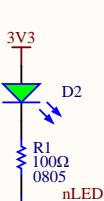
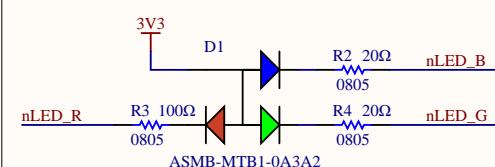


## Test LEDs

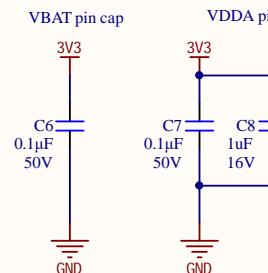
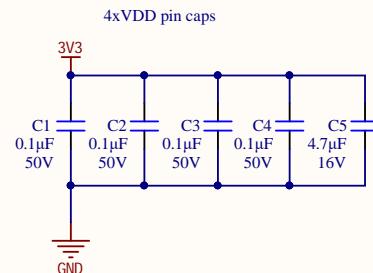


### Current Calculations

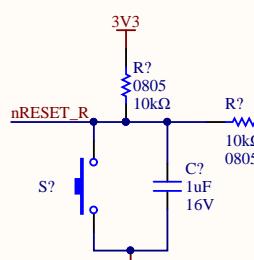
Green LED voltage drop: 2.2V  
 $I = (3.3-2.2)/100 = 11\text{mA}$

RGB LED voltage drops:  
 - Red: 2.1V;  $I = (3.3-2.1)/100 = 12\text{mA}$   
 - Blue: 3.1V;  $I = (3.3-3.1)/20 = 10\text{mA}$   
 - Green: 3.1V;  $I = (3.3-3.1)/20 = 10\text{mA}$

## Decoupling Caps

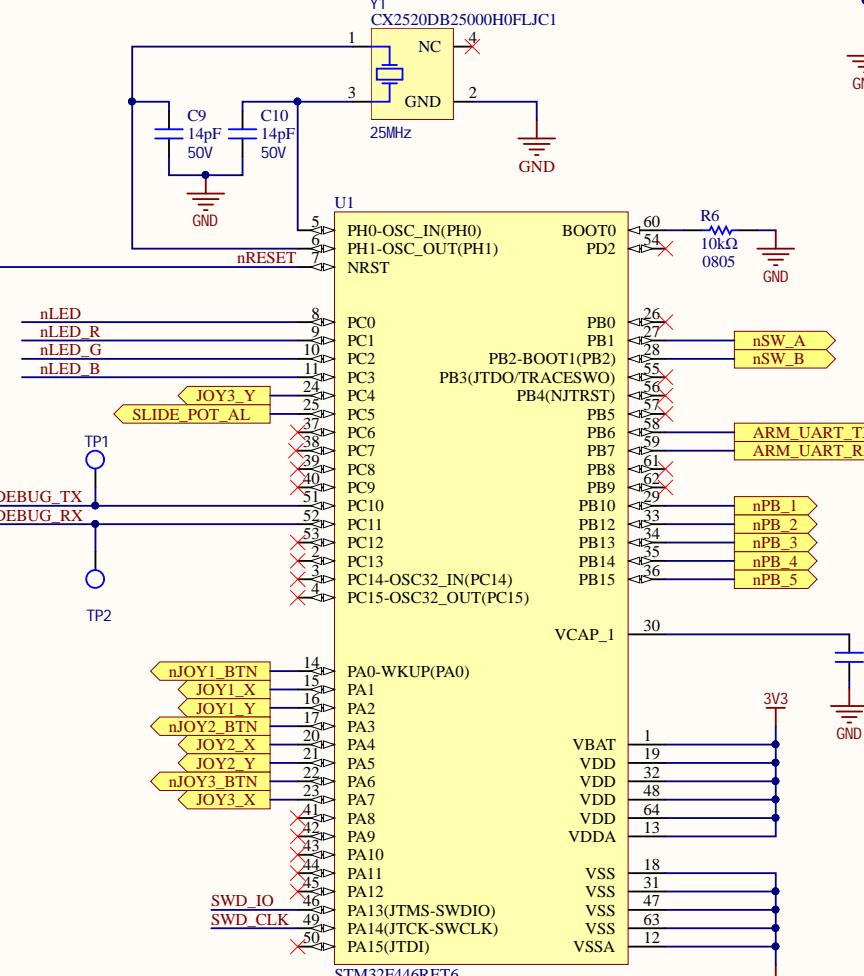


## Reset Button

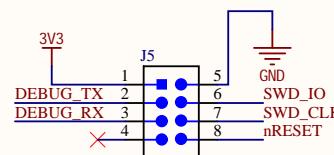


For Debounce Circuit:  
 $T = RC \rightarrow C = T/R$   
 $C = 10\text{ms}/10\text{kOhms} = 1\mu\text{F}$

## STM32F446RET6



## Debug/Programming



MOUNTING\_HOLES

TP8

GND

Title: SH1\_MCU

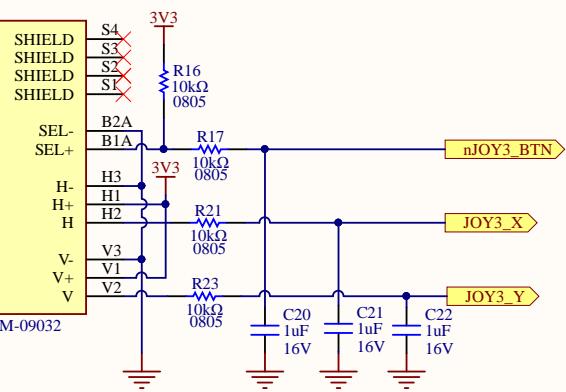
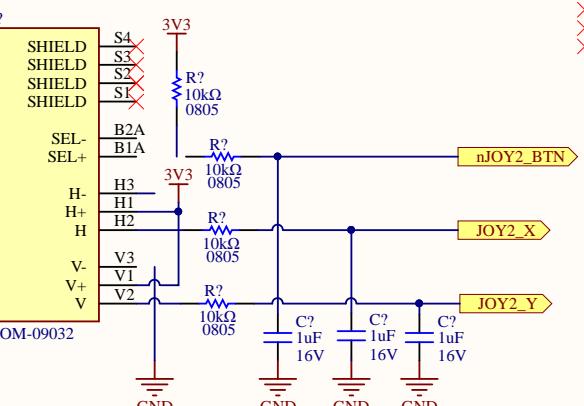
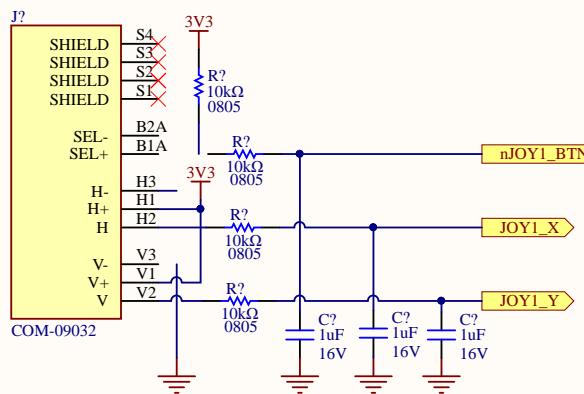
Size: Letter Drawn By: Qi nyang Bao

Date: 2020-10-31

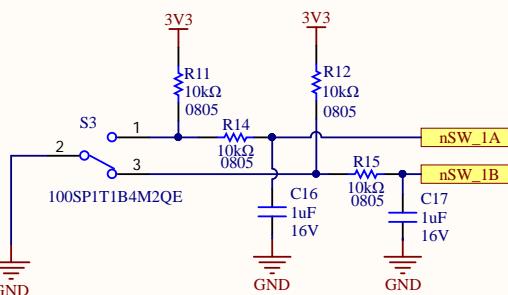
Sheet1 of 4

File: C:\Users\pkmn0\Desktop\Document Archive\Other\Electrical Git Repo\MarsRover2020-PCB\Projects\Robot Controller\

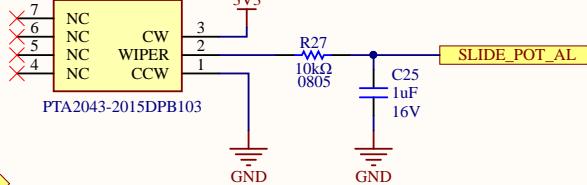
## 2-Axis Joysticks



## SPDT Switch



## Slide Potentiometer



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

### 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

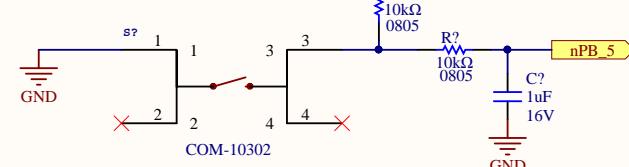
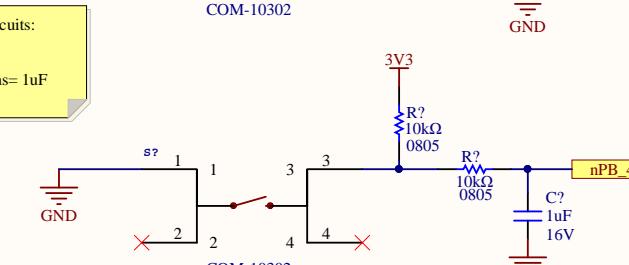
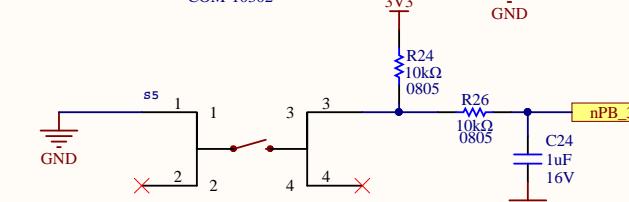
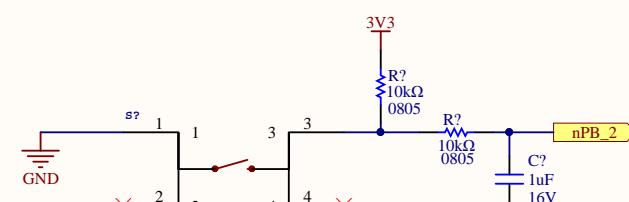
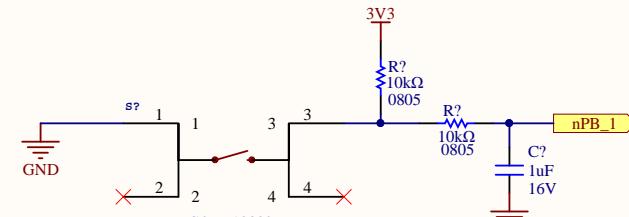
### Potentiometer:

- 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



A

A

B

B

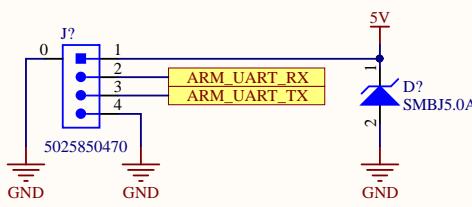
C

C

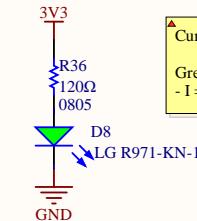
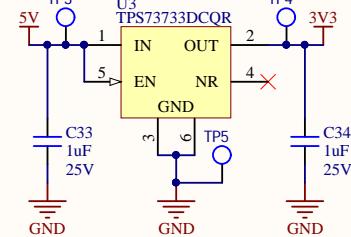
D

D

## Power In



## 5V to 3V3 LDO



Title: SH4-POWER

Size: Letter | Drawn By: Christopher Arjune

Date: 2020-10-31

Sheet 4 of 4

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