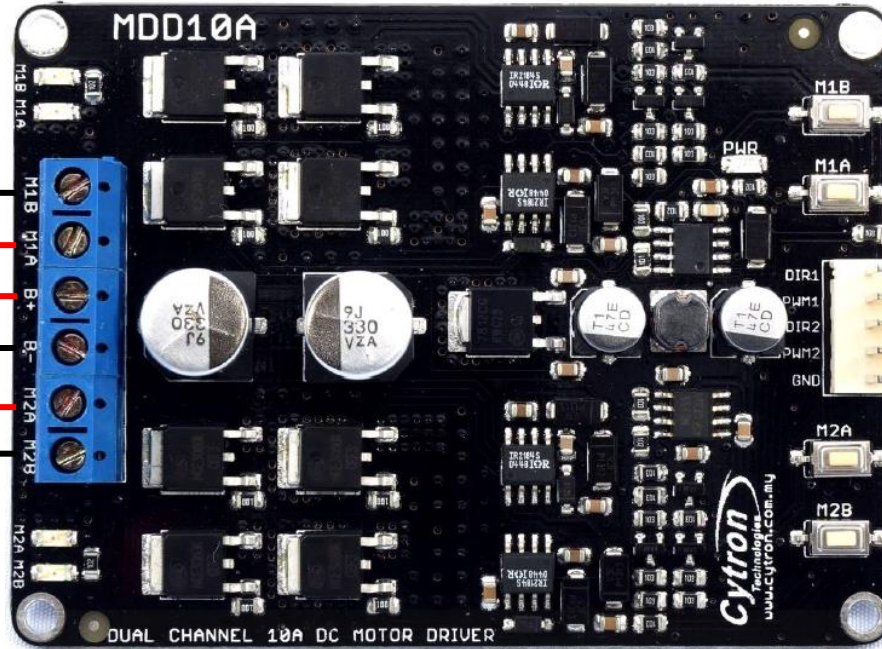
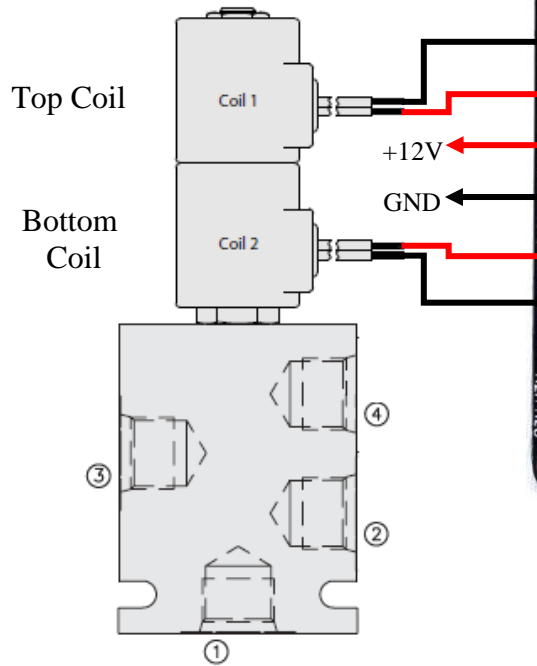
The 1000W 12V AmpFlow Power Supply is used to power MDD10A boards and valves.

MDD10A Input Port Wire Color Code:

- DIR1-blue
- PWM1-purple
- DIR2-grey
- PWM2-white
- GND-black

MDD10A Board input pins connect to Beagle Bone Blue pins.

Directional Flow Control Valve 2 (DFCV2)



- To GND of S1.1 & GND of S1.2 (green wires)
- To BLUE-GP0-PIN-4(GPIO1-17) (yellow wire)
- To GND of S1.1 & GND of S1.2 (green wires)
- To BLUE-GP0-PIN-3(GPIO1-25) (white wire)
- To GND of S1.1 & GND of S1.2 (green wires)

MDD10A Buttons:

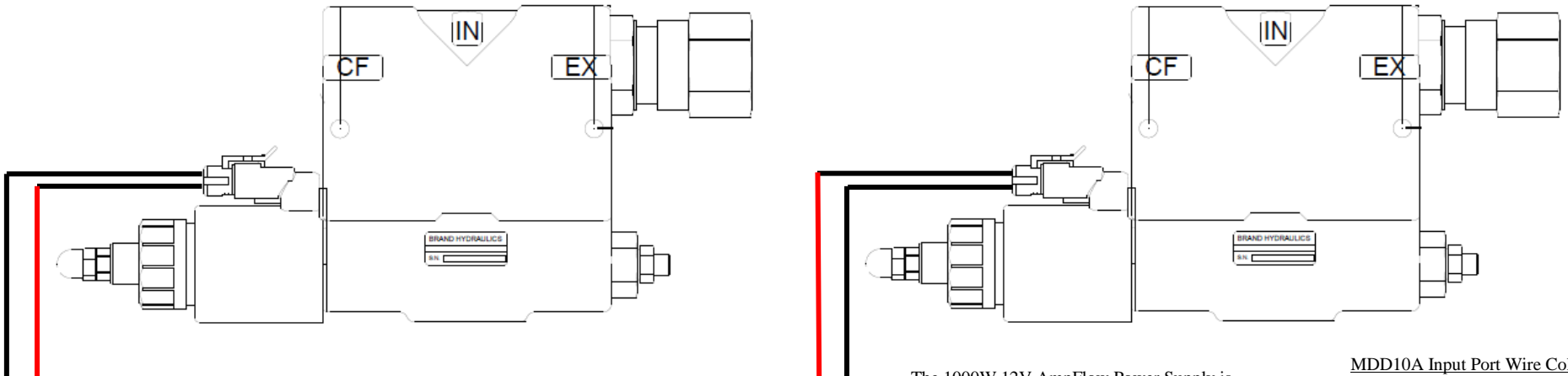
Pressing either M1A or M1B button will turn on coil 1 in the same way.

Pressing either M2A or M2B button will turn on coil 2 in the same way.

Valve Driver Board 3 (VDB3) (Top of stack) (Cytron MDD10A Dual 10A Motor Driver)

Proportional Flow Control Valve 2 (PFCV2)

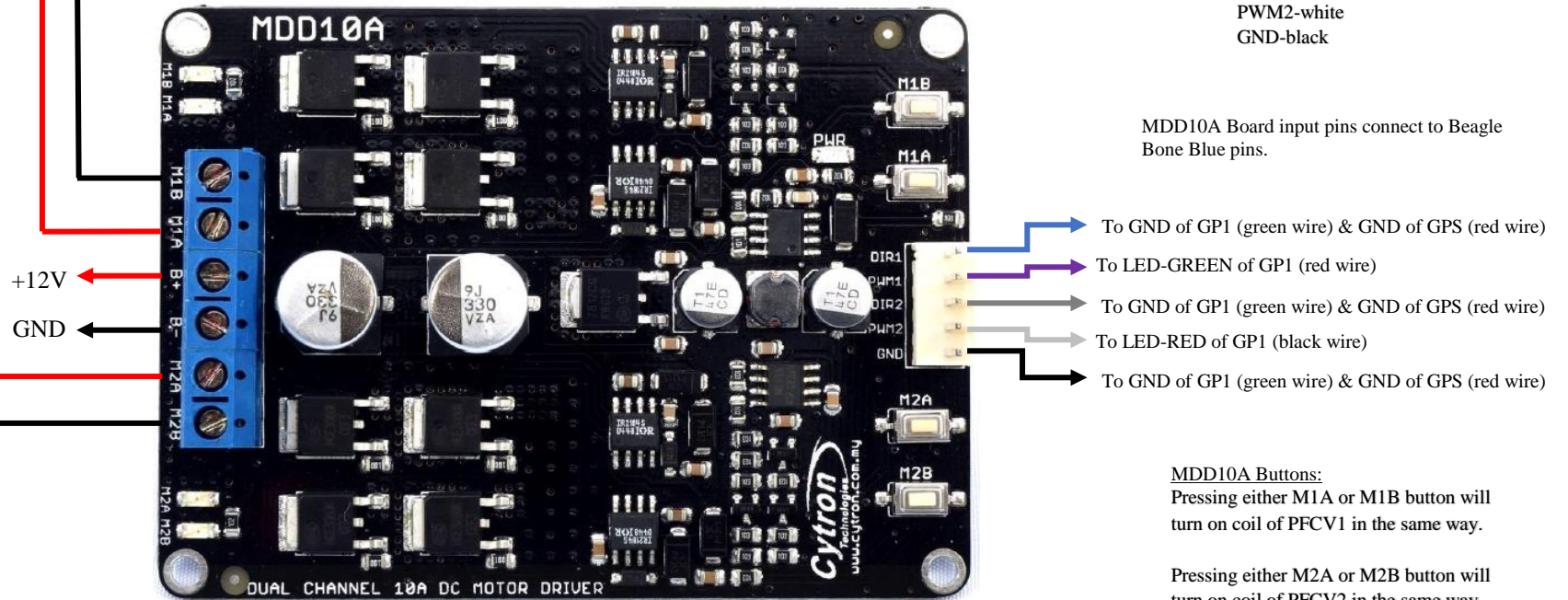
Proportional Flow Control Valve 1 (PFCV1)



The 1000W 12V AmpFlow Power Supply is used to power MDD10A boards and valves.

MDD10A Input Port Wire Color Code:
 DIR1-blue
 PWM1-purple
 DIR2-grey
 PWM2-white
 GND-black

MDD10A Board input pins connect to Beagle Bone Blue pins.

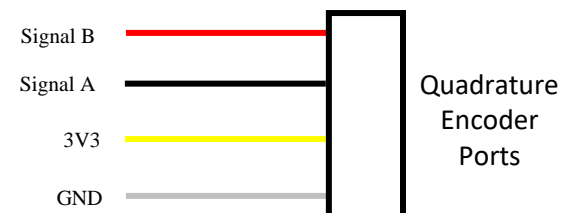
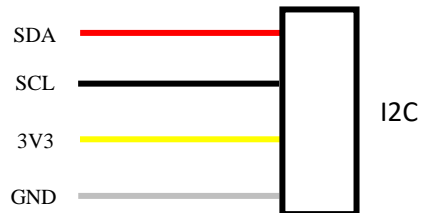
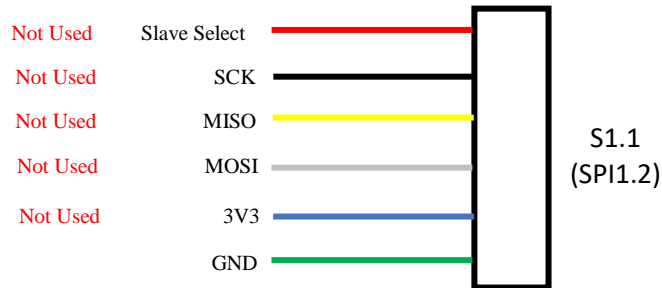
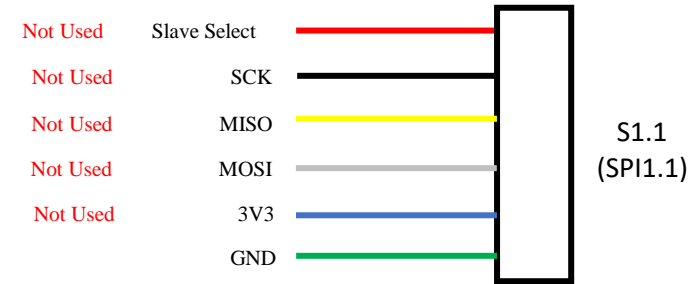
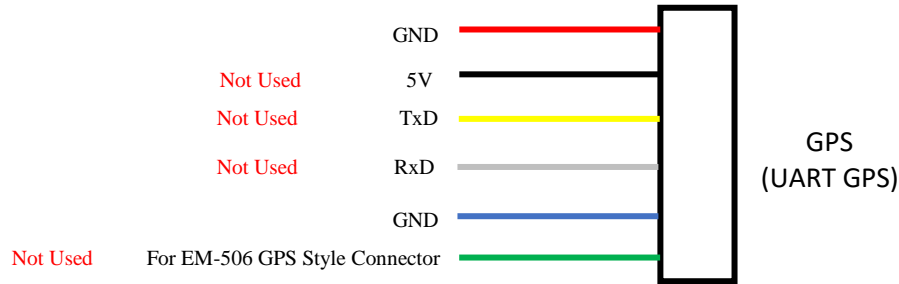
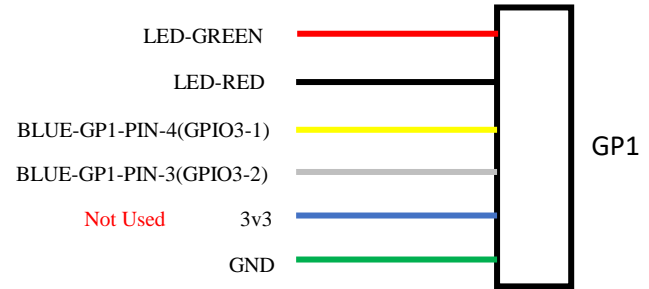
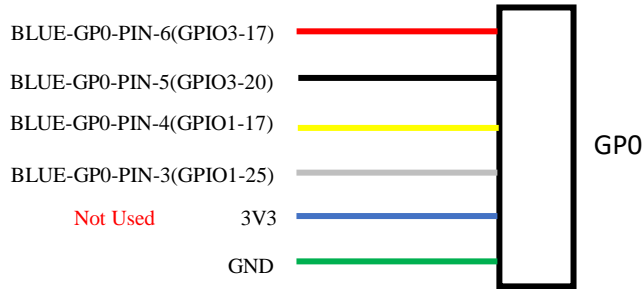


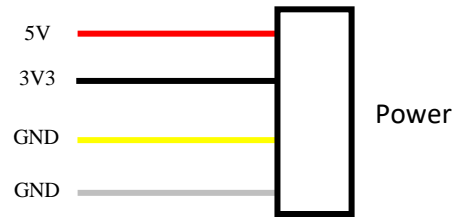
- To GND of GP1 (green wire) & GND of GPS (red wire)
- To LED-GREEN of GP1 (red wire)
- To GND of GP1 (green wire) & GND of GPS (red wire)
- To LED-RED of GP1 (black wire)
- To GND of GP1 (green wire) & GND of GPS (red wire)

MDD10A Buttons:
 Pressing either M1A or M1B button will turn on coil of PFCV1 in the same way.

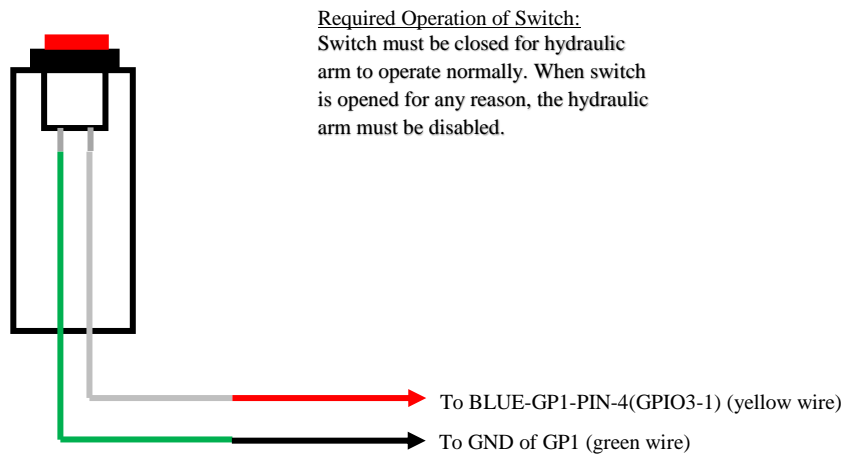
Pressing either M2A or M2B button will turn on coil of PFCV2 in the same way.

Beagle Bone Blue wire colors/labels for ports





Safety Switch Connection



Required Operation of Switch:
Switch must be closed for hydraulic arm to operate normally. When switch is opened for any reason, the hydraulic arm must be disabled.

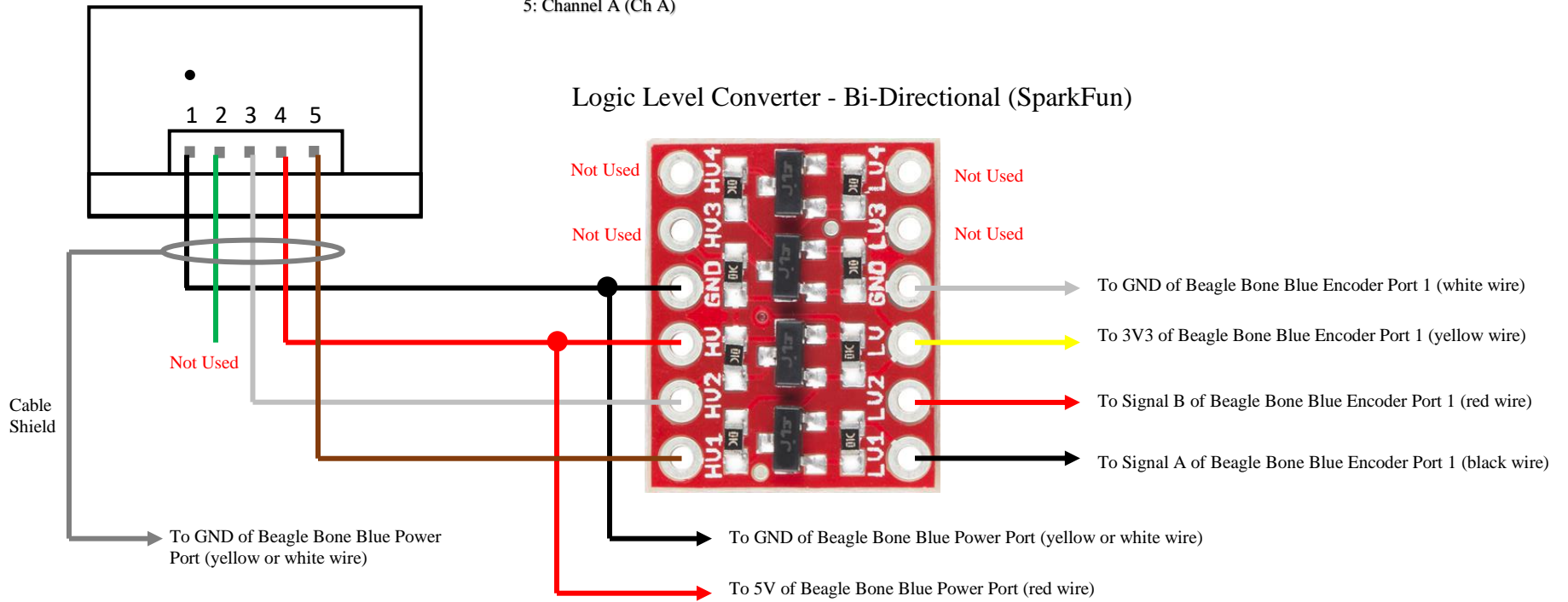
Set up BLUE-GP1-PIN-4(GPIO3-1) pin as internally pulled up. This way, when switch is closed, it pulls the pin to ground. When the switch is open, then the pin is pulled to 3.3V.

Encoder 1 Connections

HKT2204 Terminal Assignment

- 1: 0V
- 2: No Connection (N.C.)
- 3: Channel B (Ch B)
- 4: +5V
- 5: Channel A (Ch A)

Encoder 1 (HKT2204 Optical Encoder)



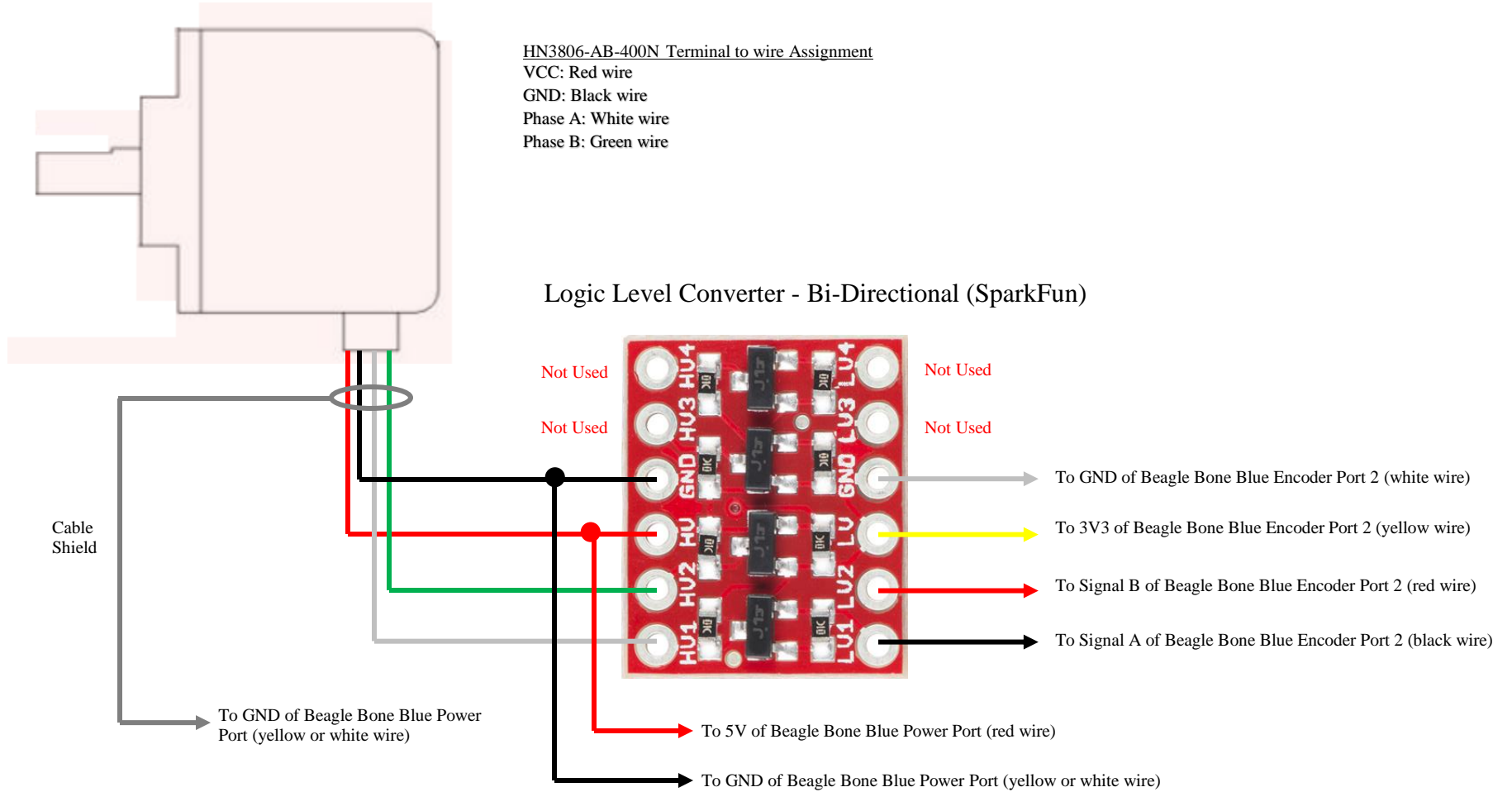
Encoder 2 Connections

Encoder 2 (HN3806-AB-400N Optical Encoder)

HN3806-AB-400N Terminal to wire Assignment

- VCC: Red wire
- GND: Black wire
- Phase A: White wire
- Phase B: Green wire

Logic Level Converter - Bi-Directional (SparkFun)



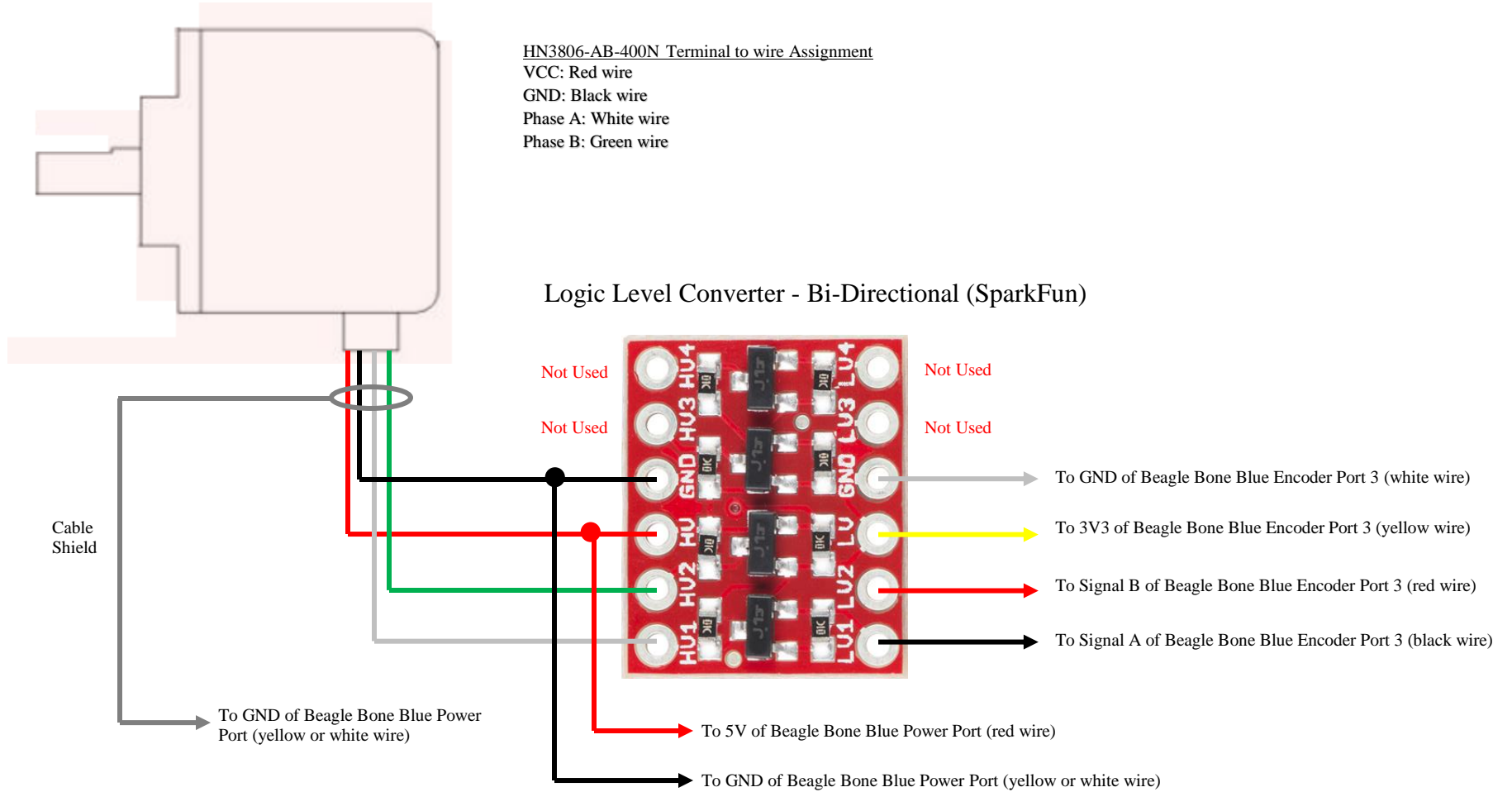
Encoder 3 Connections

Encoder 3 (HN3806-AB-400N Optical Encoder)

HN3806-AB-400N Terminal to wire Assignment

- VCC: Red wire
- GND: Black wire
- Phase A: White wire
- Phase B: Green wire

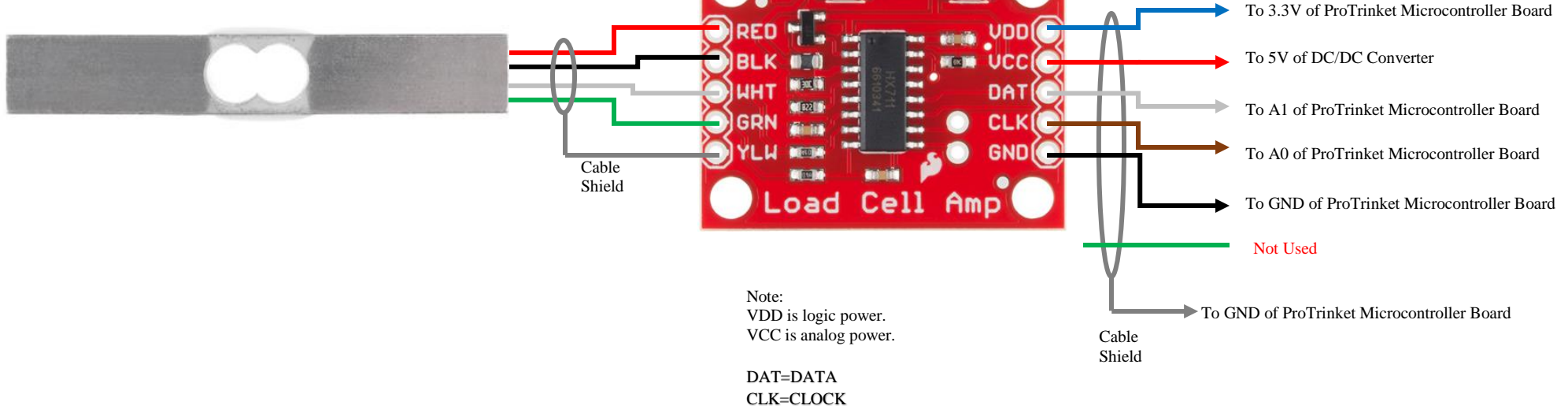
Logic Level Converter - Bi-Directional (SparkFun)



Load Cell 1 Connections

Load Cell Amplifier Board 1 (HX711)

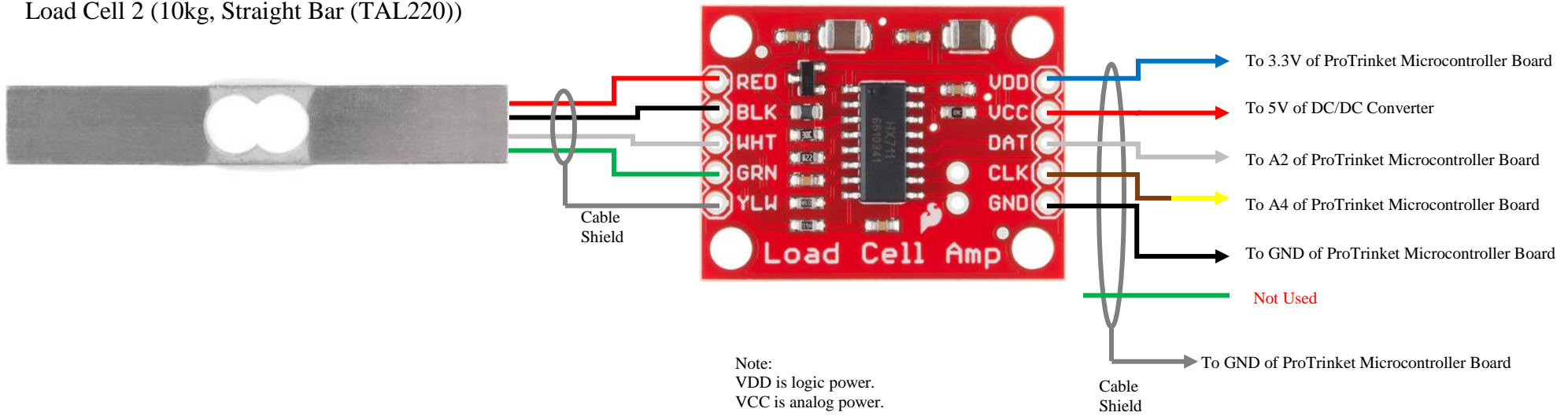
Load Cell 1 (10kg, Straight Bar (TAL220))



Load Cell 2 Connections

Load Cell Amplifier Board 2 (HX711)

Load Cell 2 (10kg, Straight Bar (TAL220))



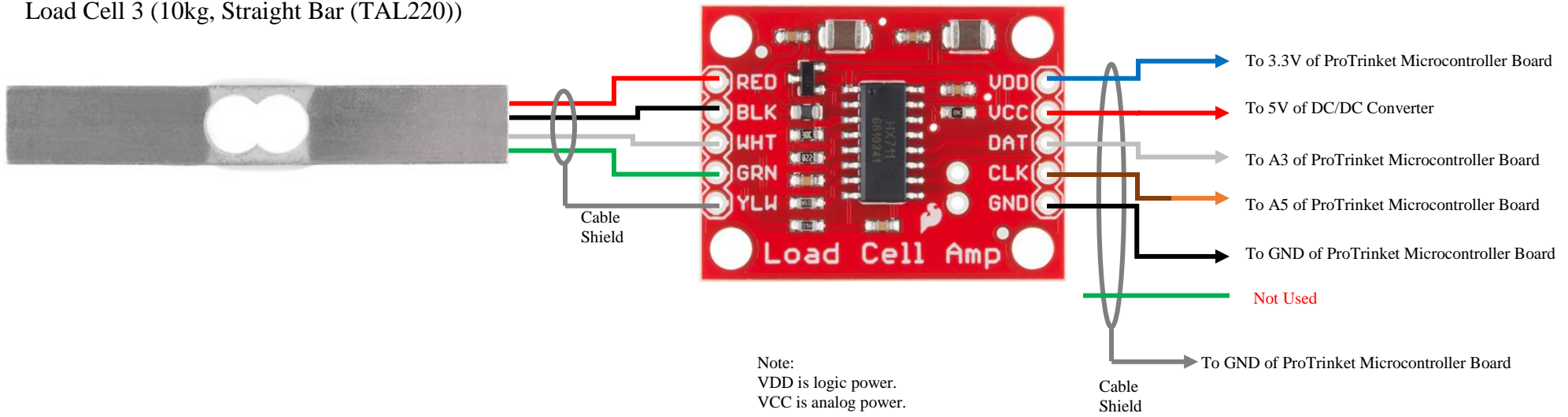
Note:
VDD is logic power.
VCC is analog power.

DAT=DATA
CLK=CLOCK

Load Cell 3 Connections

Load Cell Amplifier Board 3 (HX711)

Load Cell 3 (10kg, Straight Bar (TAL220))

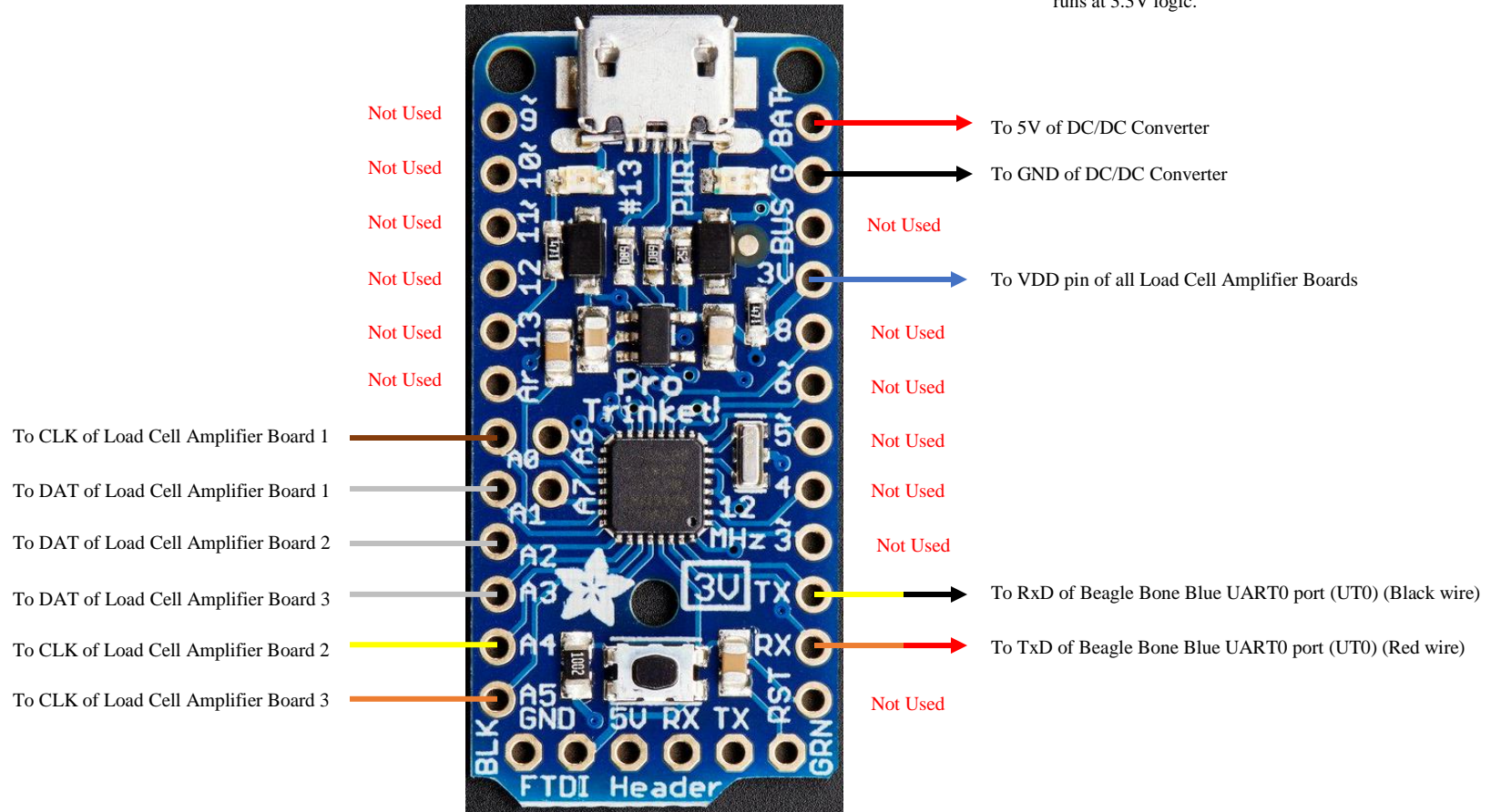


Note:
VDD is logic power.
VCC is analog power.

DAT=DATA
CLK=CLOCK

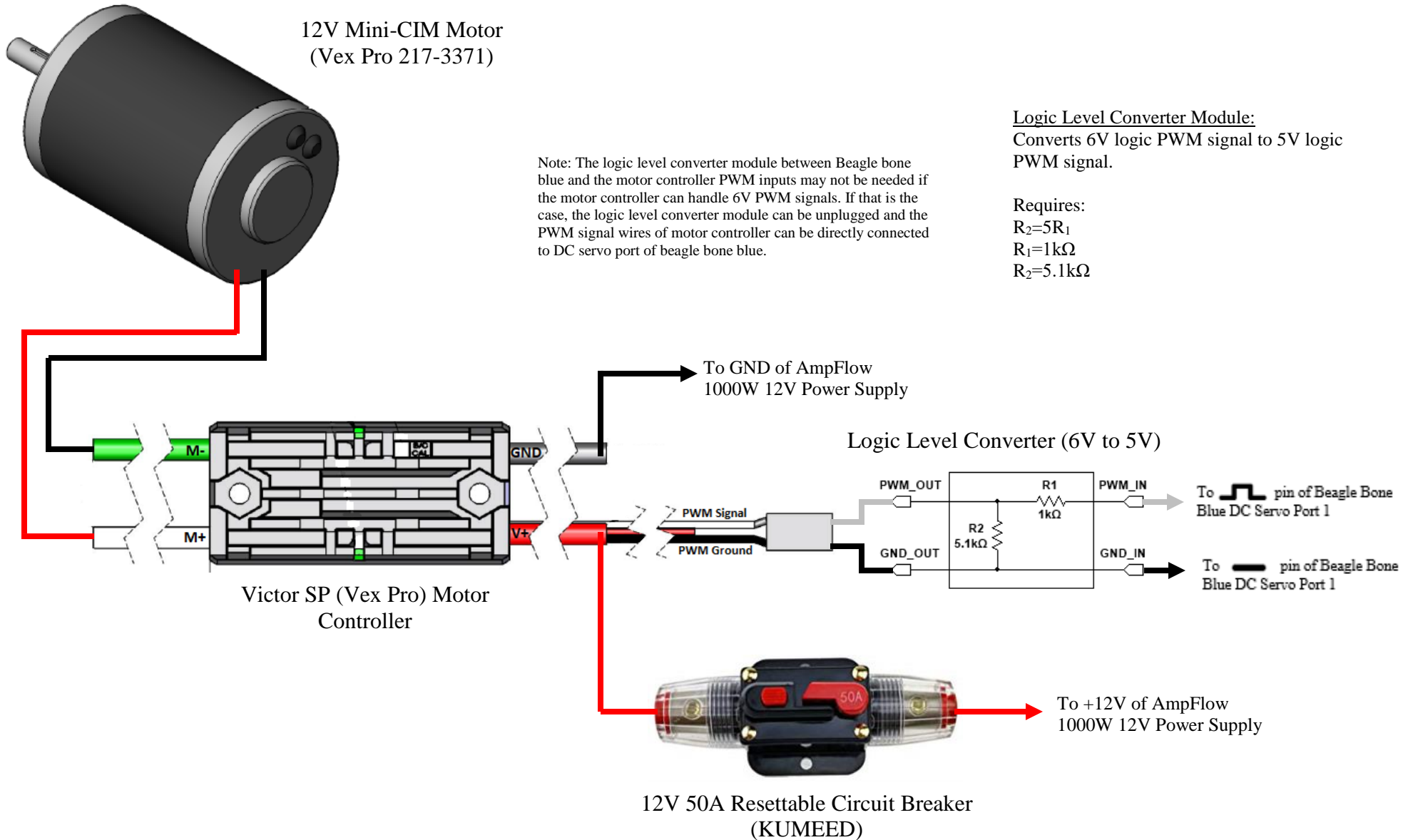
Adafruit ProTrinket Microcontroller Board (3.3V Logic Board)

Adafruit Pro Trinket 3V 12MHz Microcontroller runs at 3.3V logic level. This is necessary for the Load Cell Amplifier Boards and for the UART communication between Pro Trinket and Beagle Bone Blue which also runs at 3.3V logic.



None of These Are Used

DC Motor Controller and Voltage divider/signal conditioner connection



Hydraulic Power Unit Connections

