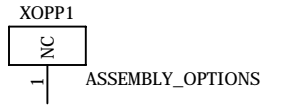
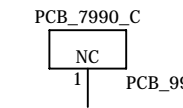


TS-7990 Standard Options



Option 1	TS-TPC-7990-SMN2E	800x480 800nit Resistive Touch display, Solo 800MHz i.MX6 CPU, 1G RAM, 4G eMMC, Extended Temp
	TS-TPC-7990-SMN3E	1024x600 800nit Capacitive Touch display, Solo 800MHz i.MX6 CPU, 1G RAM, 4G eMMC, Extended Temp
Option 3	TS-TPC-7990-QMW2E	800x480 800nit Resistive Touch display, Quad 1GHz CPU, 1G RAM, 4G eMMC, NimbeLink Socket, WiFi, Accelerometer, Extended Temp
	TS-TPC-7990-QMW3E	1024x600 800nit Capacitive Touch display, Quad 1GHz CPU, 1G RAM, 4G eMMC, NimbeLink Socket, WiFi, Accelerometer, Extended

LXD LCD Option
 7", 1024x600, PCAP Touch, 800nit
 Included on ALL Standard Options
 Add: CN1, CN5, P4

OKAYA LCD Option
 7", 800x480, Resistive Touch, 800nit
 Included on ALL Standard Options
 Add: CN11, CN4, P3

PCIe socket Option:
 Included on ALL Standard Options
 Add: U50, J3, U45, MT5, MT6

SIM socket Option:
 NOT Included on any Standard Options
 Add: CN13

Heat Sink for CPU
 TSPN: HS-50x53x13

Accelerometer Option:
 Included Only on Qxxxx Standard Option
 Add: U21

NimbeLink Socket Option:
 Included Only on Qxxxx Standard Option
 Add: CN6 & CN6A

WiFi/Bluetooth Option
 w/ Chip Antenna
 U.FL available on request
 Included Only on Qxxxx Standard Option
 Add: K2 (Chip antenna)
 (alternate: U.FL antenna connector)

Choke Option
 Input power filter feature
 NOT Included on any Standard Options
 ADD: CH1 - Remove FB46, FB44

MT LCD Option
 NOT Included on any Standard Options
 7", 800x480, Resistive Touch, 320nit
 Remove: P4, CN1, CN5, CN11, CN4, and P3
 Add: U59, CN8 and CN9

Technologic Systems	Date	June 1, 2017
Title: TS-7990		
Rev: C	Designer	Sheet 1 of 30

TS-7990 Rev.B --> Rev.C Changes

Correct several footprints

Correct Capacitive Touch Sense solution

Mini-PCIe socket uses DIO for reset (can not use CPU_RESET#)

Added Optional SIM Socket (CN13)

Change WiFi to use SPI (SDIO does not work)

eMMC 3.3V has power input that can be switched

BOM scrubbing for REACH/RoHS2 Compliance

Added RESET# to CN6

Moved TOUCH_RESET to a CPU DIO pin

All 4 iMX6 UARTs MUXed thru FPGA

FPGA has some MAX3100 UARTs

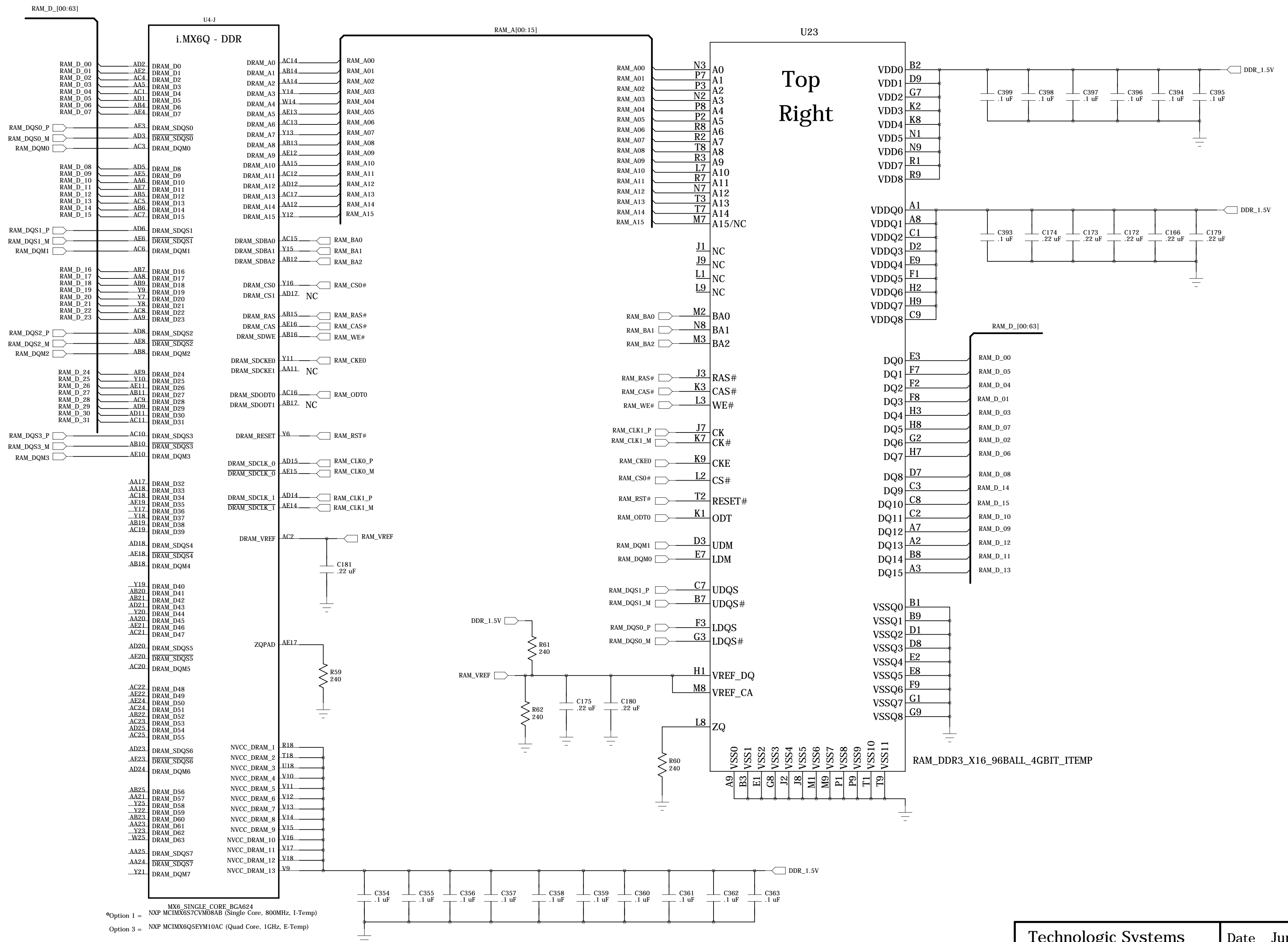
Features that require UART:

3 RS-232 Ports

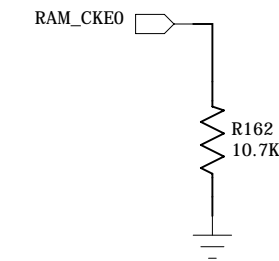
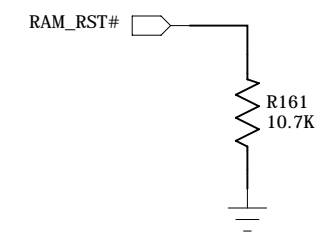
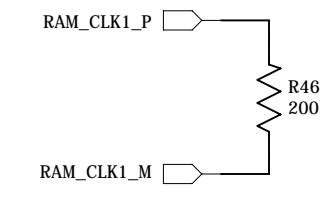
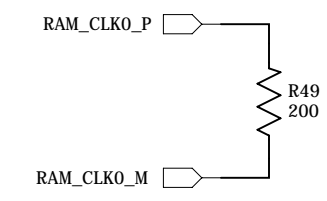
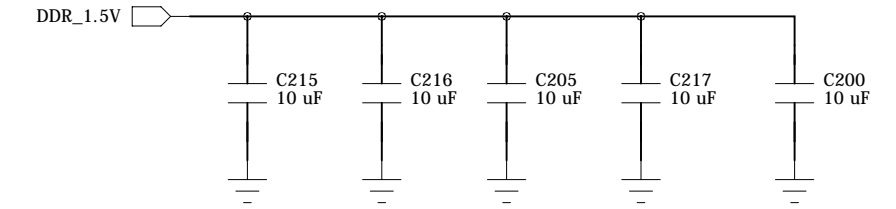
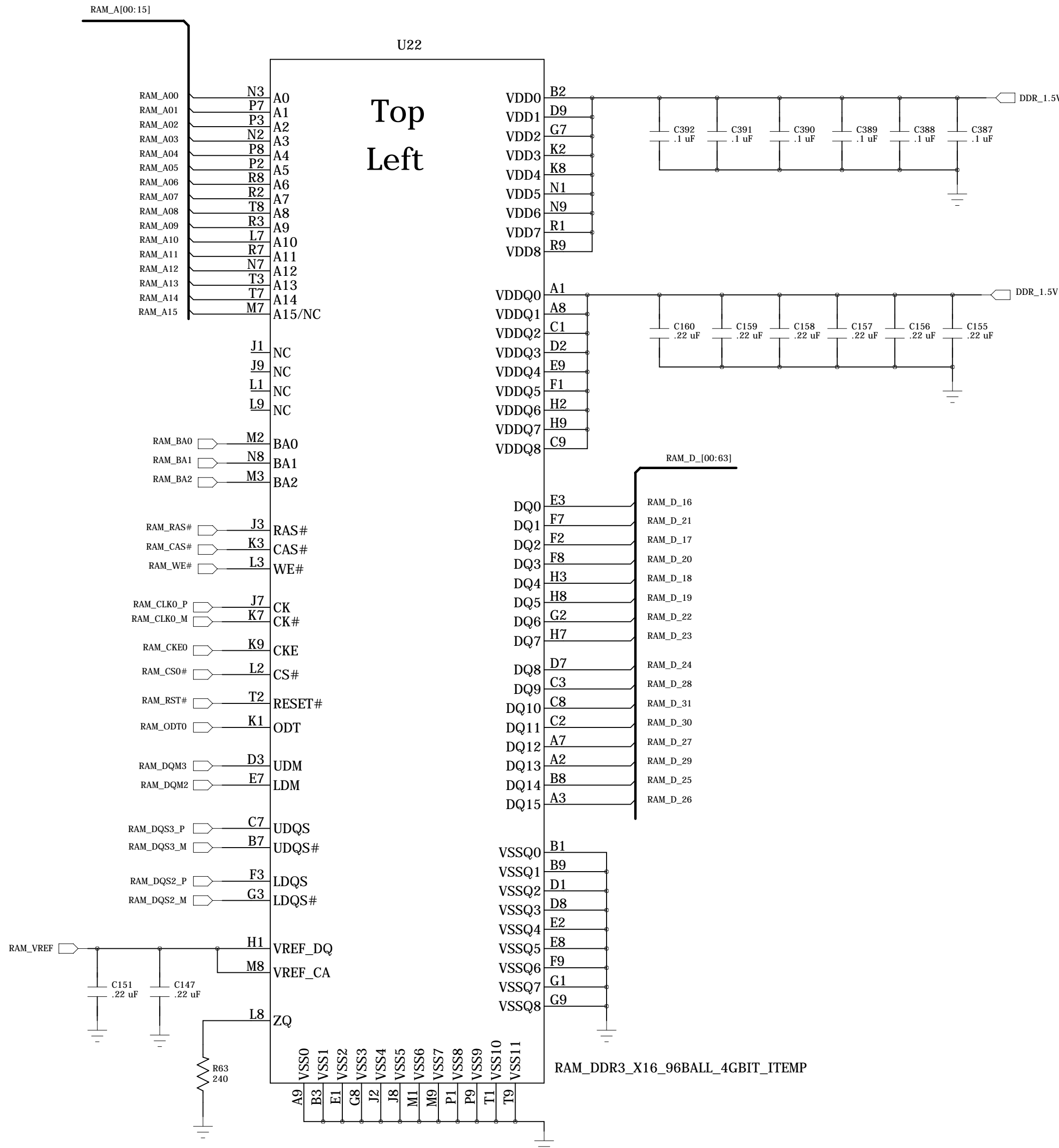
3 RS-485 Ports

1 UART for NimbeLink

1 UART for BlueTooth

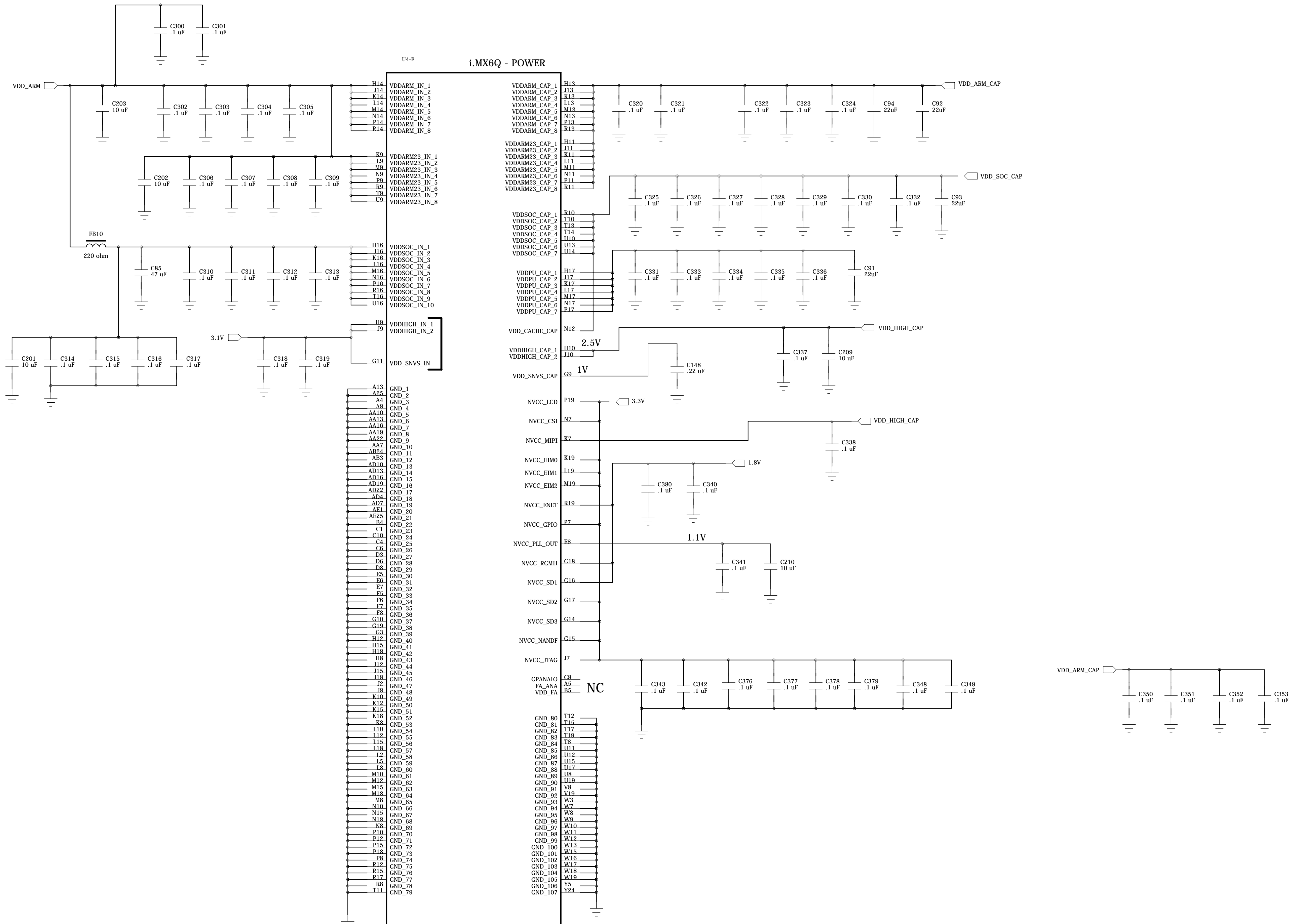


RAM Data bits 16-31



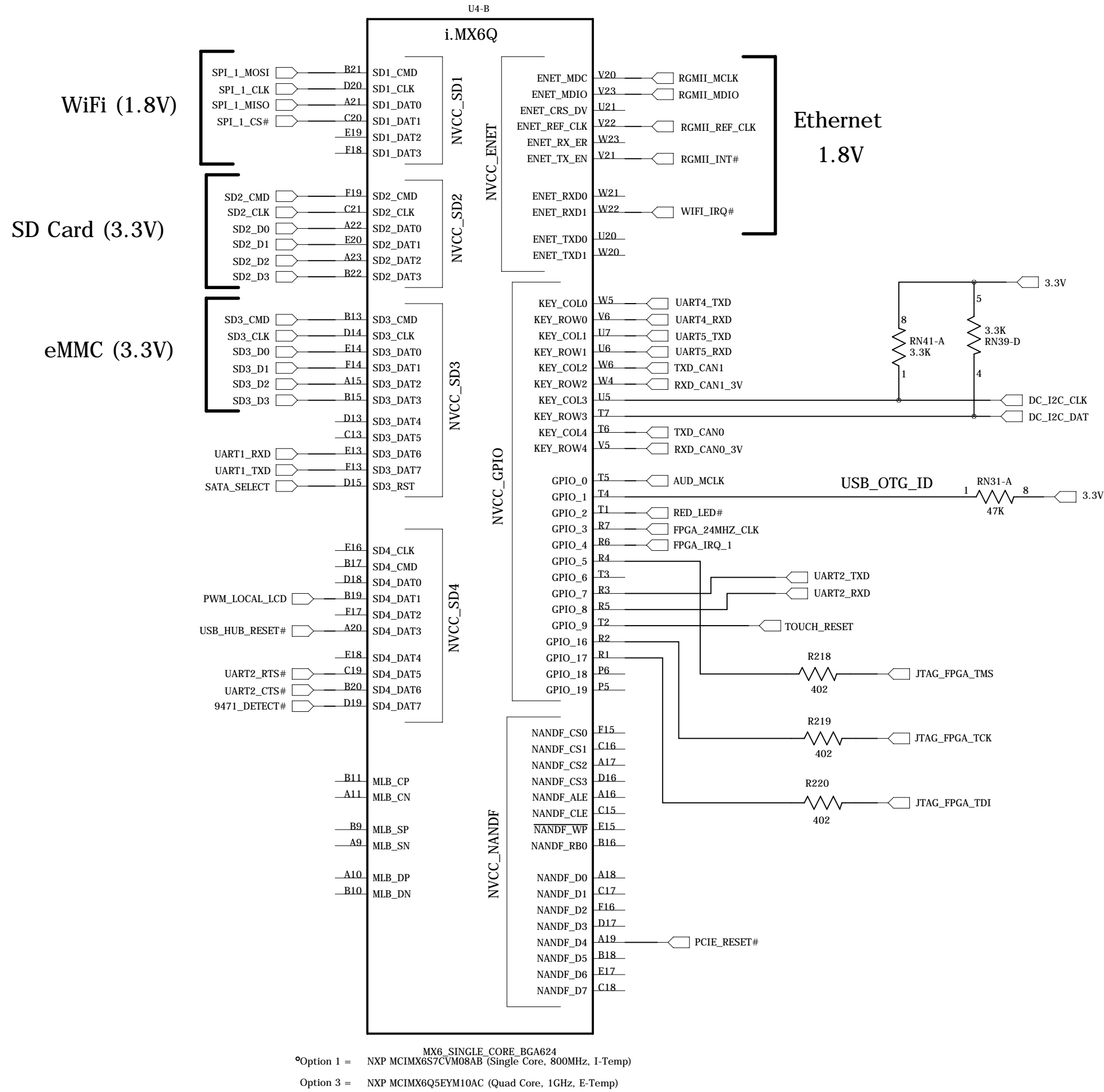
RAM_DDR3_X16_96BALL_4GBIT_ITEMP

iMX6 Power Pins

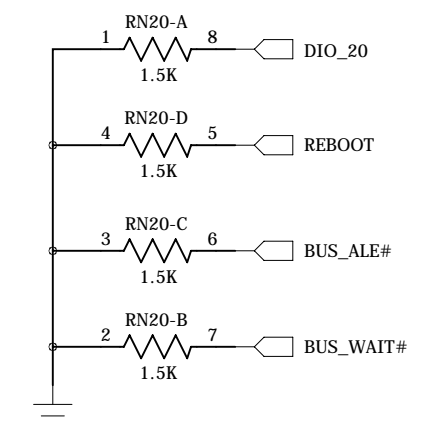
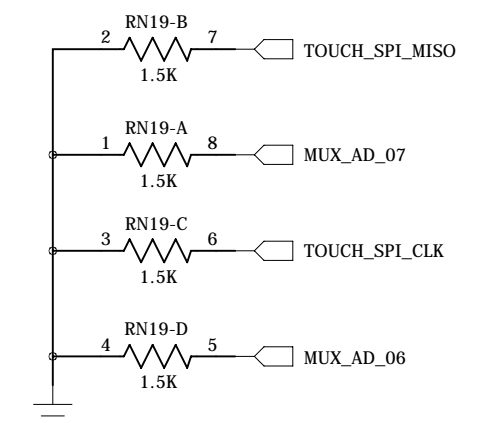
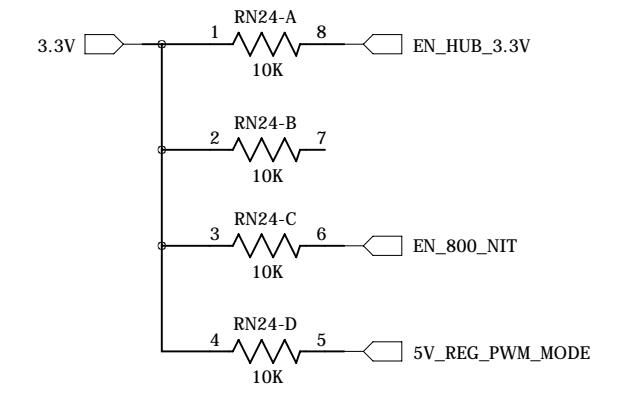


MX6_SINGLE_CORE_BGA624
 *Option 1 = NXP MCIMX6S7CV08AB (Single Core, 800MHz, I-Temp)
 Option 3 = NXP MCIMX6Q5EYM10AC (Quad Core, 1GHz, E-Temp)

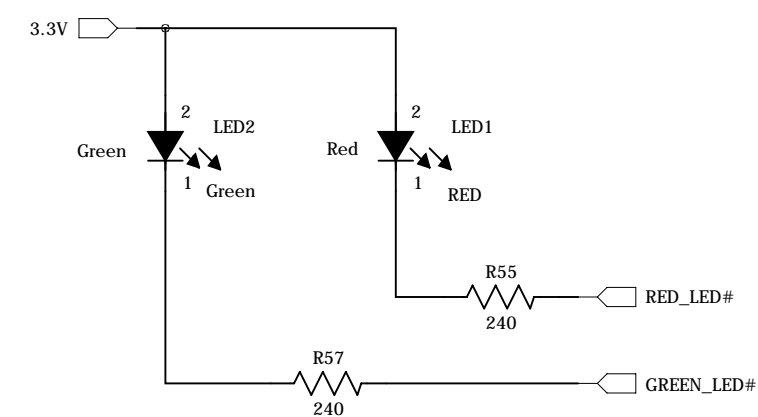
SD, GPIO, NAND



Bias Res.



iMX6 LEDs

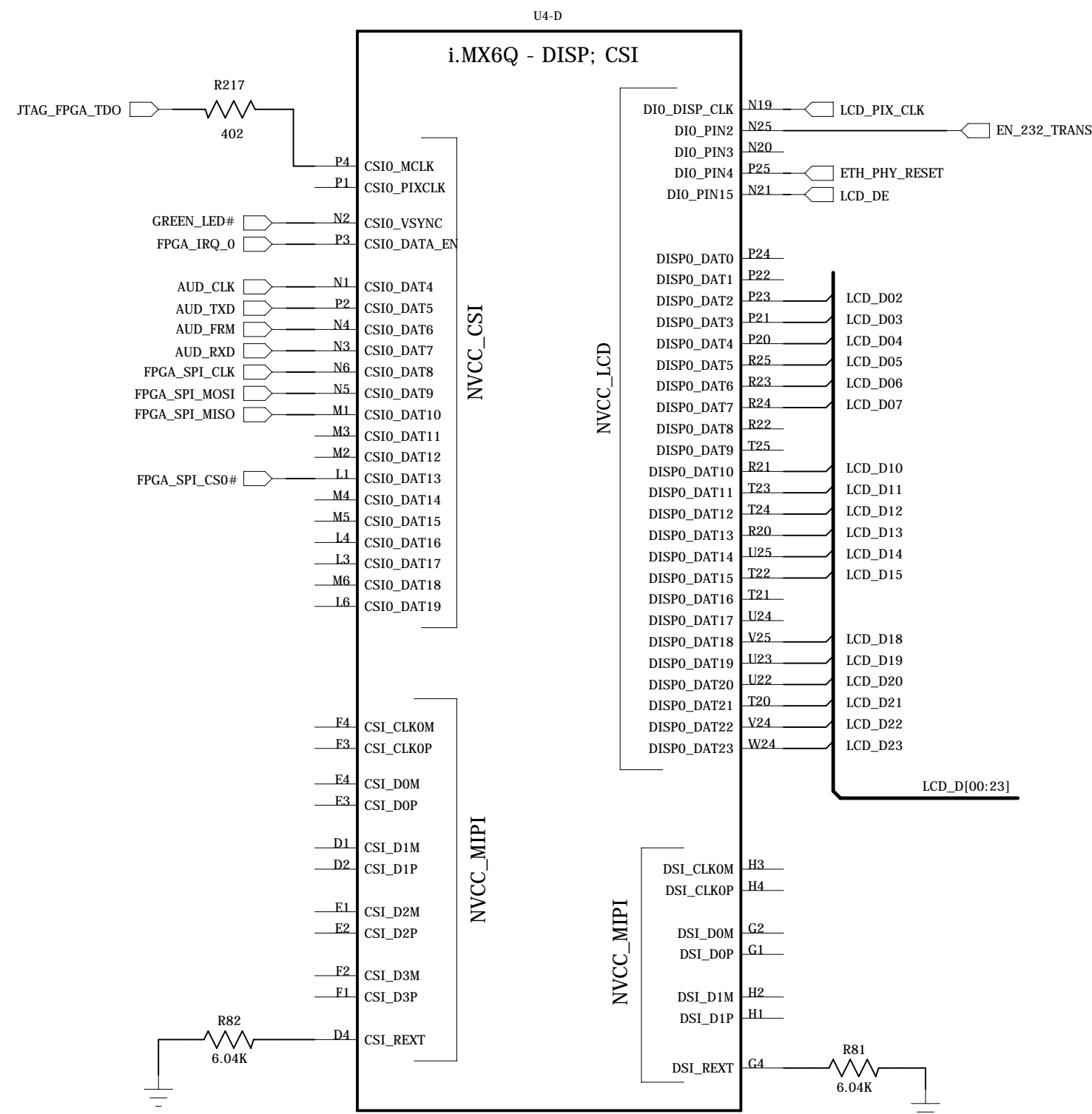


4 PWM total

PWM on SD4_DAT 1 or 2
GPIO_1 and GPIO_9

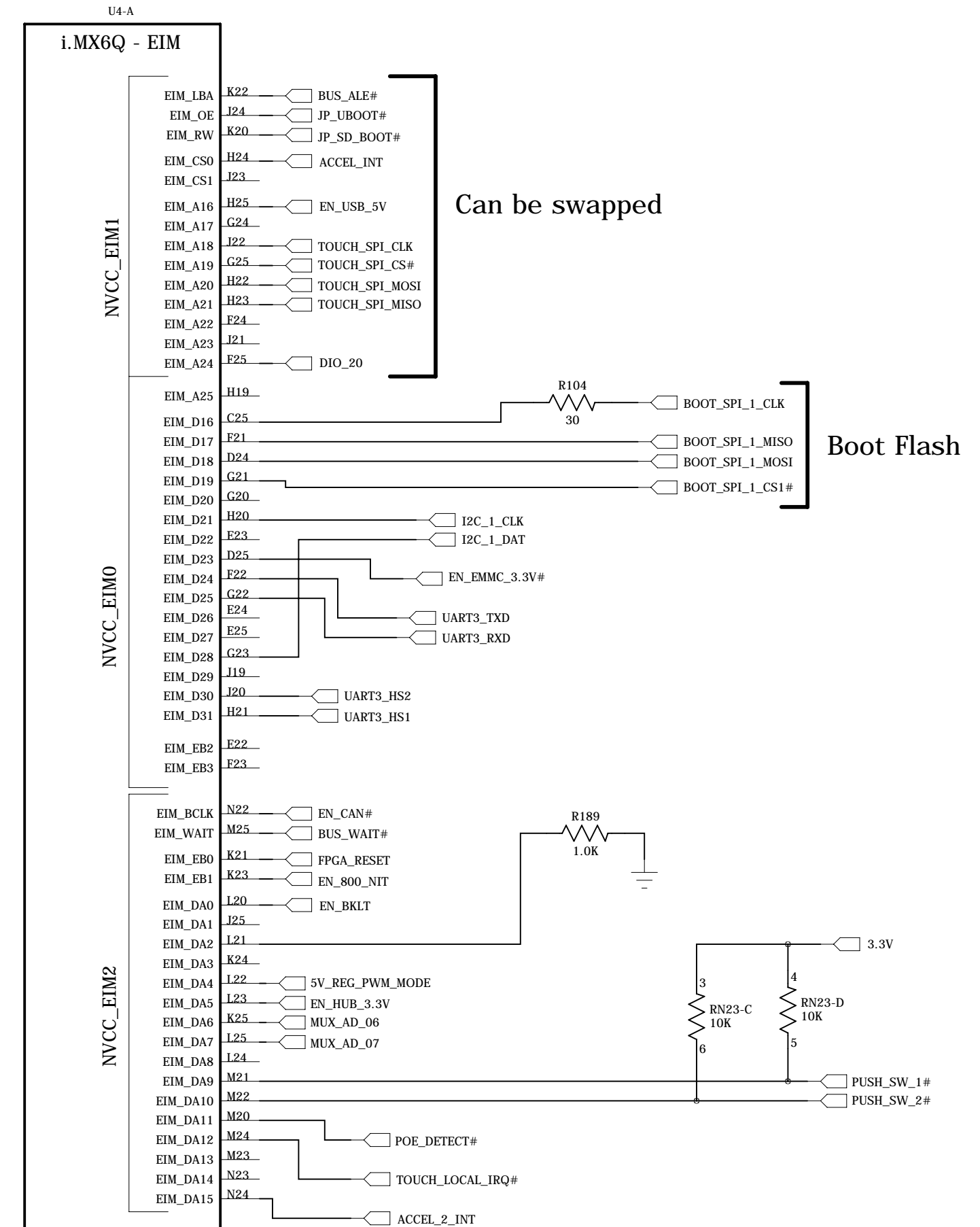
Technologic Systems	Date June 1, 2017
Title: TS-7990	
Rev: C	Designer
Sheet 7 of 30	

LCD



MX6_SINGLE_CORE_BGA624
 *Option 1 = NXP MCIMX6S7CVM08AB (Single Core, 800MHz, I-Temp)
 Option 3 = NXP MCIMX6Q5EYM10AC (Quad Core, 1GHz, E-Temp)

EIM

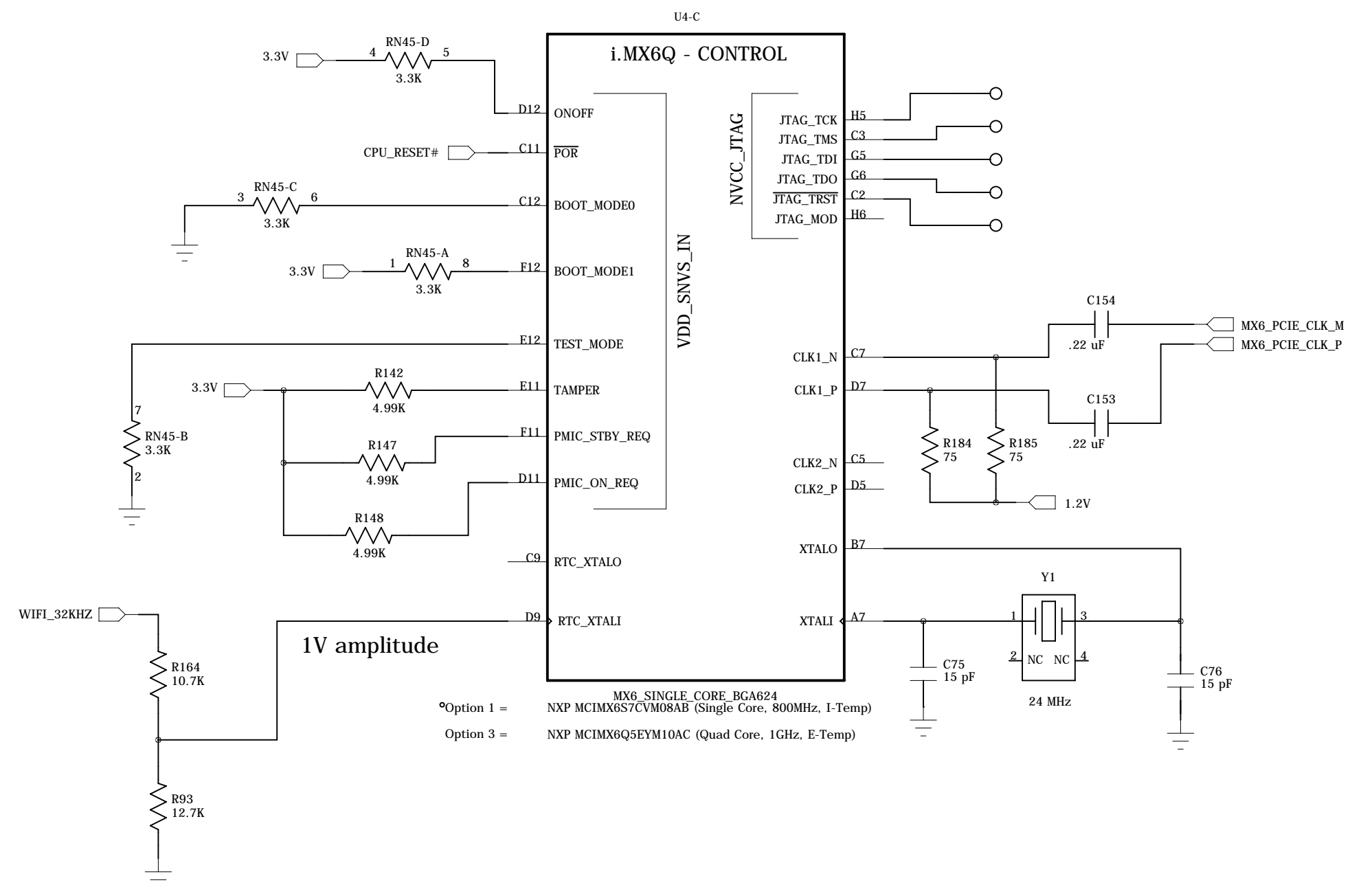


MX6_SINGLE_CORE_BGA624
 *Option 1 = NXP MCIMX6S7CVM08AB (Single Core, 800MHz, I-Temp)
 Option 3 = NXP MCIMX6Q5EYM10AC (Quad Core, 1GHz, E-Temp)

Can be swapped

Boot Flash

CPU Control

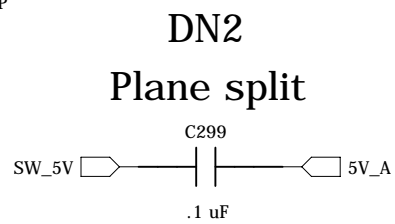
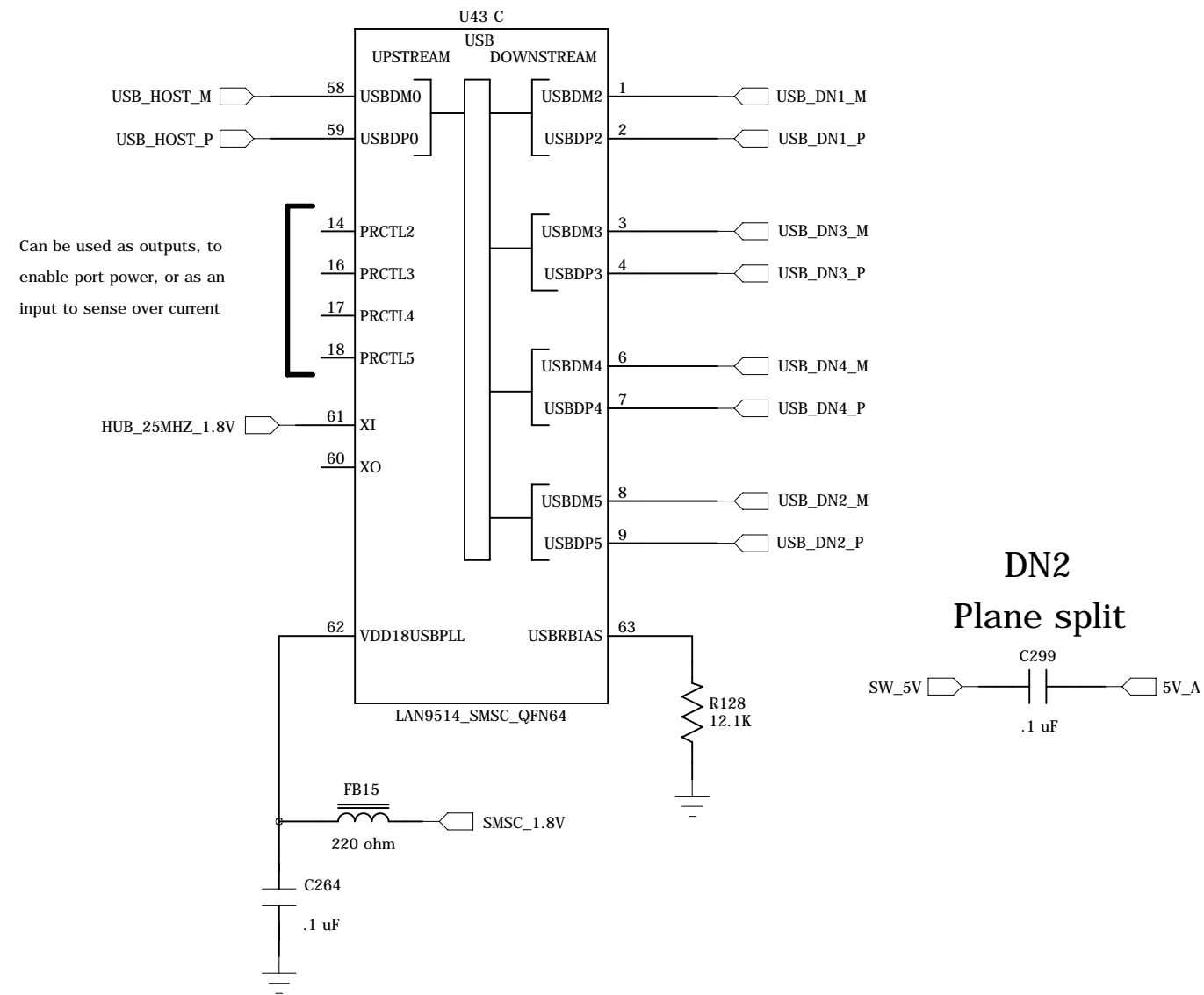


BOOT_MODE

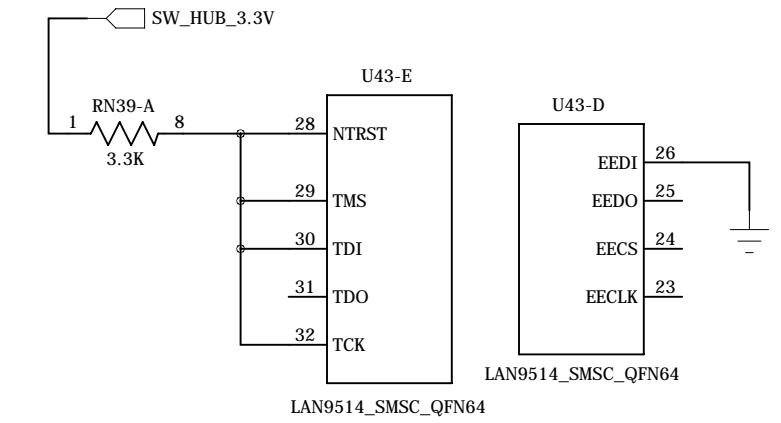
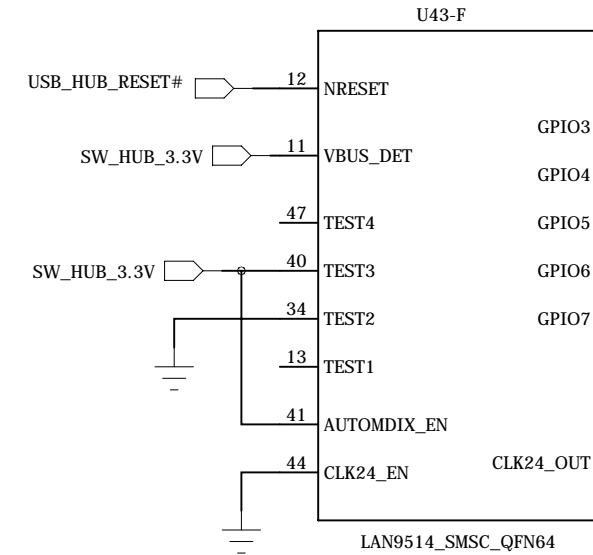
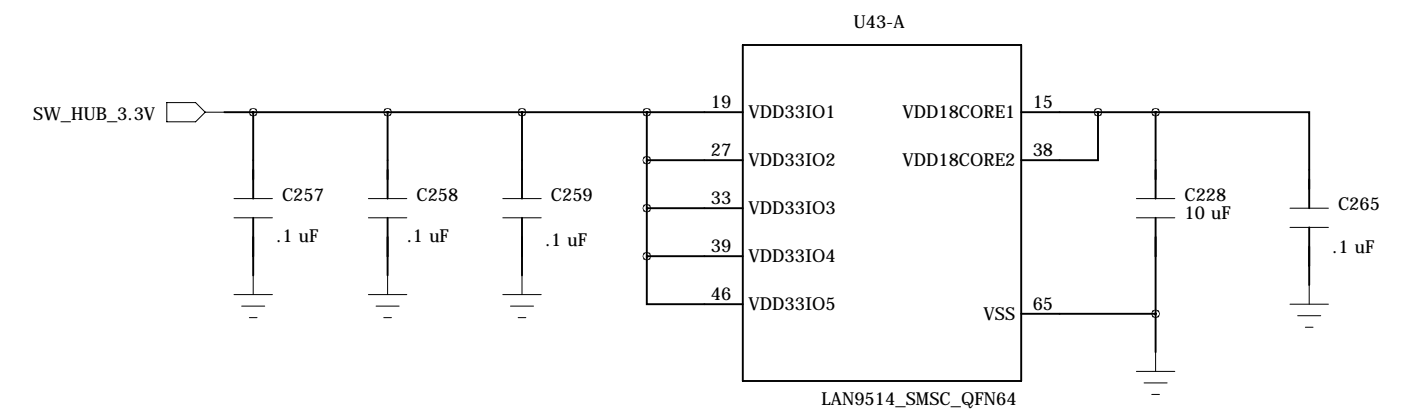
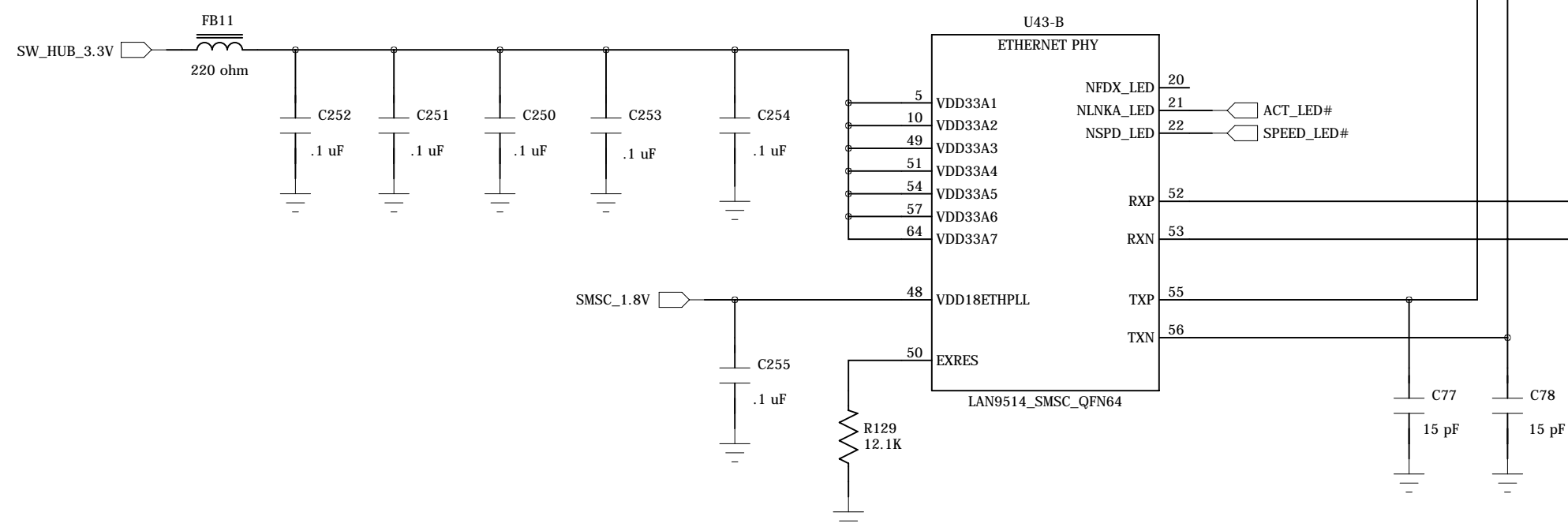
MSB	LSB	
0	0	= Fuses
0	1	= USB
1	0	= Internal Boot

2nd Ethernet Port

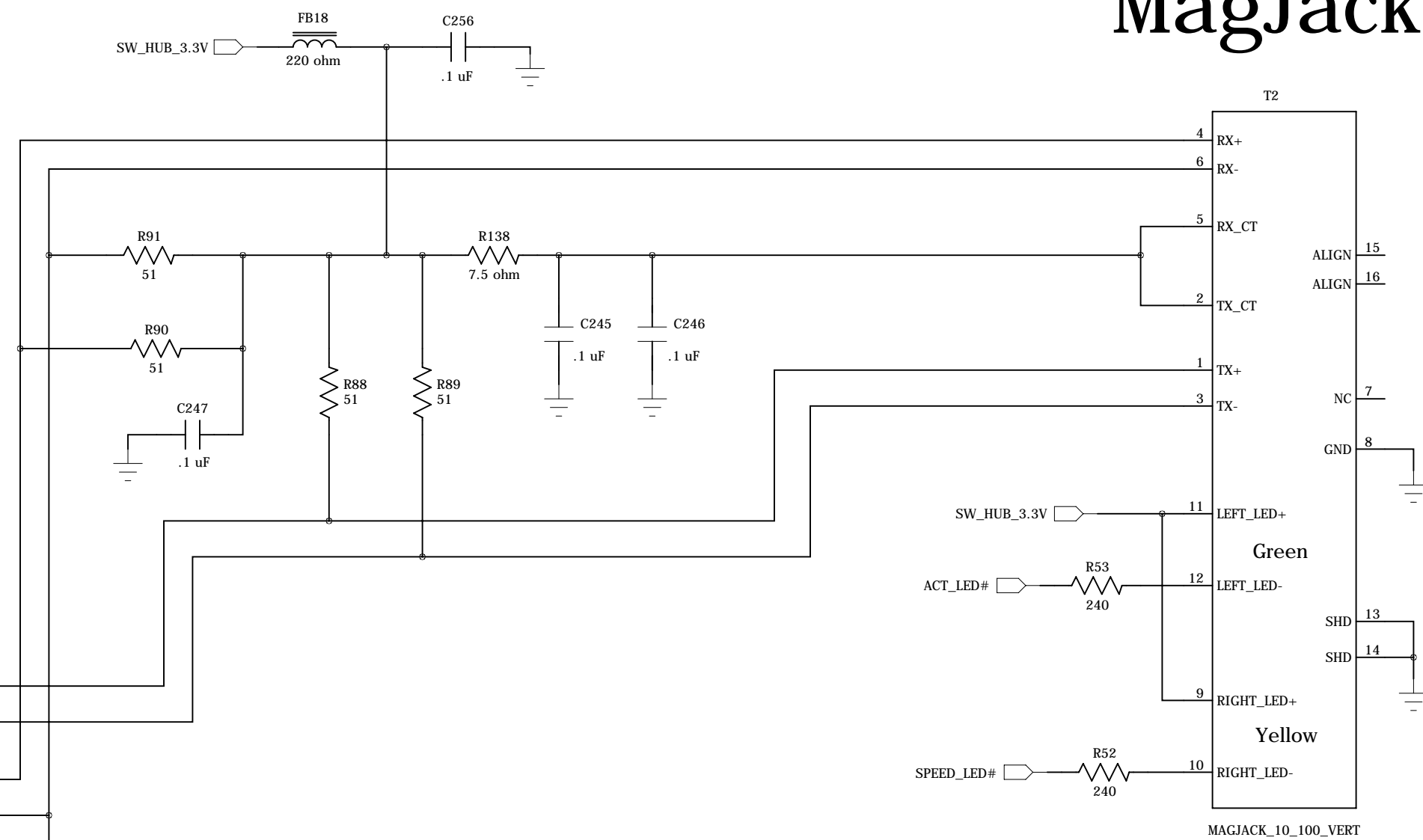
SMSC USB Hub



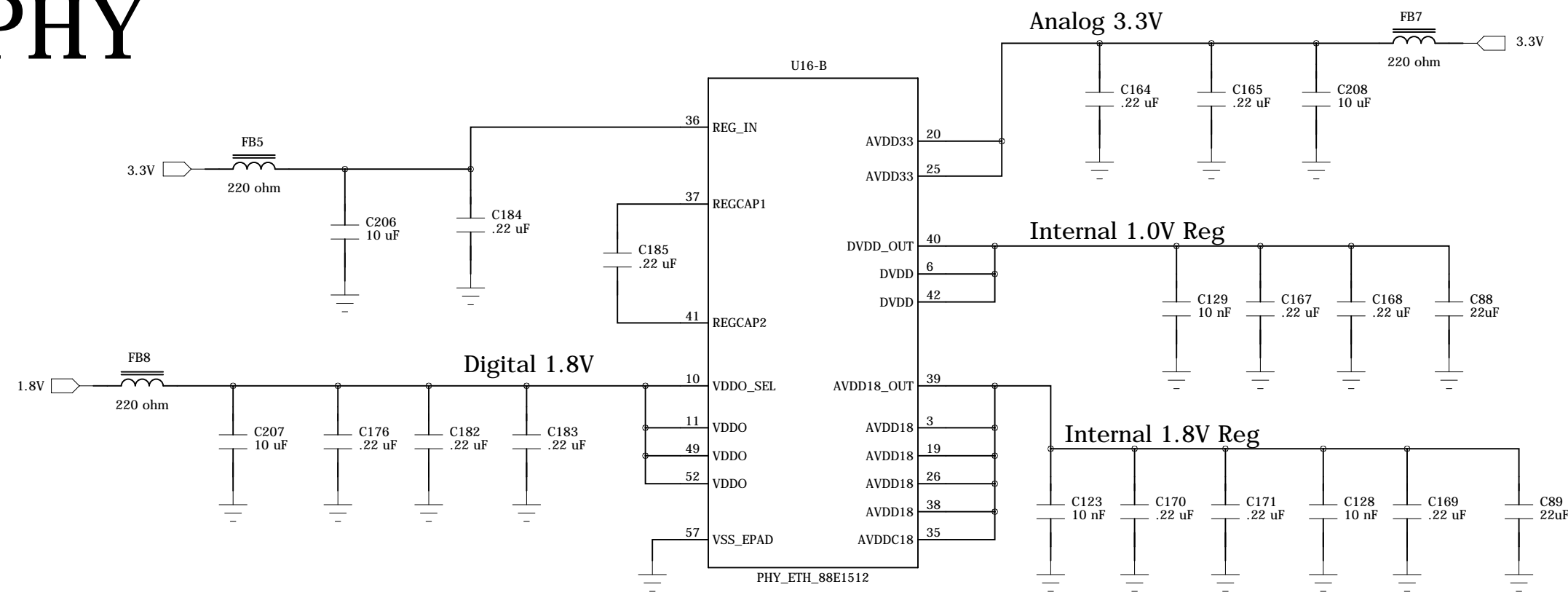
SMSC Ethernet Port



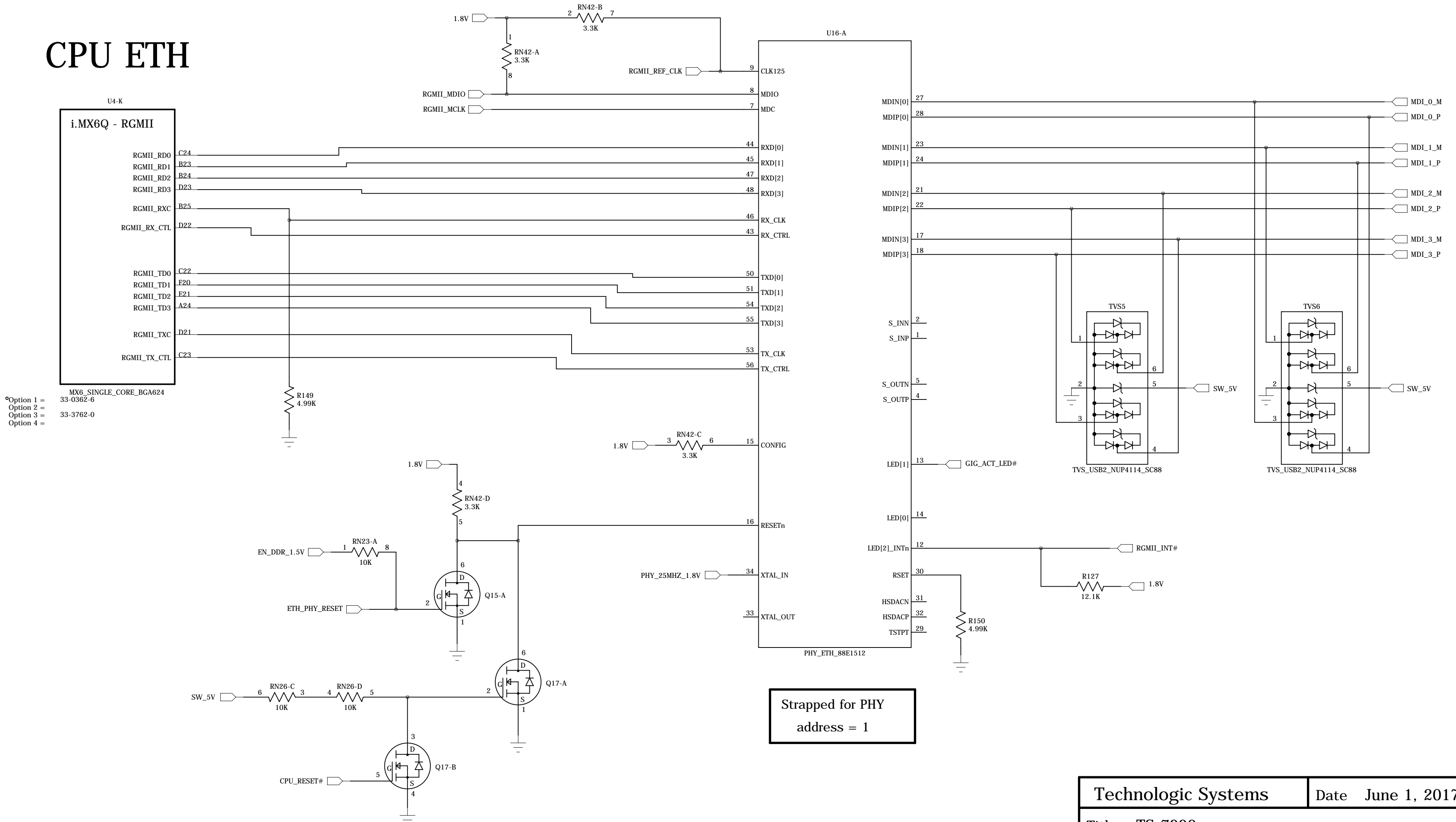
Vert. MagJack



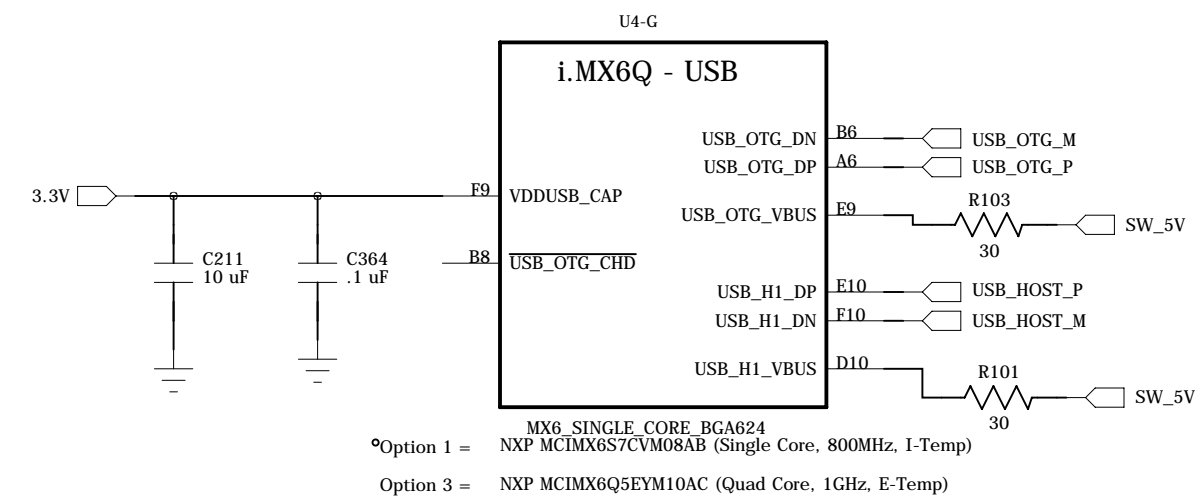
10/100/1000 Ethernet PHY



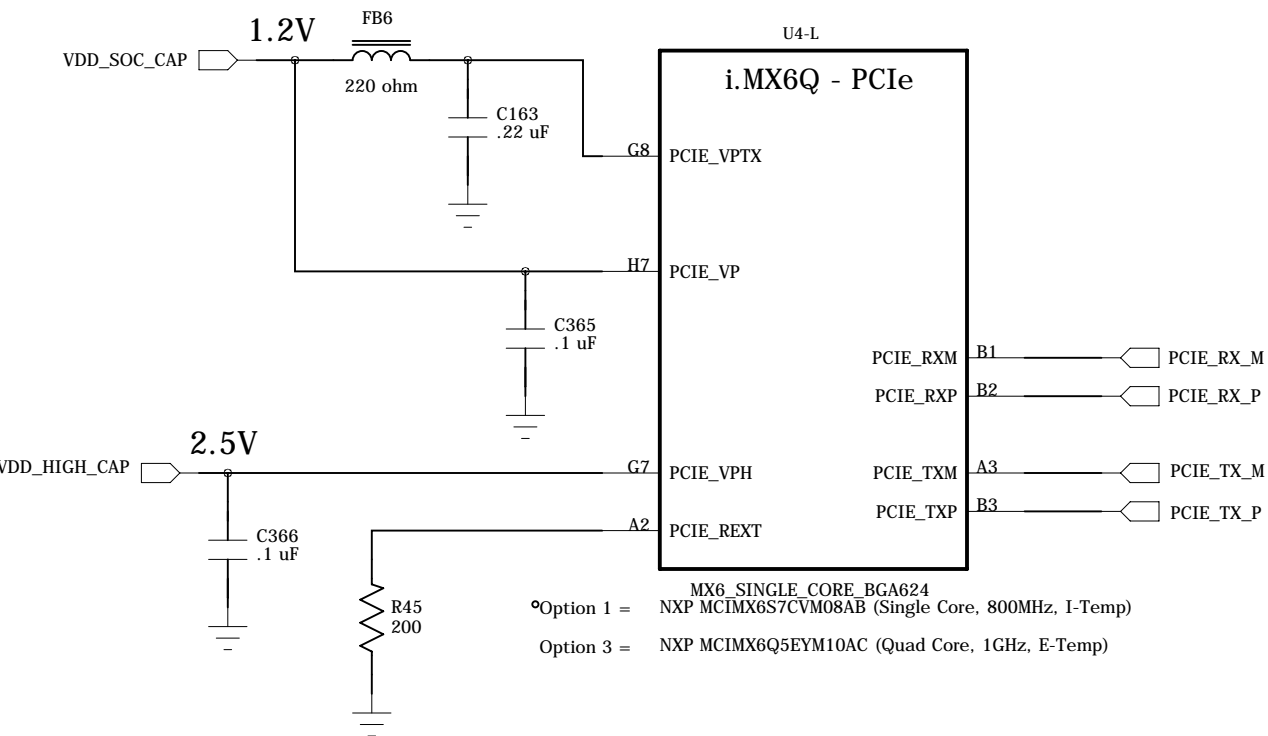
CPU ETH



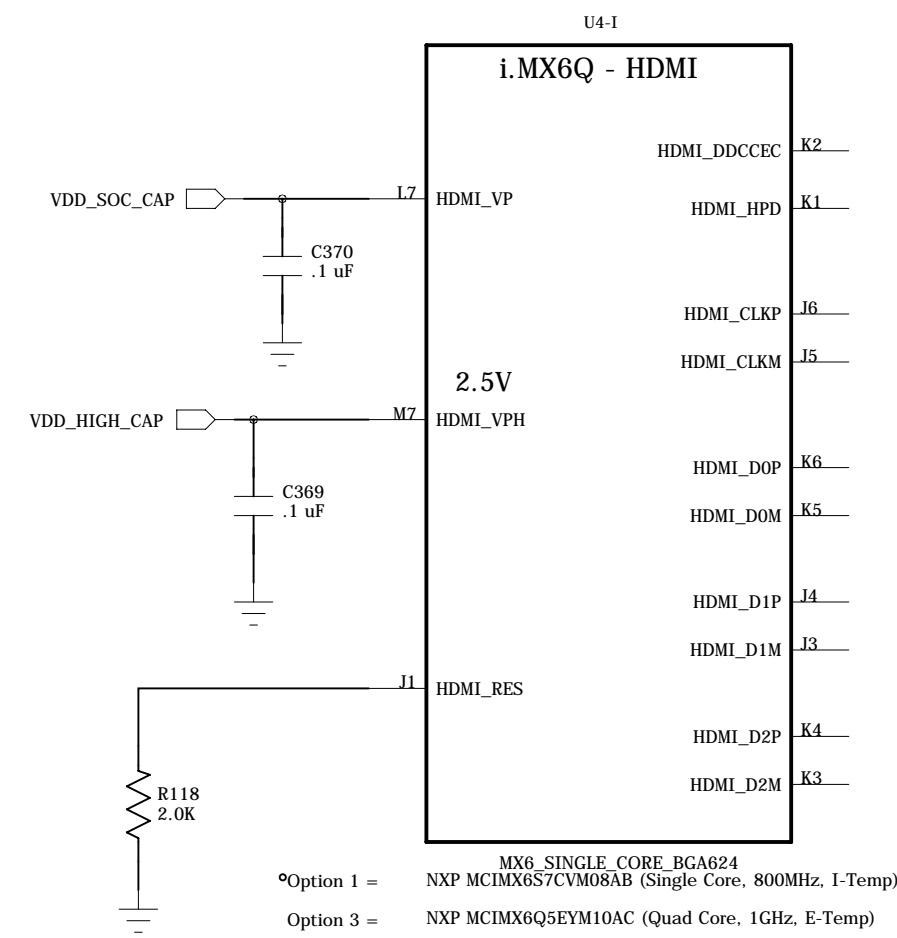
CPU USB



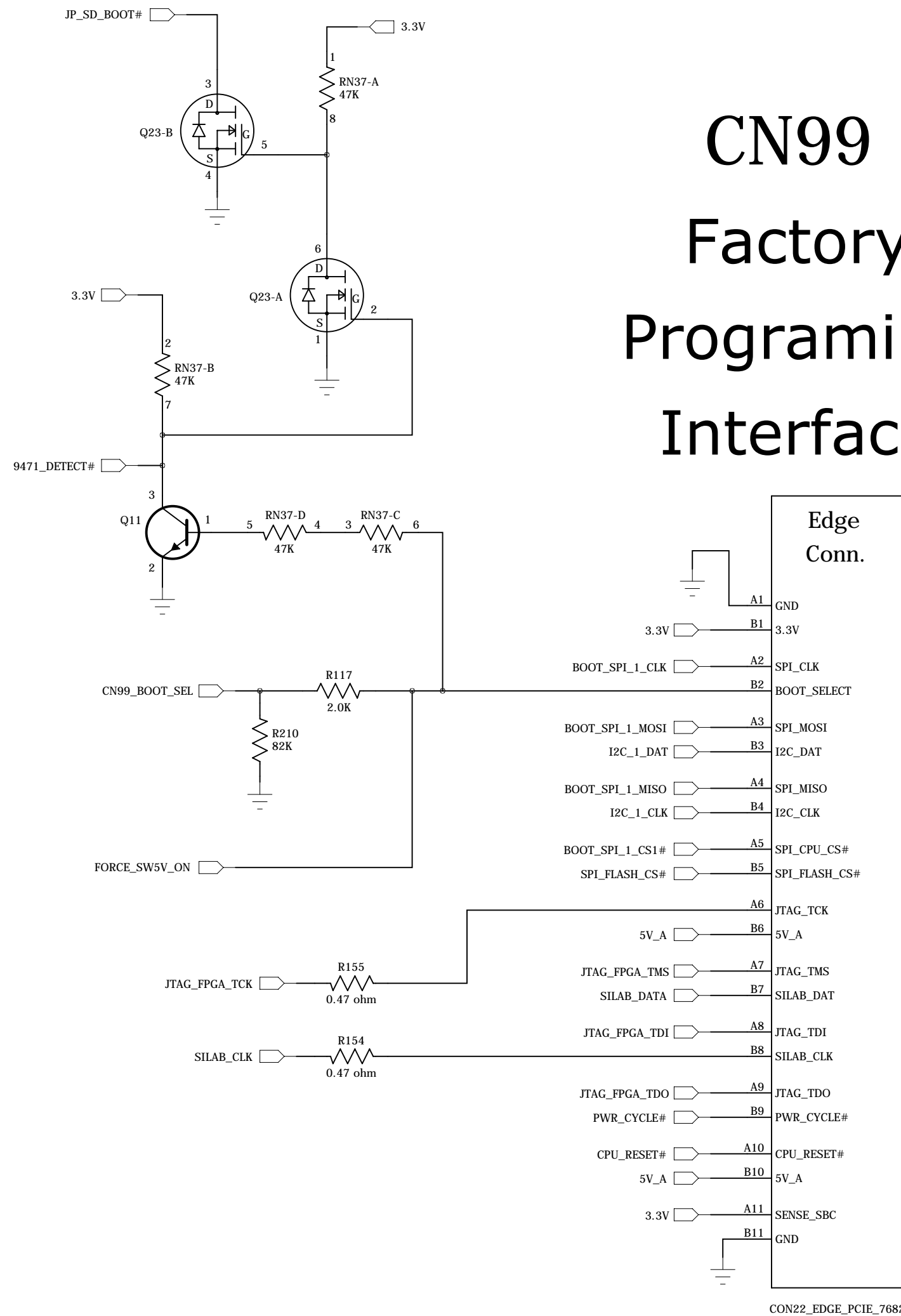
CPU PCIe



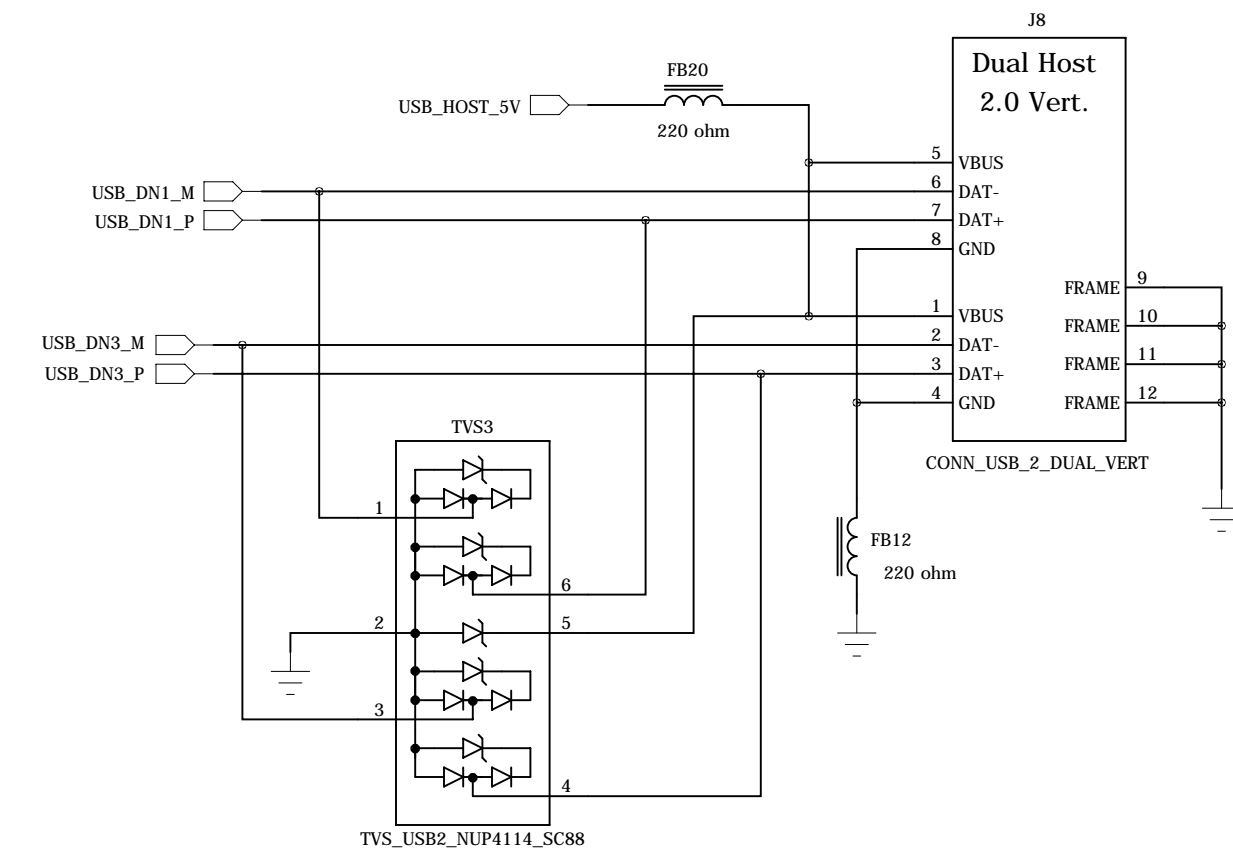
CPU HDMI



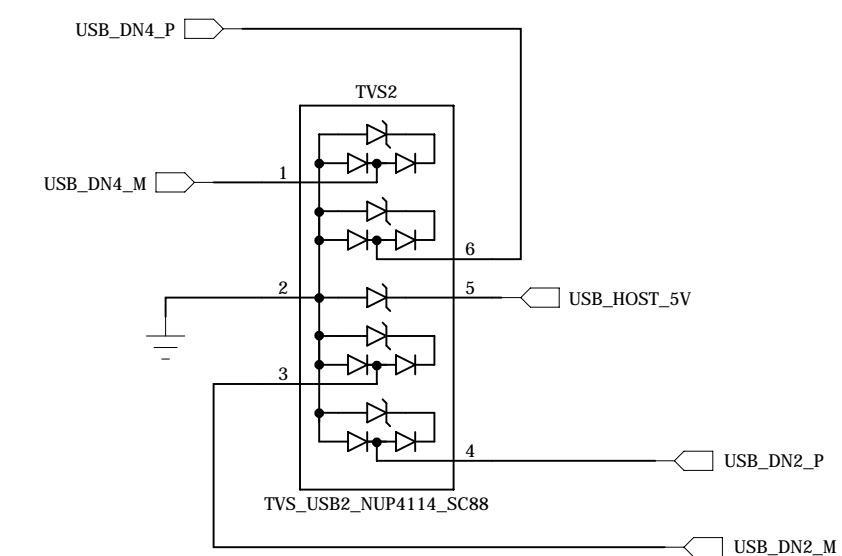
CN99 Factory Programing Interface



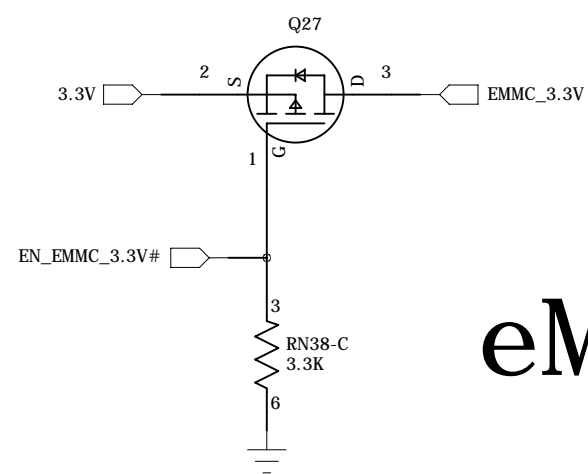
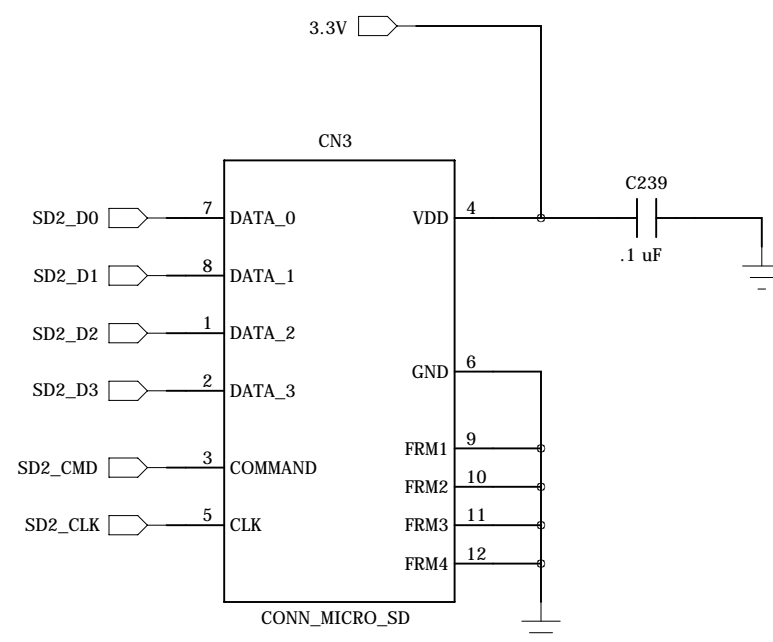
USB Host Vert. Ports



Mini-PCIE and Modem USB TVS

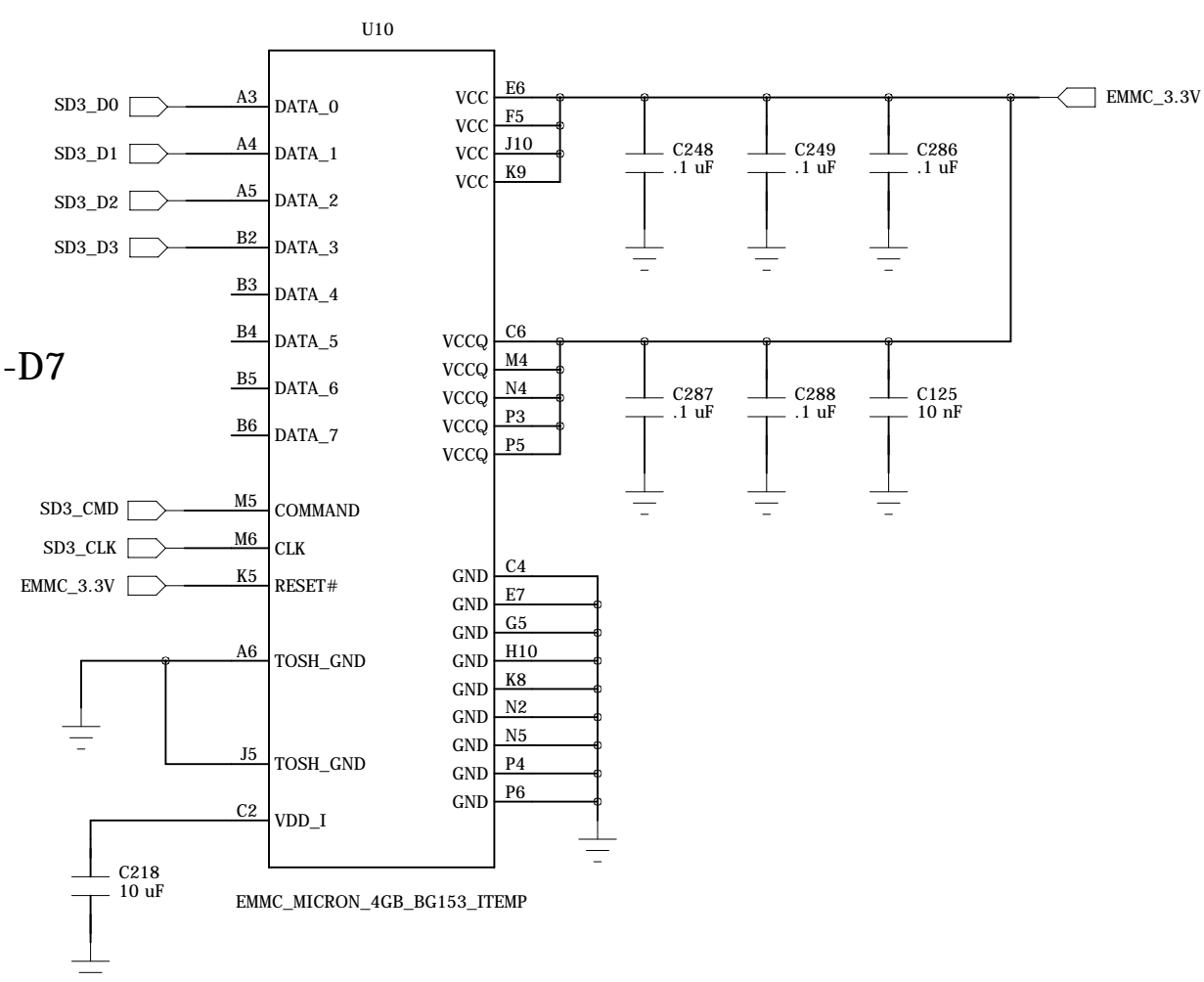


Micro SD Card Socket

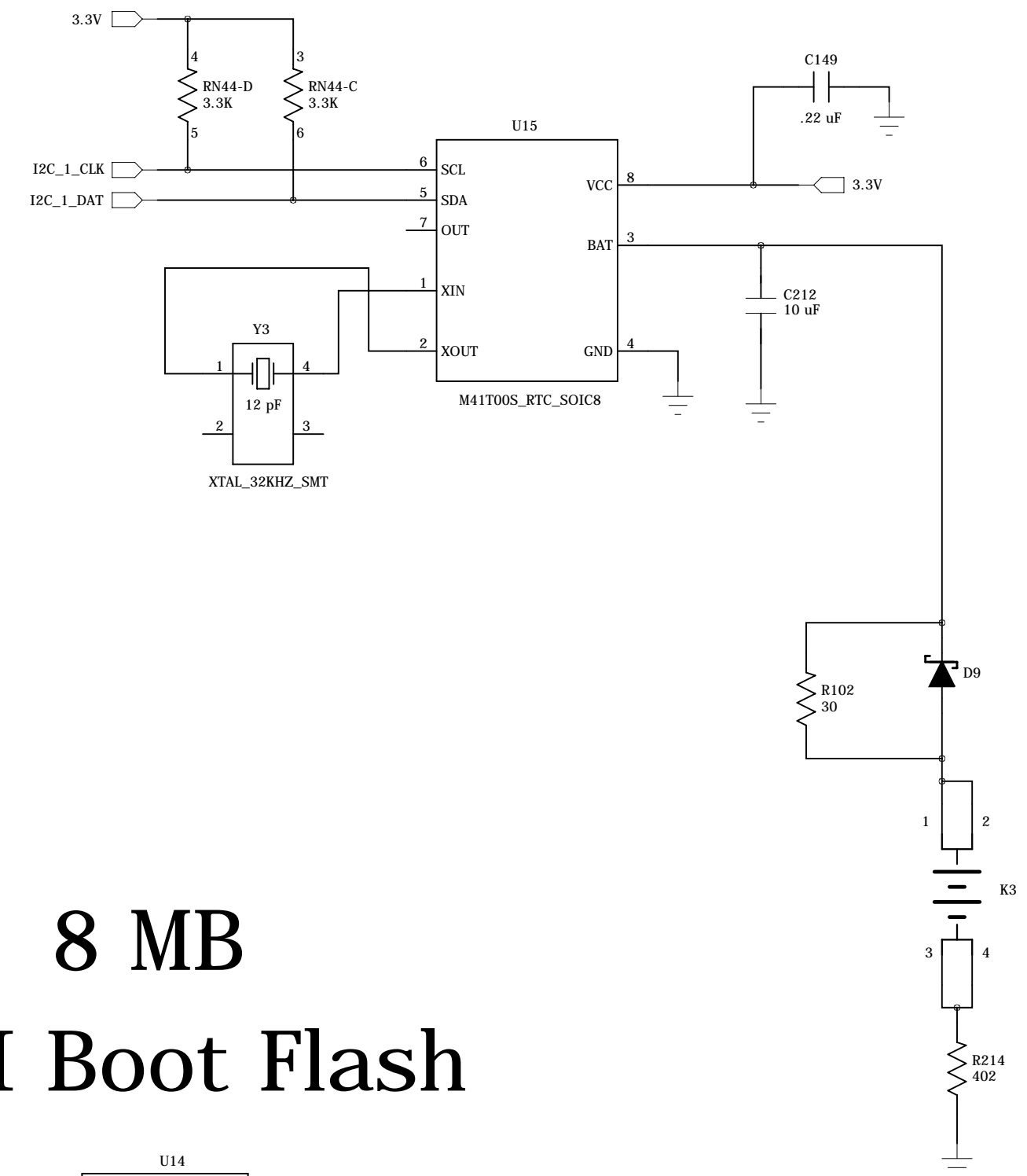


eMMC 4GB

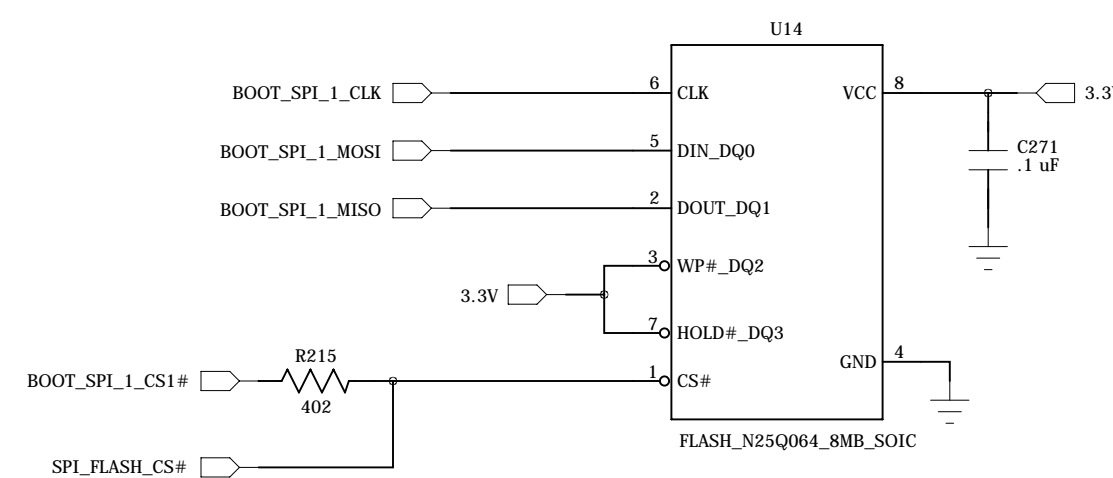
Internal PU on D4-D7



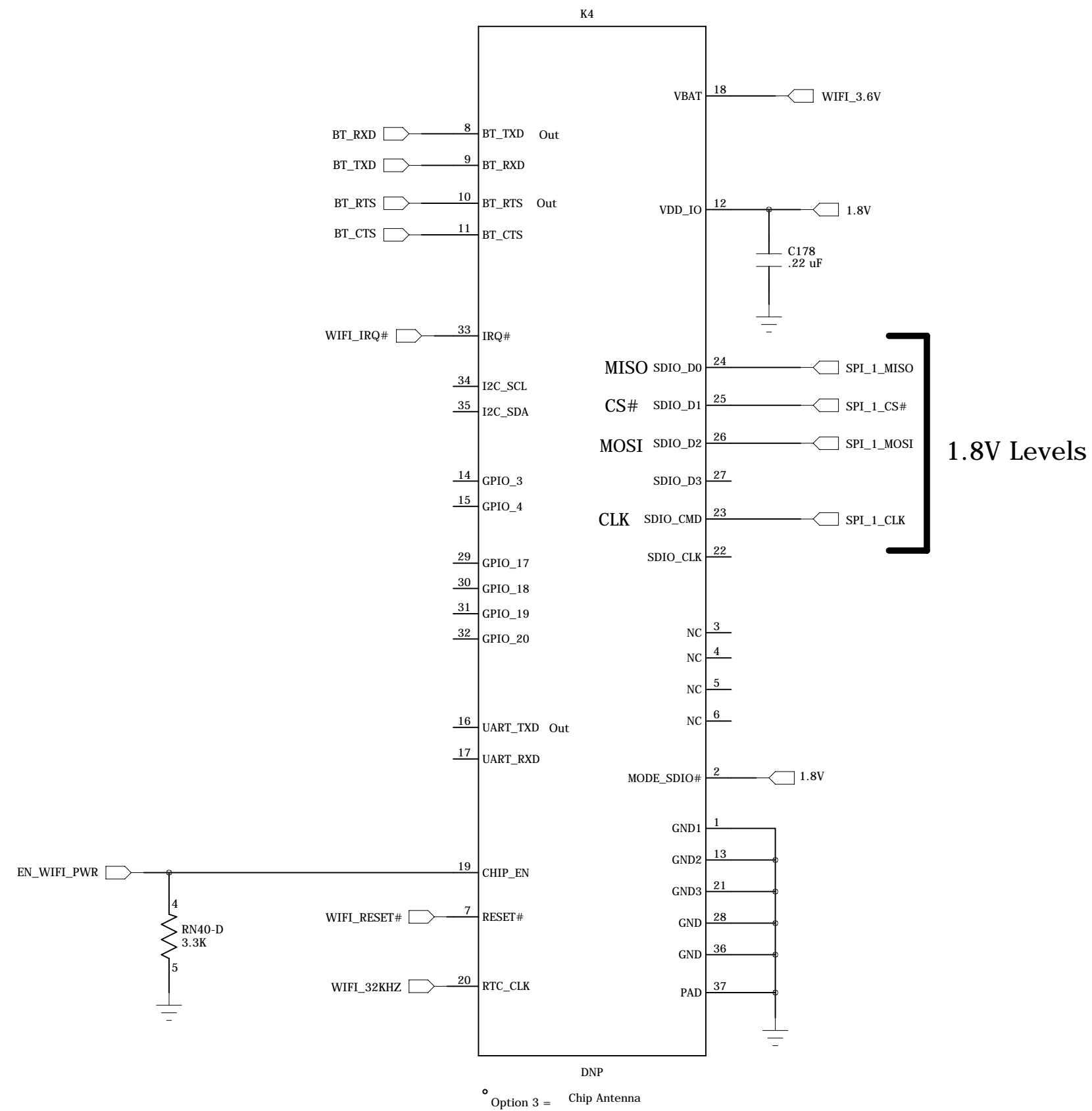
ST Micro RTC



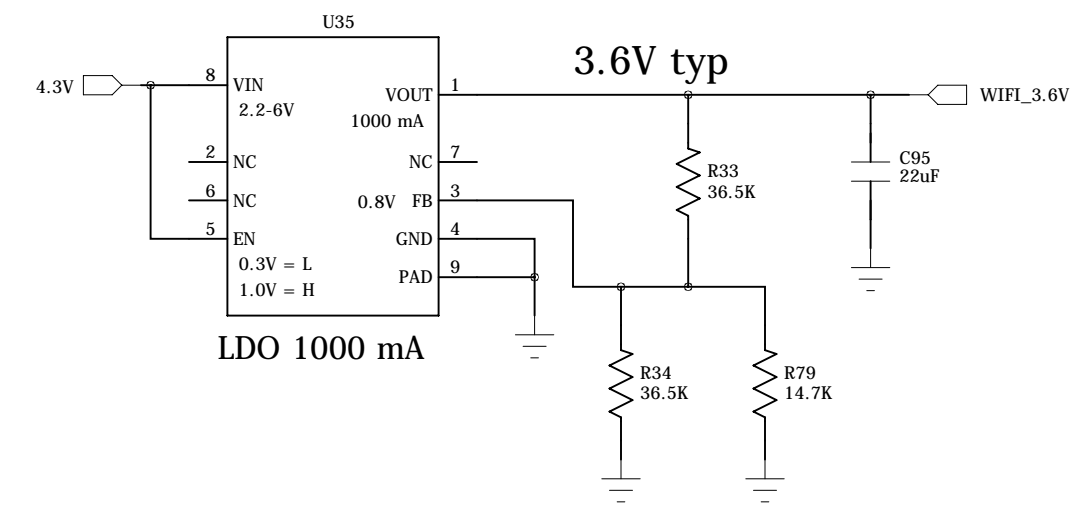
8 MB SPI Boot Flash



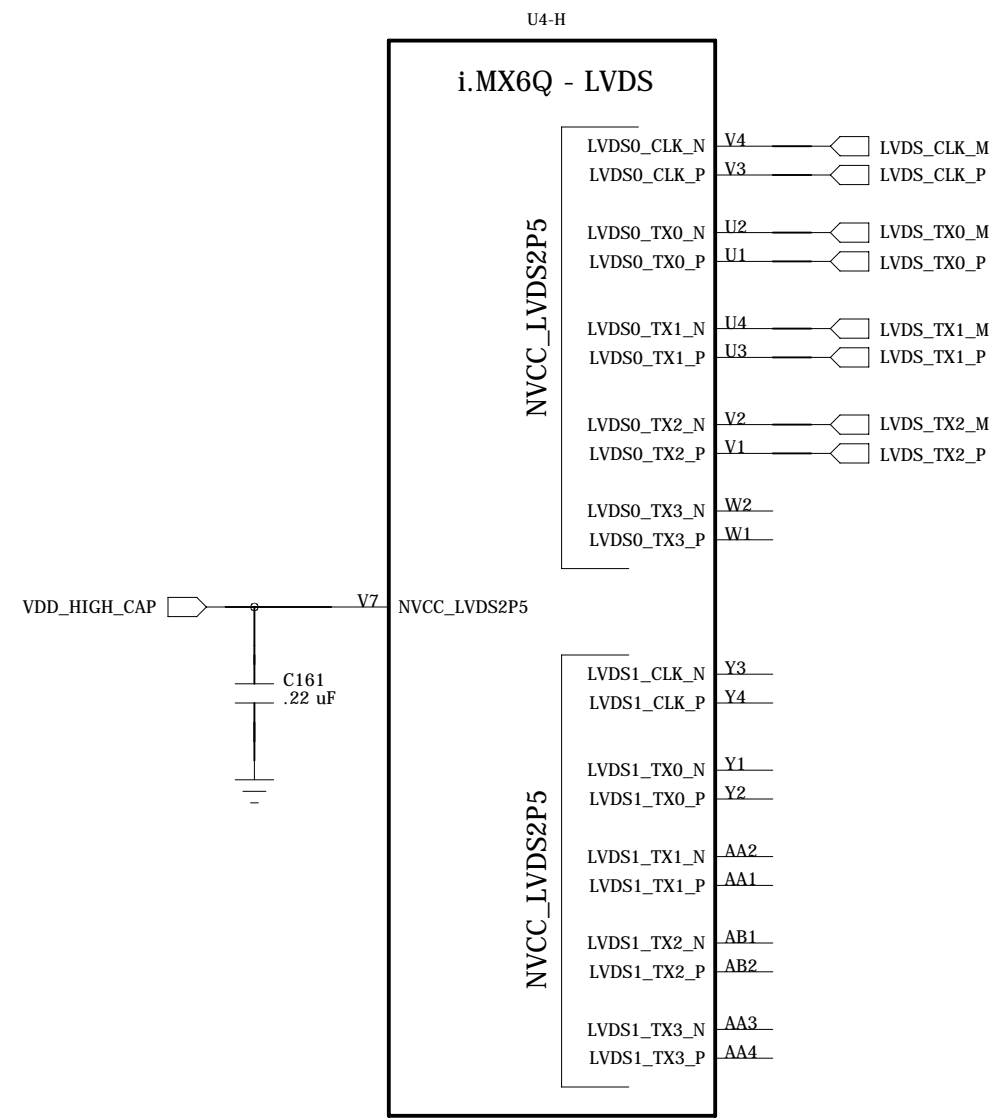
WiFi / Bluetooth Radio Module



WiFi 3.6V Regulator

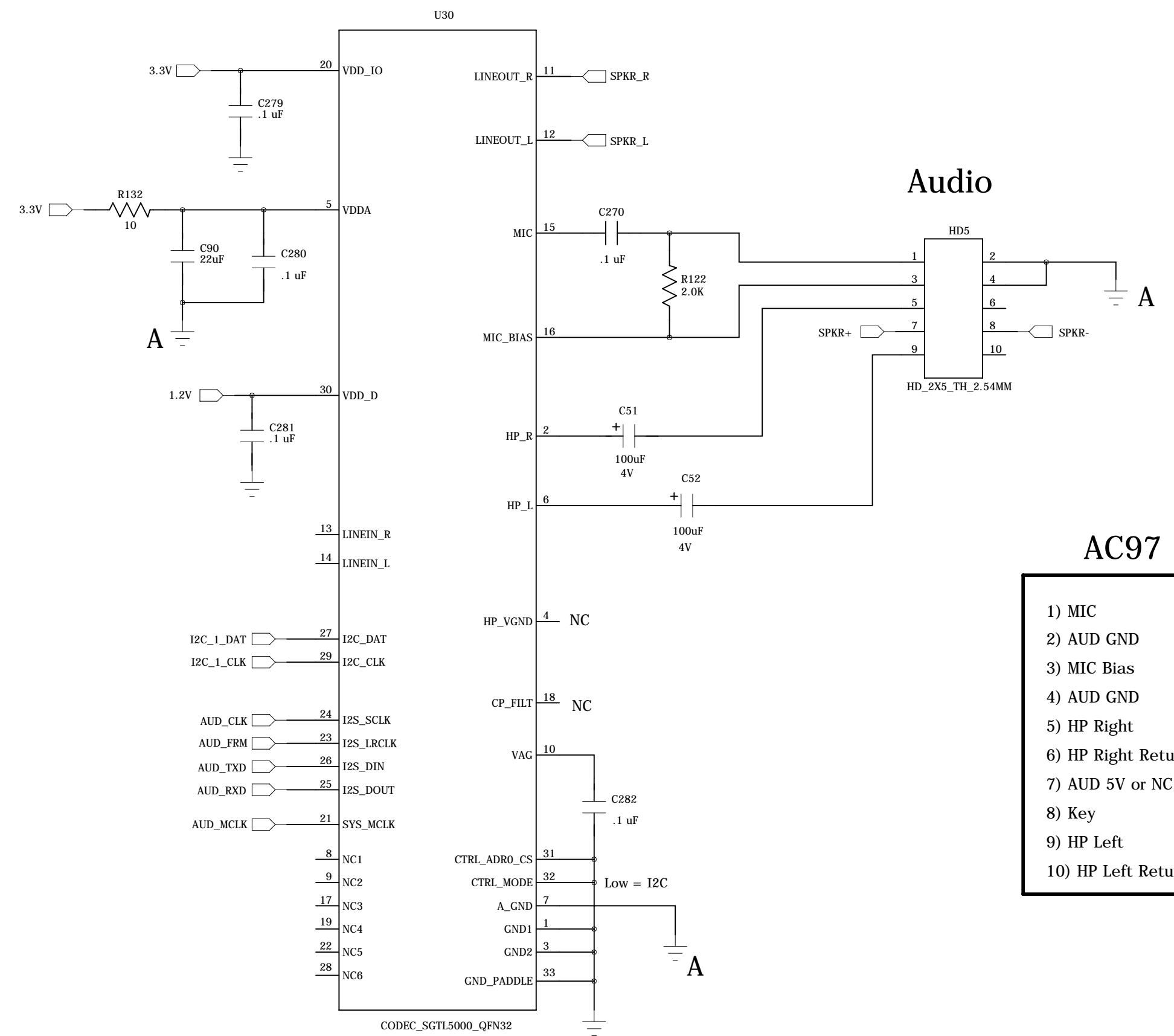


LVDS



MX6_SINGLE_CORE_BG4624
 *Option 1 = NXP MCMX6S7CVM08AB (Single Core, 800MHz, I-Temp)
 Option 3 = NXP MCMX6Q5EYM10AC (Quad Core, 1GHz, E-Temp)

Audio CODEC

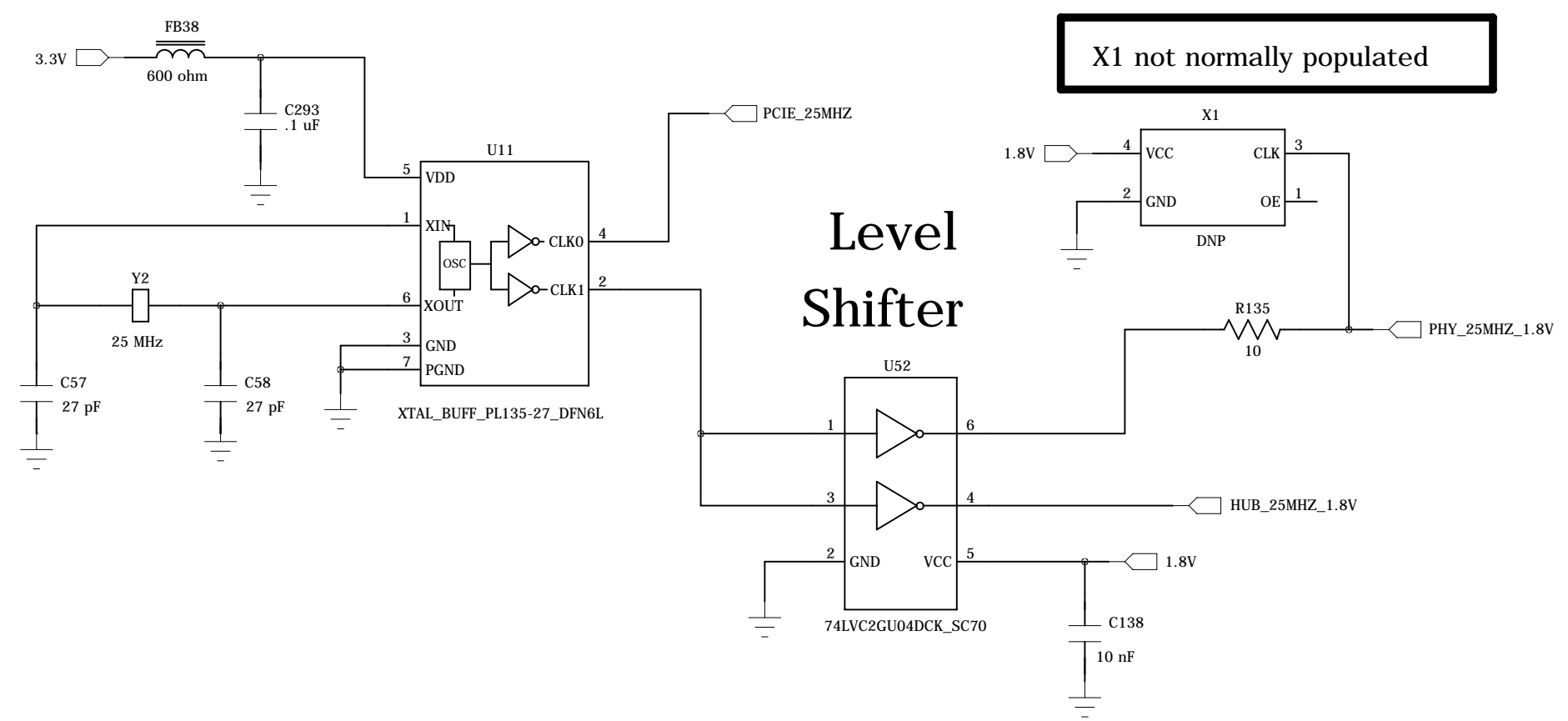


Audio

AC97

- 1) MIC
- 2) AUD GND
- 3) MIC Bias
- 4) AUD GND
- 5) HP Right
- 6) HP Right Return
- 7) AUD 5V or NC
- 8) Key
- 9) HP Left
- 10) HP Left Return

25 MHz Osc.



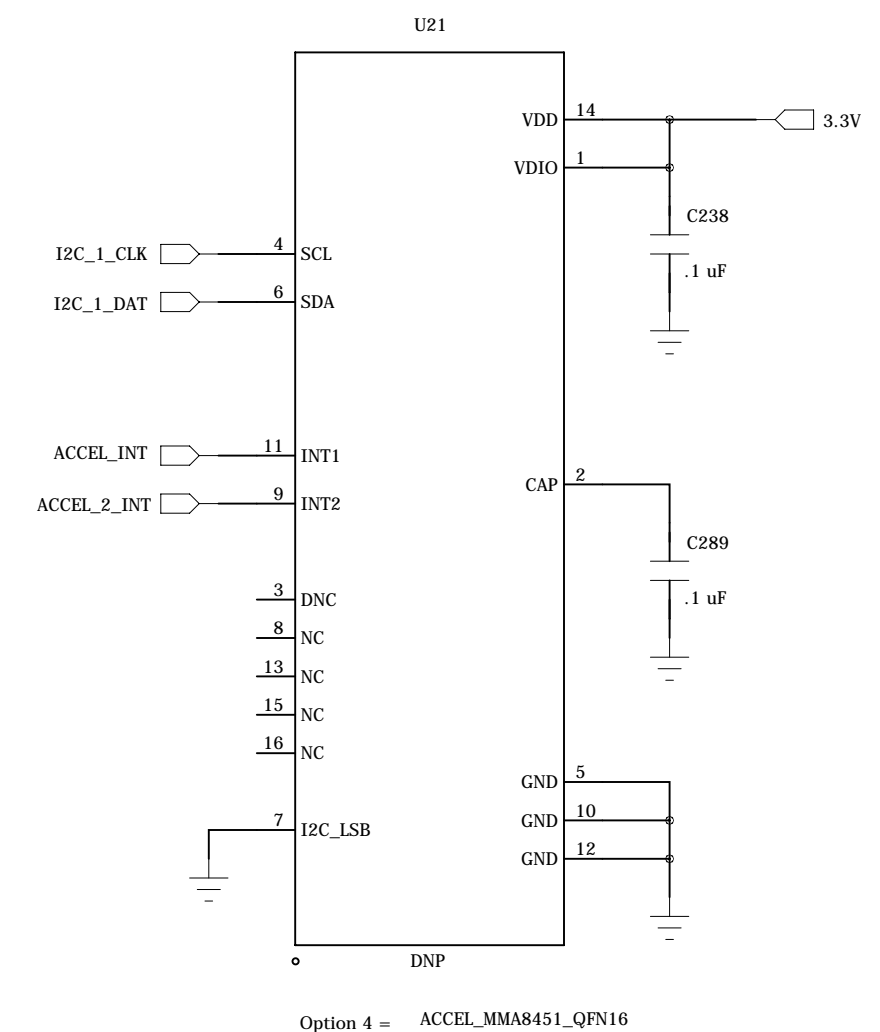
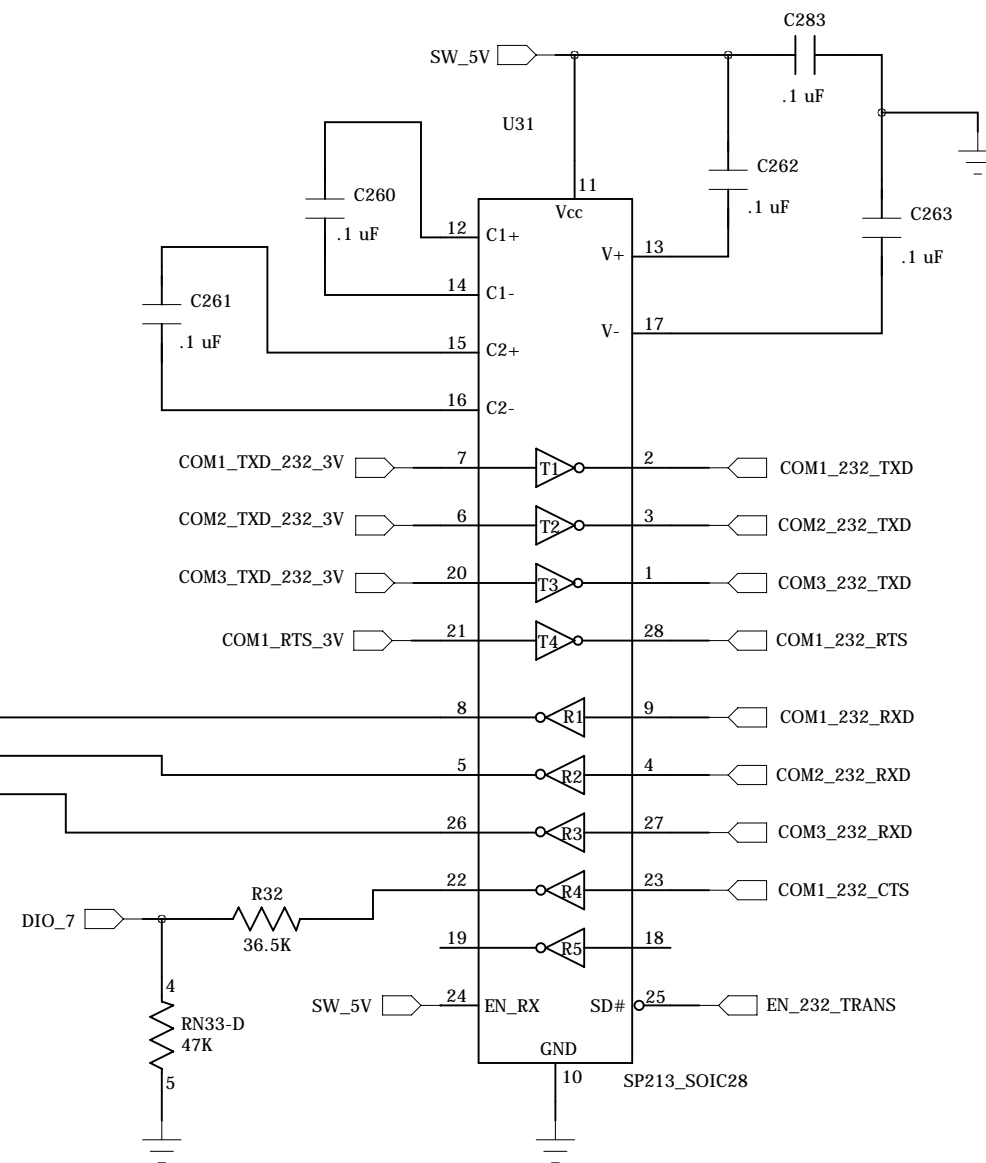
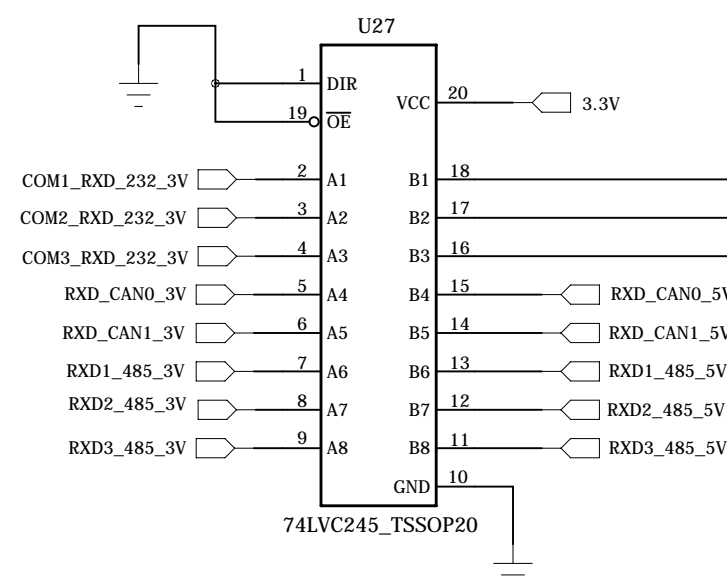
RS-232 Transceiver and COM Headers

RS-232 Transceiver

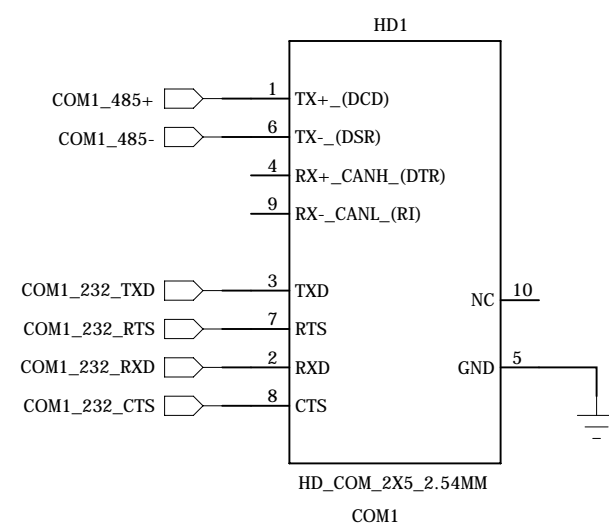
Accelerometer

3.3V <-- 5V

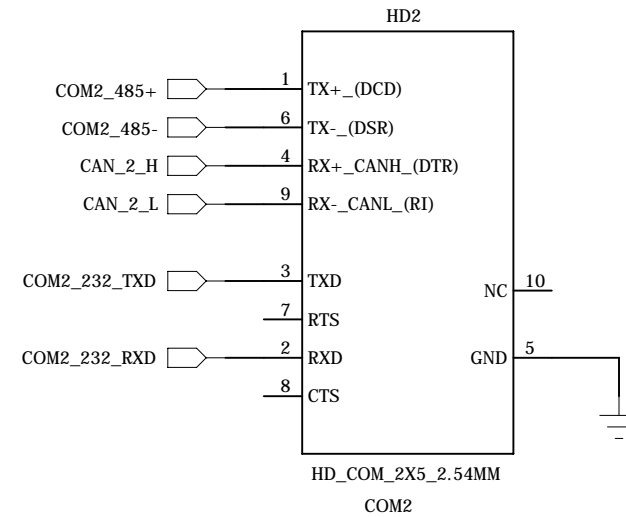
Level shifter



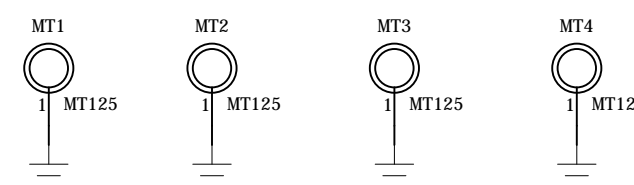
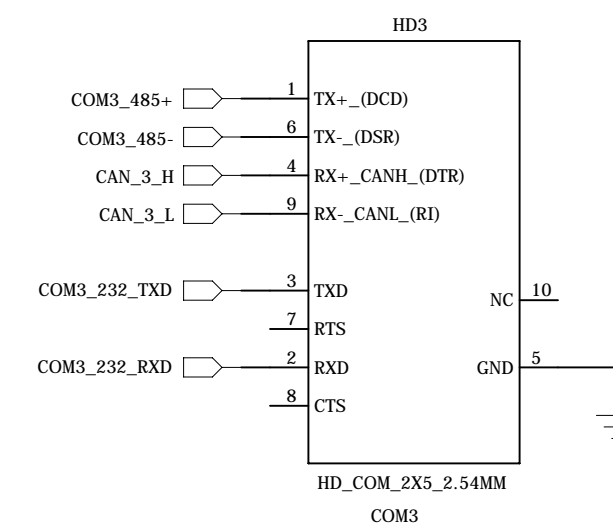
COM1 Header



COM2 Header



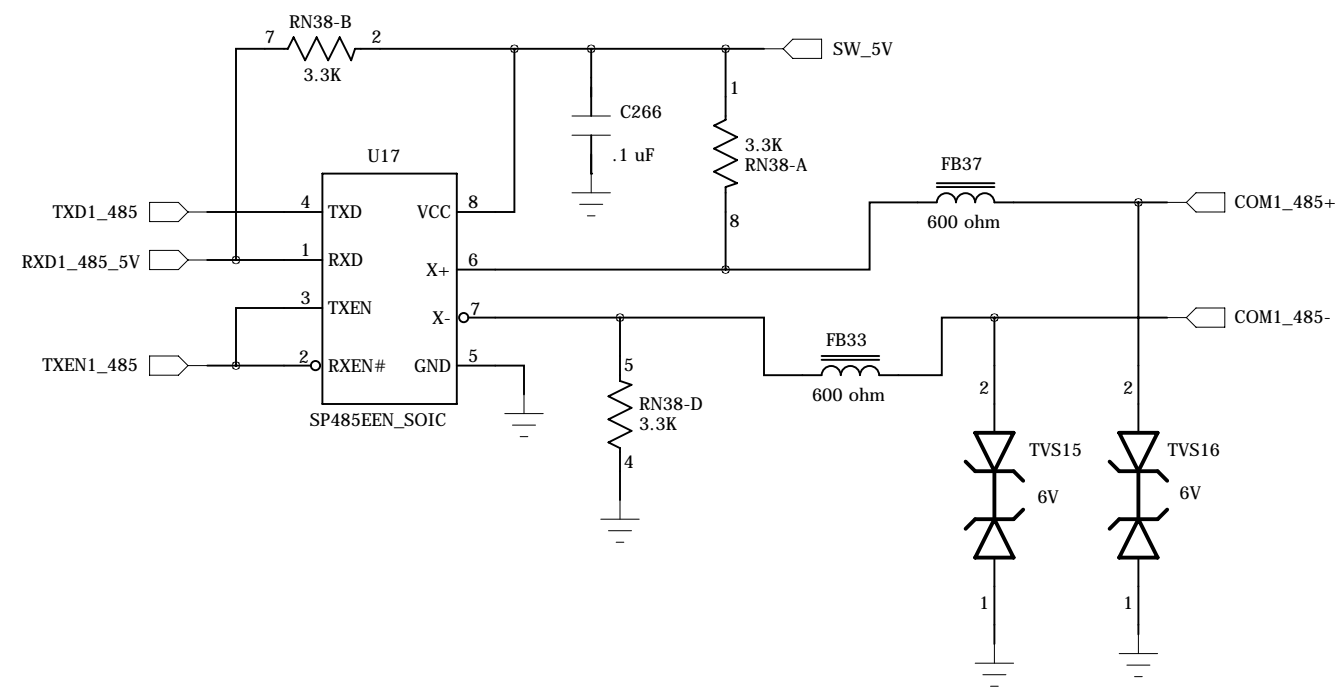
COM3 Header



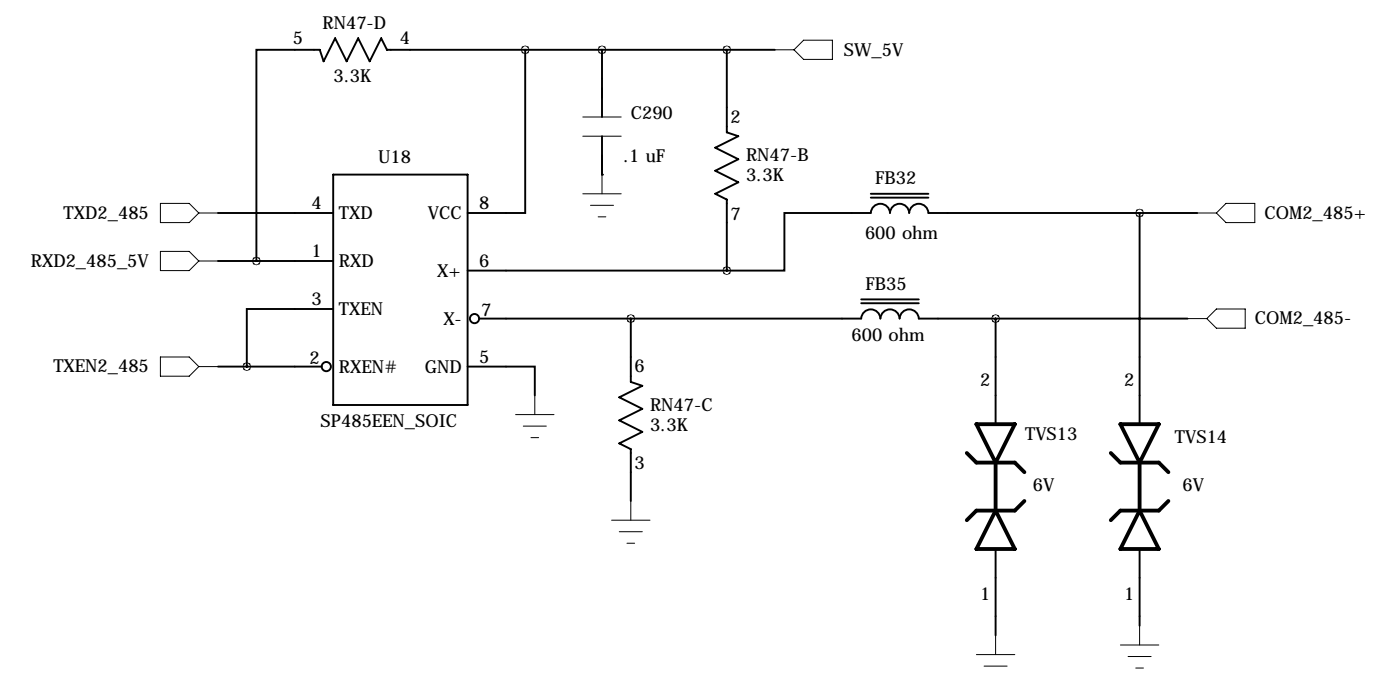
Technologic Systems		Date June 1, 2017
Title: TS-7990		
Rev: C	Designer	Sheet 20 of 30

RS-485 and CAN Transceivers

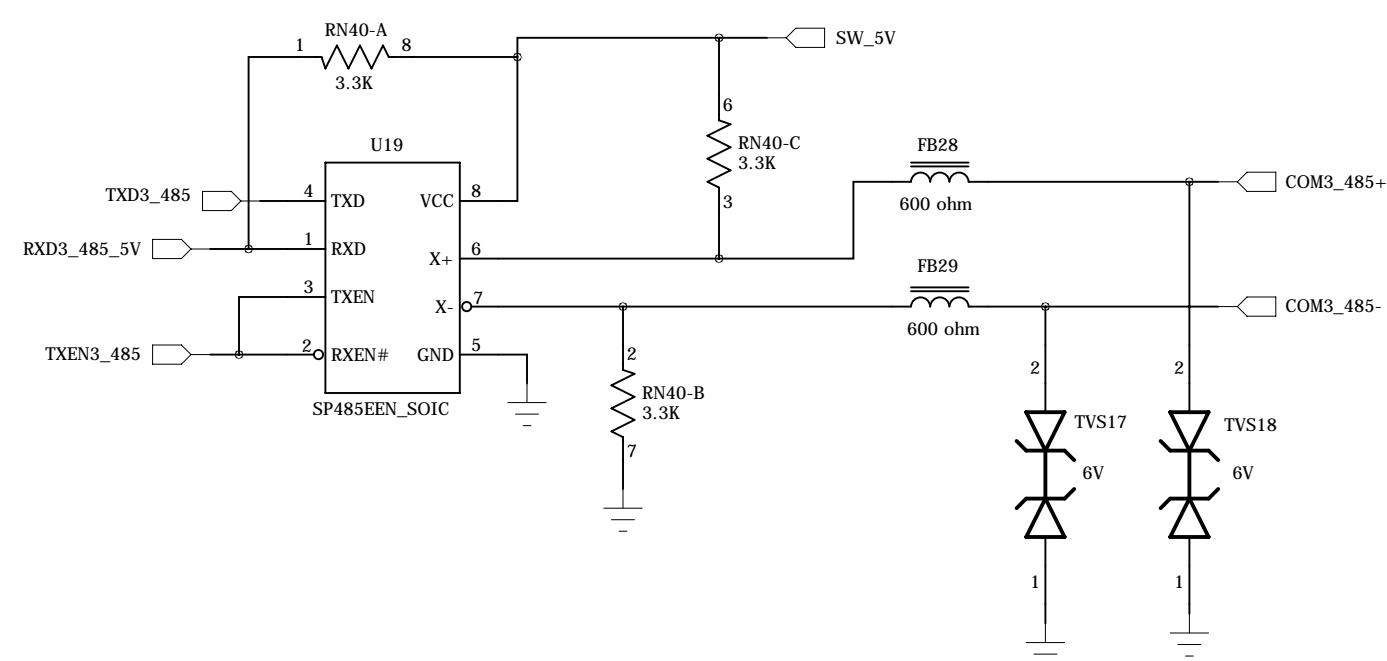
COM1 RS-485 Driver



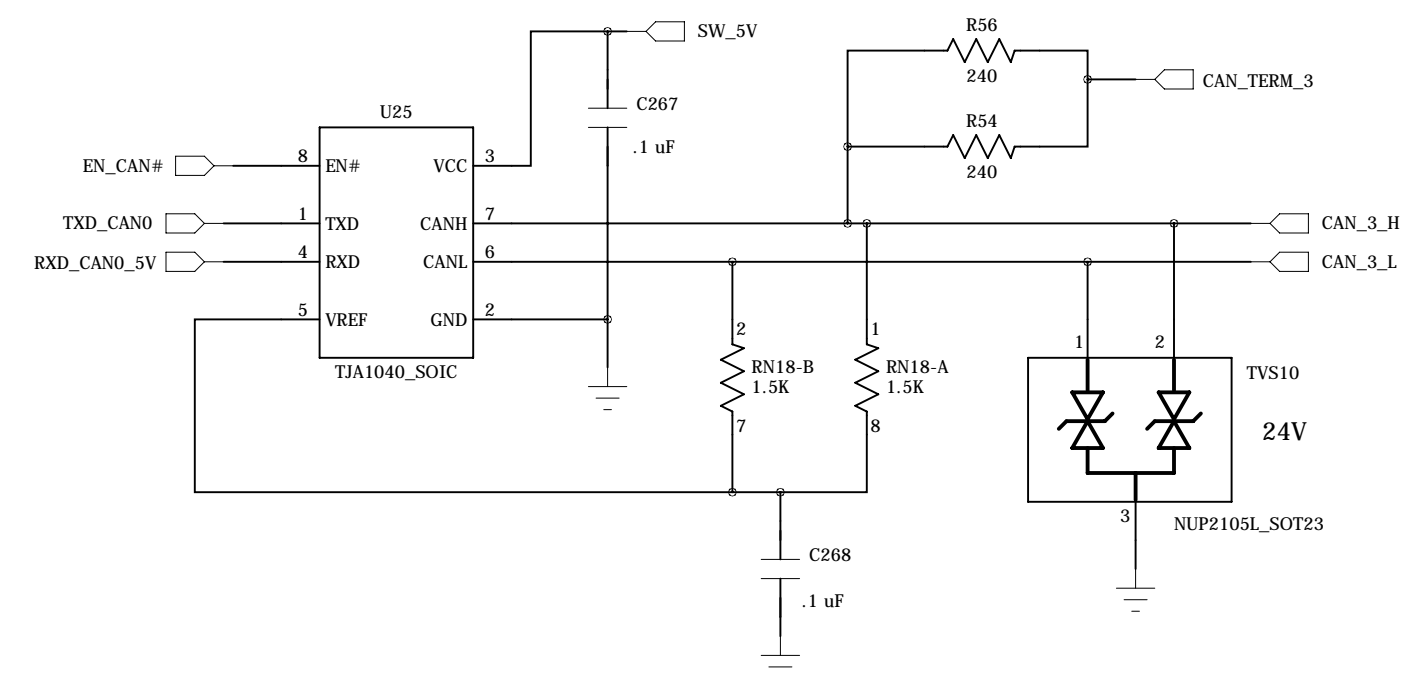
COM2 RS-485 Driver



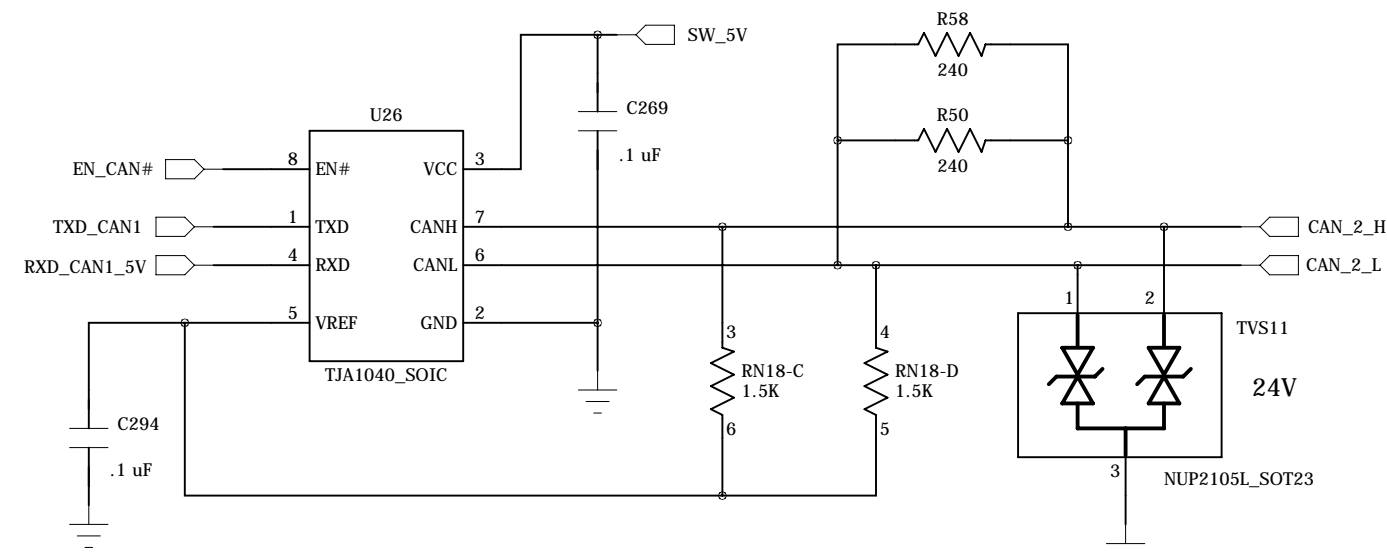
COM3 RS-485 Driver



COM3 CAN Transceiver



COM2 CAN Transceiver



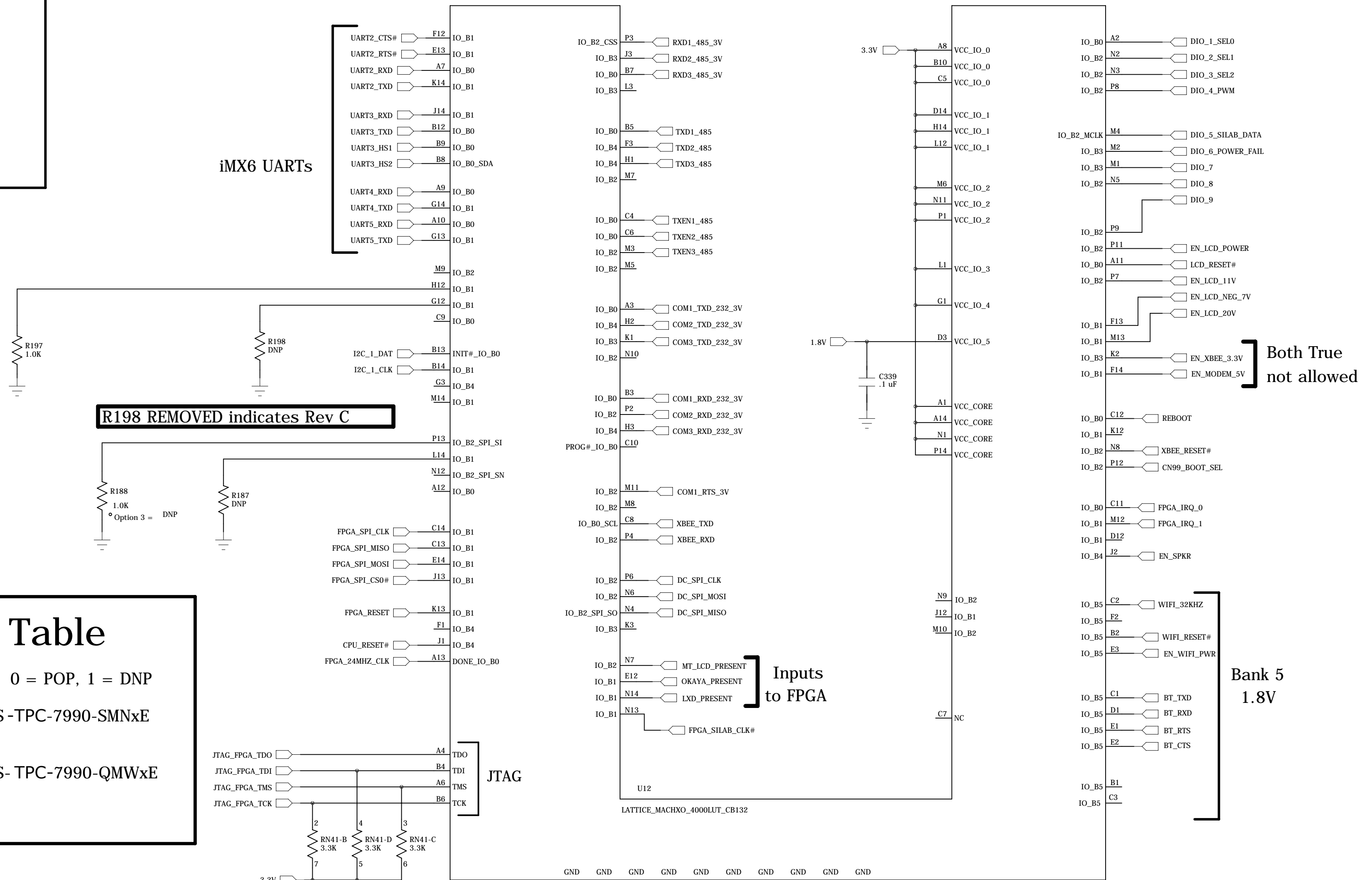
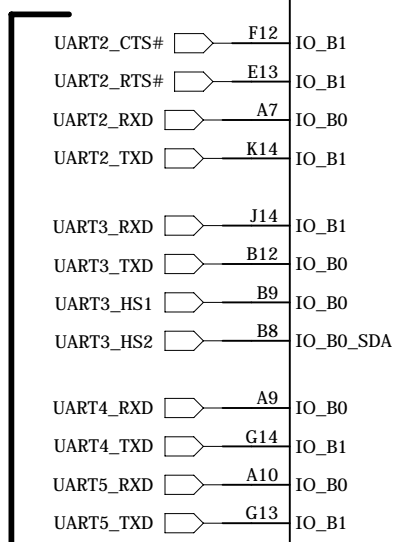
Technologic Systems	Date	June 1, 2017
Title: TS-7990		
Rev: C	Designer	Sheet 21 of 30

MACH XO2 FPGA

FPGA required for:

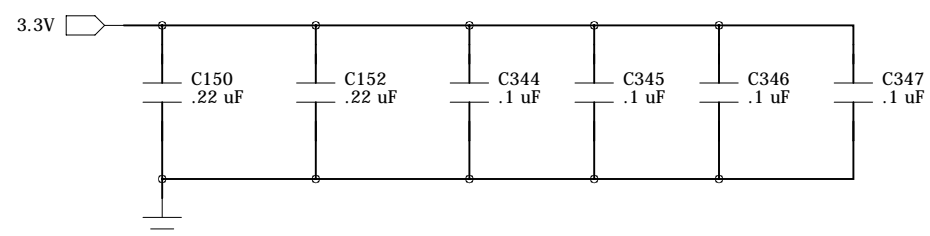
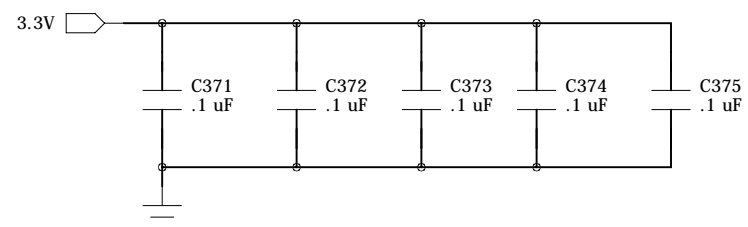
- Adds two MAX3100 UART via SPI
- Auto-485 for 3 UARTs
- Provides serial port MUXing
- Level shifting for Bluetooth
- Controls LCD power sequencing
- Option strap resistors
- DIO for DC

iMX6 UARTs



Resistor Strapping Table

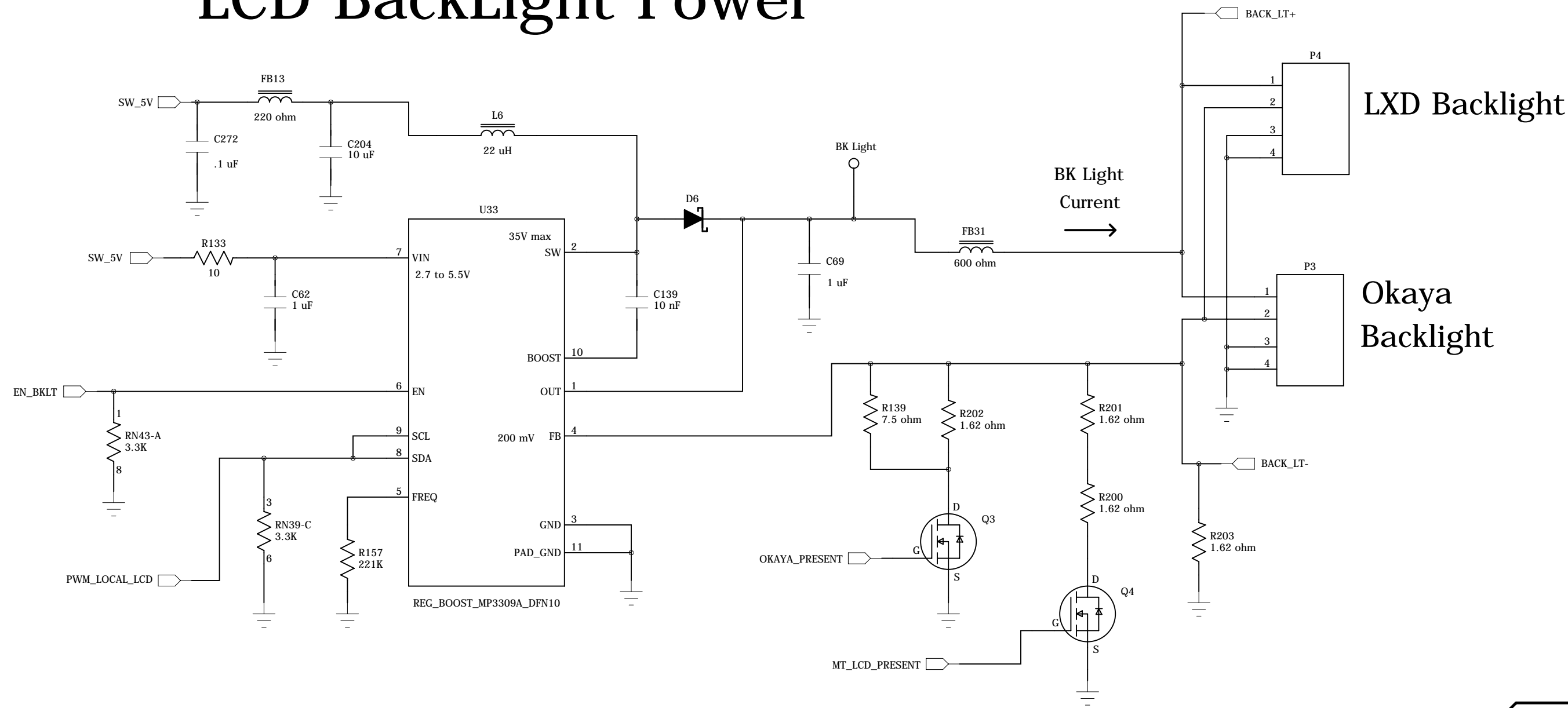
R197	R188	R187		0 = POP, 1 = DNP
0	0	1	Option 1	TS -TPC-7990-SMNxE
0	1	1	Option 3	TS- TPC-7990-QMWxE
MSB		LSB		



FPGA Features:

- Programmable PU or PD on each pin.
- Internal 2 MHz clock; 10 MHz min PLL clock
- special function pins are in unpredictable states the 1st 1 ms
- All DIO have Hysteresis inputs

LCD BackLight Power

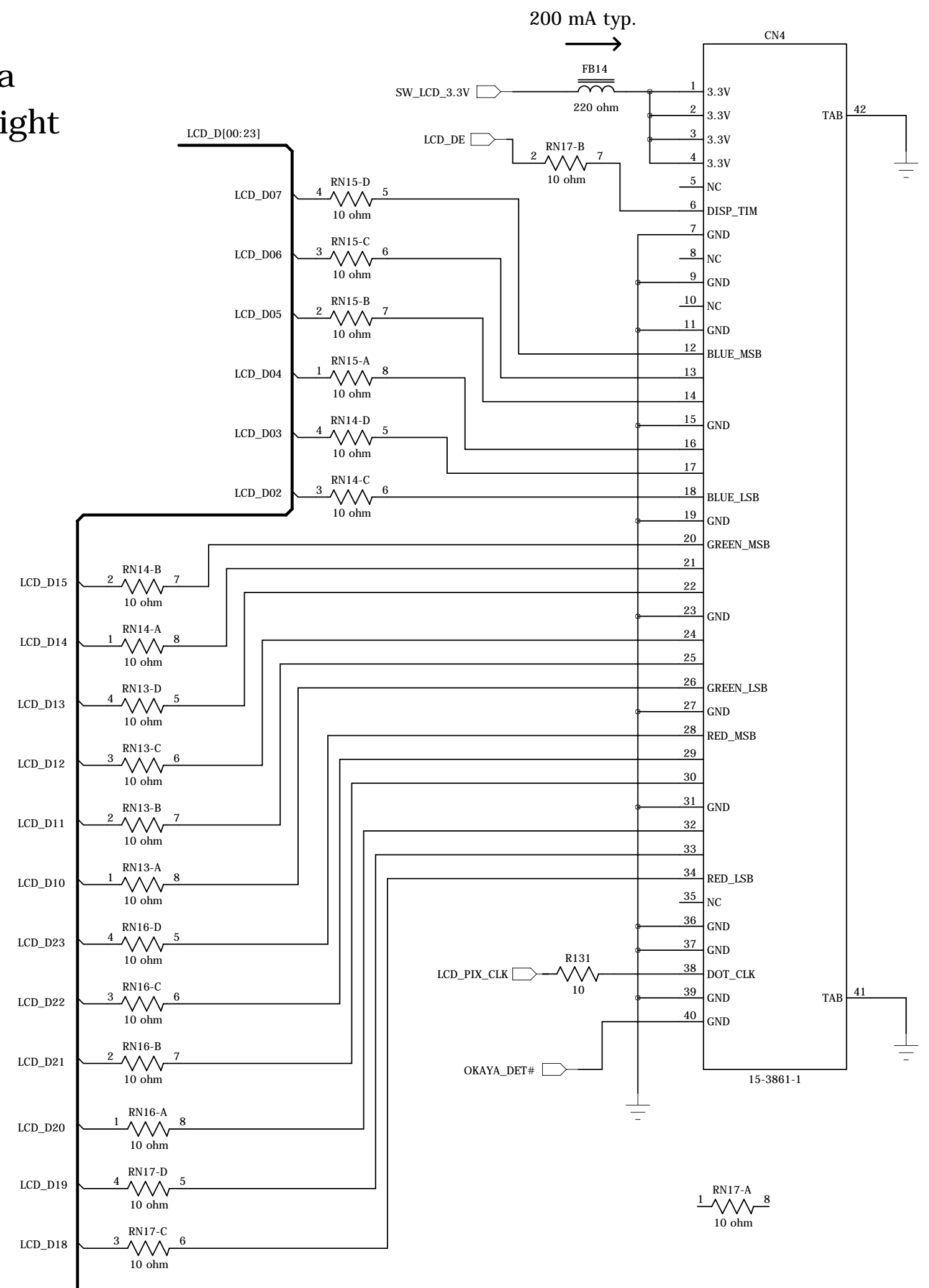


MT Backlight is on CN8

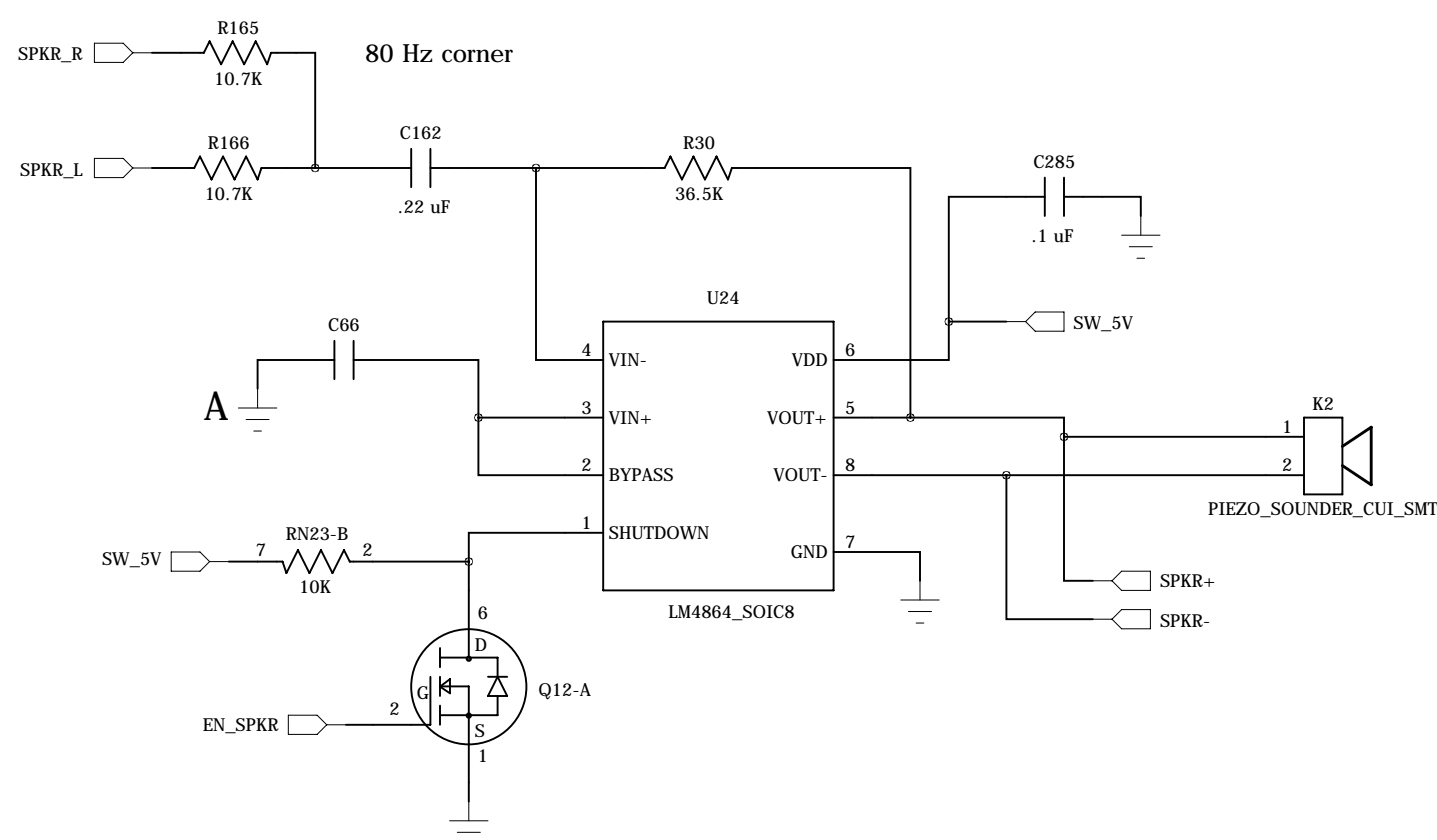
LXD Backlight

Okaya Backlight

Okaya LCD Conn.

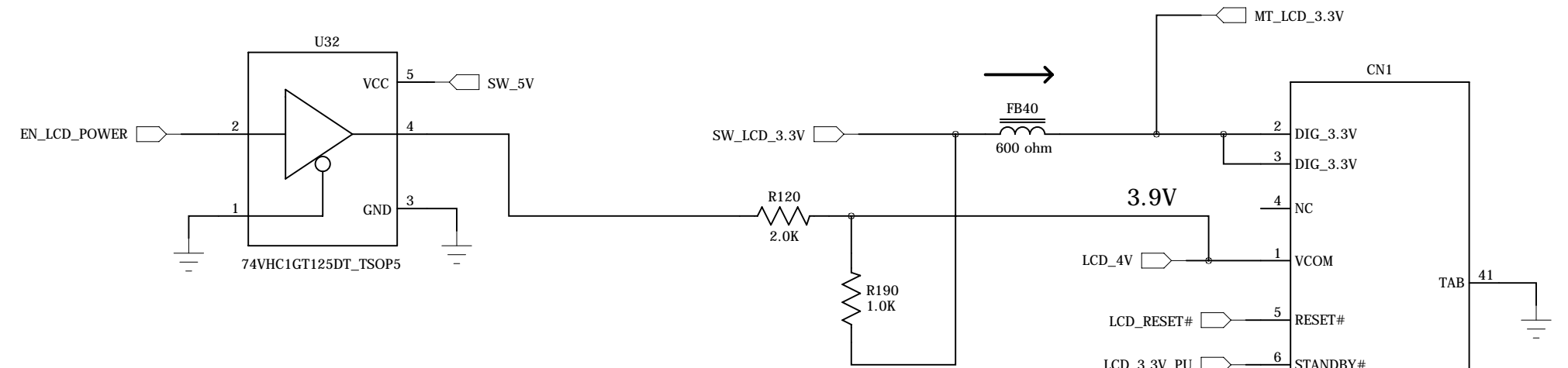


Speaker Amp

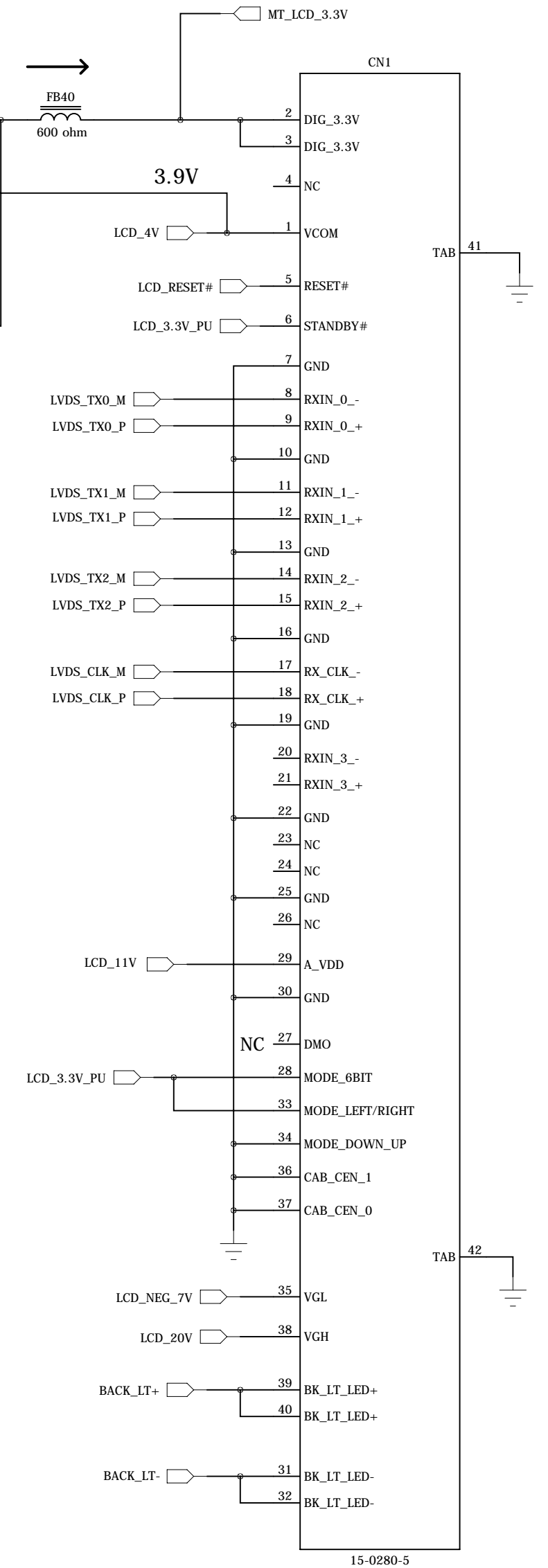
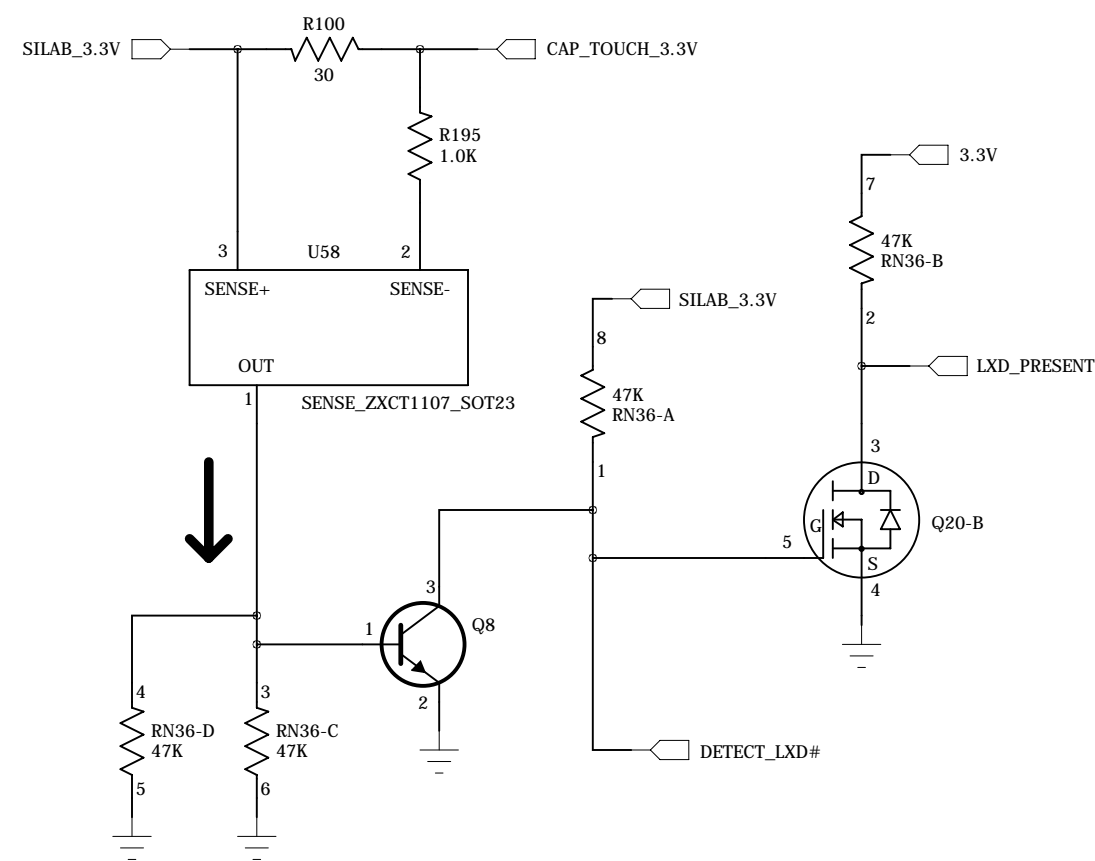


LVDS LCD Conn. LCD

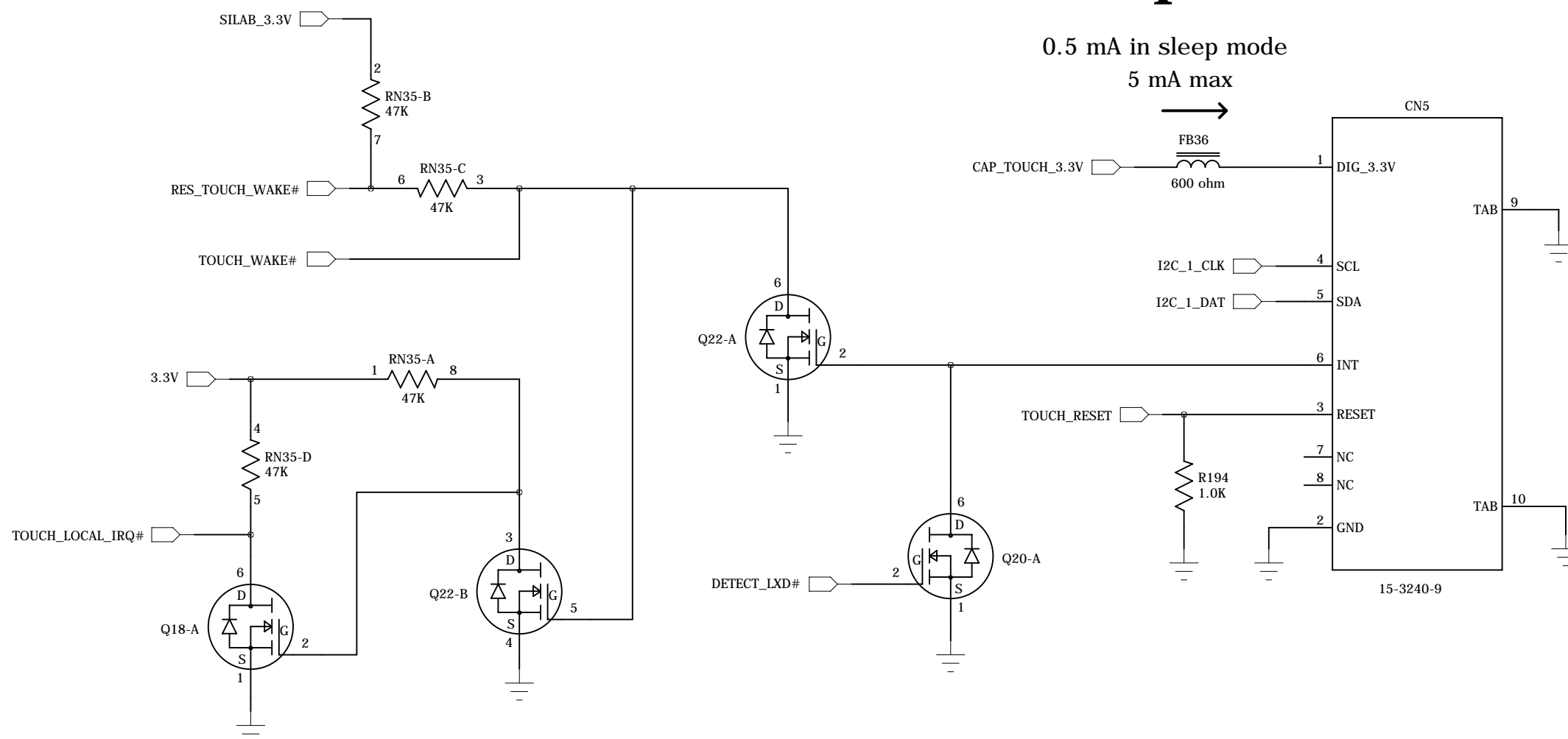
LXD LCD Conn.



Cap Touch Detect



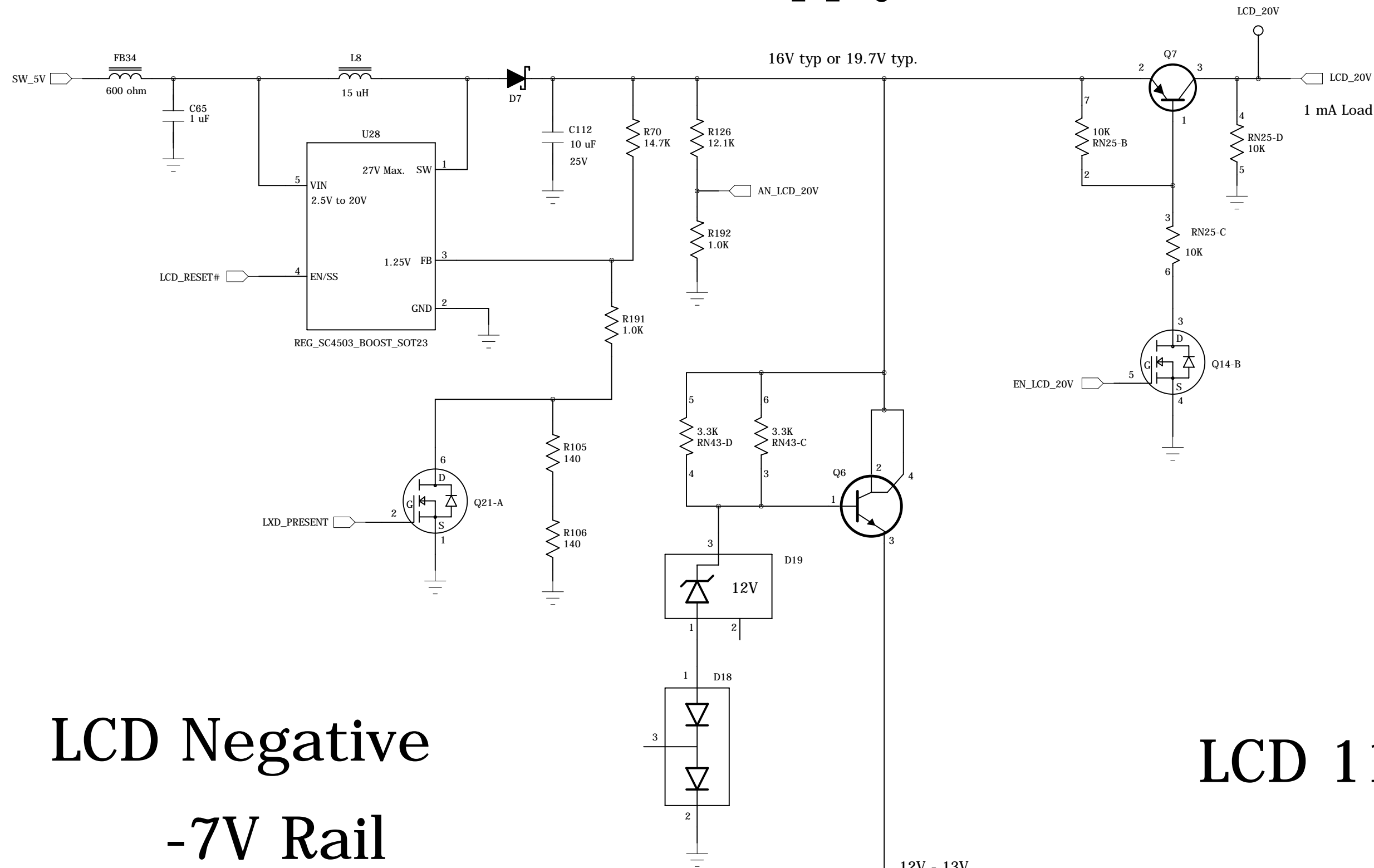
LXD Cap. Touch Conn.



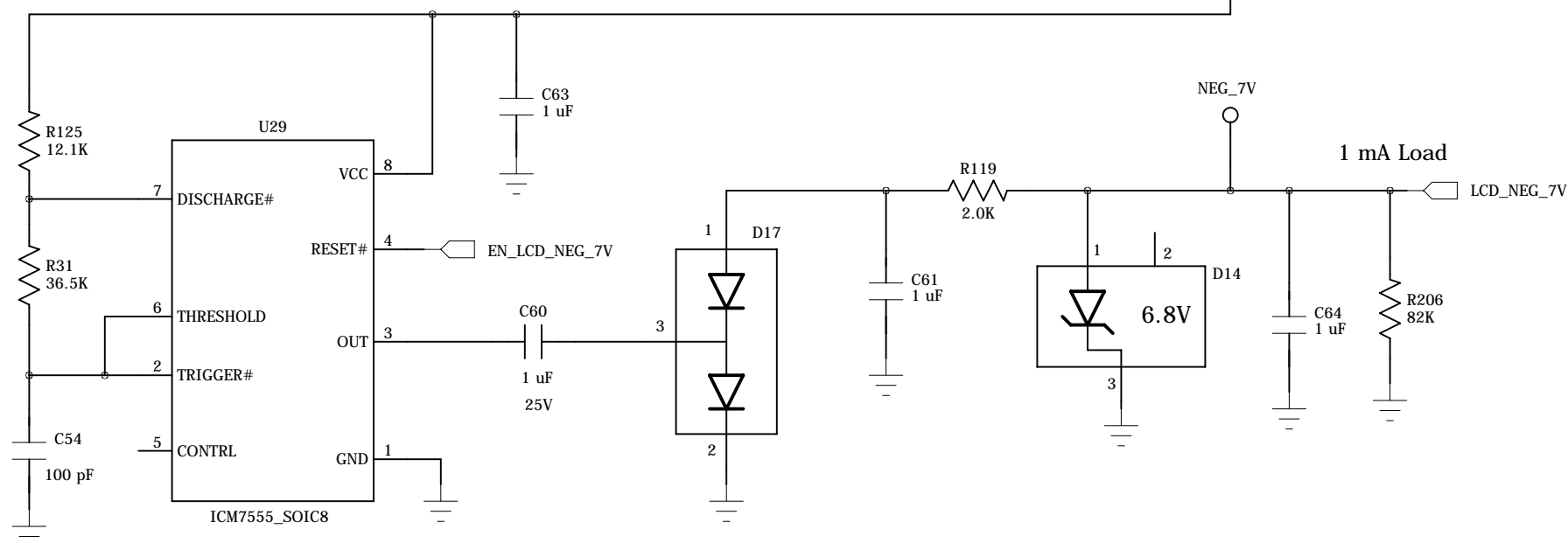
Technologic Systems	Date	June 1, 2017
Title: TS-7990		
Rev: C	Designer	Sheet 24 of 30

LXD and MT LCD Power Rails

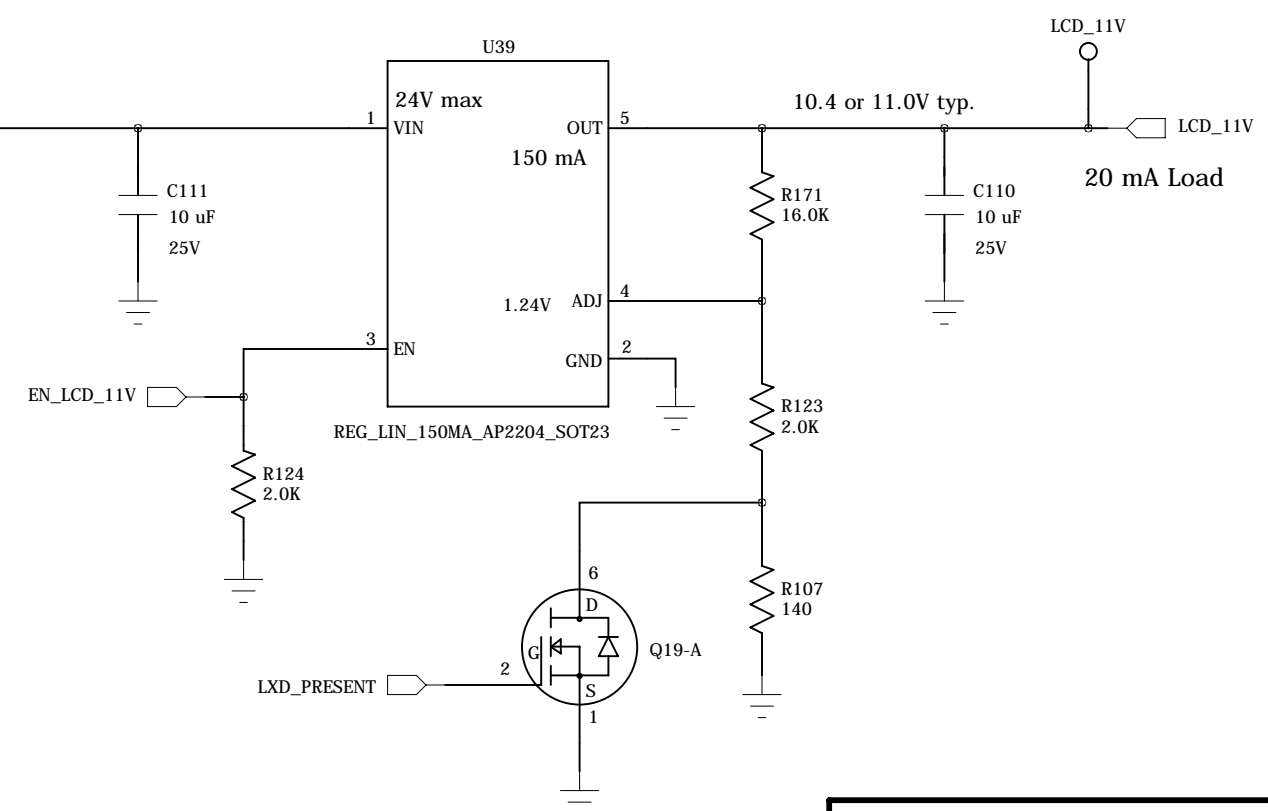
LCD +20V/16V Power Supply



LCD Negative -7V Rail

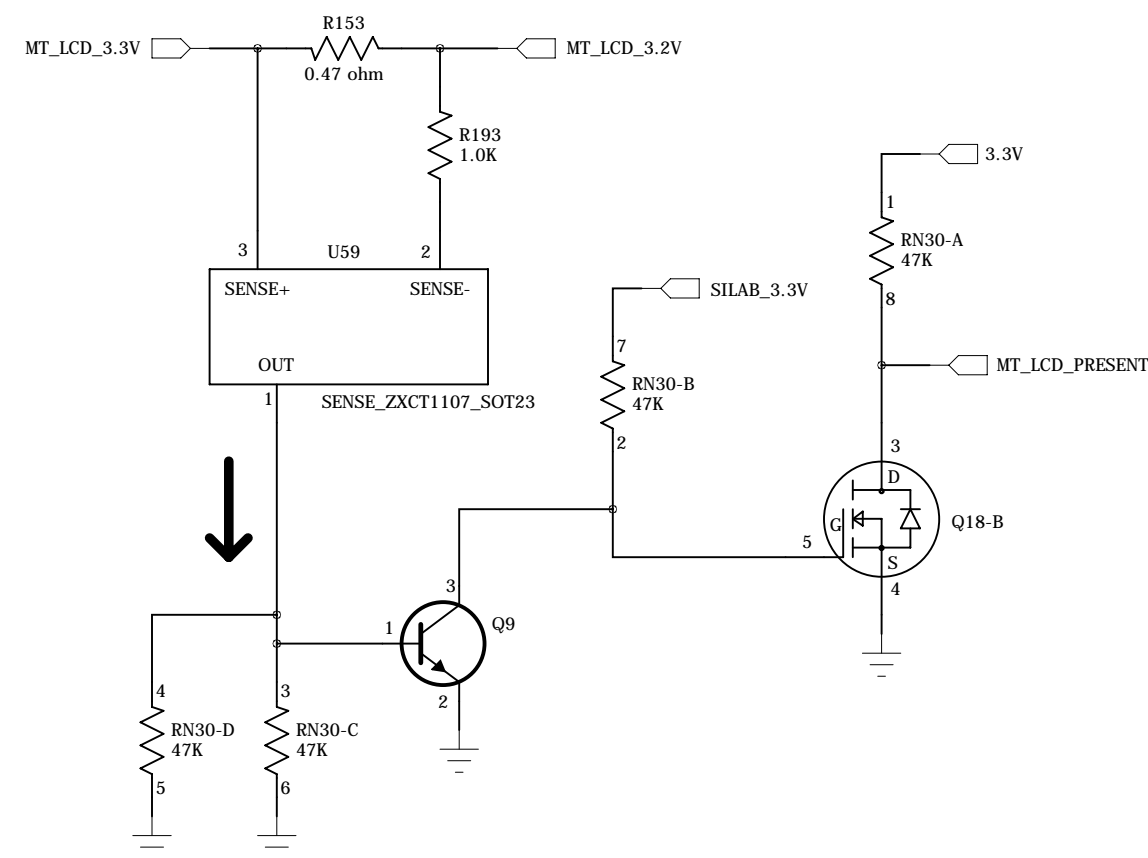


LCD 11V/10.4V Power Supply

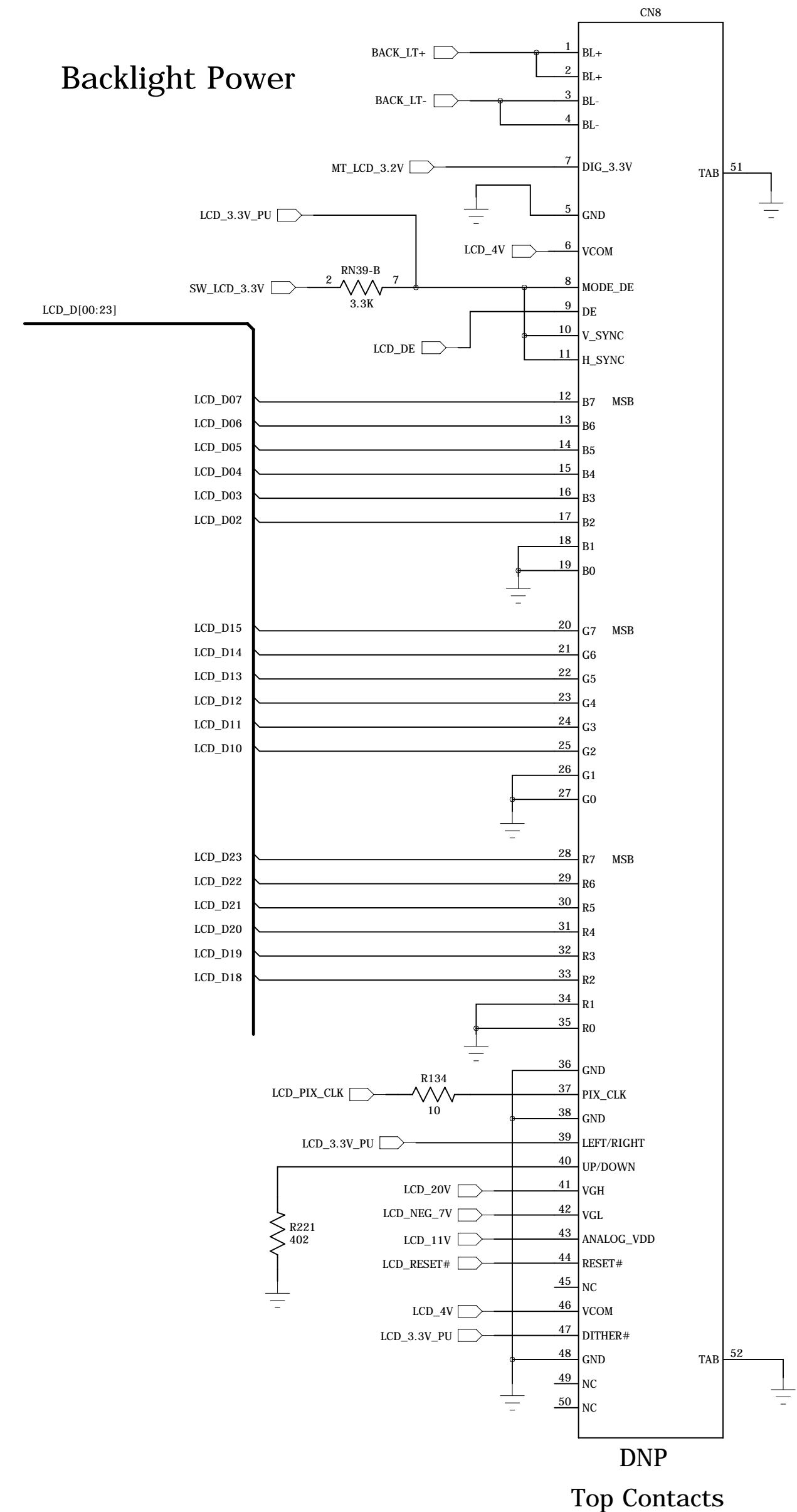


MicroTips LCD Conn.

MT LCD Detect



Backlight Power



DNP

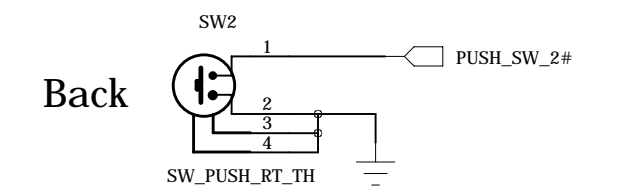
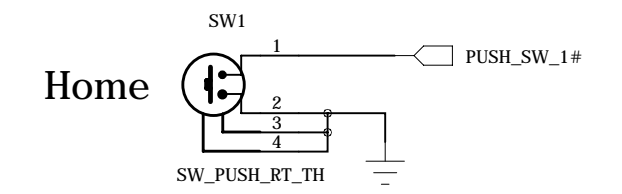
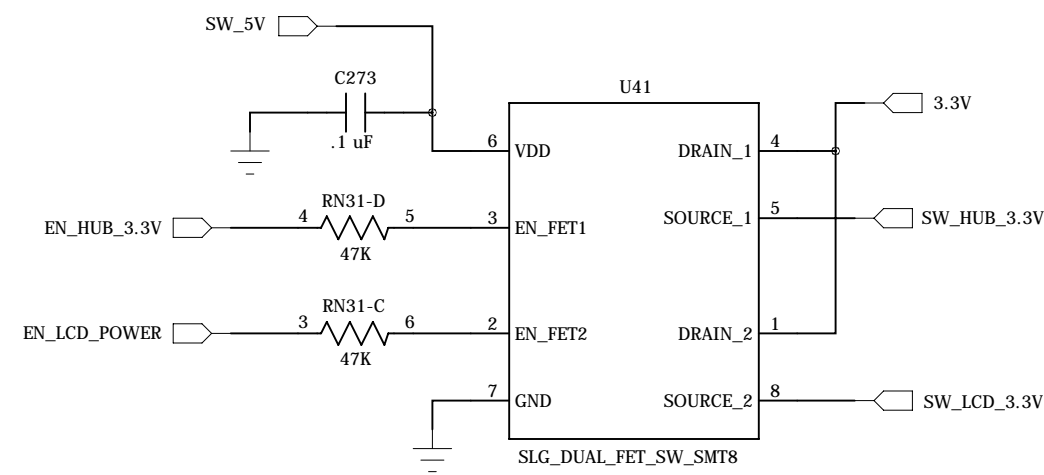
Top Contacts

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LCD Res. Touch

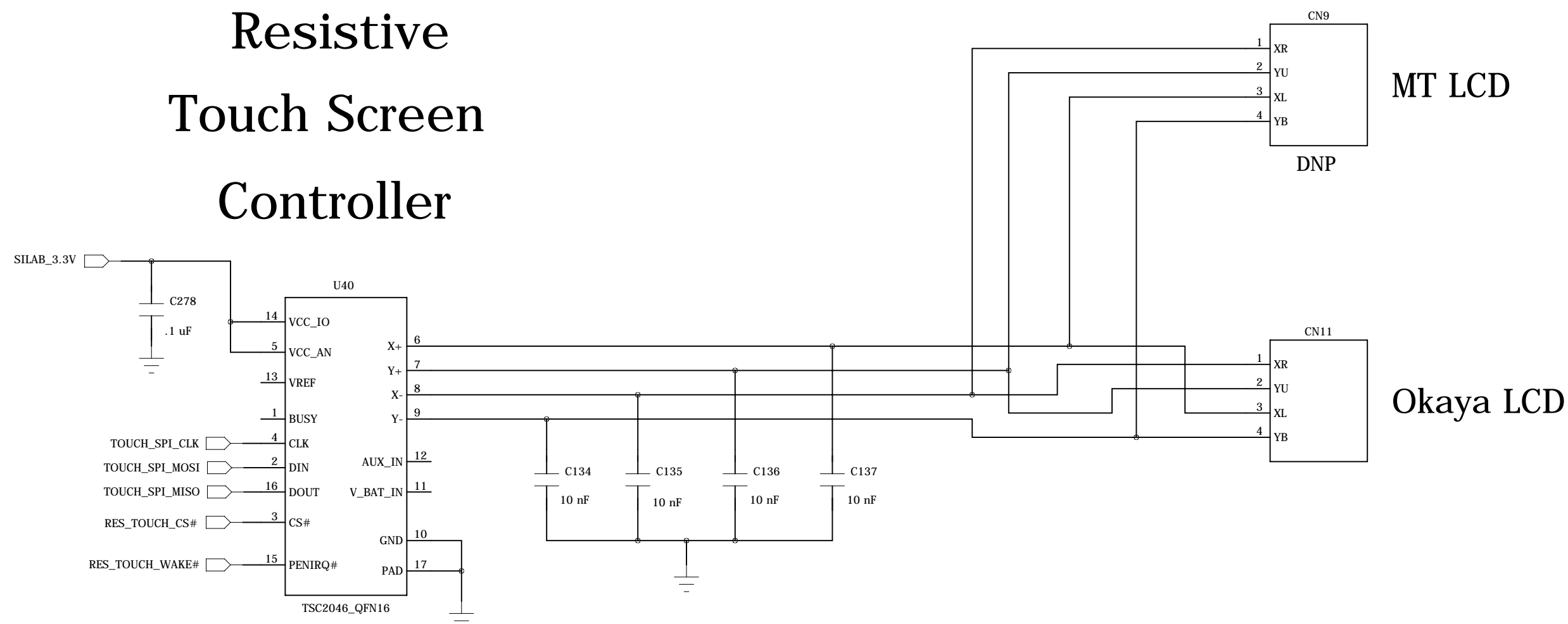
Android Push Switches

Hub and LCD Power Switch



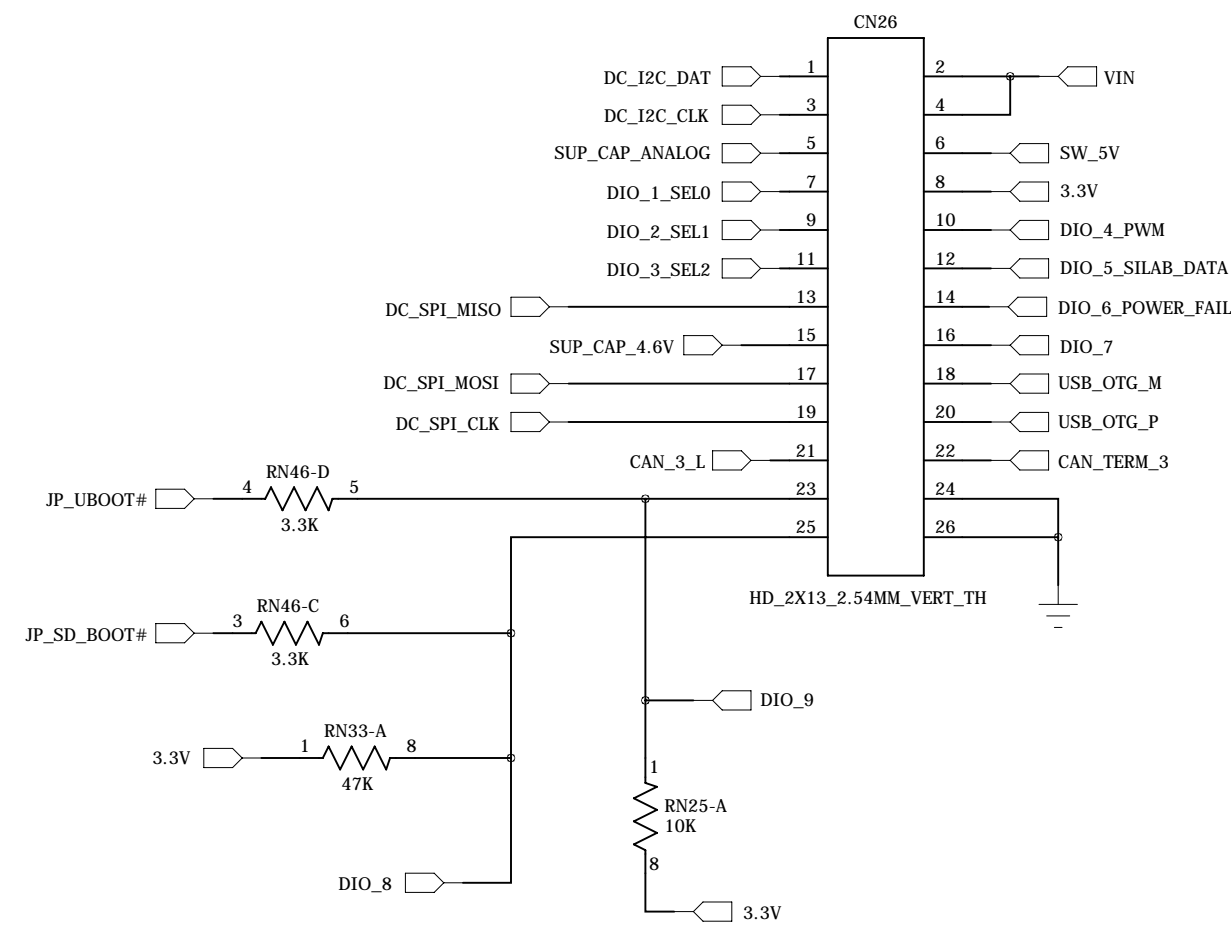
Touch Screen Connectors

Resistive Touch Screen Controller

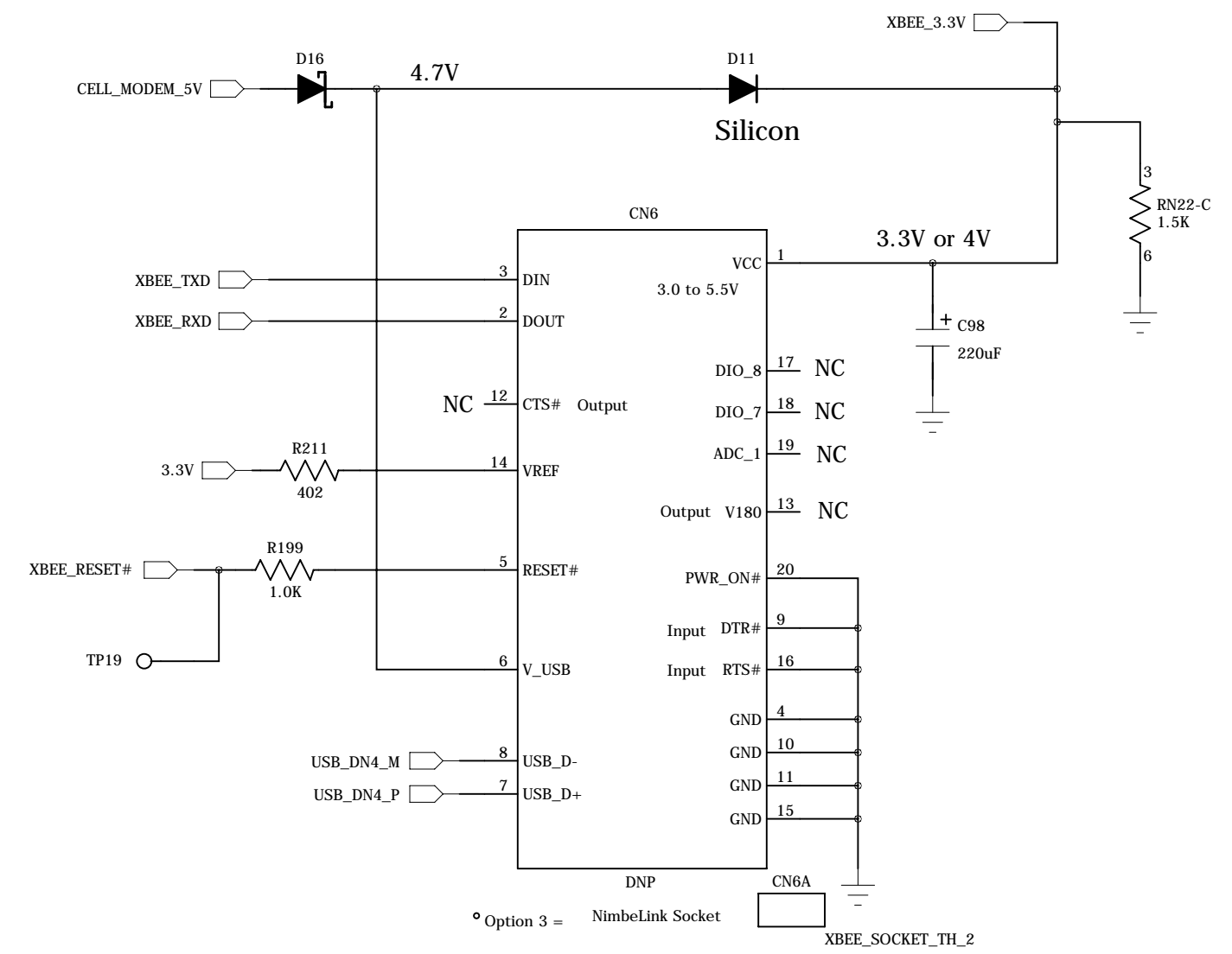


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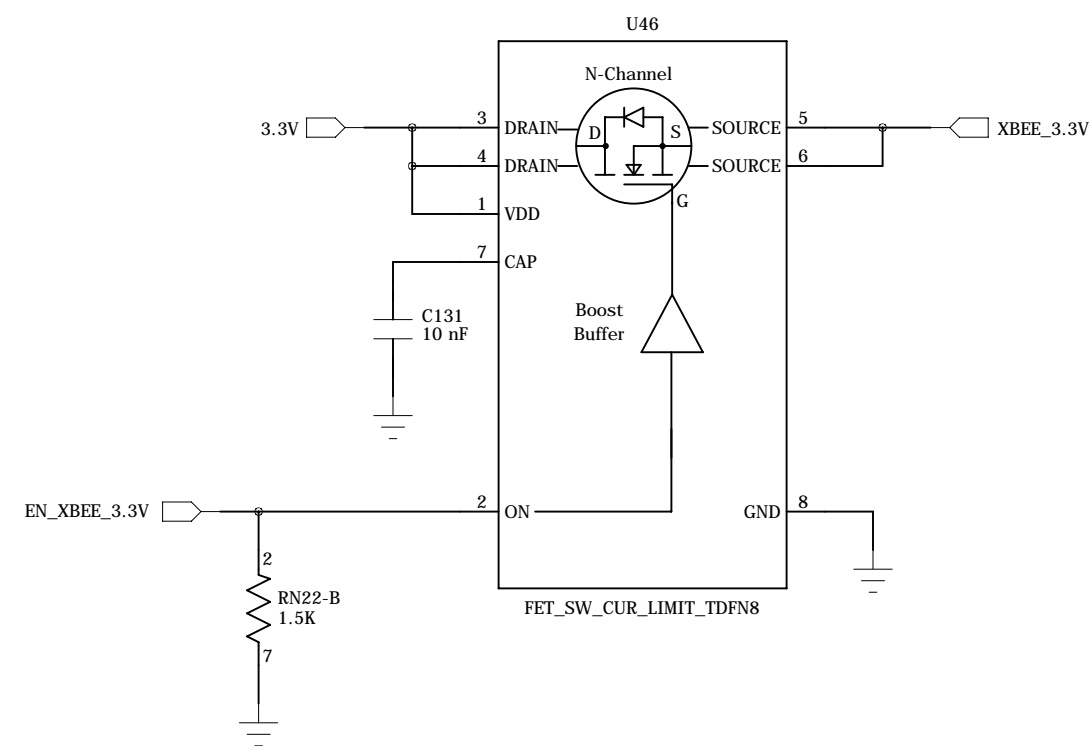
DIO Port and Jumpers



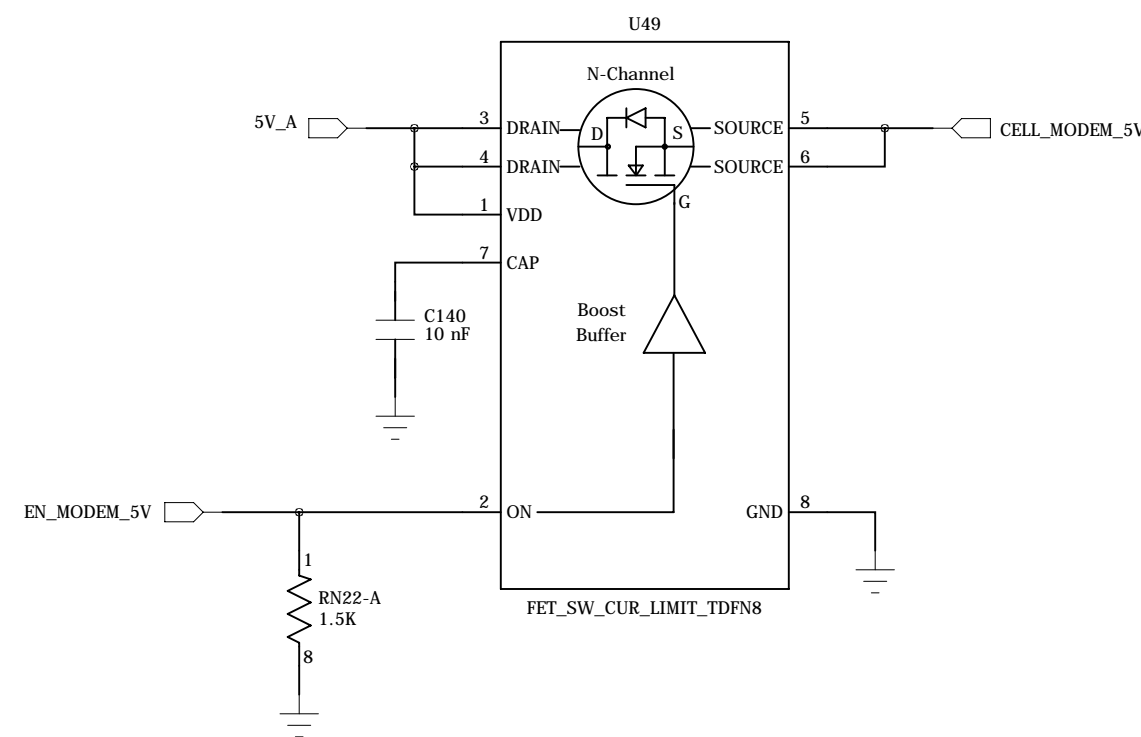
NimbeLink Modem Socket



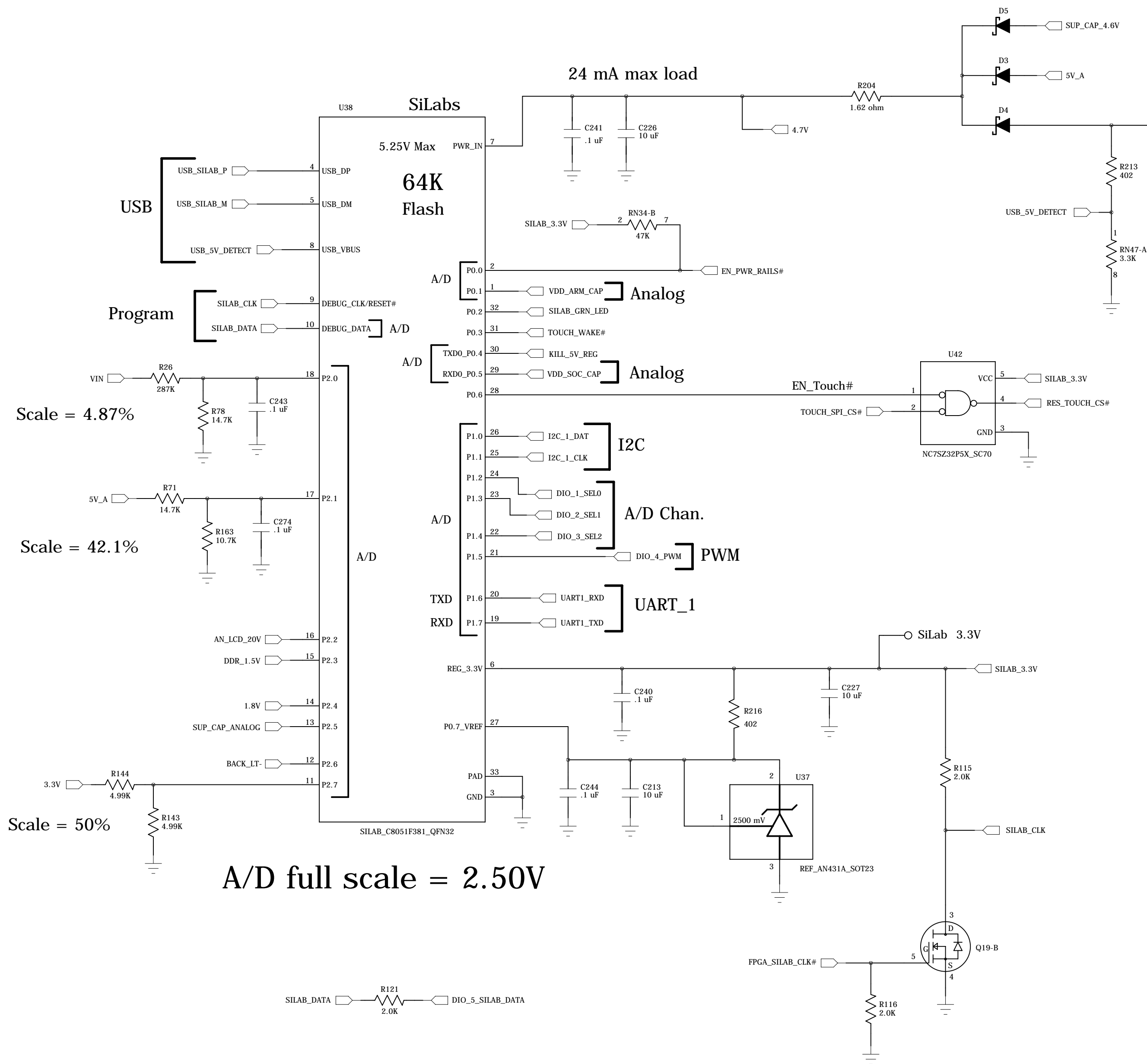
3.3V Sw.



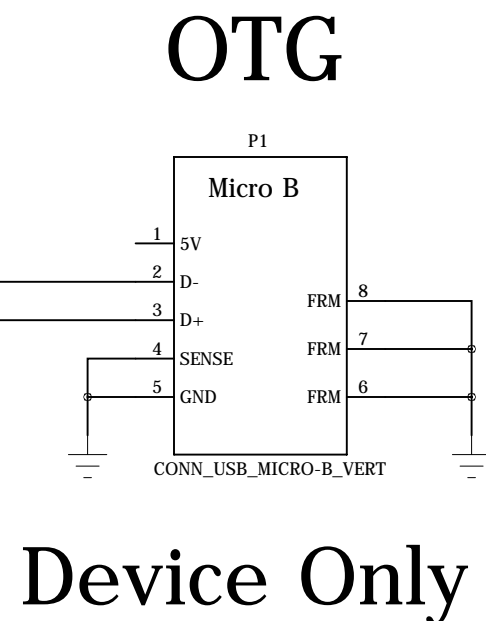
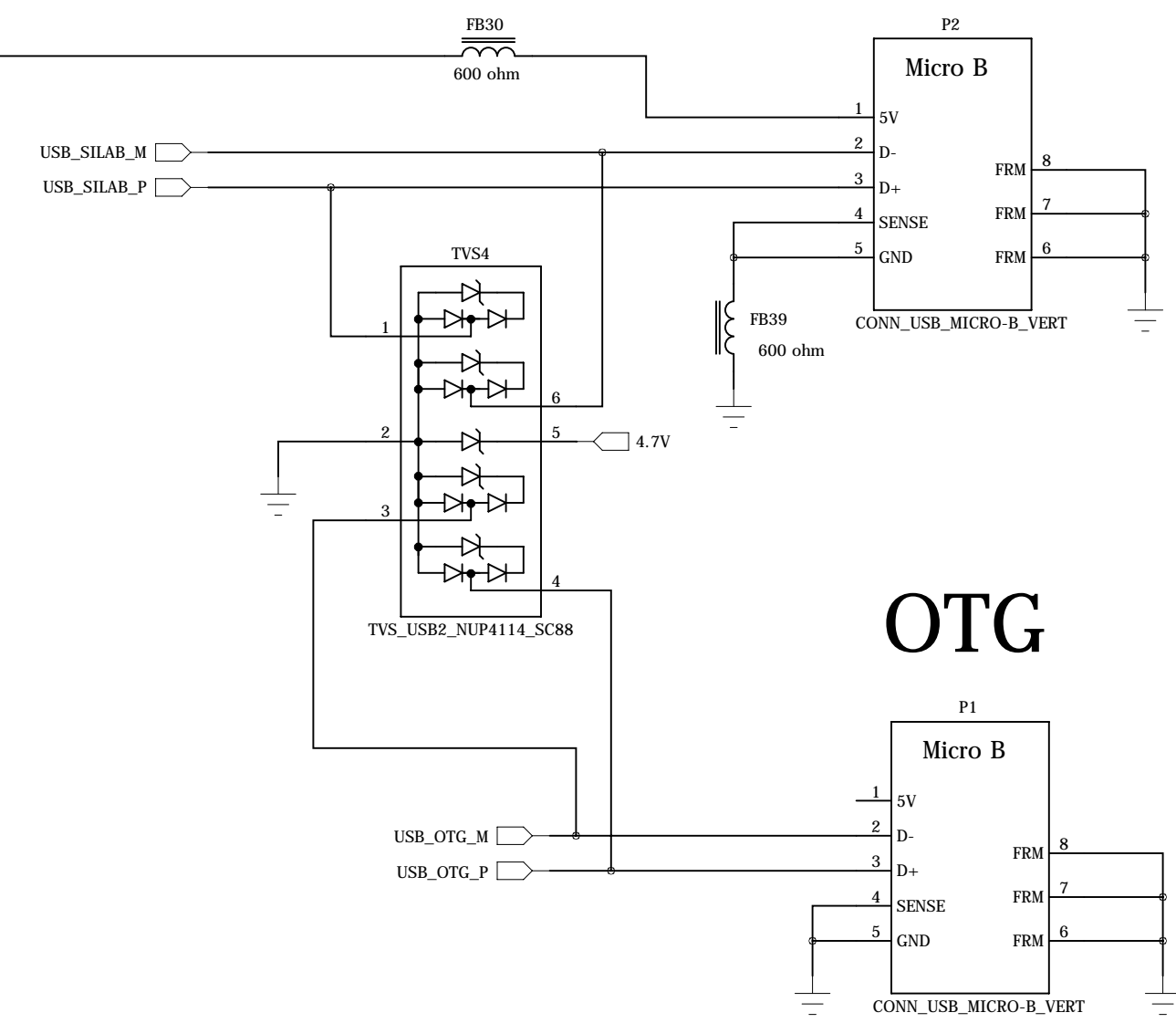
NimbeLink 5V Sw.



USB Device Port and Silab uC

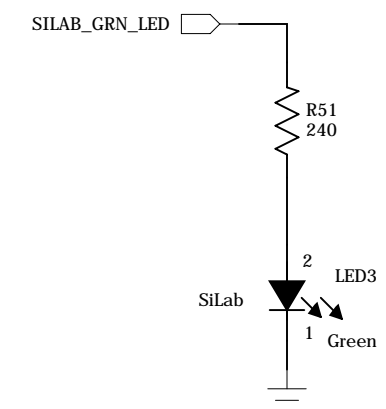


USB Device Port Console



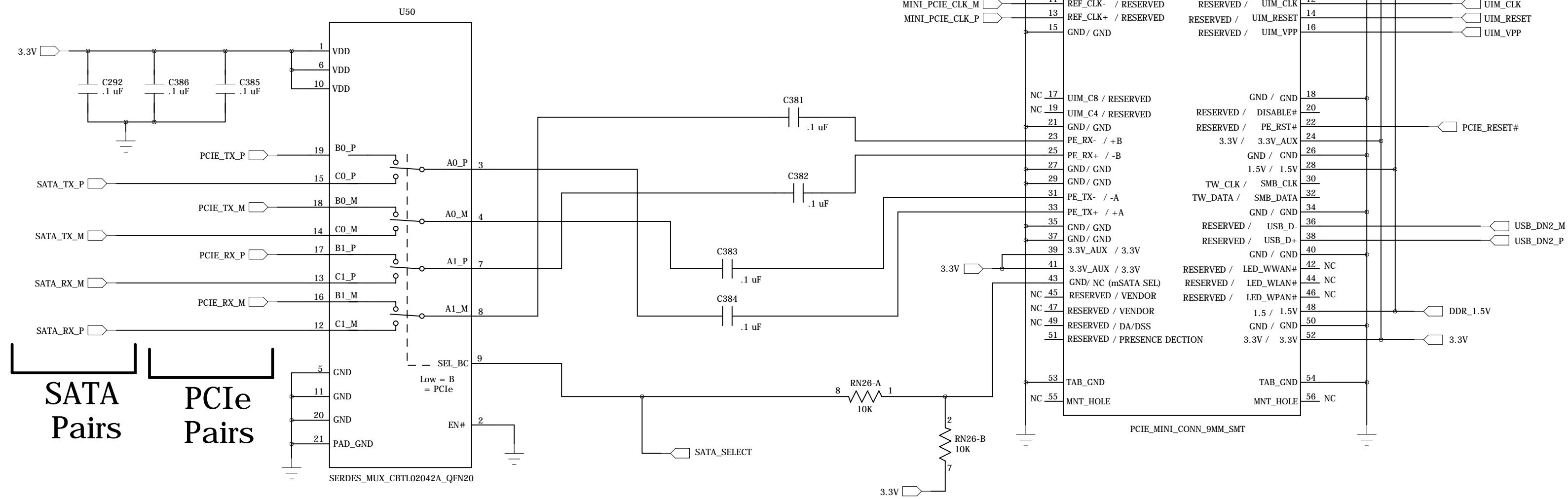
A/D full scale = 2.50V

SiLab LED



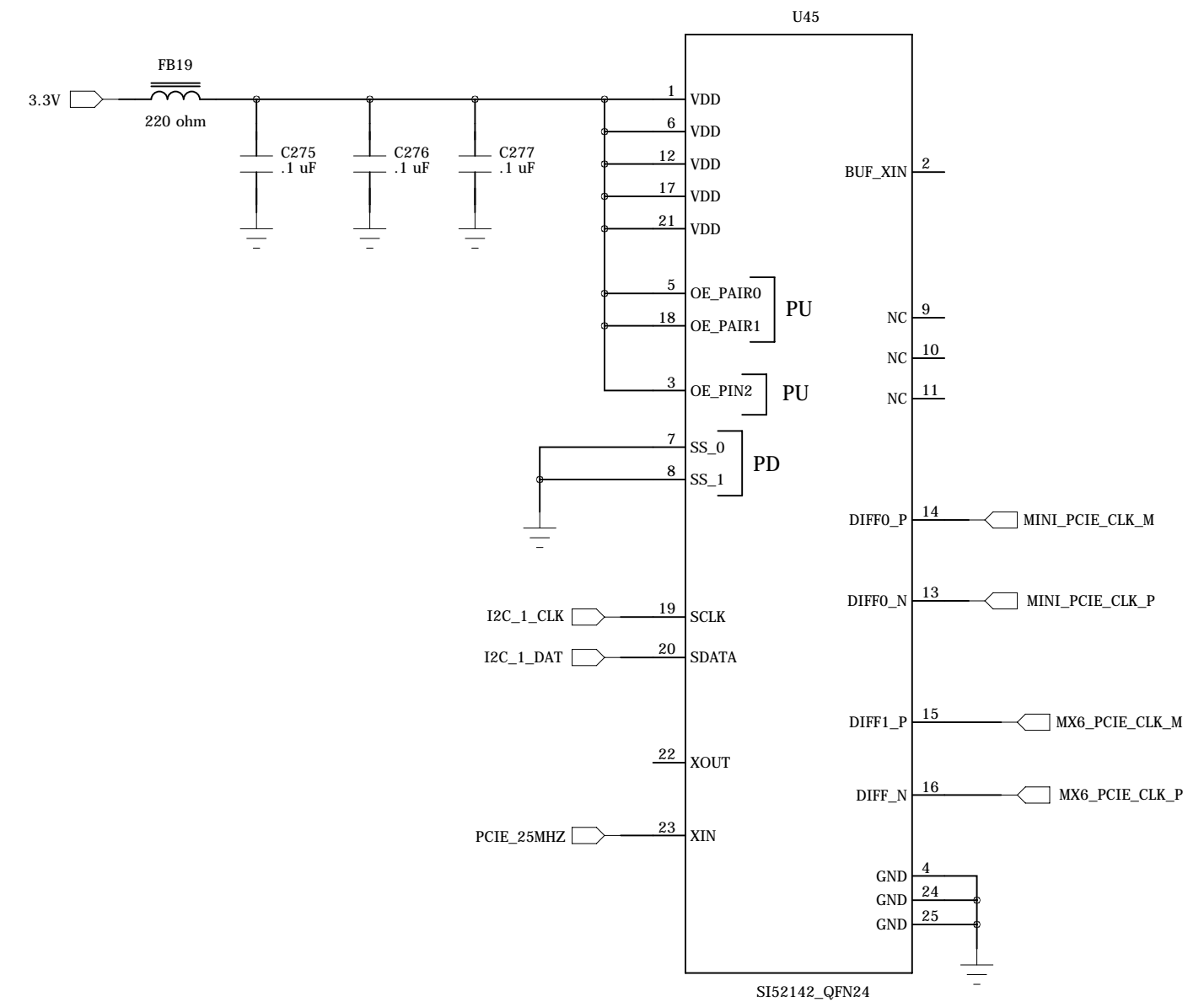
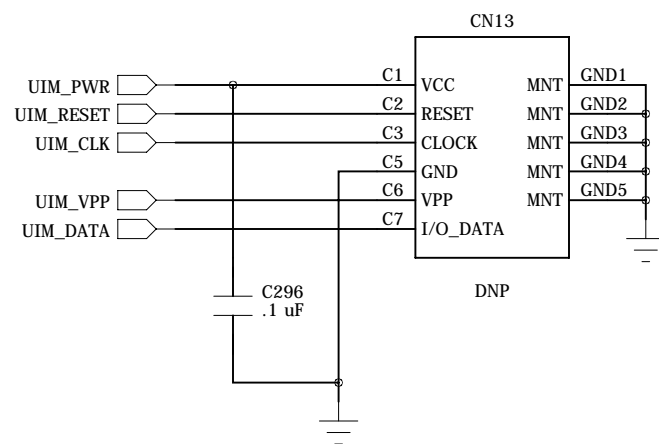
7mm Stack Height to bd. center

SERDES MUX

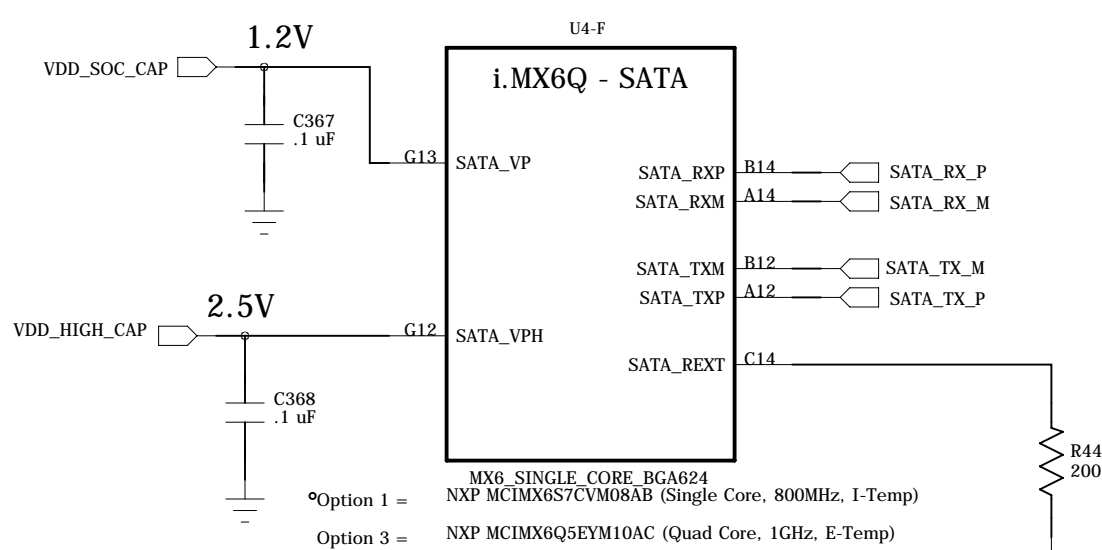


PCIe 100 MHz Clock Gen.

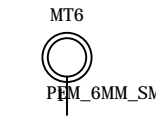
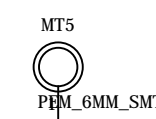
SIM Card Conn.



SATA



Option 1 = MY8_SINGLE_CORE_BGA824
 Option 3 = NXP MCIMX6Q5EYM10AC (Quad Core, 1GHz, E-Temp)



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