

A

A

B

B

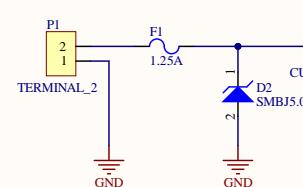
C

C

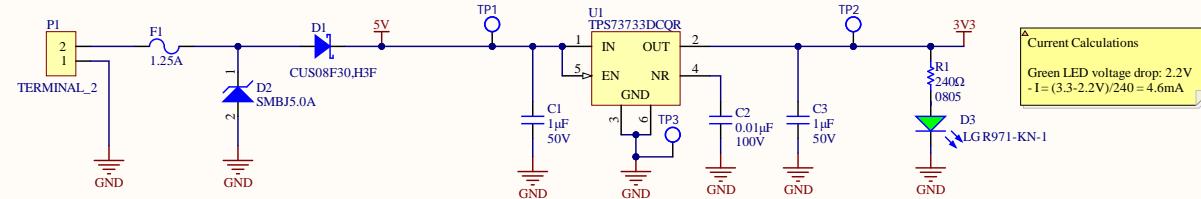
D

D

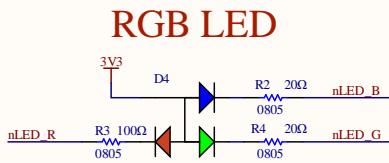
Power In



5V to 3V3 LDO



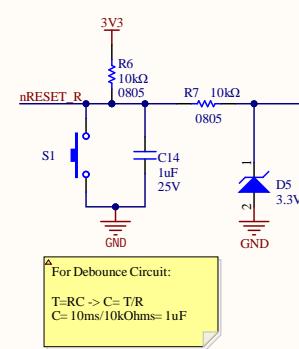
Title: Power	
Project: Robot Controller.PnjPcb	
Rev: 1	Checker: Lance Bantoto
Engineer: Christopher Arjune	
Date: 2020-12-03	Sheet: 1 of 6



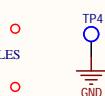
Current Calculations

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: $3.1V; I = (3.3-3.1V)/20 = 10mA$

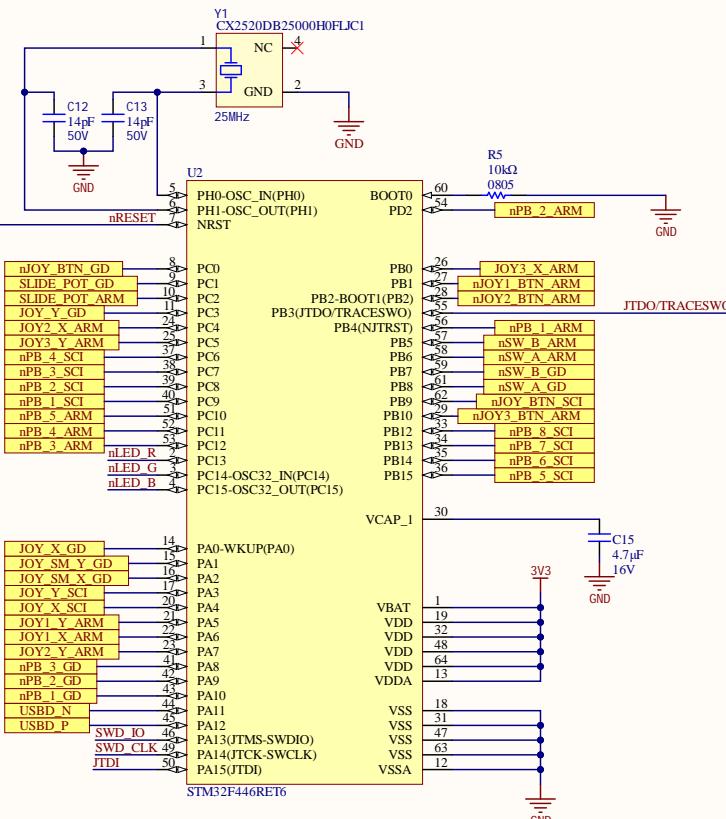
Reset Button



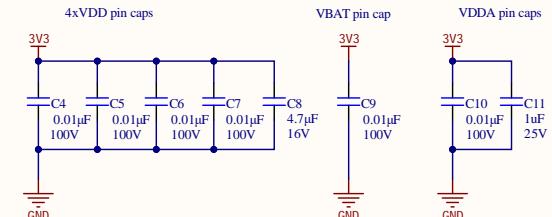
For Debounce Circuit:
 $T=RC \Rightarrow C = T/R$
 $C = 10ms/10k\Omega = 1\mu F$



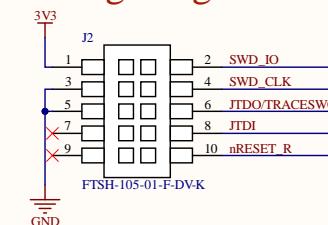
STM32F446RET6



Decoupling Caps

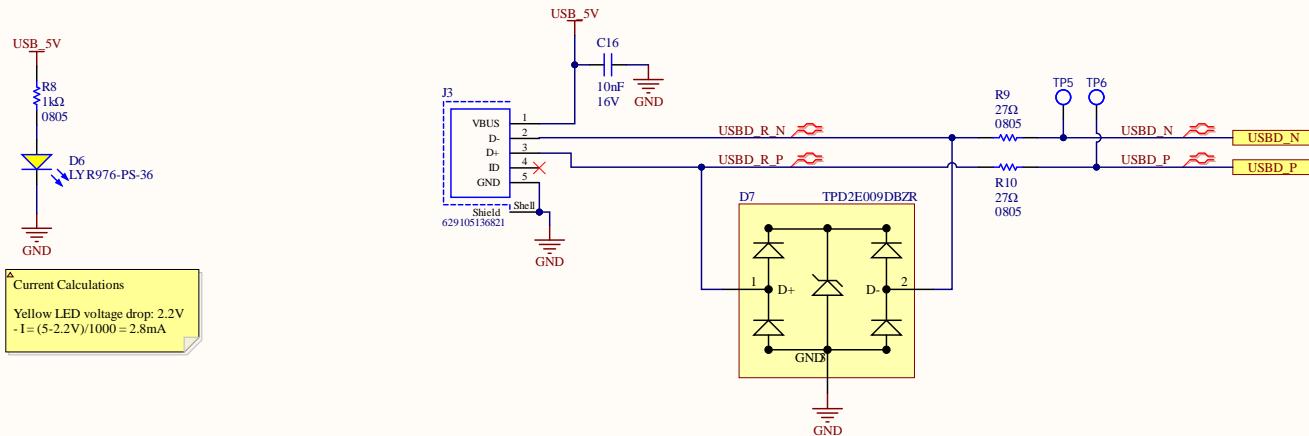


Debug/Programming



Title: Microcontroller	
Project: Robot Controller.PnjPcb	
Rev: 1	Checker: Lance Bantoto
Engineer: Christopher Arjune	
Date: 2020-12-03	Sheet: 2 of 6

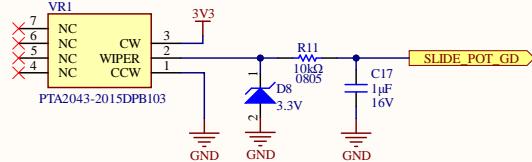
USB Connector



Title: USB	
Project: Robot Controller.PnjPcb	
Rev: 1	Checker: Lance Bantoto
Engineer: Christopher Arjune	
Date: 2020-12-03	Sheet: 3 of 6

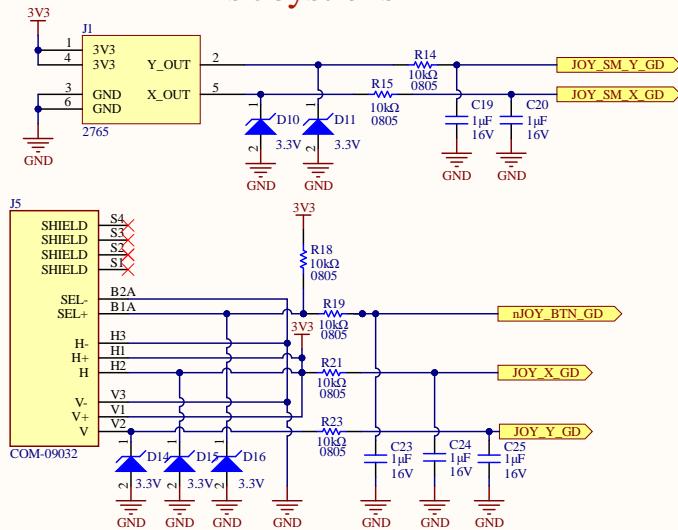


Slide Potentiometer



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

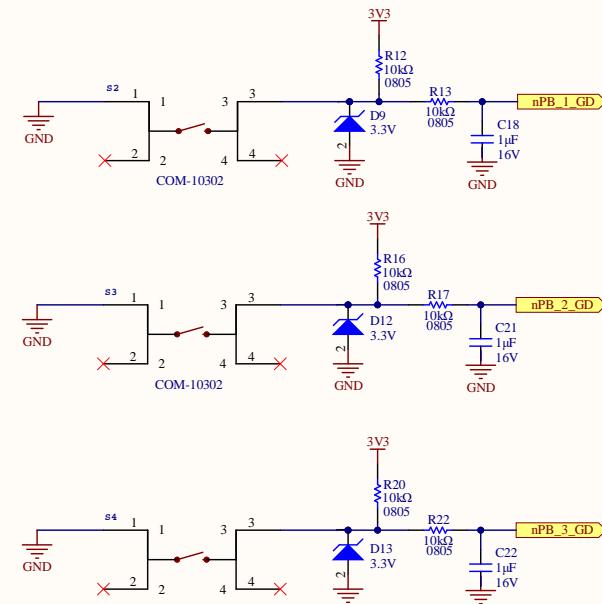
2-Axis Joysticks



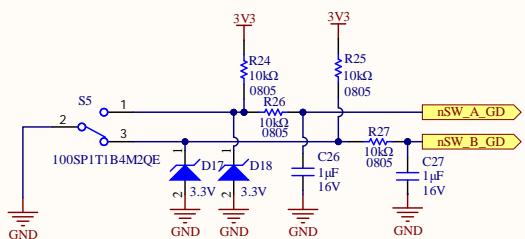
Controls (subject to change)

- Joysticks:
 - Large joystick is used for driving
 - Small joystick is used for gimbal
- Potentiometer:
 - Used for driving speed control
- Switch:
 - Used for reverse-mode toggle
- Buttons:
 - Full-stop (halt all movement immediately)
 - Extra, in case additional functionality is requested

Pushbuttons



SPDT Switch



Title: GimbdDrive Controls

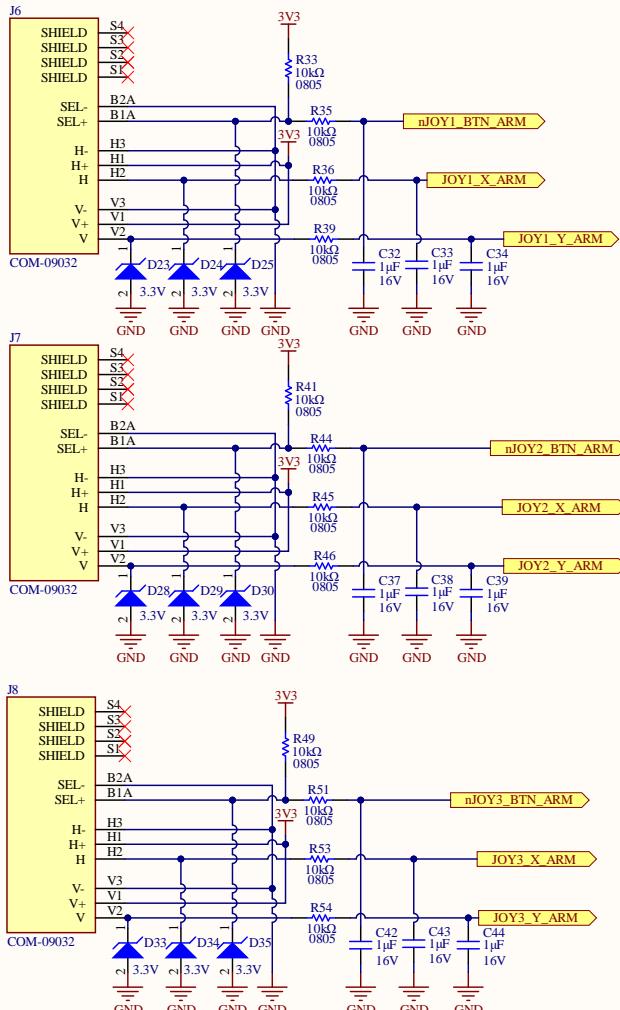
Project: Robot Controller.PrtPcb

Rev: 1 Checker: Lance Bantoto

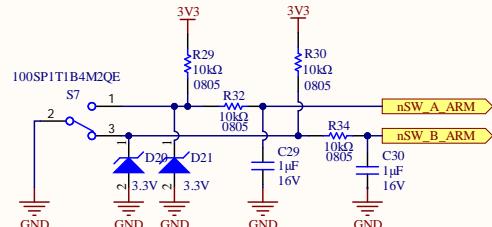
Engineer: Christopher Arjune

Date: 2020-12-03 Sheet: 4 of 6

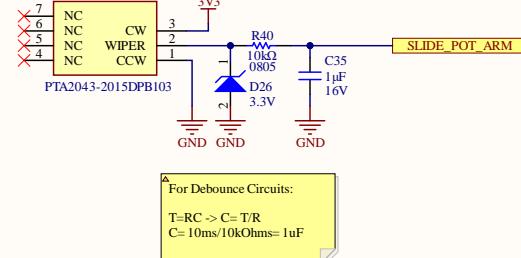
2-Axis Joysticks



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

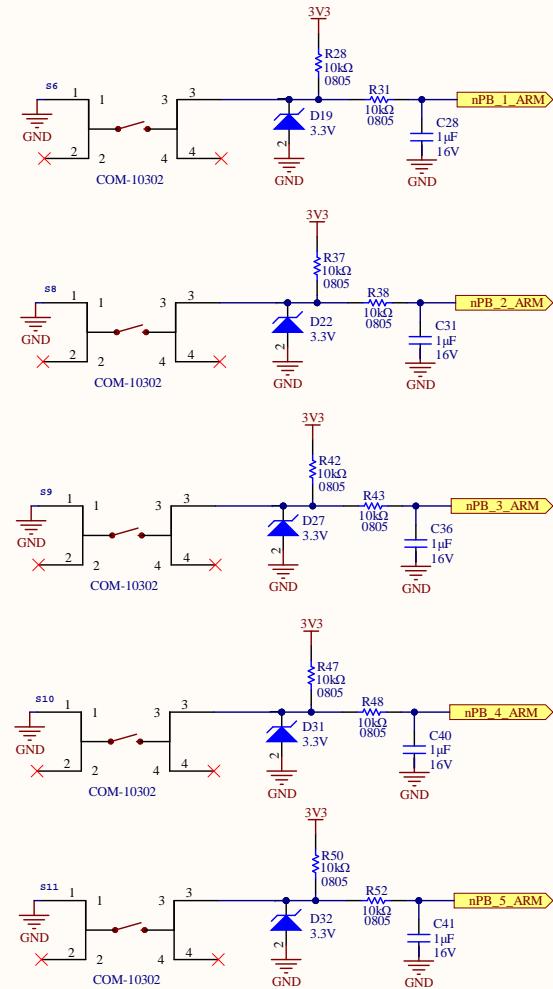
Potentiometer:

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

Buttons:

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

Pushbuttons



Title: Arm Controls

Project: Robot Controller.PriPcb

Rev: 1	Checker: Lance Bantoto
--------	------------------------

Engineer: Christopher Arjune

Date: 2020-12-03	Sheet: 5 of 6
------------------	---------------

A

A

B

B

C

C

D

D

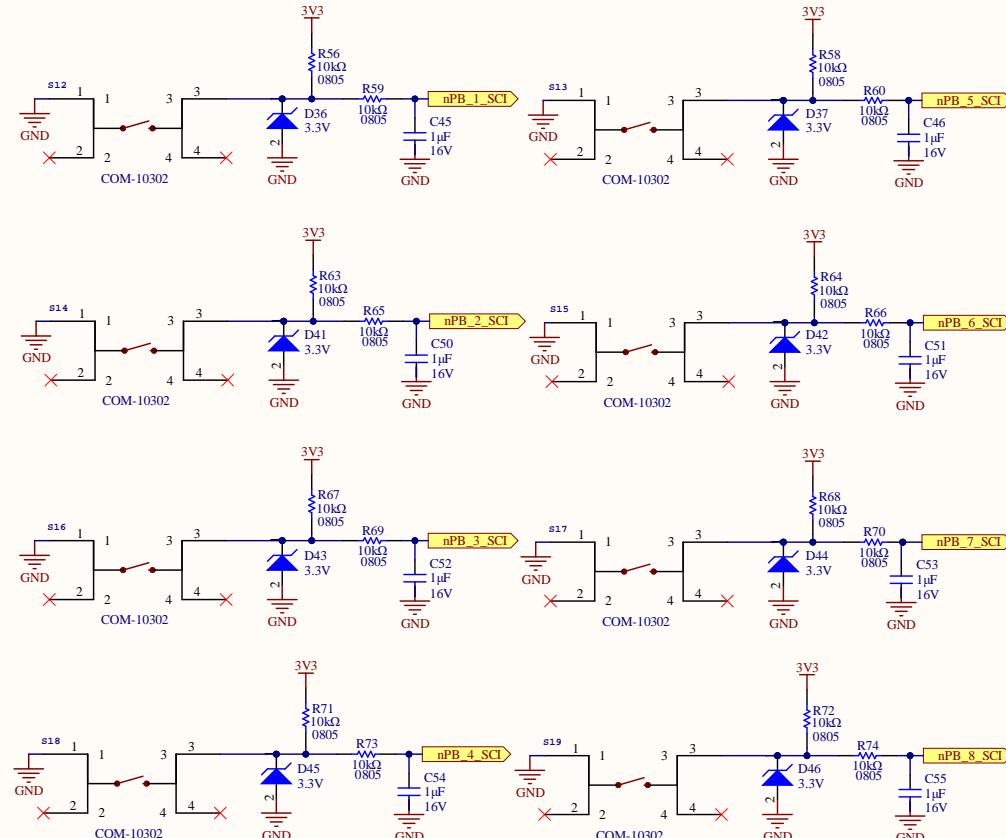
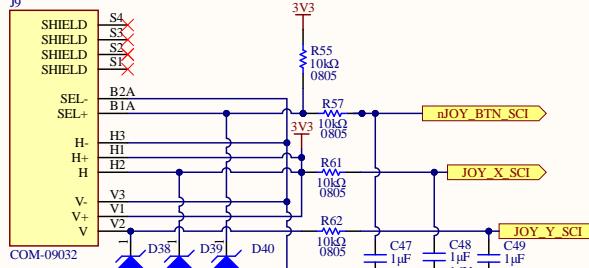
Pushbuttons

For Debounce Circuits:

$$T=RC \rightarrow C = T/R$$

$$C = 10\text{ms}/10\text{kOhms} = 1\mu\text{F}$$

2-Axis Joystick



Controls

- 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

Title: Science Controls

Project: Robot Controller.PnjPcb

Rev: 1 Checker: Lance Bantoto

Engineer: Christopher Arjune

Date: 2020-12-03 Sheet: 6 of 6