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**Connector to BB-XM**

Sheet: BB-XM Adapter (CPU)  
File: neo900\_SS\_34.sch  
**BB-XM Adapter (CPU)**

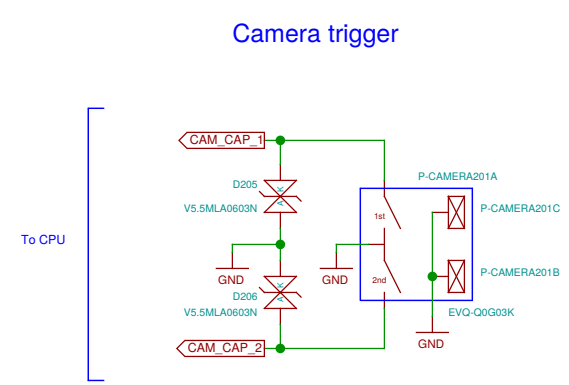
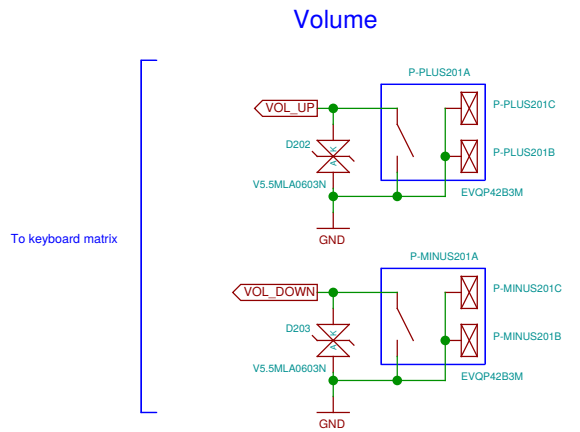
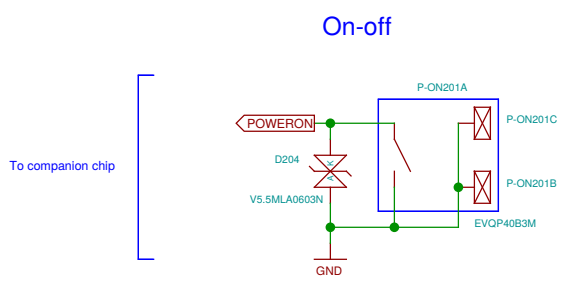
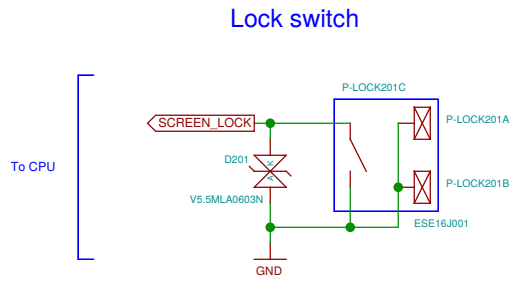
Sheet: BB-XM Adapter (DISP)  
File: neo900\_SS\_35.sch  
**BB-XM Adapter (DISP)**

Sheet: BB-XM Adapter (CAM)  
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**BB-XM Adapter (CAM)**

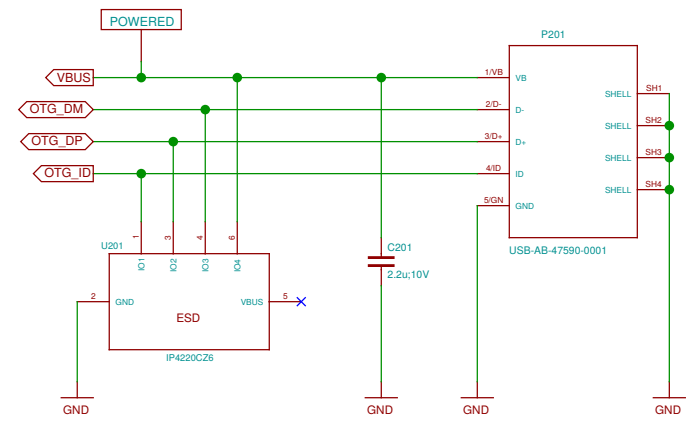
Sheet: No-Solder Components  
File: neo900\_SS\_37.sch  
**No-Solder Components**

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

Sheet: /		
File: neo900.sch		
Title: Neo900		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow f43bc96+ 20161028-20:31Z		Id: 1/37

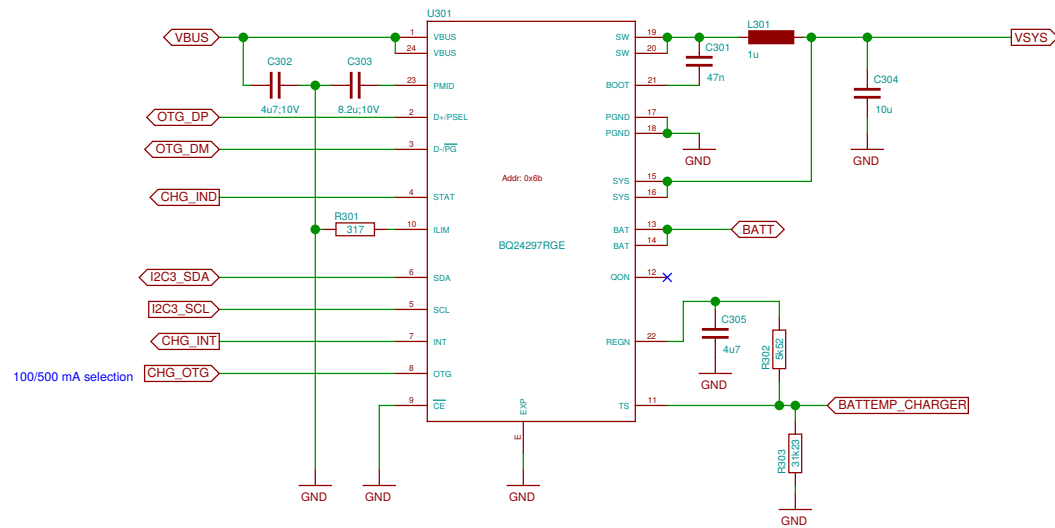


### USB OTG connector



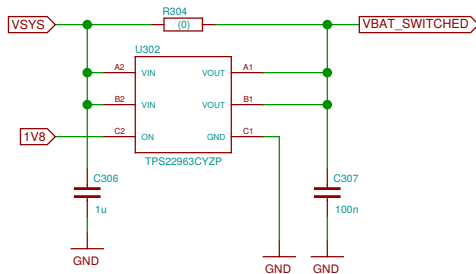
Sheet: /OTG/ File: neo900_SS_2.sch		
Title: OTG		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow f43bc96+ 20161028-20:31Z		Id: 2/37

### Battery charger with USB OTG

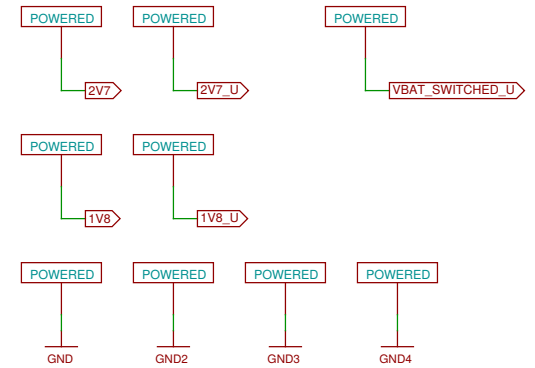


### Power distribution and sequencing

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

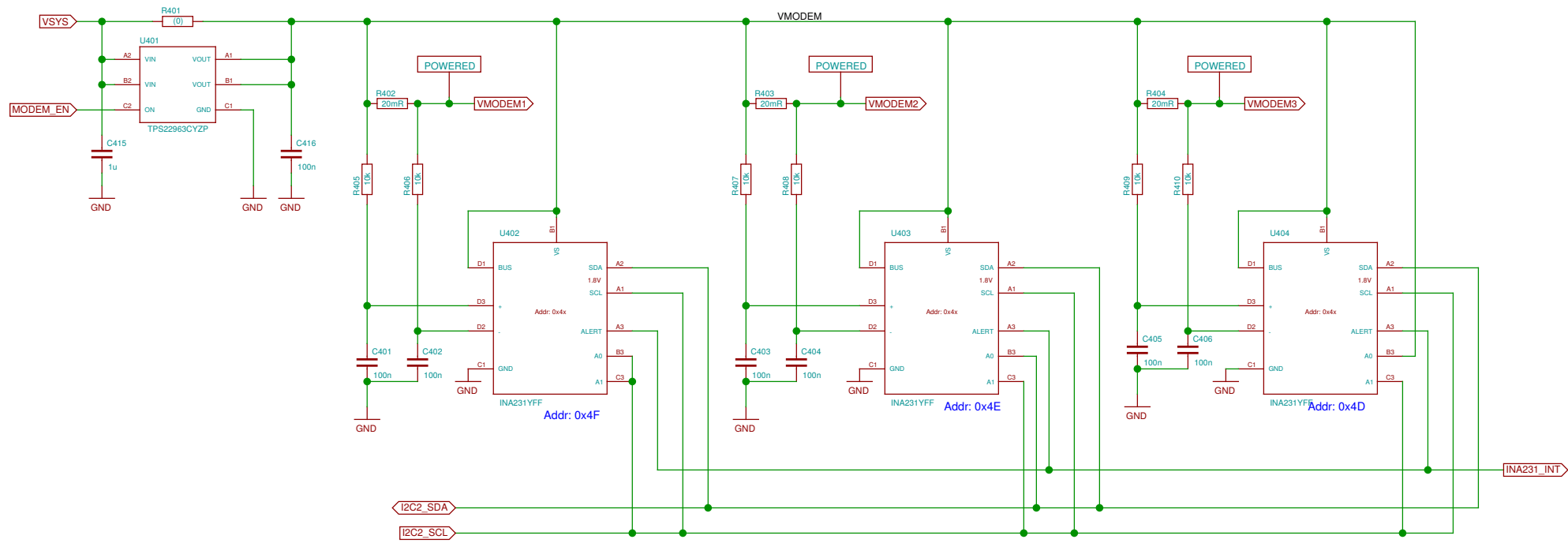


### KiCad bureaucracy

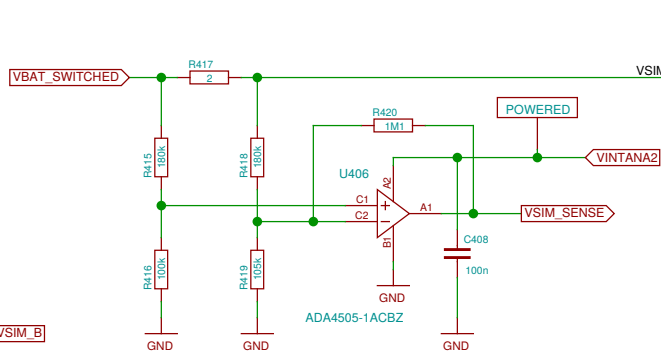


Sheet: /Charger/OTG-Booster/		
File: neo900_SS_3.sch		
Title: Charger/OTG-Booster		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow f43bc96+ 20161028-20:31Z		Id: 3/37

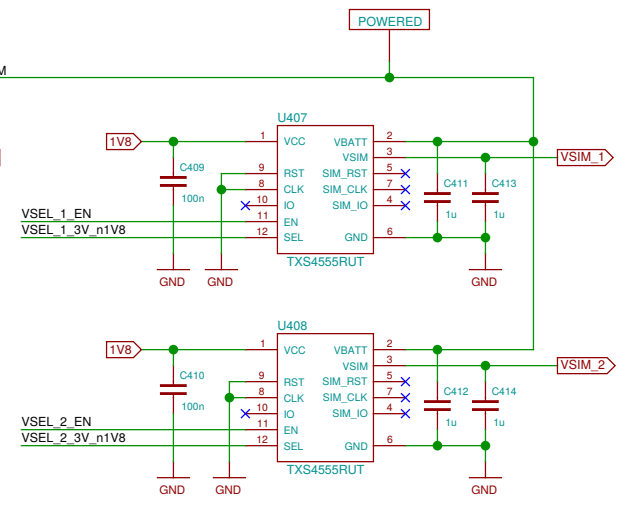
### Modem current monitor



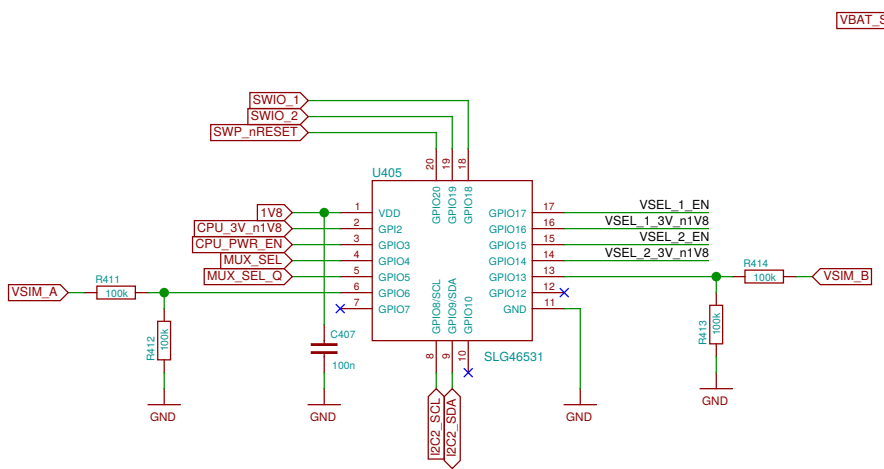
### SIM current sensing



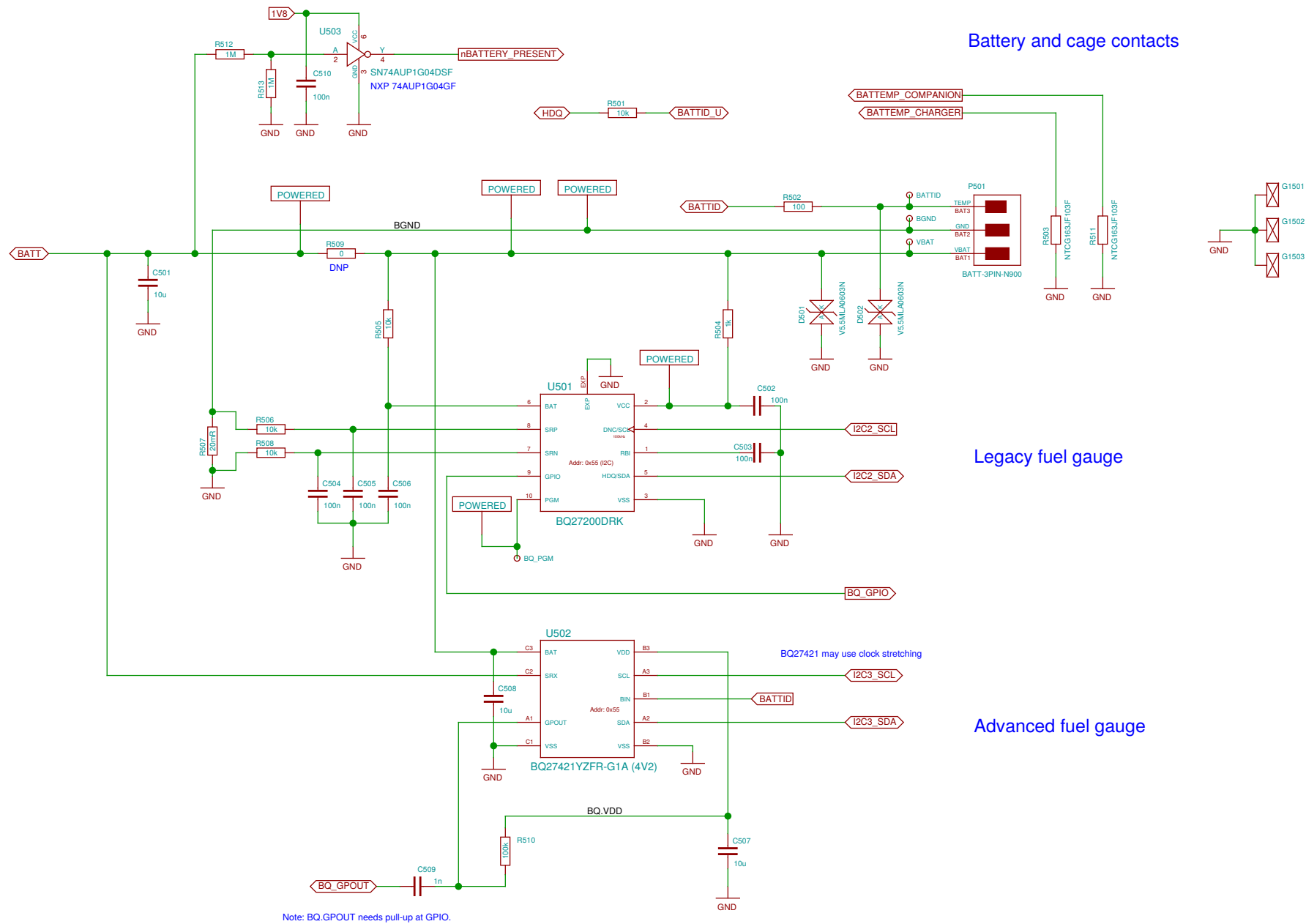
### SIM power supply



### SIM power selection



**TODO: update SLG design for changed pins**



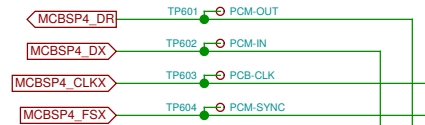
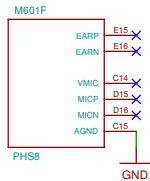
Battery and cage contacts

Legacy fuel gauge

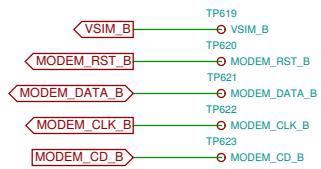
Advanced fuel gauge

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

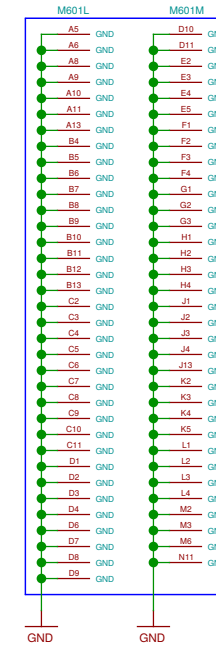
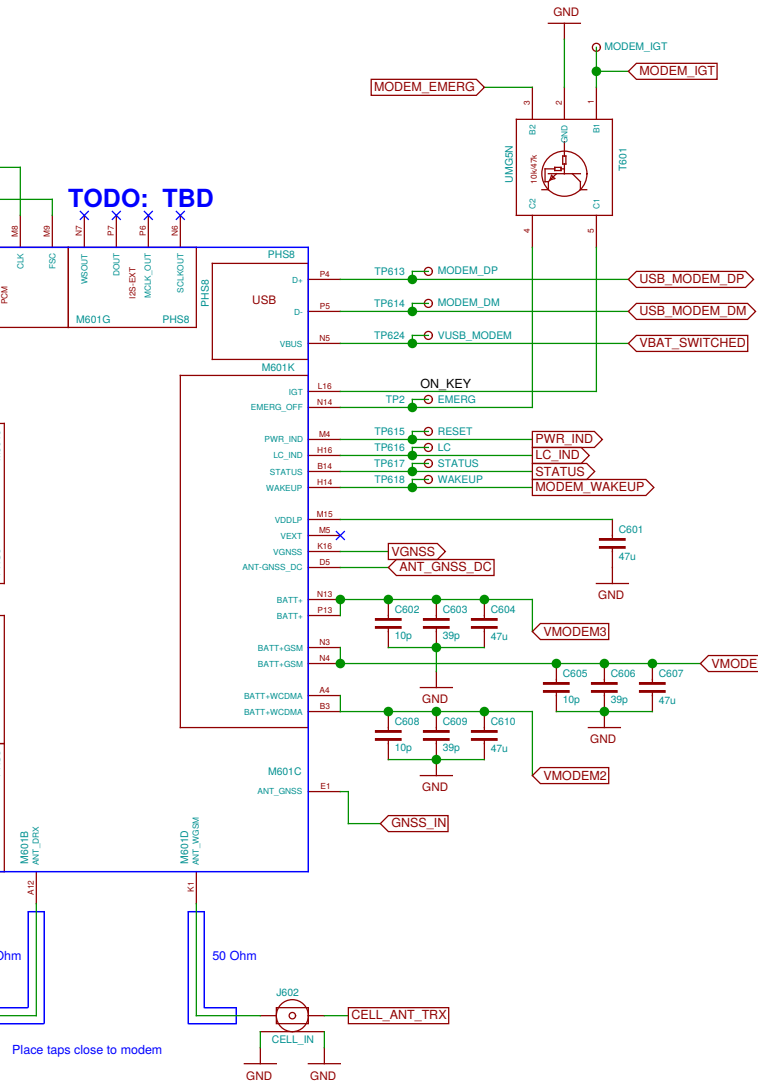
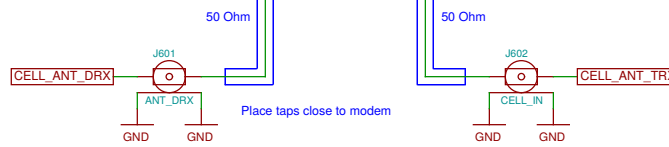
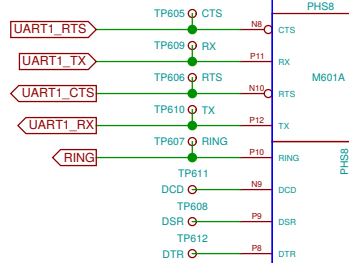
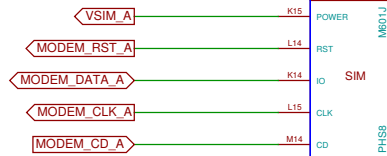
Sheet: /Fuel Gauge/		
File: neo900_SS_5.sch		
Title: Fuel Gauge		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow f43bc96+ 20161028-20:31Z		Id: 5/37



TODO: TBD



TODO: B-SIM bus FFS



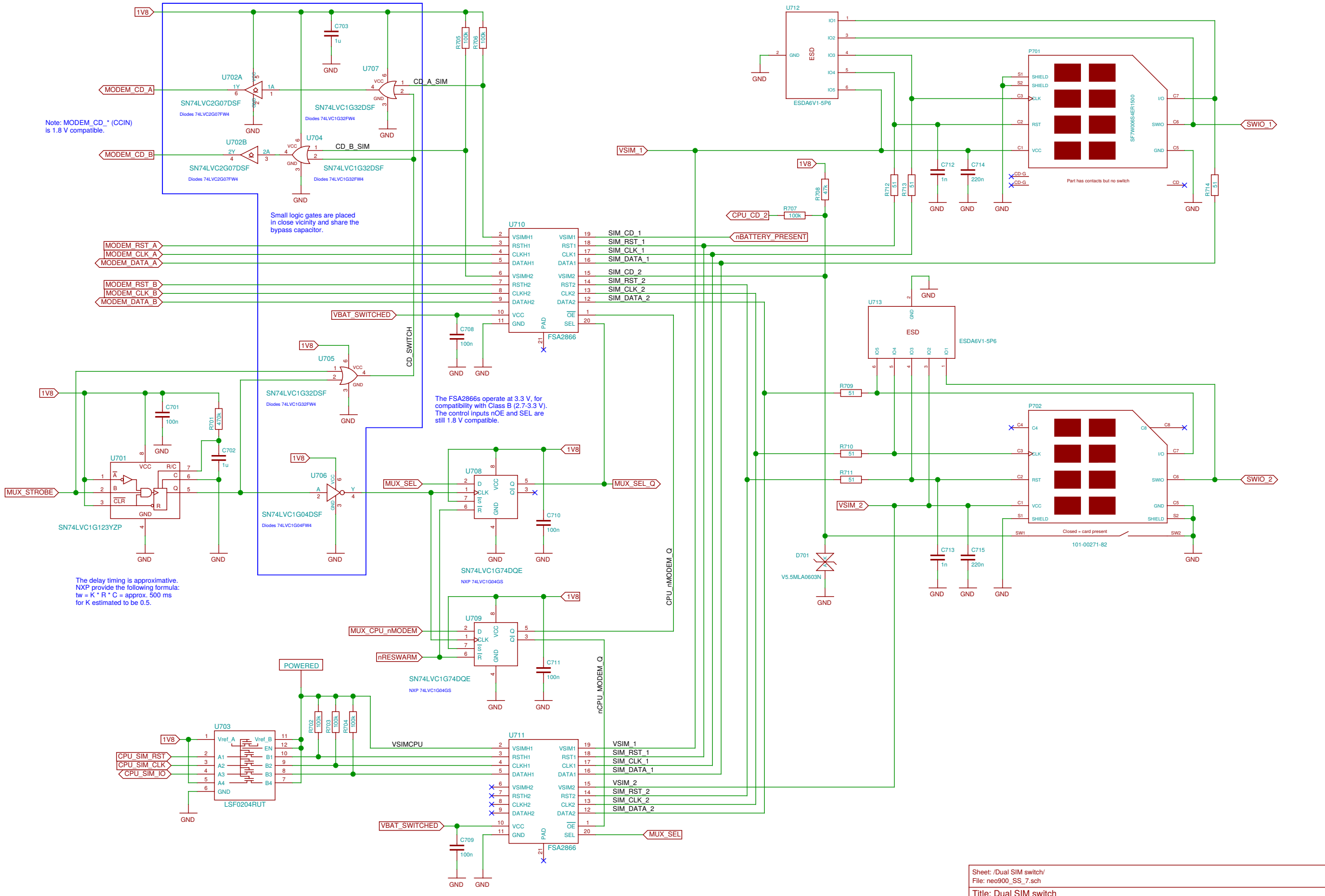
Sheet: /3G/4G Modem + SIM/		
File: neo900_SS_6.sch		
Title: 3G/4G Modem + SIM		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow f43bc96+ 20161028-20:31Z		Id: 6/37

Note: MODEM\_CD\_\* (CCIN) is 1.8 V compatible.

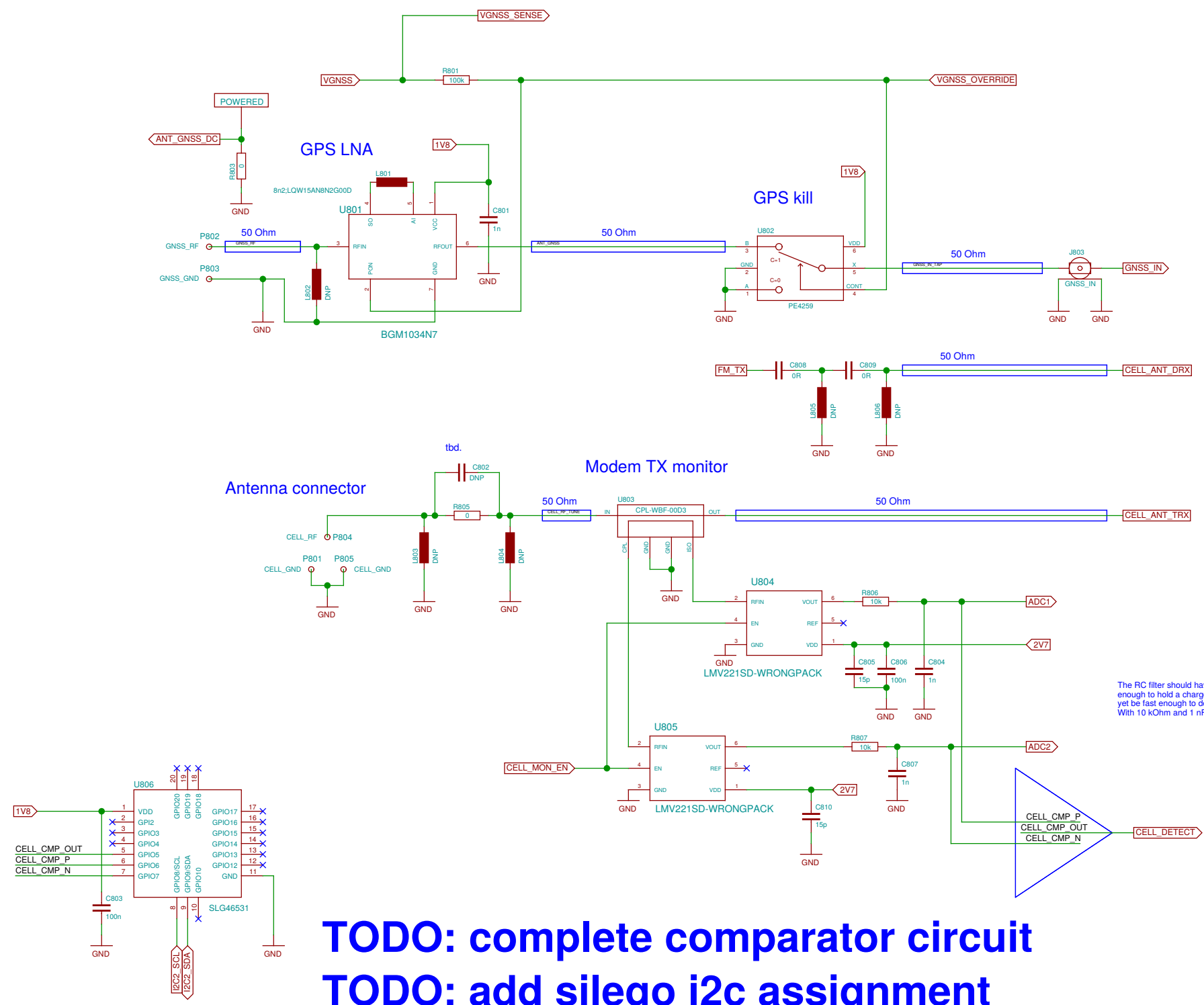
Small logic gates are placed in close vicinity and share the bypass capacitor.

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 f43bc96+ 20161028-20:31Z		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.

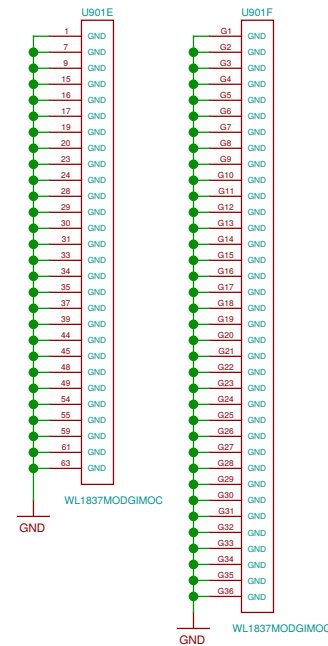
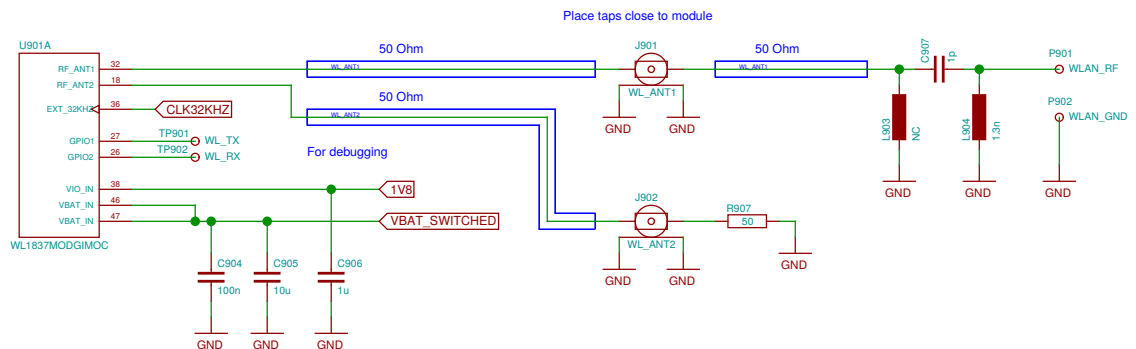
**TODO: complete comparator circuit**  
**TODO: add silego i2c assignment**

Sheet: /Antenna connections/ File: neo900_SS_8.sch		
Title: Antenna connections		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow f43bc96+ 20161028-20:31Z		Id: 8/37

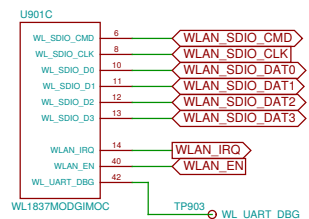


TODO: assign footprints for c-spring contacts

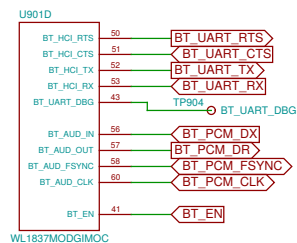
WLAN/BT antenna



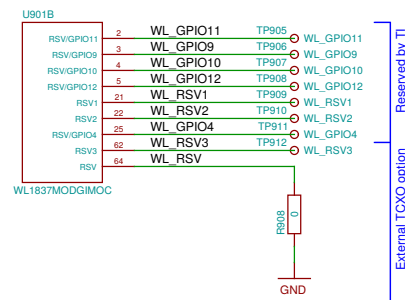
WLAN



Bluetooth

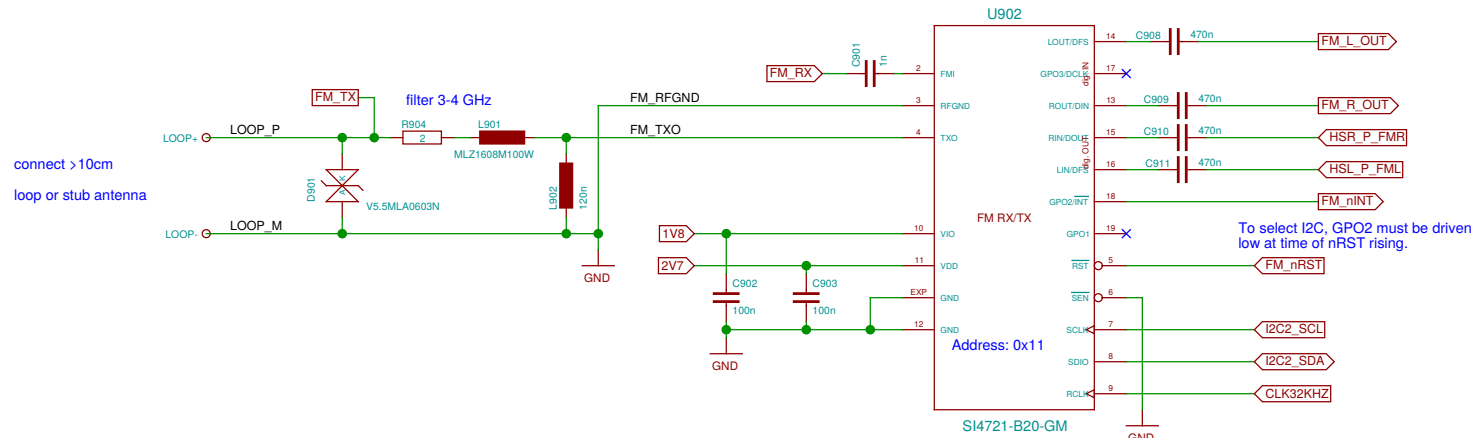


Reserved / Debugging



FM Radio (TX/RX)

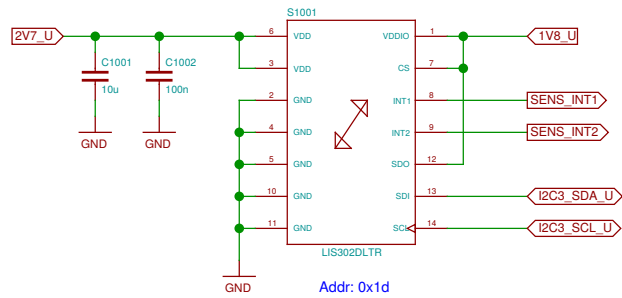
TODO: check caps



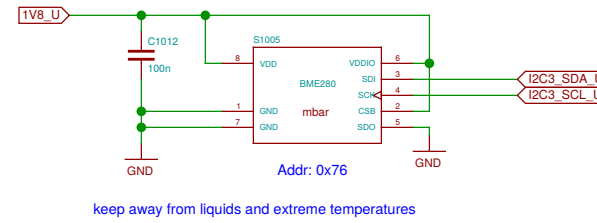
SI4705 is pin compatible (mostly) but RX-only

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 f43bc96+ 20161028-20:31Z		Id: 9/37

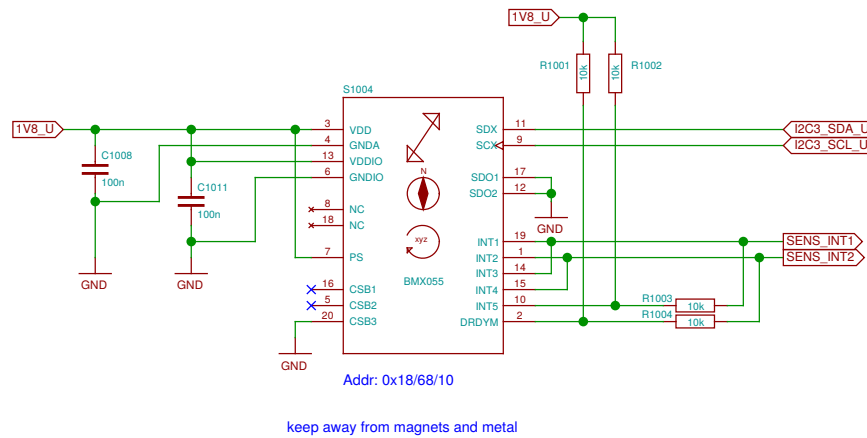
### Acceleration (legacy)



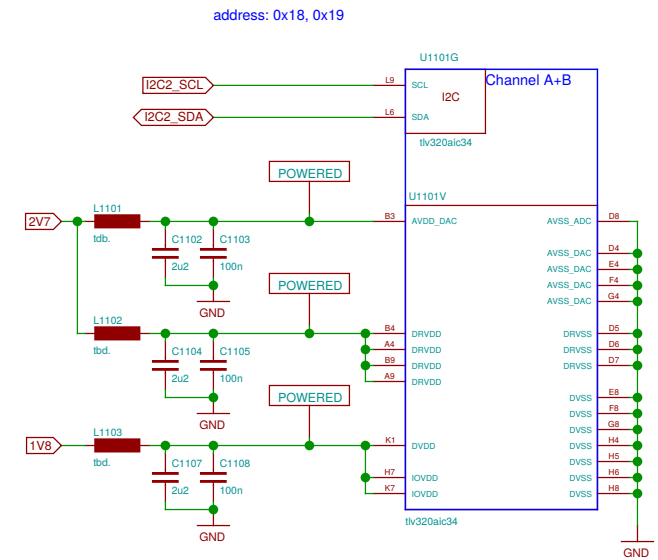
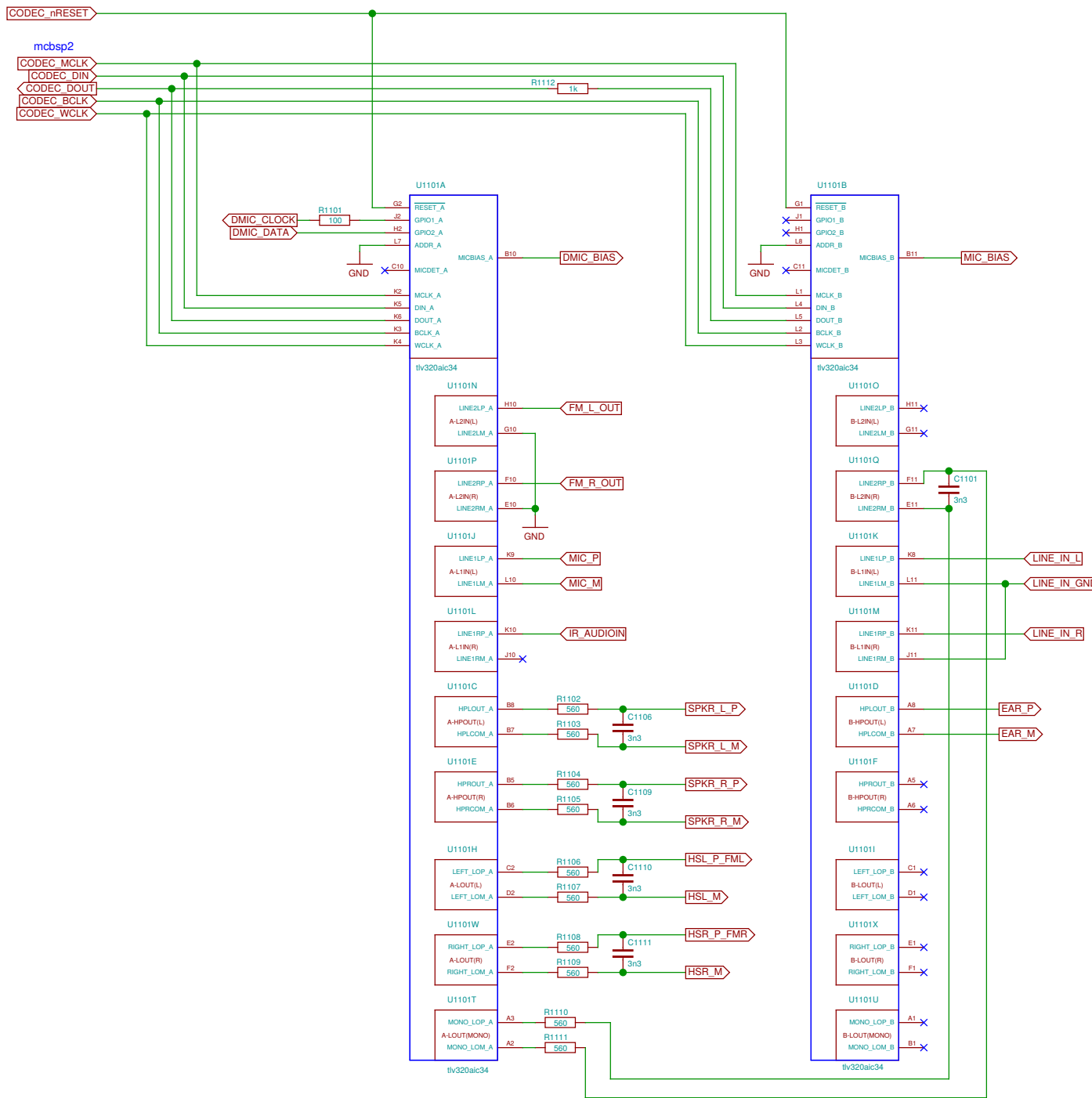
### Pressure, humidity



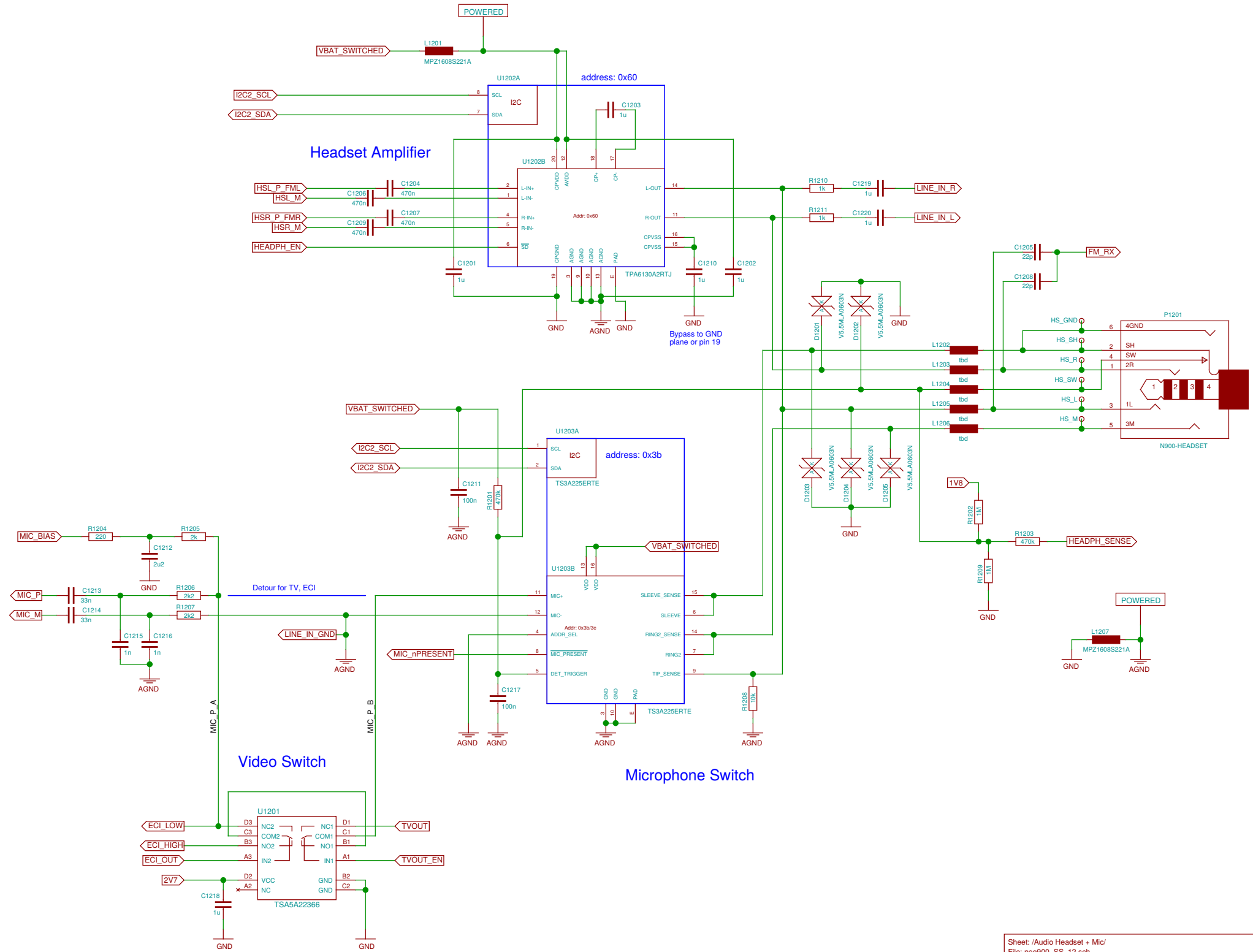
### 9-axis (acceleration, gyroscope, magnetometer)



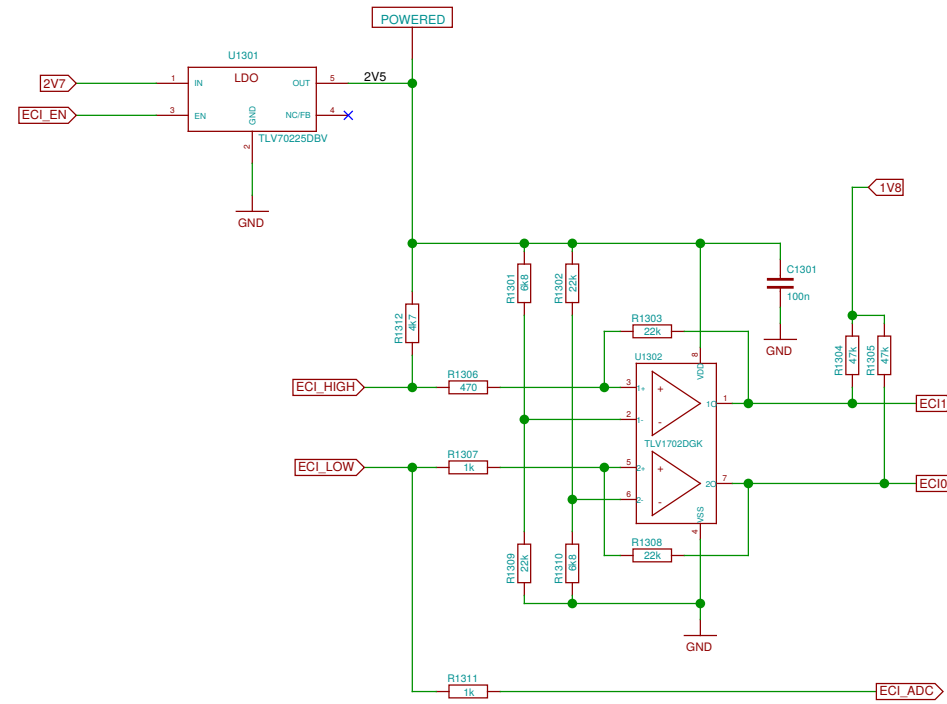
Sheet: /Sensors/		
File: neo900_SS_10.sch		
Title: Sensors		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow f43bc96+ 20161028-20:31Z		Id: 10/37



Sheet: /Audio Codec/		
File: neo900_SS_11.sch		
Title: Audio Codec		
Size: A3	Date: 2016-10-29 00:43:37	Rev:
Plotted by eeshow f43bc96+ 20161028-20:31Z		Id: 11/37

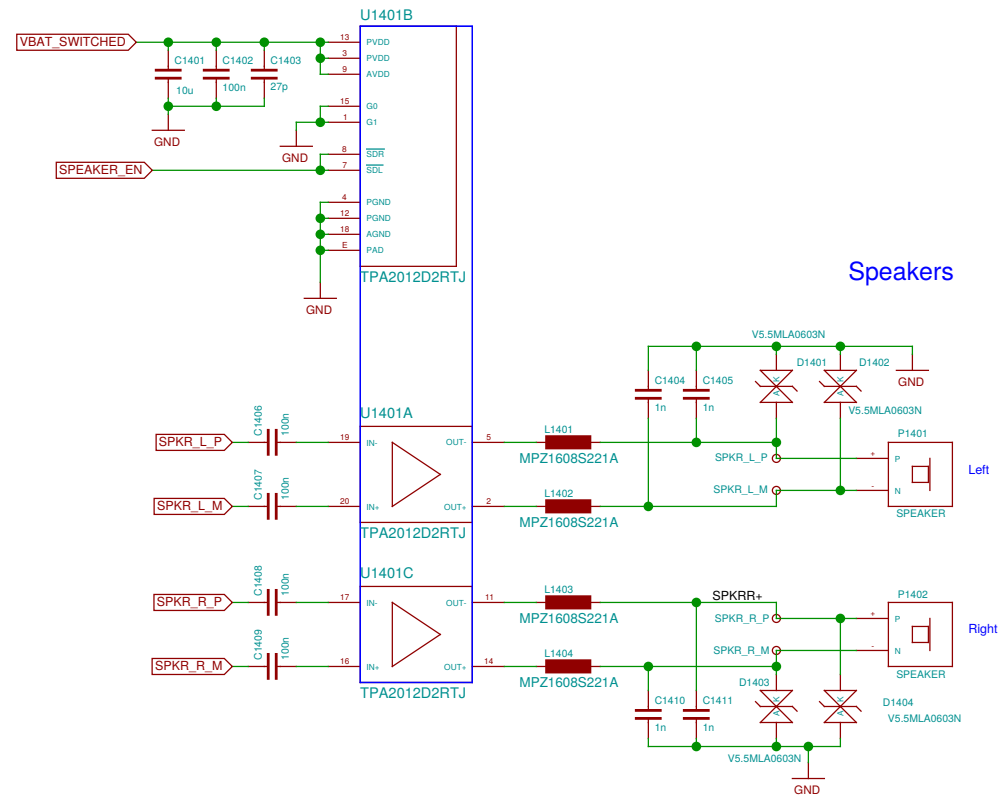


Sheet: /Audio Headset + Mic/ File: neo900_SS_12.sch		
Title: Audio Headset + Mic		
Size: A3	Date: 2016-10-29 00:43:37	Rev:
Plotted by eeshow f43bc96+ 20161028-20:31Z		Id: 12/37

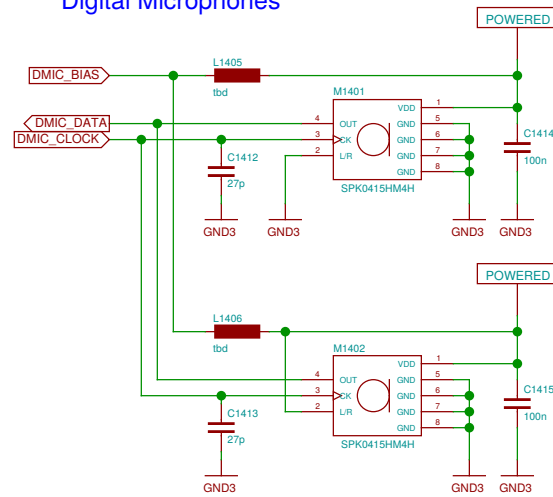


Sheet: /ECI/		
File: neo900_SS_13.sch		
Title: ECI		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow f43bc96+ 20161028-20:31Z		Id: 13/37

### Hands-free



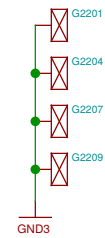
### Digital Microphones



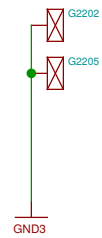
Sheet: /Audio Handsfree/		
File: neo900_SS_14.sch		
Title: Audio Handsfree		
Size: A3	Date: 2016-10-28 23:06:03	Rev:
Plotted by eeshow f43bc96+ 20161028-20:31Z		Id: 14/37

### Shield Contacts on UPPER

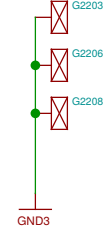
For the display



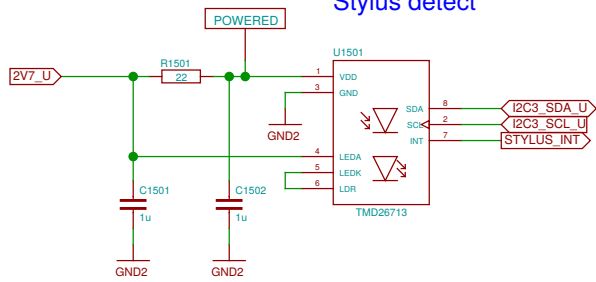
For the key mat



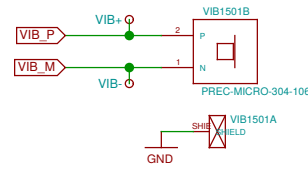
For the "key frame hook"



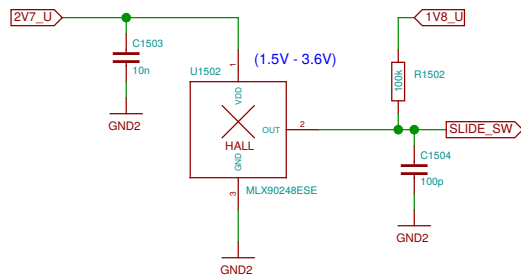
### Stylus detect



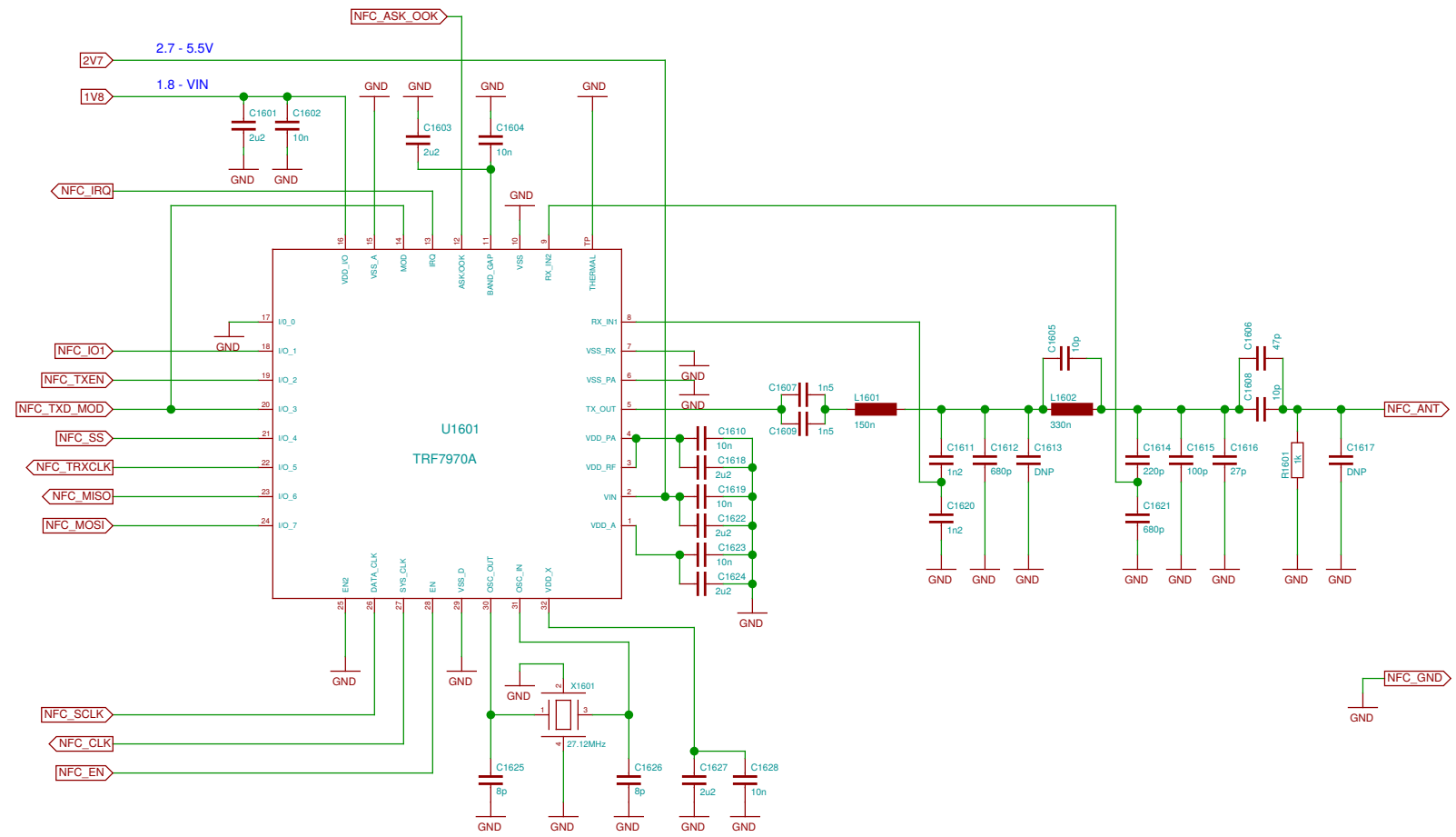
### Vibramotor



### Slide sensor



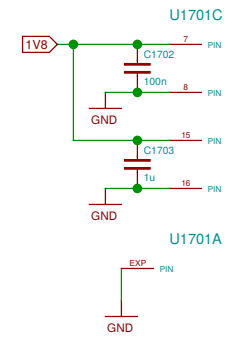
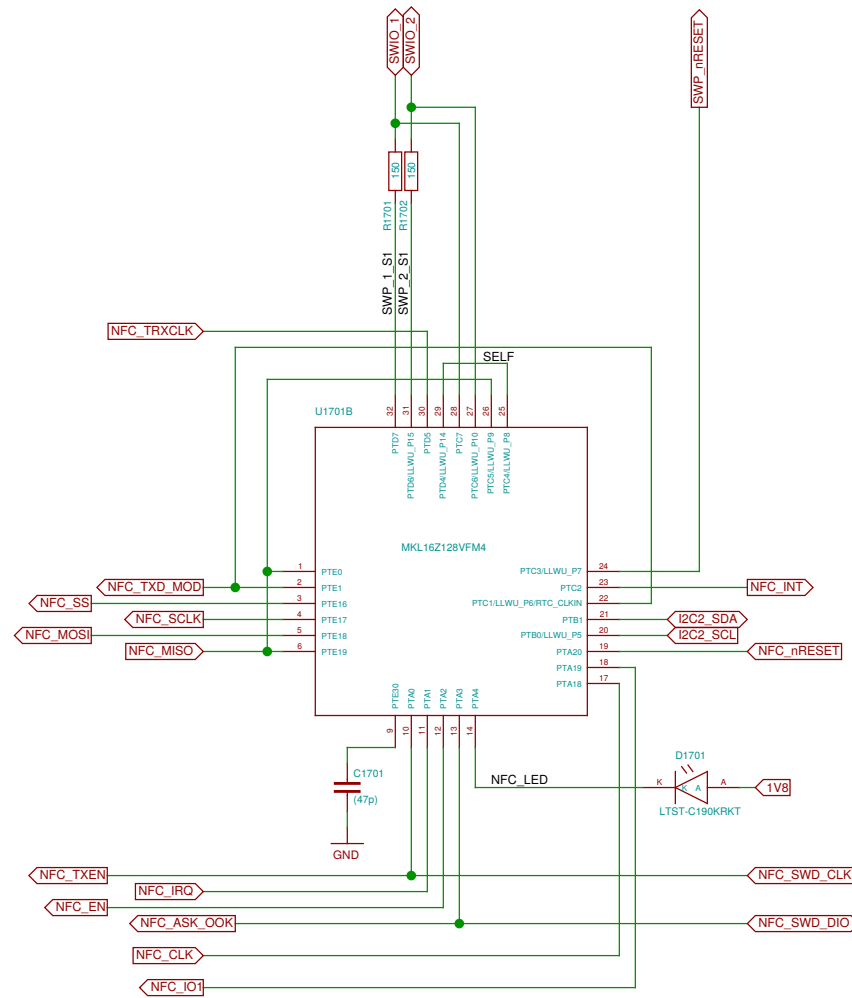
Sheet: Misc/ File: neo900_SS_15.sch		
Title: Misc		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow f43bc96+ 20161028-20:31Z		Id: 15/37



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 f43bc96+ 20161028-20:31Z		Id: 16/37

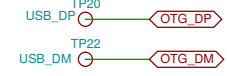
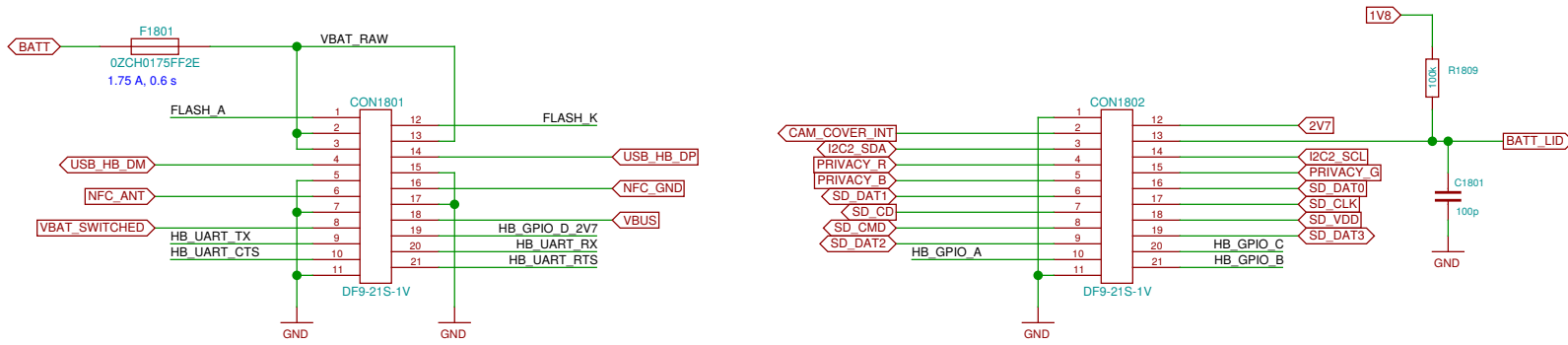




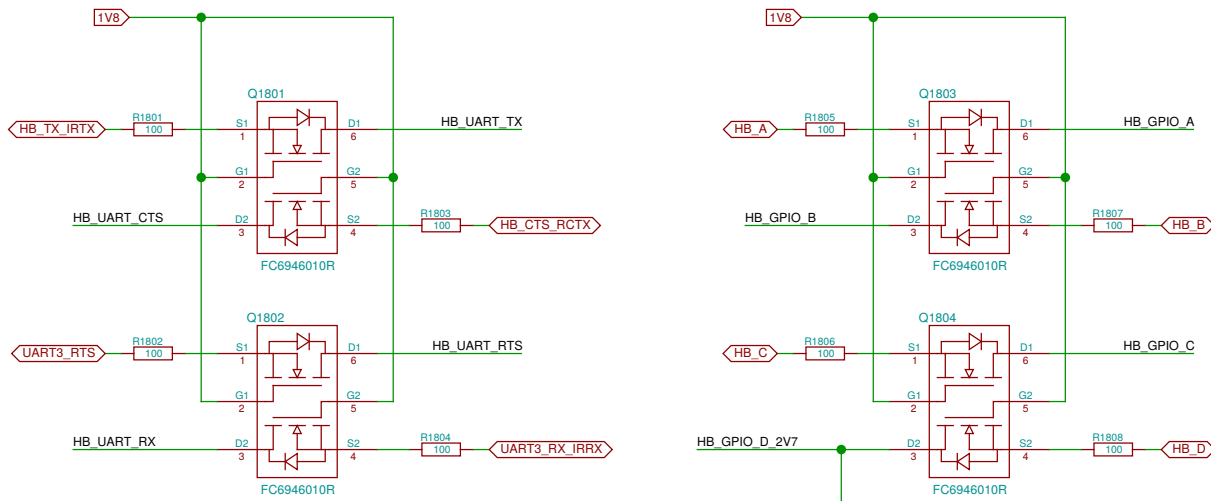
Sheet: /RFID/NFC Controller/		
File: neo900_SS_17.sch		
Title: RFID/NFC Controller		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow f43bc96+ 20161028-20:31Z		Id: 17/37

# LOWER-BOB Interconnect (LOWER side)

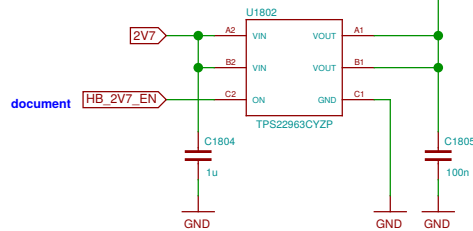
Defined in the Hackerbus specification, <http://neo900.org/stuff/papers/hb.pdf>



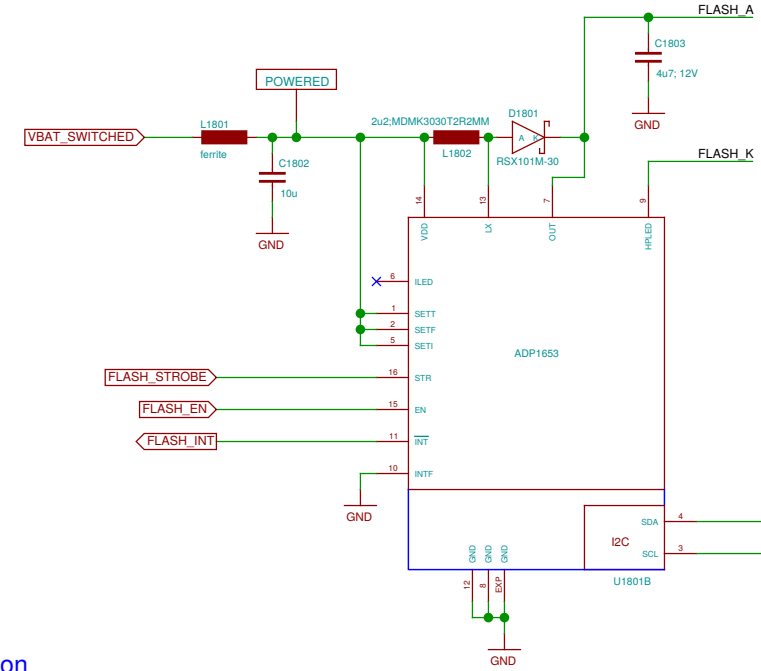
## Level shifters for Hackerbus GPIO and UART



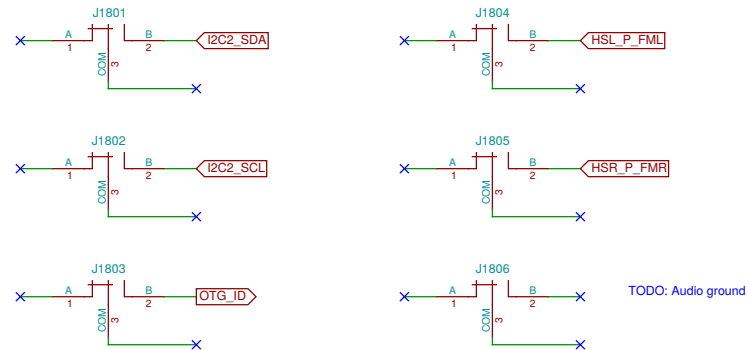
Q18xx alternative: Diodes DMN63D8LV



## Flash/Torch



## Alternate function selection



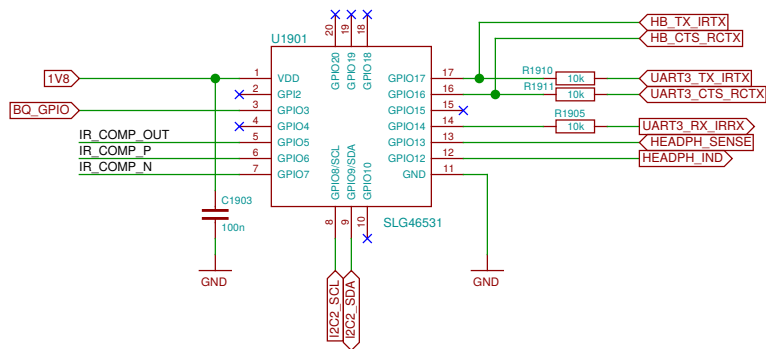
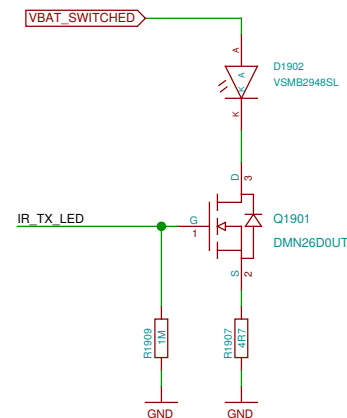
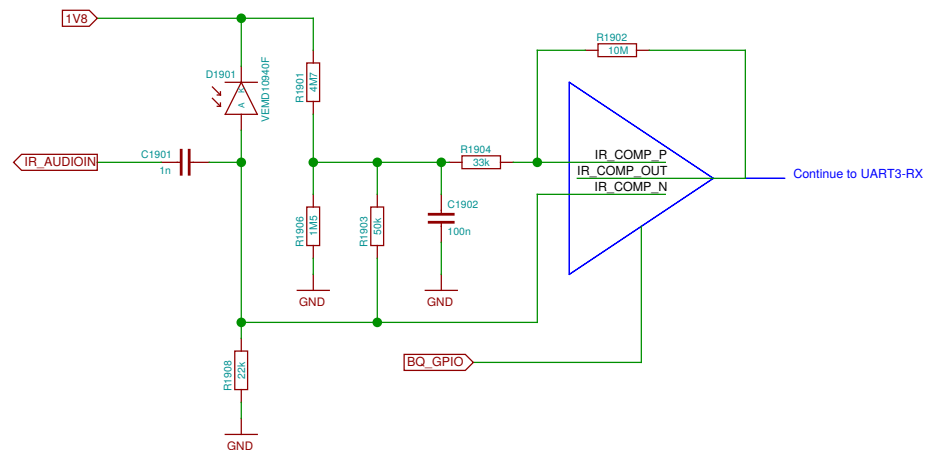
Sheet: /Hackerbus/ File: neo900_SS_18.sch		
Title: Hackerbus		
Size: A3	Date: 2016-10-28 23:55:25	Rev:
Plotted by eeshow f43bc96+ 20161028-20:31Z		Id: 18/37

(c) CC-BY-SA 2014-2016 Neo900 & GDC

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

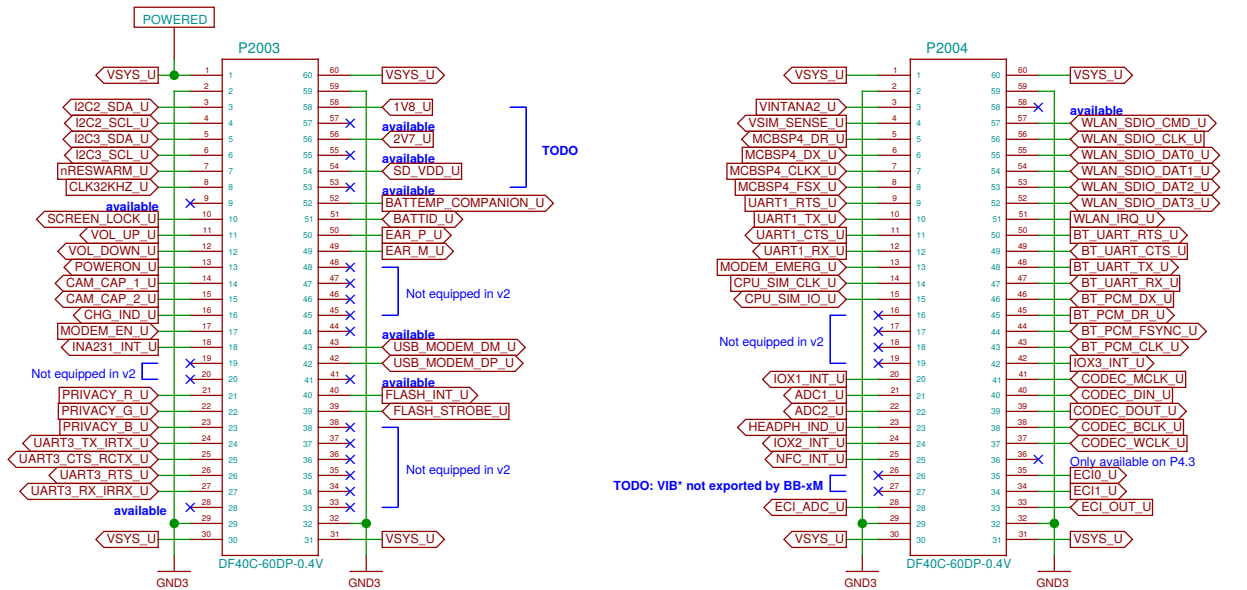
# TODO: update D1901 footprint

NOTE: 1V8 may be quite noisy

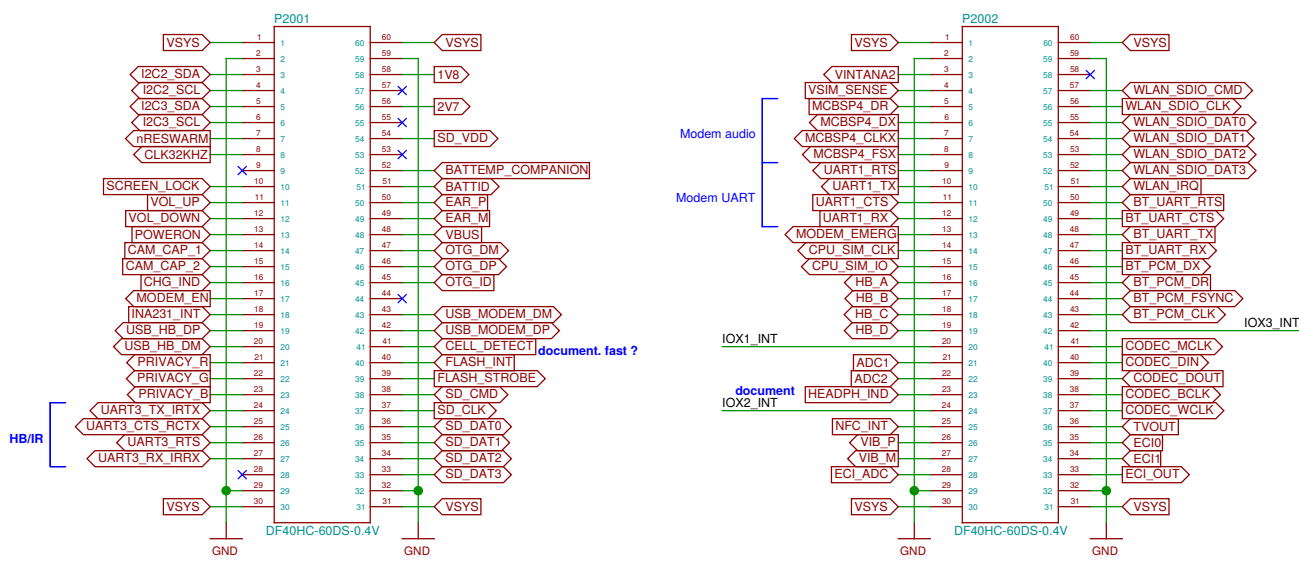
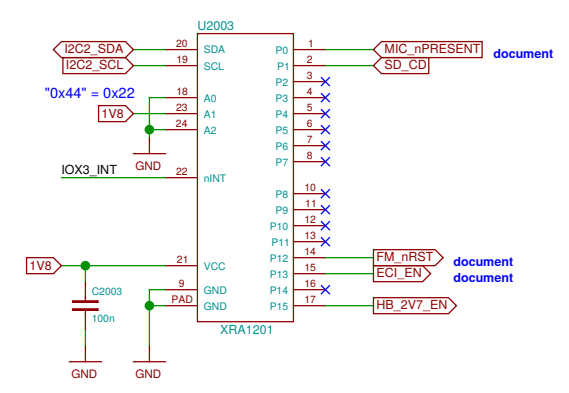
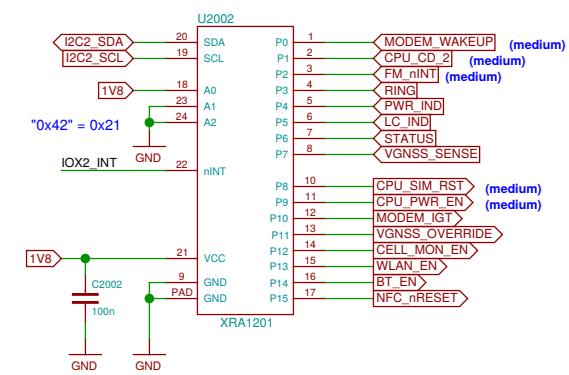
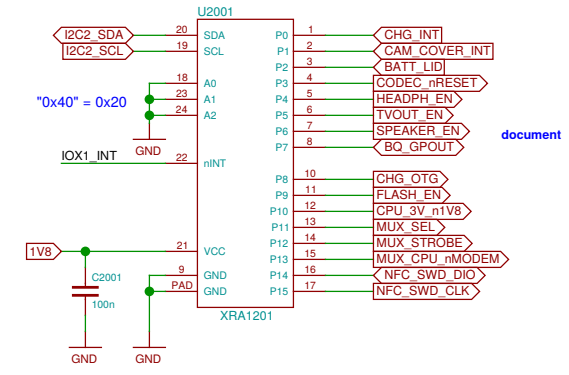


Sheet: /Infrared/ File: neo900_SS_19.sch		
Title: Infrared		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow f43bc96+ 20161028-20:31Z		Id: 19/37

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

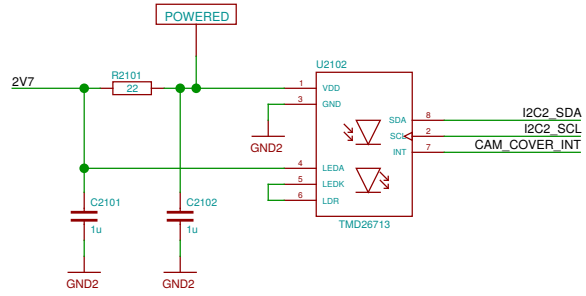


UPPER  
LOWER

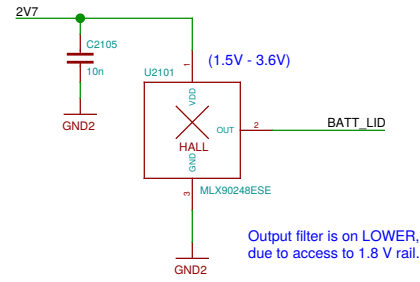


Current rating per contact: 0.3 A

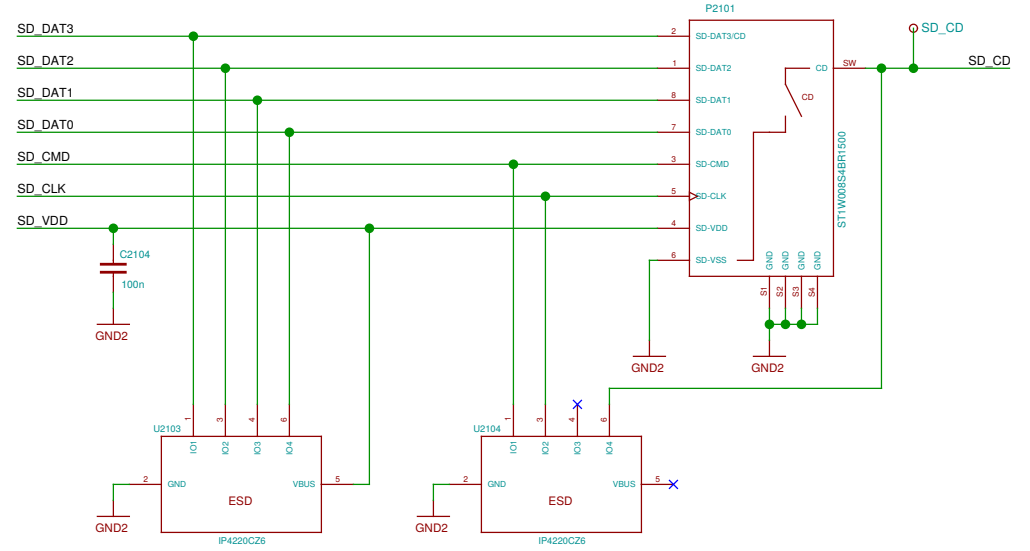
### Camera Cover detect



### Battery Cover detect

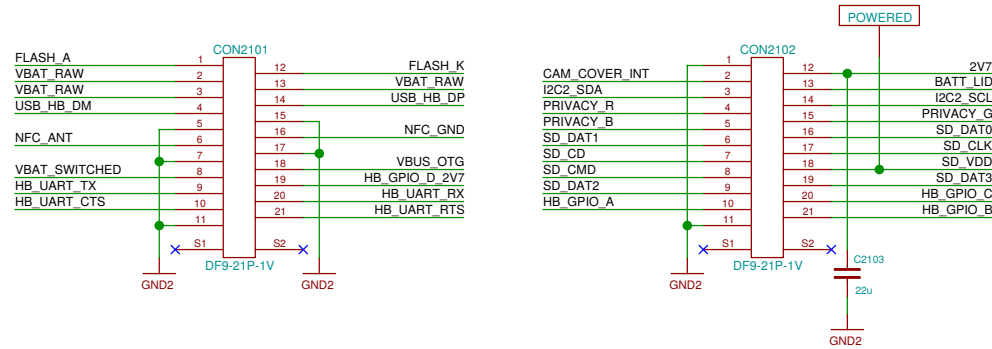


### Memory card holder

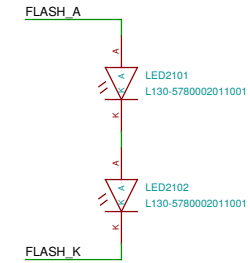


### LOWER-BOB Interconnect (BOB side)

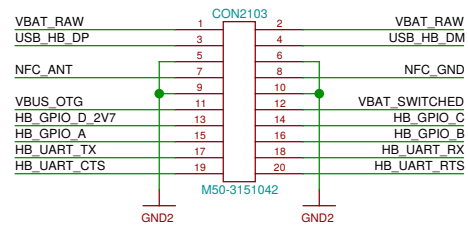
Defined in the Hackerbus specification, <http://neo900.org/stuff/papers/hb.pdf>



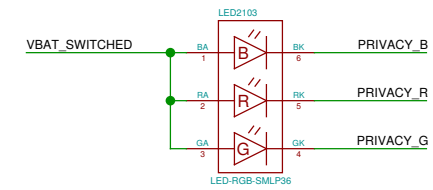
### Camera flash



### Hackerbus



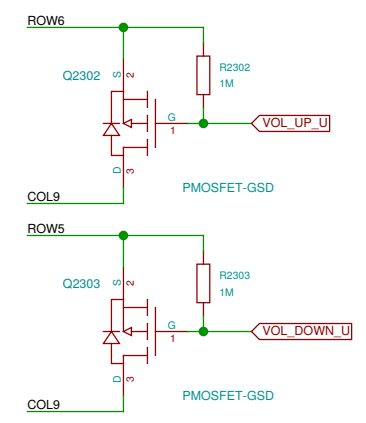
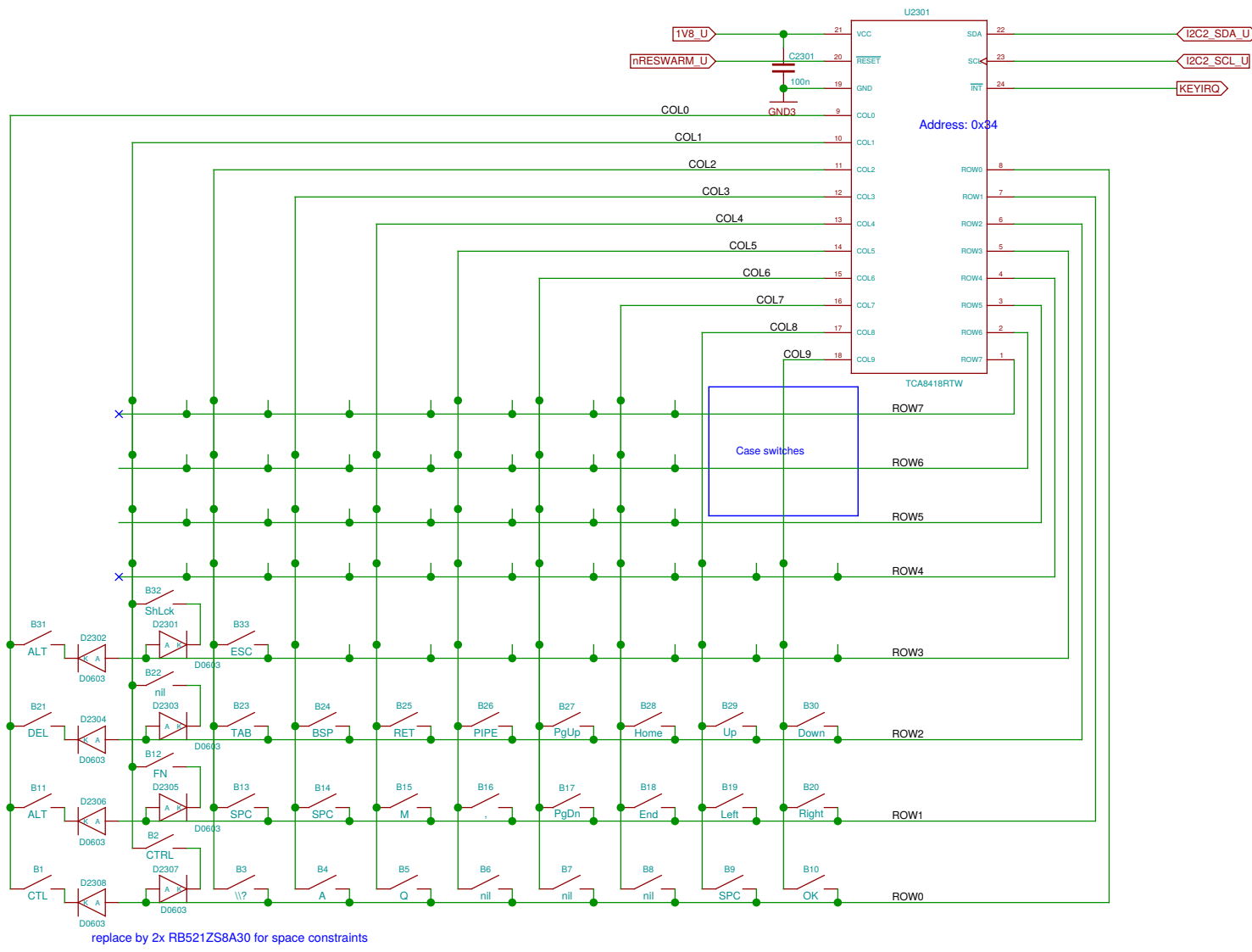
### Privacy LED



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 f43bc96+ 20161028-20:31Z		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 f43bc96+ 20161028-20:31Z		Id: 22/37



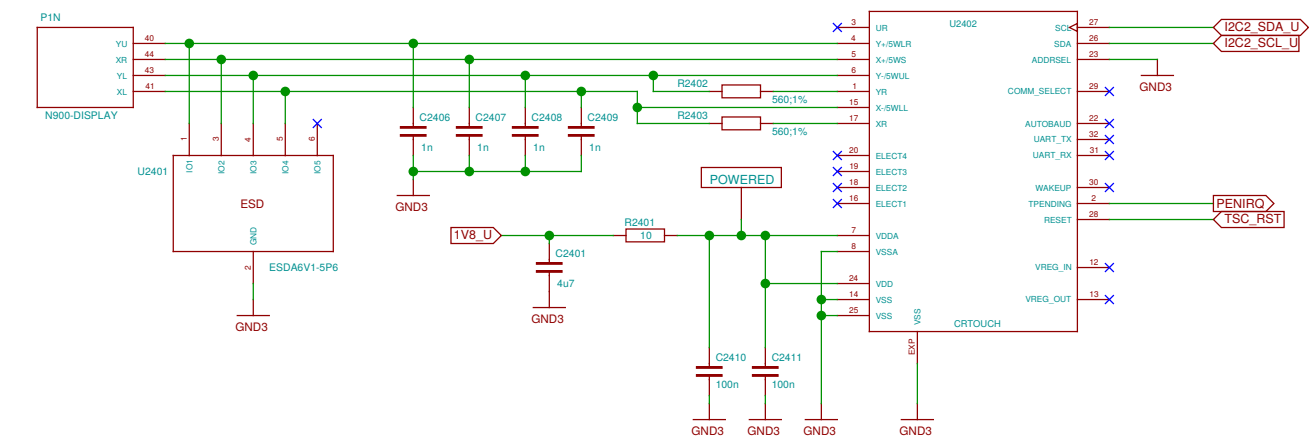
**TODO: key names are nonsense**

**TODO: rearrange matrix to avoid diodes ?**

Sheet: /Keypad/		
File: neo900_SS_23.sch		
Title: Keypad		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow f43bc96+ 20161028-20:31Z		Id: 23/37

Resistive Touch (display connector)

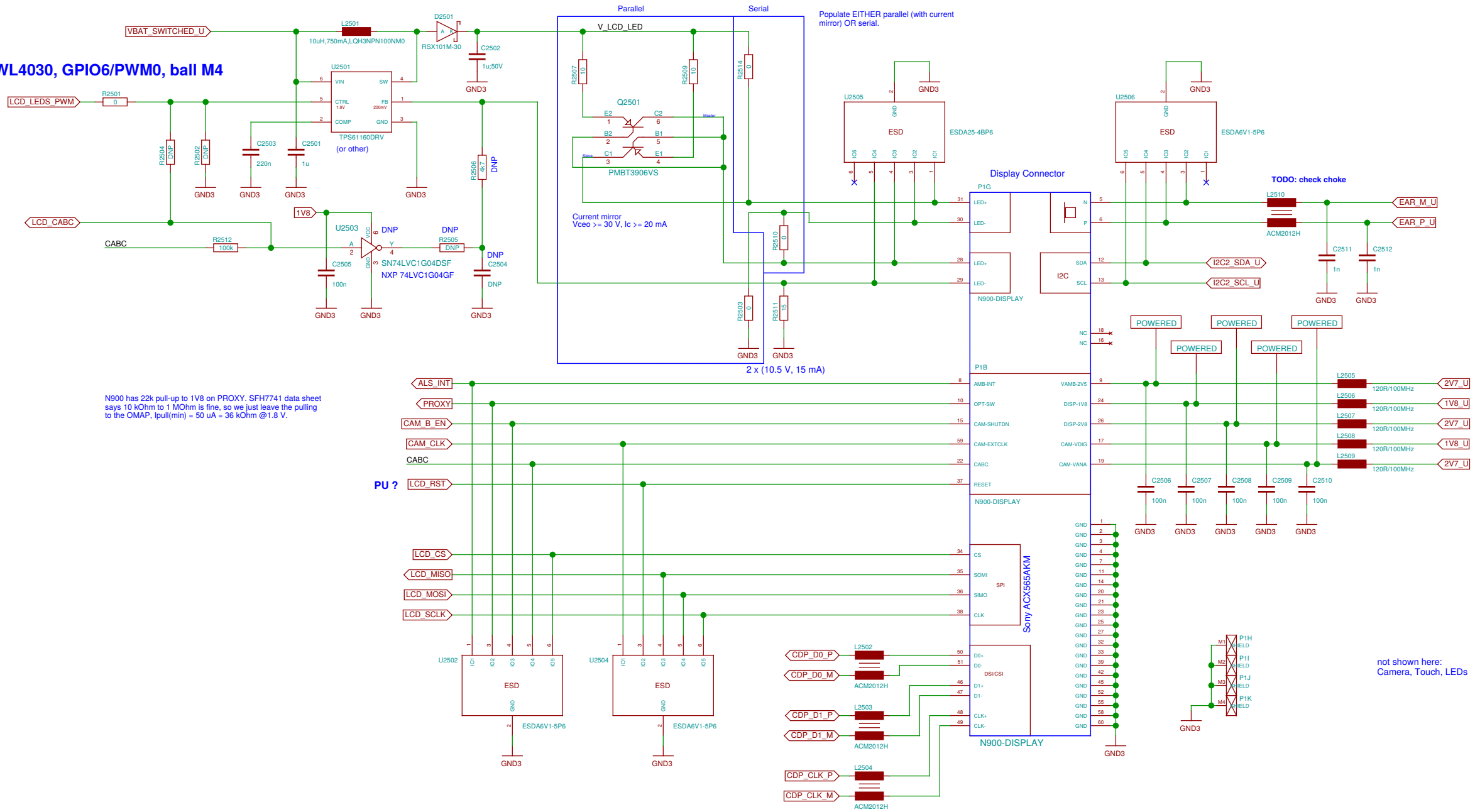
Touch screen controller



Sheet: /Display-Peripherals/ File: neo900_SS_24.sch		
Title: Display-Peripherals		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow f43bc96+ 20161028-20:31Z		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 ?

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 f43bc96+ 20161028-20:31Z		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 f43bc96+ 20161028-20:31Z		Id: 26/37

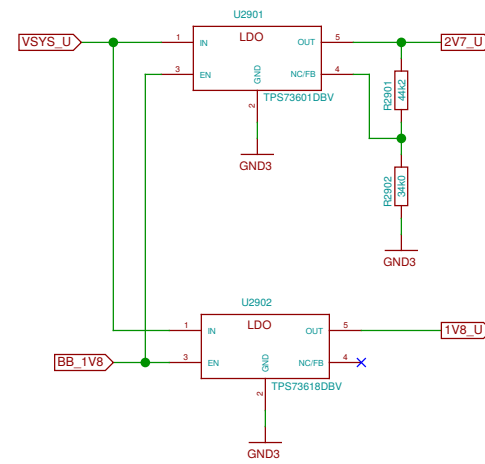
**eMMC is not part of v2**

Sheet: /eMMC/ File: neo900_SS_27.sch		
Title: eMMC		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow f43bc96+ 20161028-20:31Z		Id: 27/37

**Companion chip (TPS65950) is not part of v2**

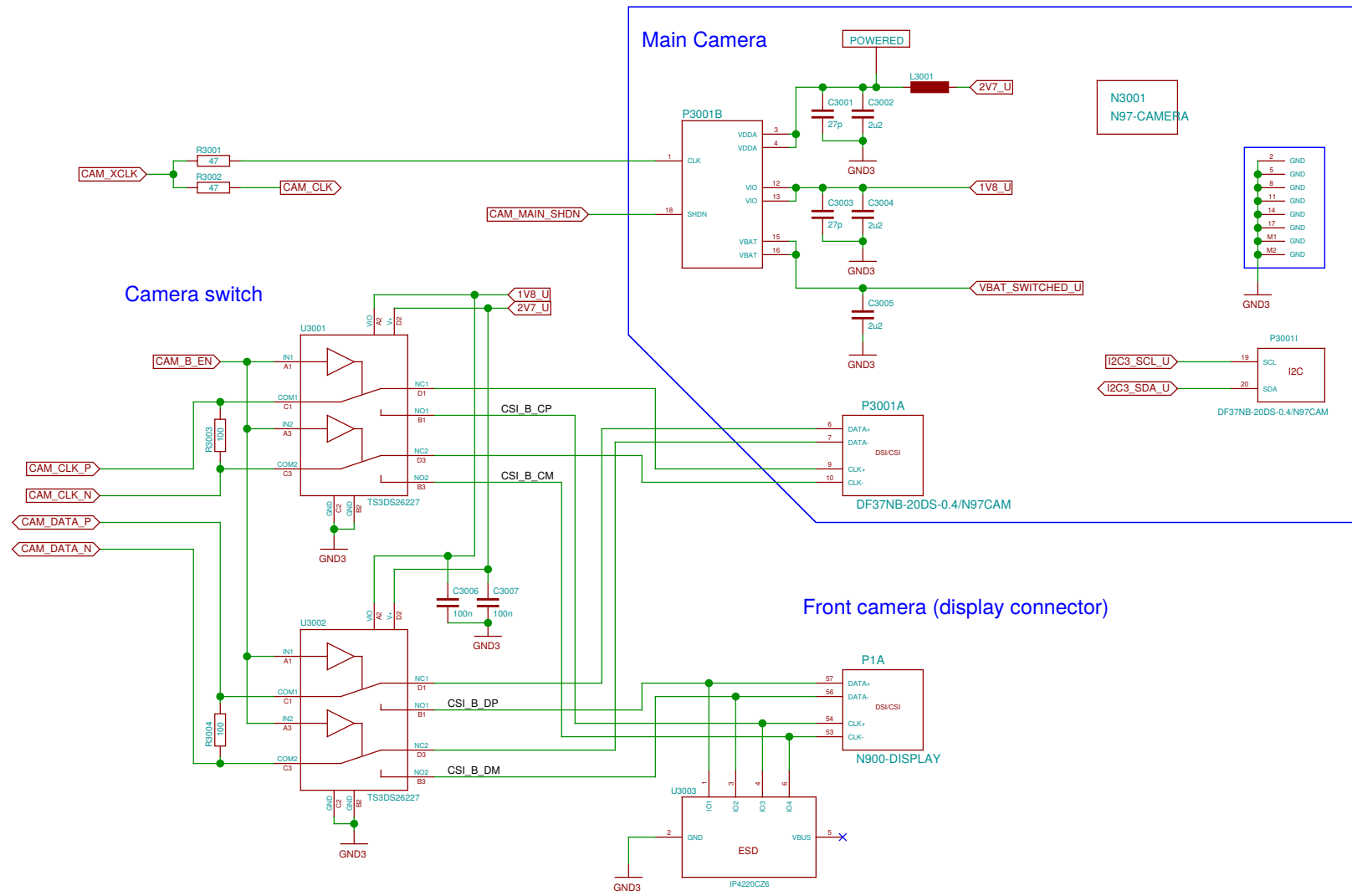
Sheet: /PMU+Codec/ File: neo900_SS_28.sch		
Title: PMU+Codec		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow f43bc96+ 20161028-20:31Z		Id: 28/37

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

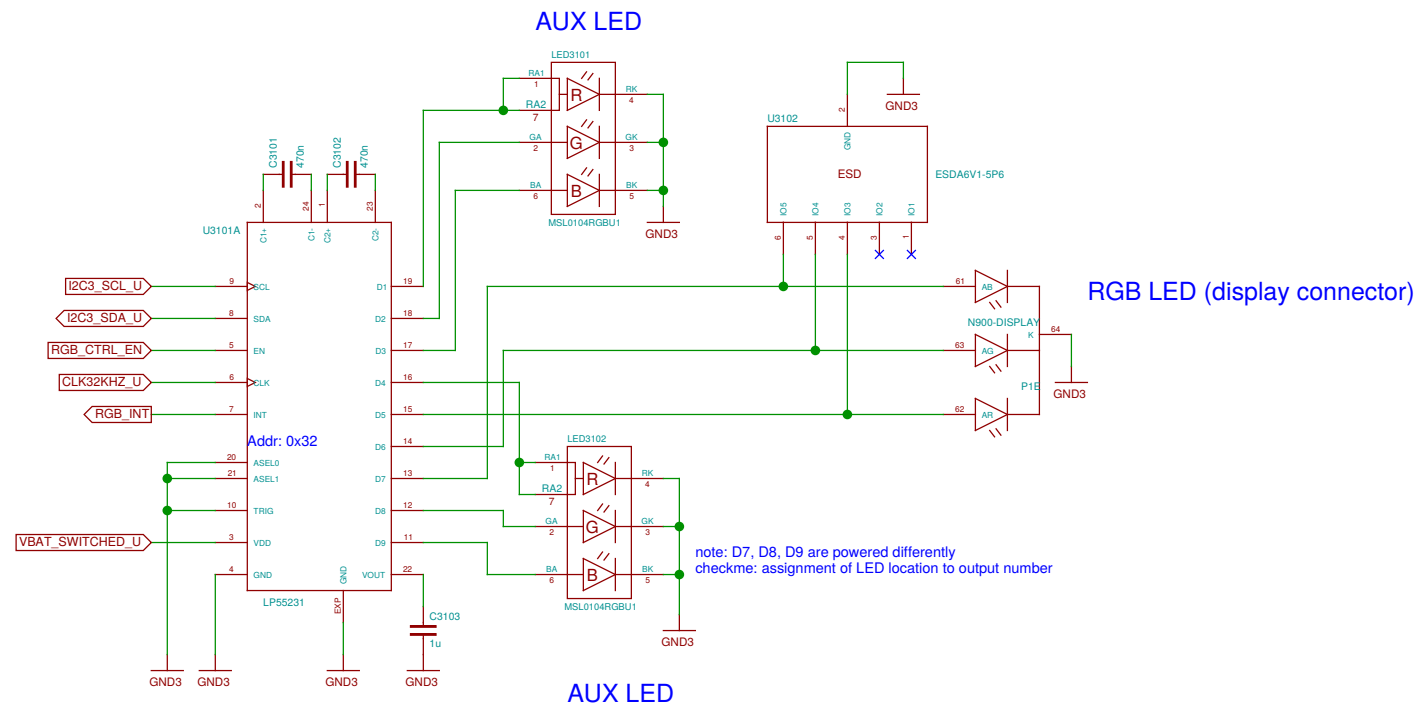


TODO: use REGEN ?

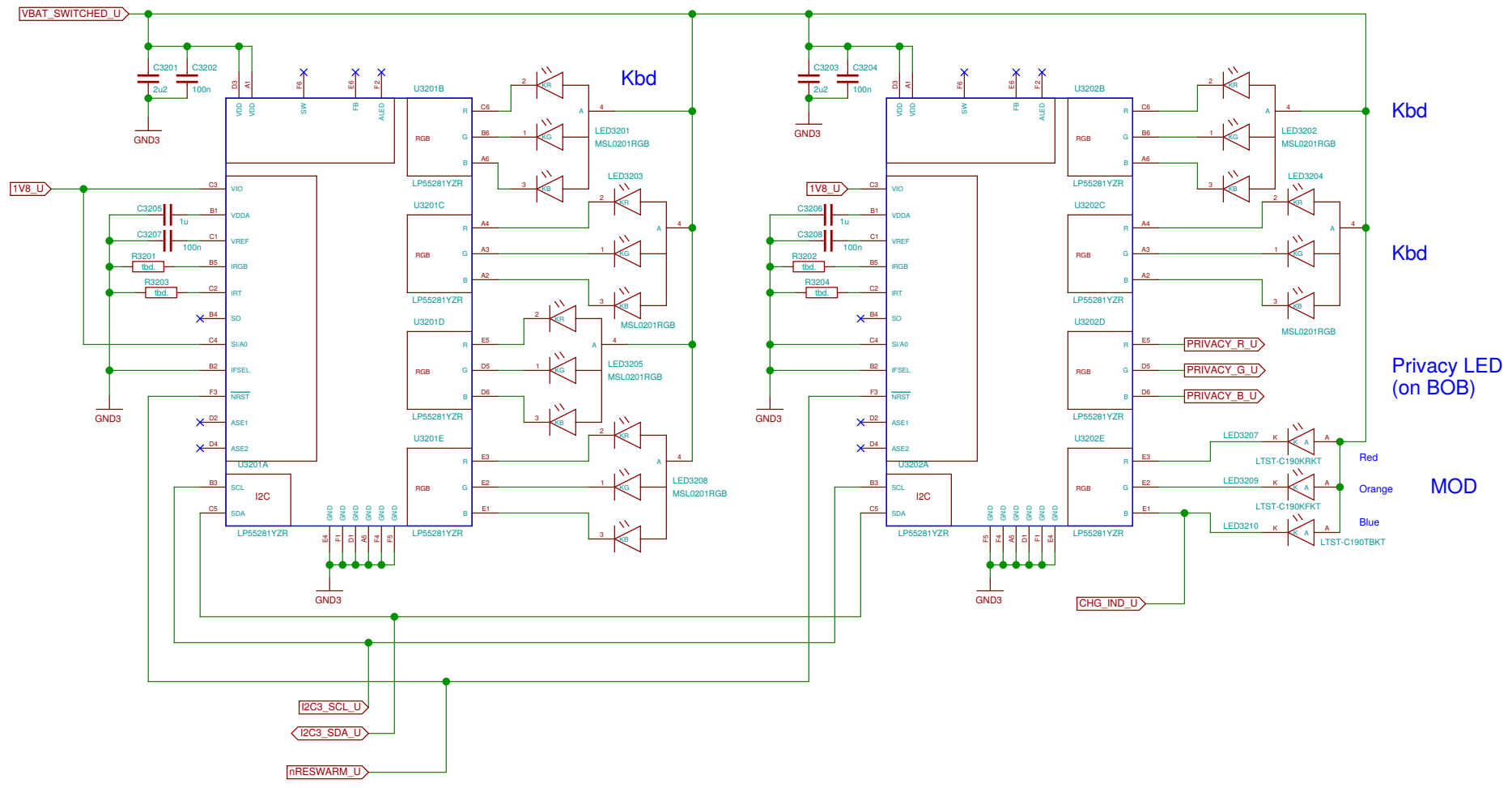
Sheet: /BB-XM Dummy (TWL4030)/		
File: neo900_SS_29.sch		
Title: BB-XM Dummy (TWL4030)		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow f43bc96+ 20161028-20:31Z		Id: 29/37



Sheet: /Camera/ File: neo900_SS_30.sch		
Title: Camera		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow f43bc96+ 20161028-20:31Z		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 f43bc96+ 20161028-20:31Z		Id: 31/37



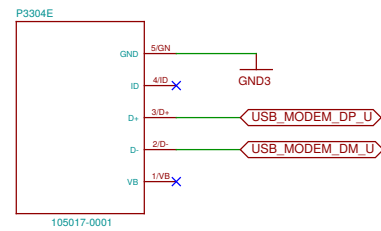
Sheet: /Basic LEDs/		
File: neo900_SS_32.sch		
Title: Basic LEDs		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow f43bc96+ 20161028-20:31Z		Id: 32/37



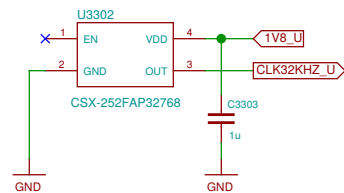
Cleaning up. The connections to BB-xM are on the next sheets.

connect to BB  
by some Micro-USB cable

### Modem USB



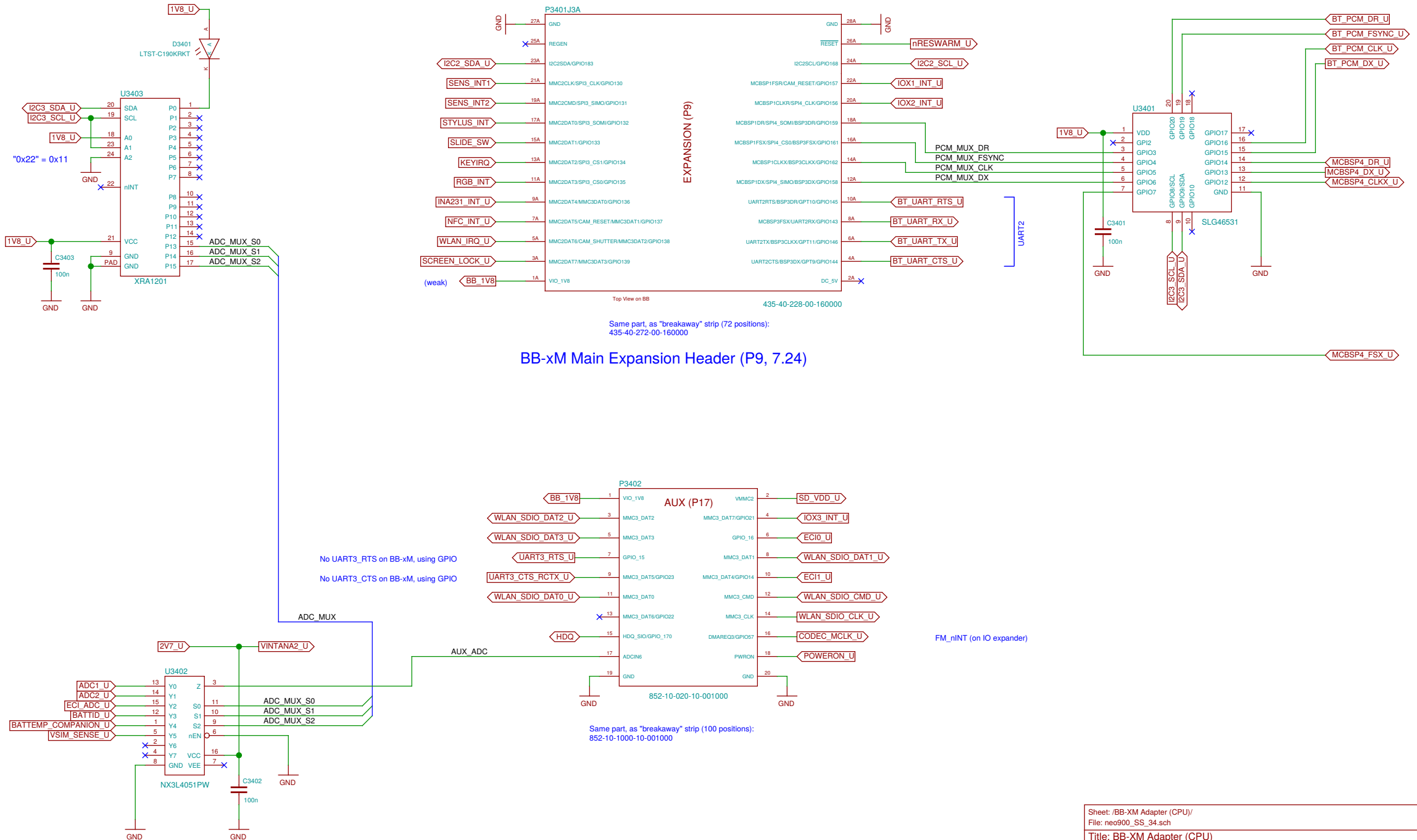
### 32 kHz clock



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 f43bc96+ 20161028-20:31Z		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)

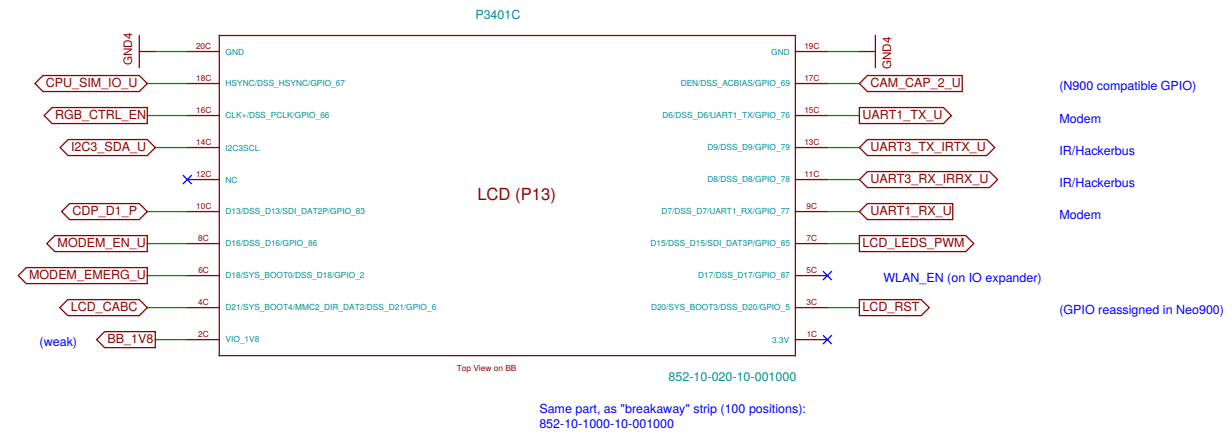
Same part, as "breakaway" strip (100 positions):  
852-10-1000-10-001000

Sheet: /BB-XM Adapter (CPU)/		
File: neo900_SS_34.sch		
Title: BB-XM Adapter (CPU)		
Size: A3	Date: 2016-10-28 21:16:24	Rev:
Plotted by eeshow f43bc96+ 20161028-20:31Z		Id: 34/37

### P11 (7.25)



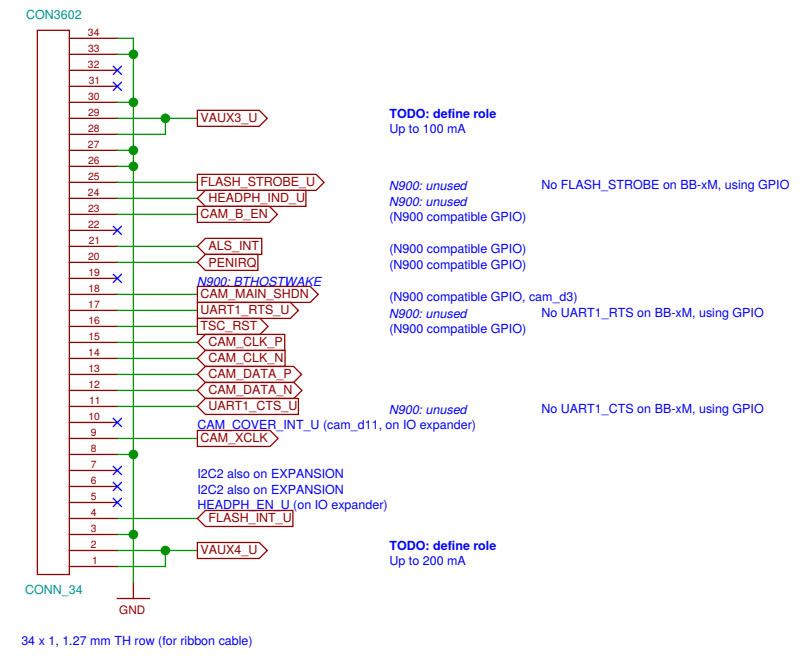
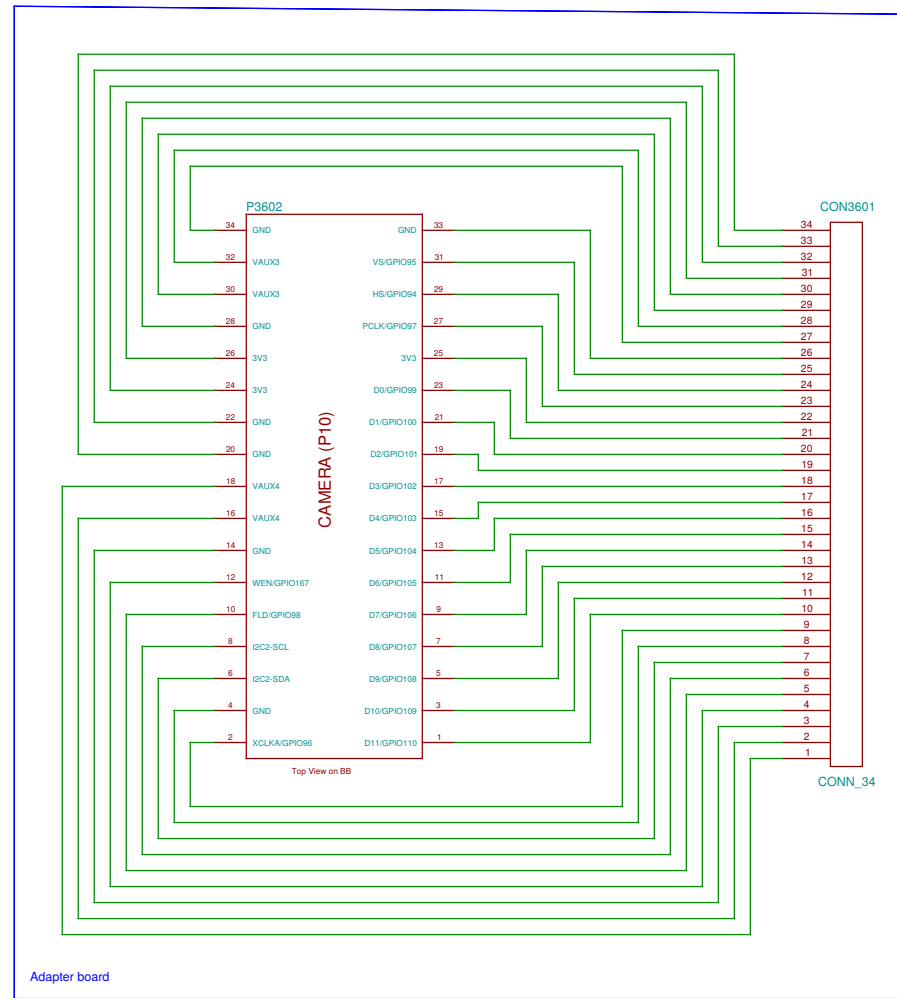
### P13 (7.25)



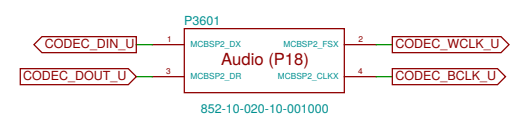
**TODO: update pin names in footprint**

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 f43bc96+ 20161028-20:31Z		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 f43bc96+ 20161028-20:31Z		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
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N3705 N97-CAMERA-HOLE
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N3706 headset jack
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N3707 STENCIL-TOP
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N3708 STENCIL-BOTTOM
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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 f43bc96+ 20161028-20:31Z		Id: 37/37