

A

A

B

B

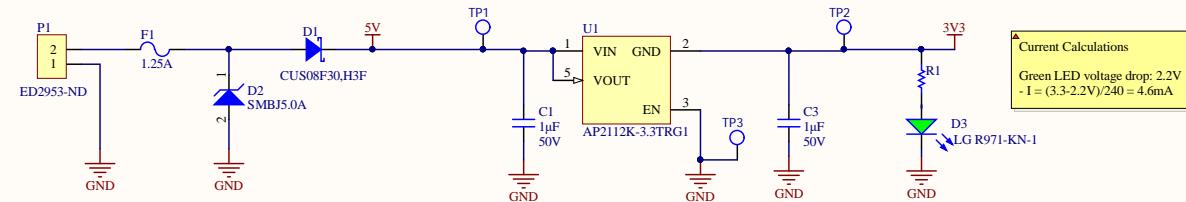
C

C

D

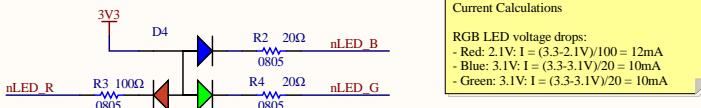
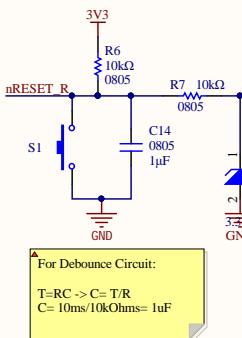
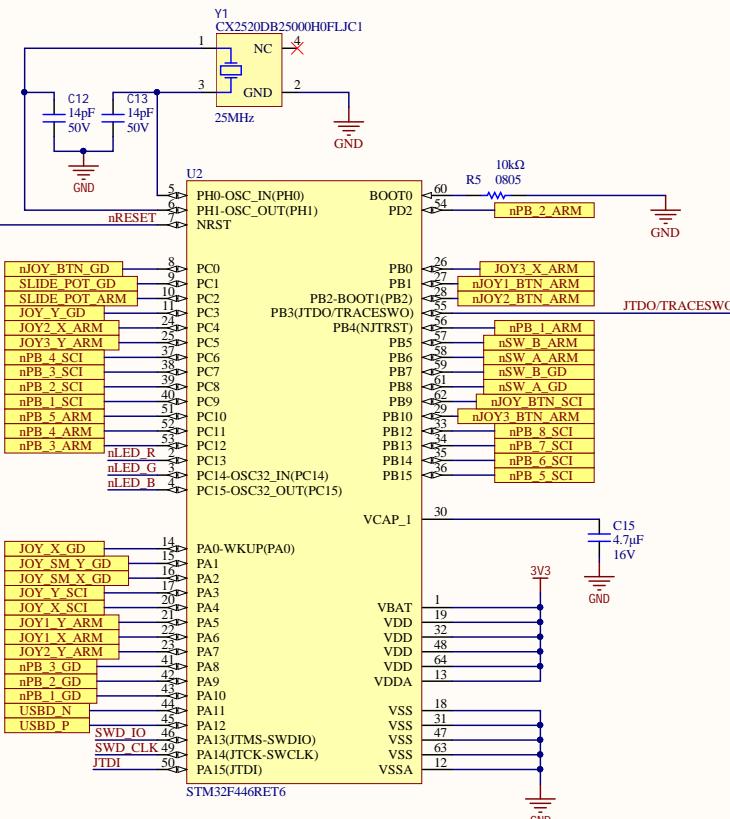
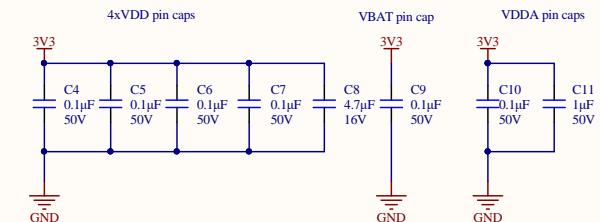
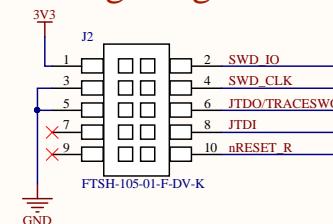
D

## Power In                  5V to 3V3 LDO



|                                  |                        |
|----------------------------------|------------------------|
| Title: Power                     |                        |
| Project: Robot Controller.PrjPcb |                        |
| Rev: 1                           | Checker: Lance Bantoto |
| Engineer: Christopher Arjune     |                        |
| Date: 2020-12-22                 | Sheet: 1 of 6          |



**RGB LED****Reset Button****STM32F446RET6****Decoupling Caps****Debug/Programming**

Title: Microcontroller

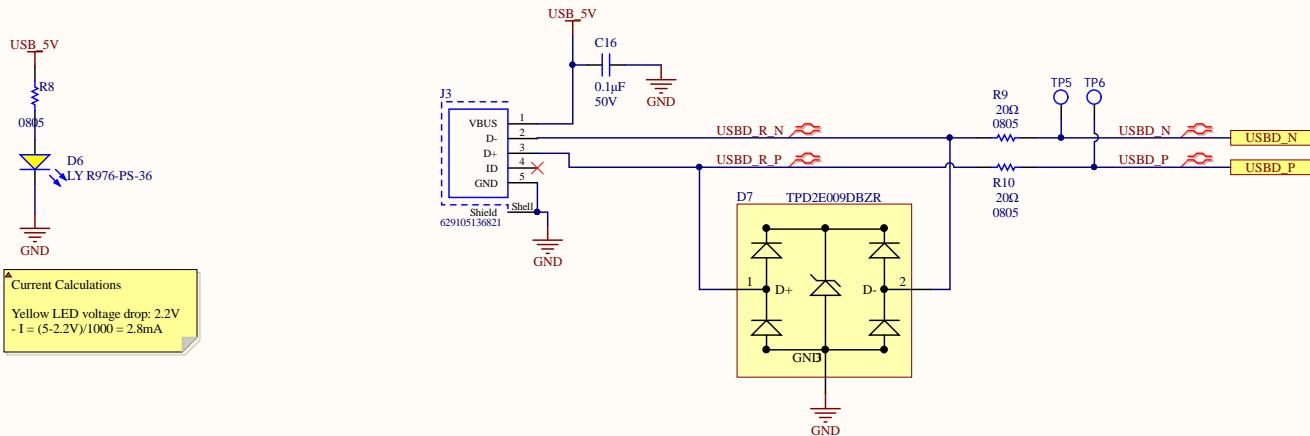
Project: Robot Controller.PnjPcb

Rev: 1 Checker: Lance Bantoto

Engineer: Christopher Arjune

Date: 2020-12-22 Sheet: 2 of 6

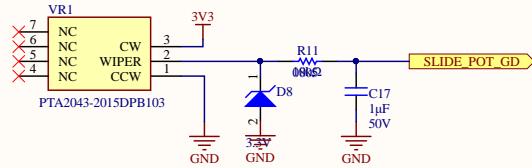
## USB Connector



|                                  |                        |
|----------------------------------|------------------------|
| Title: USB                       |                        |
| Project: Robot Controller.PrjPcb |                        |
| Rev: 1                           | Checker: Lance Bantoto |
| Engineer: Christopher Arjune     |                        |
| Date: 2020-12-22                 | Sheet: 3 of 6          |



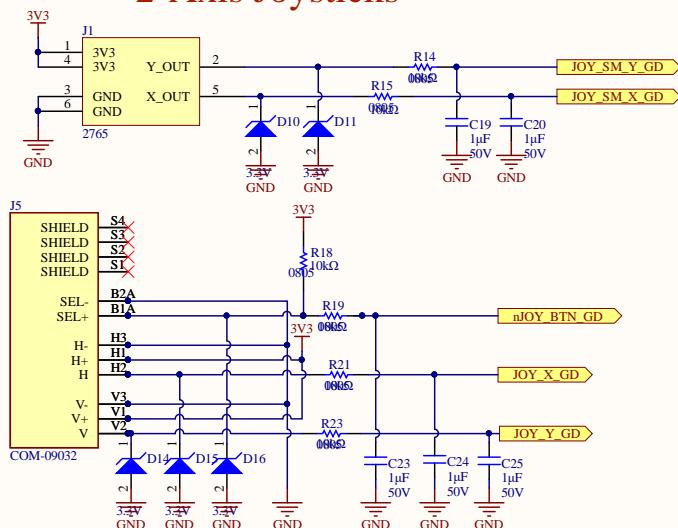
## Slide Potentiometer



For Debounce Circuits:

$$T=RC \rightarrow C = T/R \\ C = 10\text{ms}/10\text{kOhms} = 1\mu\text{F}$$

## 2-Axis Joysticks



### Controls (subject to change)

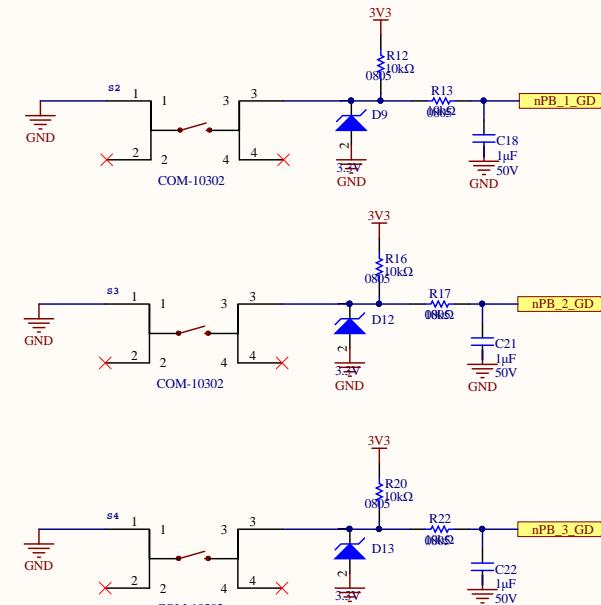
- Joysticks:  
 - 1: Large joystick is used for driving  
 - 2: Small joystick is used for gimbal

- Potentiometer:  
 - Used for driving speed control

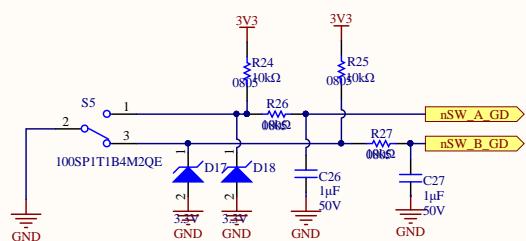
- Switch:  
 - Used for reverse-mode toggle

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

## Pushbuttons



## SPDT Switch



Title: GimbdDrive Controls

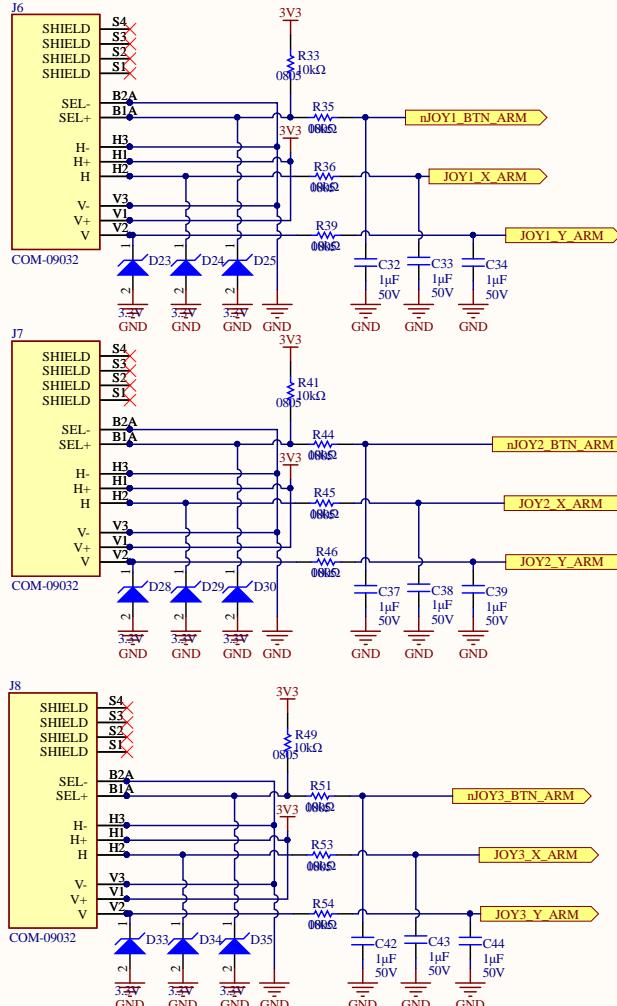
Project: Robot Controller.PrbPcb

Rev: 1 Checker: Lance Bantoto

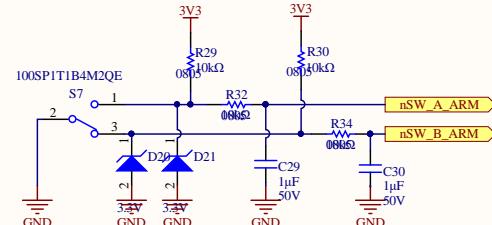
Engineer: Christopher Arjune

Date: 2020-12-22 Sheet: 4 of 6

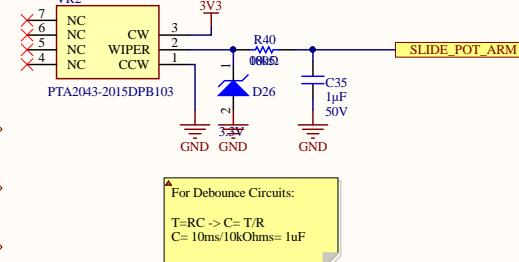
## 2-Axis Joysticks



## SPDT Switch



## Slide Potentiometer



**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

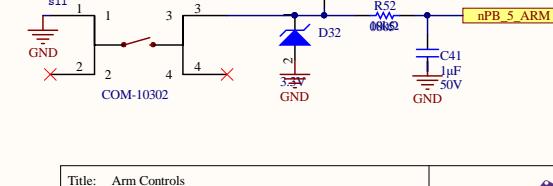
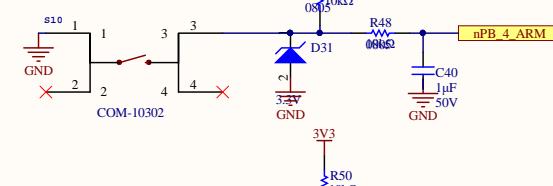
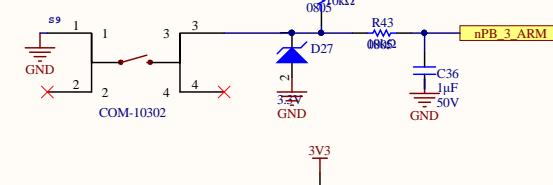
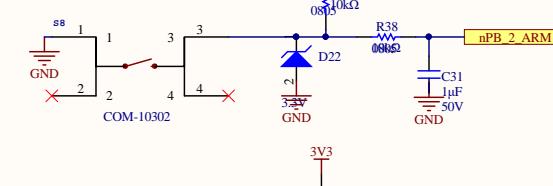
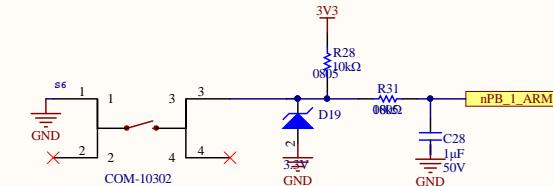
Potentiometer:

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

Buttons:

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

## Pushbuttons



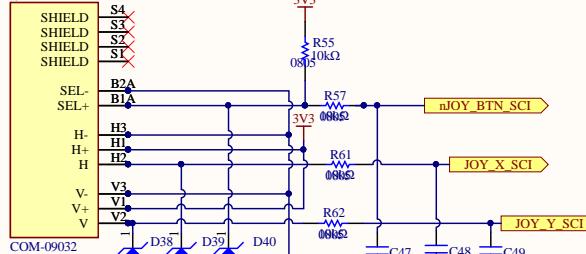
Title: Arm Controls

Project: Robot Controller.PrbPcb

Rev: 1 Checker: Lance Bantoto

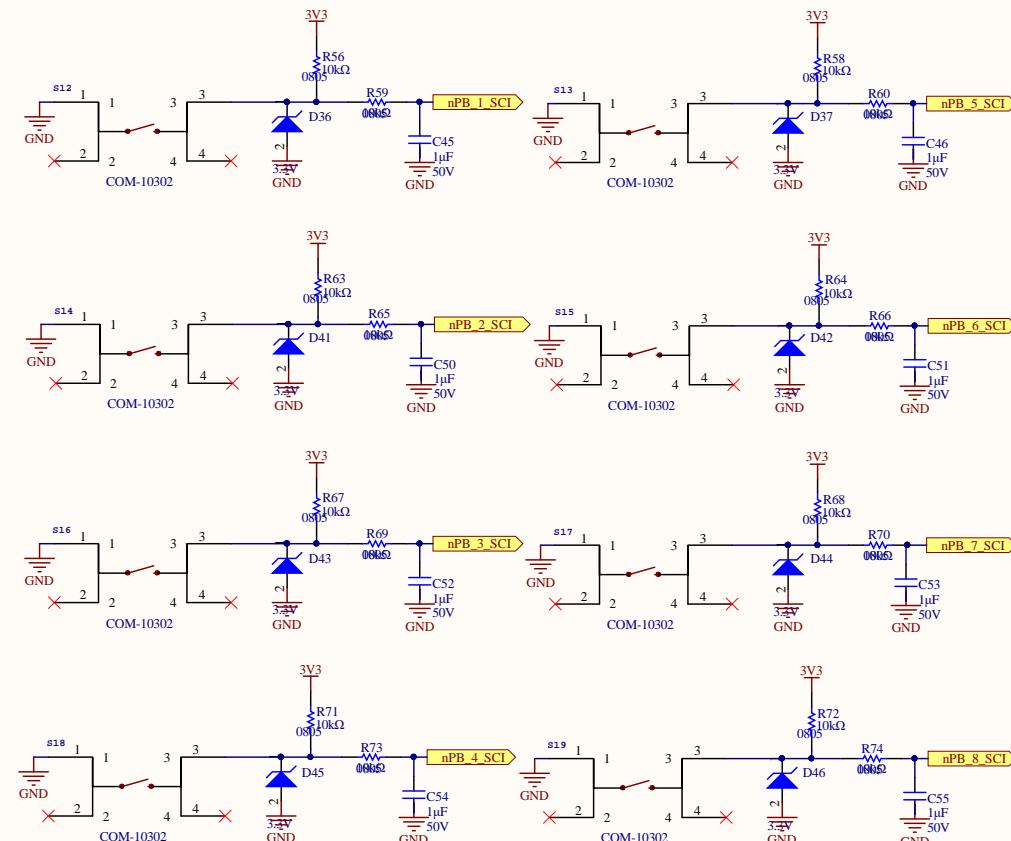
Engineer: Christopher Arjune

Date: 2020-12-22 Sheet: 5 of 6



## Pushbuttons

For Debounce Circuits:  
 $T=RC \rightarrow C = T/R$   
 $C = 10\text{ms}/10\text{k}\Omega = 1\mu\text{F}$



### Controls

- Joystick:
- Up/Down 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

|                                  |                        |
|----------------------------------|------------------------|
| Title: Science Controls          |                        |
| Project: Robot Controller.PnjPcb |                        |
| Rev: 1                           | Checker: Lance Bantoto |
| Engineer: Christopher Arjune     |                        |
| Date: 2020-12-22                 | Sheet: 6 of 6          |

