

UART Needs:

4 for RS-232
2 for RS-485
1 for BlueTooth
1 for GPS, Xbee or DC

Warning:

Xbee, GPS and DC all
share the same UART
Only one can be used

Default =

3 for RS-232
1 for RS-485
1 for BlueTooth
1 for Xbee/GPS/DC

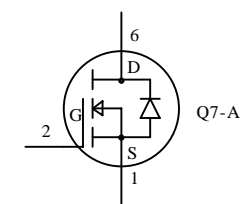
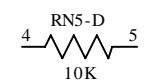
Jumpers enable 2nd RS-485 or 422
But this loses COM1 RTS and CTS

Major Changes from TS-8900 to TS-8950

Supports iMX6 with high performance GPU
Added Sleep Mode with Touch wake up
Added USB console
Primary Ethernet port is Gigabit
Changed POE from 12 watts to 24 watts
Added third USB Host port (5x1 header)
Added 3rd RS-232 port
Added A/D to monitor all power rails (and SuperCap)

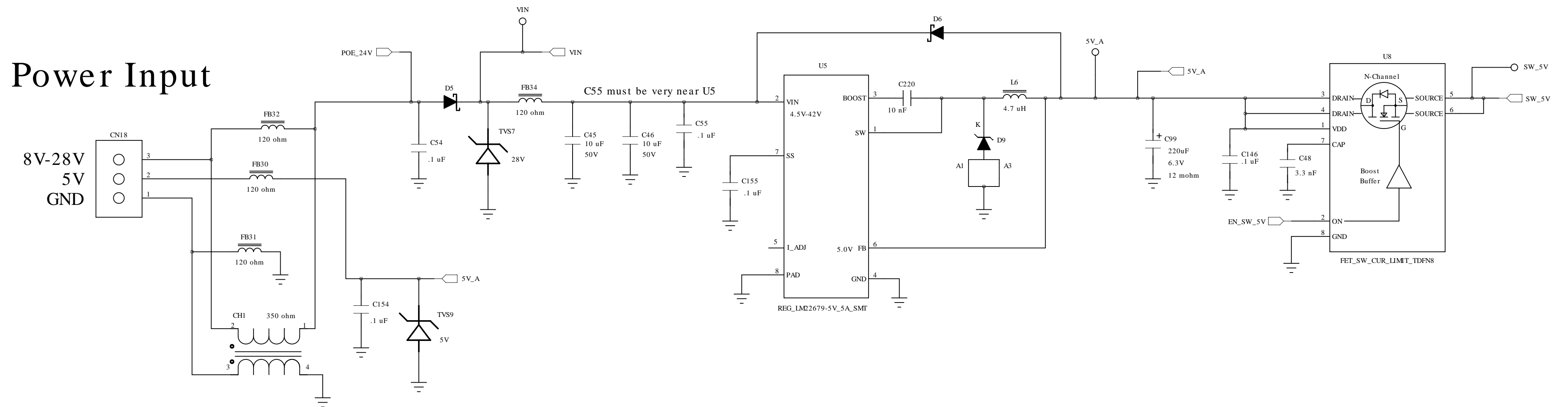
Added 12 second Power Hold circuit
Added Freescale accelerometer option
Added GPS option
Supports mSATA option
Supports MiniPCle cell modems (optional)

Optional



Technologic Systems	Date	April 27, 2015
Title:	TS-8950 Documentation	
Rev: A	Designer	Sheet 1 of 18

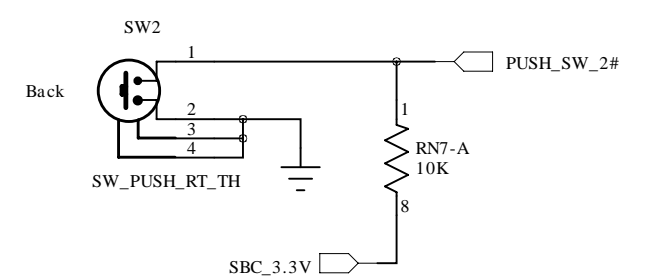
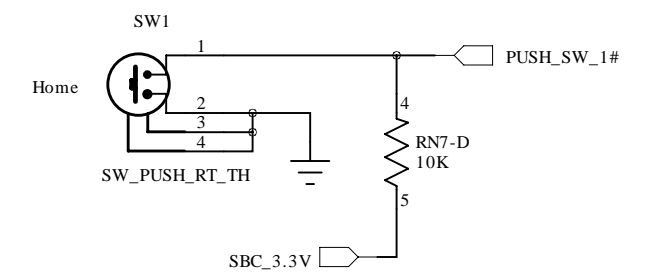
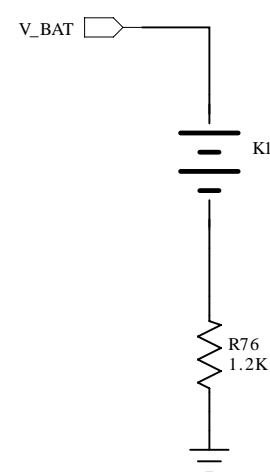
5V Power Supply (4.0 Amps)



When CH1 populated, FB31 and 32 not

Android Push Switches

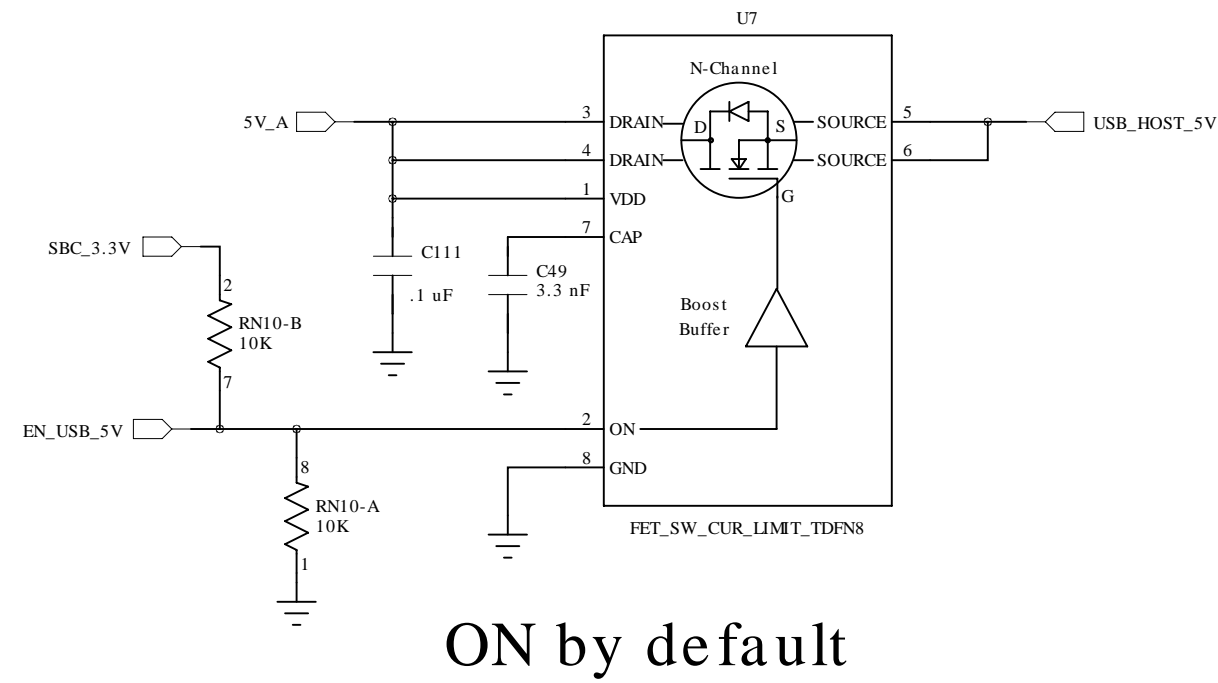
Battery for RTC



Technologic Systems	Date April 27, 2015
Title: TS-8950 5V Power, Android Push Sw	
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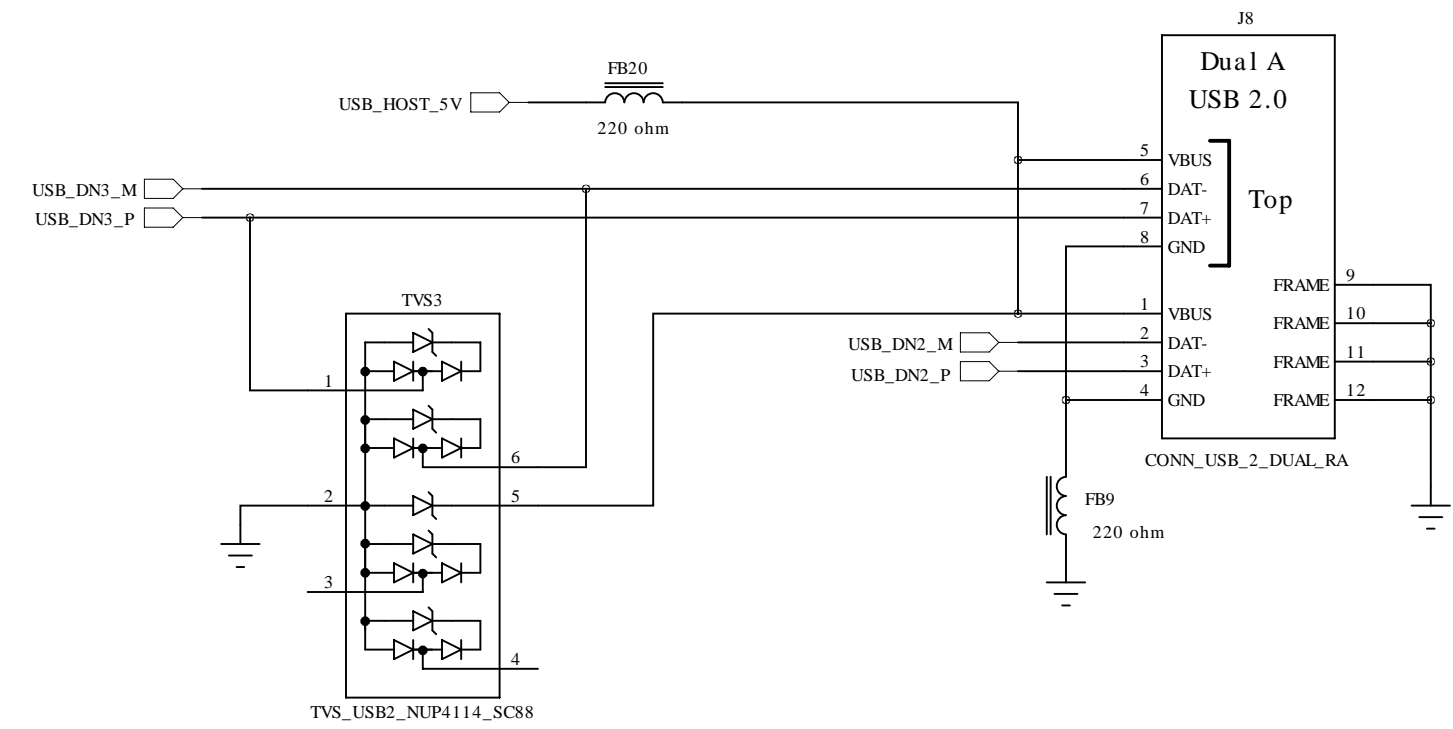
USB Ports

USB Power Switch



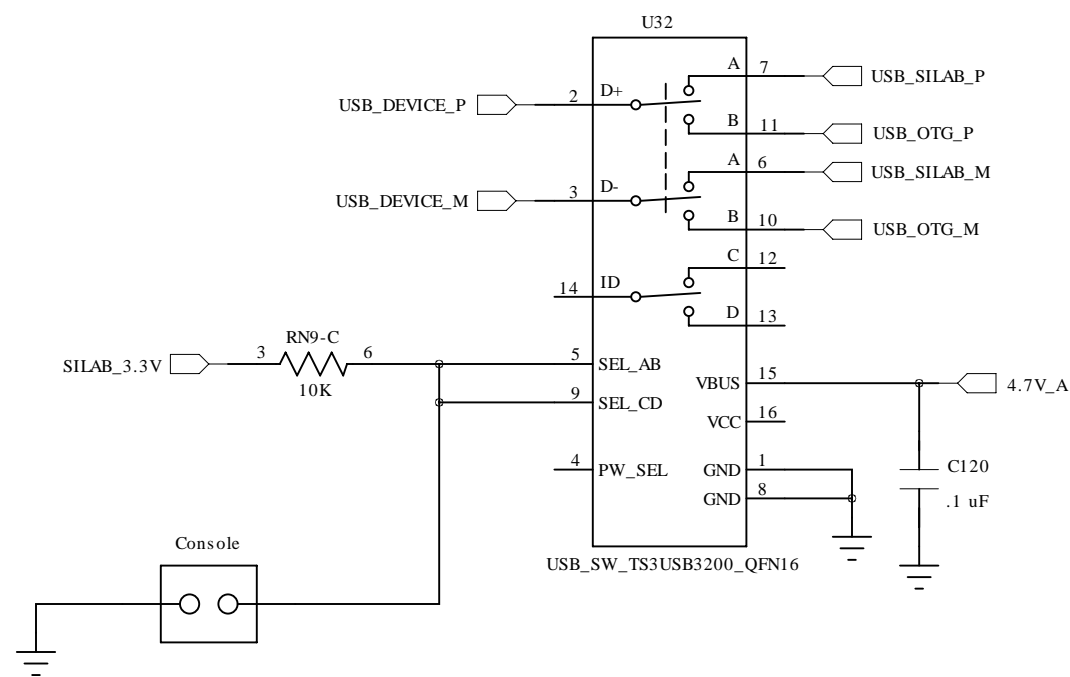
ON by default

2x Host RA USB Ports



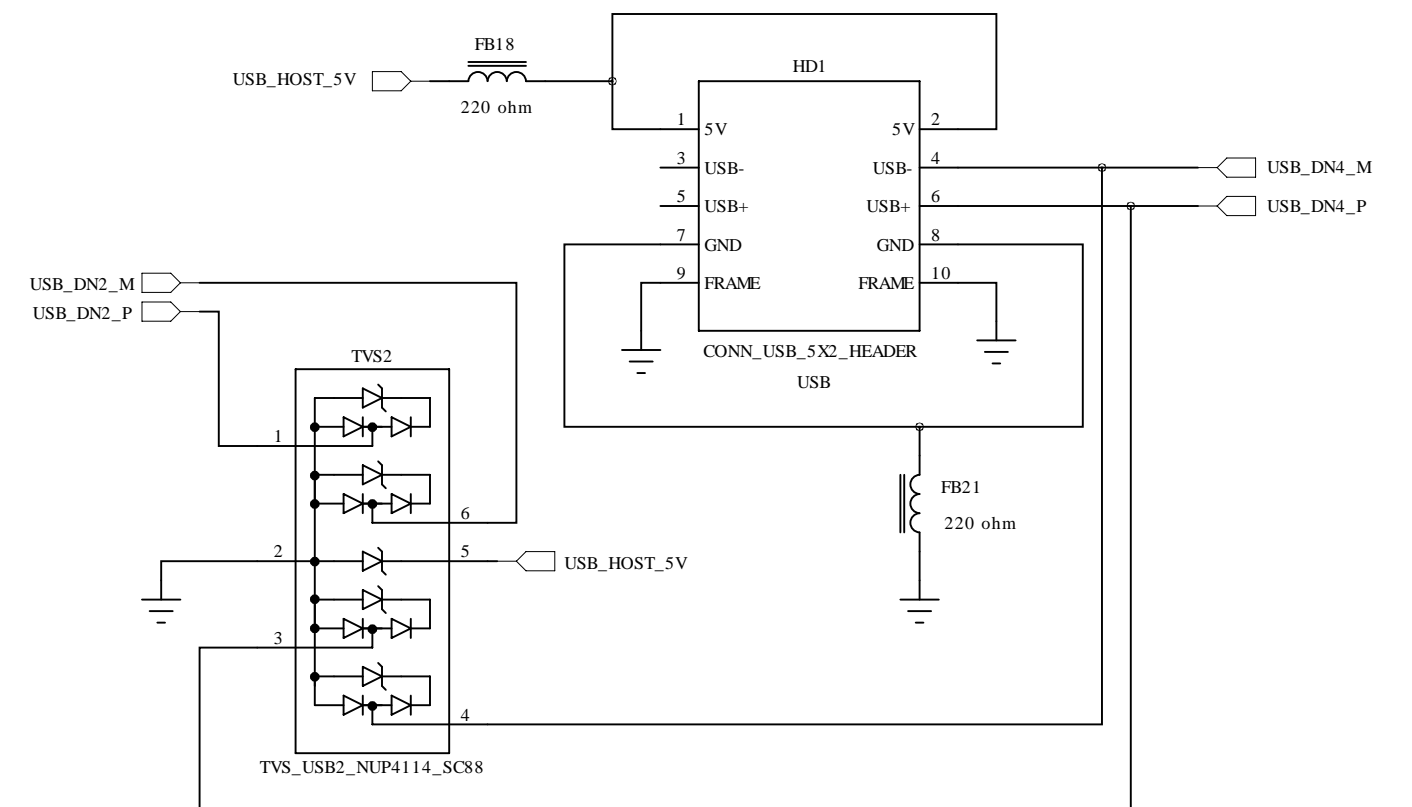
USB 2.0 MUX

Allows SiLab or iMX6 to use USB Dev Port



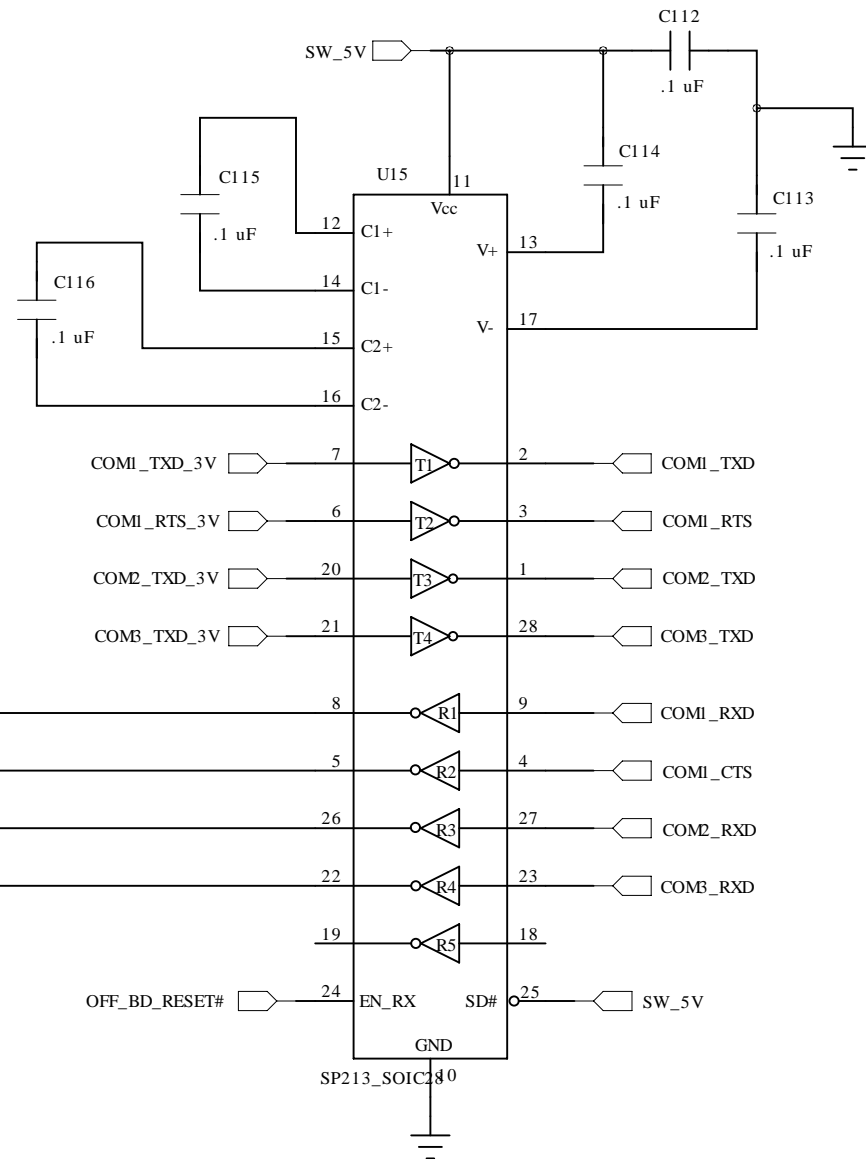
Jumper ON =
Enable SiLab Console

Internal USB Header

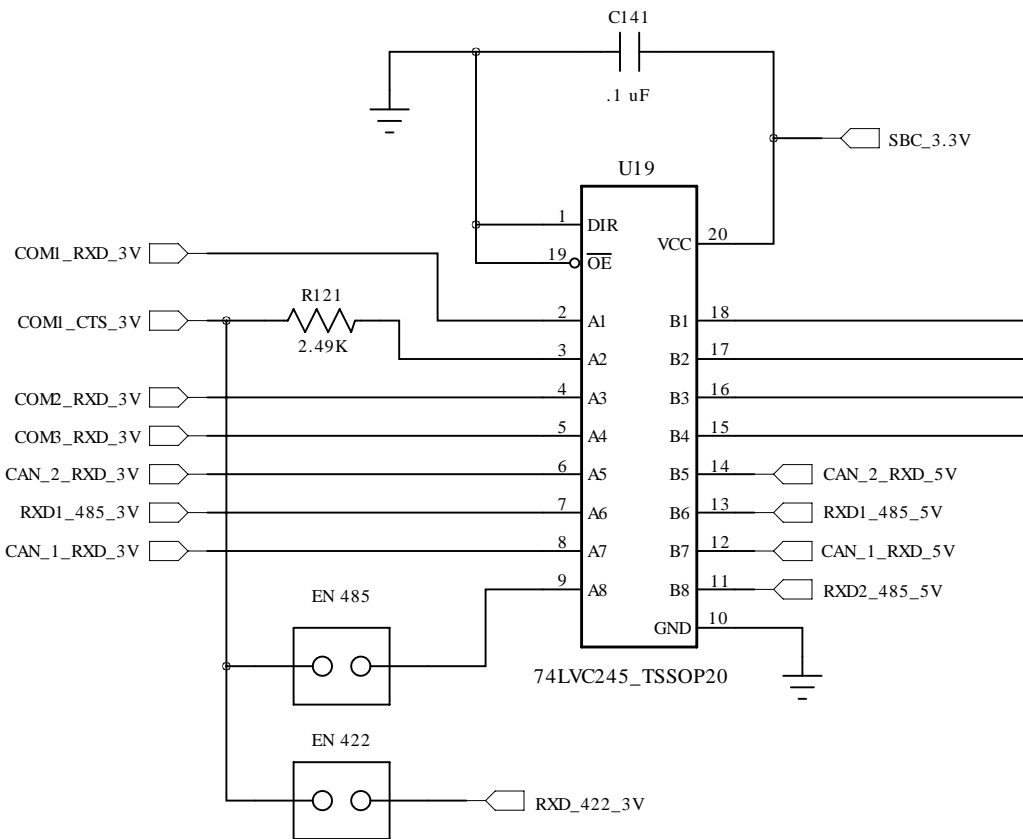


Technologic Systems	Date	April 27, 2015
Title: TS-8950	USB ports	
Rev: A	Designer	Sheet 3 of 18

RS-232 Transceiver

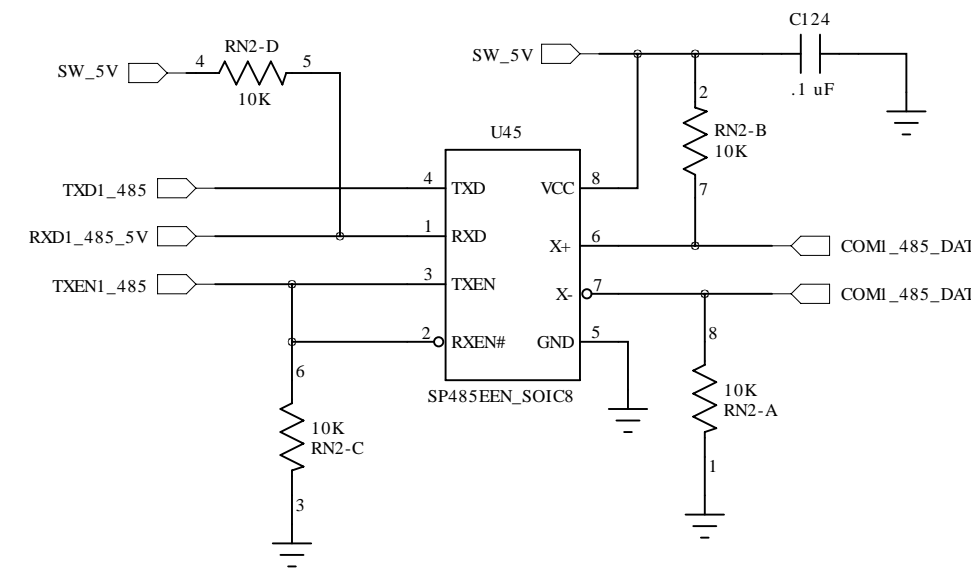


3.3V <-- 5V
Level shifter



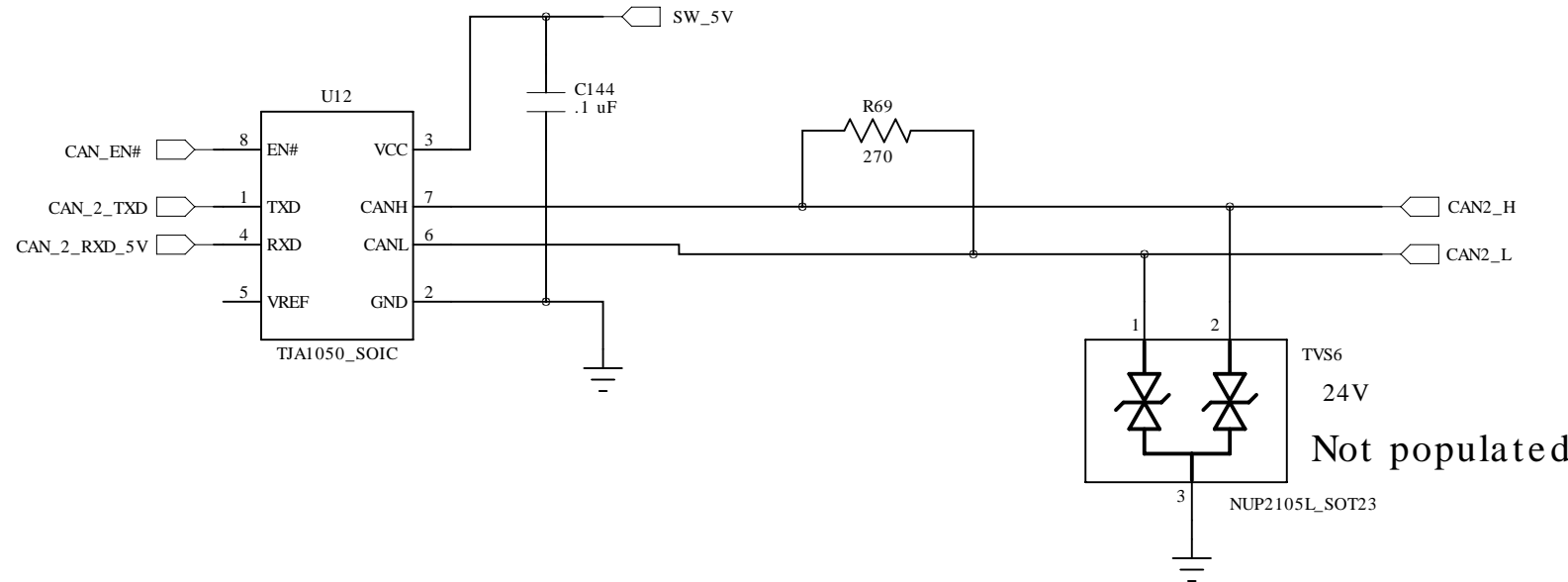
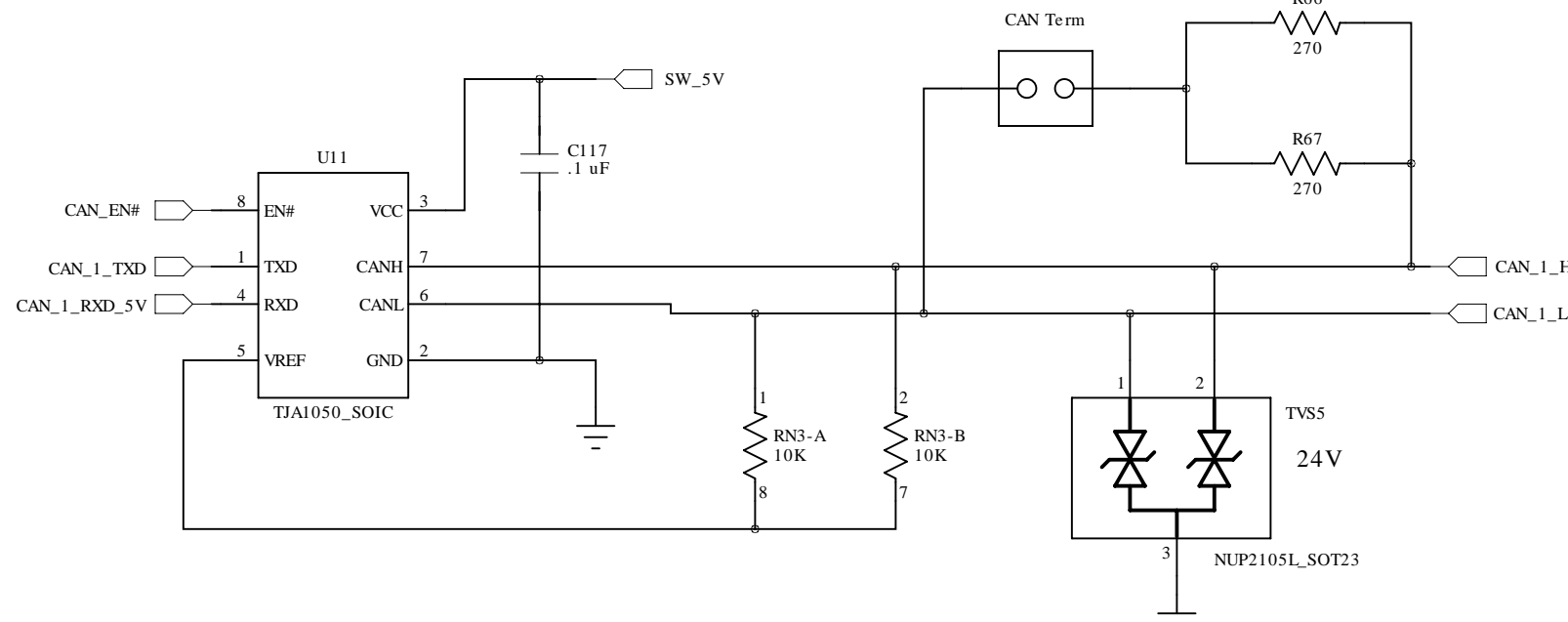
Jumper enables RS-485 or 422
Also disables COM1 Handshakes

COM1 RS-485 Driver



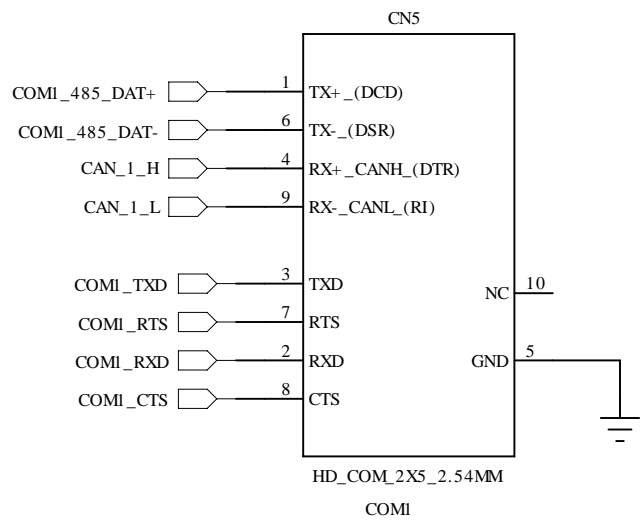
Optional 2nd CAN Transceiver

CAN Transceiver

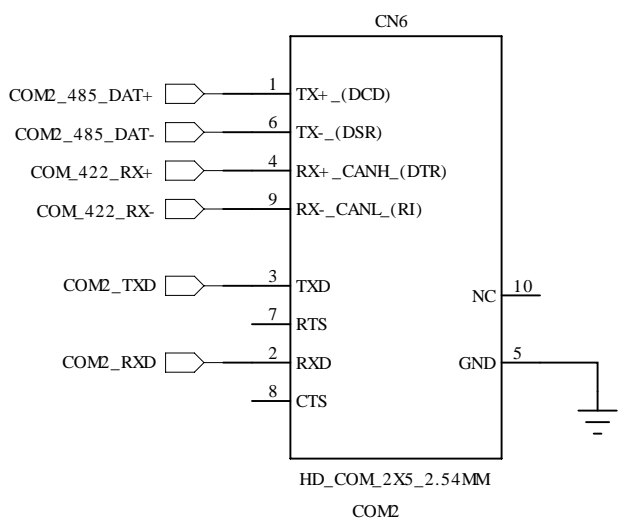


COM Ports

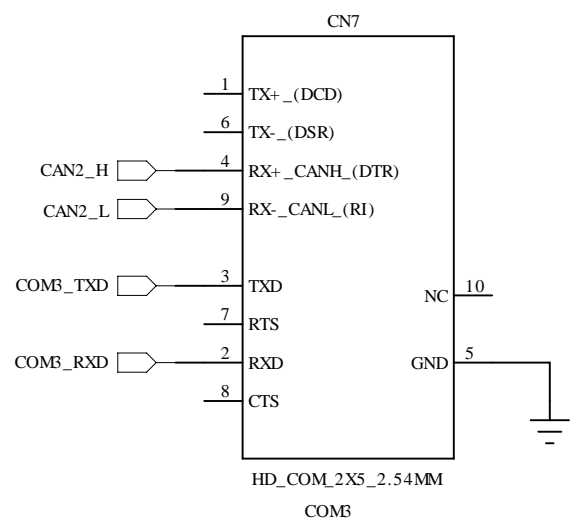
COM1 Header



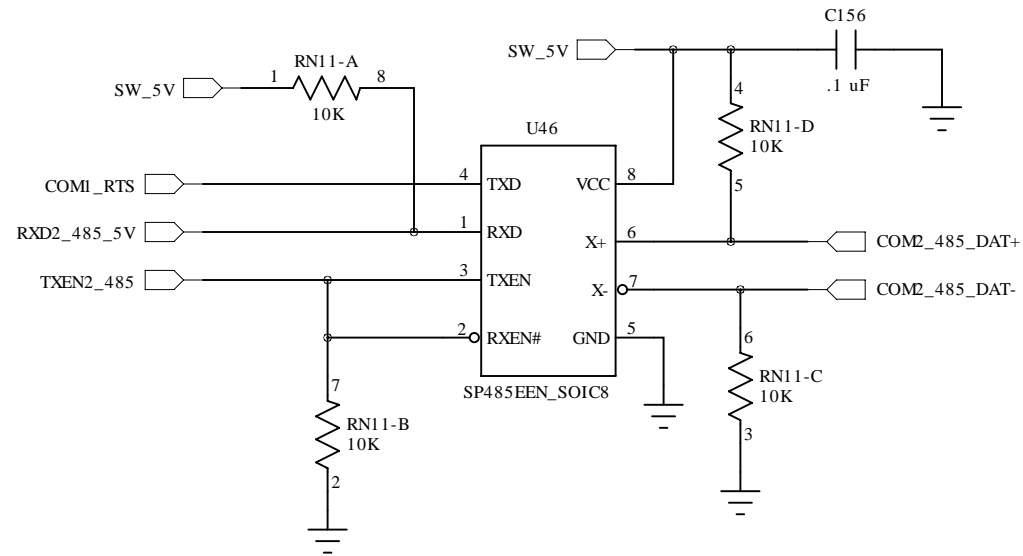
COM2 Header



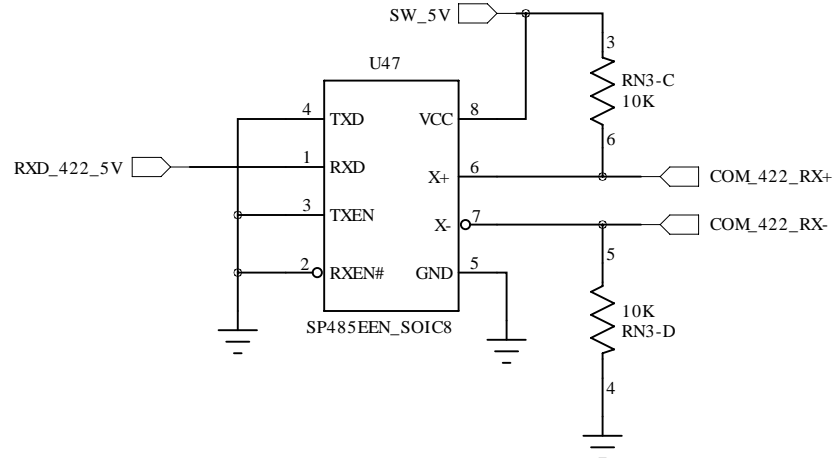
COM3 Header



COM2 RS-485 Driver

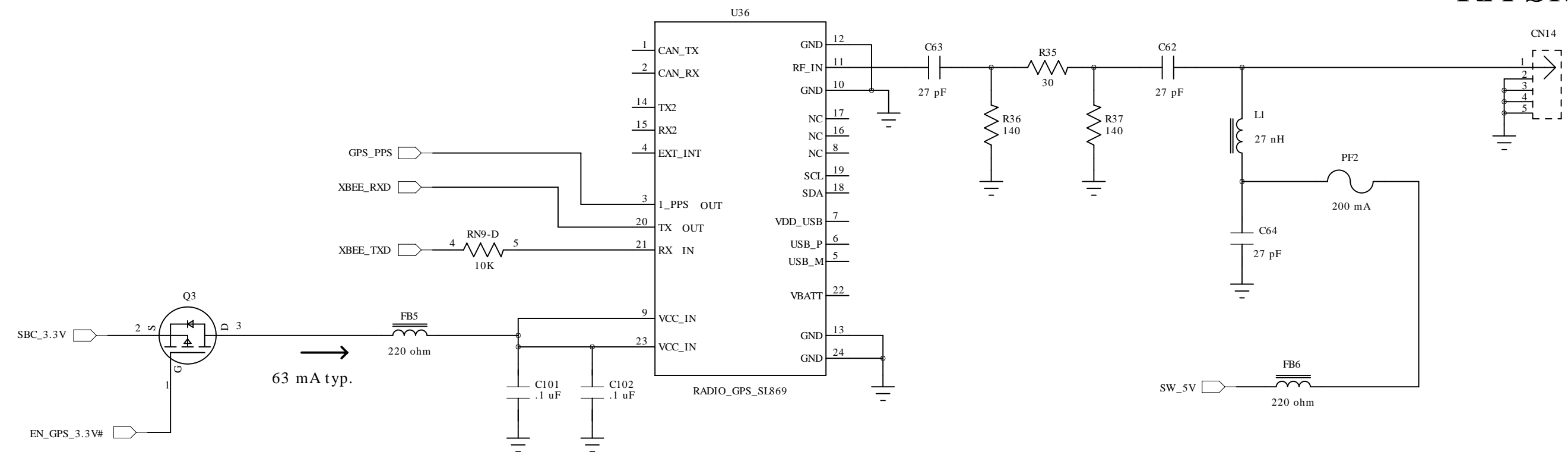


COM2 RS-422 Receiver



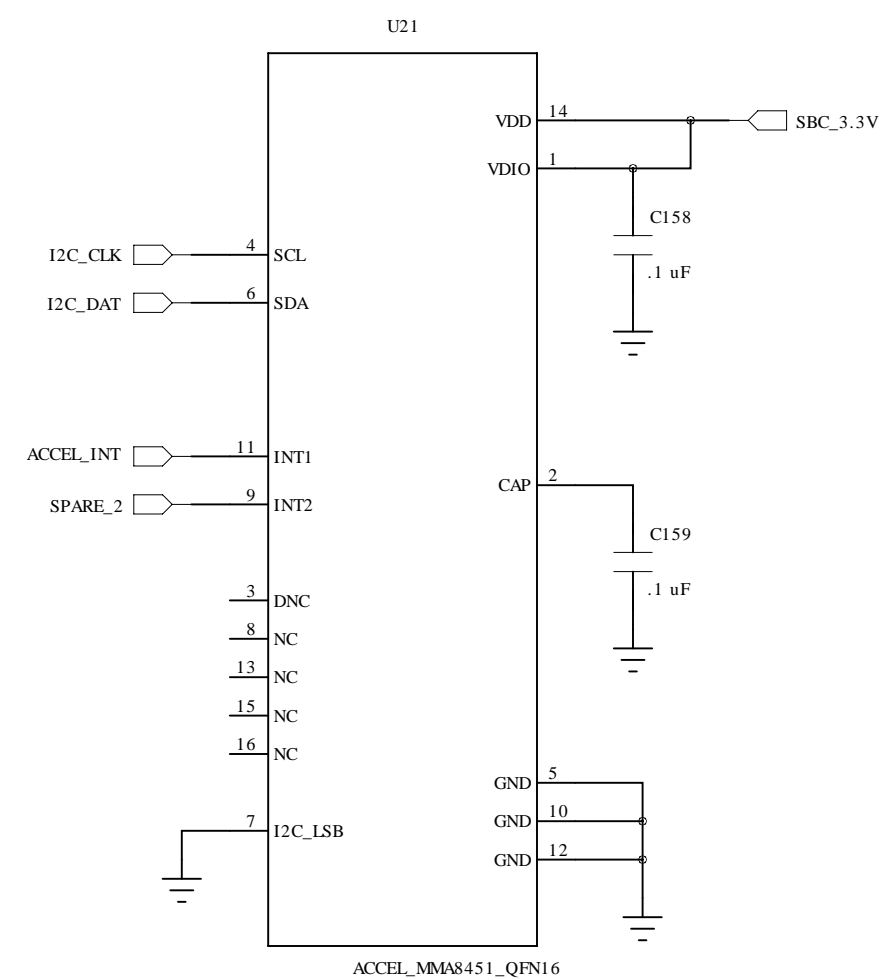
Telit SL869 GPS Radio

RF Conn.
RA SMA



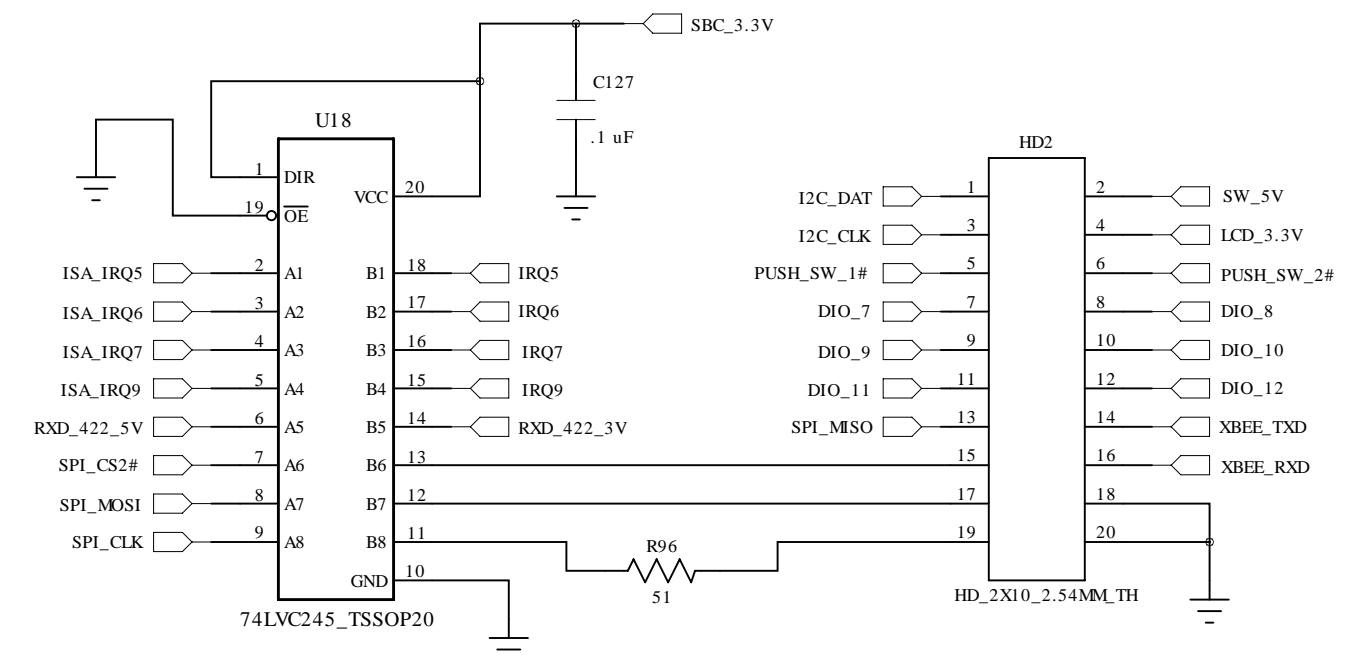
Xbee and GPS radios can not both be installed

Accelerometer



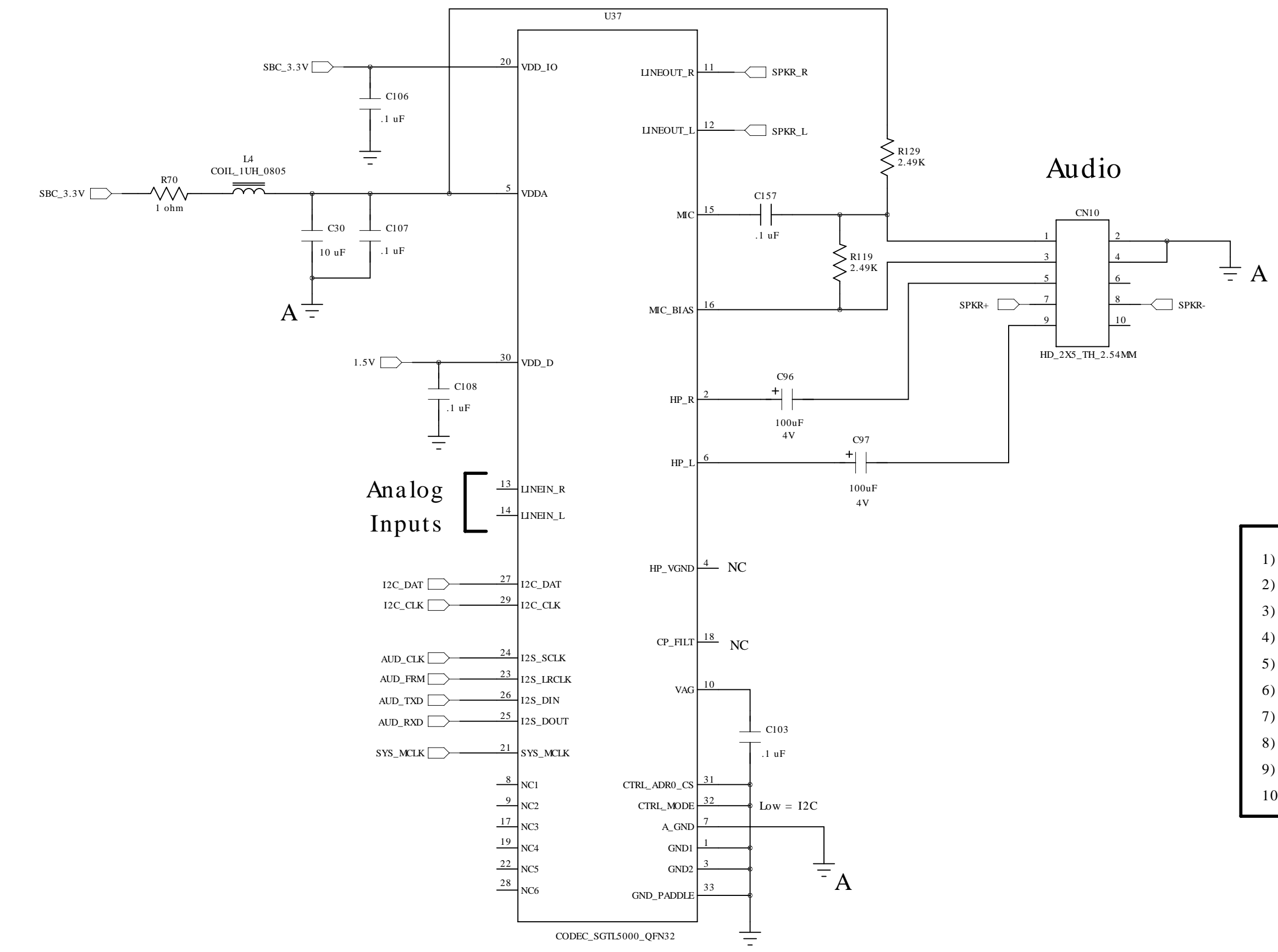
5V --> 3.3V

DIO Port



Technologic Systems	Date	April 27, 2015
Title: TS-8950	DIO, COM Ports	
Rev: A	Designer	Sheet 6 of 18

Audio CODEC

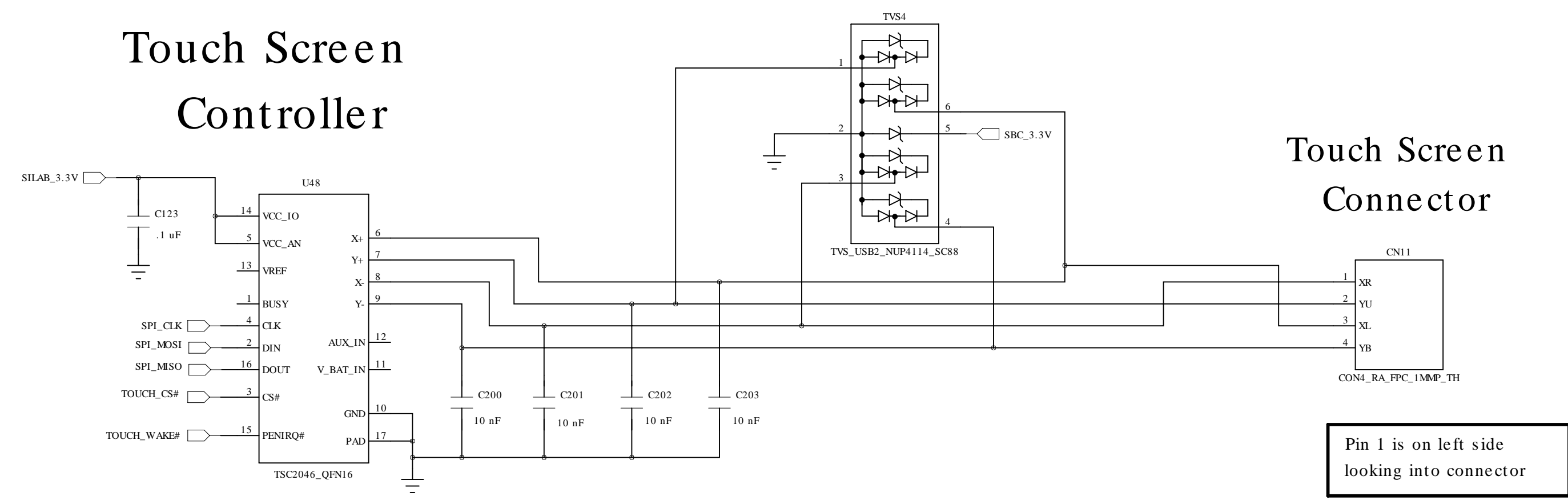


Audio

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 |

Touch Screen Controller

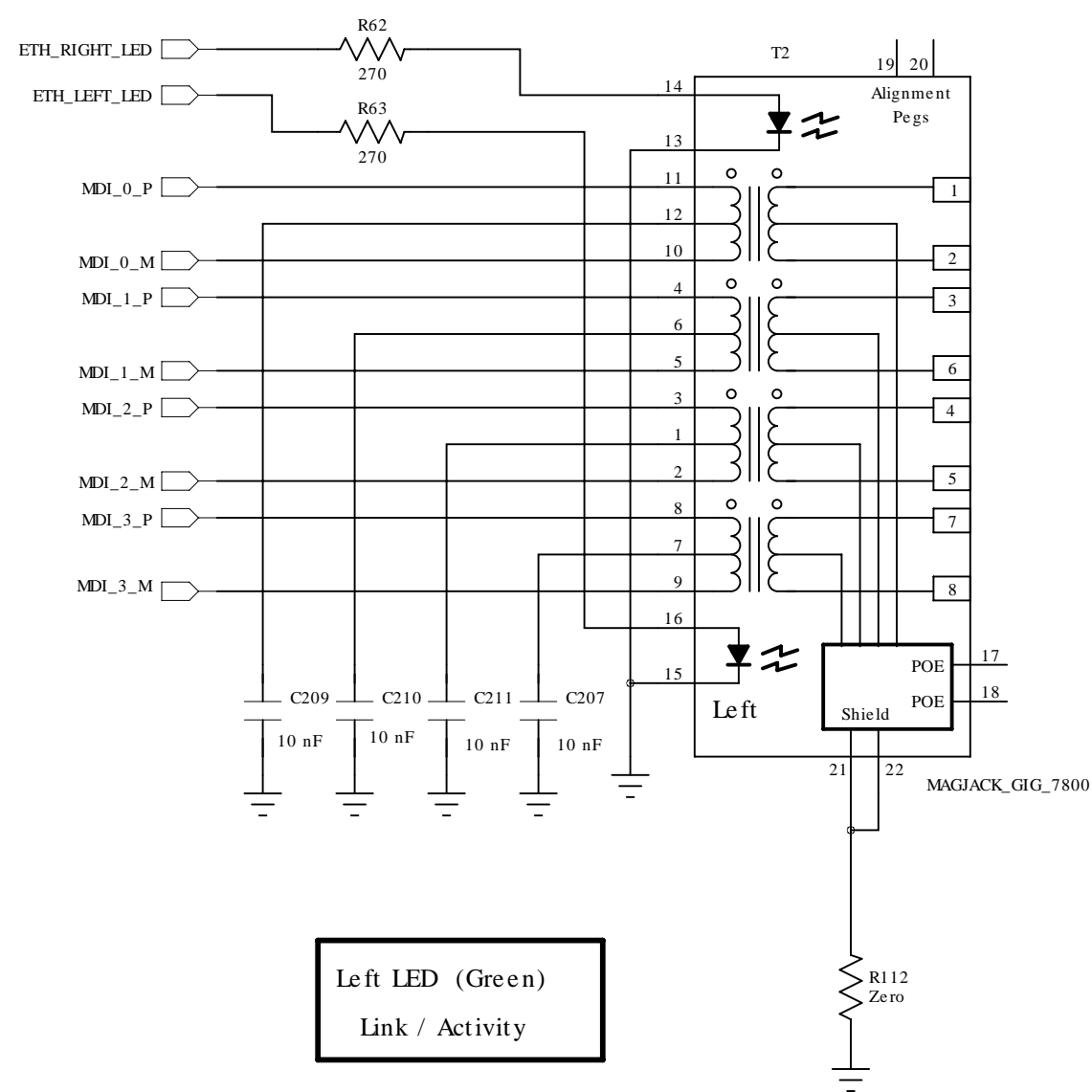


Touch Screen Connector

Pin 1 is on left side looking into connector

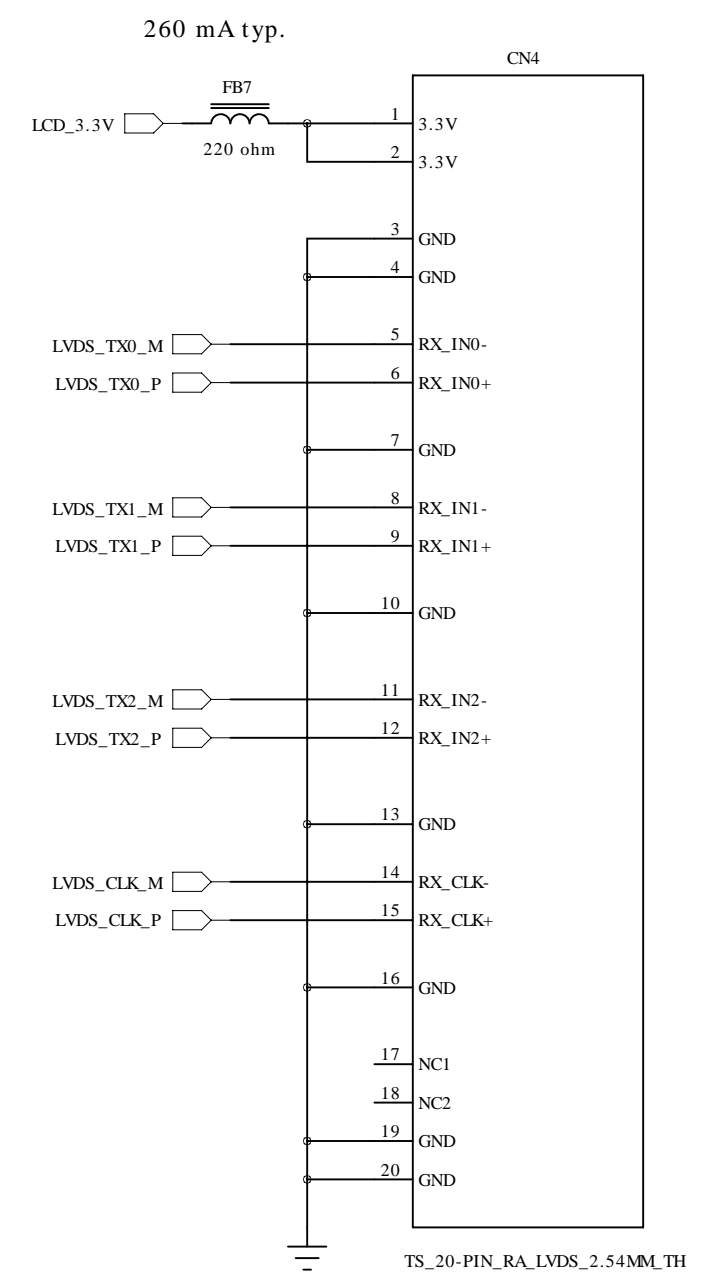
Technologic Systems	Date April 27, 2015
Title: TS-8950 LCD, Audio, TouchScreen	
Rev: A	Designer
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Gig MagJack

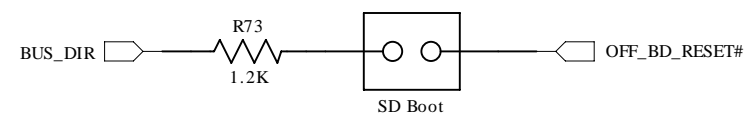


Left LED (Green)
Link / Activity

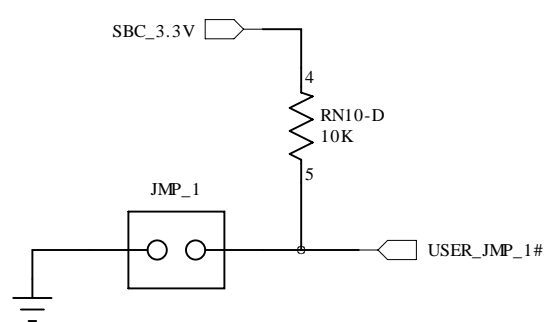
LCD Conn.



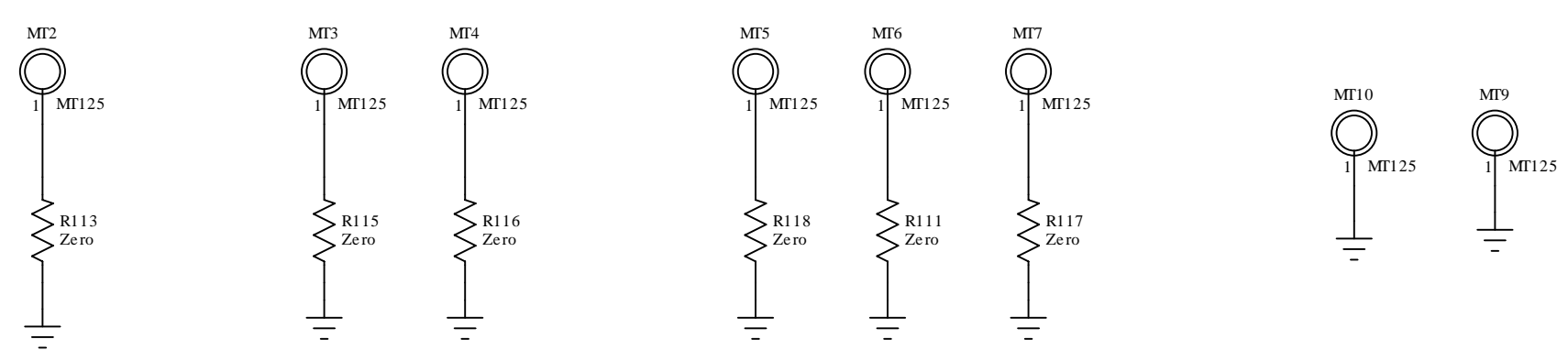
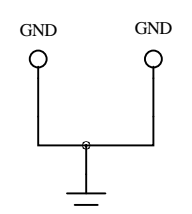
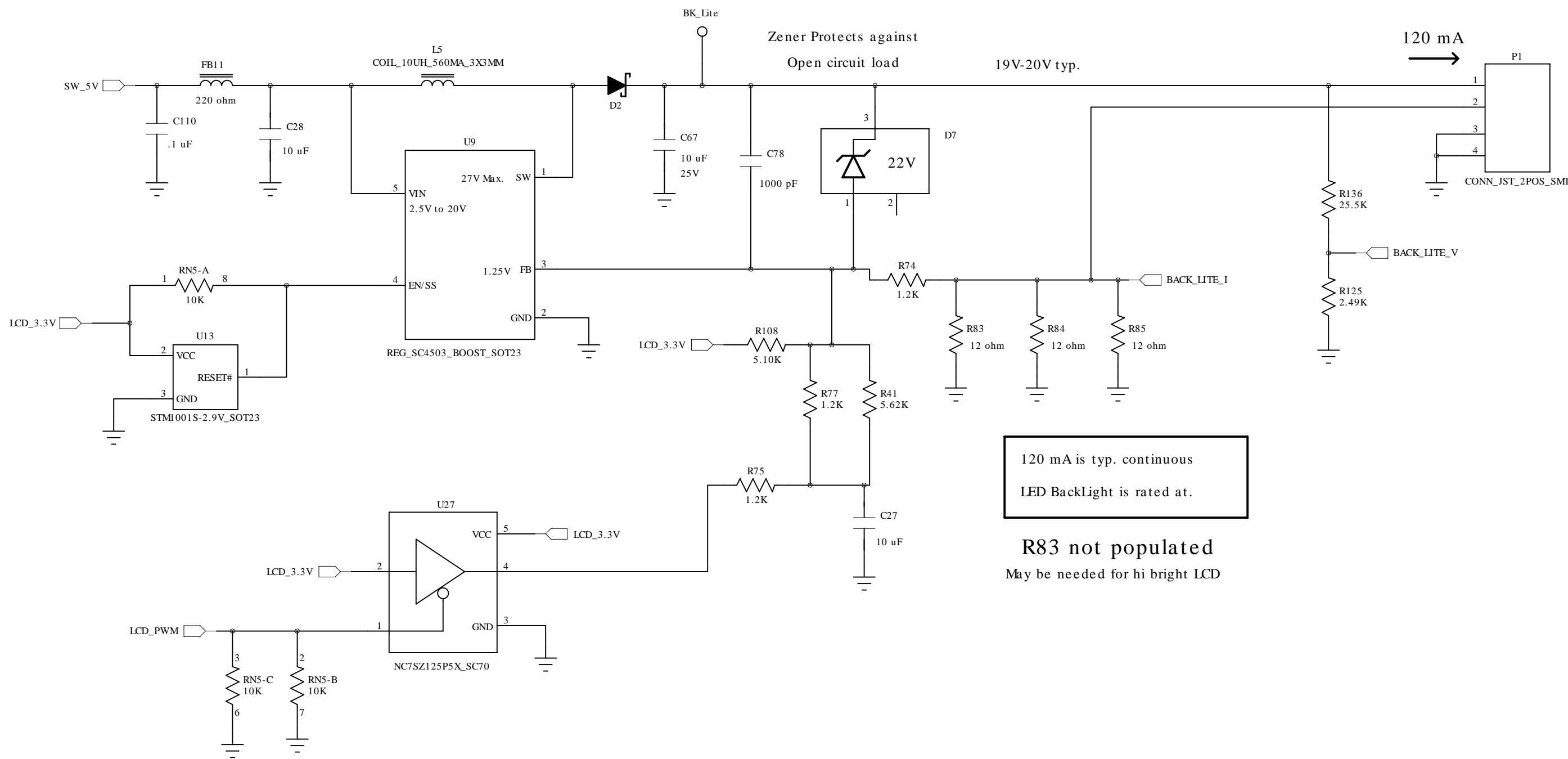
Force Boot to SD card



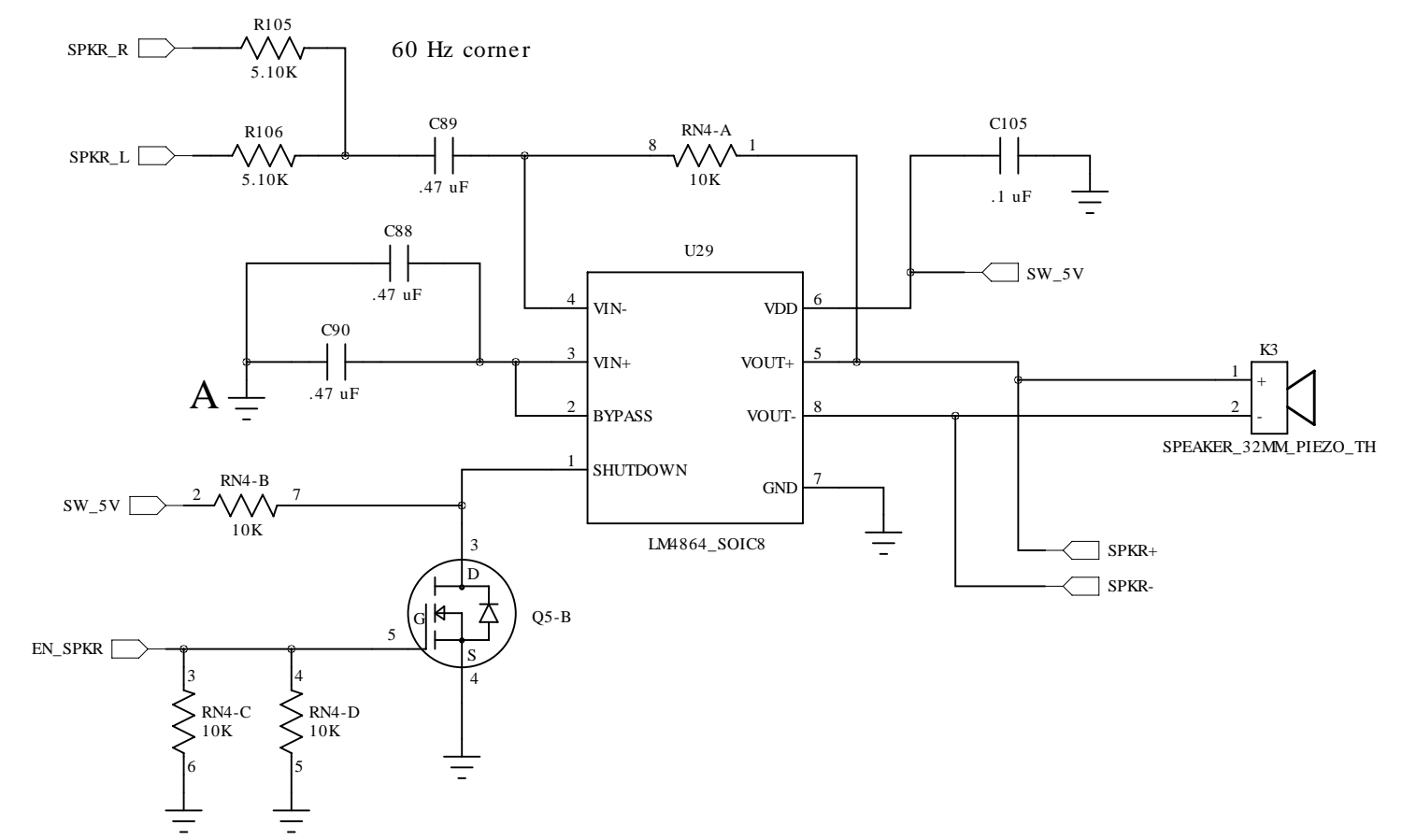
User Jumpers



BackLight Power



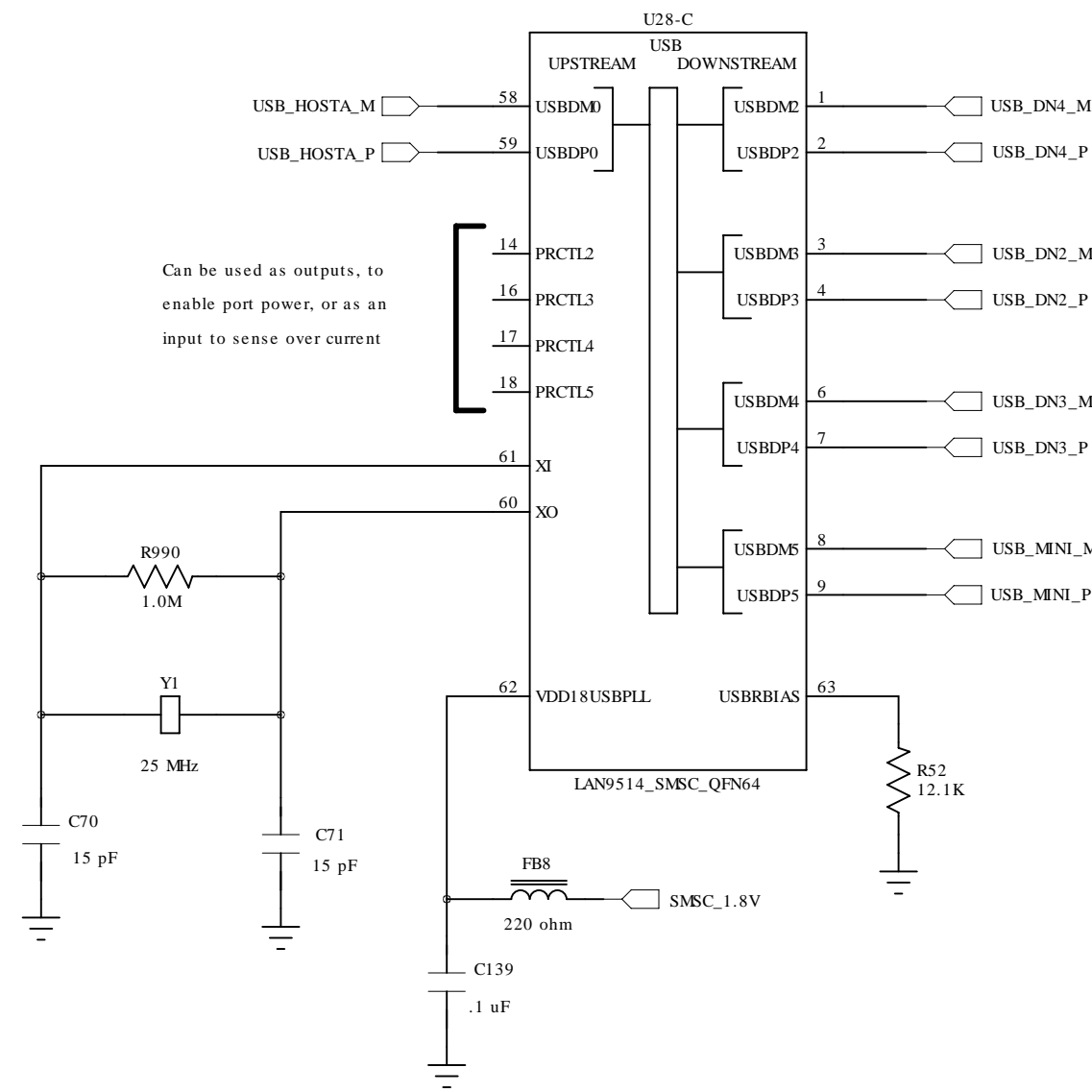
Speaker Amp



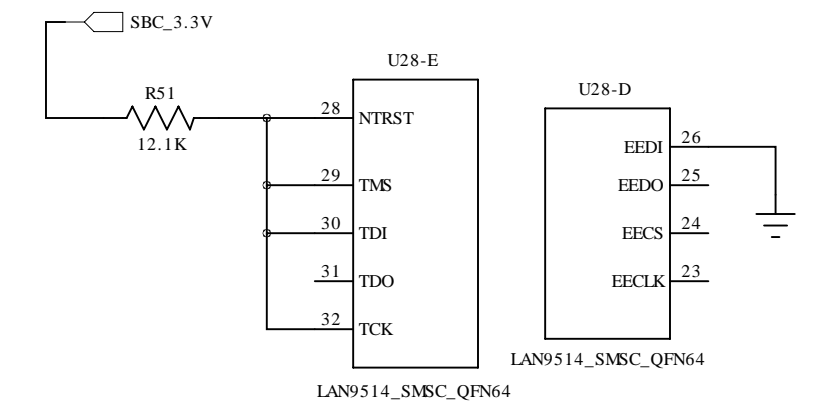
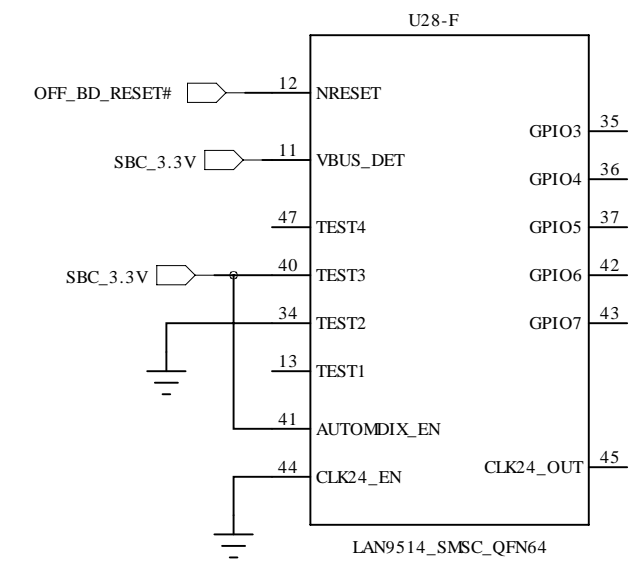
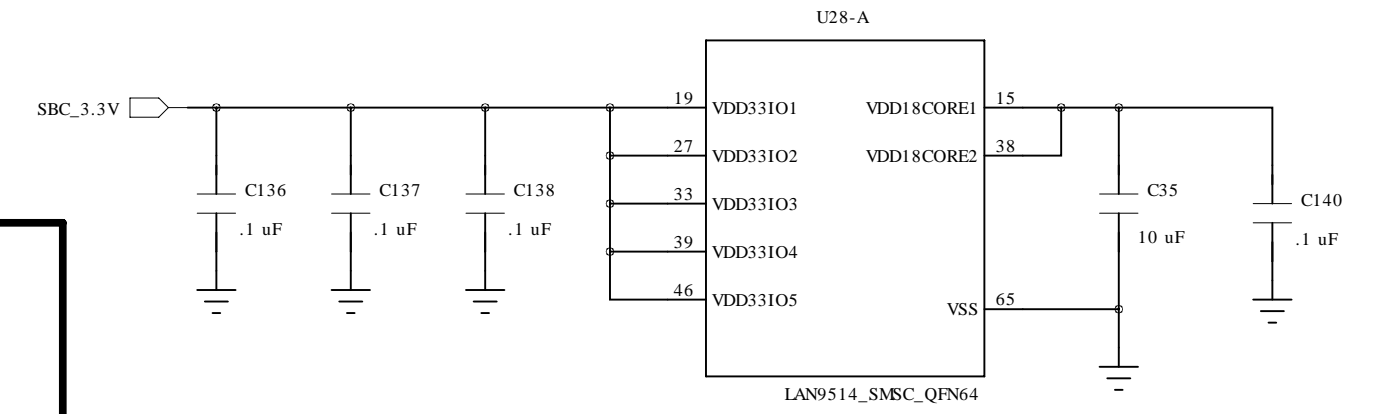
Technologic Systems	Date April 27, 2015
Title: TS-8950 Backlight Power Ethernet	
Rev: A	Designer RLM
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2nd Ethernet Port

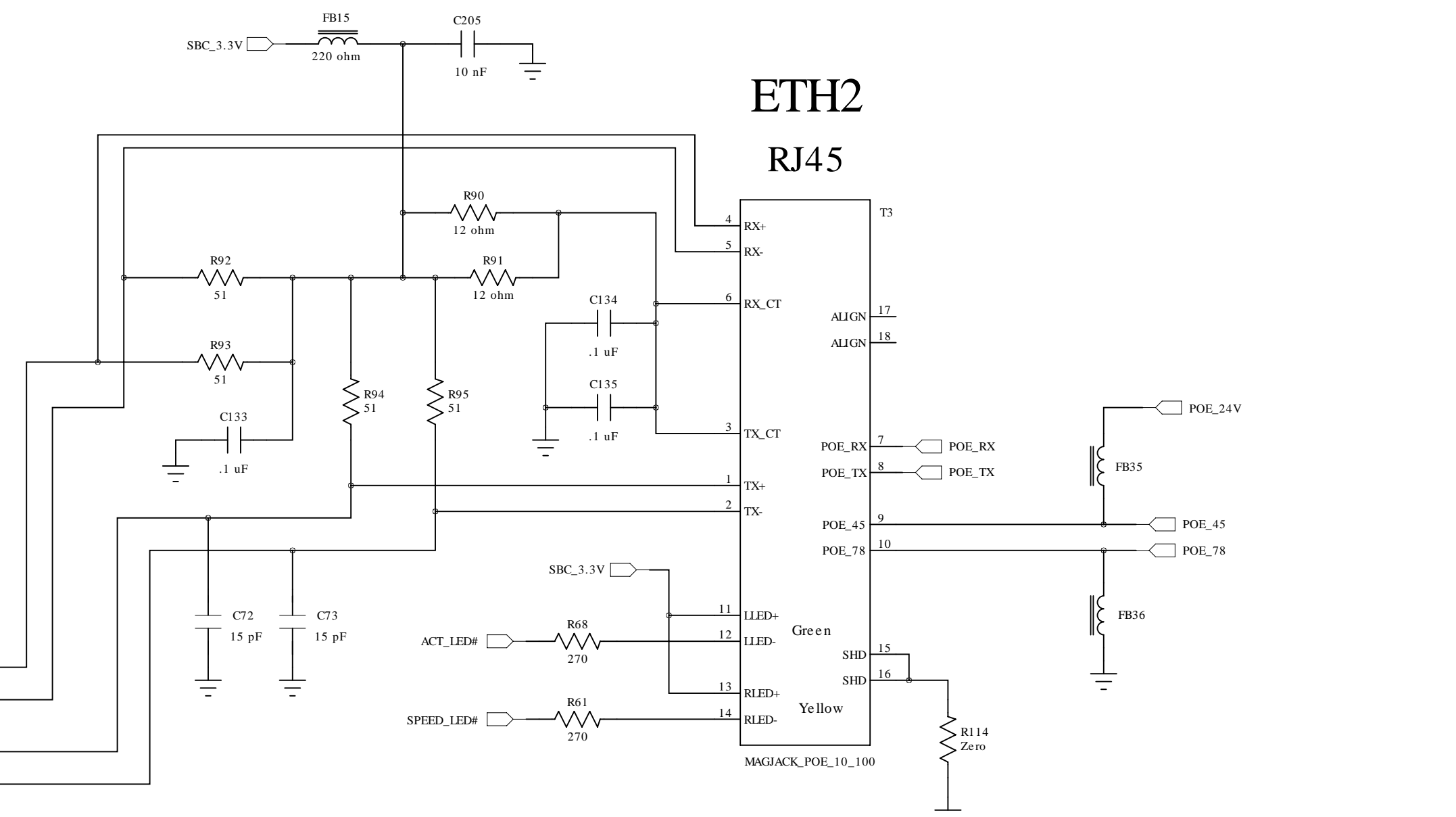
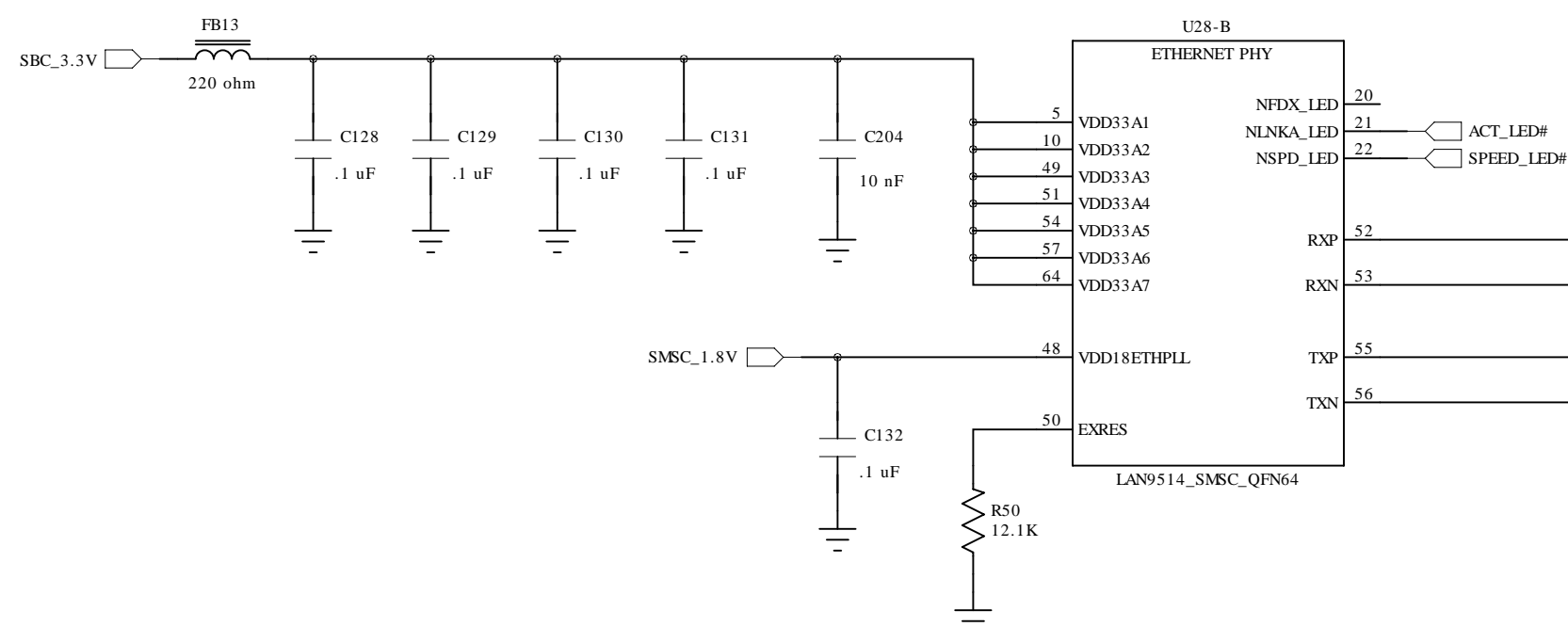
SMSC USB Hub



Typical 3.3V current
with all ports active
is 288 mA (950 mw)

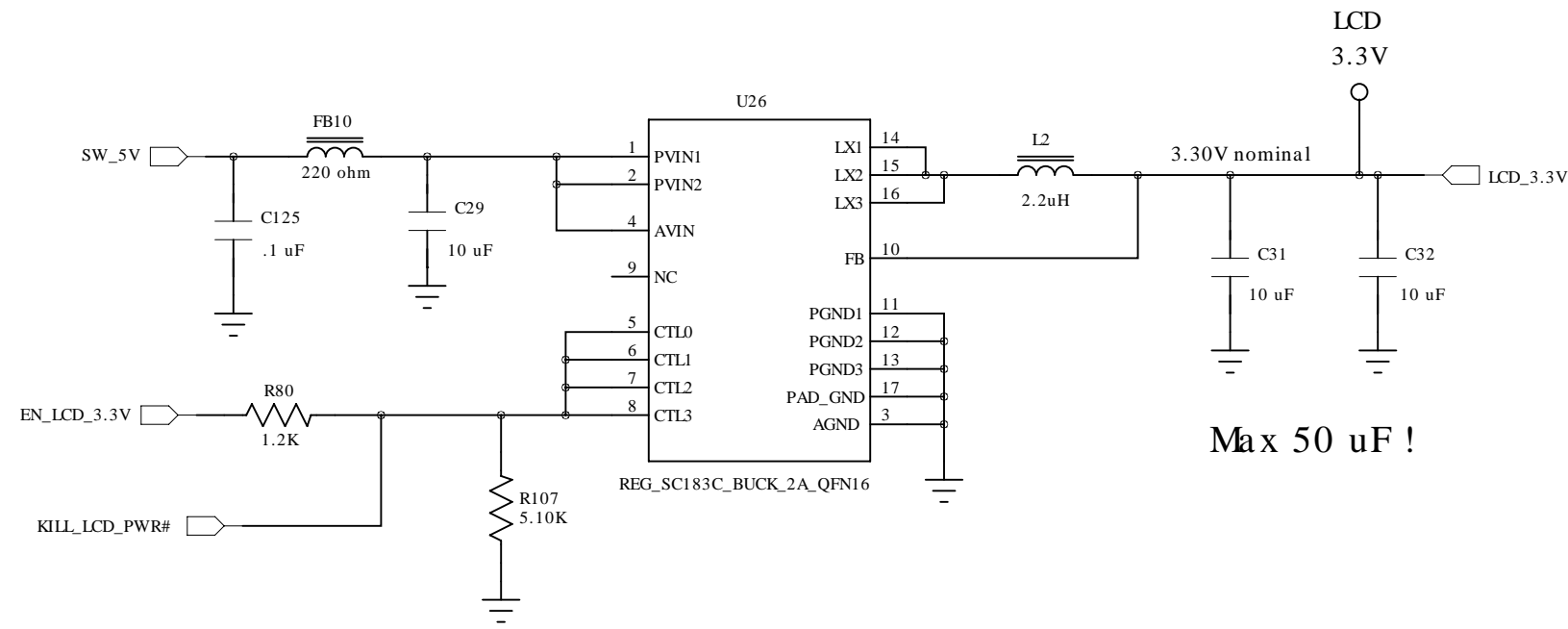


SMSC Ethernet Port

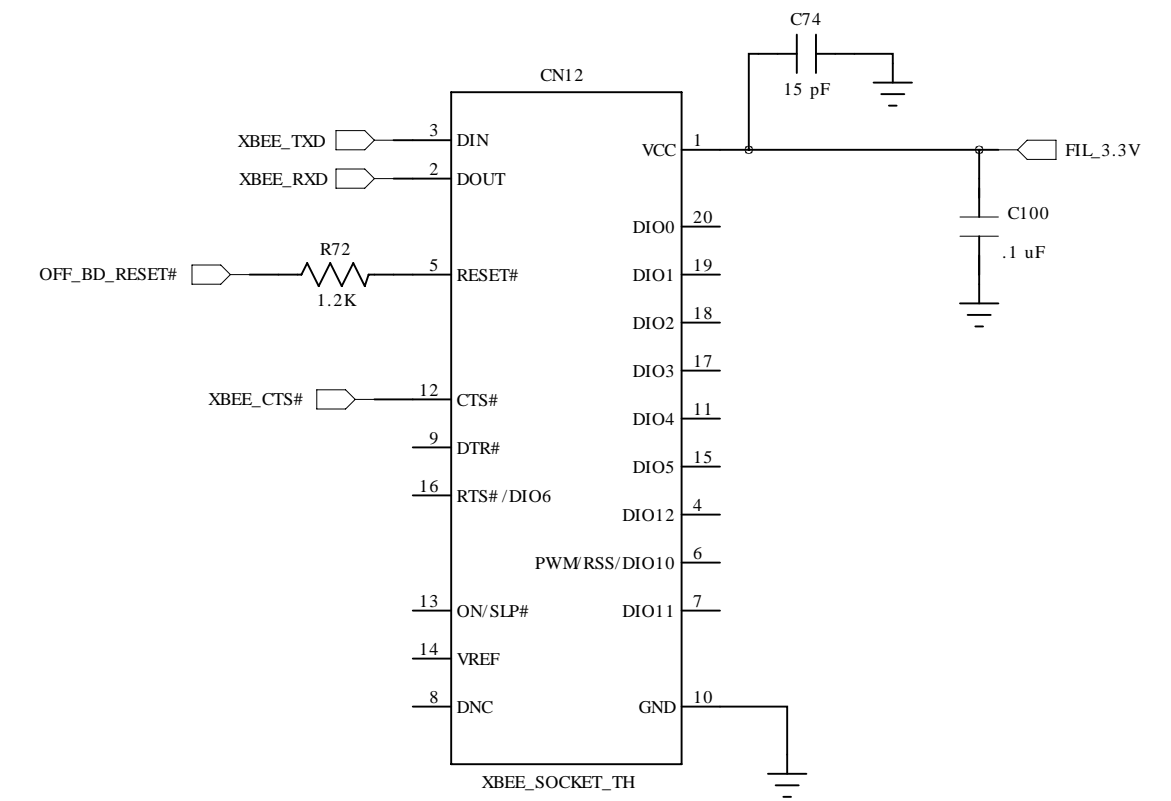


ETH2 RJ45

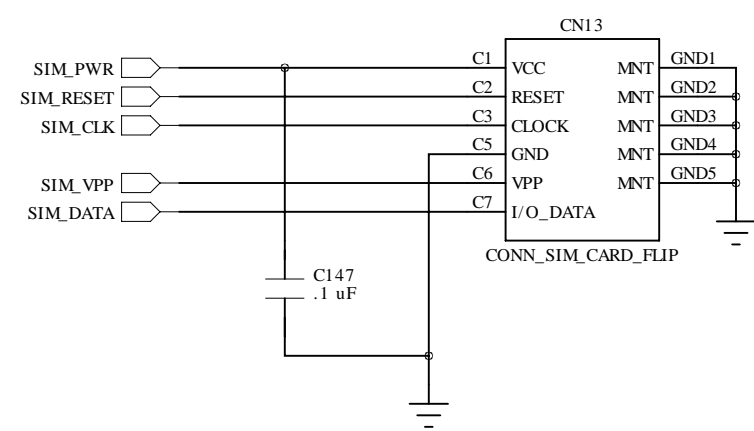
3.3V Power Supply for LCD



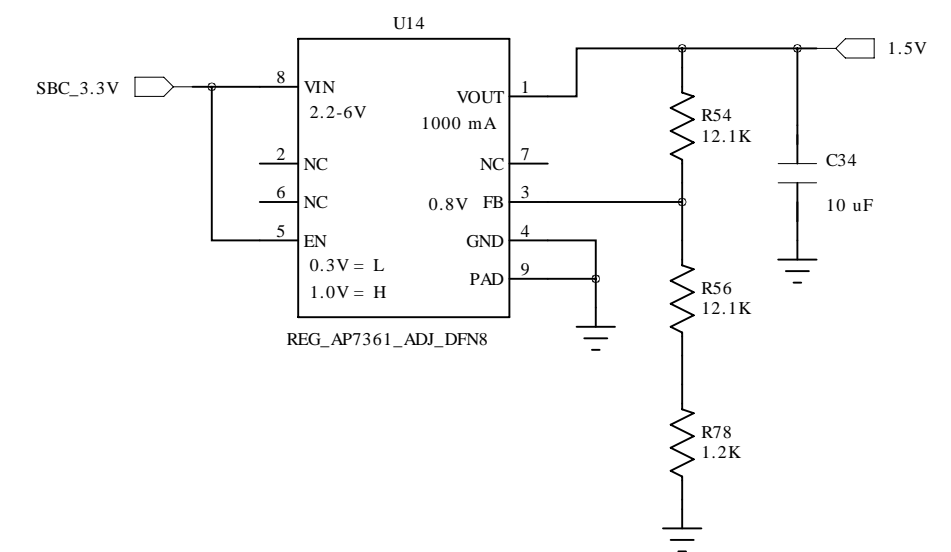
Digi/MaxStream XBee Radio



Mini PCIe SIM Card Connector



Mini PCIe 1.5V Reg.

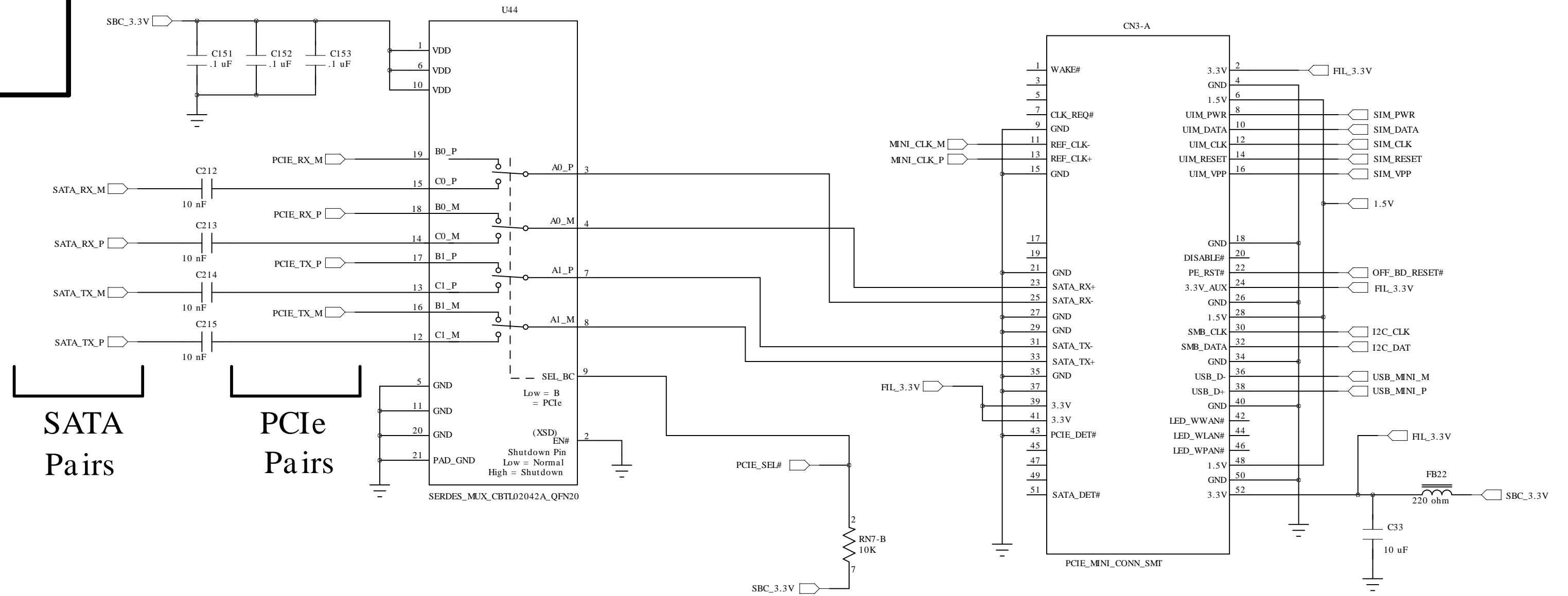


Mini PCIe

Socket

SATA Polarity can not be swapped
 PCIe Polarity can be swapped
 No length matching required for either

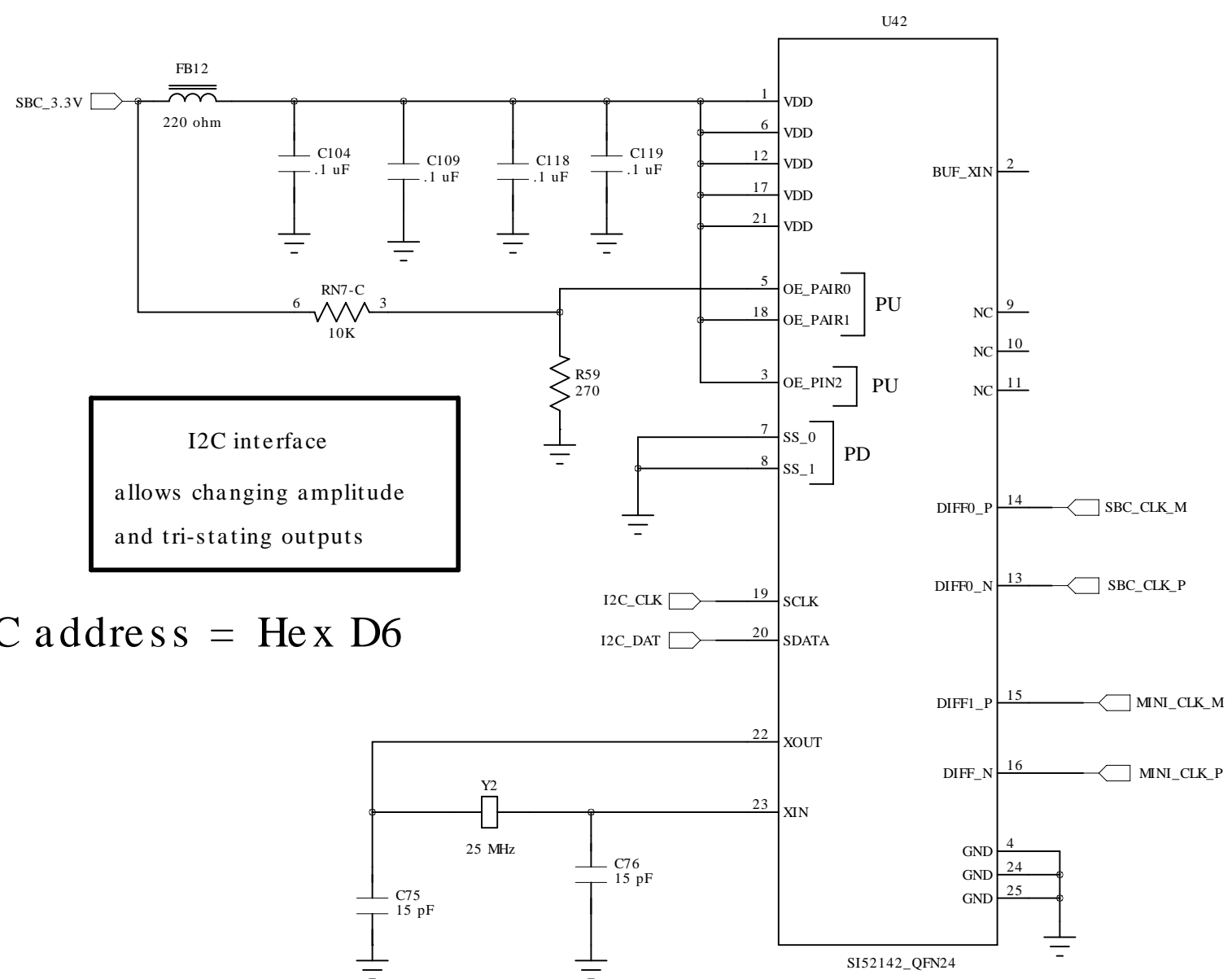
SERDES MUX



SATA Pairs

PCIe Pairs

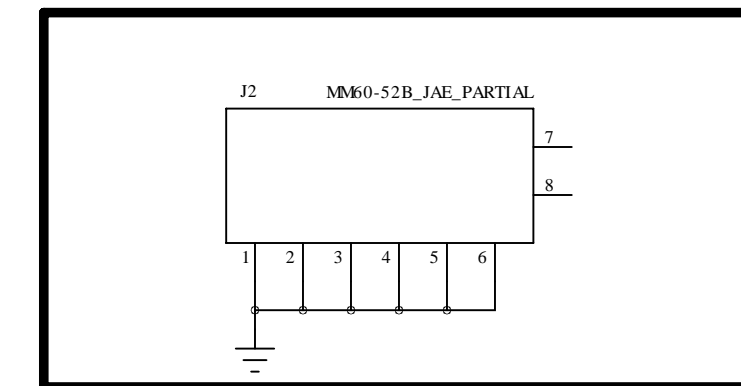
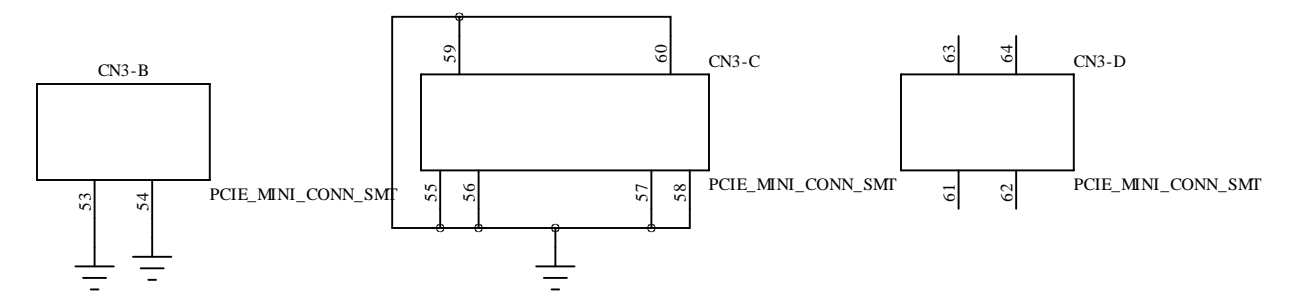
PCIe Clock Gen.



I2C interface allows changing amplitude and tri-stating outputs

I2C address = Hex D6

Phase does not matter



To Support Half-Size Mini-PCIe

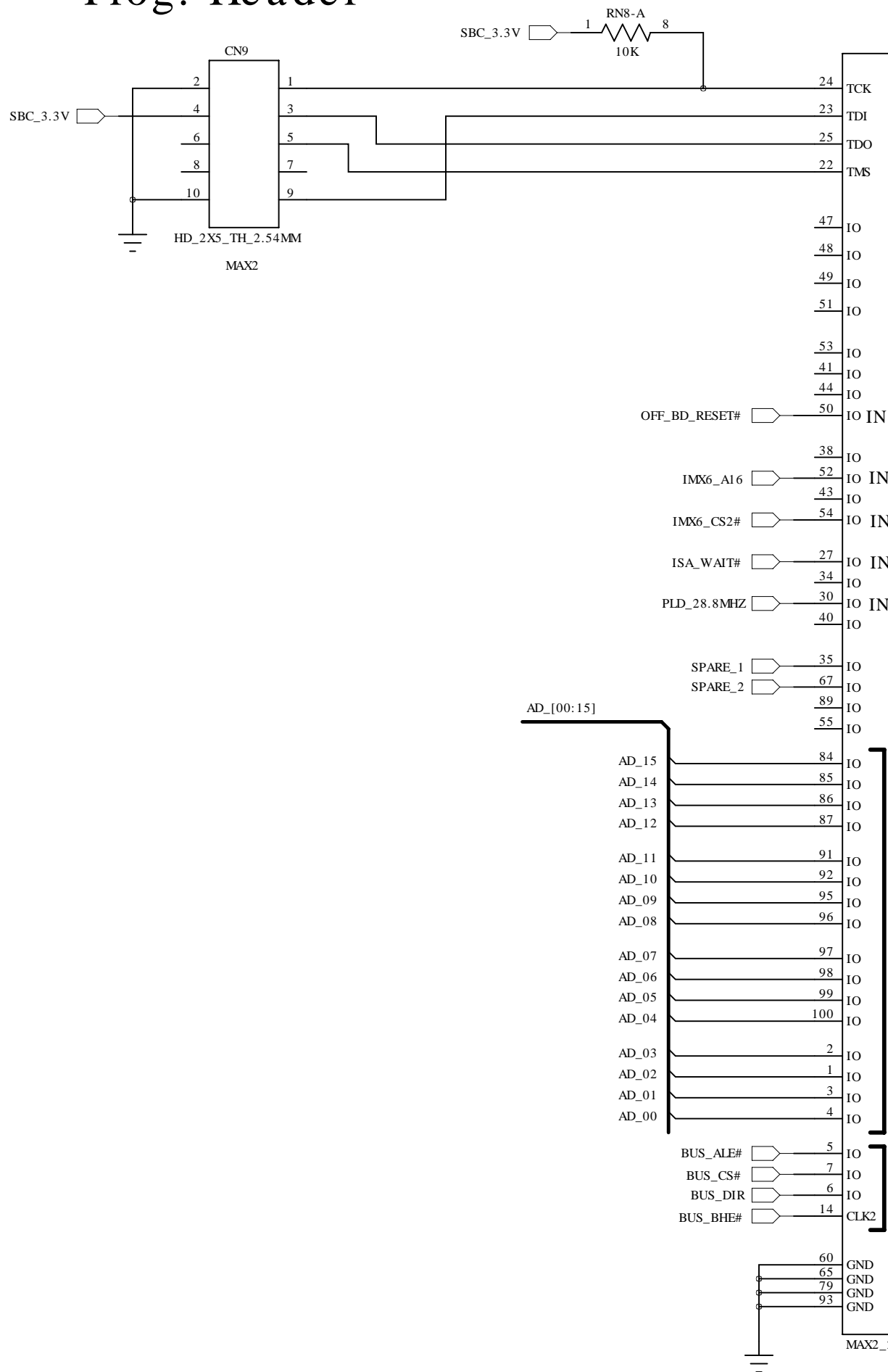
Technologic Systems	Date	April 27, 2015
Title: TS-8950	Analog	
Rev: A	Designer	Sheet 12 of 18

MAX2

PLD

Inputs on Left
Outputs on Right

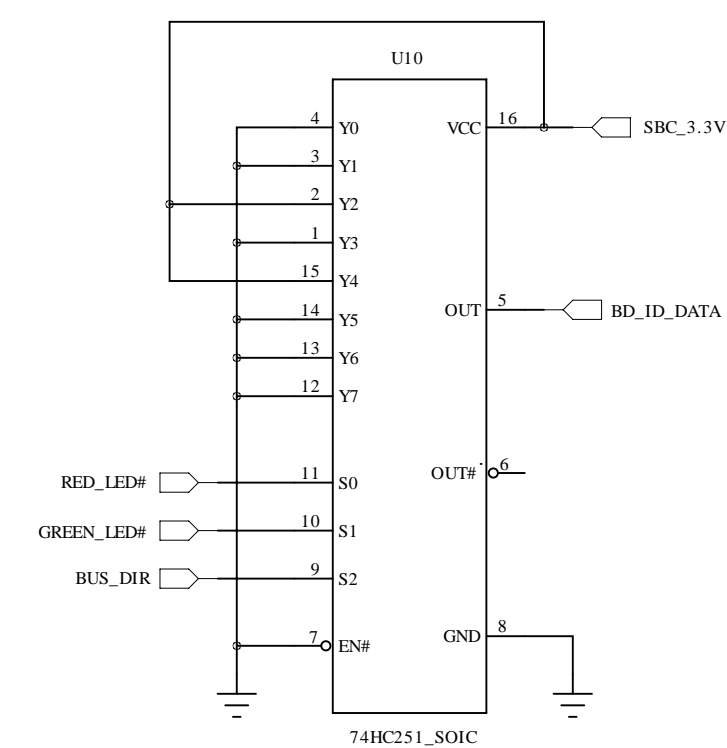
MAX2 Prog. Header



PLD requires a 28.8 MHz clock

TS-8950

Board ID = 20

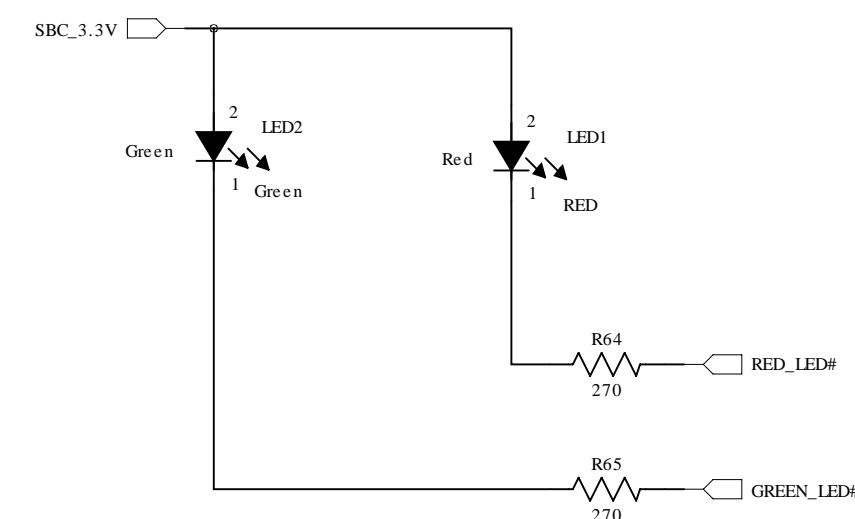


ISA_245_DIR is high for Read cycles

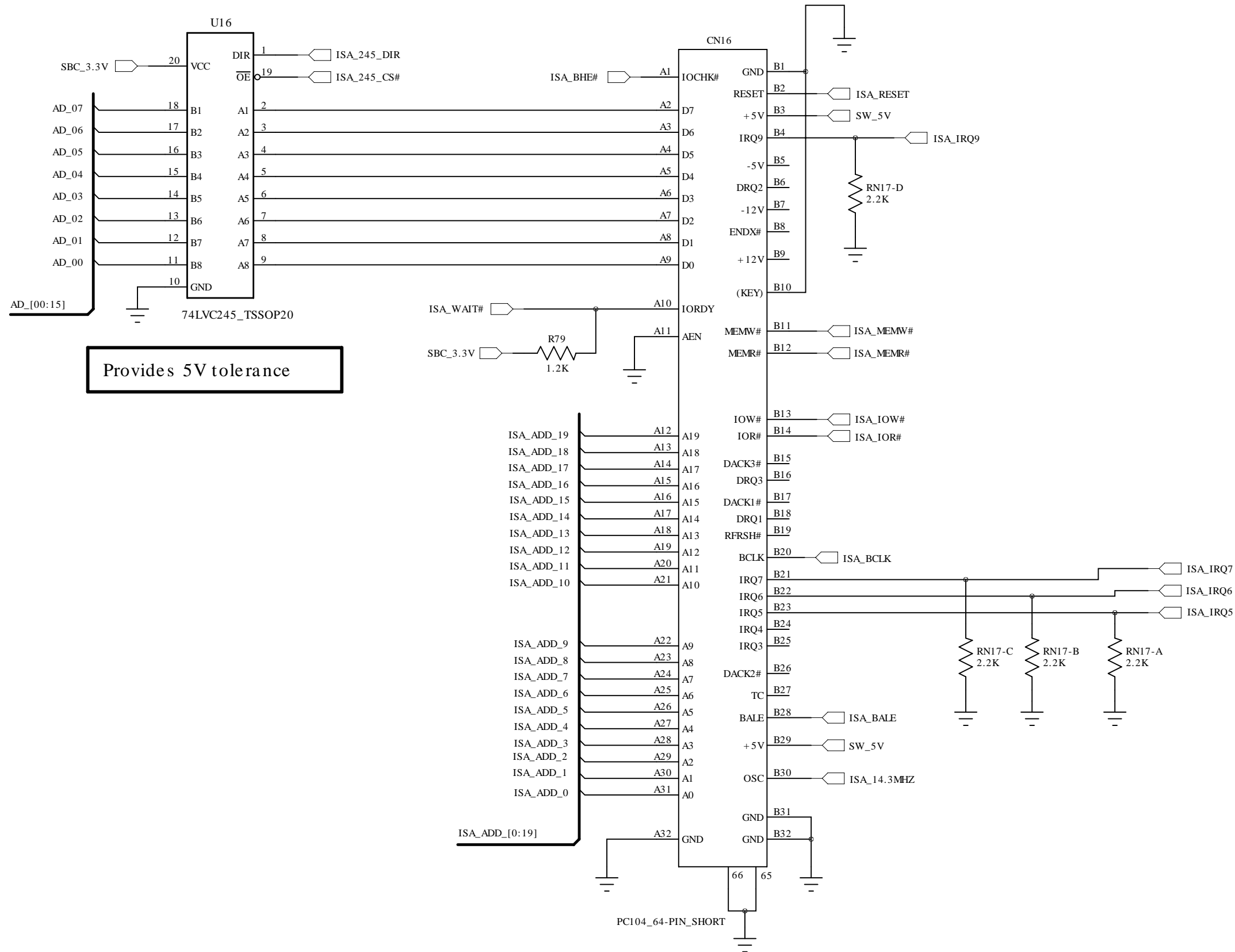
Allow BCLK and BALE to be tri-stated

Use Page Reg. for ISA addresses A16 thru A19

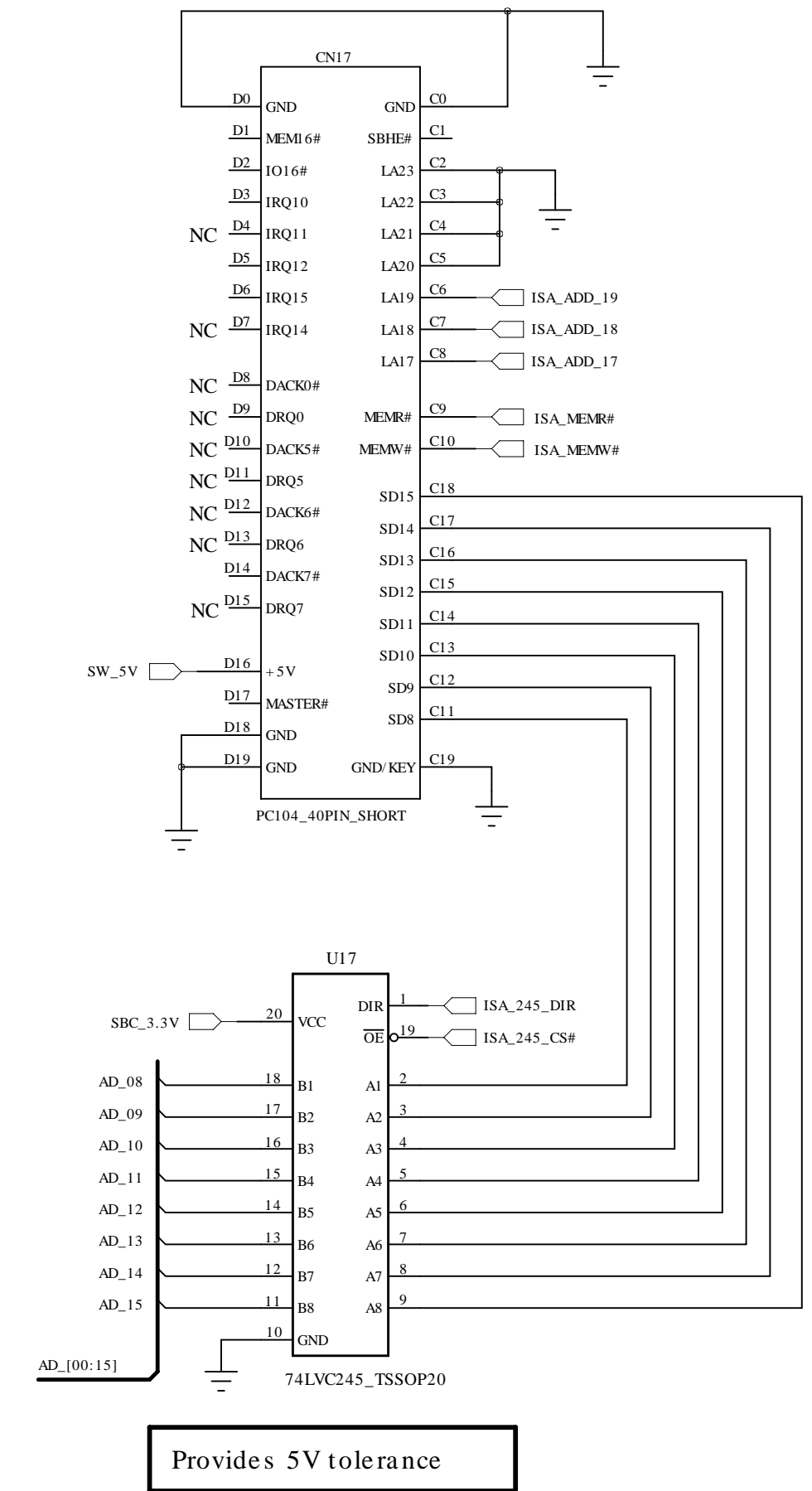
SBC LEDs



PC/104 64-pin Connector

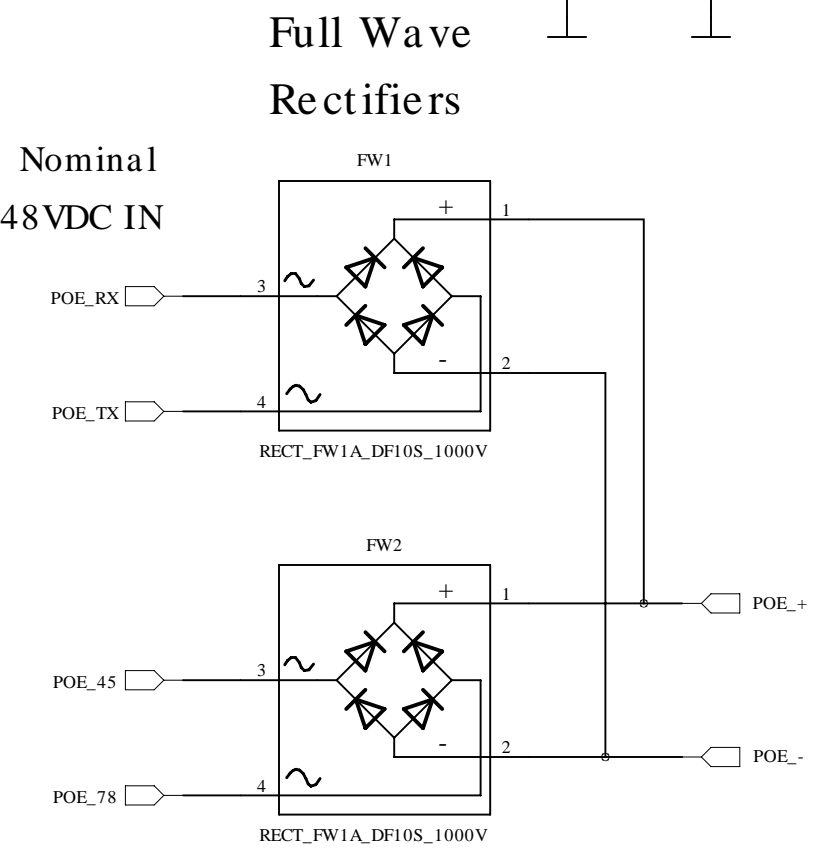
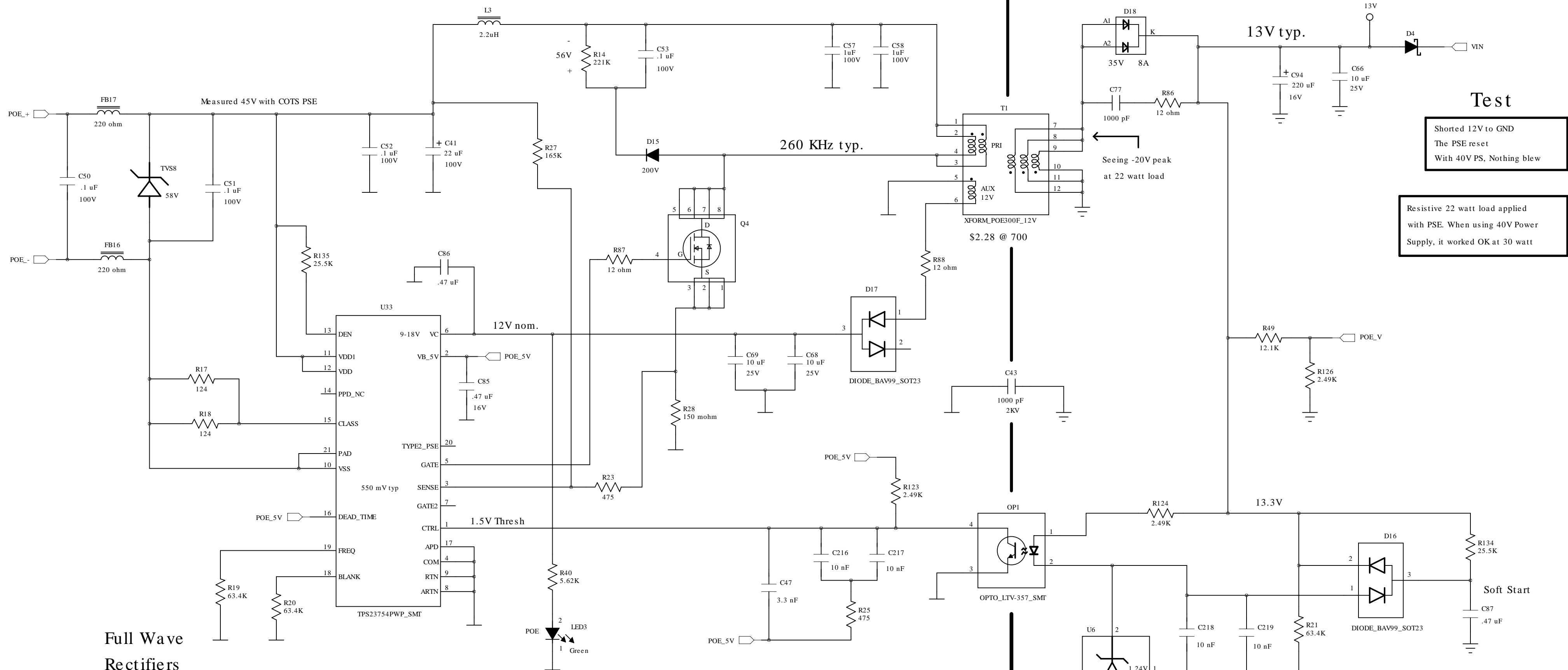


PC/104 40-pin Connector



Isolated POE Side 48V DC Input

Reg. 13V Out



Step Load Response

7 ohm load was switched on/off
12V rail dipped 500 mV
then smoothly recovered in 20 us

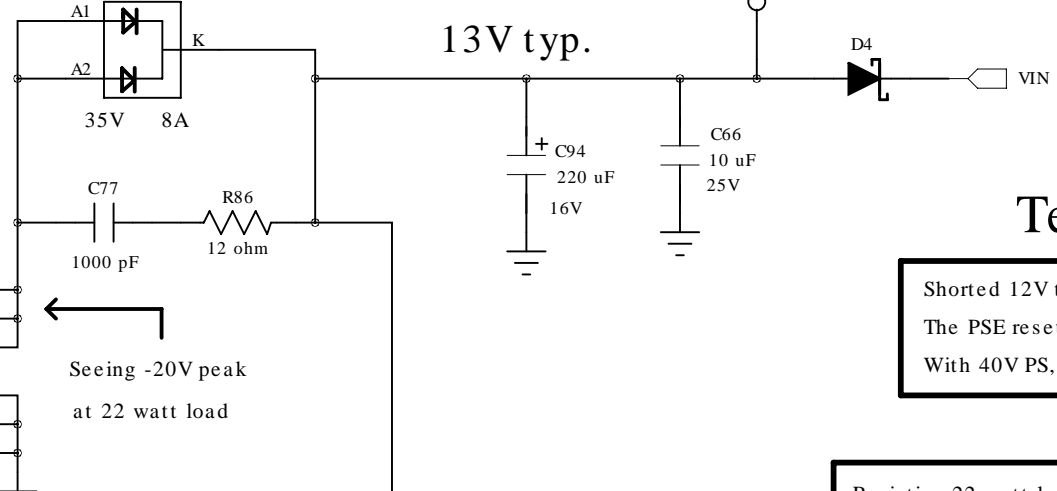
Temp. Rise

At 22 watt load
Q4 case at 60 degrees
D1 at 56 degrees
T1 was 45 degrees

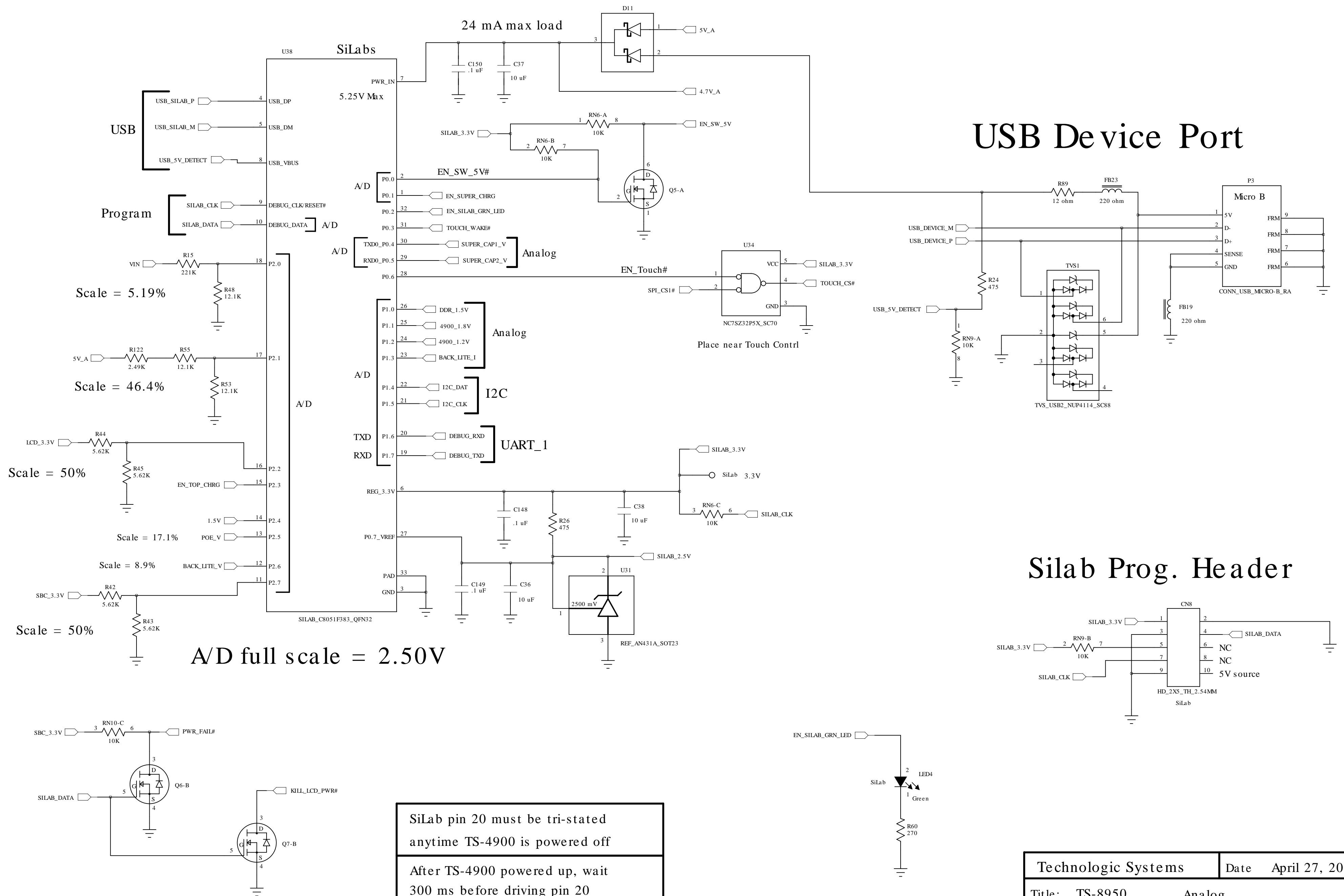
Test

Shorted 12V to GND
The PSE reset
With 40V PS, Nothing blew

Resistive 22 watt load applied
with PSE. When using 40V Power
Supply, it worked OK at 30 watt



USB Device Port and Silab uC



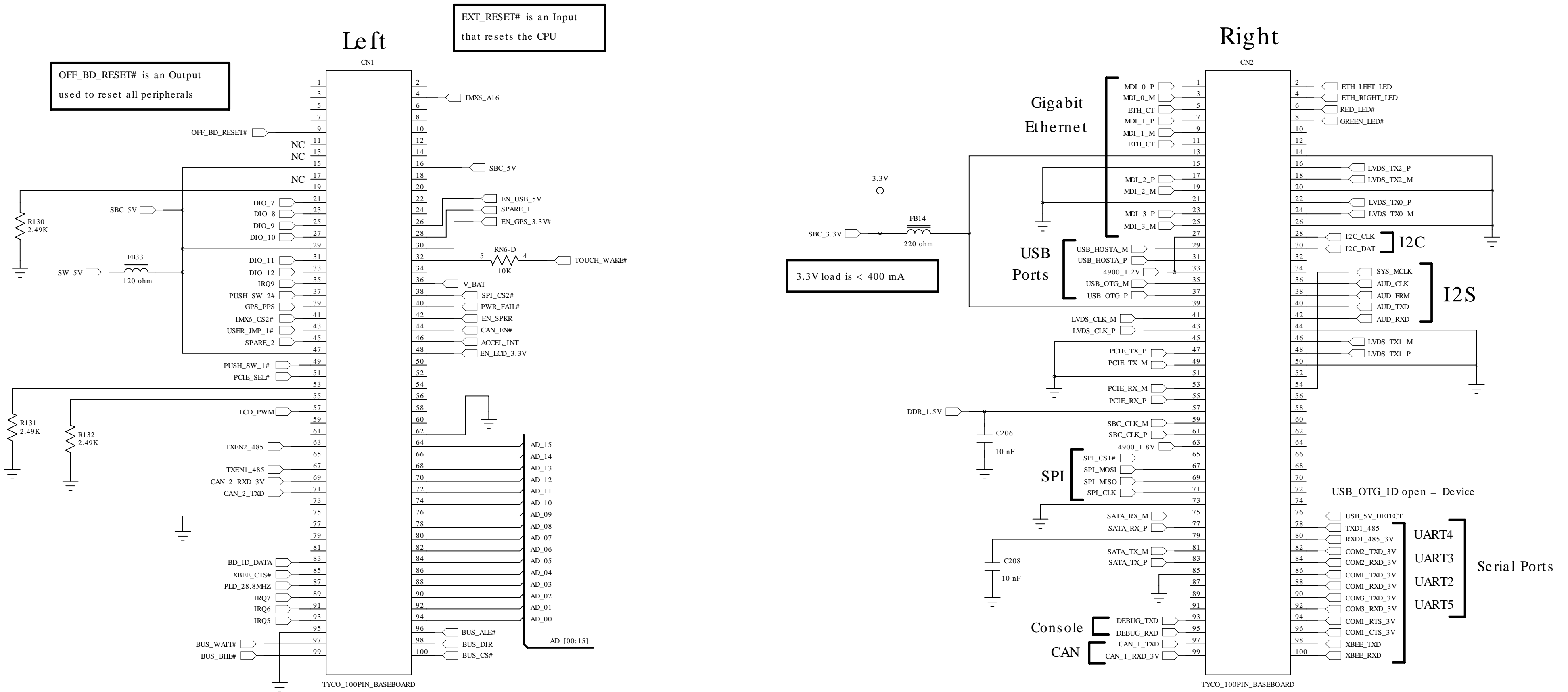
USB Device Port

Silab Prog. Header

SiLab pin 20 must be tri-stated
anytime TS-4900 is powered off
After TS-4900 powered up, wait
300 ms before driving pin 20

Technologic Systems		Date	April 27, 2015
Title:	TS-8950	Analog	
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Two 100-pin Module Connectors



OFF_BD_RESET# is an Output used to reset all peripherals

EXT_RESET# is an Input that resets the CPU

3.3V load is < 400 mA

LVDS pairs are length matched

PCIe Diff Pairs can be Polarity swapped

SATA can NOT have polarity swapped

SATA and PCIe Diff pairs do NOT have to be length matched

Boot Strap

Mode 2 = BUS_DIR	SBC Boots from
1	eMMC Flash
0	SD Card

MODE2 state is latched prior to OFF_BD_RESET# deasserted

MODE2 has a 12K PU on the SBC module