

Click | Here

This sheet: index

Sheet: OTG

File: neo900_SS_2.sch

Sheet: Charger/OTG-Booster

File: neo900_SS_3.sch

Sheet: Modem Power

File: neo900_SS_4.sch

Sheet: Fuel Gauge

File: neo900_SS_5.sch

Sheet: 3G/4G Modem + SIM

File: neo900_SS_6.sch

Sheet: Dual SIM switch

File: neo900_SS_7.sch

Sheet: Antenna connections

File: neo900_SS_8.sch

Sheet: WLAN, Bluetooth, FM

File: neo900_SS_9.sch

Sheet: Sensors

File: neo900_SS_10.sch

Sheet: Audio Codec

File: neo900_SS_11.sch

Sheet: Audio Headset + Mic

File: neo900_SS_12.sch

Sheet: ECI

File: neo900_SS_13.sch

Sheet: Audio Handsfree

File: neo900_SS_14.sch

Sheet: Misc

File: neo900_SS_15.sch

Sheet: RFID/NFC Reader

File: neo900_SS_16.sch

Sheet: RFID/NFC Controller

File: neo900_SS_17.sch

Sheet: Hackerbus

File: neo900_SS_18.sch

Sheet: Infrared

File: neo900_SS_19.sch

Sheet: B2B LOWER-UPPER

File: neo900_SS_20.sch

Sheet: uSD Breakout Board

File: neo900_SS_21.sch

Sheet: empty

File: neo900_SS_22.sch

Sheet: Keypad

File: neo900_SS_23.sch

Sheet: Display-Peripherals

File: neo900_SS_24.sch

Sheet: Display-Panel&Power

File: neo900_SS_25.sch

Click | Here

Sheet: CPU + PoP RAM/NAND

File: neo900_SS_26.sch

Sheet: eMMC

File: neo900_SS_27.sch

Sheet: PMU+Codec

File: neo900_SS_28.sch

Sheet: BB-XM Dummy (TWL4030)

File: neo900_SS_29.sch

Sheet: Camera

File: neo900_SS_30.sch

Sheet: Fancy LEDs

File: neo900_SS_31.sch

Sheet: Basic LEDs

File: neo900_SS_32.sch

Sheet: Connector to BB-XM

File: neo900_SS_33.sch

Sheet: BB-XM Adapter (CPU)

File: neo900_SS_34.sch

Sheet: BB-XM Adapter (DISP)

File: neo900_SS_35.sch

Sheet: BB-XM Adapter (CAM)

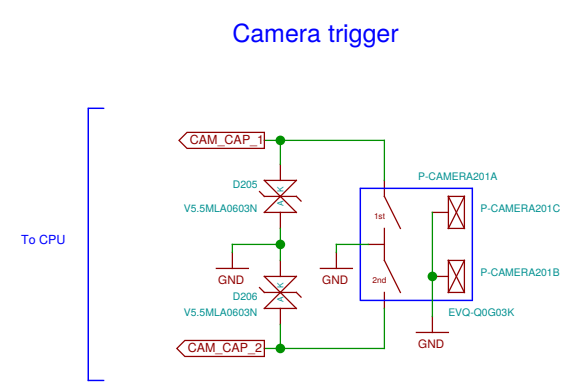
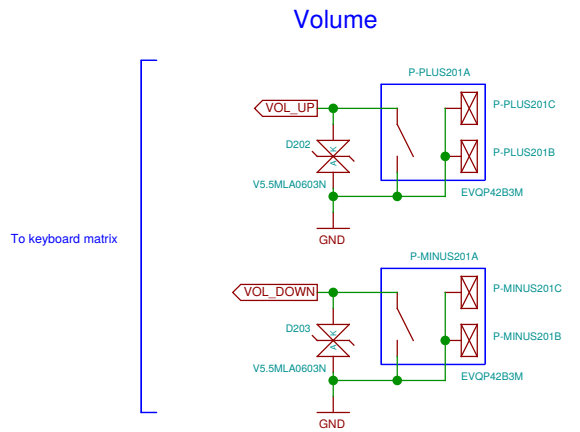
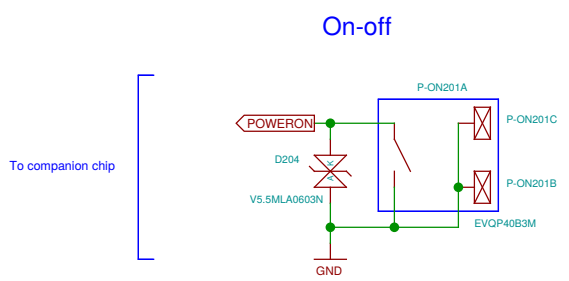
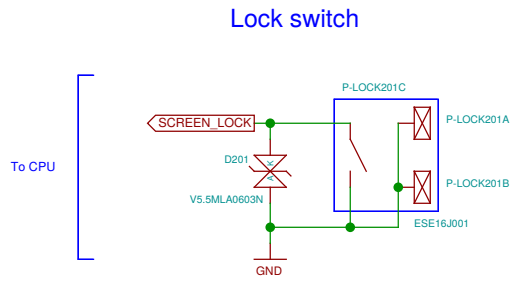
File: neo900_SS_36.sch

Sheet: No-Solder Components

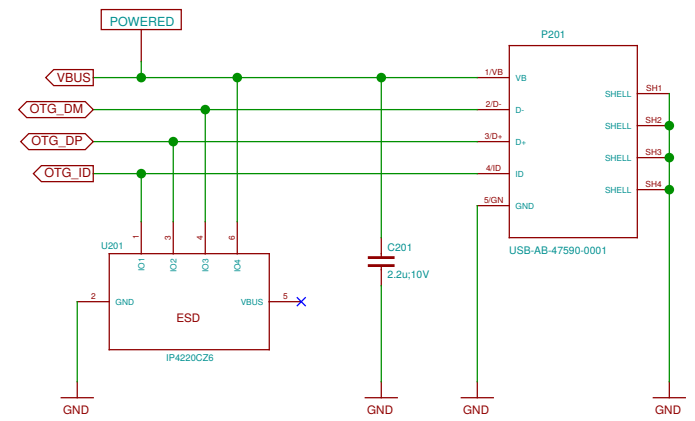
File: neo900_SS_37.sch

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

Sheet: /		
File: neo900.sch		
Title: Neo900		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		
Id: 1/37		

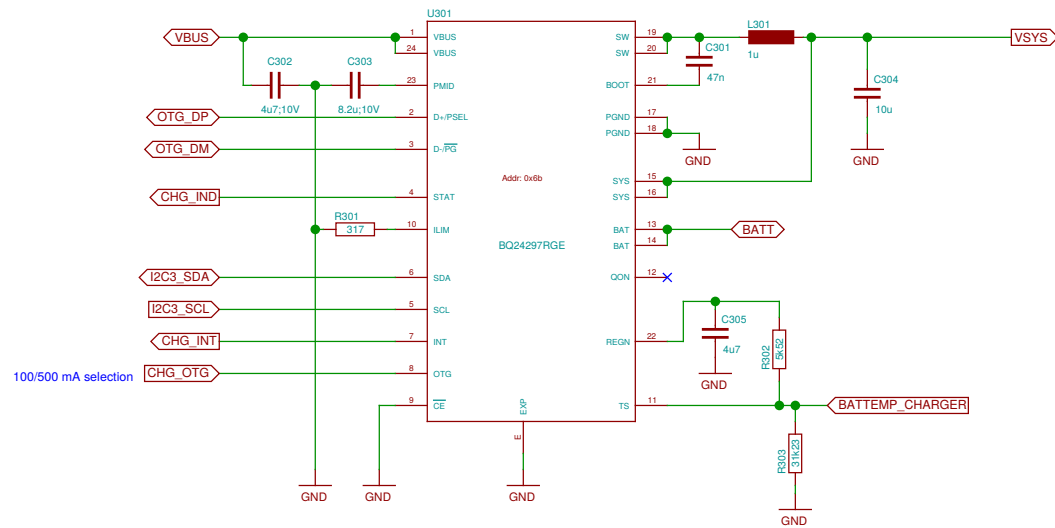


USB OTG connector



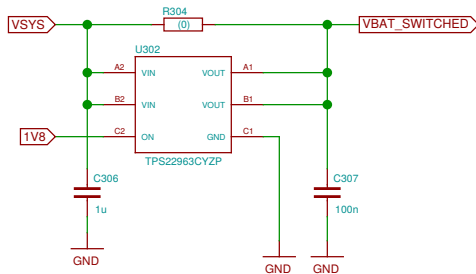
Sheet: /OTG/ File: neo900_SS_2.sch		
Title: OTG		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 2/37

Battery charger with USB OTG

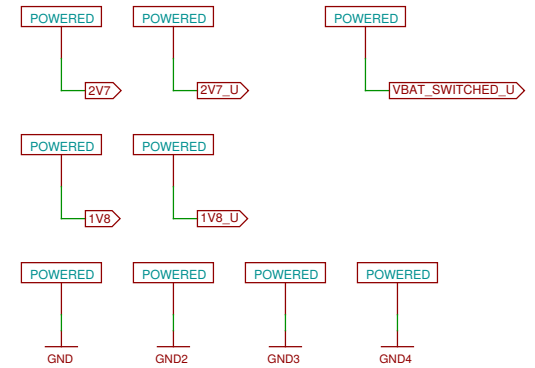


Power distribution and sequencing

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

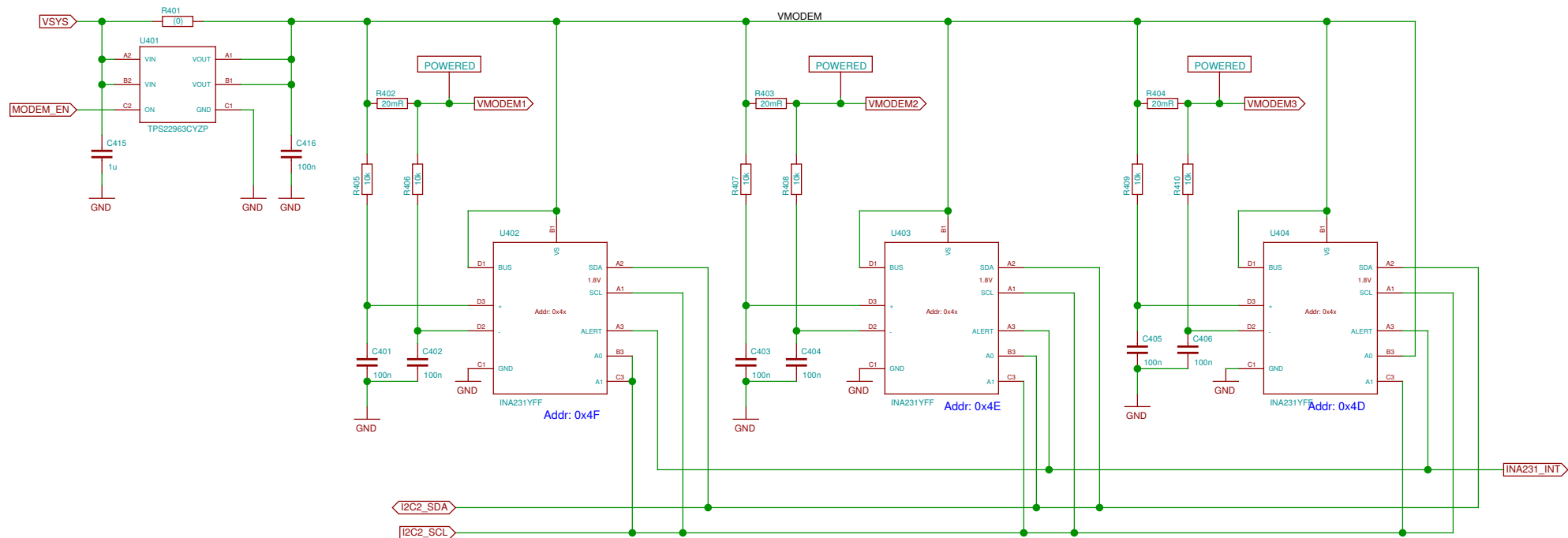


KiCad bureaucracy

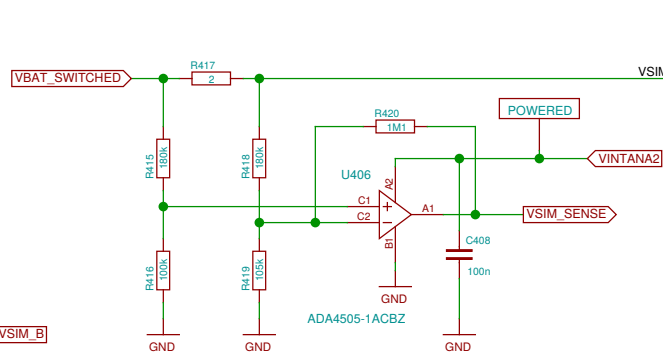


Sheet: /Charger/OTG-Booster/		
File: neo900_SS_3.sch		
Title: Charger/OTG-Booster		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 3/37

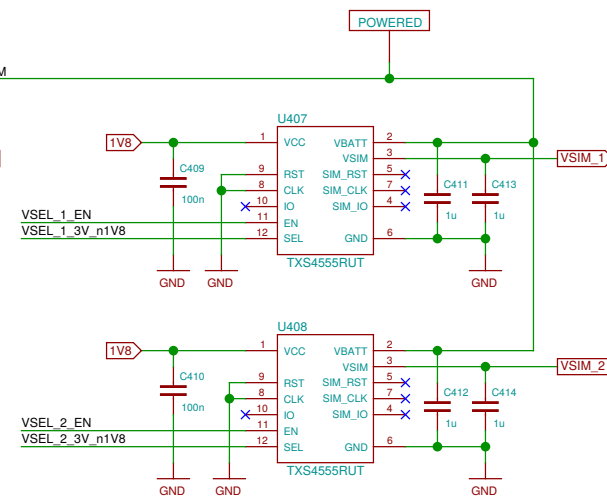
Modem current monitor



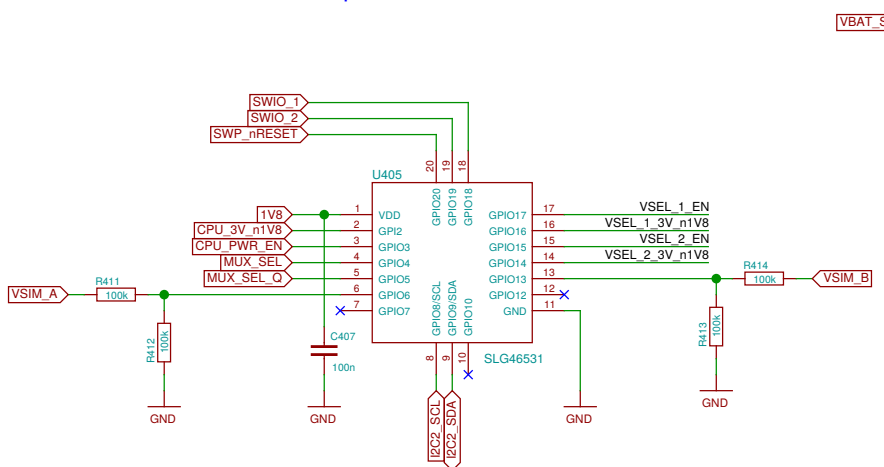
SIM current sensing



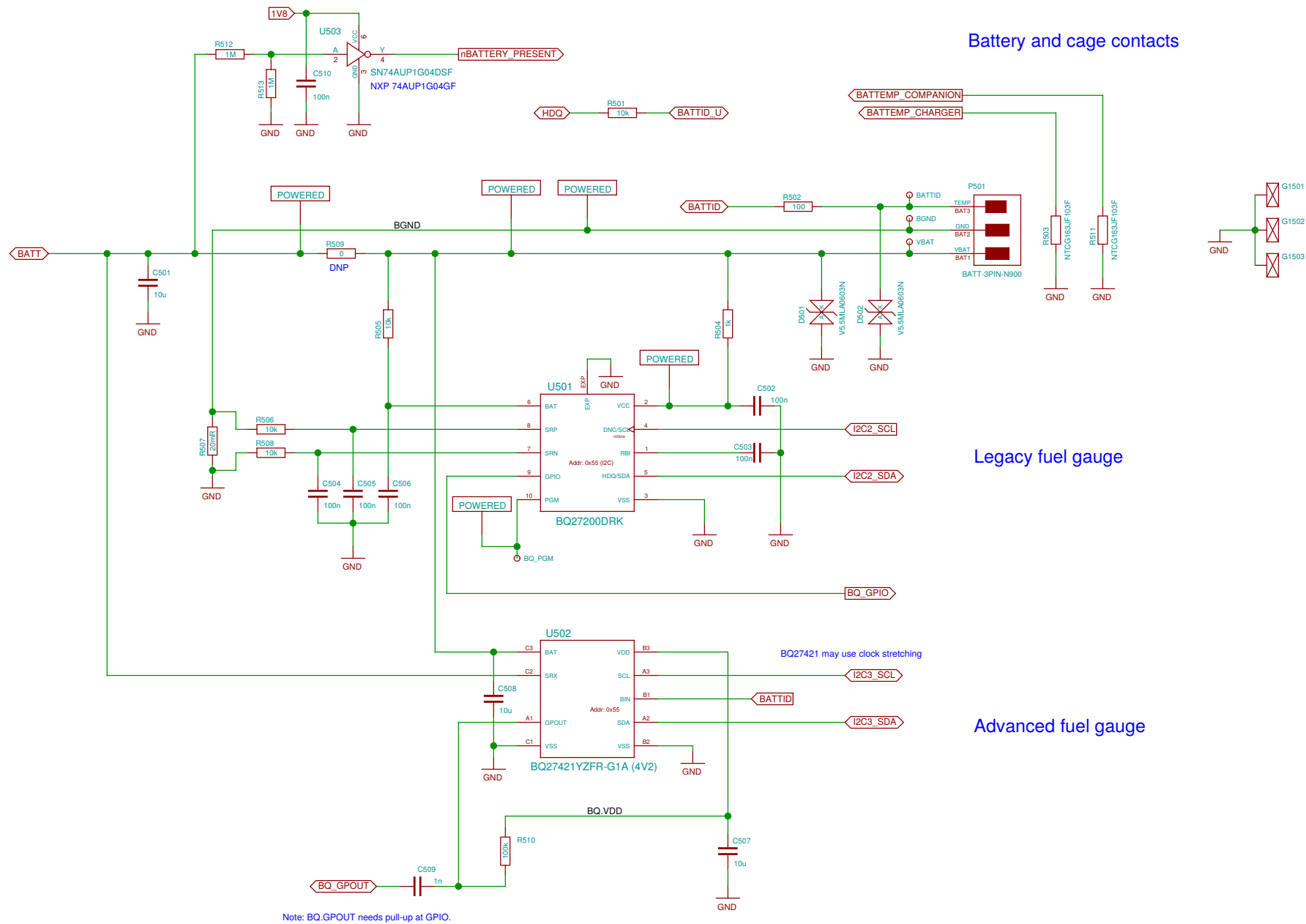
SIM power supply



SIM power selection



TODO: update SLG design for changed pins



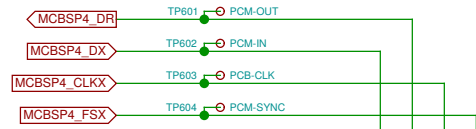
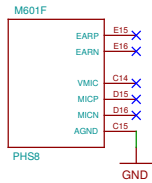
Battery and cage contacts

Legacy fuel gauge

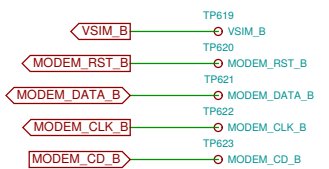
Advanced fuel gauge

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

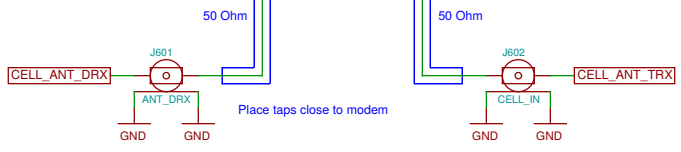
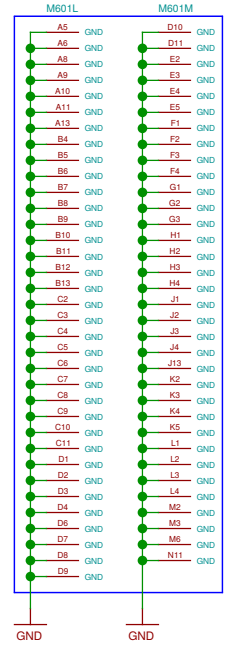
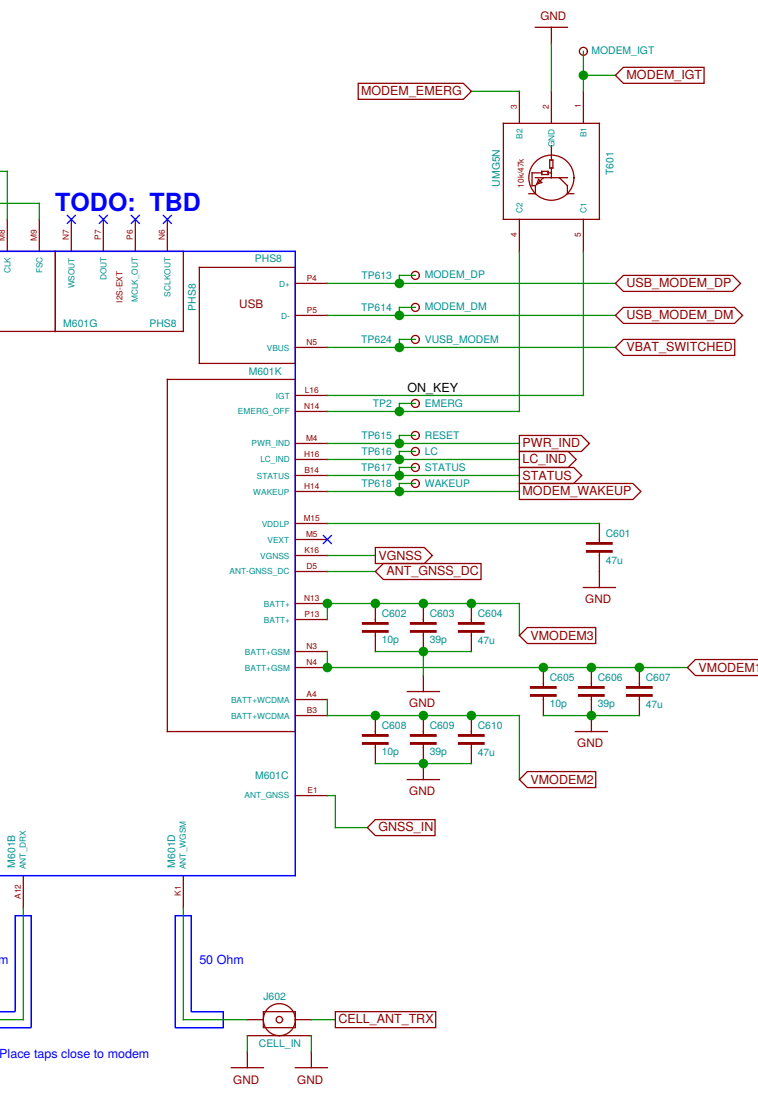
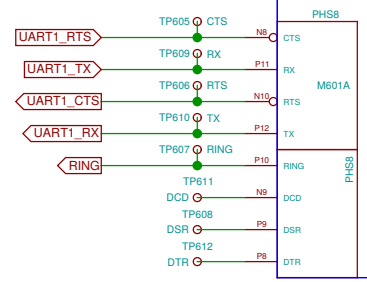
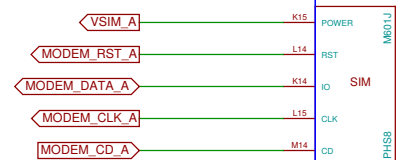
Sheet: /Fuel Gauge/		
File: neo900_SS_5.sch		
Title: Fuel Gauge		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 5/37



TODO: TBD



TODO: B-SIM bus FFS

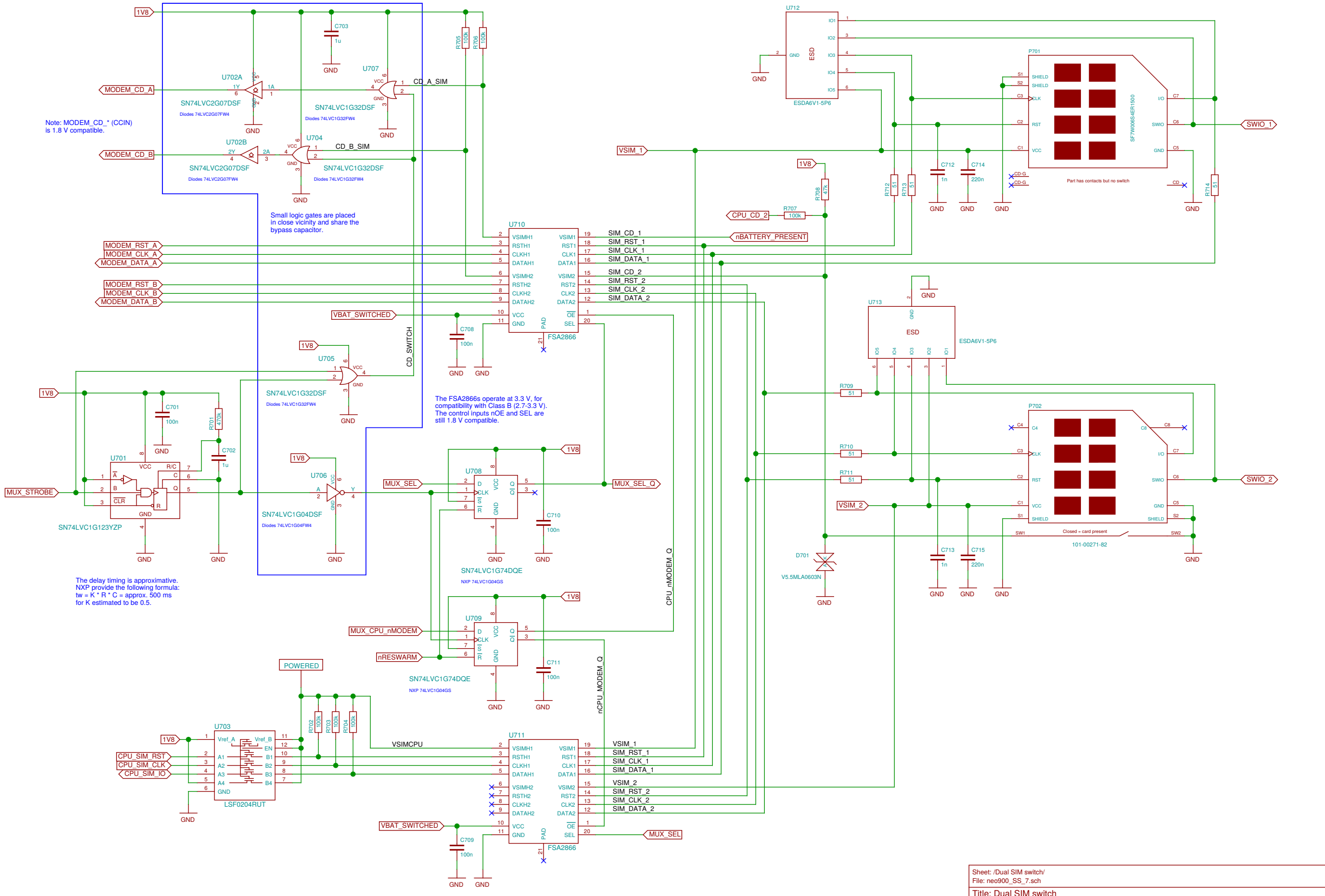


Note: MODEM_CD_* (CCIN) is 1.8 V compatible.

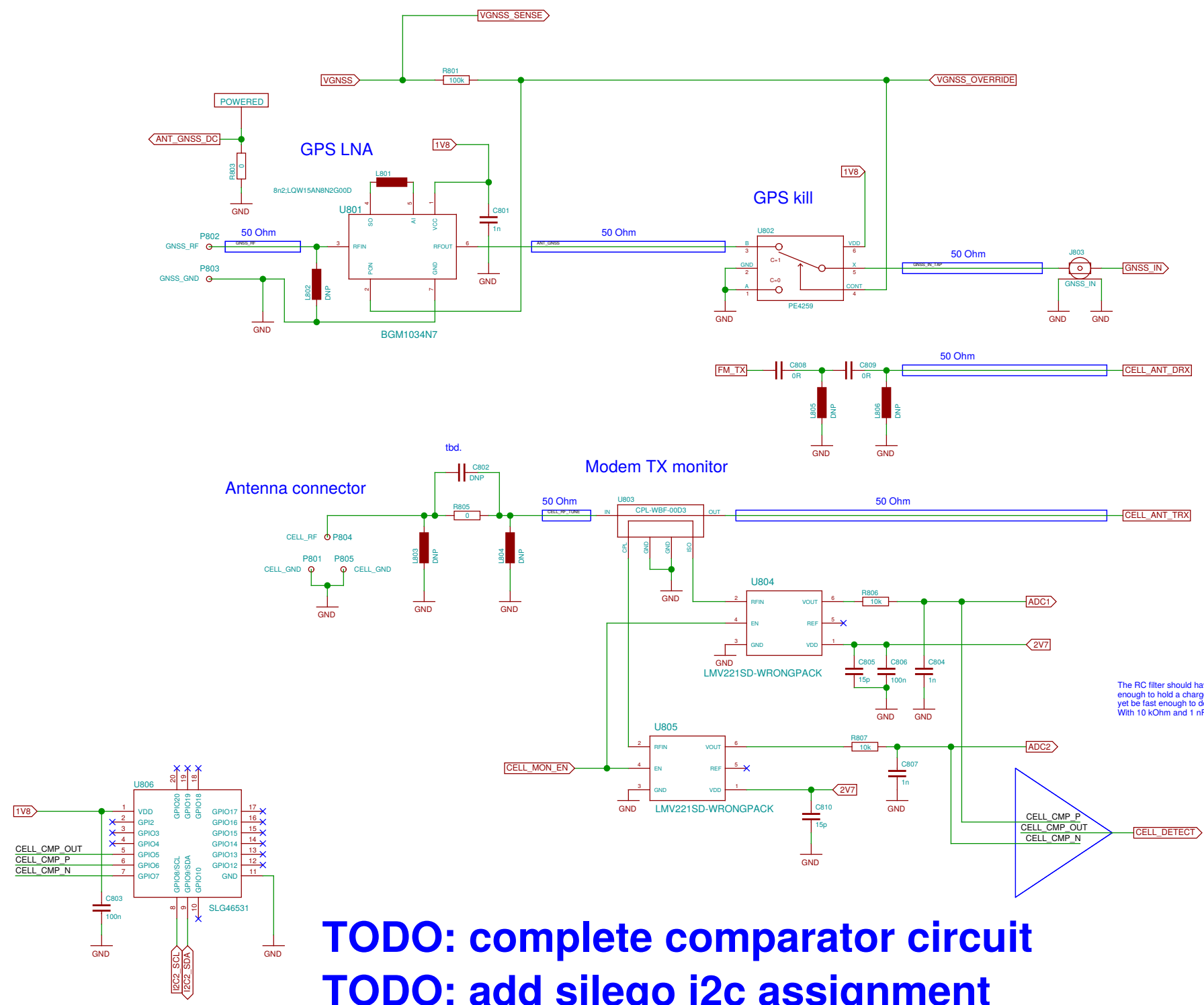
Small logic gates are placed in close vicinity and share the bypass capacitor.

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: 2016-10-28 21:16:24	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 7/37

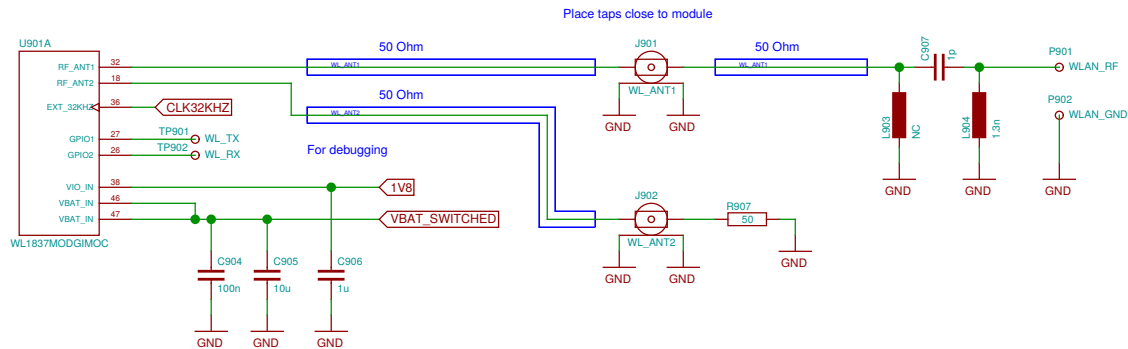


TODO: complete comparator circuit
TODO: add silego i2c assignment

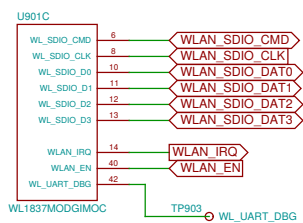
Sheet: /Antenna connections/ File: neo900_SS_8.sch		
Title: Antenna connections		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 8/37

TODO: assign footprints for c-spring contacts

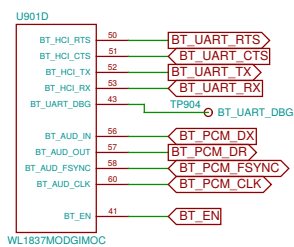
WLAN/BT antenna



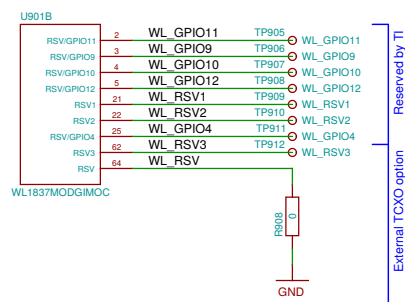
WLAN



Bluetooth

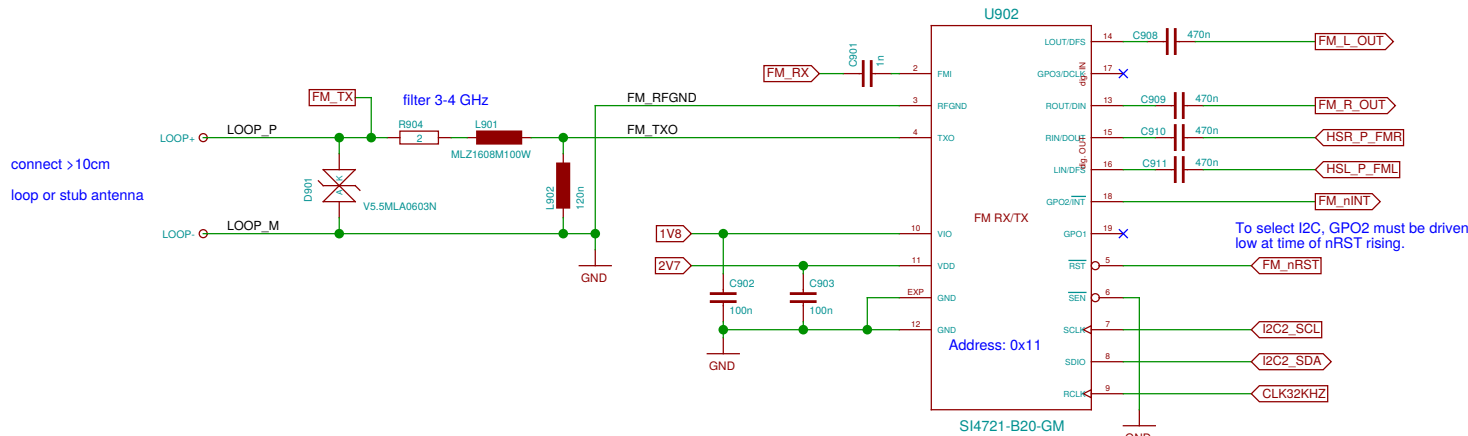


Reserved / Debugging



FM Radio (TX/RX)

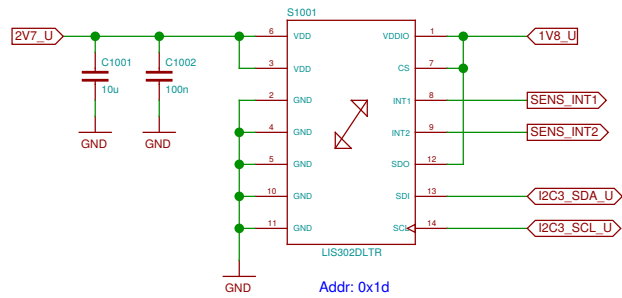
TODO: check caps



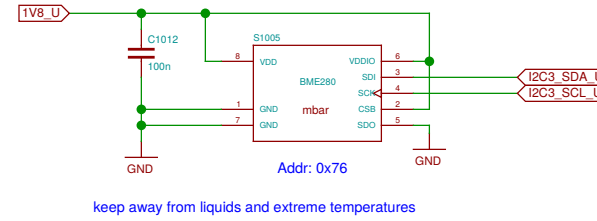
SI4705 is pin compatible (mostly) but RX-only

Sheet: /WLAN, Bluetooth, FM/		
File: neo900_SS_9.sch		
Title: WLAN, Bluetooth, FM		
Size: A3	Date: 2016-10-28 23:06:03	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 9/37

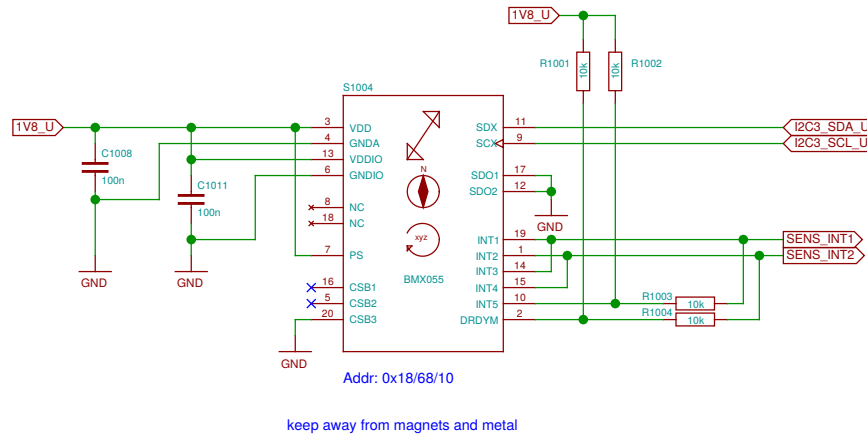
Acceleration (legacy)



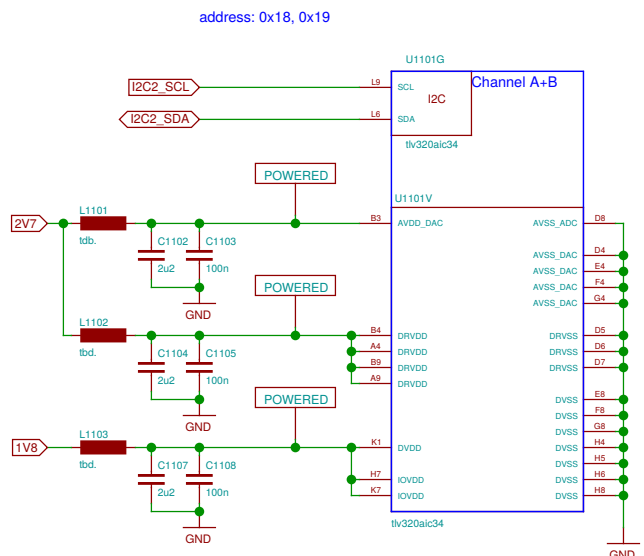
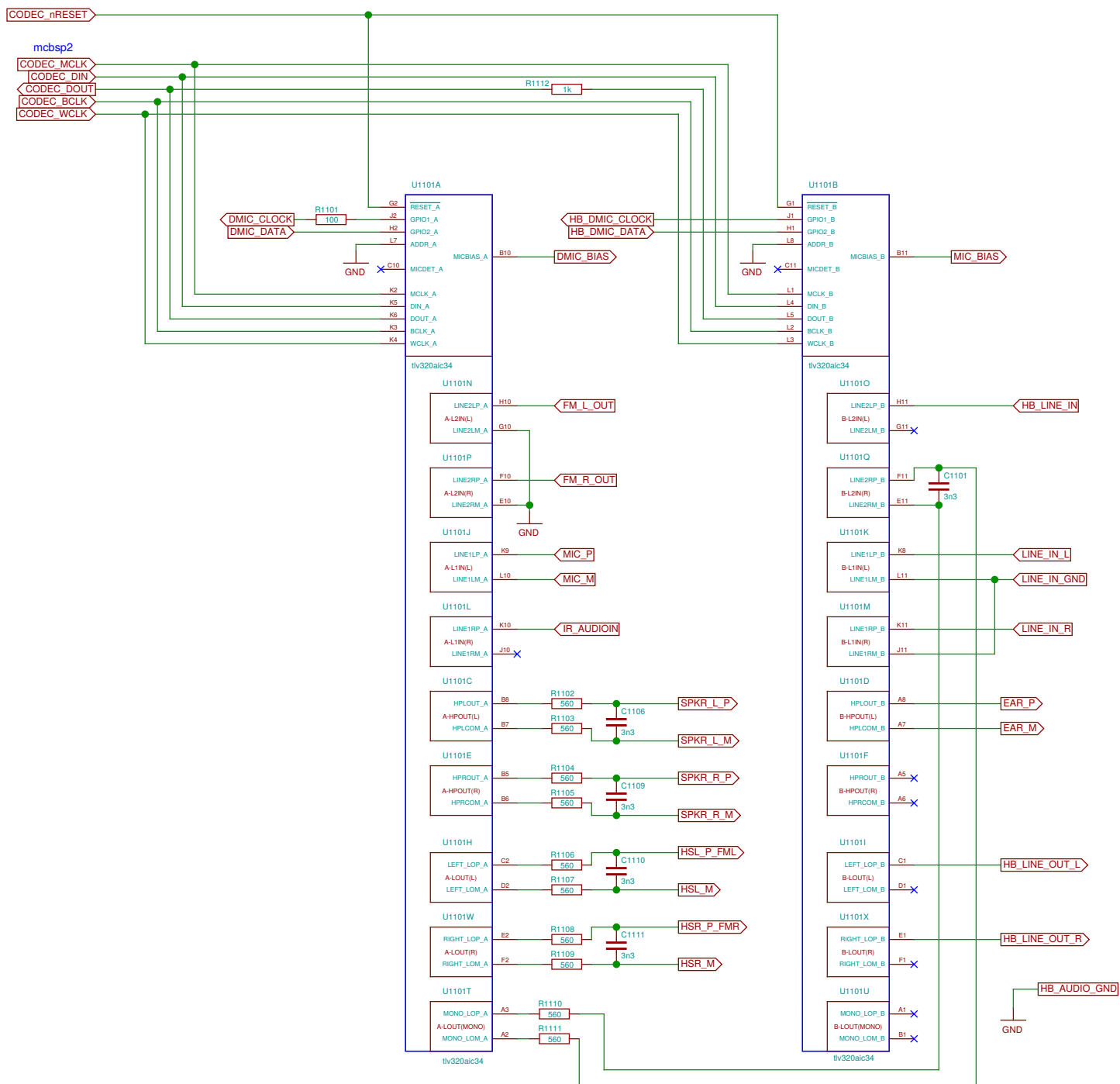
Pressure, humidity



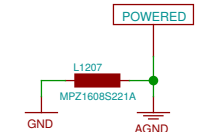
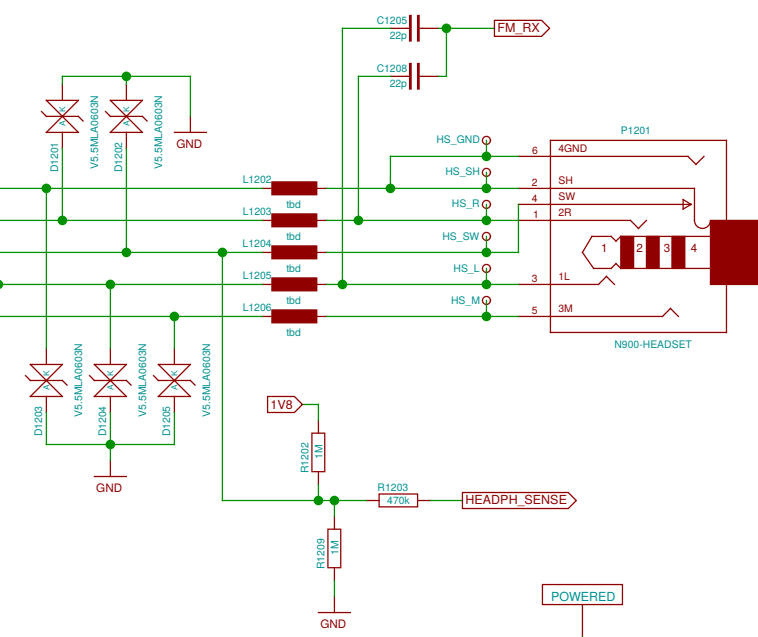
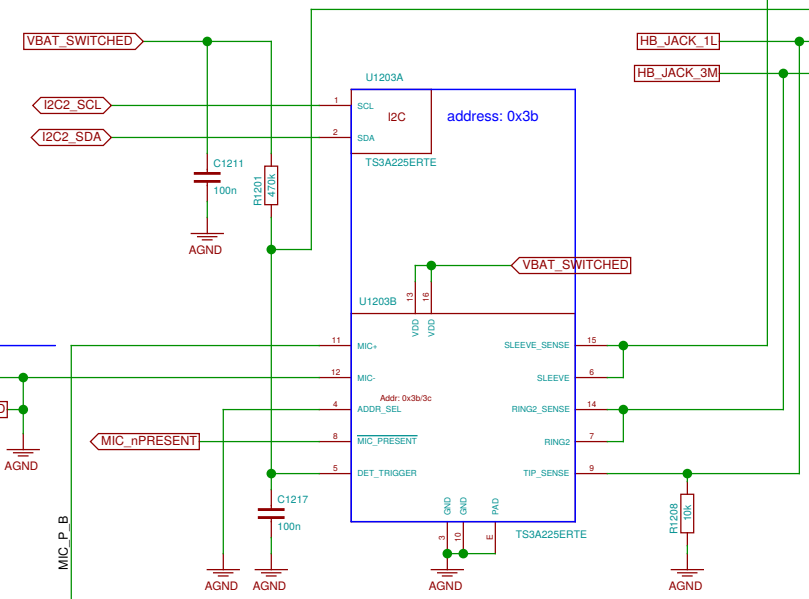
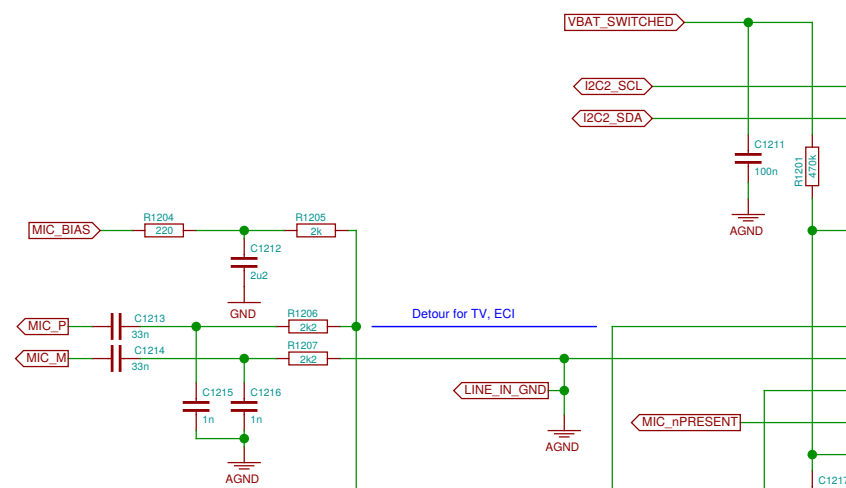
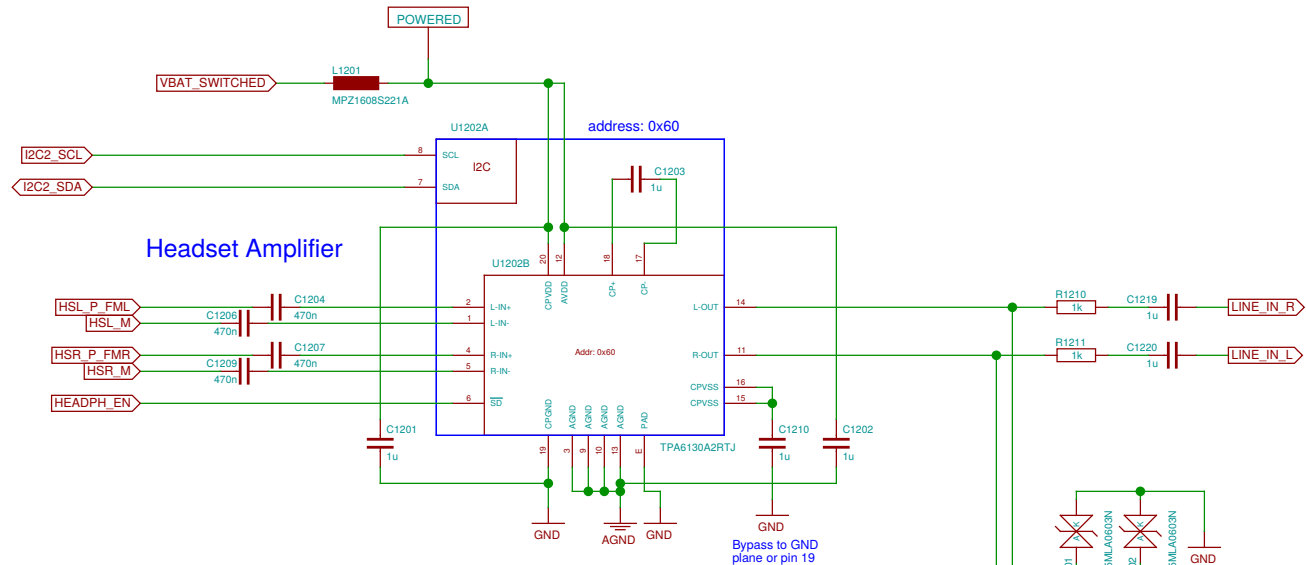
9-axis (acceleration, gyroscope, magnetometer)



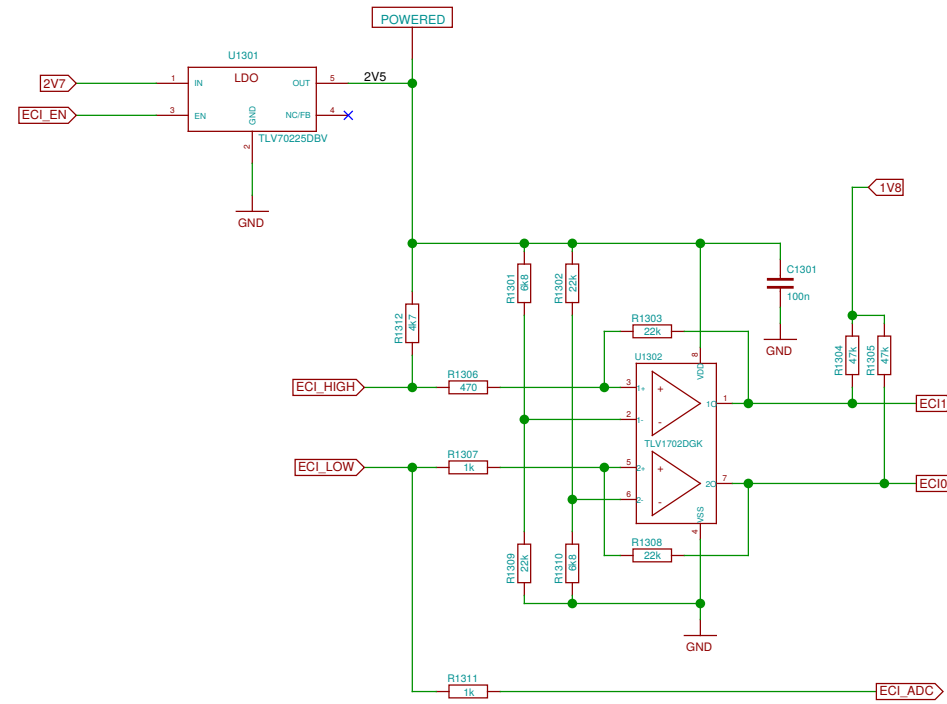
Sheet: /Sensors/		
File: neo900_SS_10.sch		
Title: Sensors		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 10/37



Sheet: /Audio Codec/		
File: neo900_SS_11.sch		
Title: Audio Codec		
Size: A3	Date: 2016-10-30 17:08:14	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 11/37

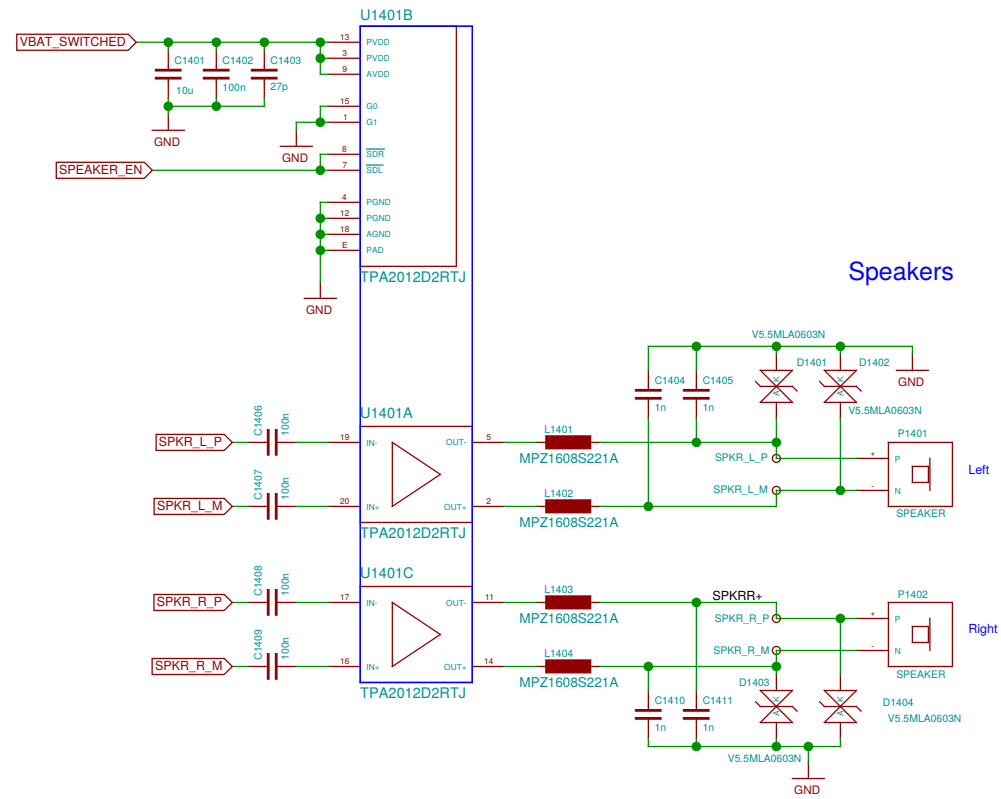


Sheet: /Audio Headset + Mic/		
File: neo900_SS_12.sch		
Title: Audio Headset + Mic		
Size: A3	Date: 2016-10-30 17:08:14	Rev:
Plotted by eeshow 96ef3e0+		20161030-17:20Z
Id: 12/37		

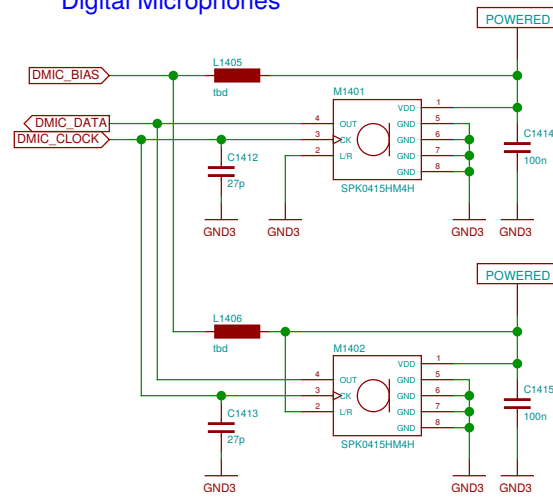


Sheet: /ECI/		
File: neo900_SS_13.sch		
Title: ECI		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 13/37

Hands-free



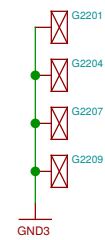
Digital Microphones



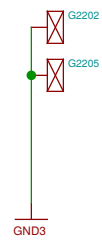
Sheet: /Audio Handsfree/		
File: neo900_SS_14.sch		
Title: Audio Handsfree		
Size: A3	Date: 2016-10-28 23:06:03	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 14/37

Shield Contacts on UPPER

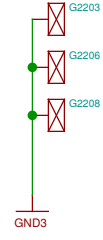
For the display



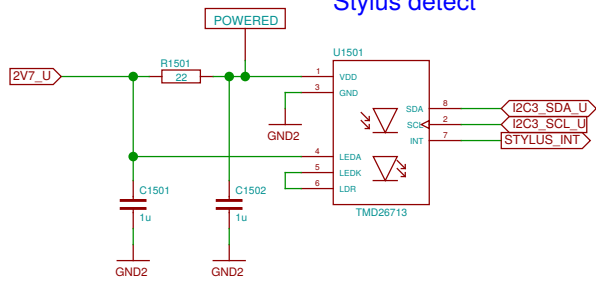
For the key mat



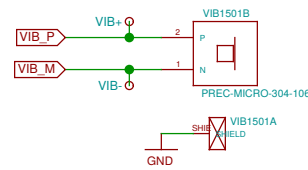
For the "key frame hook"



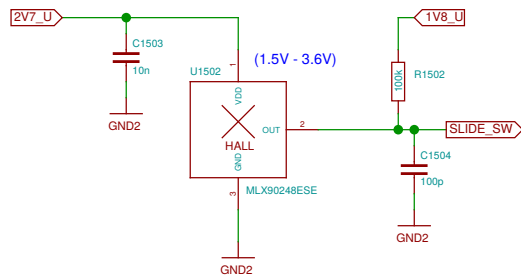
Stylus detect



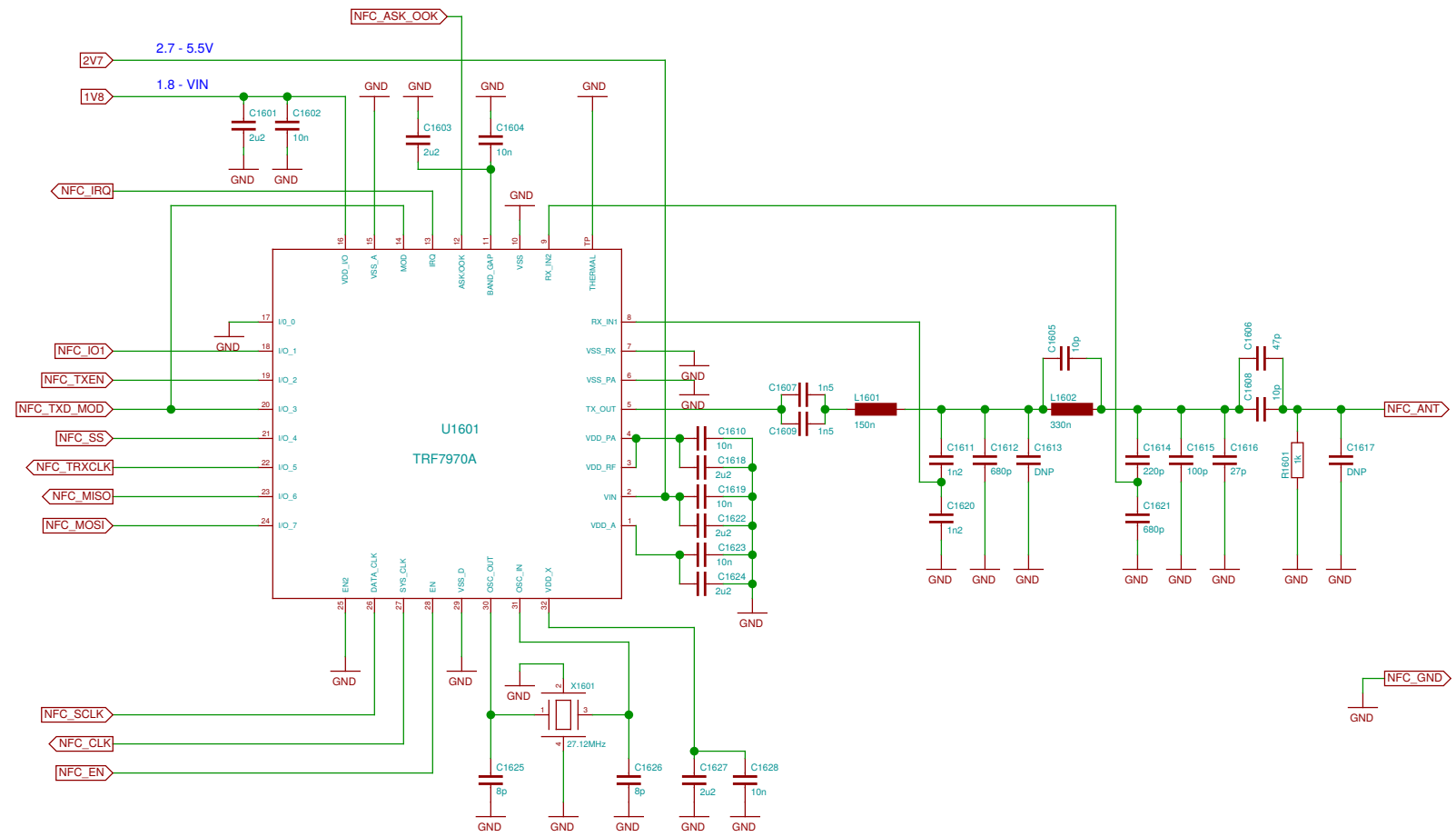
Vibramotor



Slide sensor

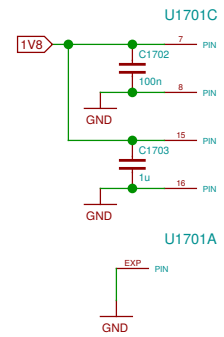
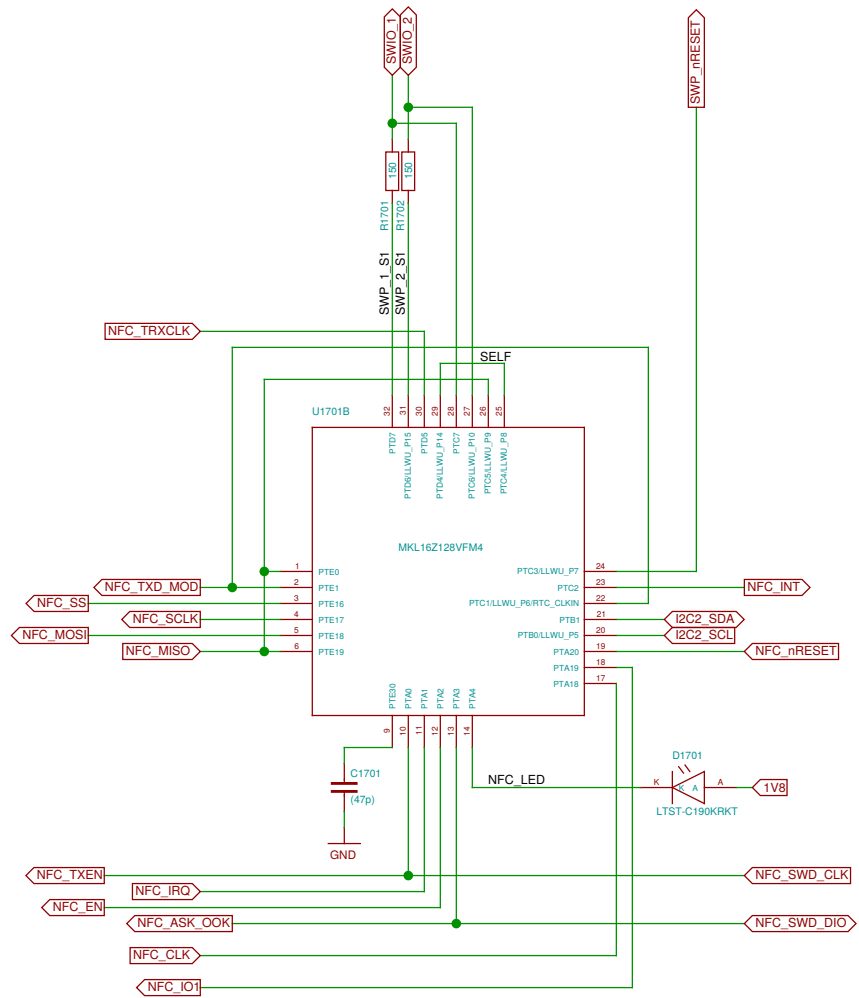


Sheet: Misc/ File: neo900_SS_15.sch		
Title: Misc		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 15/37



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

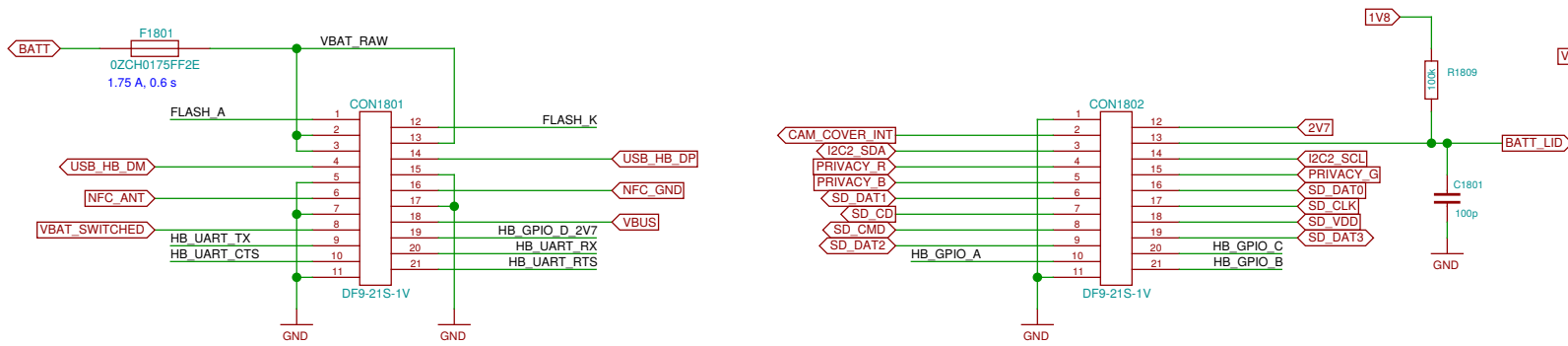
Sheet: /RFID/NFC Reader/		
File: neo900_SS_16.sch		
Title: RFID/NFC Reader		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 16/37



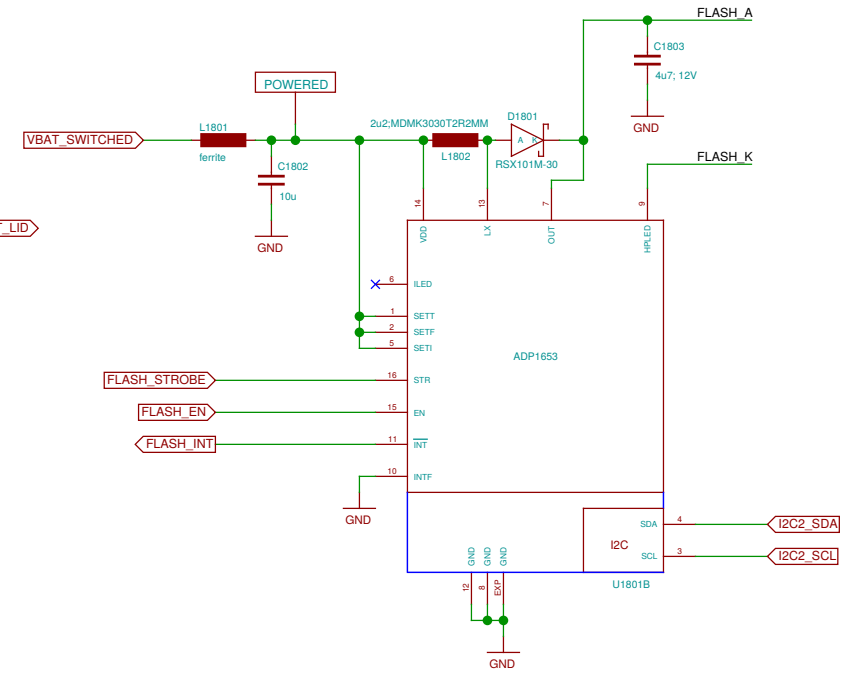
Sheet: /RFID/NFC Controller/		
File: neo900_SS_17.sch		
Title: RFID/NFC Controller		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow 96ef3e0+		20161030-17:20Z
Id: 17/37		

LOWER-BOB Interconnect (LOWER side)

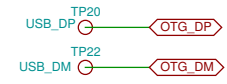
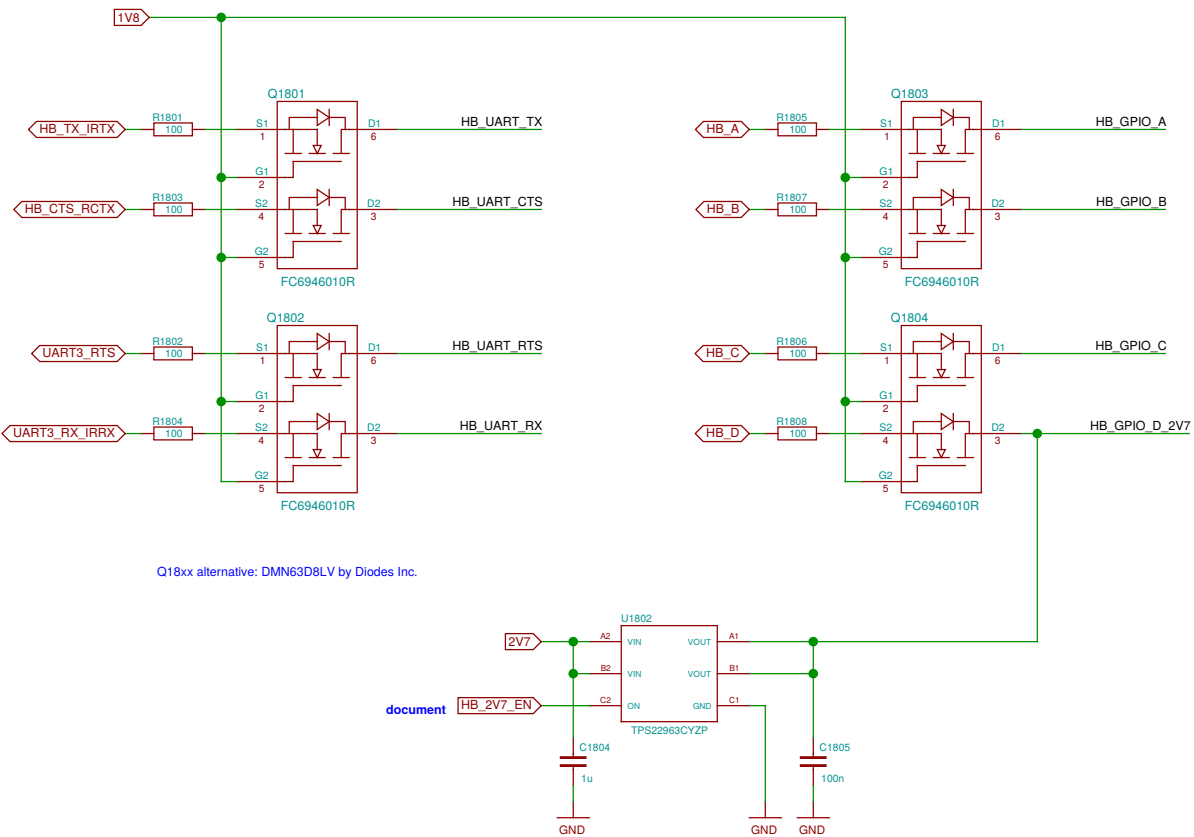
Defined in the Hackerbus specification, <http://neo900.org/stuff/papers/hb.pdf>



Flash/Torch



Level shifters for Hackerbus GPIO and UART



Patchfield

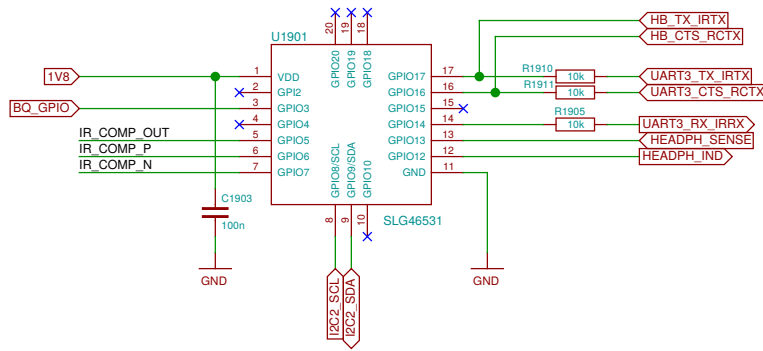
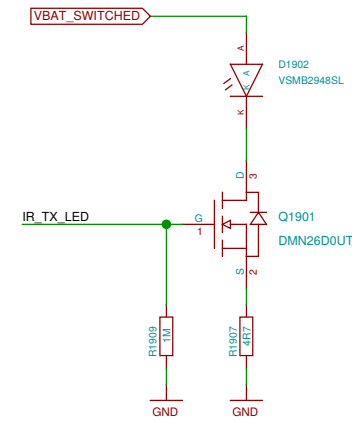
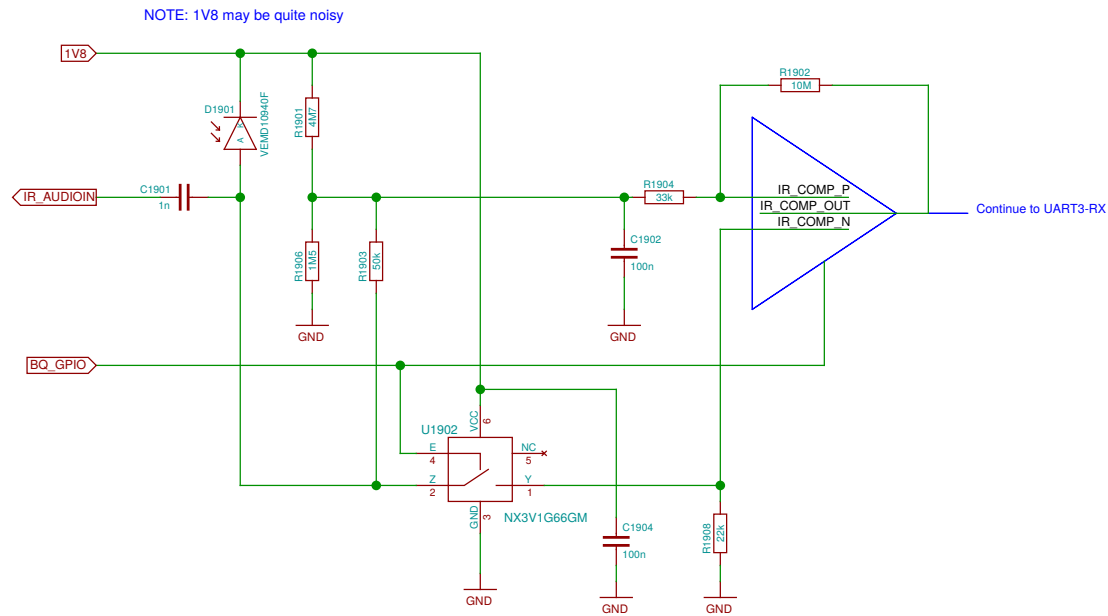
The following signals (or some of them) - **IF FEASIBLE** - should be made available on testpoints next to the 100 Ohm array of R1801 to R1808 for easy yellow wire solder-patching of secondary HB pin functions.

- TP1801 \rightarrow I2C3_SDA
- TP1802 \rightarrow I2C3_SCL
- TP1803 \rightarrow OTG_ID
- TP1804 \rightarrow HB_LINE_OUT_L
- TP1805 \rightarrow HB_LINE_OUT_R
- TP1806 \rightarrow HB_LINE_IN
- TP1807 \rightarrow HB_AUDIO_GND
- TP1808 \rightarrow HB_JACK_1L
- TP1809 \rightarrow HB_JACK_2R
- TP1810 \rightarrow HB_JACK_3M
- TP1811 \rightarrow HB_JACK_4GND
- TP1812 \rightarrow HB_DMIC_CLOCK
- TP1813 \rightarrow HB_DMIC_DATA

Sheet: /Hackerbus/ File: neo900_SS_18.sch		
Title: Hackerbus		
Size: A3	Date: 2016-10-30 18:23:57	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 18/37

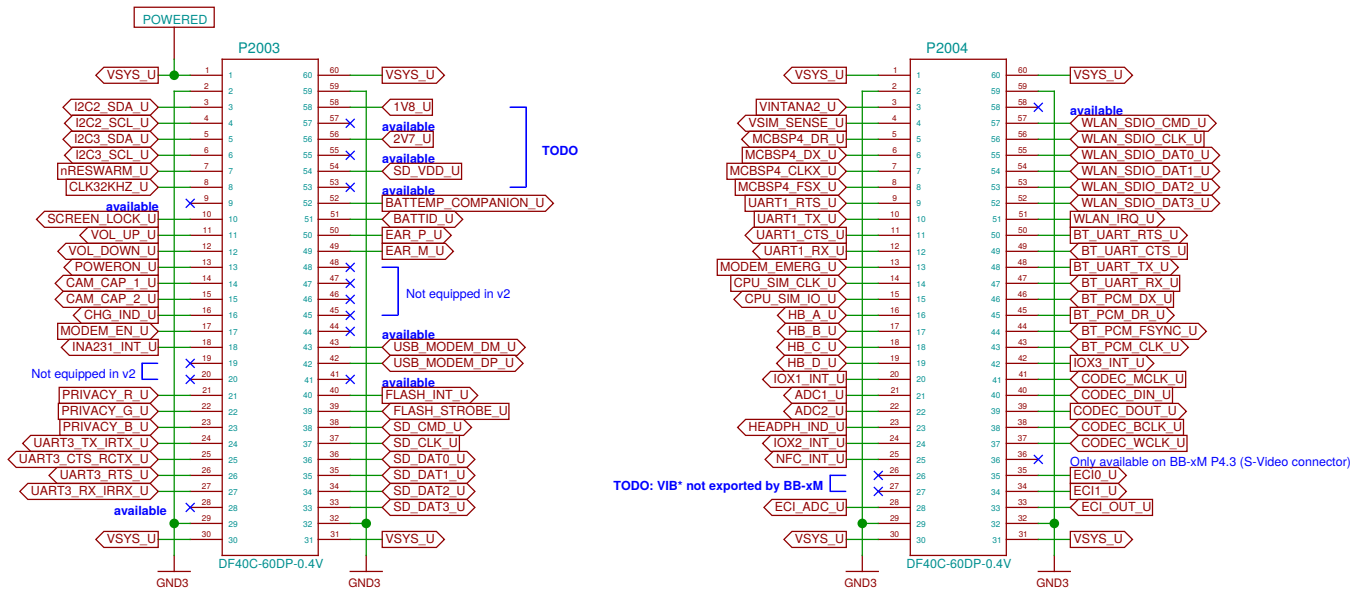
Missing 6x 2R for alternate function select (do we have the space for ca. 2.5 x 5mm?)

TODO: update D1901 footprint

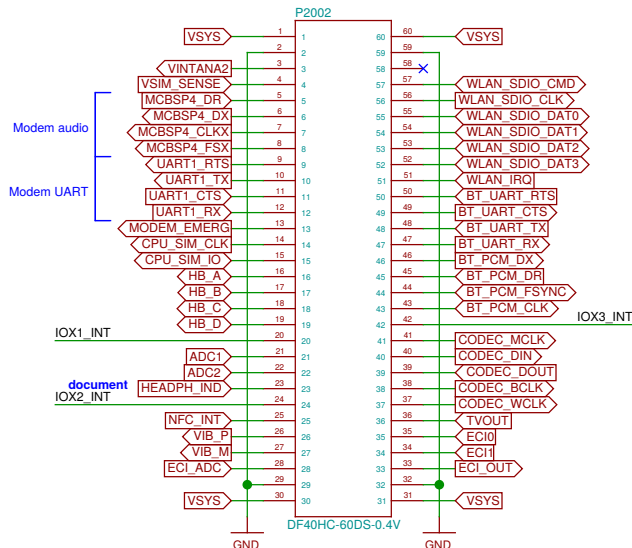
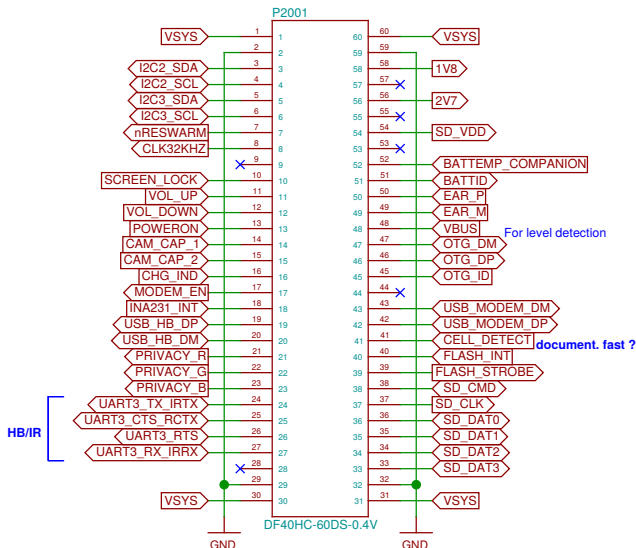
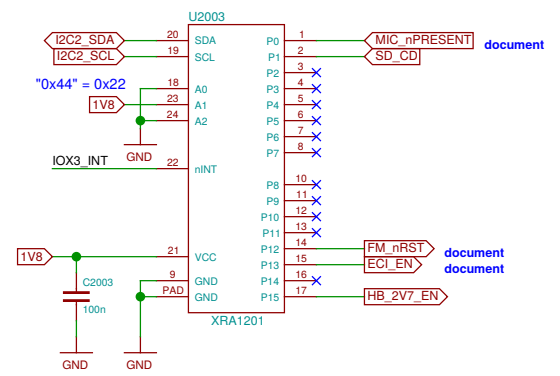
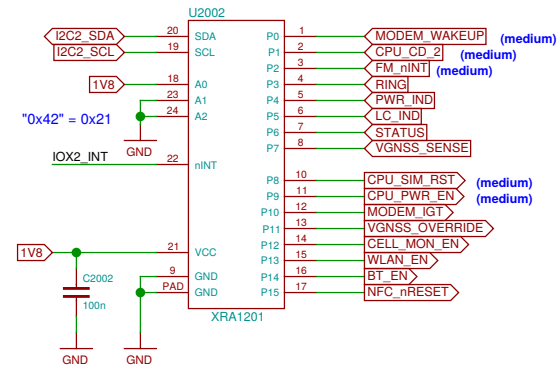
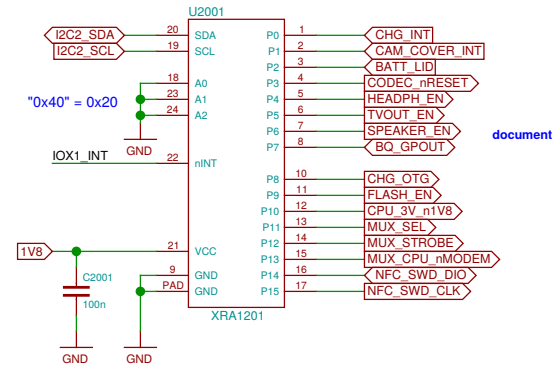


Sheet: /Infrared/ File: neo900_SS_19.sch		
Title: Infrared		
Size: A3	Date: 2016-10-29 17:39:34	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 19/37

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

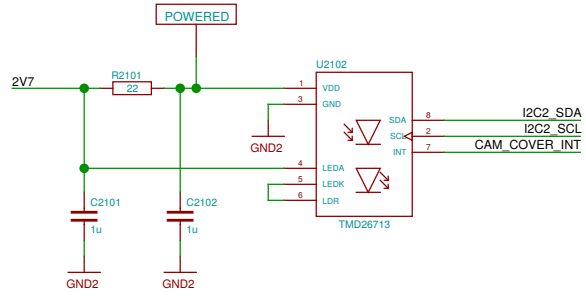


UPPER
LOWER

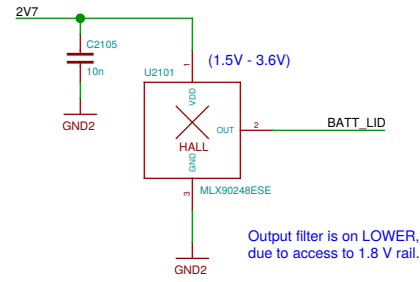


Current rating per contact: 0.3 A

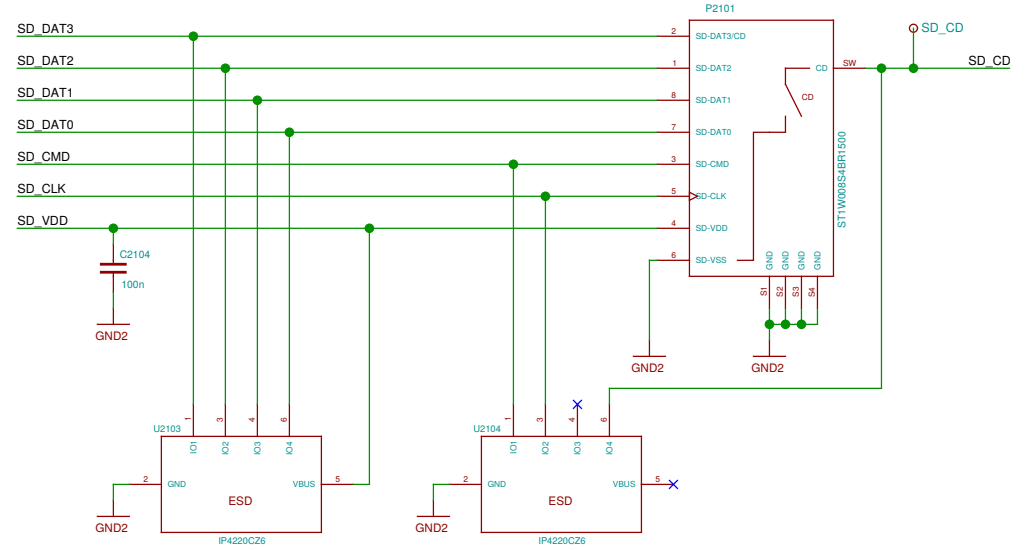
Camera Cover detect



Battery Cover detect

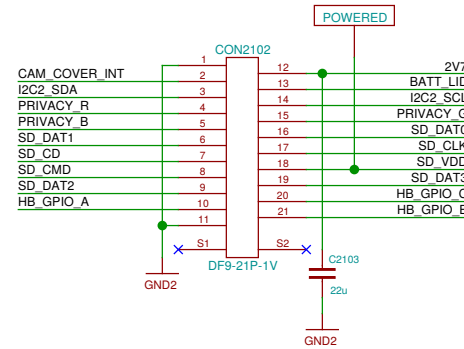
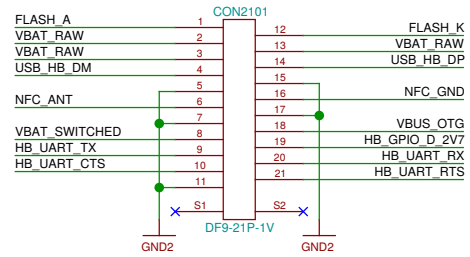


Memory card holder

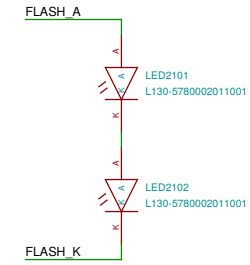


LOWER-BOB Interconnect (BOB side)

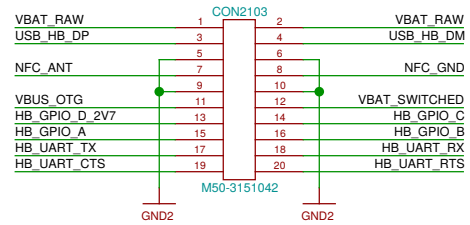
Defined in the Hackerbus specification, <http://neo900.org/stuff/papers/hb.pdf>



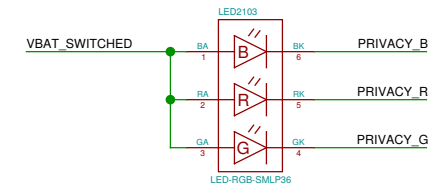
Camera flash



Hackerbus



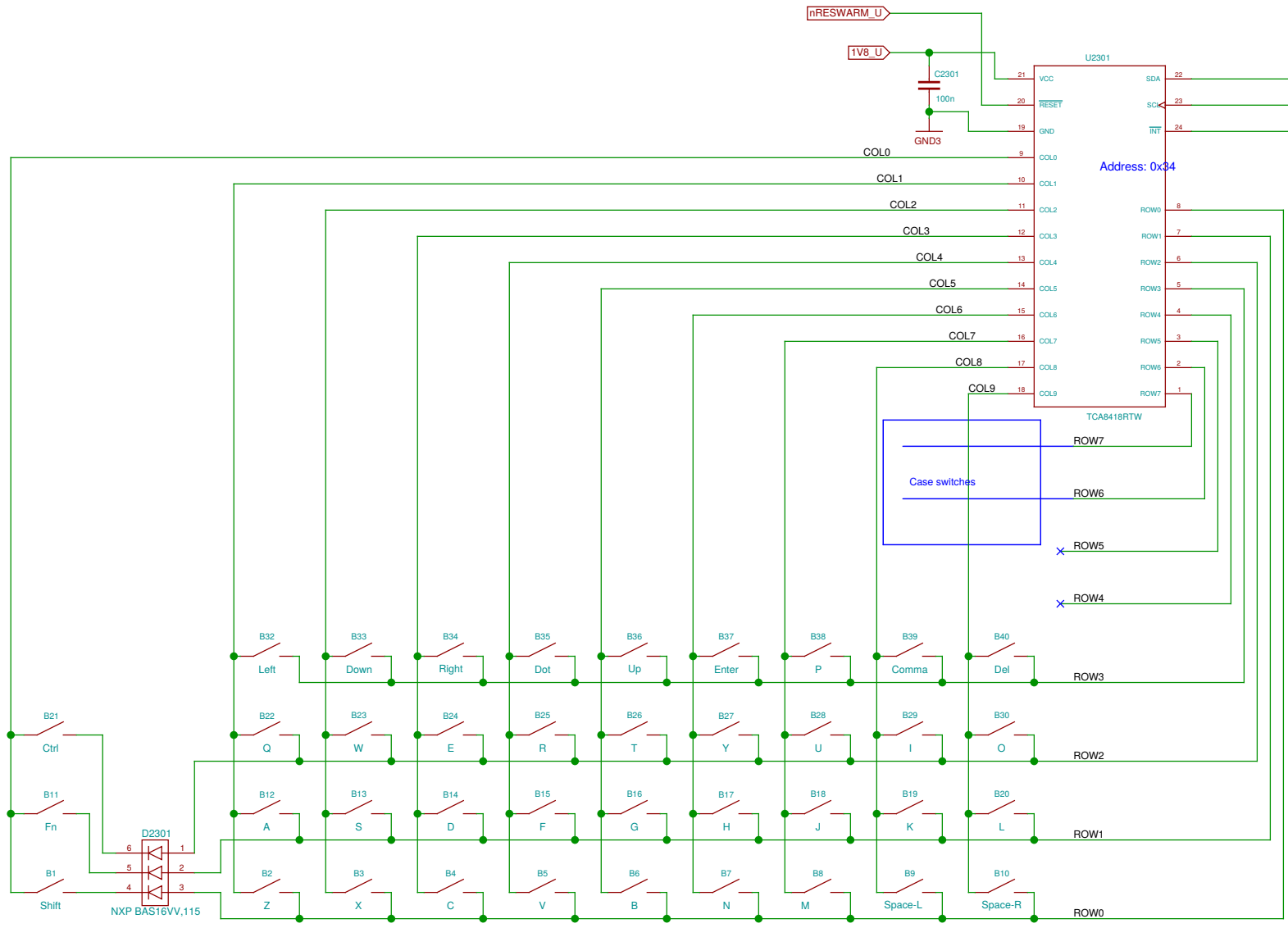
Privacy LED



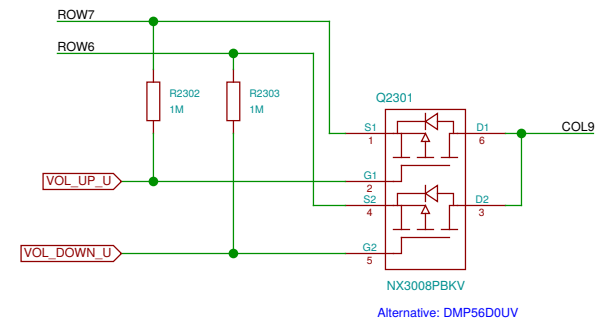
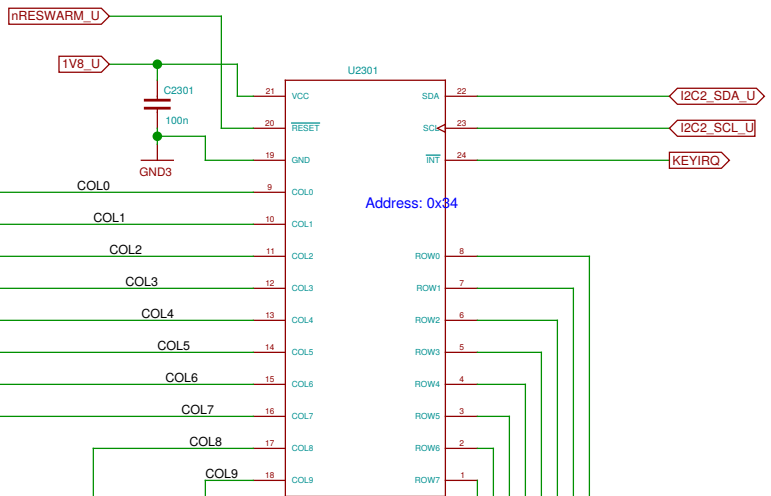
Sheet: /uSD Breakout Board/ File: neo900_SS_21.sch		
Title: uSD Breakout Board		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 21/37

TODO: consider sheet for deletion

Sheet: /empty/ File: neo900_SS_22.sch		
Title: empty		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 22/37



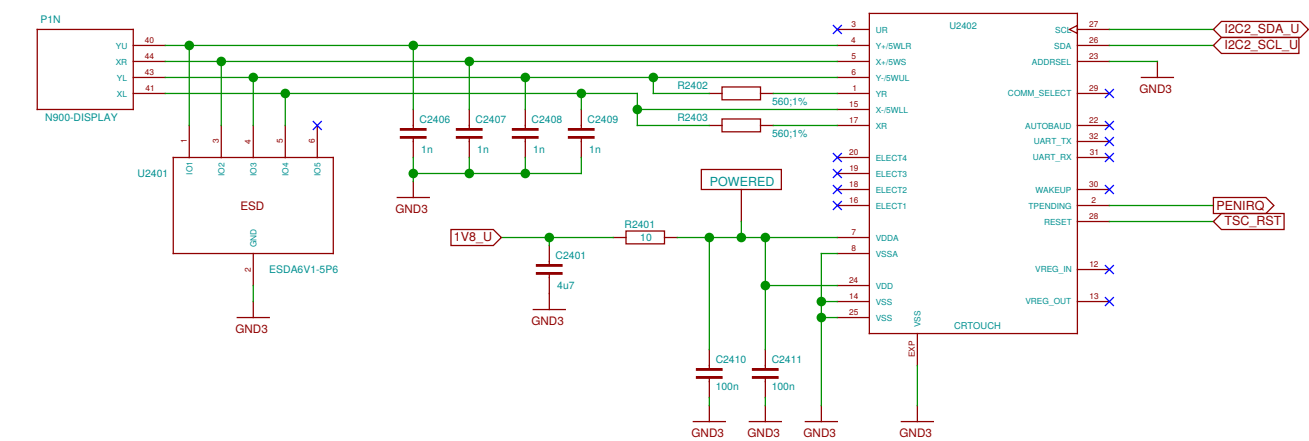
Alternative: Diodes Inc. BAS16VV-7
 Warning: Diodes Inc. have cathodes on pin 1 side, NXP anodes !



Sheet: /Keypad/ File: neo900_SS_23.sch		
Title: Keypad		
Size: A3	Date: 2016-10-31 06:28:58	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 23/37

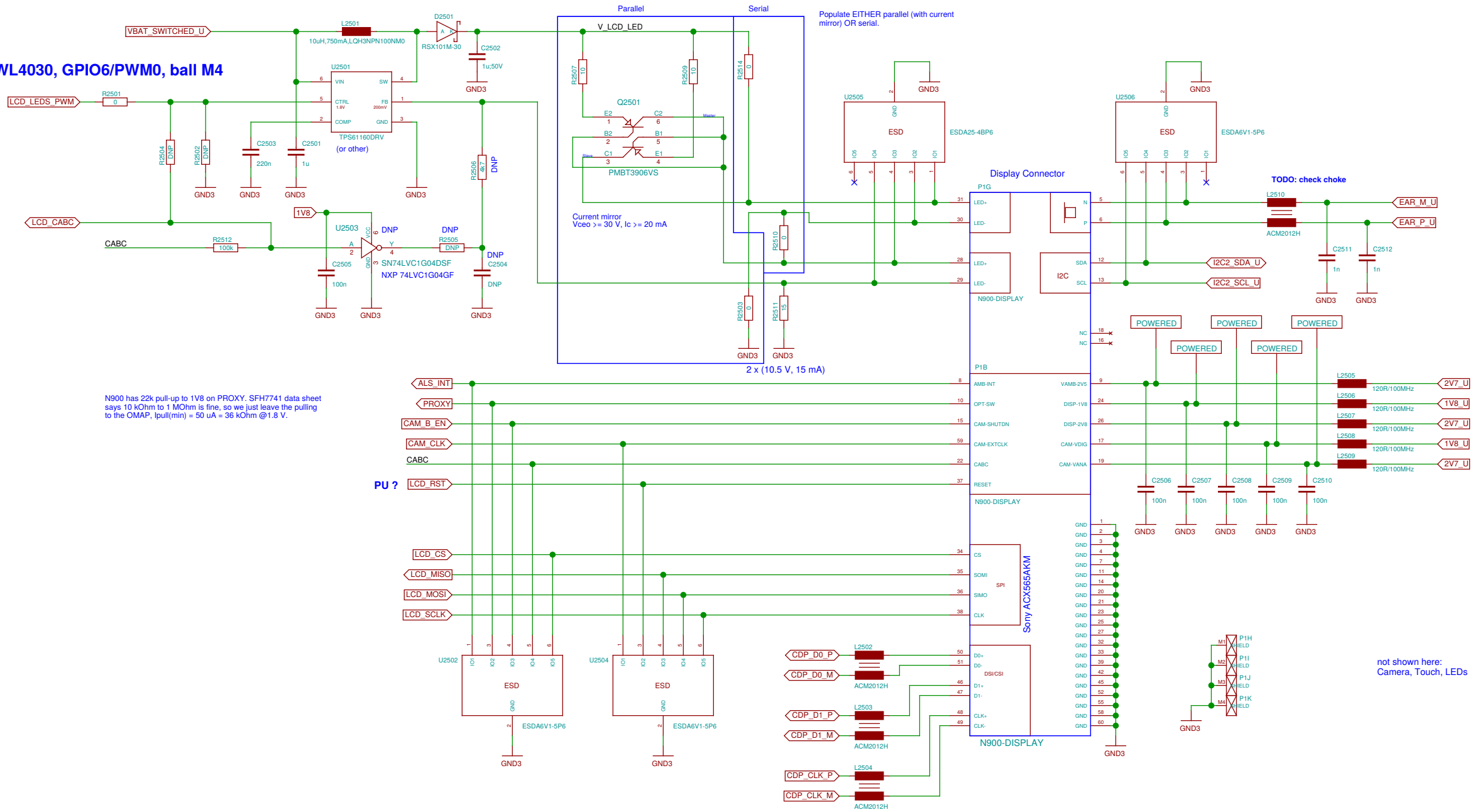
Resistive Touch (display connector)

Touch screen controller



Sheet: /Display-Peripherals/ File: neo900_SS_24.sch		
Title: Display-Peripherals		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 24/37

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 ?

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

2 x (10.5 V, 15 mA)

Populate EITHER parallel (with current mirror) OR serial.

TODO: check choke

not shown here:
Camera, Touch, LEDs

Sheet: /Display-Panel&Power/		
File: neo900_SS_25.sch		
Title: Display-Panel&Power		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 25/37

OMAP is not part of v2

Sheet: /CPU + PoP RAM/NAND/ File: neo900_SS_26.sch		
Title: CPU + PoP RAM/NAND		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 26/37

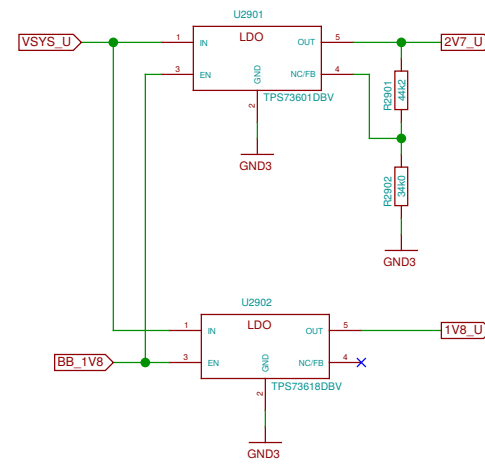
eMMC is not part of v2

Sheet: /eMMC/ File: neo900_SS_27.sch		
Title: eMMC		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 27/37

Companion chip (TPS65950) is not part of v2

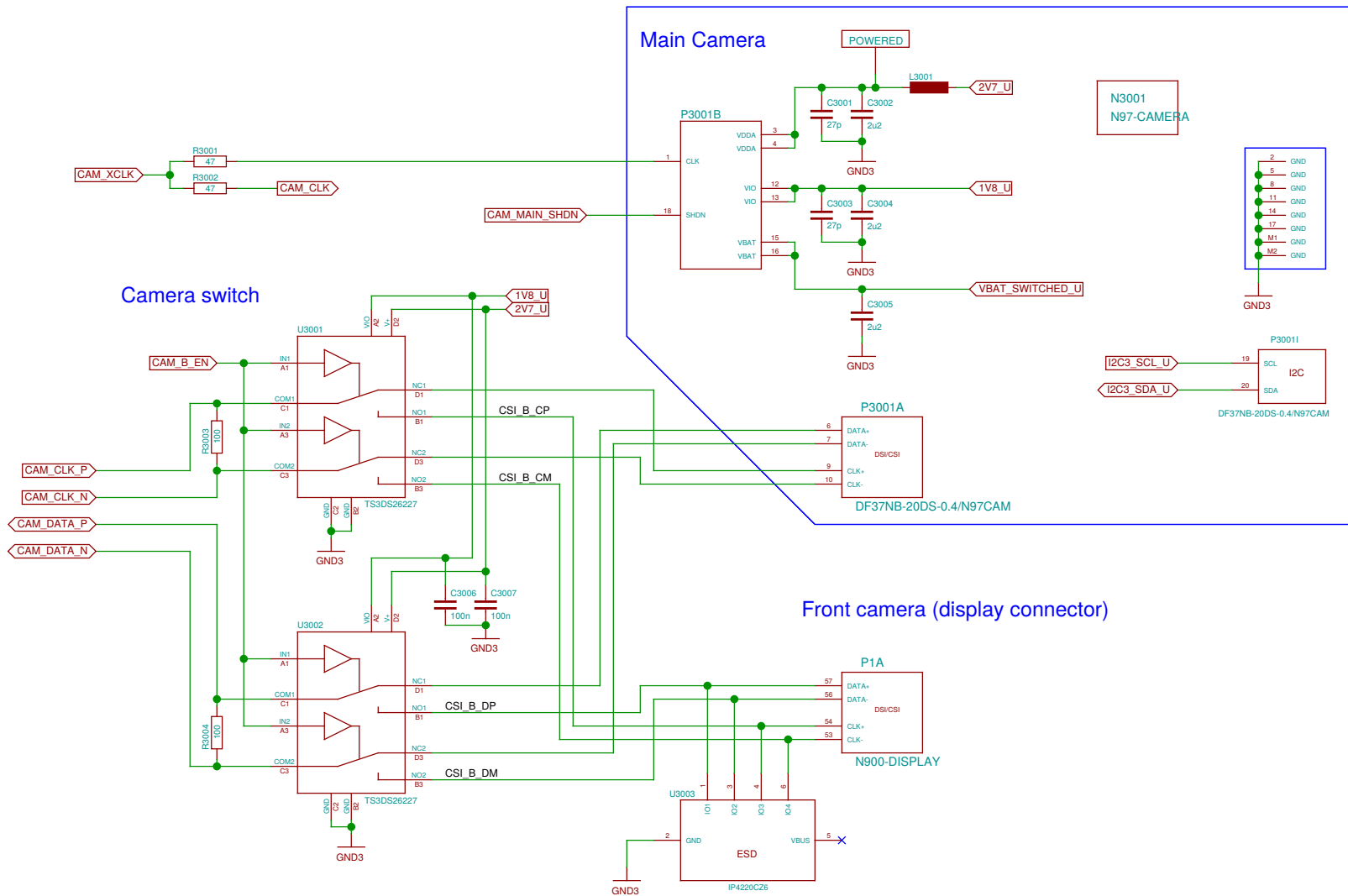
Sheet: /PMU+Codec/ File: neo900_SS_28.sch		
Title: PMU+Codec		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 28/37

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

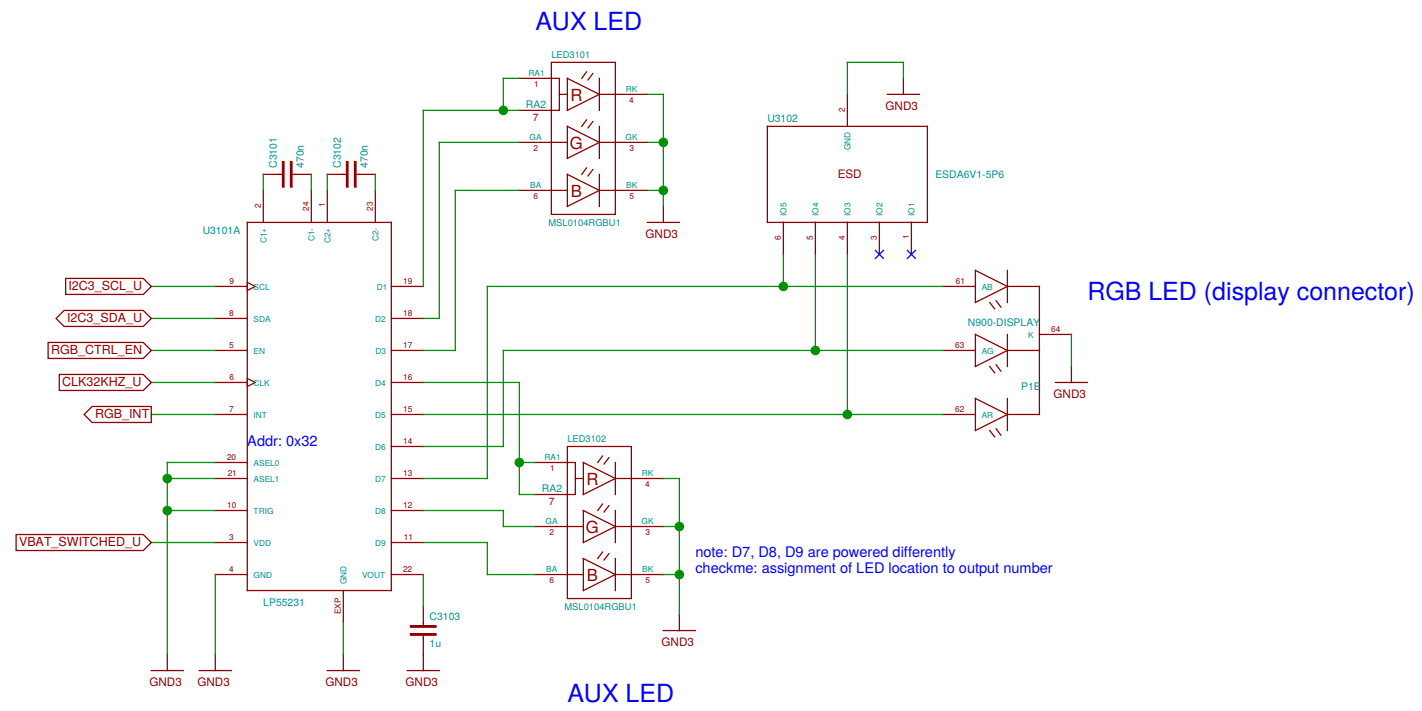


TODO: use REGEN ?

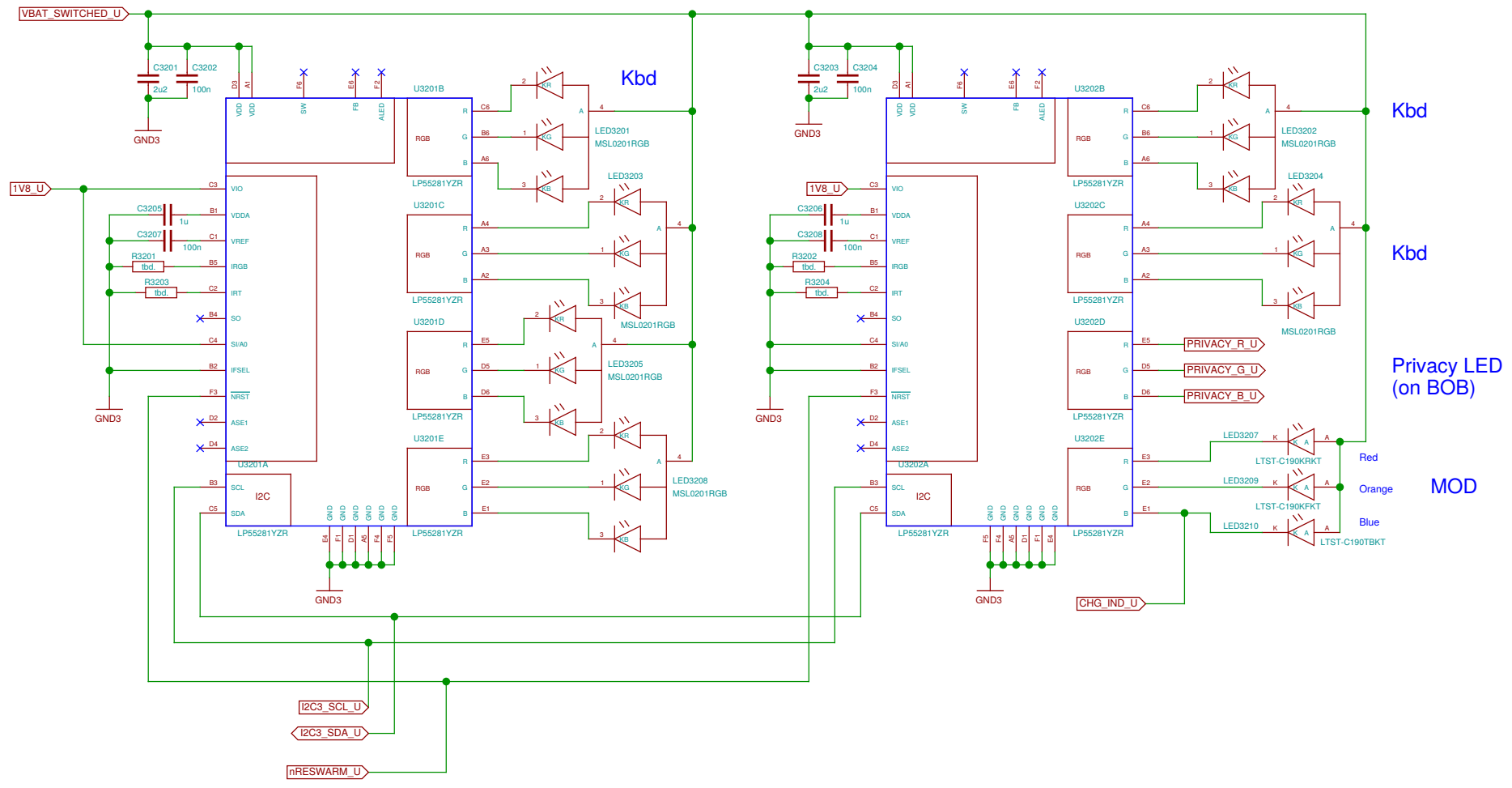
Sheet: /BB-XM Dummy (TWL4030)/		
File: neo900_SS_29.sch		
Title: BB-XM Dummy (TWL4030)		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 29/37



Sheet: /Camera/ File: neo900_SS_30.sch		
Title: Camera		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 30/37



Sheet: /Fancy LEDs/		
File: neo900_SS_31.sch		
Title: Fancy LEDs		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 31/37

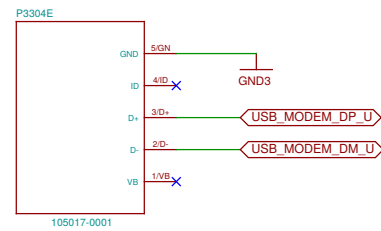


Sheet: /Basic LEDs/		
File: neo900_SS_32.sch		
Title: Basic LEDs		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 32/37

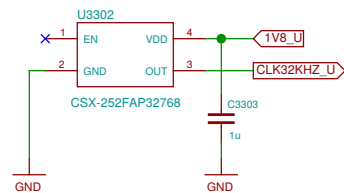
Cleaning up. The connections to BB-xM are on the next sheets.

connect to BB
by some Micro-USB cable

Modem USB



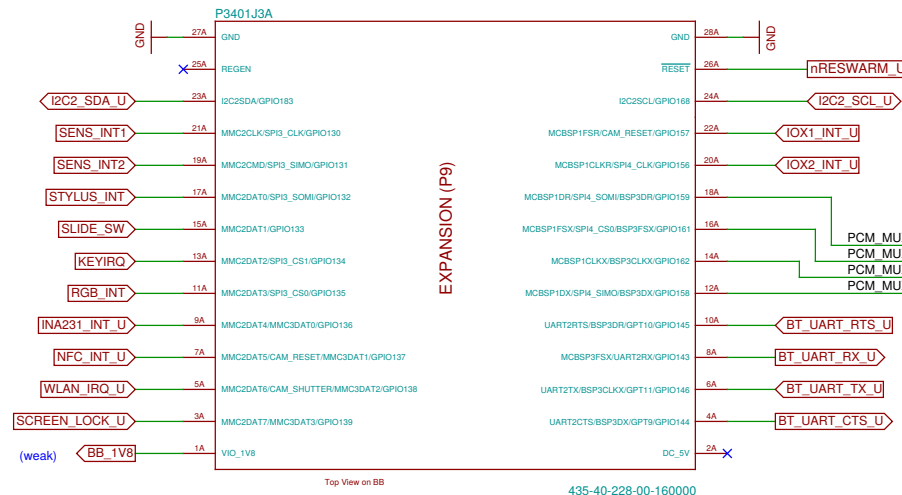
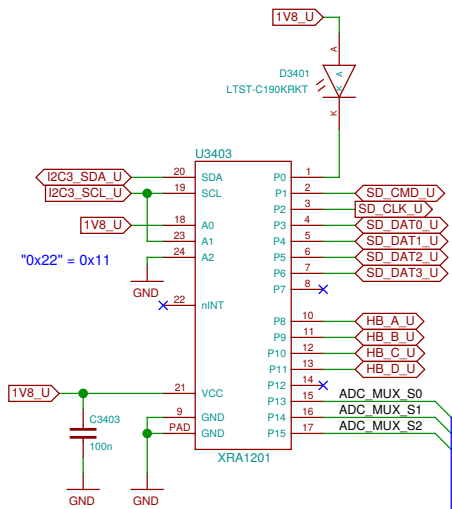
32 kHz clock



Alternative: OYKTGLJANF-0.032768

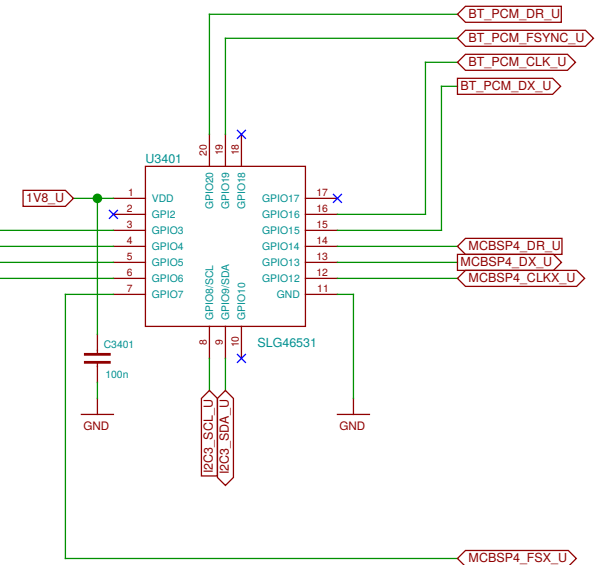
Sheet: /Connector to BB-XM/ File: neo900_SS_33.sch		
Title: Connector to BB-XM		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 33/37

TODO: update pin names in footprint

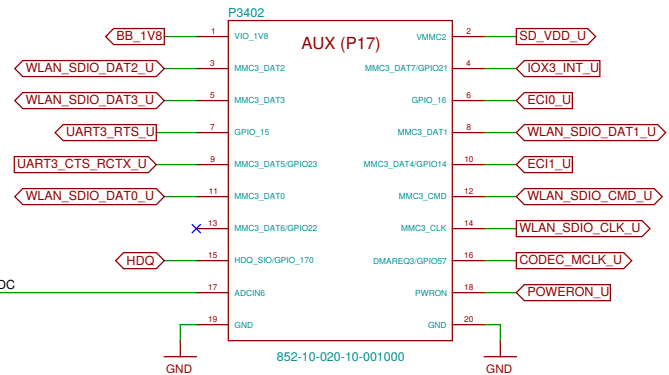


Same part, as "breakaway" strip (72 positions):
435-40-272-00-160000

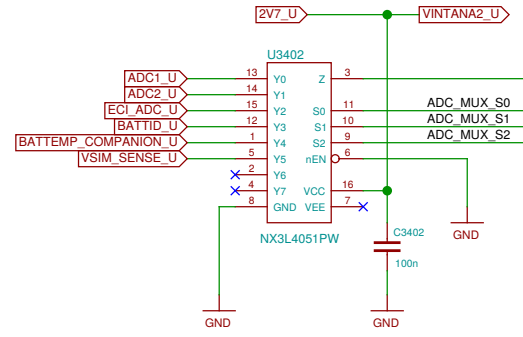
BB-XM Main Expansion Header (P9, 7.24)



No UART3_RTS on BB-xM, using GPIO
No UART3_CTS on BB-xM, using GPIO



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



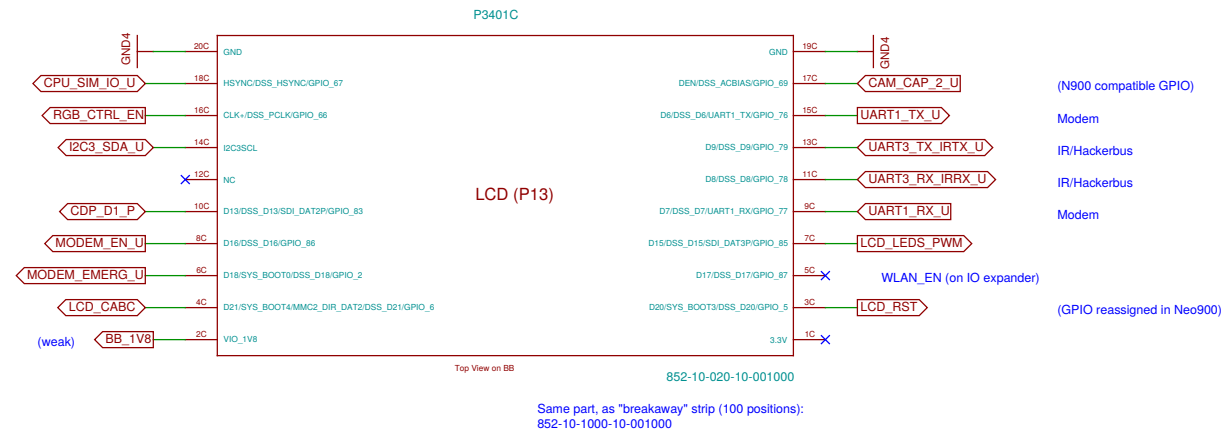
FM_nINT (on IO expander)

Sheet: /BB-XM Adapter (CPU)/		
File: neo900_SS_34.sch		
Title: BB-XM Adapter (CPU)		
Size: A3	Date: 2016-10-31 06:53:09	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 34/37

P11 (7.25)



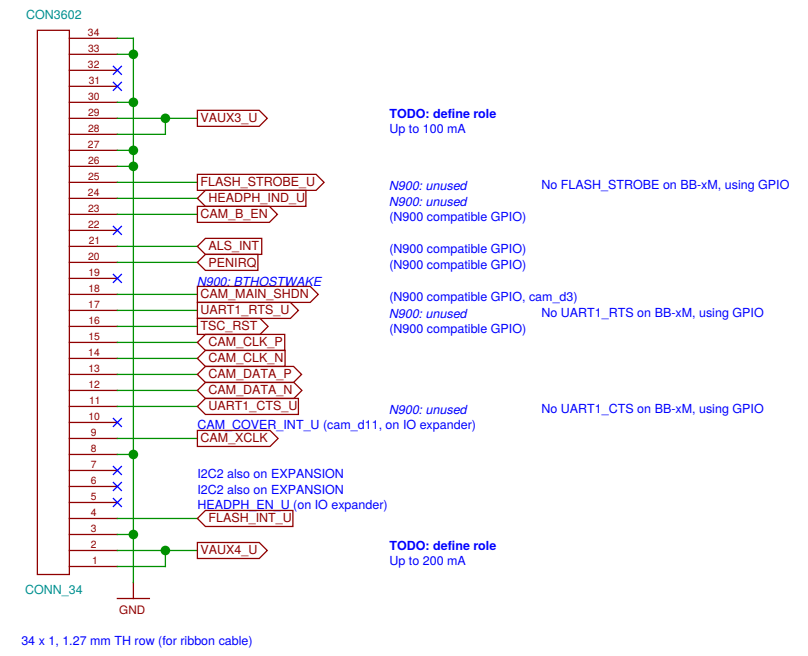
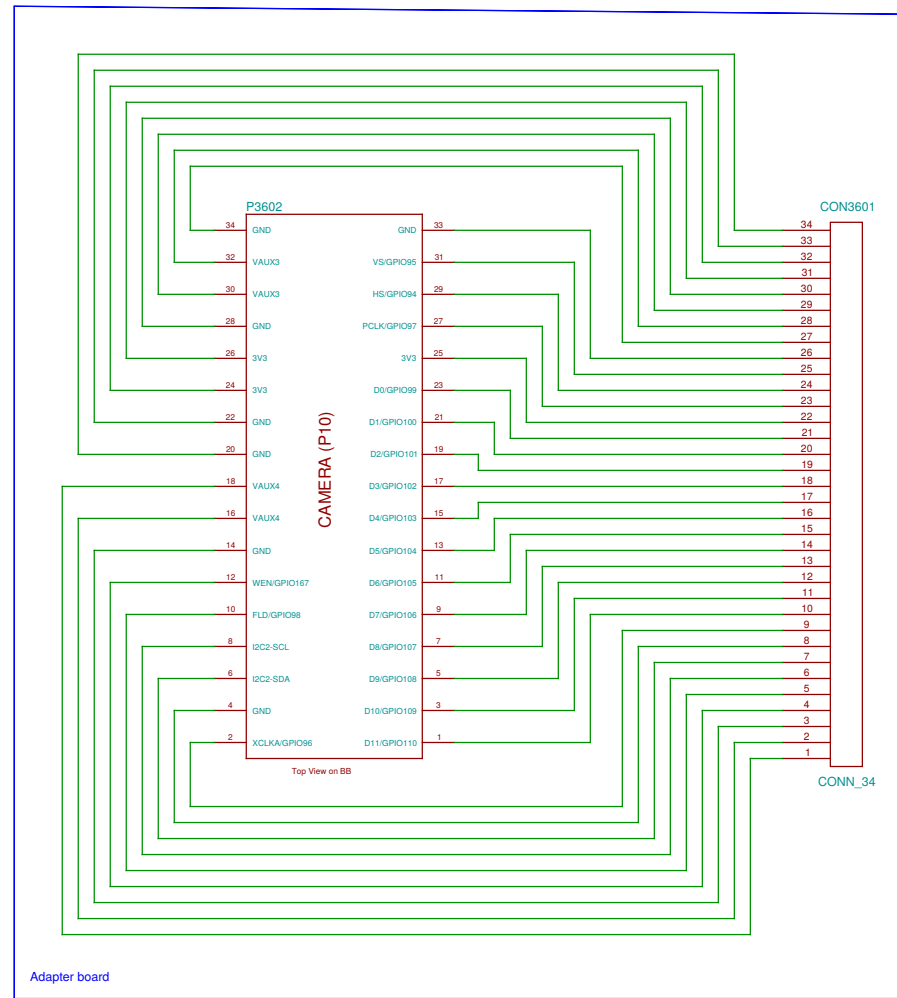
P13 (7.25)



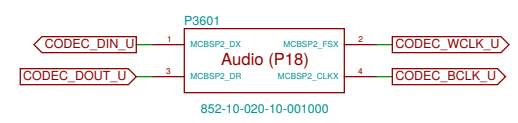
TODO: update pin names in footprint

Sheet: /BB-XM Adapter (DISP)/		
File: neo900_SS_35.sch		
Title: BB-XM Adapter (DISP)		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		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.

Sheet: /BB-XM Adapter (CAM)/		
File: neo900_SS_36.sch		
Title: BB-XM Adapter (CAM)		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 36/37

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: 2016-10-28 21:16:24	Rev:
Plotted by eeshow 96ef3e0+ 20161030-17:20Z		Id: 37/37