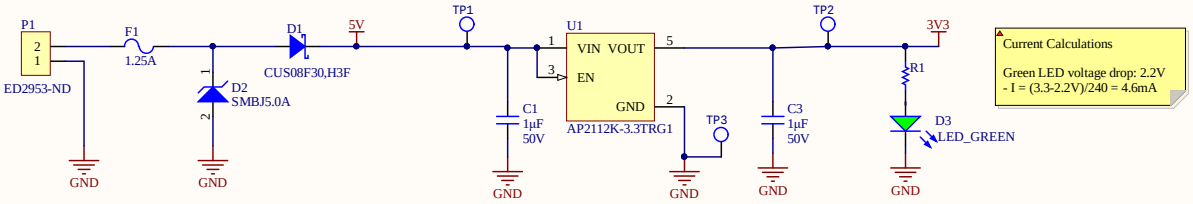
Power In

5V to 3V3 LDO



Title: Power		
Project: Robot Controller.PrjPcb		
Rev: 1	Checker: Lance Bantoto	
	Engineer: Christopher Arjune	
Date: 2021-01-10	Sheet: 1 of 6	

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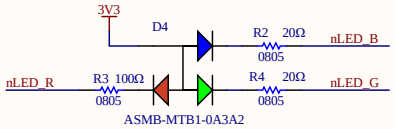
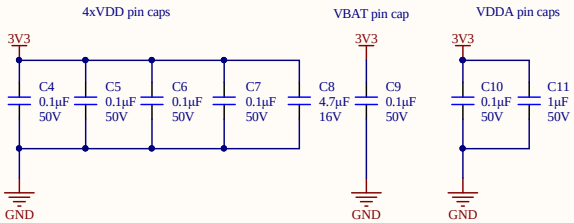
RGB LED



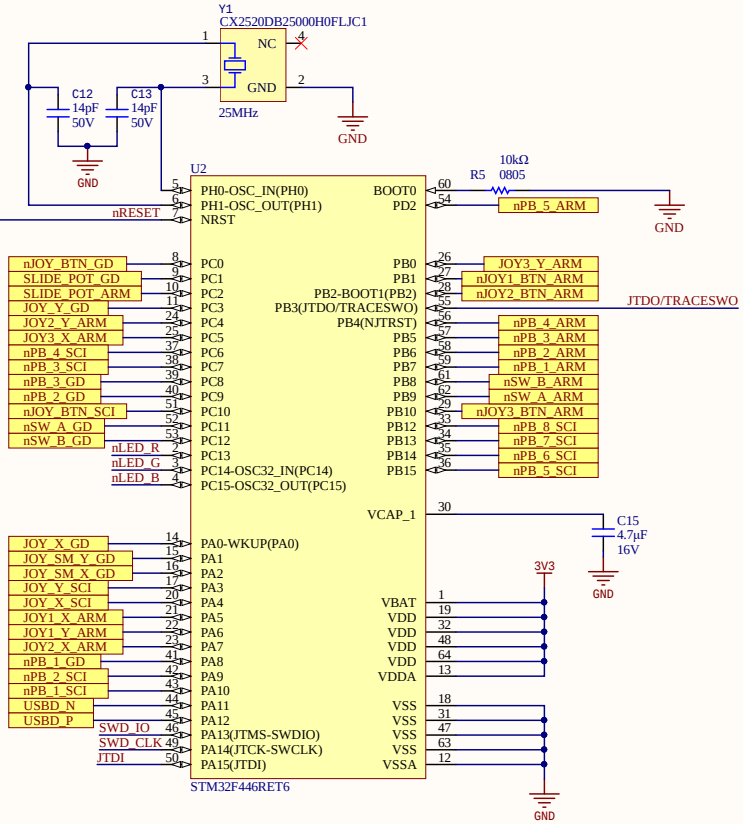
Current Calculations

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

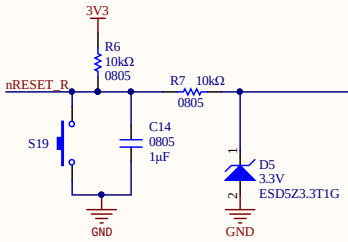
Decoupling Caps



STM32F446RET6



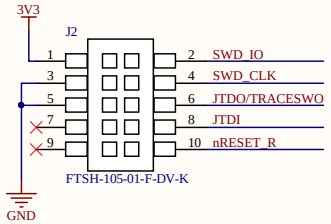
Reset Button



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: 2021-01-10	Sheet: 2 of 6	

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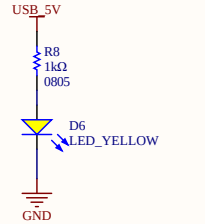
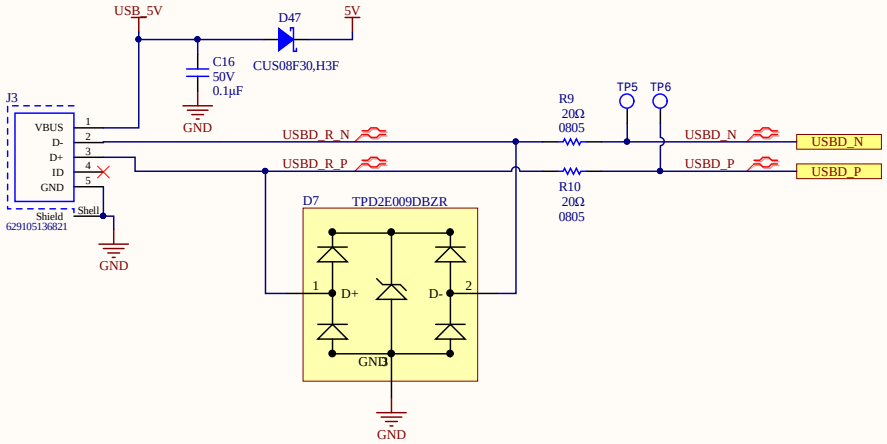
USB Connector



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: 2021-01-10	Sheet: 3 of 6	

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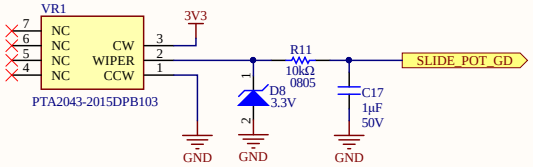
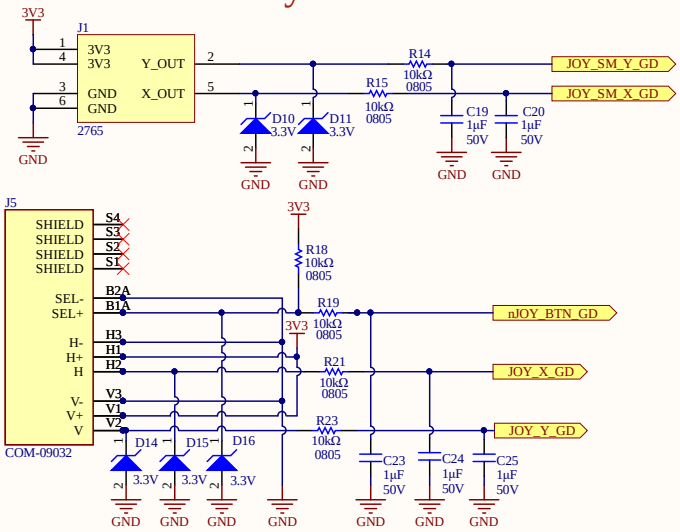
Slide Potentiometer



For Debounce Circuits:

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

2-Axis Joysticks



Controls (subject to change)

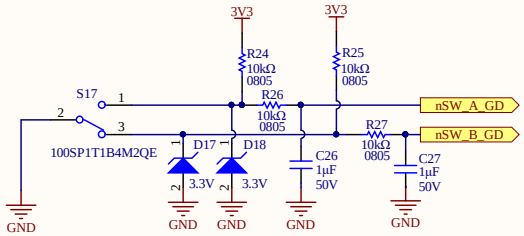
Joysticks:
- 1: Large joystick is used for driving
- 2: Small joystick is used for gimbal

Potentiometer:
- Used for driving speed control

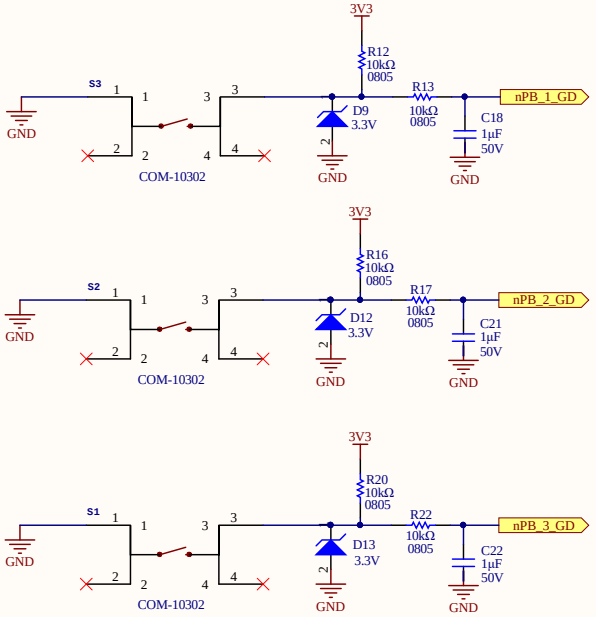
Switch:
- Used for reverse-mode toggle

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: 2021-01-10	Sheet: 4 of 6	

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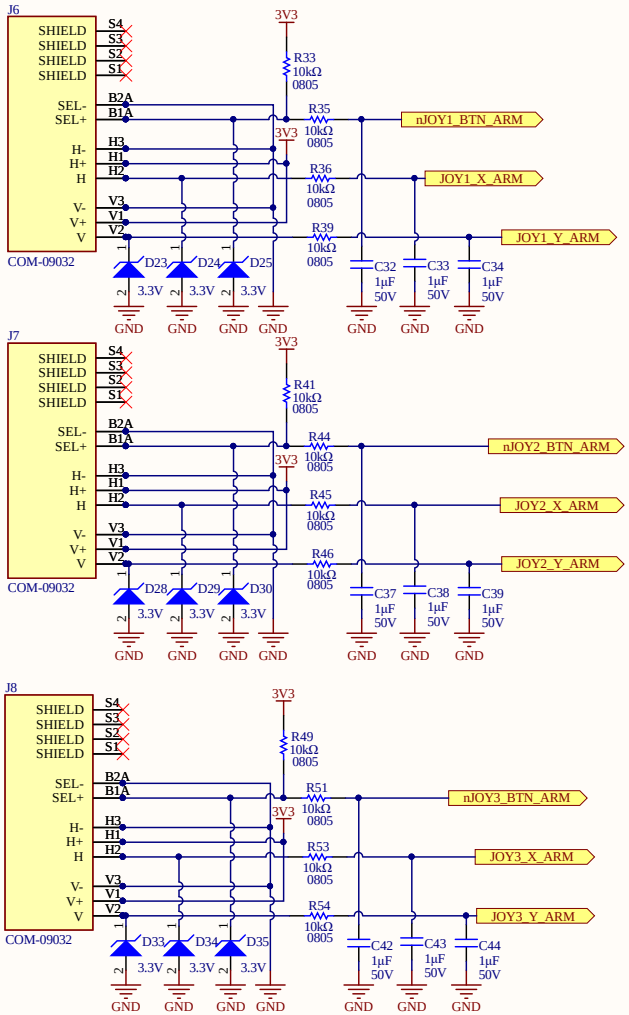
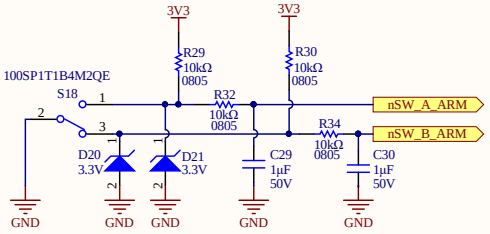
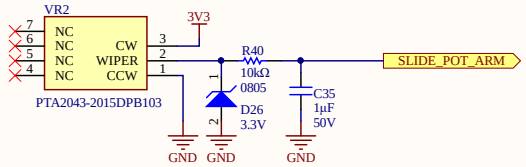
2-Axis Joysticks



SPDT Switch



Slide Potentiometer



For Debounce Circuits:

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

Controls

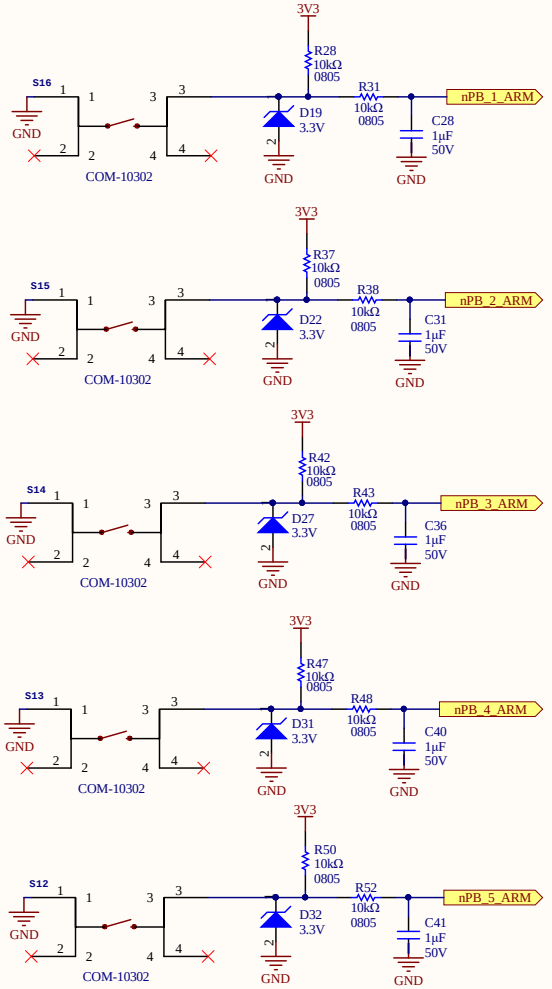
Joysticks: (in joint-control mode)
- 1: Up/Down is for shoulder, Left/Right is for turntable
- 2: Up/Down is for elbow
- 3: Up/Down is for wrist pitch, Left/Right is for wrist roll

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: 2021-01-10	Sheet:	5 of 6

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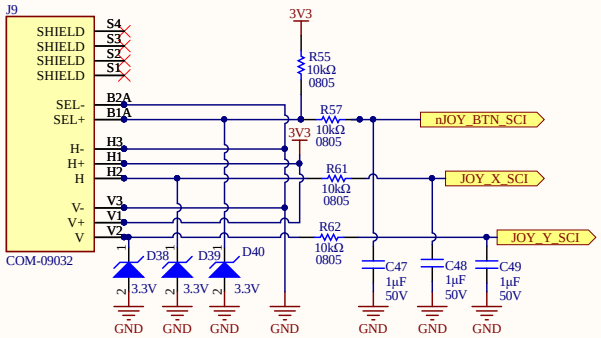
2-Axis Joystick



Controls

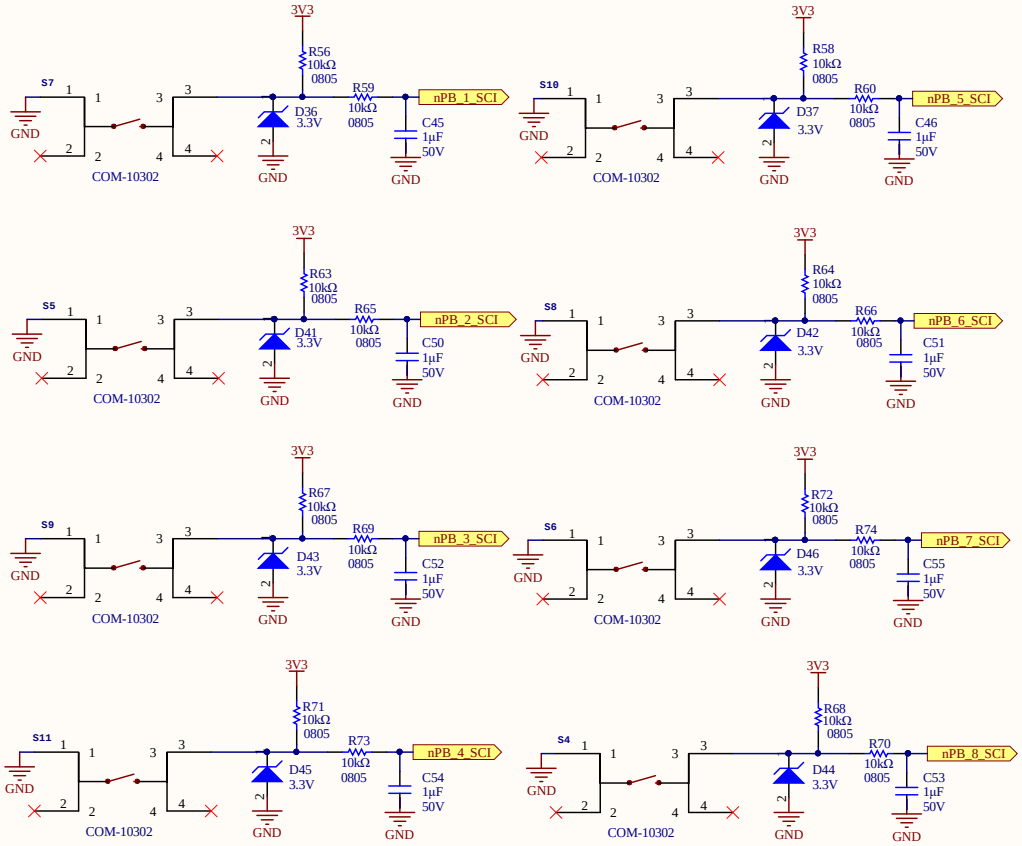
Joystick:
- Up/Down is for elevator, Left/Right is for opening/closing shovel
- Button should be used to choose between L/R and U/D, since the science mechanism may be damaged if too many things are moving at once

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: 2021-01-10	Sheet: 6 of 6	

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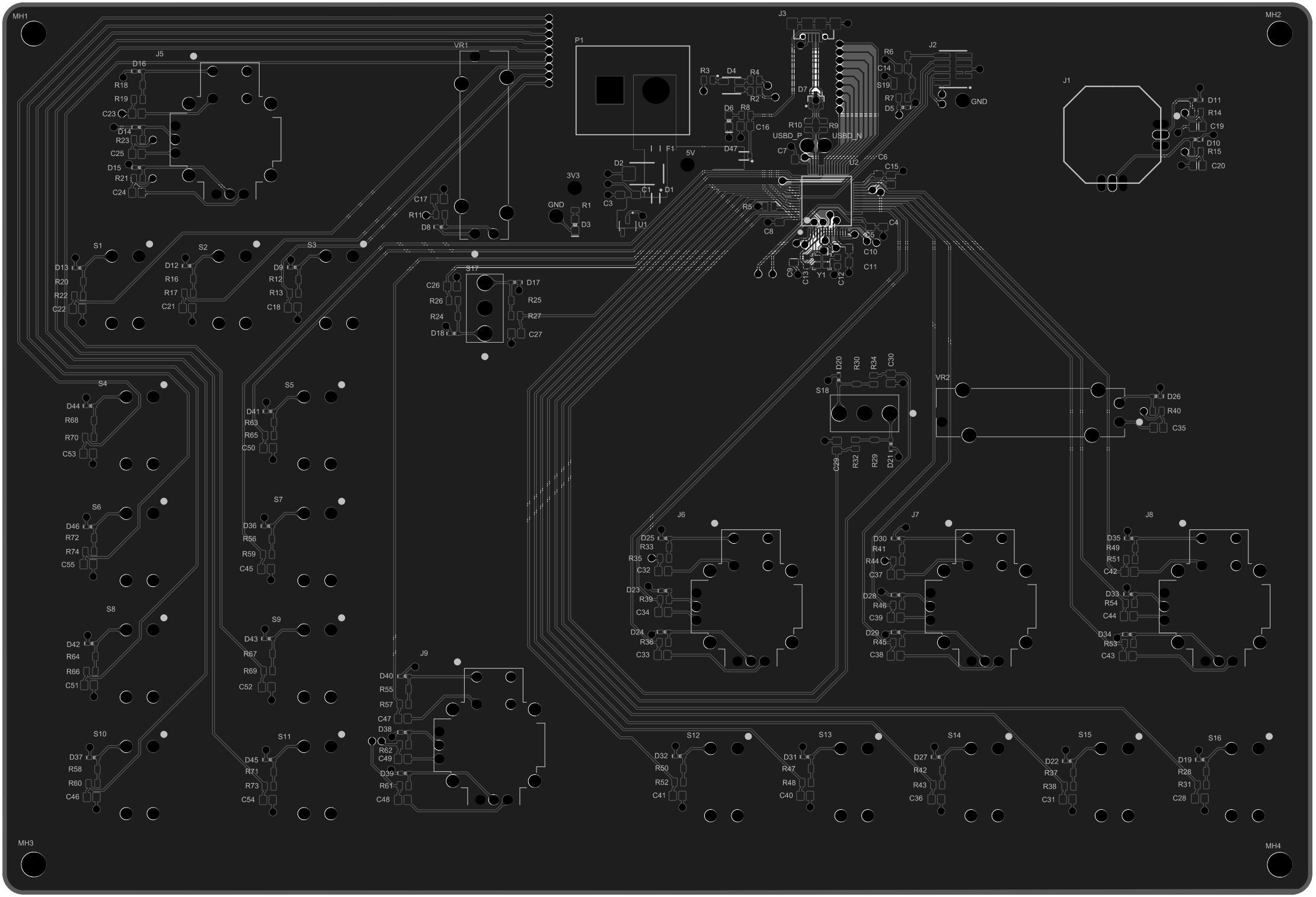
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