

Click | Here

This sheet: index

Sheet: OTG
File: neo900_SS_2.sch
OTG & Switches

Sheet: Charger/OTG-Booster
File: neo900_SS_3.sch
Charger/OTG-Booster

Sheet: Modem Power
File: neo900_SS_4.sch
Modem Power

Sheet: Fuel Gauge
File: neo900_SS_5.sch
Fuel Gauge

Sheet: 3G/4G Modem + SIM
File: neo900_SS_6.sch
3G/4G Modem + SIM

Sheet: Dual SIM switch
File: neo900_SS_7.sch
Dual SIM switch

Sheet: Antenna connections
File: neo900_SS_8.sch
Antenna connections

Sheet: WLAN, Bluetooth, FM
File: neo900_SS_9.sch
WLAN, Bluetooth, FM

Sheet: Sensors
File: neo900_SS_10.sch
Sensors

Sheet: Audio Codec
File: neo900_SS_11.sch
Audio Codec

Sheet: Audio Headset + Mic
File: neo900_SS_12.sch
Audio Headset + Mic

Sheet: ECI
File: neo900_SS_13.sch
ECI

Sheet: Audio Handsfree
File: neo900_SS_14.sch
Audio Handsfree

Sheet: Misc
File: neo900_SS_15.sch
Misc

Sheet: RFID/NFC Reader
File: neo900_SS_16.sch
RFID/NFC Reader

Sheet: RFID/NFC Controller
File: neo900_SS_17.sch
RFID/NFC Controller

Sheet: Hackerbus
File: neo900_SS_18.sch
Hackerbus

Sheet: Infrared
File: neo900_SS_19.sch
Infrared

Sheet: B2B LOWER-UPPER
File: neo900_SS_20.sch
B2B LOWER-UPPER

Sheet: uSD Breakout Board
File: neo900_SS_21.sch
uSD Breakout Board

Sheet: empty
File: neo900_SS_22.sch
empty

Sheet: Keypad
File: neo900_SS_23.sch
Keypad

Sheet: Display-Peripherals
File: neo900_SS_24.sch
Display-Peripherals

Sheet: Display-Panel&Power
File: neo900_SS_25.sch
Display-Panel&Power

Click | Here

Sheet: CPU + PoP RAM/NAND
File: neo900_SS_26.sch
CPU + PoP RAM/NAND

Sheet: eMMC
File: neo900_SS_27.sch
eMMC

Sheet: PMU+Codec
File: neo900_SS_28.sch
PMU+Codec

Sheet: BB-XM Dummy (TWL4030)
File: neo900_SS_29.sch
BB-XM Dummy (TWL4030)

Sheet: Camera
File: neo900_SS_30.sch
Camera

Sheet: Fancy LEDs
File: neo900_SS_31.sch
Fancy LEDs

Sheet: Basic LEDs
File: neo900_SS_32.sch
Basic LEDs

Sheet: Connector to BB-XM
File: neo900_SS_33.sch
Connector to BB-XM

Sheet: BB-XM Adapter (CPU)
File: neo900_SS_34.sch
BB-XM Adapter (CPU)

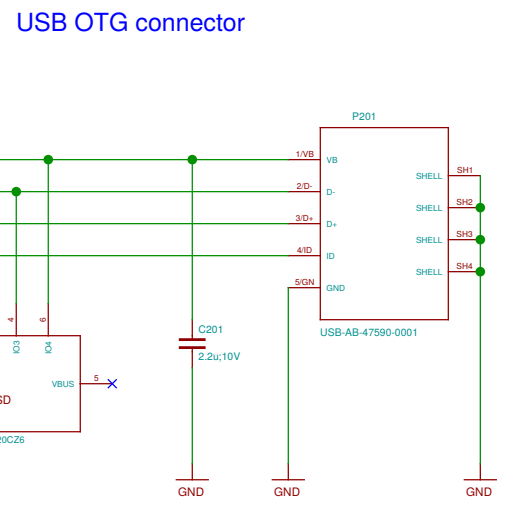
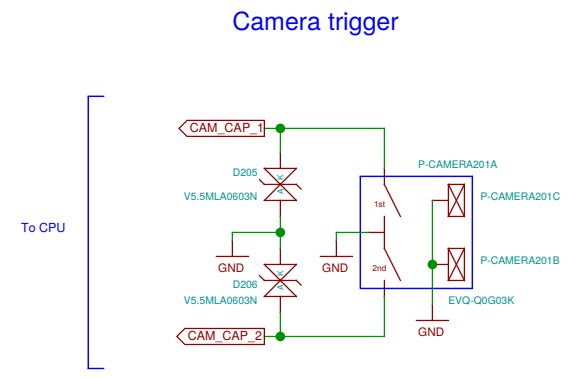
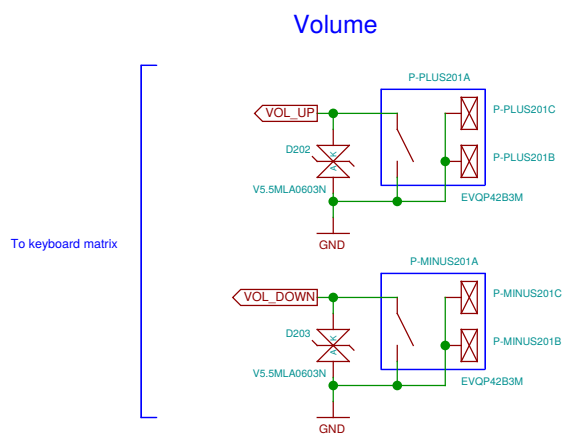
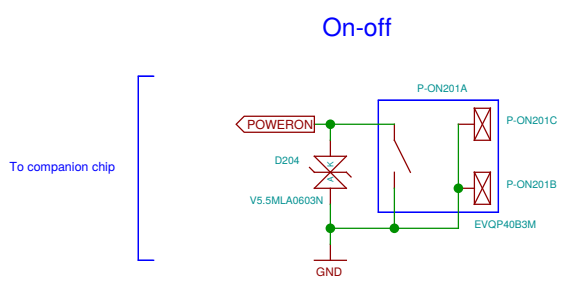
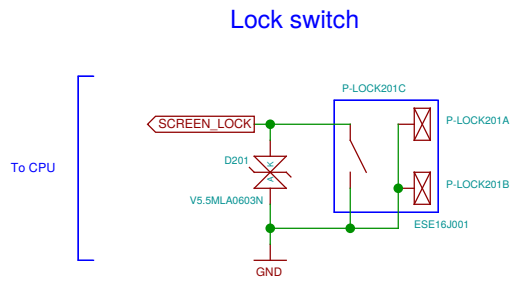
Sheet: BB-XM Adapter (DISP)
File: neo900_SS_35.sch
BB-XM Adapter (DISP)

Sheet: BB-XM Adapter (CAM)
File: neo900_SS_36.sch
BB-XM Adapter (CAM)

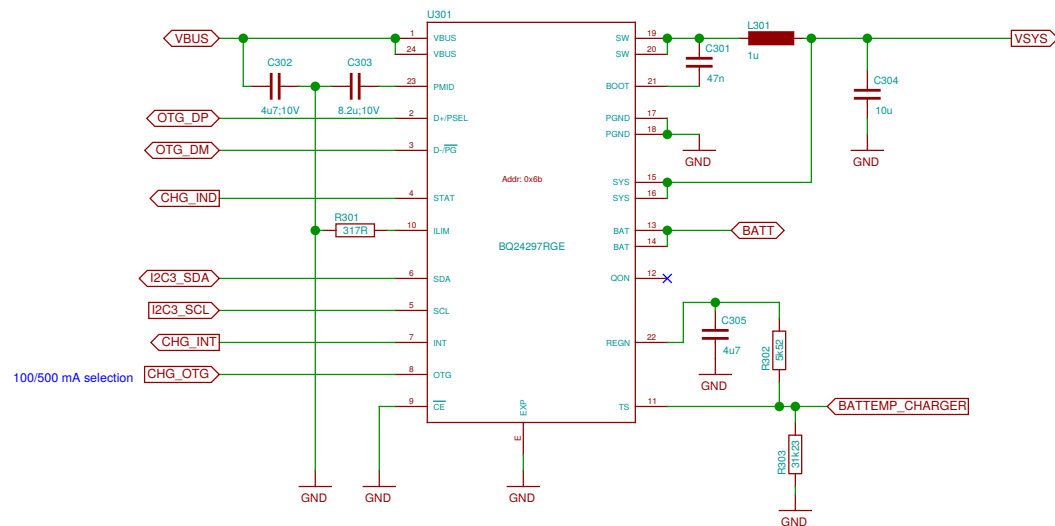
Sheet: No-Solder Components
File: neo900_SS_37.sch
No-Solder Components

Note regarding I2C addresses:
Addresses in the schematics are provided for convenience.
The authoritative source is
<https://neo900.org/git?p=misc;a=tree;f=i2c>

Sheet: /		
File: neo900.sch		
Title: Neo900		
Size: A3	Date: 16 JUL 2016	Rev:
Plotted by eeshow efbe6fa - 20161022-10:56Z		
Id: 1/37		

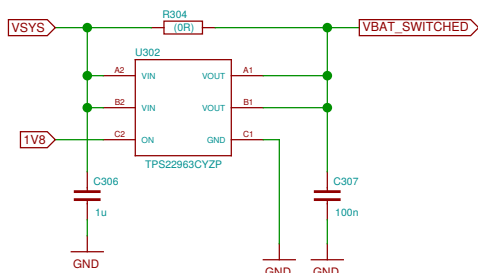


Battery charger with USB OTG

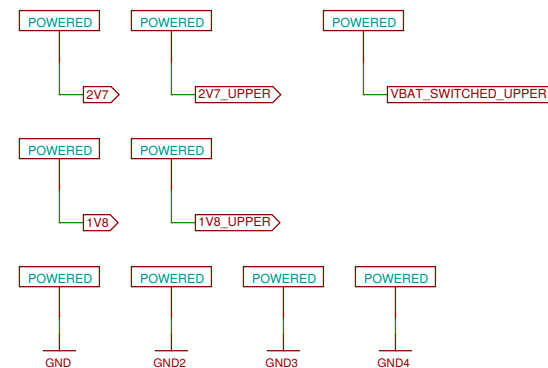


Power distribution and sequencing

Most high-current consumers are on VBAT_SWITCHED.
 1V8 signals that the regulators on UPPER are operational.

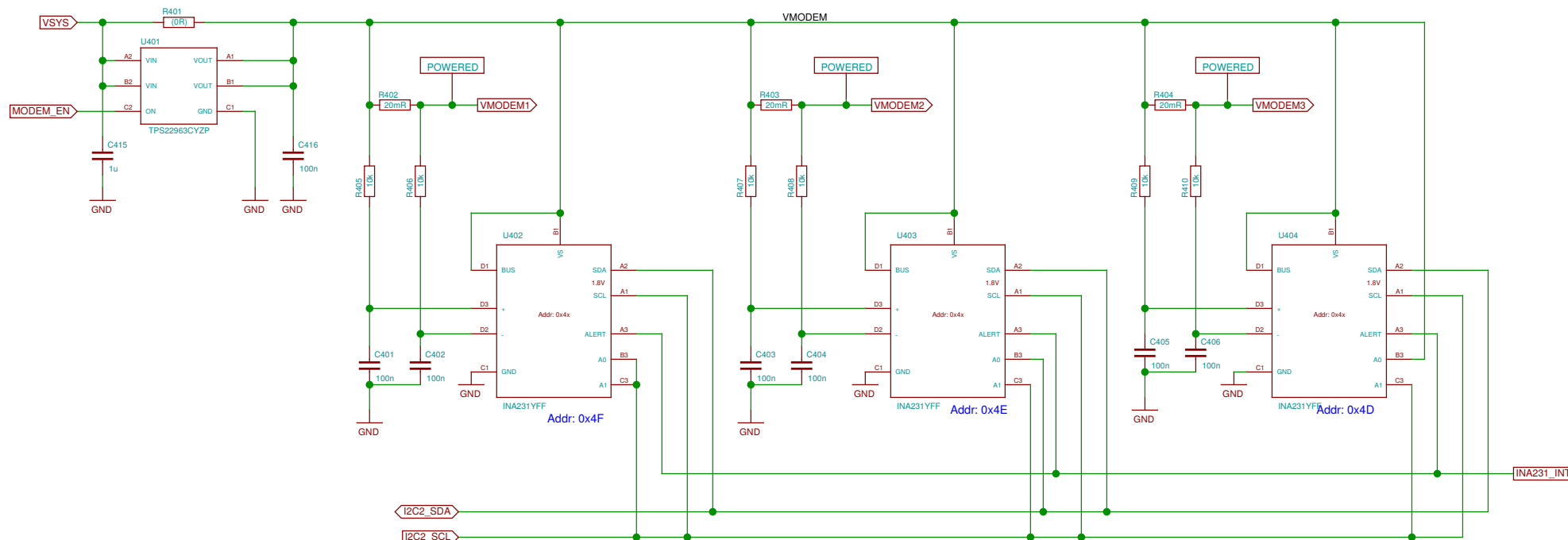


KiCad bureaucracy

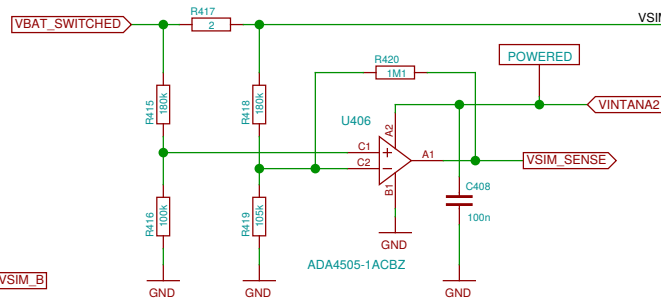


Sheet: /Charger/OTG-Booster/		
File: neo900_SS_3.sch		
Title: Charger/OTG-Booster		
Size: A3	Date: 17 JUL 2016	Rev:
Plotted by eeshow efbe6fa - 20161022-10:56Z		Id: 3/37

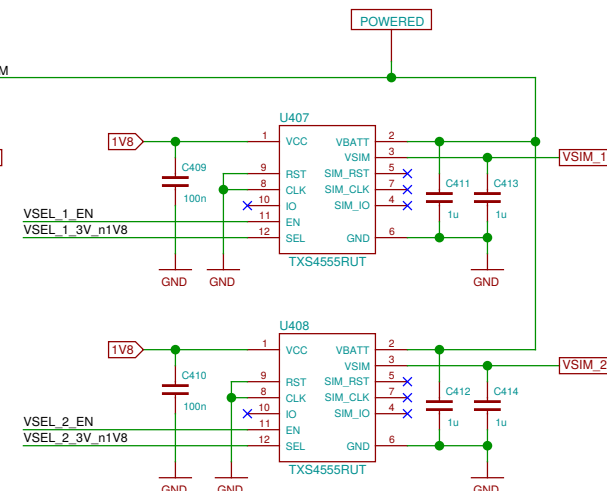
Modem current monitor



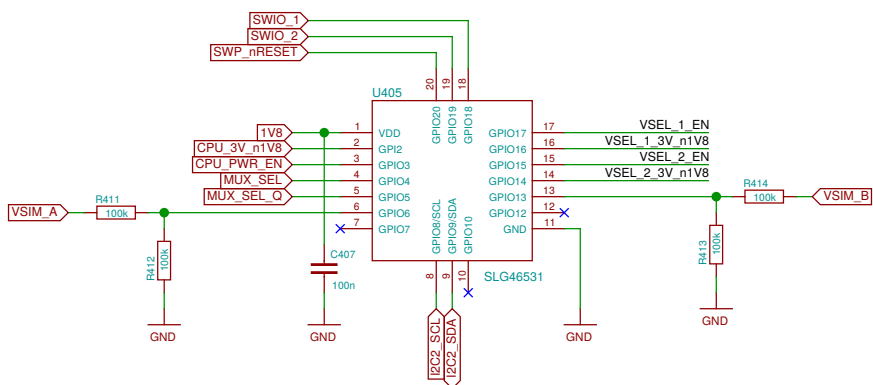
SIM current sensing



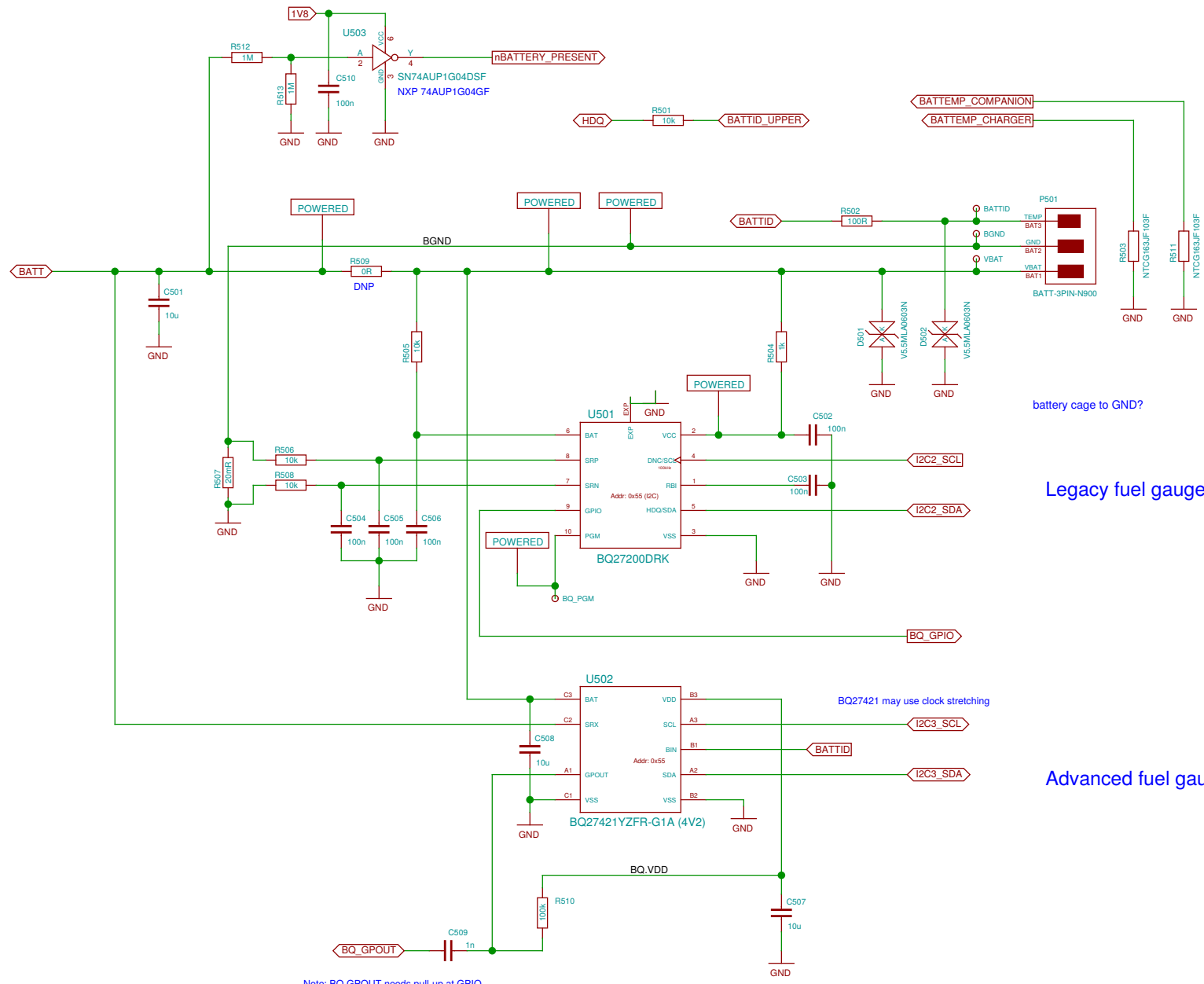
SIM power supply



SIM power selection



TODO: update SLG design for changed pins



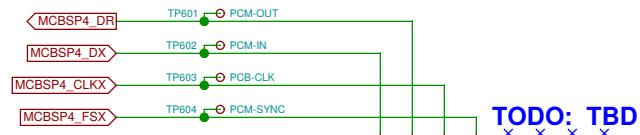
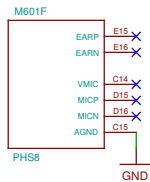
battery cage to GND?

Legacy fuel gauge

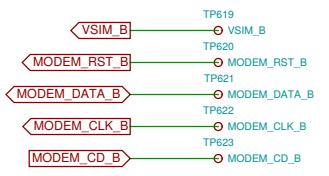
Advanced fuel gauge

Note: BQ.GPOUT needs pull-up at GPIO.

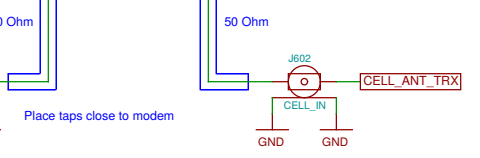
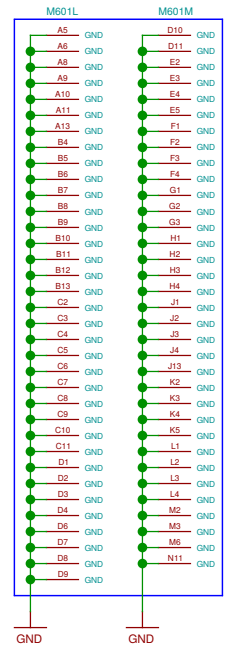
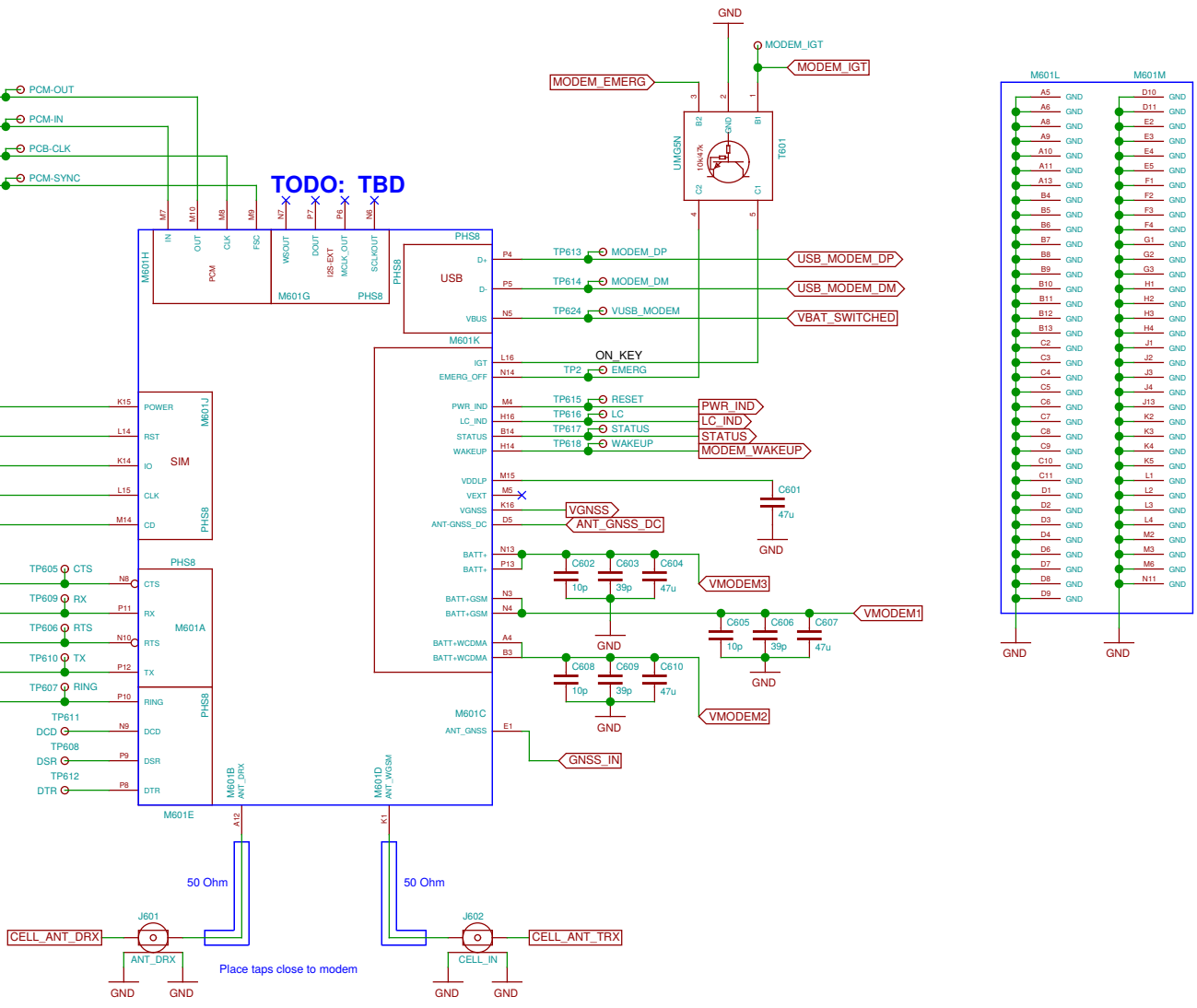
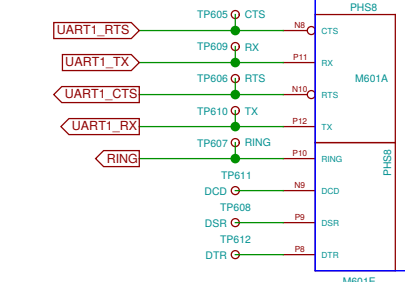
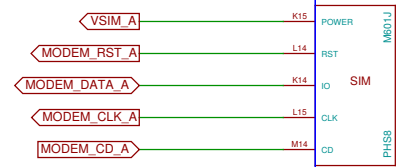
Sheet: /Fuel Gauge/		Date: 17 JUL 2016	
File: neo900_SS_5.sch		Rev:	
Title: Fuel Gauge			
Size: A3	Date: 17 JUL 2016	Rev:	
Plotted by eeshow efbe6fa - 20161022-10:56Z		Id: 5/37	



TODO: TBD



TODO: B-SIM bus FFS



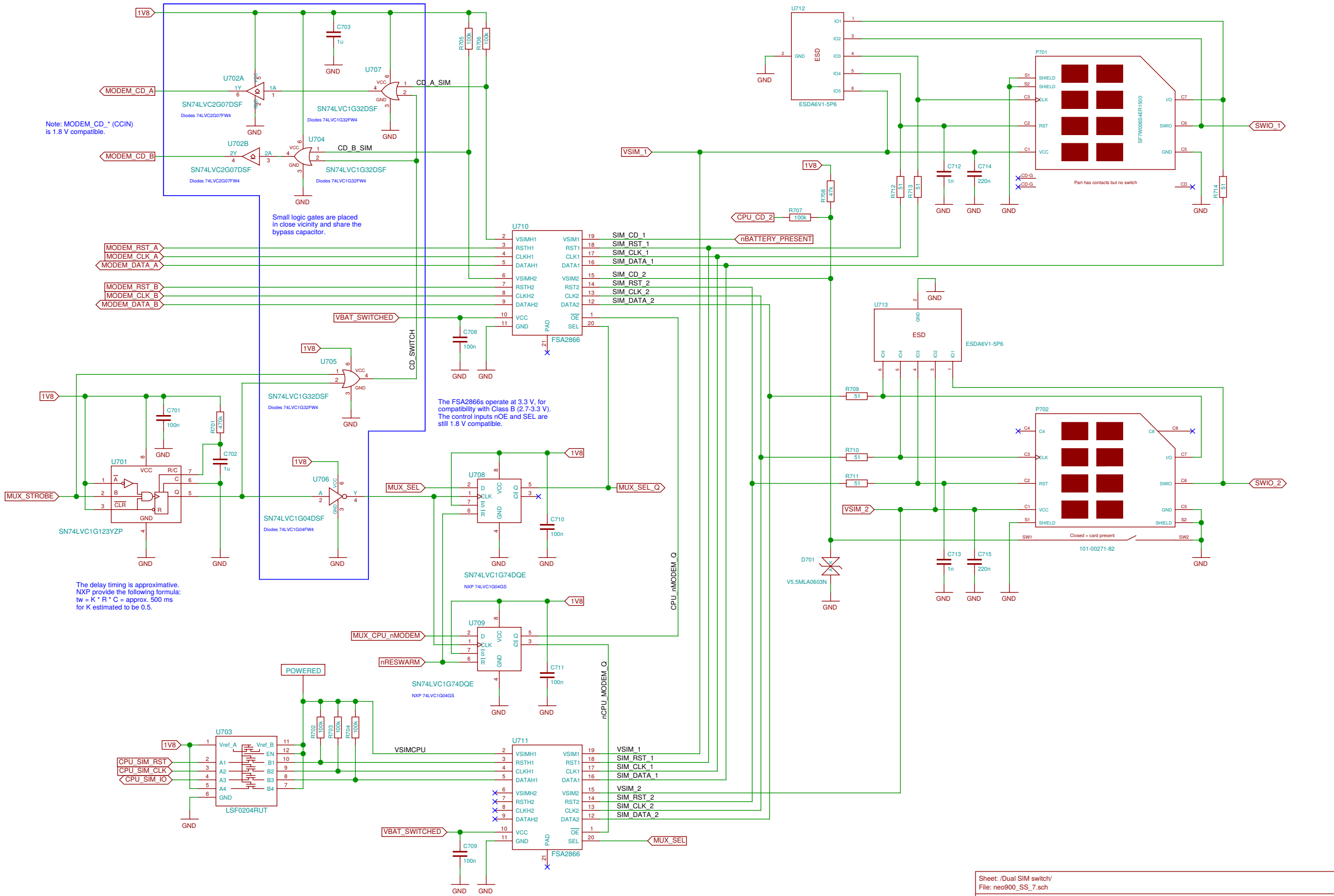
Place taps close to modem

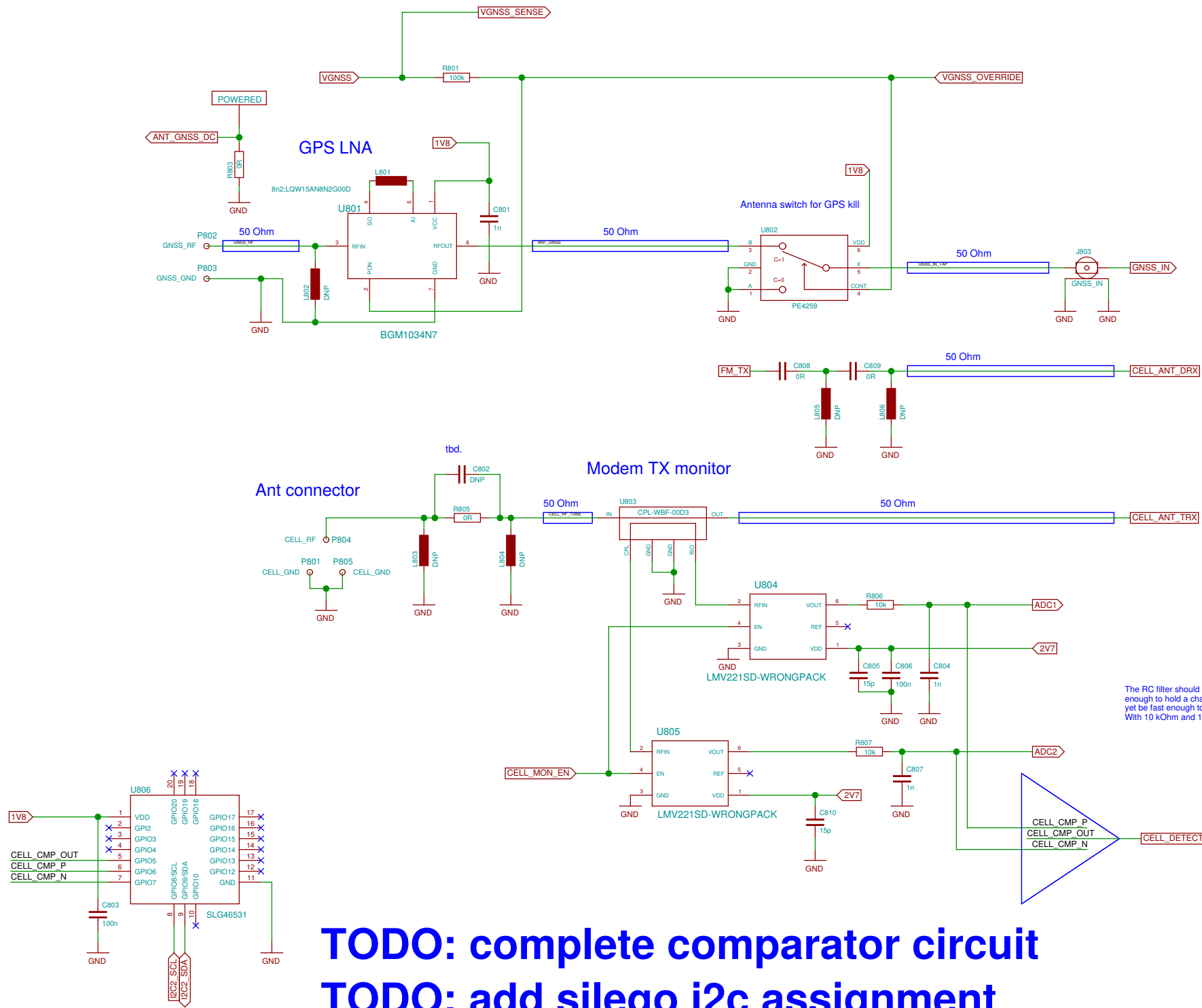
Note: MODEM_CD_* (CCIN) is 1.8 V compatible.

Small logic gates are placed in close vicinity and share the bypass capacitor.

The FSA2866s operate at 3.3 V, for compatibility with Class B (2.7-3.3 V). The control inputs nOE and SEL are still 1.8 V compatible.

The delay timing is approximative. NXP provide the following formula: $t_w = K * R * C = \text{approx. } 500 \text{ ms}$ for K estimated to be 0.5.



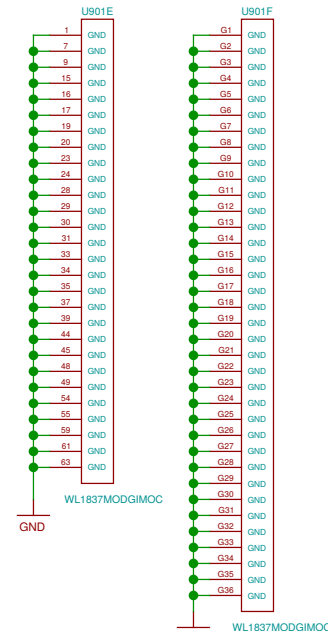
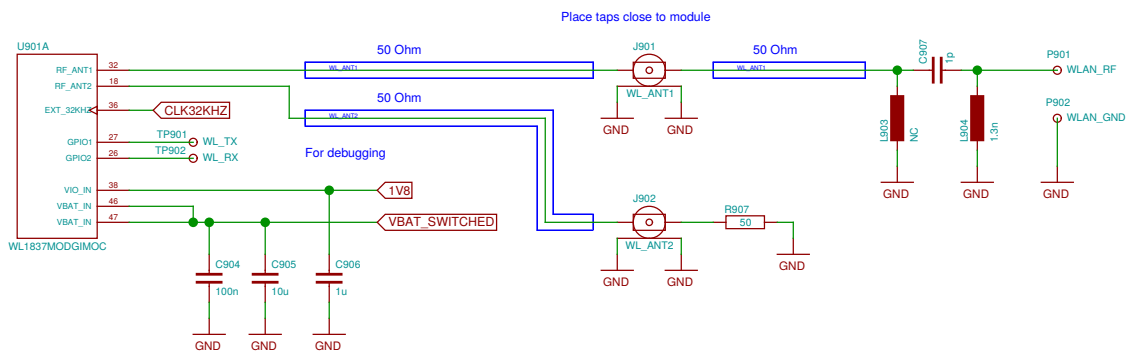


The RC filter should have C large enough enough to hold a charge in pulsed operation, yet be fast enough to detect short activity. With 10 kOhm and 1 nF, we get about 16 kHz.

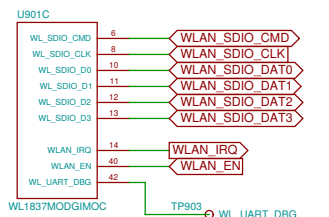
TODO: complete comparator circuit
TODO: add silego i2c assignment
TODO: iox

TODO: assign footprints for c-spring contacts

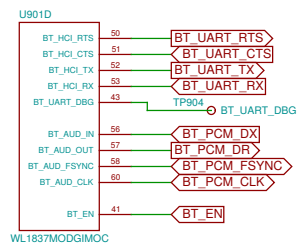
WLAN/BT antenna



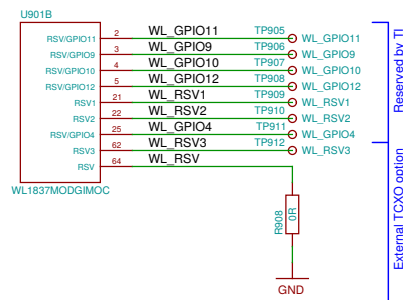
WLAN



Bluetooth

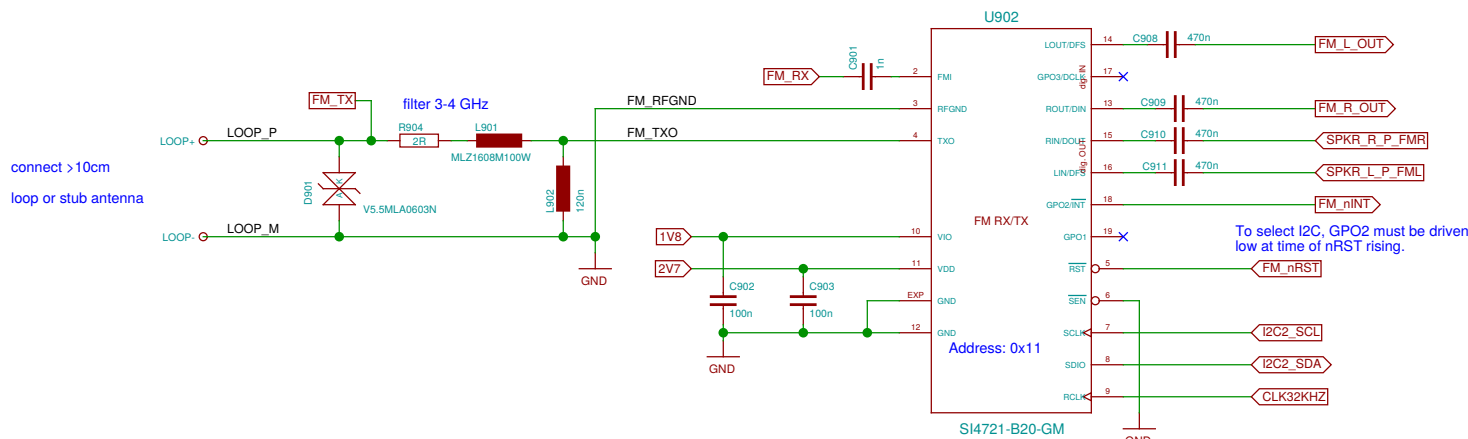


Reserved / Debugging



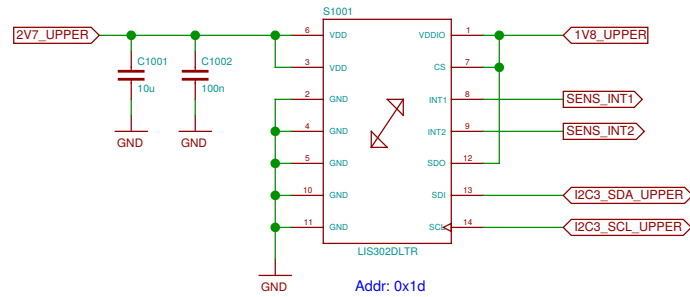
FM Radio (TX/RX)

TODO: check caps

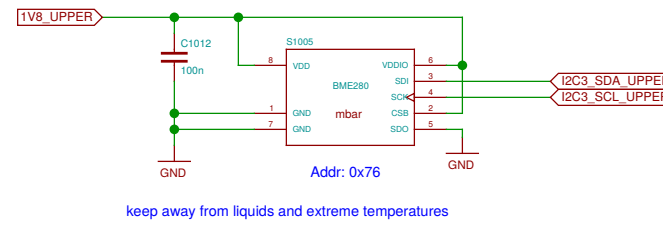


Si4705 is pin compatible (mostly) but RX-only

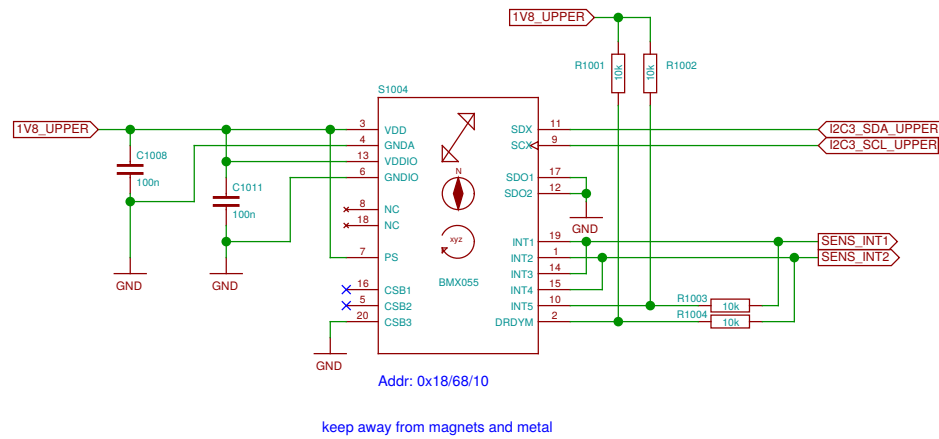
Acceleration (legacy)



Pressure, humidity

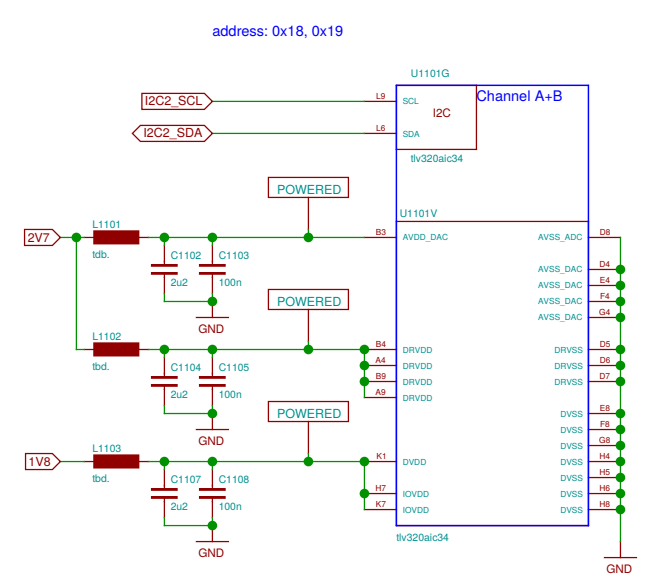
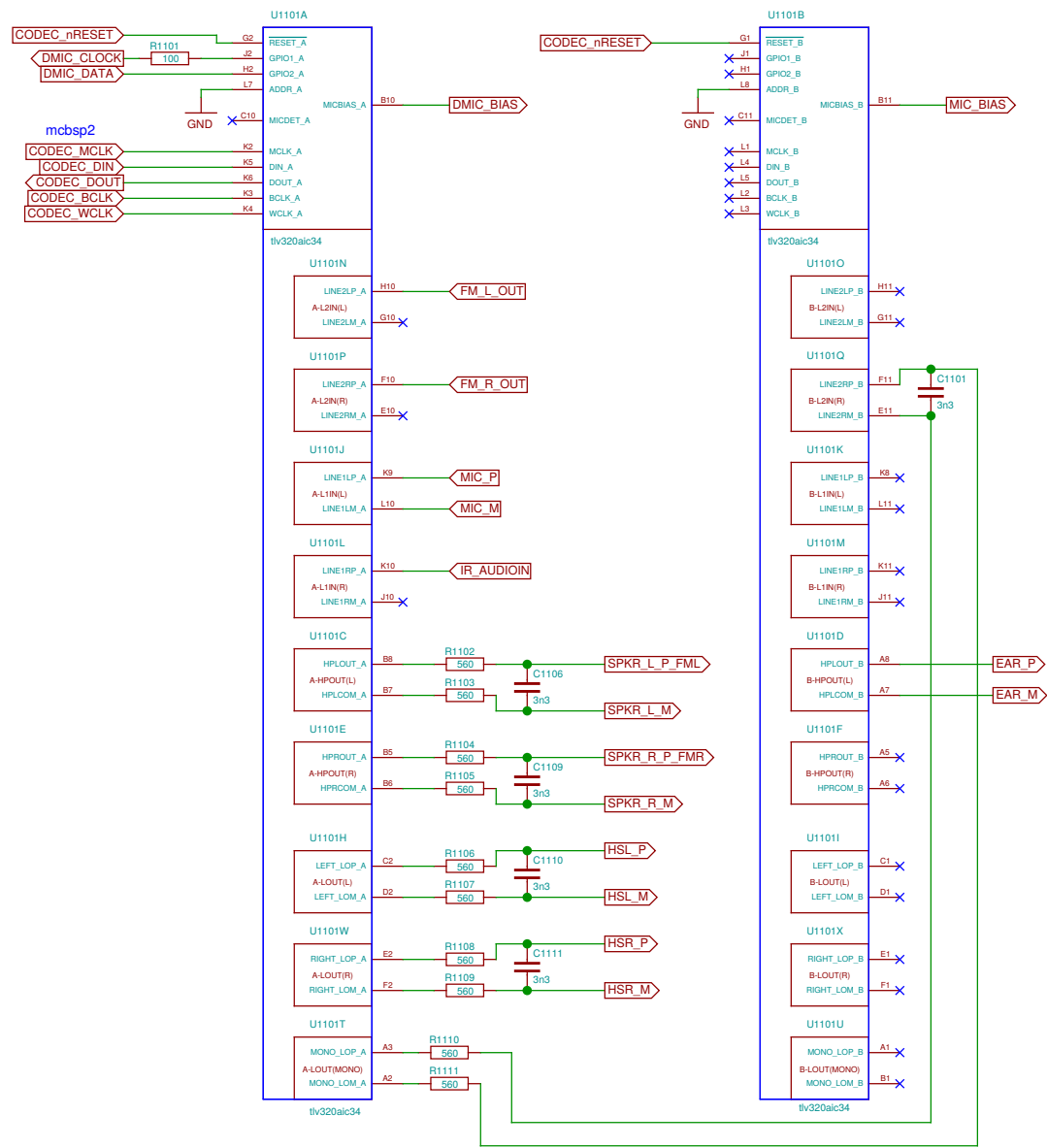


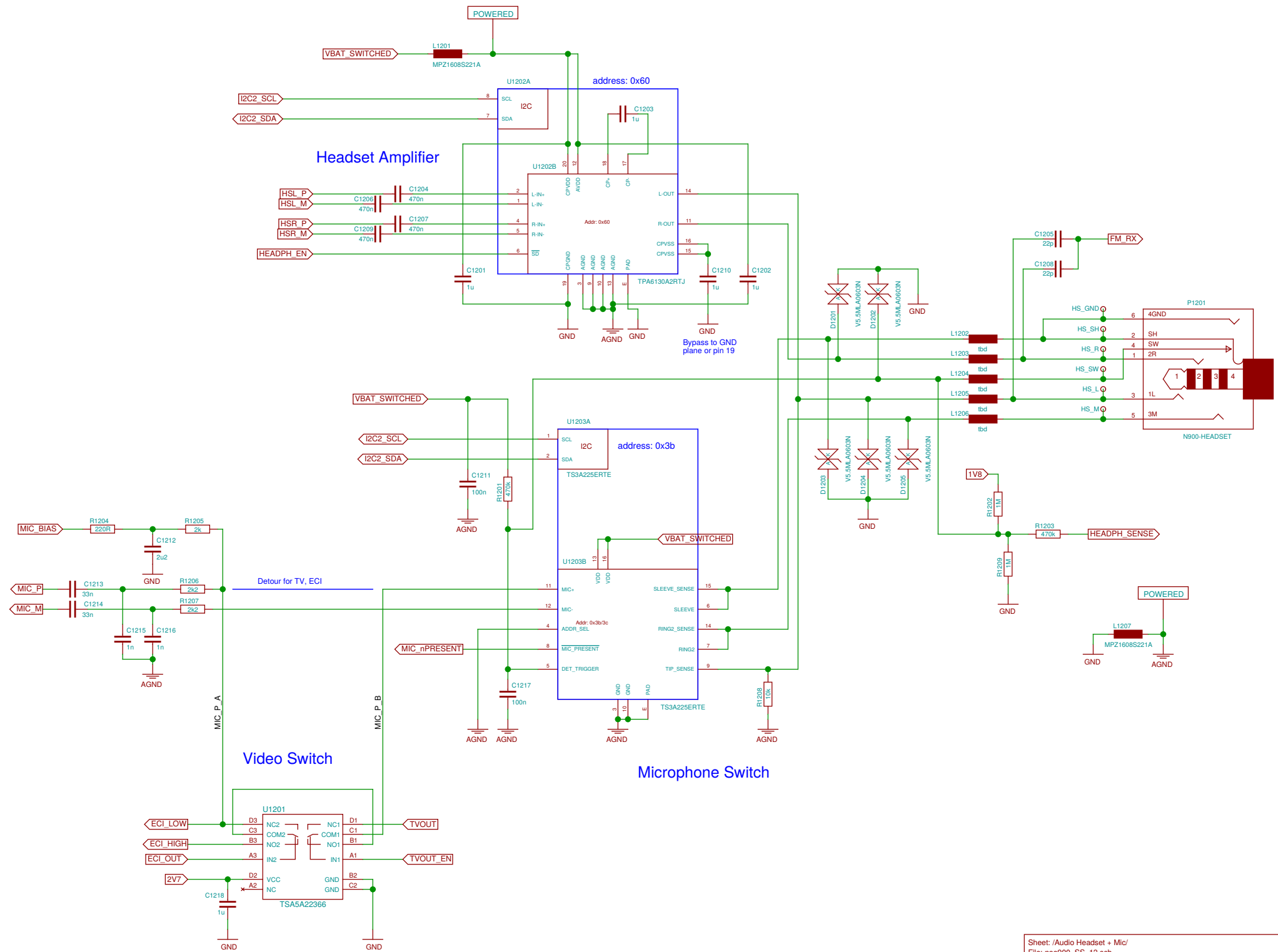
9-axis (acceleration, gyroscope, magnetometer)

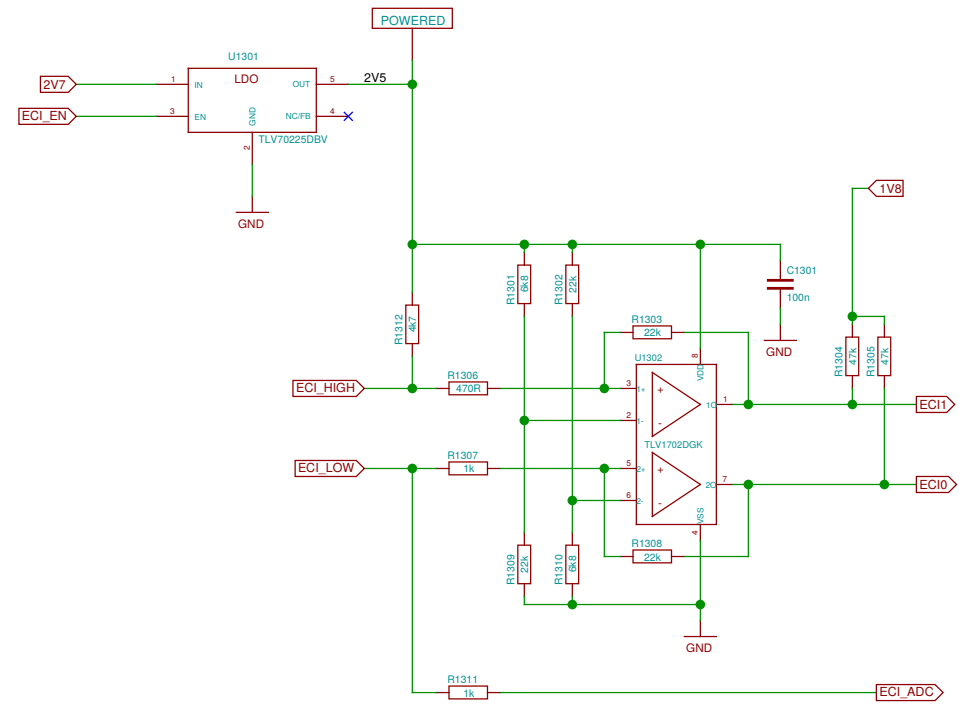


Sheet: /Sensors/ File: neo900_SS_10.sch	
Title: Sensors	
Size: A3	Date: 17 JUL 2016
Plotted by eeshow efbe6fa - 20161022-10:56Z	
Rev:	Id: 10/37

problem: this is a 0.5mm BGA making lower board expensive
 but it appears to be not extremely critical (only 3 rows and inner ring is GND)
 problem: analog mic is on upper board
 alternative: place on upper board (to be evaluated)

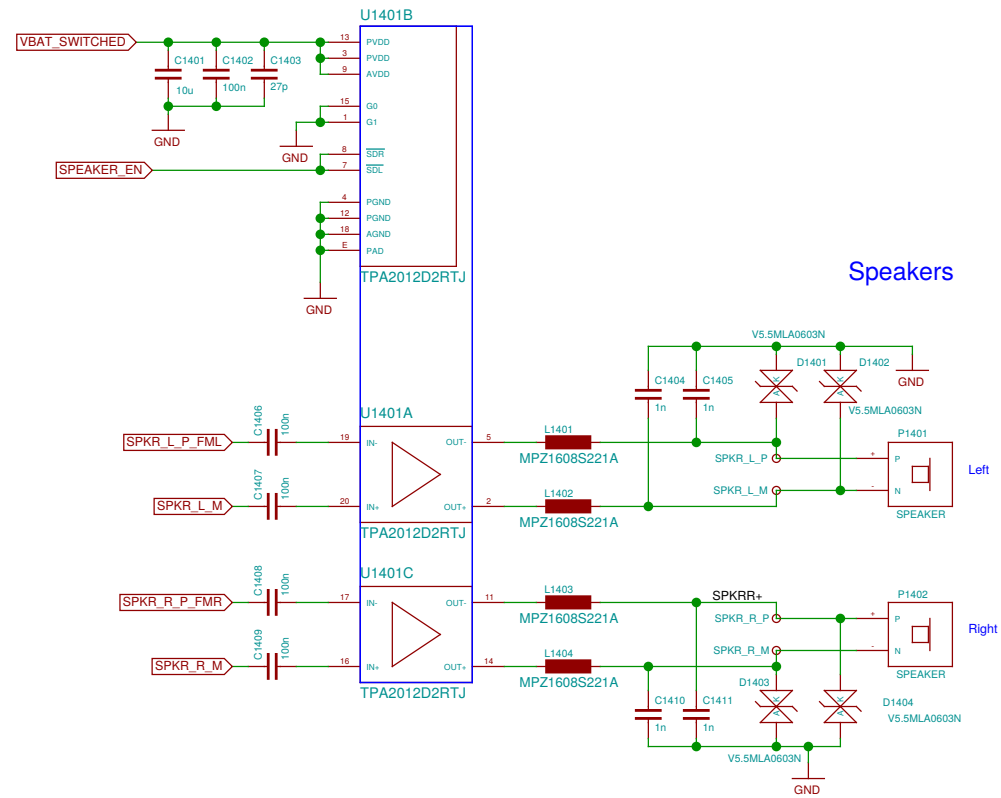




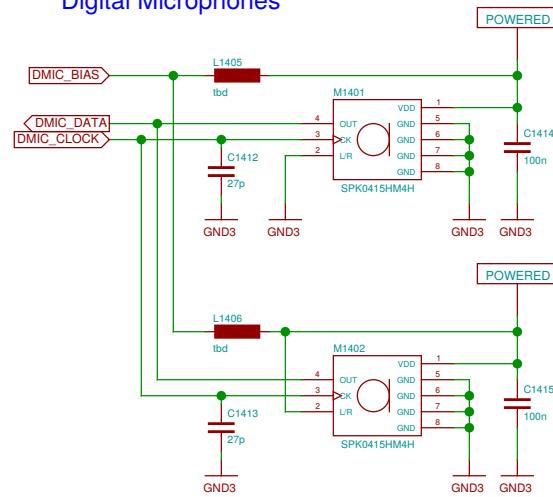


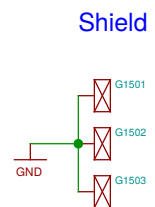
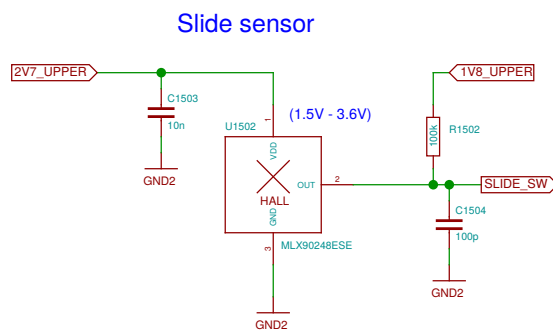
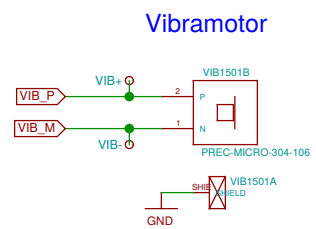
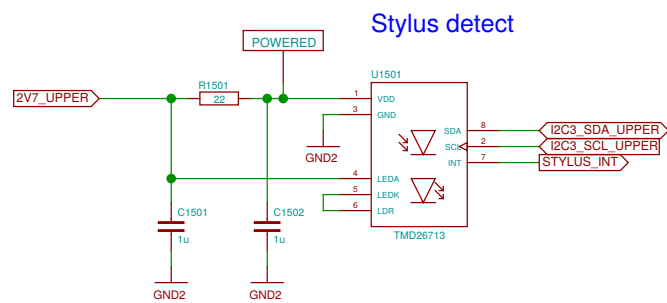
Sheet: /ECI/		File: neo900_SS_13.sch	
Title: ECI			
Size: A3	Date: 17 JUL 2016	Rev:	
Plotted by eeshow efbe6fa+ 20161022-10:56Z			Id: 13/37

Hands-free

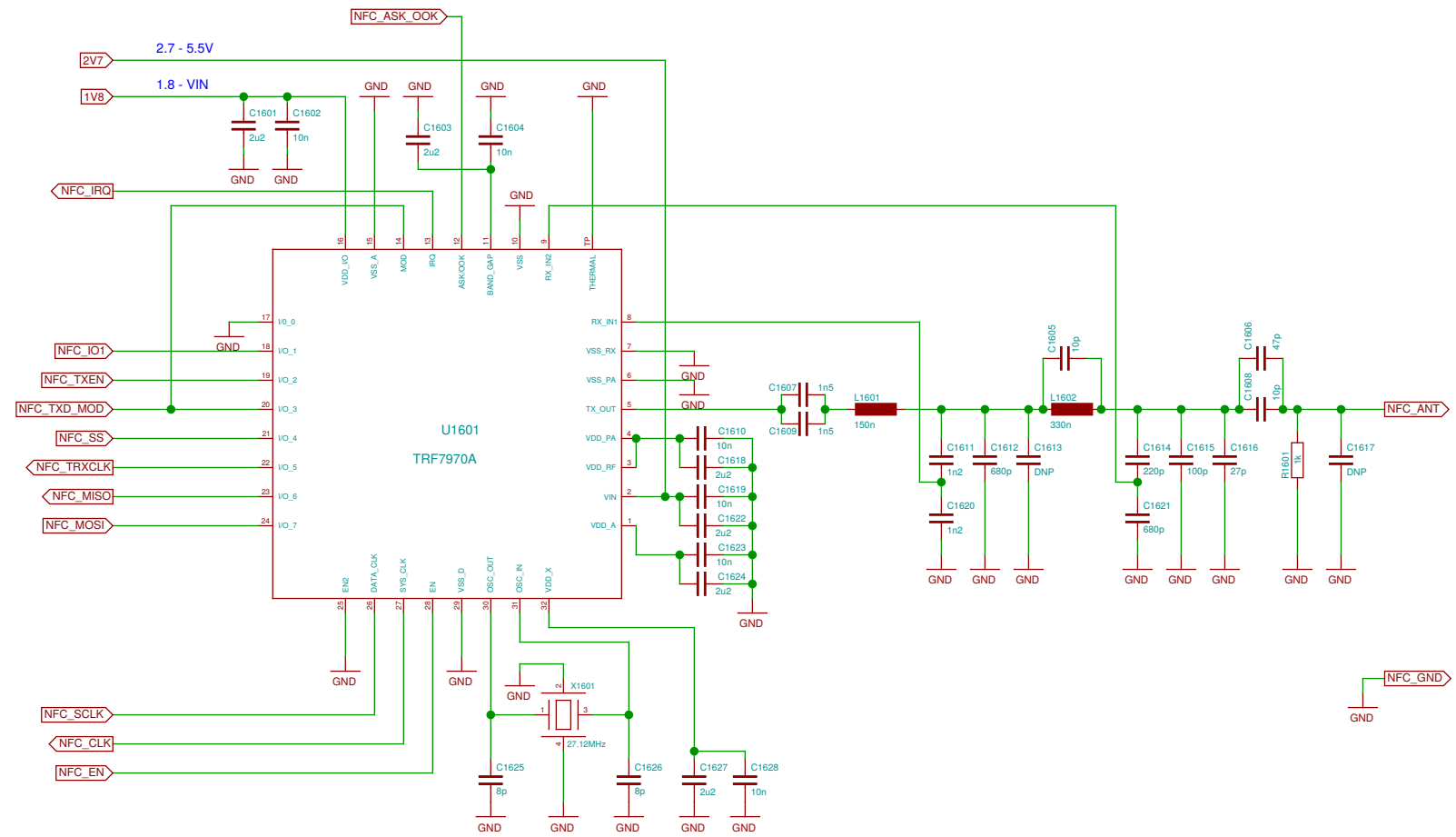


Digital Microphones

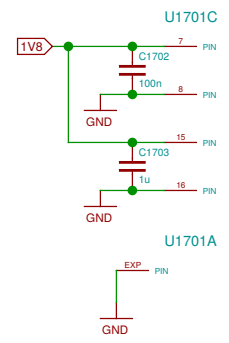
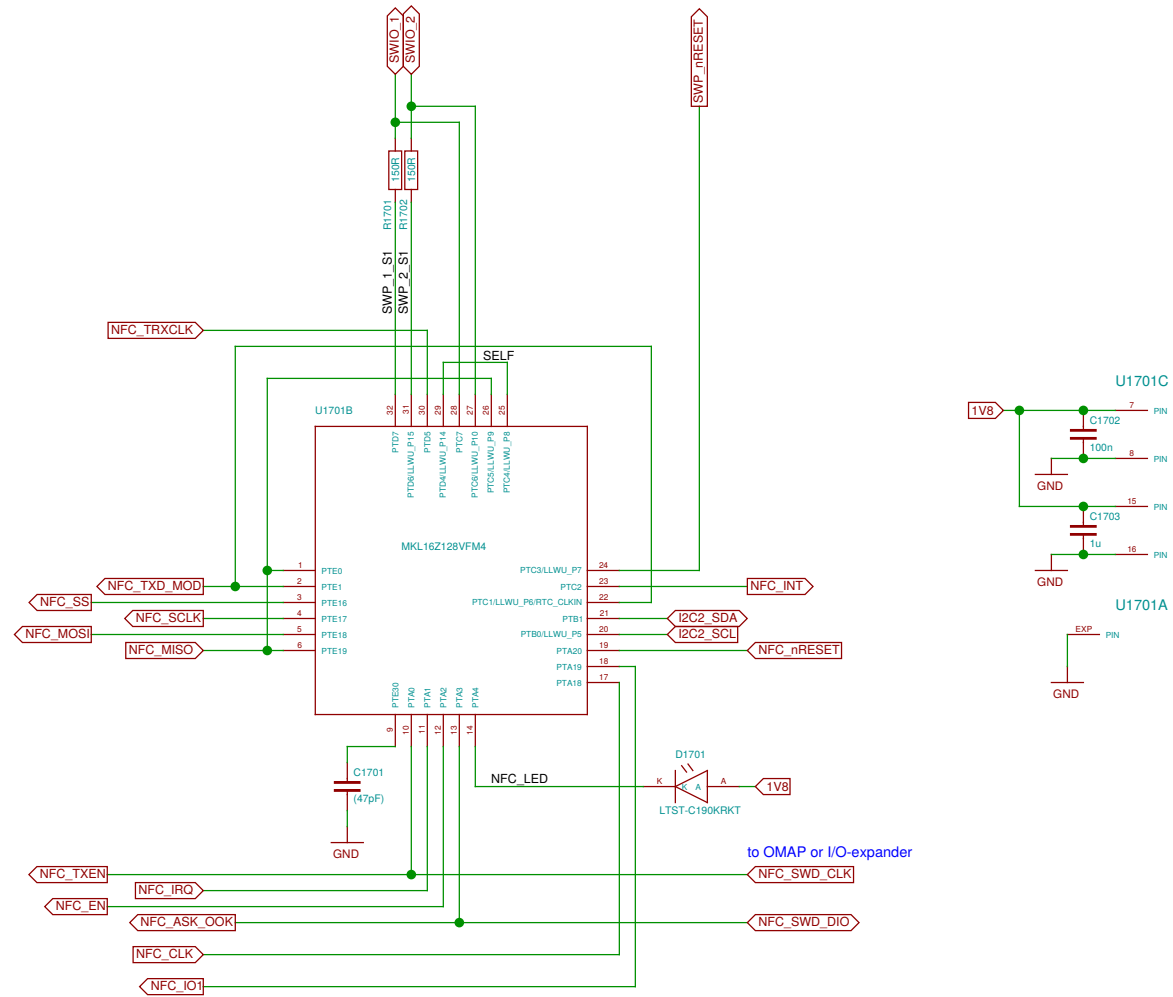




Sheet: /Misc/ File: neo900_SS_15.sch	
Title: Misc	
Size: A3	Date: 17 JUL 2016
Plotted by eeshow efbe6fa - 20161022-10:56Z	
Rev:	Id: 15/37



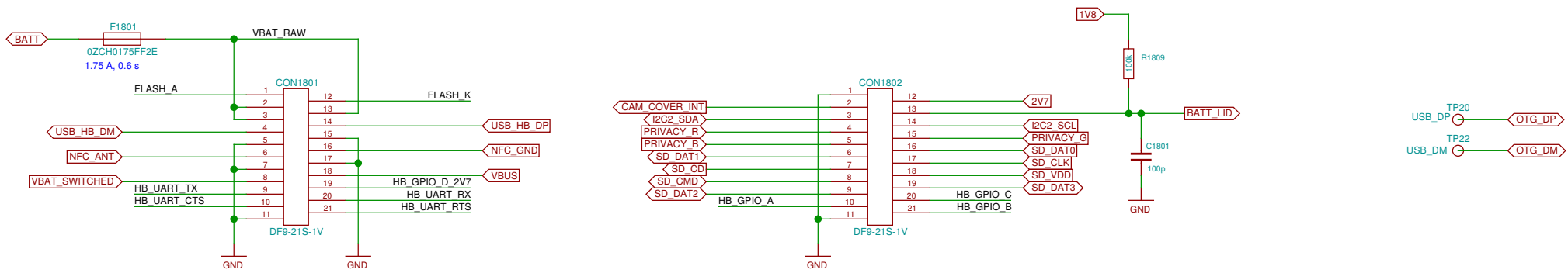
Some choices, 3.2 x 2.6 mm, 8-10 pF:
 NDK NX3225GA-27.12M-STD-CRG-2
 NDK NX3225SA-27.12M-STD-CSR-3
 Tattien XXCCEINANF-27.120000



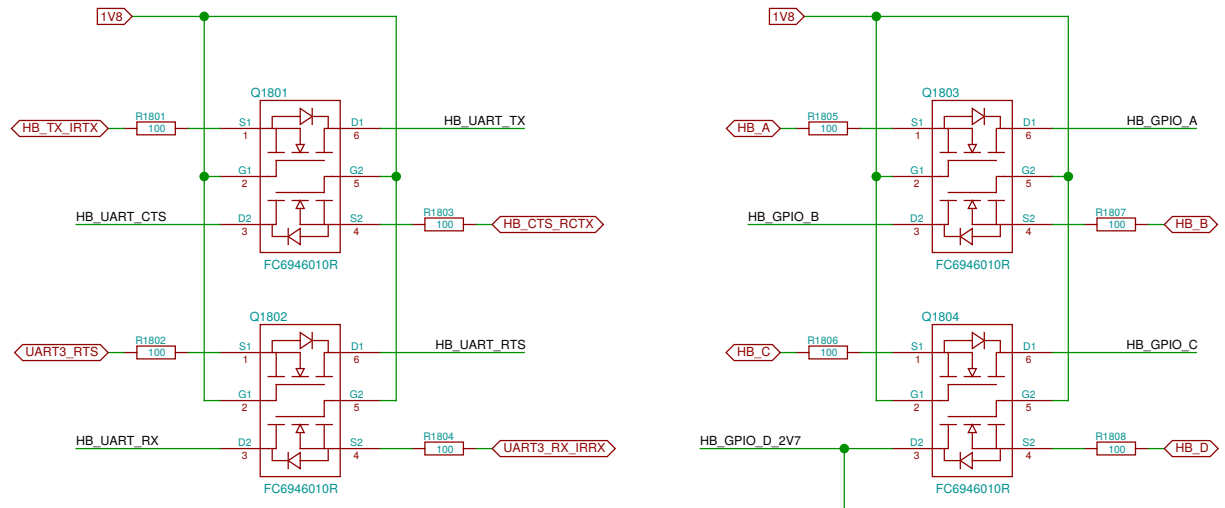
NOTE: this is mangling up Breakout and Lower board connectors
 Signals may have to be fed through the breakout board connector increasing resistance

LOWER-BOB Interconnect (LOWER side)

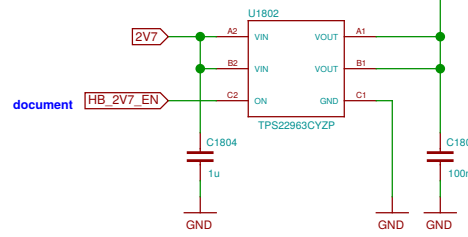
Defined in the Hackerbus specification, <http://neo900.org/stuff/papers/hb.pdf>



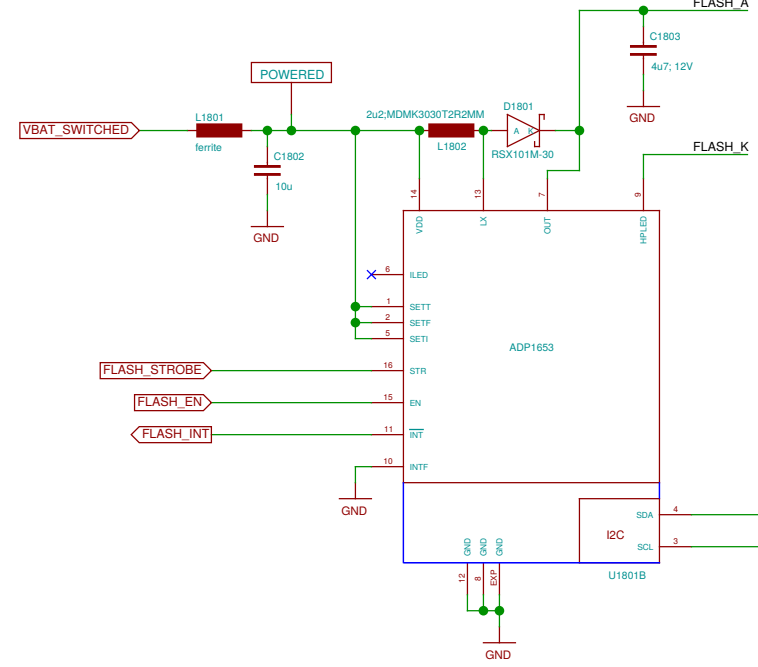
Level shifters for Hackerbus GPIO and UART



Q18xx alternative: Diodes DMN63D8LV



Flash/Torch



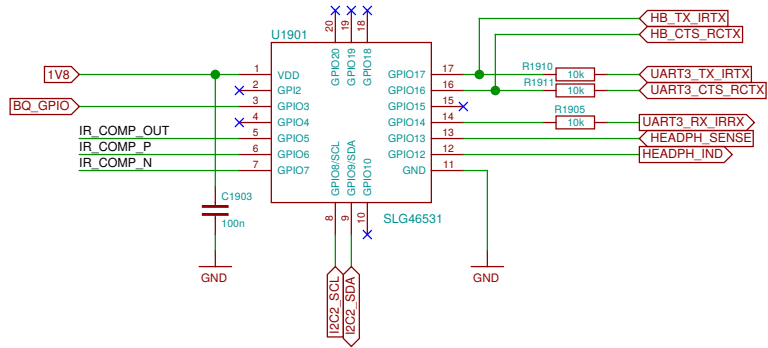
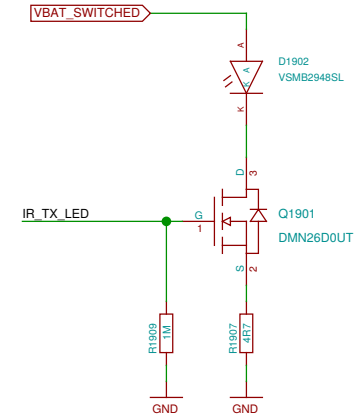
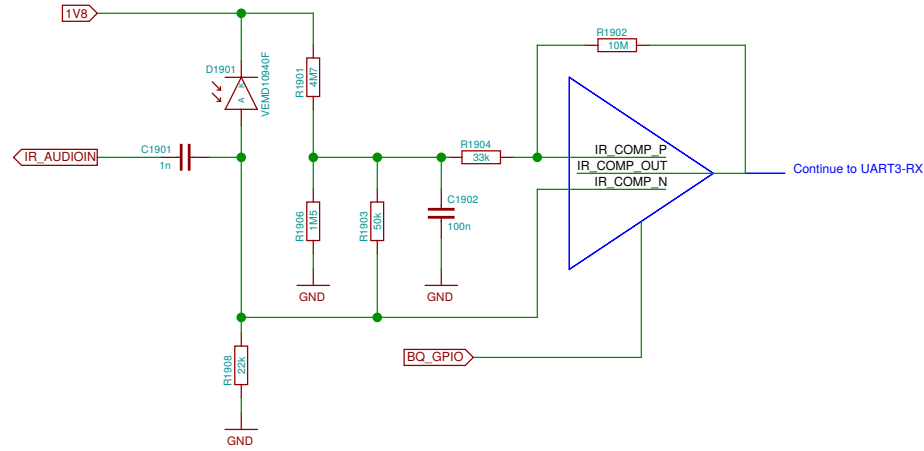
TODO: HB USB PHY may go here

Missing 6x 2R for alternate function select (do we have the space for ca. 2.5 x 5mm?)

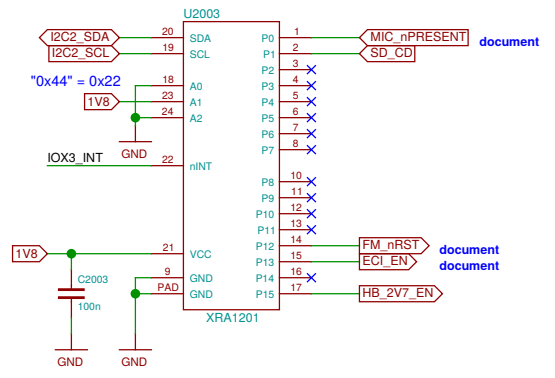
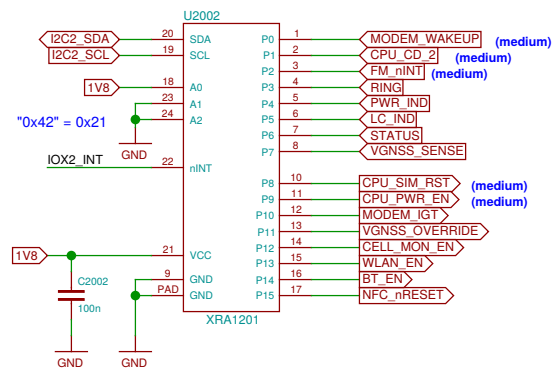
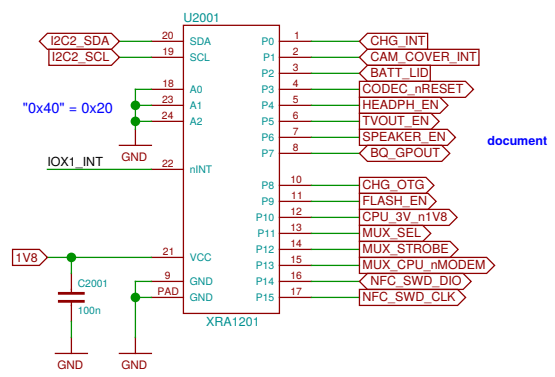
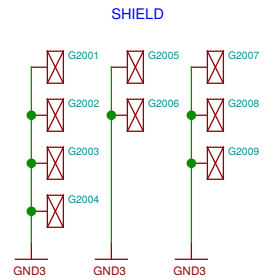
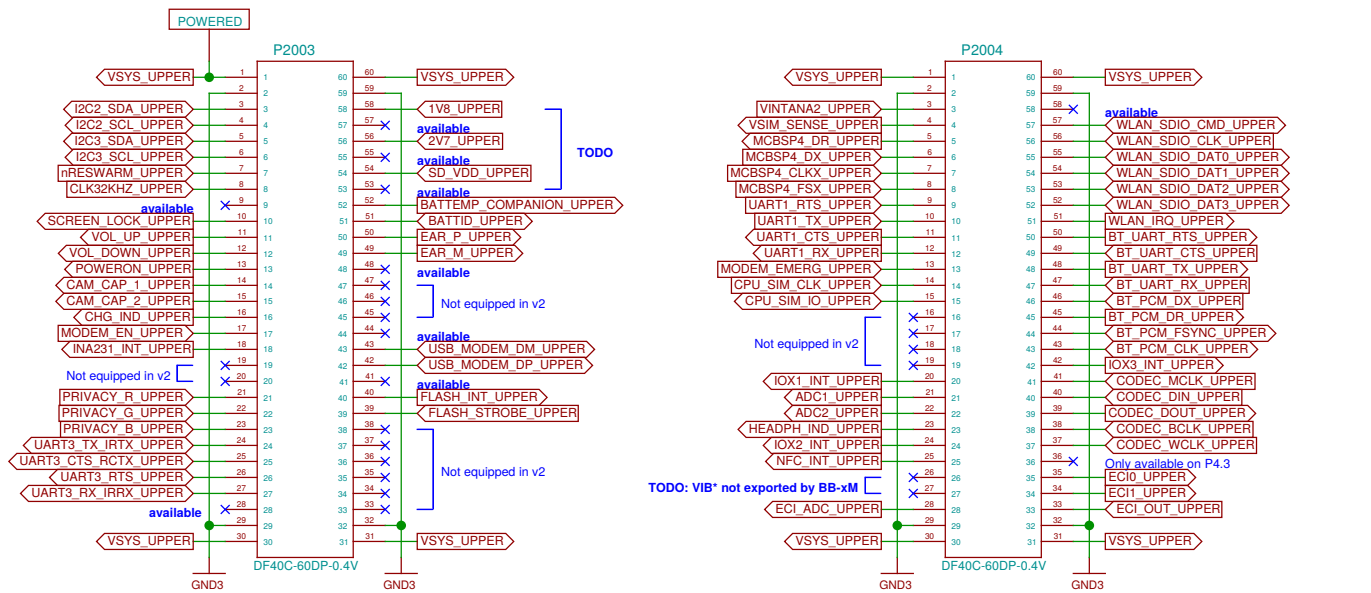
Sheet: /Hackerbus/ File: neo900_SS_18.sch		Title: Hackerbus	
Size: A3	Date: 17 JUL 2016	Rev:	
Plotted by eeshow efbe6fa - 20161022-10:56Z		Id: 18/37	

TODO: update D1901 footprint

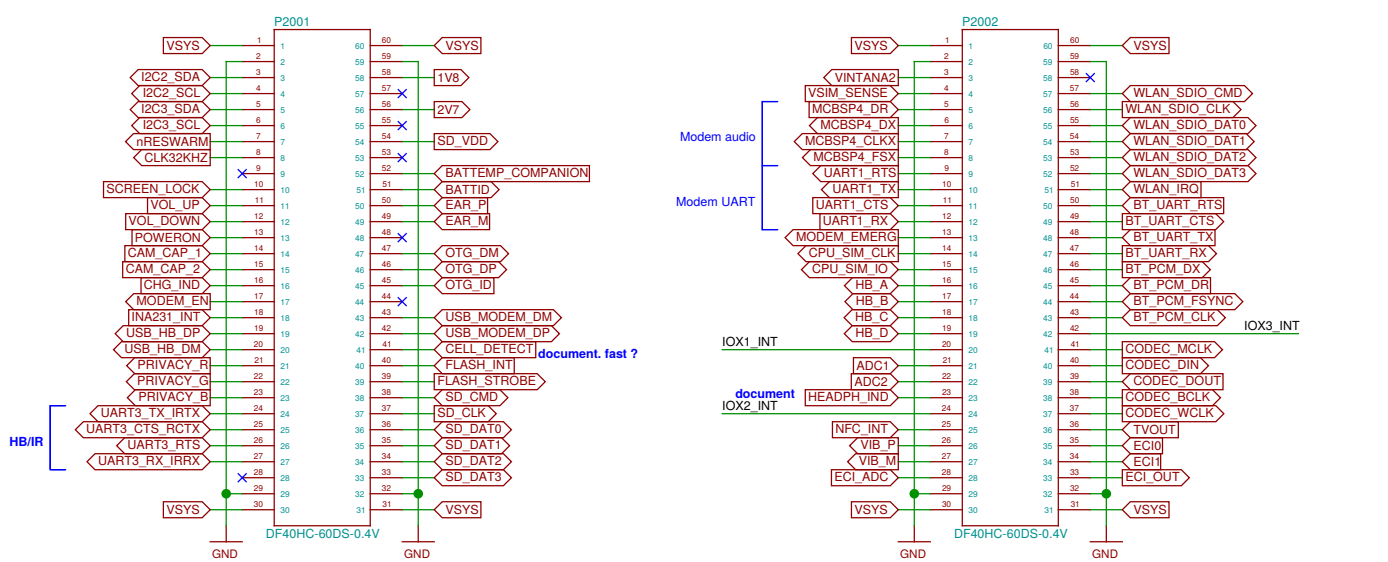
NOTE: 1V8 may be quite noisy



This is just the collection of signals we have. Proper assignment still pending.

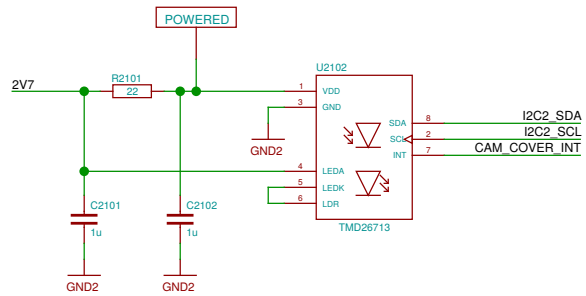


UPPER
LOWER

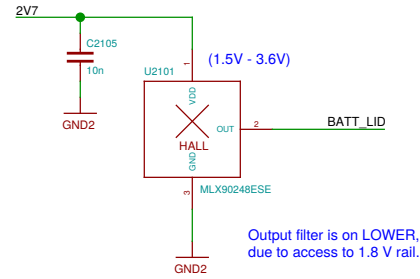


Current rating per contact: 0.3 A

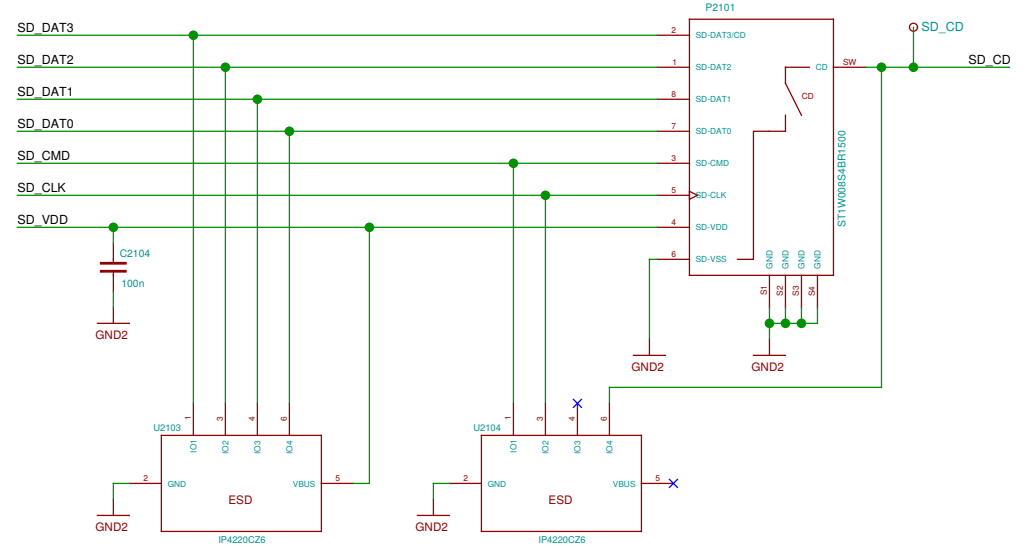
Camera Cover detect



Battery Cover detect

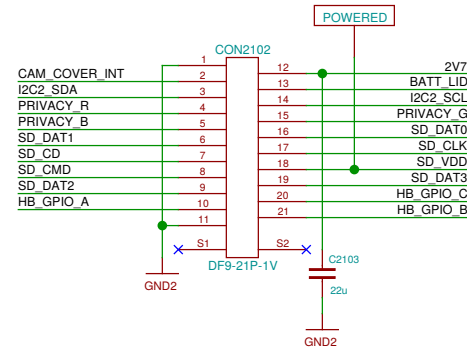
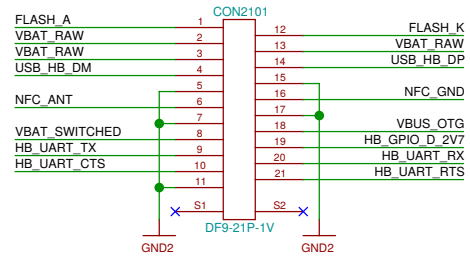


Memory card holder

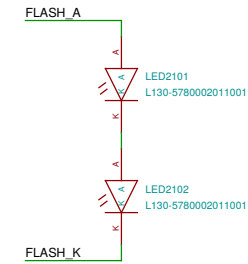


LOWER-BOB Interconnect (BOB side)

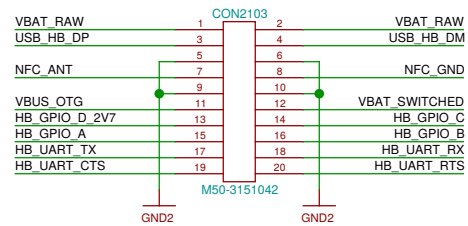
Defined in the Hackerbus specification, <http://neo900.org/stuff/papers/hb.pdf>



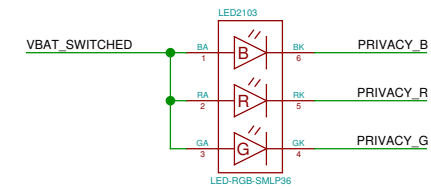
Camera flash



Hackerbus



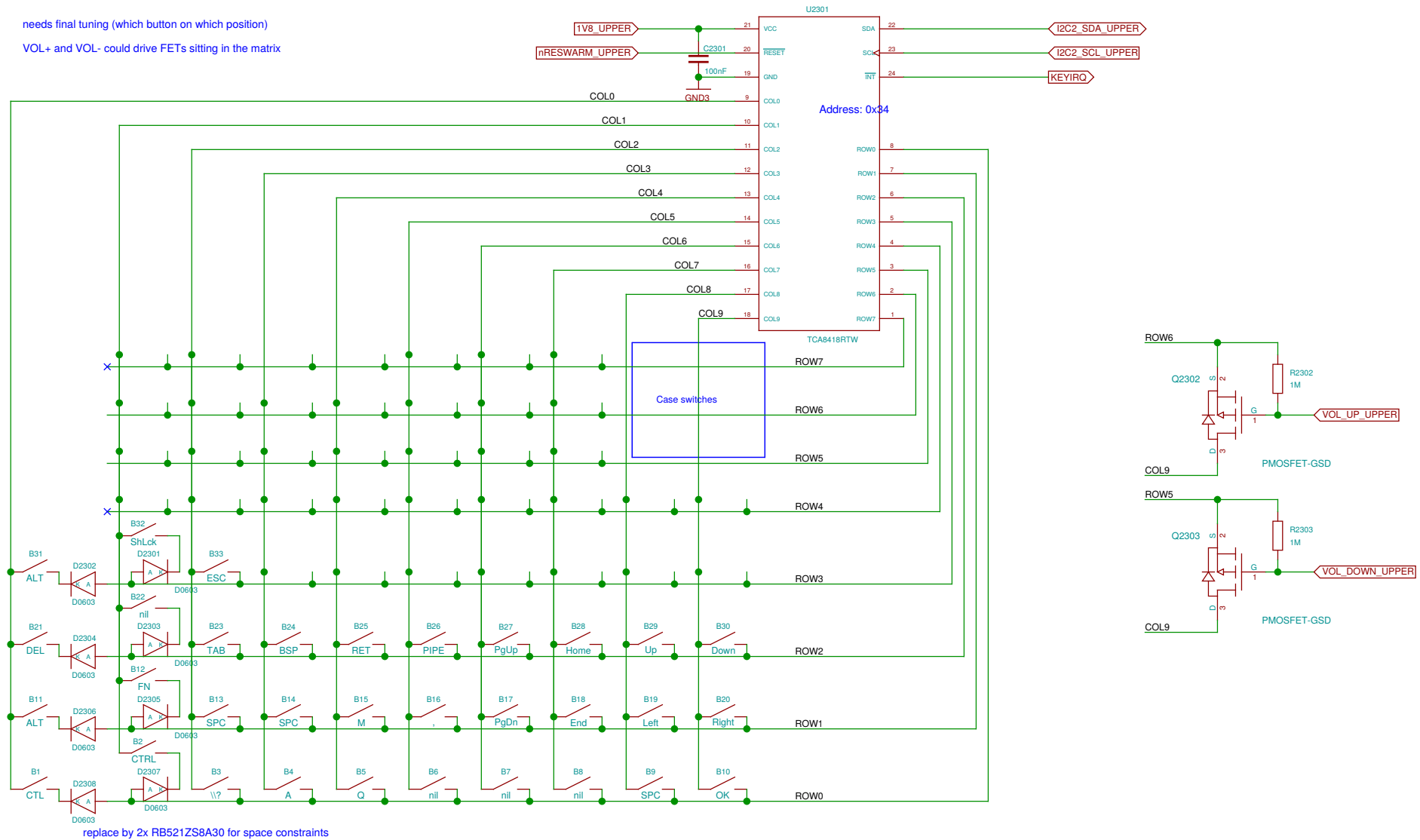
Privacy LED



TODO: consider sheet for deletion

Sheet: /empty/ File: neo900_SS_22.sch		
Title: empty		
Size: A3	Date: 17 JUL 2016	Rev:
Plotted by eeshow efbe6fa+ 20161022-10:56Z		Id: 22/37

needs final tuning (which button on which position)
 VOL+ and VOL- could drive FETs sitting in the matrix



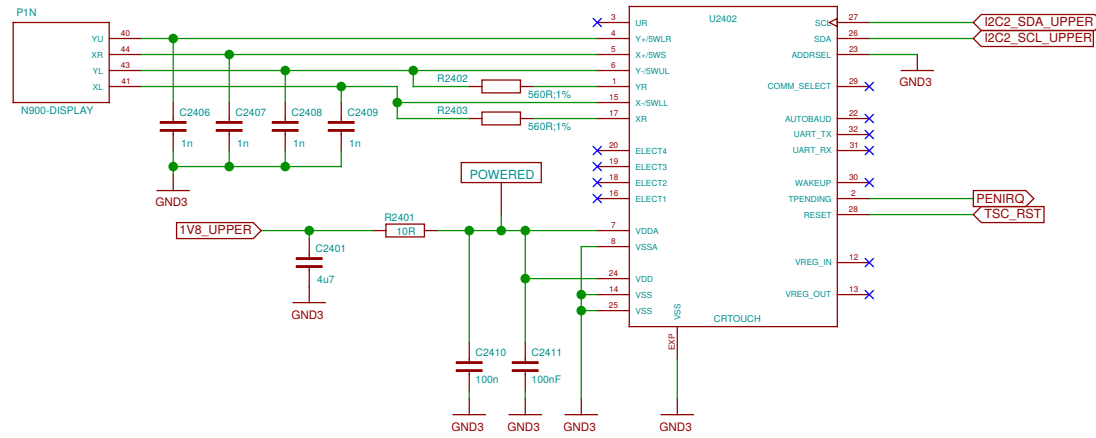
replace by 2x RB521ZS8A30 for space constraints

TODO: key names are nonsense

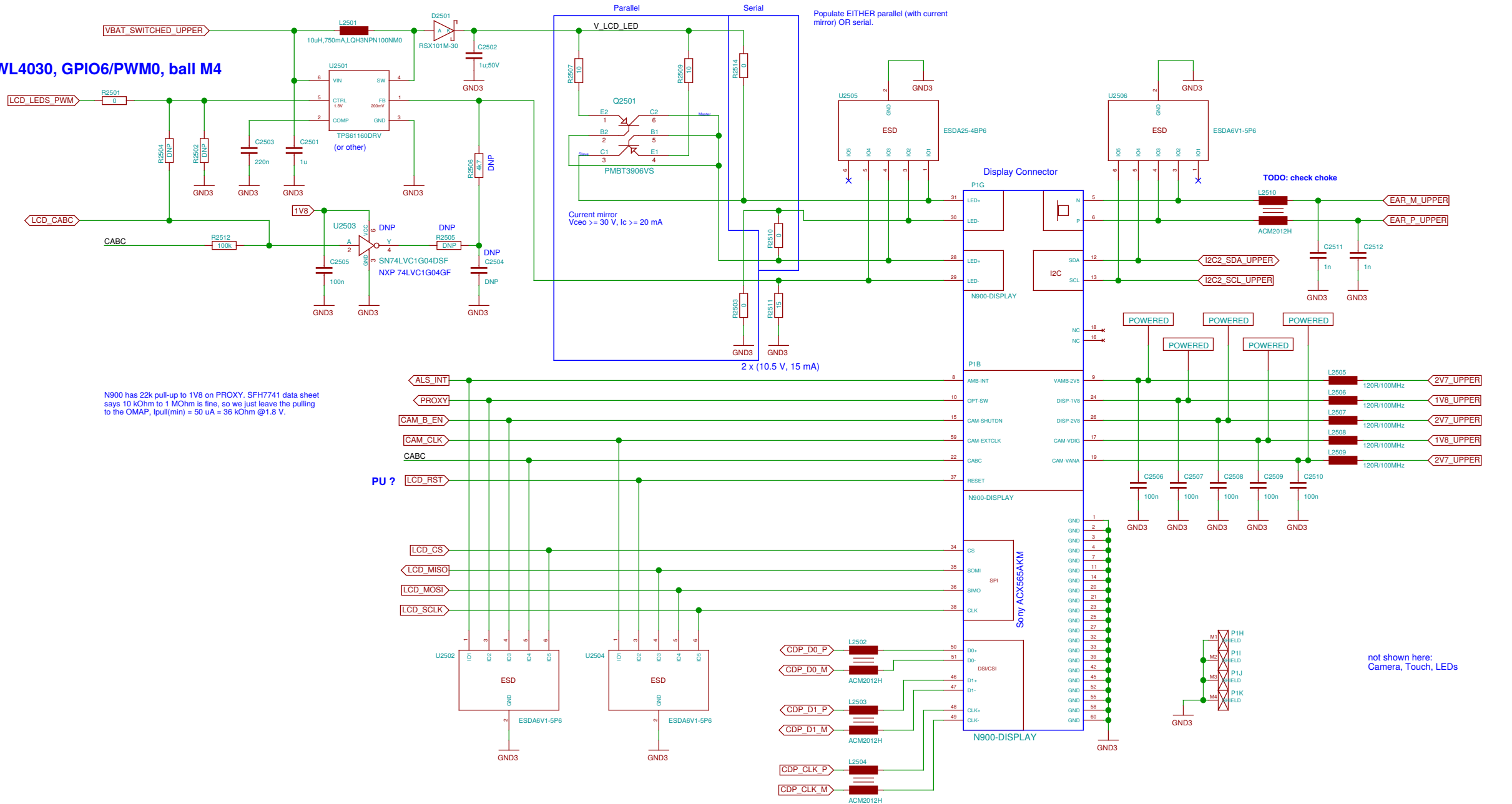
TODO: rearrange matrix to avoid diodes ?

Resistive Touch (display connector)

Touch screen controller



TWL4030, GPIO6/PWM0, ball M4



N900 has 22k pull-up to 1V8 on PROXY. SFH7741 data sheet says 10 kOhm to 1 MOhm is fine, so we just leave the pulling to the OMAP, Ipull(min) = 50 uA = 36 kOhm @1.8 V.

Current mirror
Vceo >= 30 V, Ic >= 20 mA

2 x (10.5 V, 15 mA)

TODO: check choke

not shown here:
Camera, Touch, LEDs

OMAP is not part of v2

Sheet: /CPU + PoP RAM/NAND/ File: neo900_SS_26.sch		
Title: CPU + PoP RAM/NAND		
Size: A3	Date: 17 JUL 2016	Rev:
Plotted by eeshow efbe6fa+ 20161022-10:56Z		Id: 26/37

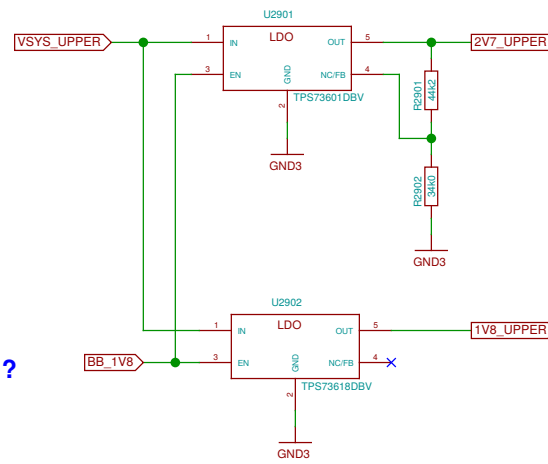
eMMC is not part of v2

Sheet: /eMMC/ File: neo900_SS_27.sch		
Title: eMMC		
Size: A3	Date: 17 JUL 2016	Rev:
Plotted by eeshow efbe6fa+ 20161022-10:56Z		Id: 27/37

Companion chip (TPS65950) is not part of v2

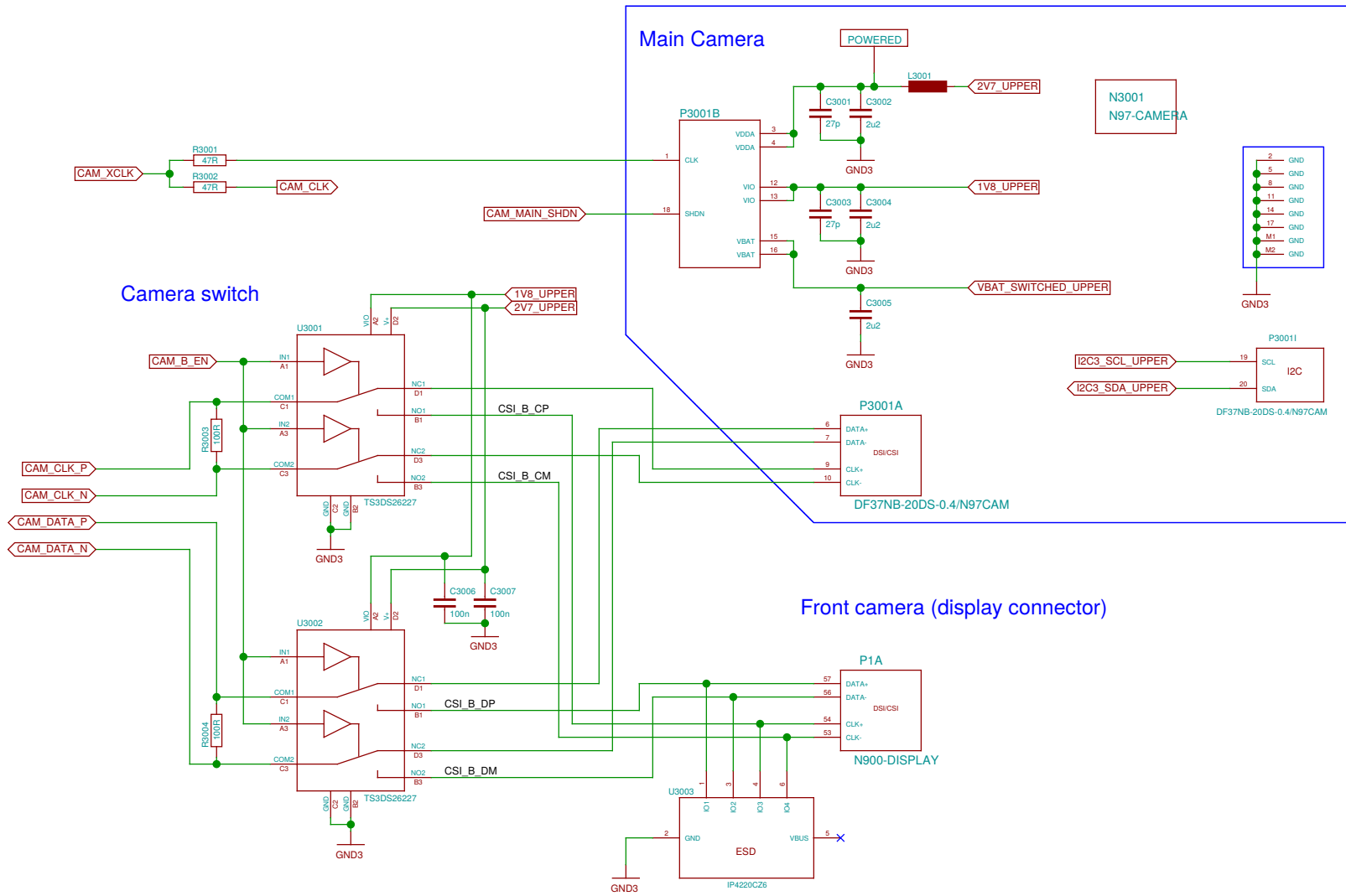
Sheet: /PMU+Codec/ File: neo900_SS_28.sch		
Title: PMU+Codec		
Size: A3	Date: 17 JUL 2016	Rev:
Plotted by eeshow efbe6fa+ 20161022-10:56Z		Id: 28/37

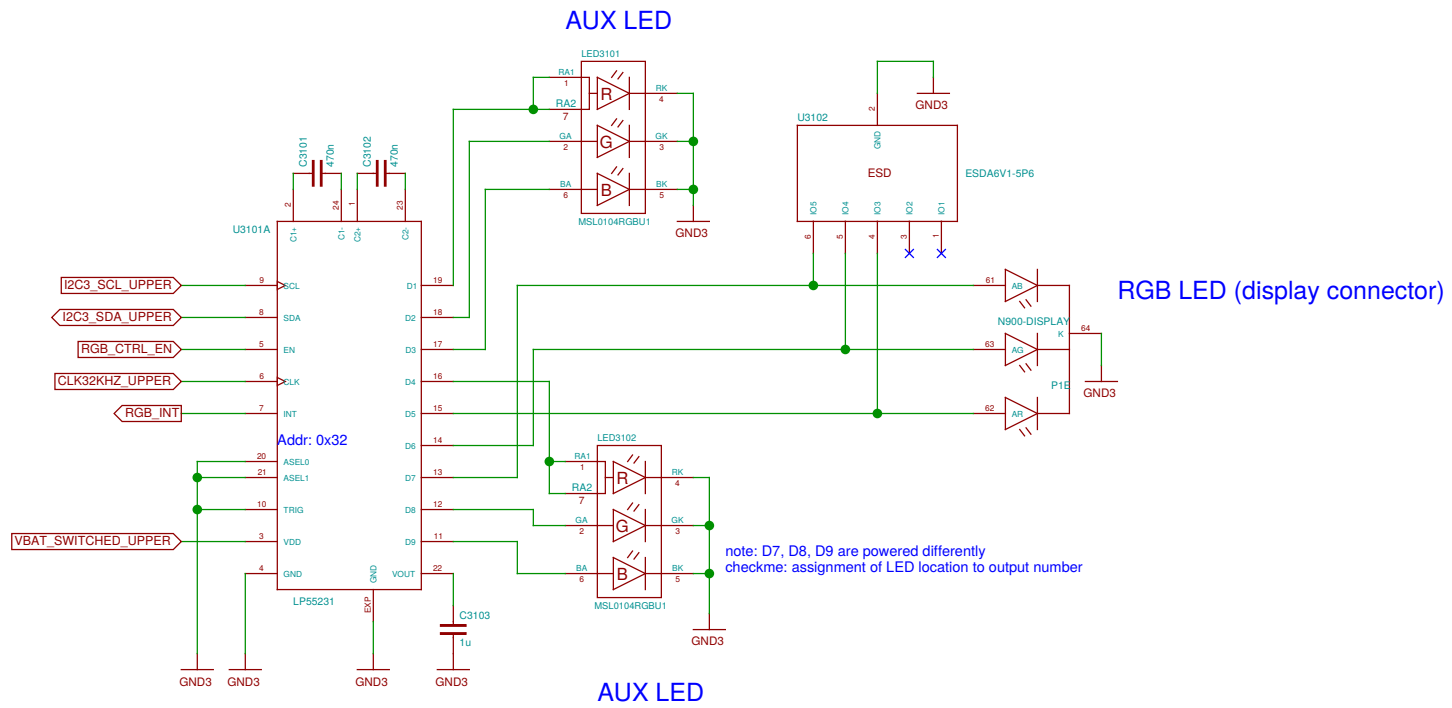
simple capless 400mA LDO for TPS65950 substitute
(only for prototype)



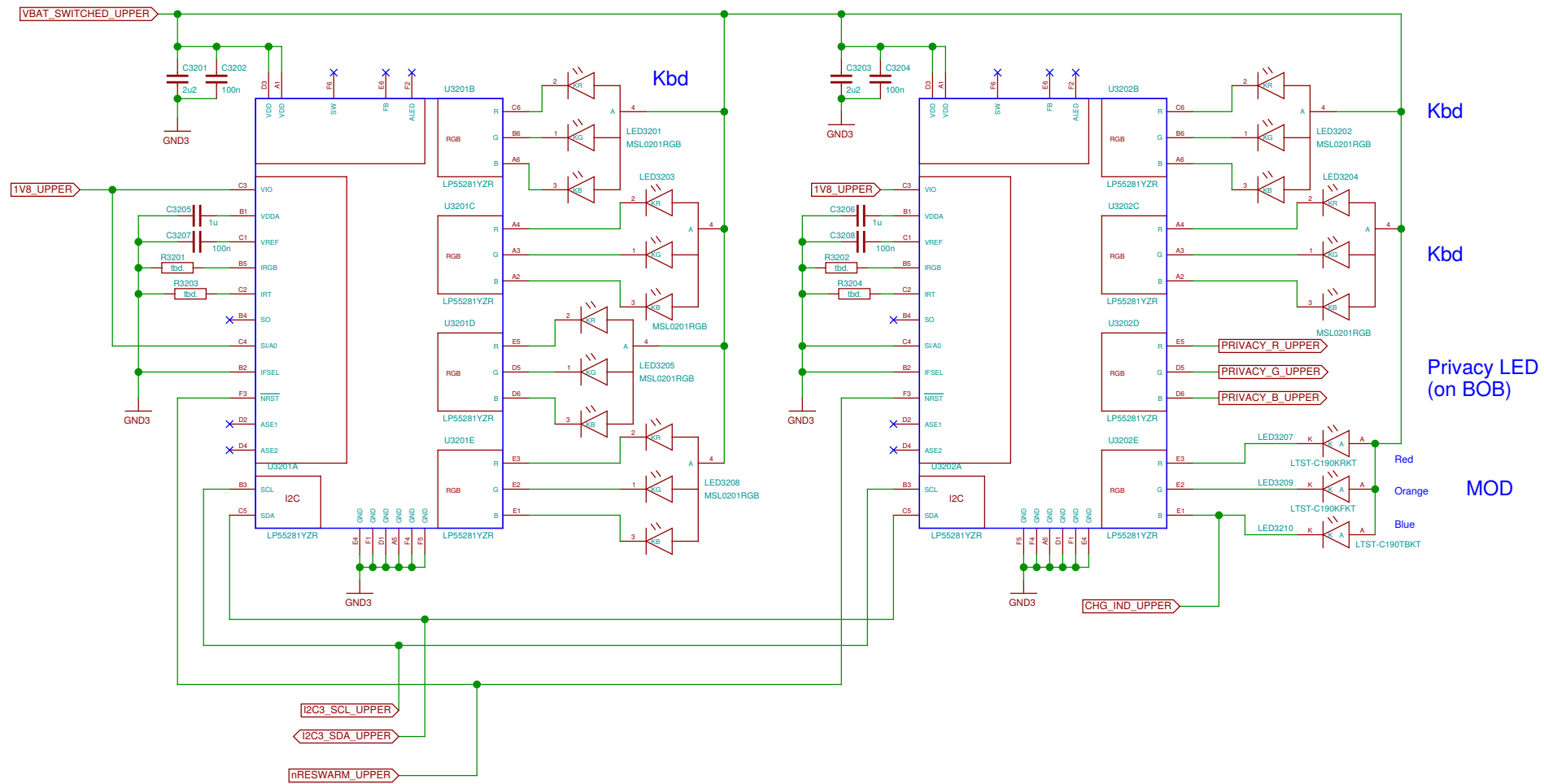
TODO: use REGEN ?

Sheet: /BB-XM Dummy (TWL4030)/	
File: neo900_SS_29.sch	
Title: BB-XM Dummy (TWL4030)	
Size: A3	Date: 17 JUL 2016
Plotted by eeshow efbe6fa+ 20161022-10:56Z	
Rev:	Id: 29/37





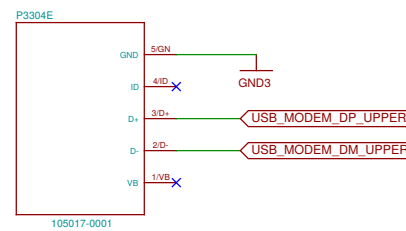
Sheet: /Fancy LEDs/		
File: neo900_SS_31.sch		
Title: Fancy LEDs		
Size: A3	Date: 17 JUL 2016	Rev:
Plotted by eeshow efbe6fa+ 20161022-10:56Z		Id: 31/37



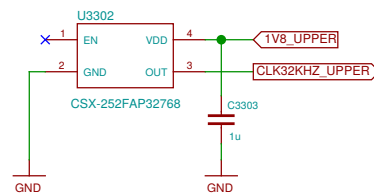
Cleaning up. The connections to BB-xM are on the next sheets.

connect to BB
by some Micro-USB cable

Modem USB

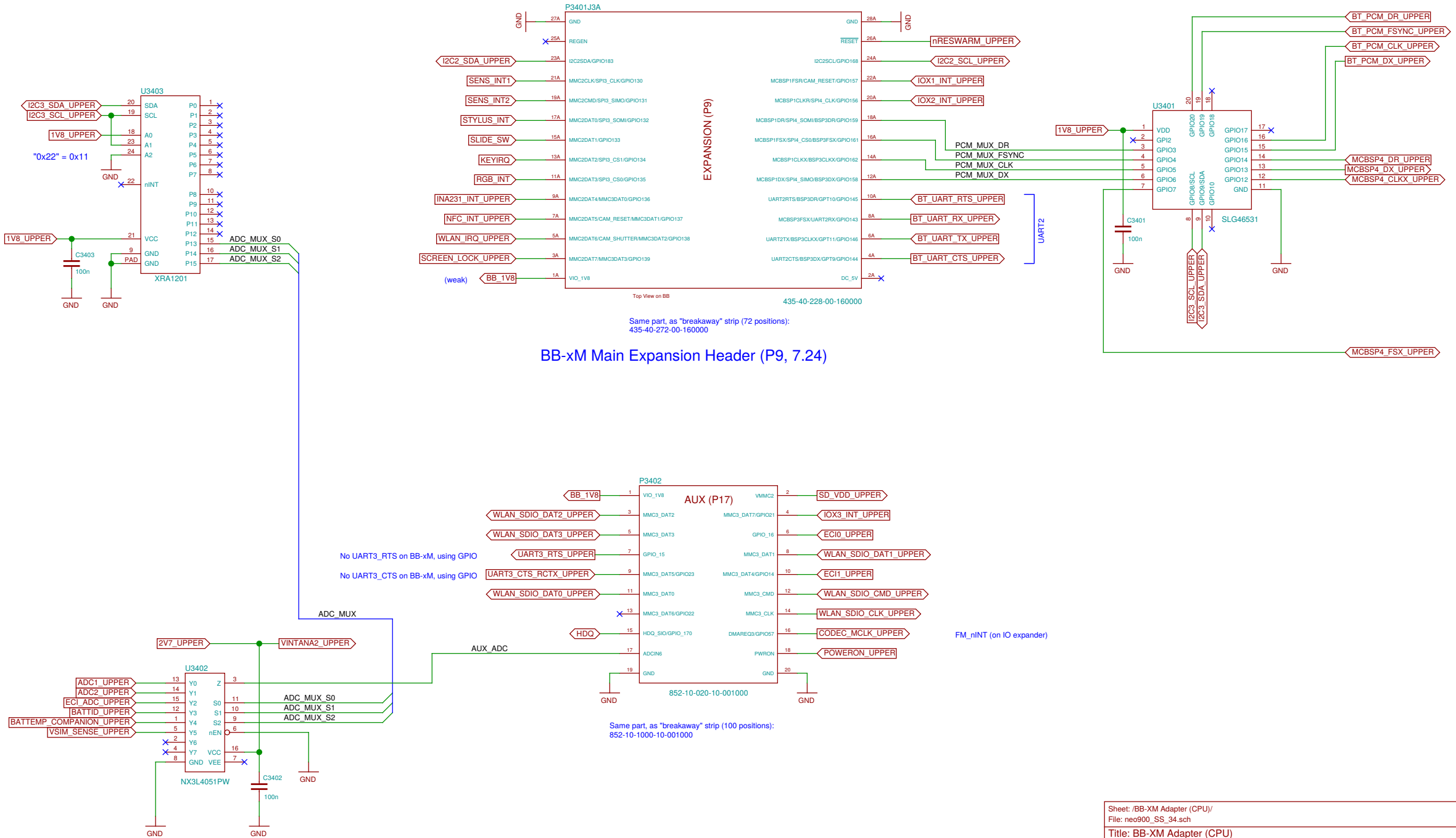


32 kHz clock

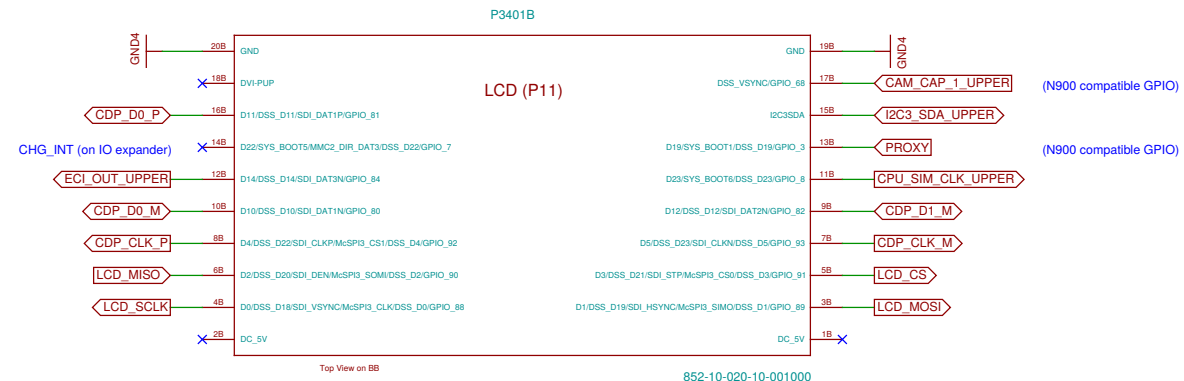


Alternative: OYKTGLJANF-0.032768

TODO: update pin names in footprint

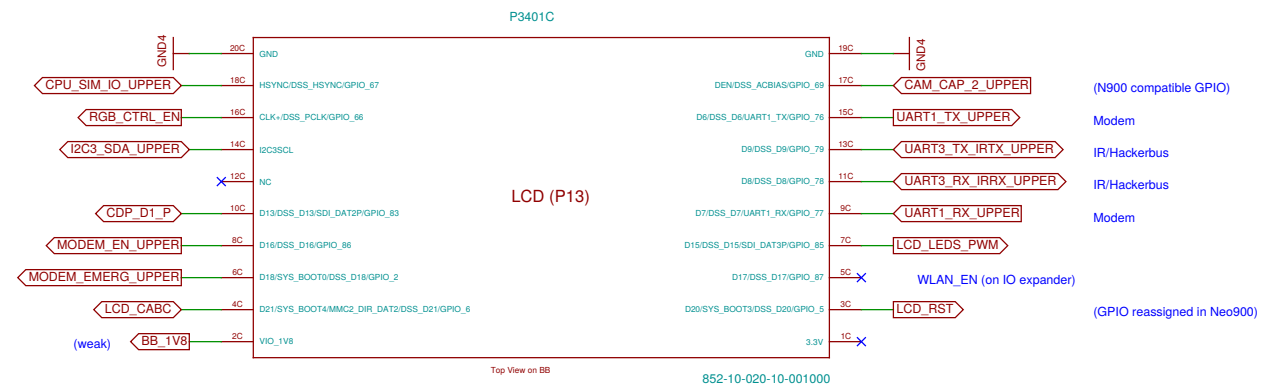


P11 (7.25)



Same part, as "breakaway" strip (100 positions):
852-10-1000-10-001000

P13 (7.25)

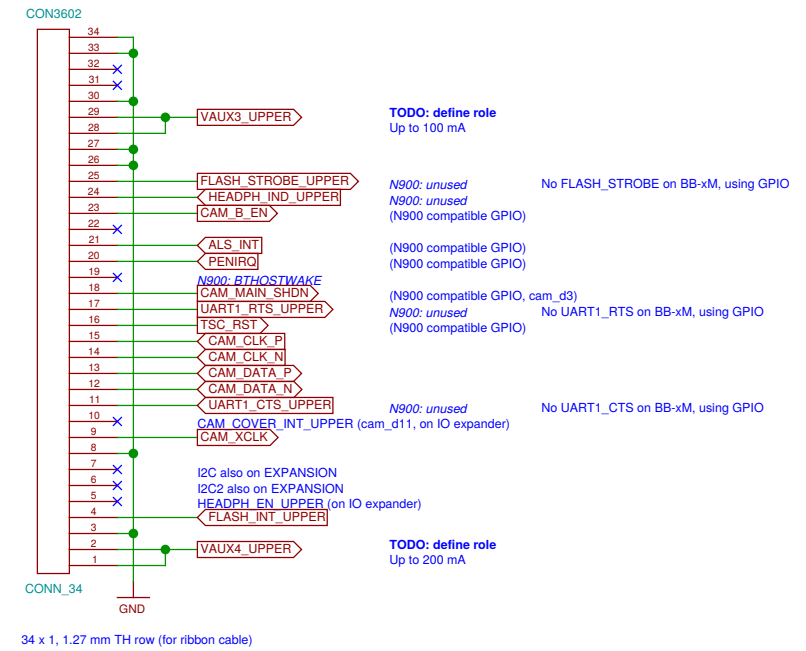
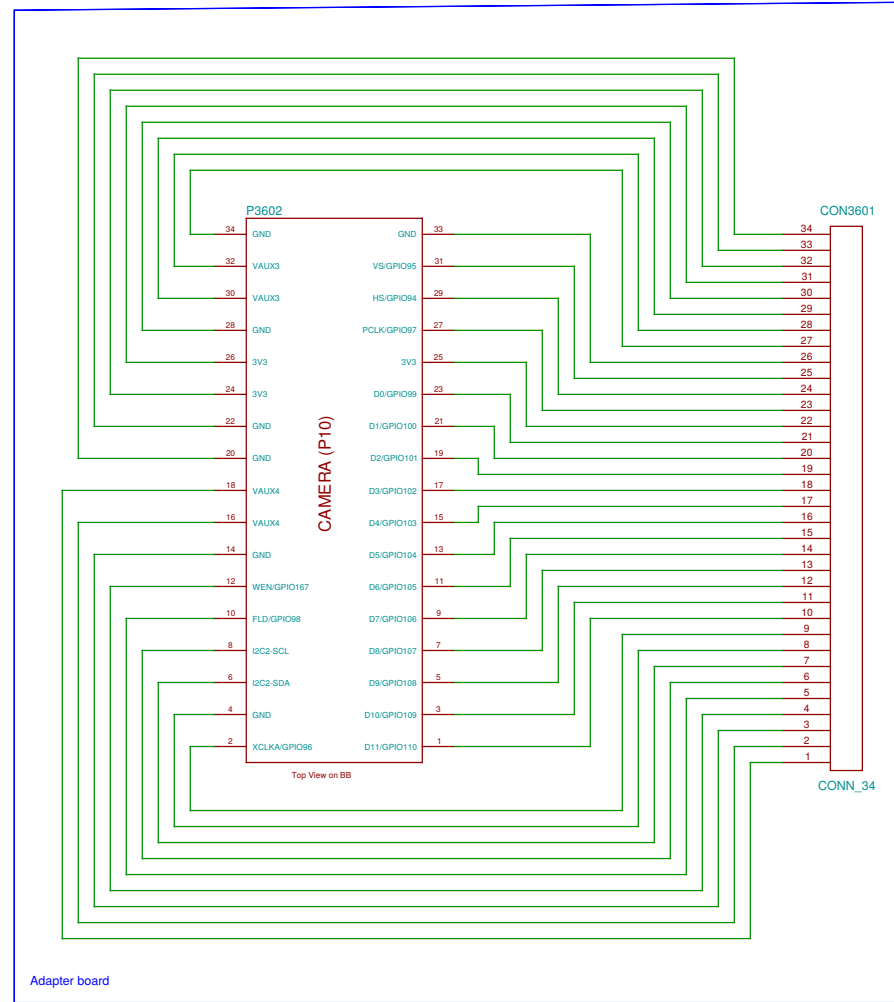


Same part, as "breakaway" strip (100 positions):
852-10-1000-10-001000

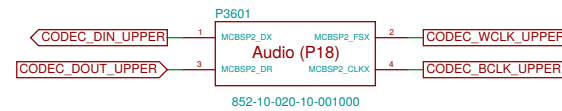
TODO: update pin names in footprint

Sheet: /BB-XM Adapter (DISP/		
File: neo900_SS_35.sch		
Title: BB-XM Adapter (DISP)		
Size: A3	Date: 17 JUL 2016	Rev:
Plotted by eeshow efbe6fa+ 20161022-10:56Z		Id: 35/37

Processor Camera Port Interface (P10, 7.20.3)



TODO: update pin names in footprint



This part is a "breakaway" strip (20 positions) and needs to be customized (cut) before assembly. Alternatively, 852-10-100-10-001000 (100 positions) could be used.

Molex Jumper cables to connect BB-XM-Adapter to Uppwer board

N3701 15015-0439	N3702 15015-0439	N3703 15015-0439
CPU	DISP	CAM

N3704 N900 case assembly

N3705 N97-CAMERA-HOLE

N3706 headset jack

N3707 STENCIL-TOP

N3708 STENCIL-BOTTOM

Sheet: /No-Solder Components/ File: neo900_SS_37.sch		
Title: No-Solder Components		
Size: A3	Date: 17 JUL 2016	Rev:
Plotted by eeshow efbe6fa+ 20161022-10:56Z		Id: 37/37