Vacuum Fluorescent Display Clock

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04. +3.3V Power Supply — POS3P3V_Power_Supply.sch
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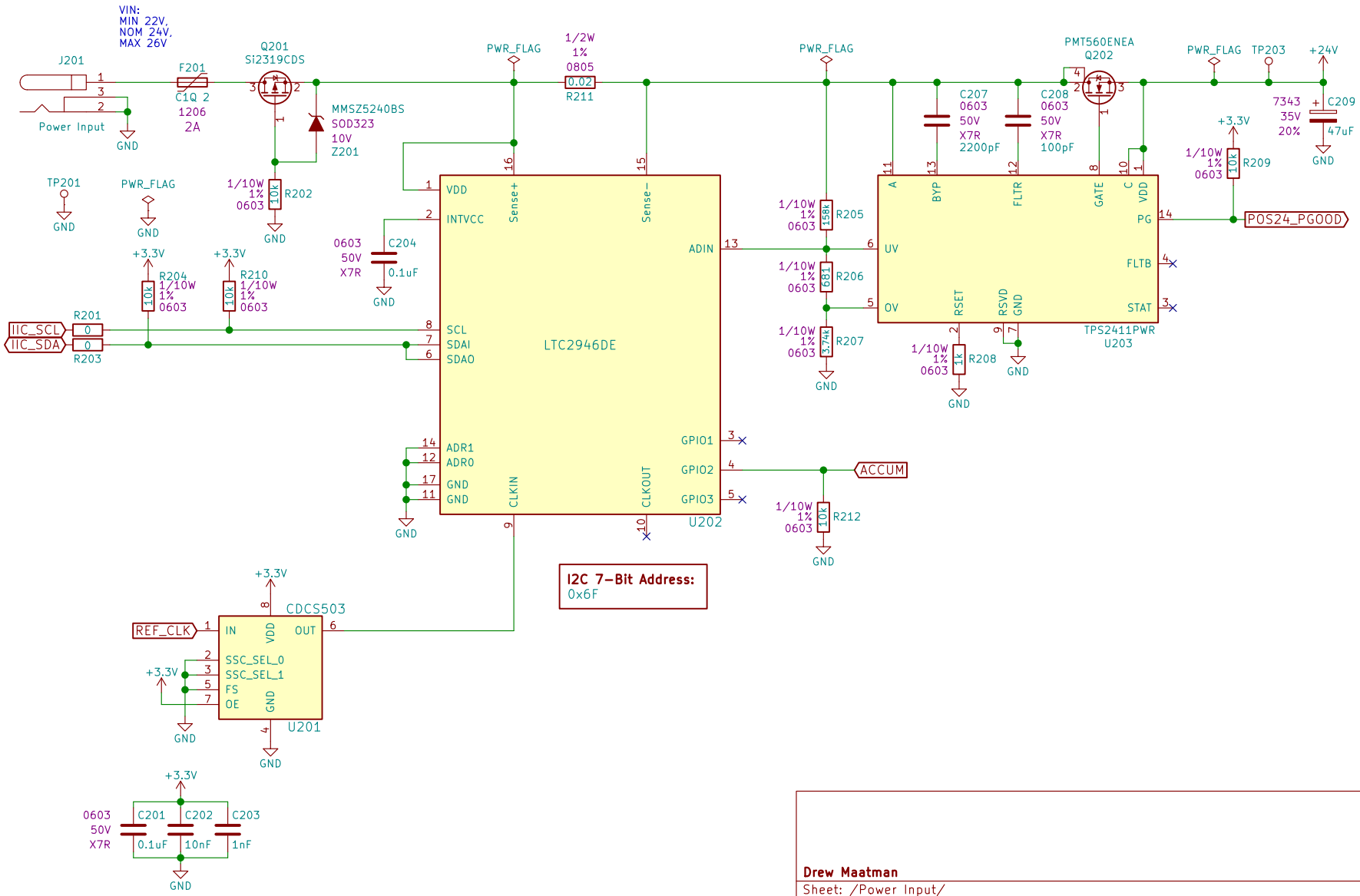
Input Overvoltage/Undervoltage/Reverse Polarity Lockout



Drew Maatman	
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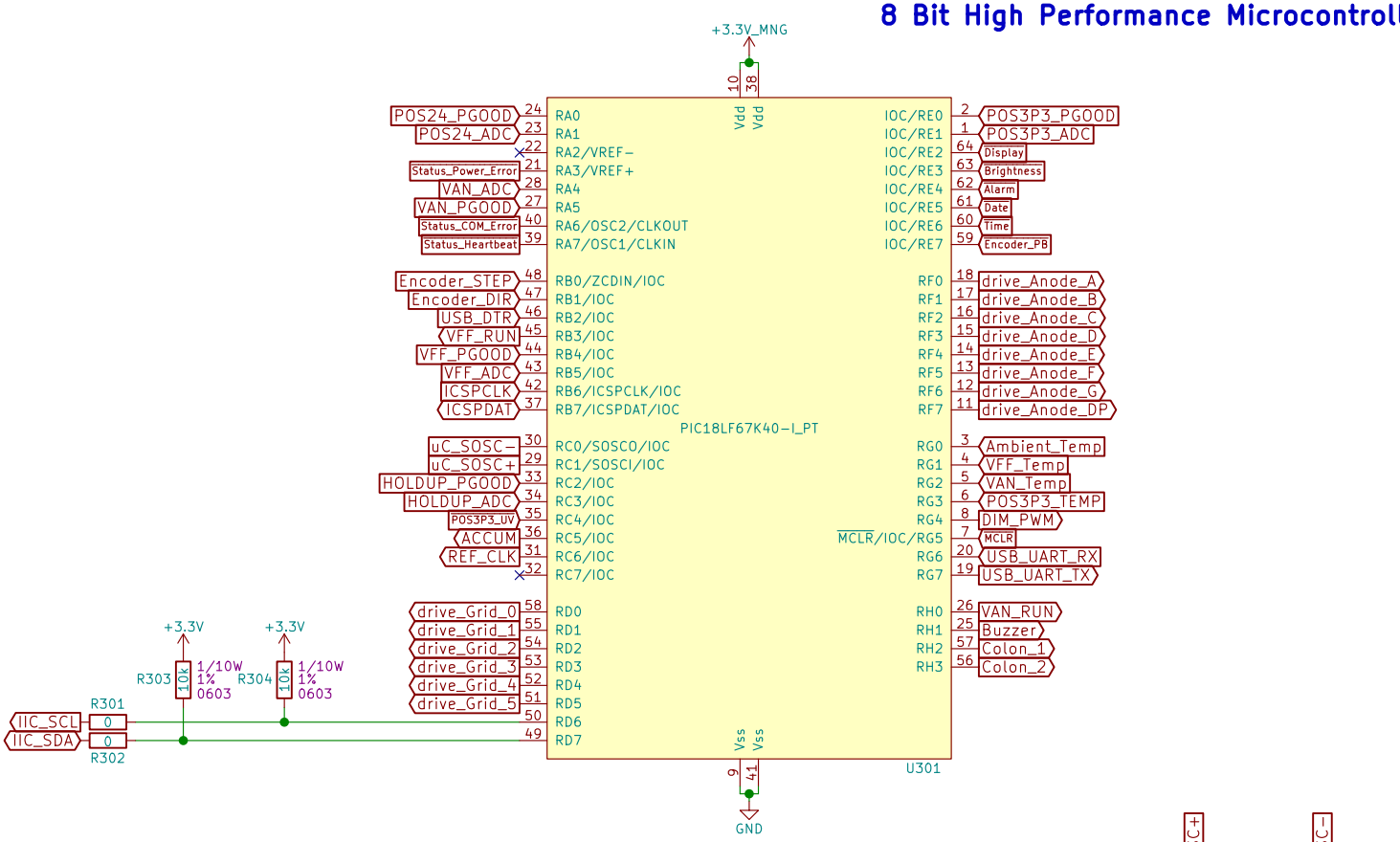
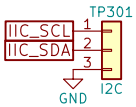
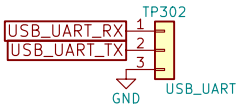
Title: Power Input	
Size: A	Date: 2017-03-06
KiCad E.D.A. kicad (5.0.0)	Rev: 2
	Id: 2/23

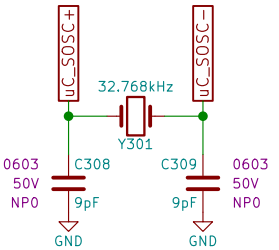
8 Bit High Performance Microcontroller

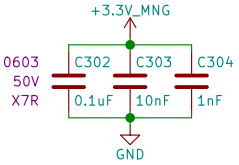


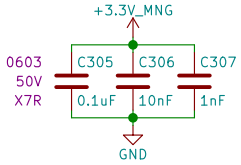


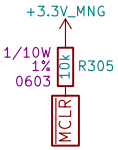


I2C 7-Bit Address:
MASTER









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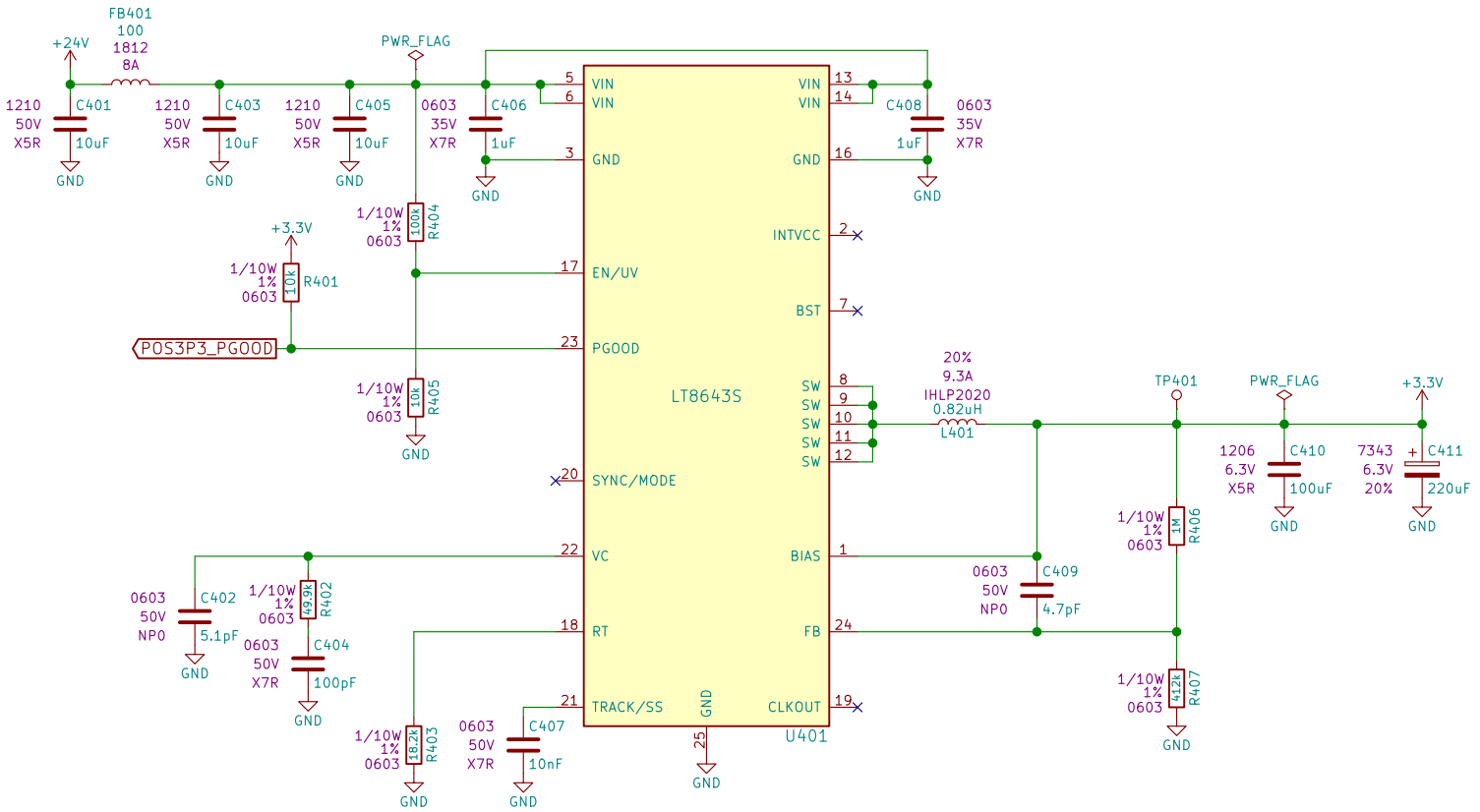
KiCad E.D.A. kicad (5.0.0)		Id: 3/23

+3.3V, 6A Power Supply



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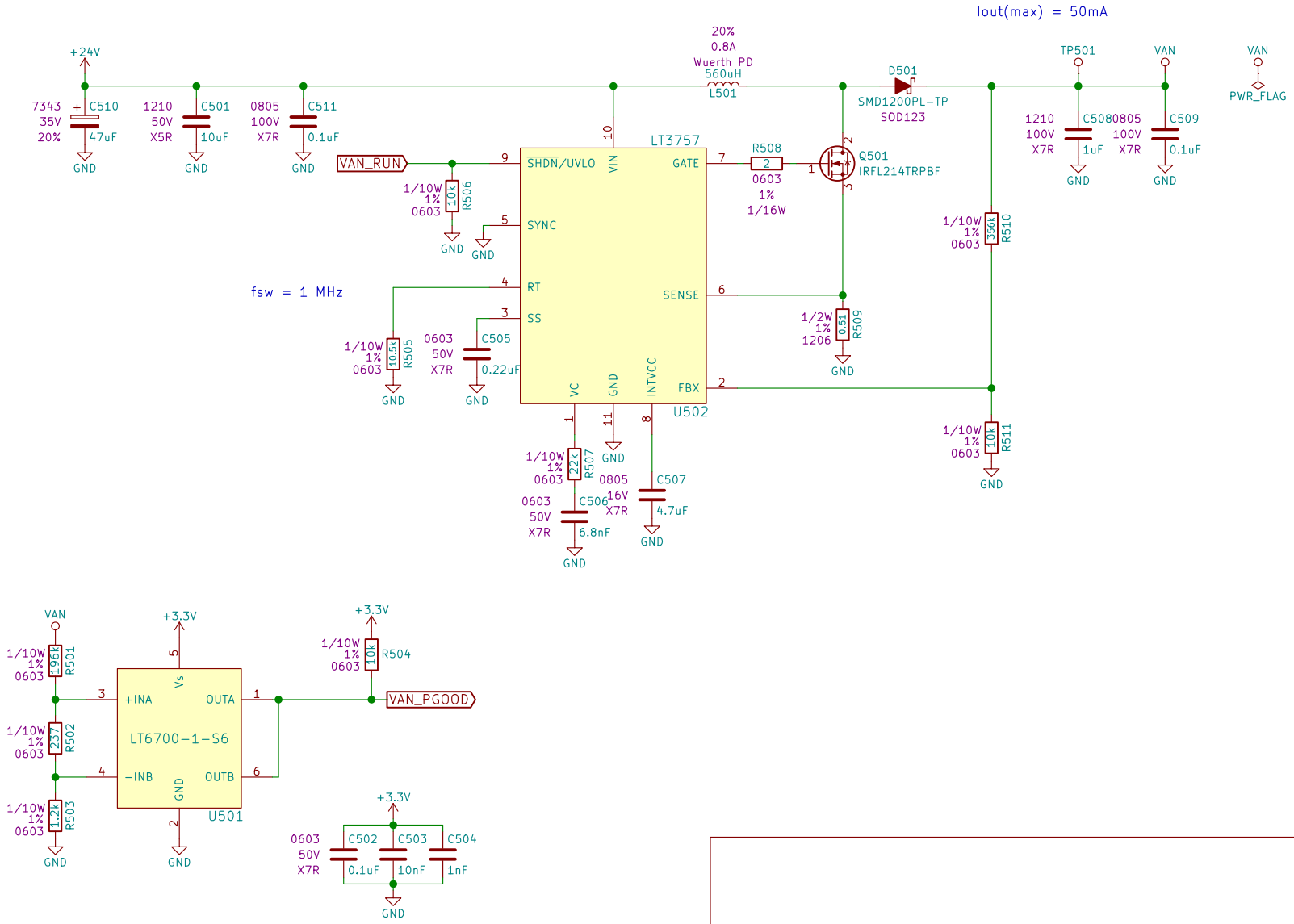
Anode/Grid +60V, 50mA Power Supply



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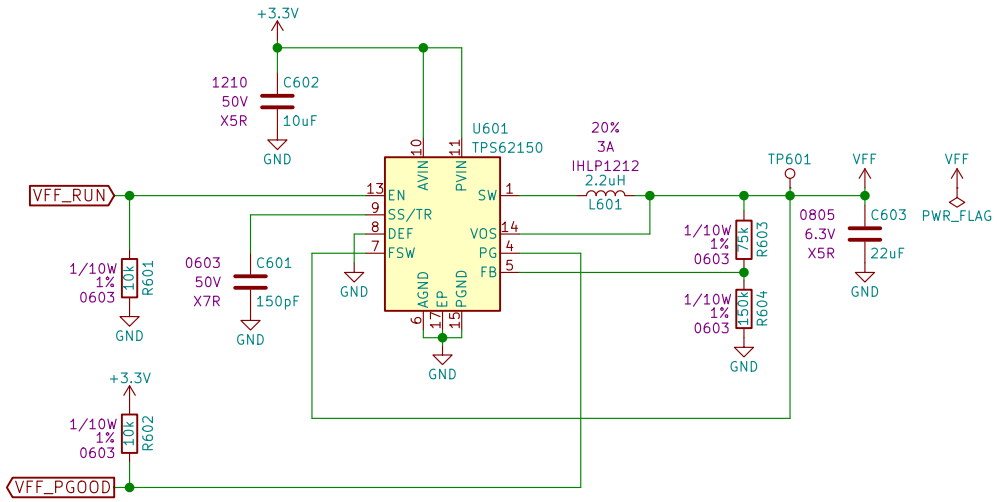
KiCad E.D.A. kicad (5.0.0)		Id: 5/23

Filament +1.2V, 1A Power Supply



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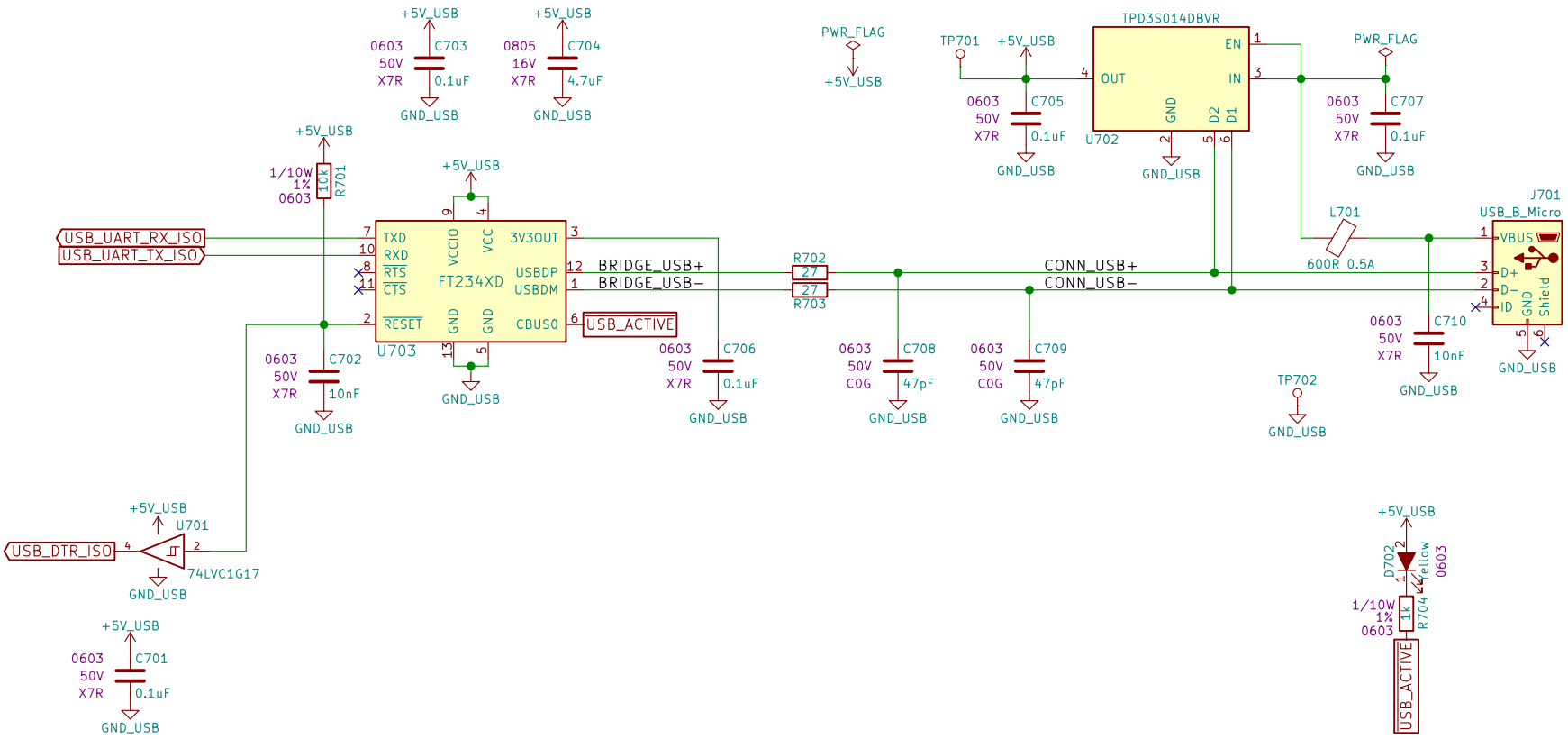
Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.0.0)		Id: 6/23

UART to USB Bridge



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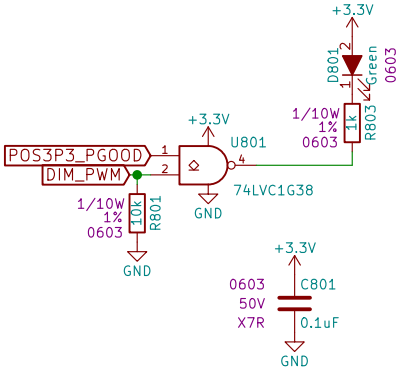
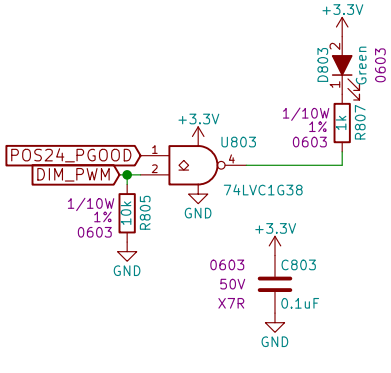
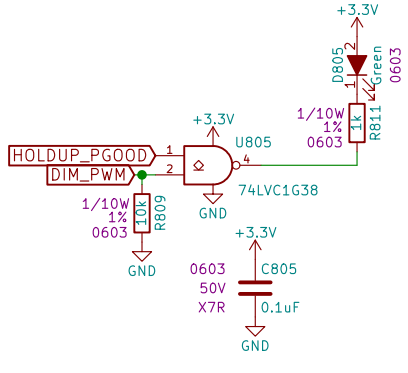
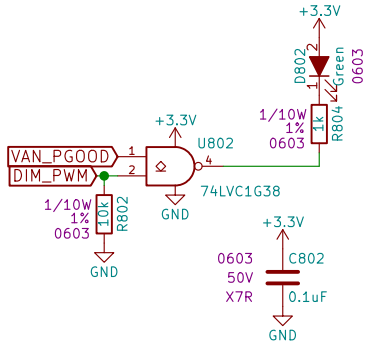
KiCad E.D.A. kicad (5.0.0)		Id: 7/23

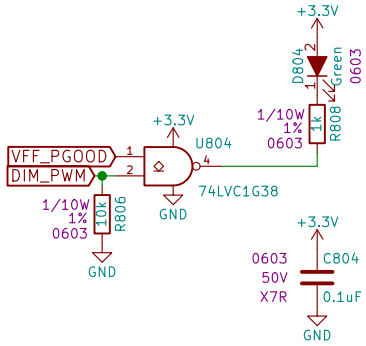
PGOOD Indicators

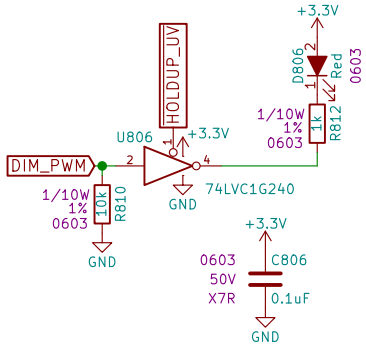












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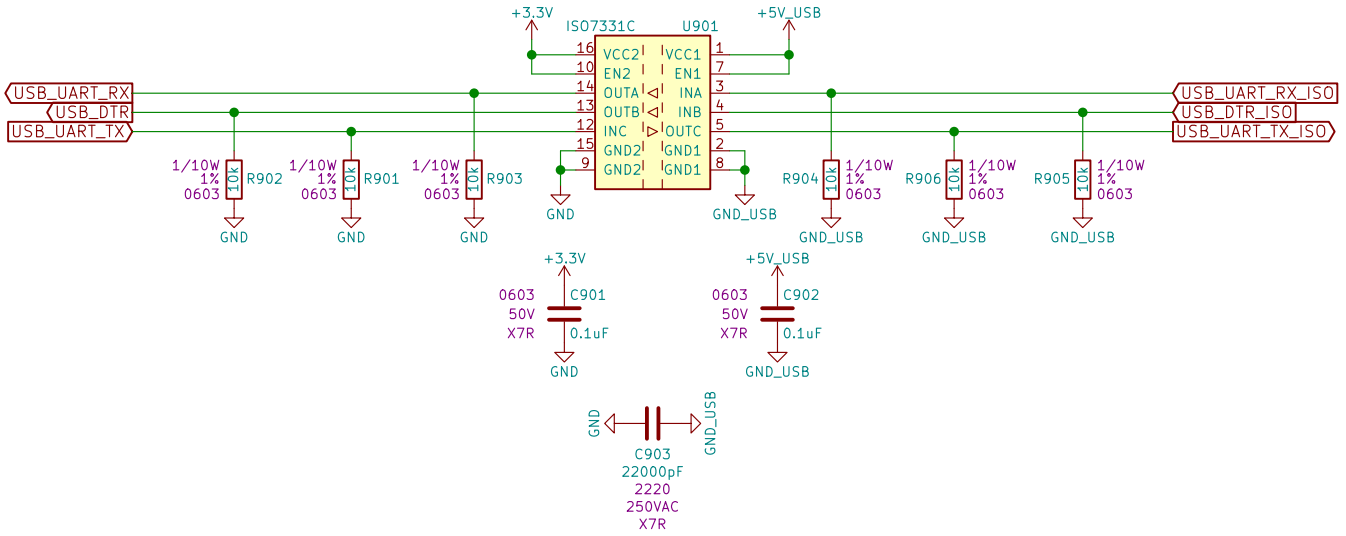
Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.0.0)		Id: 8/23

USB UART Isolation



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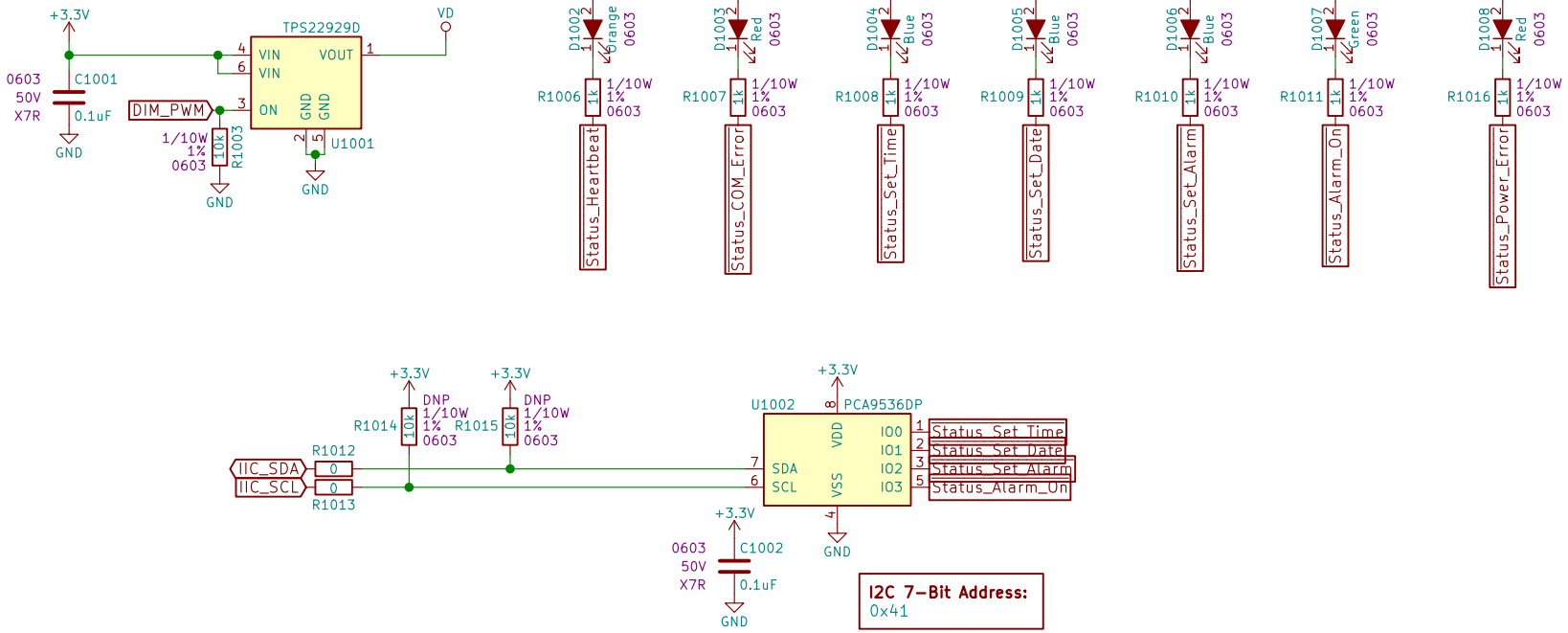
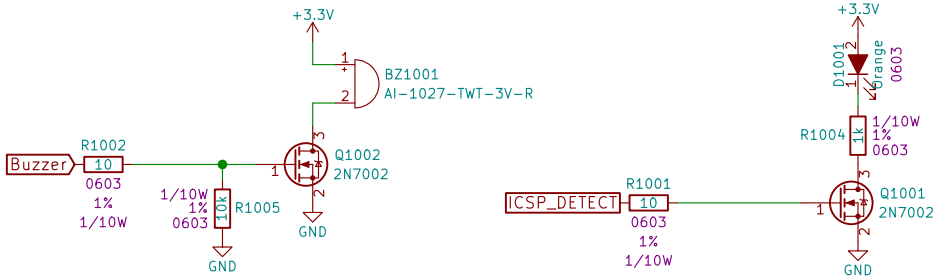
Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.0.0)		Id: 9/23

Status Indicators





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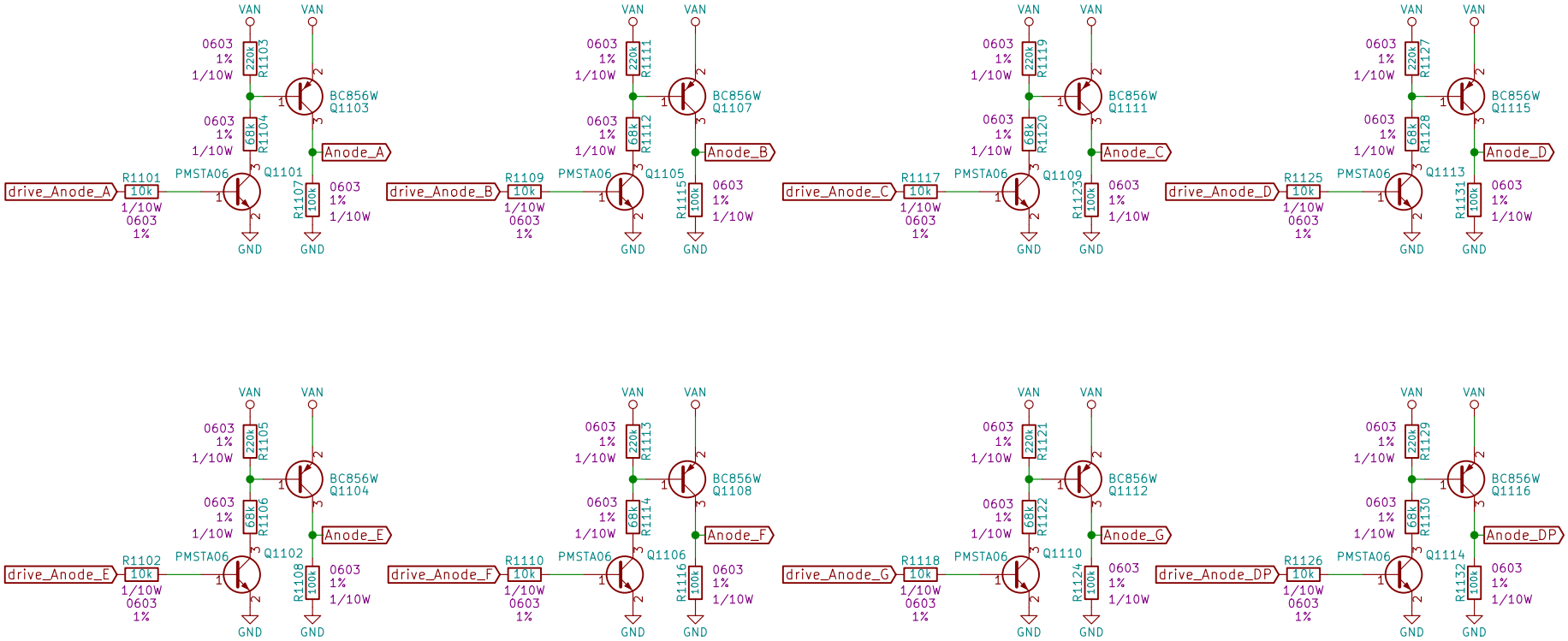
Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.0.0)		Id: 10/23

Anode Drivers



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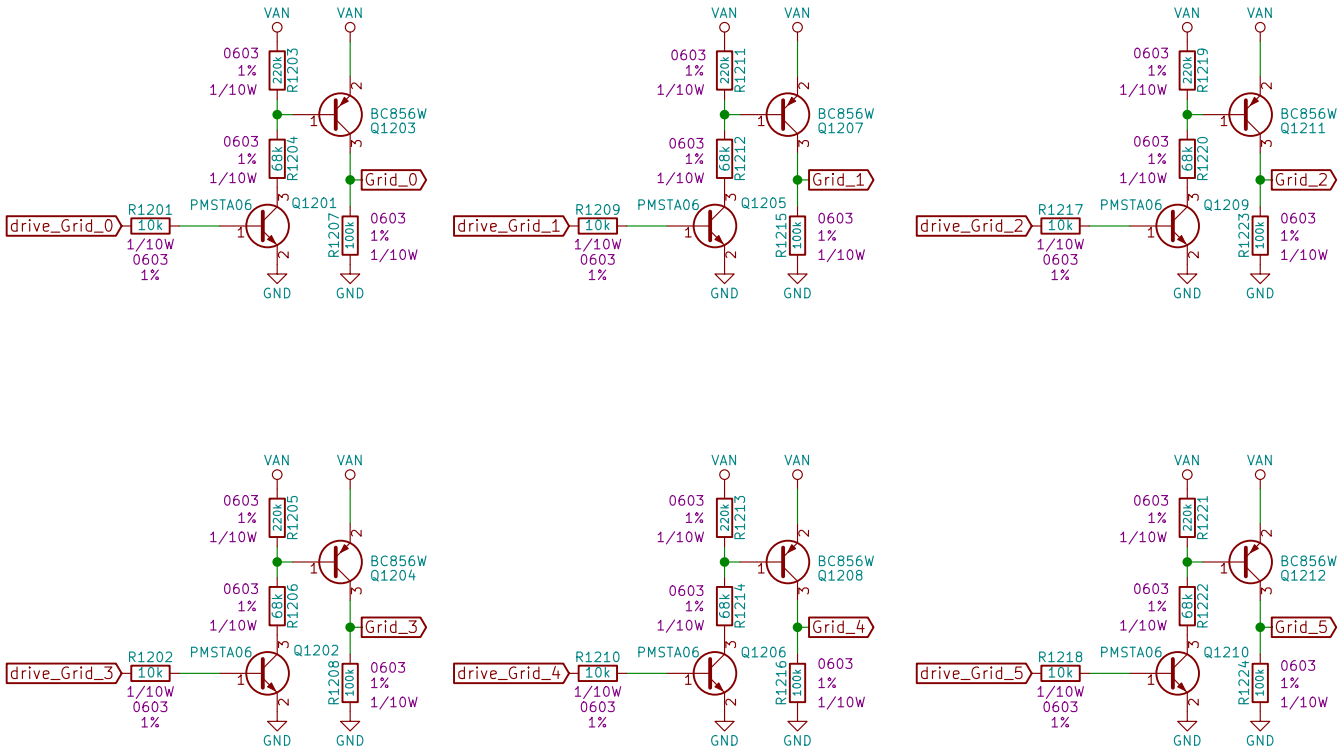
Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.0.0)		Id: 11/23

Grid Drivers



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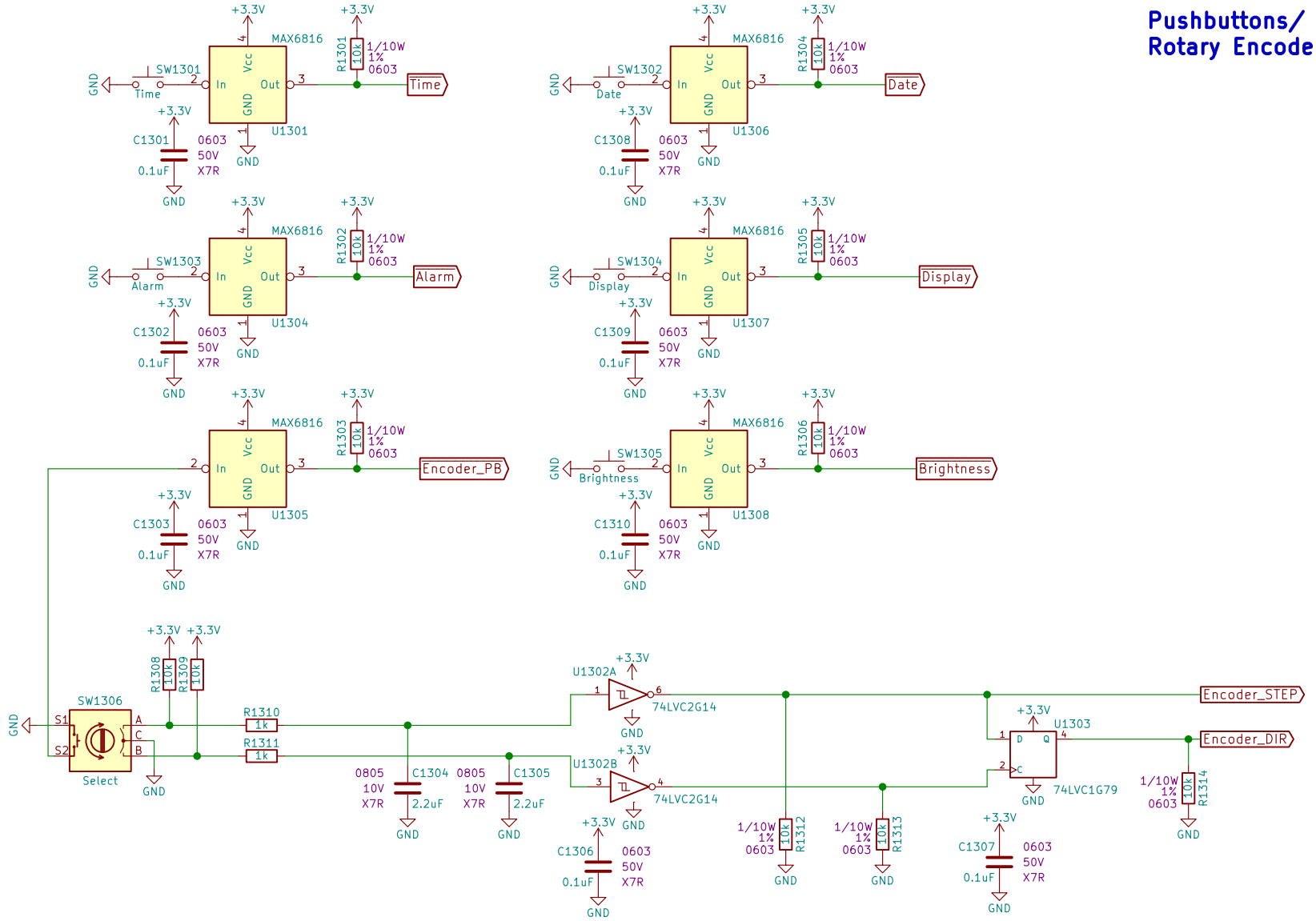
Pushbuttons/
Rotary Encoder
SW1301
Time
SW1302
Date
SW1303
Alarm
SW1304
Display
SW1305
Brightness
SW1306
Select
MAX6816
U1301
U1306
U1304
U1307
U1305
U1308
R1301
R1304
R1302
R1305
R1303
R1306
10k
1/10W
1%
0603
C1301
C1308
C1302
C1309
C1303
C1310
0603
50V
X7R
0.1uF
R1308
R1309
R1310
R1311
1k
U1302A
U1302B
74LVC2G14
U1303
74LVC1G79
C1304
C1305
0805
10V
X7R
2.2uF
C1306
C1307
R1312
R1313
R1314
+3.3V
GND
Time
Date
Alarm
Display
Brightness
Encoder_PB
Encoder_STEP
Encoder_DIR
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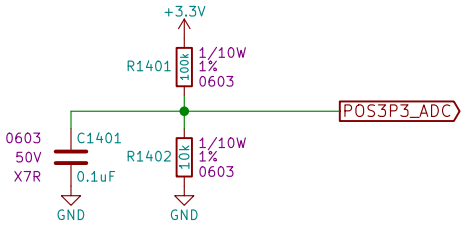
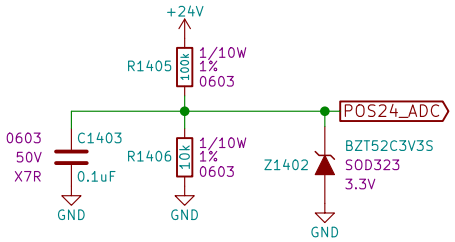
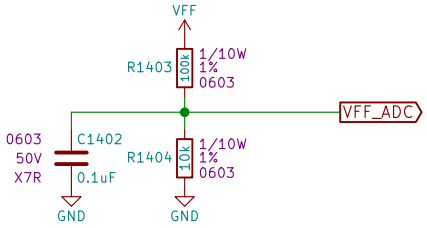
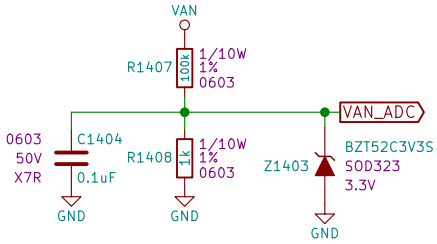
File: Pushbuttons.sch
Title:
Size: A
Date:
Rev:
KiCad E.D.A. kicad (5.0.0)
Id: 13/23

ADC Dividers/Filters









Sheet: /Analog Inputs/ File: AnalogInputs.sch		
Title:		
Size: A	Date:	**Rev:**
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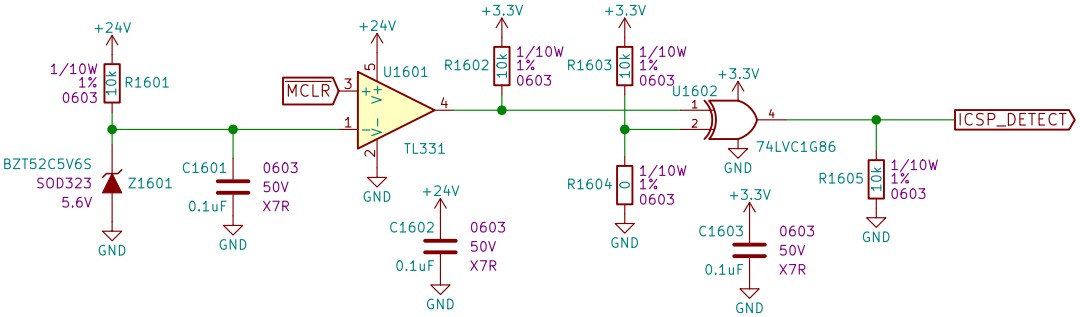
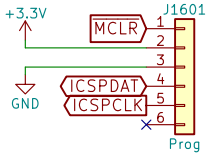
* All of PORTC should be configured as open drain outputs for sinking current from LEDs
* All of PORTA is used for ADC measurments/external oscillator
* Most of PORTD is used for driving grid switches, can be set up as a 6 bit structure located at the PORTC memory address
* All of PORTF is used for driving anode switches, so smae thing as above with 8 bits
* All of PORTE is used for measuring pushbuttons so all should be set as inputs with IOC's enabled
* Same with PORTB except with only 6 bits, and used for generic input logic signals
* RD0 and RD1 should be routed to SMT1 and SMT2 so that the signal measurement timers can be used to measure dipslay update rate and refresh rate
* RG3 should be configured as an output for a CCPx module to produce a PWM signal for dimming LEDs on the board. Display itself will be dimmed in software by adjusting the on time
* EUSART5 must be used for USB serial communication since only this module can be routed to PORTG
* RG0 and RG1 will be the inputs to CCPx modules to measure the switching frequency (maybe duty cycle as well) of VFF and VAN supplies
* RG4 should be set/cleared every other display refresh cycle, and the input snese ciruit queued when cleared, so that energy/charge per display cycle can be measured
* While operating, the external 16MHz clock with internal 4x PLL will yield an FOSC of 64MHz. While the display is off, FOSC should be switched to something slower internally to minimize power consumption

Sheet: /Firmware Notes/ File: FirmwareNotes.sch		
Title:		
Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.0.0)		Id: 15/23

Programming Header/ICSP Detection





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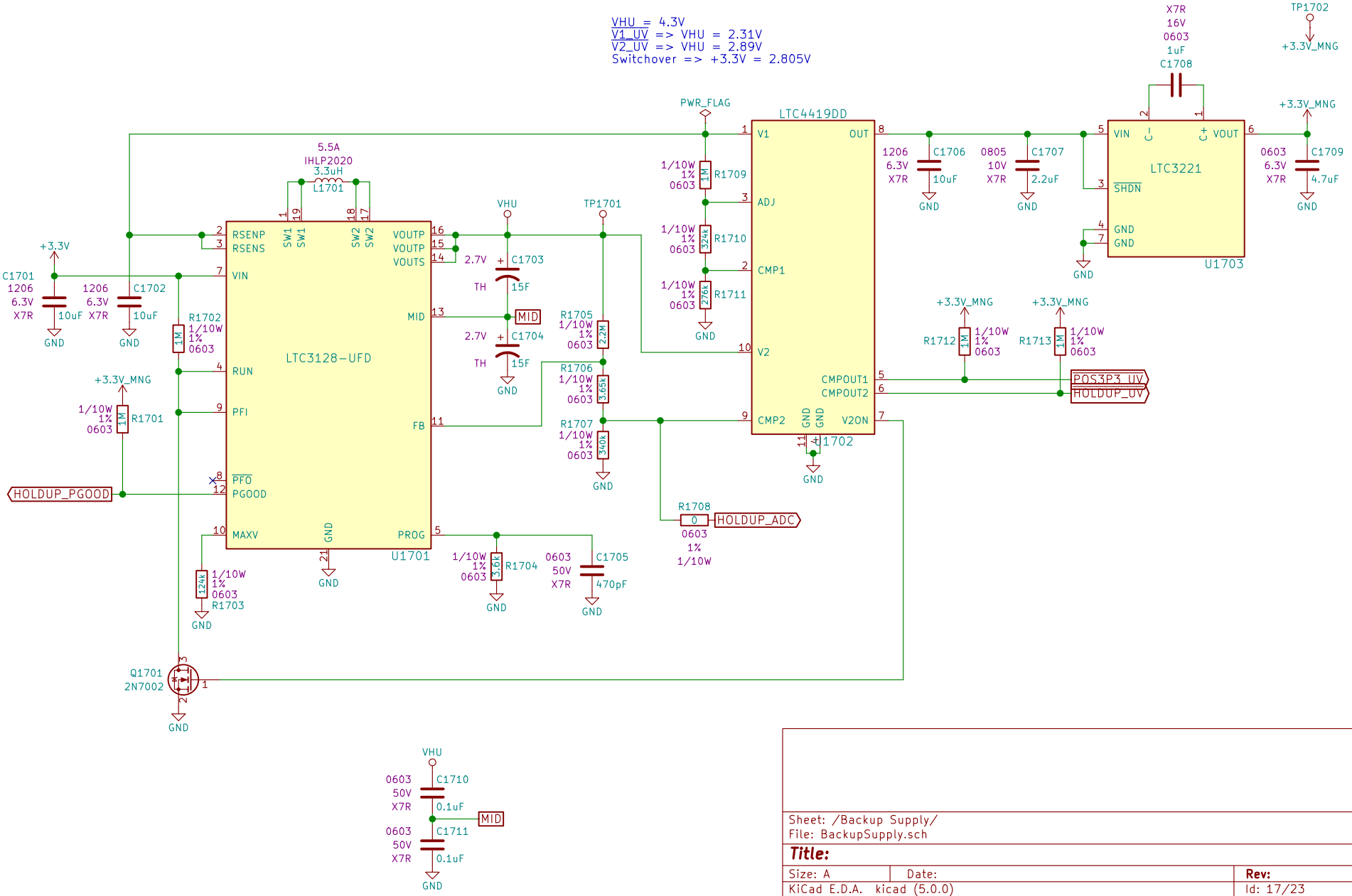
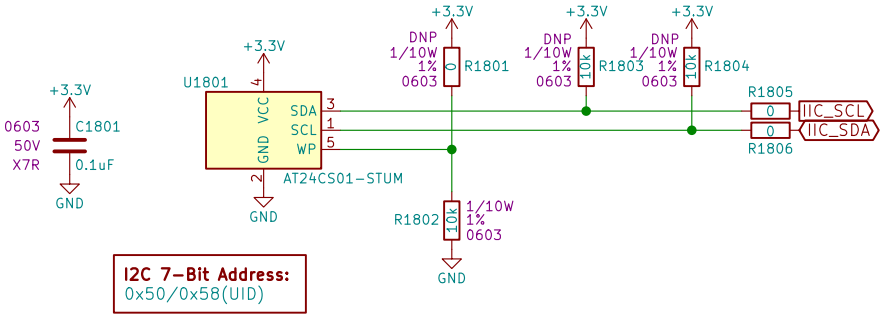
KiCad E.D.A. kicad (5.0.0)		Id: 16/23

Supercap Backup Circuit/+3.3V Management Supply



Serial Number



Sheet: /Serial Number/		
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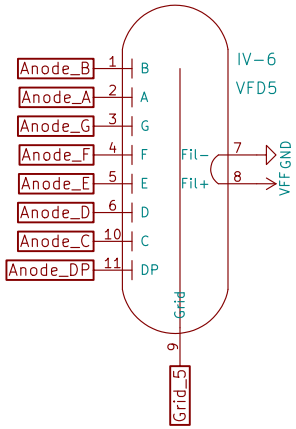
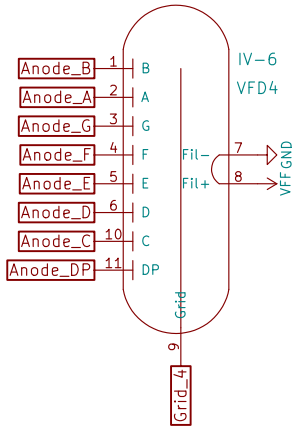
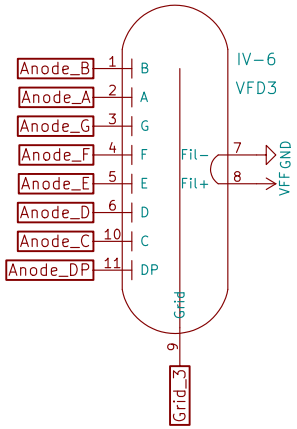
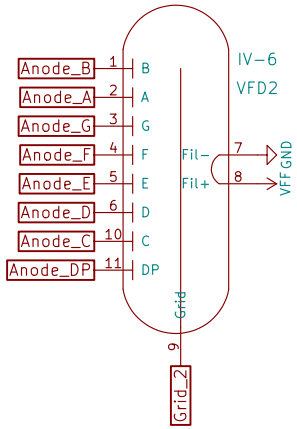
Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.0.0)		Id: 18/23

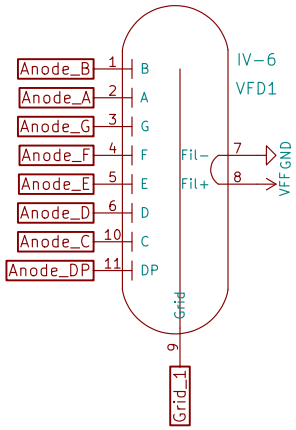
VFD Tubes/Colons

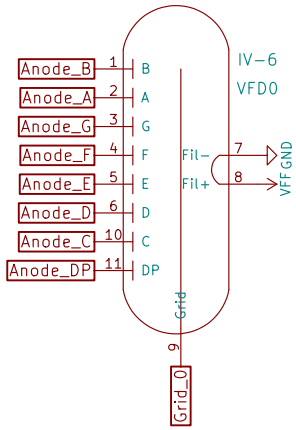


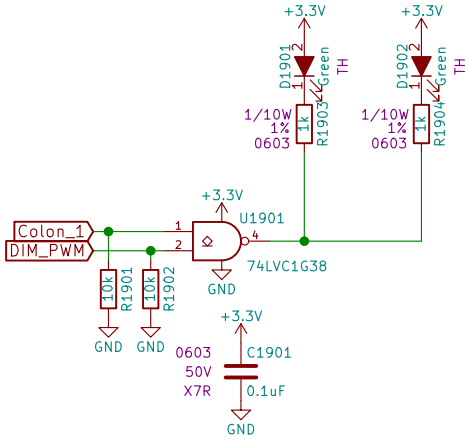


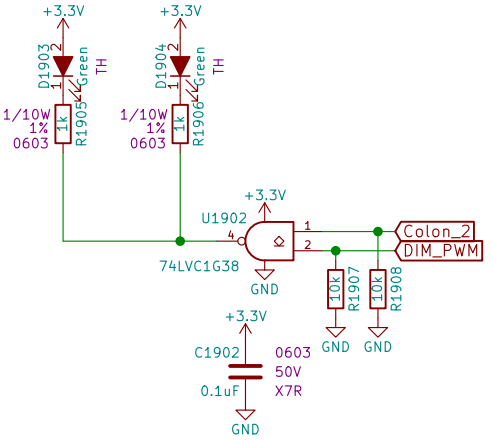












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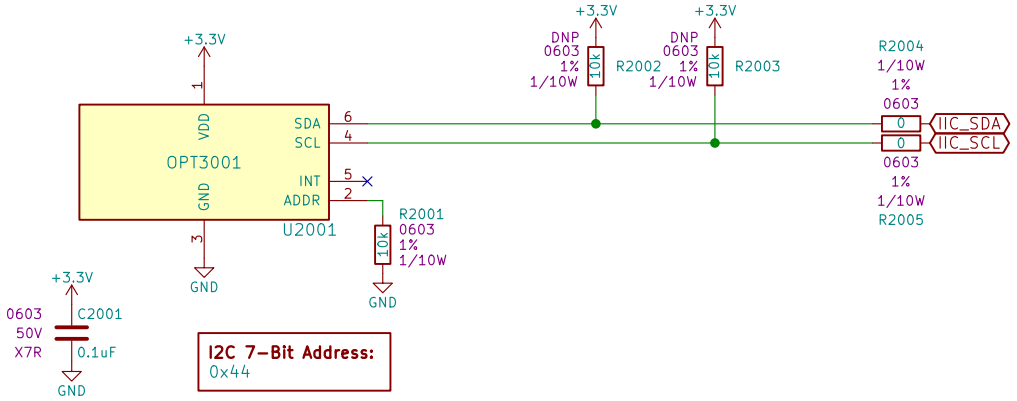
Ambient Light Sensor



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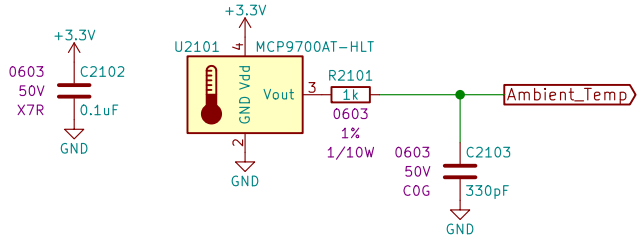
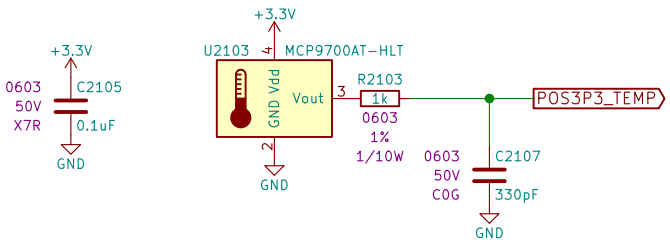
Temperature Sensors

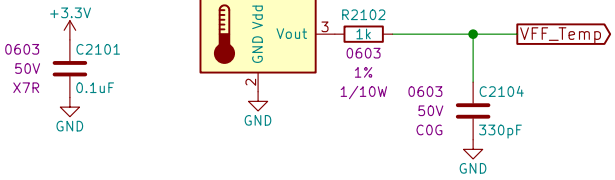
Place away from heating components



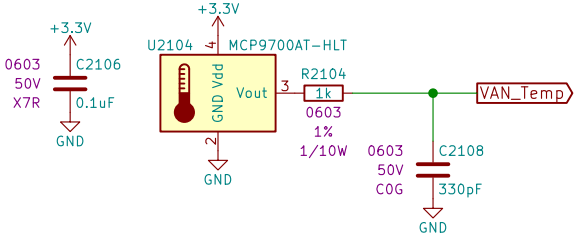
Place near POS3P3 power supply



Place near VFF power supply



Place near VAN power supply



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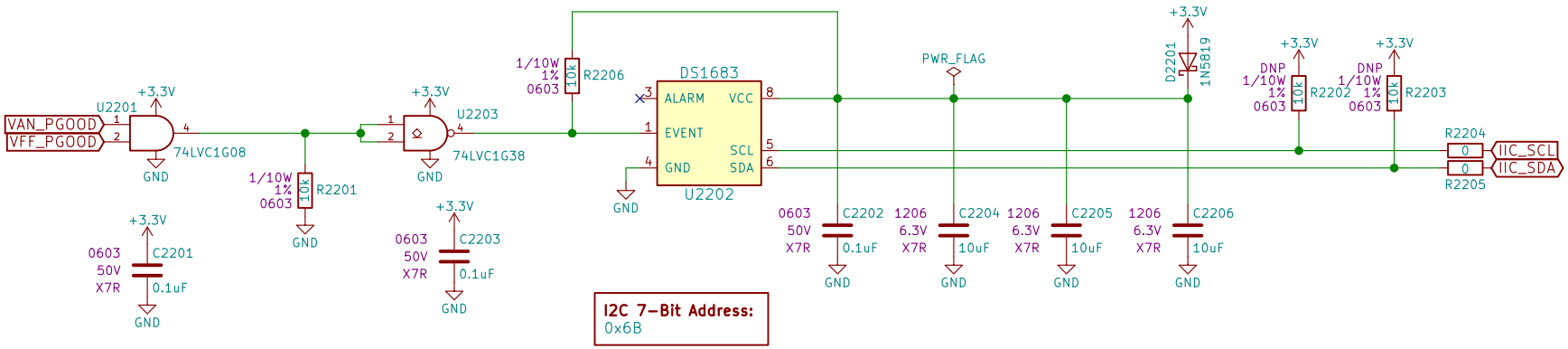
Tube Life Timer



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Mechanical Components

MH2301
4-40 Mounting Hole

MH2303
4-40 Mounting Hole

MH2305
4-40 Mounting Hole

MH2307
4-40 Mounting Hole

FID2301 FID2302 FID2303

MH2302
4-40 Mounting Hole

MH2304
4-40 Mounting Hole

MH2306
4-40 Mounting Hole

MH2308
4-40 Mounting Hole

Symbols

ESD

OSHW

KiCAD

Polarity

High Voltage

MK2301
#4-40 Screw

MK2303
#4-40 Screw

MK2305
#4-40 Screw

MK2307
#4-40 Screw

MK2309
#4-40 Standoff

MK2311
#4-40 Standoff

MK2313
#4-40 Standoff

MK2315
#4-40 Standoff

MK2302
#4-40 Screw

MK2304
#4-40 Screw

MK2306
#4-40 Screw

MK2308
#4-40 Screw

MK2310
#4-40 Standoff

MK2312
#4-40 Standoff

MK2314
#4-40 Standoff

MK2316
#4-40 Standoff

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