

DB1 IO Distribution Board - REV 1.0

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Introduction

The IO Distribution Board connects four buffered I2C busses, four Emergency Stop signals and four general-purpose I/O lines from four remote IO Node boards to the Arduino Mega microcontroller and the Motor Controller board.

This board is mounted on the rear of the base of the DB1 robot. The prototype board is a 5cm x 7cm perfboard.

Connections

The board has the following connections:

EXT IO

This is the connection to the External I/O lines, one per node. It connects to the Arduino Mega Shield Board.

Connector Type: 5-pin JST Male

Part Reference Number: J5

Pinouts:

1. Ground
2. I/O Line 4
3. I/O Line 3
4. I/O Line 2
5. I/O Line 1

I2C

This is a Molex I2C connector for the master I2C line. It connects to the Arduino Mega Shield Board.

Connector Type: 4-pin Molex Male, Part number 0705530003

Part Reference Number: J6

Pinouts:

1. 5 VDC
2. I2C SDA
3. Ground
4. I2C SCL

EM STOP OUT

This is the connection to the Emergency Stop lines, one per node. It connects to the Motor Controller Board.

Connector Type: 5-pin JST Male

Part Reference Number: J7

Pinouts:

1. Ground
2. Emergency Stop Line 4
3. Emergency Stop Line 3
4. Emergency Stop Line 2
5. Emergency Stop Line 1

POWER INPUT

This is the power supply connection. It connects to the Power Distribution Board.

Connector Type: 2-pin Screw Terminal

Part Reference Number: ST1

Pinouts:

1. + 5 VDC
2. Ground

IO EXTEND 01 - 04

These are the connections to the external IO bus. They connect to the IO Node Boards located throughout the robot chassis.

Connector Type: 6-pin Aviation Male

Part Reference Number: J1 to J4

Pinouts:

1. Ground
2. LDA (Buffered I2C Data Bus)
3. LCL (Buffered I2C Clock)
4. + 5 VDC
5. I/O Line
6. Emergency Stop

Indicators

The board has the following indicator:

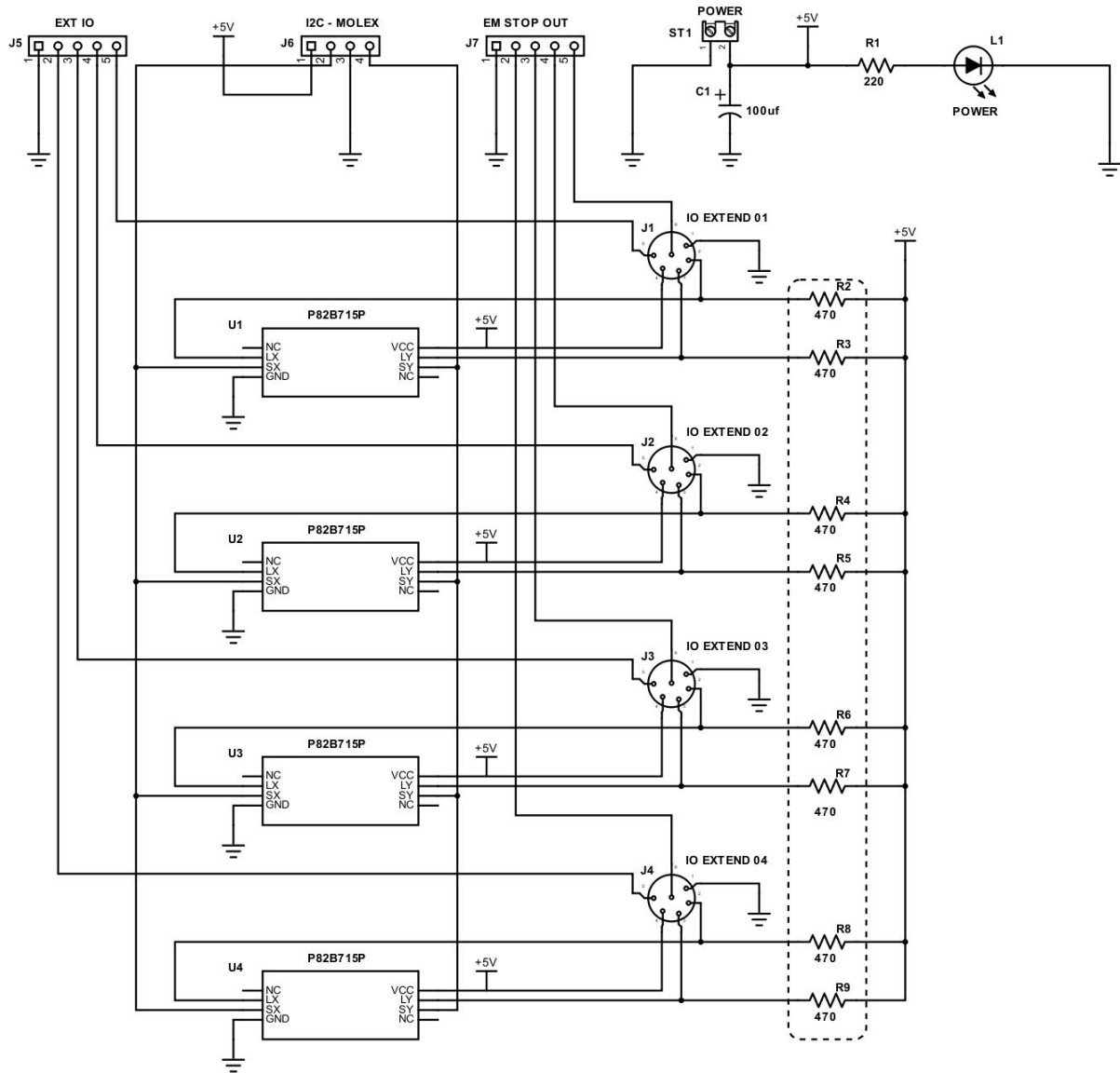
POWER

This is the power indicator, which illuminates when 5 VDC is supplied to the board.

Indicator Type: 3mm LED, Blue

Part Reference Number: L1

Schematic

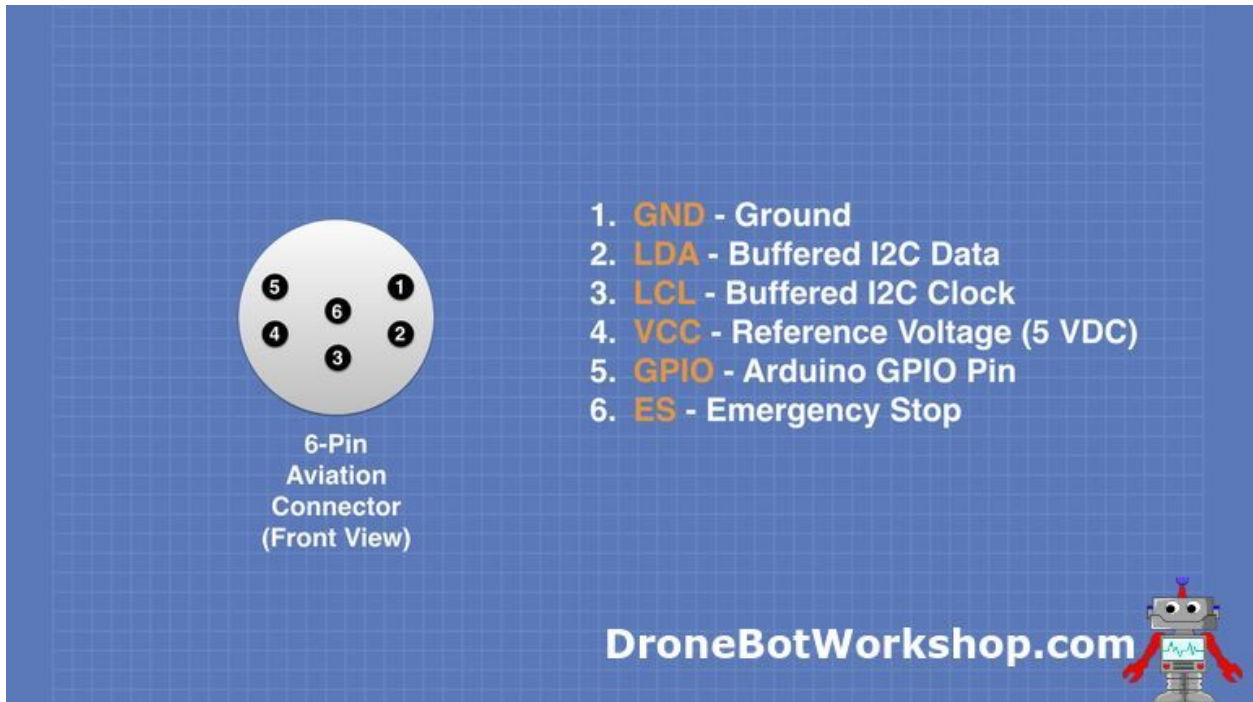


Parts List

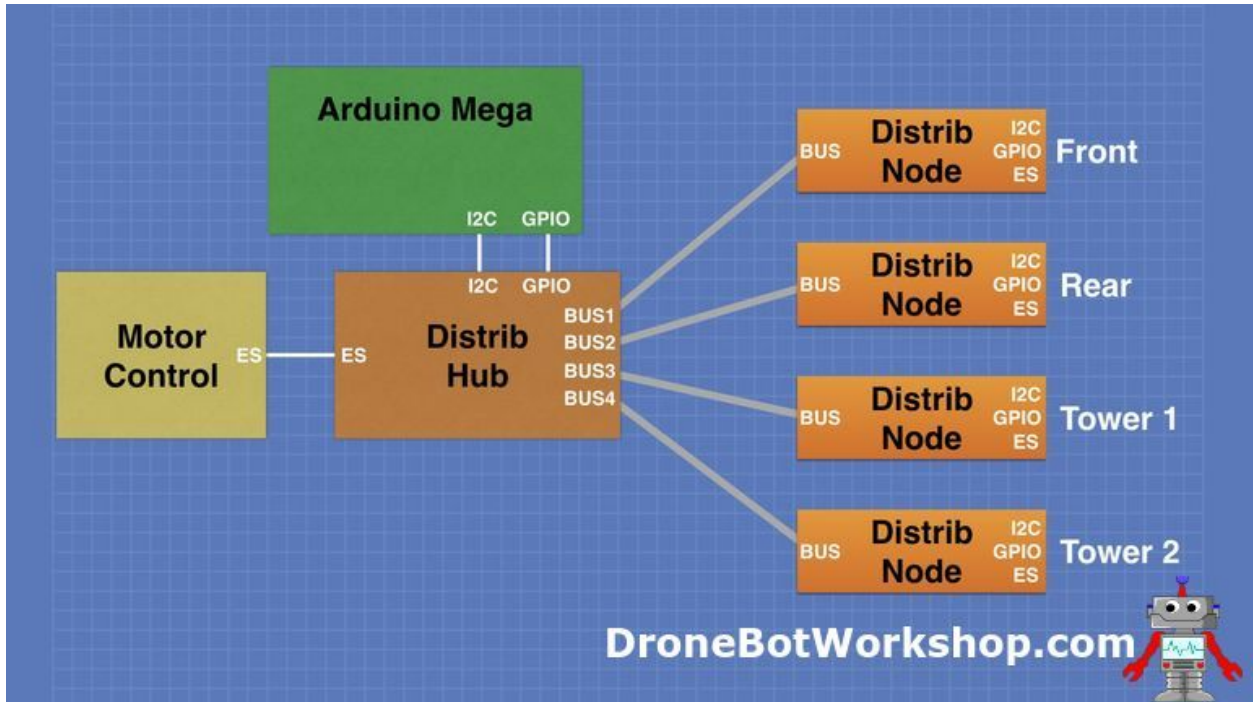
RefDes	Name	Value	Manufacturer	Part Number	QTY
J6	I2C - MOLEX	4-pin Molex I2C	MOLEX	0705530003	1
J7	EM STOP OUT	5-pin JST Male	-		1
J5	EXT IO	5-pin JST Male	-		1
ST1	POWER	2-pin terminal	-		1
C1	POLARIZED CAPACITOR	100uf	-		1
R1	RESISTOR	220 Ohm	-		1
L1	POWER	3mm LED	-		1
U3	I2C Buffer		Texas Instruments	P82B715P	4
R2 - R9	RESISTOR ARRAY 1x8	470 Ohm	BOURNS	4116R-1-471	1
J1 - J4	IO EXTEND 03	6-pin Aviation	-		4

- Note that 470-ohm resistors are in a single resistor array. Discrete resistors may also be used.
- Resistor array value may require adjustment as value depends upon cable load and capacitance.

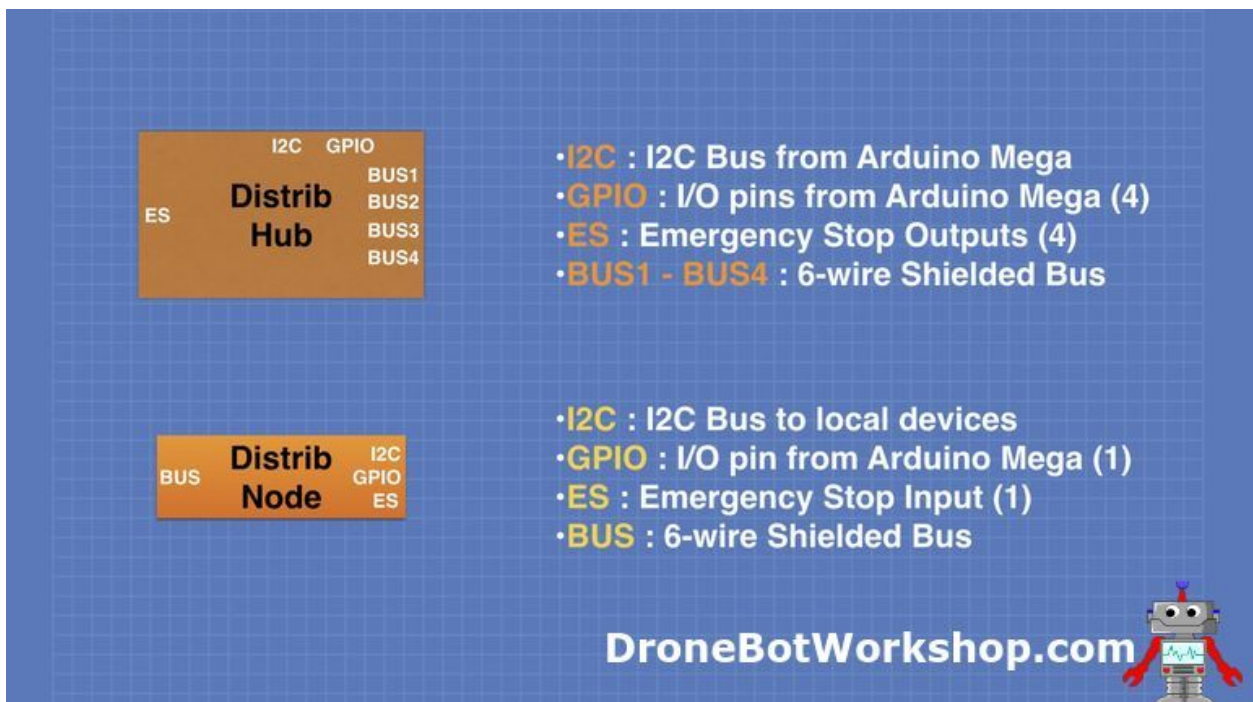
Additional Notes & Images



This image illustrates the pinout of the four aviation connectors used for the external bus connections. See further below for an image of the connectors

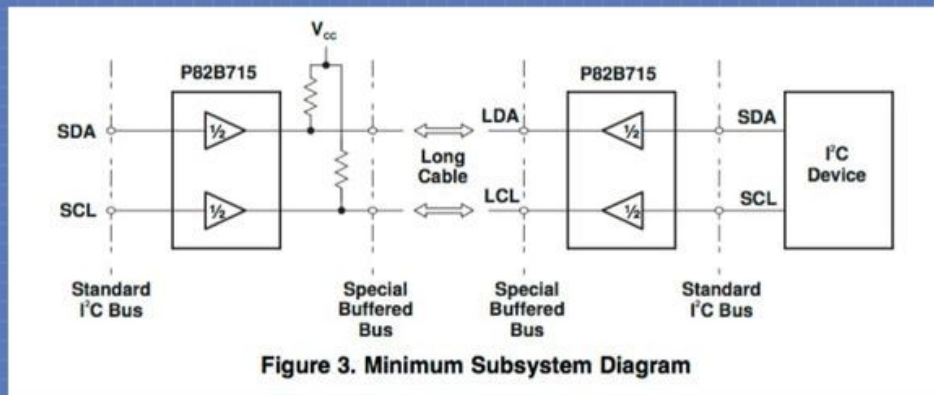


This image illustrates the wiring topology in the DB1 robot. The IO Distribution Board is the “Distrib Hub” in this diagram.



This image illustrates the sensor bus node connections.

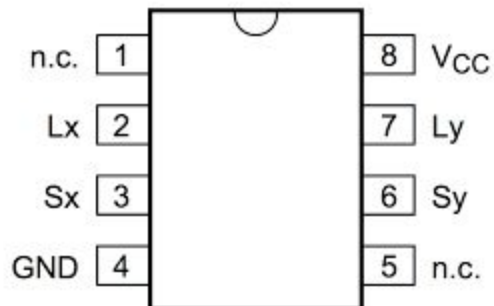
P82B715 Buffered I2C Bus Drivers



DroneBotWorkshop.com



This image illustrates the operation of the P82B715 I2C Bus Drivers.



This is the pinout of the P82B715 I2C Bus Driver in the 8-pin DIP package.



This is the Molex 0705530003 connector used for the I2C connections. The “arrow” indentation indicates pin #1.



This is the 6-pin aviation connector (and mating female plug) used for the I/O connections.