

Mounting Holes

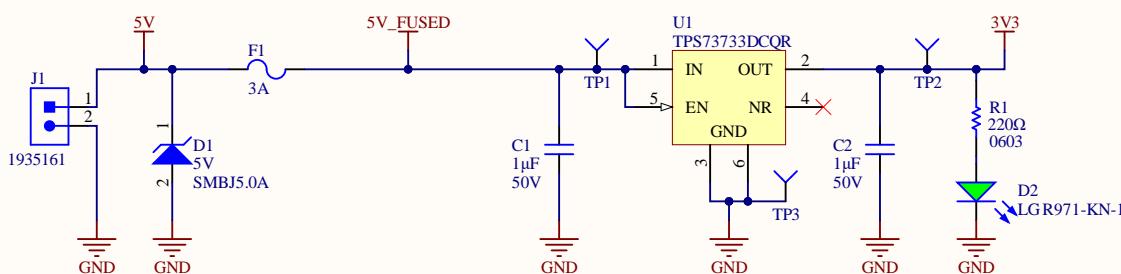
^{H1}^{H2}

Need to make new mounting hole part depending on Andrew's fastener choice

^{H3}^{H4}

Add eFuse for Rev 3

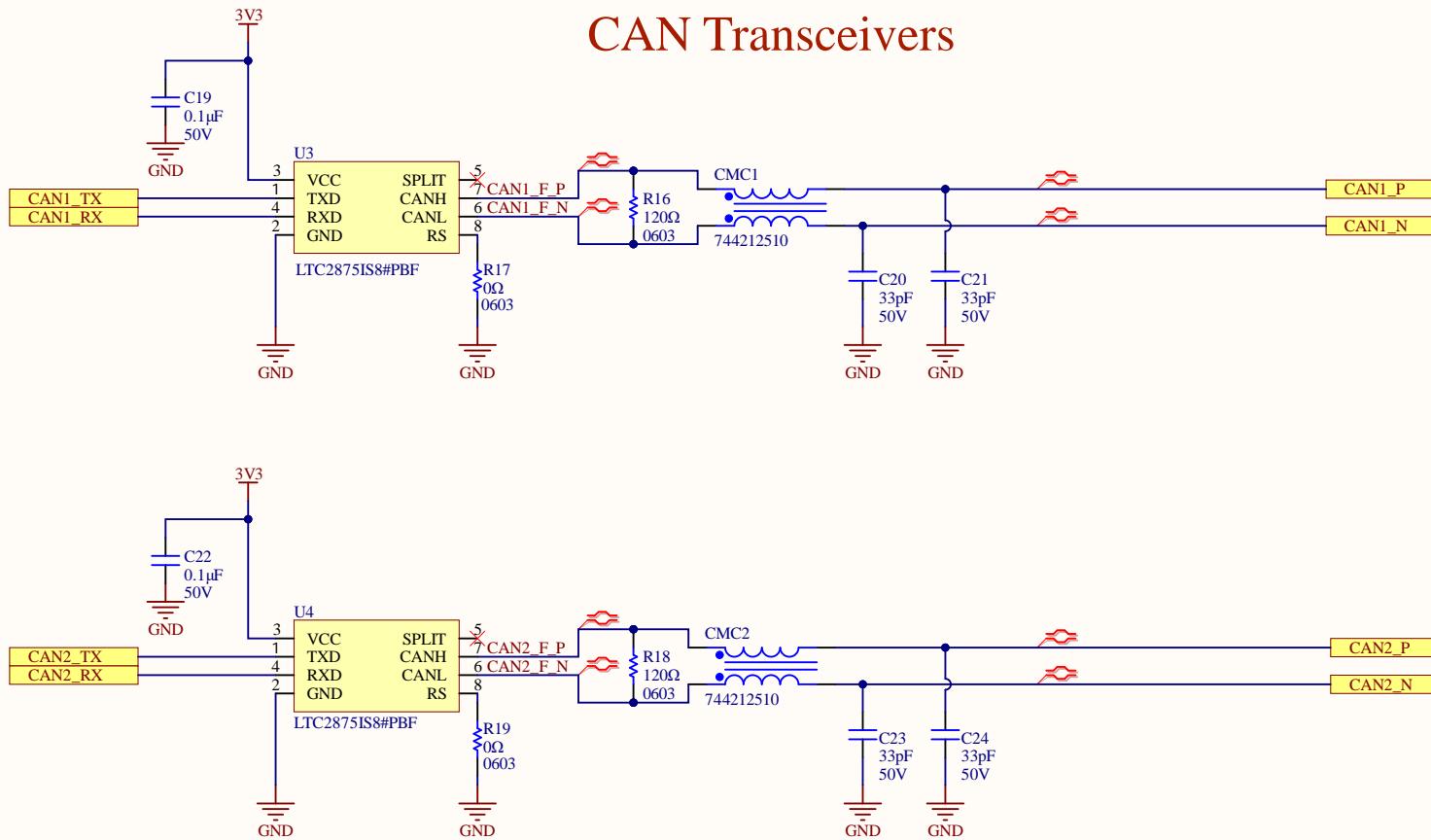
5V to 3.3V LDO (Max 1A)

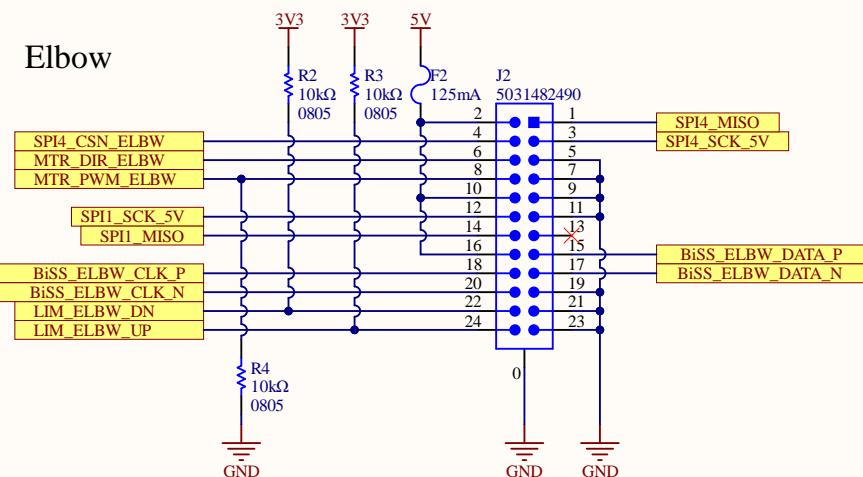
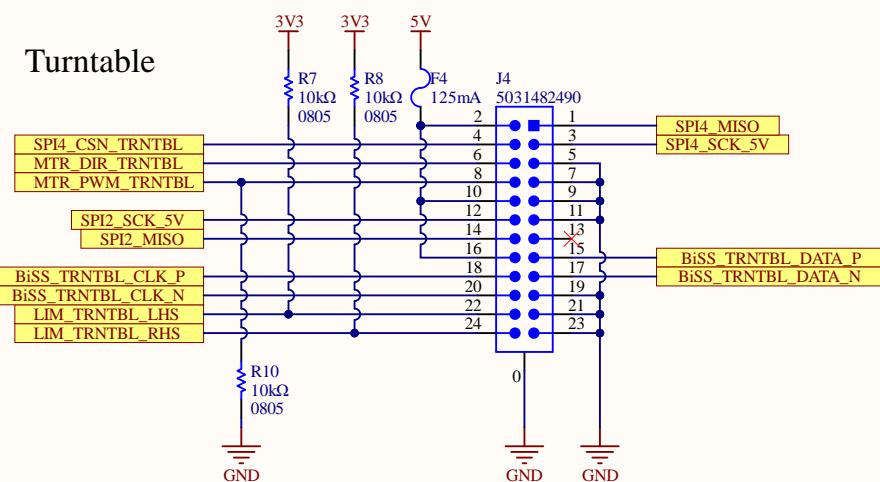
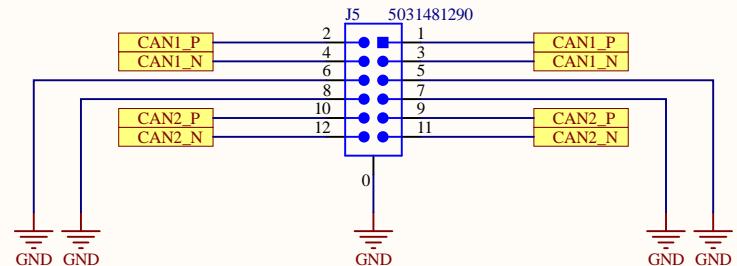
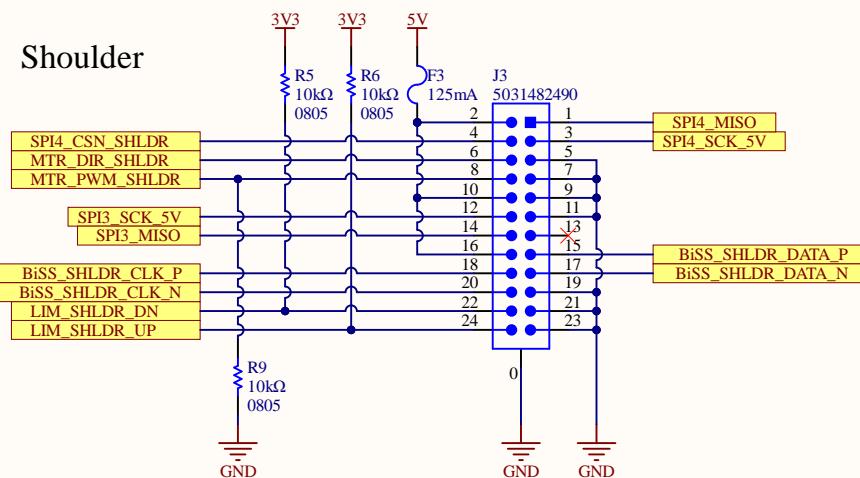


Current Calculations

Green LED voltage drop: 2.2V
 $- I = (3.3 - 2.2V) / 220 = 5mA$

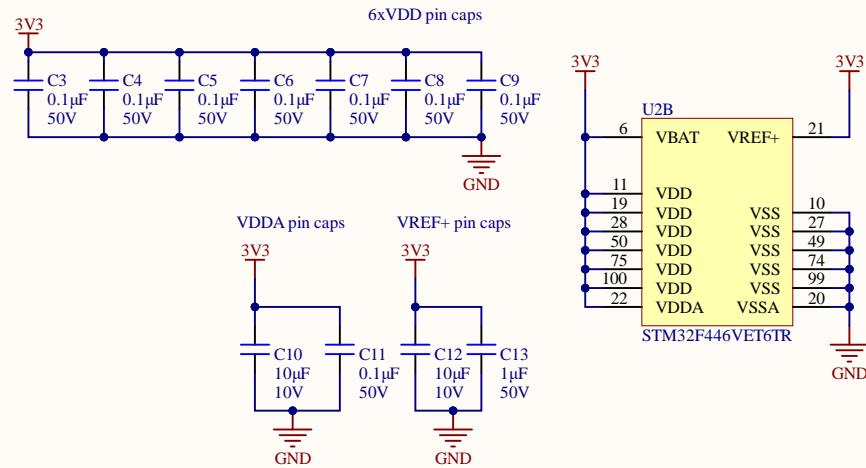
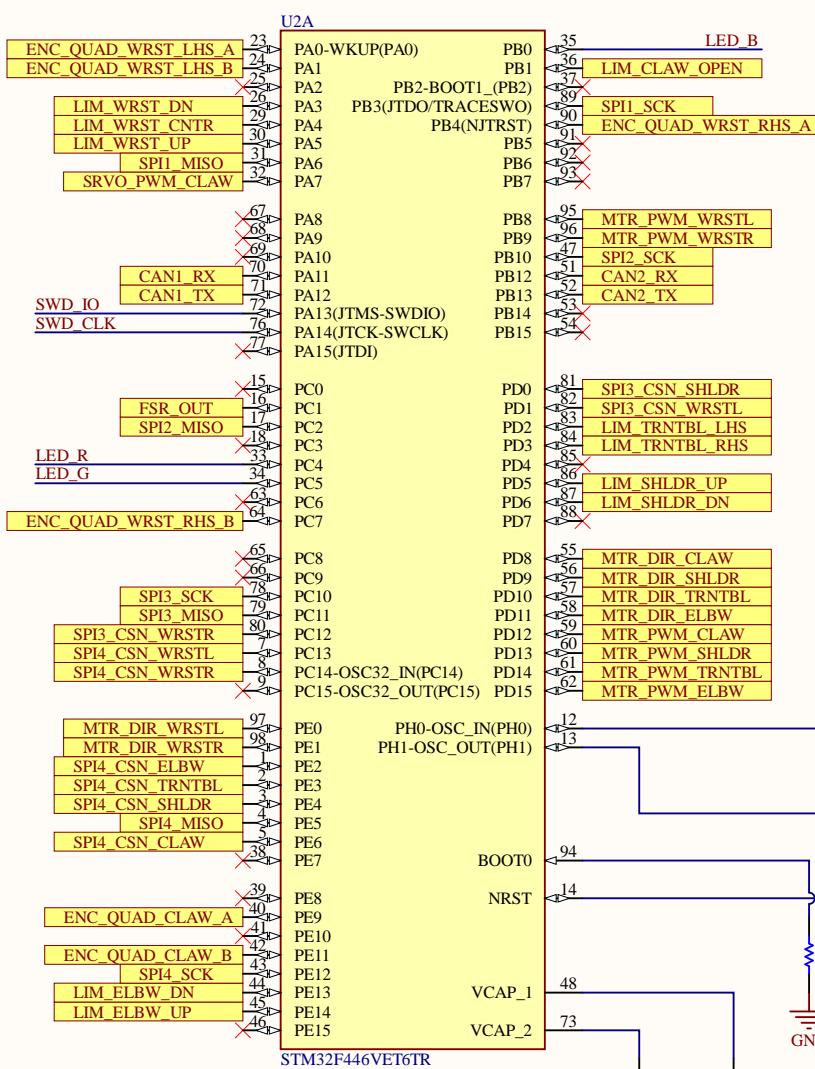
CAN Transceivers



Elbow**Turntable****CAN Connections****Shoulder**

Acronyms Explained
 FSR: Force Sensitive Resistor
 CLAW: Claw
 WRST: Wrist
 SHLDR: Shoulder
 ELBW: Elbow
 TRNTBL: Turntable
 DIR: Direction for motors
 MTR: motor

STM32F446VET7



Force Sensitive Resistor

[△]Sensor:
Manufacturer: Interlink Electronics
Manufacturer Part Number: 30-81794
Supplier: Digi-Key
Supplier Part Number: 1027-1001-ND
<https://cdn.sparkfun.com/assets/8/a/1/2/0/2010-10-26-DataSheet-FSR402-Layout2.pdf>
Resistance at 20N = 800 ohms
Resistance at 100N = 250 ohms

[△]Differential amplifier gain:
 $A_v = 825k/165k = 5$

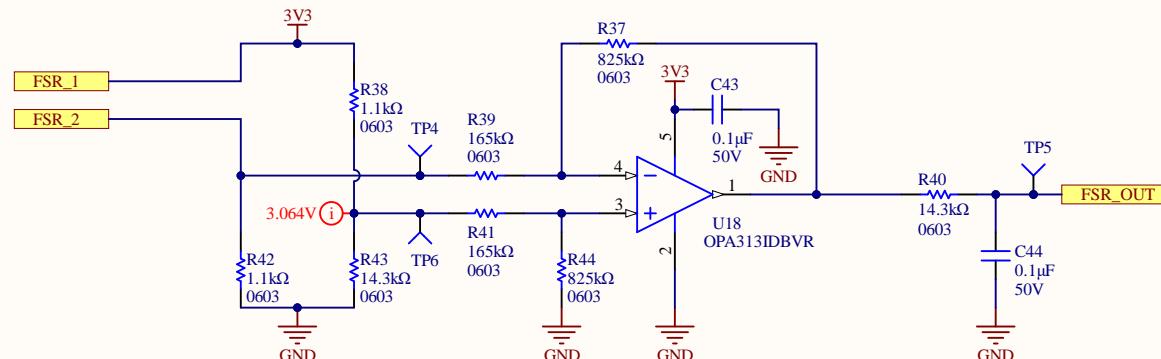
Wheatstone bridge voltage output values:
At 20N, $V_{out} = 3.2V$
At 100N, $V_{out} = 0.5V$

Low pass filter cutoff frequency:
 $f_c = 1/(2\pi \cdot 14.3k \cdot 0.1\mu F) = 111.30 \text{ Hz}$

Links to differential amplifier calculations and documentation
<https://docs.google.com/spreadsheets/d/1JzRwpCH-aMdlyAMp5zl6xFD8GIuJzvmOR8Y5Kzd1RN0/edit#gid=0>

[△]Gain = 5

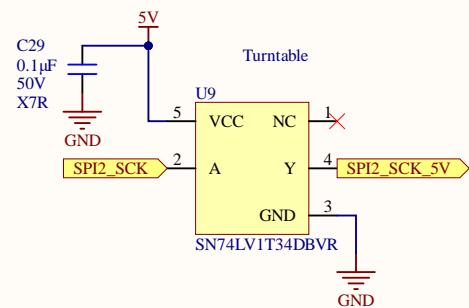
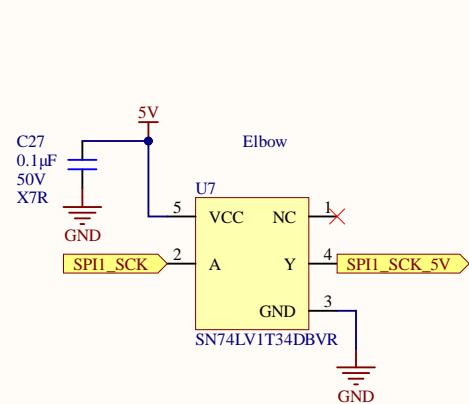
Wheatstone Bridge



Differential Amplifier

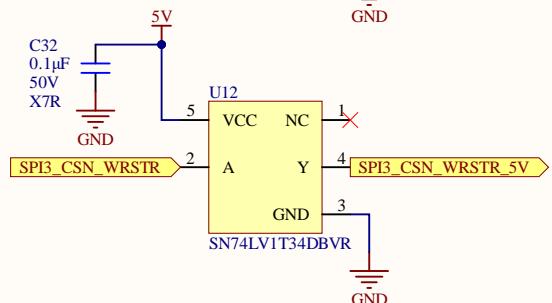
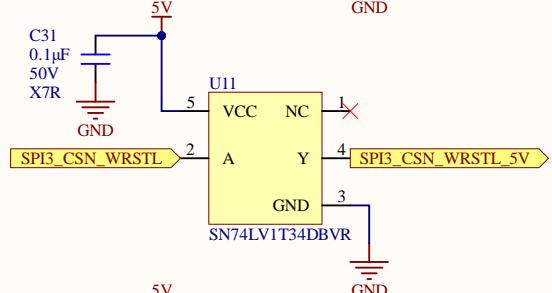
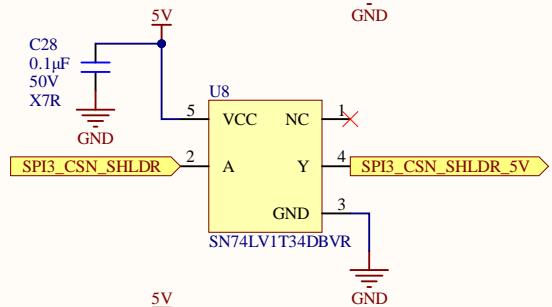
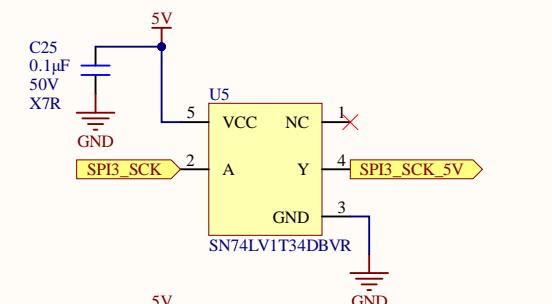
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Size: Letter		Drawn By: Ayesha Ebrahim
Date: 11/12/2020		Sheet 7 of 9
File: C:\Users\kyli eh\Desktop\Works\UWRT\MarsRover2021-hardware\Projects\Arm\Rev2\SH8 - FORCE SENSITIVE F		TEAM

A Encoder Level Shifter

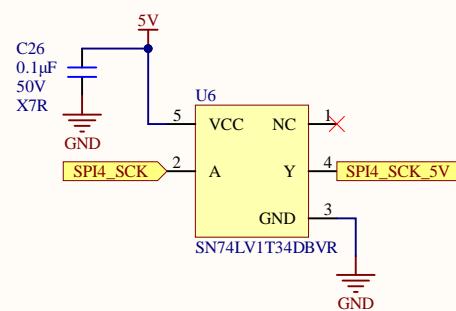


Encoder manufacturer: Broadcom
Encoder part number: AEAT-6012-A06

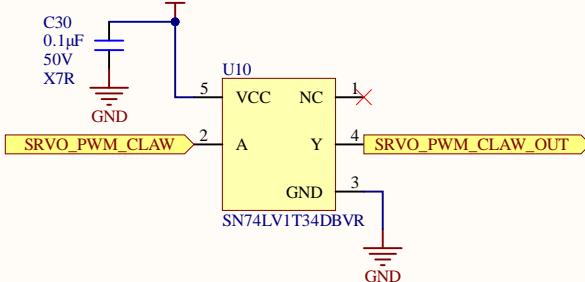
Did not level shift MISO signals since the STM32 SPI peripheral is 5V tolerant



B Current Sensor Level Shifter

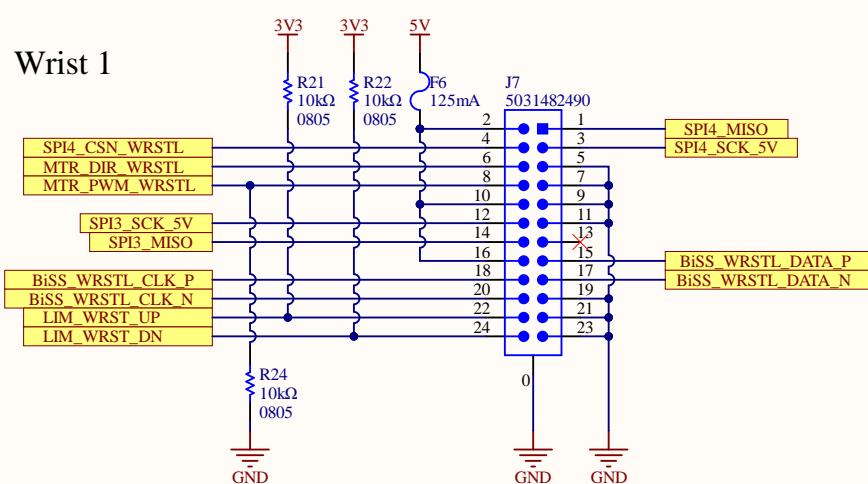


C Servo Level Shifter

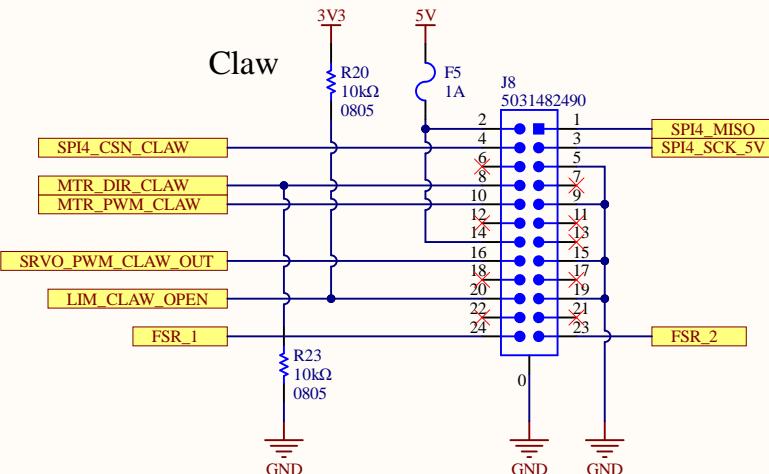


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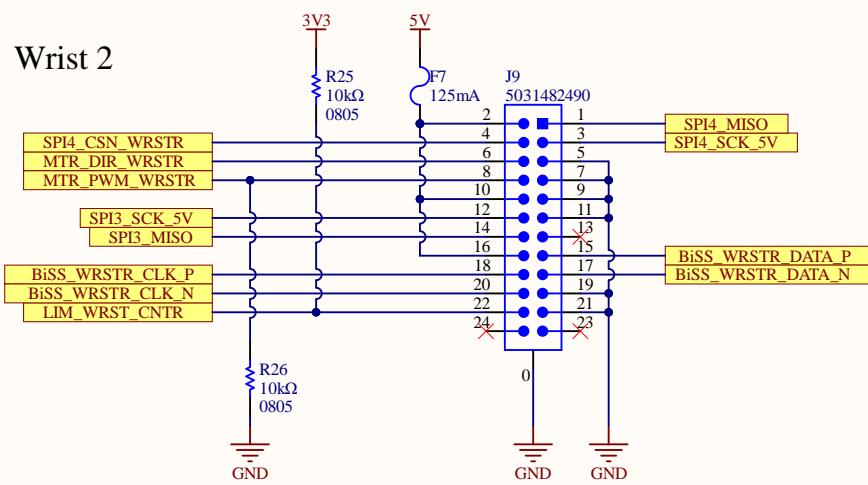
A

Wrist 1

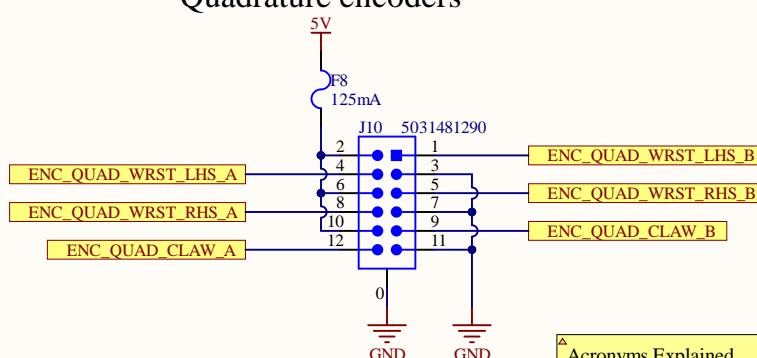
B

Claw

A

Wrist 2

C

Quadrature encoders

B

C

D

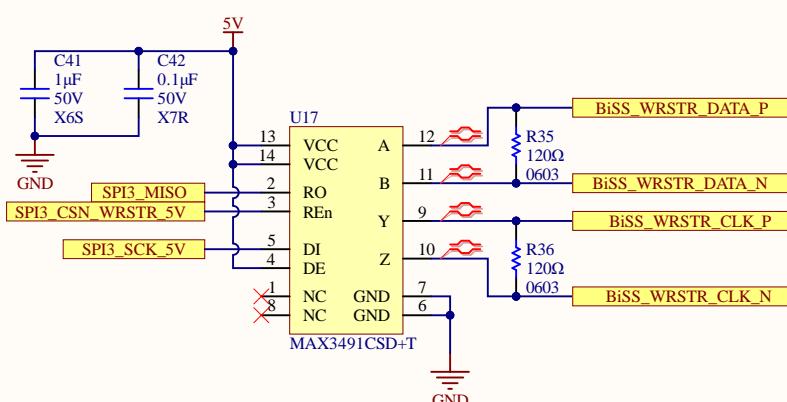
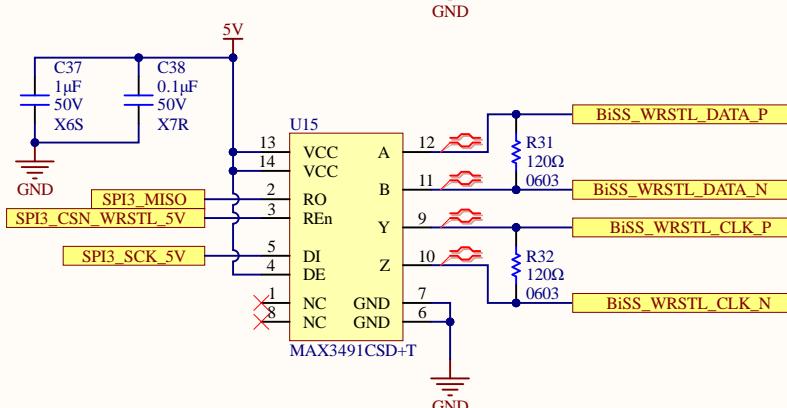
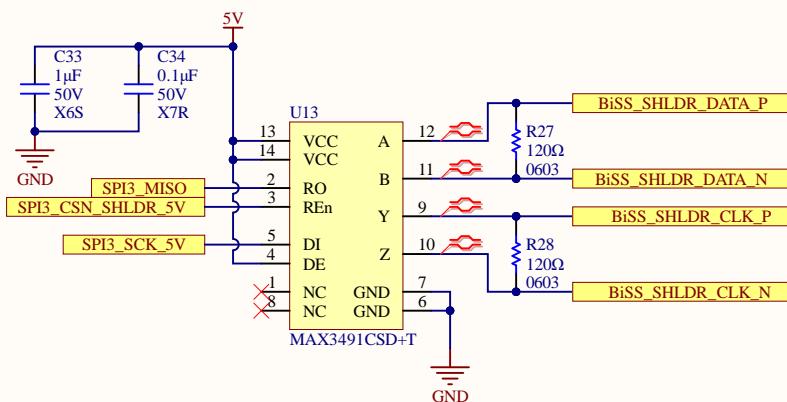
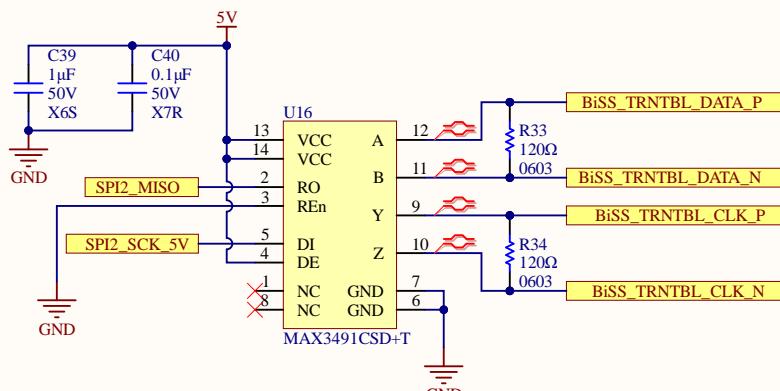
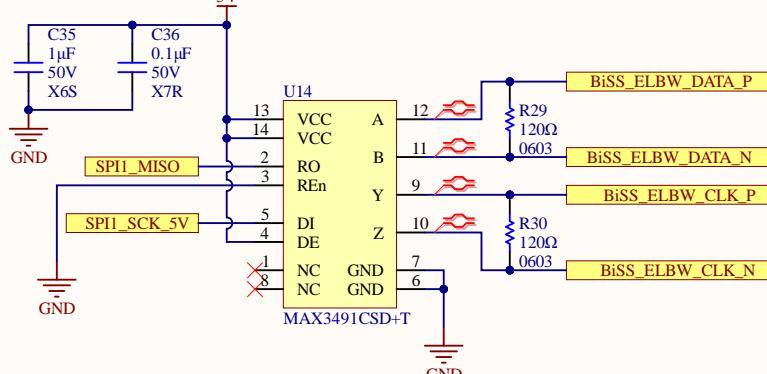
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Add pull-ups

Netzer Encoders



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