Standard Options

XOPP1 NC 1 ASSEMBLY_OPTIONS

NC 1 PCB_99

Option 1 TS-7120-PROTO NXP i.MX6UL 695MHz ARM A7, Prototype, (-40 to 85C)

Optional Components/Features Summary

OBD-II Option:

Requires parts on Page 30 of schematic

ADD: CN9, U57, U60

REMOVE: CN17

Web Schematic: Some proprietary information has been withheld.

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6UL Serial Ports

All 4 RS-232 levels

Mikro Bus UART

FPGA Serial Ports

Nimbelink with Flow Contrl

Two 485 ports with TX_EN

DMX port - bastard format

GPS UART

OBD-II UART

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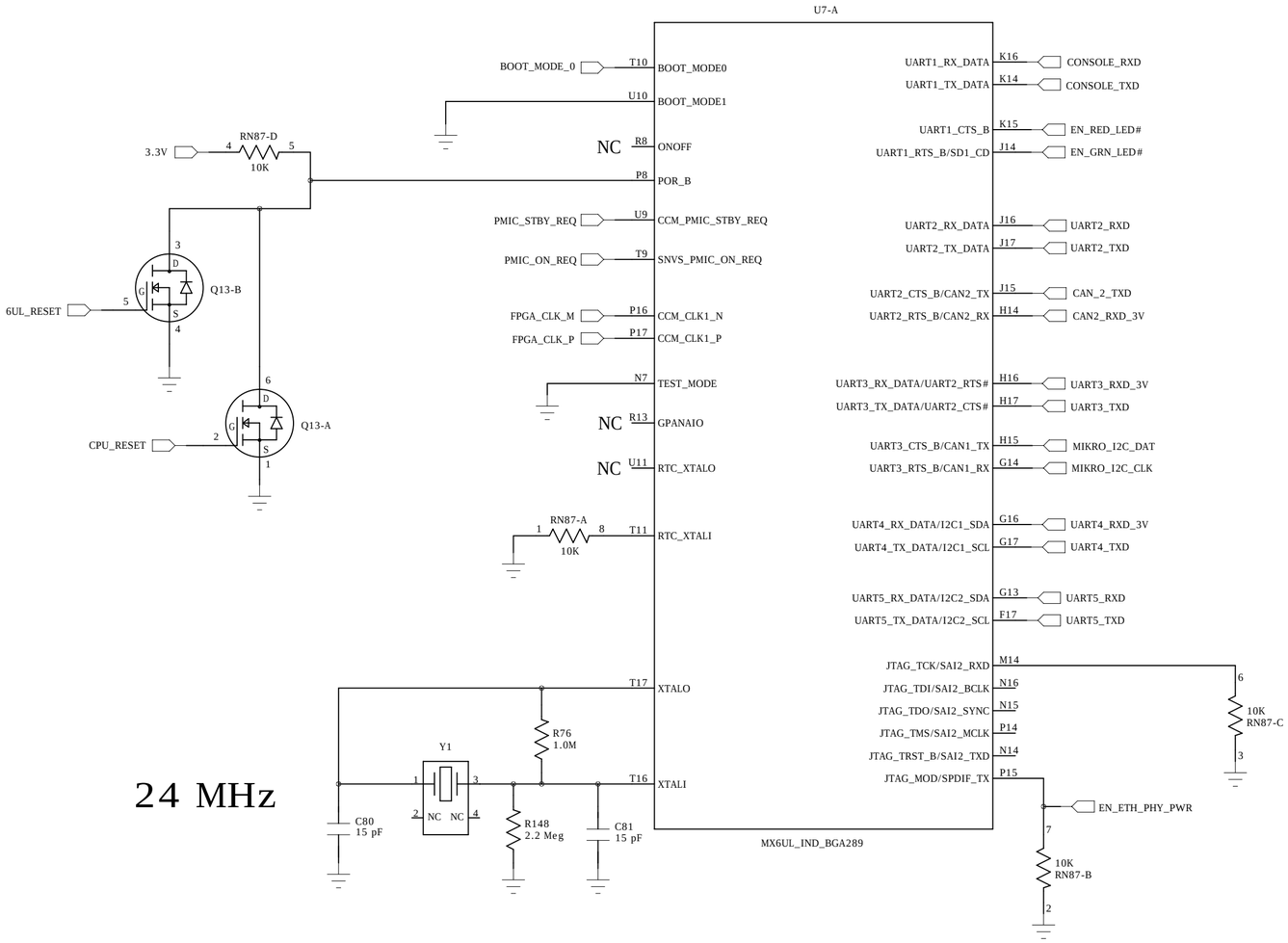
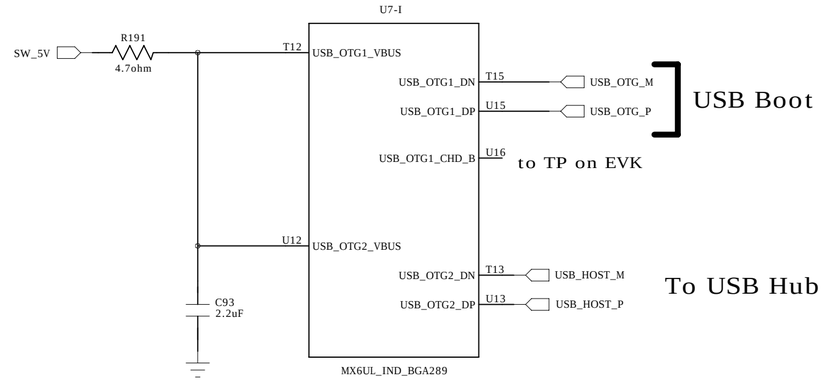
6UL UART and Control

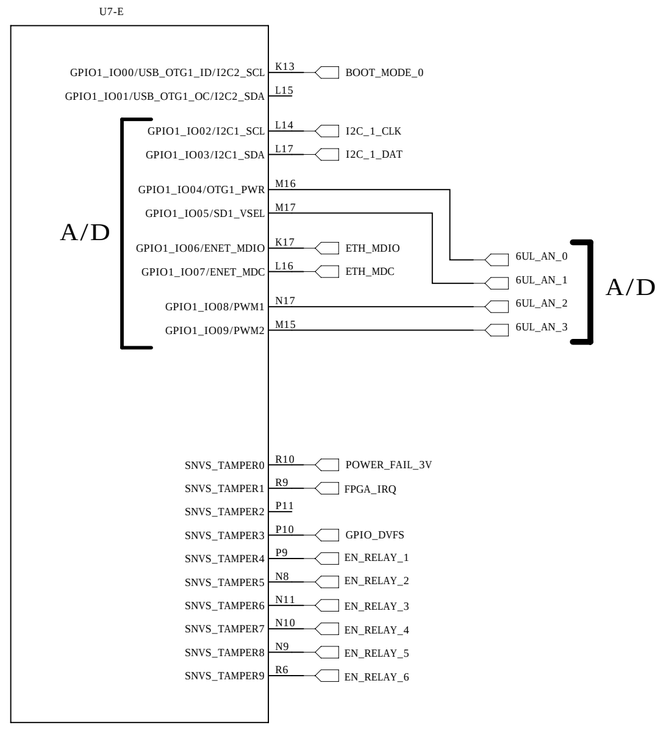


24 MHz

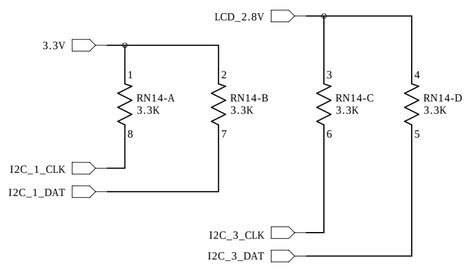
6UL USB Ports



6UL DIO



I2C PU Res.



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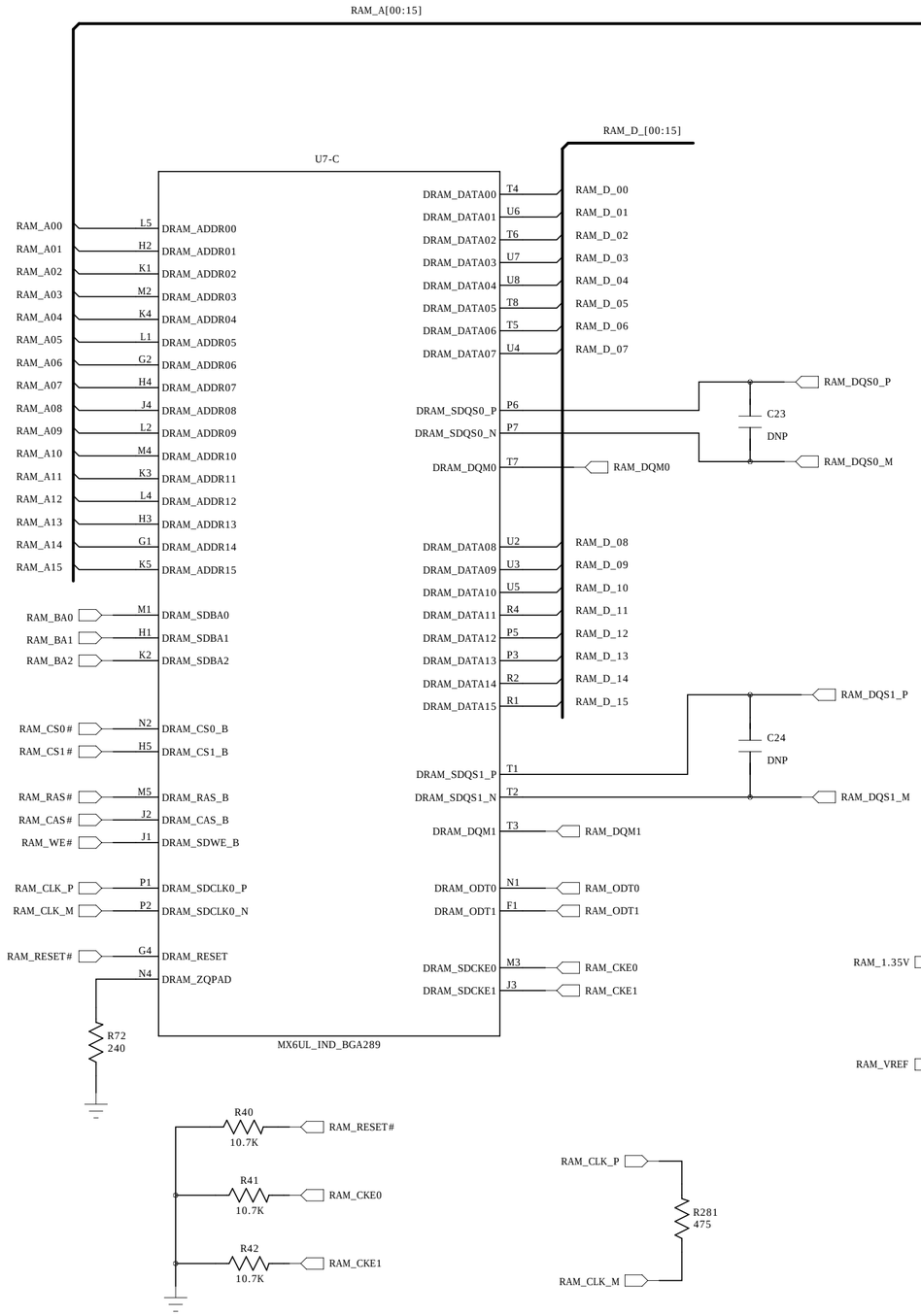
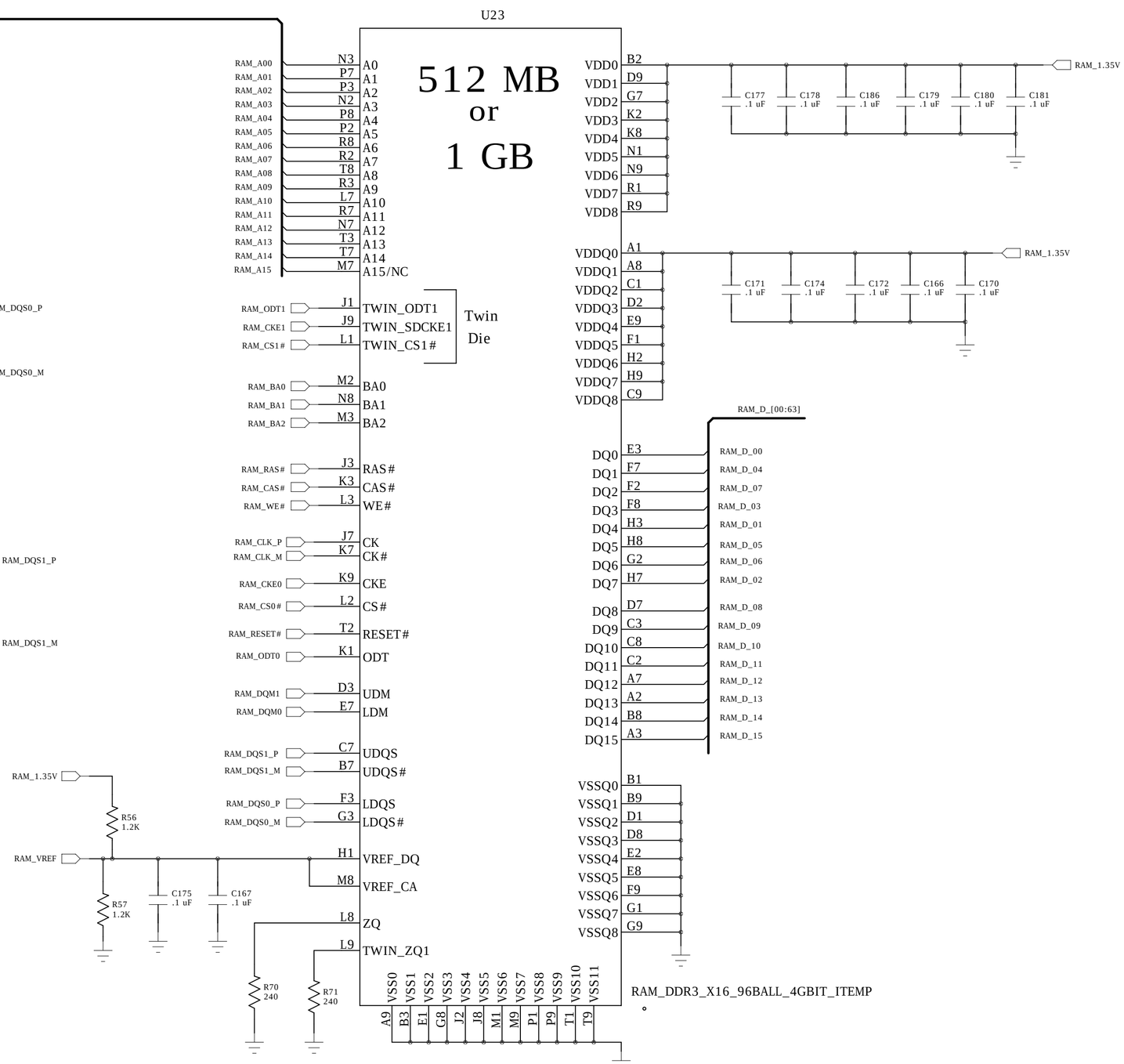
6UL RAM Interface



DDR3 RAM



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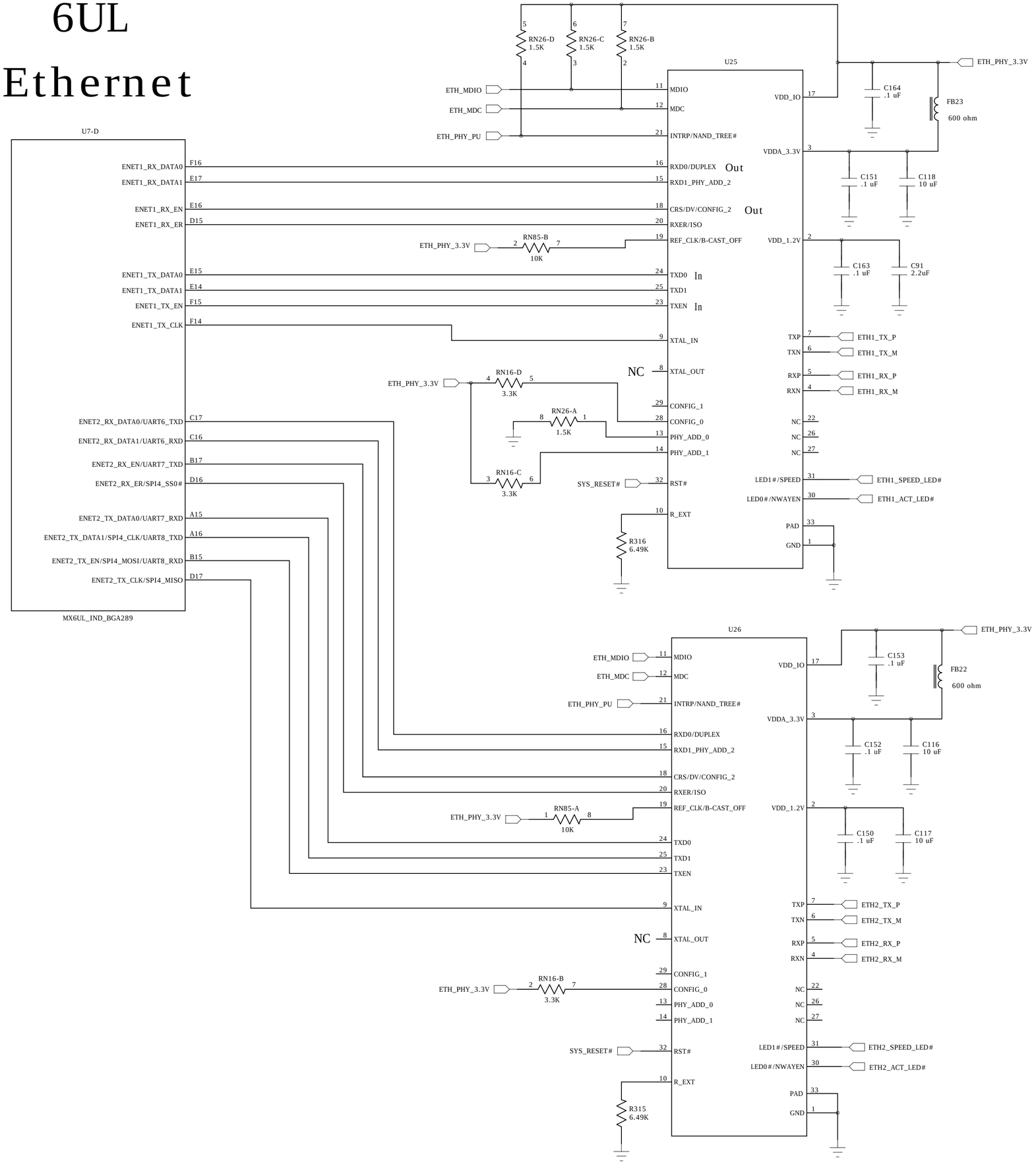
6UL Ethernet



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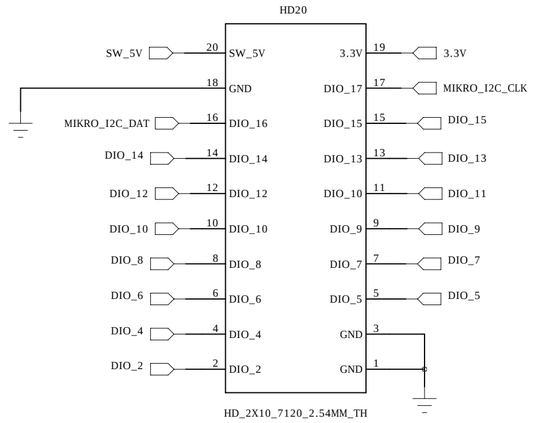
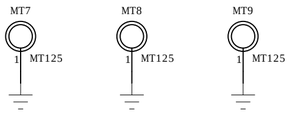
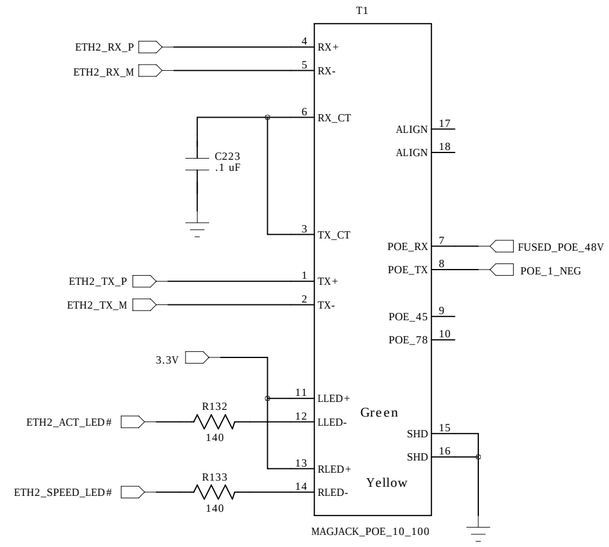
Daughter Card Interface

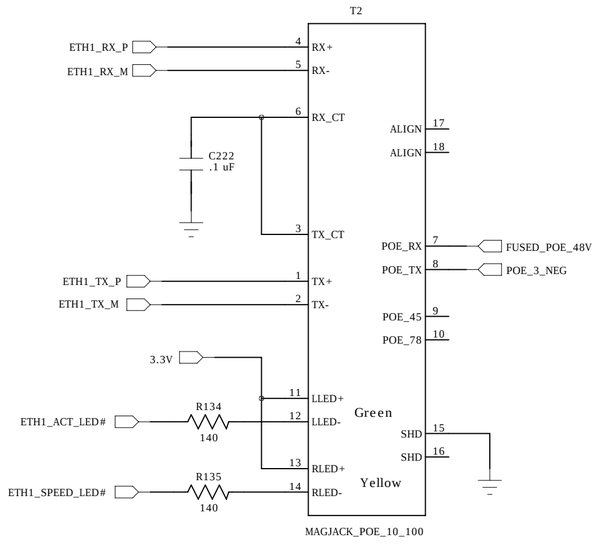




10/100 MagJack



10/100 MagJack



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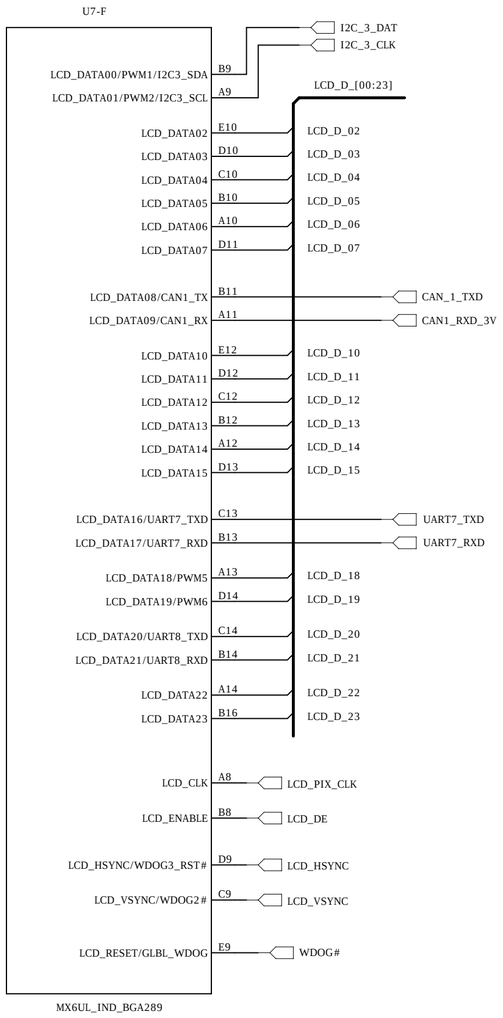
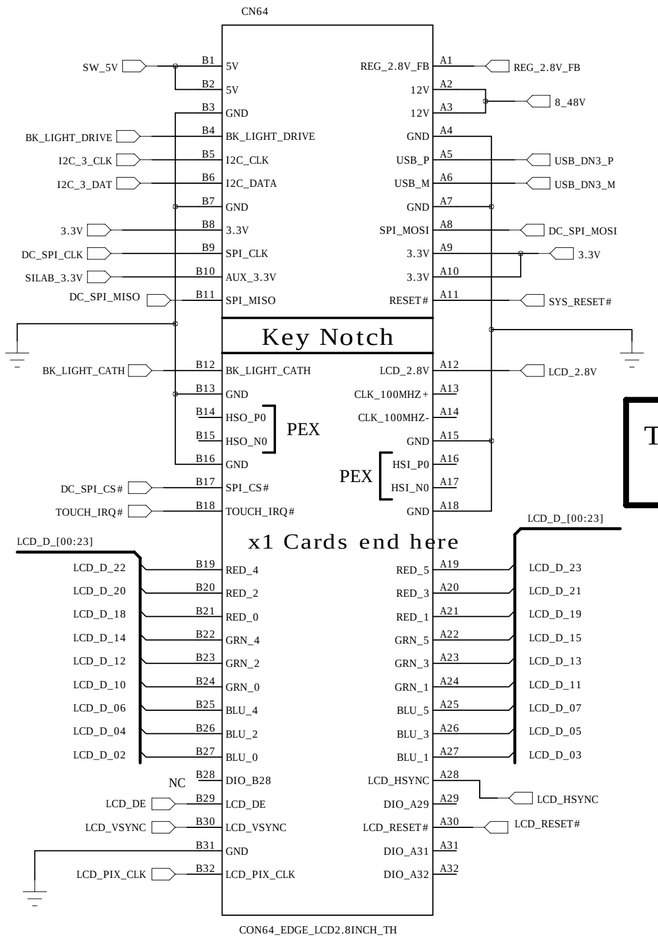
6UL LCD



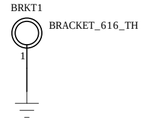
Daughter Card Conn.



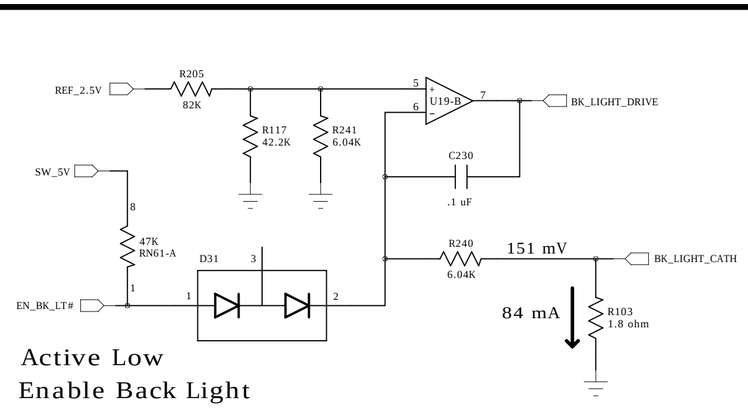
9 GND
9 Power
6 Rsvd for PEX
2 for I2C
2 for USB
4 for SPI Bus
2 for Reset and IRQ
2 for LCD Backlight
1 2.8V_FB
27 for FPGA DIO

Tianma 2.8 inch LCD

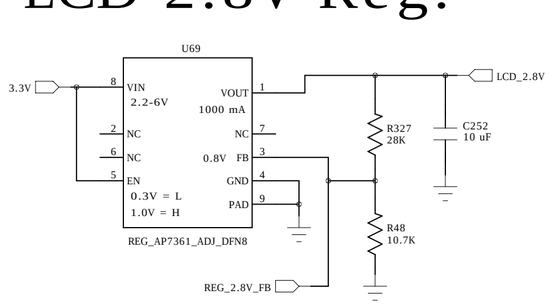
Daughter Bd Bracket

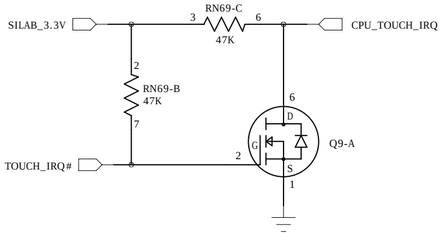


2.8 inch LCD Back Light Driver



LCD 2.8V Reg.





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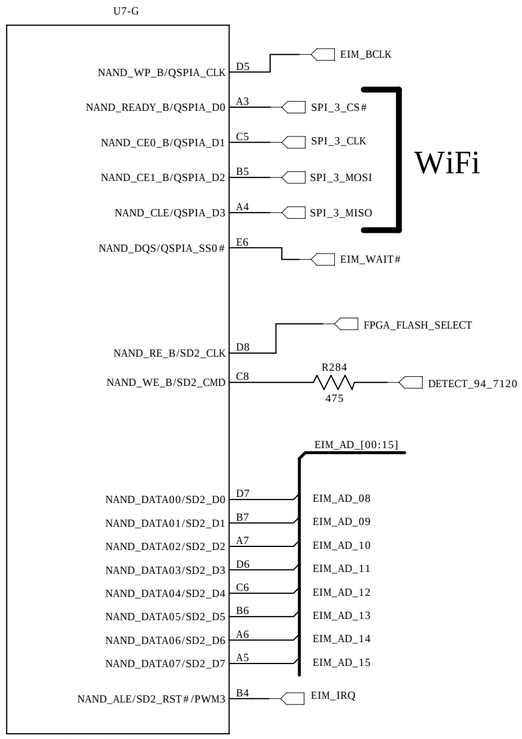
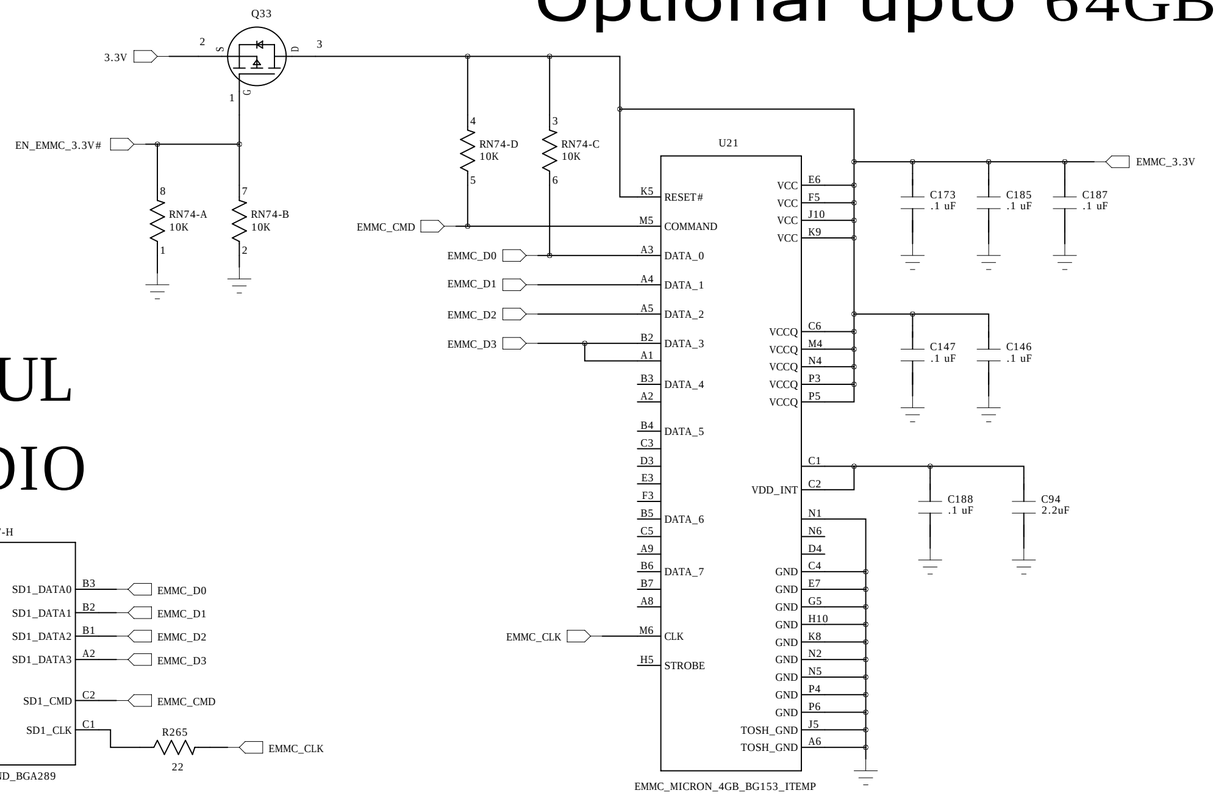
6UL EIM

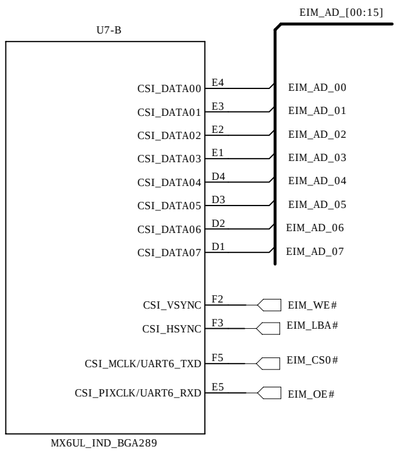


eMMC 4GB
Optional upto 64GB



6UL SDIO

6UL EIM



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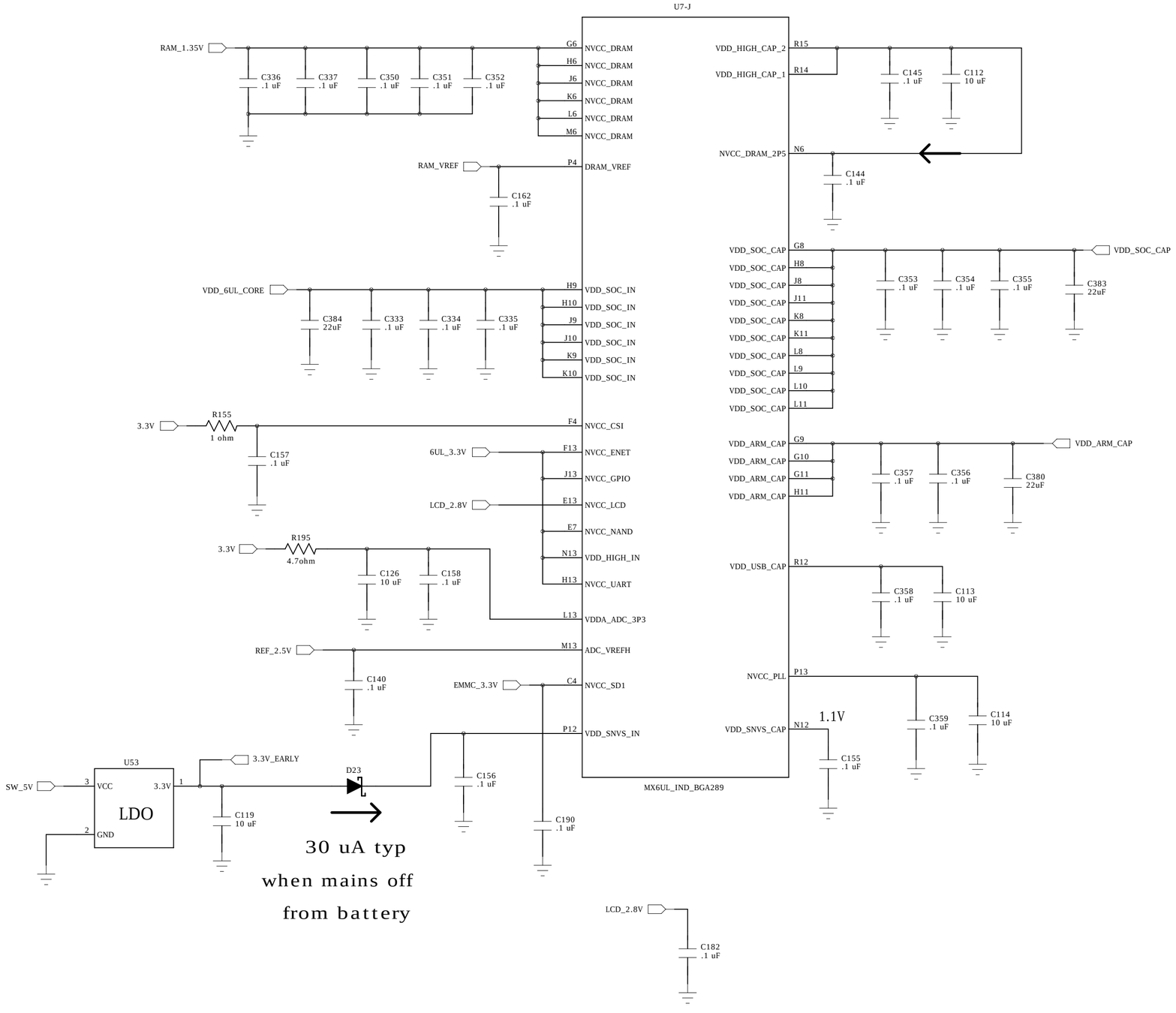
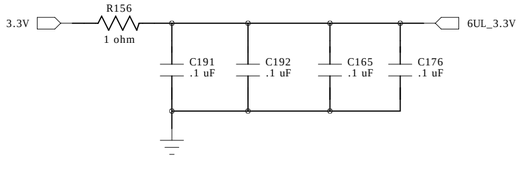
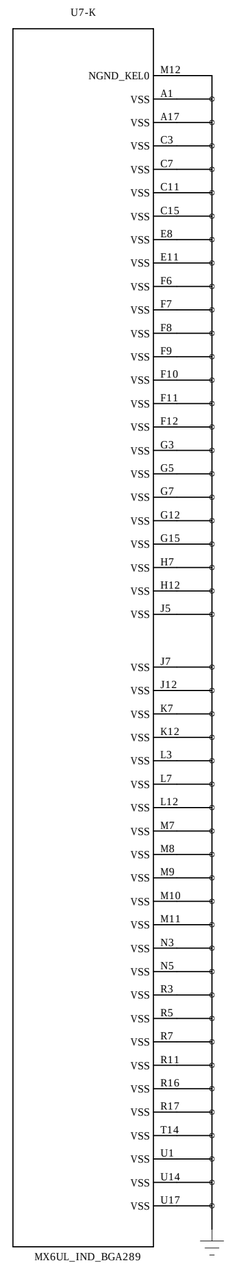
6UL Power





6UL GND



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3.3V 2A Reg #1

SW_5V

3.3V

CPU Core 1A Reg #2

SW_5V

VDD_6UL_CORE

RAM 1.35V 1A Reg #2

SW_5V

RAM_1.35V

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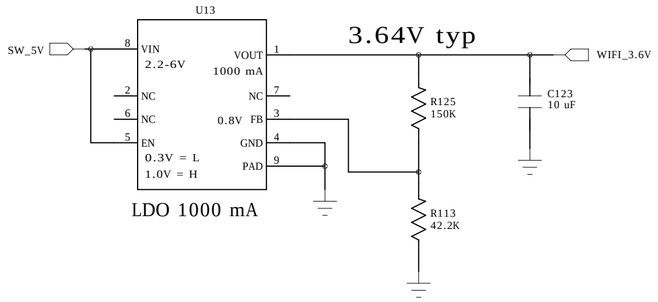
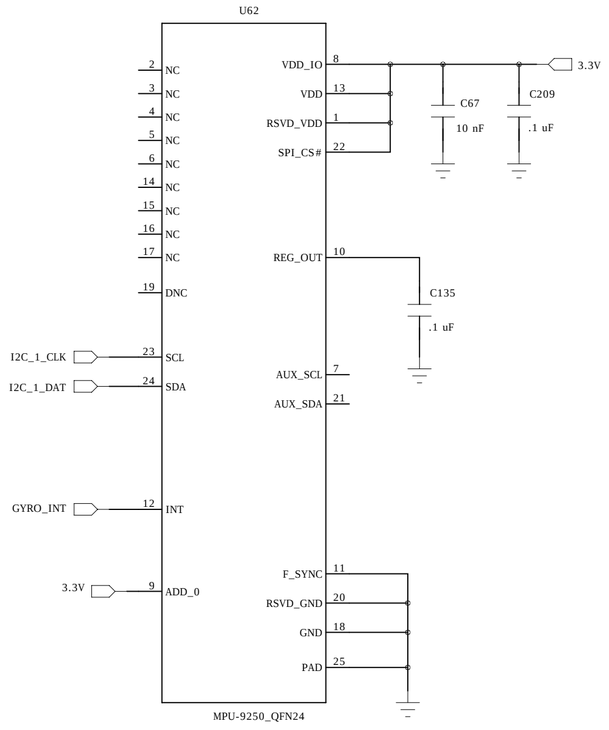
WiFi

WiFi 3.6V Regulator

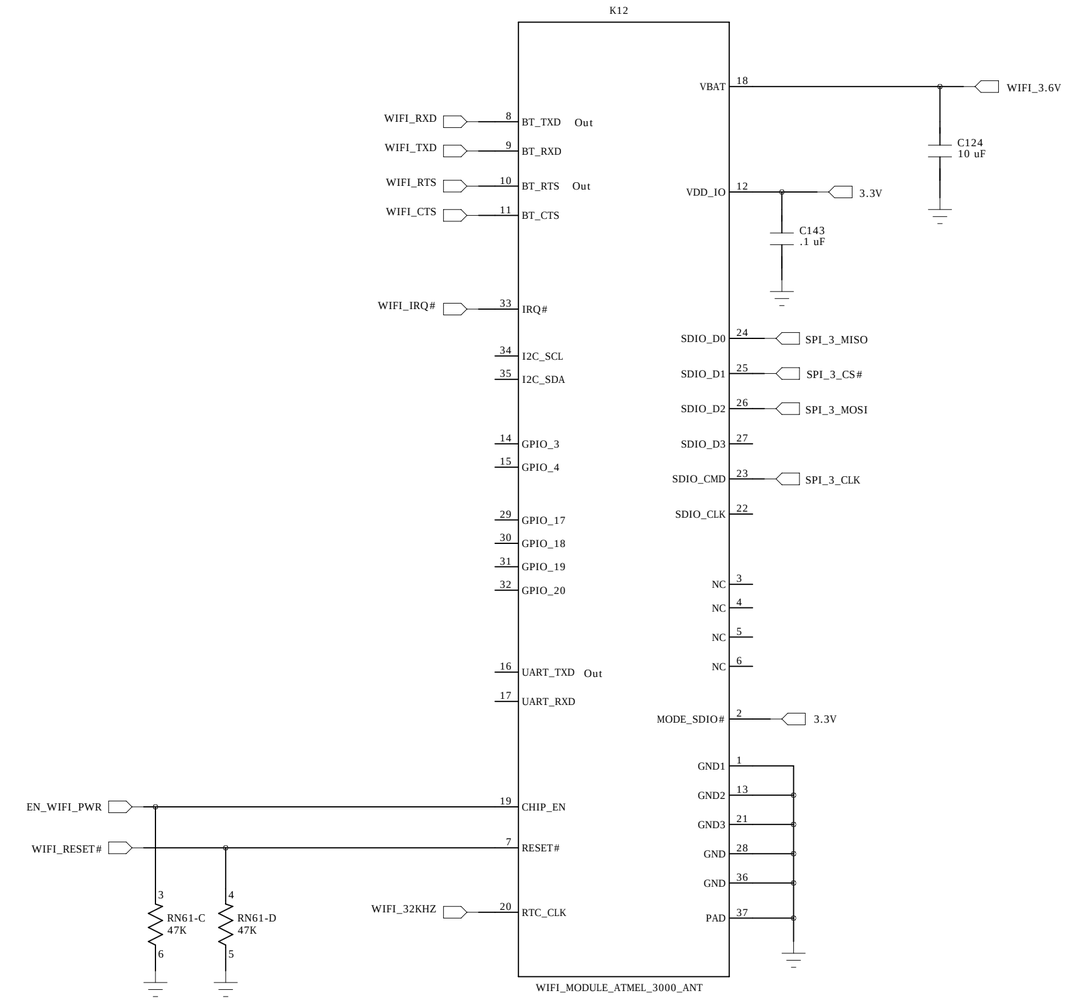


Gyro-Accelerometer



Option 2 =

WiFi / Blutooth Radio Module



Option 1 =

Option 3 =

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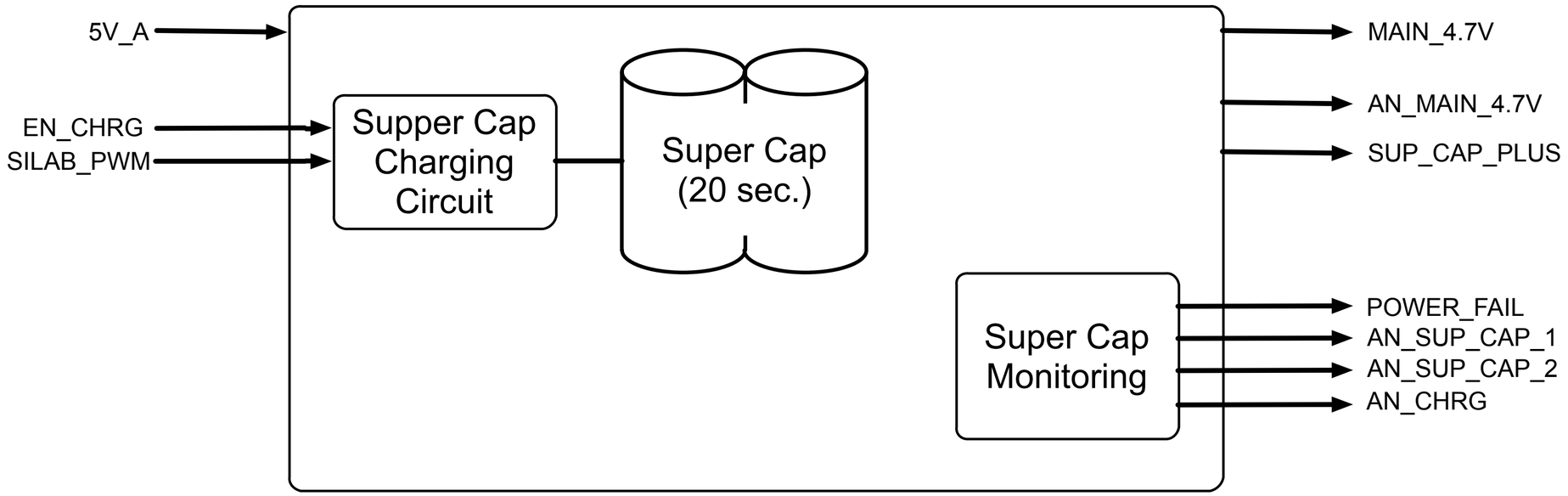
SuperCap 20 Second Power Hold



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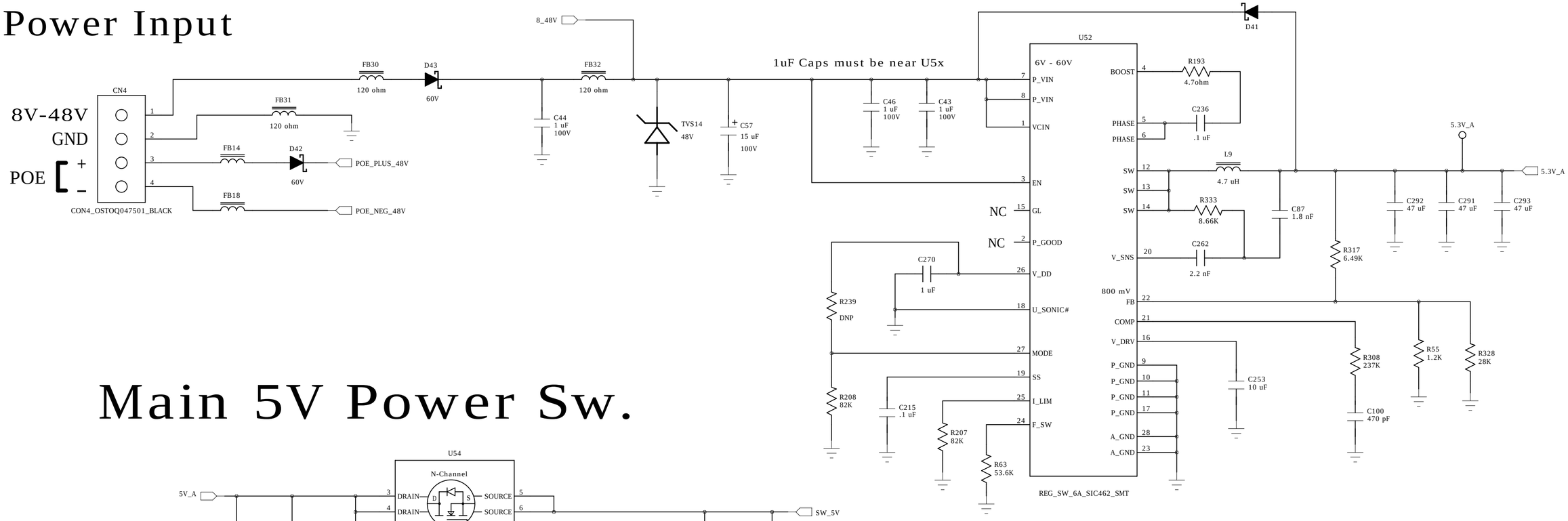
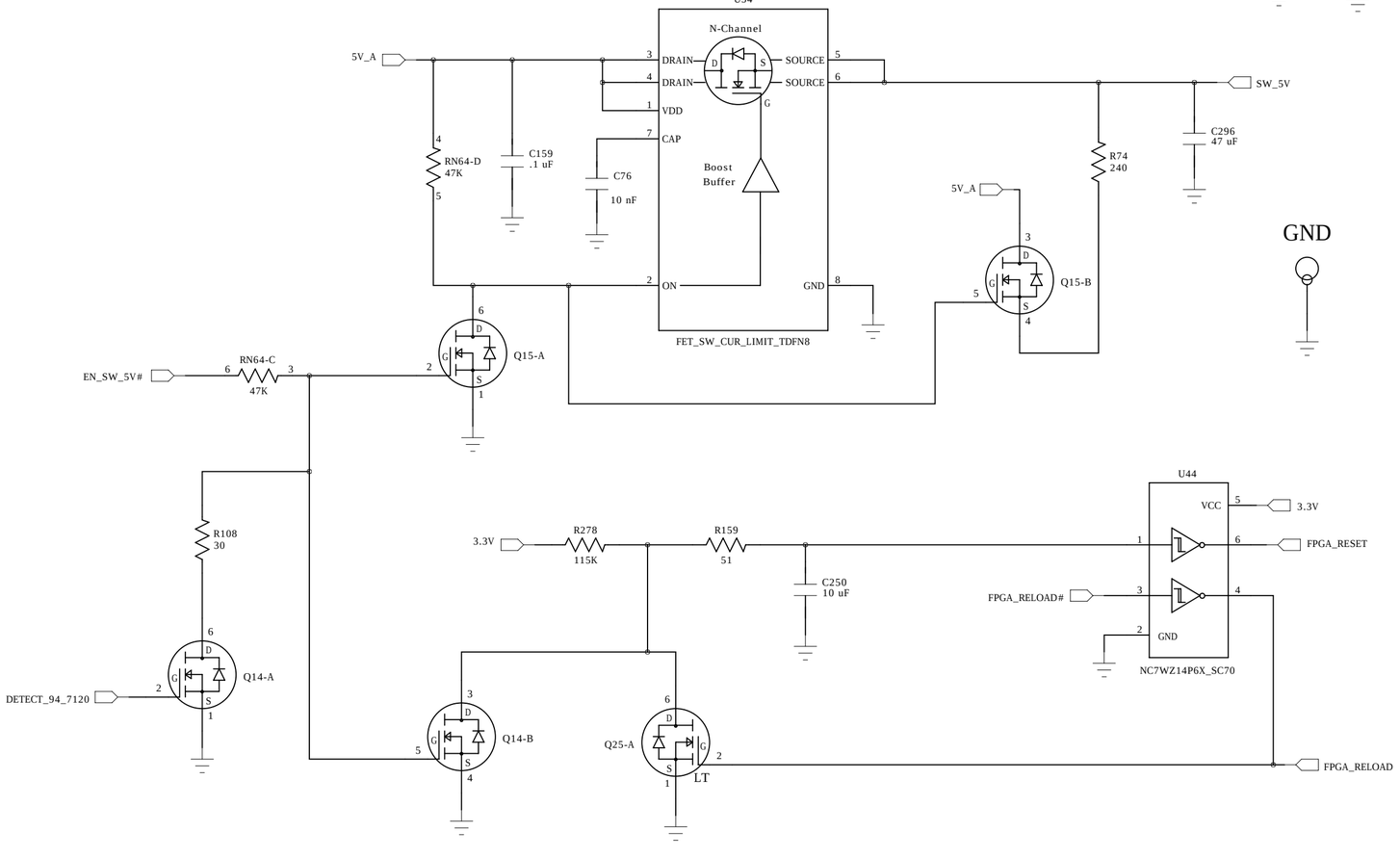
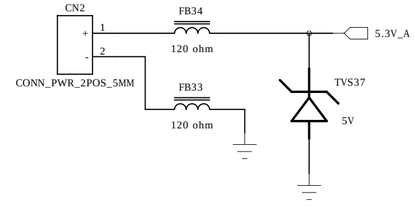
Power Input



Main 5V Power Sw.



5V Power Input



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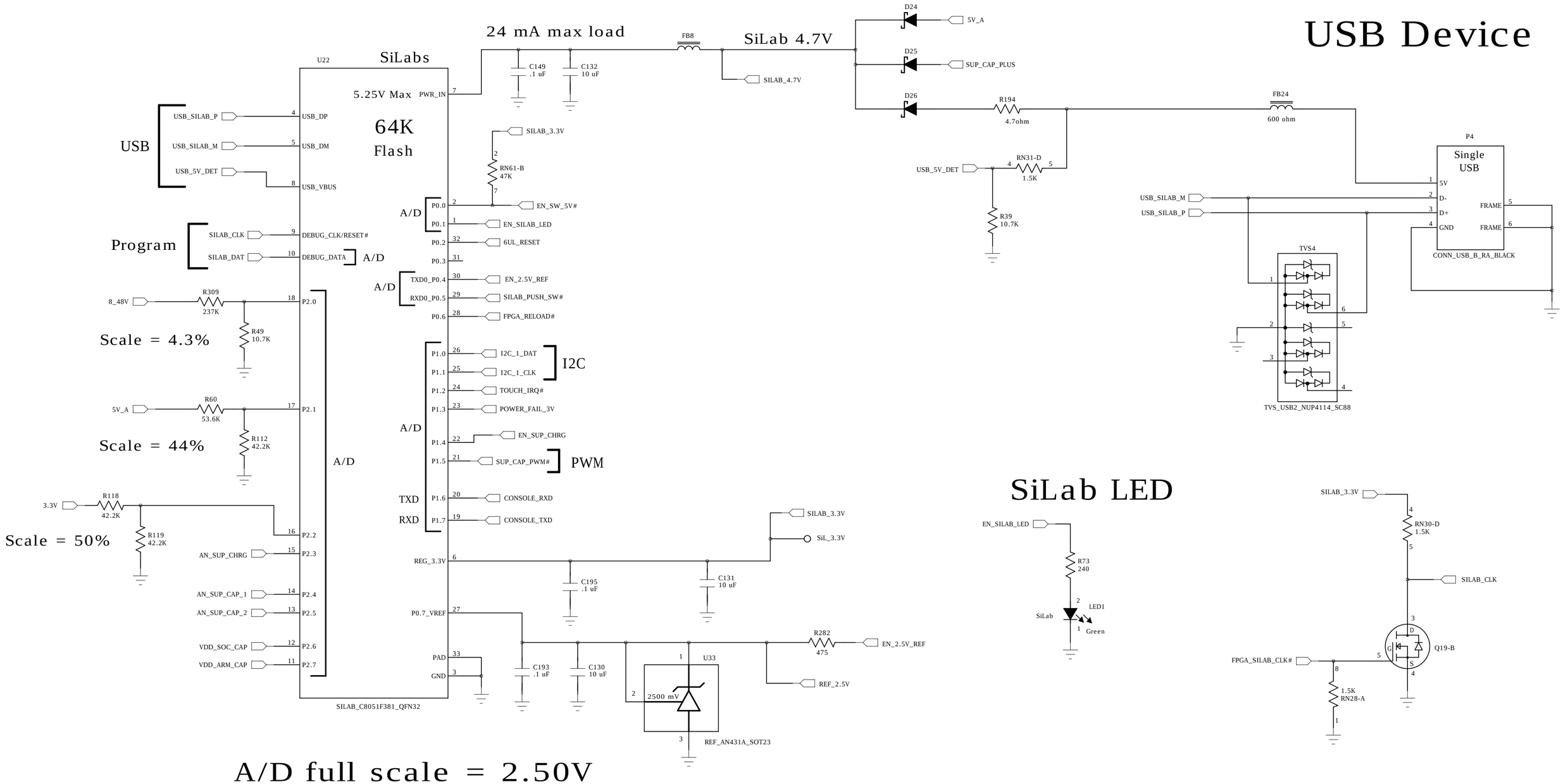
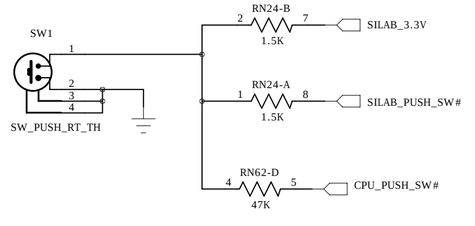
USB Device Port and SiLab uC



SiLab LED

Push Switch



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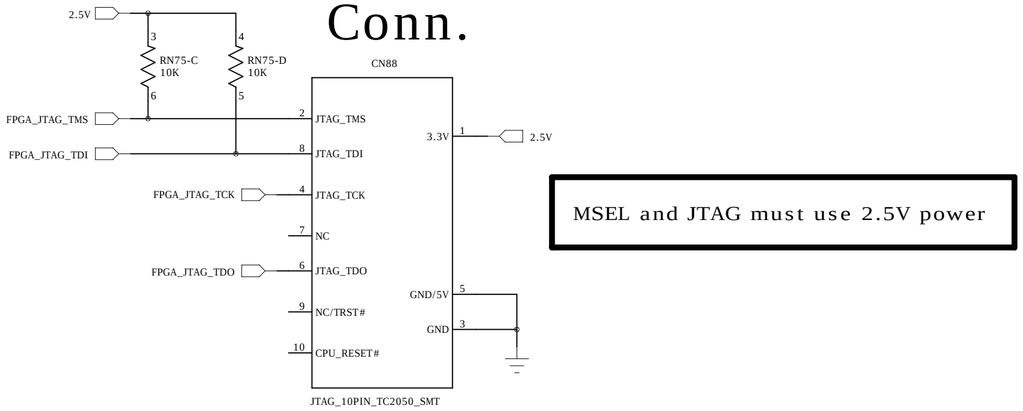
FPGA JTAG Conn.



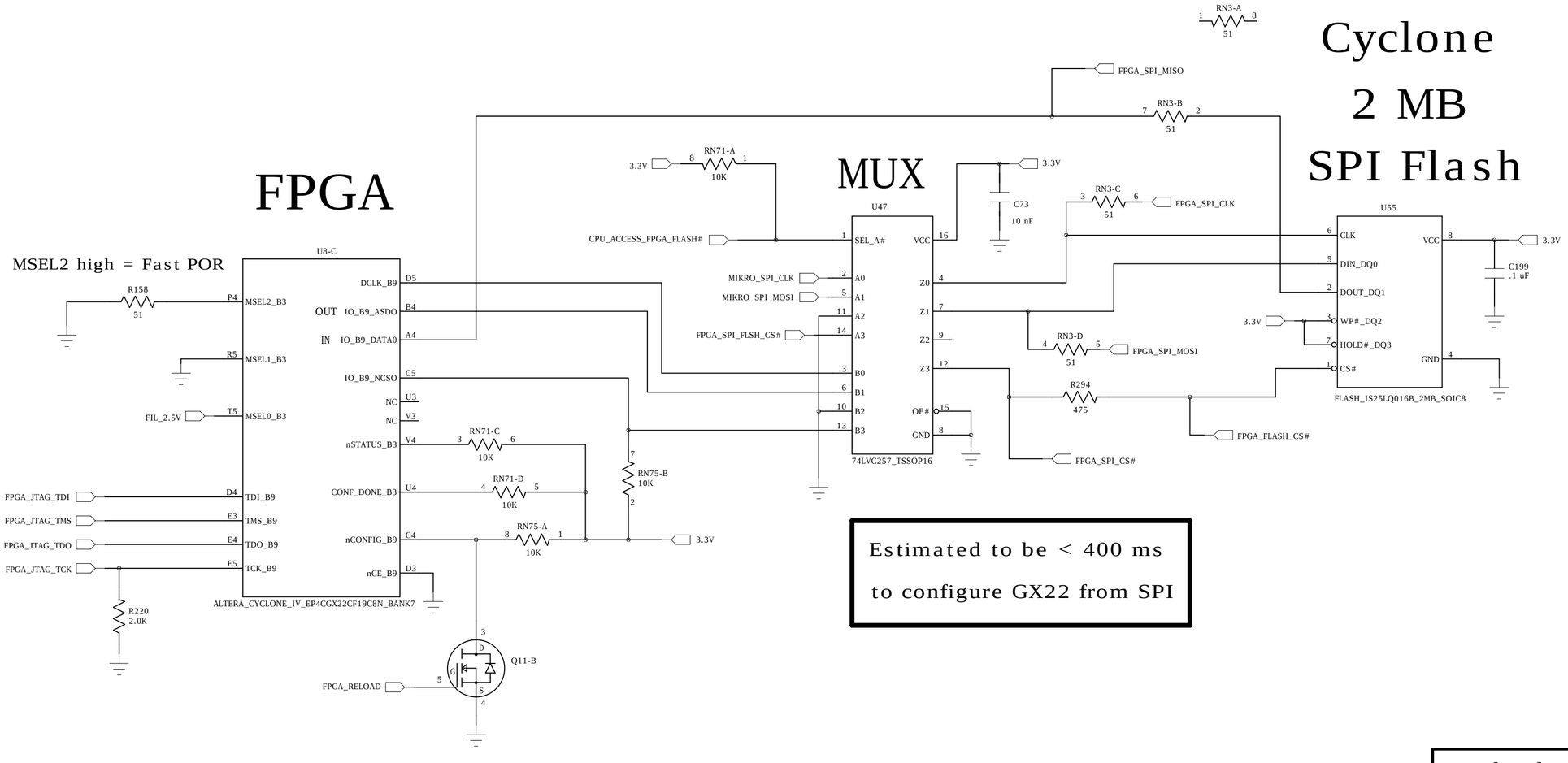
MSEL and JTAG must use 2.5V power

Tag-Connect

Cyclone 2 MB SPI Flash

FPGA

MUX



Estimated to be < 400 ms to configure GX22 from SPI

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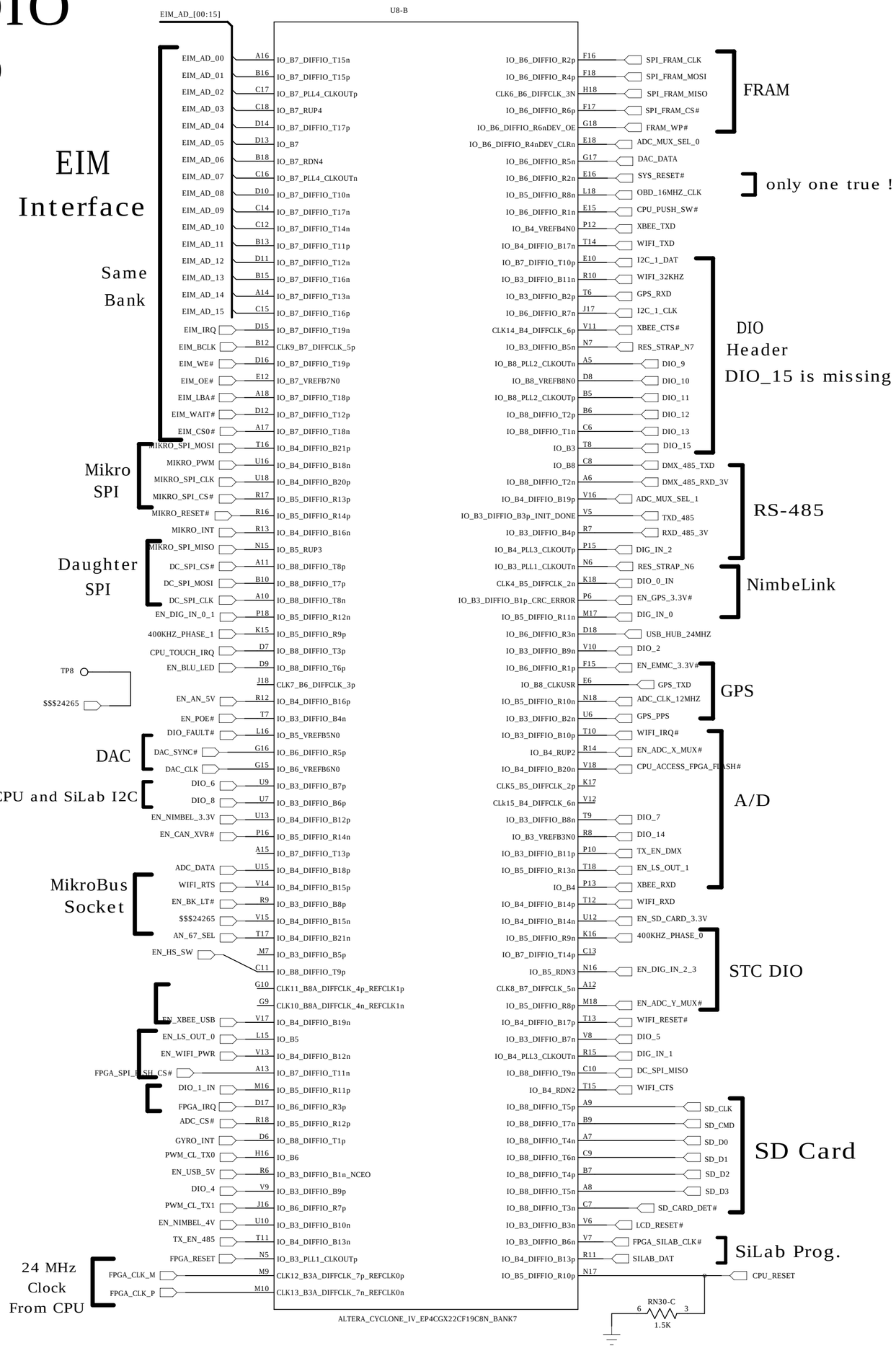
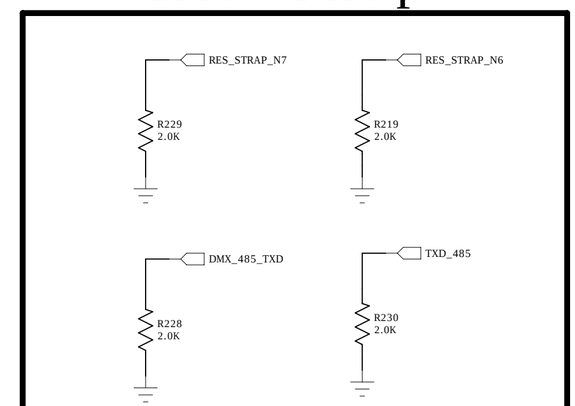
FPGA DIO

147 DIO



Res. Straps



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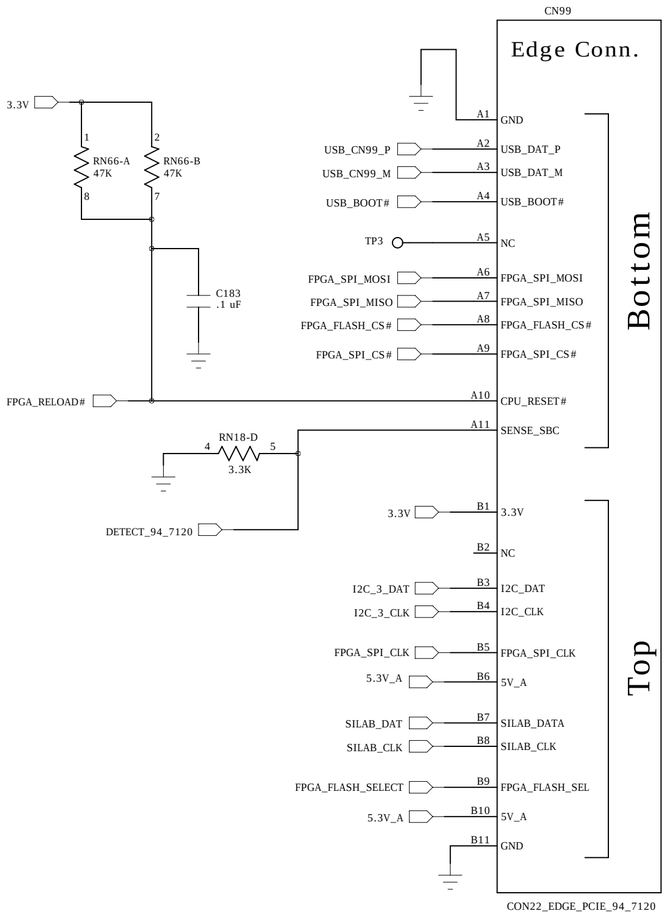
FPGA Stuff

CN99

Factory Programing Interface



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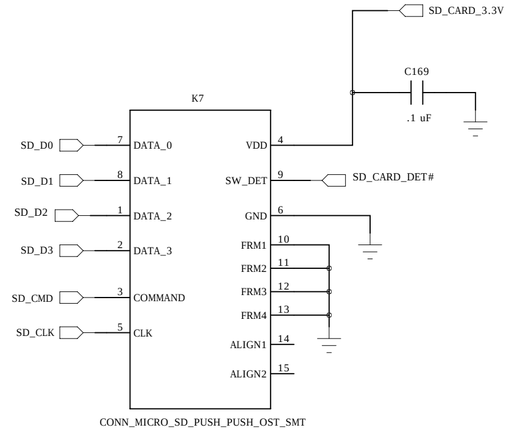
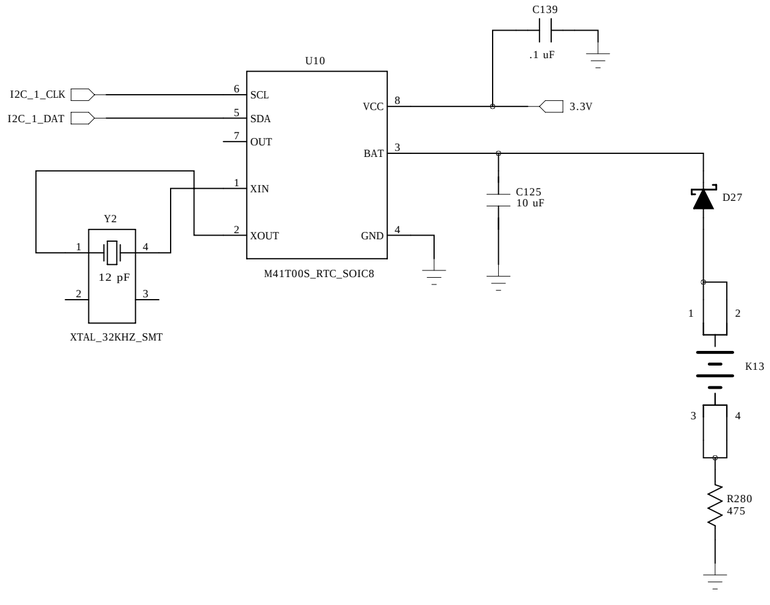
Push-Push
Micro SD Card Socket



ST Micro RTC



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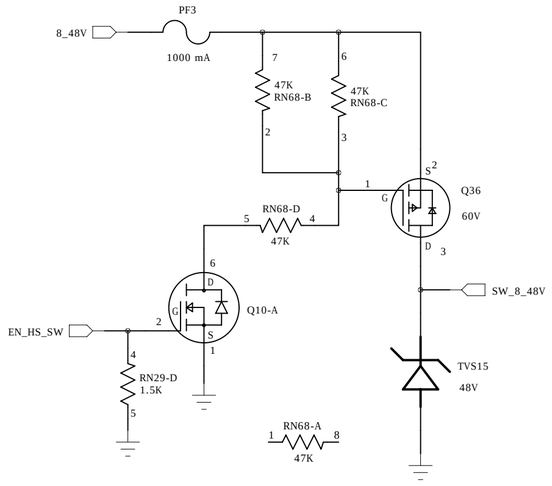
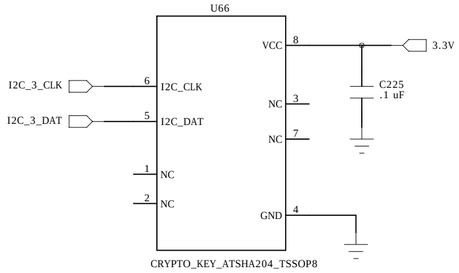
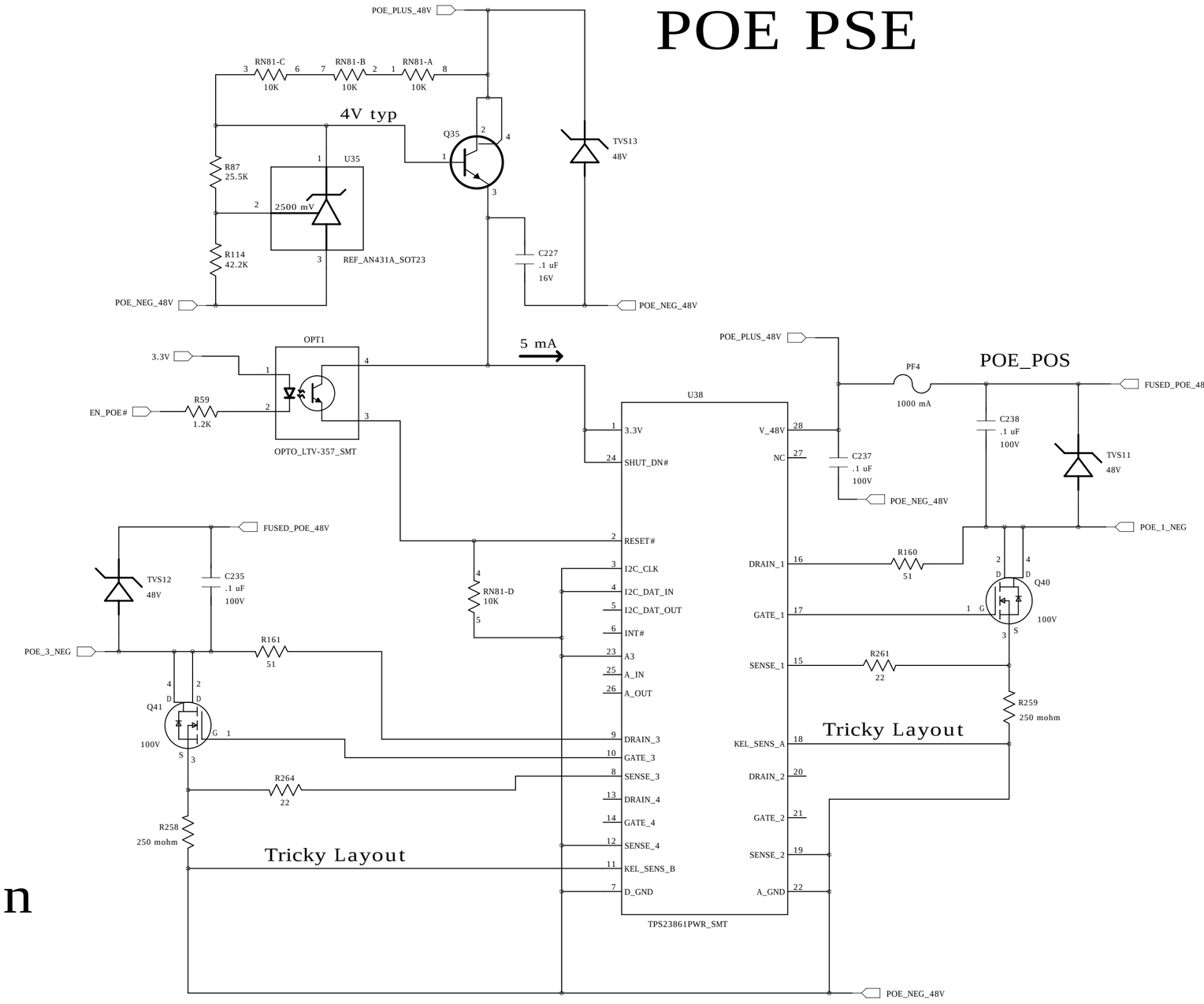
STC High-Side Switch



Crypto Authentication



POE PSE



GND

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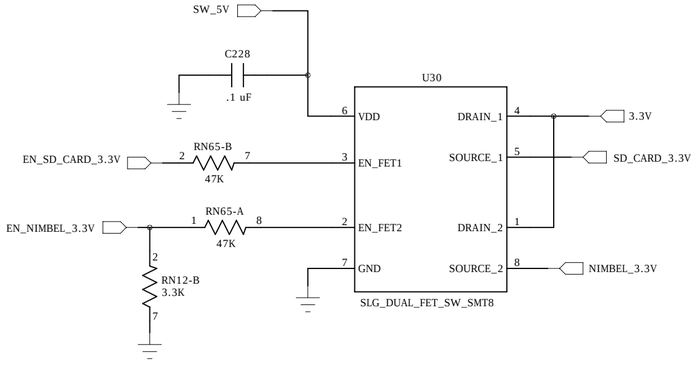
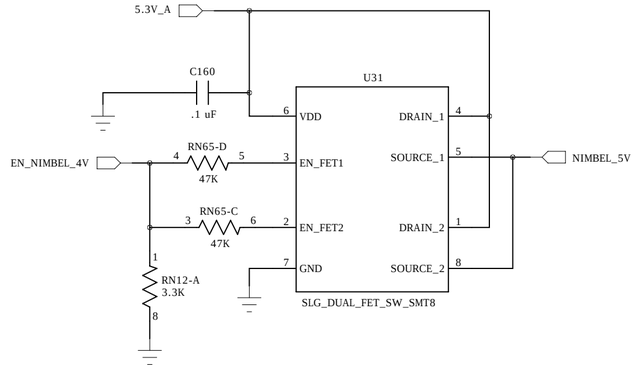
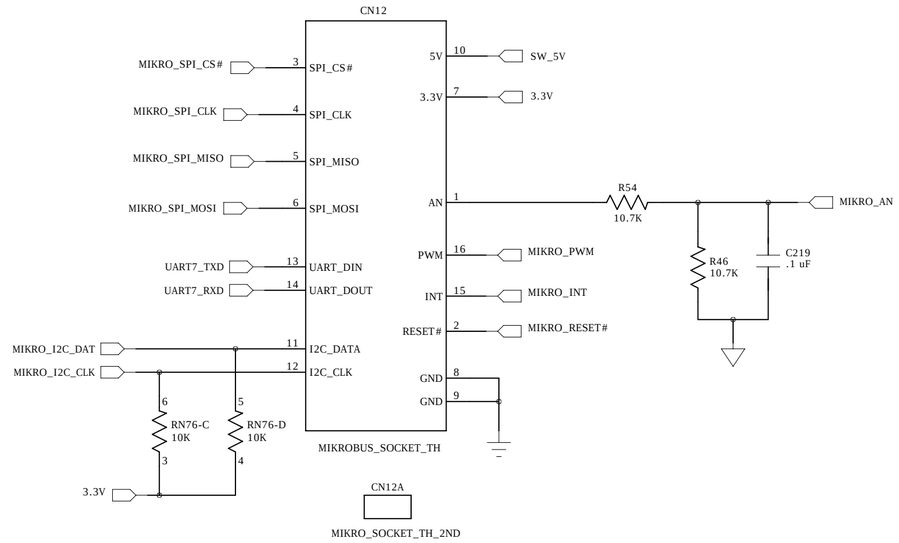
NimbeLink and SD Card Sw. 3.3V



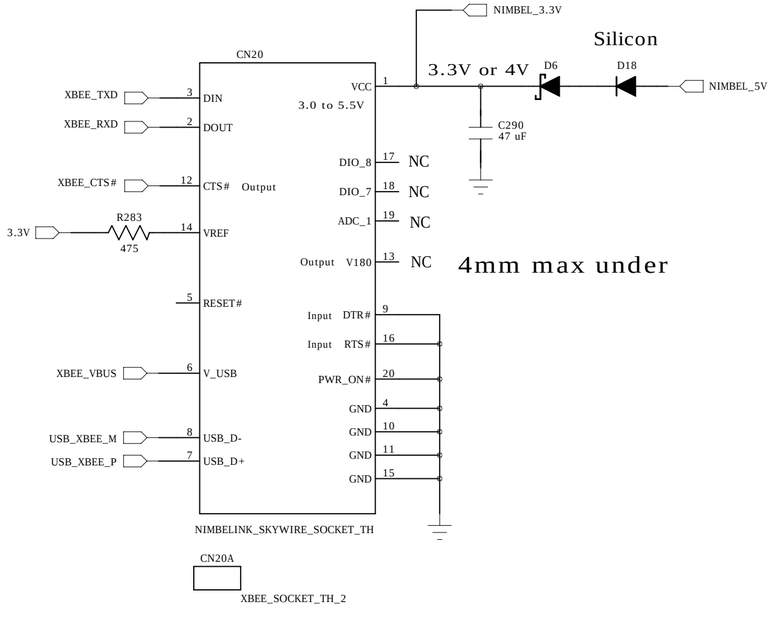
NimbeLink 4V Switched Power



Mikro Bus Socket

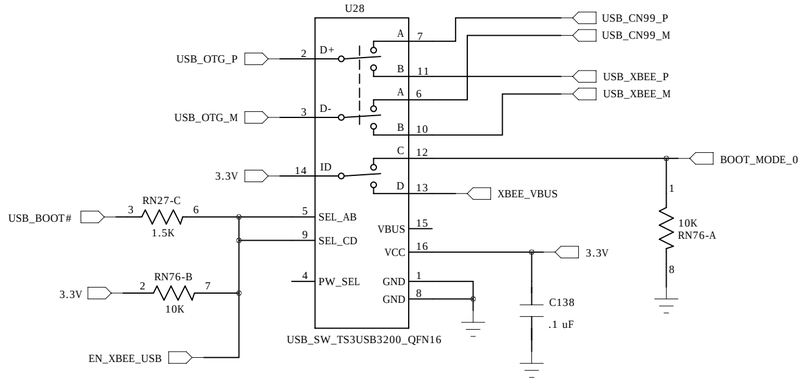


NimbeLink or Xbee Modem Socket

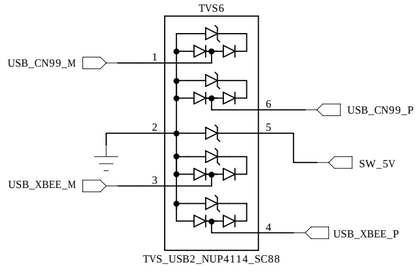


USB OTG MUX

To Xbee or CN99 Boot



OTG TVS



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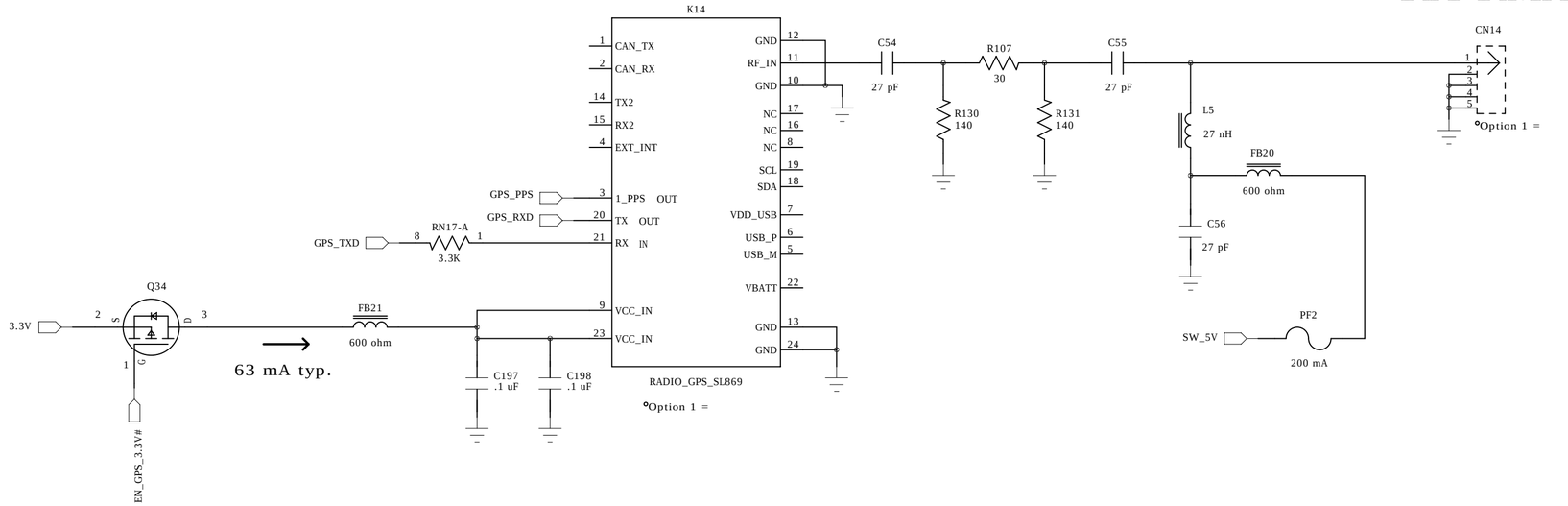
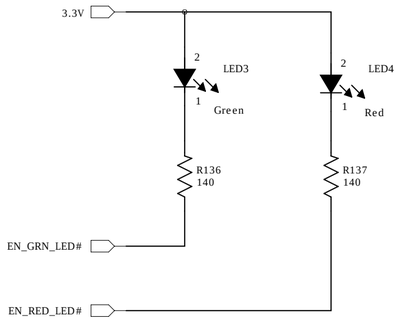
Telit SL869
GPS Radio

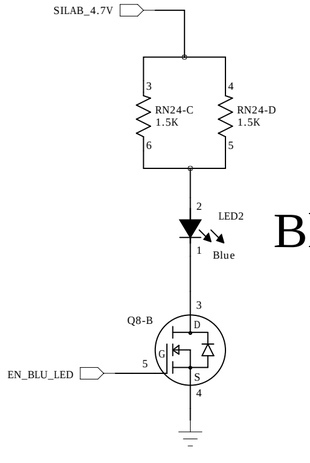
RF Conn.

RA RMA



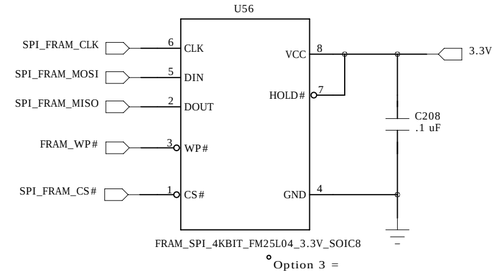
SMT RA LEDs





Blue LED

FRAM Memory



2K Bytes

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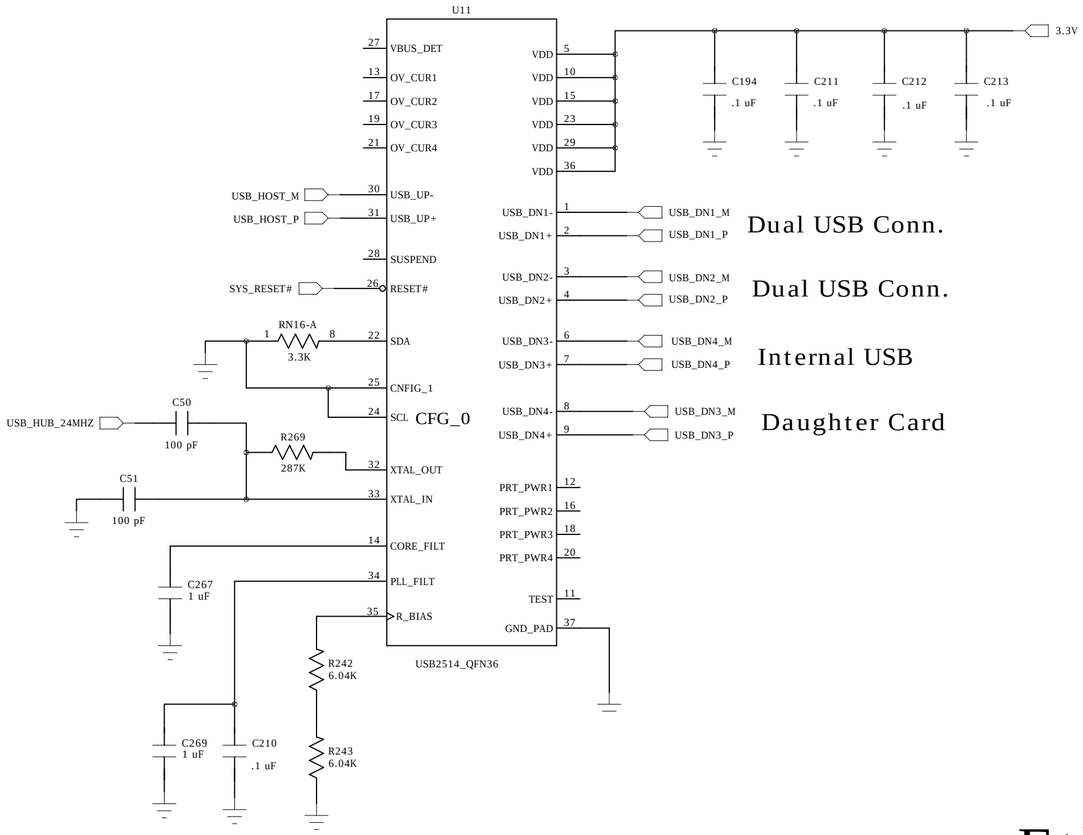
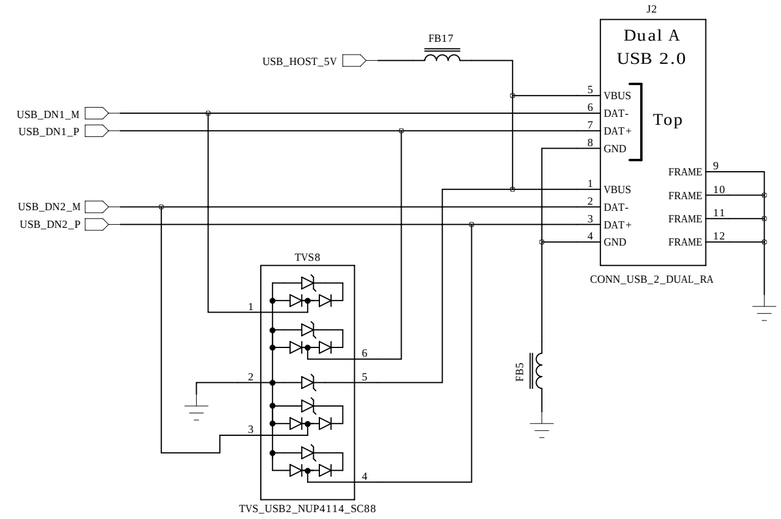
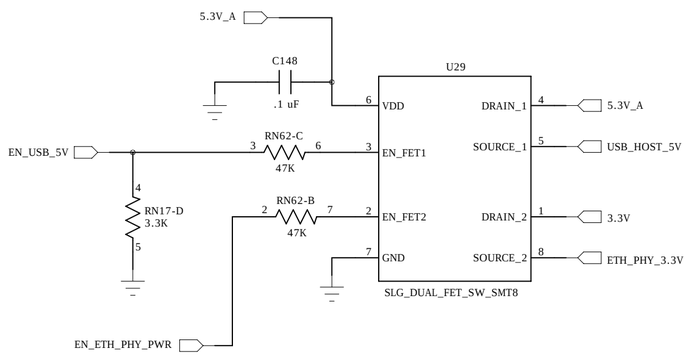
USB2 Hub



Dual Host USB 2.0

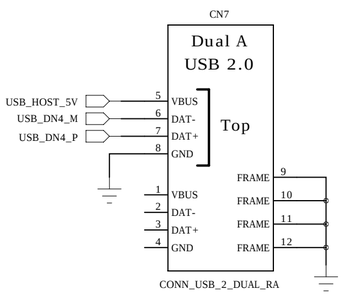


Eth PHY and USB Switched Power



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

Internal Host USB



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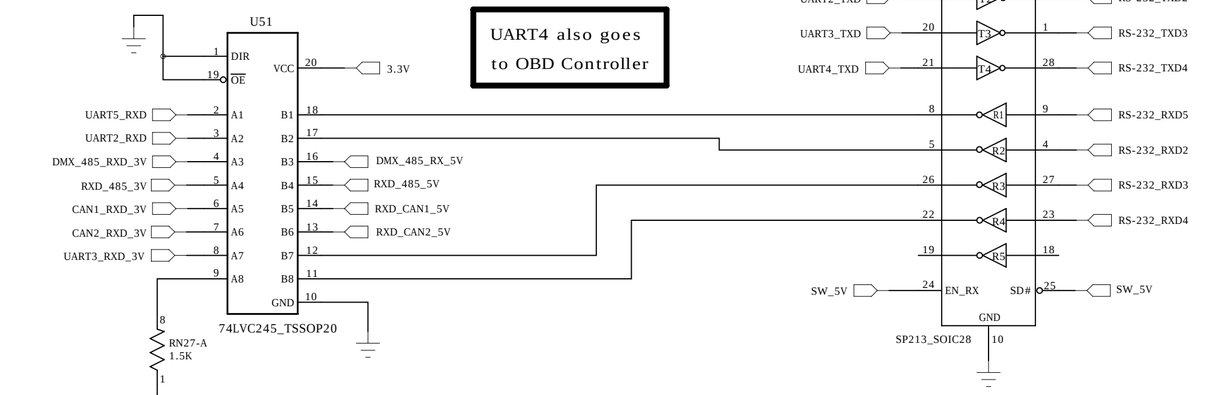
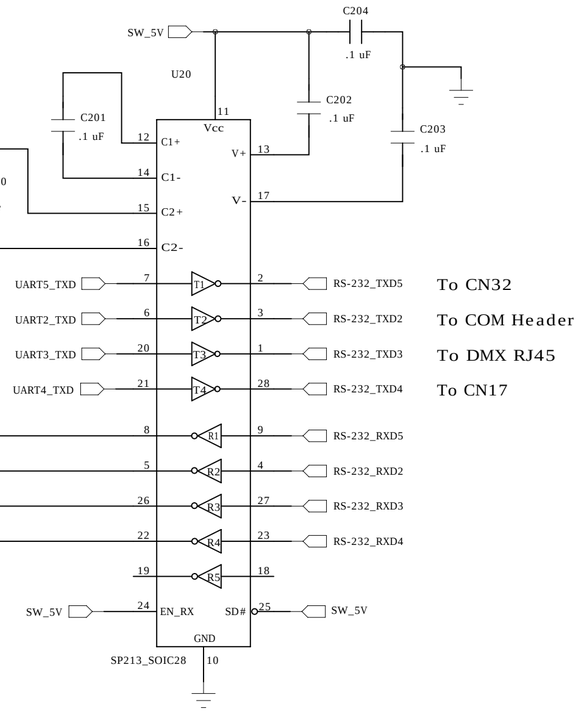
RS-232 Transceiver

3.3V <-- 5V

Level shifter



UART4 also goes to OBD Controller



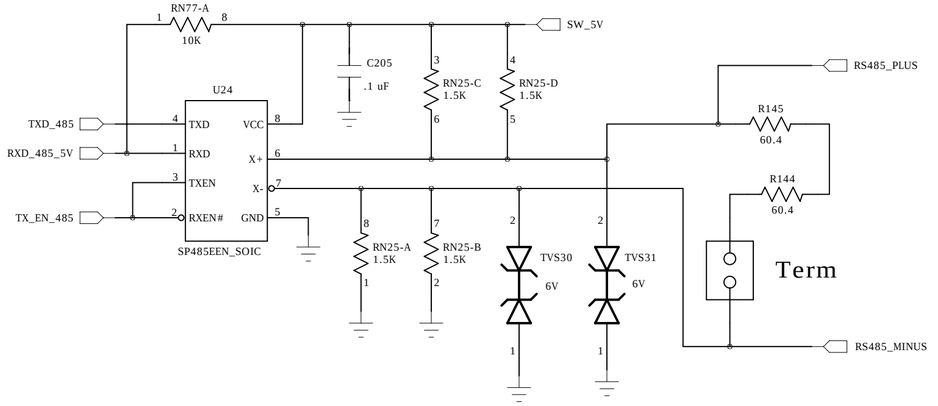
To CN32

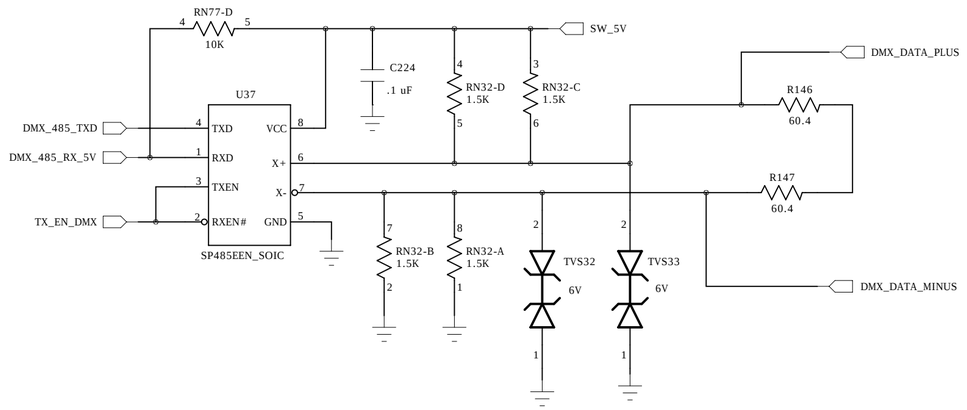
To COM Header

To DMX RJ45

To CN17

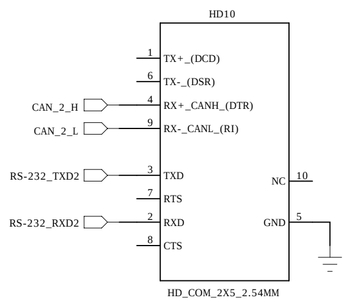
RS-485 Drivers



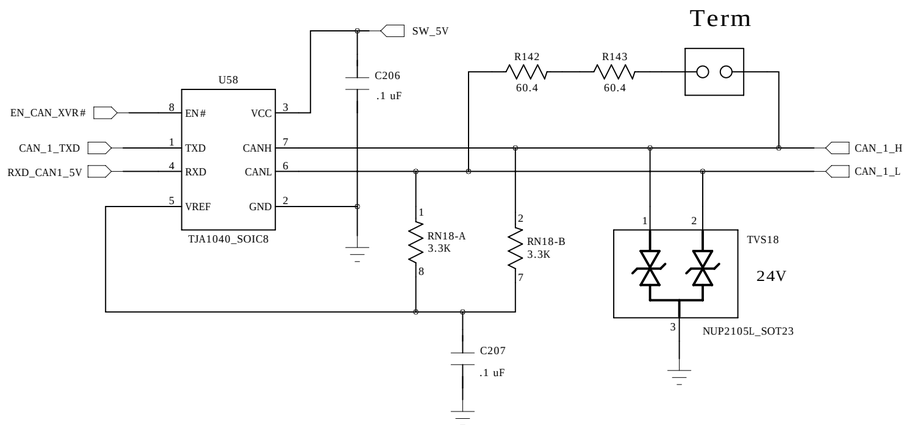


COM

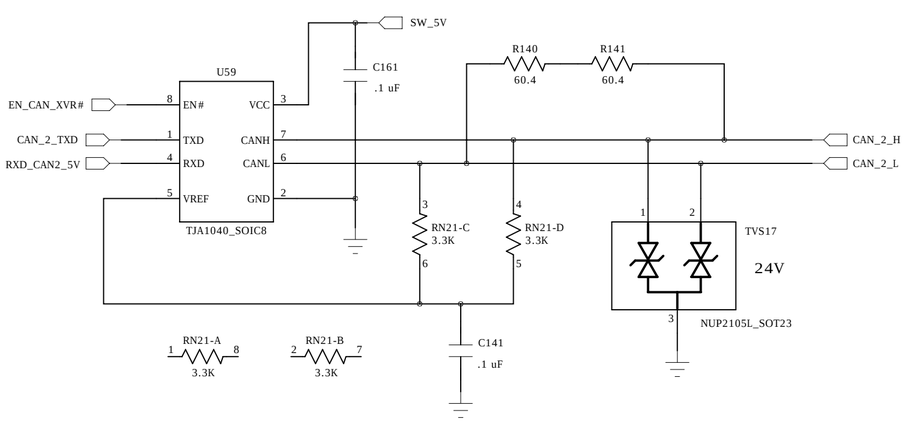
Header



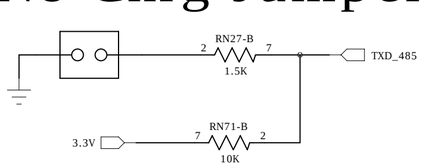
CAN1 Tranceiver



CAN2 Tranceiver



No Chrg Jumper



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Analog Inputs 0-3 --> 0-25 mA or 0-5V
Analog Inputs 4-5 --> 0-10V

0-24 mA
or 0-5V
or Dig. Input
Dry Contact compatible

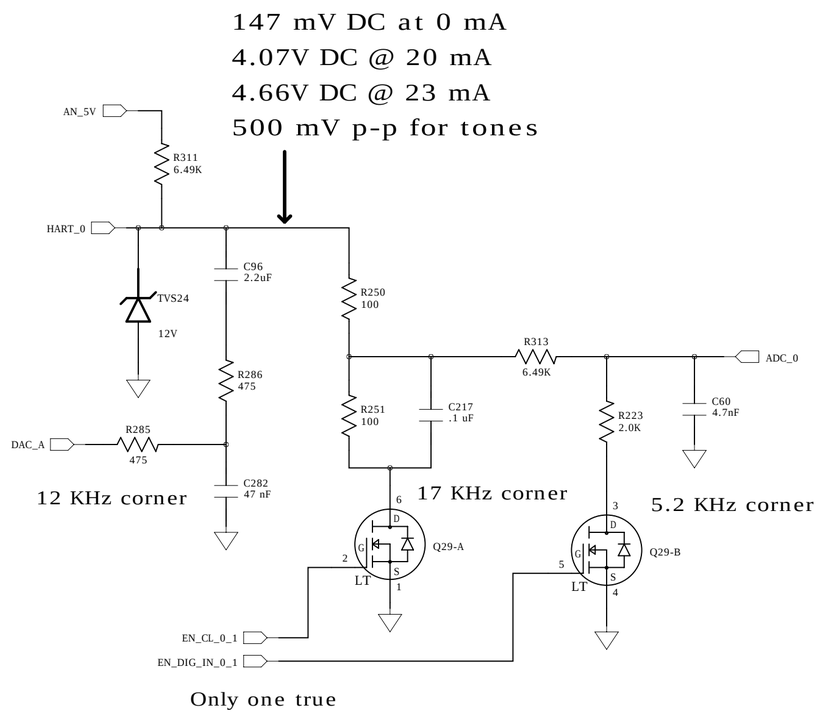
Input impedance is
196 ohm DC
163 ohms AC

3 Vp-p needed at DAC_A
to get 500 mV p-p at TVS

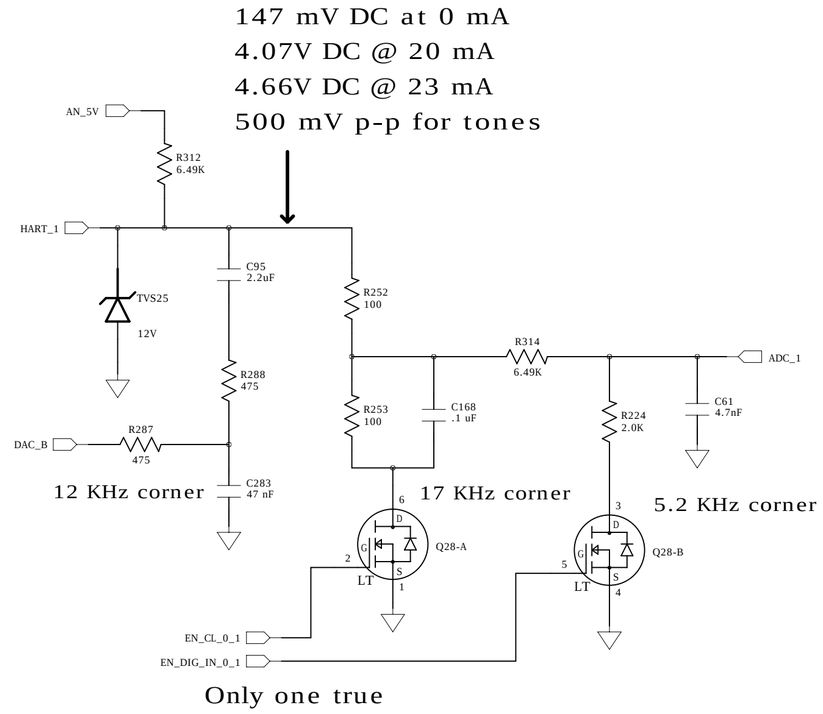
1 uF forms high pass
- corner at 140 Hz

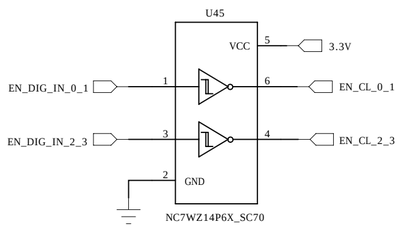
10.7K par 200 par 950 = 163 ohms

HART compatible 4-20 mA



HART compatible 4-20 mA





HART Protocol = Bell 202

Half Duplex 1200 baud

FSK, 1200 Hz = Mark
2200 Hz = Space

Used for Caller ID in NA

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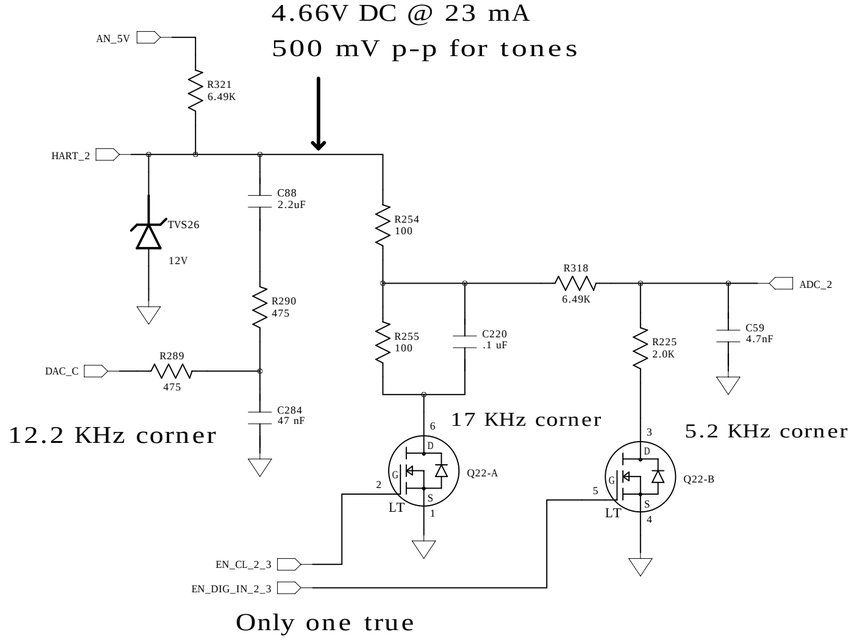
HART 2 & 3

HART compatible 4-20 mA

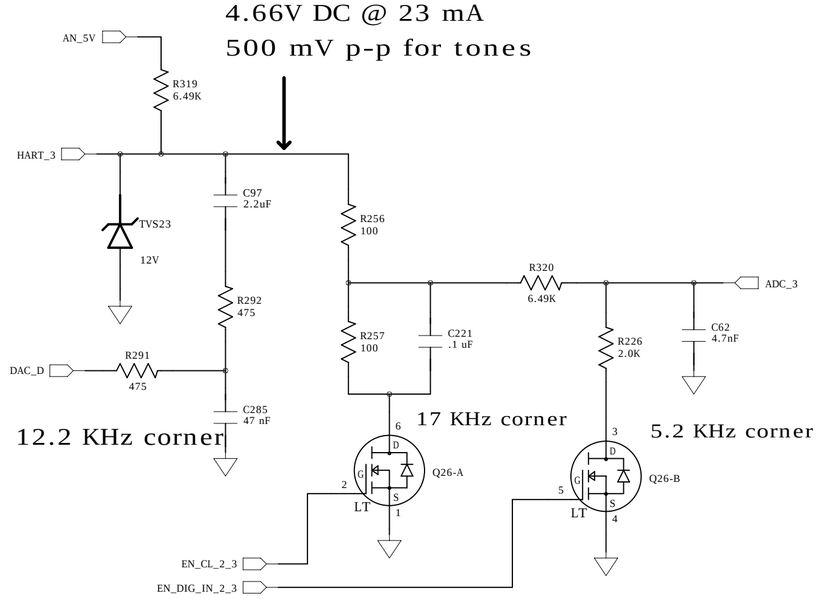
147 mV DC at 0 mA
4.07V DC @ 20 mA
4.66V DC @ 23 mA
500 mV p-p for tones



Only one true

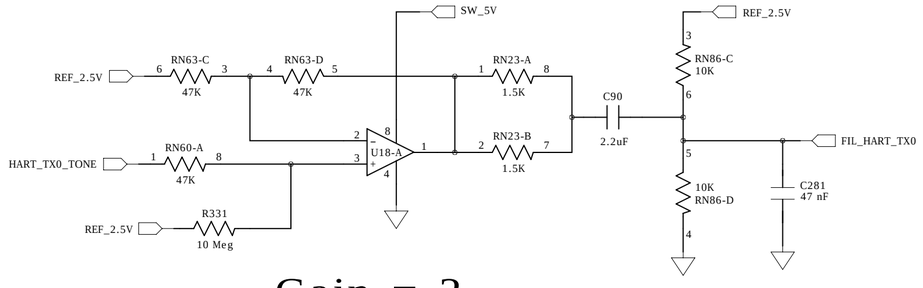
HART compatible 4-20 mA

147 mV DC at 0 mA
4.07V DC @ 20 mA
4.66V DC @ 23 mA
500 mV p-p for tones



Only one true

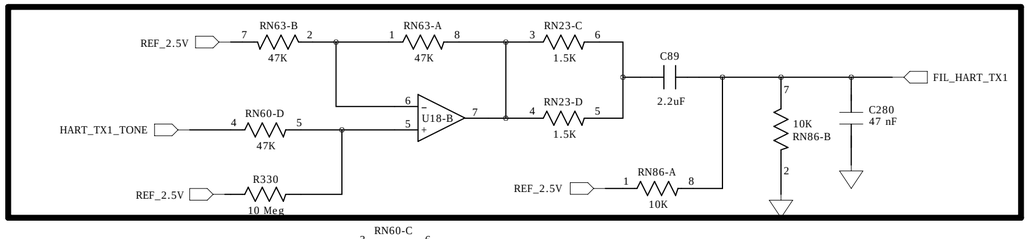
TX_CL HART



Gain = 2

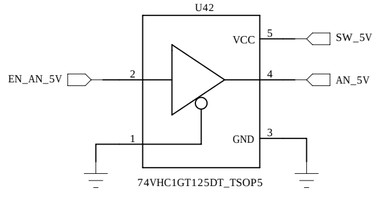
5.2 KHz low pass

Delete



5.2 KHz low pass

Analog 5V



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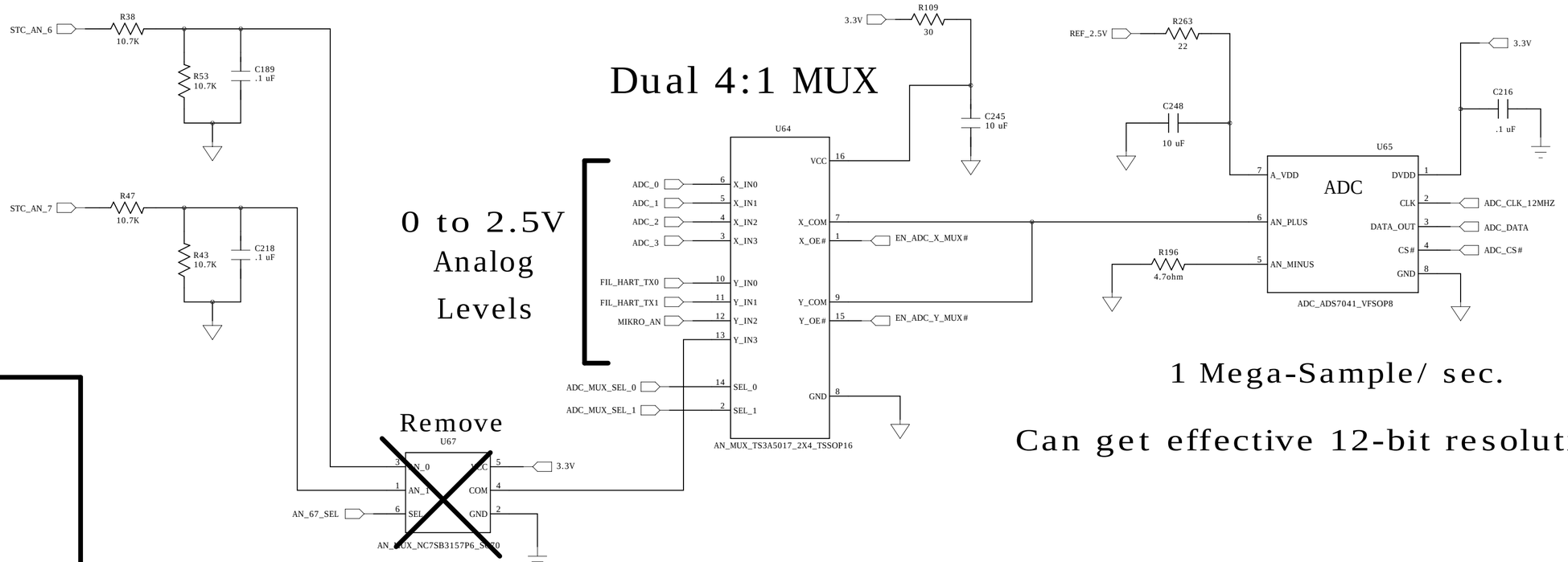
4 Channels of 8-bit DAC

6 Channels of 12-bit A/D

CH0 thru CH3 = 0-25 mA or 0-5V

10-bit A/D

Dual 4:1 MUX

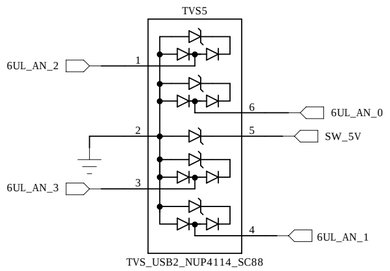


1 Mega-Sample/ sec.

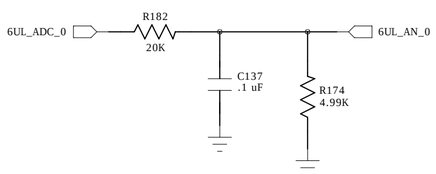
Can get effective 12-bit resolution

Remove

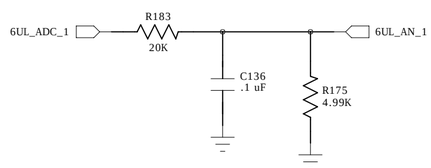
6UL_ADC TVS



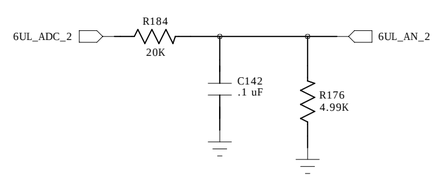
0-12.5V



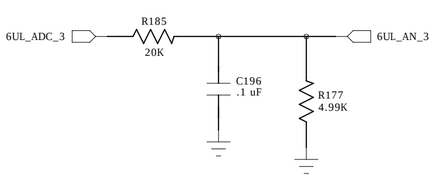
0-12.5V



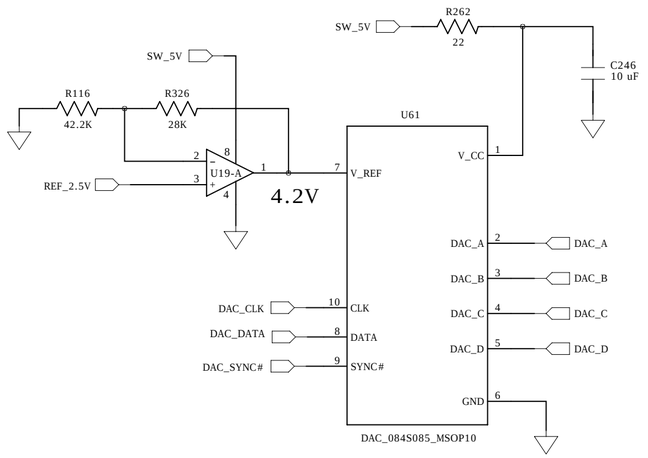
0-12.5V



0-12.5V



8-bit DAC



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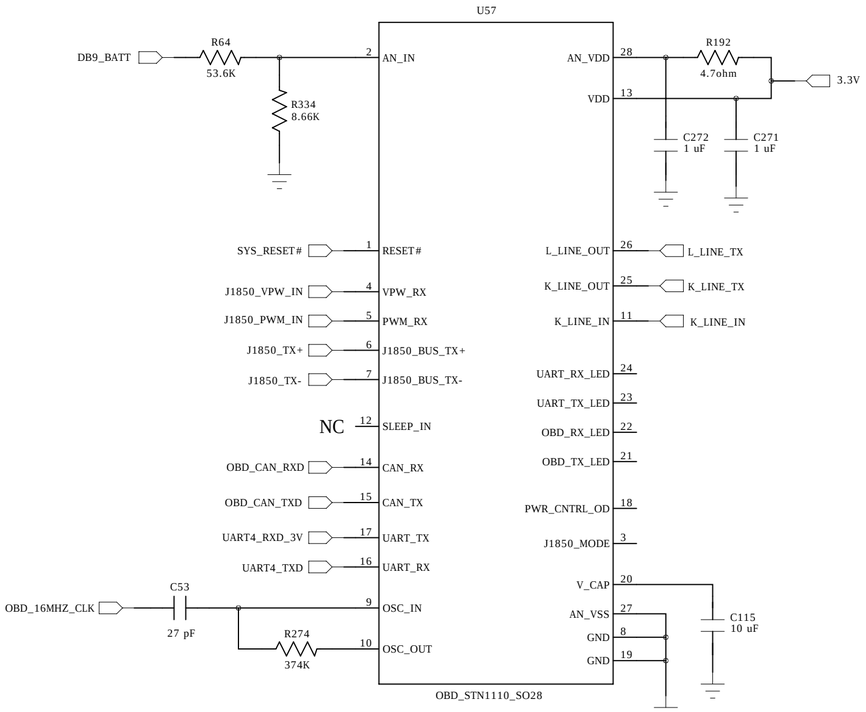
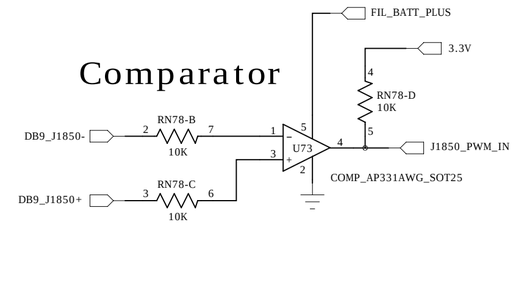
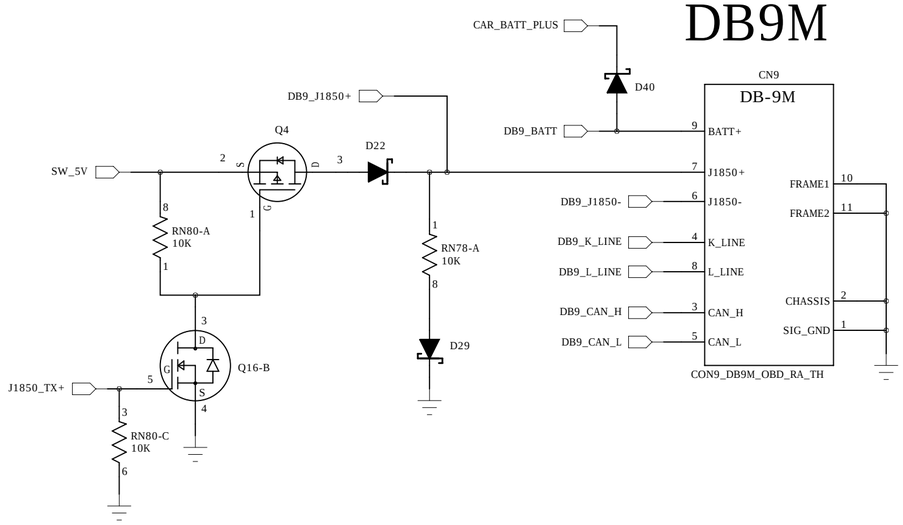
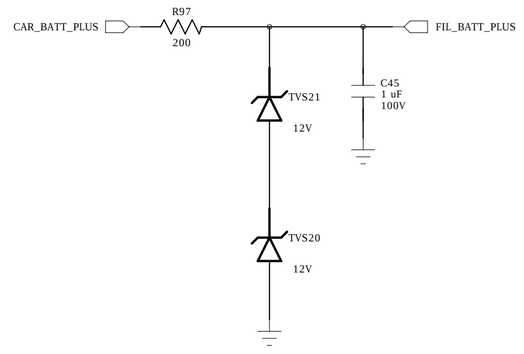
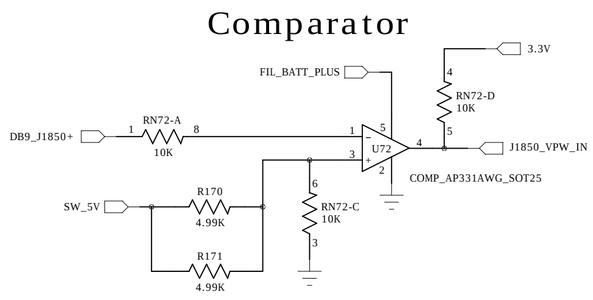
OBD Circuits

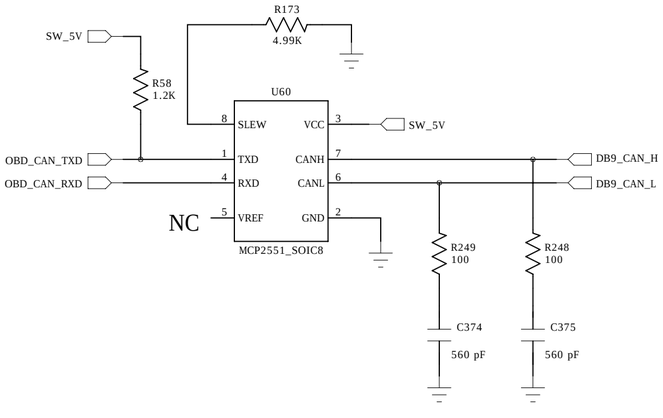


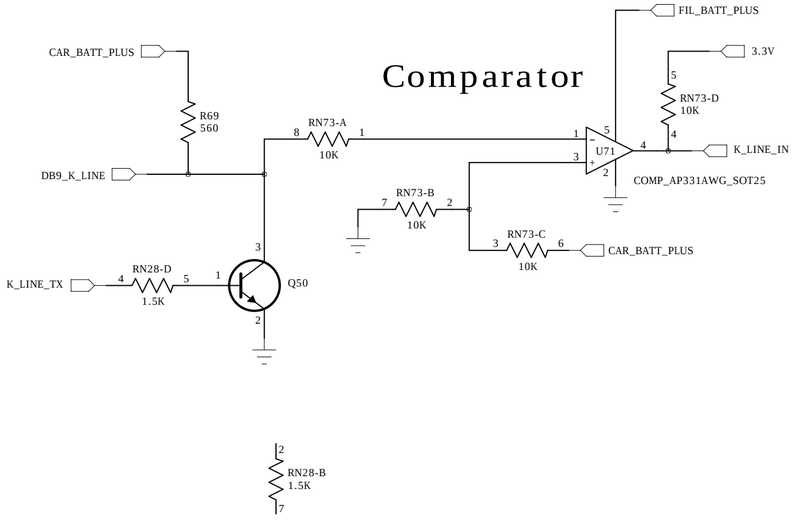


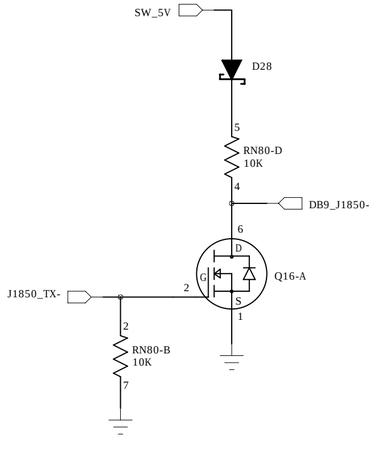


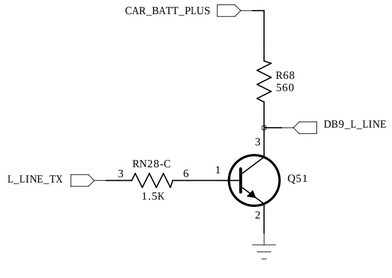












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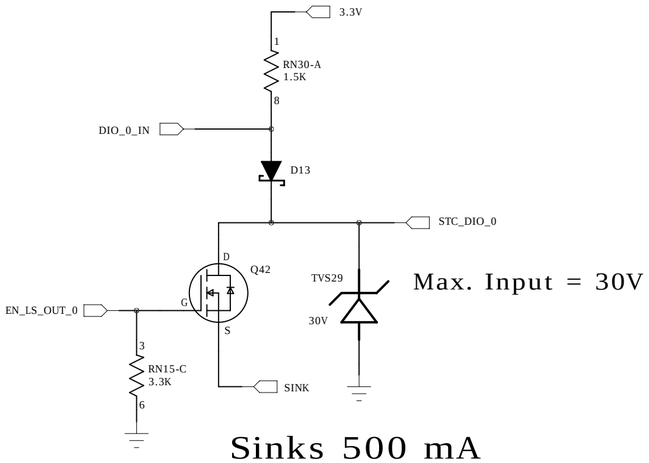
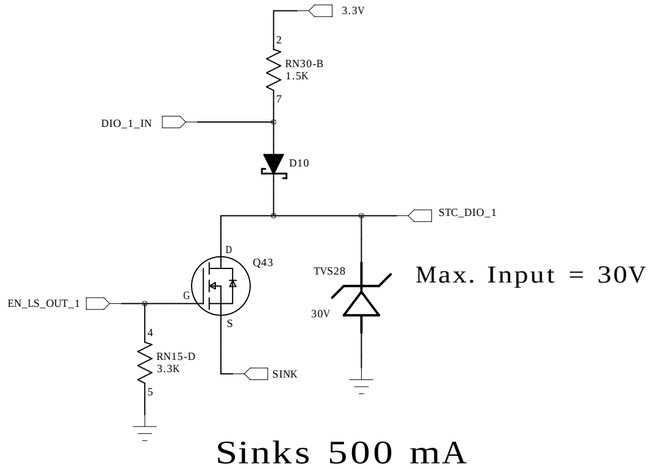
DIO_0



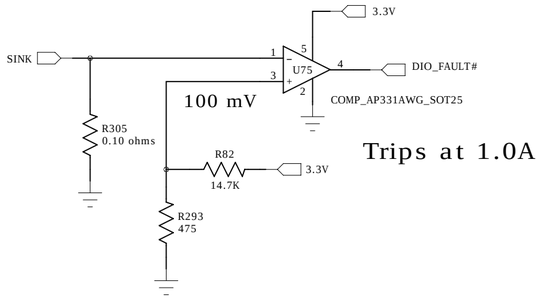
Sinks 500 mA

DIO_1



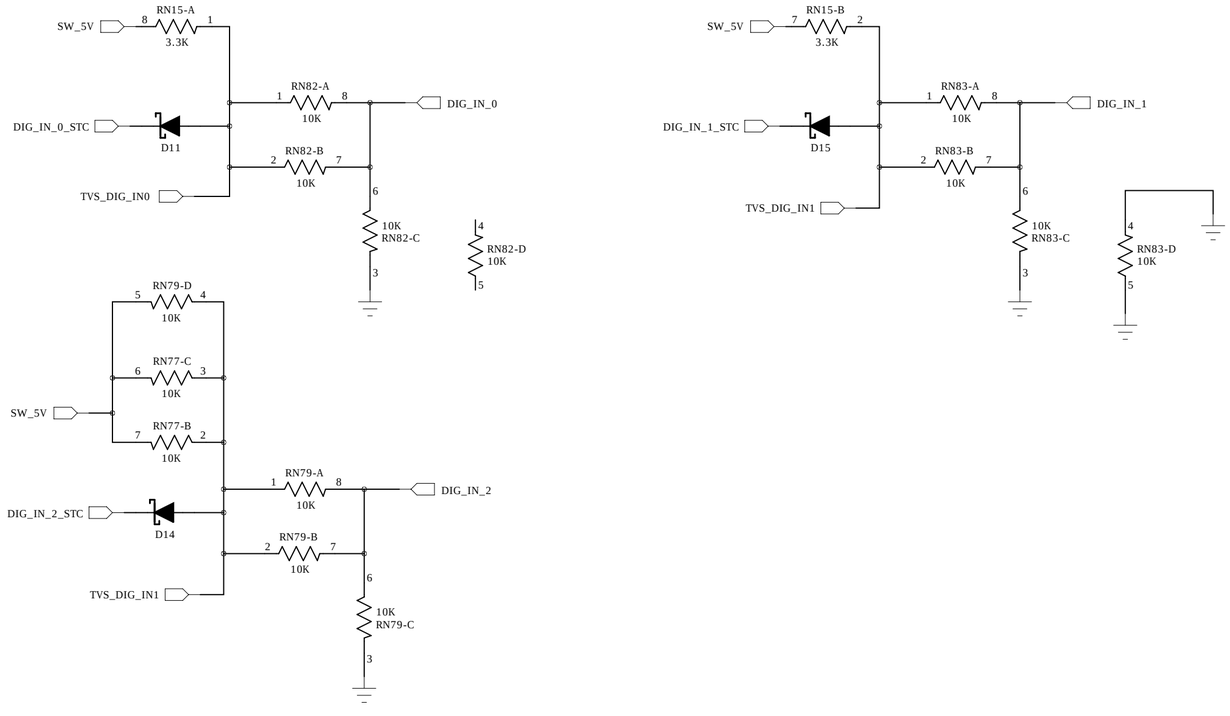
Sinks 500 mA

Comparator

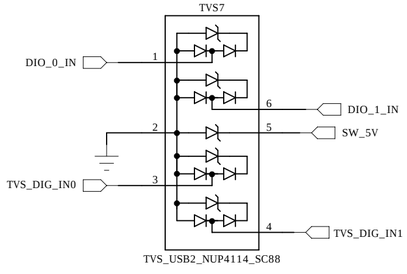


Trips at 1.0A

Dig Inputs



Dig IN TVS



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PWM --> 4-20 mA Current Loop Transmitters

0-25 mA TX full range

400 kHz

non-overlapping phases

Full Wave Bridge Rect.

A/D full scale = 2.50V

ISO 12V

SW_5V

T3 3:4 Ratio

D38 D37 D39 D36

C64 10 uF

CL_GND

C214 .1 uF

Q31-B Q31-A LT

400KHZ_PHASE_0

400KHZ_PHASE_1

RN12-C 3.3K

RN12-D 3.3K

HIGH_CLAMP

LOW_CLAMP

D33 D34

RN88-C 10K

RN88-D 10K

U34 U32 2500 mV REF_AN431A_SOT23

12V-5V

R190 20K

C261 2.2 nF

C370 560 pF

6.9 KHz corner

R189 20K

RN67-A 47K

6.0 KHz corner

RN67-C 47K

U17-A

Q45

R99 200

C133 10 uF

ISO_12V

4-20 mA

3.5 mA

R222 2.0K

HART_TX0

D16

CL_TX0

TVS22 12V

10-bit

62 KHz PWM

U40 U41

VCC GND

SW_5V

PWM_CL_TX0

PWM_CL_TX1

74VHC1GT125DT_TSOP5

C106 C103 1000 pF

RN88-B 10K

RN88-A 10K

R273 374K

R275 374K

U46 NC7WZ14P6X_SC70

D35 D32

C226 .1 uF

HART_TX0_TONE

HART_TX1_TONE

C104 C105 1000 pF

HART_TX0

HART_TX1

C109 22 nF 630V

1200 and 2200 Hz

Tones are 500 mV p-p

ISO 12V

R188 20K

C260 2.2 nF

C371 560 pF

R186 20K

RN67-B 47K

RN67-D 47K

U17-B

Q46

R98 200

6.9 KHz corner

6.0 KHz corner

4-20 mA

D12

HART_TX1

CL_TX1

TVS19 12V

CL_GND

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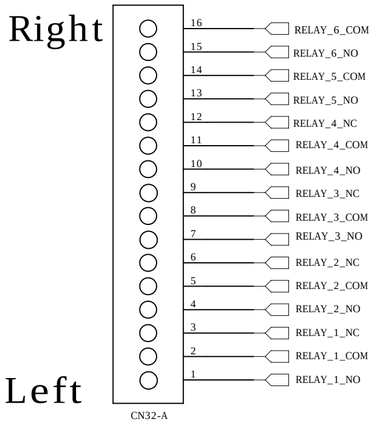
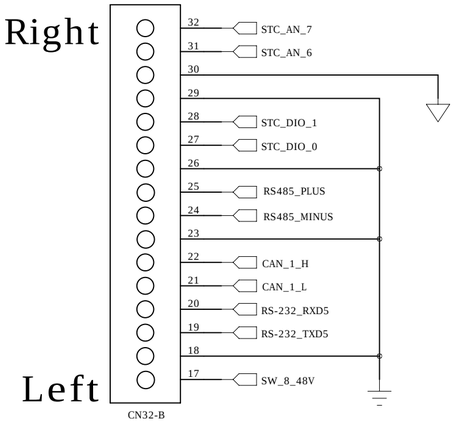
2 x 16 Screw Term. Positions

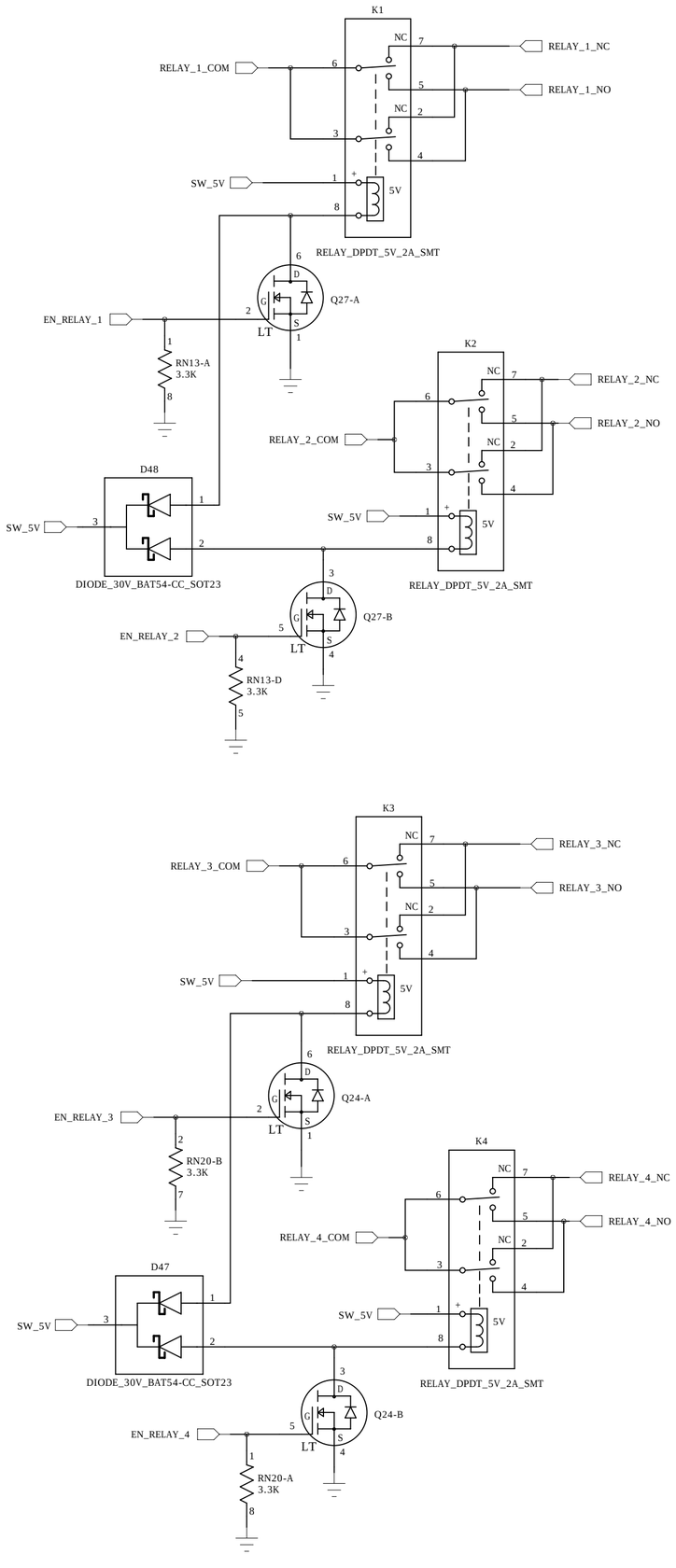
Top Row



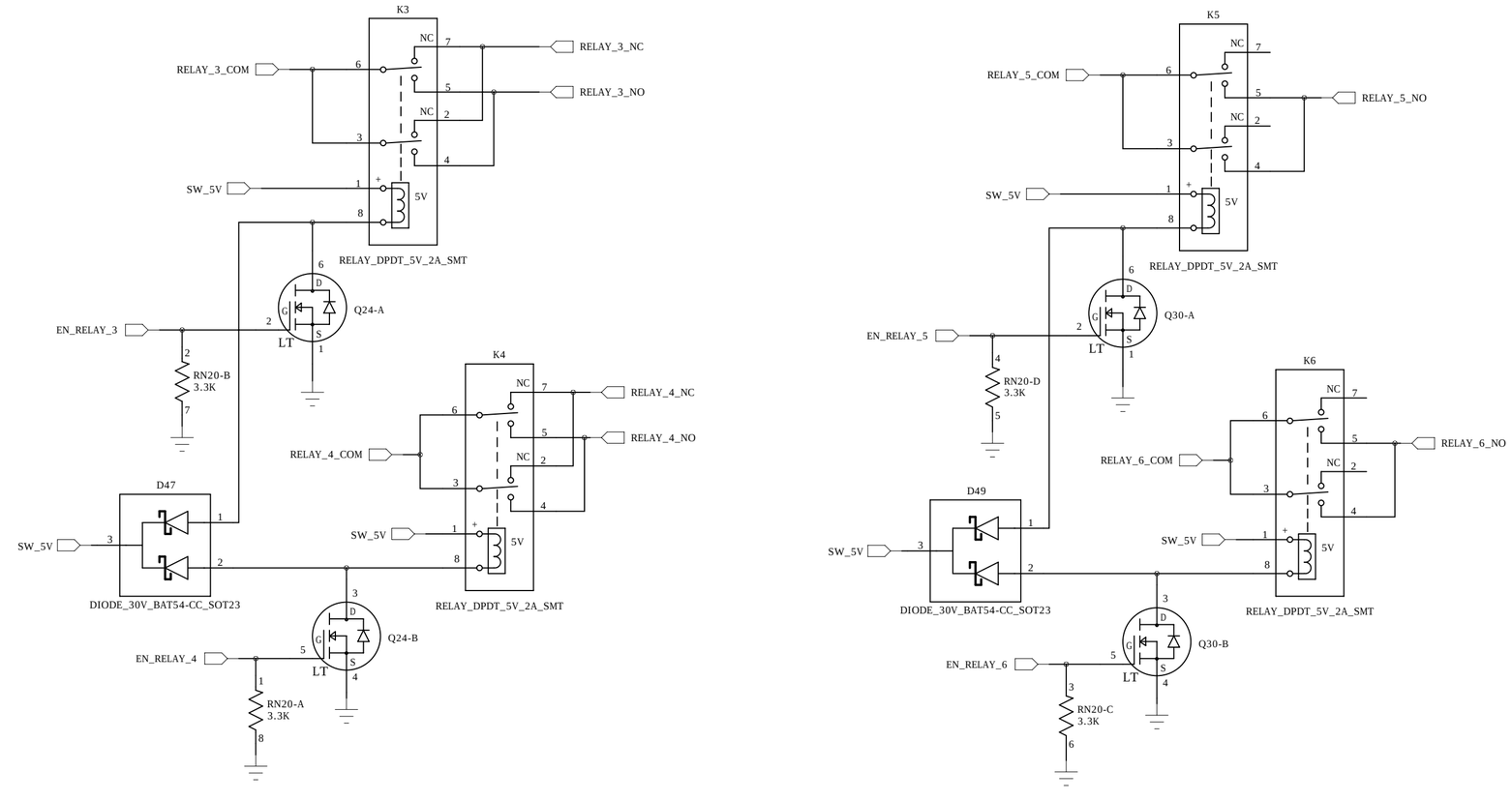
Bottom Row



Relays



Relays



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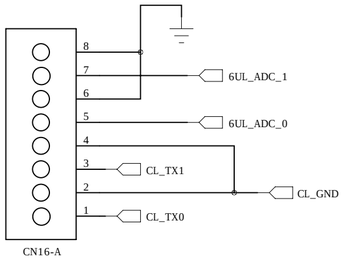
2 x 8 Screw Term.

Top Row

Right

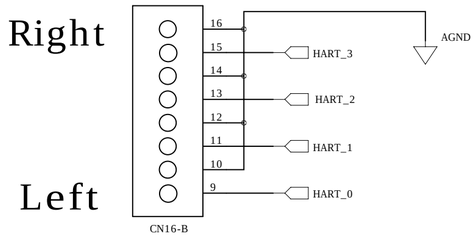
Left



Bottom Row

Right

Left



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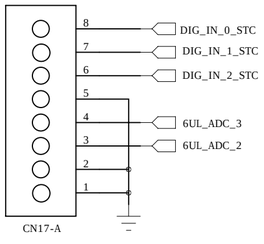

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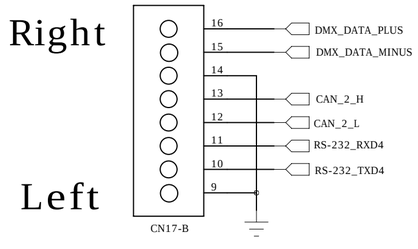

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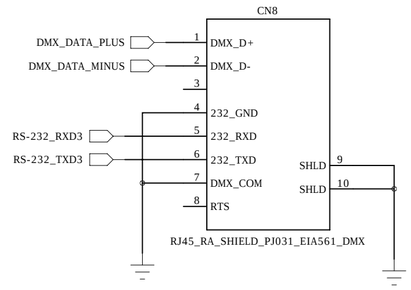

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