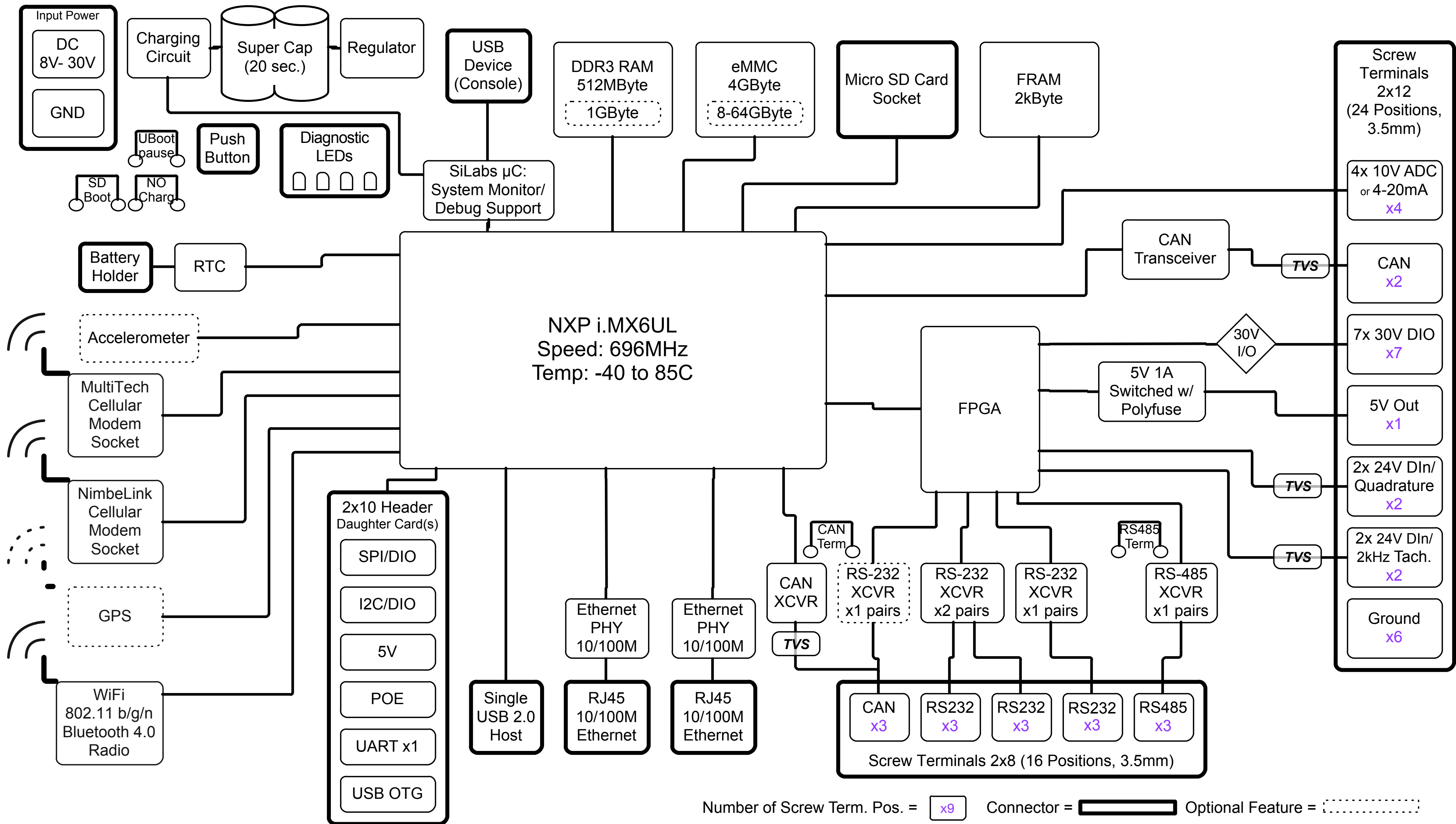
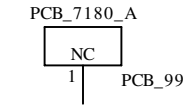
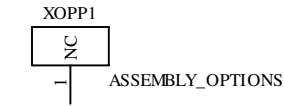


# TS-7180 Rev A



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# Standard Options



Option 1 TS-7180-SMW1I

NXP i.MX6UL 695MHz ARM A7, 512MB DDR3, 4GB eMMC, MultiTech, NimbeLink/Xbee, 2 CAN, 3 RS-232, TS-SILO, WiFi/Bluetooth w/Chip,FRAM (-40 to 85C)

Option 2 TS-7180-SRW9I

NXP i.MX6UL 695MHz ARM A7, 1GB DDR3, 4GB eMMC, MultiTech, NimbeLink/Xbee, 2 CAN, 3 RS-232, TS-SILO, WiFi/Bluetooth w/Chip,FRAM, Gyro, GPS (-40 to 85C)

## Optional Components/Features Summary

All Parts are Industrial Temp

### TS-SILO Option

Included on ALL Standard Options

ADD: C98, C99

### NimbeLink Option

Included on ALL Standard Options

ADD: CN5, C95, D6, U29 and U31

### GPS Option

Included only on xxx9x Standard Option

ADD: K4 & CN4

### WiFi/Bluetooth Option w/ Chip Antenna

U.FL available on request

Included on ALL Standard Options

ADD: K2 (chip antenna)

(alternate: U.FL antenna connector)

### MultiTech Option

Included on ALL Standard Options

ADD: CN6, C96, U29, U31 and U39

### Gyro Option:

Included only on xxx9x Standard Option

ADD: U34

### FRAM Option:

Included on ALL standard Options

ADD: U35

### 1 GByte RAM Option

Included only on xxx9x Standard Option

REMOVE: U23 4Gbit Die

ADD: U23 8Gbit Die

### 2nd CAN Option

Included on ALL Standard Options

ADD: U5, TVS17, R140, R141, RN21, C161, C141

REMOVE: R197, R198

### 4th RS-232 Option

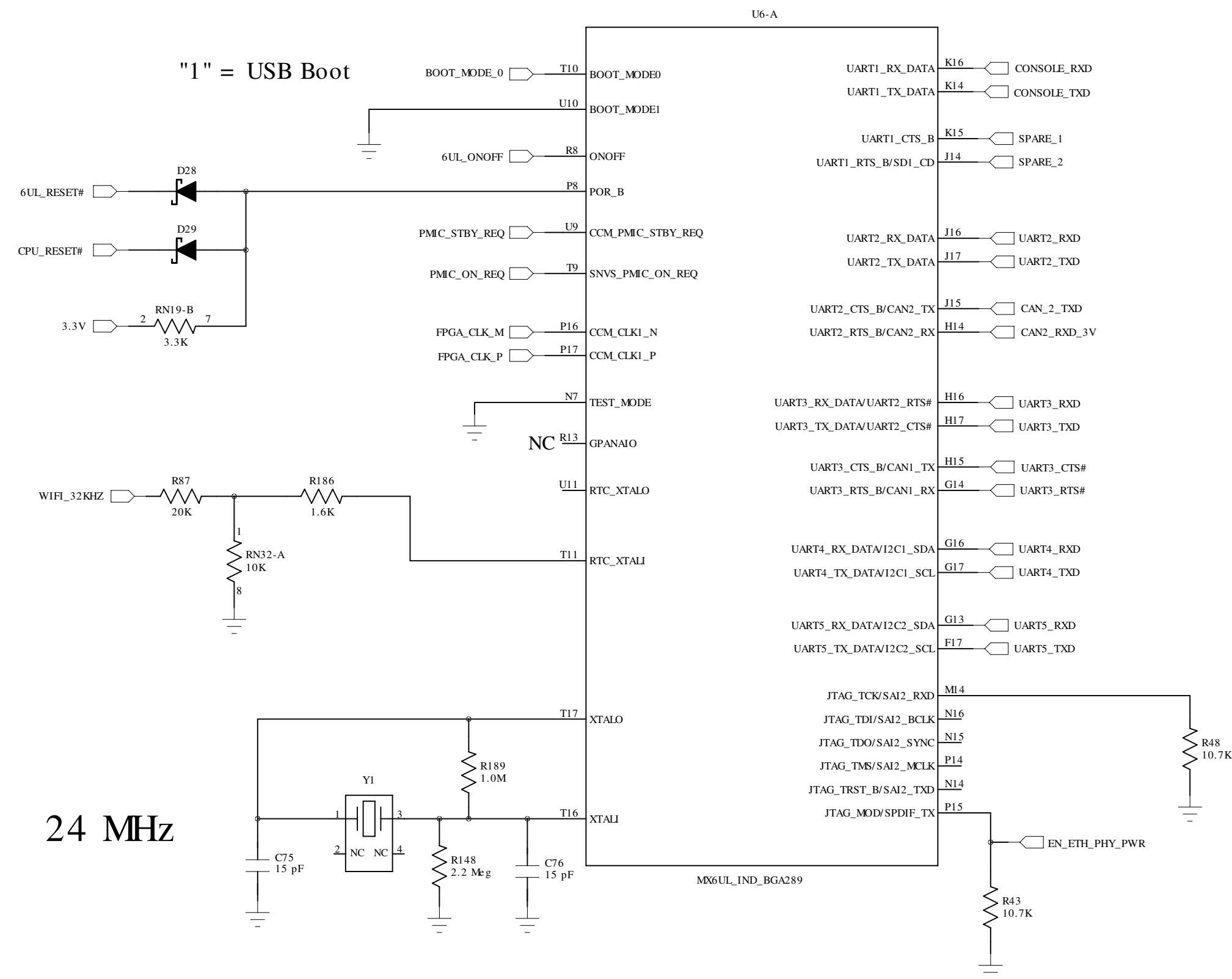
NOT Included on any Standard Options

ADD: R197, R198

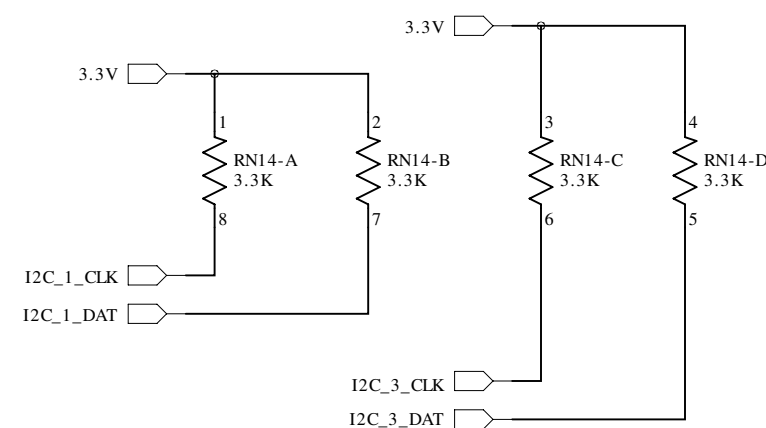
REMOVE: U5, TVS17, R140, R141, RN21, C161, C141

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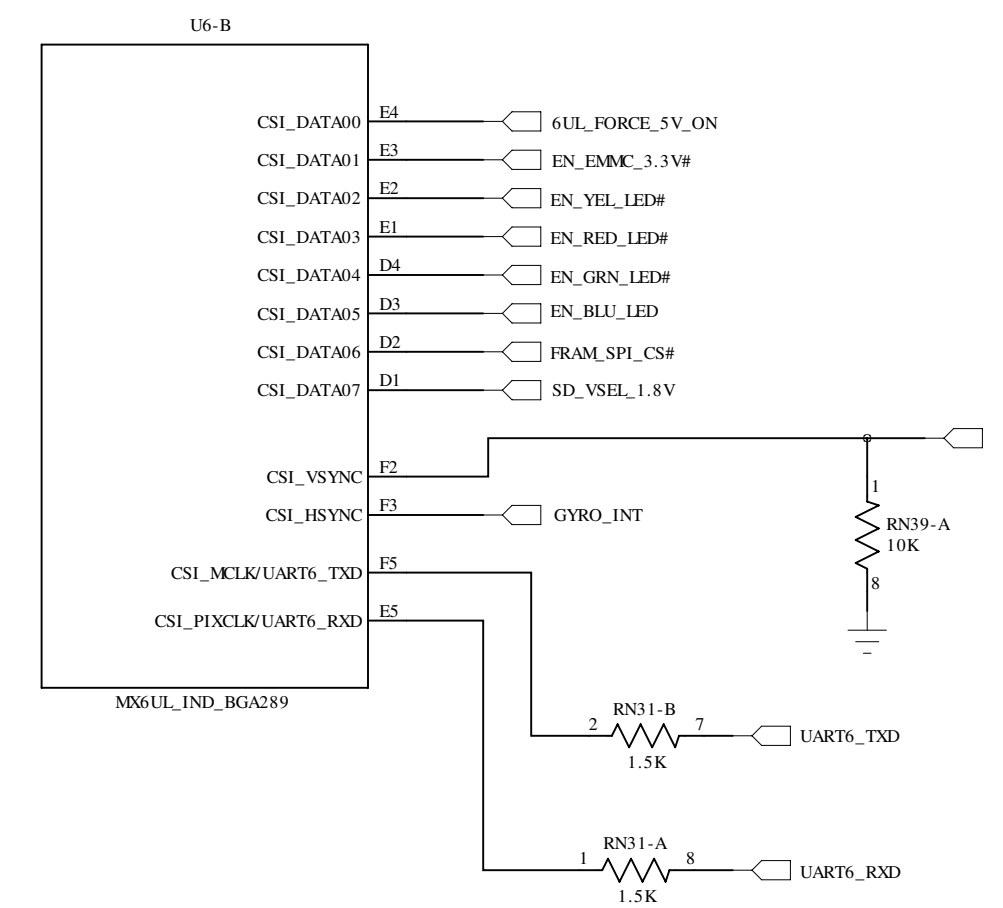
# 6UL UART and Control



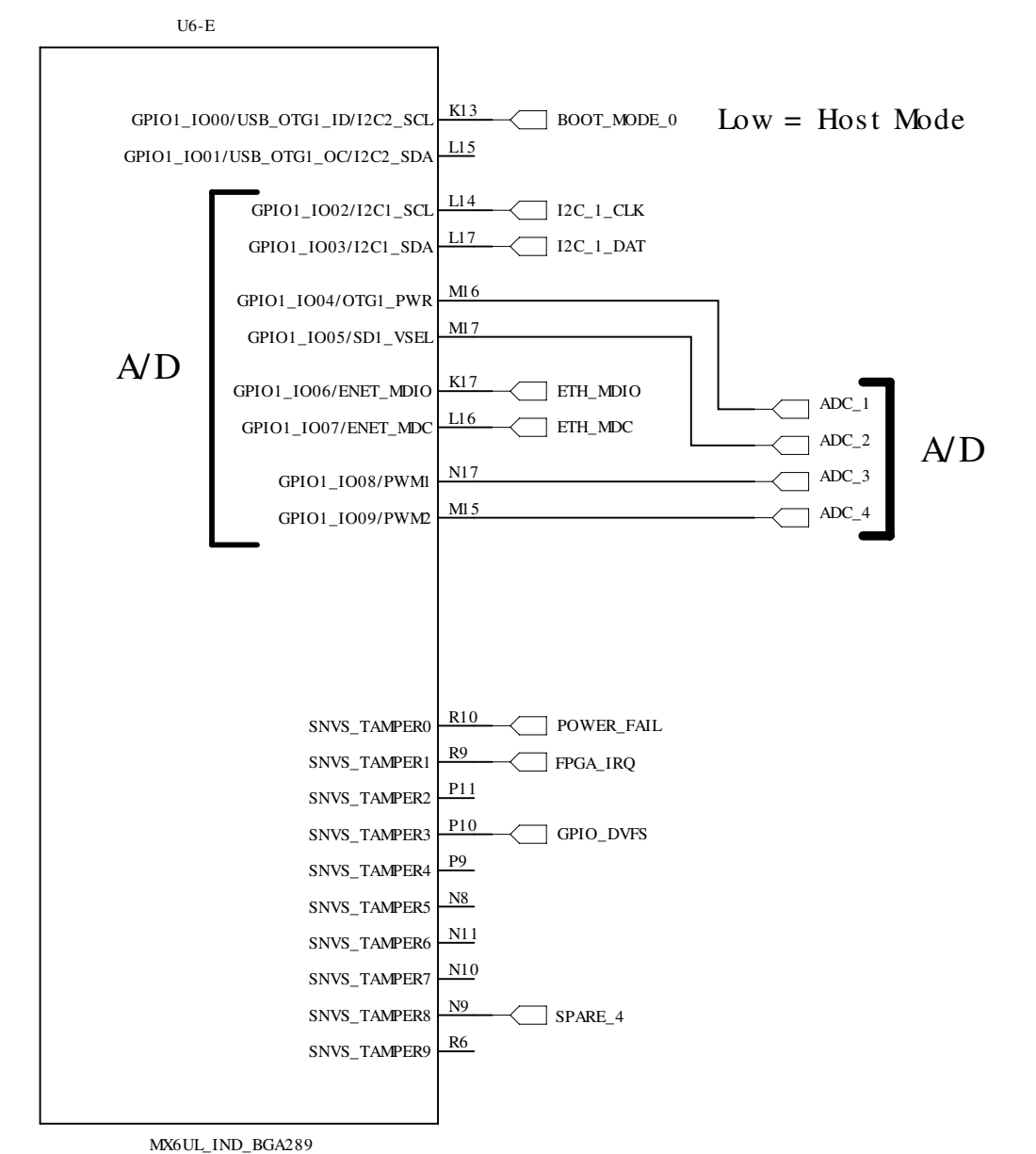
## I2C PU Res.



# 6UL DIO/Camera

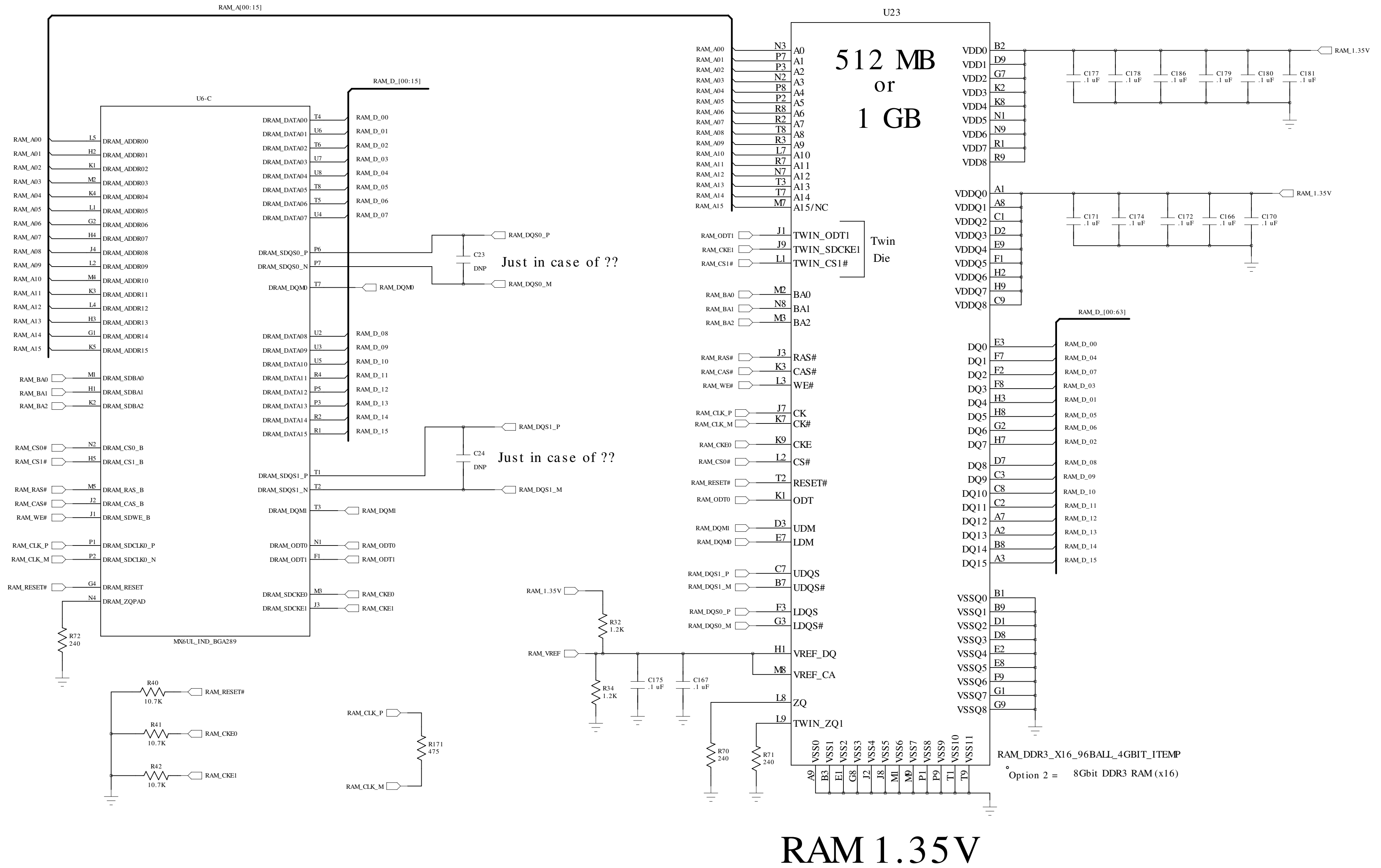


# 6UL DIO



# 6UL RAM Interface

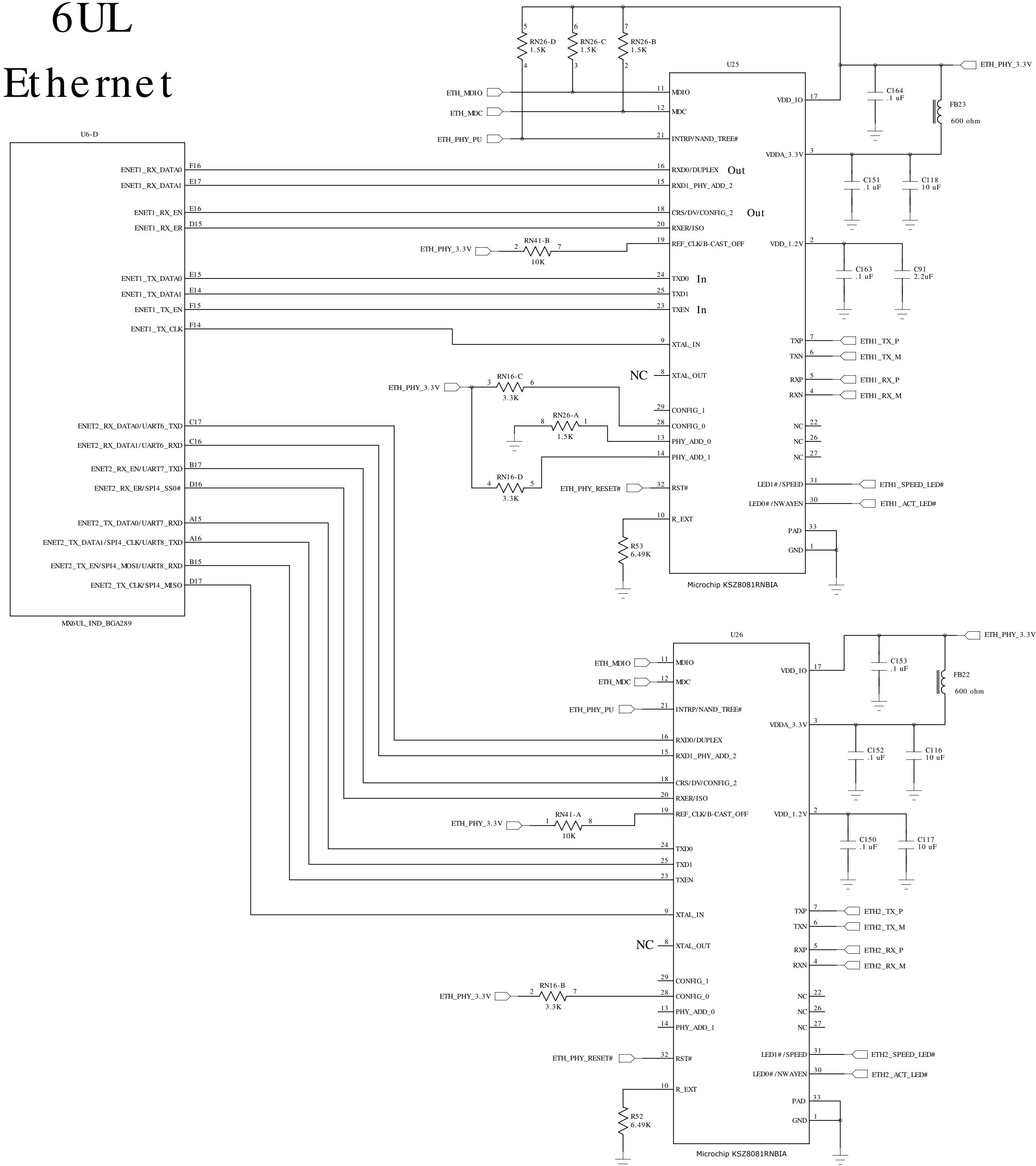
# DDR3 RAM



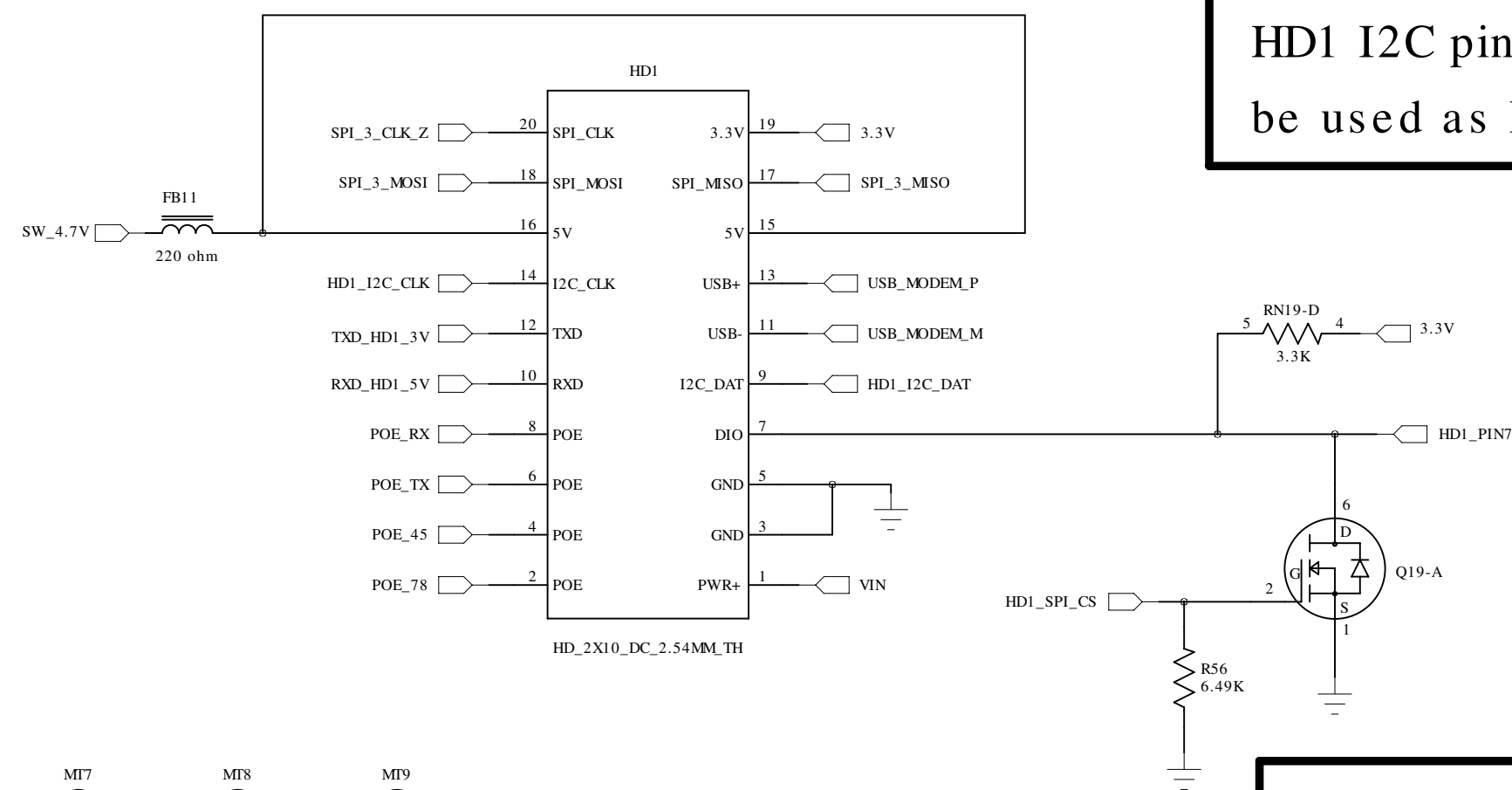
RAM 1.35 V

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# 6UL Ethernet

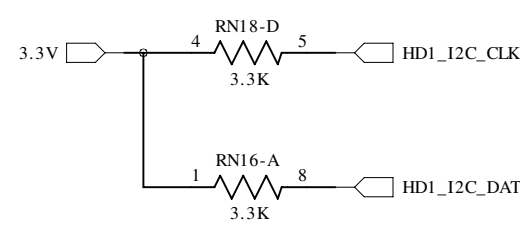
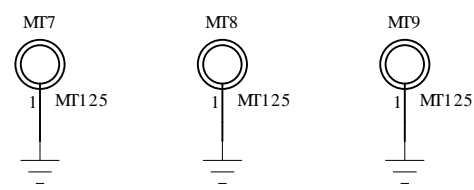


# Daughter Card Interface

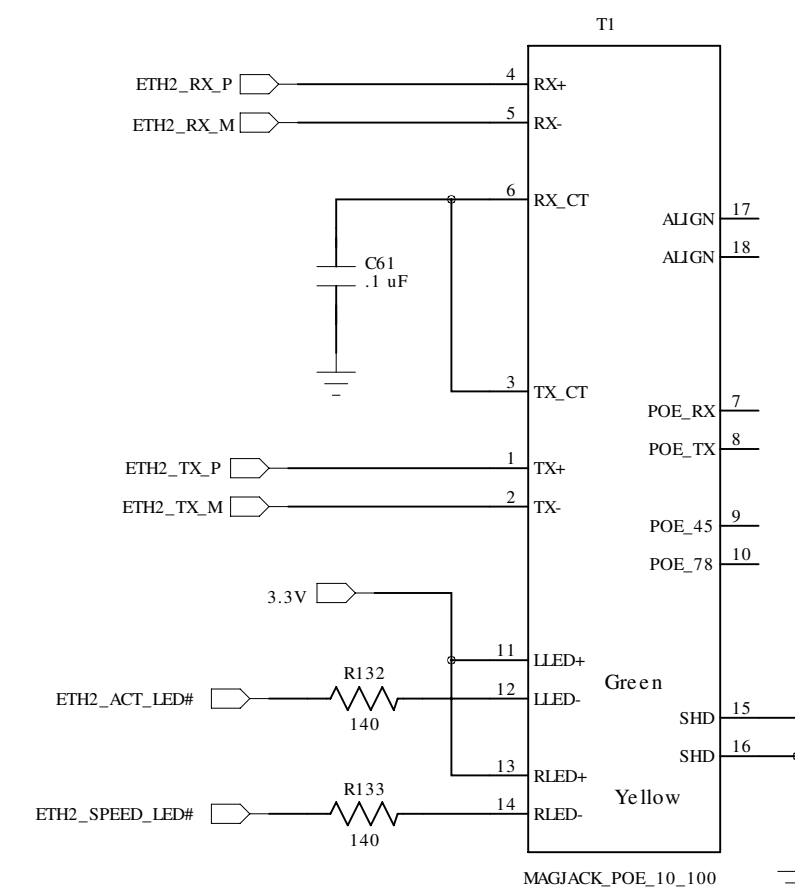


HD1 I2C pins can be used as DIO

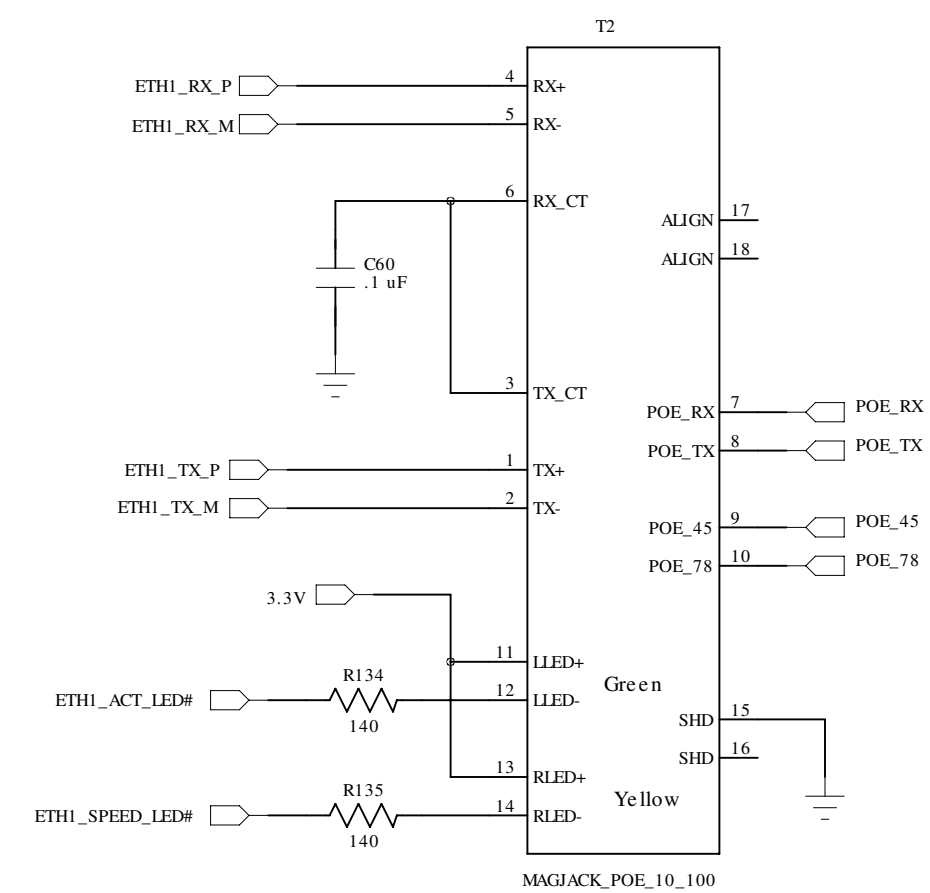
HD1\_PIN7 is 5V tolerant



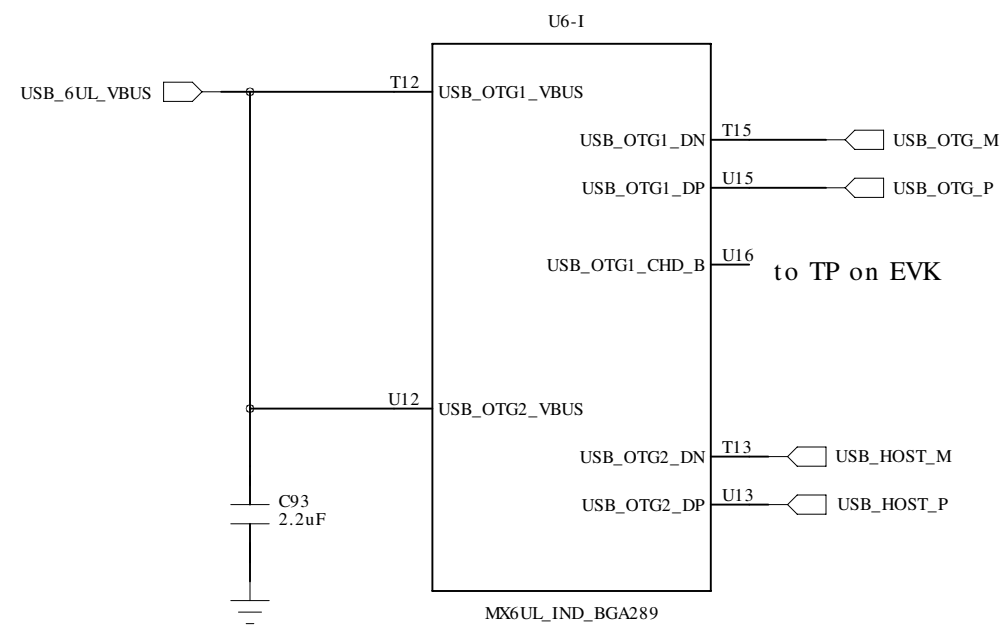
## 10/100 MagJack



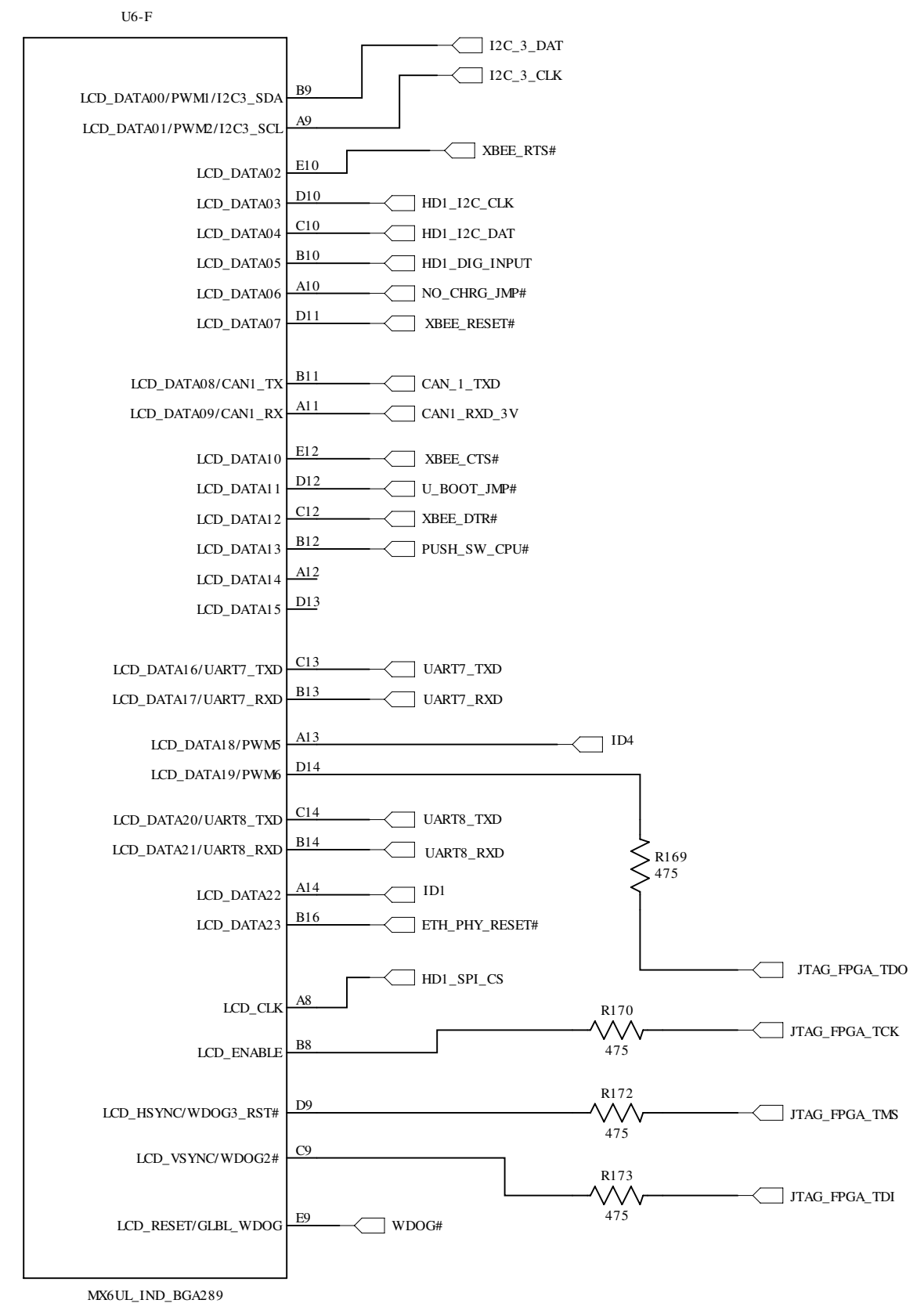
## 10/100 MagJack



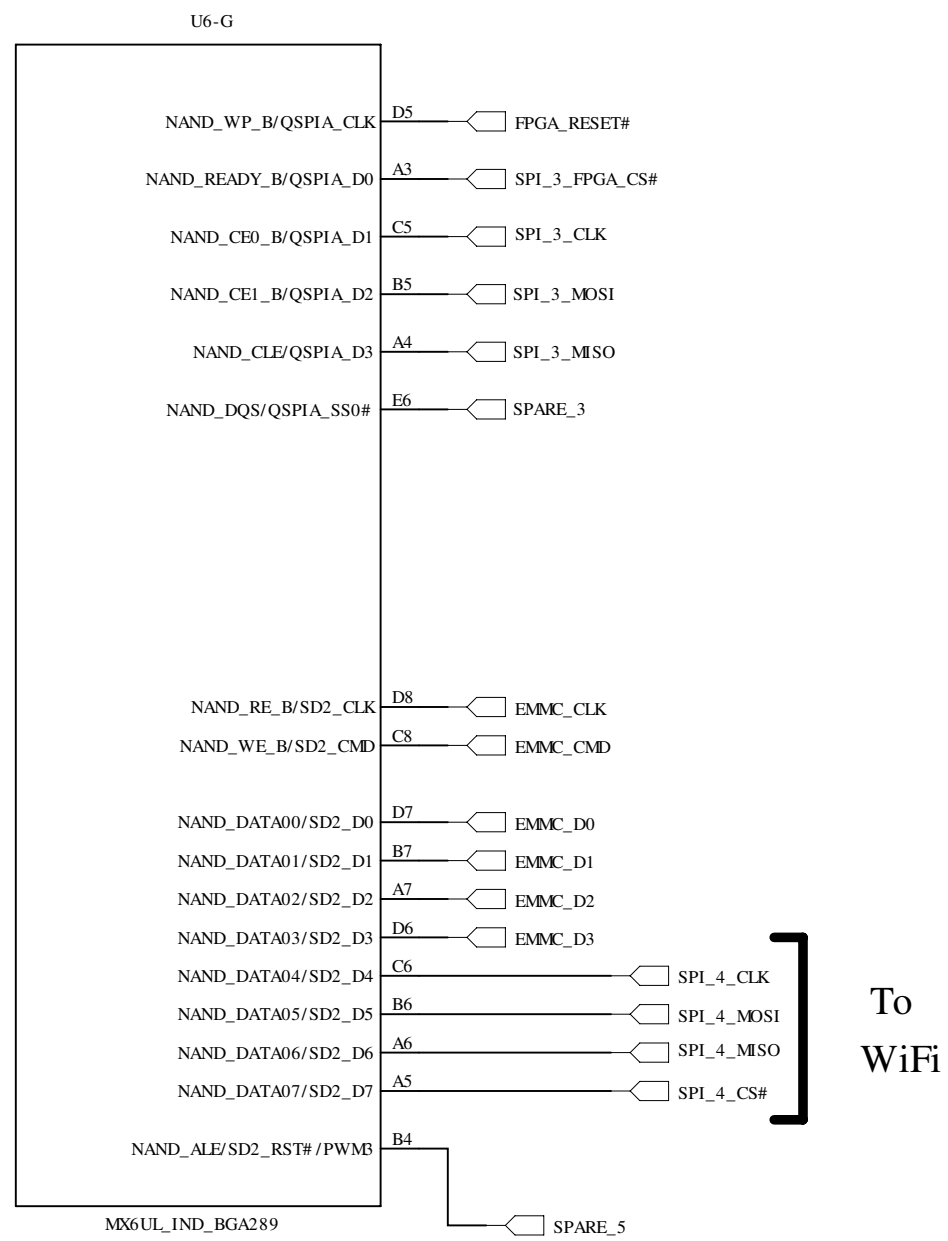
# 6UL USB Ports



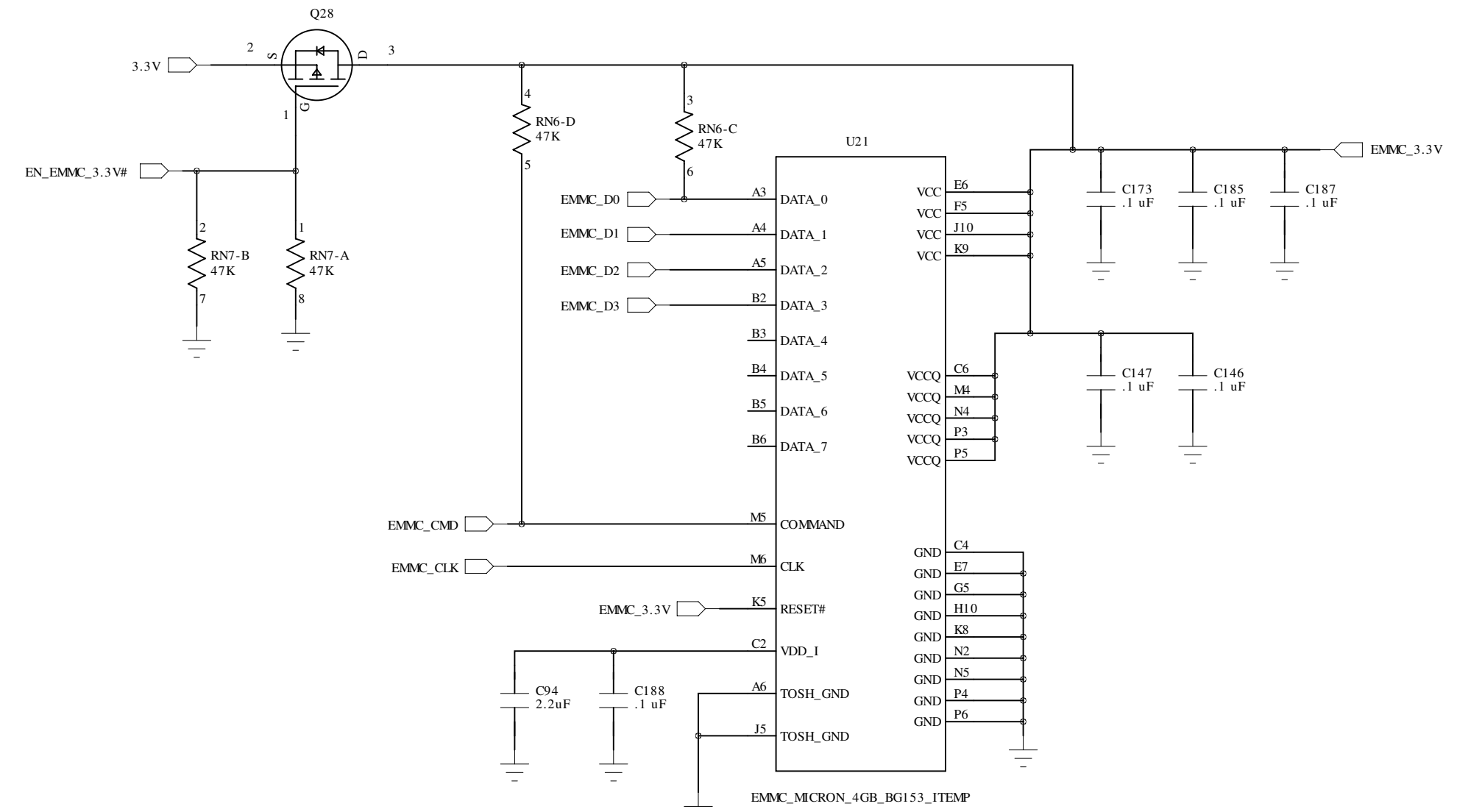
# 6UL LCD



# 6UL Flash

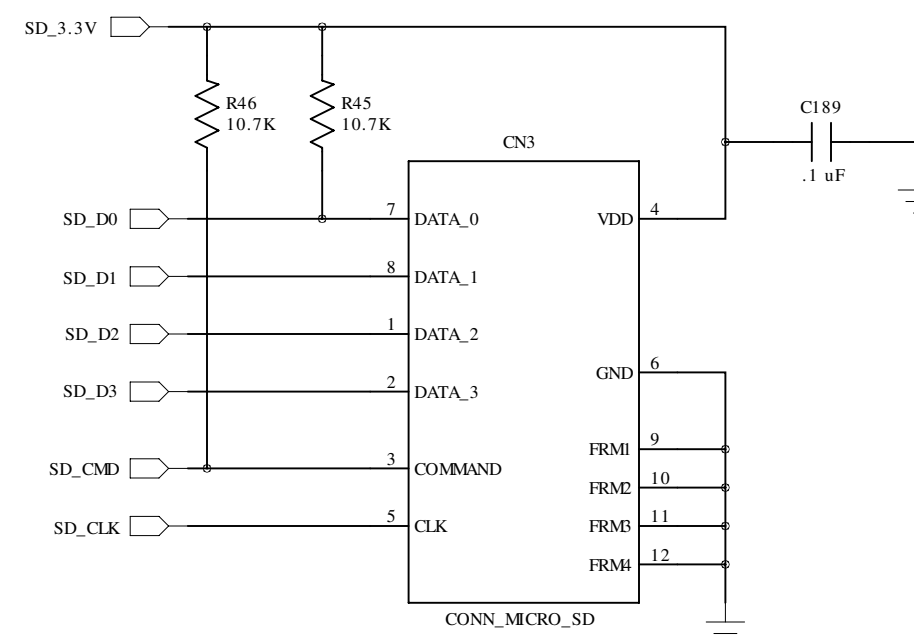
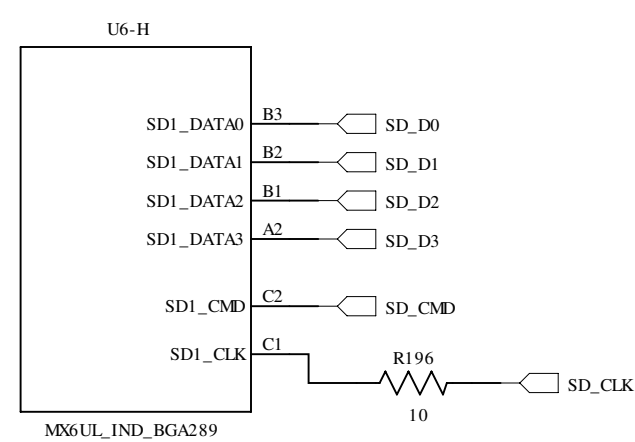


# eMMC 4GB - 64GB



# Micro SD Card Socket

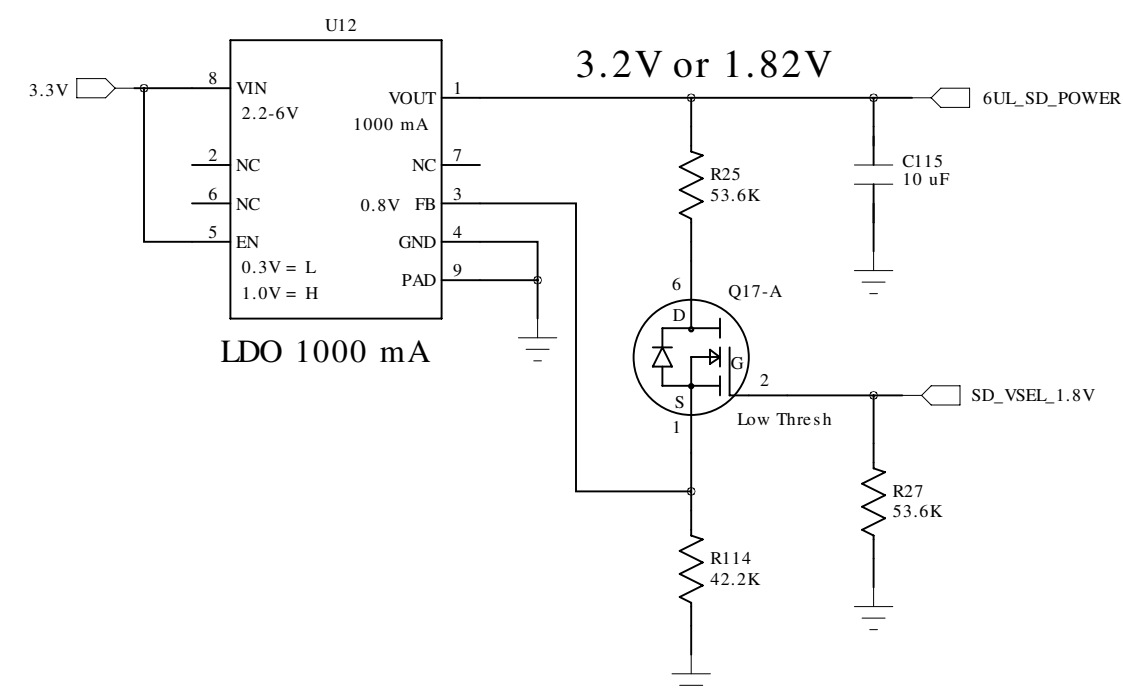
# 6UL SDIO





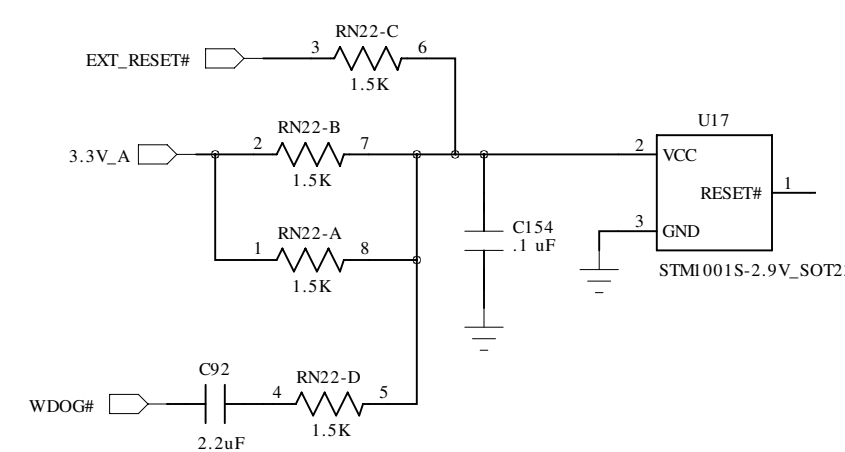
# SD Card 1A Reg

## 1.8V or 3.2V



# 3.3V 2A Reg # 1

SW\_4.7V --> 3.3V



3.3V is shutdown if EXT\_RESET# or WDOG# is asserted, or 3.3V\_A is too low

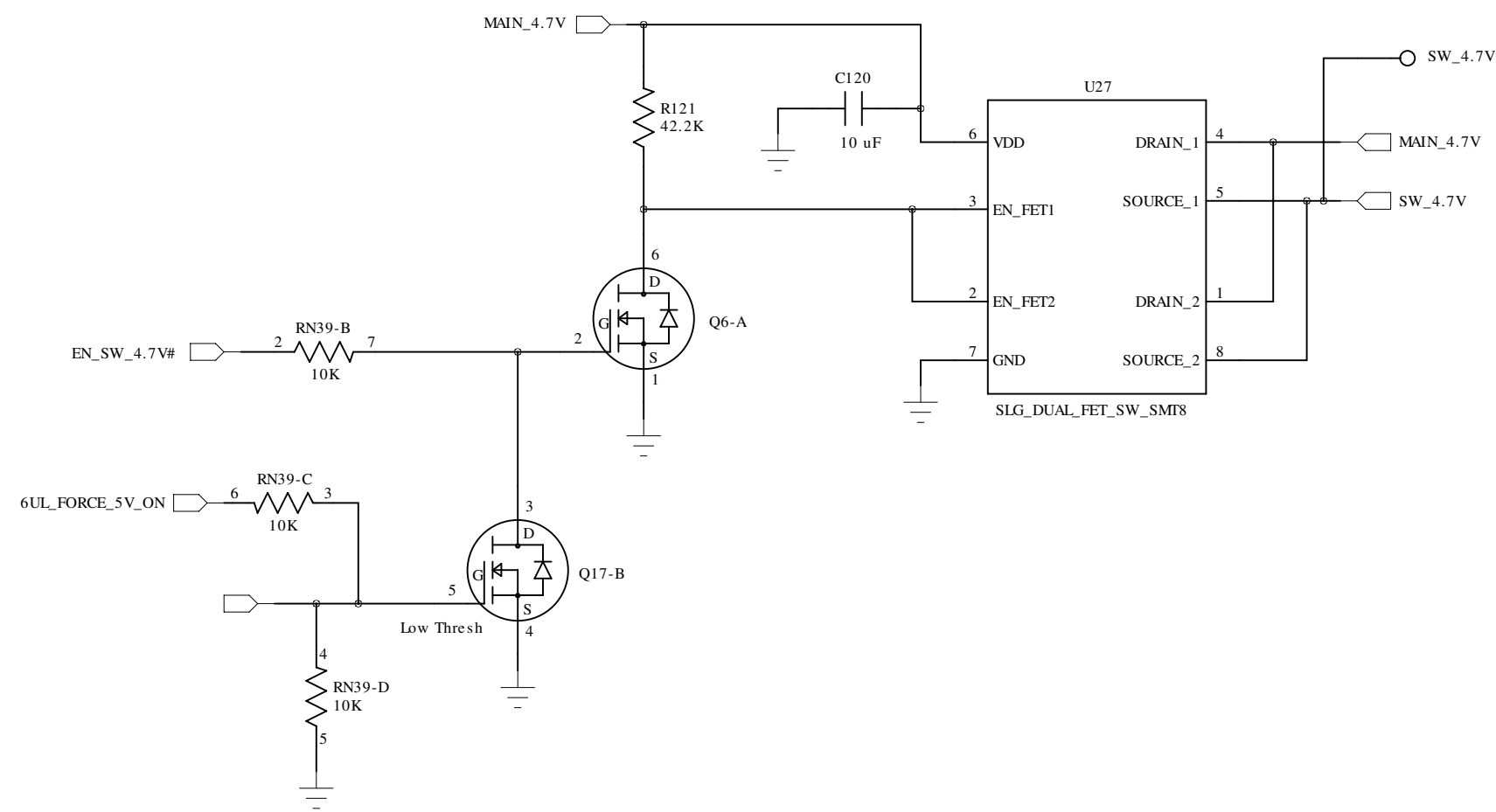
# CPU Core 1A Reg # 2

SW\_4.7V --> VDD\_6UL\_CORE

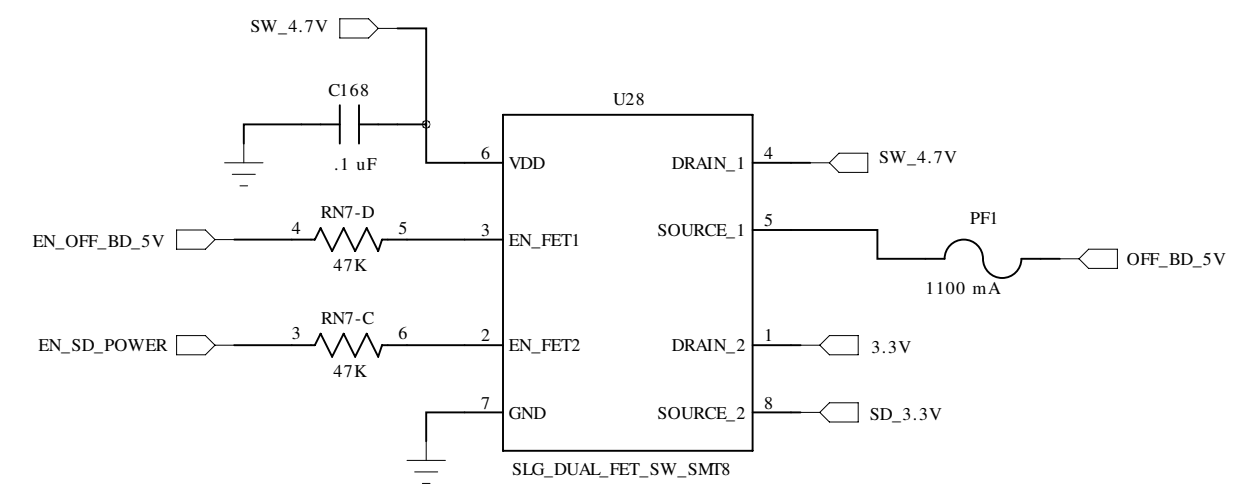
# RAM 1.35V 1A Reg # 2

SW\_4.7V --> RAM\_1.35V

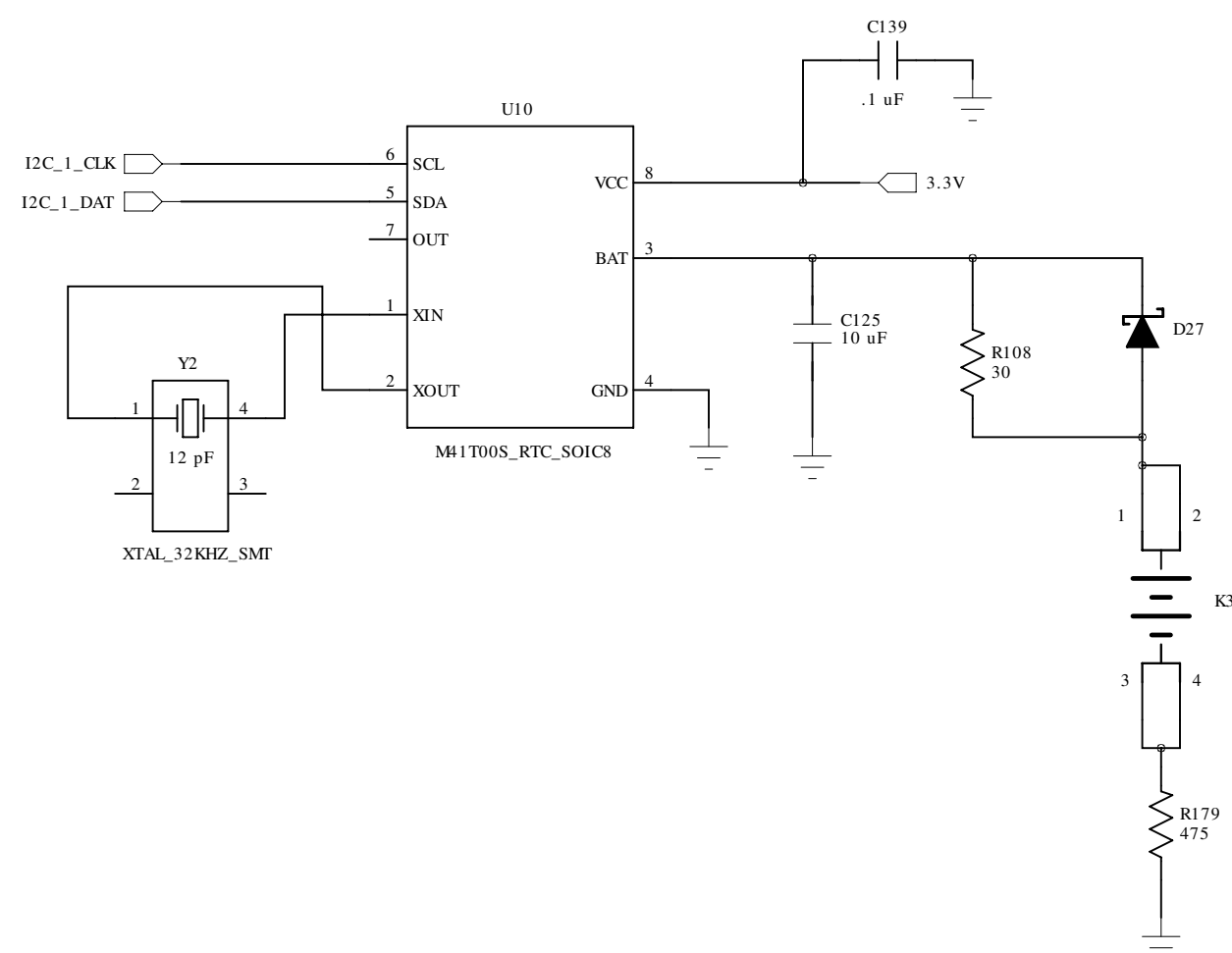
## Main 5V Power Sw.



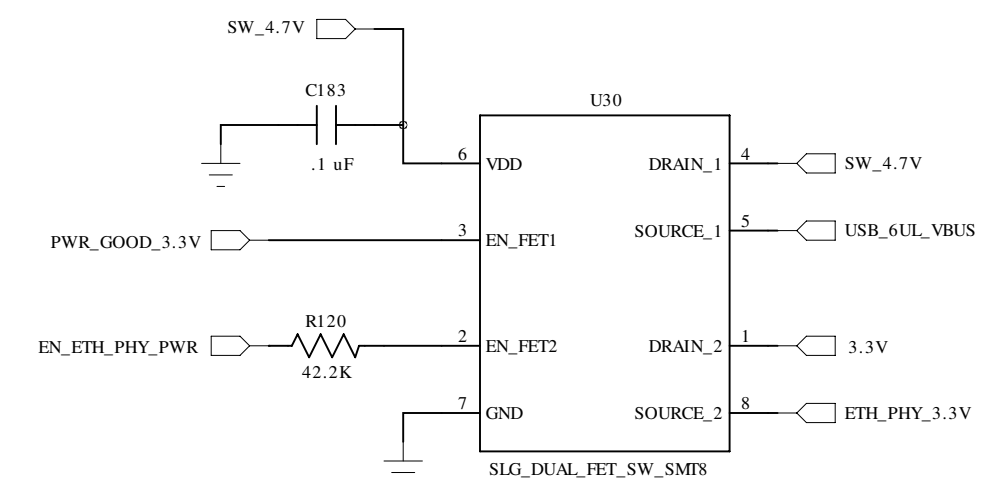
## Off Board 5V sw. and SD Card Power Sw.



## ST Micro RTC

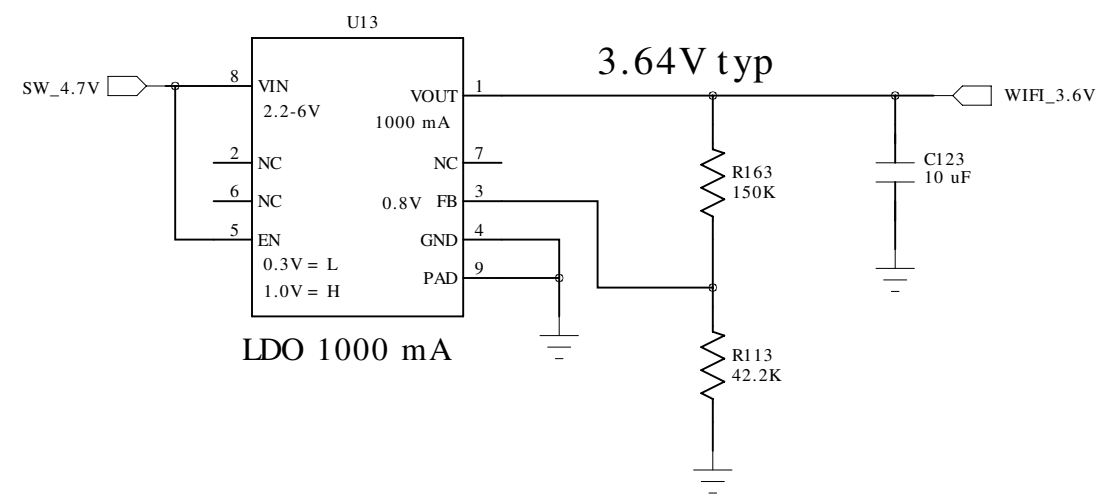


## USB VBus and Eth Power Sw.

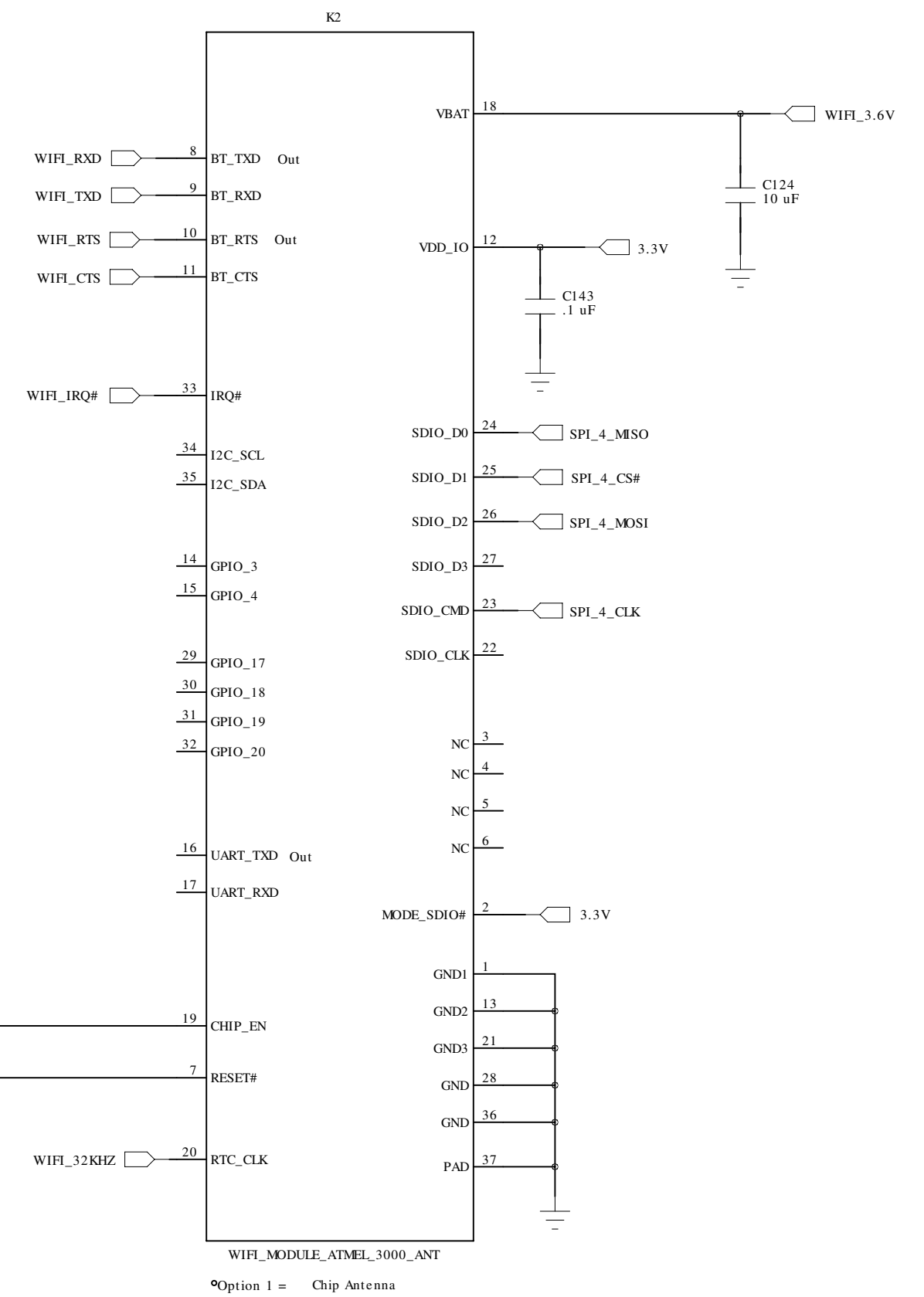


# WiFi

## WiFi 3.6V Regulator

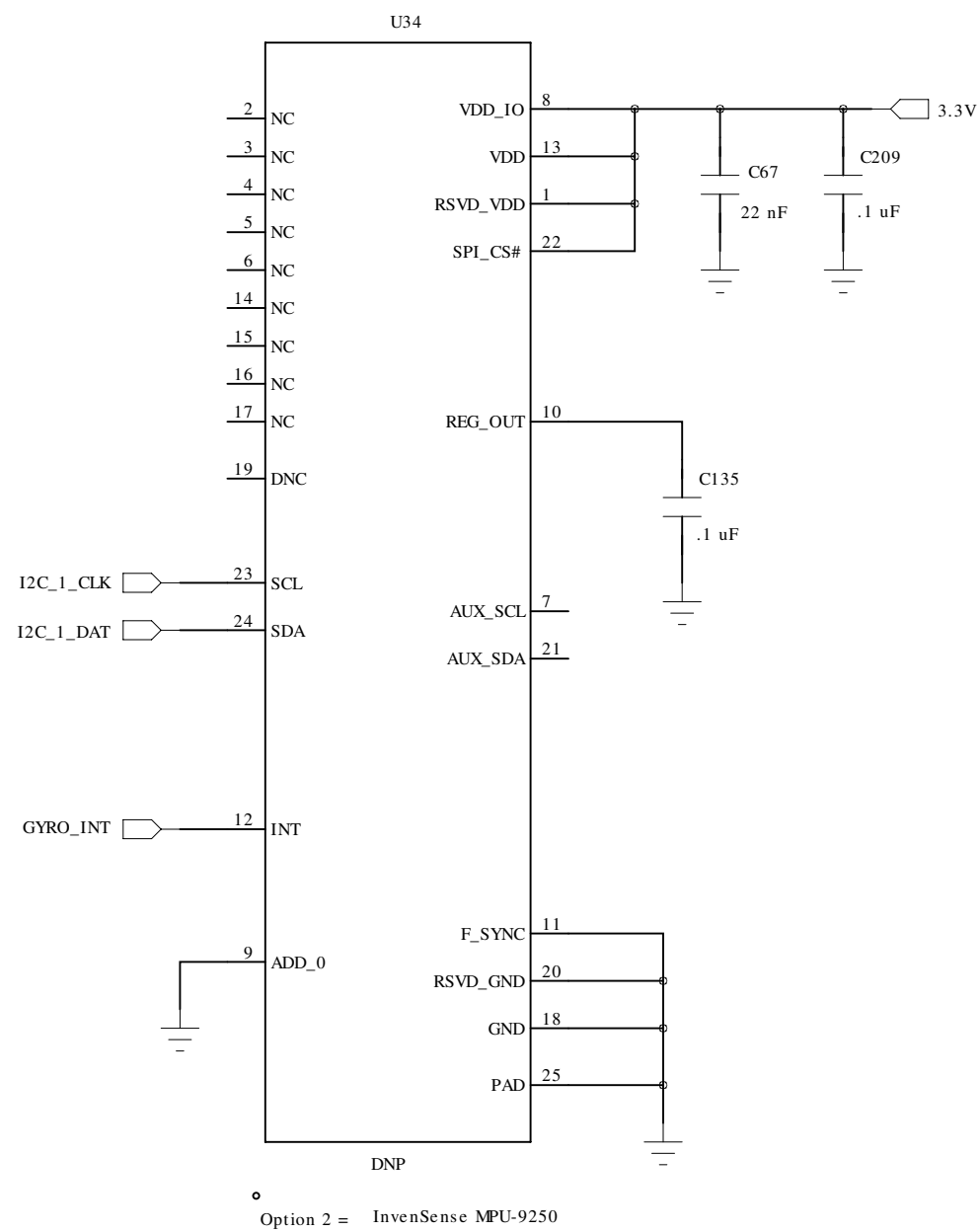


## WiFi / Bluetooth Radio Module

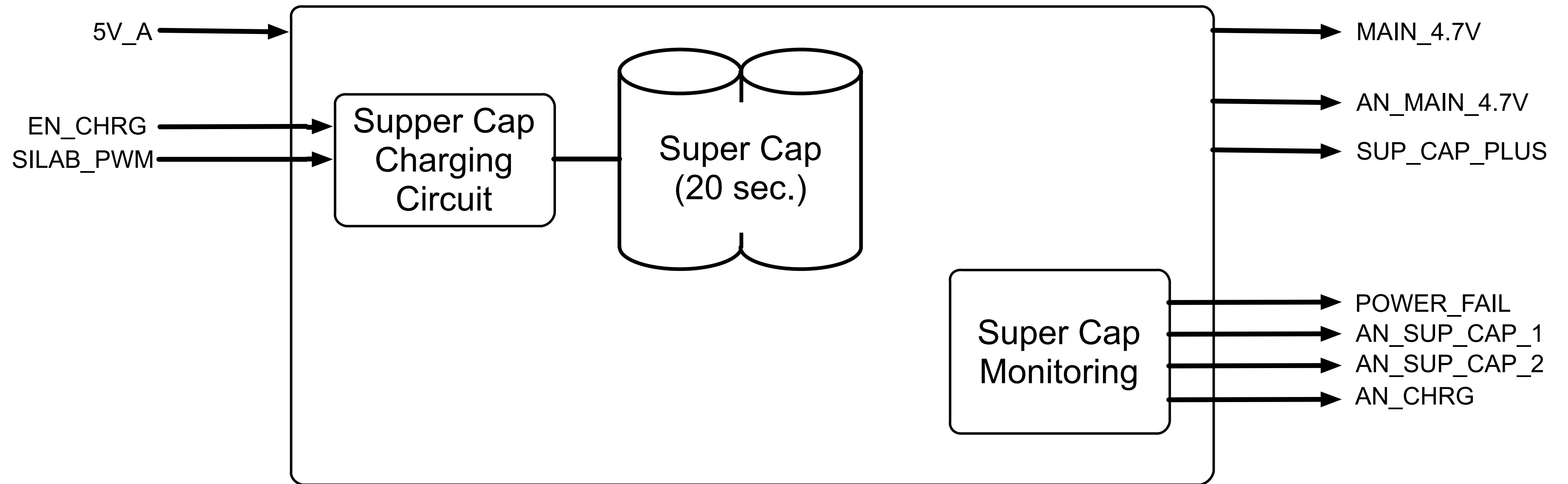


## Gyro-Accelerometer

Included only on xxx9x Standard Option

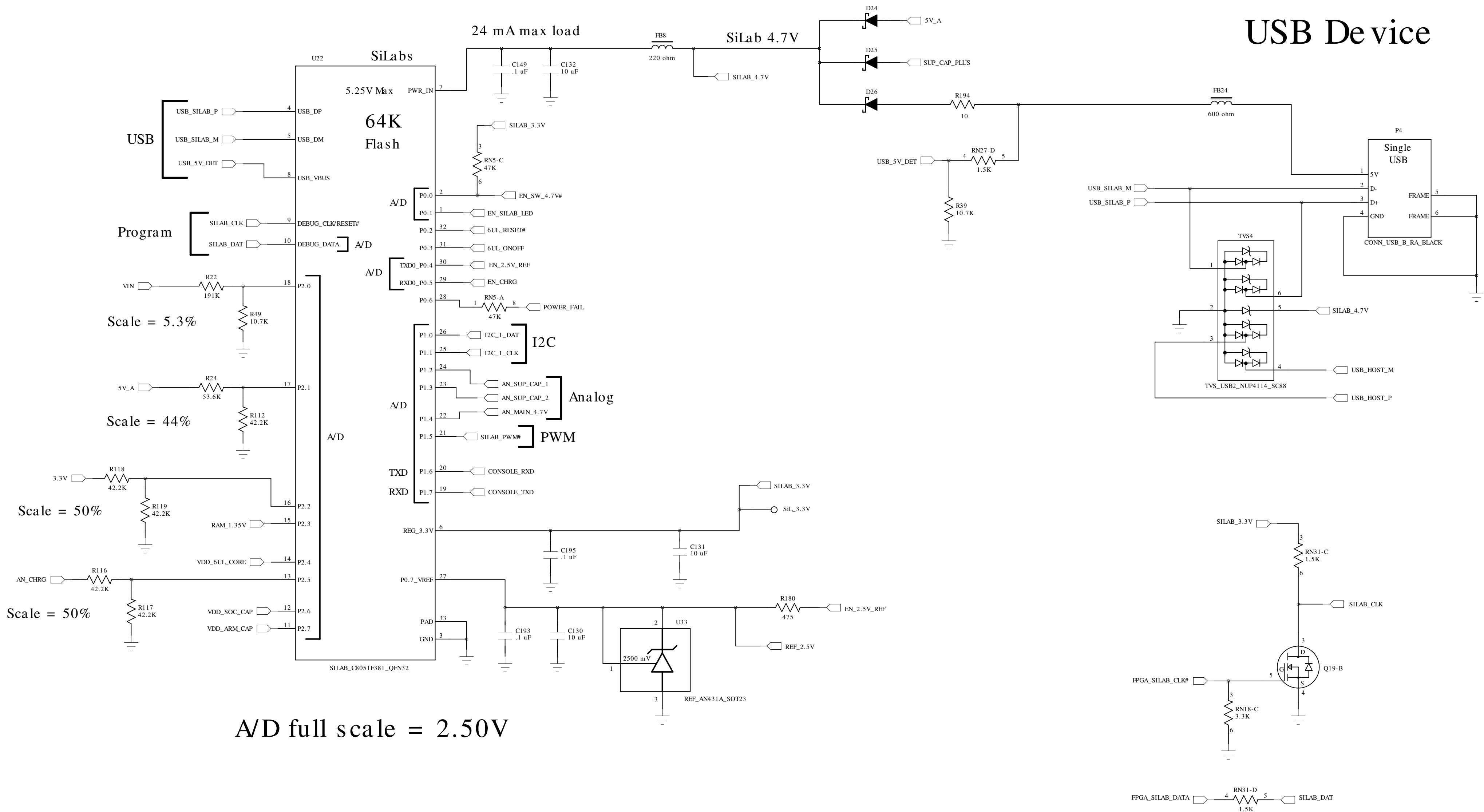


# SuperCap 20 Second Power Hold



20 seconds assumes 1 watt load  
25F SuperCaps charged to 4.8V  
Functions down to SuperCap = 3.8V

# USB Device Port and SiLab uC



# MACH XO2 FPGA

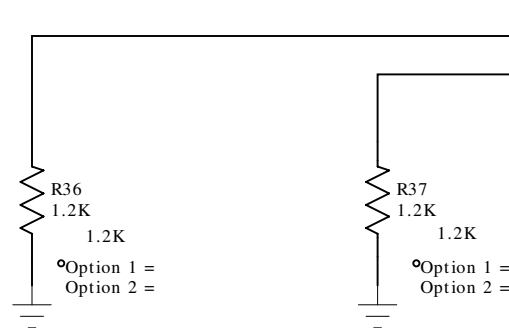
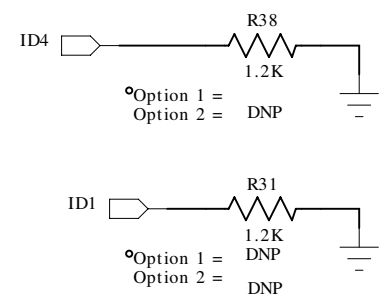
## FPGA required for:

- Auto-485 for one UART
- MUX for UARTs
- Two Tachometers
- One Quadrature detector
- Additional I/O

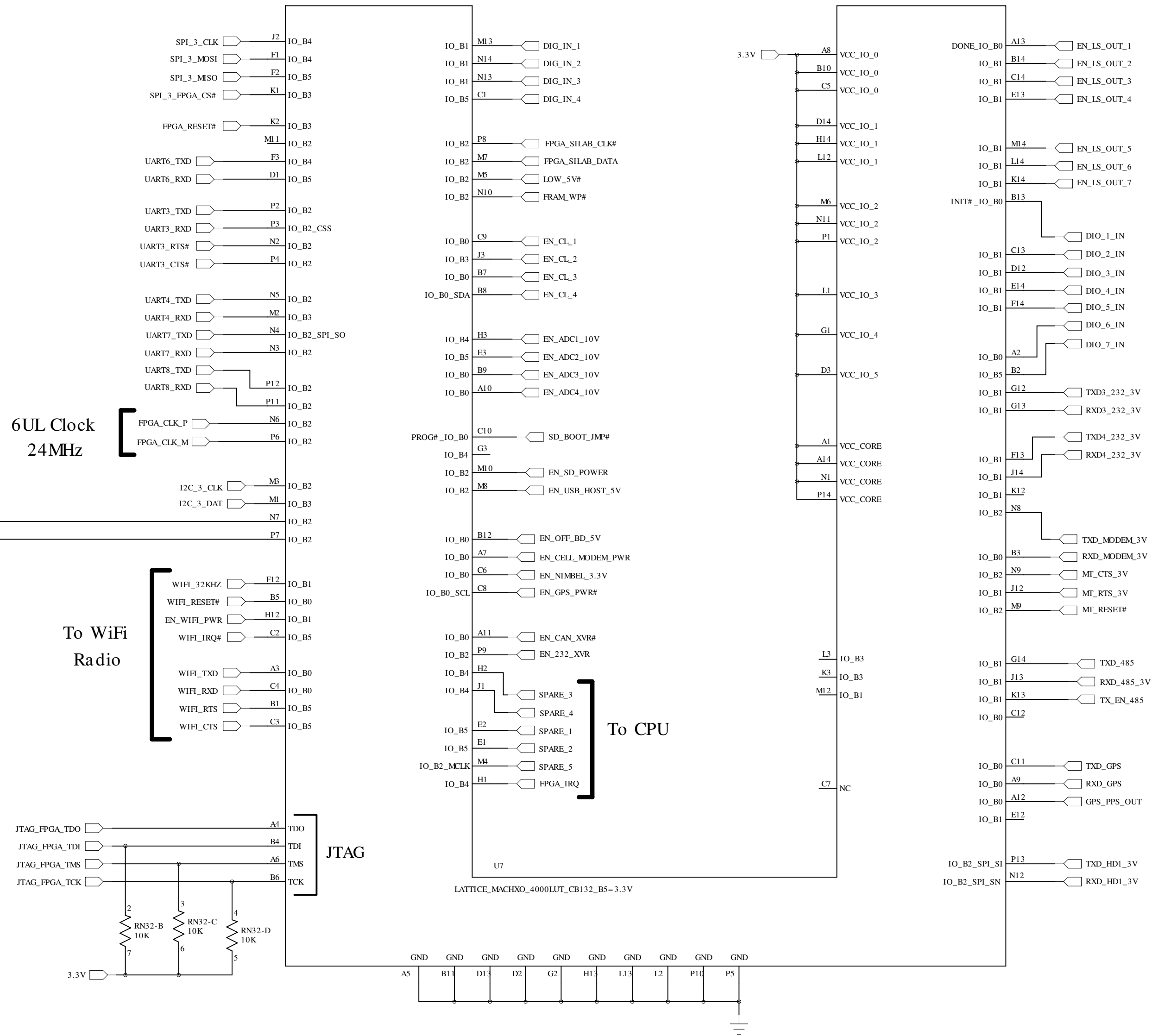
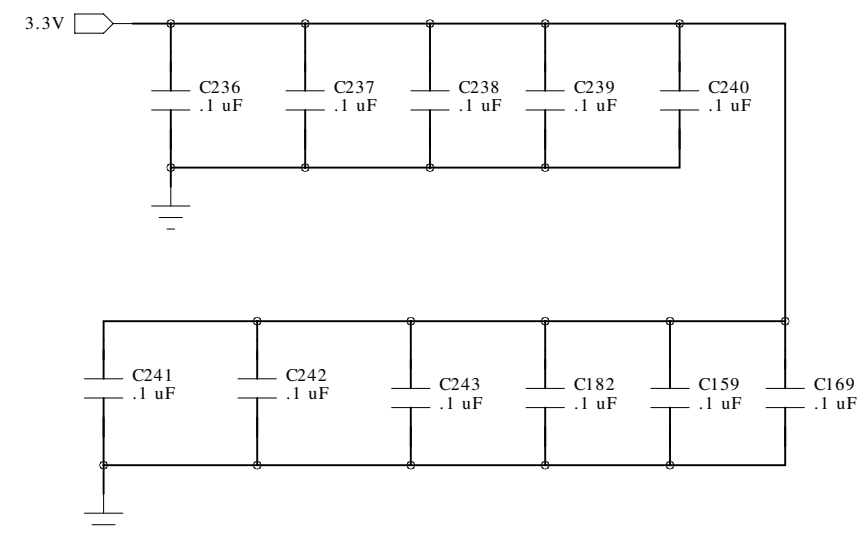
## Resistor Strapping Table

0 = POP, 1 = DNP

R38	R37	R36	R31	
0	0	0	1	TS-7180-SMW11
1	0	0	1	TS-7180-SRW91



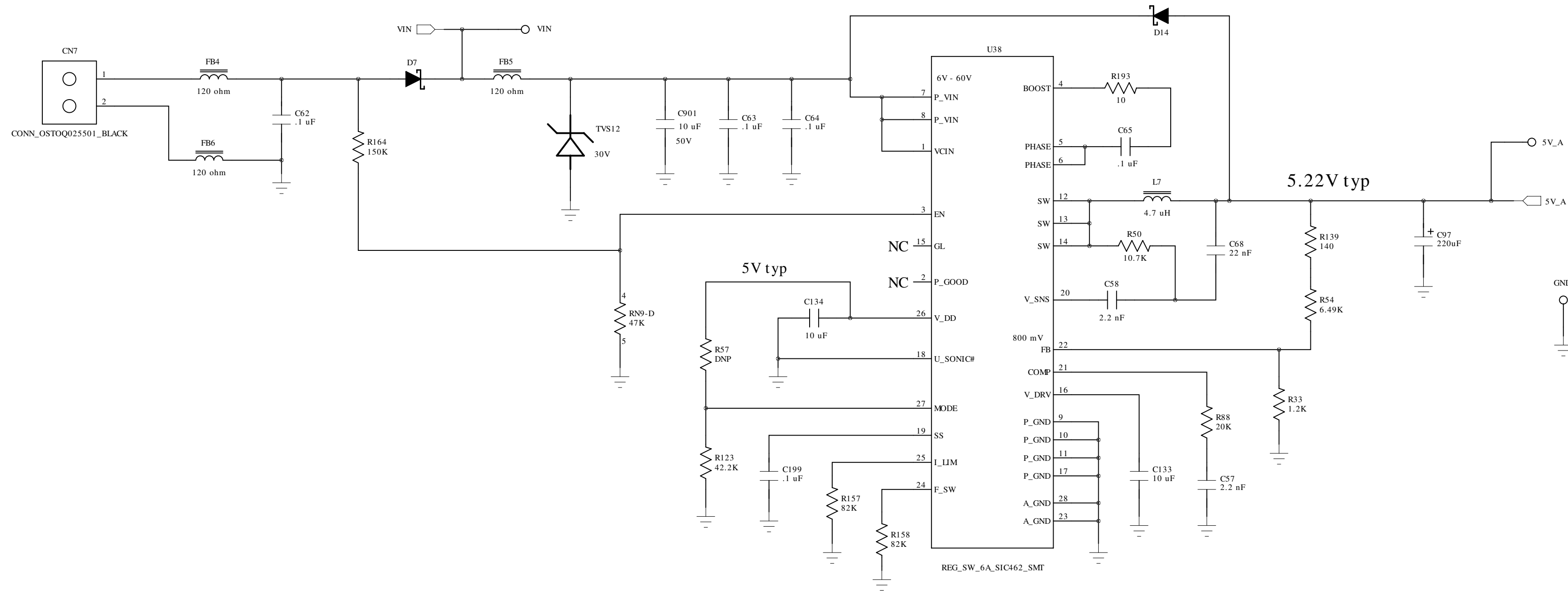
## FPGA bypass Caps



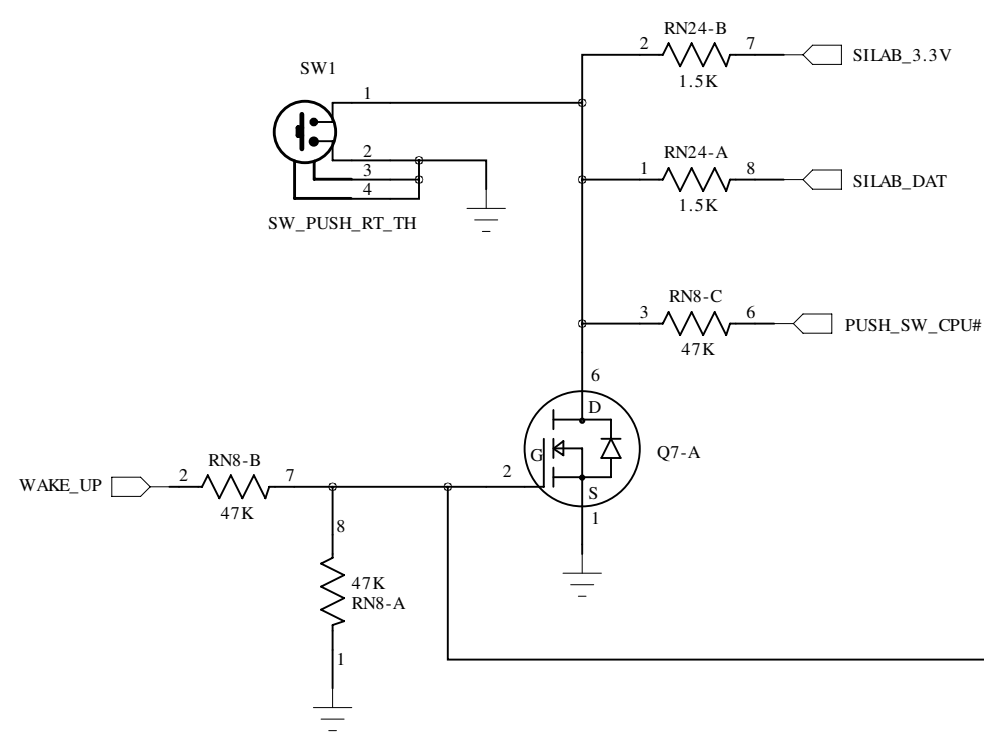
# Vishay SiC462 6A Regulator

8-30 VDC

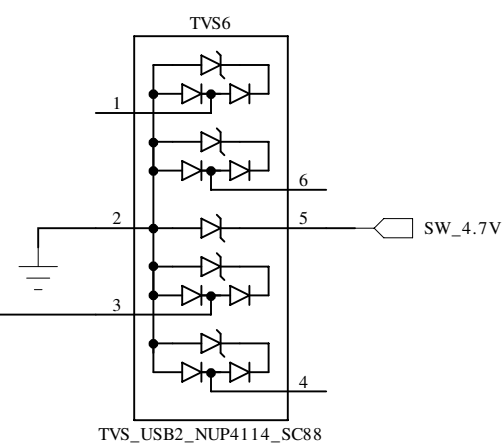
Power Input



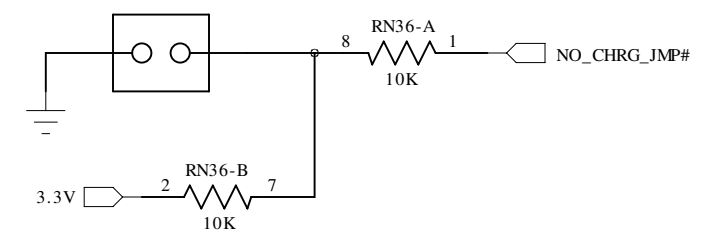
## Push Switch



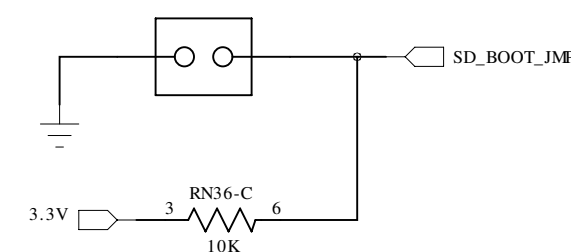
## TVS



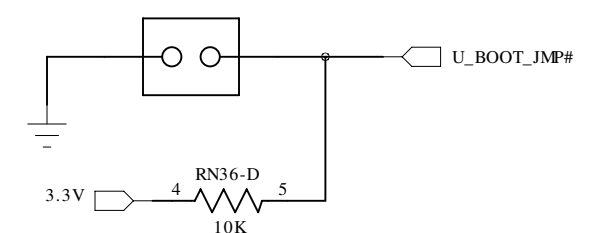
## No Chrg Jumper



## Boot to SD

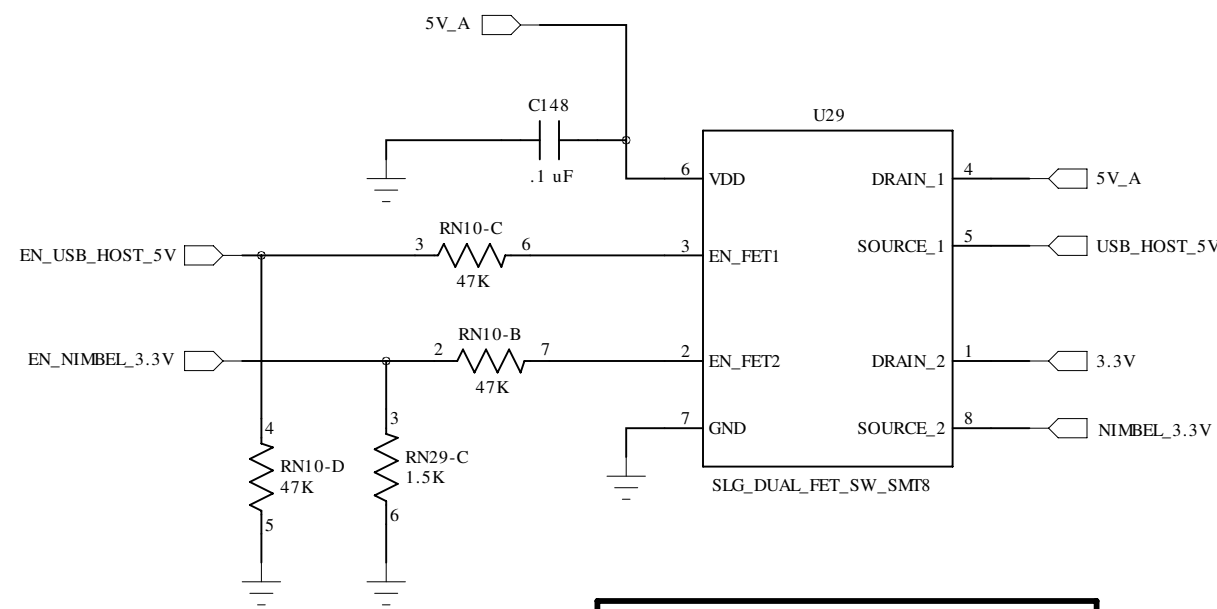


## U-Boot Stop



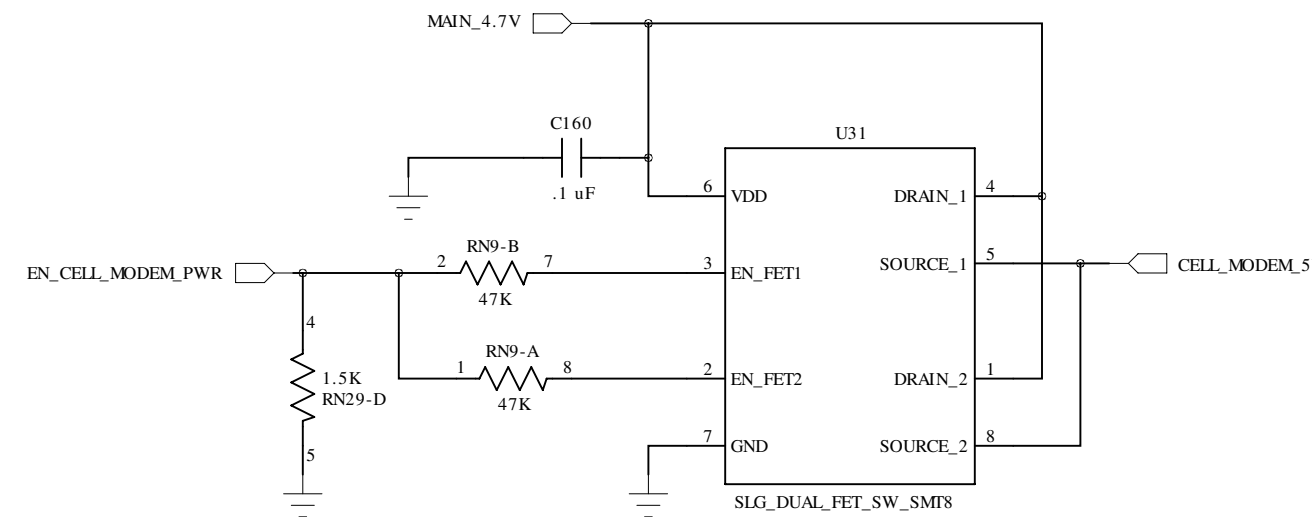
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# USB and NimbeLink Switched Power

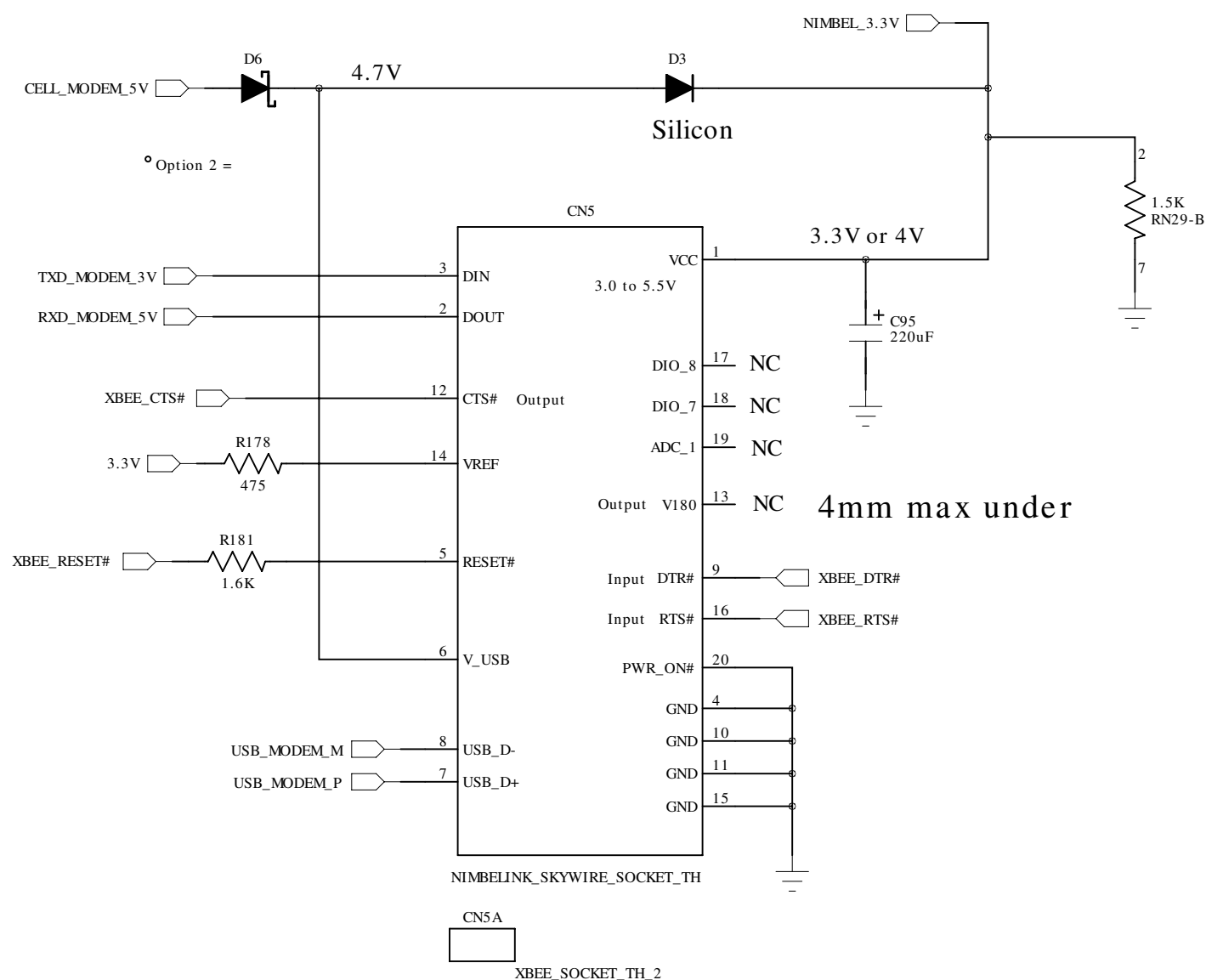


Rise time of both outputs measured at ~1V/ms

# 3G Modem Switched Power

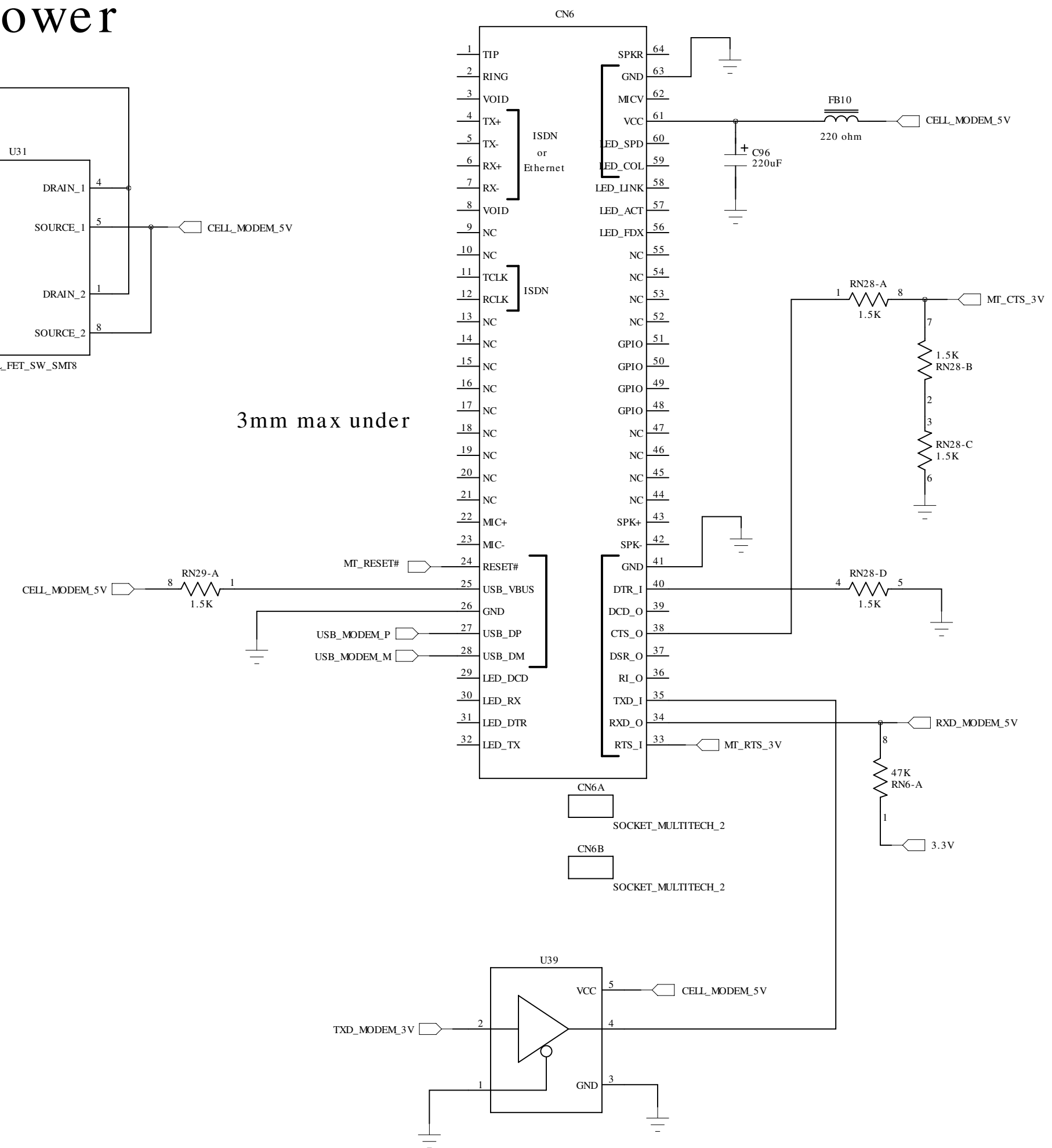


# NimbeLink Modem Socket



4mm max under

# MultiTech Socket



3mm max under

# Multitech Modems

Inputs (TXD) are always TTL compatible  
Outputs (RXD) swing CMOS levels  
This means 0-5V if 5V powered

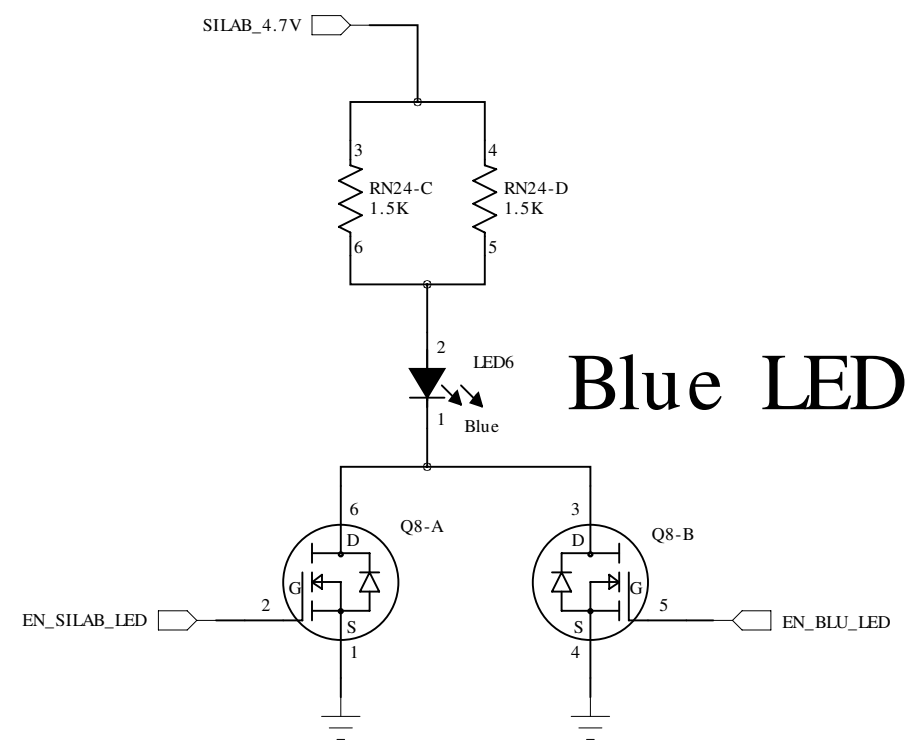
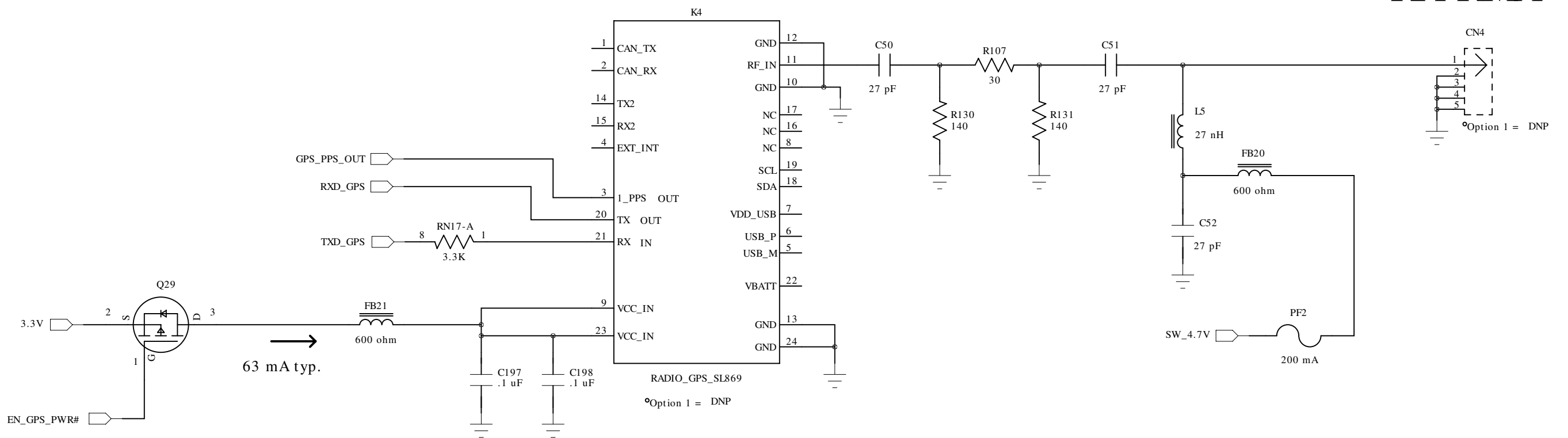
DTR and RTS are active low true Inputs

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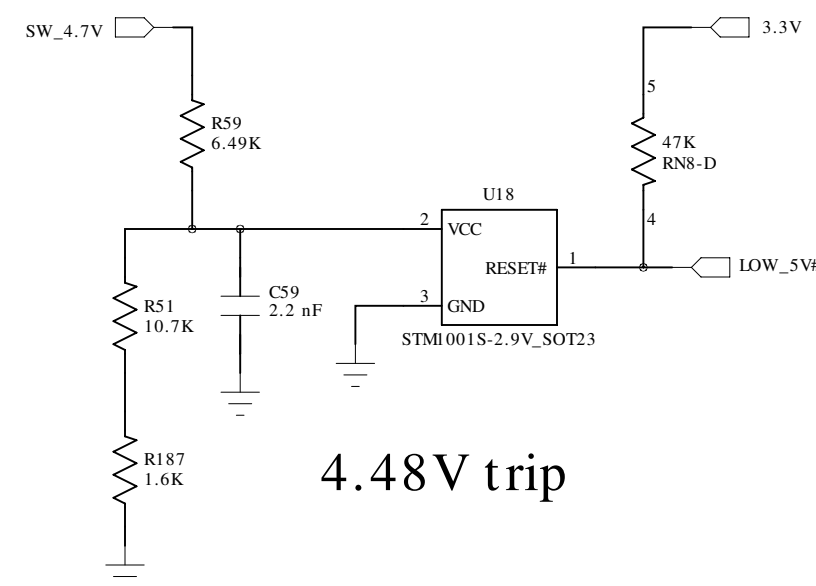
# Telit SL869 GPS Radio

RF Conn.  
RA RMA



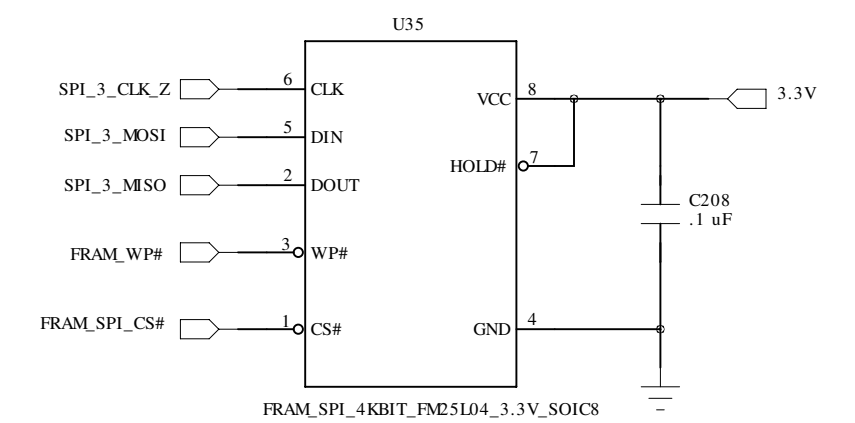
Blue LED

## FRAM Protect



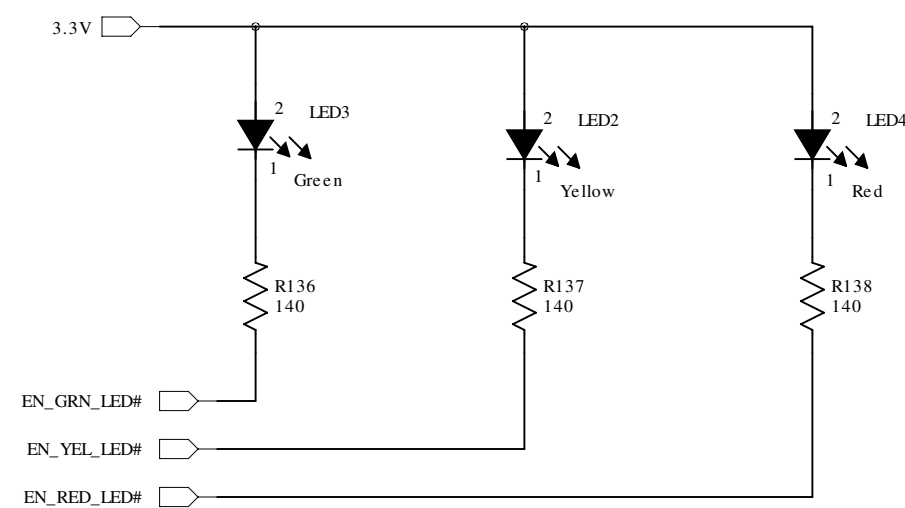
4.48V trip

## FRAM Memory



2K Bytes

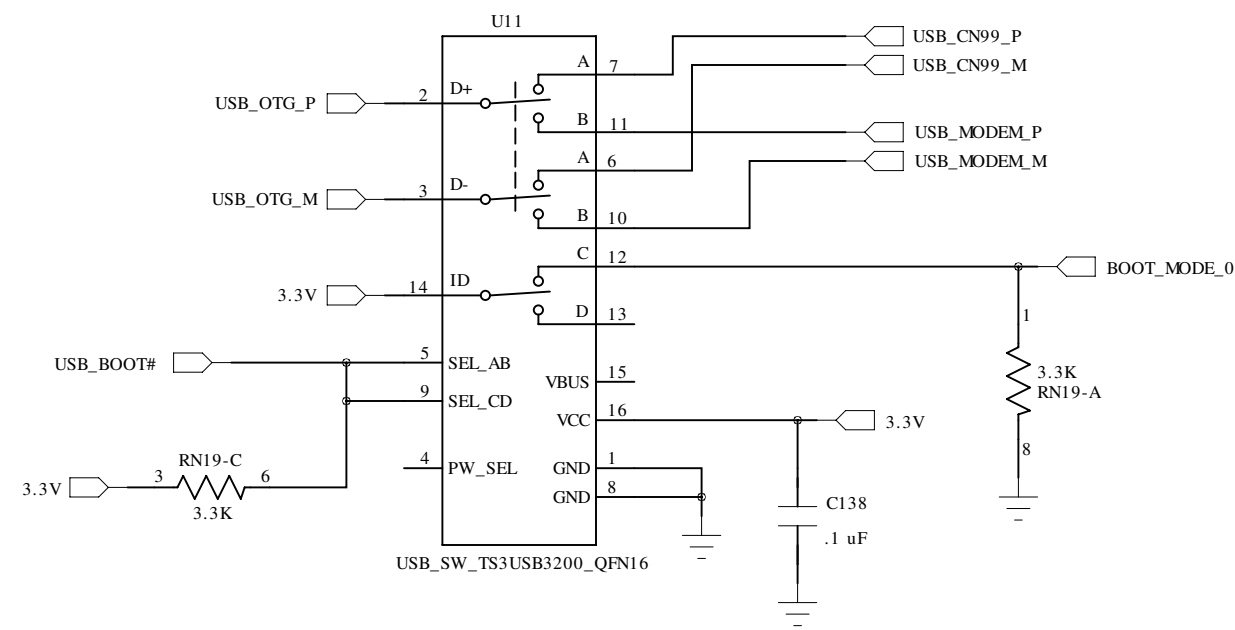
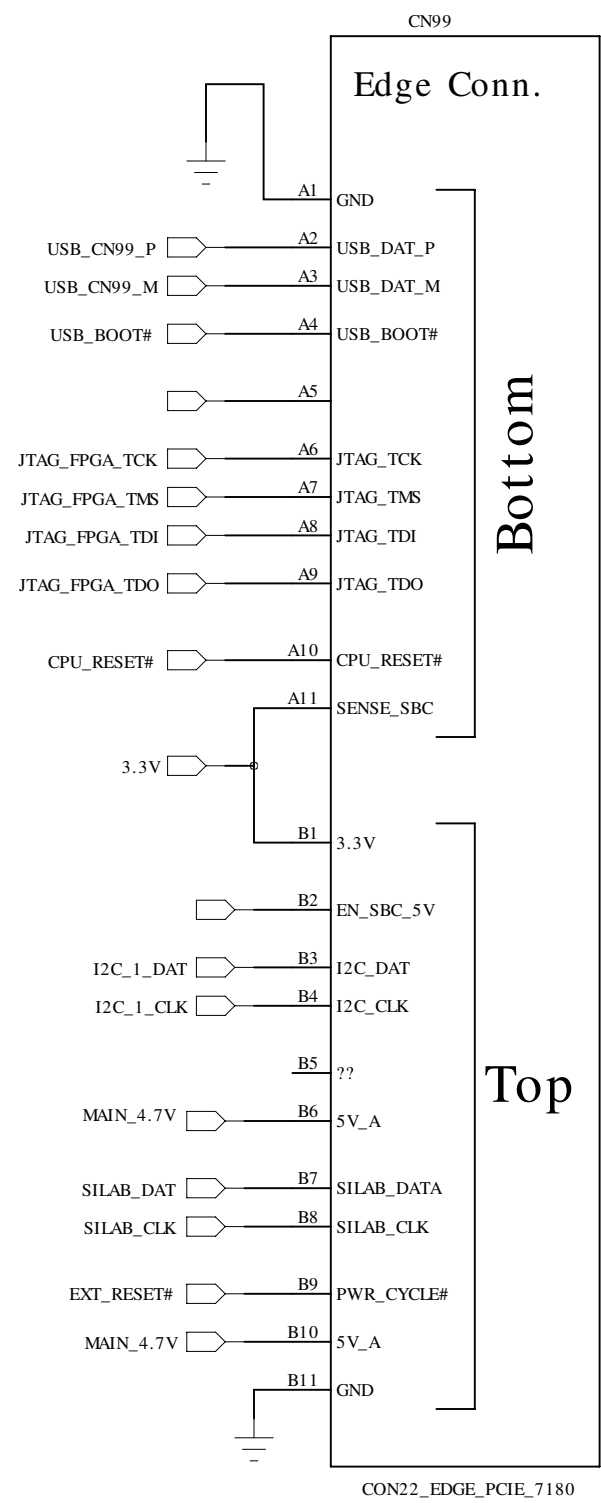
## SMT RA LEDs



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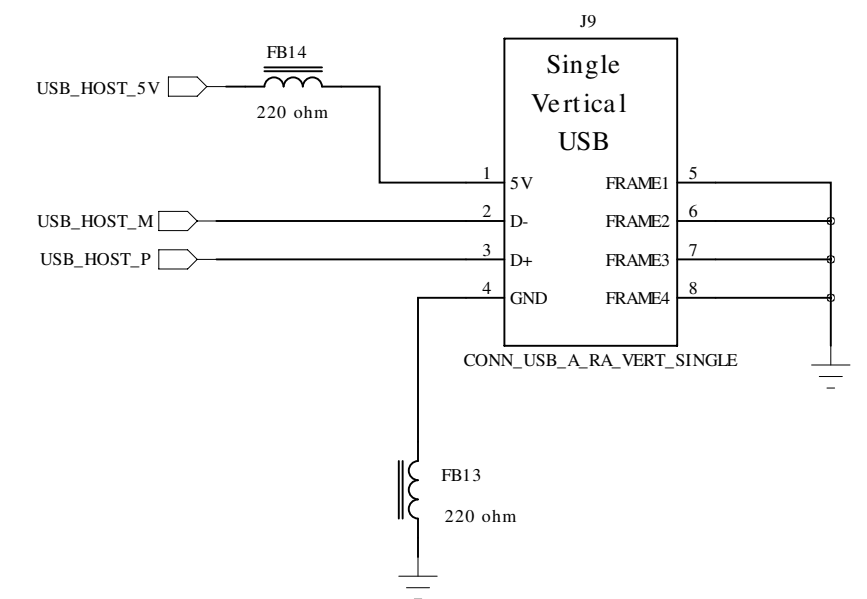
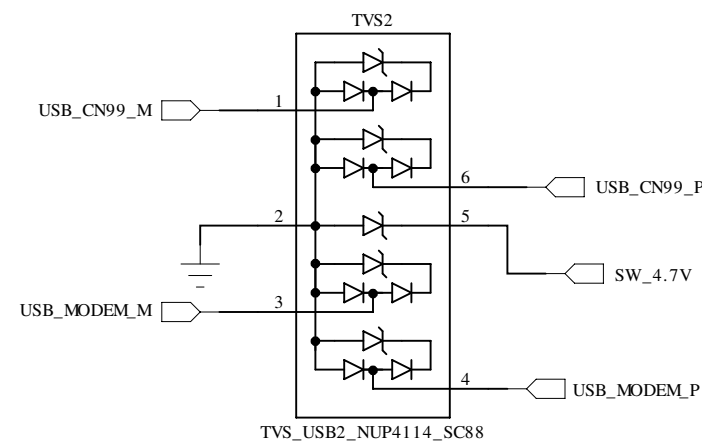
# CN99 Factory Test

# USB OTG MUX To Modem or CN99



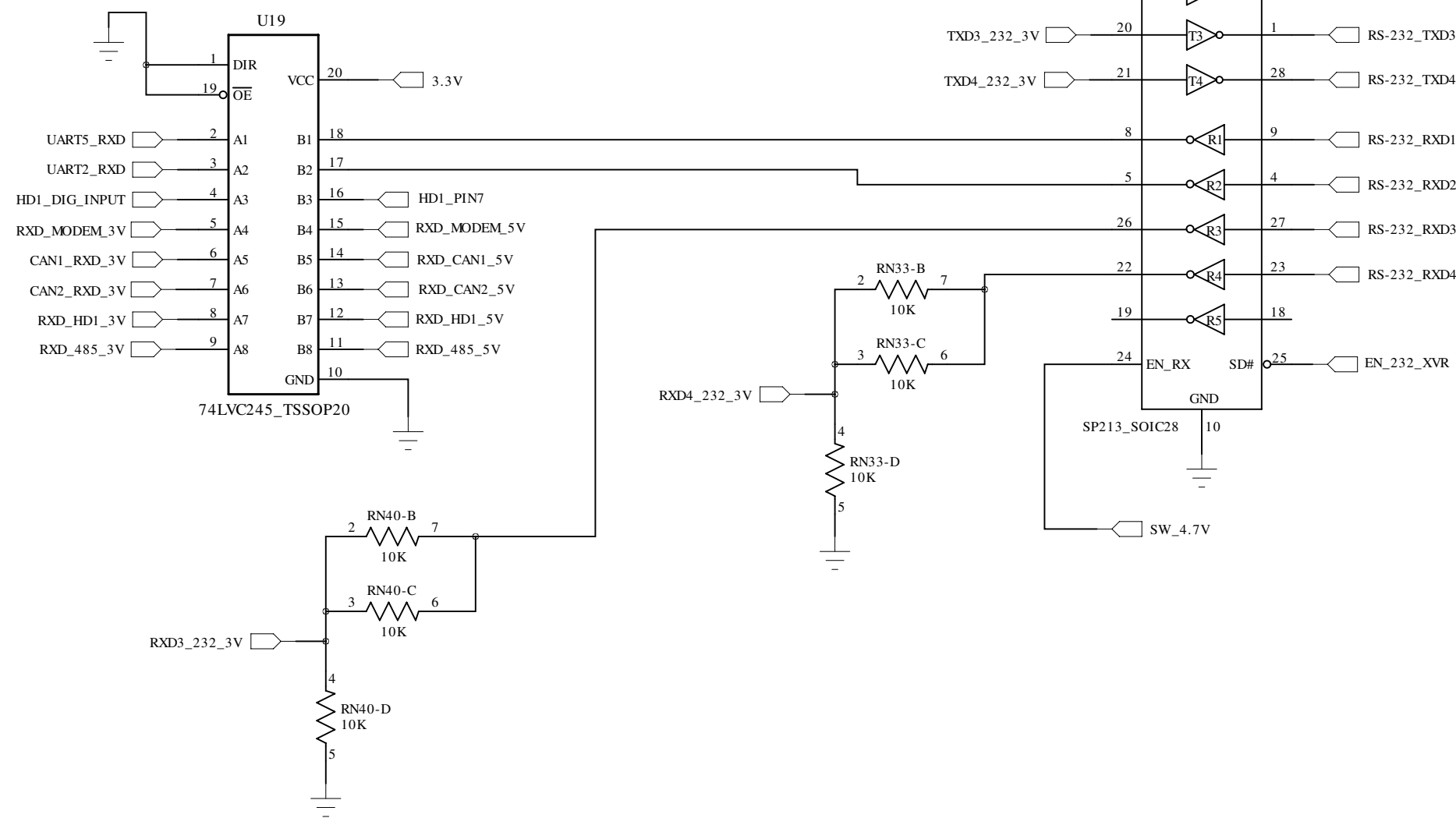
# Single Host USB

# OTG TVS

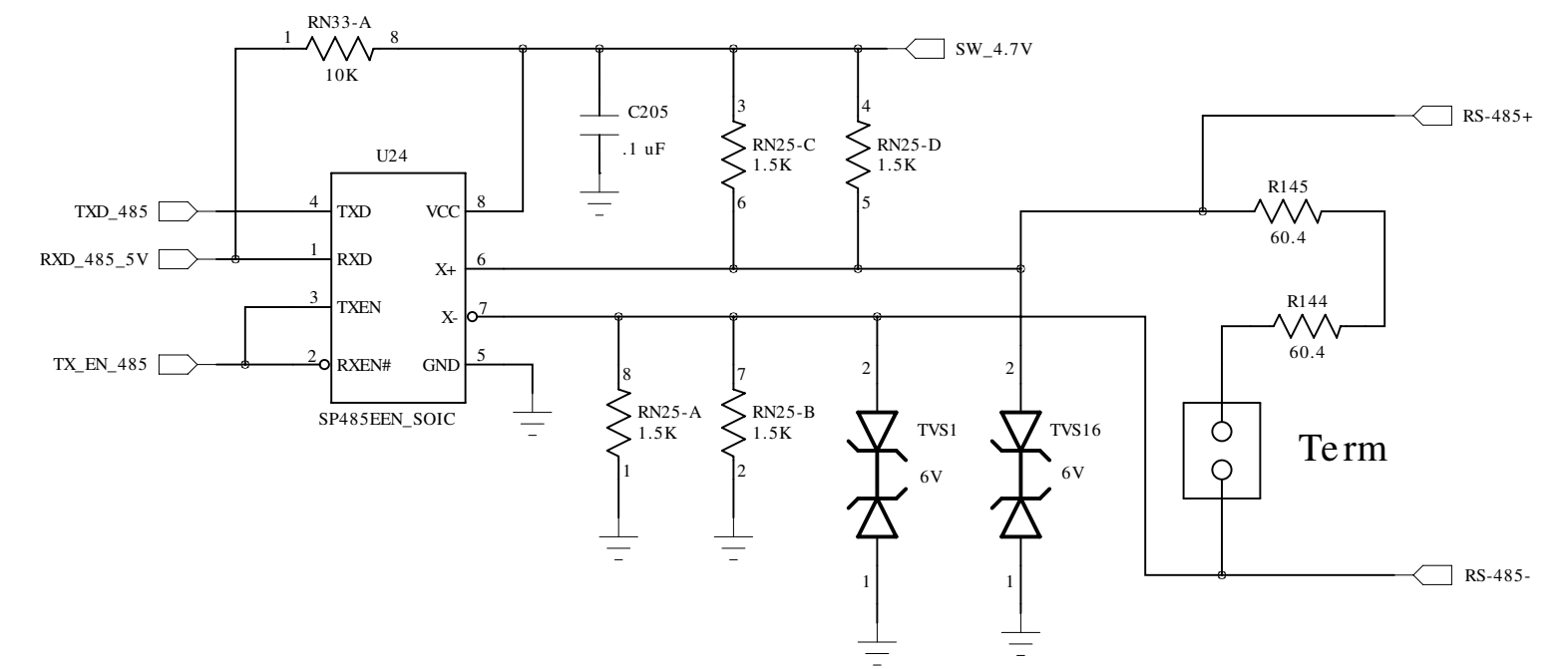


# RS-232 Transceiver

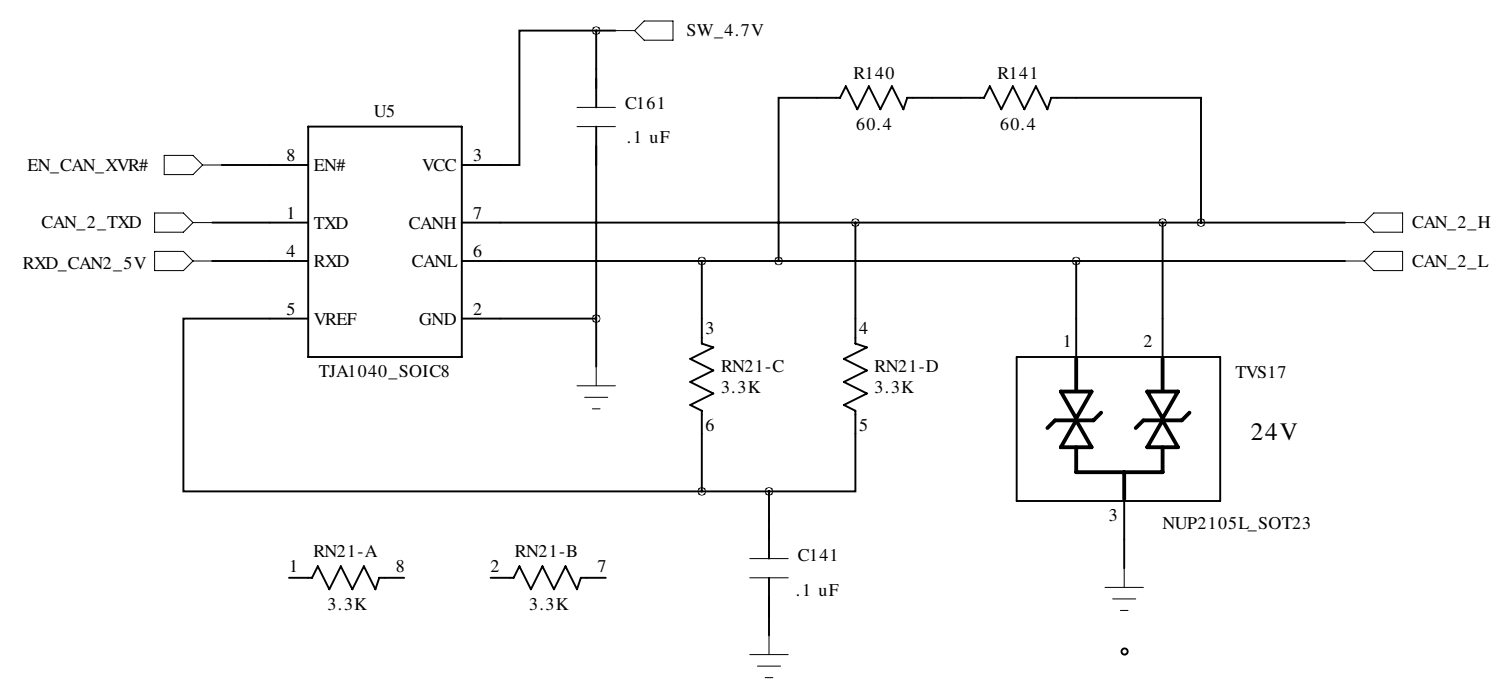
3.3V <-- 5V  
Level shifter



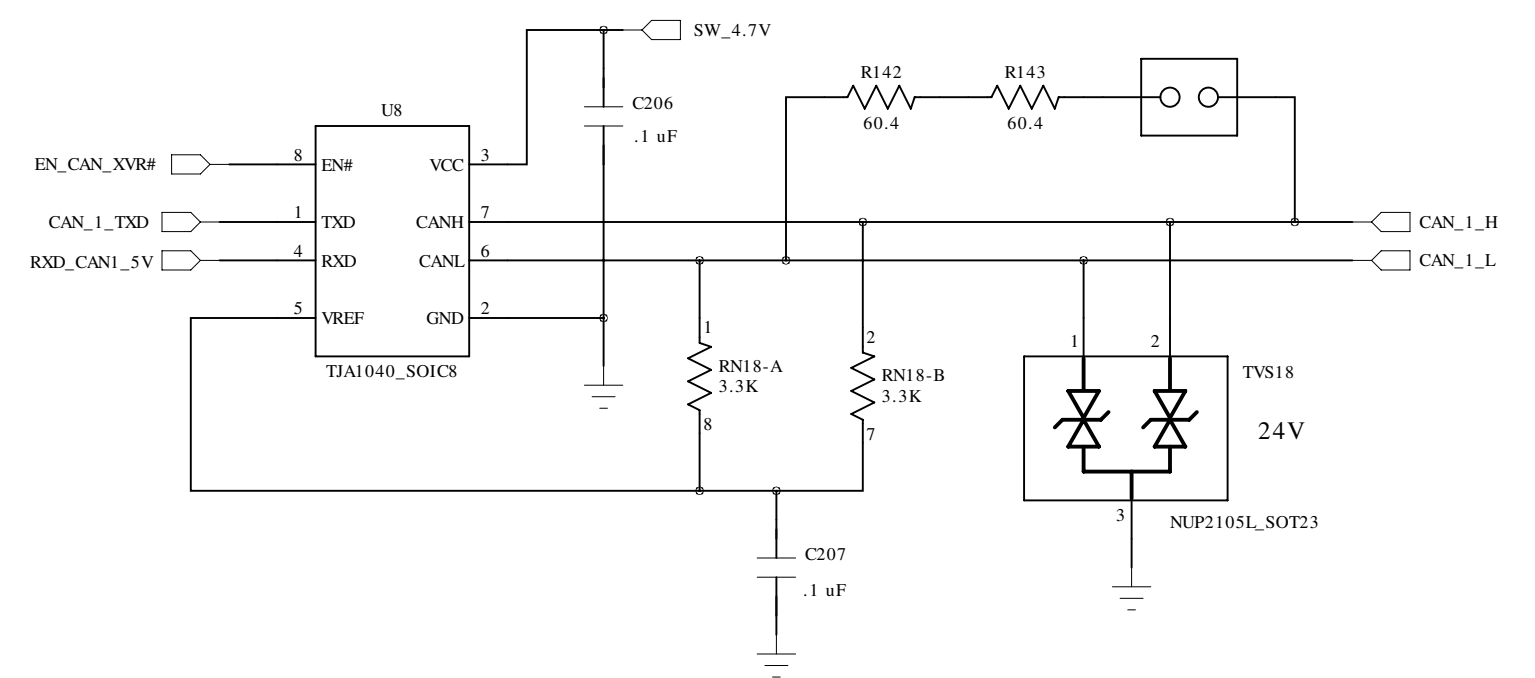
# RS-485 Driver



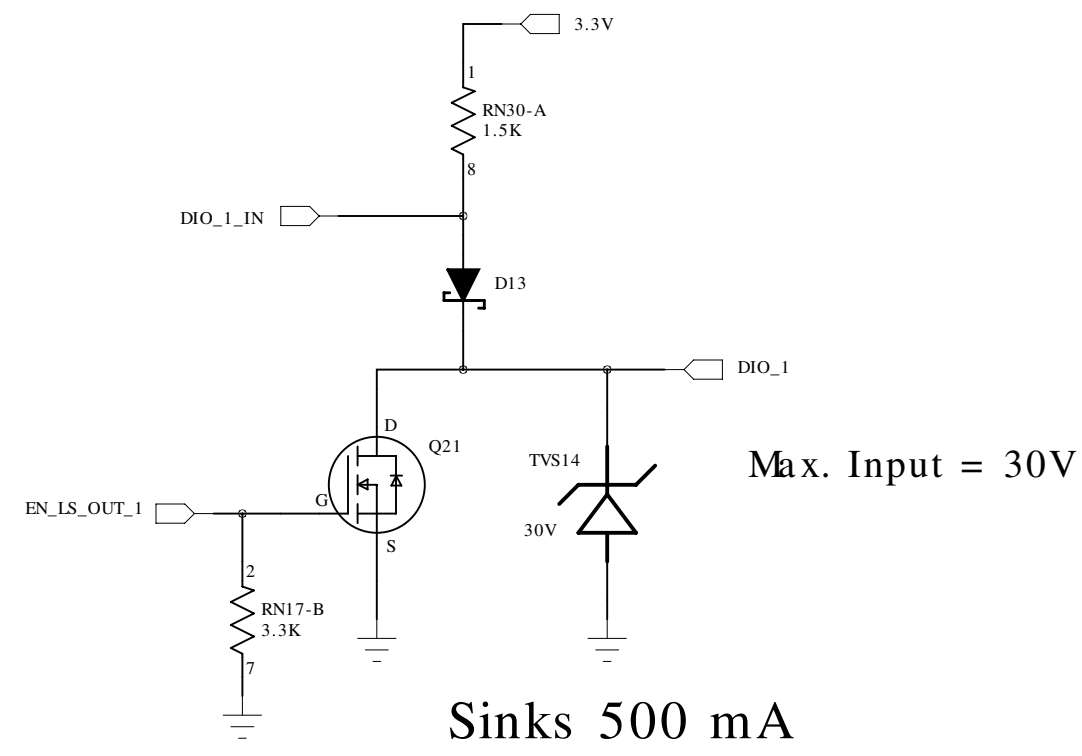
# CAN2 Transceiver



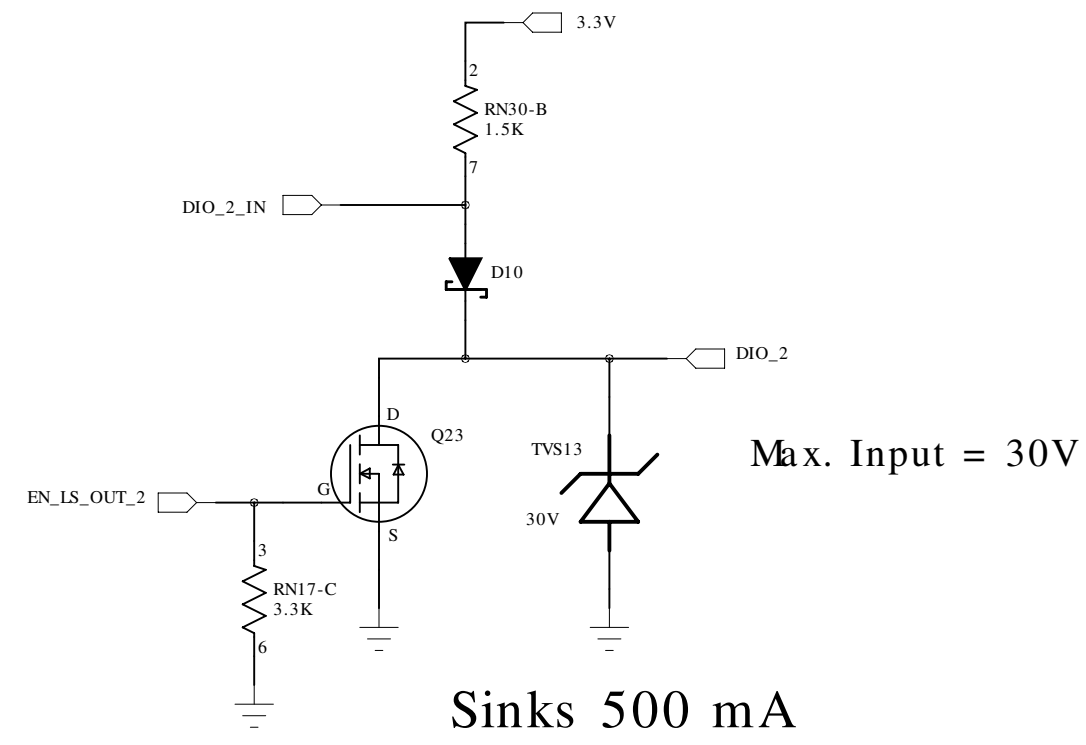
# CAN1 Transceiver



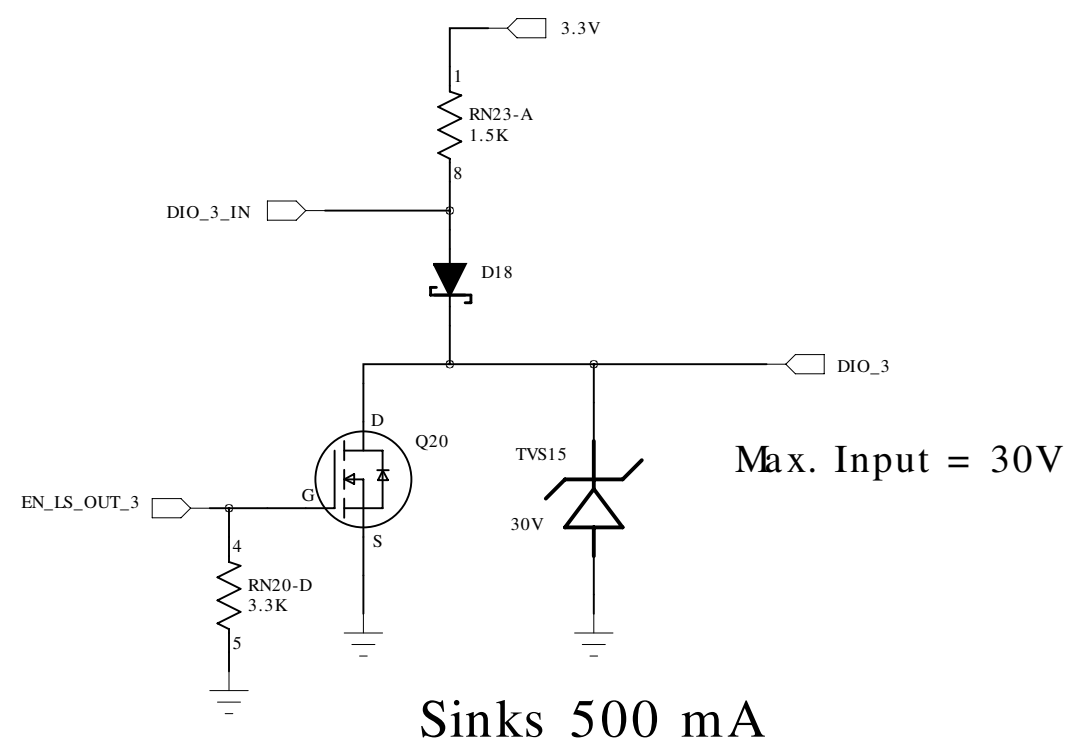
### DIO\_1



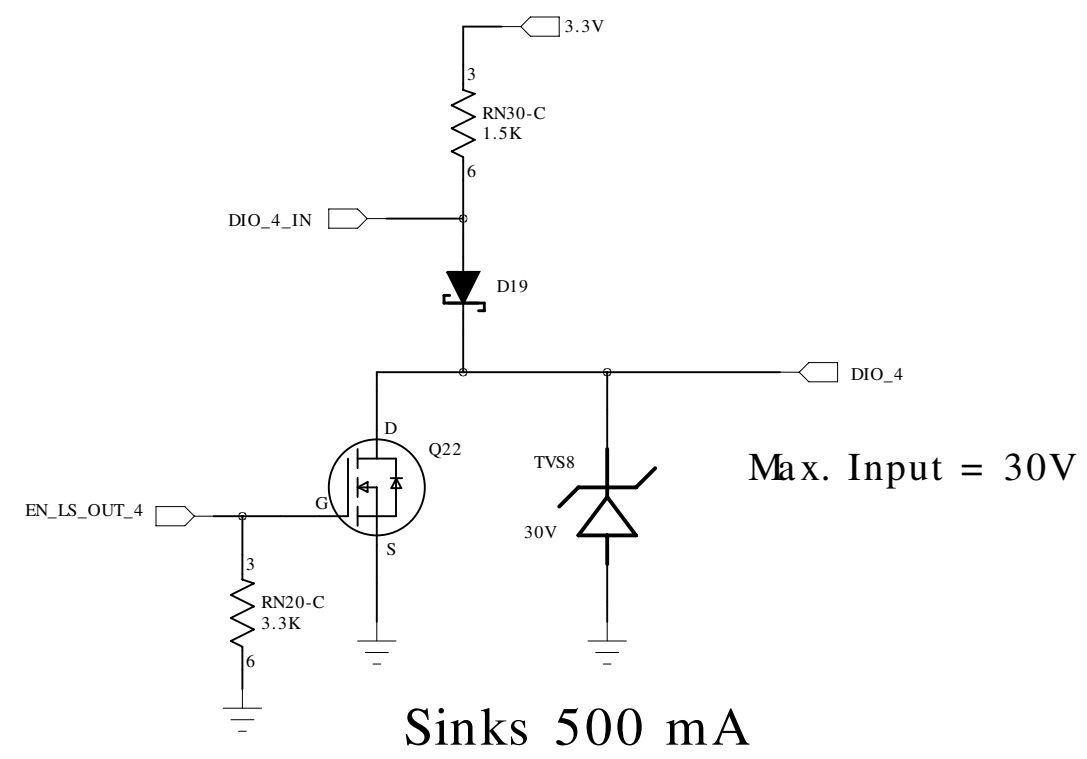
### DIO\_2



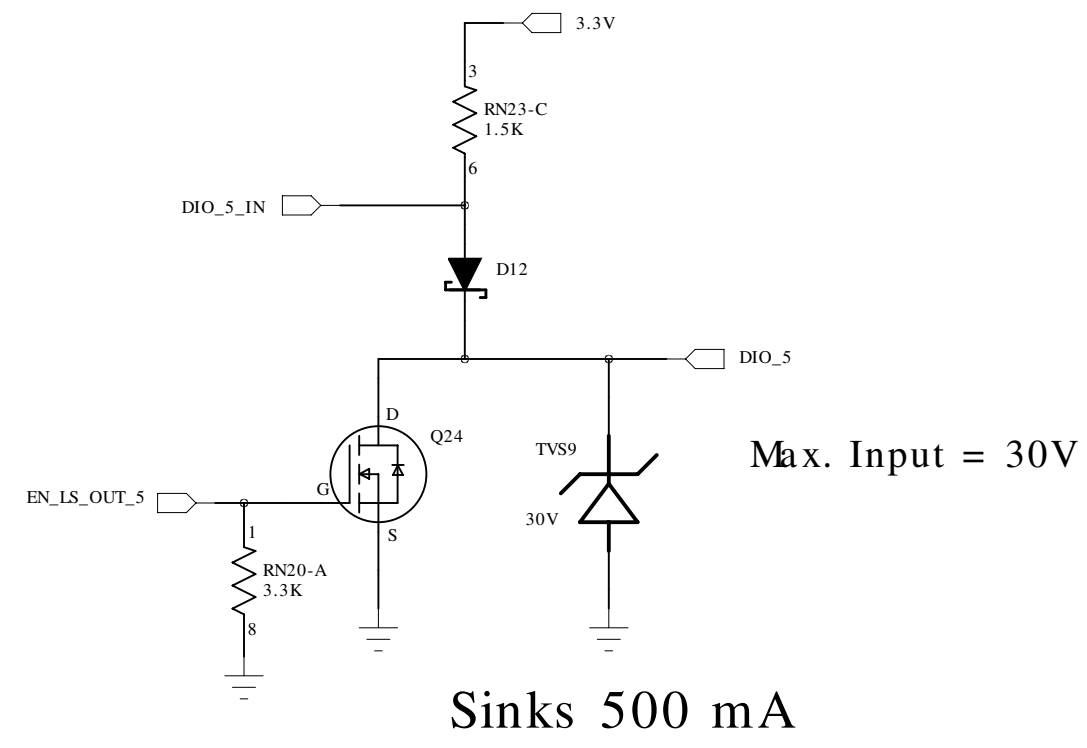
### DIO\_3



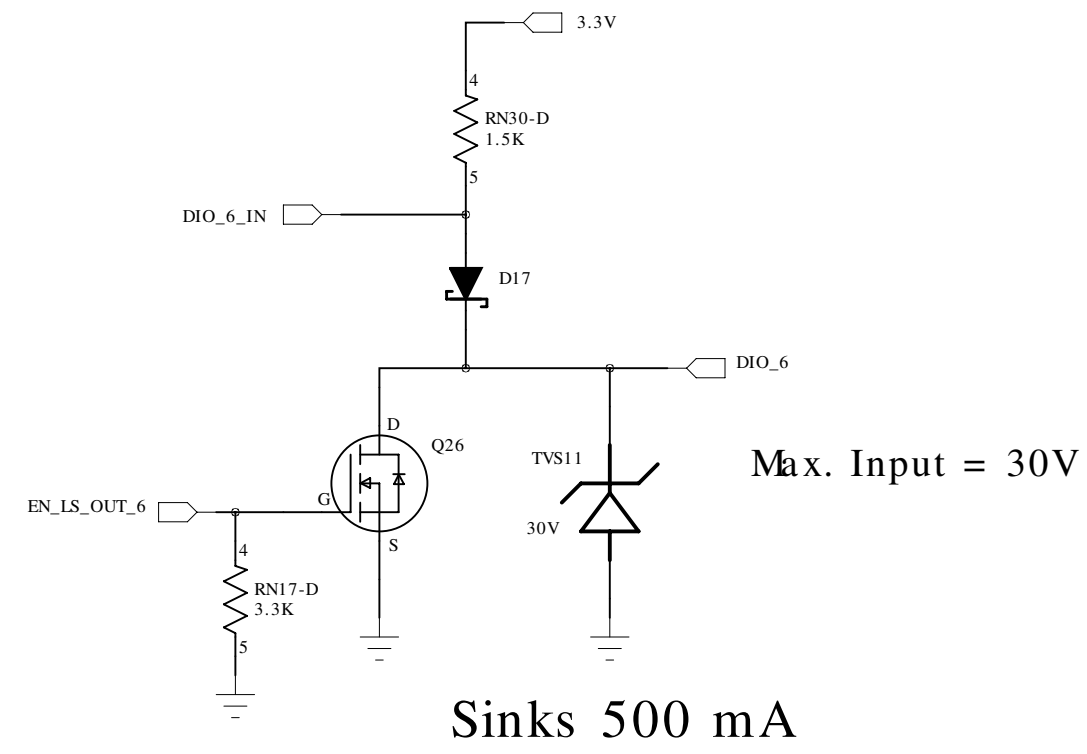
### DIO\_4



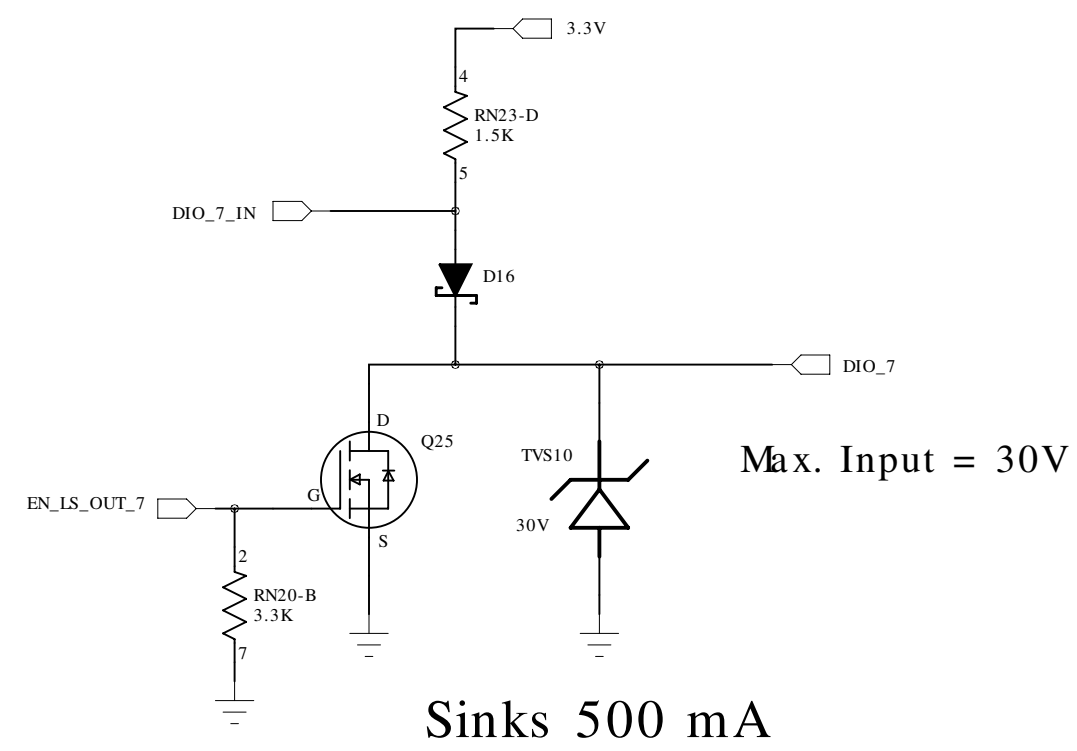
### DIO\_5



### DIO\_6



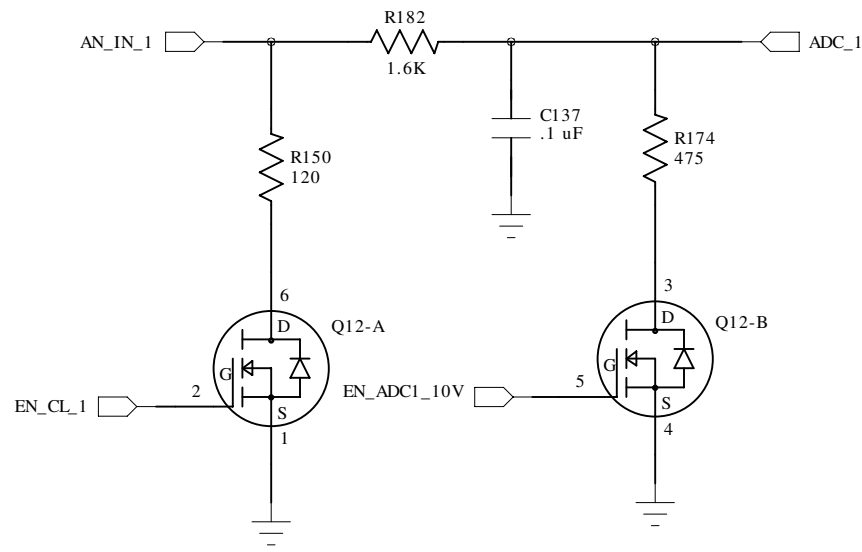
### DIO\_7



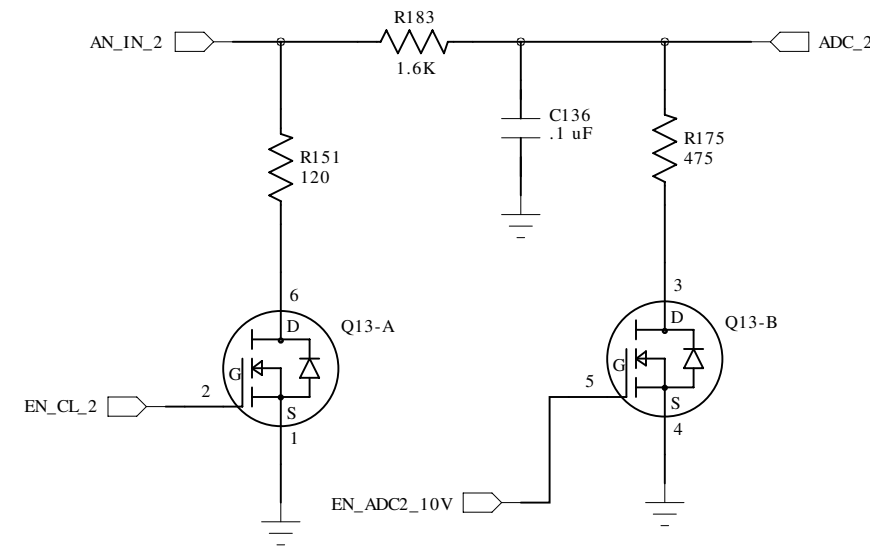
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# Analog Inputs

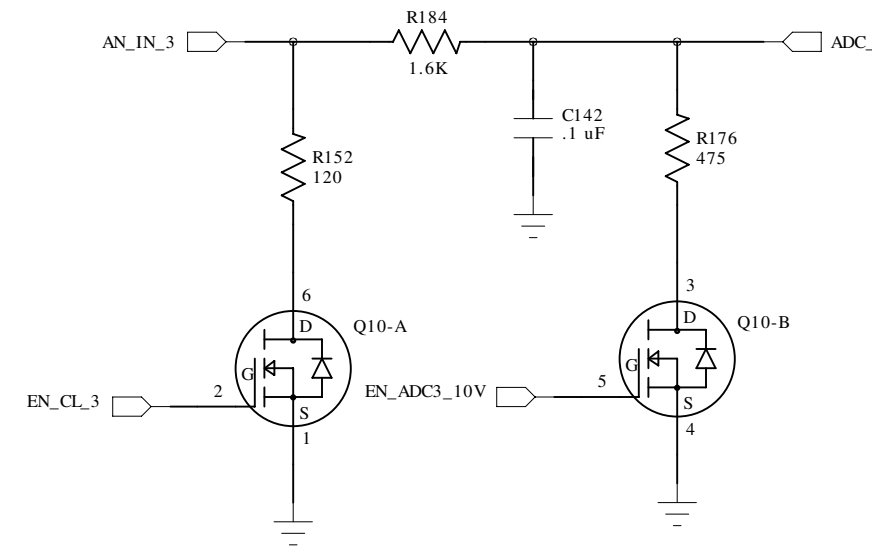
0-10.9V  
or 0-20.8 mA



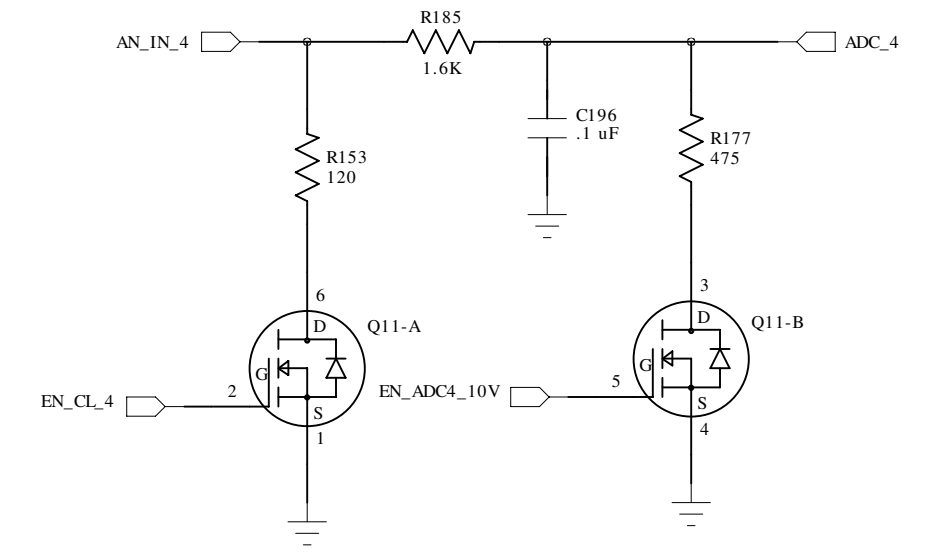
0-10.9V  
or 0-20.8 mA



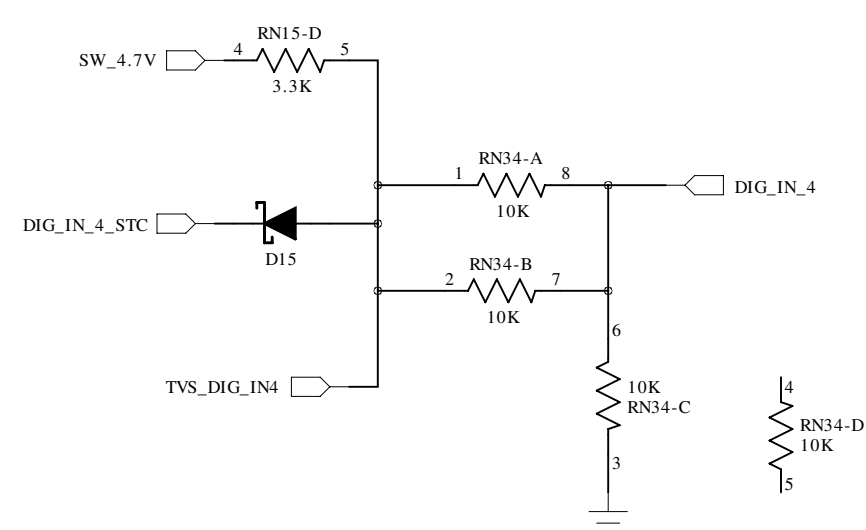
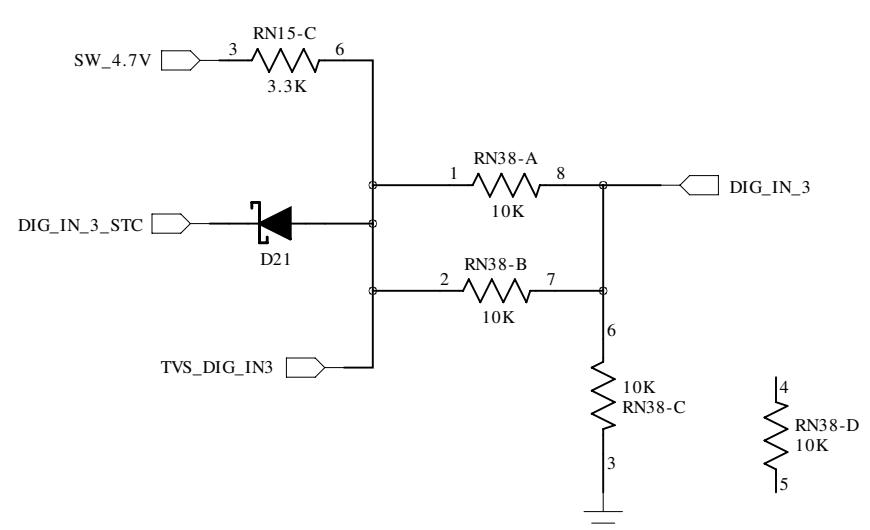
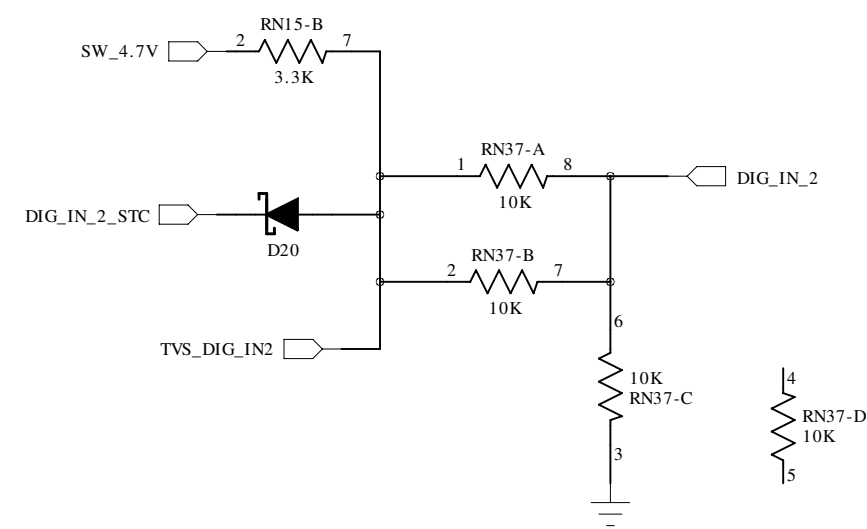
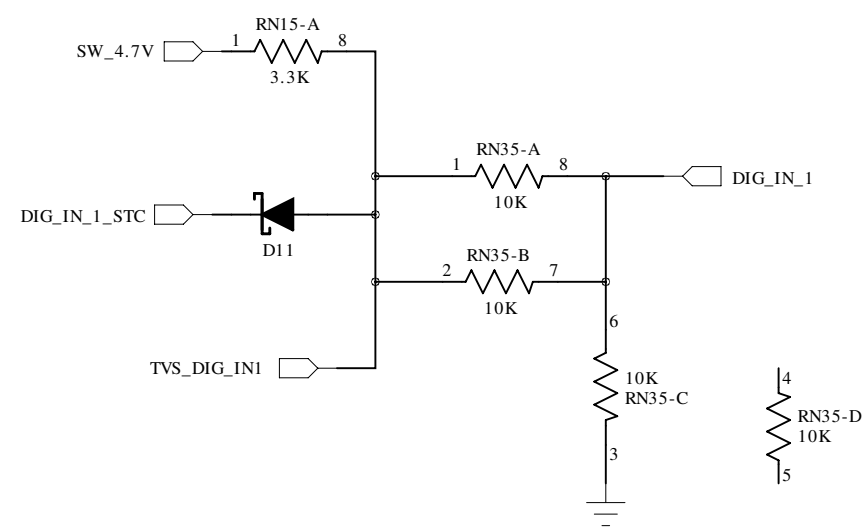
0-10.9V  
or 0-20.8 mA



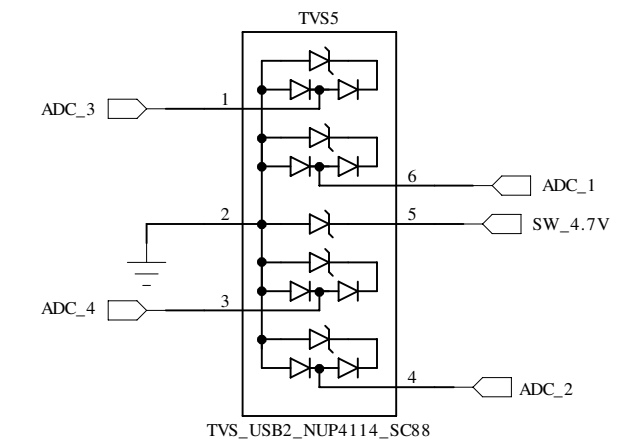
0-10.9V  
or 0-20.8 mA



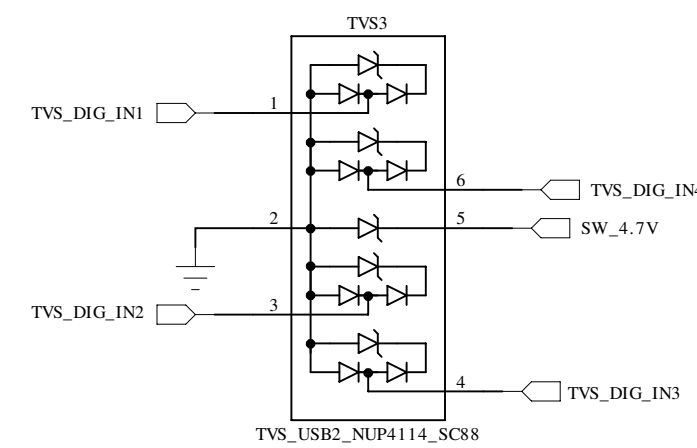
# Dig Inputs



# ADC TVS

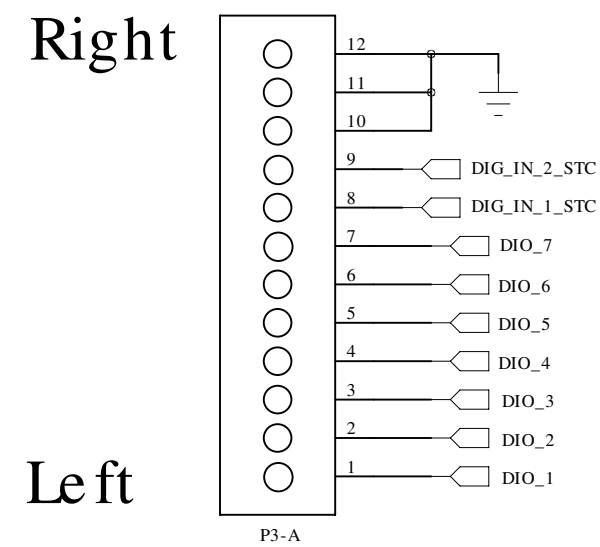


# Dig IN TVS

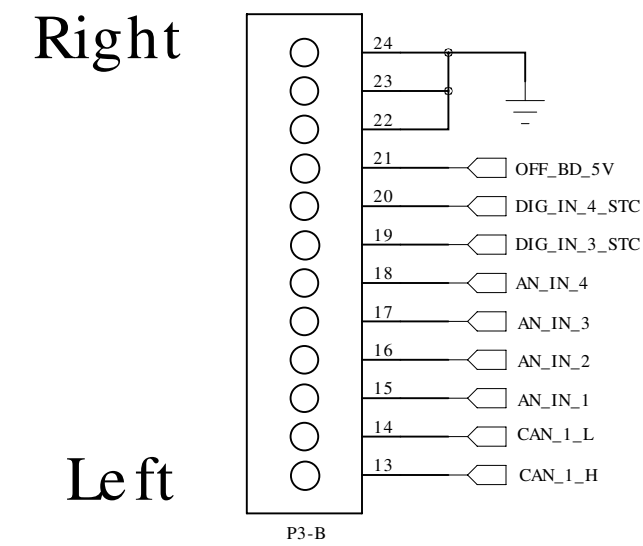


# 2 x 12 Screw Term. Positions

## Top Row

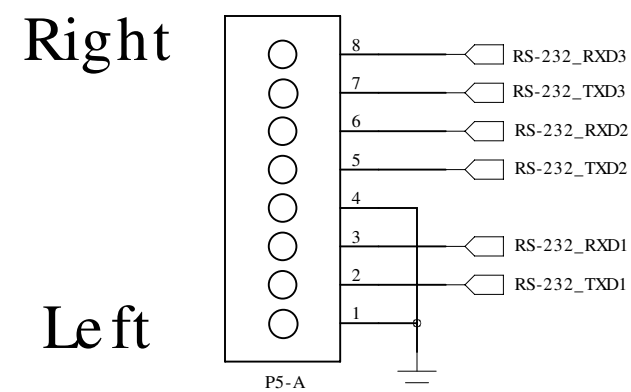


## Bottom Row

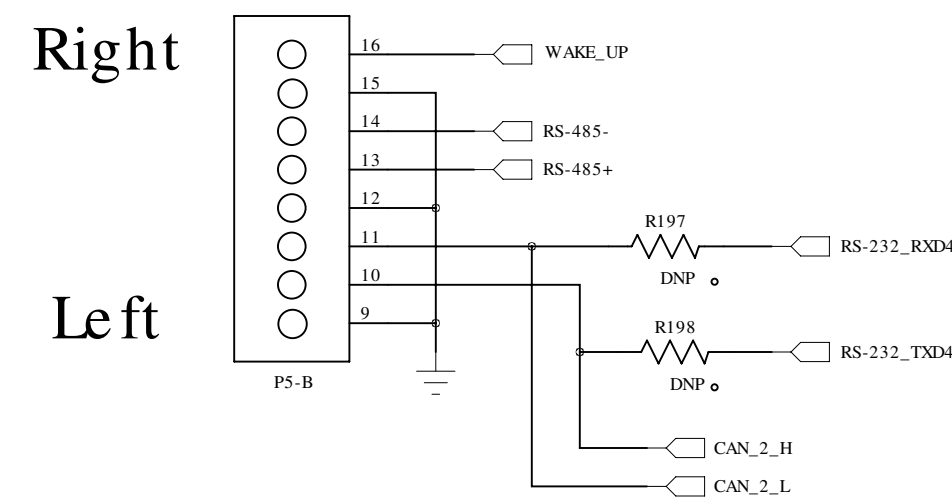


# 2 x 8 Screw Term.

## Top Row



## Bottom Row



When 10 ohm resistors populated  
CAN parts depopulated