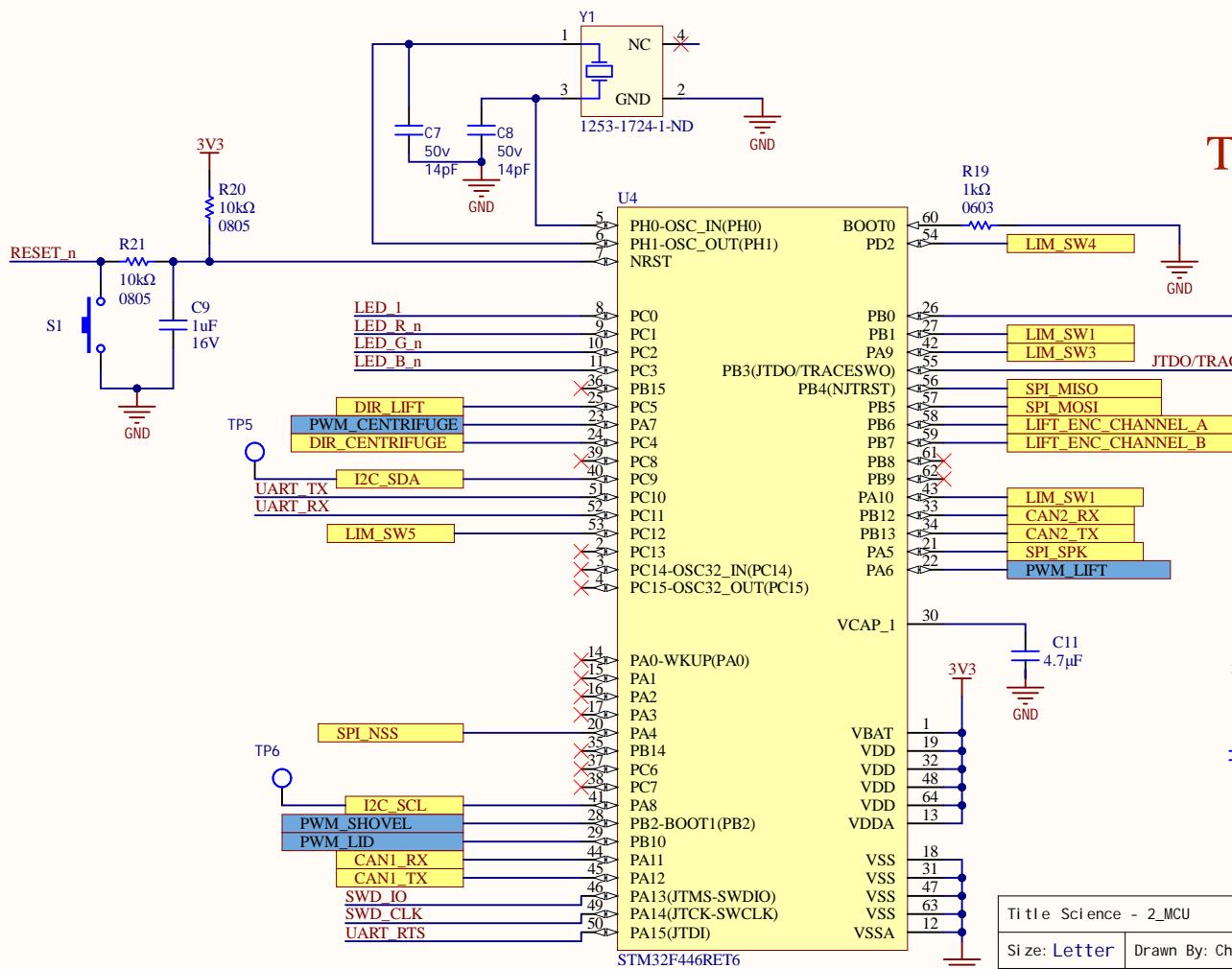
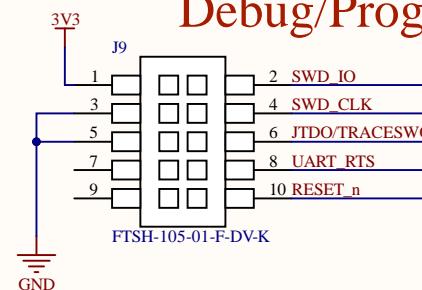


### Current Calculations

Green LED voltage drop: 2.2V  
 $I = (3.3 - 2.2)/120 = 10.83\text{mA}$

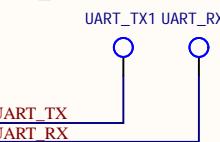
RGB LED voltage drops:  
 - Red: 2.1V:  $I = (3.3 - 2.1)/120 = 10\text{mA}$   
 - Blue: 3.1V:  $I = (3.3 - 3.1)/20 = 10\text{mA}$   
 - Green: 3.1V:  $I = (3.3 - 3.1)/20 = 10\text{mA}$

## Debug/Programming

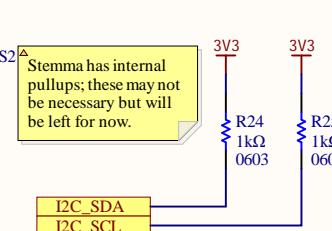


## Test Button

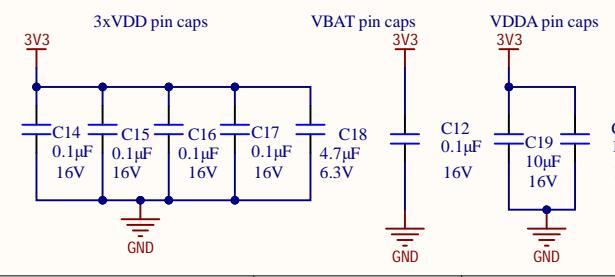
## Testpoints



## I2C Pullups



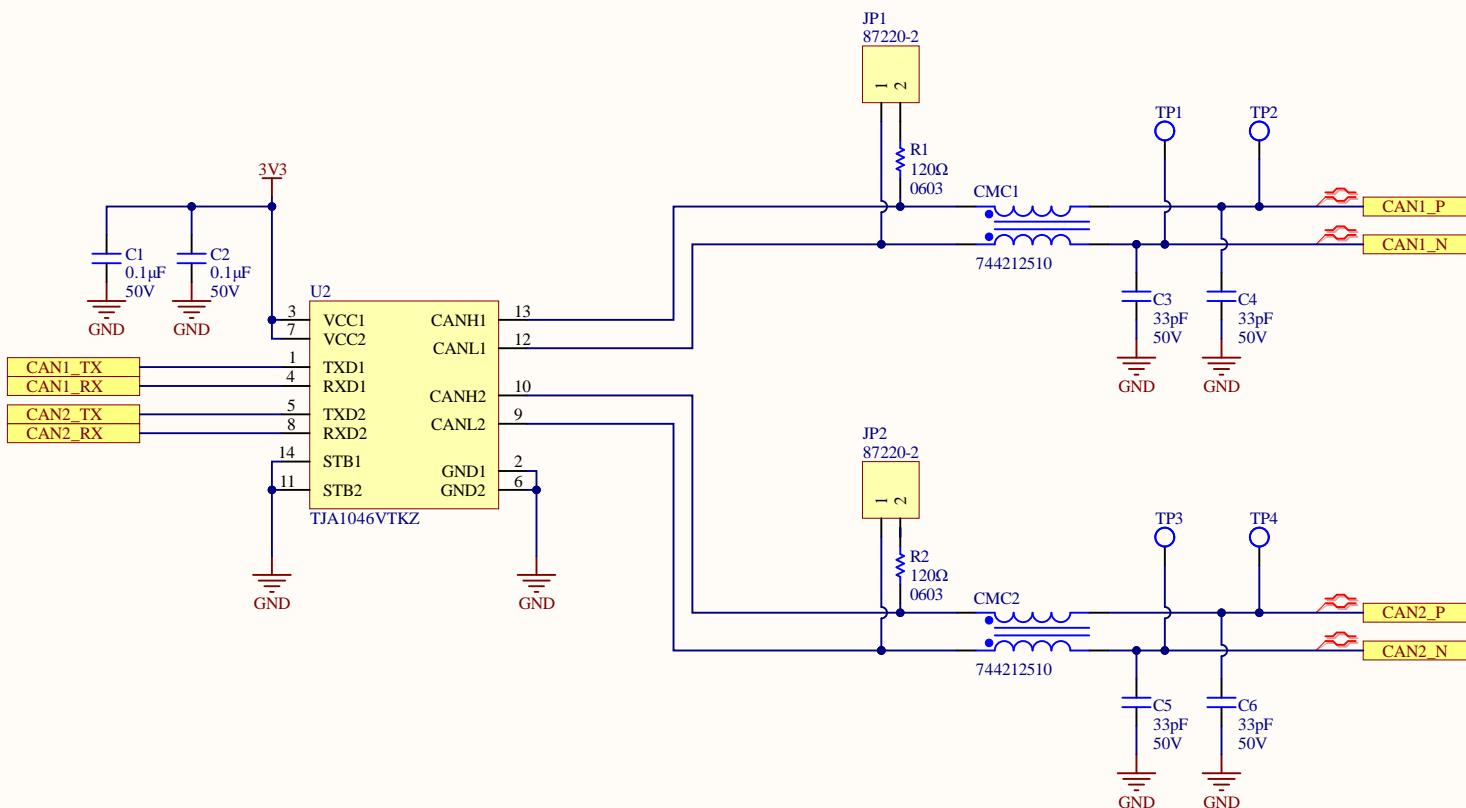
Stemma has internal pullups; these may not be necessary but will be left for now.



A

# CAN Transceivers

B



C

D

Title: Science - 3_CAN		UW Robotics 200 University Avenue Waterloo Ontario Canada N2L 3G6
Size: Letter	Drawn By: Christopher Arjune	
Date: 9/25/2020	Sheet 3 of 6	
File: C:\Users\badpr\altium_projects\MarsRover2021-hardware\Projects\Science\Rev2\SH5 - CAN.SchDoc		UW ROBOTICS TEAM

## 5V - 3.3V Buck Converter

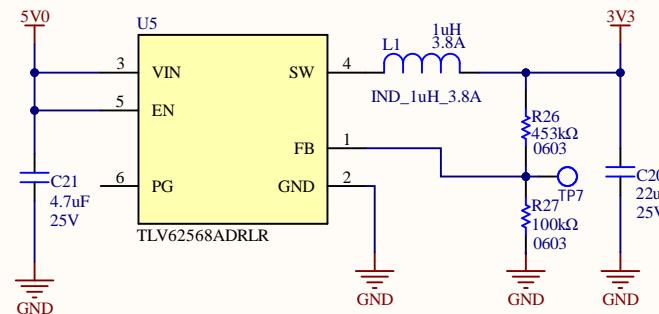
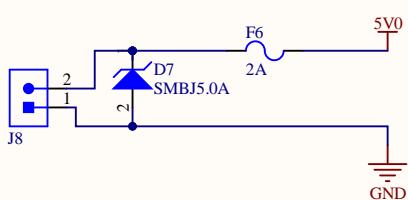
Designed for 3.3V - 5V input

**Route for 1A in**

Inductor: SDR0403-1R0ML  
1uH, 20%, 33mOhm DCR (max)  
3.8A (rms), 5.5A (sat), 3.2mm tall

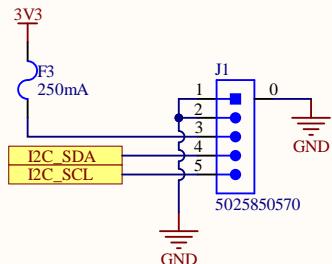
**Route for 3A out**

Maximum output current = 2A  
Maximum output power = 6.6W  
Expected efficiency at 1A = 94.3%

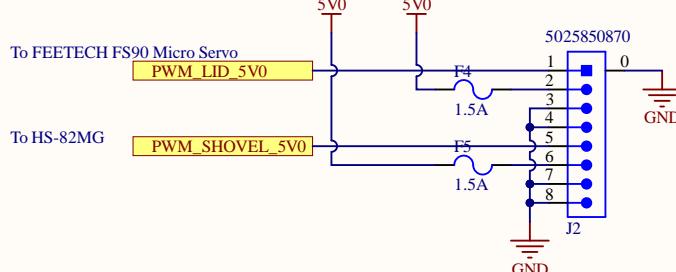


# Encoders

## I<sup>2</sup>C Sensors



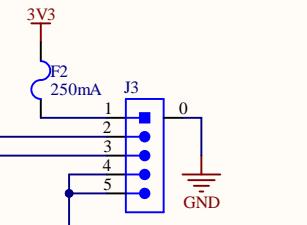
## Servos



64 CPR Encoder (Helical Pinion) on Motor

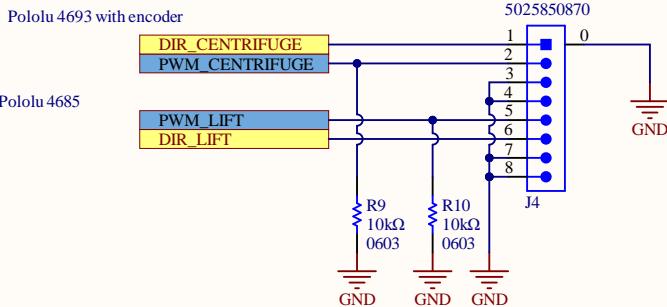
LIFT ENC CHANNEL B IN

LIFT ENC CHANNEL A IN

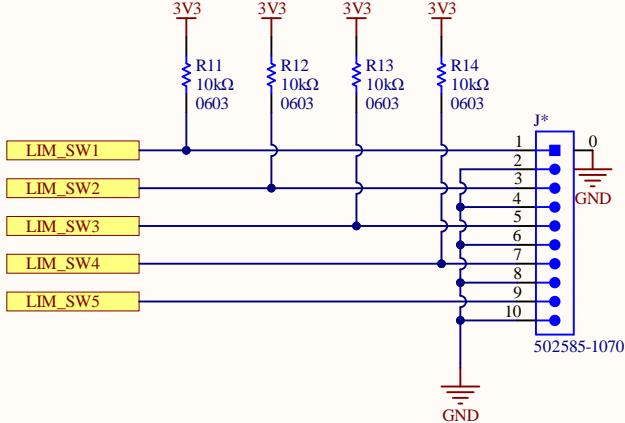


B5B-PH-SM4-TB(LF)(SN)

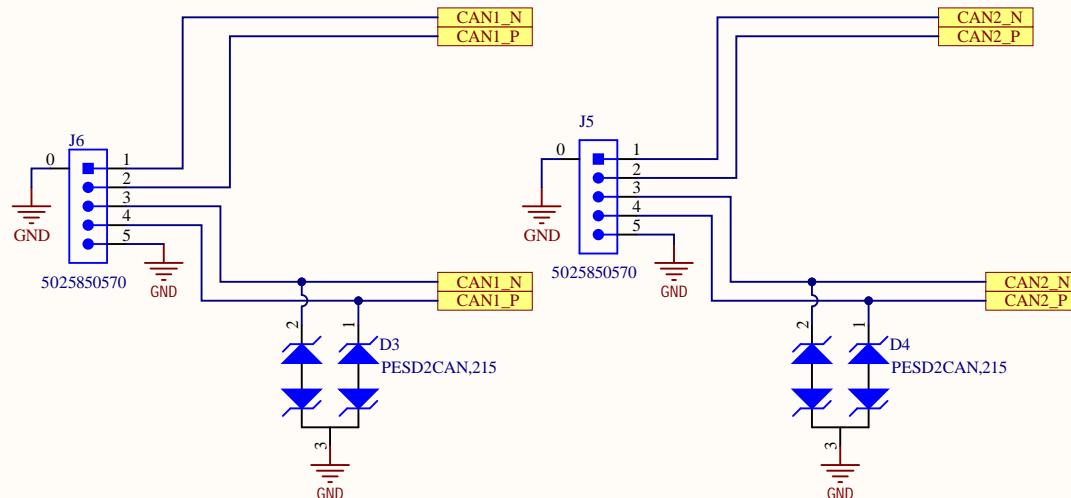
## DC Motors



## Limit Switches



## CAN



Title: Science - 5\_Integrated-Connectors

Size: Letter Drawn By: Wolfgang Wiedholz

Date: 9/25/2020 Sheet 15 of 6

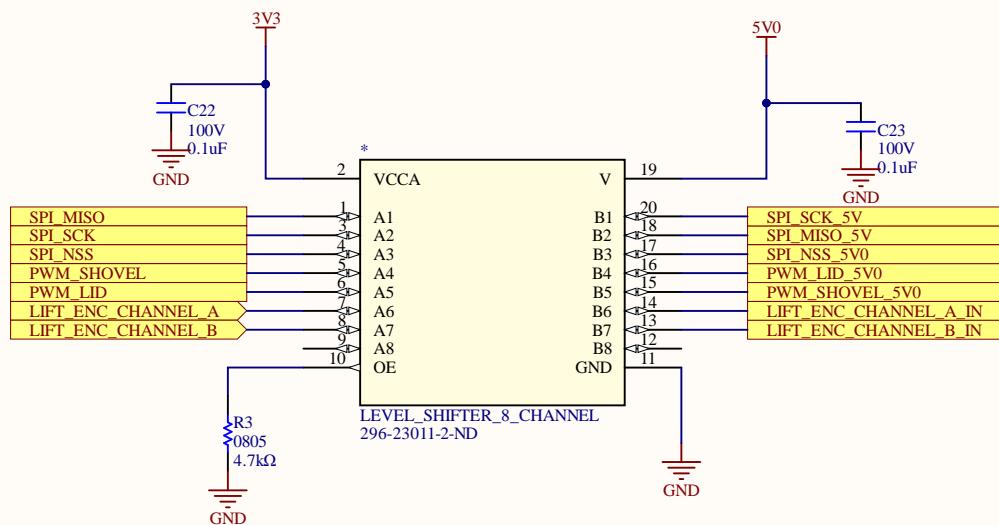
File: C:\Users\badpr\altium\_projects\MarsRover2021-hardware\Projects\Science\Rev2\SH2 - CONNECTORS.SchD

A

Decoupling values may  
need to be changed

## Level Shifter

5V - 3V Conversion



B

A

B

C

C

## Mounting Holes



D

D

Title: Science - 6\_Servo\_and\_Encoders

Size: Letter | Drawn By: Wolfgang Windholz

Date: 9/25/2020 | Sheet 6 of 6

File: C:\Users\badpr\altium\_projects\MarsRover2021-hardware\Projects\Science\Rev2\SH3 - LEVEL SHIFTER.SCH



