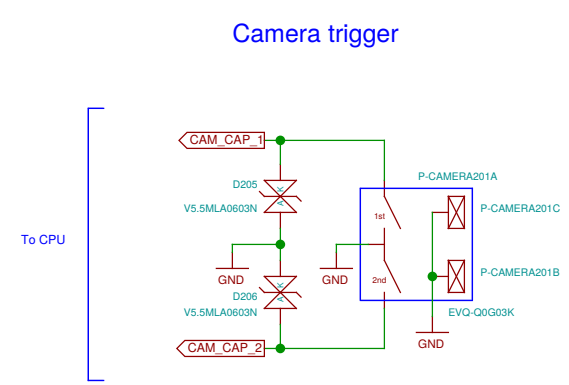
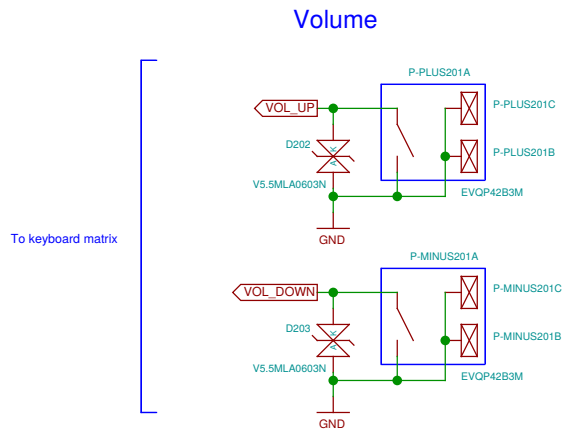
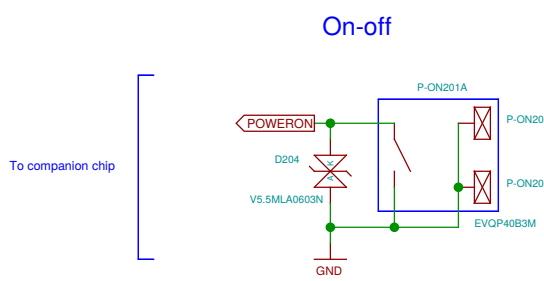
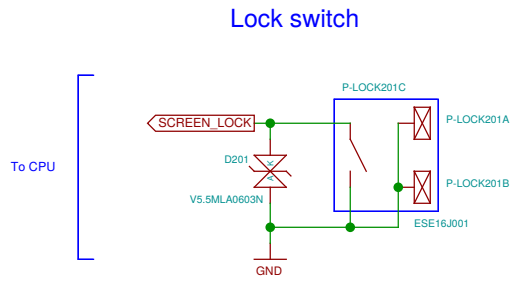
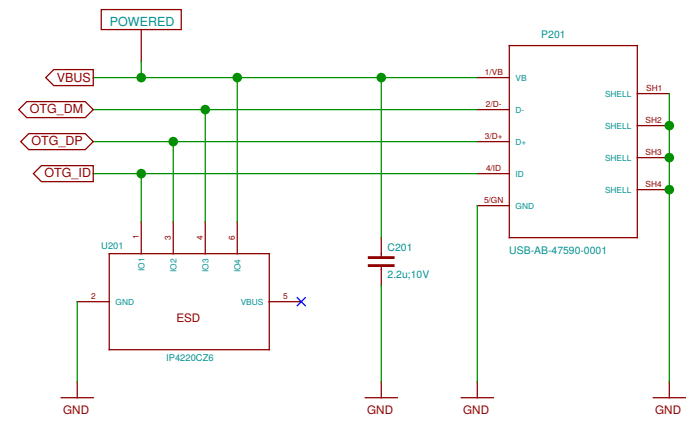


| | | | | | | | | | | |
|--|---|---|---------------------------|---|---|---|---|------------------------------|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Click Here V | | | | | | | | | | |
| This sheet: index | | | | | | | | | | |
| Sheet: OTG File: neo900_SS_2.sch | | | | | | | | | | |
| 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 V | | | | | | | | | | |
| 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/misc/tree/i2c | | | | | | | | | | |
| | | | | | | | | Sheet: / File: neo900.sch | | |
| | | | | | | | | Title: Neo900 | | |
| Size: A3 | | | Date: 2016-10-31 08:32:45 | | | | | Rev: | | |
| Plotted by eeshow 96ef3e0+ 20161030-17:20Z | | | | | | | | Id: 1/37 | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |

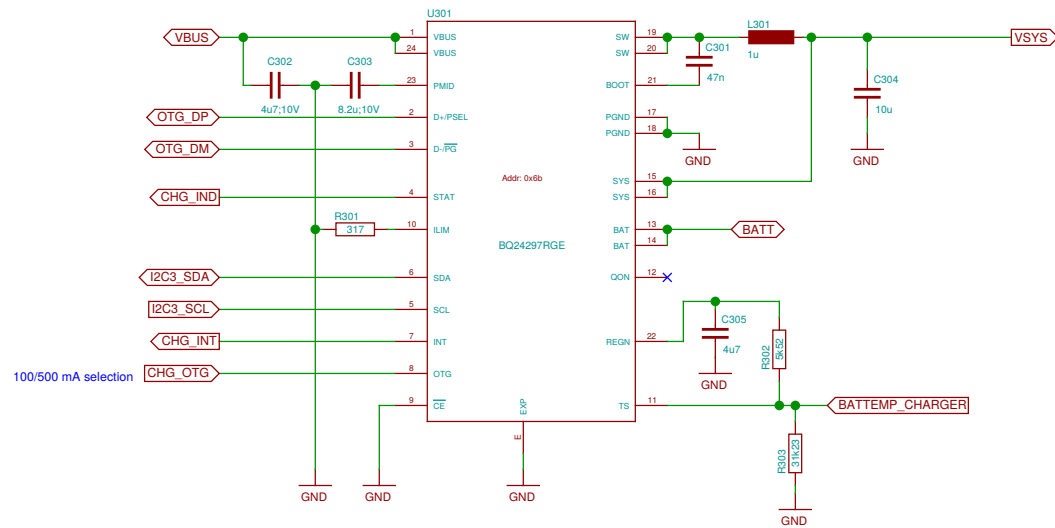


USB OTG connector



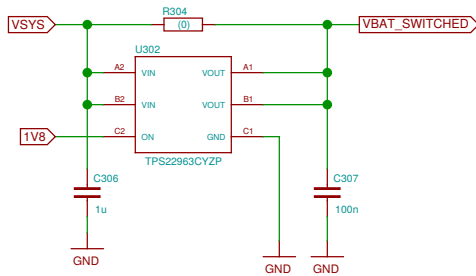
| | | |
|--|---------------------------|----------|
| Sheet: /OTG/ File: neo900_SS_2.sch | | |
| Title: OTG | | |
| Size: A3 | Date: 2016-10-31 08:32:45 | Rev: |
| Plotted by eeshow 96ef3e0+ 20161030-17:20Z | | Id: 2/37 |

Battery charger with USB OTG

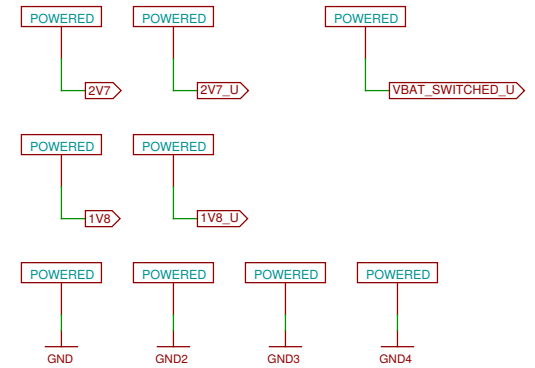


Power distribution and sequencing

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

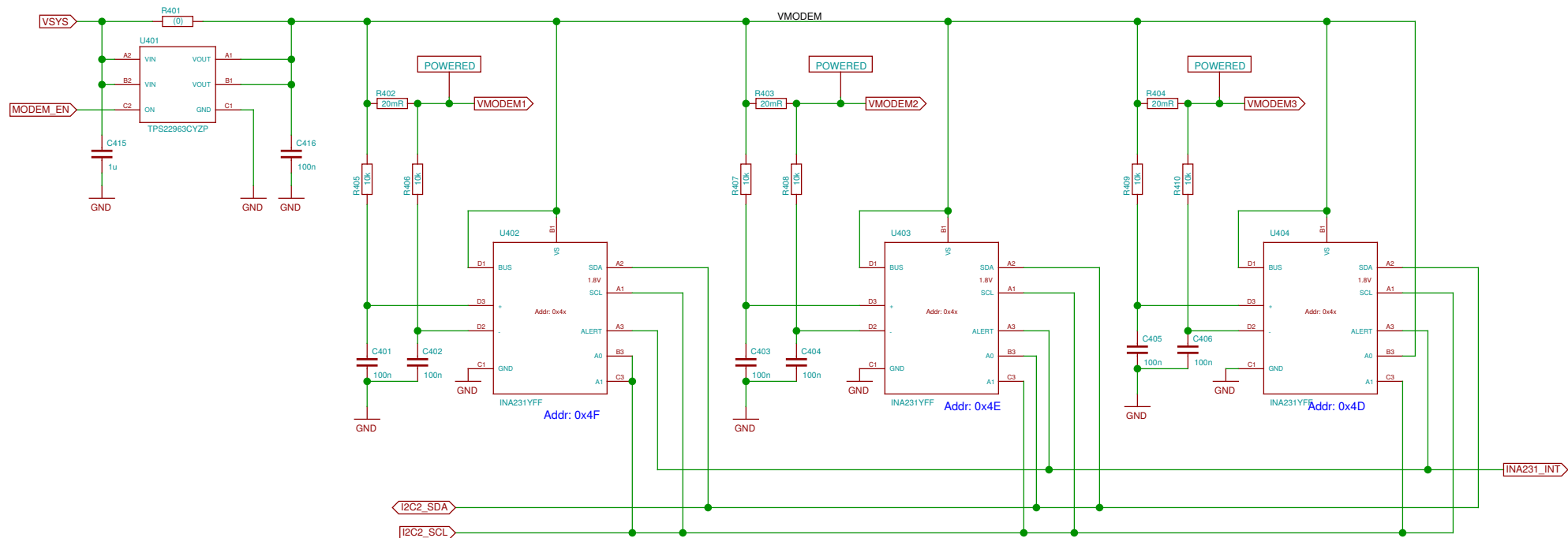


KiCad bureaucracy

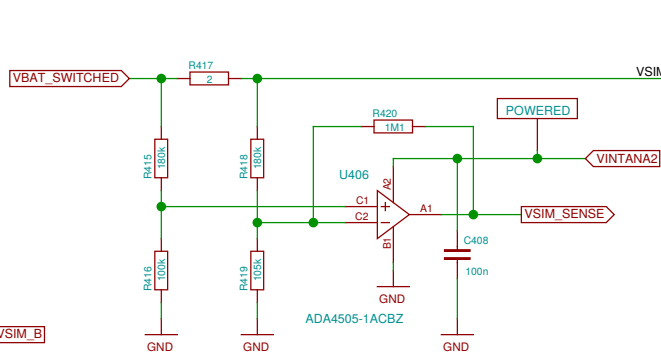


| | | |
|--|---------------------------|----------|
| Sheet: /Charger/OTG-Booster/ | | |
| File: neo900_SS_3.sch | | |
| Title: Charger/OTG-Booster | | |
| Size: A3 | Date: 2016-10-31 08:32:45 | Rev: |
| Plotted by eeshow 96ef3e0+ 20161030-17:20Z | | Id: 3/37 |

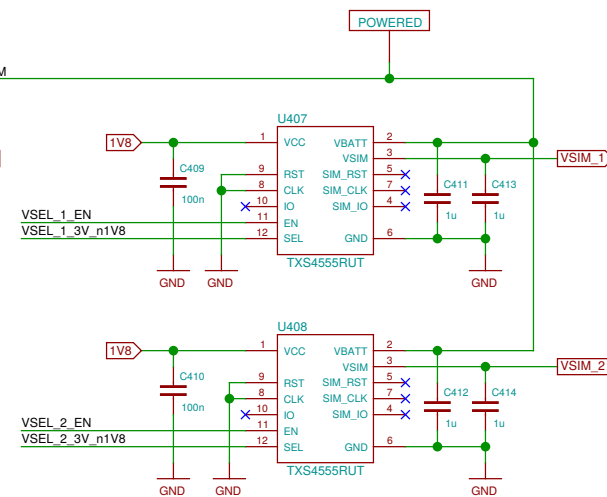
Modem current monitor



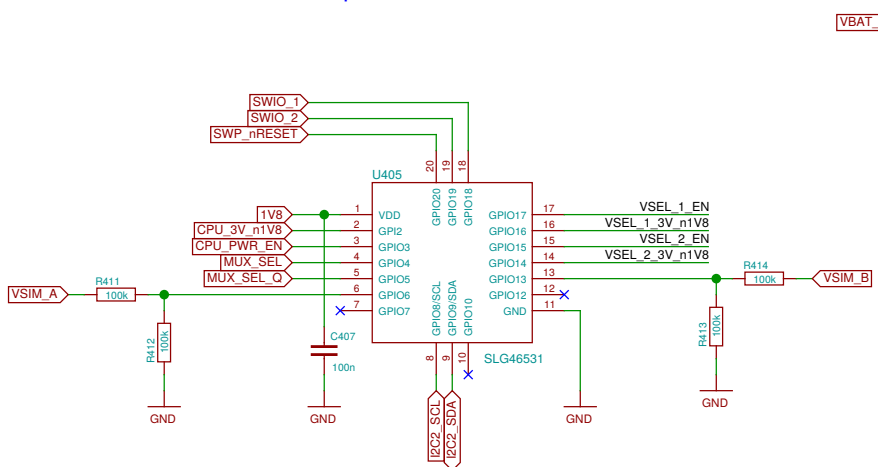
SIM current sensing



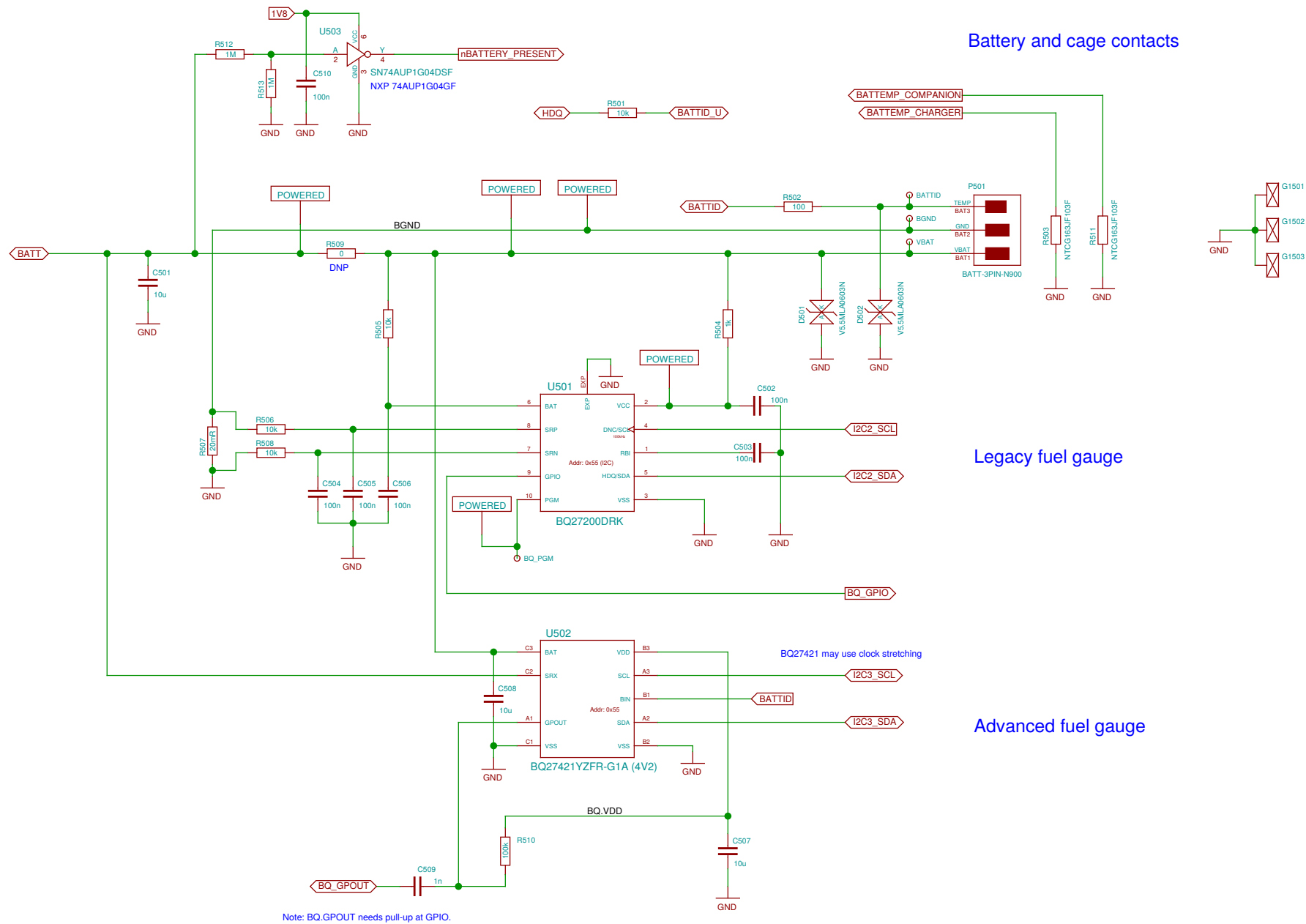
SIM power supply



SIM power selection



TODO: update SLG design for changed pins



Battery and cage contacts

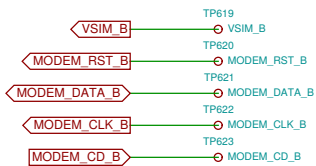
Legacy fuel gauge

Advanced fuel gauge

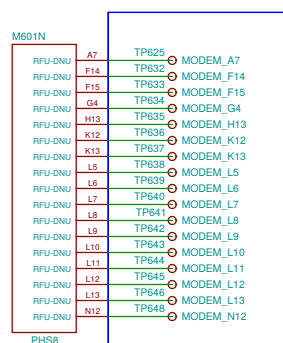
Note: BQ.GPOUT needs pull-up at GPIO.

| | | |
|--|---------------------------|----------|
| Sheet: /Fuel Gauge/ | | |
| File: neo900_SS_5.sch | | |
| Title: Fuel Gauge | | |
| Size: A3 | Date: 2016-10-31 08:32:45 | Rev: |
| Plotted by eeshow 96ef3e0+ 20161030-17:20Z | | Id: 5/37 |

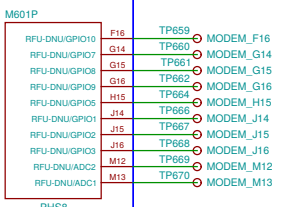
SIM B bus



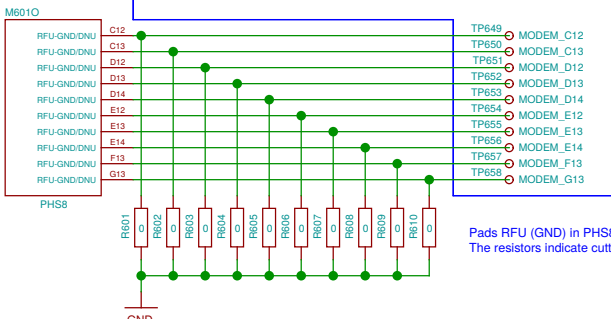
17+10+10 = 37 test points. PCB space permitting, to be in arranged a 6 x 6 + 1 grid with 1.0 mm pitch. This patchfield is to be placed adjacent to the SIM B bus test points.



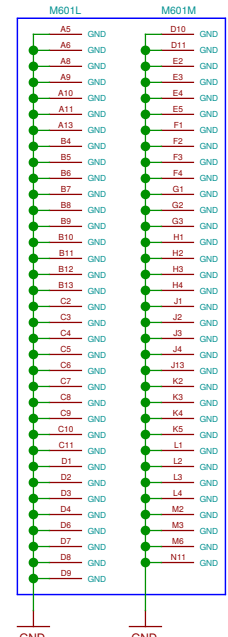
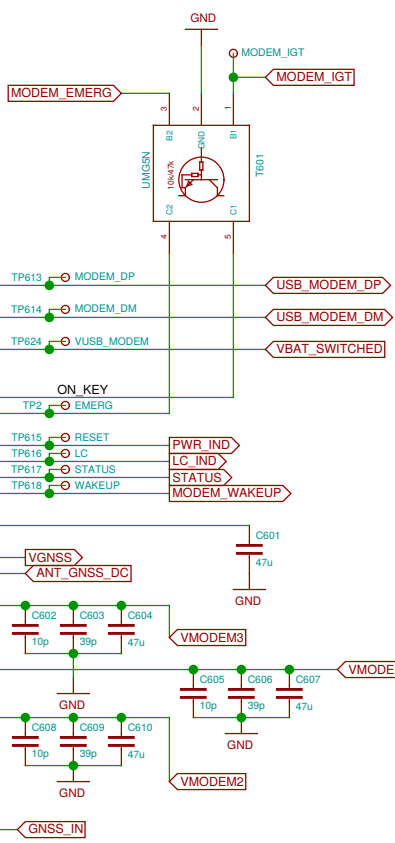
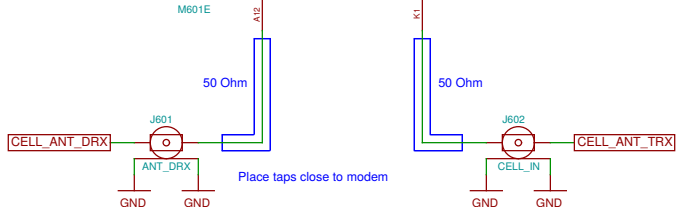
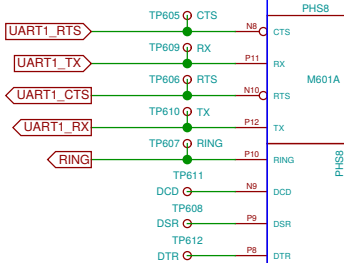
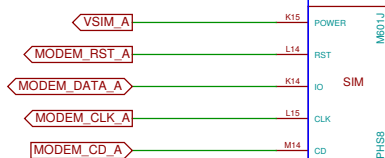
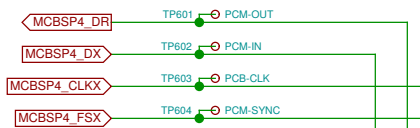
Pads that are DNU in PHS8 and PLS8.



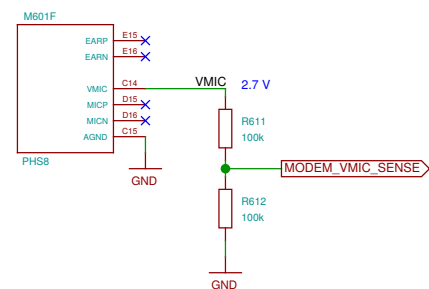
Pads that are DNU in PHS8 but have a GPIO or ADC function assigned to them in PLS8.



Pads RFU (GND) in PHS8 and RFU (DNU) in PLS8. The resistors indicate cuttable traces.



Anti-eavesdropping

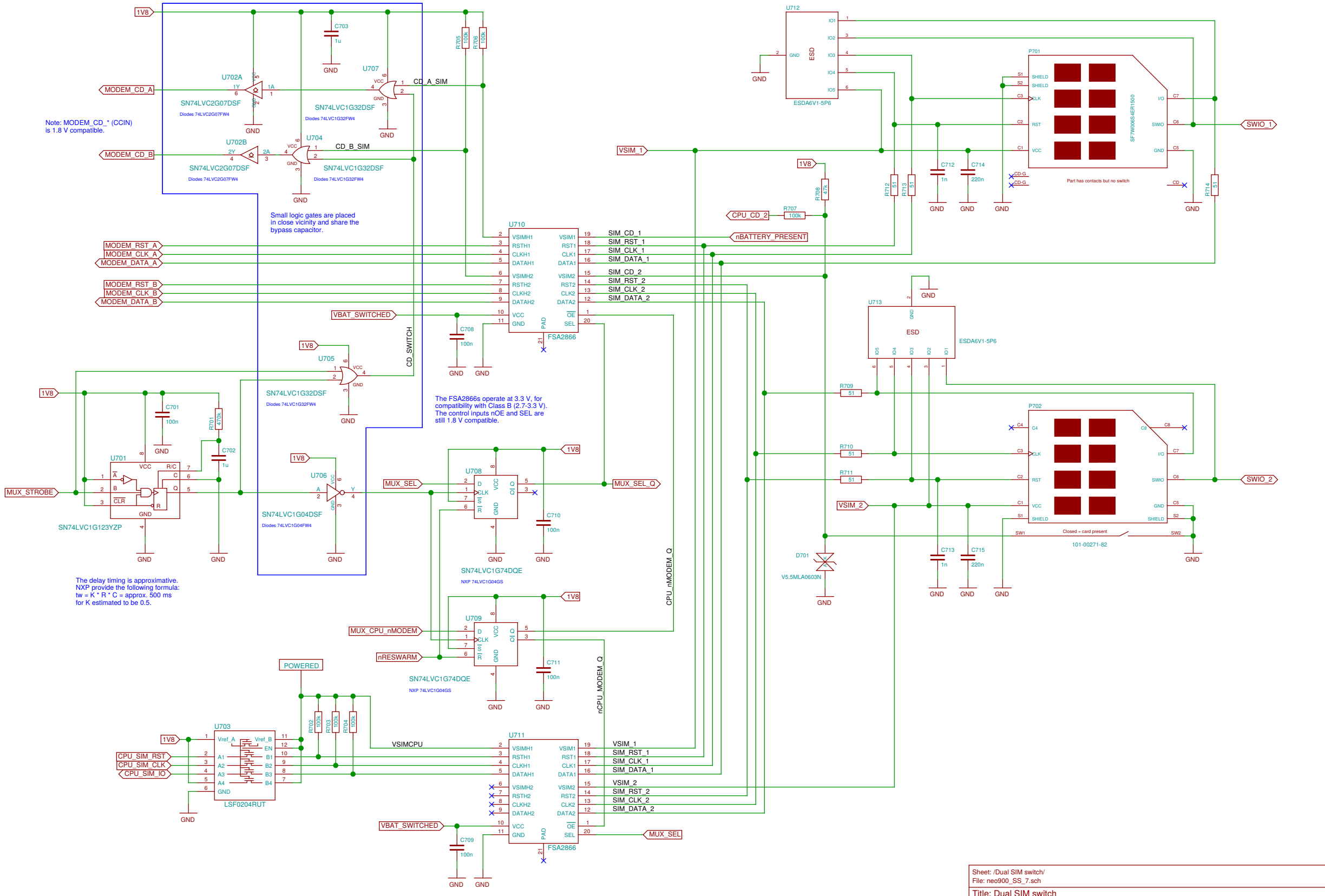


Note: MODEM_CD_* (CCIN) is 1.8 V compatible.

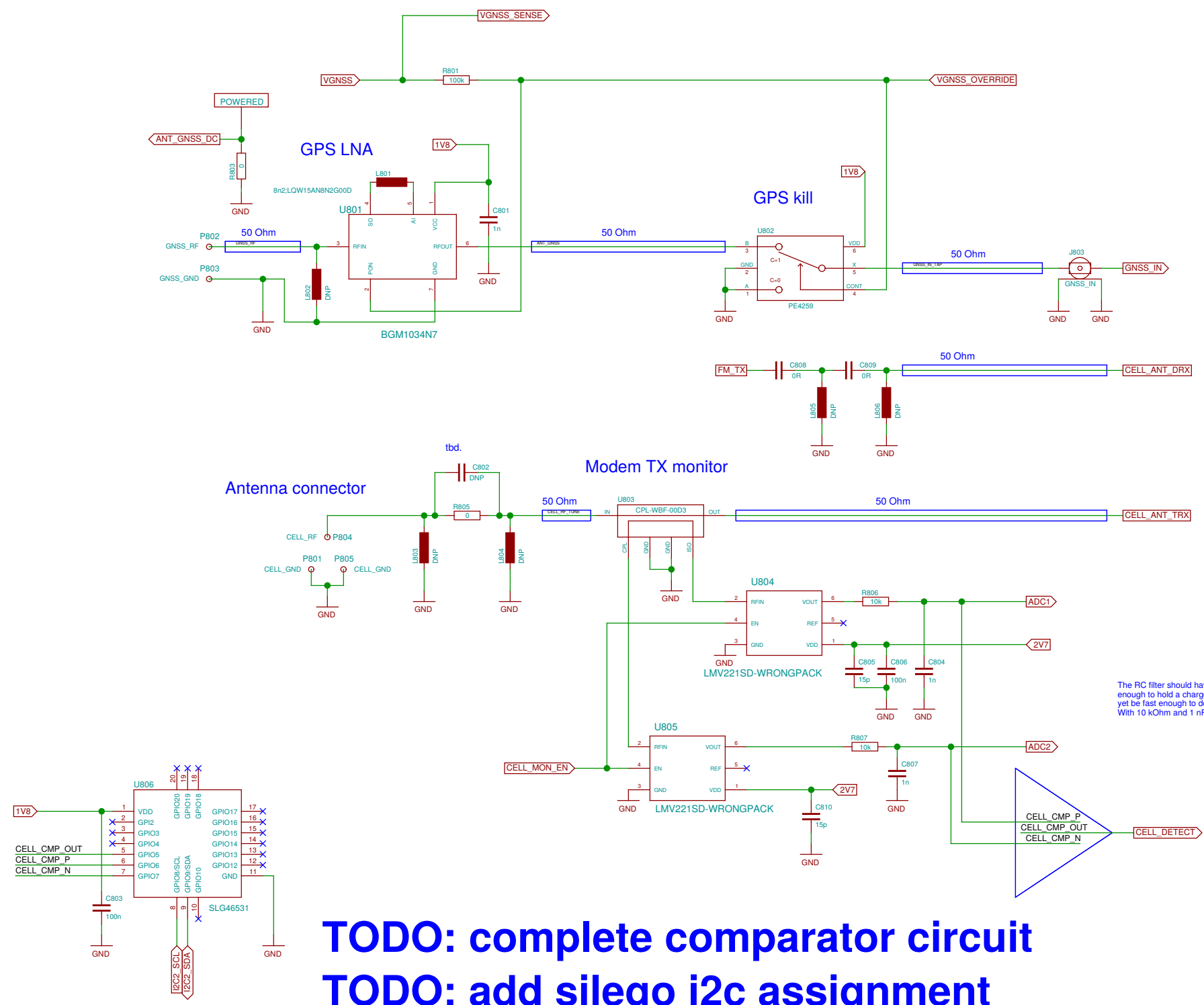
Small logic gates are placed in close vicinity and share the bypass capacitor.

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: 2016-10-31 08:32:45 | Rev: |
| Plotted by eeshow 96ef3e0+ 20161030-17:20Z | | Id: 7/37 |

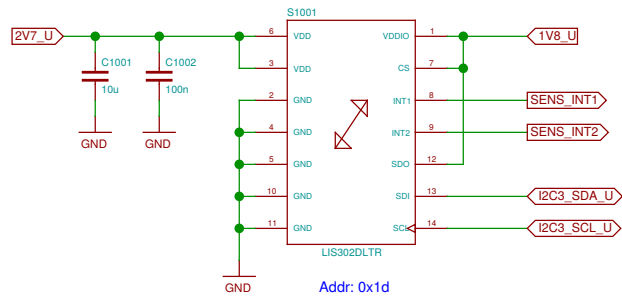


The RC filter should have C large enough enough to hold a charge in pulsed operation, yet be fast enough to detect short activity. With 10 kOhm and 1 nF, we get about 16 kHz.

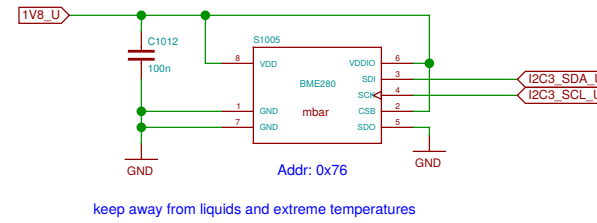
TODO: complete comparator circuit
TODO: add silego i2c assignment

| | | |
|---|---------------------------|----------|
| Sheet: /Antenna connections/ File: neo900_SS_8.sch | | |
| Title: Antenna connections | | |
| Size: A3 | Date: 2016-10-31 08:32:45 | Rev: |
| Plotted by eeshow 96ef3e0+ 20161030-17:20Z | | Id: 8/37 |

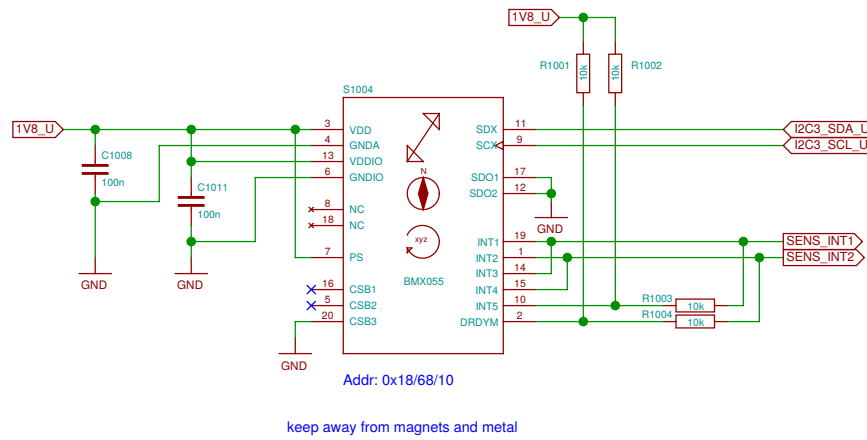
Acceleration (legacy)



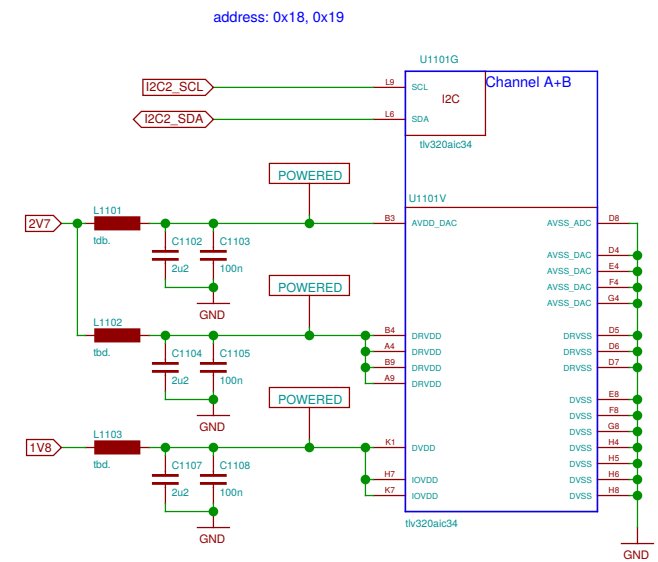
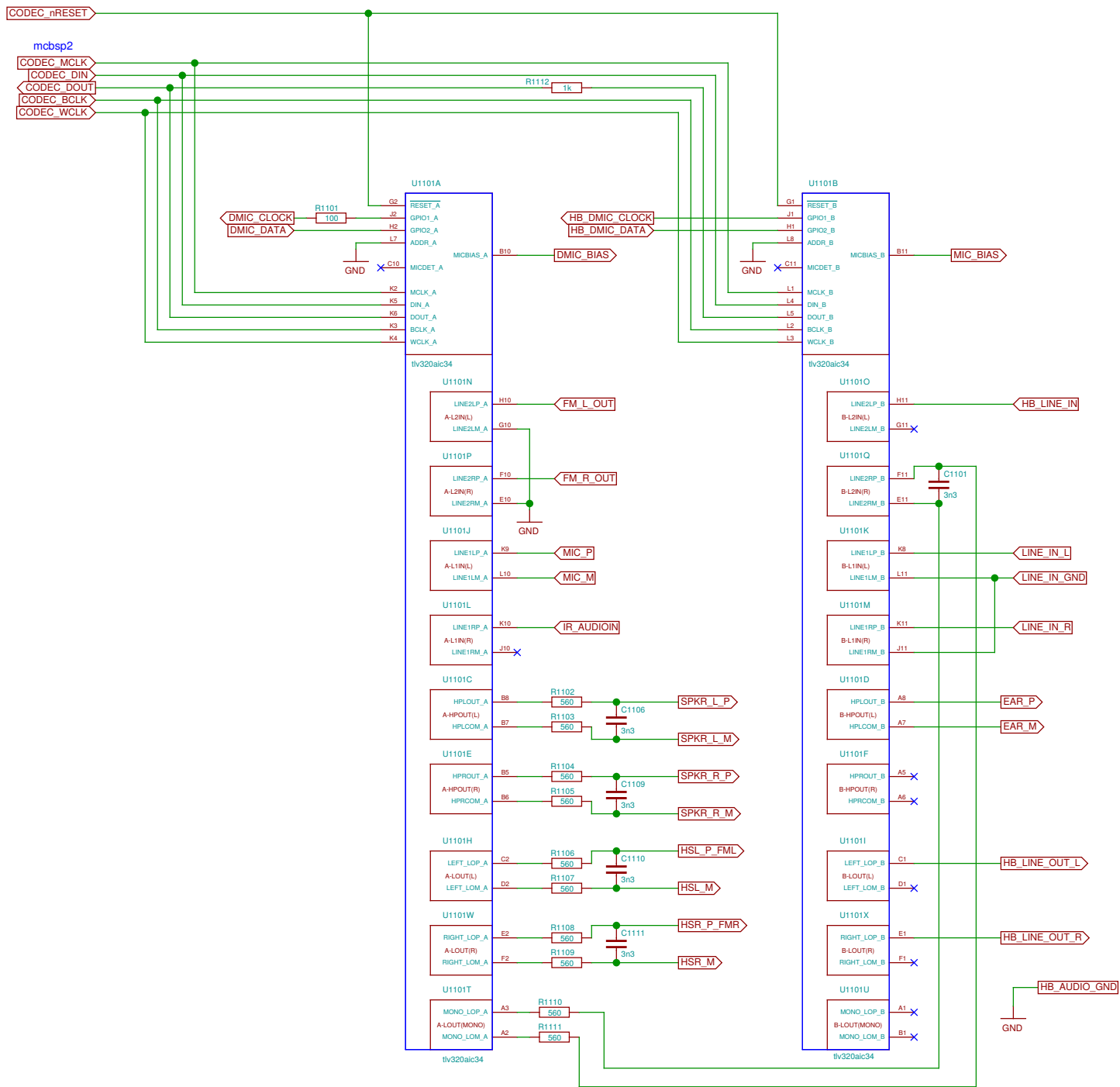
Pressure, humidity



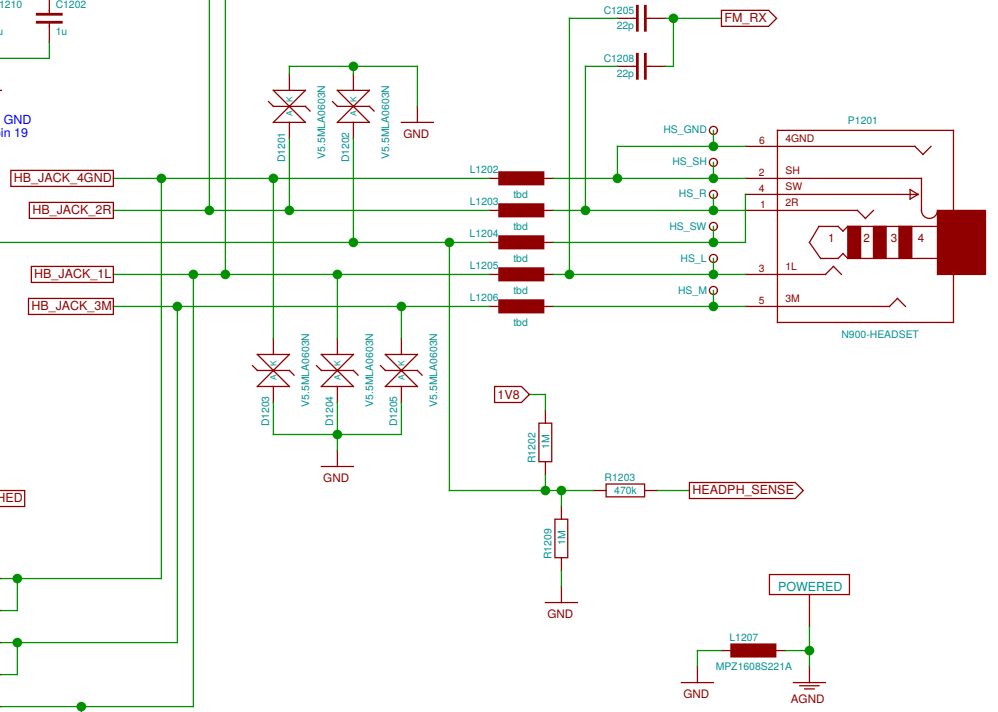
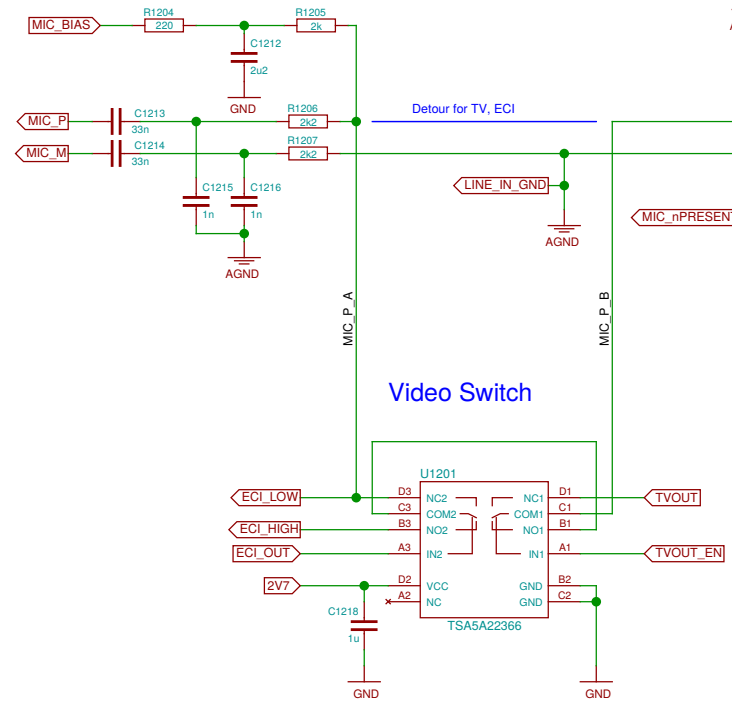
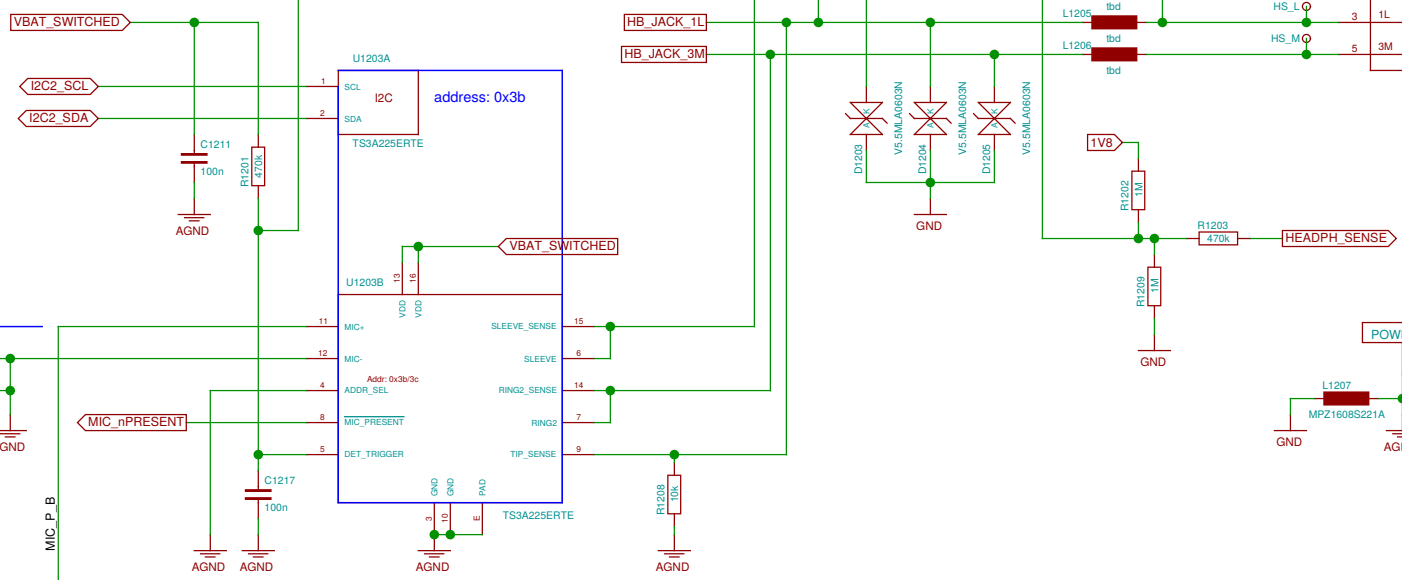
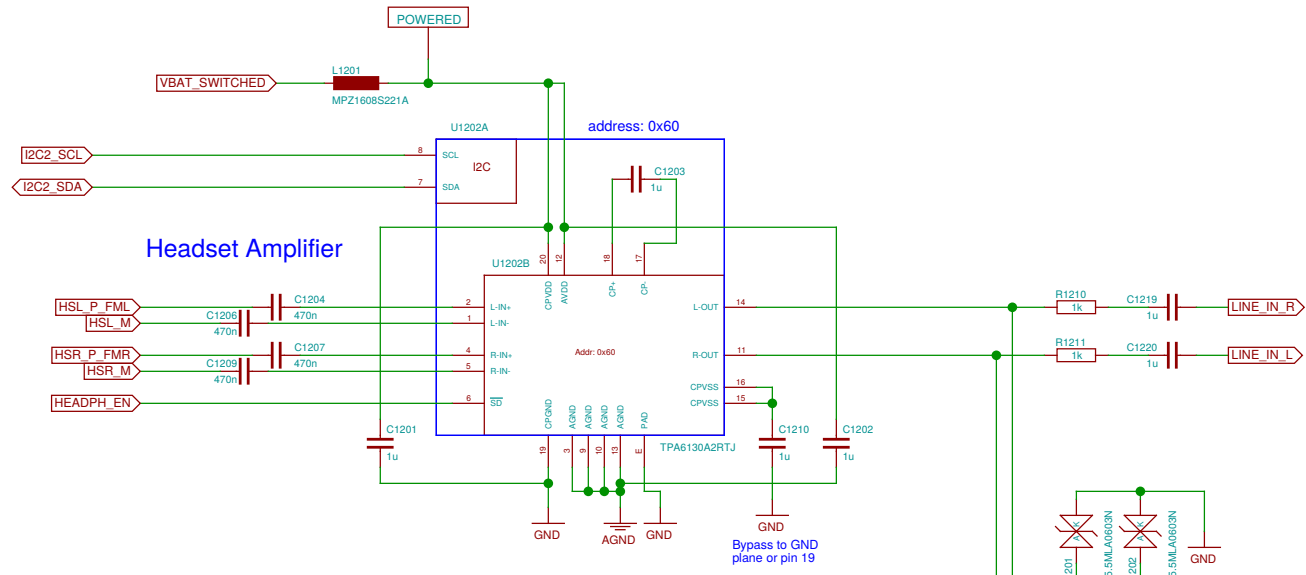
9-axis (acceleration, gyroscope, magnetometer)



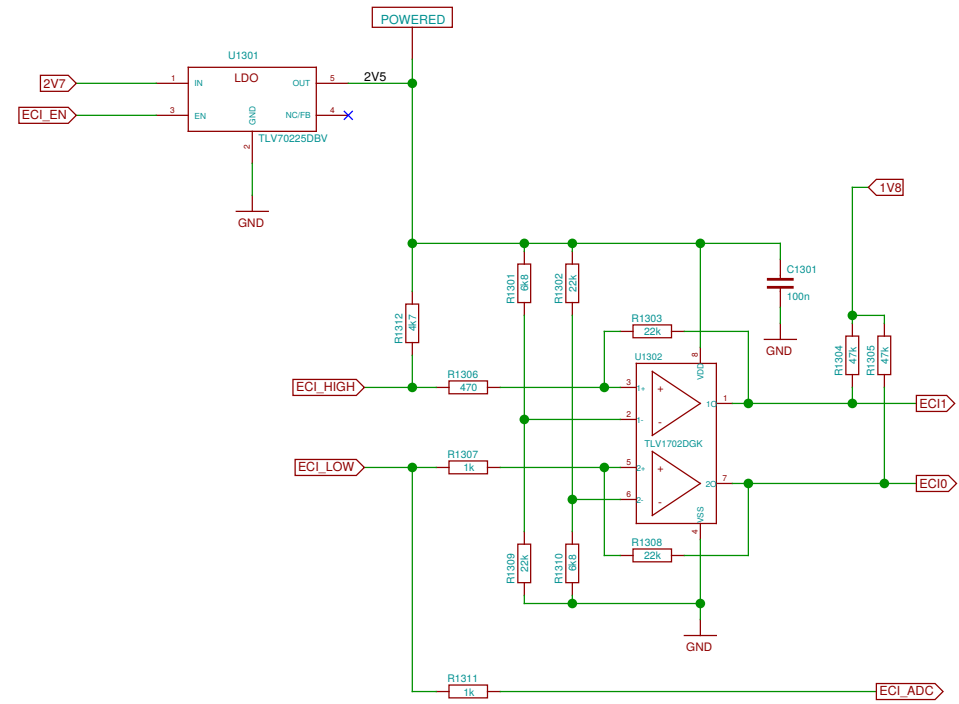
| | | |
|--|---------------------------|-----------|
| Sheet: /Sensors/ | | |
| File: neo900_SS_10.sch | | |
| Title: Sensors | | |
| Size: A3 | Date: 2016-10-31 08:32:45 | Rev: |
| Plotted by eeshow 96ef3e0+ 20161030-17:20Z | | Id: 10/37 |



| | | |
|--|---------------------------|-----------|
| Sheet: /Audio Codec/ File: neo900_SS_11.sch | | |
| Title: Audio Codec | | |
| Size: A3 | Date: 2016-10-31 08:32:45 | Rev: |
| Plotted by eeshow 96ef3e0+ 20161030-17:20Z | | Id: 11/37 |

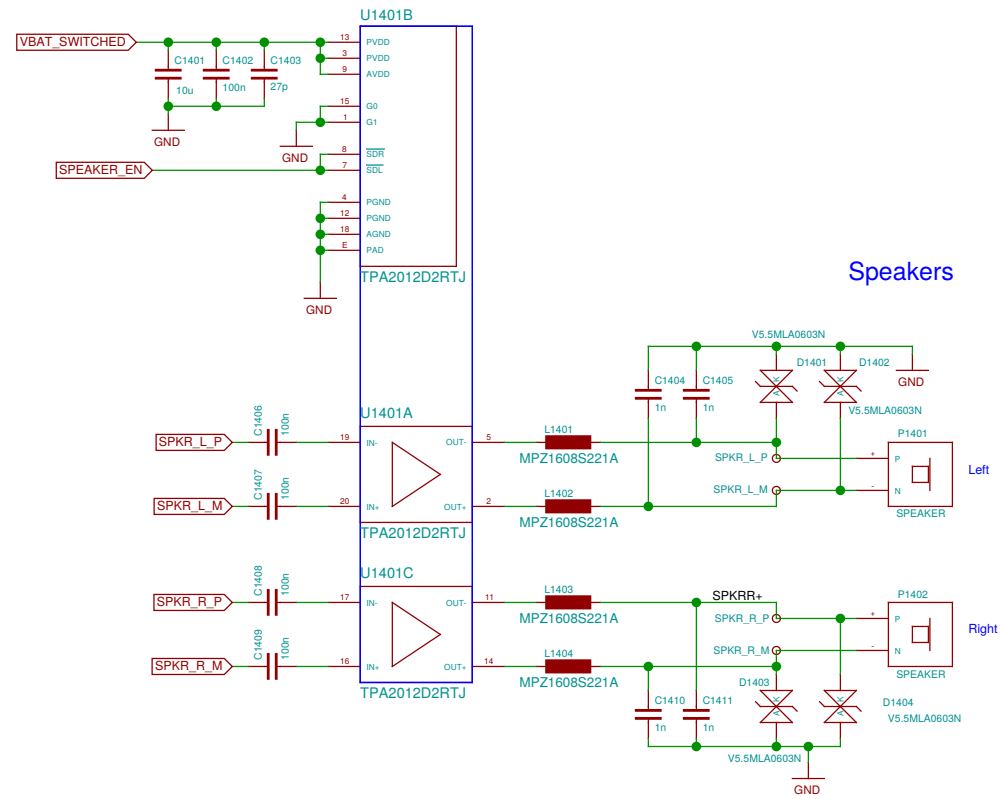


| | | |
|------------------------------|---------------------------|-----------------|
| Sheet: /Audio Headset + Mic/ | | |
| File: neo900_SS_12.sch | | |
| Title: Audio Headset + Mic | | |
| Size: A3 | Date: 2016-10-31 08:32:45 | Rev: |
| Plotted by eeshow 96f3e0+ | | 20161030-17:20Z |
| Id: 12/37 | | |

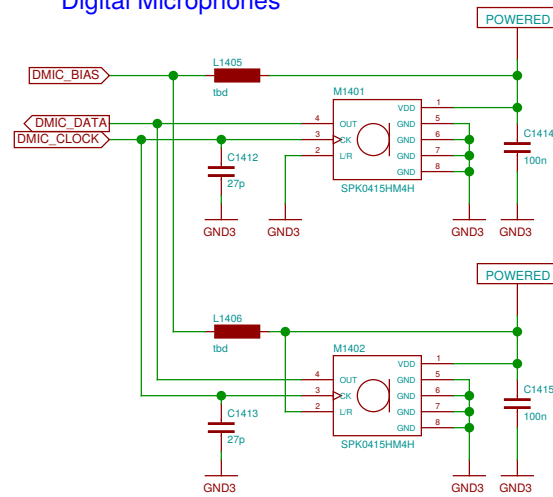


| | | |
|--|---------------------------|-----------|
| Sheet: /ECI/ | | |
| File: neo900_SS_13.sch | | |
| Title: ECI | | |
| Size: A3 | Date: 2016-10-31 08:32:45 | Rev: |
| Plotted by eeshow 96ef3e0+ 20161030-17:20Z | | Id: 13/37 |

Hands-free



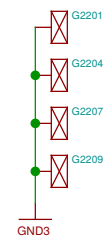
Digital Microphones



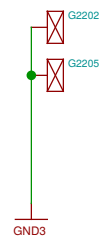
| | | |
|--|---------------------------|-----------|
| Sheet: /Audio Handsfree/ | | |
| File: neo900_SS_14.sch | | |
| Title: Audio Handsfree | | |
| Size: A3 | Date: 2016-10-31 08:32:45 | Rev: |
| Plotted by eeshow 96ef3e0+ 20161030-17:20Z | | Id: 14/37 |

Shield Contacts on UPPER

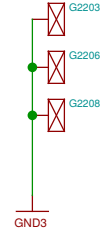
For the display



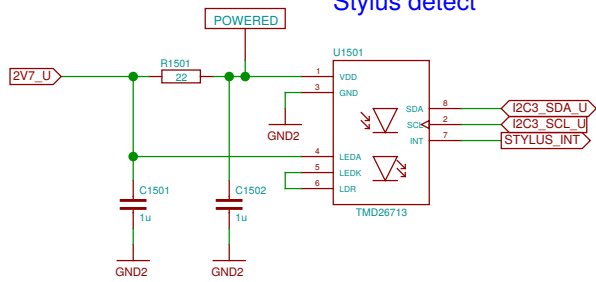
For the key mat



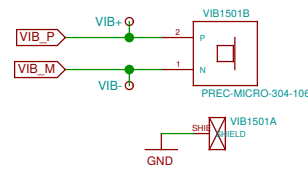
For the "key frame hook"



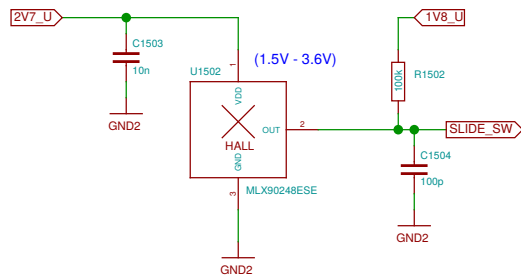
Stylus detect



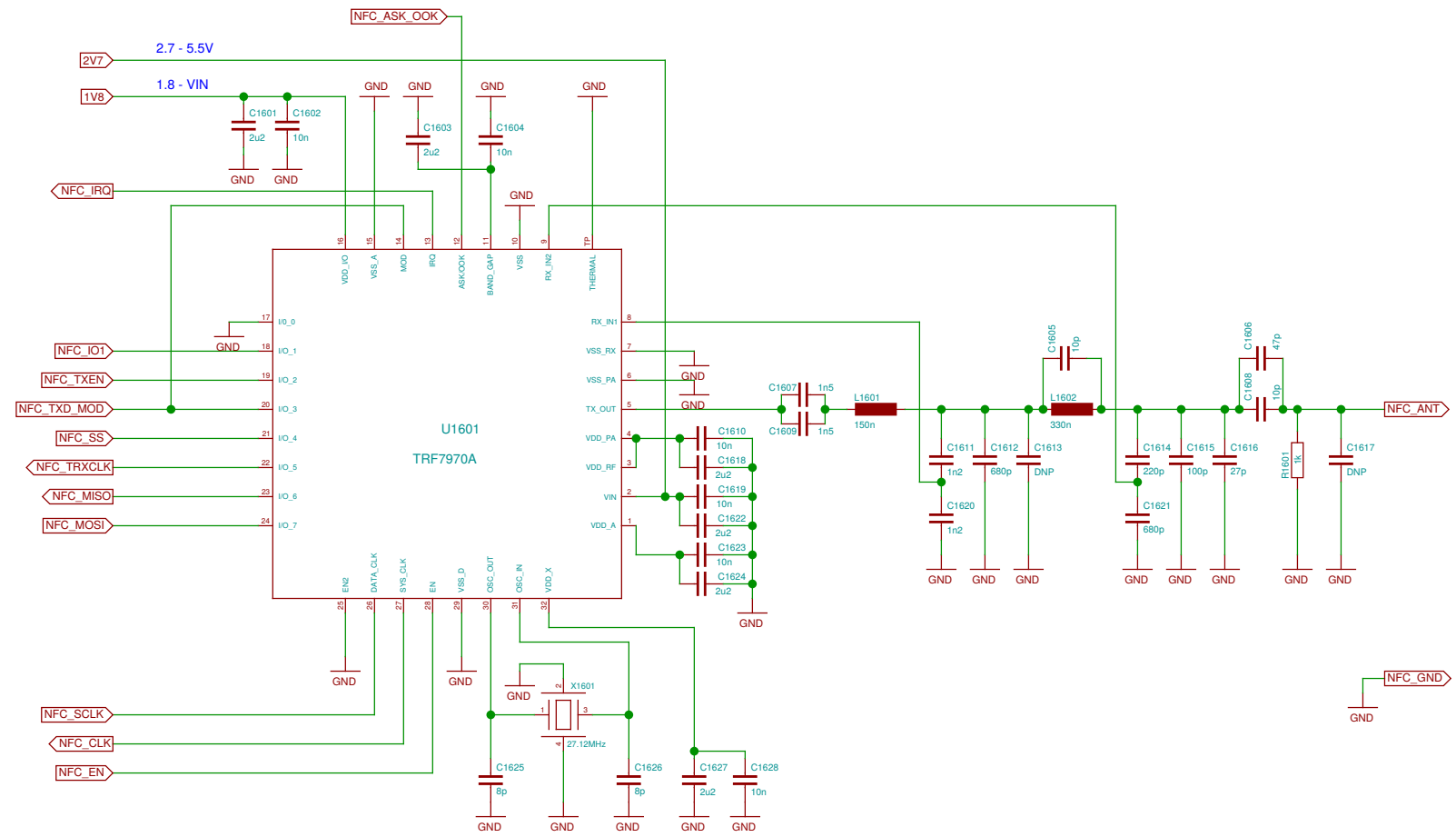
Vibramotor



Slide sensor

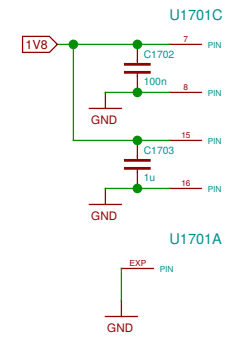
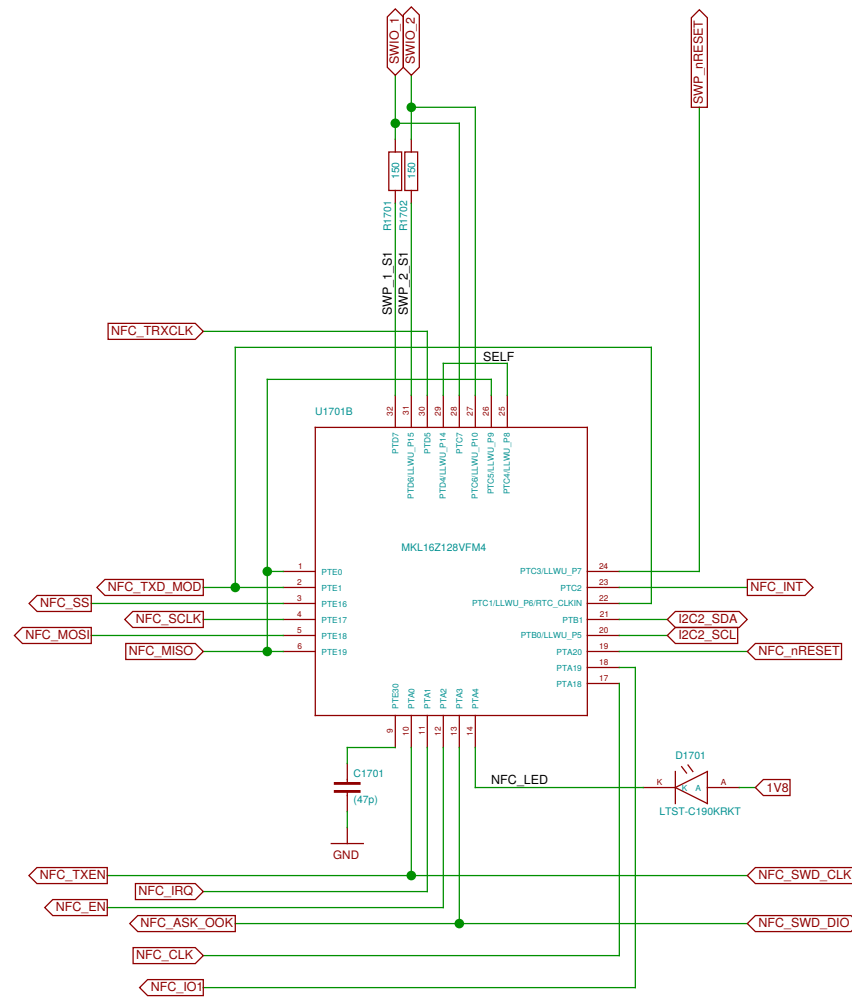


| | | |
|--|---------------------------|-----------|
| Sheet: Misc/ File: neo900_SS_15.sch | | |
| Title: Misc | | |
| Size: A3 | Date: 2016-10-31 08:32:45 | Rev: |
| Plotted by eeshow 96ef3e0+ 20161030-17:20Z | | Id: 15/37 |



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

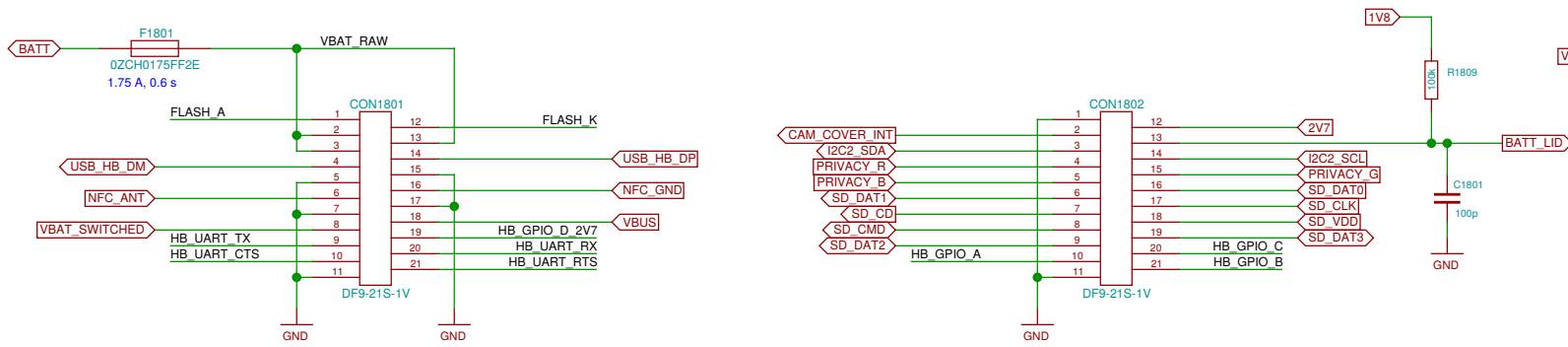
| | | |
|--|---------------------------|-----------|
| Sheet: /RFID/NFC Reader/ File: neo900_SS_16.sch | | |
| Title: RFID/NFC Reader | | |
| Size: A3 | Date: 2016-10-31 08:32:45 | Rev: |
| Plotted by eeshow 96ef3e0+ 20161030-17:20Z | | Id: 16/37 |



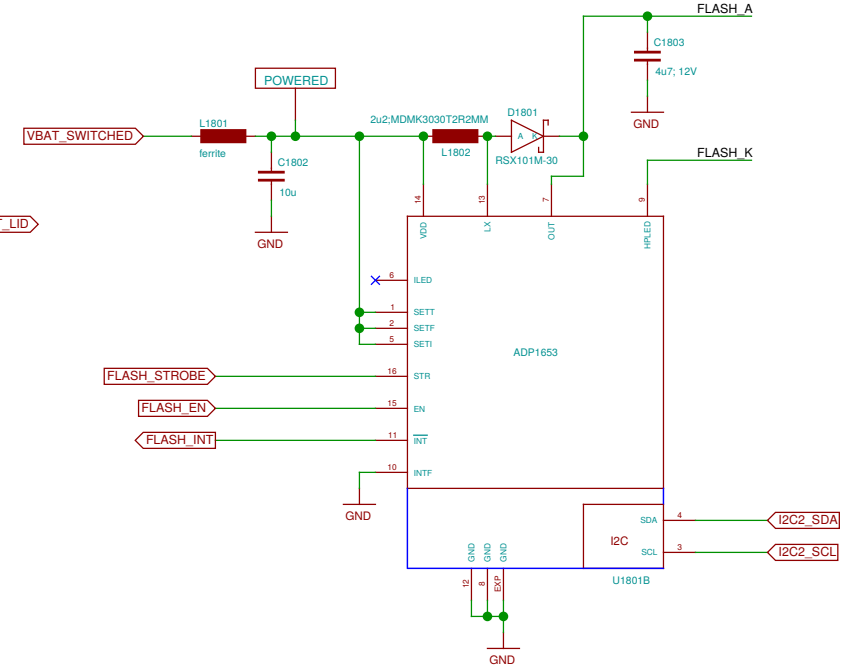
| | | |
|------------------------------|---------------------------|-----------------|
| Sheet: /RFID/NFC Controller/ | | |
| File: neo900_SS_17.sch | | |
| Title: RFID/NFC Controller | | |
| Size: A3 | Date: 2016-10-31 08:32:45 | Rev: |
| Plotted by eeshow 96ef3e0+ | | 20161030-17:20Z |
| Id: 17/37 | | |

LOWER-BOB Interconnect (LOWER side)

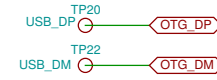
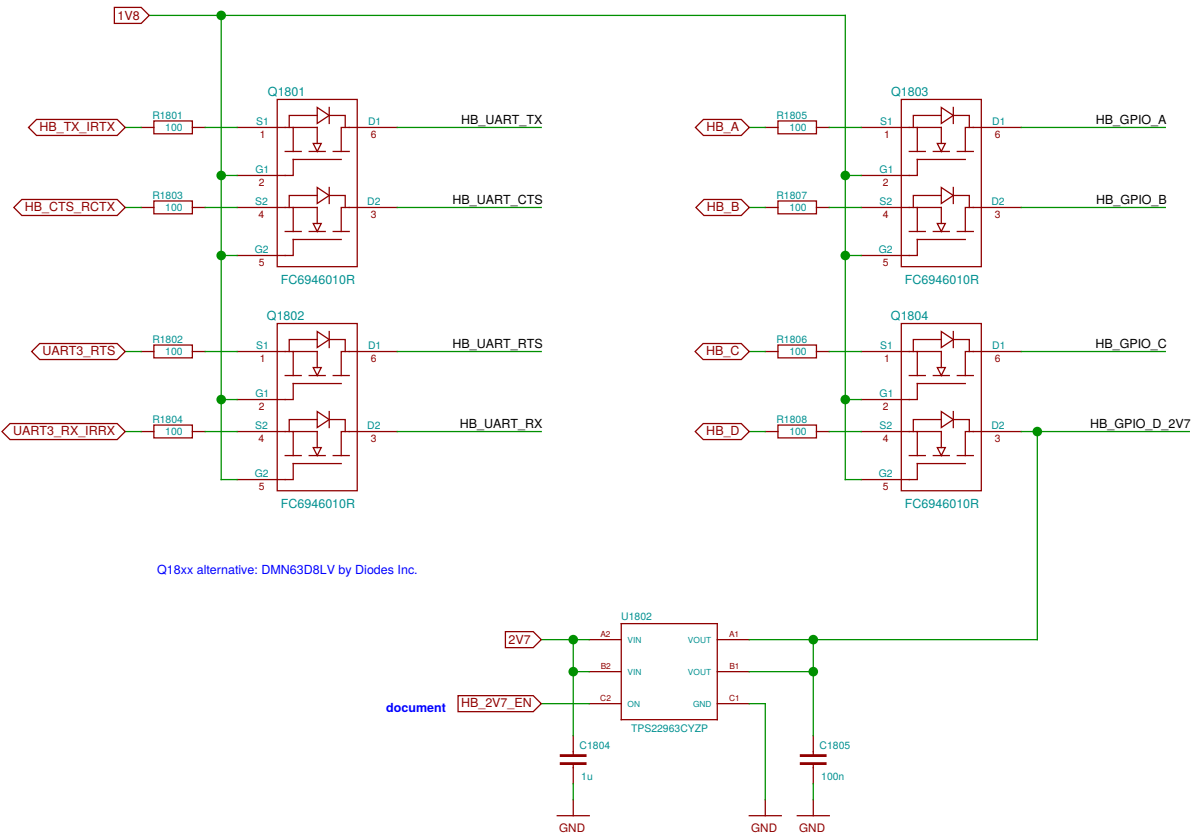
Defined in the Hackerbus specification, <http://neo900.org/stuff/papers/hb.pdf>



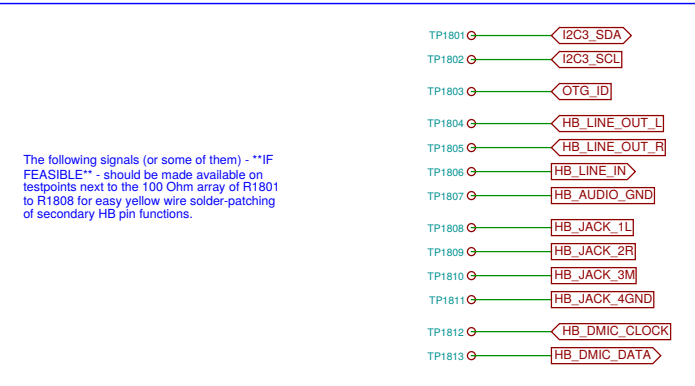
Flash/Torch



Level shifters for Hackerbus GPIO and UART

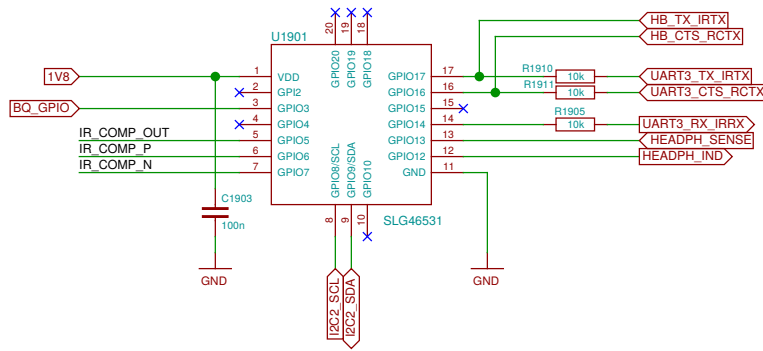
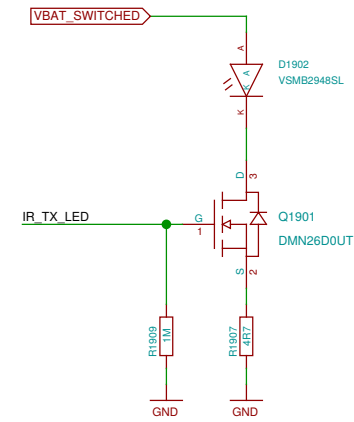
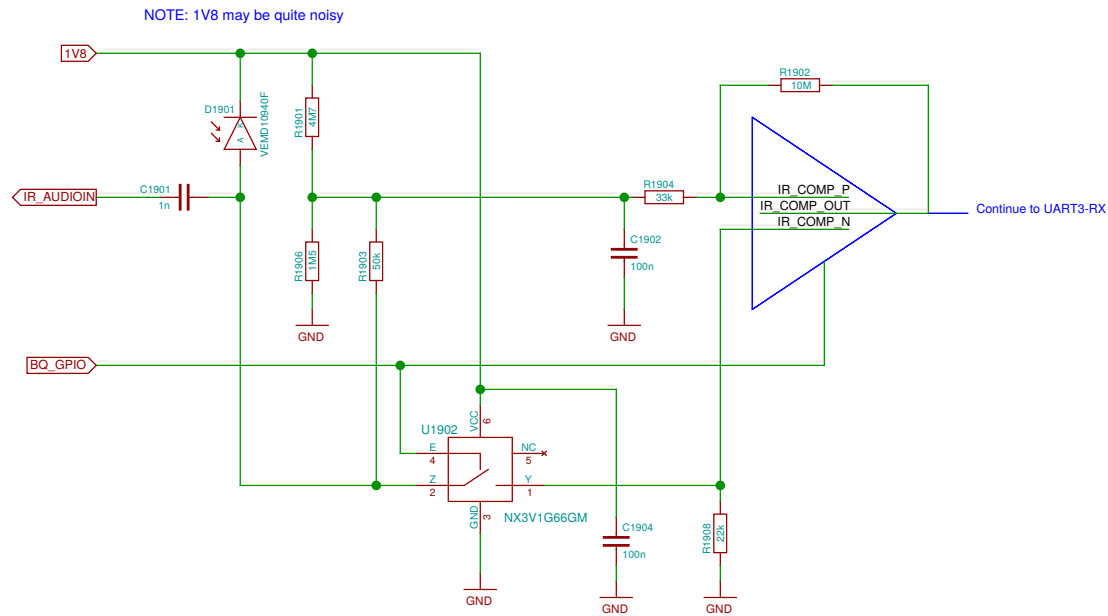


Patchfield



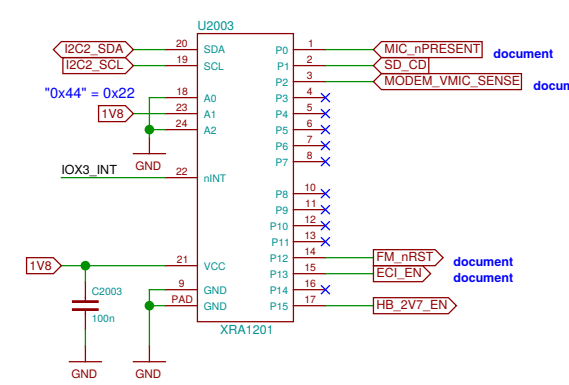
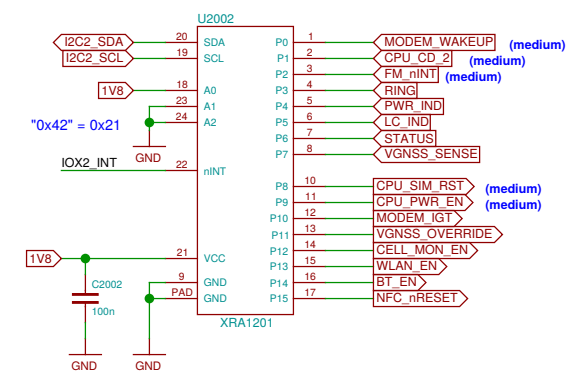
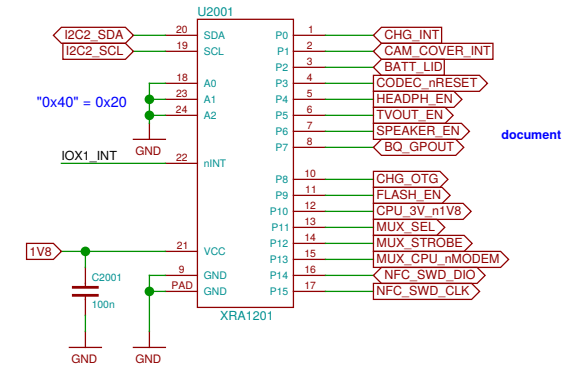
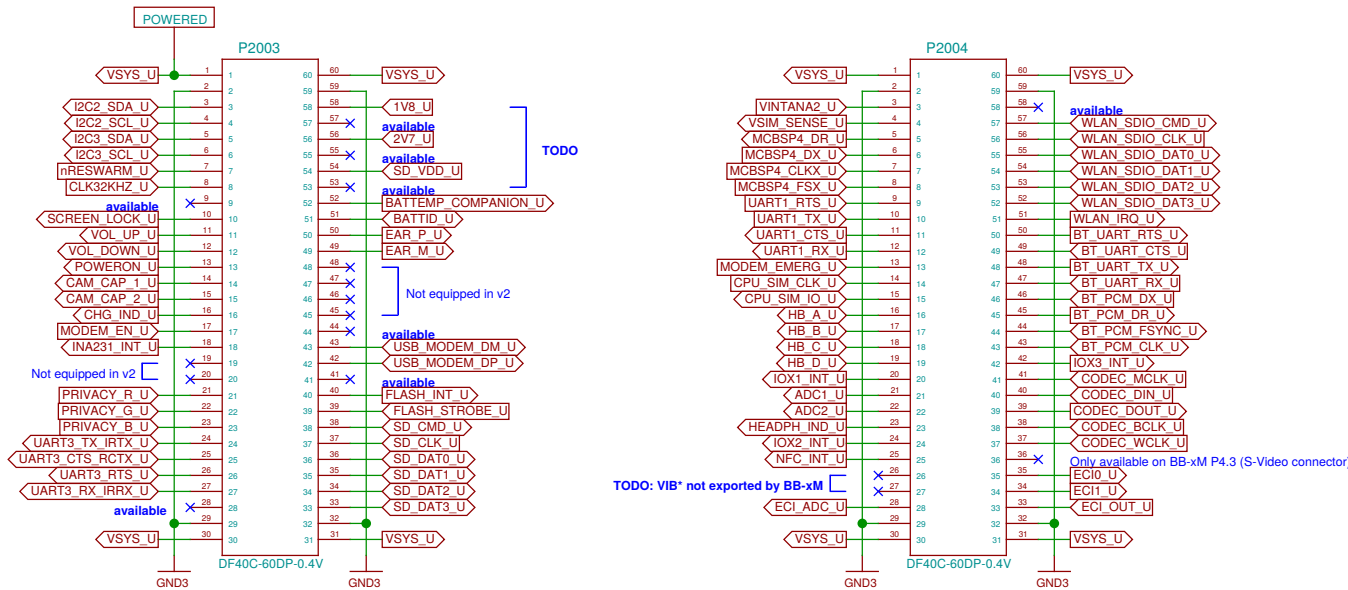
| | | |
|--|---------------------------|-----------|
| Sheet: /Hackerbus/ File: neo900_SS_18.sch | | |
| Title: Hackerbus | | |
| Size: A3 | Date: 2016-10-31 08:32:45 | Rev: |
| Plotted by eeshow 96ef3e0+ 20161030-17:20Z | | Id: 18/37 |

TODO: update D1901 footprint



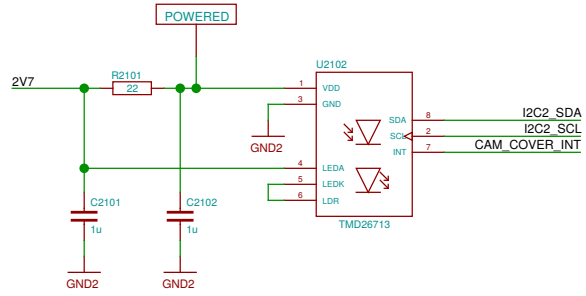
| | | |
|---|---------------------------|-----------|
| Sheet: /Infrared/ File: neo900_SS_19.sch | | |
| Title: Infrared | | |
| Size: A3 | Date: 2016-10-31 08:32:45 | Rev: |
| Plotted by eeshow 96ef3e0+ 20161030-17:20Z | | Id: 19/37 |

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

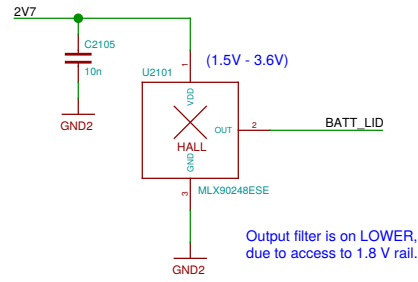


Current rating per contact: 0.3 A

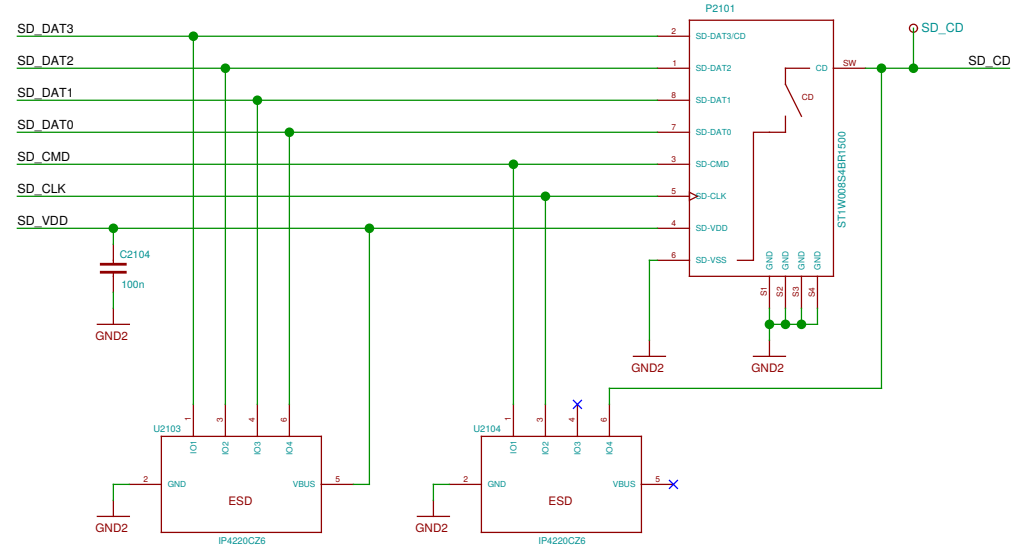
Camera Cover detect



Battery Cover detect

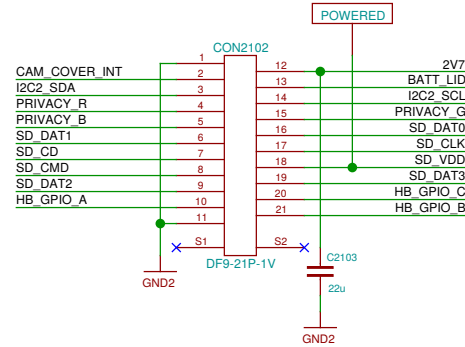
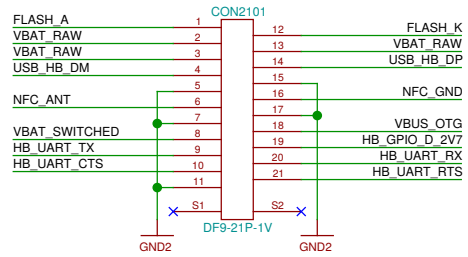


Memory card holder

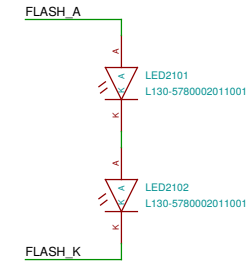


LOWER-BOB Interconnect (BOB side)

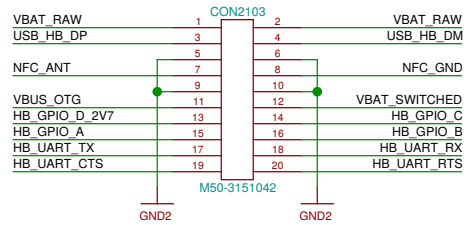
Defined in the Hackerbus specification, <http://neo900.org/stuff/papers/hb.pdf>



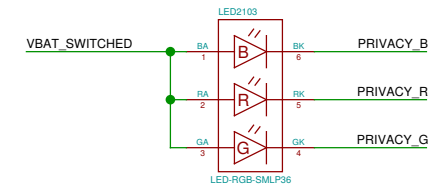
Camera flash



Hackerbus



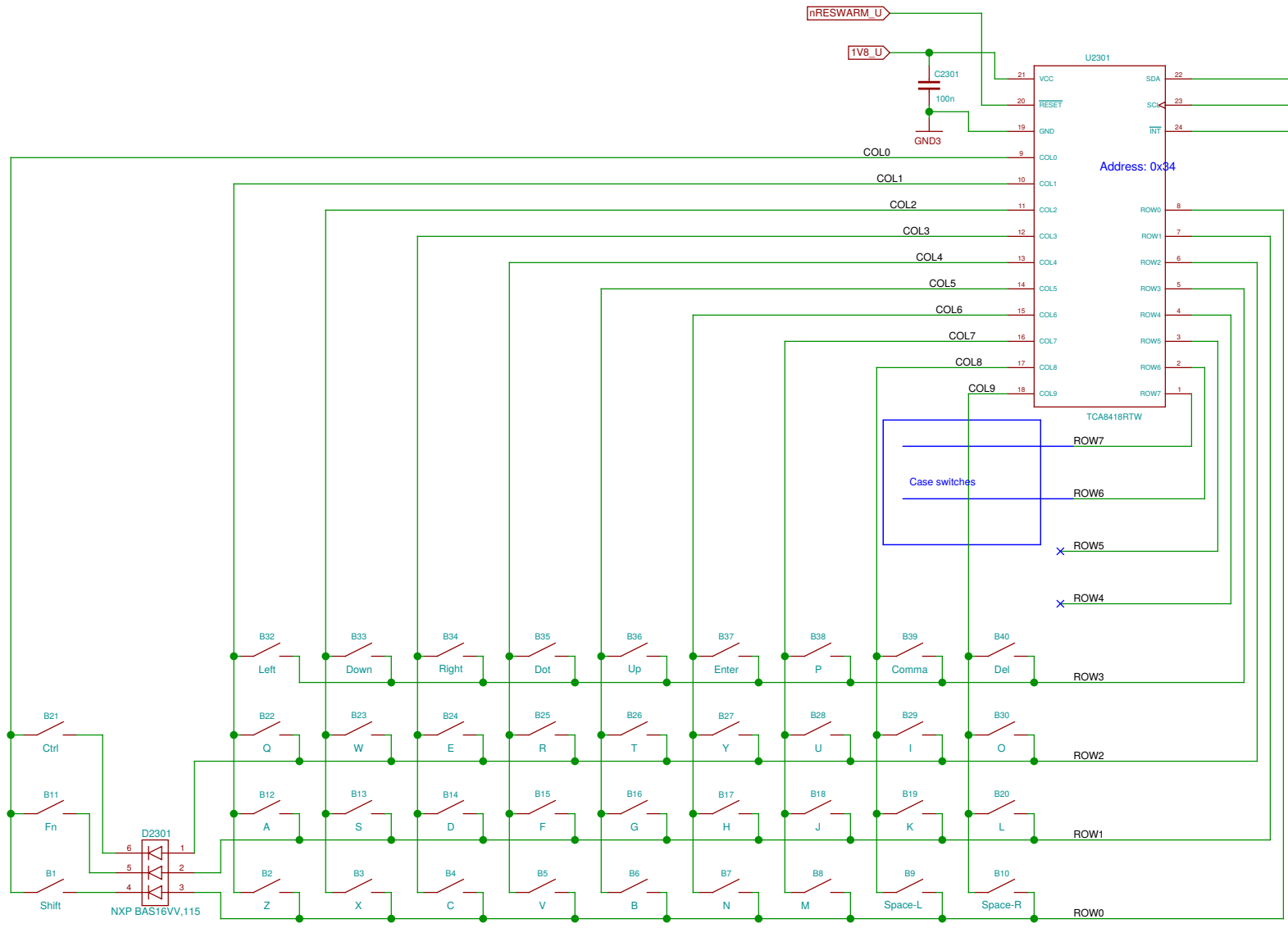
Privacy LED



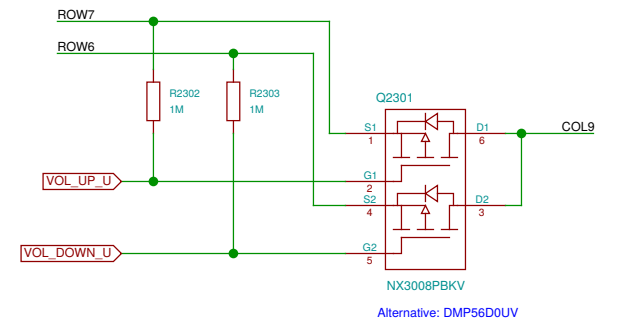
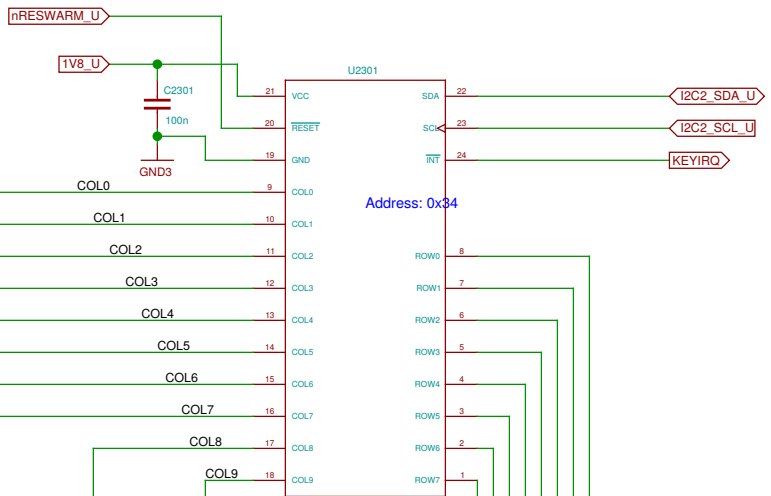
| | | |
|---|---------------------------|-----------|
| Sheet: /uSD Breakout Board/ File: neo900_SS_21.sch | | |
| Title: uSD Breakout Board | | |
| Size: A3 | Date: 2016-10-31 08:32:45 | Rev: |
| Plotted by eeshow 96ef3e0+ 20161030-17:20Z | | Id: 21/37 |

TODO: consider sheet for deletion

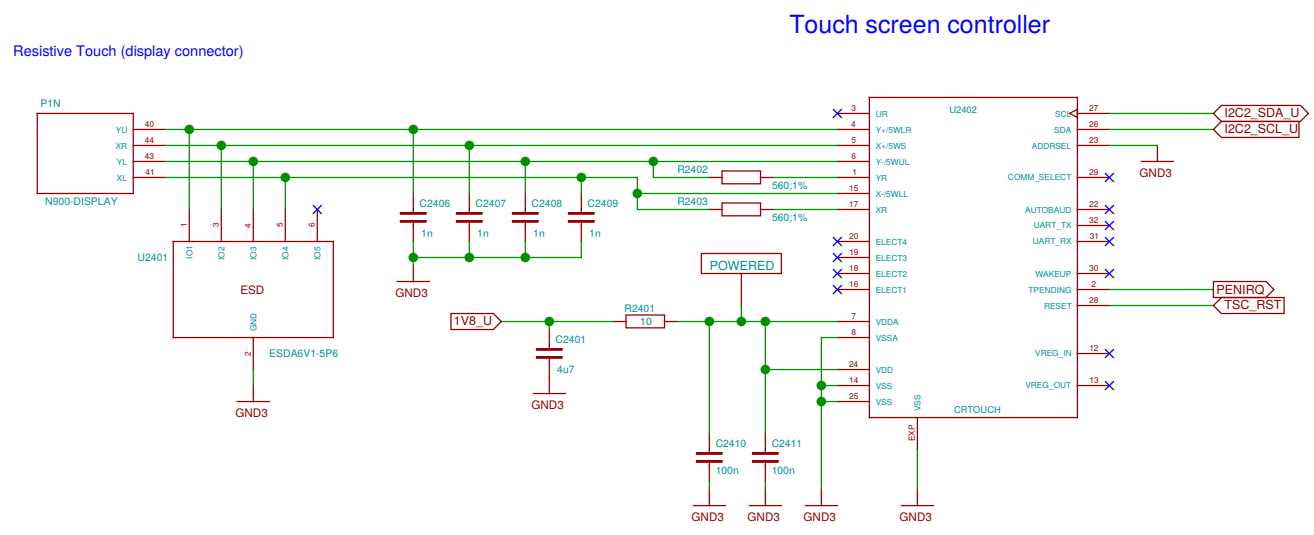
| | | |
|--|---------------------------|-----------|
| Sheet: /empty/ File: neo900_SS_22.sch | | |
| Title: empty | | |
| Size: A3 | Date: 2016-10-31 08:32:45 | Rev: |
| Plotted by eeshow 96ef3e0+ 20161030-17:20Z | | Id: 22/37 |



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 08:32:45 | Rev: |
| Plotted by eeshow 96ef3e0+ 20161030-17:20Z | | Id: 23/37 |



Touch screen controller

Resistive Touch (display connector)

| | | |
|--|---------------------------|-----------|
| Sheet: /Display-Peripherals/ | | |
| File: neo900_SS_24.sch | | |
| Title: Display-Peripherals | | |
| Size: A3 | Date: 2016-10-31 08:32:45 | Rev: |
| Plotted by eeshow 96ef3e0+ 20161030-17:20Z | | Id: 24/37 |

OMAP is not part of v2

| | | |
|---|---------------------------|-----------|
| Sheet: /CPU + PoP RAM/NAND/ File: neo900_SS_26.sch | | |
| Title: CPU + PoP RAM/NAND | | |
| Size: A3 | Date: 2016-10-31 08:32:45 | Rev: |
| Plotted by eeshow 96ef3e0+ 20161030-17:20Z | | Id: 26/37 |

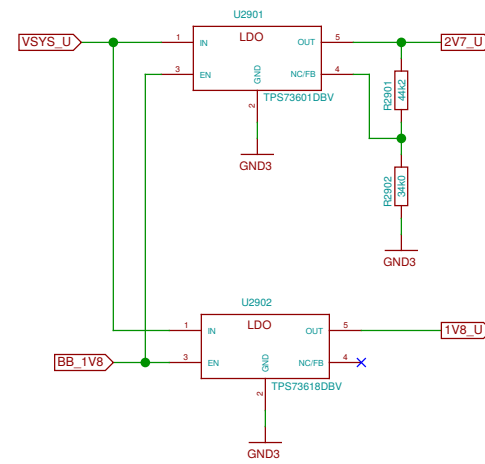
eMMC is not part of v2

| | | |
|--|---------------------------|-----------|
| Sheet: /eMMC/ File: neo900_SS_27.sch | | |
| Title: eMMC | | |
| Size: A3 | Date: 2016-10-31 08:32:45 | Rev: |
| Plotted by eeshow 96ef3e0+ 20161030-17:20Z | | Id: 27/37 |

Companion chip (TPS65950) is not part of v2

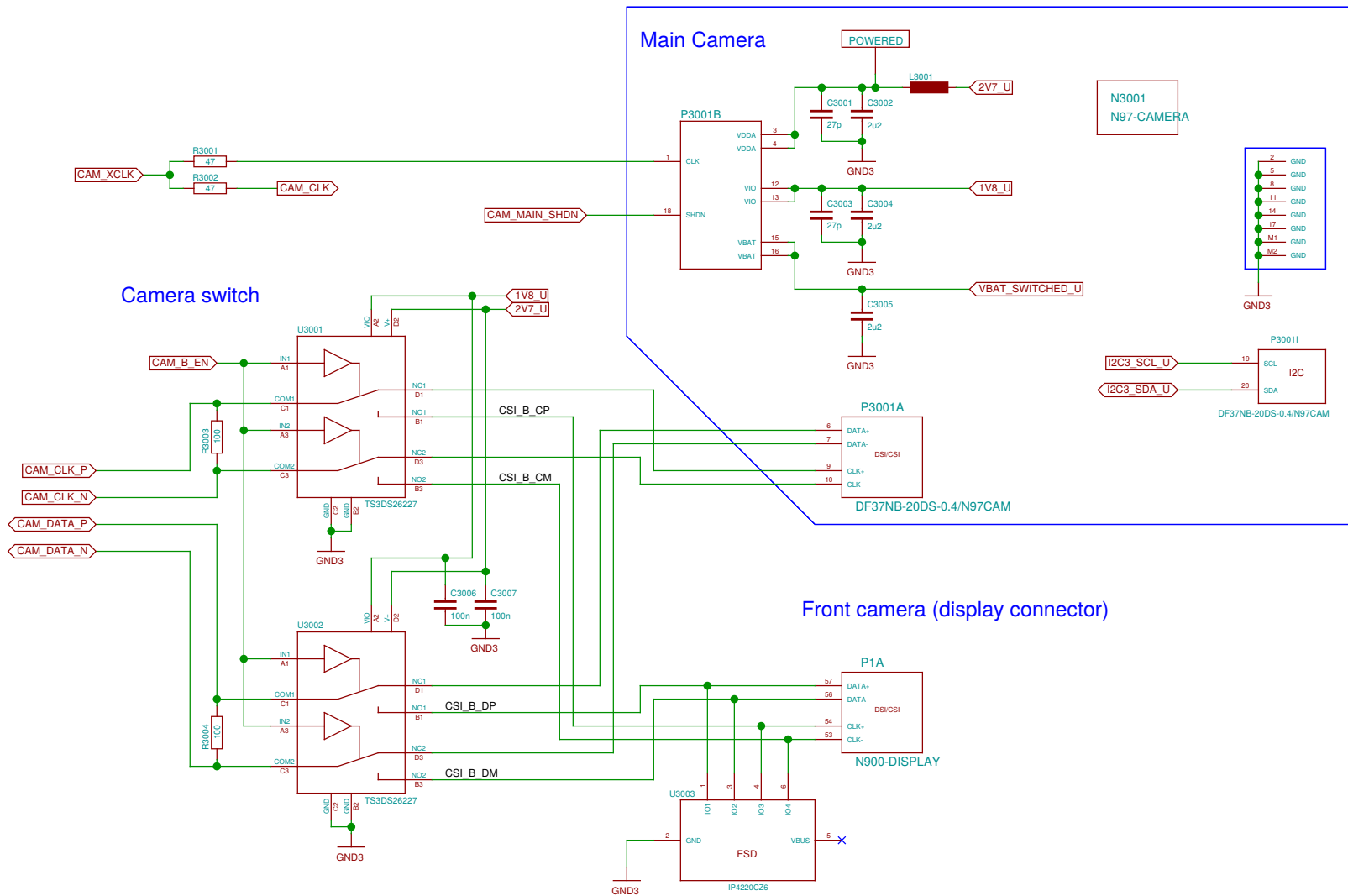
| | | |
|--|---------------------------|-----------|
| Sheet: /PMU+Codec/ File: neo900_SS_28.sch | | |
| Title: PMU+Codec | | |
| Size: A3 | Date: 2016-10-31 08:32:45 | Rev: |
| Plotted by eeshow 96ef3e0+ 20161030-17:20Z | | Id: 28/37 |

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

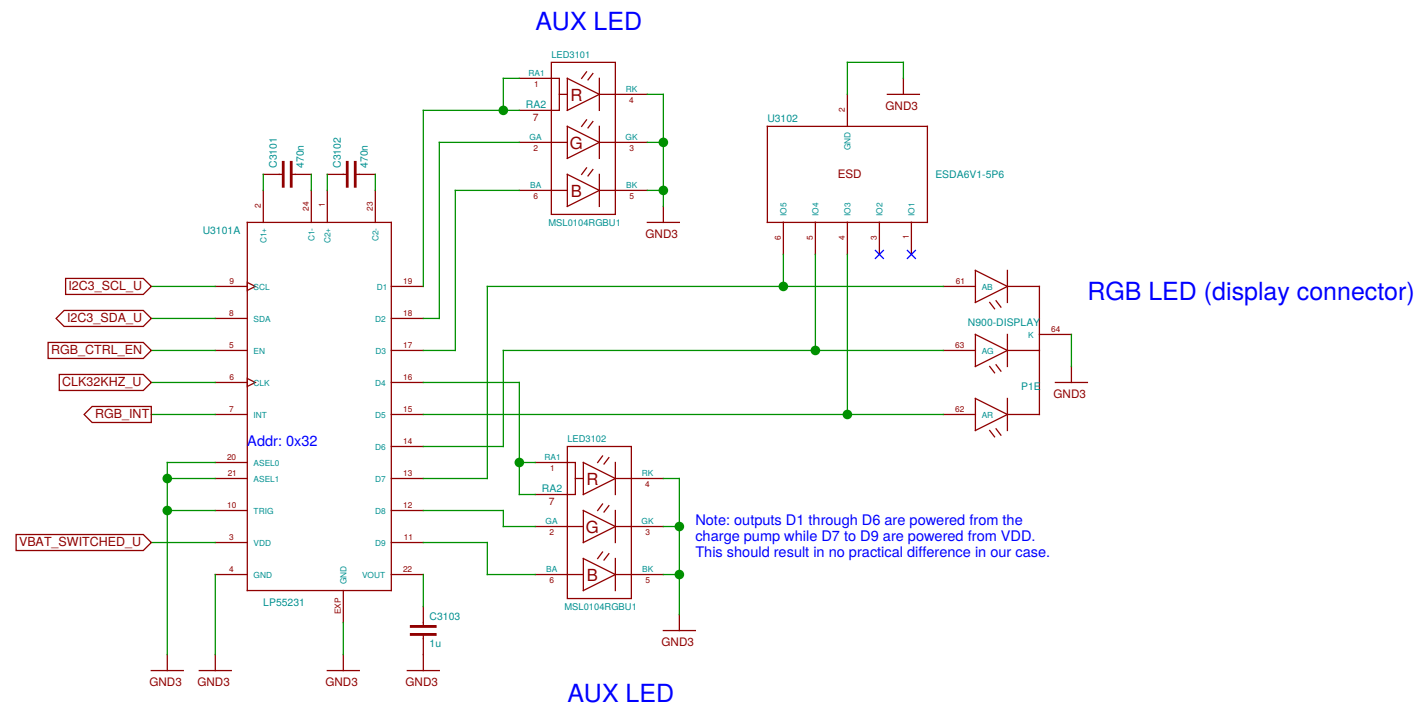


TODO: use REGEN ?

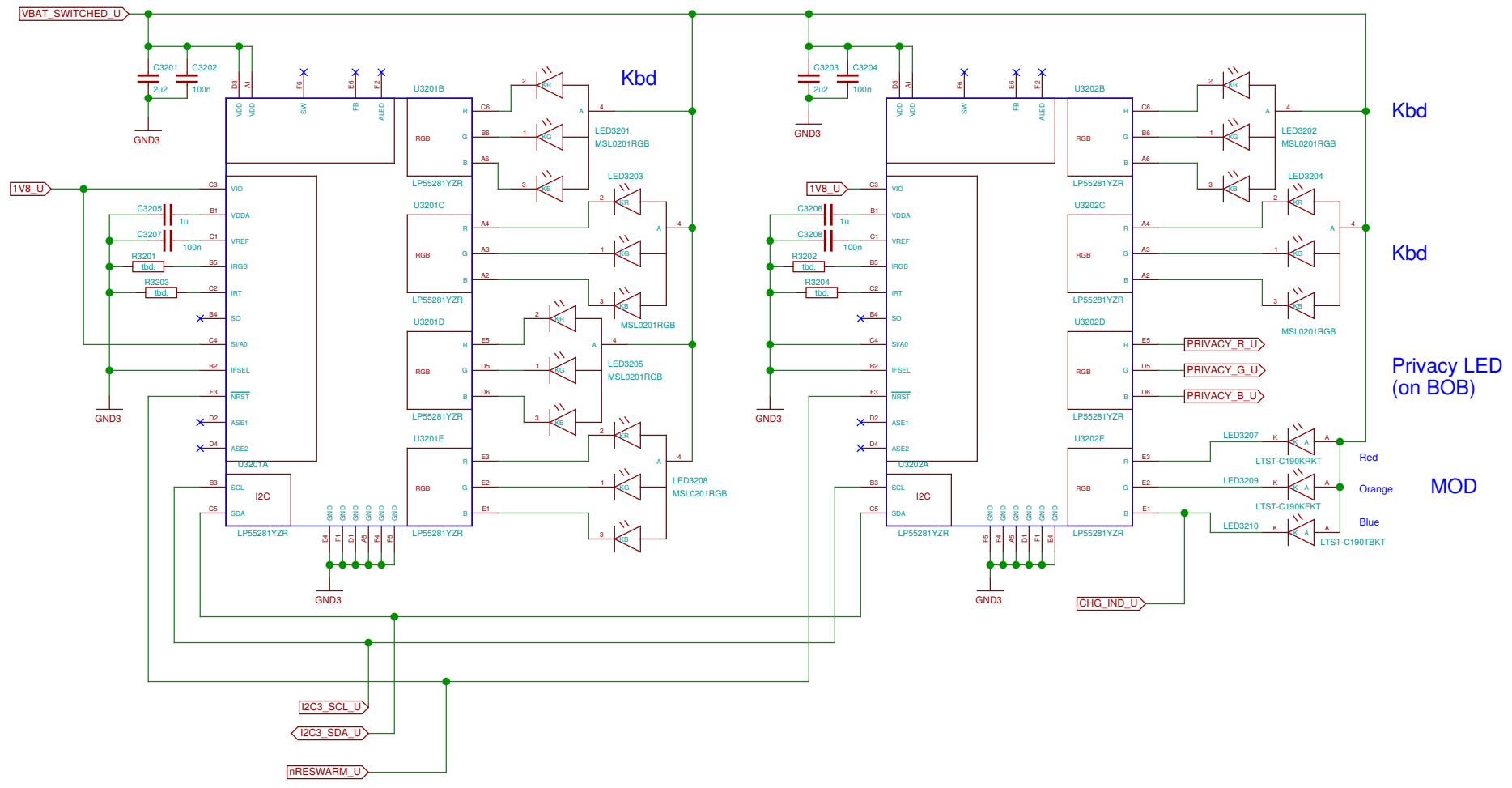
| | | |
|--|---------------------------|-----------|
| Sheet: /BB-XM Dummy (TWL4030)/ | | |
| File: neo900_SS_29.sch | | |
| Title: BB-XM Dummy (TWL4030) | | |
| Size: A3 | Date: 2016-10-31 08:32:45 | Rev: |
| Plotted by eeshow 96ef3e0+ 20161030-17:20Z | | Id: 29/37 |



| | | |
|--|---------------------------|-----------|
| Sheet: /Camera/ File: neo900_SS_30.sch | | |
| Title: Camera | | |
| Size: A3 | Date: 2016-10-31 08:32:45 | 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: 2016-10-31 19:05:55 | Rev: |
| Plotted by eeshow 96ef3e0+ 20161030-17:20Z | | Id: 31/37 |

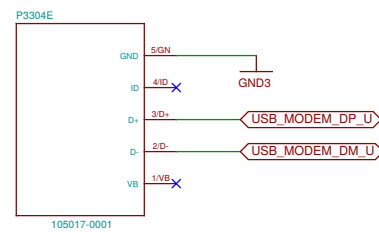


| | | |
|--|---------------------------|-----------|
| Sheet: /Basic LEDs/ | | |
| File: neo900_SS_32.sch | | |
| Title: Basic LEDs | | |
| Size: A3 | Date: 2016-10-31 08:32:45 | Rev: |
| Plotted by eeshow 96ef3e0+ 20161030-17:20Z | | Id: 32/37 |

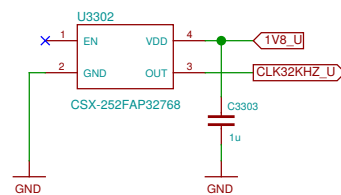
Cleaning up. The connections to BB-xM are on the next sheets.

connect to BB
by some Micro-USB cable

Modem USB



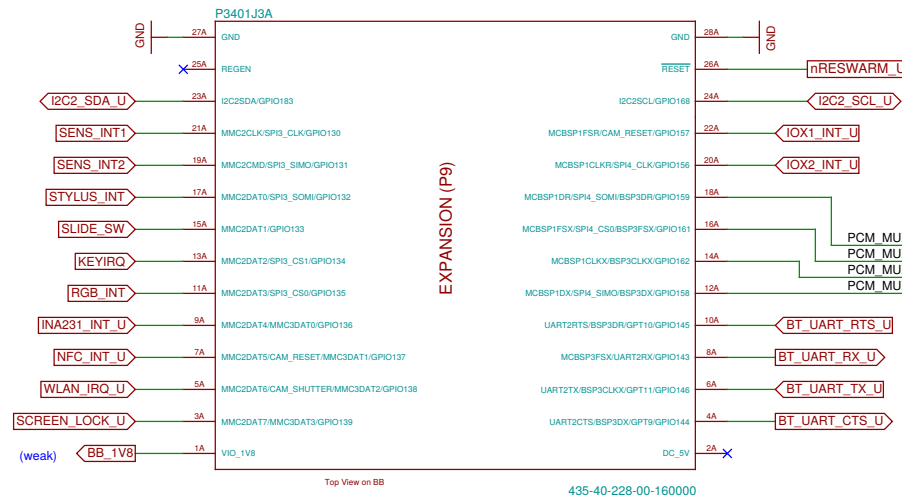
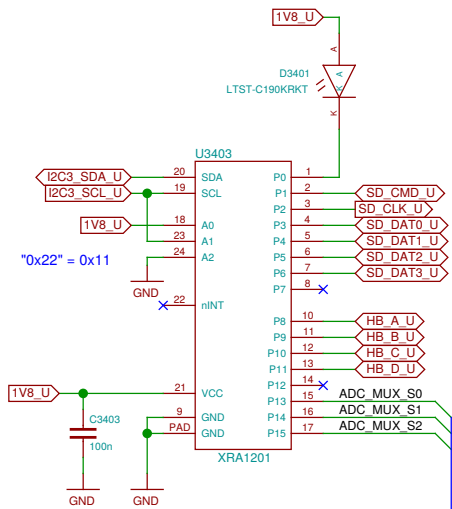
32 kHz clock



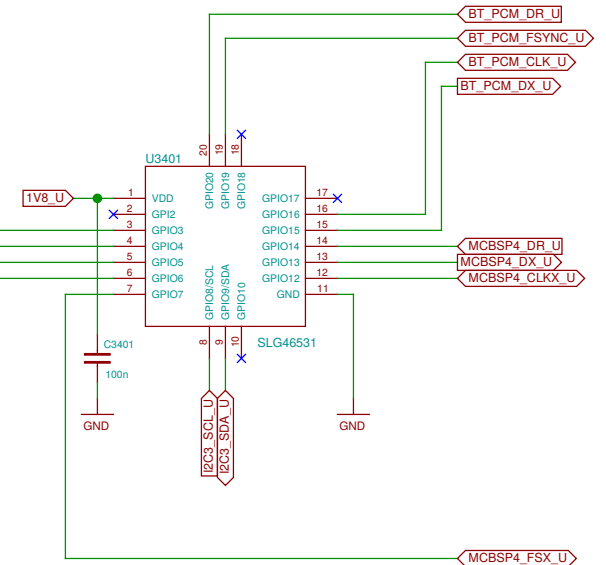
Alternative: OYKTGLJANF-0.032768

| | | |
|---|---------------------------|-----------|
| Sheet: /Connector to BB-XM/ File: neo900_SS_33.sch | | |
| Title: Connector to BB-XM | | |
| Size: A3 | Date: 2016-10-31 08:32:45 | Rev: |
| Plotted by eeshow 96ef3e0+ 20161030-17:20Z | | Id: 33/37 |

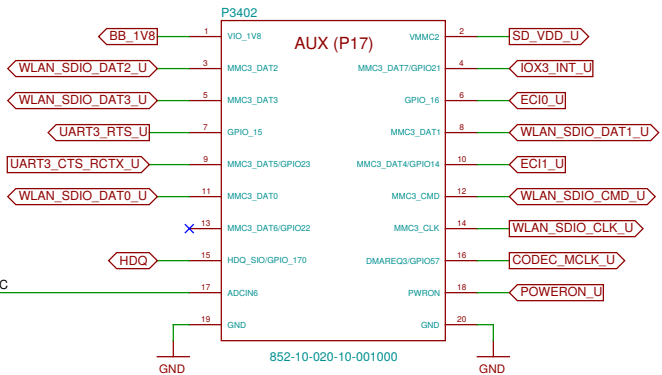
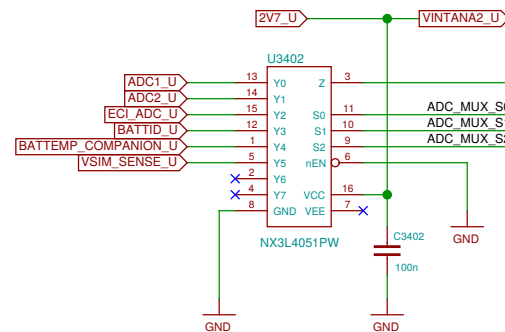
TODO: update pin names in footprint



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

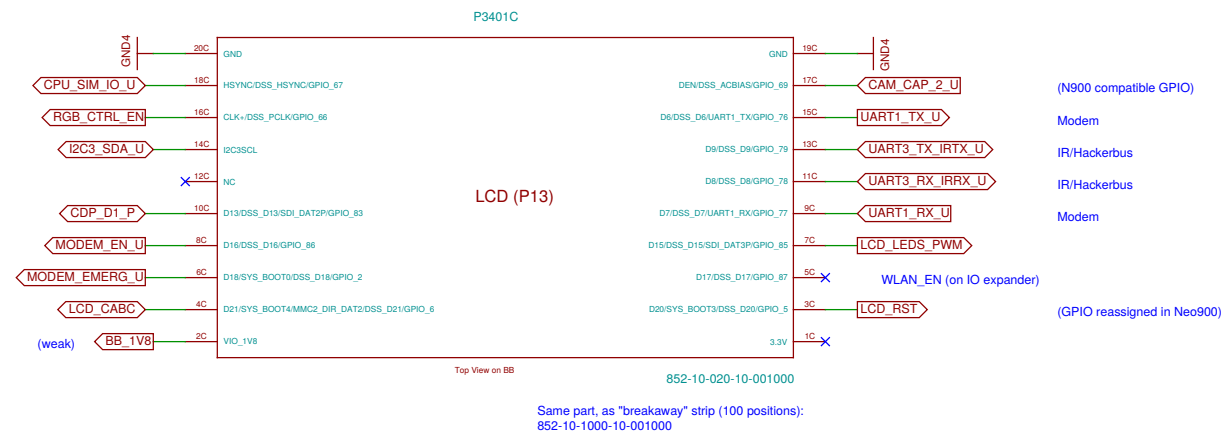
FM_nINT (on IO expander)

| | | |
|--|---------------------------|-----------|
| 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)

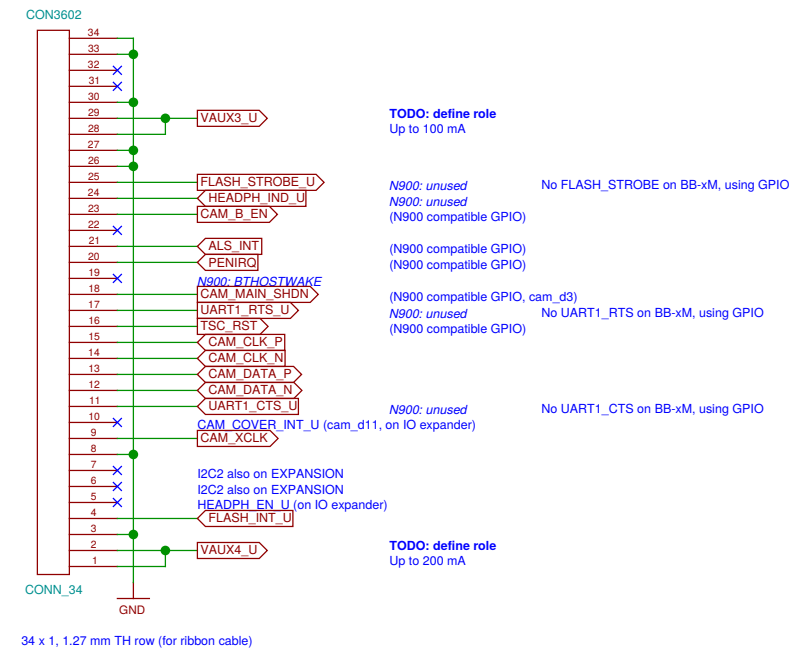
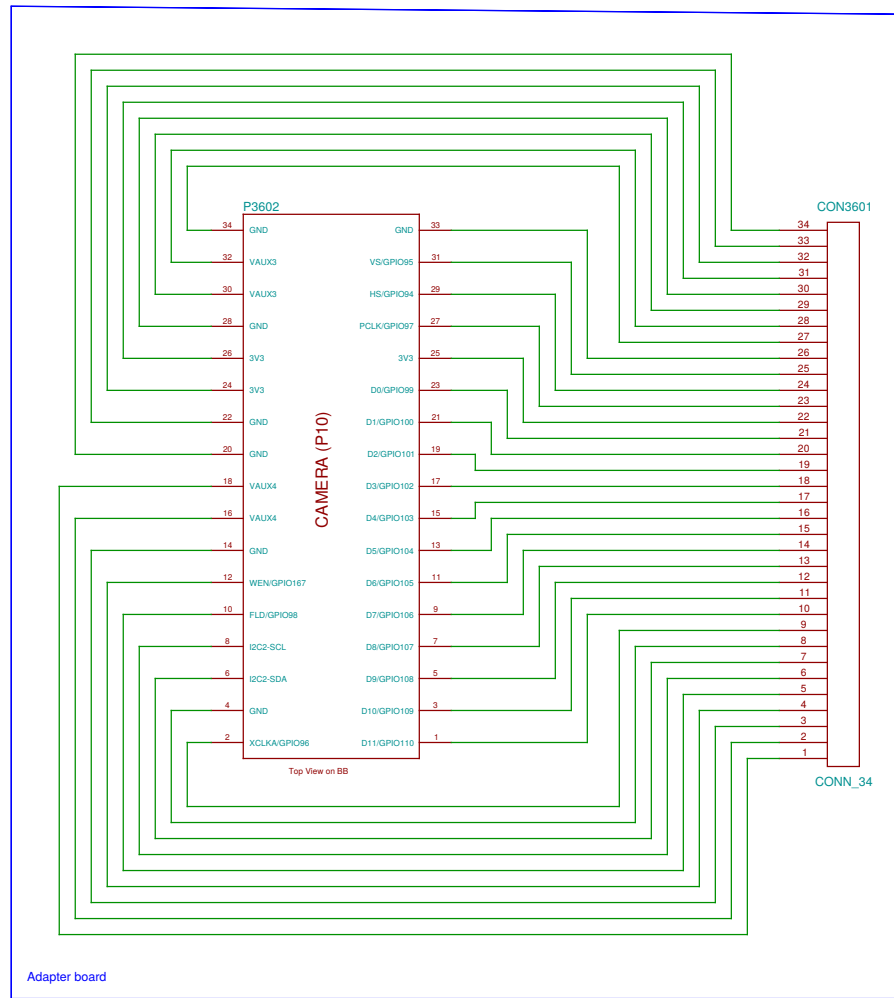


P13 (7.25)

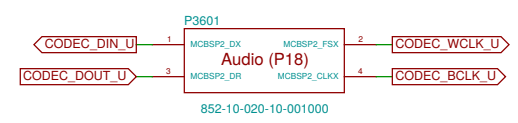


TODO: update pin names in footprint

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: 2016-10-31 08:32:45 | 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: 2016-10-31 08:32:45 | Rev: |
| Plotted by eeshow 96ef3e0+ 20161030-17:20Z | | Id: 37/37 |