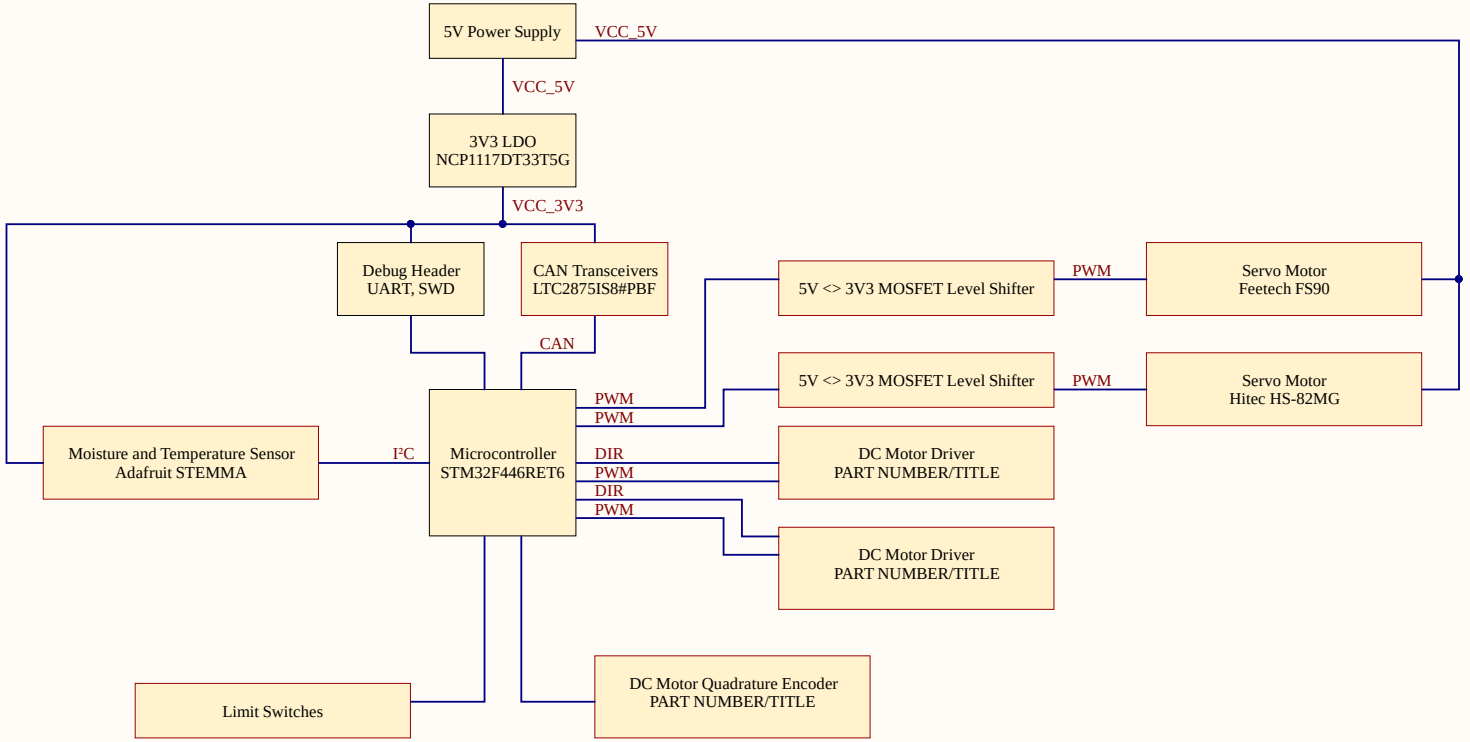
Mounting Holes

H1 H2

H3 H4



Title Science - 1_Block-Diagram		UW Robotics 200 University Avenue Waterloo Ontario Canada N2L 3G6
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Date: 2020-05-01	Sheet 1 of 6	
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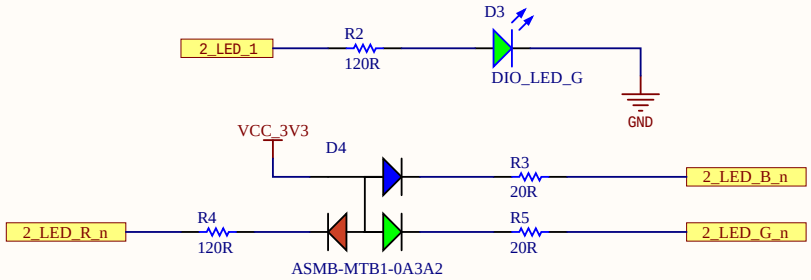
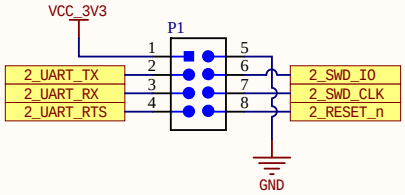
Debug/Programming



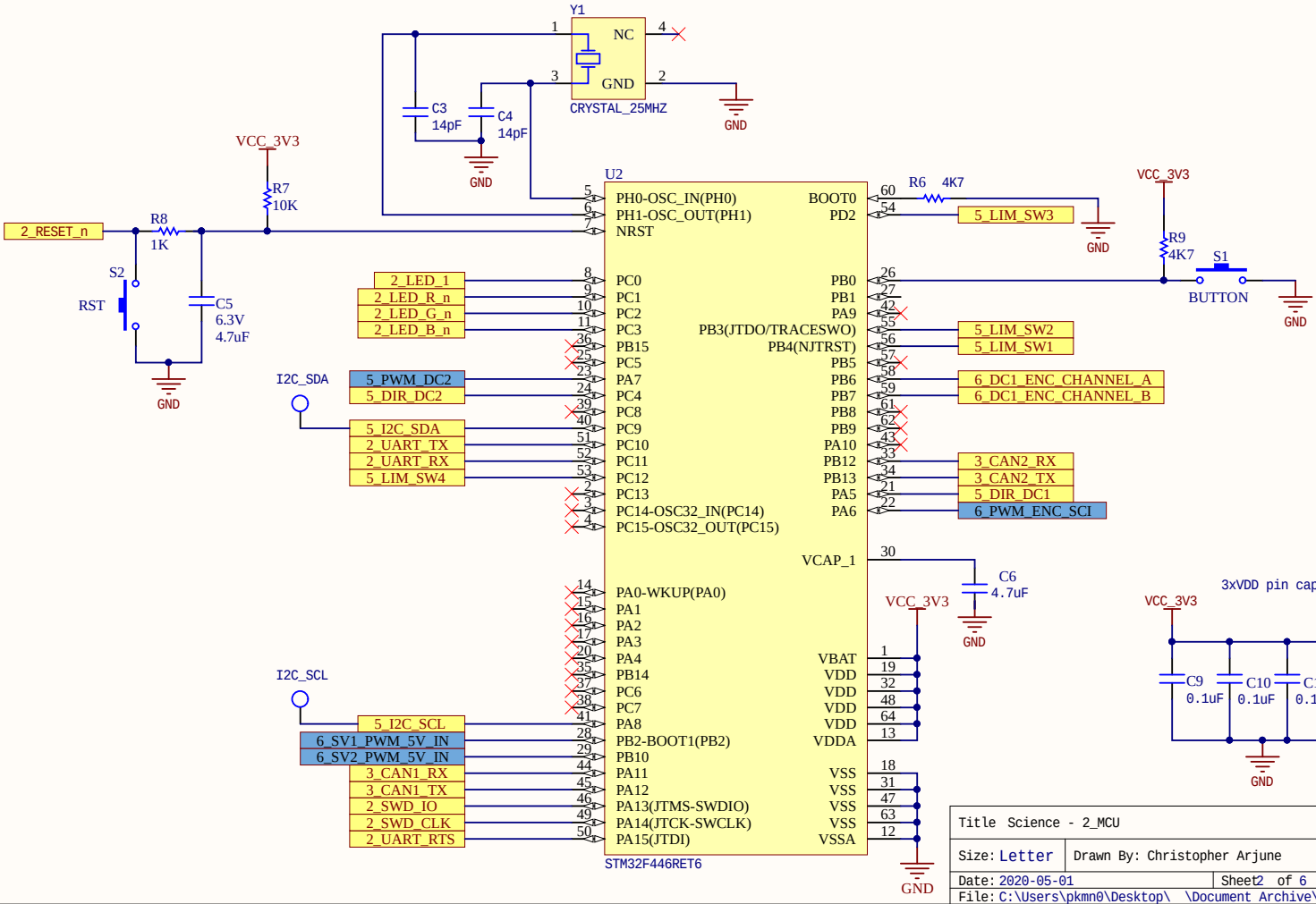
Current Calculations

Green LED voltage drop: 2.2V
- I = (3.3-2.2V)/120 = 10.83mA

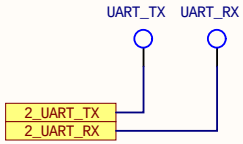
RGB LED voltage drops:
- Red: 2.1V: I = (3.3-2.1V)/120 = 10mA
- Blue: 3.1V: I = (3.3-3.1V)/20 = 10mA
- Green: 3.1V: I = (3.3-3.1V)/20 = 10mA



STM32F446RET6

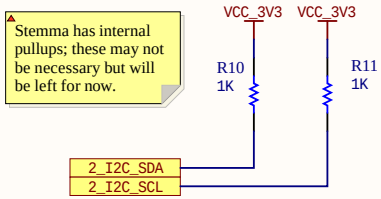


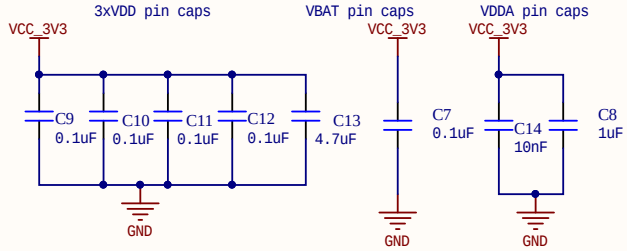
Testpoints



I²C Pullups

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





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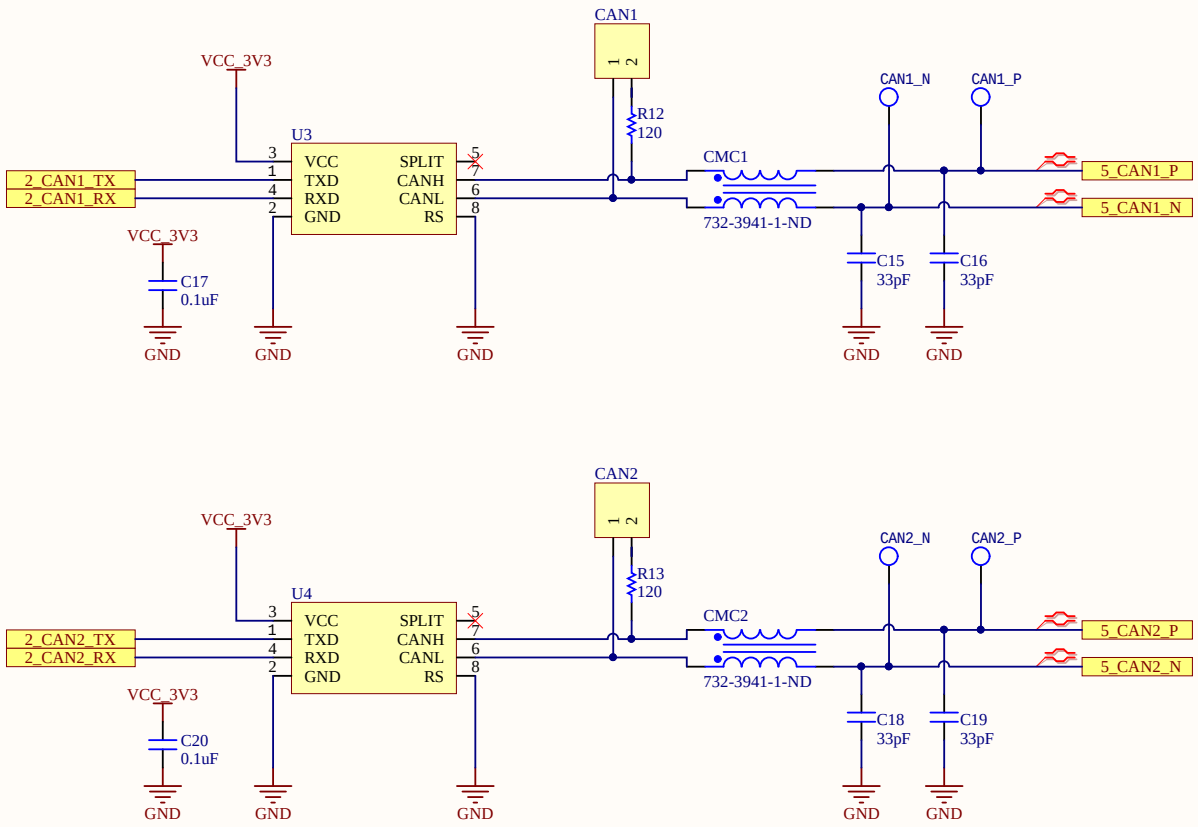
CAN Transceivers



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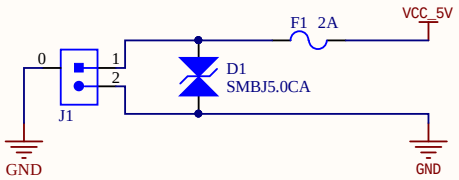
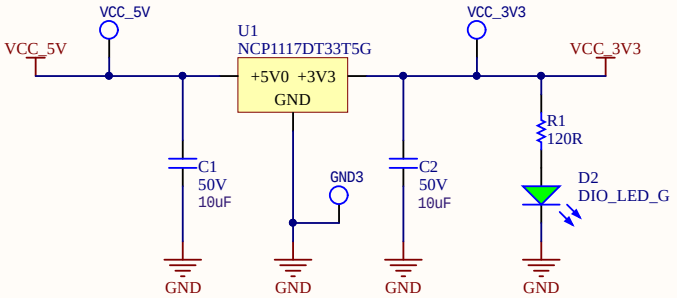
Power In



5V -> 3V3 LDO



LED forward voltage: 2.2V
I = (3.3-2.2)/120 = 9.17mA

- V2: Replace LDO with an LDO with less ESR requirements
- Explore adding bulk capacitor

Title Science - 4_Power		UW Robotics 200 University Avenue Waterloo Ontario Canada N2L 3G6
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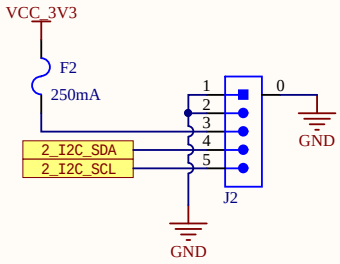
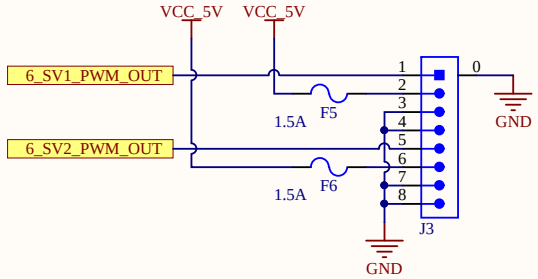
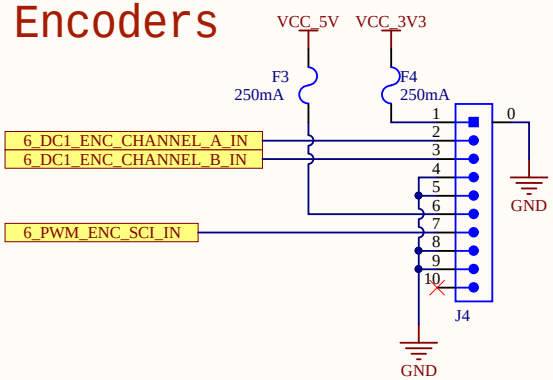
I²C Sensors



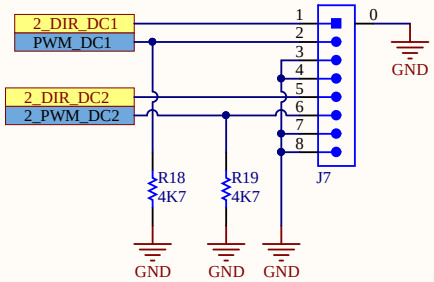
Servos



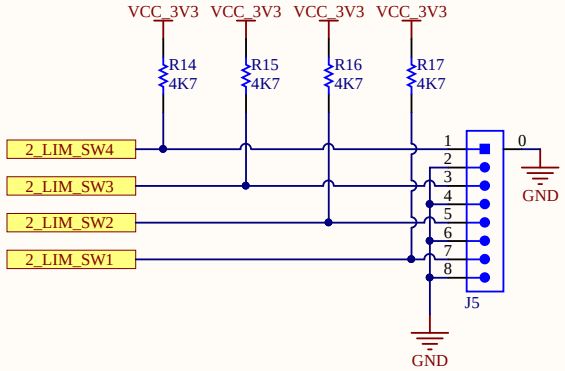
Encoders



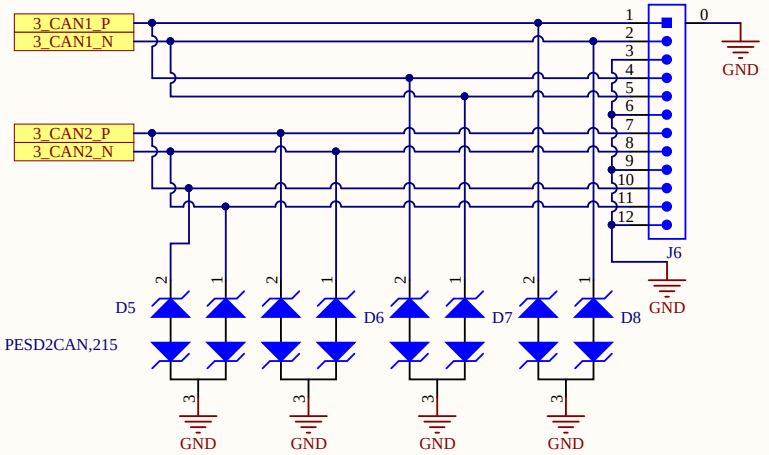
DC Motors



Limit Switches



CAN



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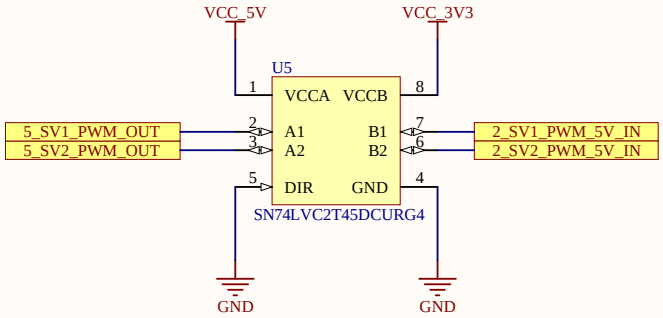
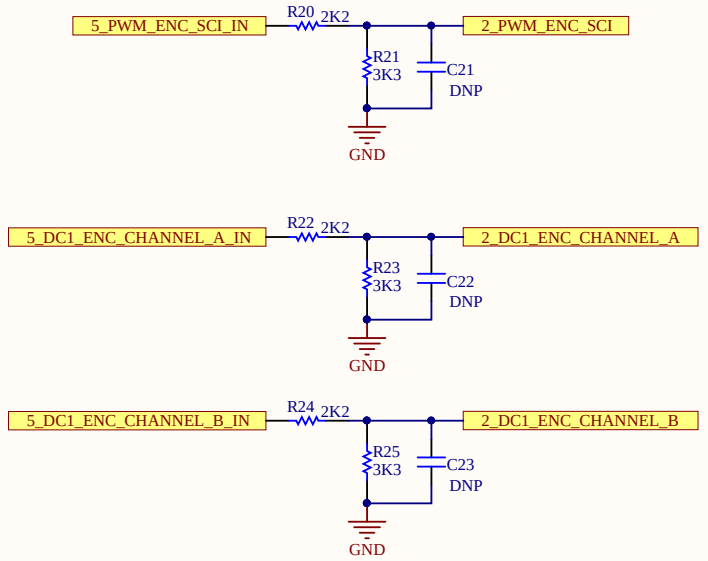
Servo Level Shifters



Encoder Voltage Dividers



Low-pass filter cutoff frequency:
fc = 1 / (2*PI*3.3k*?)
= ? Hz

Voltage Division:
Vout = 5 * 3.3k / (2.2k + 3.3k)

Title: Science - 6_Servo_and_Encoders		UW Robotics 200 University Avenue Waterloo Ontario Canada N2L 3G6
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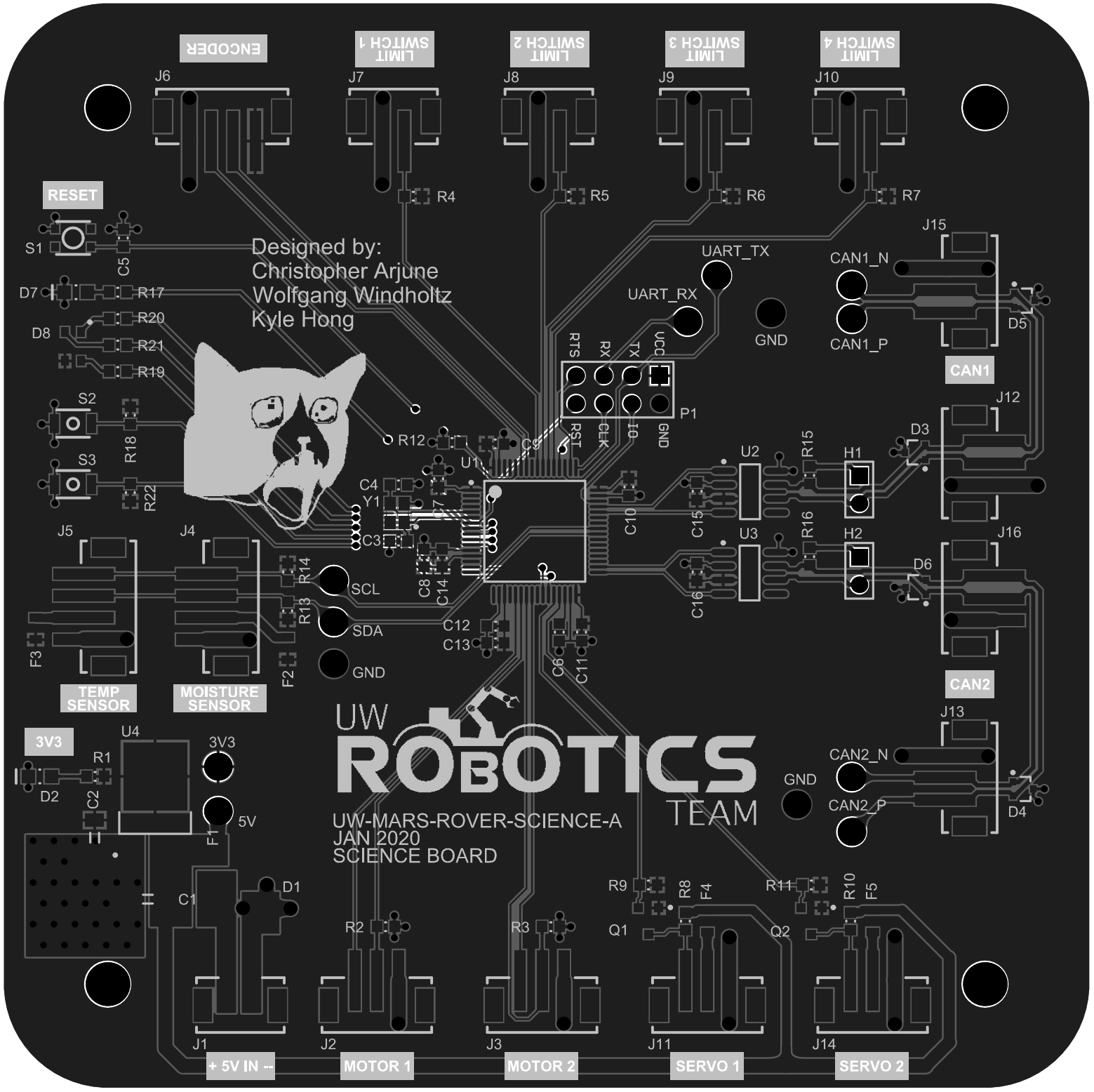
ENCODER
LIMIT SWITCH 1
LIMIT SWITCH 2
LIMIT SWITCH 3
LIMIT SWITCH 4
J6
J7
J8
J9
J10
RESET
S1
C5
Designed by:
Christopher Arjune
Wolfgang Windholtz
Kyle Hong
D7
R17
D8
R20
R21
R19
S2
S3
R18
R22
R12
C9
U1
C4
Y1
C7
C3
R4
R5
R6
R7
UART_TX
UART_RX
GND
RTS
RX
TX
VCC
RST
CLK
IO
GND
P1
J15
CAN1_N
CAN1_P
D5
CAN1
J12
D3
U2
R15
H1
C10
C15
U3
R16
H2
D6
J16
J5
J4
R14
R13
SCL
SDA
GND
C8
C14
C12
C13
C6
C11
F3
F2
TEMP SENSOR
MOISTURE SENSOR
CAN2
J13
CAN2_N
CAN2_P
D4
3V3
U4
R1
D2
C2
3V3
5V
F1
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J11
J14
+ 5V IN --
MOTOR 1
MOTOR 2
SERVO 1
SERVO 2