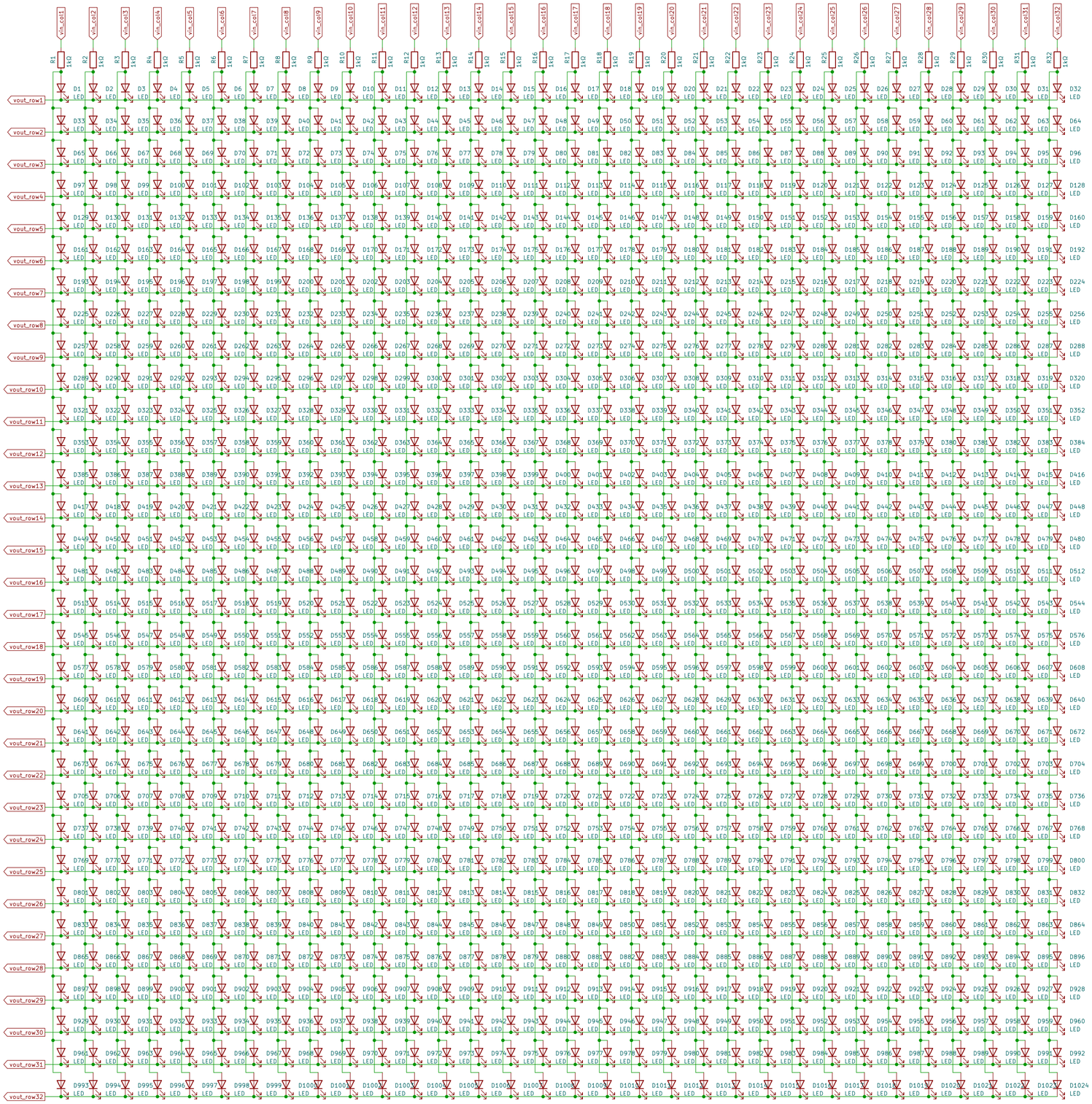
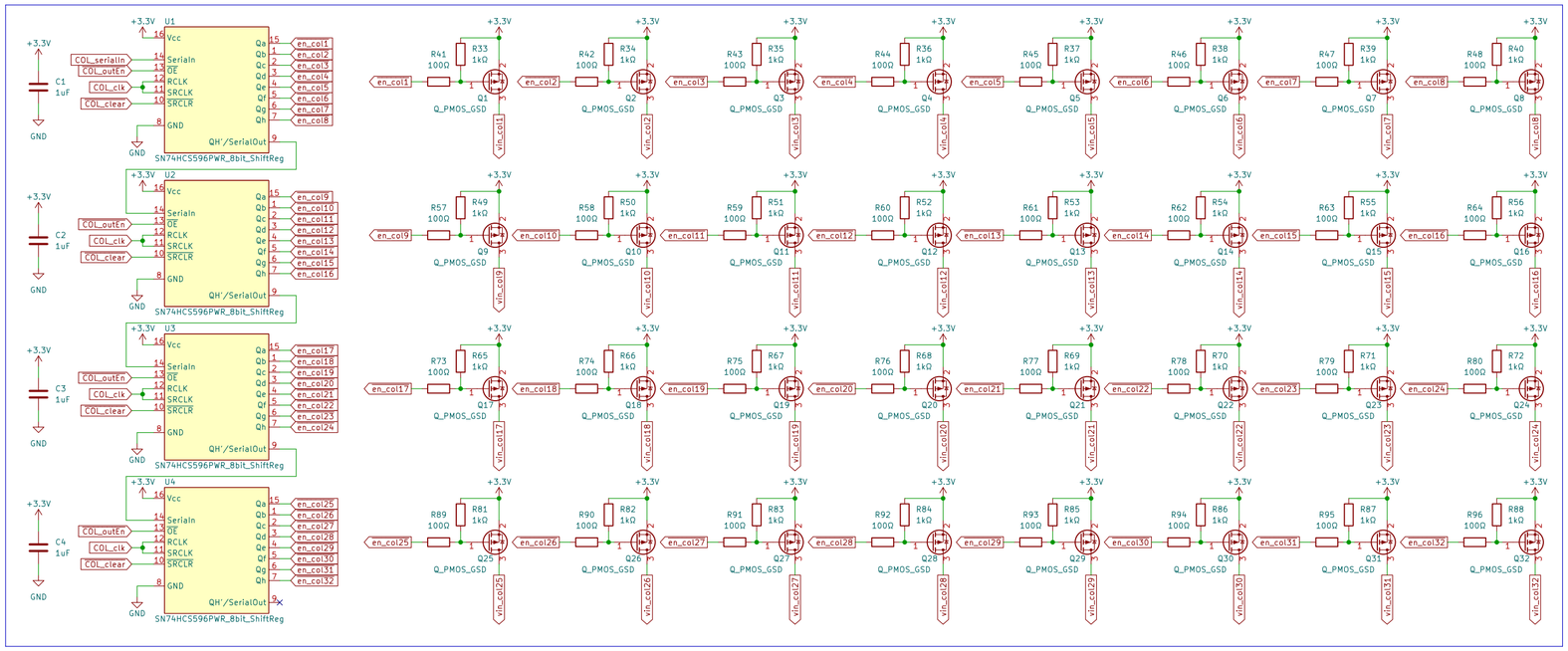
NOTE: 1kΩ current limiting resistors exist for only 1 column each.
This works because of the way the the LED matrix is multiplexed: for every 'frame', only one row is lit at a time.
So to create one image, each row is pulled to ground in quick succesion. For every row pulled to ground, paths to 3.3V are simultaneously opened for the appropriate columns.



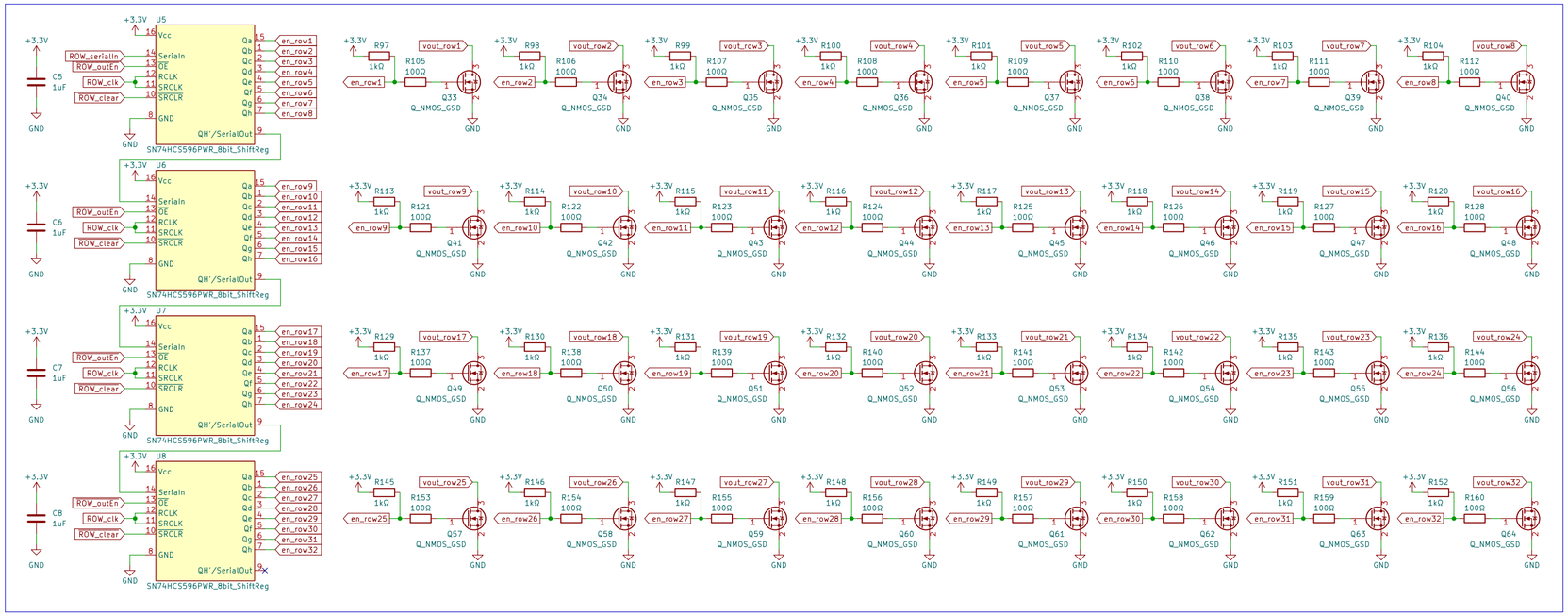
LED Matrix	
Mihir Savadi	
Sheet: /LEDMATRIX/	
File: fancyGradCap_rev2_LEDMATRIX.kicad_sch	
Title: fancyGradCap_Rev2	
Size: A2	Date: 2022-01-25
Rev: 1	
KiCad E.D.A. kicad (6.0.0)	Id: 2/5

NOTE: The SN74HCS596PWR_8bit_ShiftReg's Qx outputs are open drains, necessitating a pullup path.
It may appear strange, but this is why the NMOS circuits have a pullup before the gate-current limiting resistor.
This is also why all the Qx outputs have a input-shaped netports, since current is 'flowing into' them.
The PMOS is 'en_x' because a 0 closes the Drain-Source path. The NMOS is 'en_x' because 1 closes the Drain-Source path.
Only the SerialOut output of the SN74HCS596PWR_8bit_ShiftReg is Push/Pull.

LED Matrix Column Driver Circuitry



LED Matrix Row Driver Circuitry



LED Matrix driver circuitry
Mihir Savadi
Sheet: /LEDDriverCircuitry/
File: fancyGradCap_rev2_LEDDriverCircuitry.kicad_sch

Title: fancyGradCap_rev2

Size: A2	Date: 2022-01-27	**Rev: 1**
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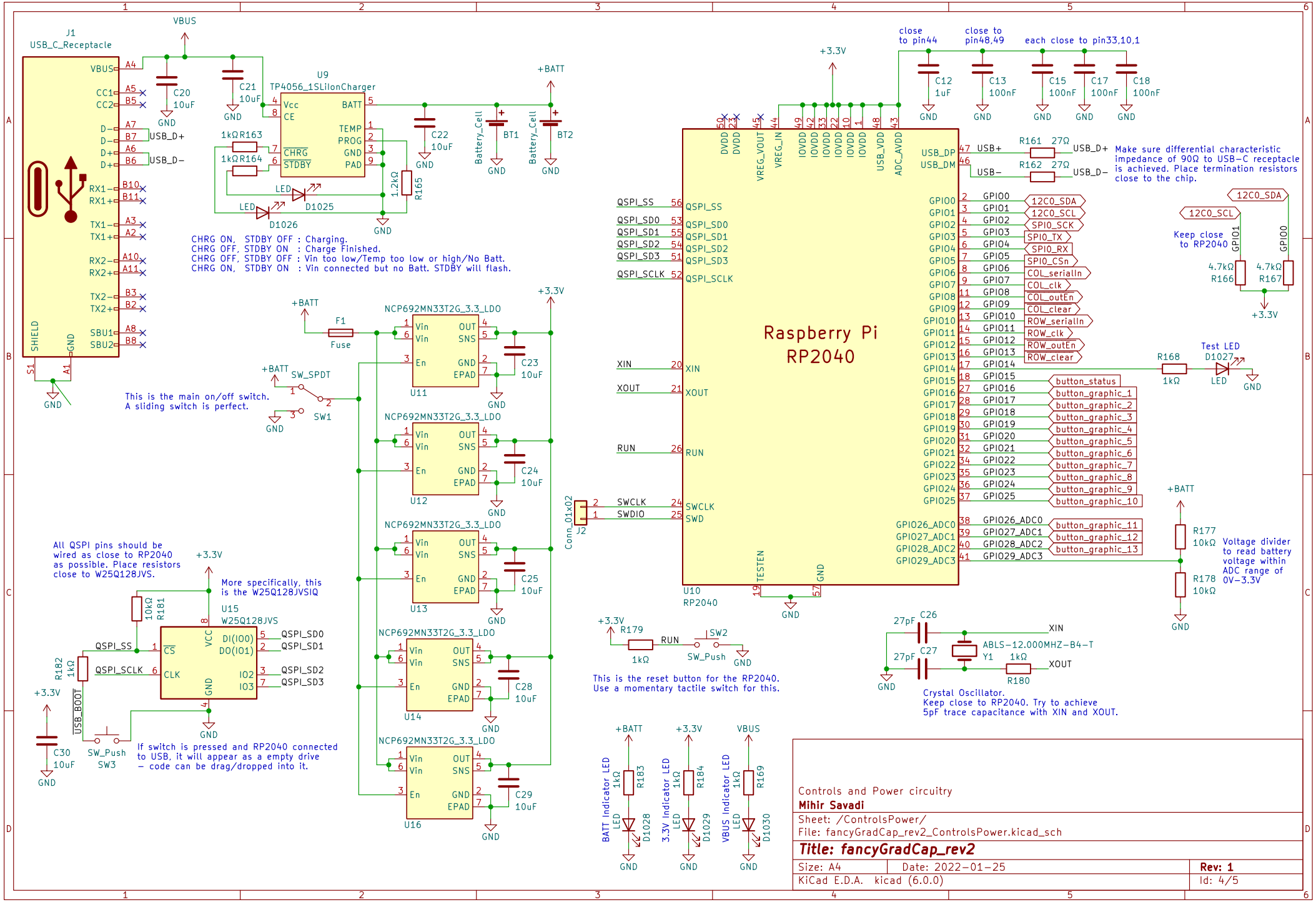
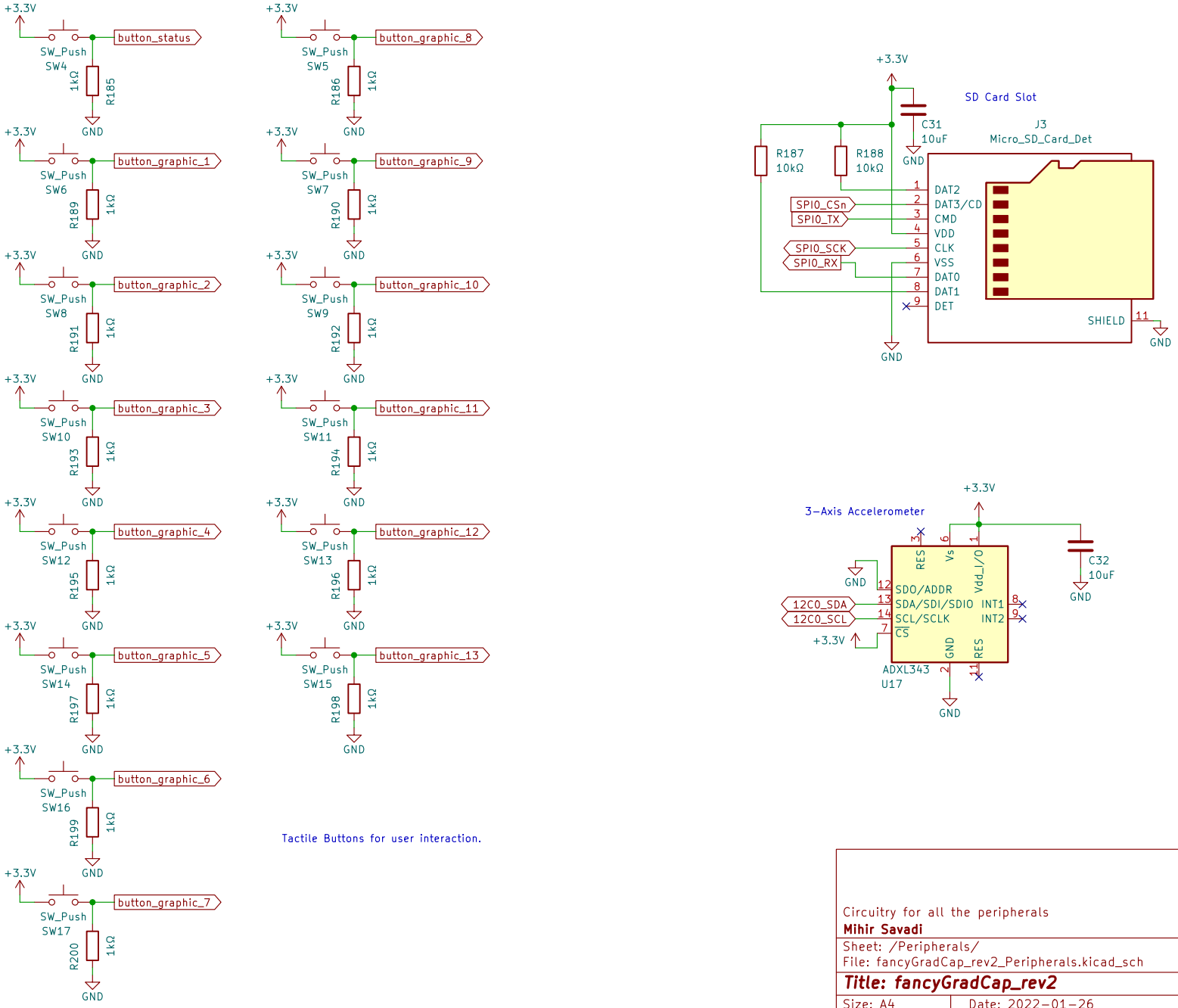

J1
USB_C_Receptacle
VBUS
C20
10uF
C21
10uF
U9
TP4056_1SLilonCharger
1kΩR163
1kΩR164
LED
D1025
D1026
1.2kΩ
R165
C22
10uF
Battery_Cell
BT1
BT2
+BATT
CHRG ON, STDBY OFF : Charging.
CHRG OFF, STDBY ON : Charge Finished.
CHRG OFF, STDBY OFF : Vin too low/Temp too low or high/No Batt.
CHRG ON, STDBY ON : Vin connected but no Batt. STDBY will flash.
F1
Fuse
SW_SPDT
SW1
This is the main on/off switch.
A sliding switch is perfect.
NCP692MN33T2G_3.3_LDO
U11
U12
U13
U14
U16
C23
10uF
C24
10uF
C25
10uF
C28
10uF
C29
10uF
+3.3V
Raspberry Pi
RP2040
U10
close to pin44
close to pin48,49
each close to pin33,10,1
C12
1uF
C13
100nF
C15
100nF
C17
100nF
C18
100nF
R161 27Ω
R162 27Ω
USB_D+
USB_D−
Make sure differential characteristic impedance of 90Ω to USB−C receptacle is achieved. Place termination resistors close to the chip.
12C0_SDA
12C0_SCL
Keep close to RP2040
4.7kΩ
R166
4.7kΩ
R167
Test LED
D1027
R168
1kΩ
button_status
button_graphic_1
button_graphic_2
button_graphic_3
button_graphic_4
button_graphic_5
button_graphic_6
button_graphic_7
button_graphic_8
button_graphic_9
button_graphic_10
button_graphic_11
button_graphic_12
button_graphic_13
R177
10kΩ
R178
10kΩ
Voltage divider to read battery voltage within ADC range of 0V−3.3V
Conn_01x02
J2
SWCLK
SWDIO
R179
1kΩ
RUN
SW2
SW_Push
This is the reset button for the RP2040.
Use a momentary tactile switch for this.
27pF
C26
27pF
C27
ABLS−12.000MHZ−B4−T
Y1
1kΩ
R180
XIN
XOUT
Crystal Oscillator.
Keep close to RP2040. Try to achieve 5pF trace capacitance with XIN and XOUT.
All QSPI pins should be wired as close to RP2040 as possible. Place resistors close to W25Q128JVS.
More specifically, this is the W25Q128JVSIQ
U15
W25Q128JVS
10kΩ
R181
1kΩ
R182
USB_BOOT
SW_Push
SW3
If switch is pressed and RP2040 connected to USB, it will appear as a empty drive − code can be drag/dropped into it.
C30
10uF
BATT Indicator LED
3.3V Indicator LED
VBUS Indicator LED
1kΩ
R183
R184
R169
D1028
D1029
D1030
Controls and Power circuitry
Mihir Savadi
Sheet: /ControlsPower/
File: fancyGradCap_rev2_ControlsPower.kicad_sch
Title: fancyGradCap_rev2
Size: A4
Date: 2022−01−25
Rev: 1
KiCad E.D.A. kicad (6.0.0)
Id: 4/5



Circuitry for all the peripherals

Mihir Savadi

Sheet: /Peripherals/

File: fancyGradCap_rev2_Peripherals.kicad_sch

Title: fancyGradCap_rev2

Size: A4	Date: 2022-01-26	**Rev: 1**
KiCad E.D.A. kicad (6.0.0)		Id: 5/5