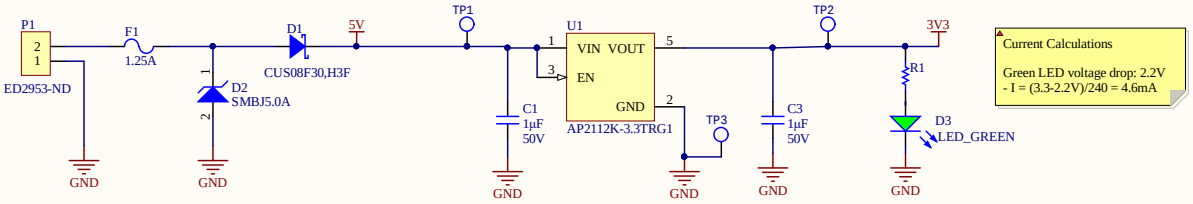
Power In

5V to 3V3 LDO



Title: Power	
Project: Robot Controller.PrjPcb	
Rev: 1	Checker: Lance Bantoto
	Engineer: Christopher Arjune
Date: 2021-01-03	Sheet: 1 of 6

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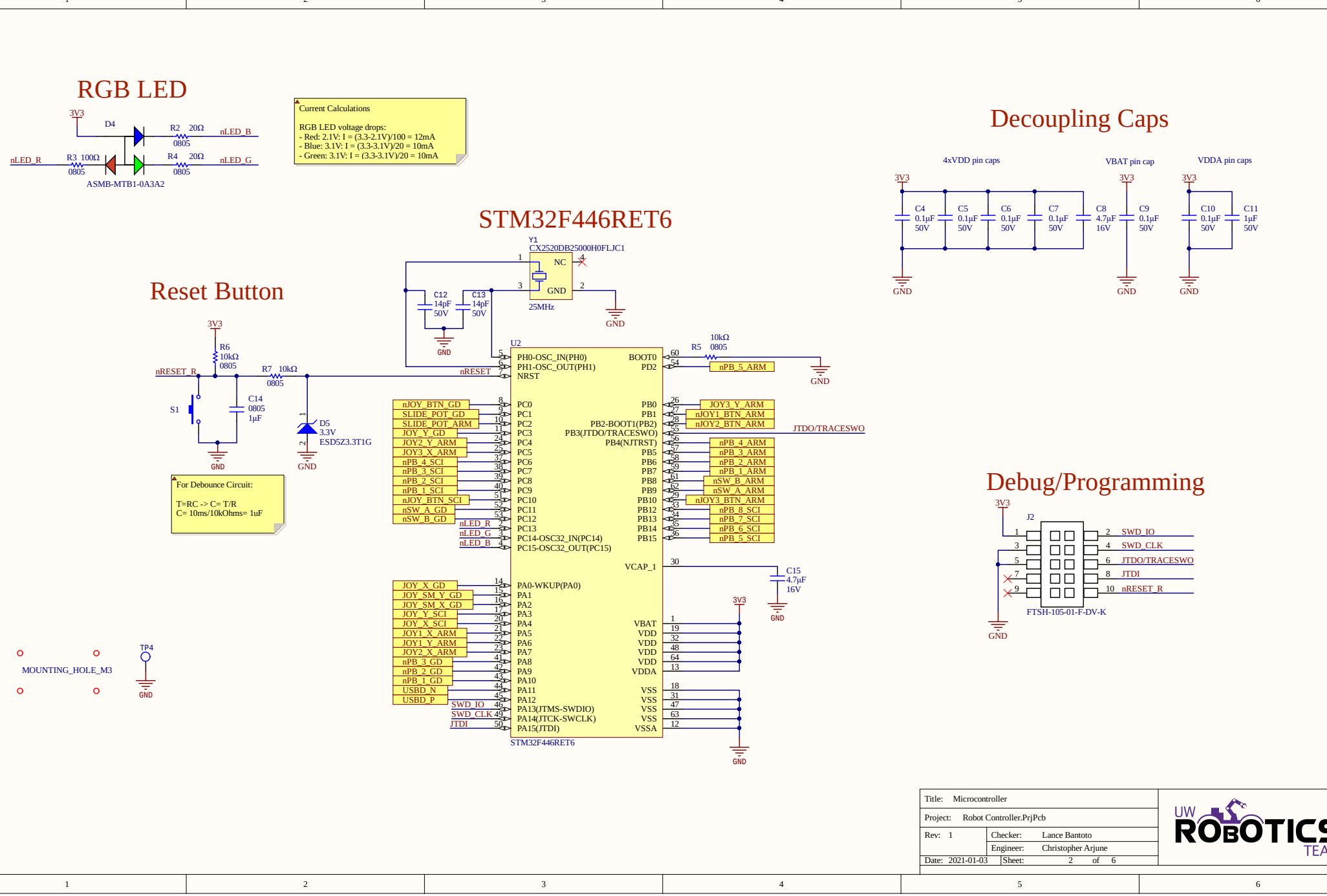
RGB LED
3V3
D4
R2 20Ω
0805
nLED_B
nLED_R
R3 100Ω
0805
R4 20Ω
0805
nLED_G
ASMB-MTB1-0A3A2
Current Calculations
RGB LED voltage drops:
- Red: 2.1V: I = (3.3-2.1V)/100 = 12mA
- Blue: 3.1V: I = (3.3-3.1V)/20 = 10mA
- Green: 3.1V: I = (3.3-3.1V)/20 = 10mA
Decoupling Caps
4xVDD pin caps
VBAT pin cap
VDDA pin caps
C4 0.1µF 50V
C5 0.1µF 50V
C6 0.1µF 50V
C7 0.1µF 50V
C8 4.7µF 16V
C9 0.1µF 50V
C10 0.1µF 50V
C11 1µF 50V
GND
STM32F446RET6
Y1
CX2520DB25000H0FLJC1
NC
GND
25MHz
C12 14pF 50V
C13 14pF 50V
Reset Button
R6 10kΩ 0805
R7 10kΩ 0805
nRESET_R
nRESET
S1
C14 0805 1µF
D5 3.3V ESD5Z3.3T1G
For Debounce Circuit:
T=RC -> C= T/R
C= 10ms/10kOhms= 1uF
U2
PH0-OSC_IN(PH0)
PH1-OSC_OUT(PH1)
NRST
R5 10kΩ 0805
nPB_5_ARM
nJOY_BTN_GD
SLIDE_POT_GD
SLIDE_POT_ARM
JOY_Y_GD
JOY2_Y_ARM
JOY3_X_ARM
nPB_4_SCI
nPB_3_SCI
nPB_2_SCI
nPB_1_SCI
nJOY_BTN_SCI
nSW_A_GD
nSW_B_GD
nLED_R
nLED_G
nLED_B
JOY_X_GD
JOY_SM_Y_GD
JOY_SM_X_GD
JOY_Y_SCI
JOY_X_SCI
JOY1_X_ARM
JOY1_Y_ARM
JOY2_X_ARM
nPB_3_GD
nPB_2_GD
nPB_1_GD
USBD_N
USBD_P
SWD_IO
SWD_CLK
JTDI
JOY3_Y_ARM
nJOY1_BTN_ARM
nJOY2_BTN_ARM
JTDO/TRACESWO
nPB_4_ARM
nPB_3_ARM
nPB_2_ARM
nPB_1_ARM
nSW_B_ARM
nSW_A_ARM
nJOY3_BTN_ARM
nPB_8_SCI
nPB_7_SCI
nPB_6_SCI
nPB_5_SCI
C15 4.7µF 16V
VCAP_1
3V3
STM32F446RET6
Debug/Programming
J2
SWD_IO
SWD_CLK
JTDO/TRACESWO
JTDI
nRESET_R
FTSH-105-01-F-DV-K
MOUNTING_HOLE_M3
TP4
Title: Microcontroller
Project: Robot Controller.PrjPcb
Rev: 1
Checker: Lance Bantoto
Engineer: Christopher Arjune
Date: 2021-01-03
Sheet: 2 of 6
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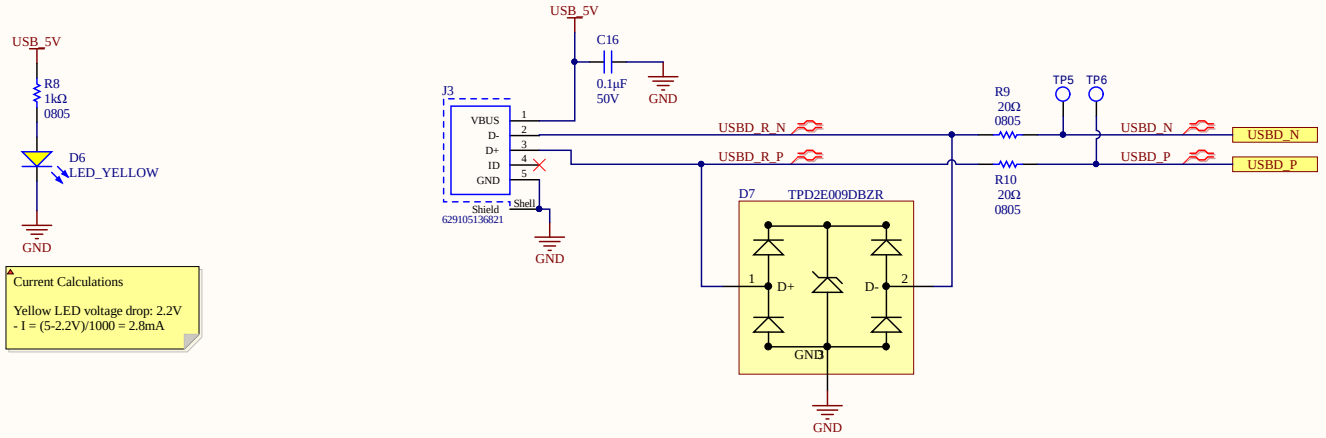
USB Connector



Title: USB		
Project: Robot Controller.PrjPcb		
Rev: 1	Checker: Lance Bantoto	
	Engineer: Christopher Arjune	
Date: 2021-01-03	Sheet: 3 of 6	

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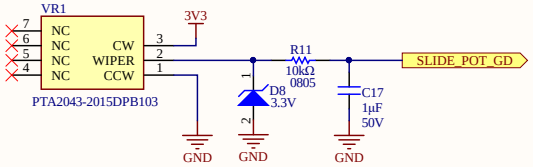
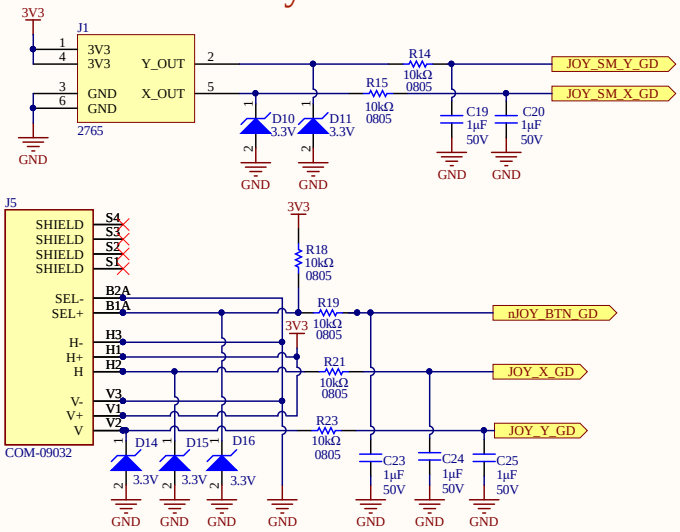
Slide Potentiometer



For Debounce Circuits:

T=RC -> C= T/R
C= 10ms/10kOhms= 1uF

2-Axis Joysticks



Controls (subject to change)

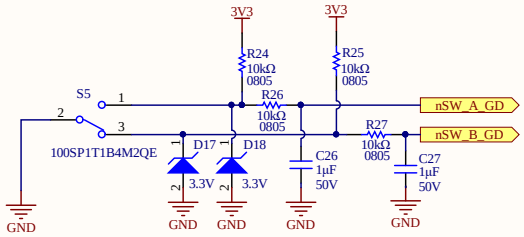
Joysticks:
- 1: Large joystick is used for driving
- 2: Small joystick is used for gimbal

Potentiometer:
- Used for driving speed control

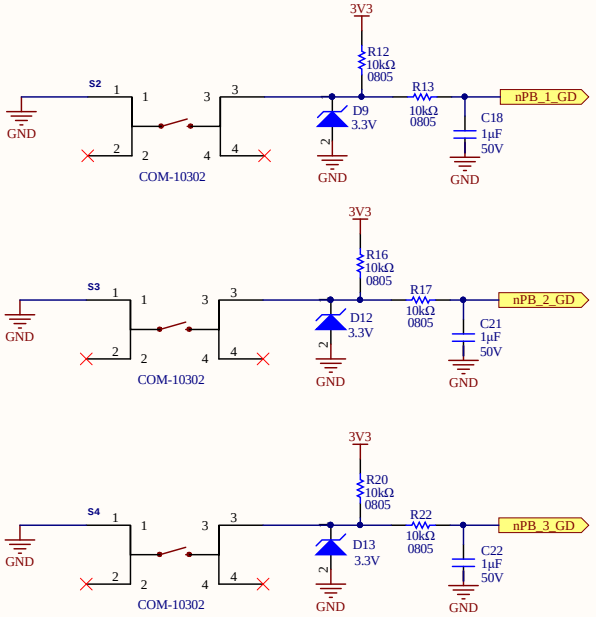
Switch:
- Used for reverse-mode toggle

Buttons:
- 1: Full-stop (halt all movement immediately)
- 2-3: Extra, in case additional functionality is requested

SPDT Switch



Pushbuttons



Title: GimbDrive Controls		
Project: Robot Controller.PrjPcb		
Rev: 1	Checker: Lance Bantoto	
	Engineer: Christopher Arjune	
Date: 2021-01-03	Sheet: 4 of 6	

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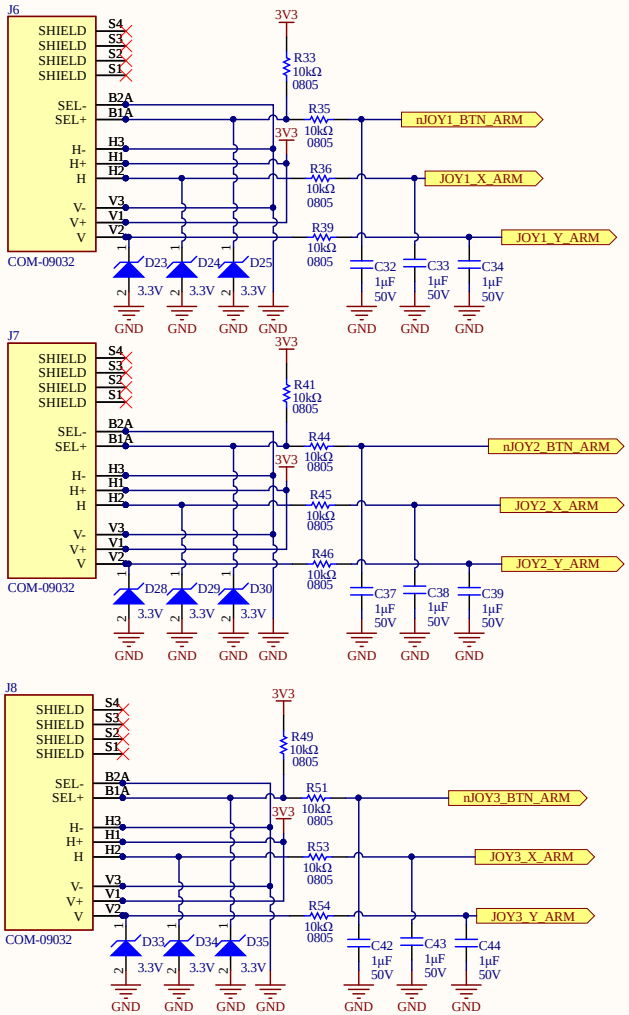
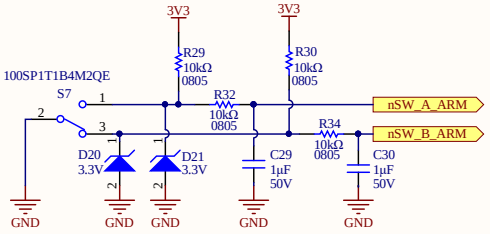
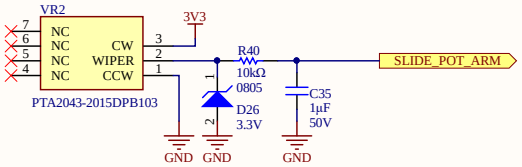
2-Axis Joysticks



SPDT Switch



Slide Potentiometer



For Debounce Circuits:

T=RC -> C= T/R
C= 10ms/10kOhms= 1uF

Controls

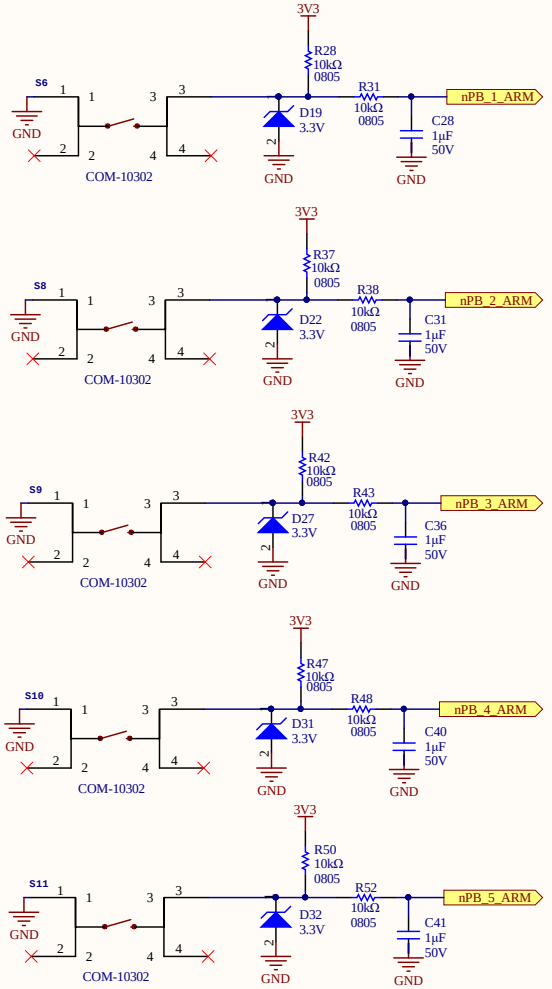
Joysticks: (in joint-control mode)
- 1: Up/Down is for shoulder, Left/Right is for turntable
- 2: Up/Down is for elbow
- 3: Up/Down is for wrist pitch, Left/Right is for wrist roll

Switch:
- Used to toggle between joint-control and inverse-kinematics

Potentiometer:
- Used to adjust movement speed of joints/arm (depending on control mode)

Buttons:
- 1/2: Open/close claw
- 3/4: Set/Go to home position
- 5: Extra, in case extra functionality is requested later

Pushbuttons



Title: Arm Controls		
Project: Robot Controller.PrjPcb		
Rev: 1	Checker: Lance Bantoto	
	Engineer: Christopher Arjune	
Date: 2021-01-03	Sheet: 5 of 6	

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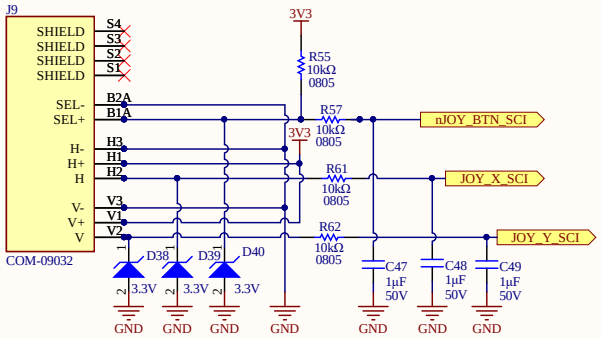
2-Axis Joystick



Controls

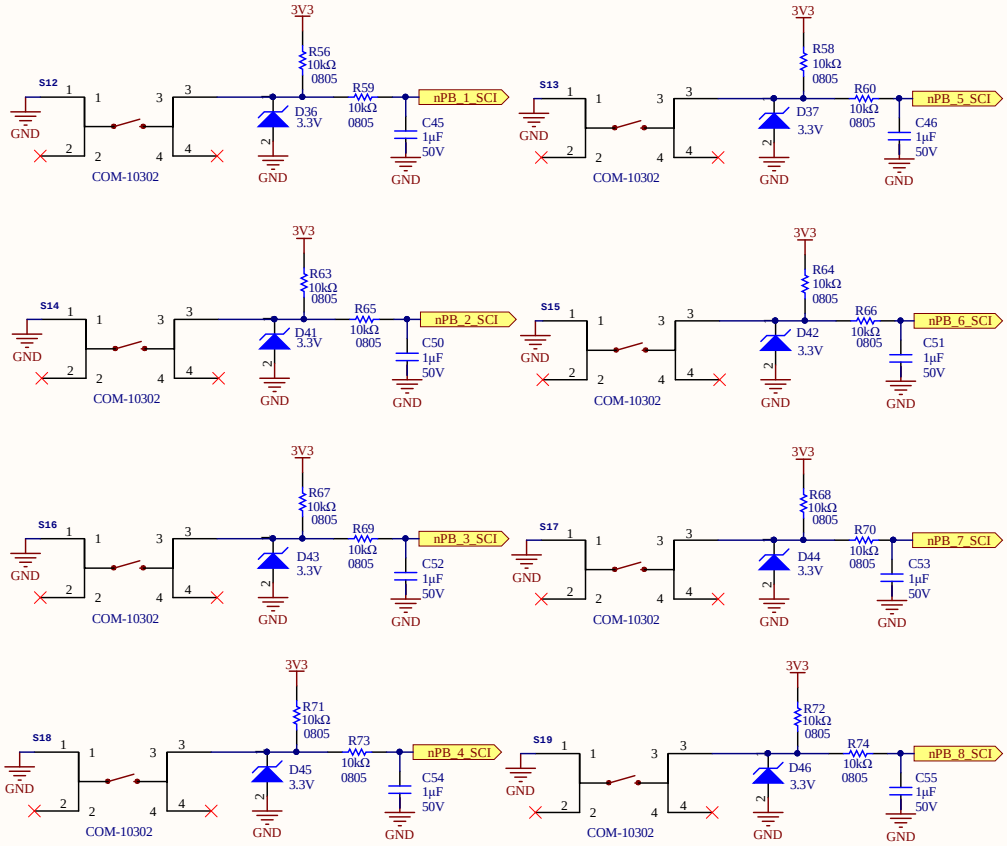
Joystick:
- Up/Down is for elevator, Left/Right is for opening/closing shovel
- Button should be used to choose between L/R and U/D, since the science mechanism may be damaged if too many things are moving at once

Buttons:
- 1/2: Move left/right 1 index
- 3/4: Move to leftmost/rightmost index
- 5/6: Open/close lid
- 7: Pre-programmed mixing sequence
- 8: Extra, in case additional functionality is requested later

Pushbuttons

For Debounce Circuits:

T=RC -> C= T/R
C= 10ms/10kOhms= 1uF



Title: Science Controls		
Project: Robot Controller.PrjPcb		
Rev: 1	Checker: Lance Bantoto	
	Engineer: Christopher Arjune	
Date: 2021-01-03	Sheet: 6 of 6	

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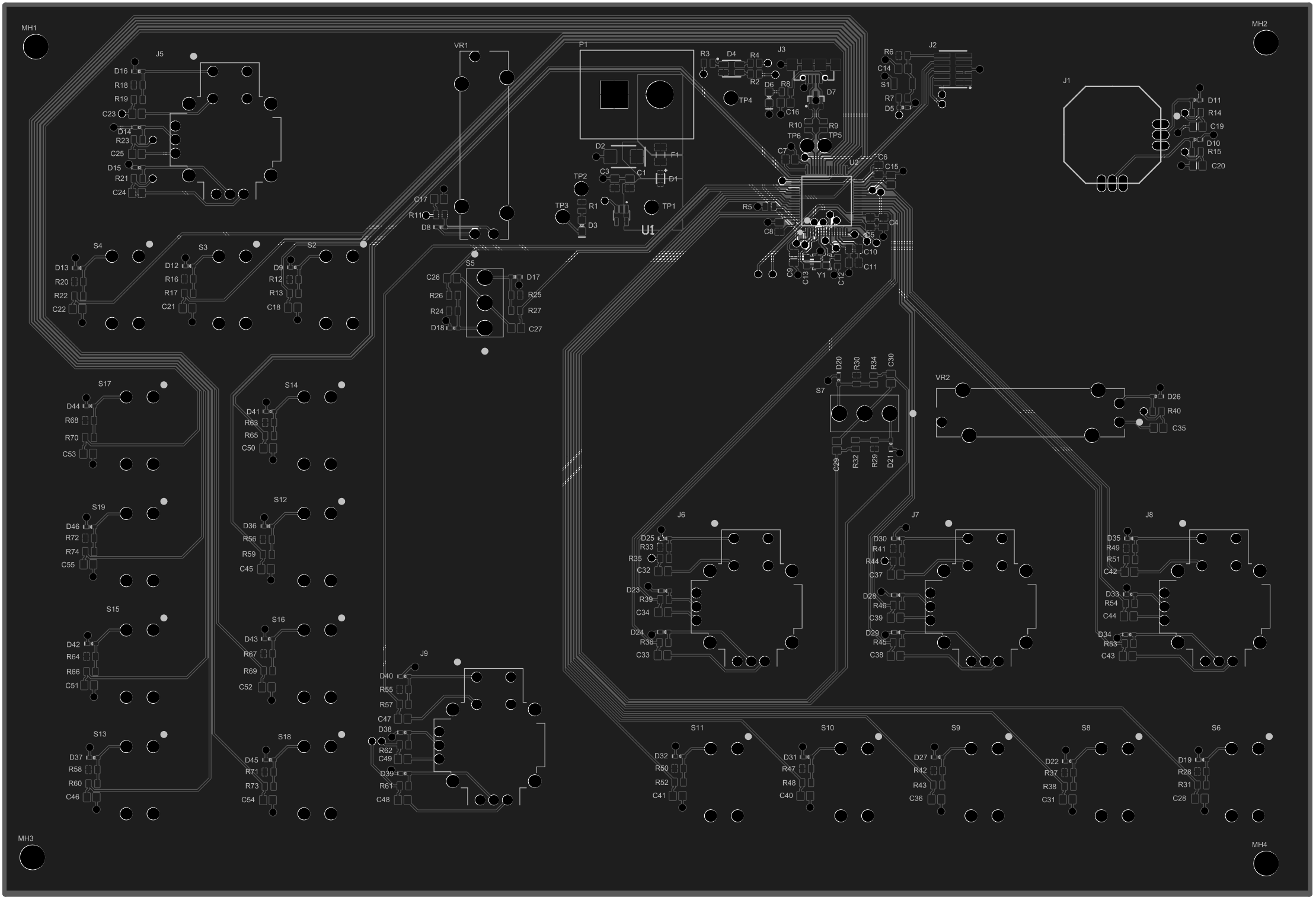
MH1
MH2
MH3
MH4
J5
VR1
P1
J3
J2
J1
U1
U2
S4
S3
S2
S5
S7
VR2
S17
S14
S19
S12
S15
S16
S13
S18
J9
J6
J7
J8
S11
S10
S9
S8
S6