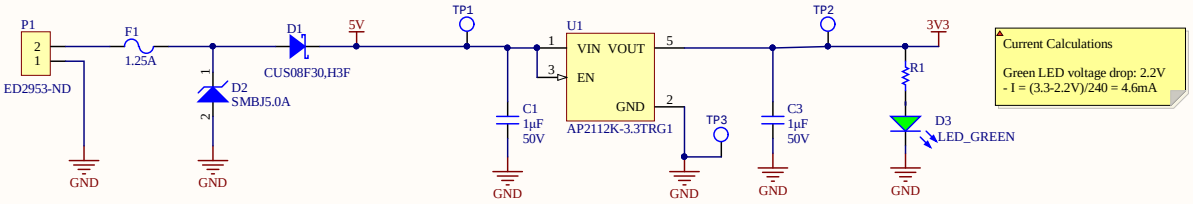
Power In

5V to 3V3 LDO



Title: Power		
Project: Robot Controller.PrjPcb		
Rev: 1	Checker: Lance Bantoto	
	Engineer: Christopher Arjune	
Date: 2021-01-13	Sheet: 1 of 6	

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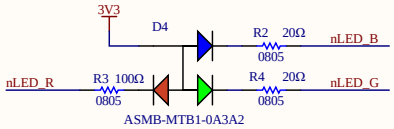
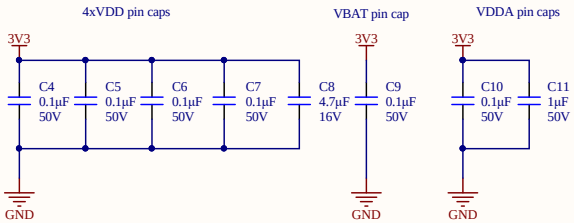
RGB LED



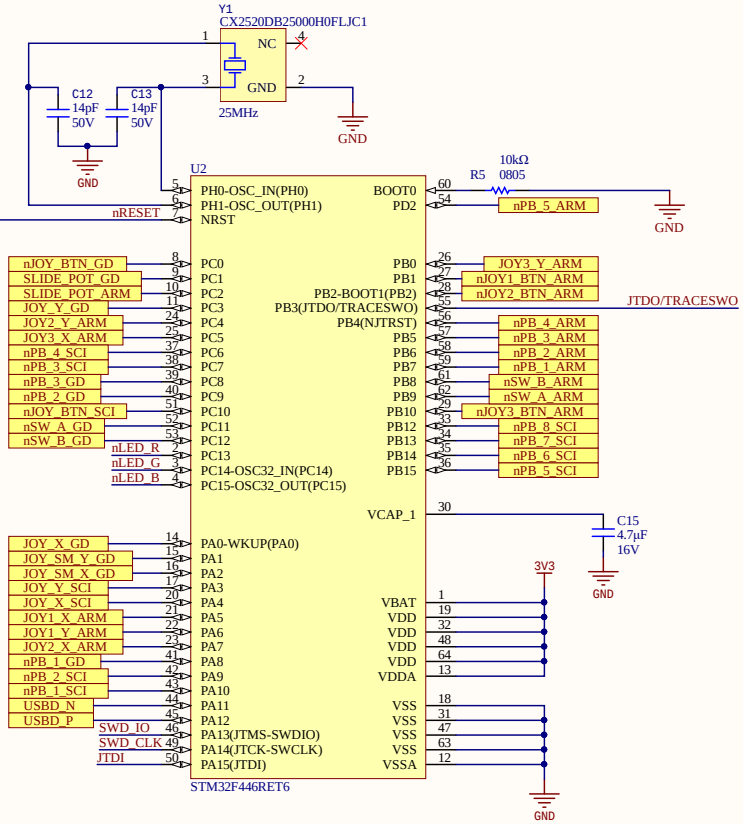
Current Calculations

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

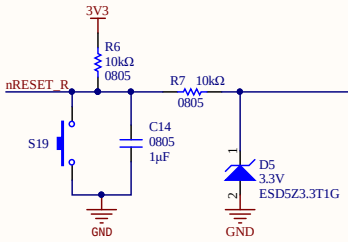
Decoupling Caps



STM32F446RET6



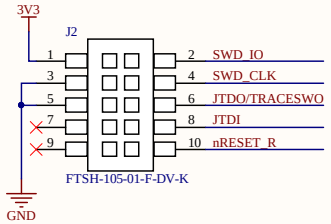
Reset Button



For Debounce Circuit:

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

Debug/Programming



Title: Microcontroller		
Project: Robot Controller.PrjPcb		
Rev: 1	Checker:	Lance Bantoto
	Engineer:	Christopher Arjune
Date: 2021-01-13	Sheet:	2 of 6

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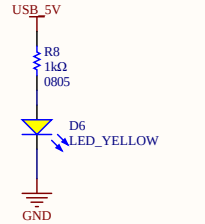
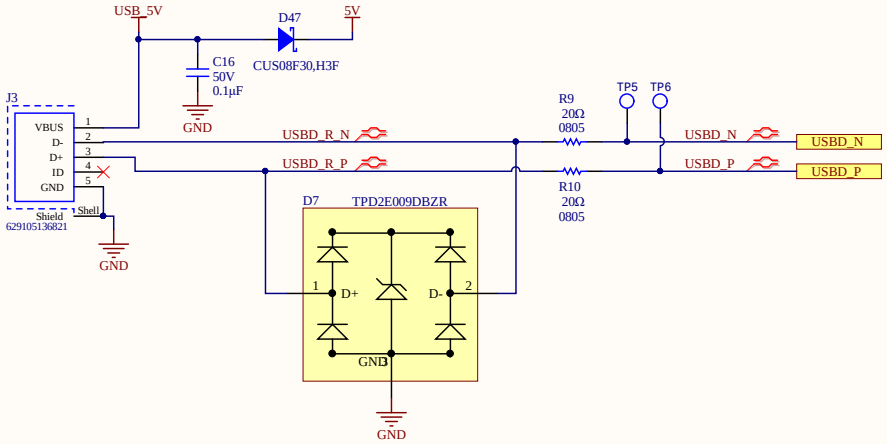
USB Connector



Current Calculations

Yellow LED voltage drop: 2.2V
- I = (5-2.2V)/1000 = 2.8mA



Title: USB		
Project: Robot Controller.PrjPcb		
Rev: 1	Checker: Lance Bantoto	
	Engineer: Christopher Arjune	
Date: 2021-01-13	Sheet: 3 of 6	

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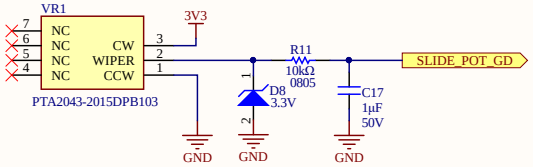
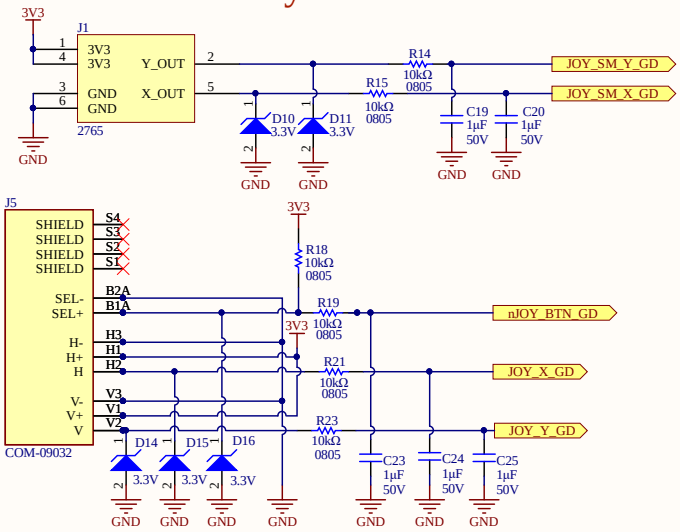
Slide Potentiometer



For Debounce Circuits:

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

2-Axis Joysticks



Controls (subject to change)

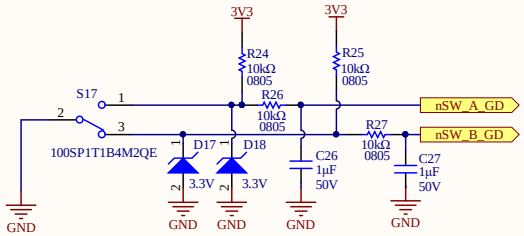
Joysticks:
- 1: Large joystick is used for driving
- 2: Small joystick is used for gimbal

Potentiometer:
- Used for driving speed control

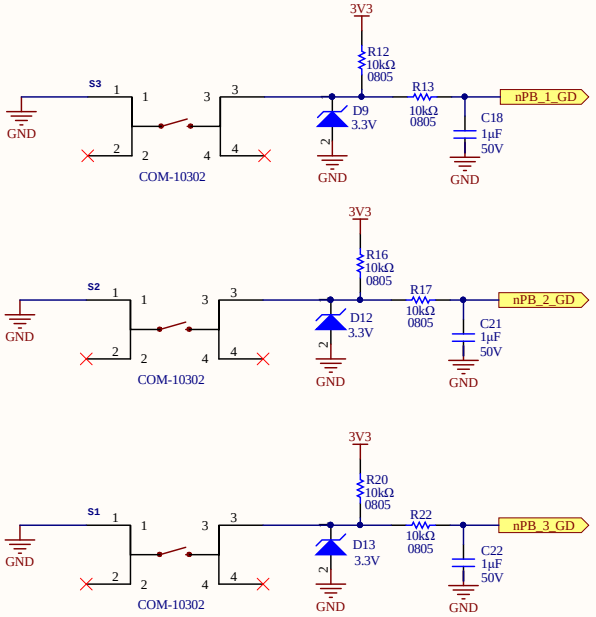
Switch:
- Used for reverse-mode toggle

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: 2021-01-13	Sheet:	4 of 6

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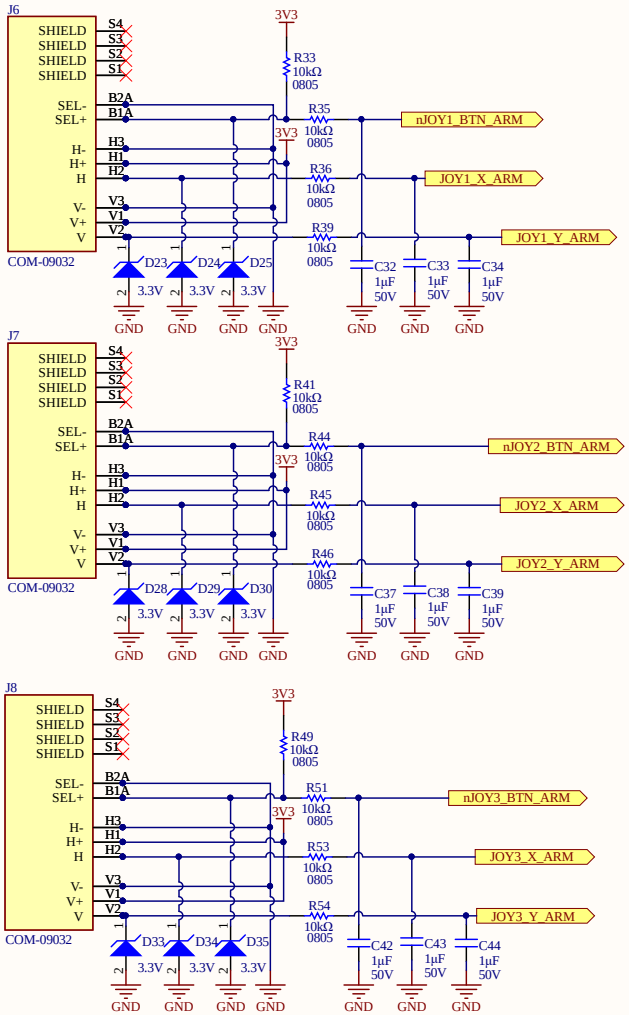
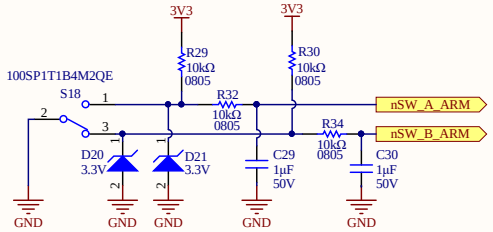
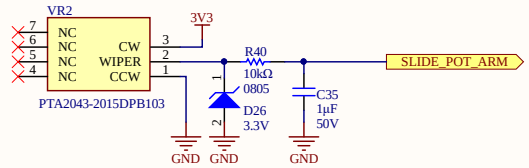
2-Axis Joysticks



SPDT Switch



Slide Potentiometer



For Debounce Circuits:

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

Controls

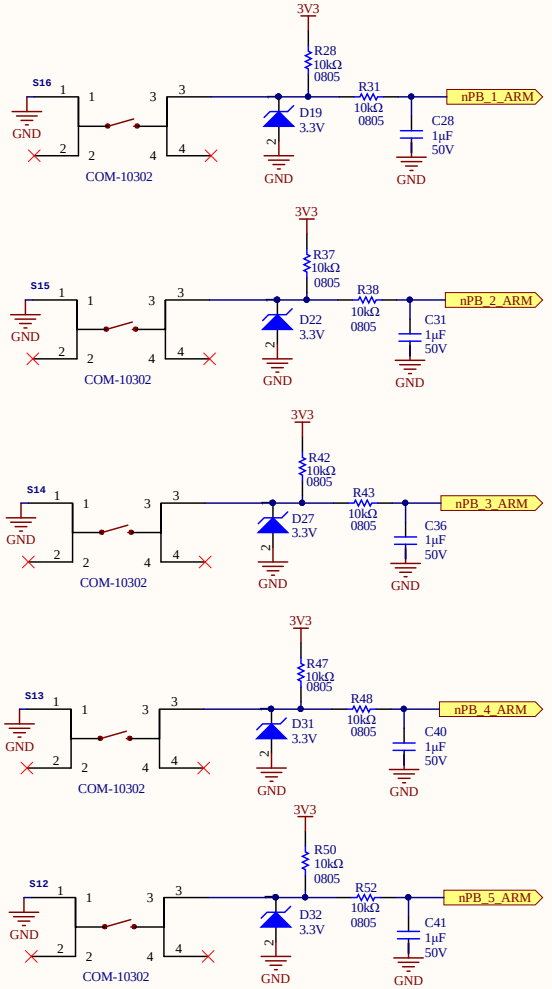
Joysticks: (in joint-control mode)
- 1: Up/Down is for shoulder, Left/Right is for turntable
- 2: Up/Down is for elbow
- 3: Up/Down is for wrist pitch, Left/Right is for wrist roll

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: 2021-01-13	Sheet:	5 of 6

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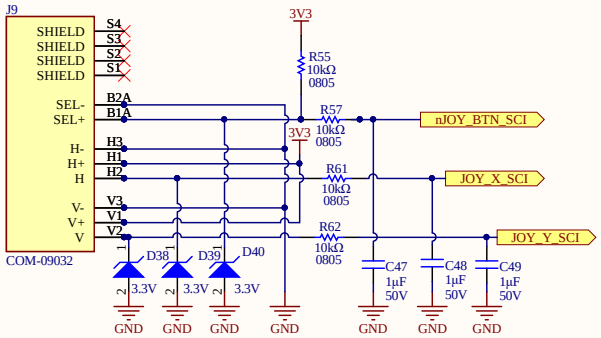
2-Axis Joystick



Controls

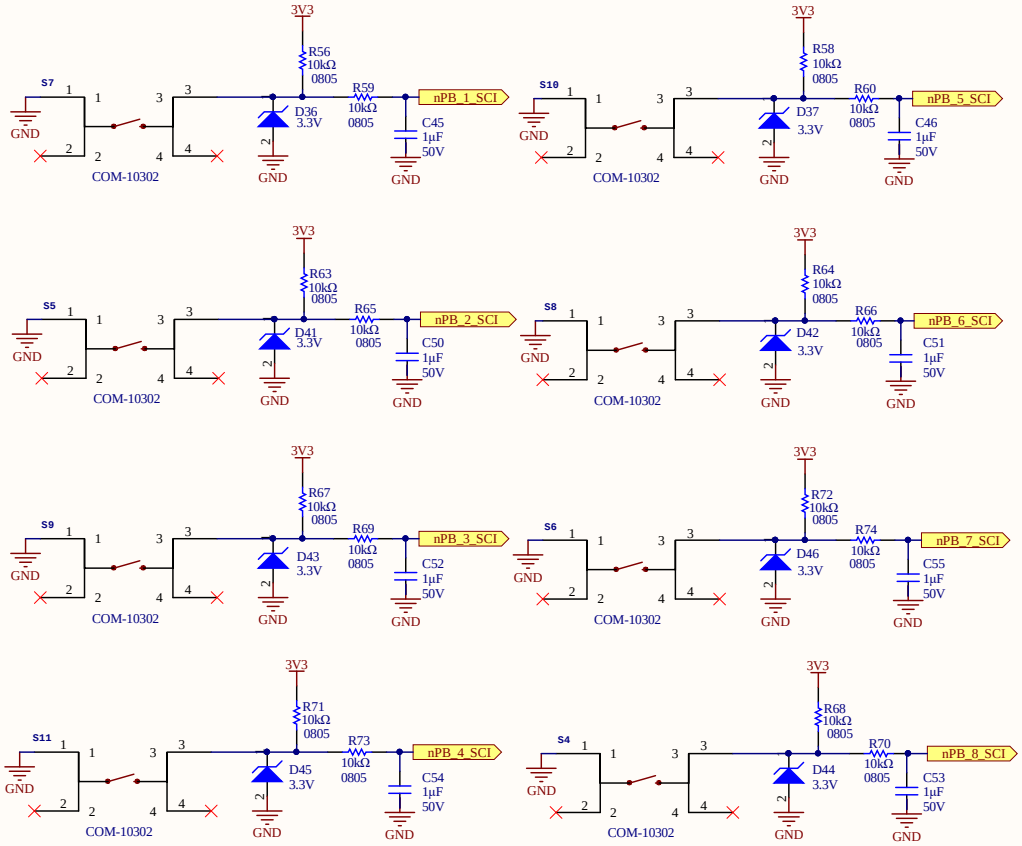
Joystick:
- Up/Down is for elevator, Left/Right is for opening/closing shovel
- Button should be used to choose between L/R and U/D, since the science mechanism may be damaged if too many things are moving at once

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: 2021-01-13	Sheet: 6 of 6	

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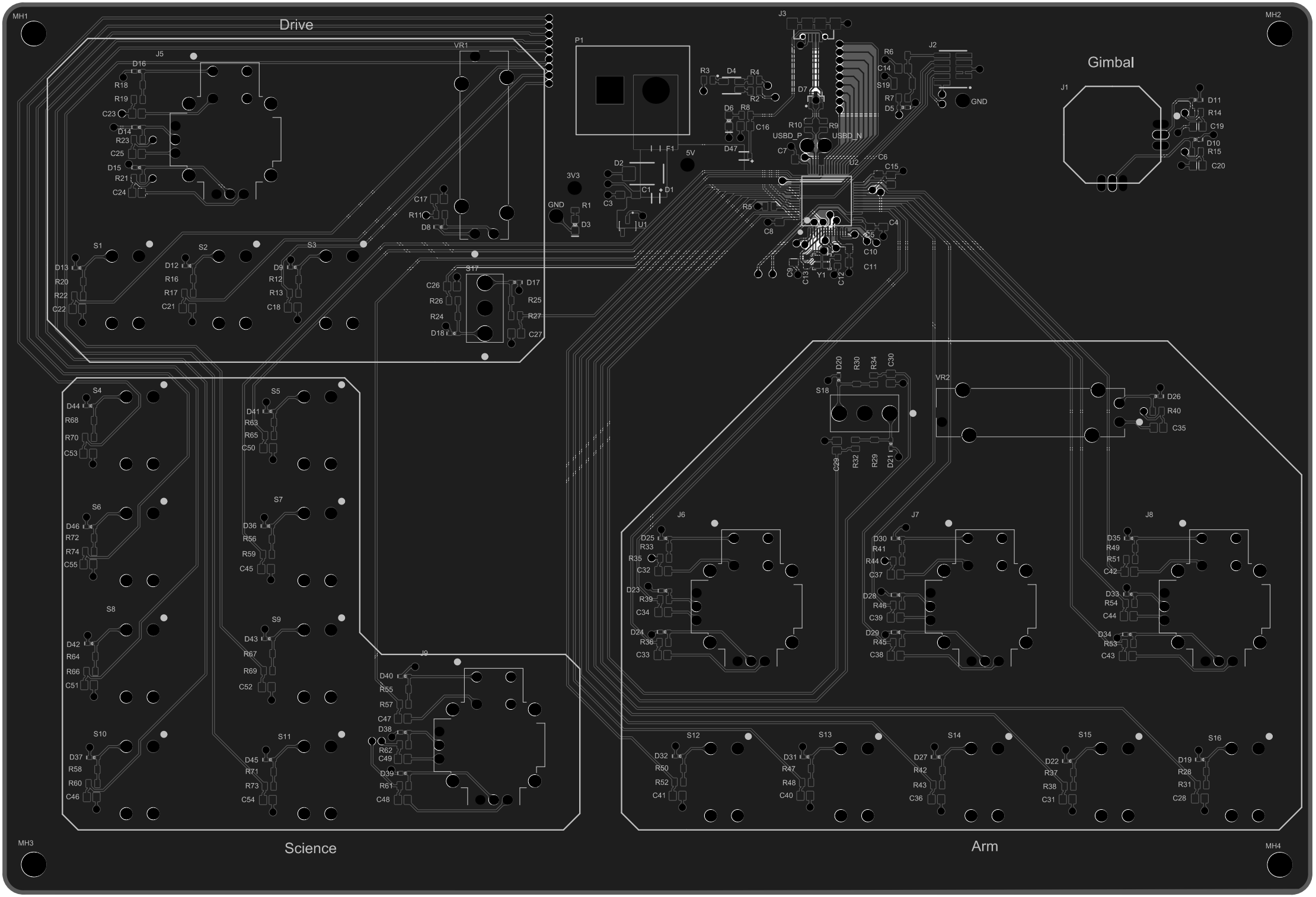
Drive
Gimbal
Science
Arm
MH1
MH2
MH3
MH4
J1
J2
J3
J5
P1
VR1
VR2
S1
S2
S3
S4
S5
S6
S7
S8
S9
S10
S11
S12
S13
S14
S15
S16
S17
S18
J6
J7
J8
J9
U1
U2
Y1
F1
3V3
5V
GND
USBD_P
USBD_N