Hiveboard.ca

HiveBoard

Version 1.0

3-11-2023

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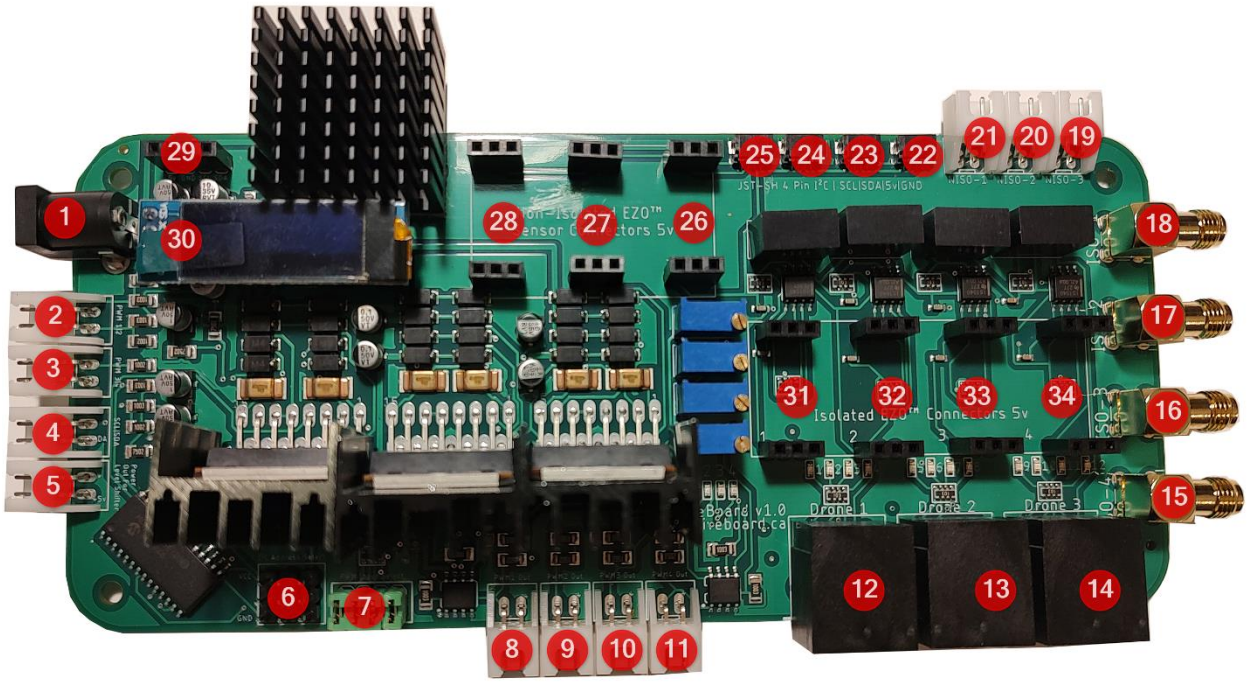
Layout



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Addressing

I²CAddressing

The I²C address of the HiveBoard is controlled by the jumper pin. The Board I²C Select is labelled #6 on the Layout diagram. Possible address is (0x20-0x27)

	20		25
	21		26
	22		27
	24		

Pump Control

The pump is controlled by a MCP23017 chip with the addresses below:

Channel 0	Drone1 Output1	Channel 8	Drone3 Output1
Channel 1	Drone1 Output2	Channel 9	Drone3 Output2
Channel 2	Drone1 Output3	Channel 10	Drone3 Output3
Channel 3	Drone1 Output4	Channel 11	Drone3 Output4
Channel 4	Drone2 Output1	Channel 12	LED1/PWM1
Channel 5	Drone2 Output2	Channel 13	LED2/PWM2
Channel 6	Drone2 Output3	Channel 14	LED3/PWM3
Channel 7	Drone2 Output4	Channel 15	LED4/PWM4

Screen

The screen's address is 3c

Wiring

PWM Inputs

Labelled as #2 and #3 on the Layout diagram – please see PWM input section under Setup for more information

	If one is planning to control PWM externally through a SBC then they would connect the GPIO to these pins

I²C

Labelled as #4 on the Layout diagram

	The board I²C runs at 5V and not 3.3V. A level shifter is recommended

Level Shifter

Labelled as #5 on the Layout diagram

	When connecting the HiveBoard to a SBC where the I^2C is not running at 5V, a level shifter should be used. One should use these pins to provide the reference high voltage and ground for the level shifter. Using a level shifter is recommended regardless to ensure compatibility

PWM Outputs

Labelled as #8-#11 on the Layout diagram – Please see PWM section for more information on PWM signal

	Each PWM output is wired (+/-)

DroneBoard Connectors

Labelled as #12-#14 on Layout diagram

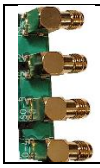
The DroneBoards provide 4 outputs each as well as a I^2C connection

One can use a standard ethernet cable to connect the HiveBoard to the DroneBoard and DroneBoard Basic. If one is making their own breakout board, the wiring of the Drone connectors is as below. All outputs run at ~9.5V. It is enough voltage for most 12v pumps

1. SCL	5. 5V
2. Output 4	6. Output2
3. SDA	7. GND
4. Output3	8. Output 1

Isolated EZO™ Connectors

Labelled as #15-#18 on the Layout diagram

	Standard SMA Connectors

Non-Isolated EZO™ Connectors

Labelled as #19-#21 on the Layout diagram

	Standard JST-XH 2 pin Connector for sensor probe Wired as GND/PRB+

JST-SH I^2C Connectors

Labelled as #22-#25 on the Layout diagram

	JST-SH 4 pin connectors

	Wired for I²C as (SDA/SCL/5V/GND) Compatible with STEMMA QT

Non-Isolated EZO™ Connectors

Labelled as #26-#28 on the Layout diagram

	Runs at 5v Designed For: Atlas Scientific EZO™ Temperature Probe Atlas Scientific EZO™ Flow Totalizer

I²C Connector

Labelled as #29 on the Layout diagram

	Wired to Accept most Adafruit Sensors Wired as 5v/GND/SCL/SDA

Isolated EZO™ Circuit Connector

Labelled as #31-#34 on the Layout diagram

	Runs at 5v Designed For: Atlas Scientific EZO™ pH Sensor Atlas Scientific EZO™ ORP Sensor Atlas Scientific EZO™ Electrical Conductivity Sensor Atlas Scientific EZO™ Dissolved Oxygen Sensor Atlas Scientific EZO™ Temperature Sensor Atlas Scientific EZO™ Flow Totalizer

Setup

Powering the Board

Labelled as #1 on the Layout diagram

The HiveBoard is designed to be powered by 12VDC. The board provides power for I²C communication

PWM Control

The PWM outputs can be controlled both internally and externally via jumper pin (#7). Enabling the jumper pin enables internal control. If one wants to control them externally they would be connecting the GPIO from their SBC to the connectors and leaving the jumpers empty. If one wants to use the onboard PWM control they should not connect anything to the connectors.

****Currently Mycodo is not designed to handle the PWM being controlled internally by the MCP23017 chip, instead of PWM control the LED's will be activated and the PWM outputs will run at 100% duty cycle****

When controlling externally the PWM control has 2 possible voltage (V) ranges.

The range is 0-5V by default; to operate at 0-10V one would also have the equivalent channel enabled from the MCP23017 (channels 12-15)

I^2C

This board provides its own power to the I^2C communication. Do not connect any external power source to the I^2C power source

Wired at 5v

Cooling

This device has quite a few components that generate heat. It's recommended that one does not keep the HiveBoard in a sealed place; some active cooling is necessary.

In testing it was found that at least a 40 mm fan with airflow over the heatsink (specifically above the screen) was sufficient.