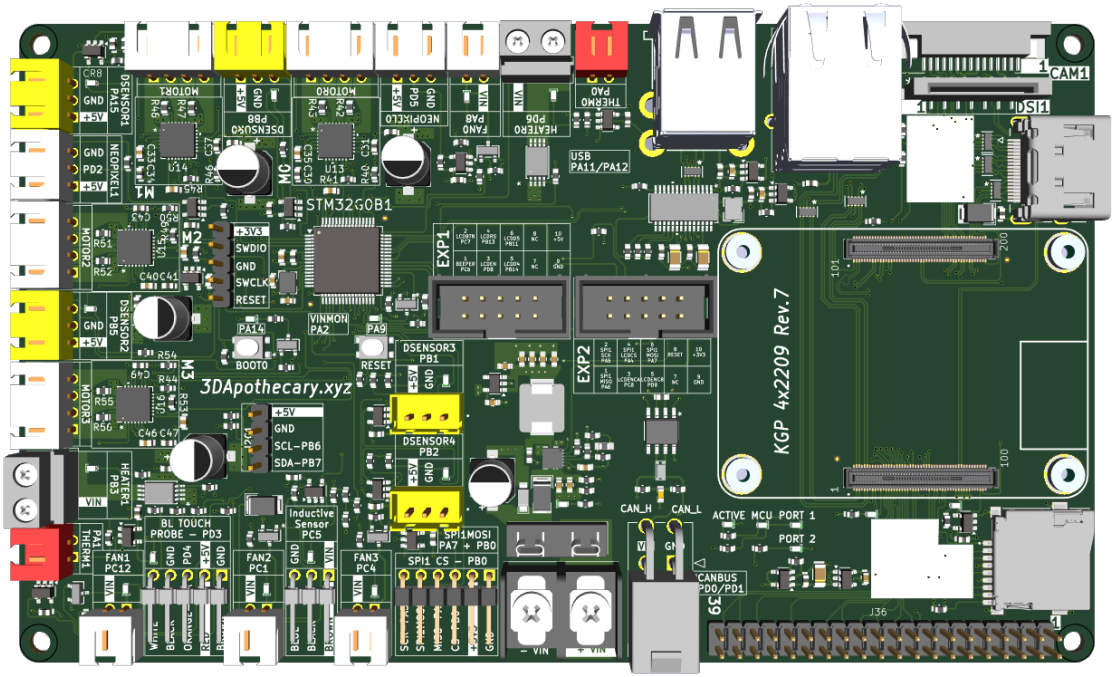


KGP 4x2209 Rev.7 Features:

1. MCU: STM32G0B1RET6
   - DFU Firmware Flashing from Host
2. 12V or 24V Operation
3. Raspberry Pi CM4 (or equivalent host) with:
   - Raspberry Pi: 40 Pin Header/Camera & DSI Sockets
   - Full Size HDMI Socket
   - RJ45 Ethernet Socket
   - 2x USB A Sockets
4. 6A 5V Power
5. 3D Printer Interfaces:
   - MCU Function Pins on PCB Silkscreen
   - DFU/Reset Buttons with LEDs State Indicators
   - 4x TMC2209 Stepper Motor Drivers (White Sockets)
   - 5x Endstop Sensors with LEDs (Yellow Sockets)
   - 2x 15A Heater Drivers with Thermistor Inputs (Red Sockets)
   - 4x Fan Drivers (White Sockets)
   - CAN Interface with Split 60Ω Terminator
   - "EXP1/EXP2" Connectors for use with UC12864 UI
   - SPI Available in "EXP1/EXP2" Connectors & Separate Connector
   - I2C Port with 5V power
   - VIN Voltage Sensor

PWR_MGMT File: PWM_MGMT.kicad_sch	MCU File: MCU.kicad_sch	SWD File: SWD.kicad_sch	BUSES File: SPI_I2C.kicad_sch	HEATER_THERM File: HEATER_THERM.kicad_sch
SENSORS File: SENSORS.kicad_sch	FANS File: FANS.kicad_sch	3DACC File: 3DACC.kicad_sch	MOTOR_0 File: MOTOR_0.kicad_sch	MOTOR_1 File: MOTOR_1.kicad_sch
MOTOR_2 File: MOTOR_2.kicad_sch	MOTOR_3 File: MOTOR_3.kicad_sch	CM4_CONN File: CM4_CONN.kicad_sch	SDCARD File: SDCARD.kicad_sch	USB File: USB.kicad_sch
ETHERNET File: ETHERNET.kicad_sch	RPI40_CONN File: RPI40_CONN.kicad_sch	HDMI0 File: HDMI0.kicad_sch	CAM1_DSI1 File: CAM1_DSI1.kicad_sch	MISC File: MISC.kicad_sch

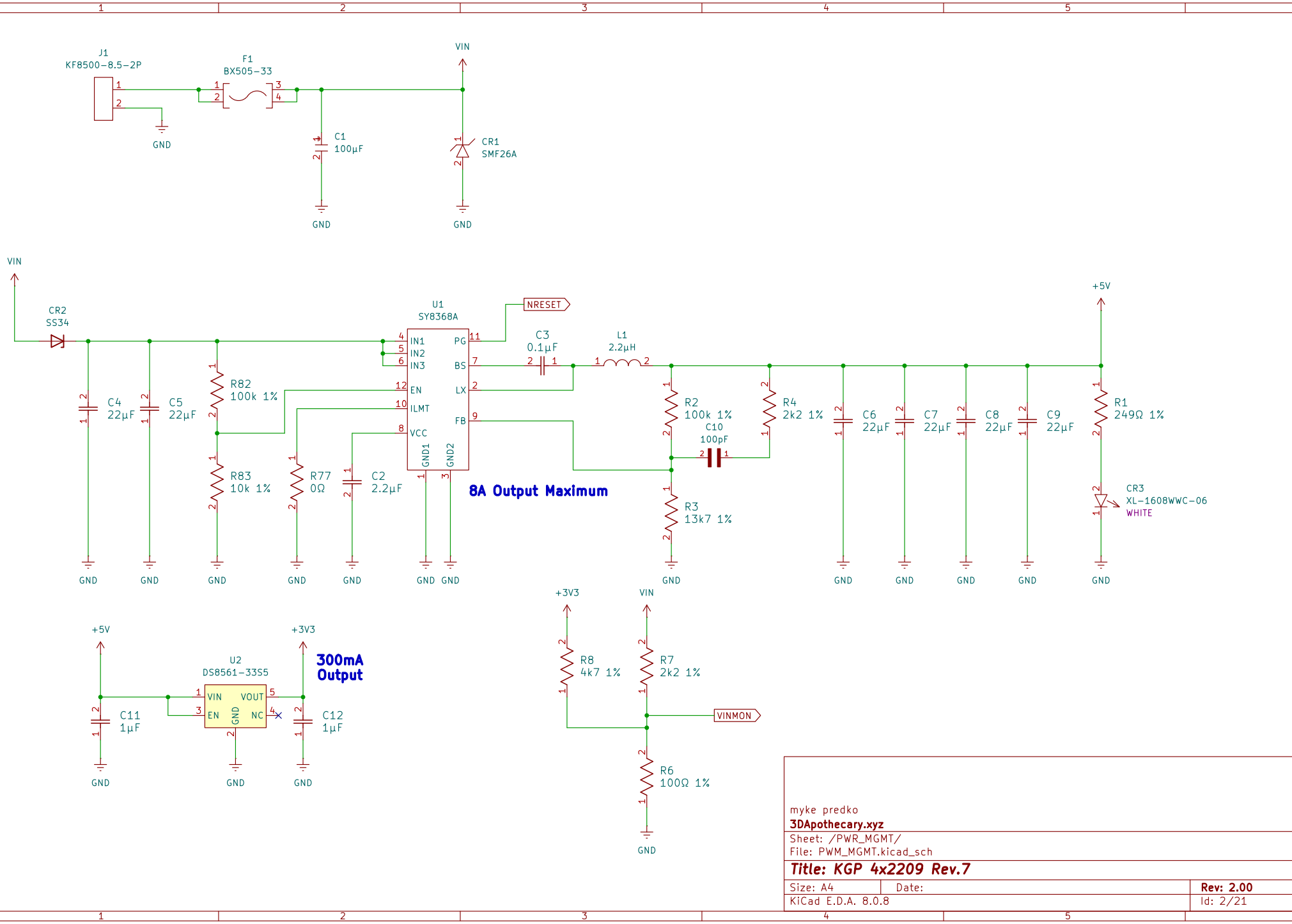
Vision Statement:
The KGP 4x2209 is a complete, cost effective, easy to use Klipper Controller Board for Beginners and Experts.

myke predko
3DApothecary.xyz

Sheet: /
File: KGP_4x2209_Rev_7.kicad_sch

Title: KGP 4x2209 Rev.7

Size: A4	Date:	**Rev: 2.00**
KiCad E.D.A. 8.0.8		Id: 1/21

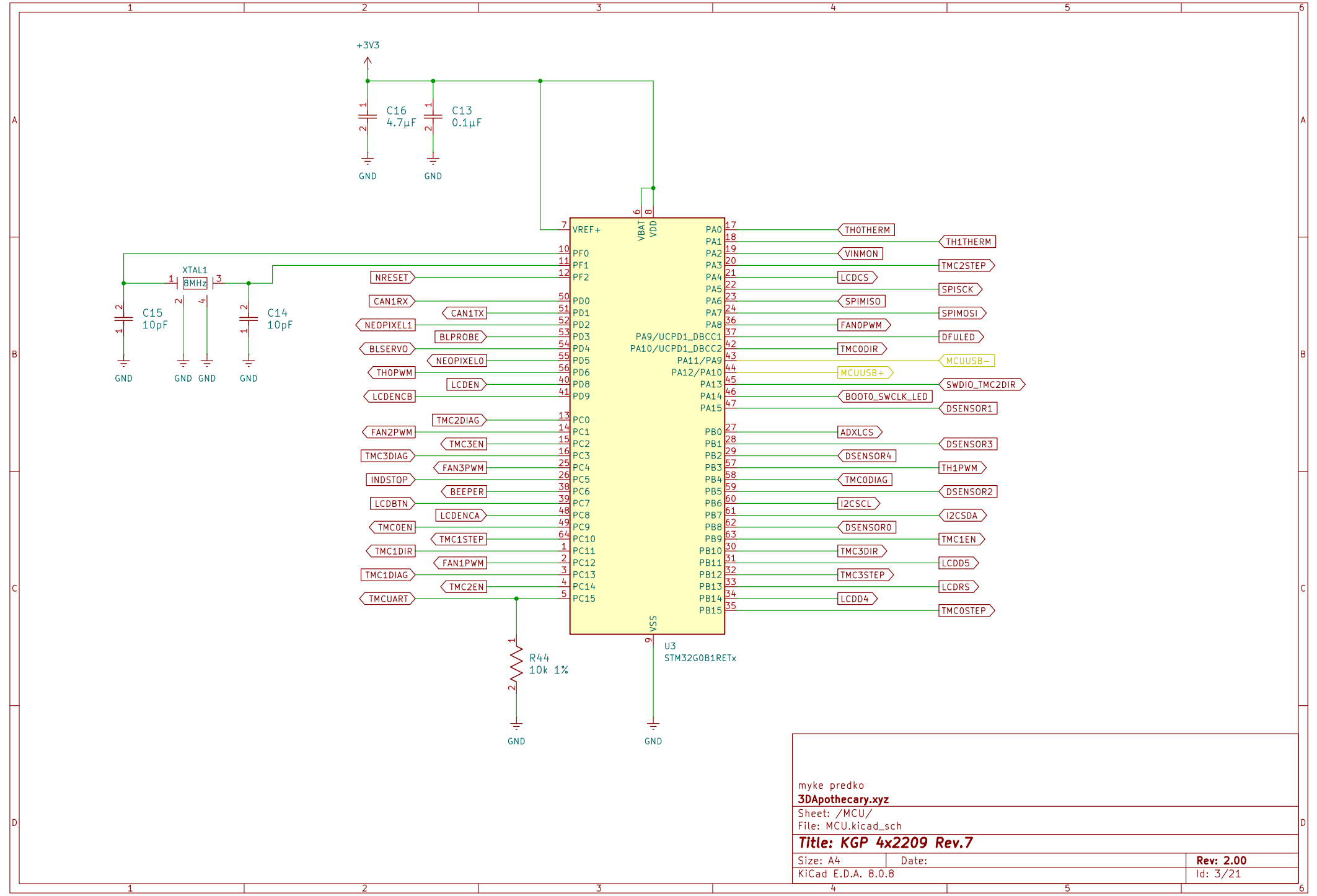


myke predko
3DApothecary.xyz

Sheet: /PWR_MGMT/
File: PWM_MGMT.kicad_sch

Title: KGP 4x2209 Rev.7

Size: A4	Date:	**Rev: 2.00**
KiCad E.D.A. 8.0.8		Id: 2/21

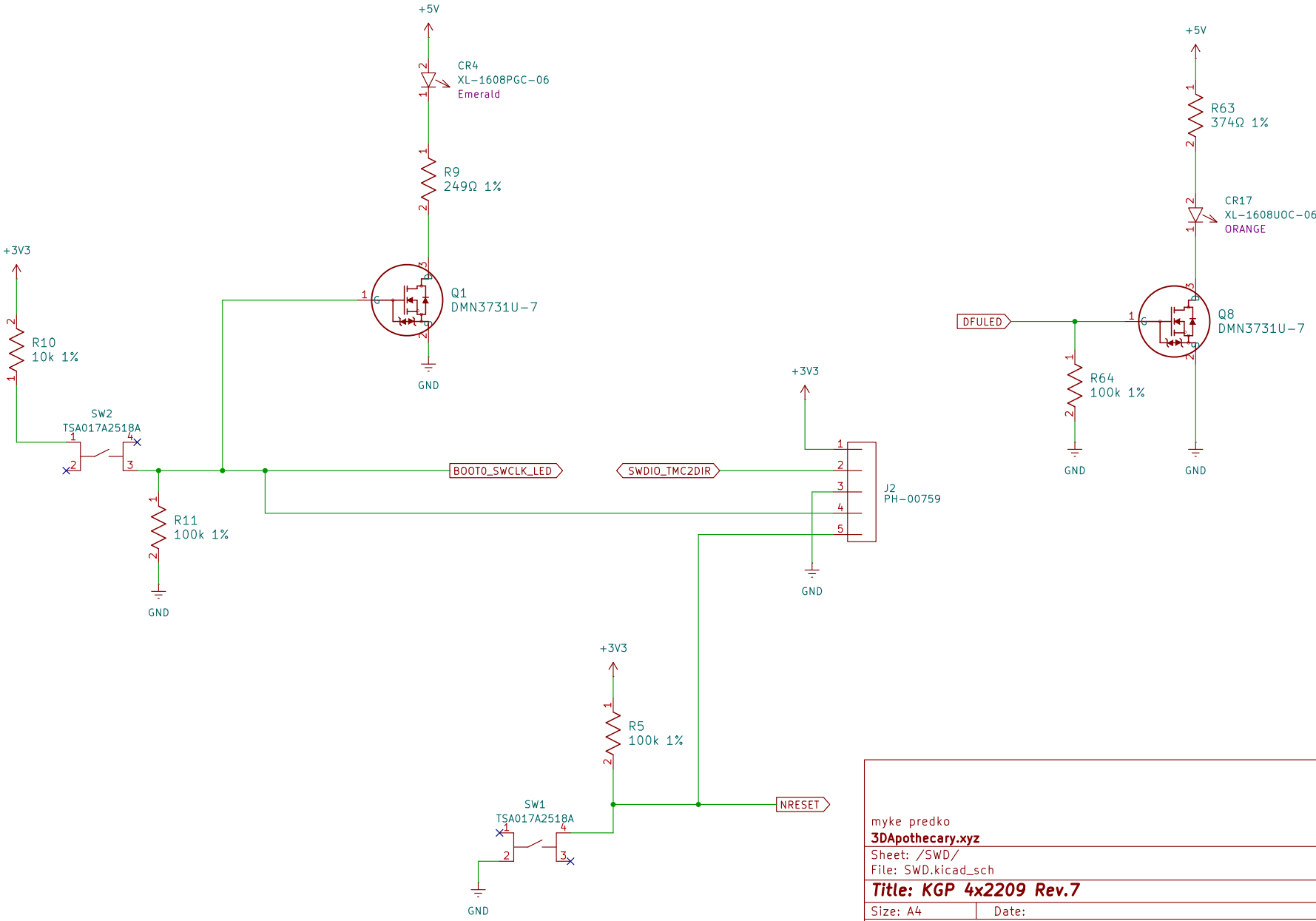


myke predko
3DApothecary.xyz

Sheet: /MCU/
File: MCU.kicad_sch

Title: KGP 4x2209 Rev.7

Size: A4	Date:	**Rev: 2.00**
KiCad E.D.A. 8.0.8		Id: 3/21

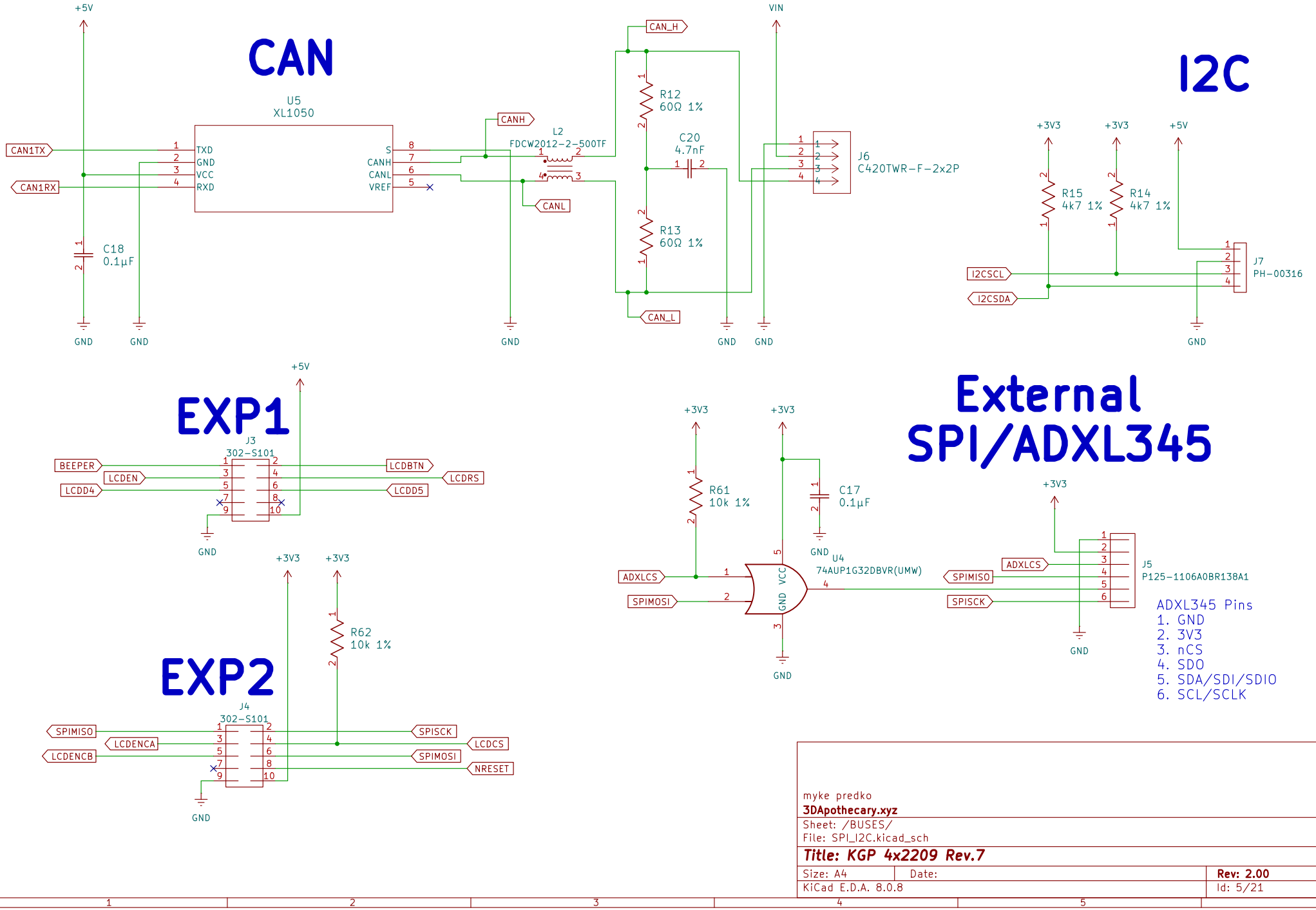


myke predko
3DApothecary.xyz

Sheet: /SWD/
File: SWD.kicad_sch

Title: KGP 4x2209 Rev.7

Size: A4	Date:	**Rev: 2.00**
KiCad E.D.A. 8.0.8		Id: 4/21

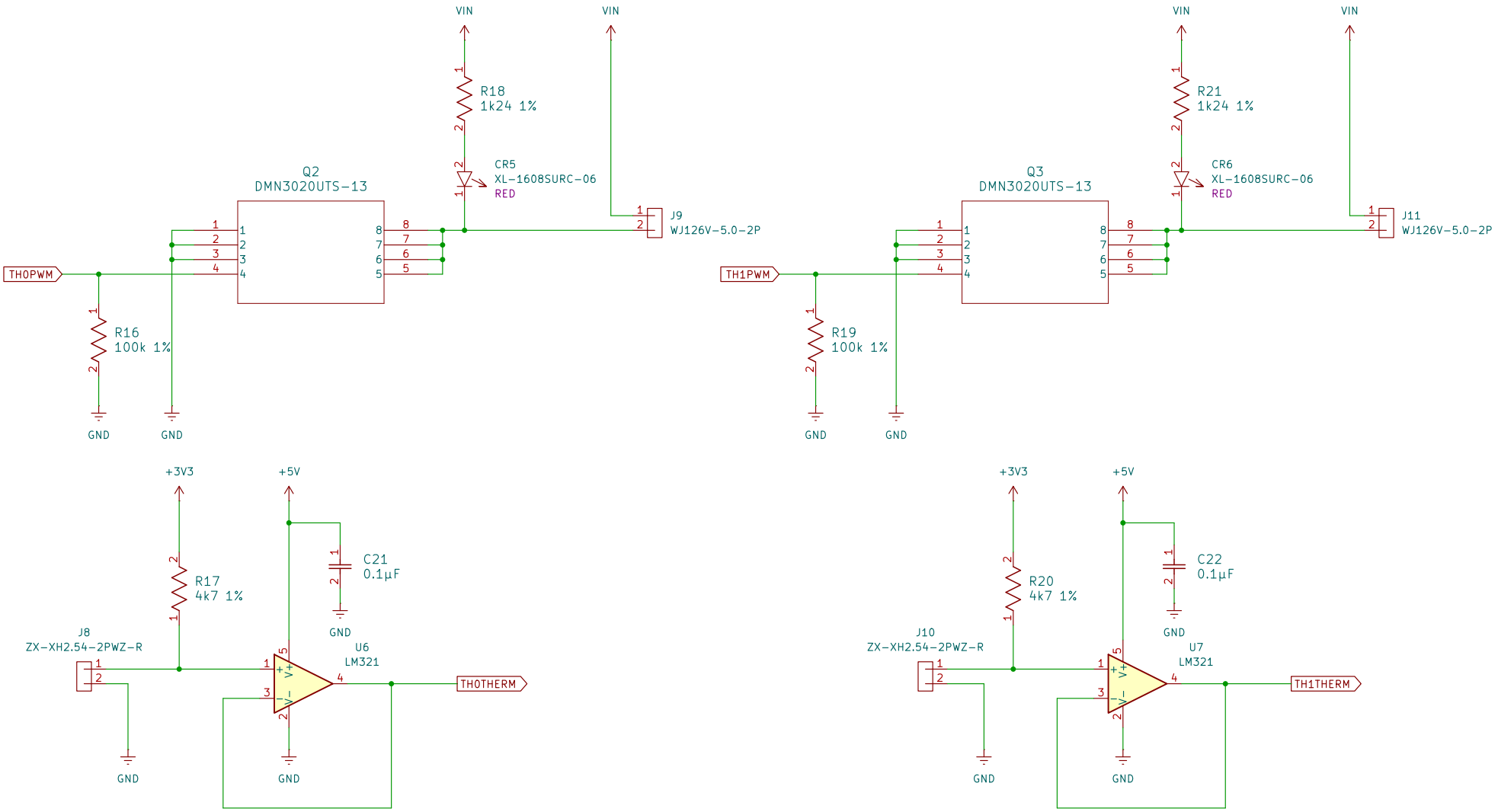


myke predko
3DApothecary.xyz

Sheet: /BUSES/
File: SPI_I2C.kicad_sch

Title: KGP 4x2209 Rev.7

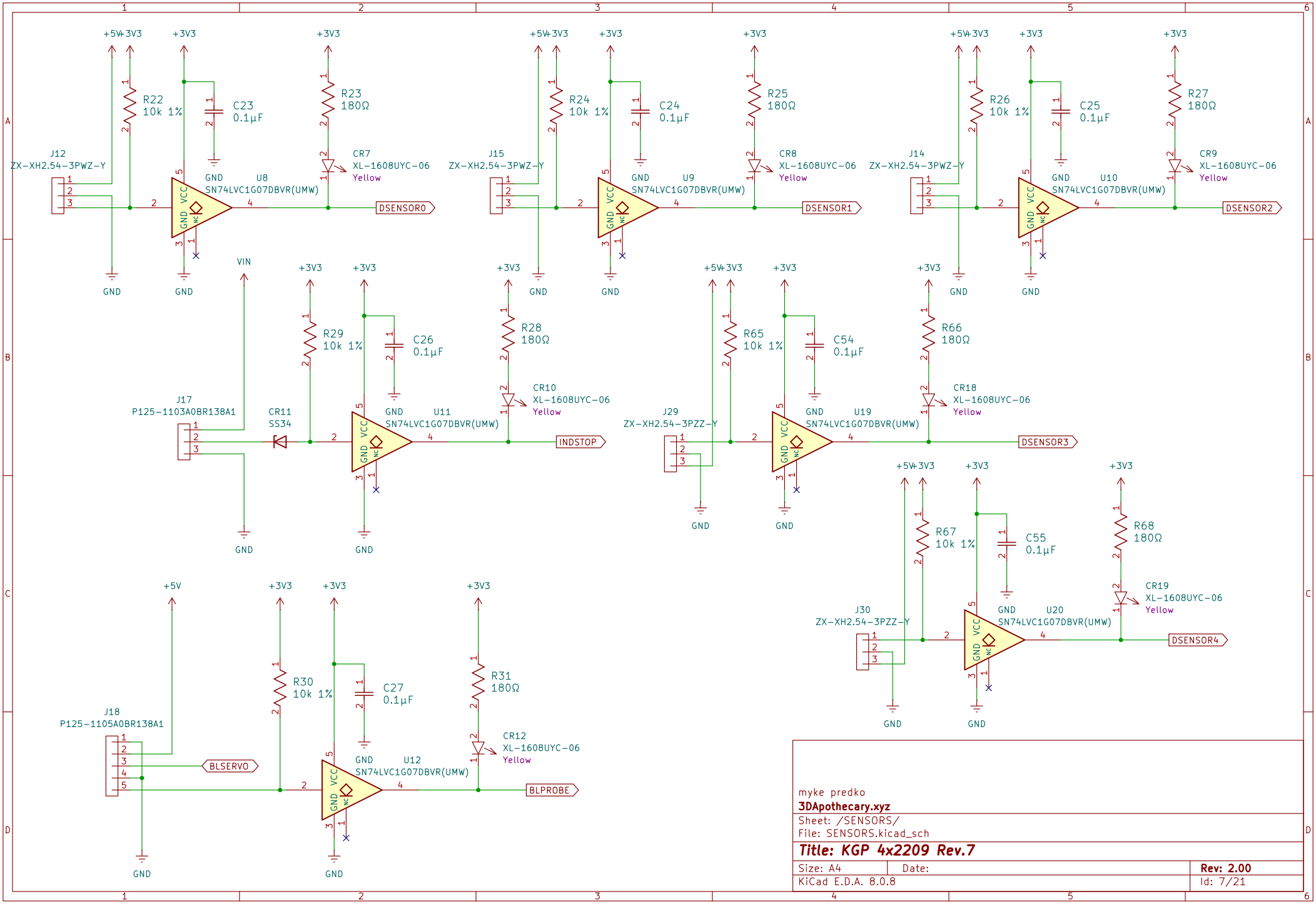
Size: A4	Date:	**Rev: 2.00**
KiCad E.D.A. 8.0.8		Id: 5/21

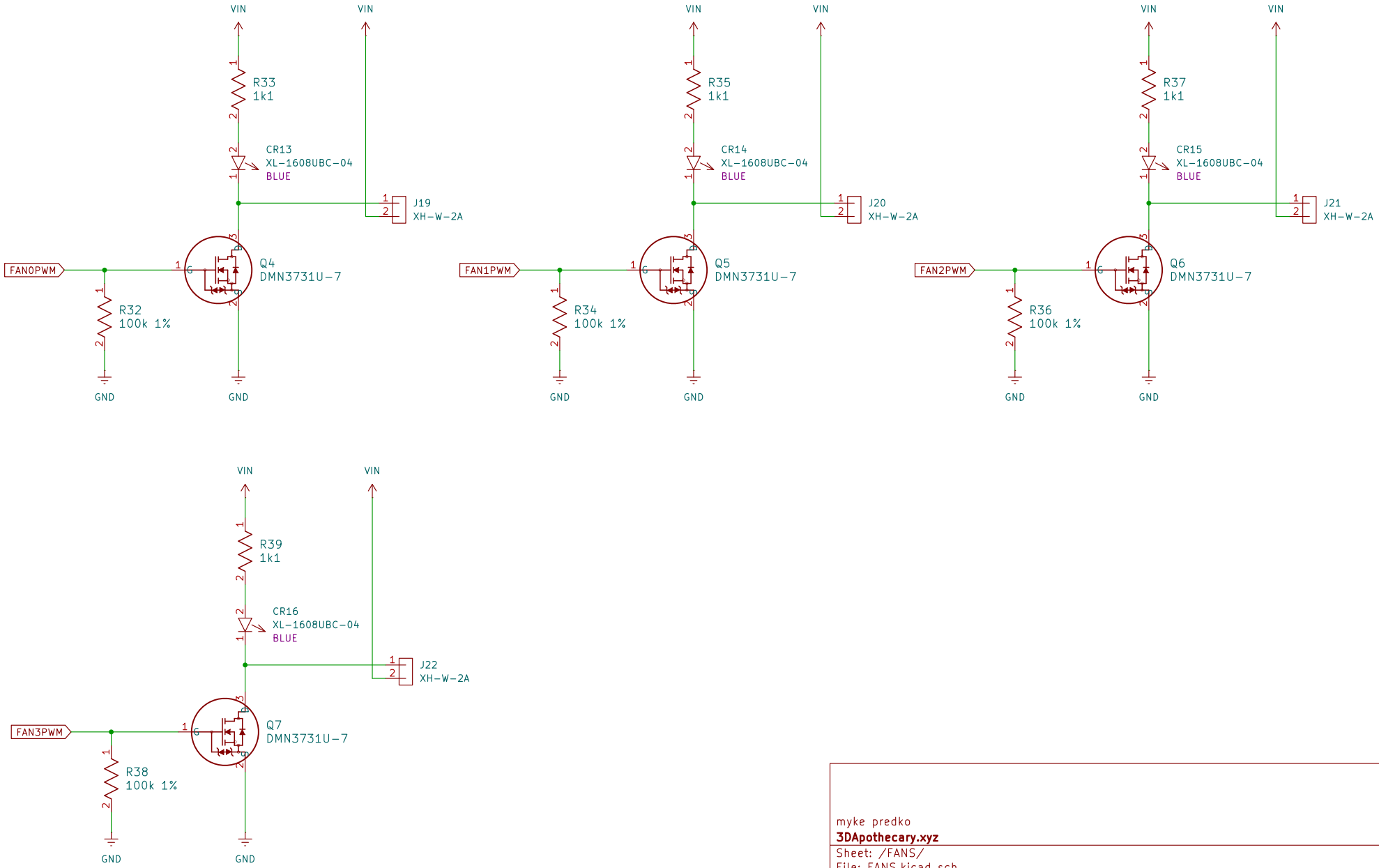


myke predko
3DApothecary.xyz
Sheet: /HEATER_THERM/
File: HEATER_THERM.kicad_sch

Title: KGP 4x2209 Rev.7

Size: A4	Date:	**Rev: 2.00**
KiCad E.D.A. 8.0.8		Id: 6/21


+5V
+3V3
R22
10k 1%
C23
0.1µF
R23
180Ω
J12
ZX-XH2.54-3PWZ-Y
CR7
XL-1608UYC-06
Yellow
GND
U8
SN74LVC1G07DBVR(UMW)
DSENSOR0
R24
10k 1%
C24
0.1µF
R25
180Ω
J15
ZX-XH2.54-3PWZ-Y
CR8
XL-1608UYC-06
Yellow
U9
SN74LVC1G07DBVR(UMW)
DSENSOR1
R26
10k 1%
C25
0.1µF
R27
180Ω
J14
ZX-XH2.54-3PWZ-Y
CR9
XL-1608UYC-06
Yellow
U10
SN74LVC1G07DBVR(UMW)
DSENSOR2
VIN
R29
10k 1%
C26
0.1µF
R28
180Ω
J17
P125-1103A0BR138A1
CR11
SS34
CR10
XL-1608UYC-06
Yellow
U11
SN74LVC1G07DBVR(UMW)
INDSTOP
R65
10k 1%
C54
0.1µF
R66
180Ω
J29
ZX-XH2.54-3PZZ-Y
CR18
XL-1608UYC-06
Yellow
U19
SN74LVC1G07DBVR(UMW)
DSENSOR3
+5V
R30
10k 1%
C27
0.1µF
R31
180Ω
J18
P125-1105A0BR138A1
BLSERVO
CR12
XL-1608UYC-06
Yellow
U12
SN74LVC1G07DBVR(UMW)
BLPROBE
R67
10k 1%
C55
0.1µF
R68
180Ω
J30
ZX-XH2.54-3PZZ-Y
CR19
XL-1608UYC-06
Yellow
U20
SN74LVC1G07DBVR(UMW)
DSENSOR4
myke predko
3DApothecary.xyz
Sheet: /SENSORS/
File: SENSORS.kicad_sch
Title: KGP 4x2209 Rev.7
Size: A4
Date:
Rev: 2.00
KiCad E.D.A. 8.0.8
Id: 7/21

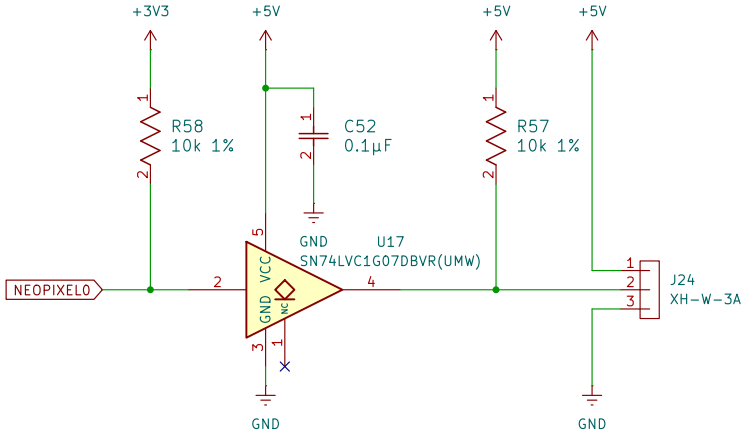


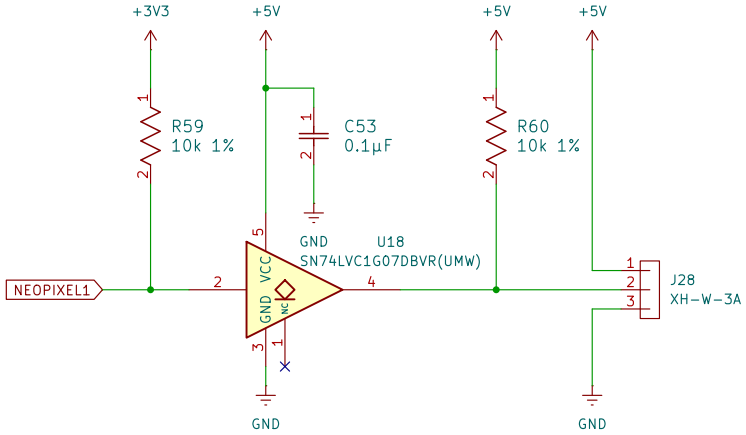
myke predko
3DApothecary.xyz

Sheet: /FANS/
File: FANS.kicad_sch

Title: KGP 4x2209 Rev.7

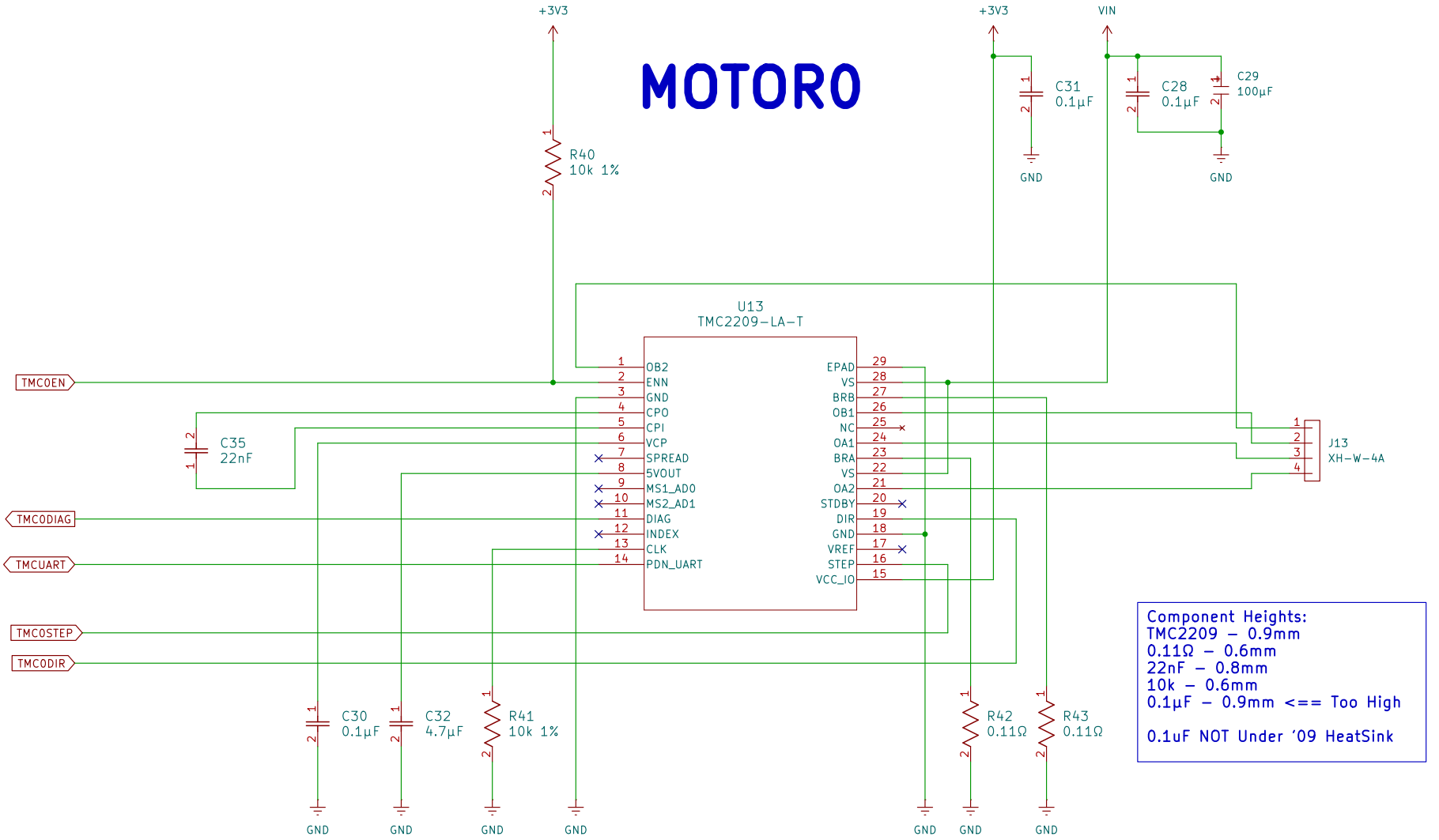
Size: A4	Date:	**Rev: 2.00**
KiCad E.D.A. 8.0.8		Id: 8/21

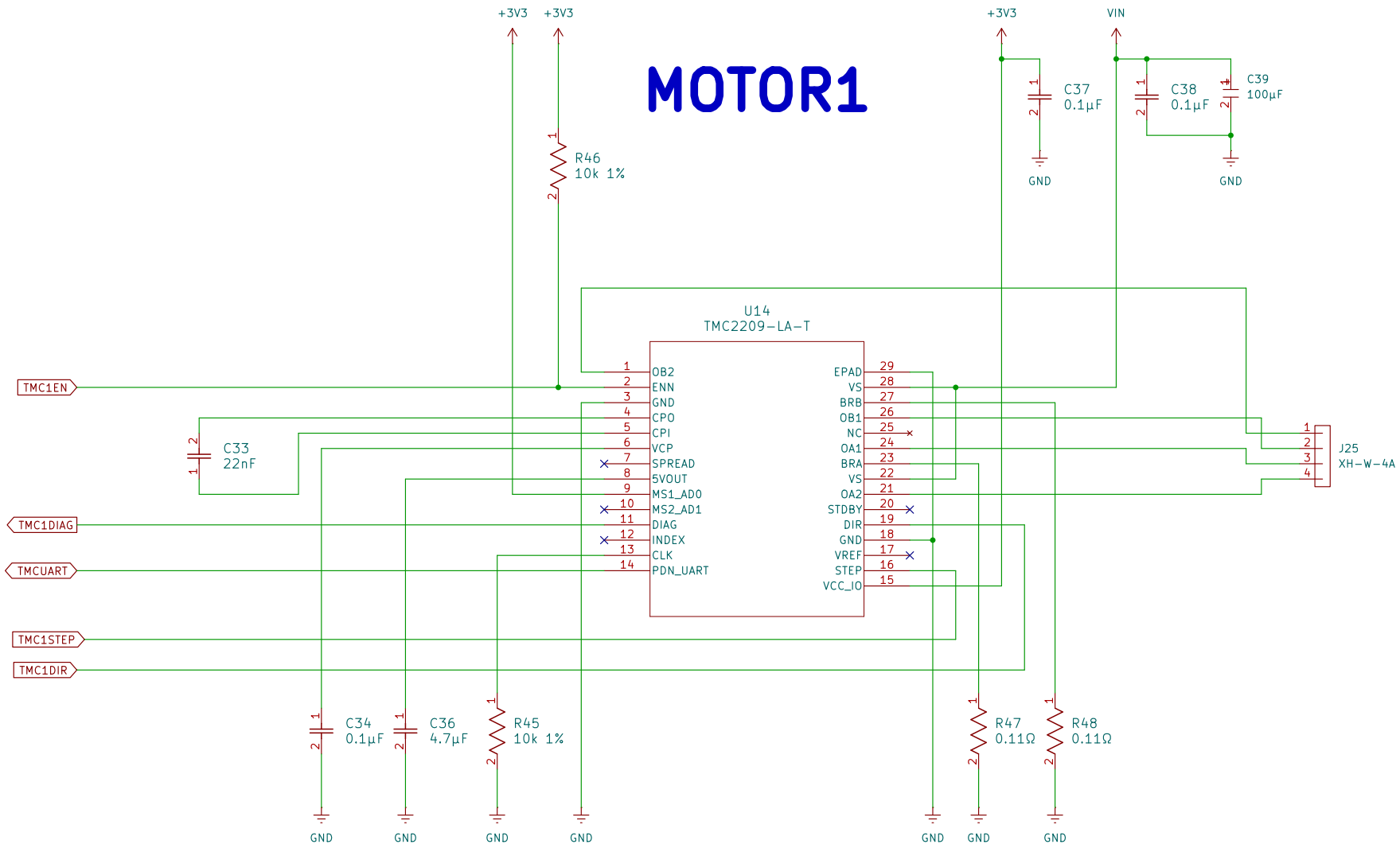




myke predko	
3DApothecary.xyz	
Sheet: /3DACC/	
File: 3DACC.kicad_sch	
Title: KGP 4x2209 Rev.7	
Size: A4	Date:
KiCad E.D.A. 8.0.8	Id: 9/21

Rev: 2.00


MOTOR0
+3V3
R40
10k 1%
+3V3
VIN
C31
0.1µF
C28
0.1µF
C29
100µF
GND
GND
GND
U13
TMC2209-LA-T
TMC0EN
TMC0DIAG
TMCUART
TMC0STEP
TMC0DIR
OB2
ENN
GND
CPO
CPI
VCP
SPREAD
5VOUT
MS1_AD0
MS2_AD1
DIAG
INDEX
CLK
PDN_UART
EPAD
VS
BRB
OB1
NC
OA1
BRA
VS
OA2
STDBY
DIR
GND
VREF
STEP
VCC_IO
C35
22nF
J13
XH-W-4A
C30
0.1µF
C32
4.7µF
R41
10k 1%
R42
0.11Ω
R43
0.11Ω
GND
GND
GND
GND
GND
GND
GND
Component Heights:
TMC2209 – 0.9mm
0.11Ω – 0.6mm
22nF – 0.8mm
10k – 0.6mm
0.1µF – 0.9mm <== Too High
0.1uF NOT Under '09 HeatSink
myke predko
3DApothecary.xyz
Sheet: /MOTOR_0/
File: MOTOR_0.kicad_sch
Title: KGP 4x2209 Rev.7
Size: A4
Date:
Rev: 2.00
KiCad E.D.A. 8.0.8
Id: 10/21

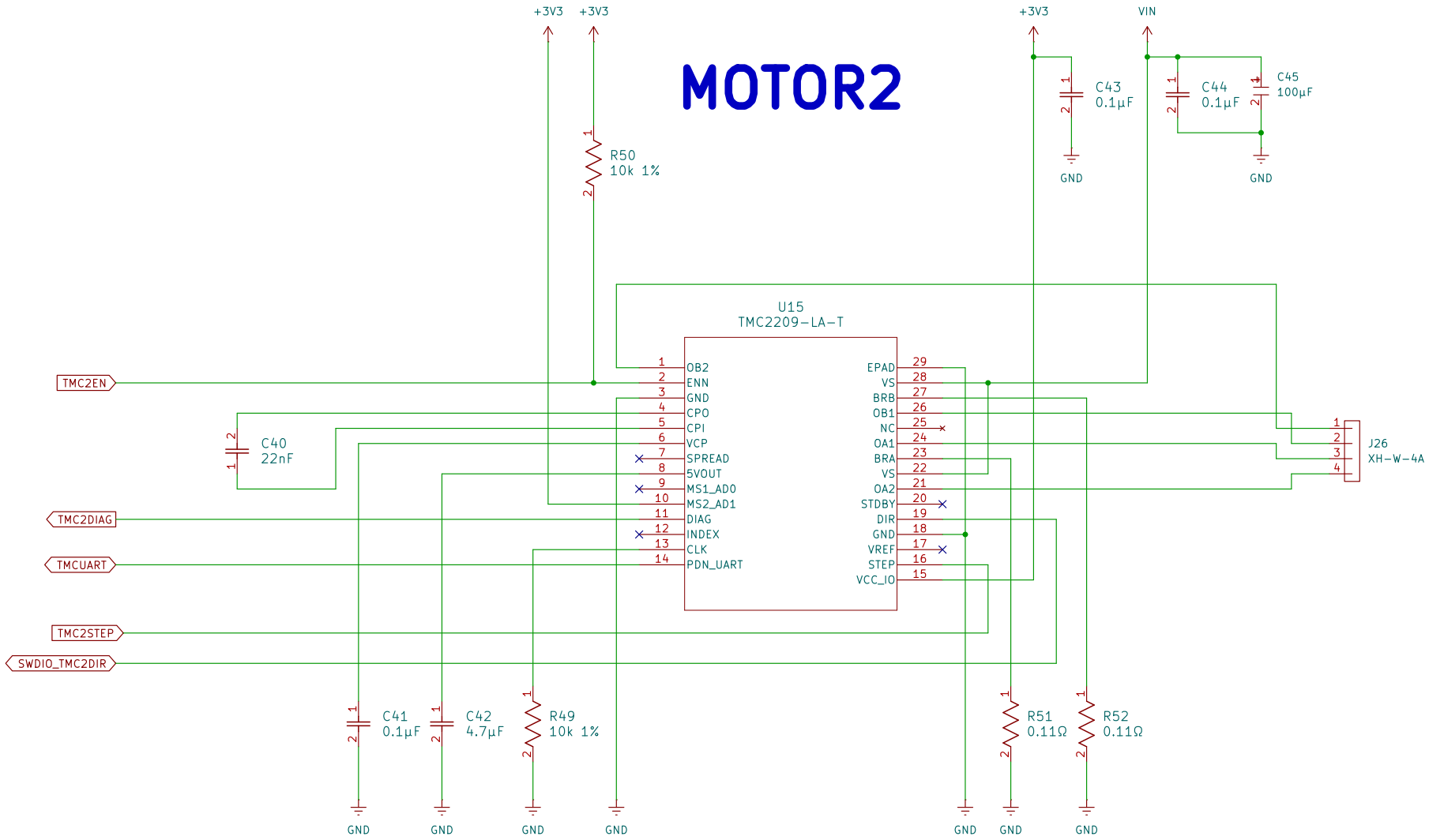


myke predko
3DApothecary.xyz

Sheet: /MOTOR_1/
File: MOTOR_1.kicad_sch

Title: KGP 4x2209 Rev.7

Size: A4	Date:	**Rev: 2.00**
KiCad E.D.A. 8.0.8		Id: 11/21

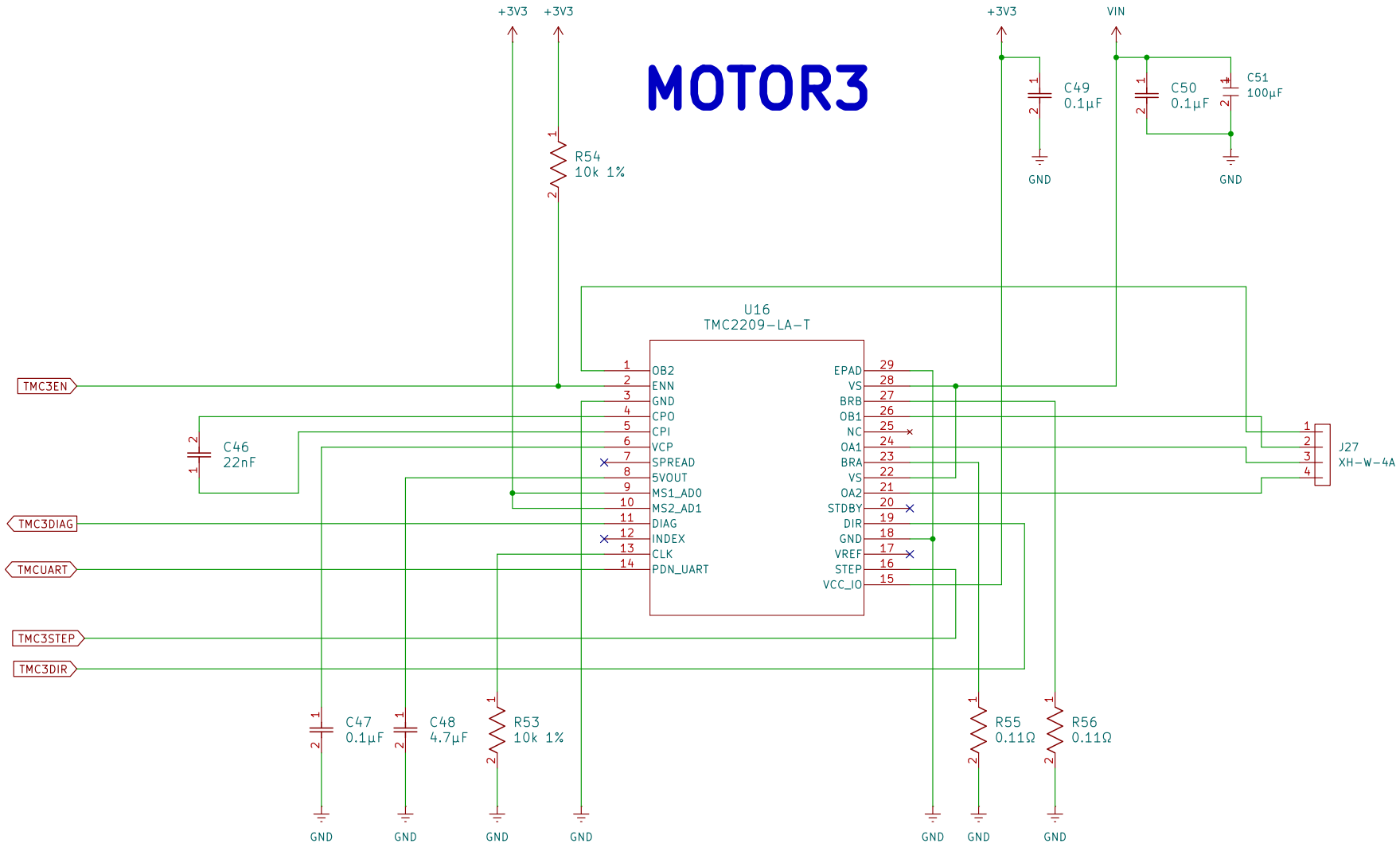


myke predko
3DApothecary.xyz

Sheet: /MOTOR_2/
File: MOTOR_2.kicad_sch

Title: KGP 4x2209 Rev.7

Size: A4	Date:	**Rev: 2.00**
KiCad E.D.A. 8.0.8		Id: 12/21

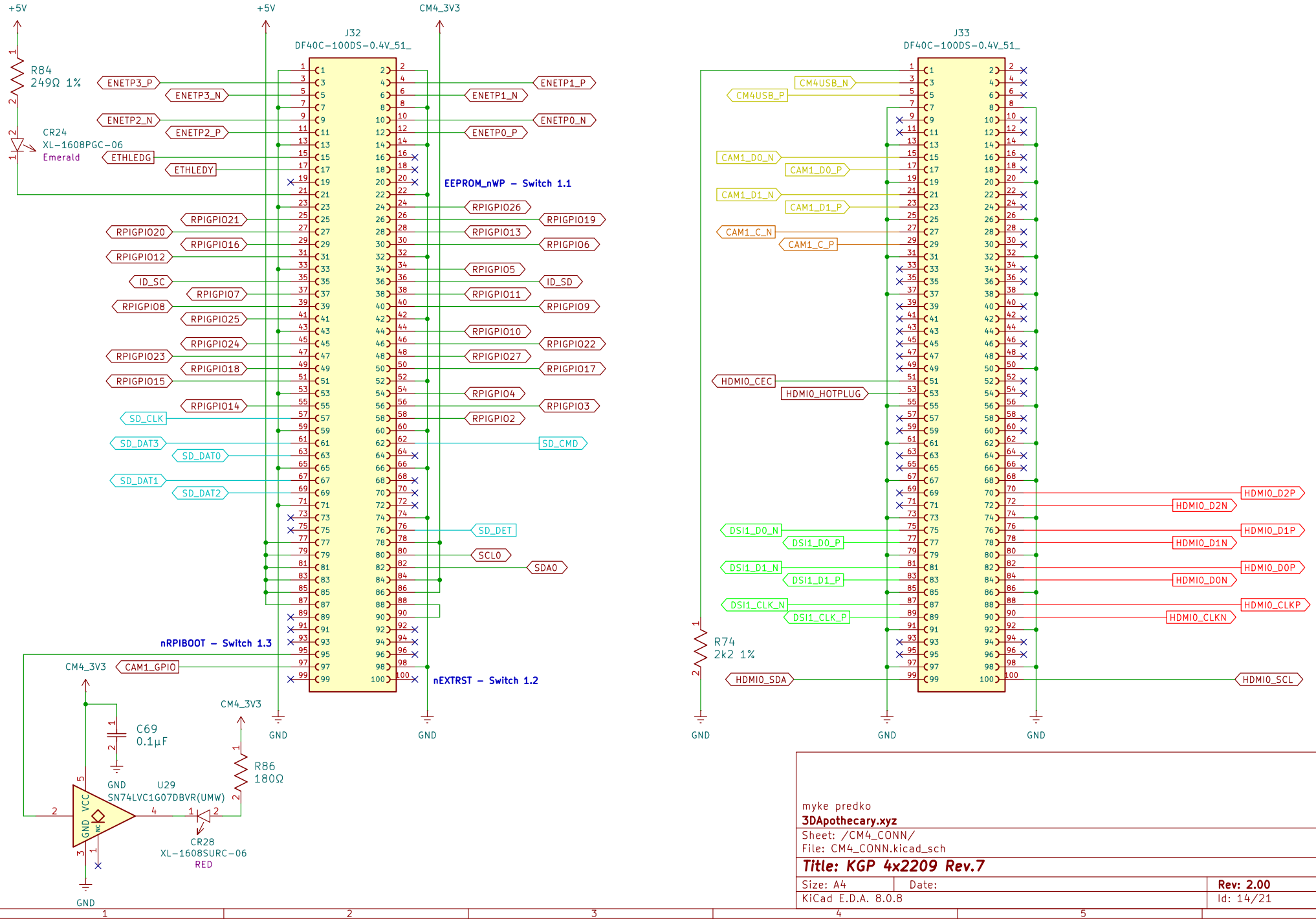


myke predko
3DApothecary.xyz

Sheet: /MOTOR_3/
File: MOTOR_3.kicad_sch

Title: KGP 4x2209 Rev.7

Size: A4	Date:	**Rev: 2.00**
KiCad E.D.A. 8.0.8		Id: 13/21

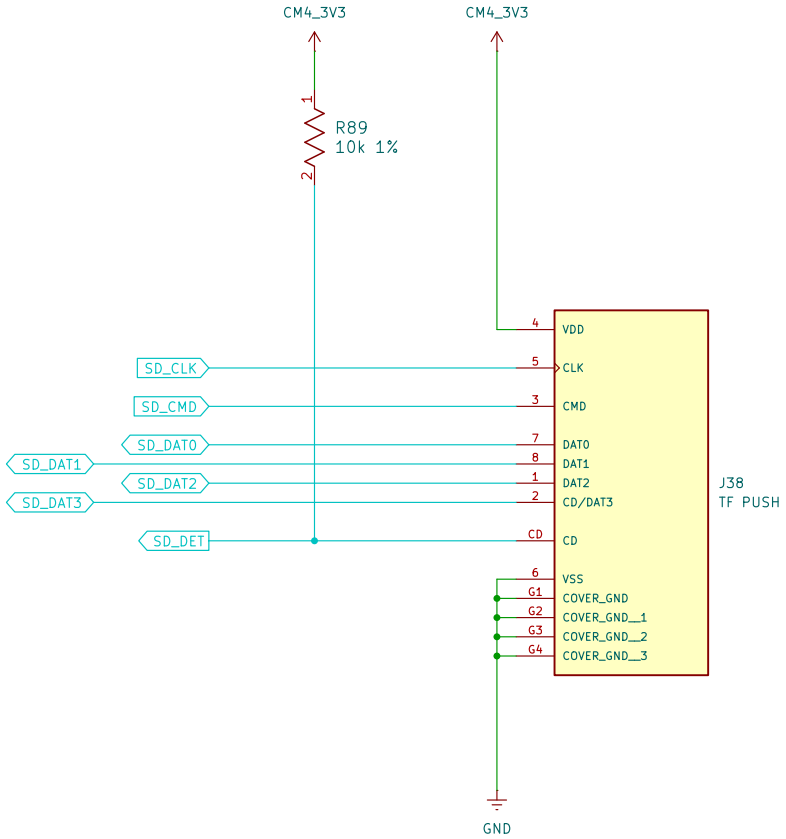


myke predko
3DApothecary.xyz

Sheet: /CM4_CONN/
File: CM4_CONN.kicad_sch

Title: KGP 4x2209 Rev.7

Size: A4	Date:	**Rev: 2.00**
KiCad E.D.A. 8.0.8		Id: 14/21

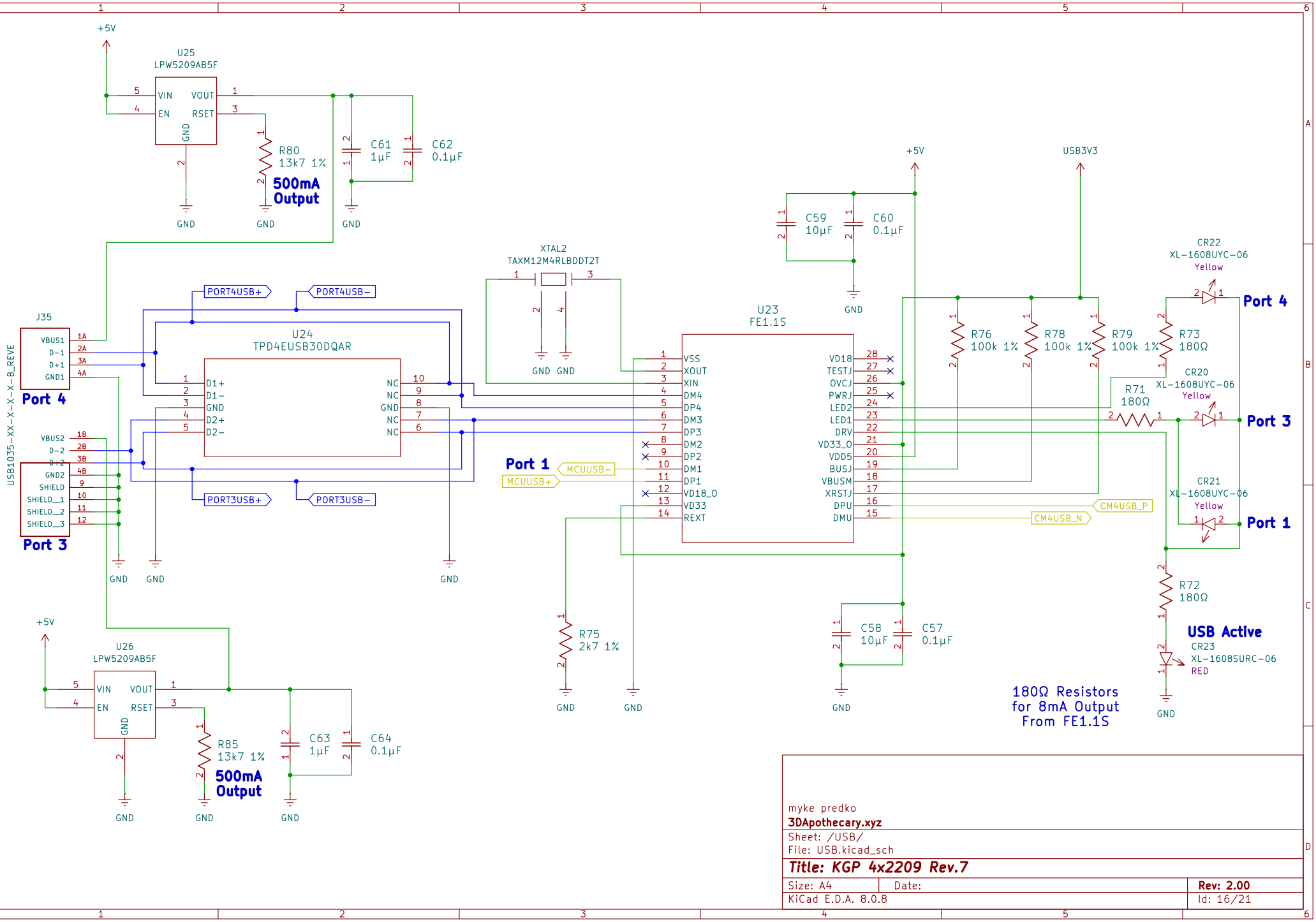


myke predko
3DApothecary.xyz

Sheet: /SDCARD/
File: SDCARD.kicad_sch

Title: KGP 4x2209 Rev.7

Size: A4	Date:	**Rev: 2.00**
KiCad E.D.A. 8.0.8		Id: 15/21

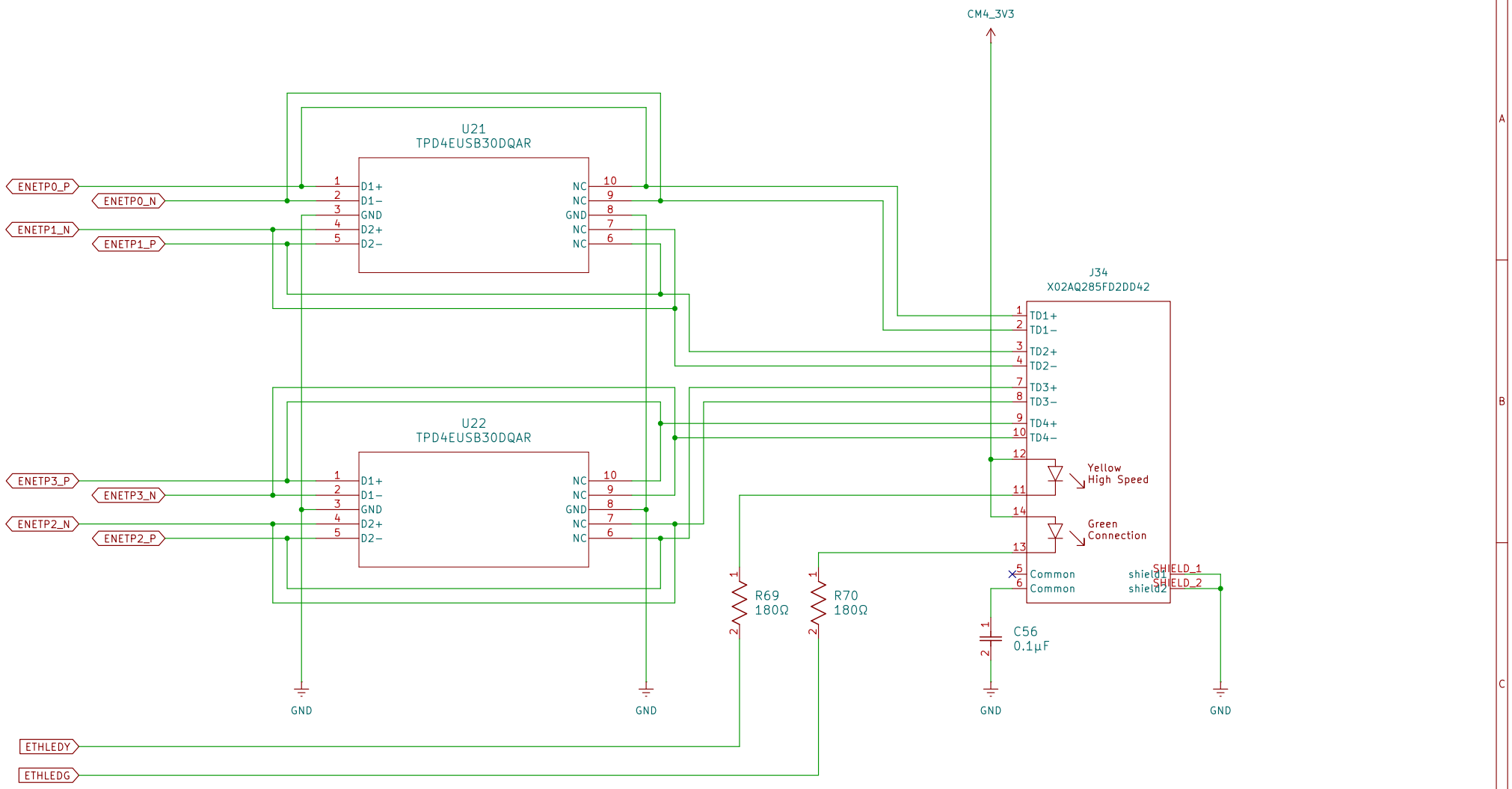


myke predko
3DApothecary.xyz

Sheet: /USB/
File: USB.kicad_sch

Title: KGP 4x2209 Rev.7

Size: A4	Date:	**Rev: 2.00**
KiCad E.D.A. 8.0.8		Id: 16/21

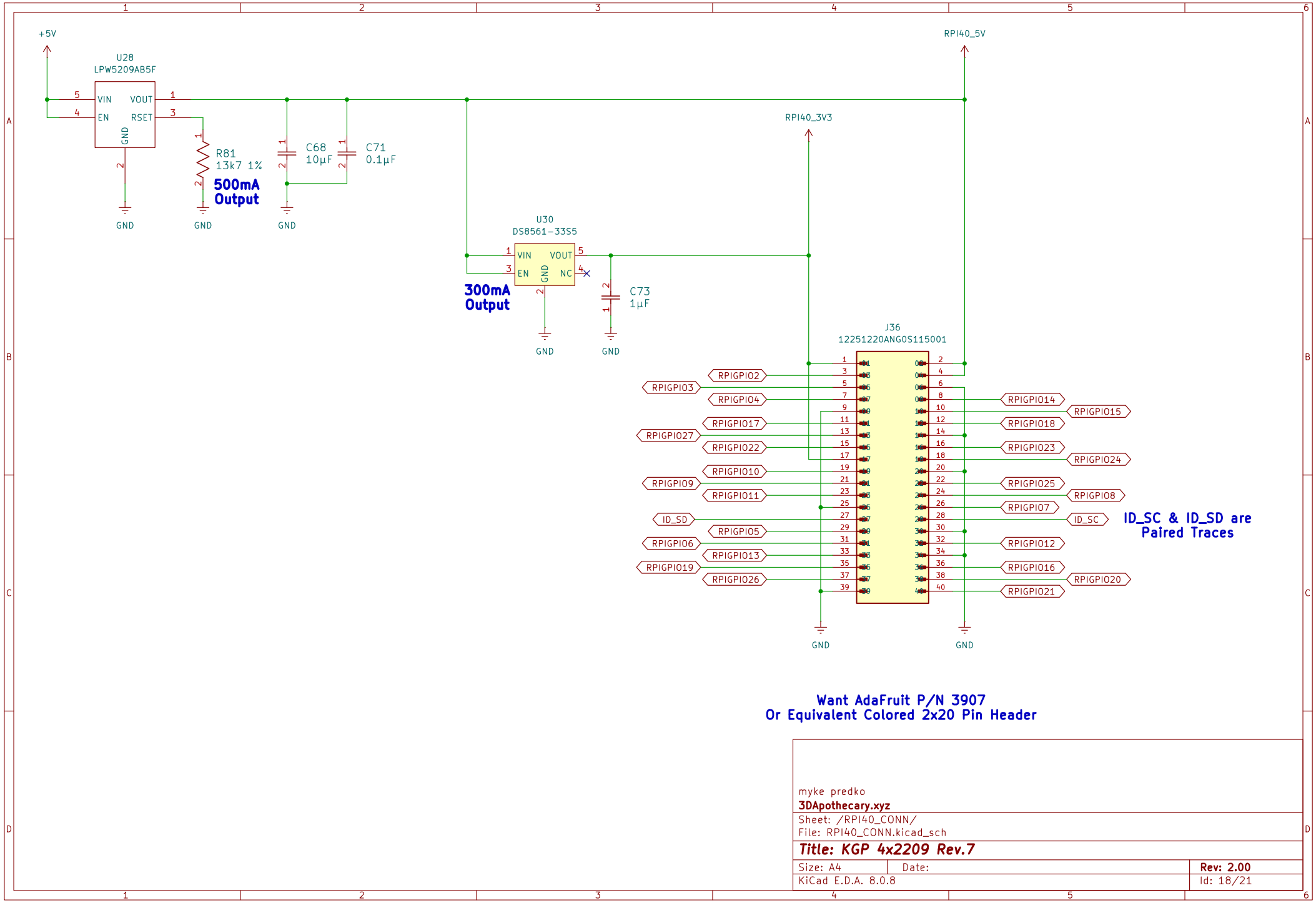


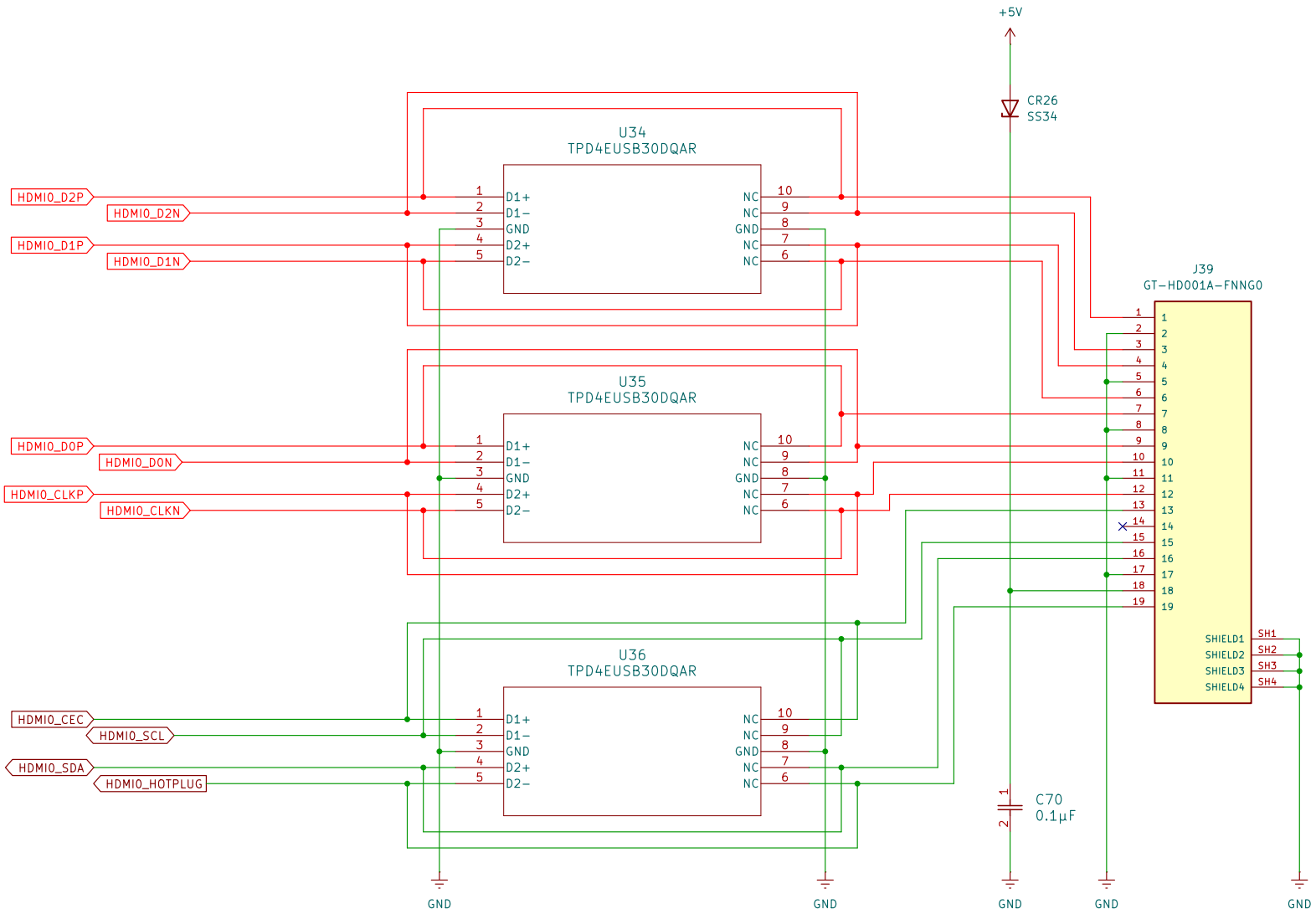
myke predko
3DApothecary.xyz

Sheet: /ETHERNET/
File: ETHERNET.kicad_sch

Title: KGP 4x2209 Rev.7

Size: A4	Date:	**Rev: 2.00**
KiCad E.D.A. 8.0.8		Id: 17/21


+5V
U28
LPW5209AB5F
VIN
EN
VOUT
RSET
GND
R81
13k7 1%
500mA
Output
C68
10µF
C71
0.1µF
RPI40_5V
RPI40_3V3
U30
DS8561-33S5
NC
300mA
Output
C73
1µF
J36
12251220ANG0S115001
RPIGPIO2
RPIGPIO3
RPIGPIO4
RPIGPIO17
RPIGPIO27
RPIGPIO22
RPIGPIO10
RPIGPIO9
RPIGPIO11
ID_SD
RPIGPIO5
RPIGPIO6
RPIGPIO13
RPIGPIO19
RPIGPIO26
RPIGPIO14
RPIGPIO15
RPIGPIO18
RPIGPIO23
RPIGPIO24
RPIGPIO25
RPIGPIO8
RPIGPIO7
ID_SC
RPIGPIO12
RPIGPIO16
RPIGPIO20
RPIGPIO21
ID_SC & ID_SD are
Paired Traces
Want AdaFruit P/N 3907
Or Equivalent Colored 2x20 Pin Header
myke predko
3DApothecary.xyz
Sheet: /RPI40_CONN/
File: RPI40_CONN.kicad_sch
Title: KGP 4x2209 Rev.7
Size: A4
Date:
Rev: 2.00
KiCad E.D.A. 8.0.8
Id: 18/21

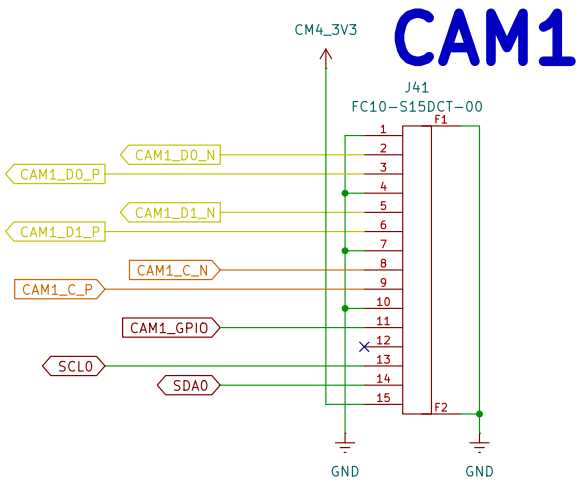


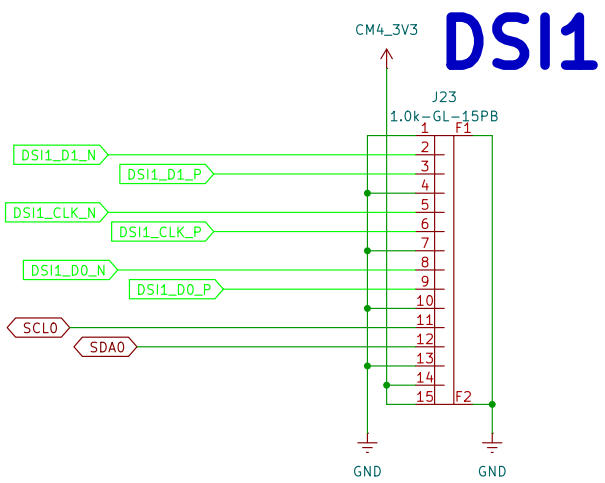
myke predko
3DApothecary.xyz

Sheet: /HDMI0/
File: HDMI0.kicad_sch

Title: KGP 4x2209 Rev.7

Size: A4	Date:	**Rev: 2.00**
KiCad E.D.A. 8.0.8		Id: 19/21





myke predko
3DApothecary.xyz

Sheet: /CAM1_DSI1/
File: CAM1_DSI1.kicad_sch

Title: KGP 4x2209 Rev.7

Size: A4	Date:	**Rev: 2.00**
KiCad E.D.A. 8.0.8		Id: 20/21

Notes:

1. ST Indicates that the Pull Up on Reset (R10) for the STM32G0B1 is NOT REQUIRED. Remove and test board operation without it (Including SWD Operation).
2. Need Part Number of Coloured 40Pin Raspberry Pi Connector

Changes from Rev.5:

1. Moved R10 from inline to MCU SWCLK to BOOT0 Switch +3V3 Connection
2. Change all 100k Resistors to 100k 1%
3. Corrected Ethernet LED Polarity
4. Changed Standoff Manufacturer and Part Number
5. Removed R77, C66 & C67
6. EXP2 Silkscreen Incorrectly Noted Pin 6 as "MISO"/Corrected to "MOSI"
7. Remove U27 to allow UC1701 Display to work without extra printer.cfg statements
8. "ADXLCS" Pin is incorrectly marked as "PD0" on Topside Silk/Should be "PB0"
9. USB Pin Information Moved Closer to 2x USB A Socket Housing
10. Corrected TMC1STEP to "PC10" on Backside Silkscreen/"PB10" was wrong
11. BLTouch "PROBE" Pin Changed to "PD3" on Topside Silkscreen/Not "PD5"
12. Moved "VINMON" Pin Silkscreen by MCU
13. Reversed CAM1 Connector Pins
14. Marked DSI1 & CAM1 Connectors with large knockout Label and Pin "1" Indication
15. Added "STM32G0B1" Label Above MCU
16. Marked RPI 40 Pin Connector with a White Knockout "1"
17. Removed J16, 2 Pin 5V/GND Header
18. Replaced U1 & L1 with SY8368A & 2.0µH coil
19. Added Whitespace to open area by SD Card Socket
20. Added "M#" on the inside of each Motor Square on Topside
21. Changed J7 I2C Voltage to 5V/Changed the Silkscreen to Match
22. Eliminated Thermal Reliefs on High-Current Pins
23. Reviewed LED Current Limiting Resistors for 8mA through all LEDs Heater and Fan LEDs' Resistors Specified for VIN = 10V
24. Rev.7: Changed Ethernet Connector to XKB X02AQ285FD2DD42

Mounting Holes

H1 MountingHole
H2 MountingHole
H3 MountingHole
H4 MountingHole

Sinhoo SMTWE2515MTJ 1.5mm High/M2.5 Threaded Standoffs

MP1 M2.5 x 1.5mm SMTWE2515MTJ
MP2 M2.5 x 1.5mm SMTWE2515MTJ
MP3 M2.5 x 1.5mm SMTWE2515MTJ
MP4 M2.5 x 1.5mm SMTWE2515MTJ

Fiducials

FID1 Fiducial
FID2 Fiducial
FID3 Fiducial
FID4 Fiducial

myke predko
3DApothecary.xyz

Sheet: /MISC/
File: MISC.kicad_sch

Title: KGP 4x2209 Rev.7

Size: A4	Date:	**Rev: 2.00**
KiCad E.D.A. 8.0.8		Id: 21/21