



SJSU

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Arm Breakout

Robotics

Documentation

SJSU-IB2023

Written & Designed by: Jeffrey Lam, Dawinder Sekhon

Features

USB-C

MPU-6050

CAN, I2C, AD0 Jumpers

Applications

Breakout board used to send power and data to the MPU-6050 and CAN Bus for motors.

The boards have an input and output USB-C connector so it can either connect to the Universal Controller Board or to another Arm Breakout board.

At most 4 MPU-6050s can be used at a time by utilizing 2 I2C channels.

USB-C Stubby

12-Pin USB-C comes in SMD form.

MPU-6050

The MPU-6050 receives 3.3V through VCC. The device communicates bi-directionally using I2C SCL, SDA pins. The MPU-6050 has two possible addresses 0x68, 0x69 which are selected by driving the AD0 pin either LOW or HIGH respectively. This can be selected with the AD0 jumper solder pad.

CAN

CAN transceiver sends signal through USB-C and is received in the arm breakout. This line is broken into high and low onto a solder pad that also contains a pad for the voltage line for arm motors. The board contains two sets of pads for ease of use for connecting to motors.

I2C

The two I2C lines are sent over USB-C and are received in the arm breakout. These lines are sent to a set of jumper solder pads one for SDA and the other for SCL. This allows for selection of which line will go to the MPU.

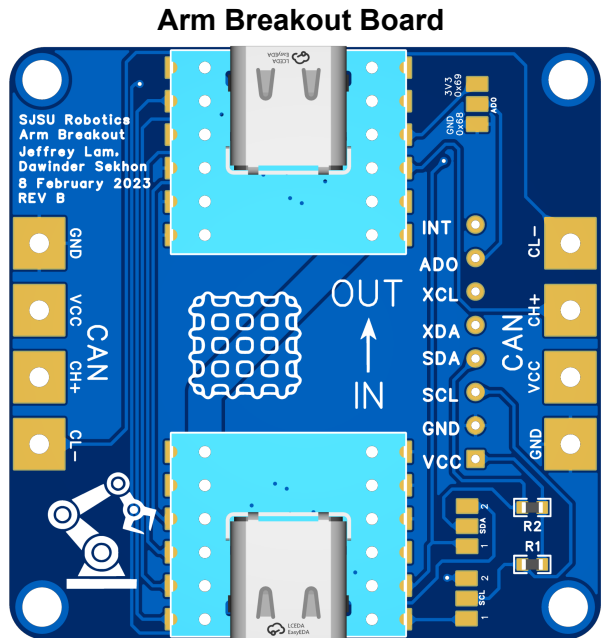


Figure 1: Top-view

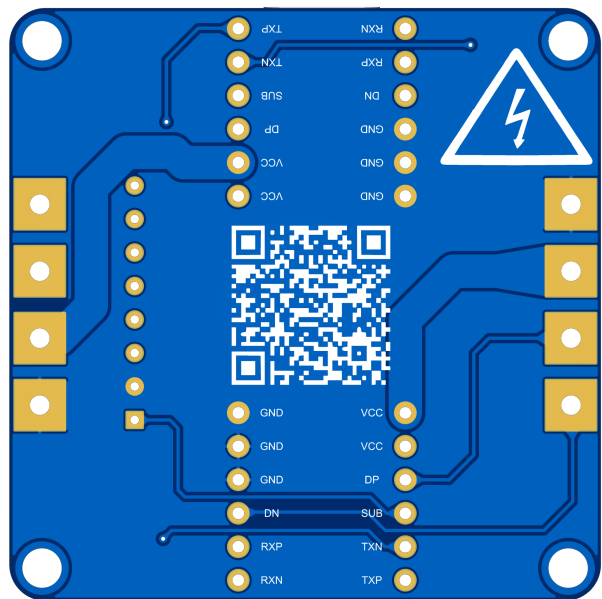


Figure 2: Bottom-view

AD0 Jumpers

AD0 from the MPU is sent to a jumper solder pad. This allows the AD0 to be set high or low as the solder pads have a VCC pad and a ground pad.

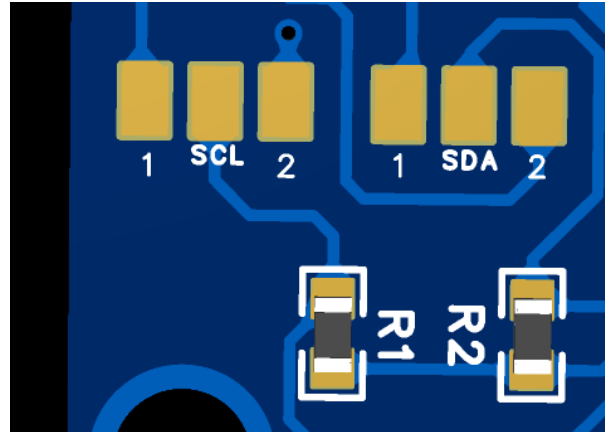


Figure 3: Solder Pads for 12C SCL and SDA Jumpers

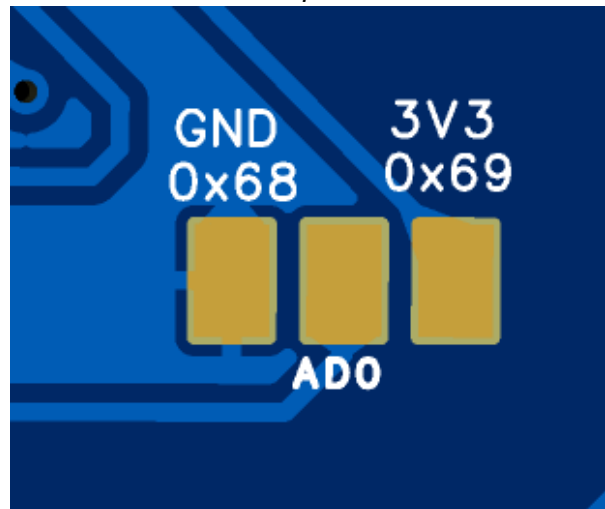


Figure 4: Solder Pads for AD0 jumper.

Block Diagram

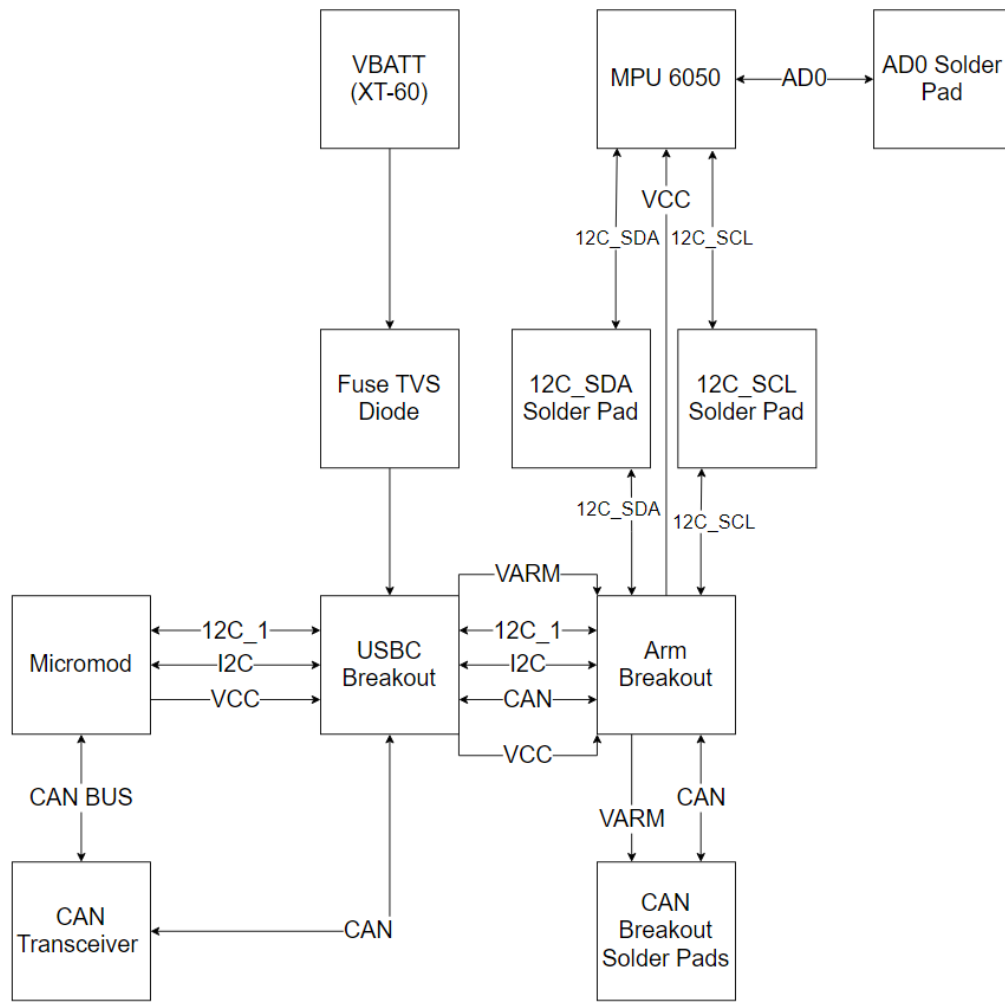


Figure 5: General Use Block Diagram

USB C Breakout

TXP pins are shorted together.

RXP pins are shorted together.

TXN pins are shorted together.

RXN pins are shorted together.

SUB pins are shorted together.

USB-C is broken out with the intention of using a USB 3.X C to C cable to make connections to different parts of the rover.

TX and RX pins are not connected for drive

VBUS	D+	D-	TXP	TXN
VBATT	CANH	CANL	I2C_SDA	I2C_SCL

GND	RXP	RXN	SUB DRIVE	SUB ARM
GND	I2C_SDA1	I2C_SCL1	HOME_X	3V3

Table 1: USB C Breakout Connections

**** USB C CABLE CROSSES TX > RX and RX > TX (KEEP IN MIND FOR UPSTREAM CONNECTIONS) ****

**** USE ONLY 240W USB 3.X C TO C CABLES FOR CONNECTIONS OTHERWISE RISK OF BURNING CABLE ****

USB C 3.X Stubby Breakout Board seen below in figure 6.

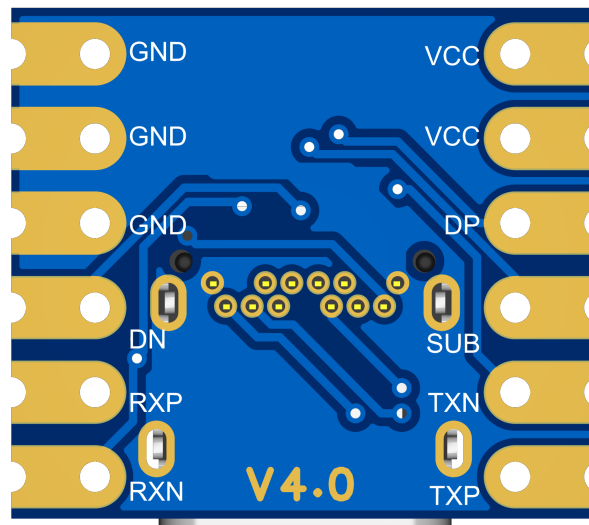


Figure 6: USB-C Stubby Breakout

Specifications

Designed Ratings

Parameter	Rating
USB C Breakout Current	5A
Buck Converter Current	1A

Table 2: Designed Ratings