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Display-Panel&Power

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CPU + PoP RAM/NAND

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Connector to BB-XM

Sheet: BB-XM Adapter (CPU)
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BB-XM Adapter (CPU)

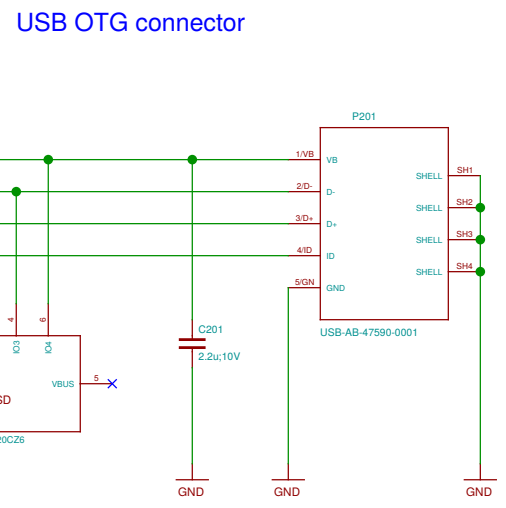
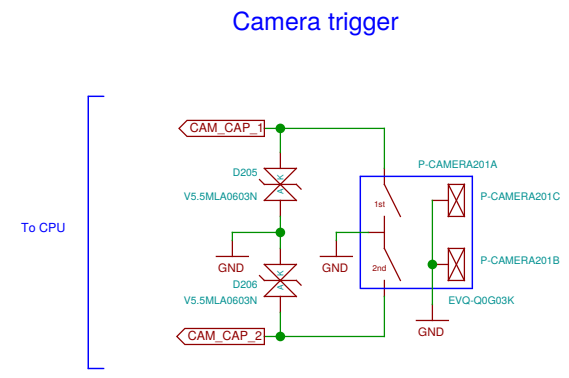
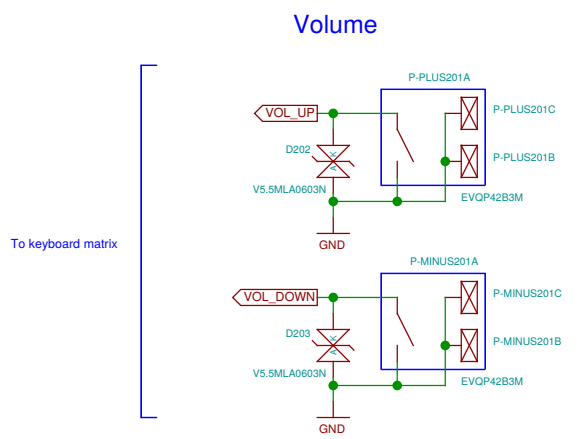
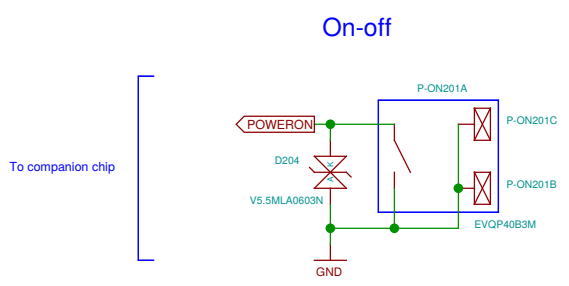
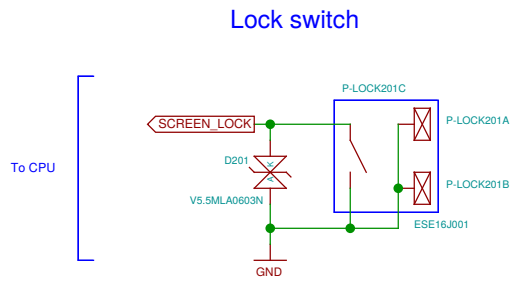
Sheet: BB-XM Adapter (DISP)
File: neo900_SS_35.sch
BB-XM Adapter (DISP)

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

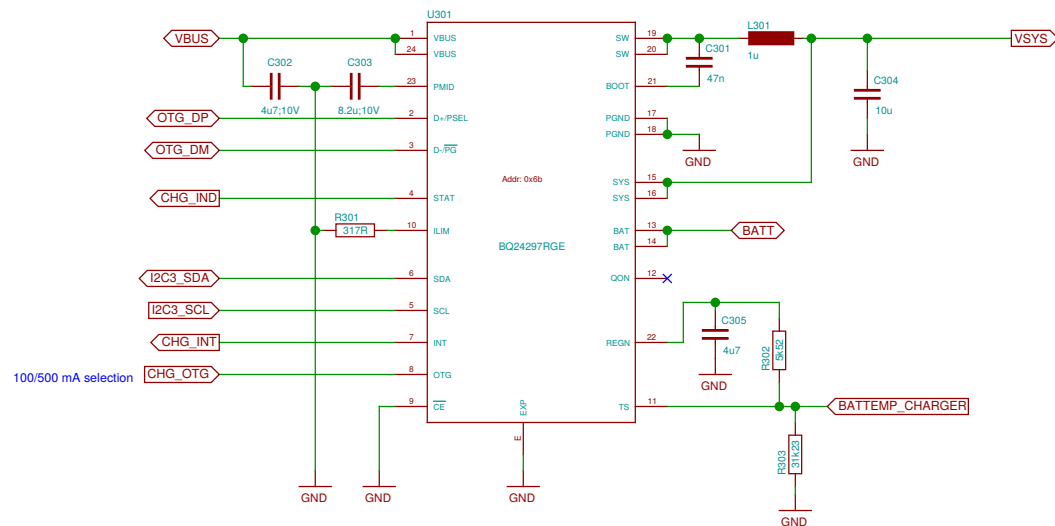
Sheet: No-Solder Components
File: neo900_SS_37.sch
No-Solder Components

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		

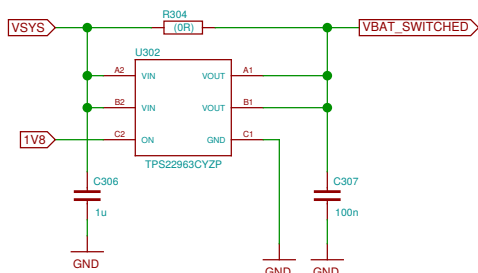


Battery charger with USB OTG

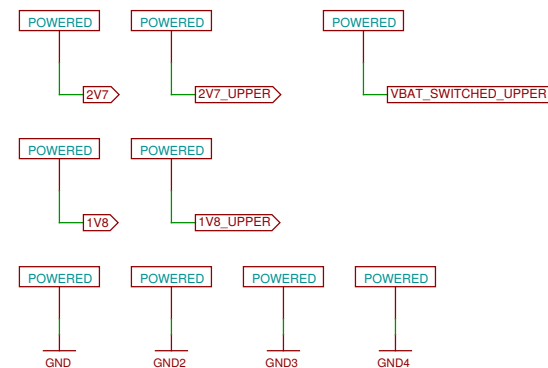


Power distribution and sequencing

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

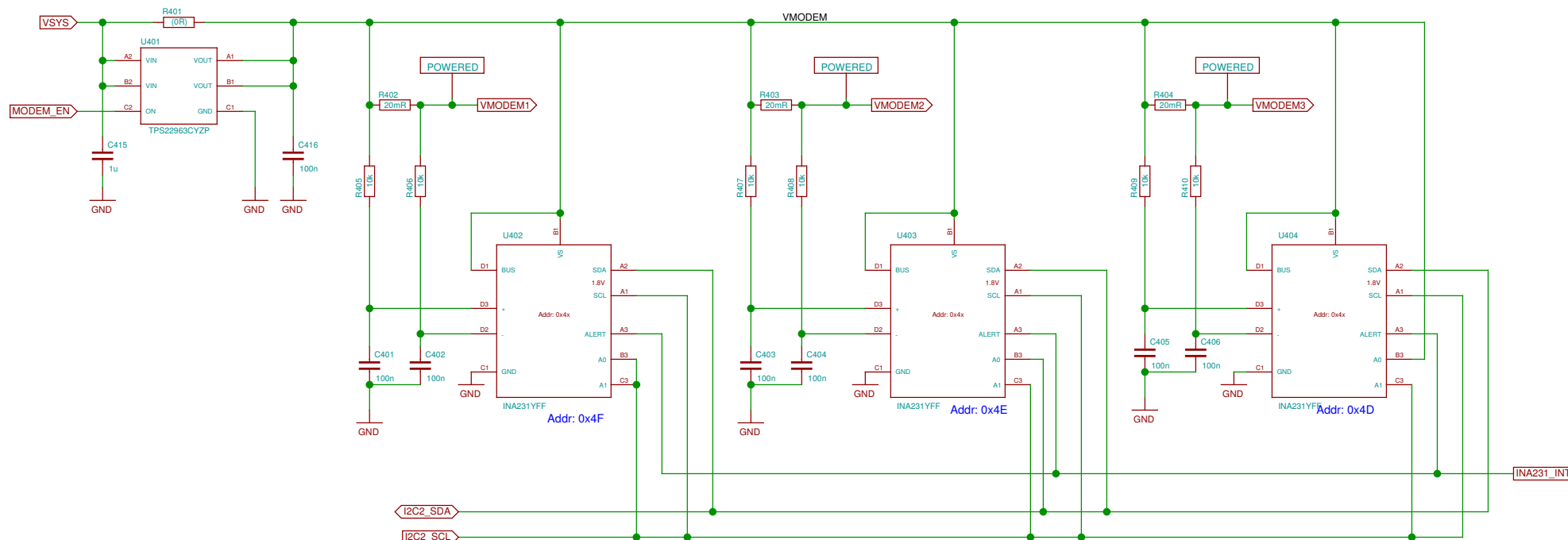


KiCad bureaucracy

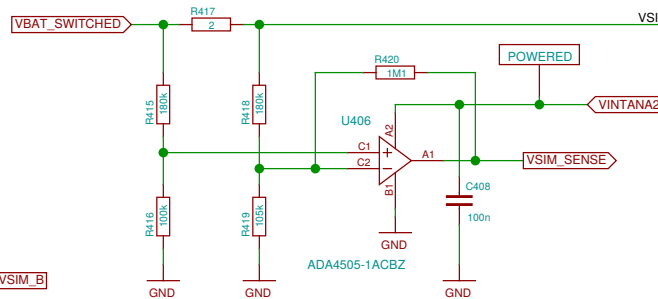


Sheet: /Charger/OTG-Booster/		
File: neo900_SS_3.sch		
Title: Charger/OTG-Booster		
Size: A3	Date: 17 JUL 2016	Rev:
Plotted by eeshow efbe6fa - 20161022-10:56Z		Id: 3/37

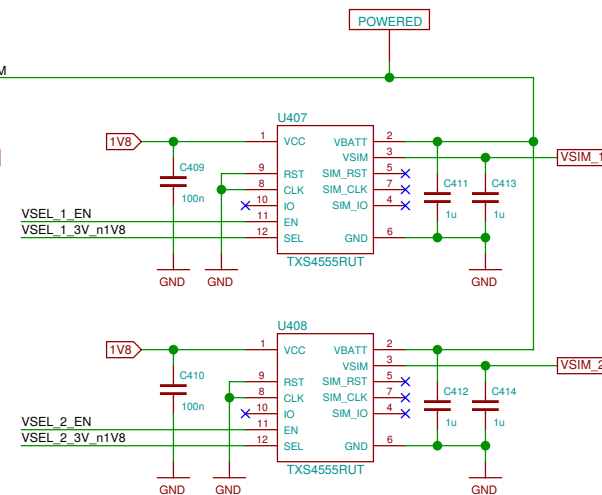
Modem current monitor



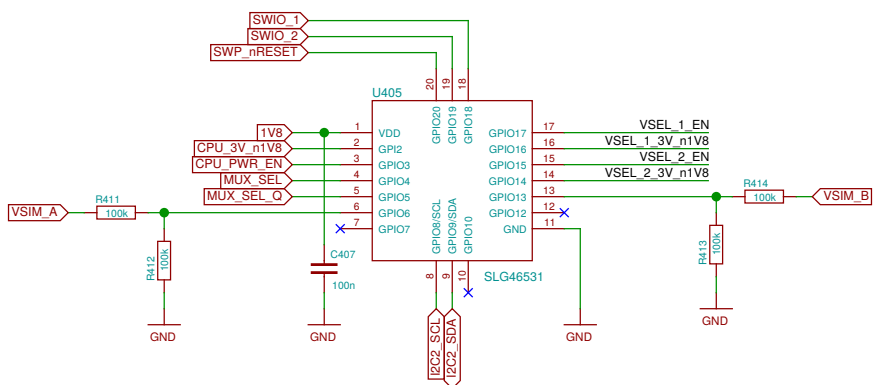
SIM current sensing



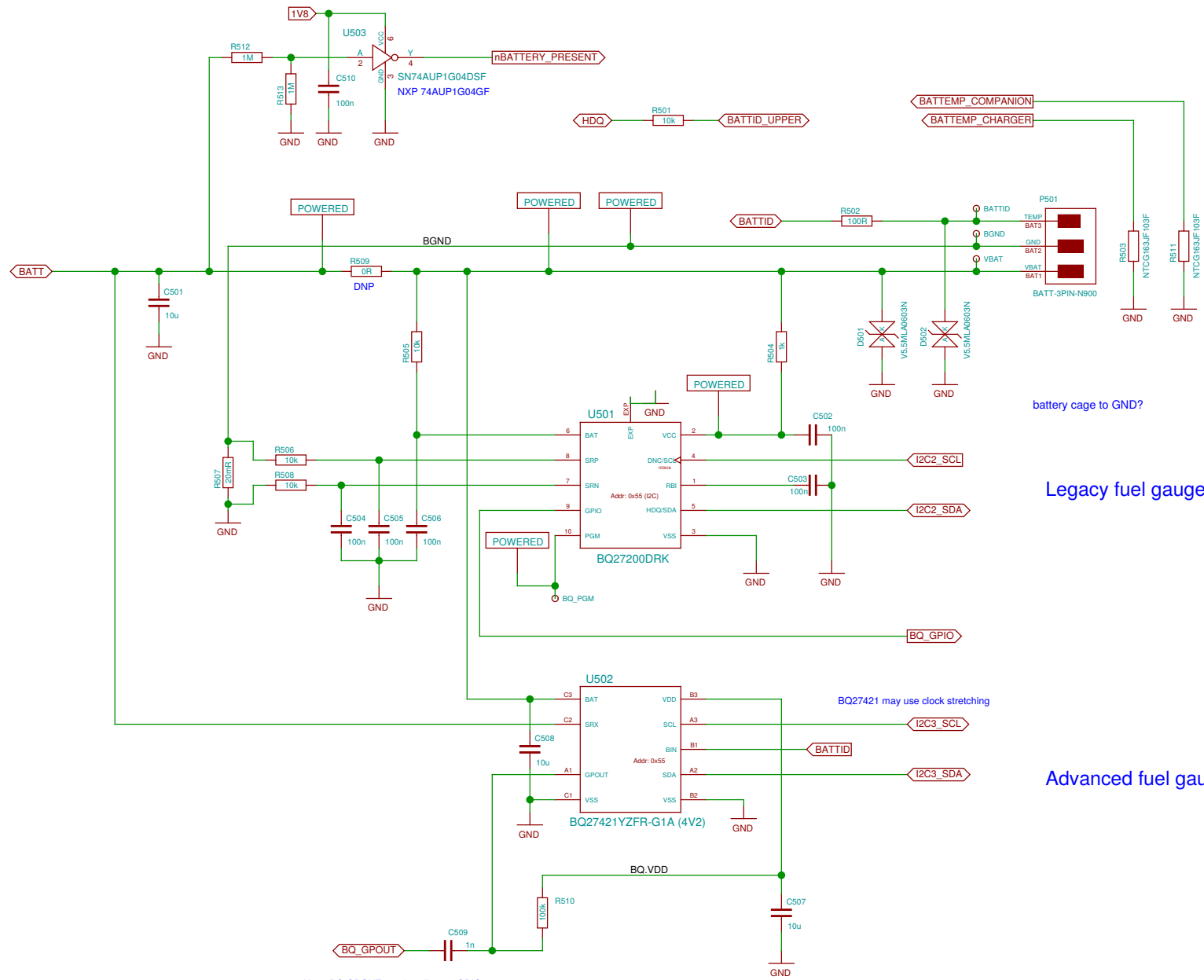
SIM power supply



SIM power selection



TODO: update SLG design for changed pins



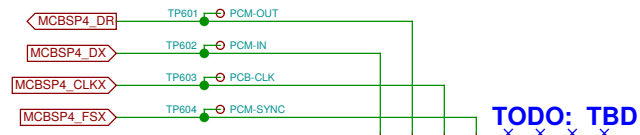
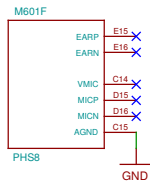
battery cage to GND?

Legacy fuel gauge

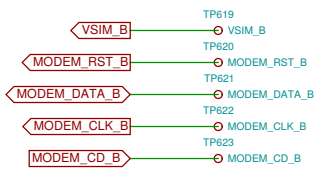
Advanced fuel gauge

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

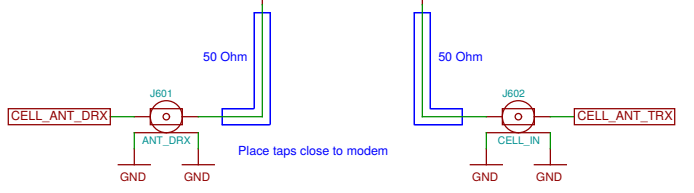
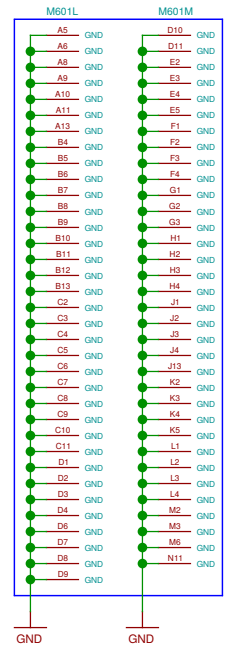
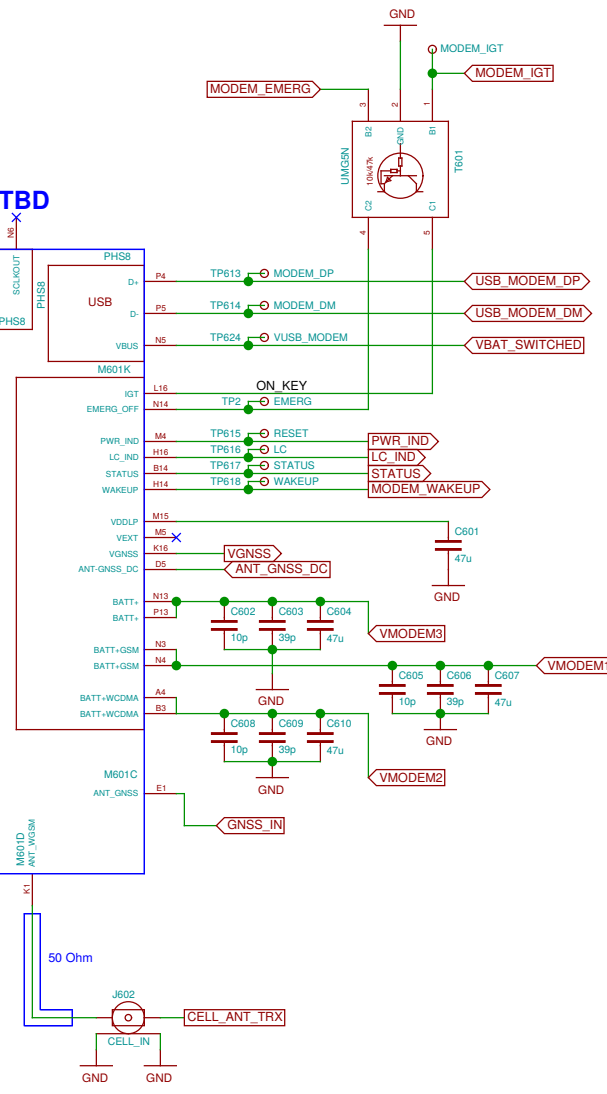
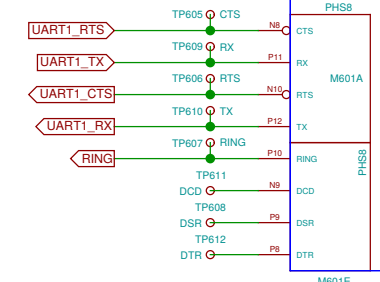
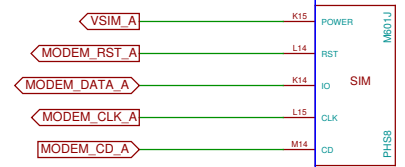
Sheet: /Fuel Gauge/		Date: 17 JUL 2016	
File: neo900_SS_5.sch		Rev:	
Title: Fuel Gauge			
Size: A3	Date: 17 JUL 2016	Rev:	
Plotted by eeshow efbe6fa+ 20161022-10:56Z		Id: 5/37	



TODO: TBD



TODO: B-SIM bus FFS



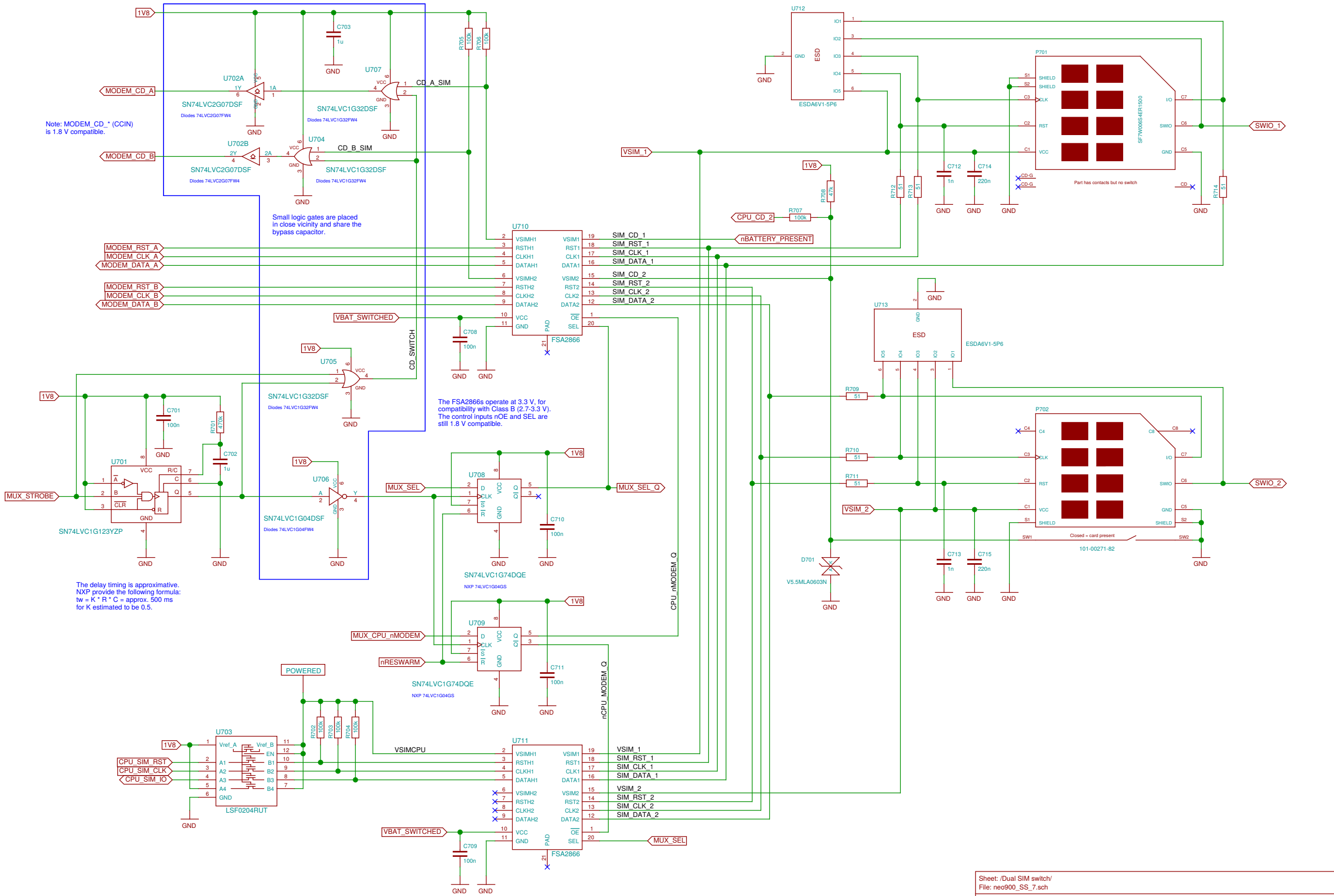
Place taps close to modem

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

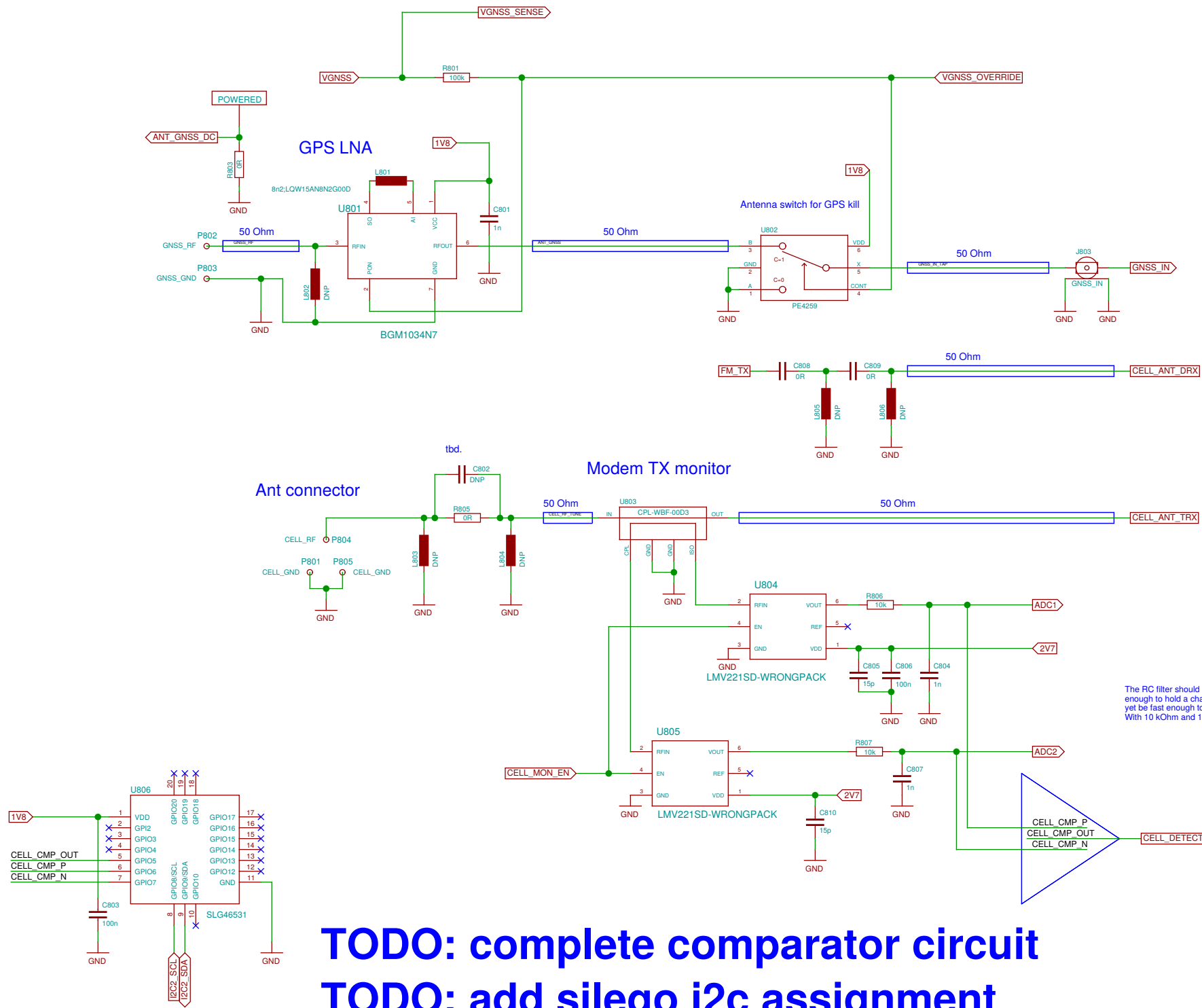
Small logic gates are placed in close vicinity and share the bypass capacitor.

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.



Sheet: /Dual SIM switch/		File: neo900_SS_7.sch	
Title: Dual SIM switch			
Size: A3	Date: 17 JUL 2016	Rev:	
Plotted by: eshow efbe6fa - 20161022-10:56Z		Id: 7/37	

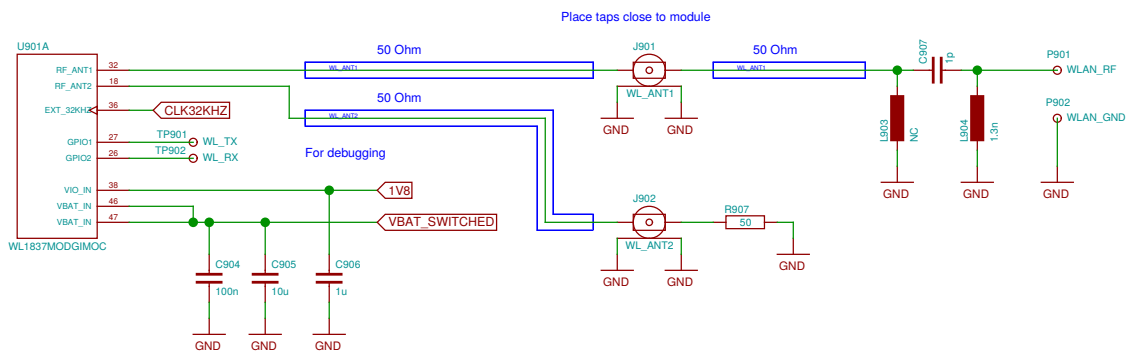


The RC filter should have C large enough enough to hold a charge in pulsed operation, yet be fast enough to detect short activity. With 10 kOhm and 1 nF, we get about 16 kHz.

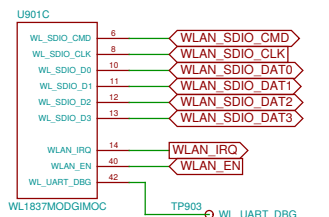
TODO: complete comparator circuit
TODO: add silego i2c assignment
TODO: iox

TODO: assign footprints for c-spring contacts

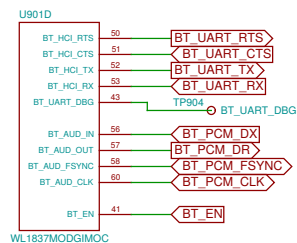
WLAN/BT antenna



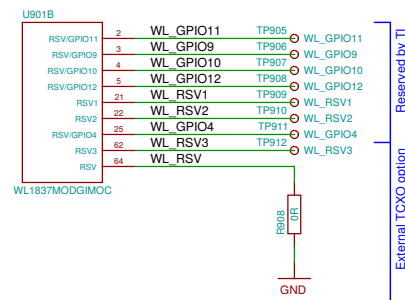
WLAN



Bluetooth

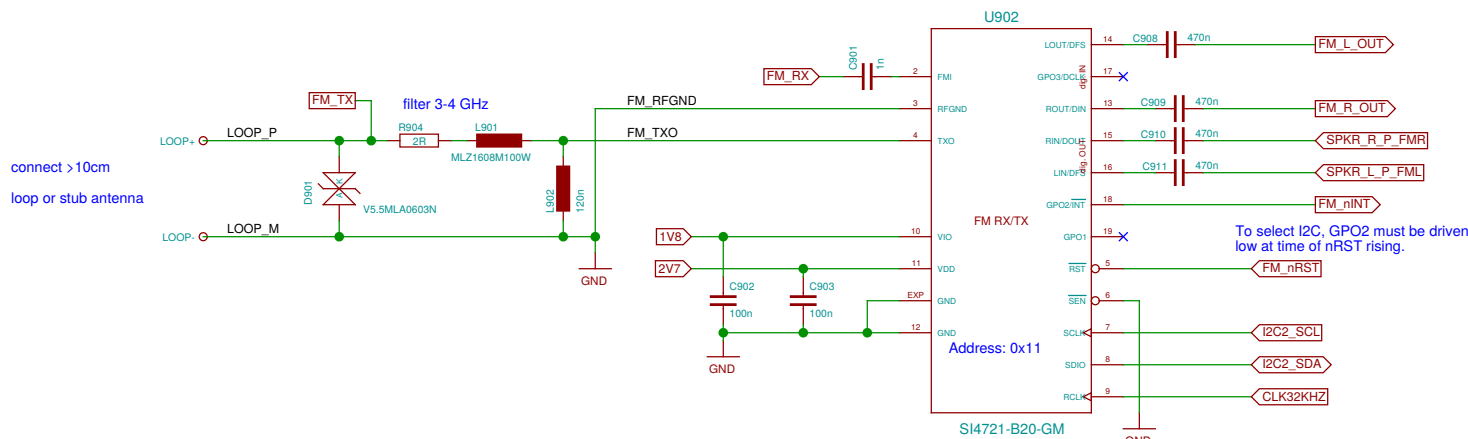


Reserved / Debugging



FM Radio (TX/RX)

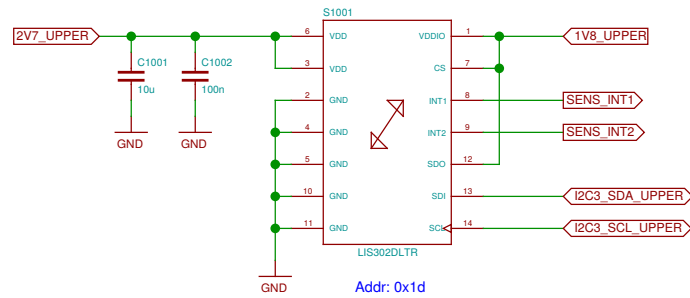
TODO: check caps



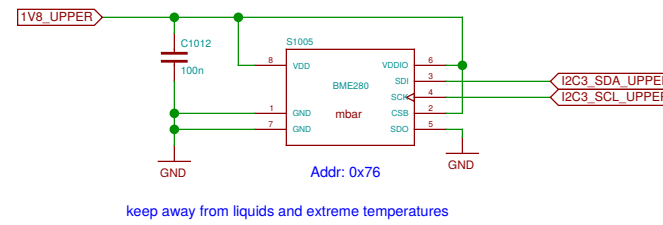
Si4705 is pin compatible (mostly) but RX-only

Sheet: /WLAN, Bluetooth, FM/		Date: 17 JUL 2016	
File: neo900_SS_9.sch		Rev: 9/37	
Title: WLAN, Bluetooth, FM		Id: 9/37	
Size: A3	Date: 17 JUL 2016	Rev: 9/37	
Plotted by eeshow efbe6fa - 20161022-10:56Z			

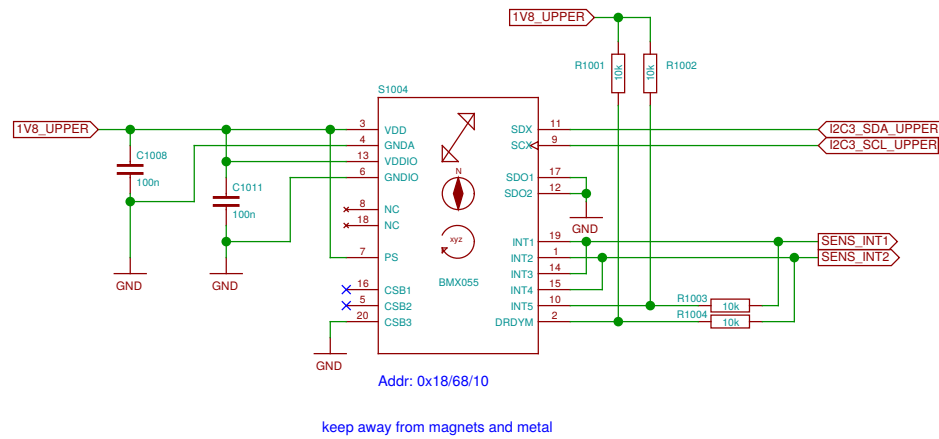
Acceleration (legacy)



Pressure, humidity

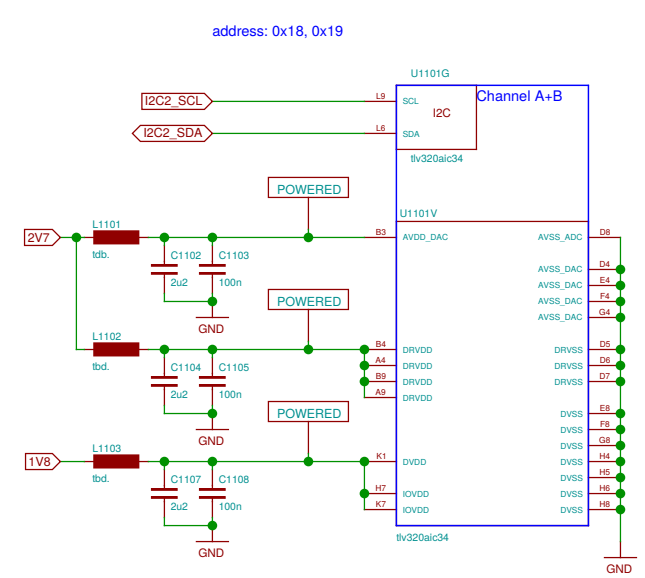
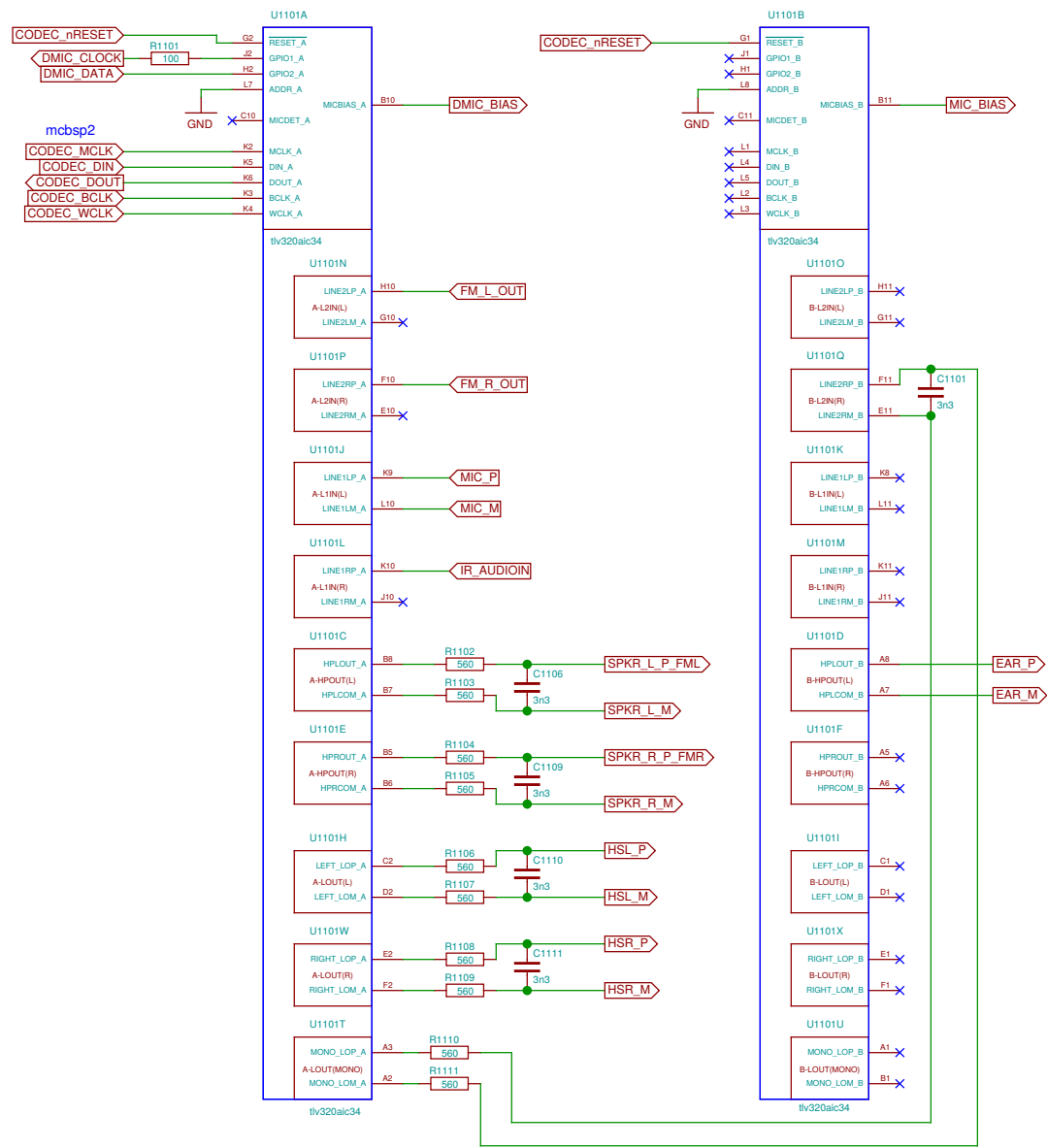


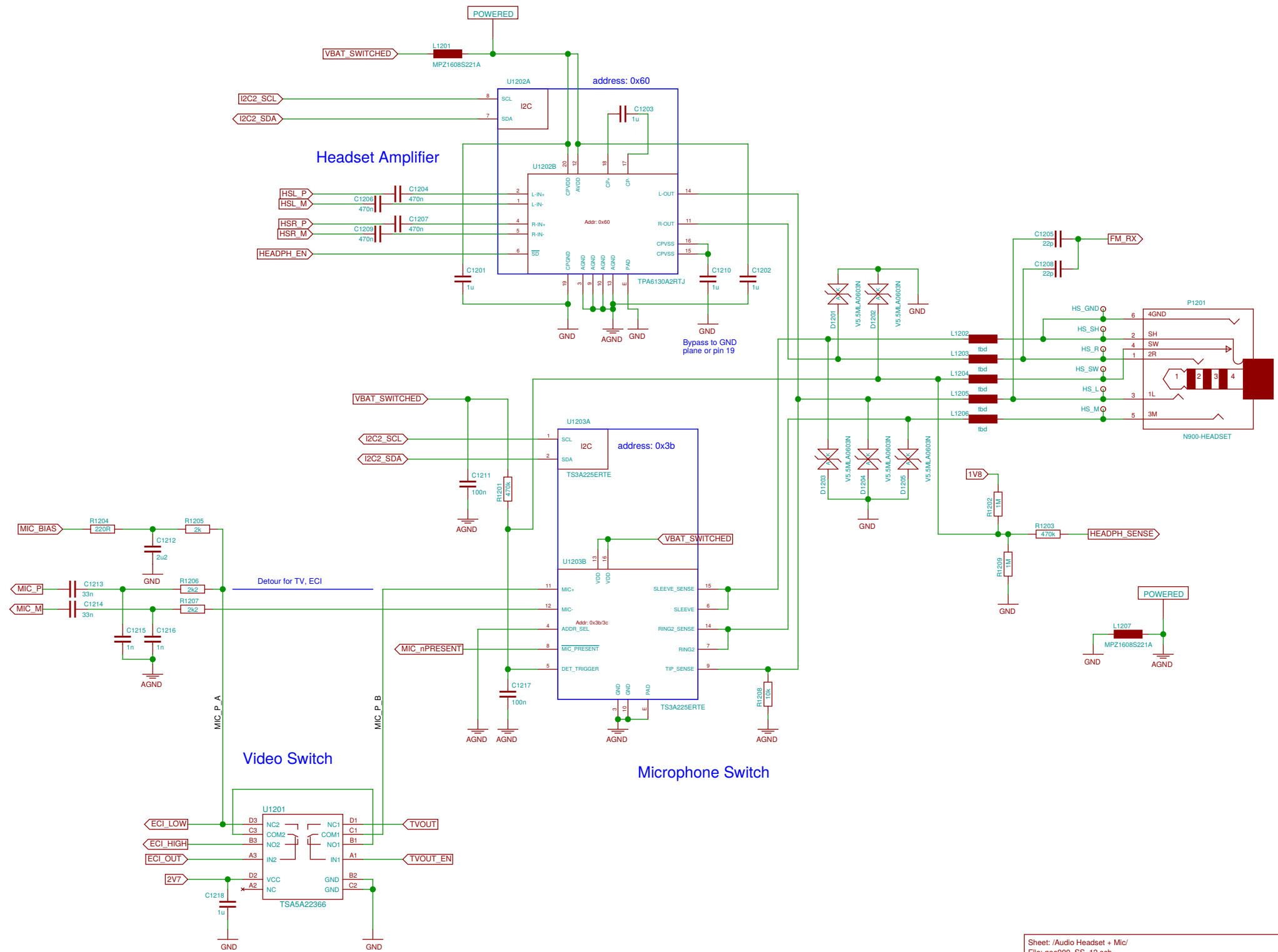
9-axis (acceleration, gyroscope, magnetometer)



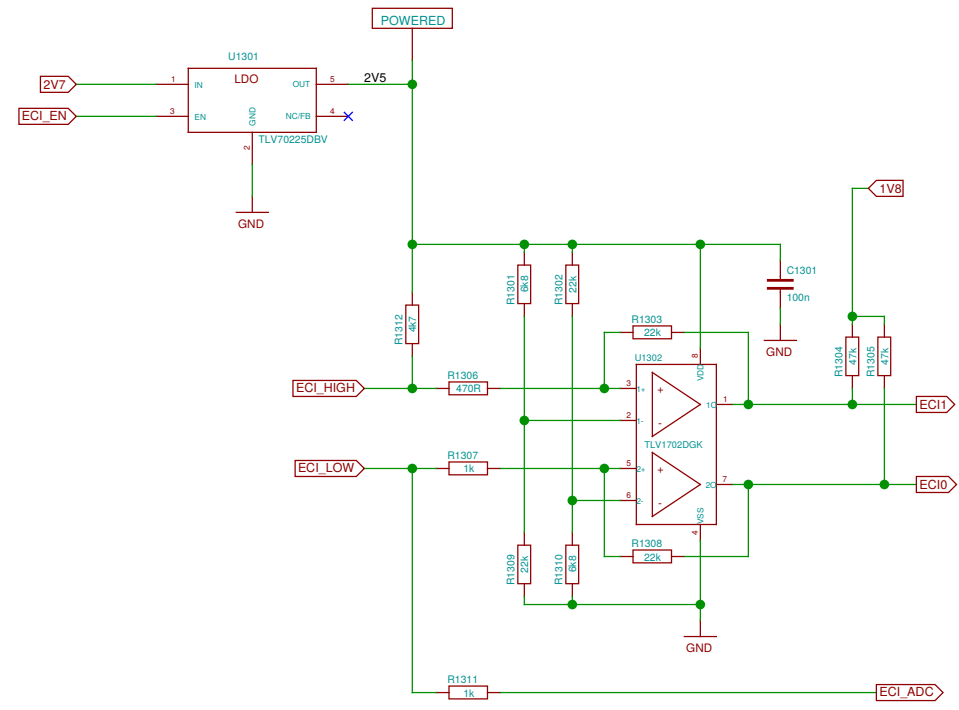
Sheet: /Sensors/ File: neo900_SS_10.sch		
Title: Sensors		
Size: A3	Date: 17 JUL 2016	Rev:
Plotted by eeshow efbe6fa - 20161022-10:56Z		Id: 10/37

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)



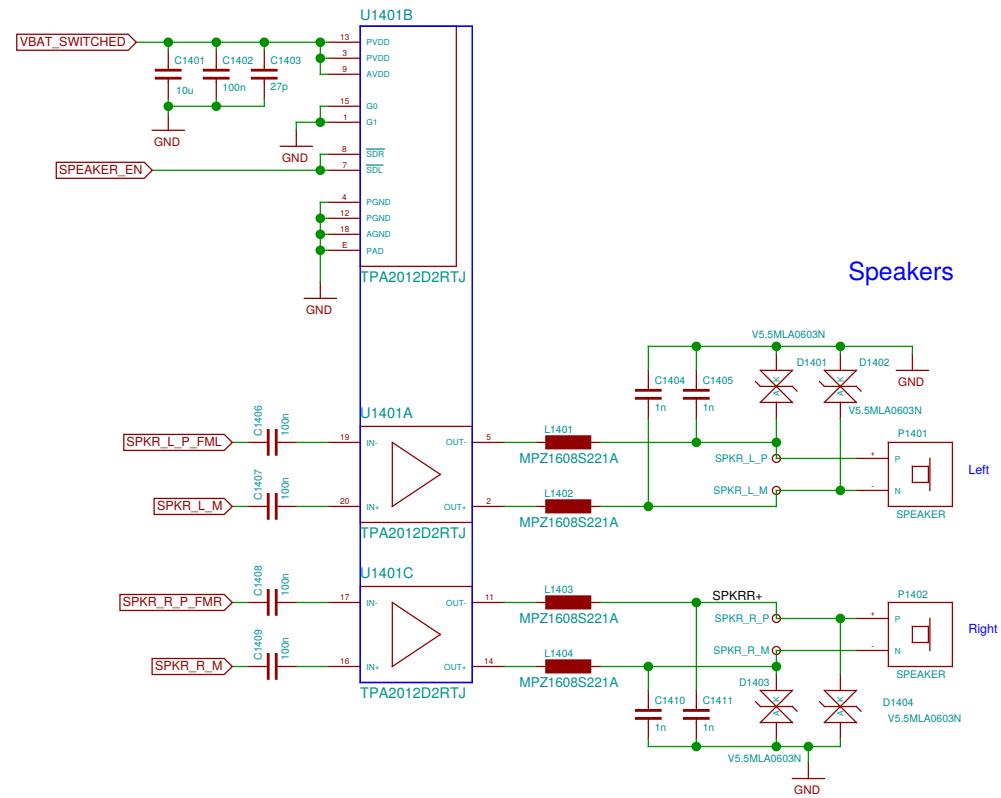


Sheet: /Audio Headset + Mic/		Date: 17 JUL 2016	
File: neo900_SS_12.sch		Rev:	
Title: Audio Headset + Mic		Id: 12/37	
Size: A3	Date: 17 JUL 2016		Rev:
Plotted by eeshow efbe6fa - 20161022-10:56Z		Id: 12/37	

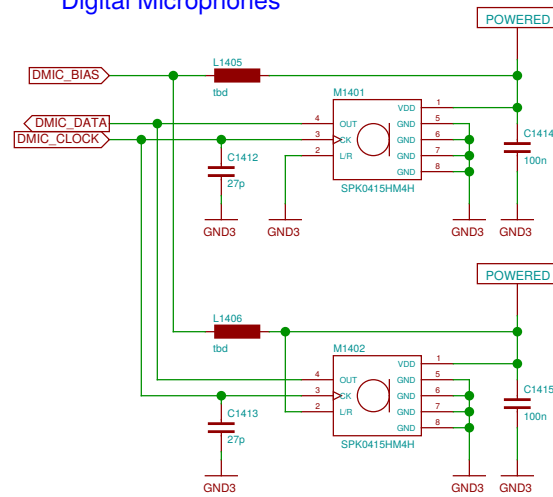


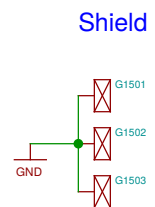
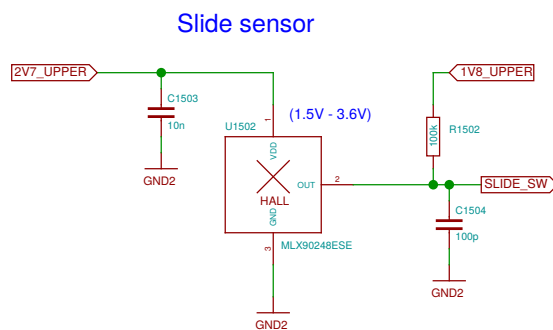
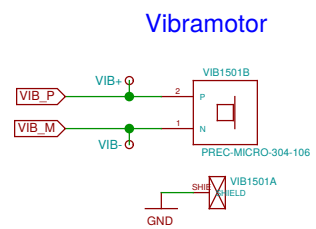
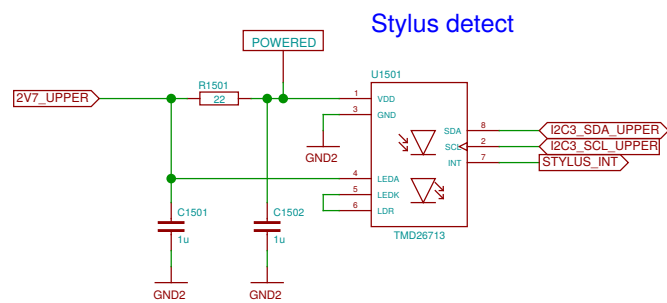
Sheet: /ECI/		
File: neo900_SS_13.sch		
Title: ECI		
Size: A3	Date: 17 JUL 2016	Rev:
Plotted by eeshow efbe6fa+ 20161022-10:56Z		Id: 13/37

Hands-free

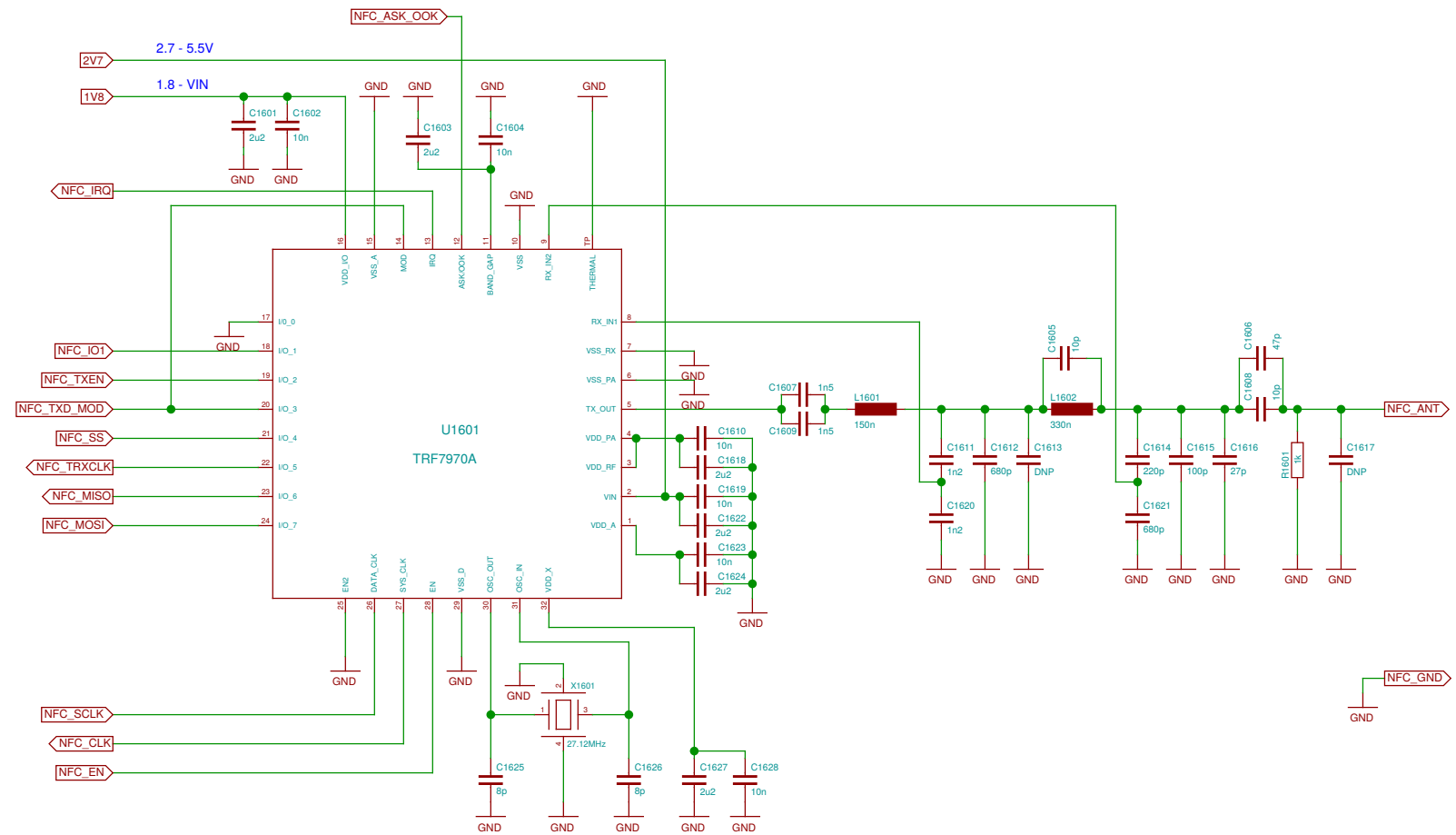


Digital Microphones

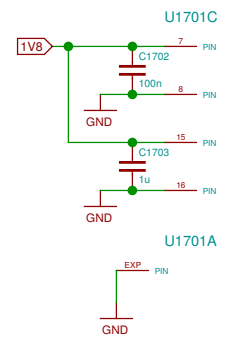
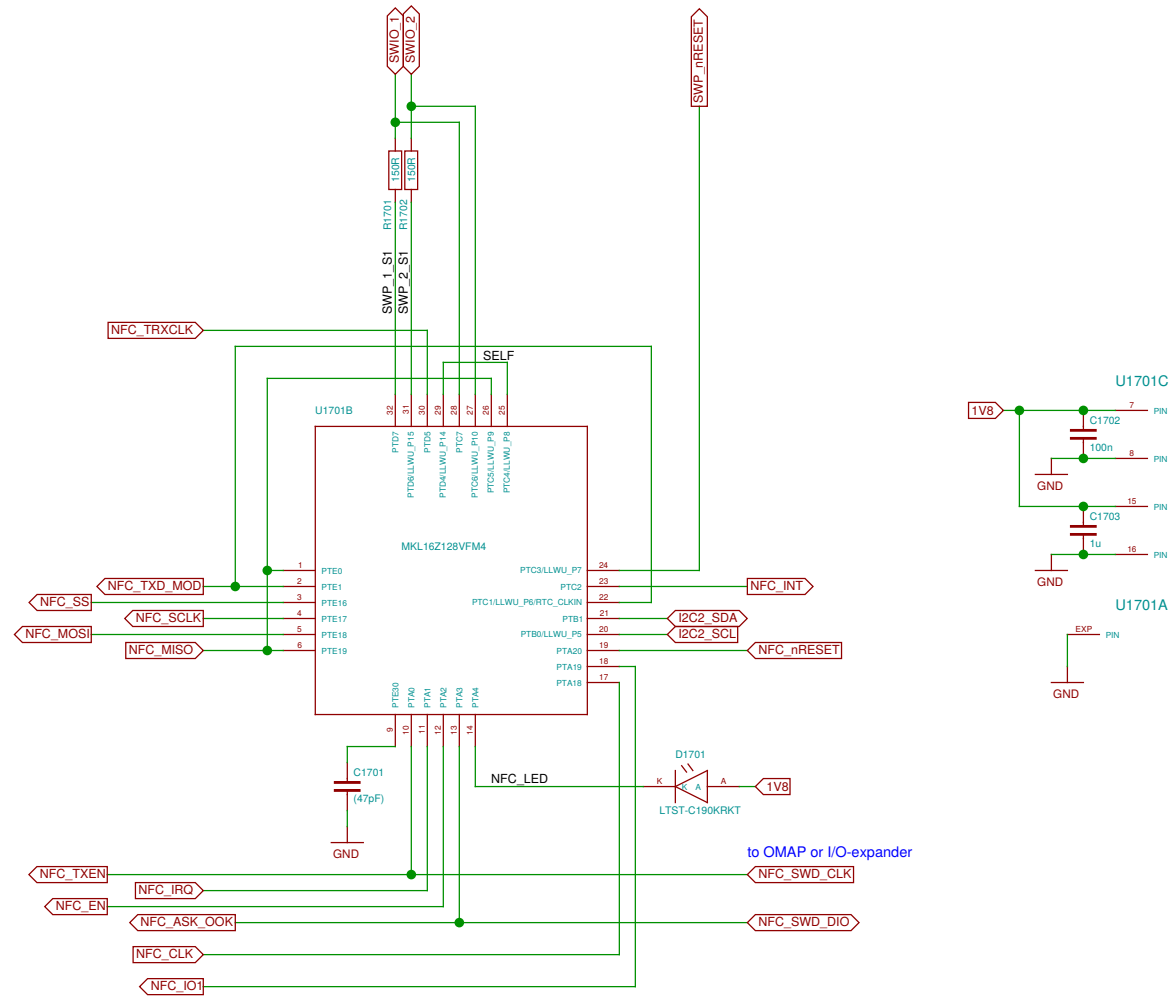




Sheet: /Misc/ File: neo900_SS_15.sch	
Title: Misc	
Size: A3	Date: 17 JUL 2016
Plotted by eeshow efbe6fa - 20161022-10:56Z	
Rev:	Id: 15/37



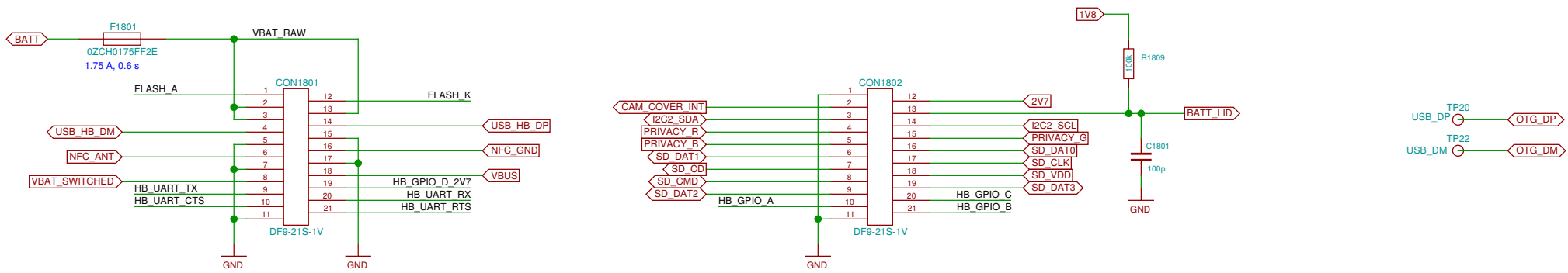
Some choices, 3.2 x 2.6 mm, 8-10 pF:
 NDK NX3225GA-27.12M-STD-CRG-2
 NDK NX3225SA-27.12M-STD-CSR-3
 Tattien XXCCEINANF-27.120000



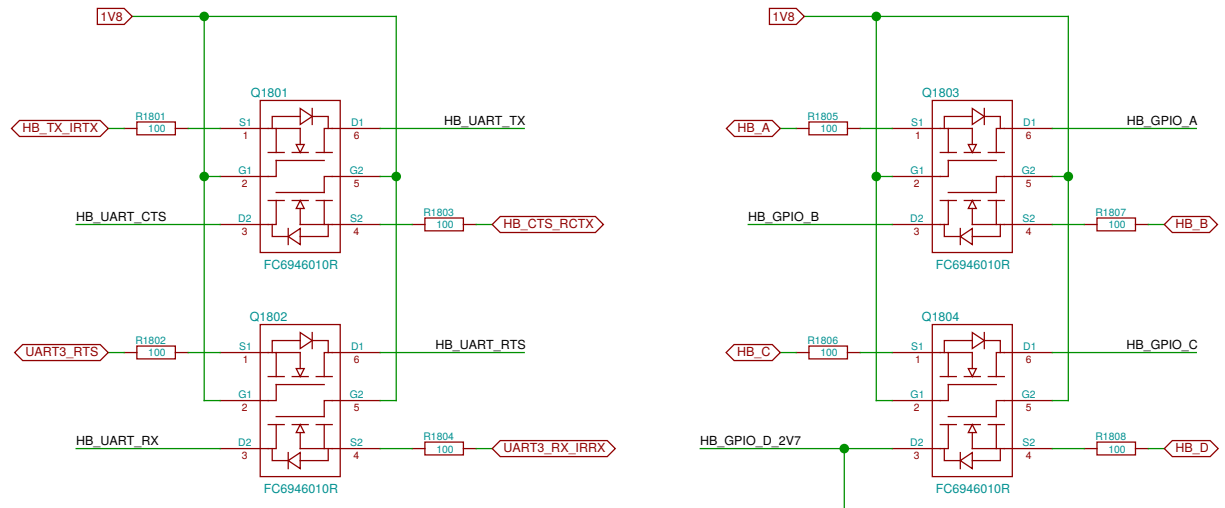
NOTE: this is mangling up Breakout and Lower board connectors
 Signals may have to be fed through the breakout board connector increasing resistance

LOWER-BOB Interconnect (LOWER side)

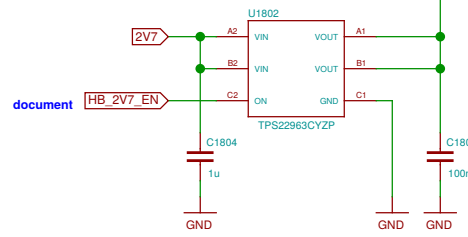
Defined in the Hackerbus specification, <http://neo900.org/stuff/papers/hb.pdf>



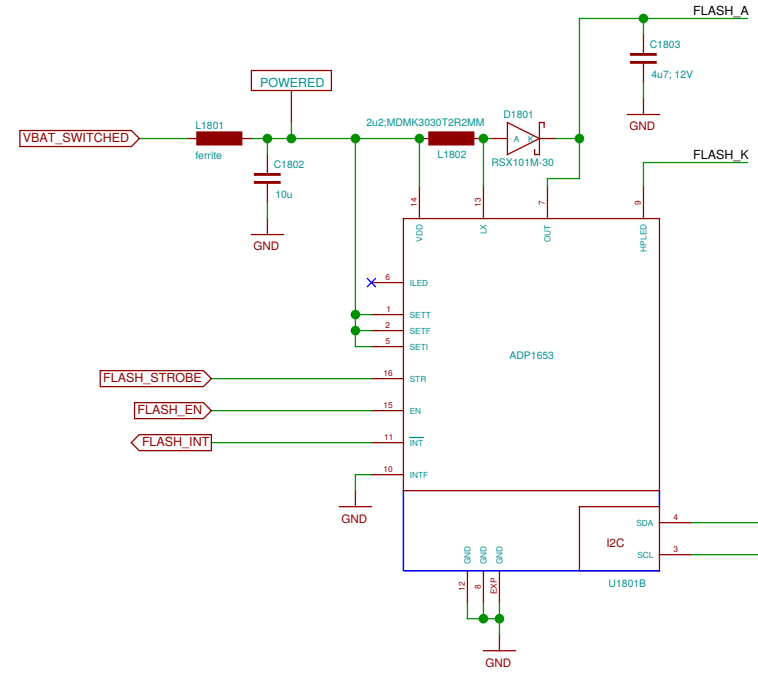
Level shifters for Hackerbus GPIO and UART



Q18xx alternative: Diodes DMN63D8LV



Flash/Torch

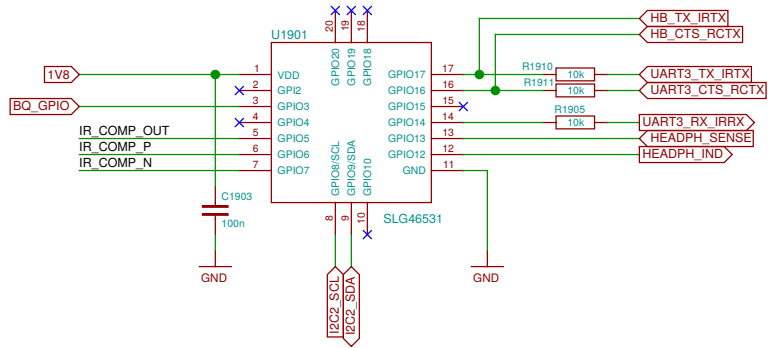
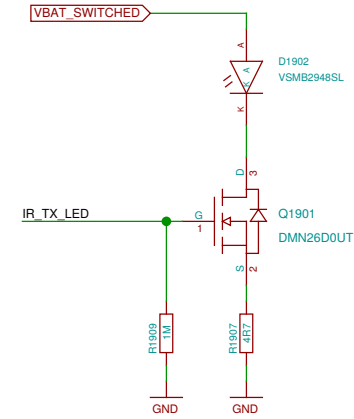
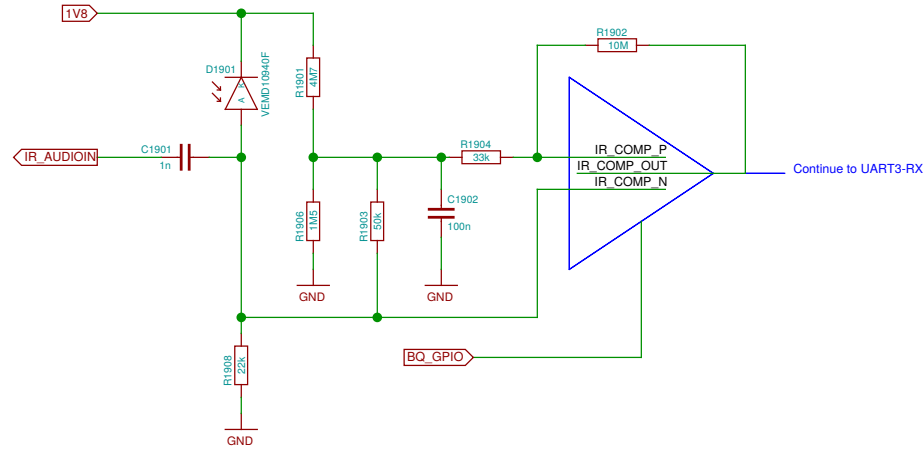


TODO: HB USB PHY may go here

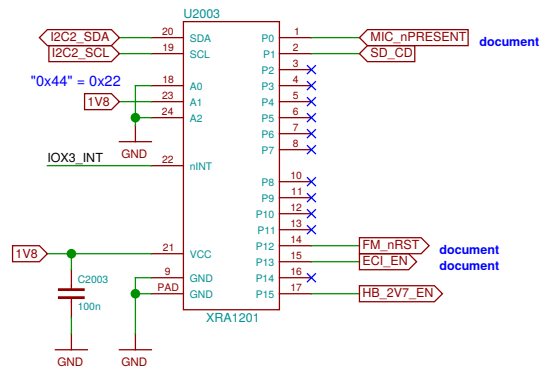
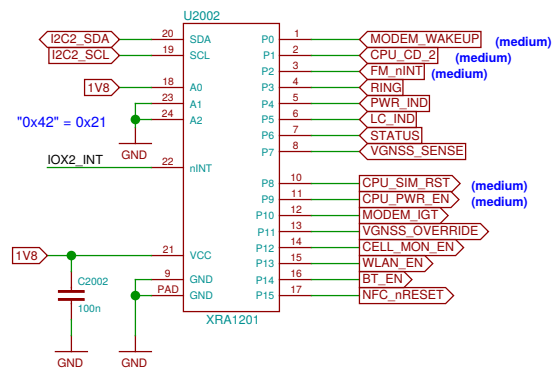
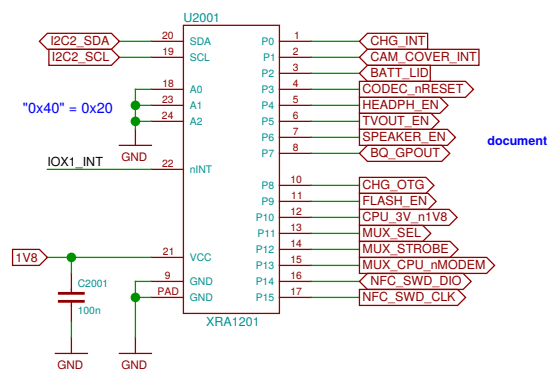
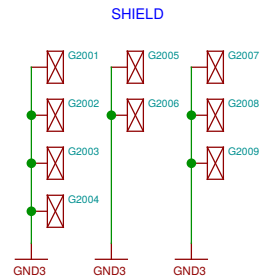
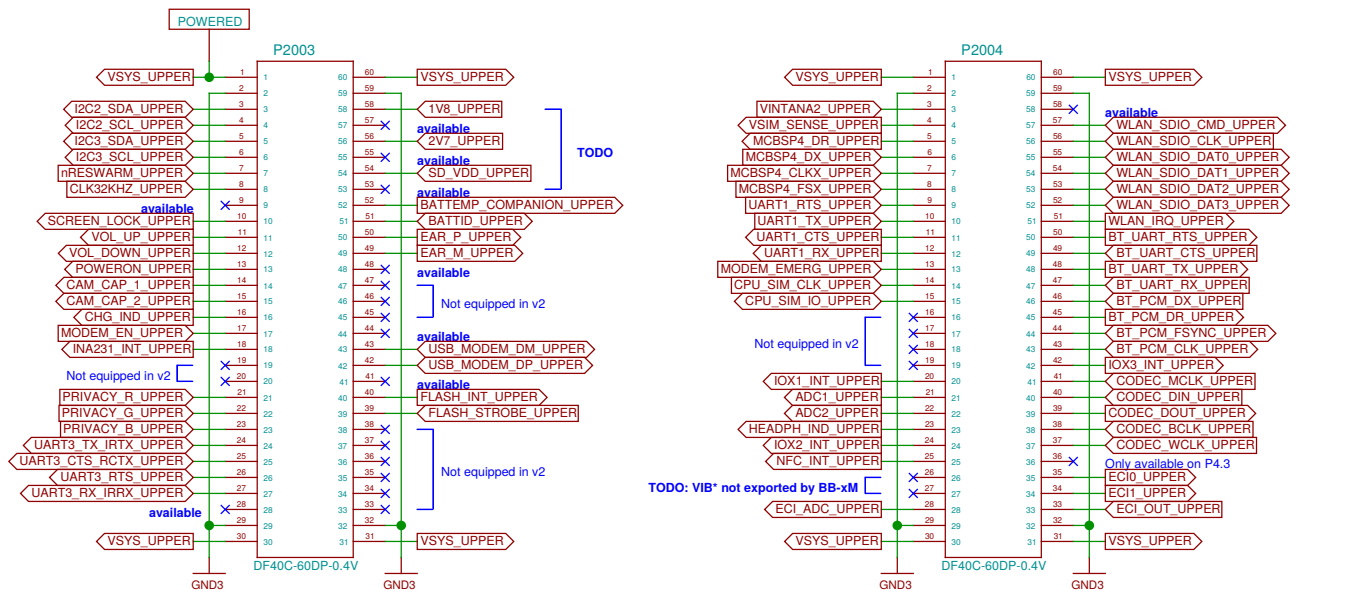
Missing 6x 2R for alternate function select (do we have the space for ca. 2.5 x 5mm?)

TODO: update D1901 footprint

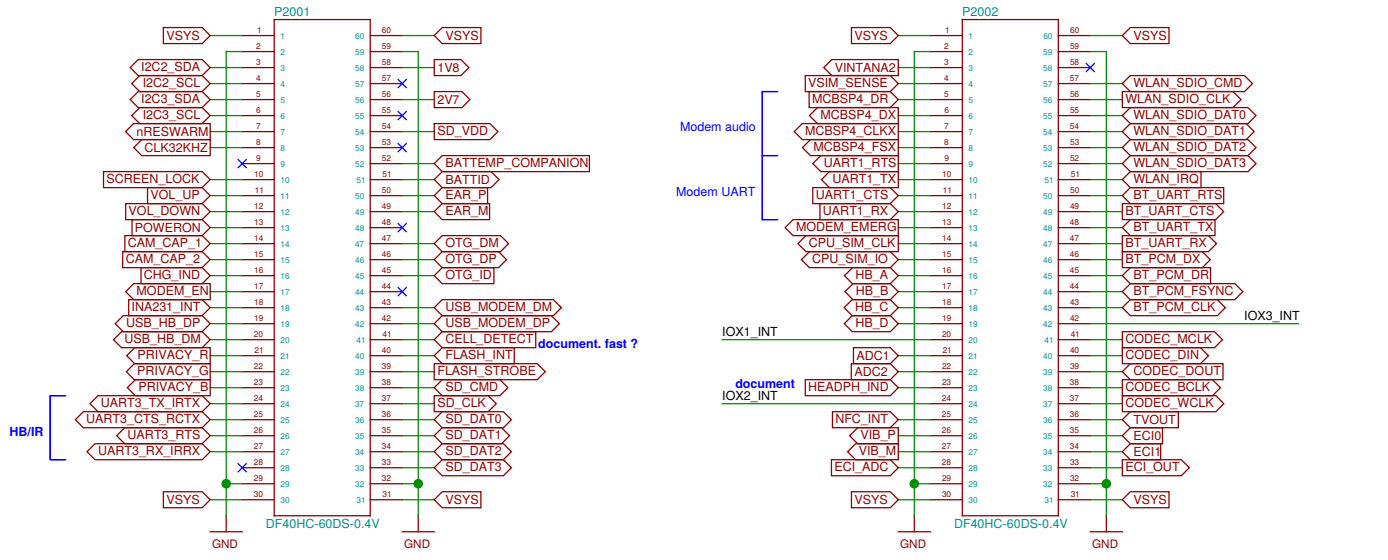
NOTE: 1V8 may be quite noisy



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

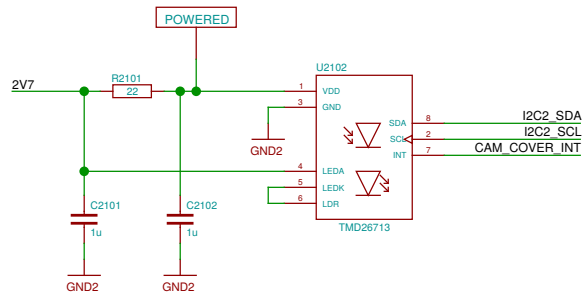


UPPER
LOWER

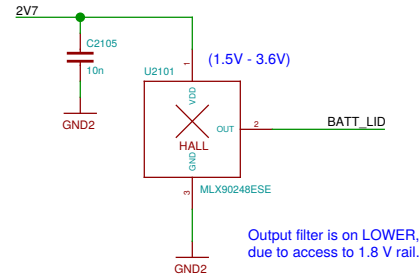


Current rating per contact: 0.3 A

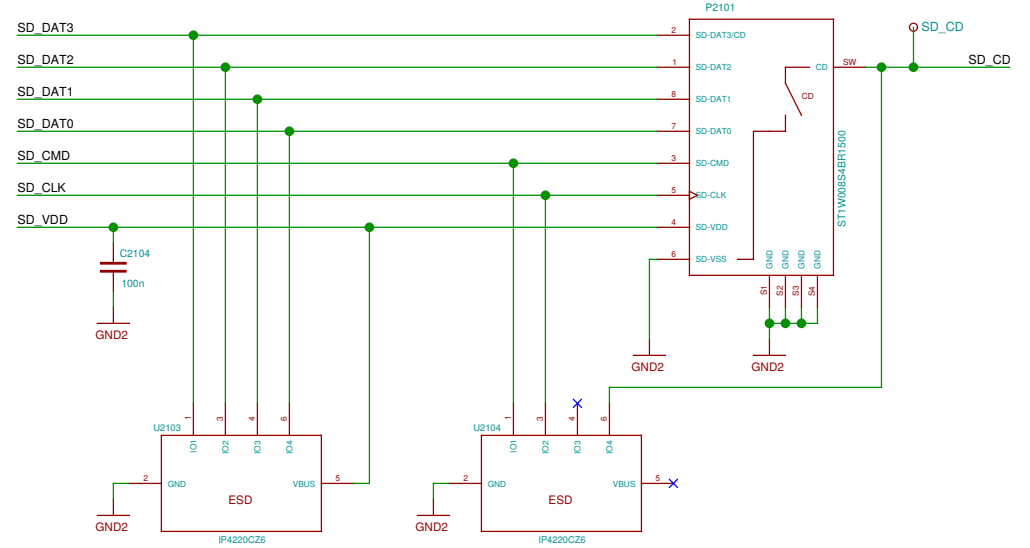
Camera Cover detect



Battery Cover detect

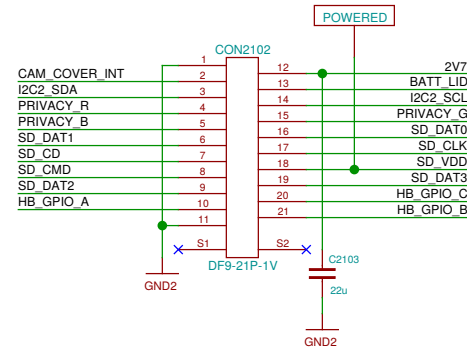
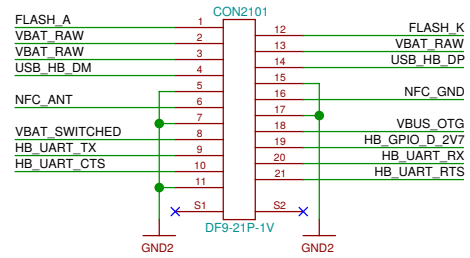


Memory card holder

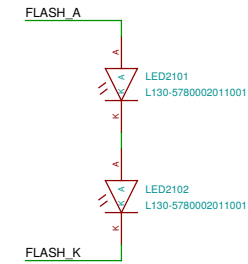


LOWER-BOB Interconnect (BOB side)

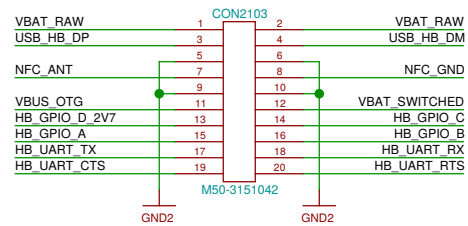
Defined in the Hackerbus specification, <http://neo900.org/stuff/papers/hb.pdf>



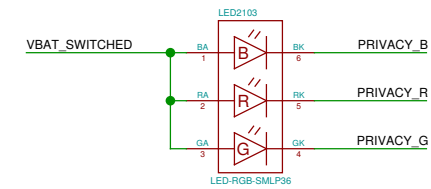
Camera flash



Hackerbus



Privacy LED



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

Title: uSD Breakout Board

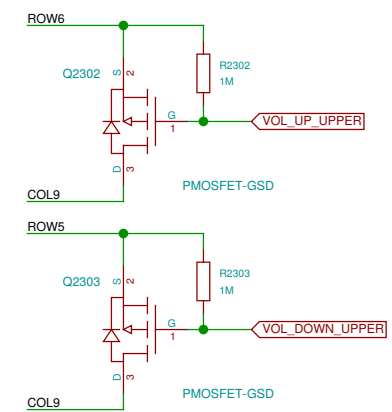
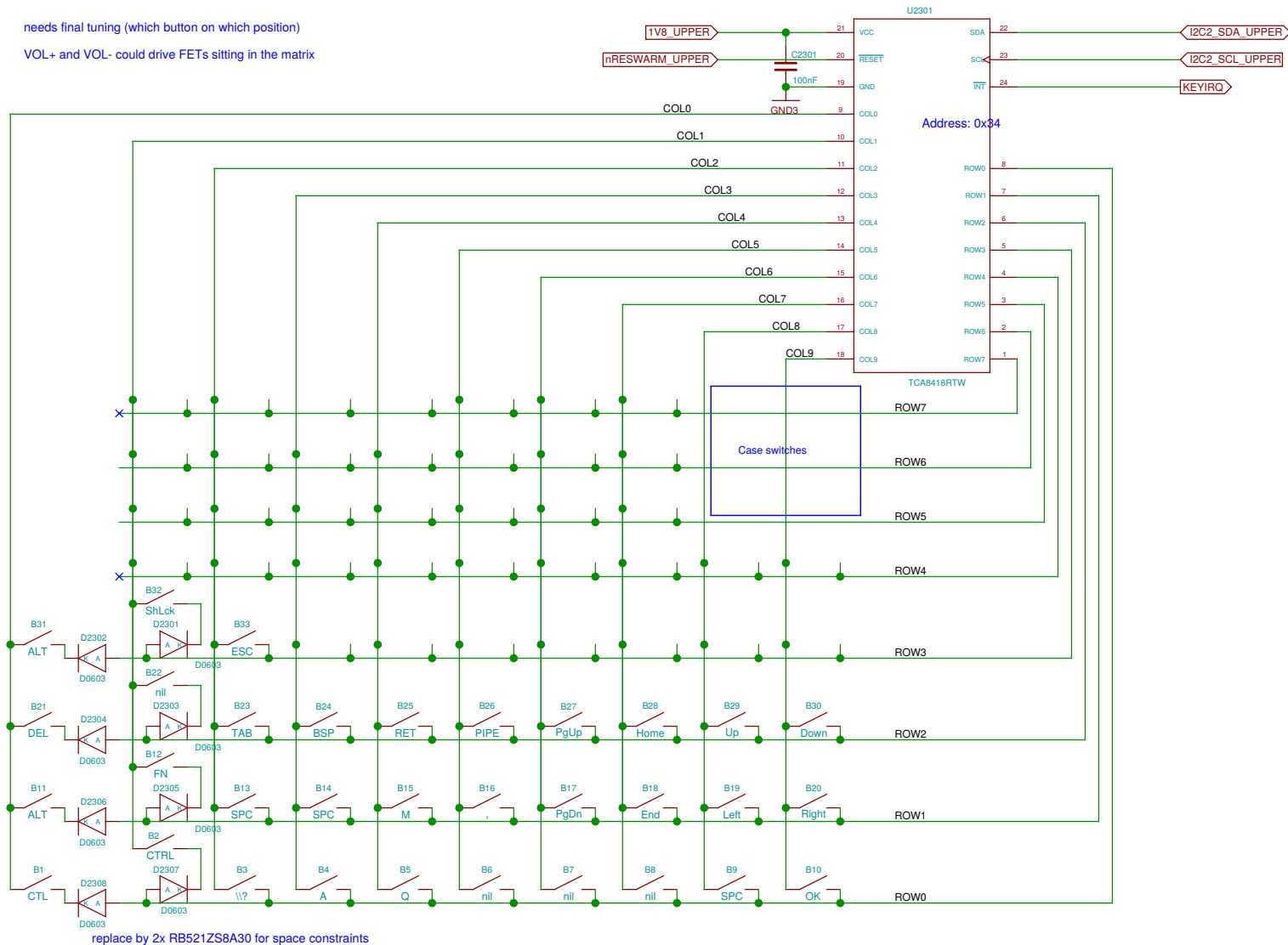
Size: A3 Date: 17 JUL 2016
Plotted by eeshow efbe6fa - 20161022-10:56Z

Rev:
Id: 21/37

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



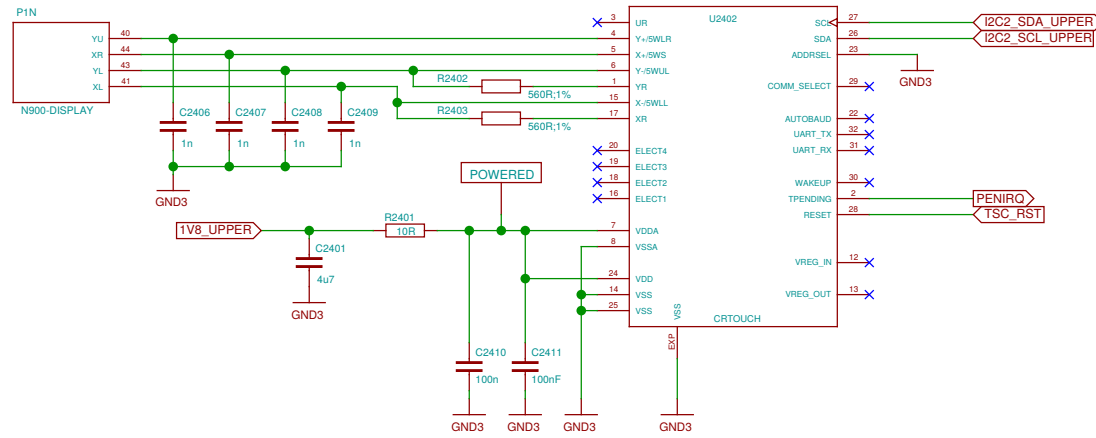
TODO: key names are nonsense

TODO: rearrange matrix to avoid diodes ?

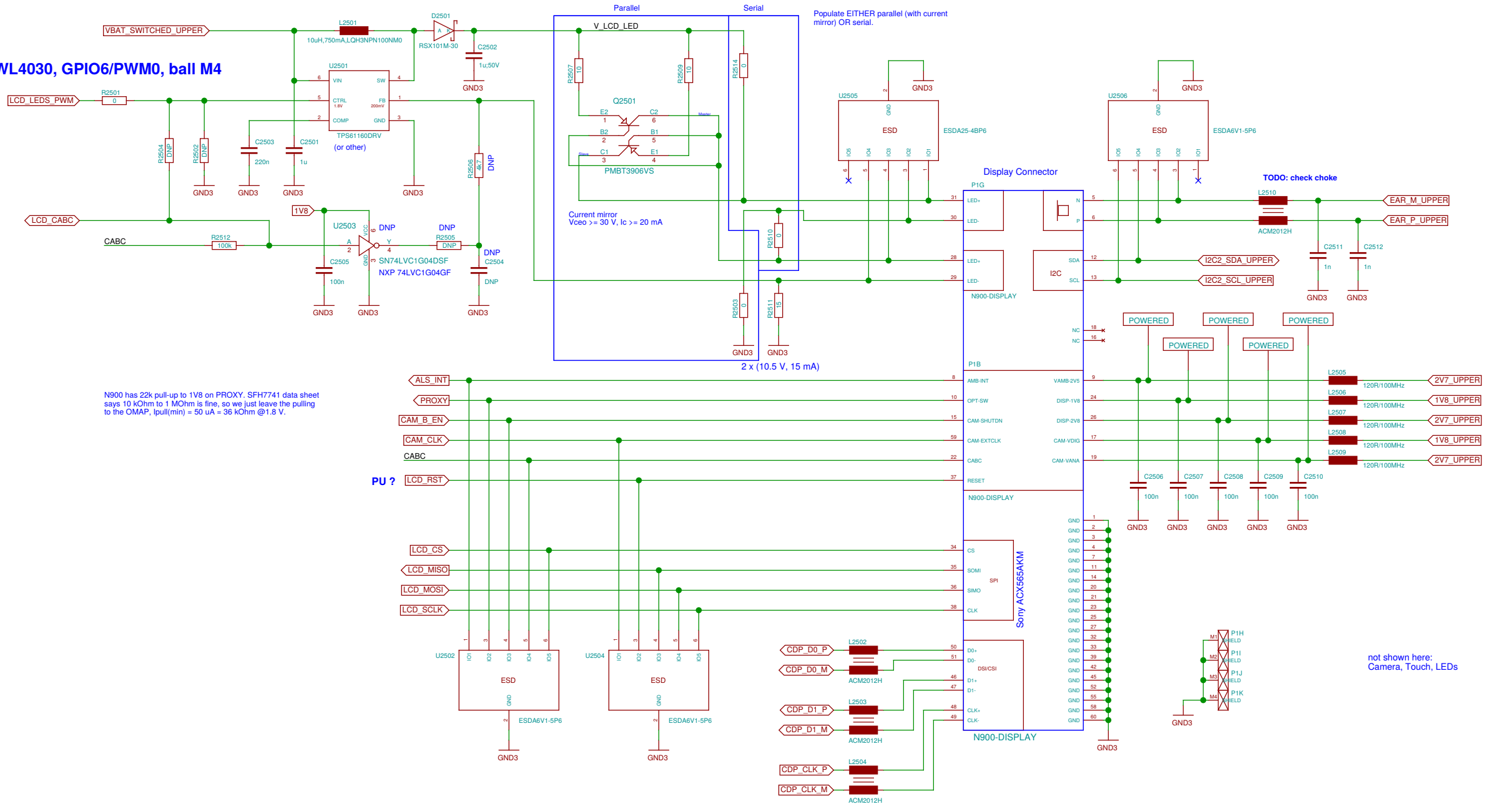
replace by 2x RB521ZS8A30 for space constraints

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.

PU ?

Populate EITHER parallel (with current mirror) OR serial.

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

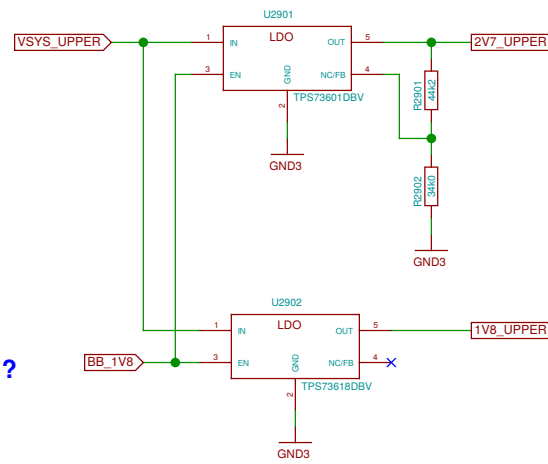
eMMC is not part of v2

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

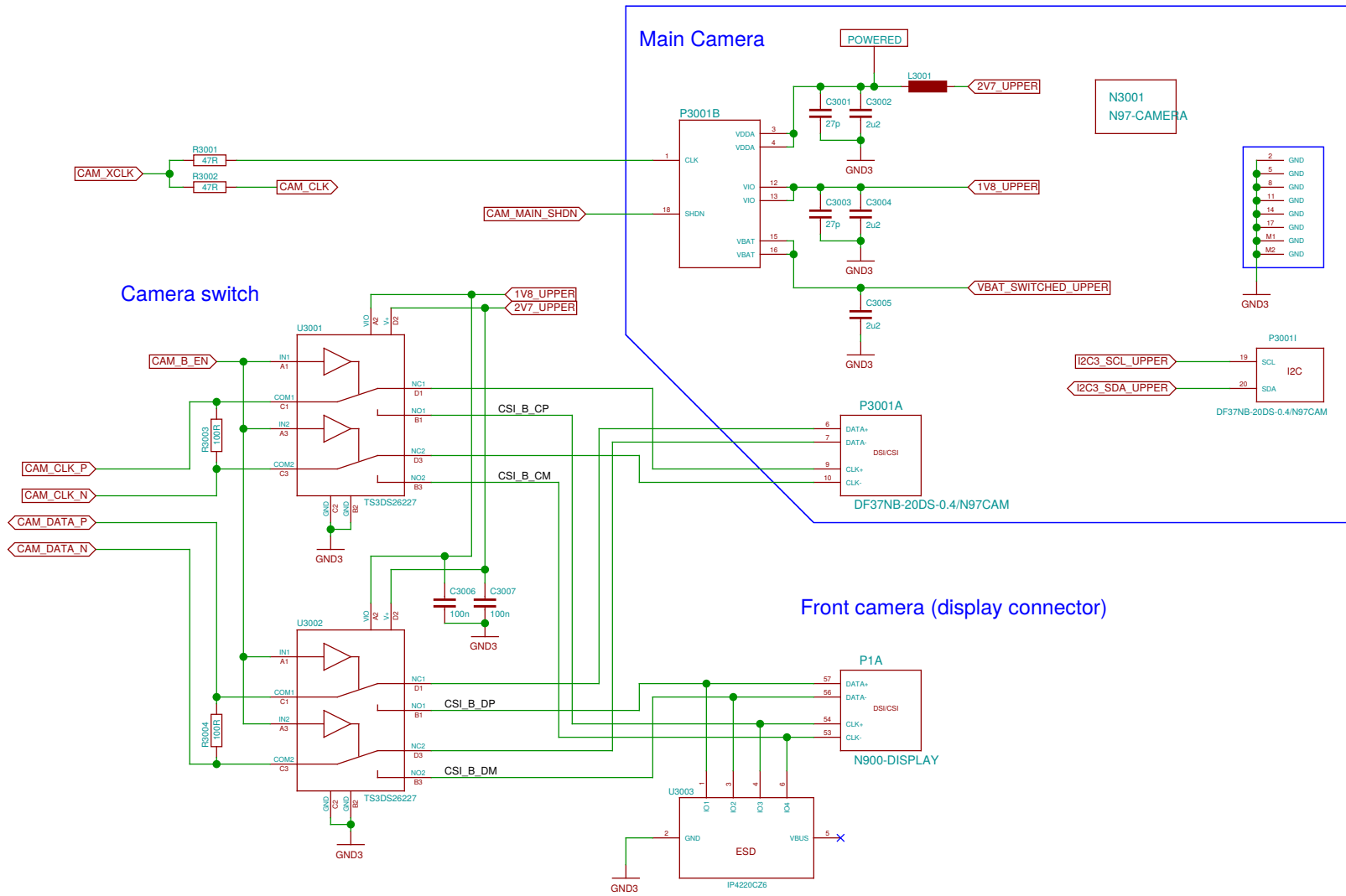
Sheet: /PMU+Codec/ File: neo900_SS_28.sch		
Title: PMU+Codec		
Size: A3	Date: 17 JUL 2016	Rev:
Plotted by eeshow efbe6fa+ 20161022-10:56Z		Id: 28/37

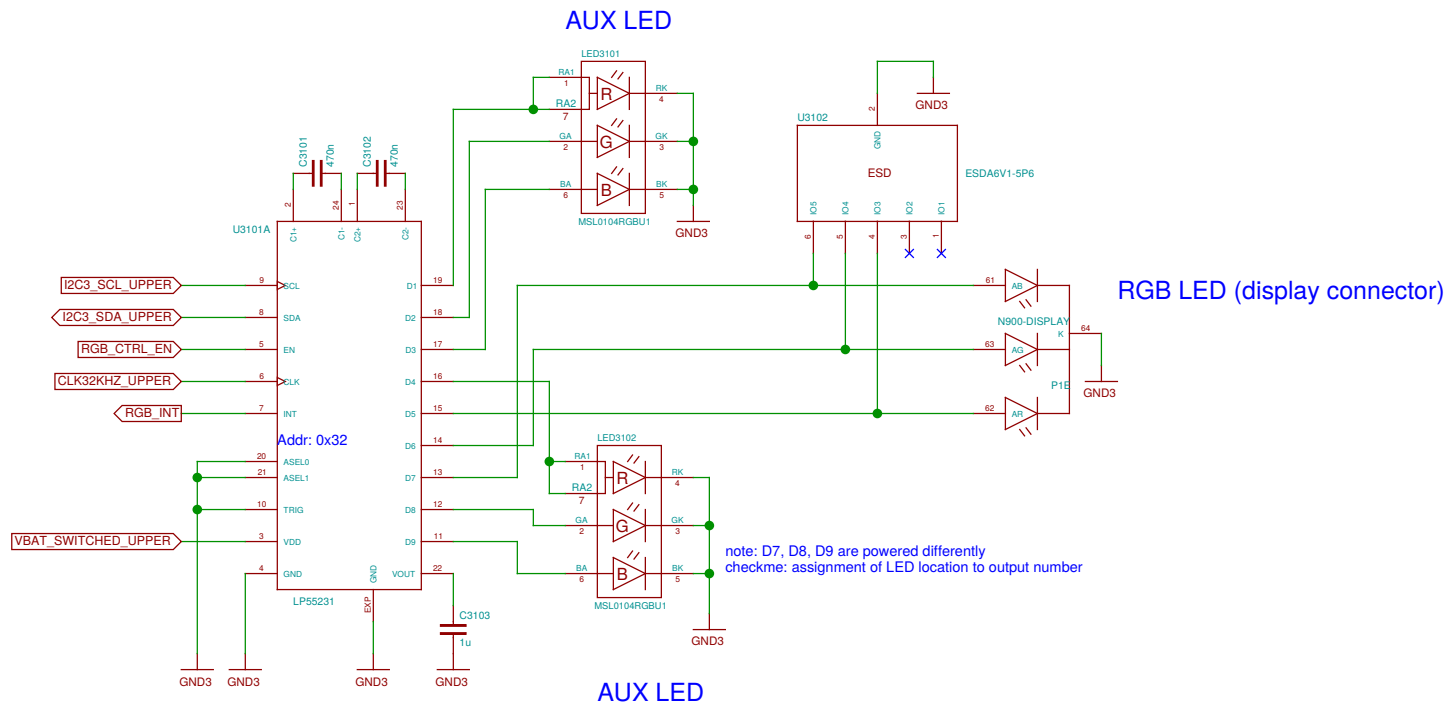
simple capless 400mA LDO for TPS65950 substitute
(only for prototype)



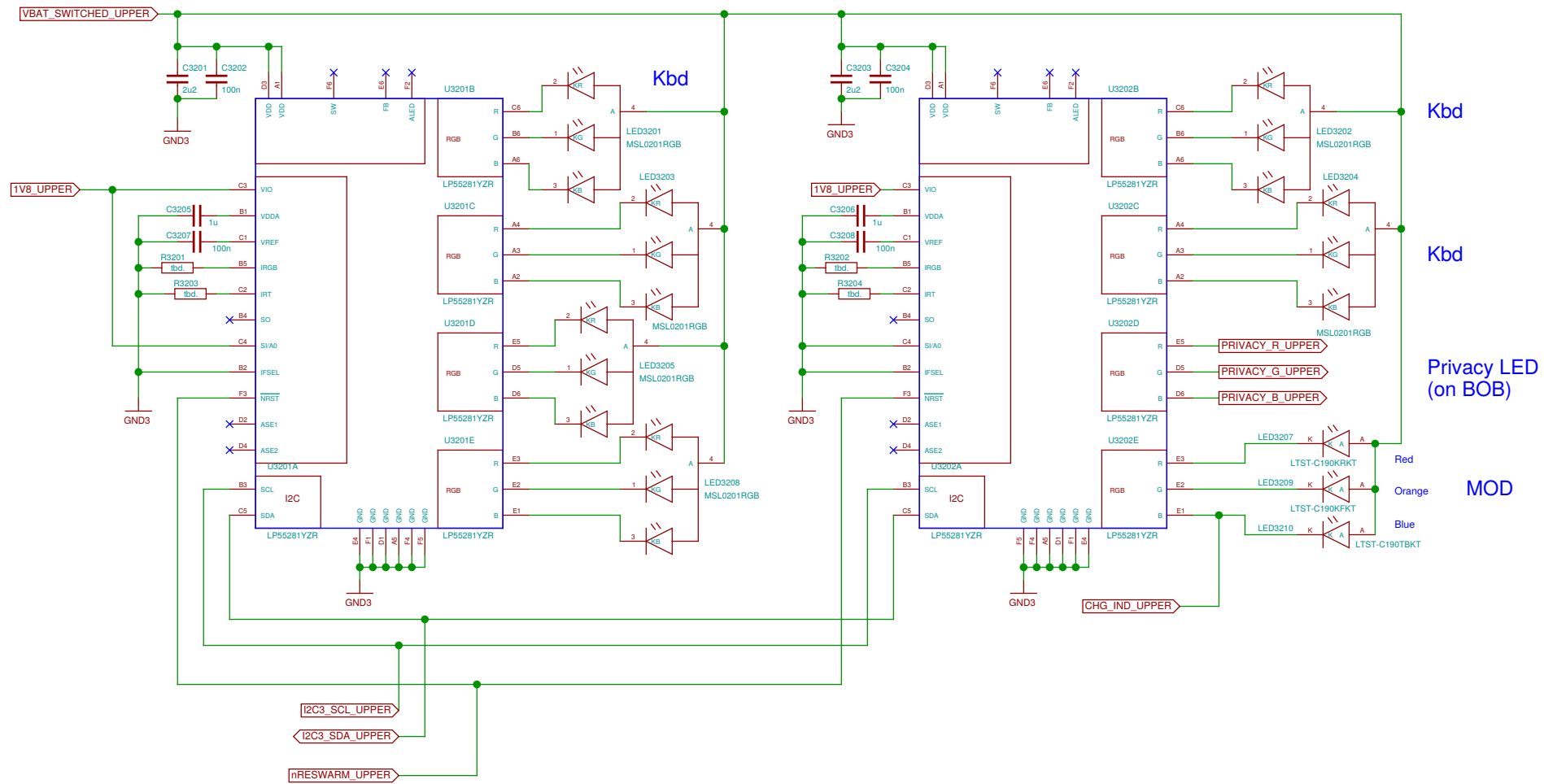
TODO: use REGEN ?

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





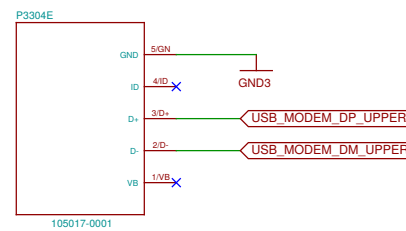
Sheet: /Fancy LEDs/		Date: 17 JUL 2016	
File: neo900_SS_31.sch		Rev:	
Title: Fancy LEDs			
Size: A3	Date: 17 JUL 2016		Rev:
Plotted by eeshow efbe6fa+ 20161022-10:56Z			Id: 31/37



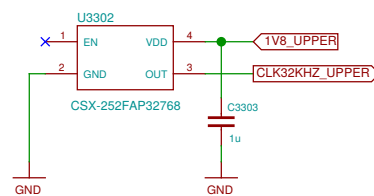
Cleaning up. The connections to BB-xM are on the next sheets.

connect to BB
by some Micro-USB cable

Modem USB



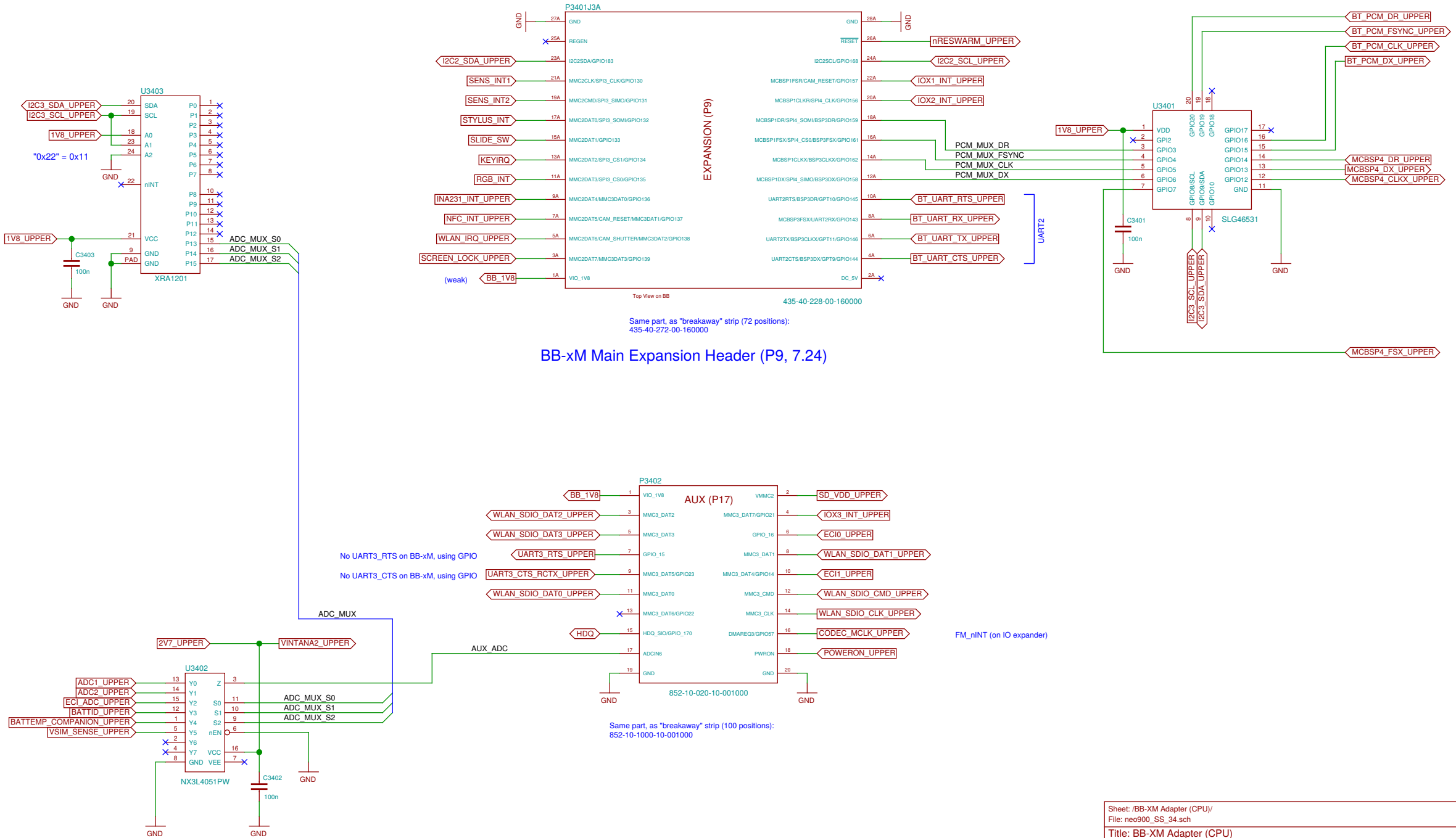
32 kHz clock



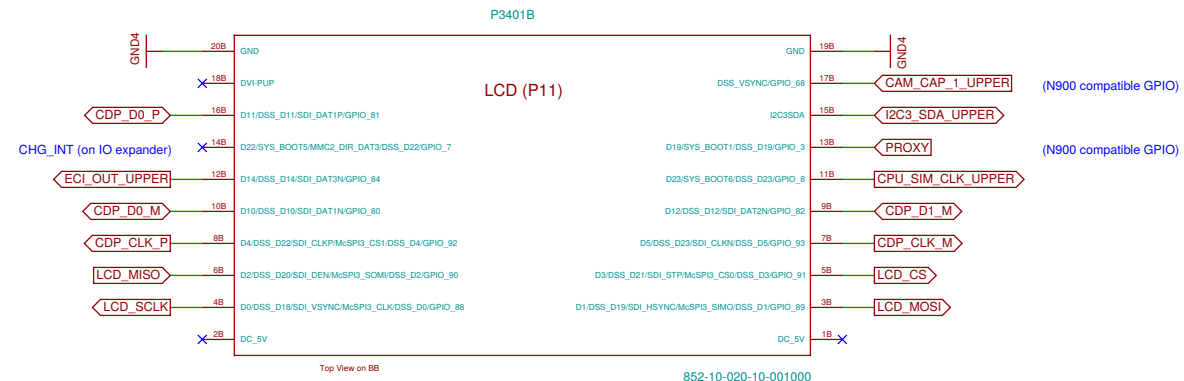
Alternative: OYKTGLJANF-0.032768

Sheet: /Connector to BB-XM/ File: neo900_SS_33.sch		
Title: Connector to BB-XM		
Size: A3	Date: 17 JUL 2016	Rev:
Plotted by eeshow efbe6fa+ 20161022-10:56Z		
Id: 33/37		

TODO: update pin names in footprint

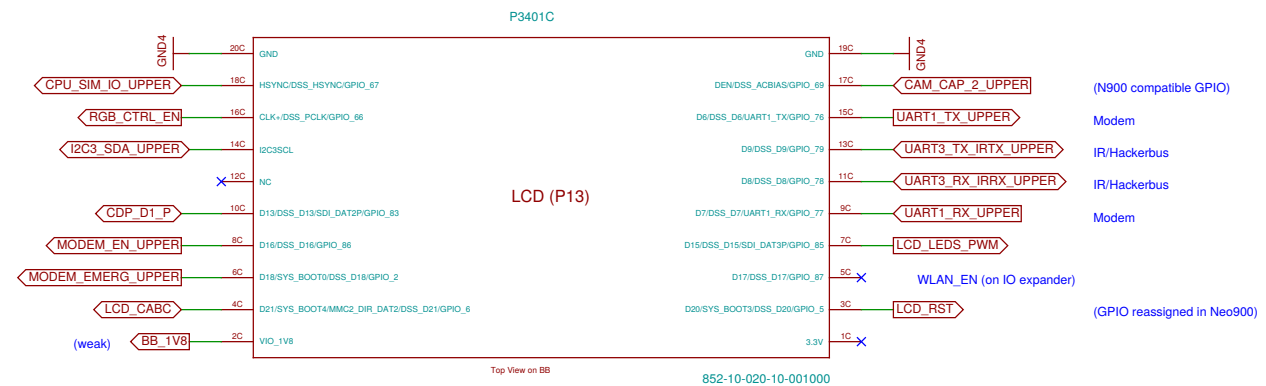


P11 (7.25)



852-10-020-10-001000
Same part, as "breakaway" strip (100 positions):
852-10-1000-10-001000

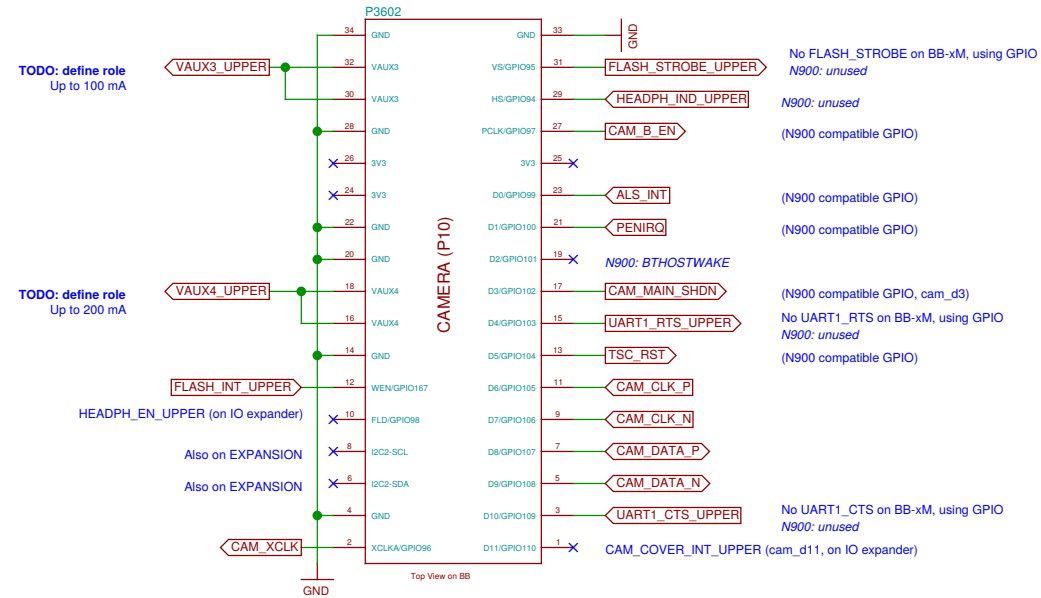
P13 (7.25)



852-10-020-10-001000
Same part, as "breakaway" strip (100 positions):
852-10-1000-10-001000

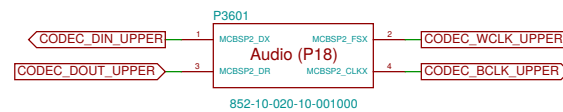
TODO: update pin names in footprint

Processor Camera Port Interface (P10, 7.20.3)



TODO: update pin names in footprint

TODO: define structure of interconnect and select part



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