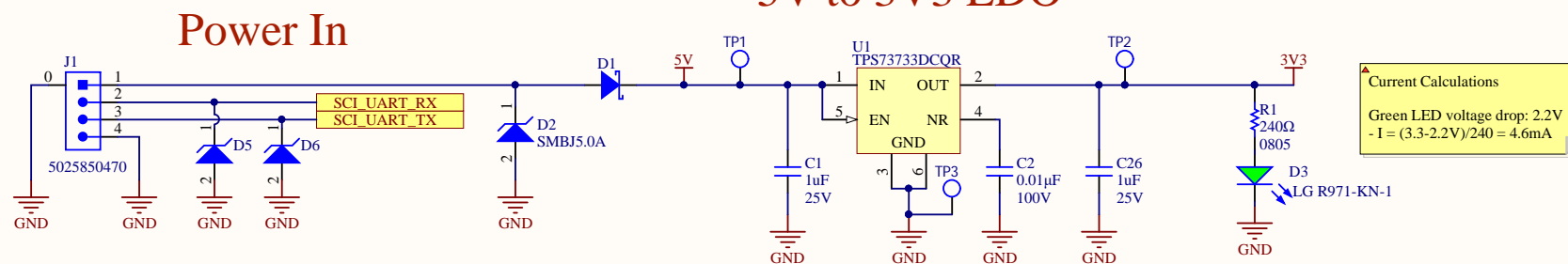
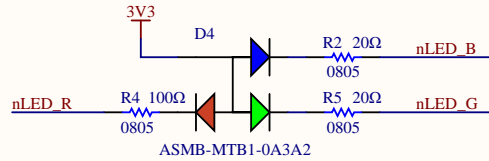


5V to 3V3 LDO



Test LEDs

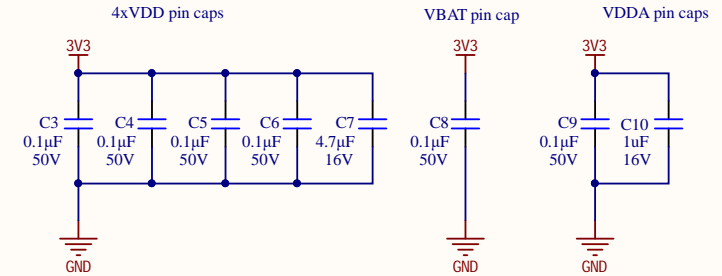


Current Calculations

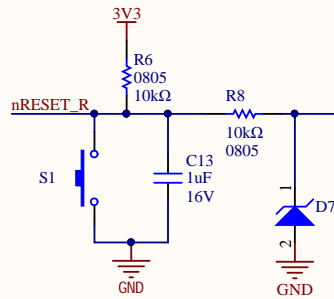
RGB LED voltage drops:

- 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



Reset Button

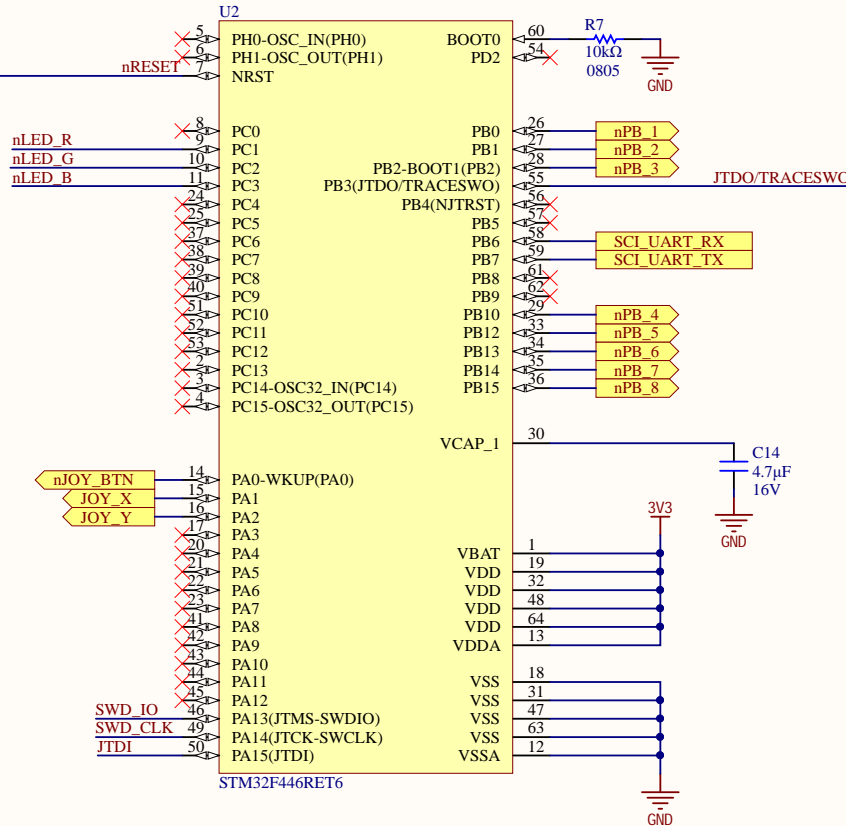


For Debounce Circuit:

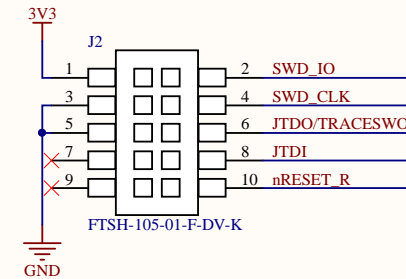
$$T = RC \rightarrow C = T/R$$

$$C = 10ms / 10kOhms = 1\mu F$$

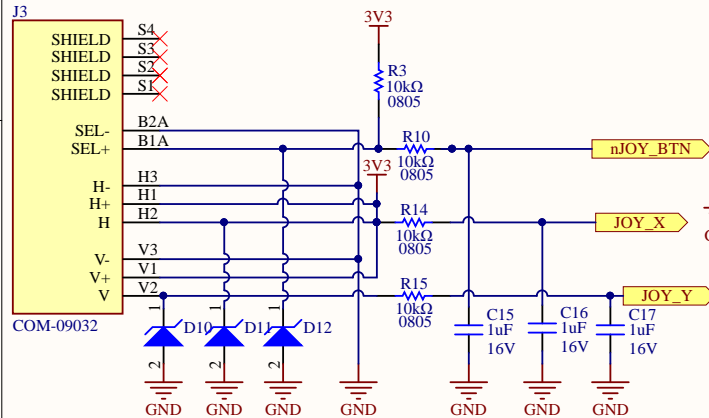
STM32F446RET6



Debug/Programming



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:

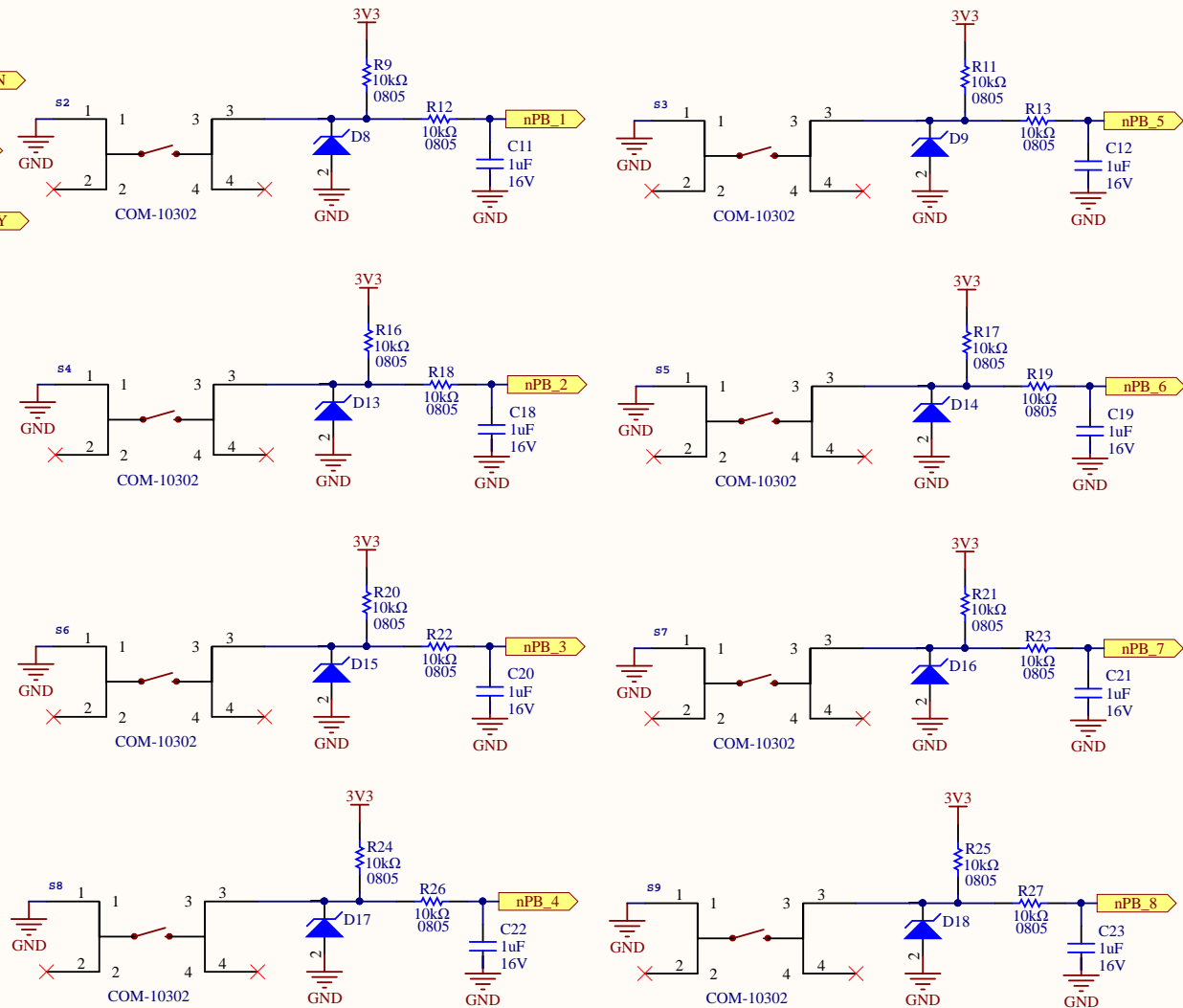
- 1/2: Move left/right 1 index
- 3/4: Move to leftmost/rightmost index
- 5/6: Open/close lid
- 7: Pre-programmed mixing sequence
- 8: Extra, in case additional functionality is requested later

Pushbuttons

For Debounce Circuits:

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

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



Title RC Science - Controls

Size: Letter Drawn By: Christopher Arjune

Date: 2020-11-11 Sheet3 of 3

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