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Charger/OTG

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Sheet: Battery



Battery

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Modem Power

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3G/4G Modem

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SIM cards and switch

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Modem Antennas

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WLAN, Bluetooth, FM

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Audio Codec

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Misc

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RFID/NFC

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Infrared

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B2B LOWER-UPPER

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Hackerbus

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uSD Breakout Board

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Keypad and buttons

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Display

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Cameras

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LEDs

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V

Sheet: Adaptation (v2 only)



Adaptation (v2 only)

File: v2.sch

Sheet: BB-xM Adapter (CPU)



BB-xM Adapter (CPU)

File: bbcpu.sch

Sheet: BB-xM Adapter (DISP)



BB-xM Adapter (DISP)

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Sheet: BB-xM Adapter (CAM)



BB-xM Adapter (CAM)

File: bbcam.sch

Circuits that exist in the v2 prototype only
and that will not be part of the final design.

Unless indicated otherwise, resistors have a tolerance of 1%,
or better. If the nominal value specified in the schematics is
only available with lower tolerance, use that.

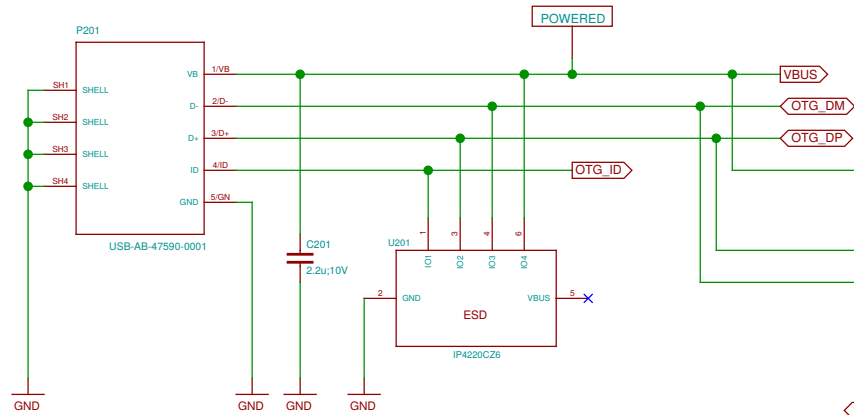
Unless indicated otherwise, all capacitors should be X5R or X6S,
or better (X7R, NP0, etc.)
If no voltage is specified, use ≥ 6.3 V.

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

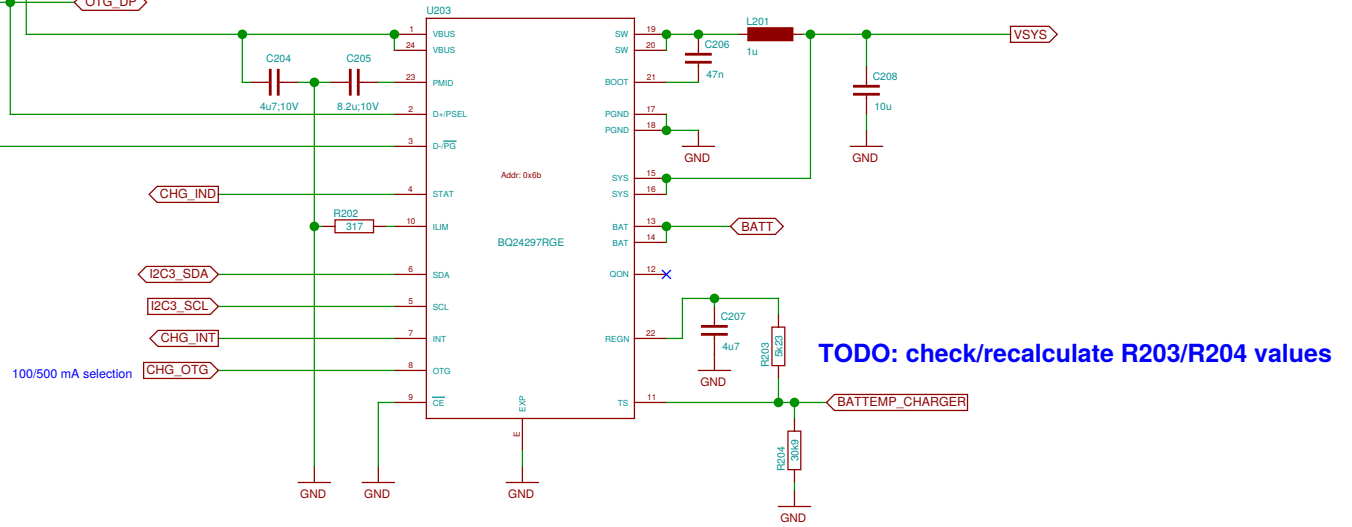
Signals that exist on both LOWER and UPPER (and maybe also BOB)
have a _U suffix on UPPER. No suffix is needed to distinguish
between LOWER and BOB because all BOB components are on
the same sheet and wires connecting them use sheet-local labels.

| | |
|--|---------------------------|
| Sheet: / | |
| File: neo900.sch | |
| Title: Neo900 | |
| Size: A3 | Date: 2016-12-03 19:31:15 |
| Plotted by: eeshow 221aa28 20161208-00:03Z | Rev: Id: 1/25 |

USB OTG connector

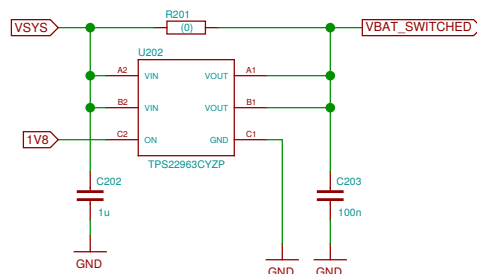


Battery charger with USB OTG

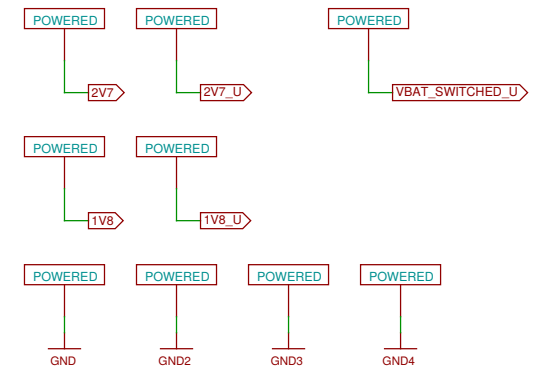


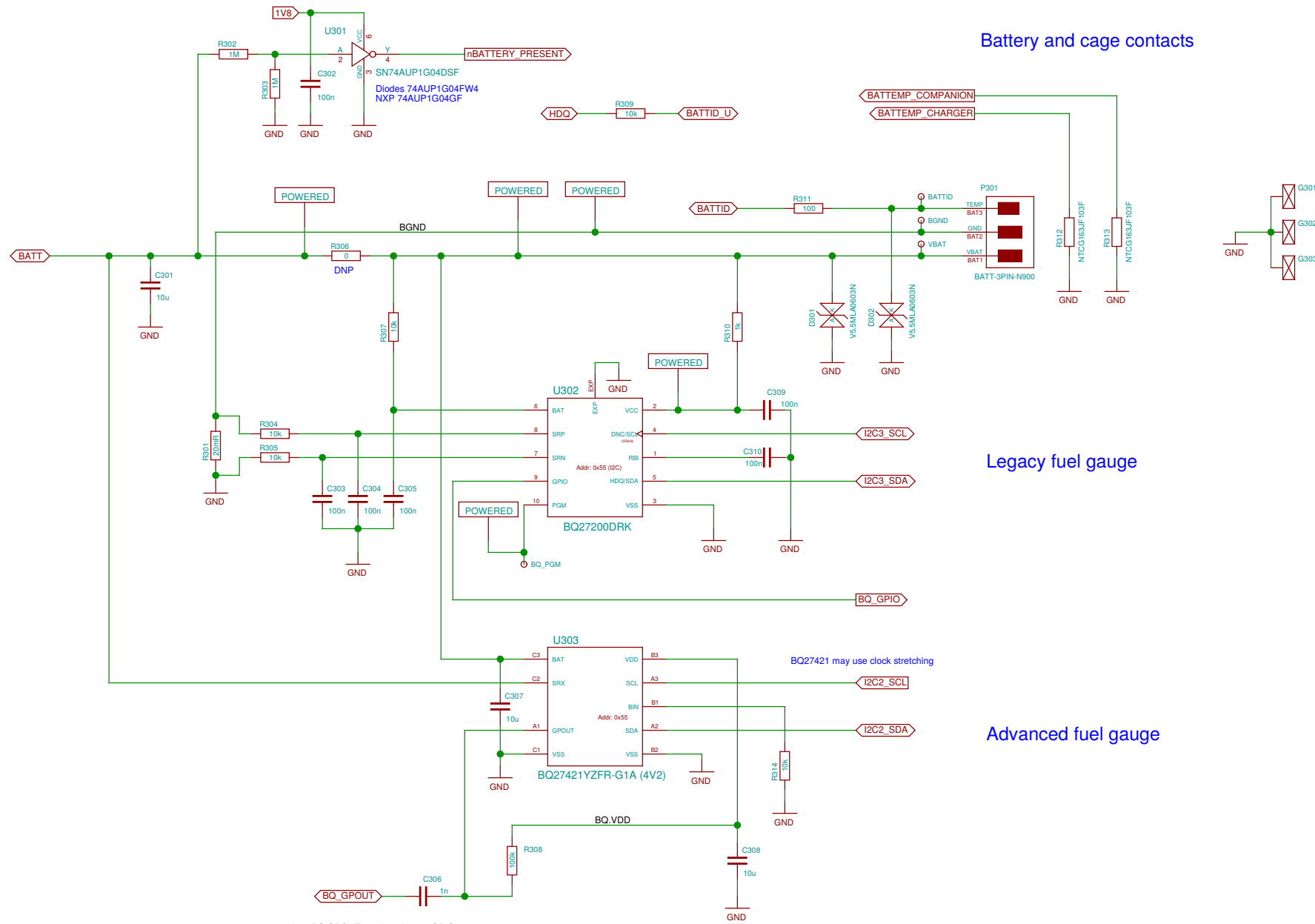
Power distribution and sequencing

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



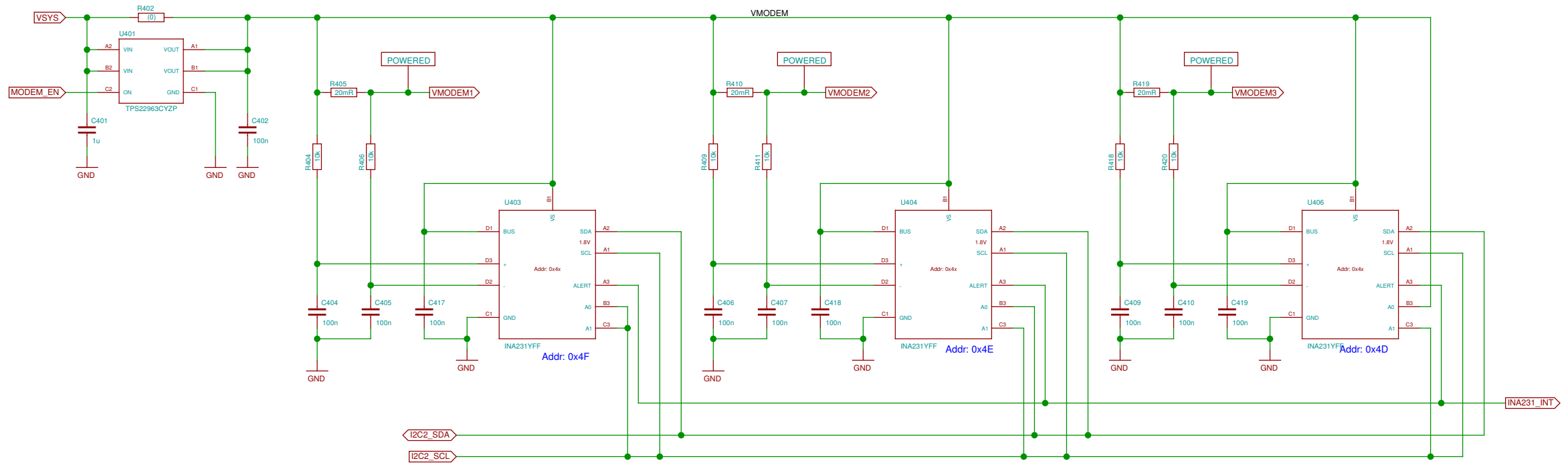
KiCad bureaucracy



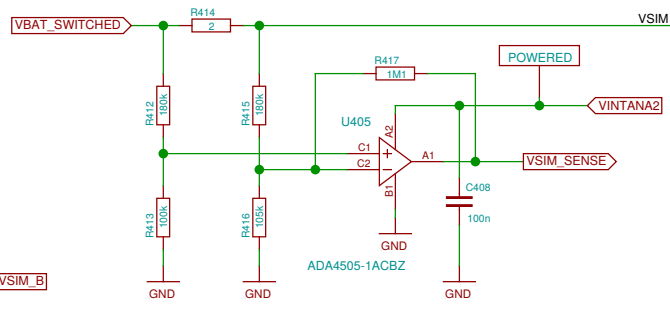


| | |
|--|---------------------------|
| Sheet: /Battery/ File: battery.sch | |
| Title: Battery | |
| Size: A3 | Date: 2016-11-29 23:12:49 |
| Plotted by: eeshow 221aa28 20161208-00:03Z | Rev: Id: 3/25 |

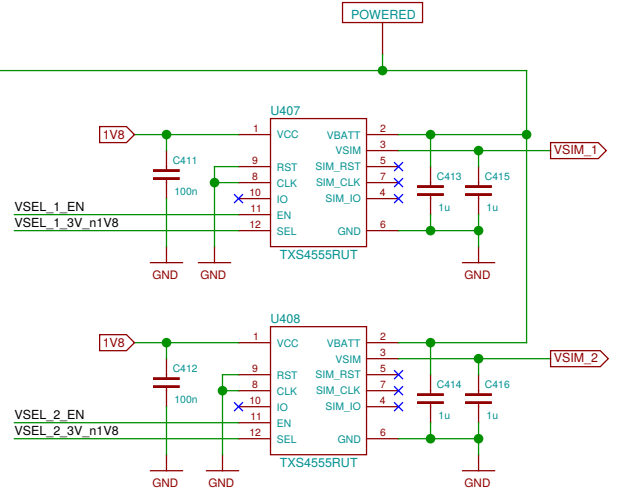
Modem current monitor



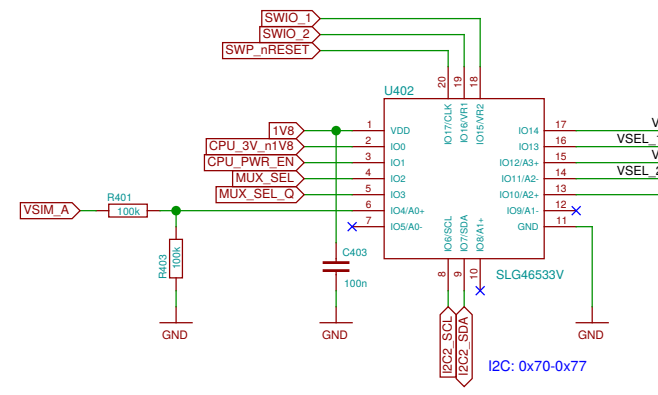
SIM current sensing



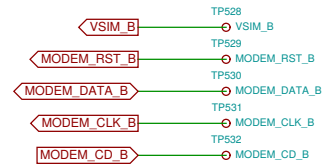
SIM power supply



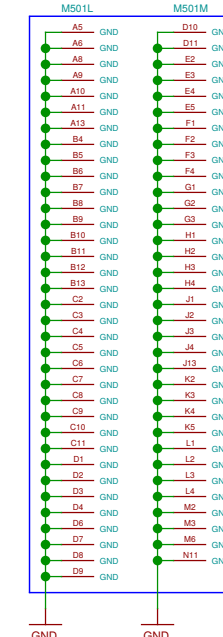
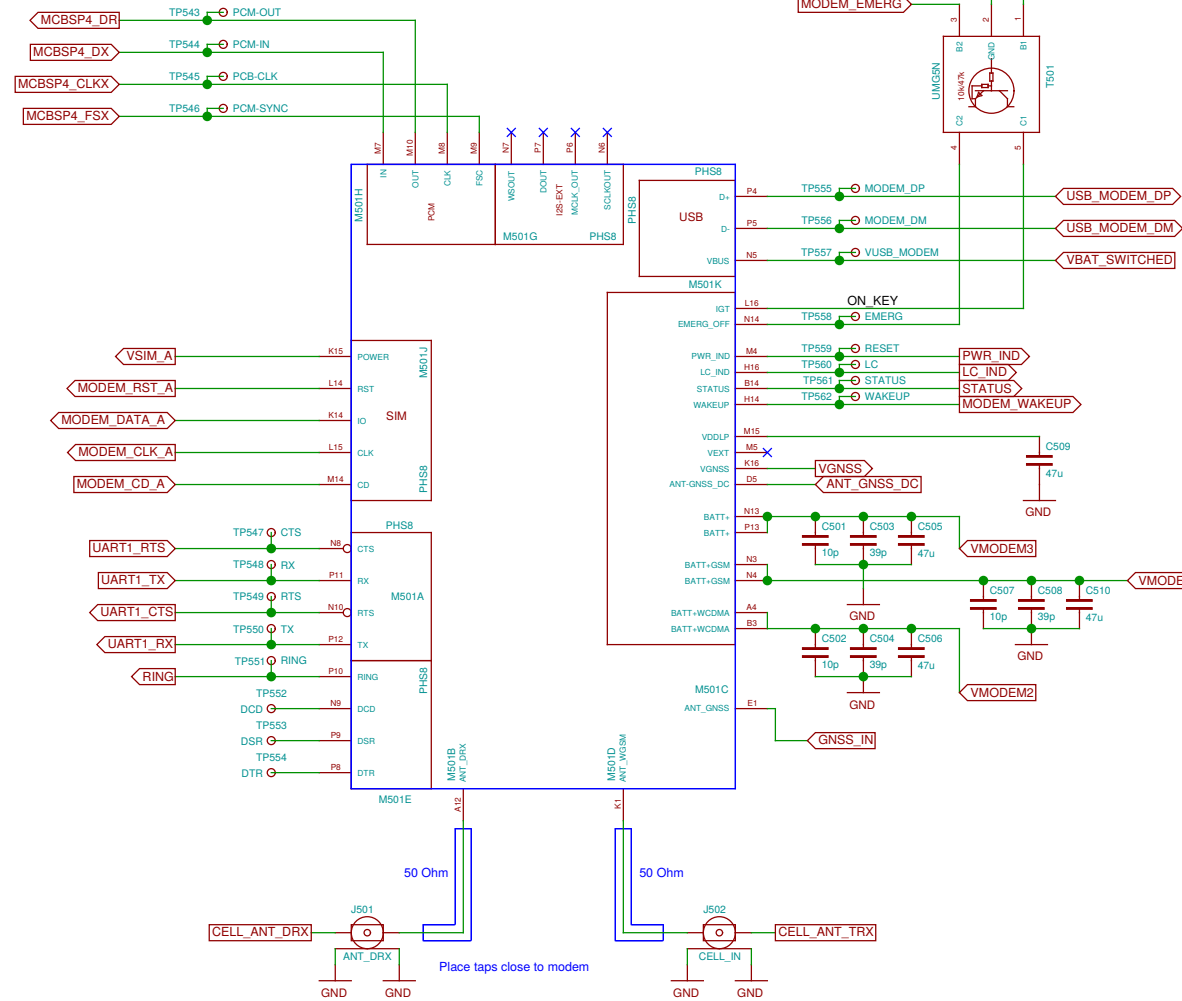
SIM power selection



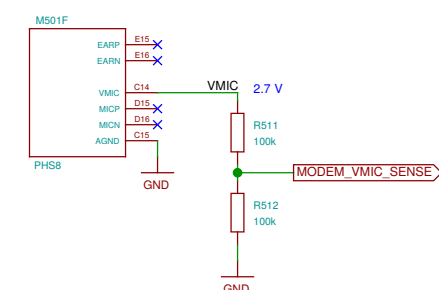
SIM B bus



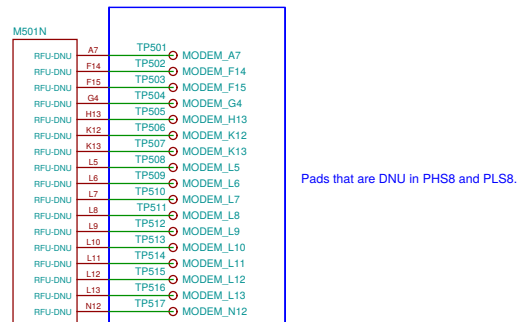
Modem (module)



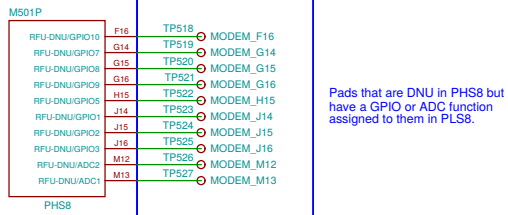
Anti-eavesdropping



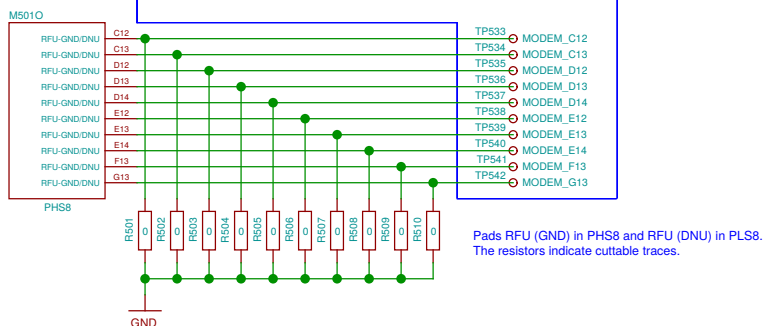
17+10+10 = 37 test points. PCB space permitting, to be arranged in a 6 x 6 + 1 grid with 1.0 mm pitch. This patch field is to be placed adjacent to the SIM B bus test points.



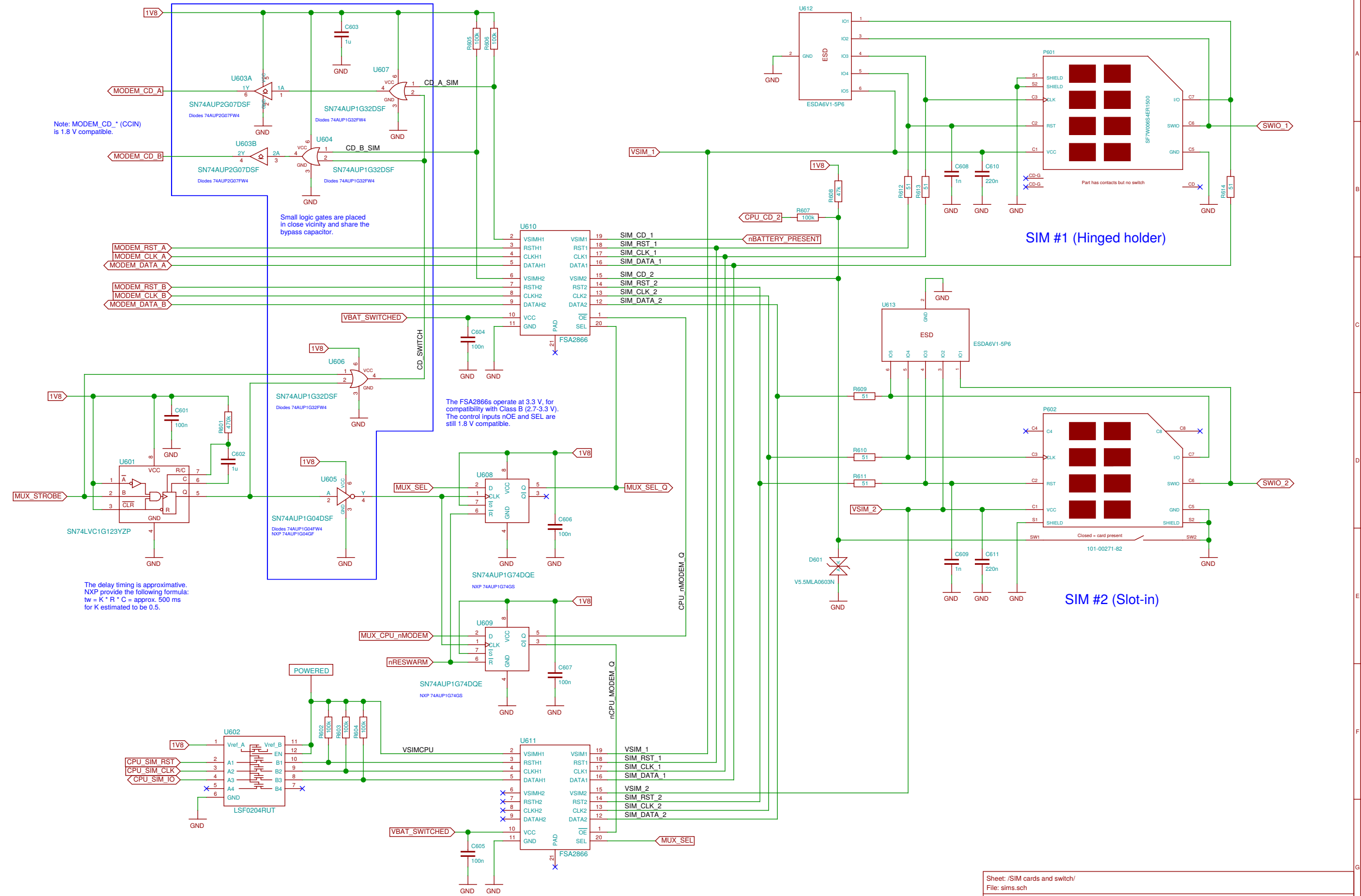
Pads that are DNU in PHS8 and PLS8.



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



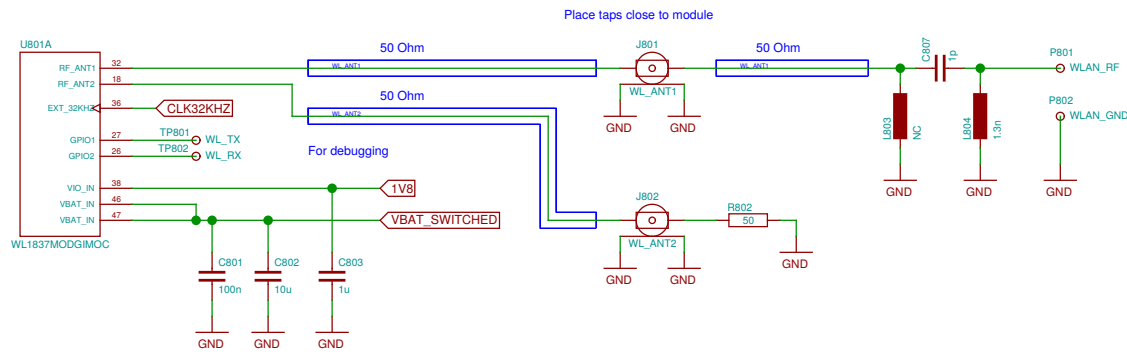
Pads RFU (GND) in PHS8 and RFU (DNU) in PLS8. The resistors indicate cuttable traces.



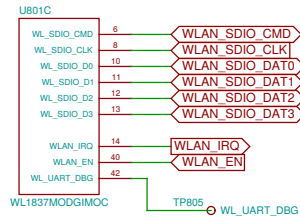
| | | |
|---|---------------------------|----------|
| Sheet: /SIM cards and switch/ File: sims.sch | | |
| Title: SIM cards and switch | | |
| Size: A3 | Date: 2016-11-21 23:56:50 | Rev: |
| Plotted by eeshow 221aa28 20161208-00:03Z | | Id: 6/25 |

TODO: assign footprints for c-spring contacts

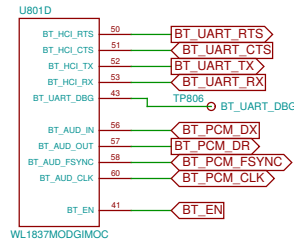
WLAN/BT antenna



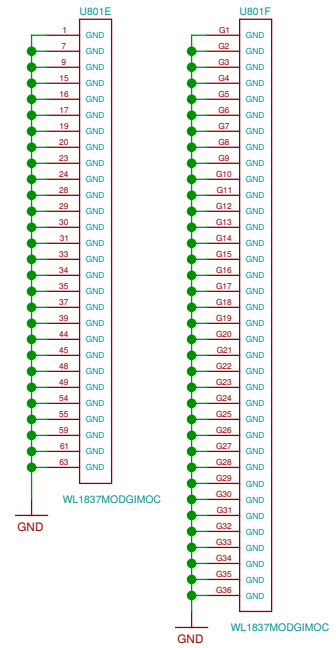
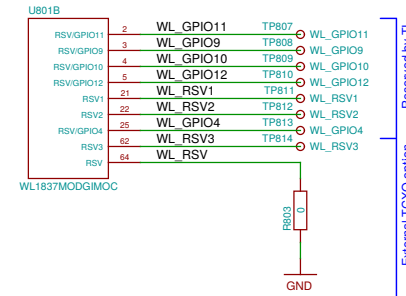
WLAN



Bluetooth

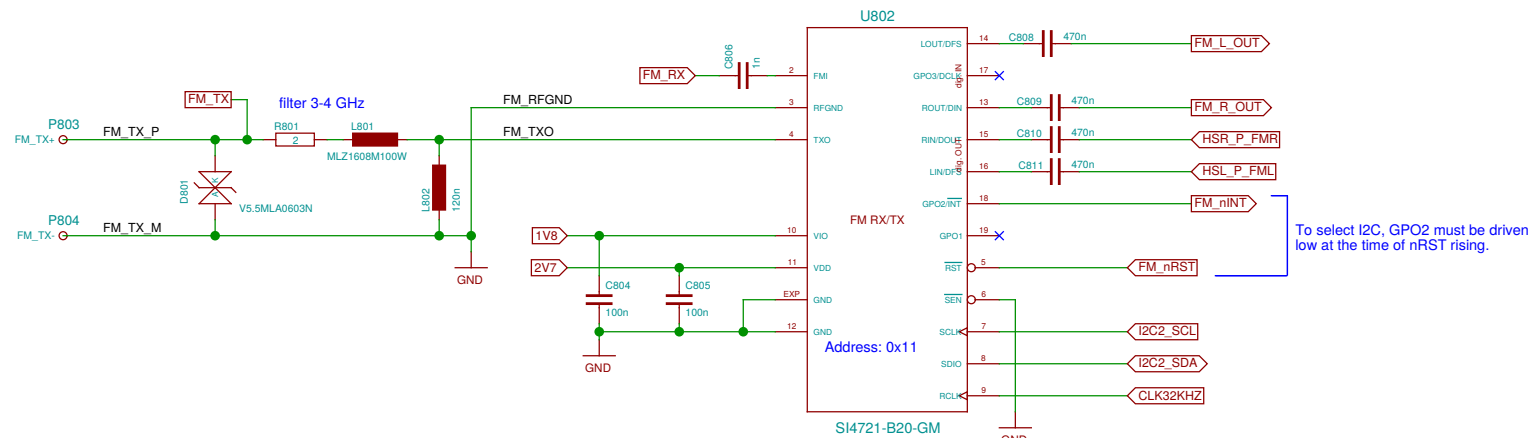


Reserved / Debugging



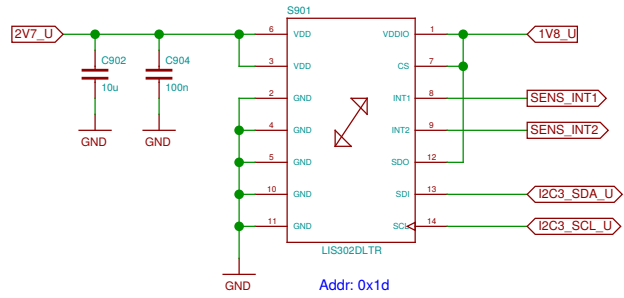
FM Radio (TX/RX)

FM TX antenna

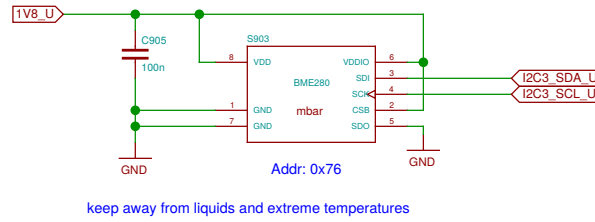


SI4705 is pin compatible (mostly) but RX-only

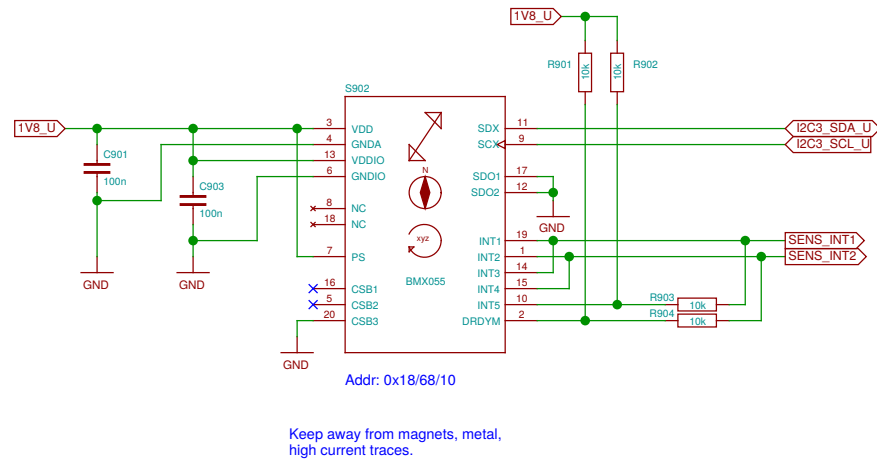
Acceleration (legacy)



Pressure, humidity

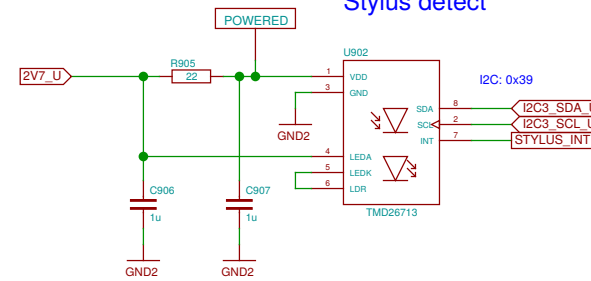


9-axis (acceleration, gyroscope, magnetometer)

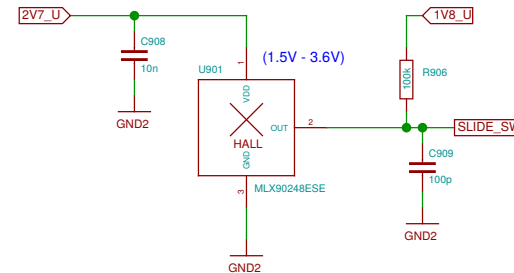


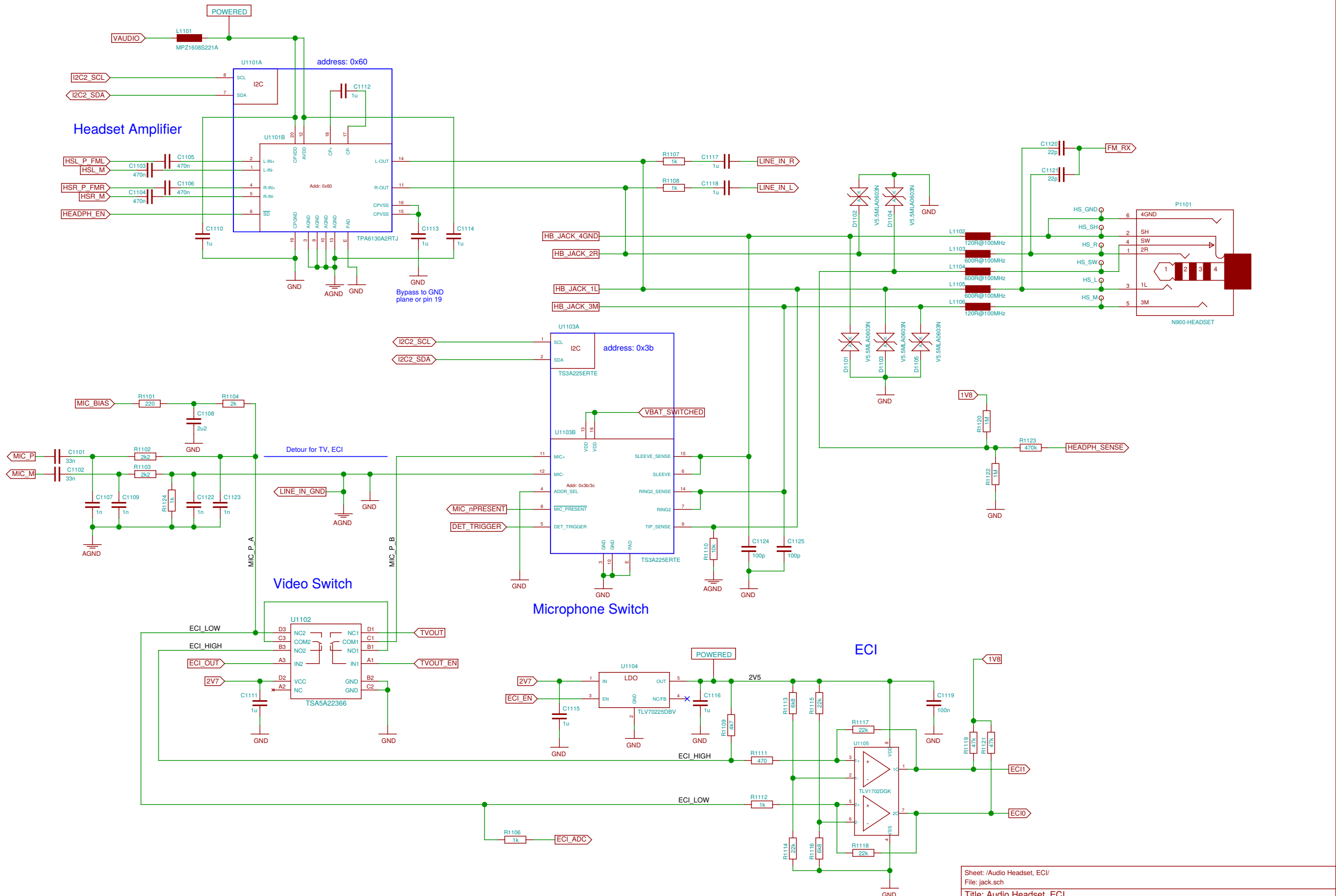
UPPER LOWER

Stylus detect



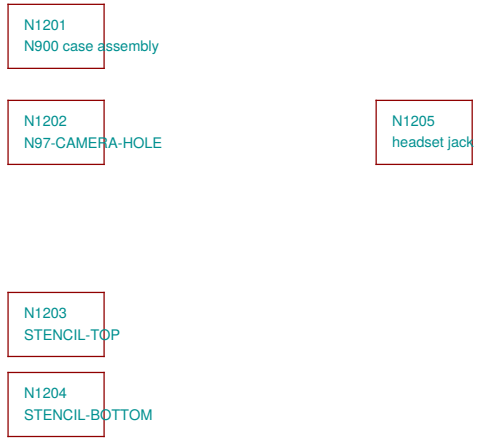
Slide sensor



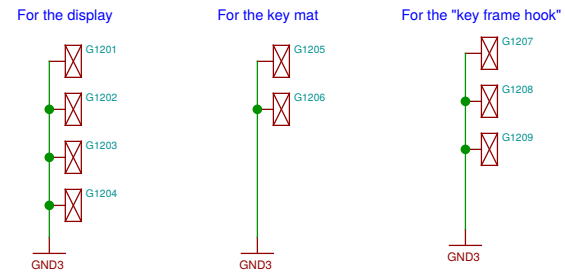


| | | | |
|-----------------------------|--|---------------------------|--|
| Sheet: /Audio Headset, ECI/ | | Date: 2016-12-07 23:55:46 | |
| File: jack.sch | | Rev: | |
| Title: Audio Headset, ECI | | Id: 11/25 | |
| Size: A3 | Plotted by: eeshow 221aa28 20161208-00:03Z | | |

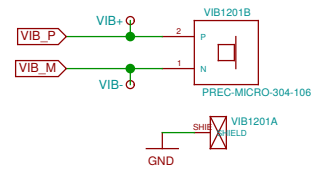
No-Solder Components



Shield Contacts on UPPER



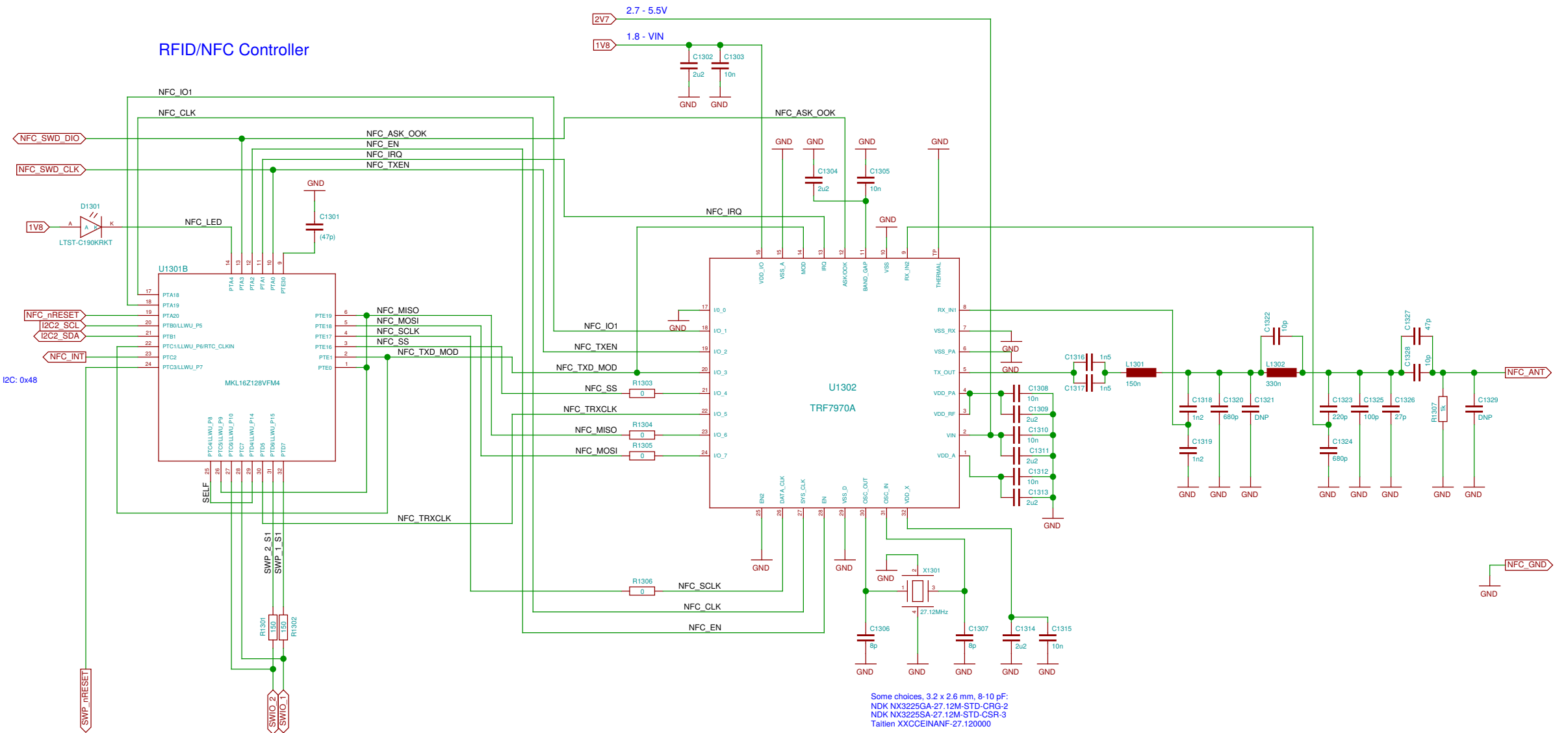
Vibramotor



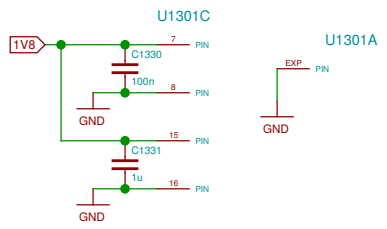
| | | |
|---|---------------------------|-----------|
| Sheet: /Misc/ | | |
| File: misc.sch | | |
| Title: Misc | | |
| Size: A3 | Date: 2016-11-18 15:49:26 | Rev: |
| Plotted by eeshow 221aa28 20161208-00:03Z | | Id: 12/25 |

RFID/NFC Transceiver

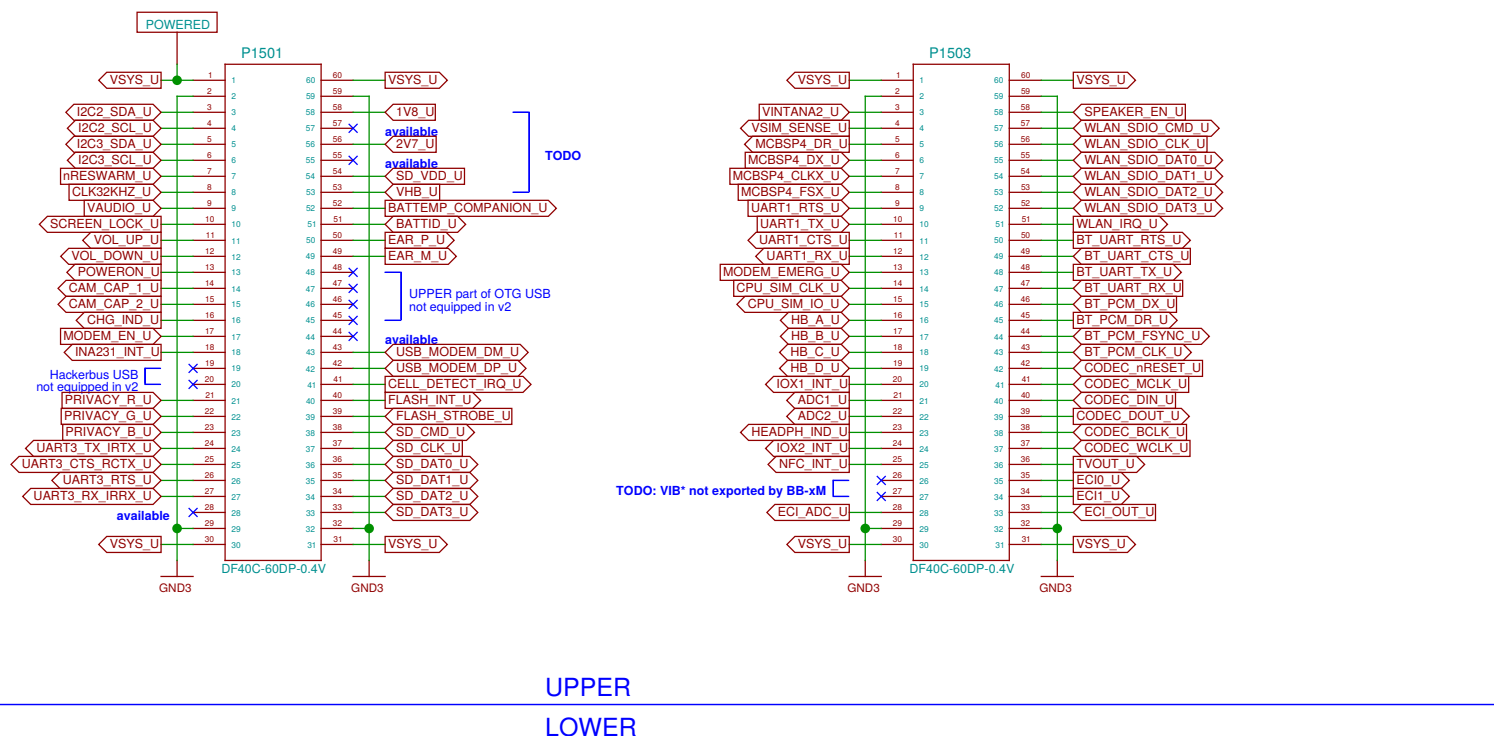
RFID/NFC Controller



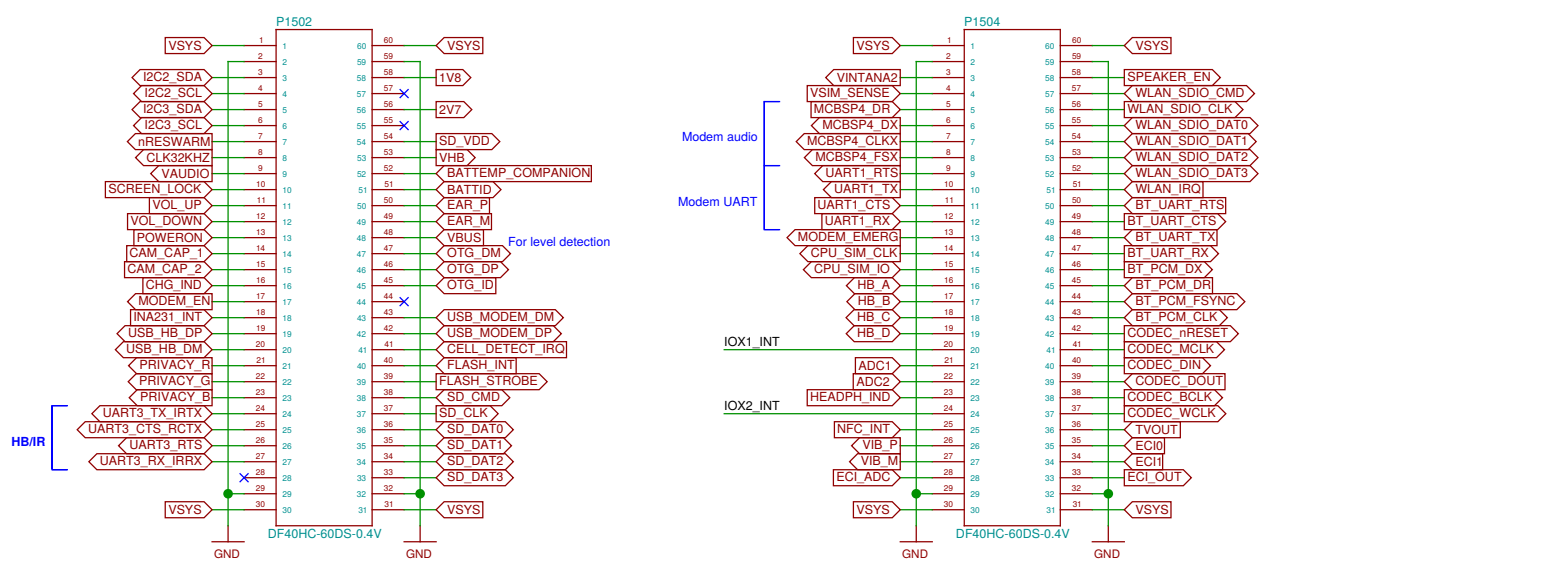
Some choices, 3.2 x 2.6 mm, 8-10 pF:
 NDK NX3225GA-27.12M-STD-CRG-2
 NDK NX3225SA-27.12M-STD-CSR-3
 Tallien XXCCEINANF-27.120000



This is just the collection of signals we have. Assignment can still change, e.g., to improve layout.

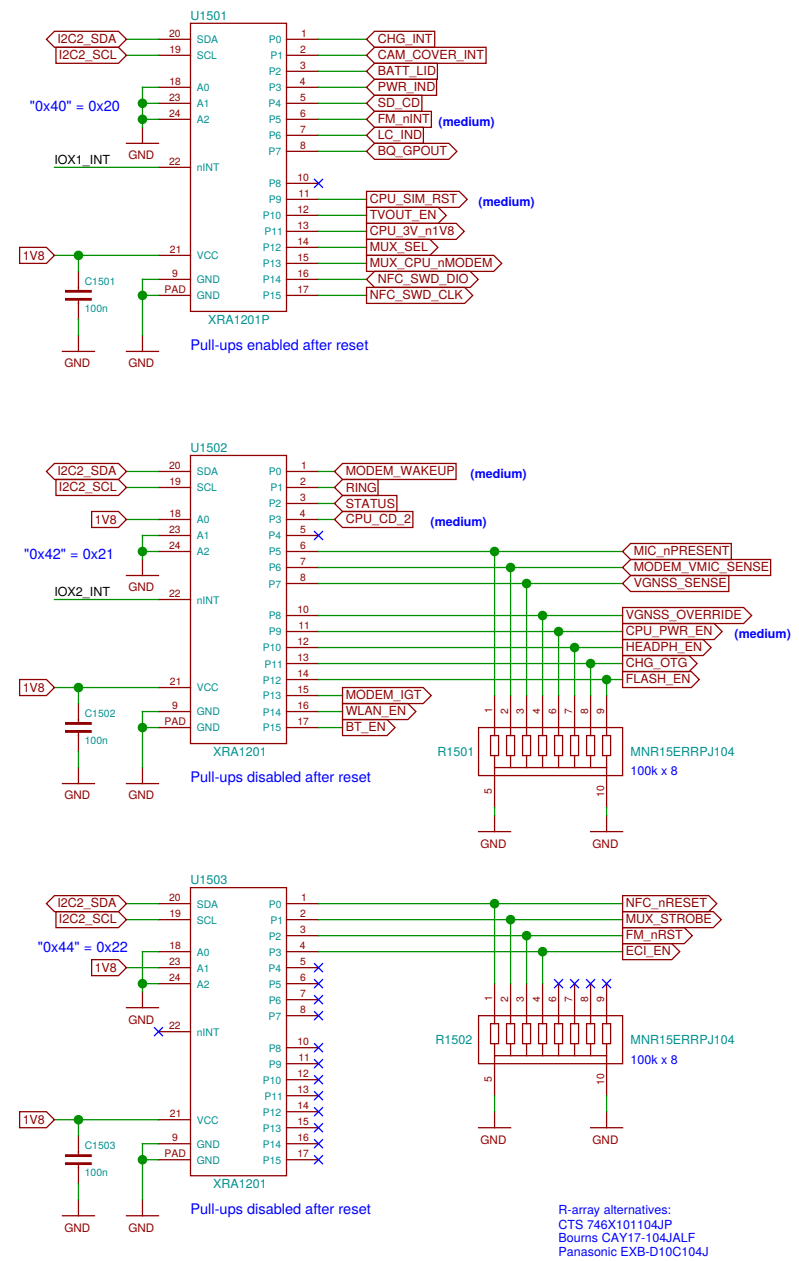


UPPER
LOWER



Current rating per contact: 0.3 A

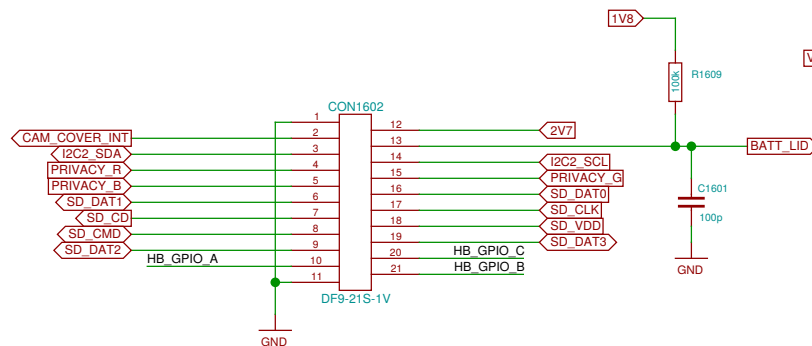
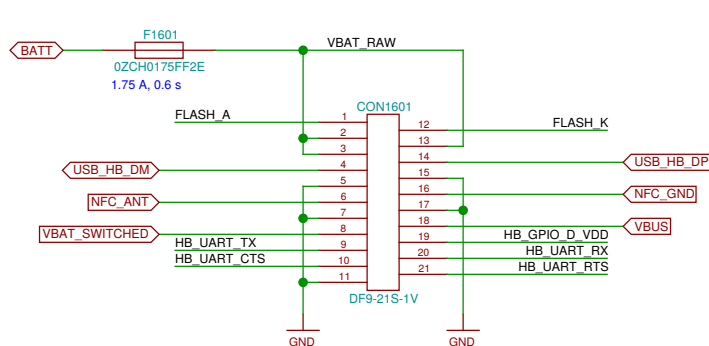
IO expanders (on LOWER)



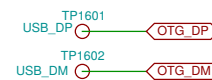
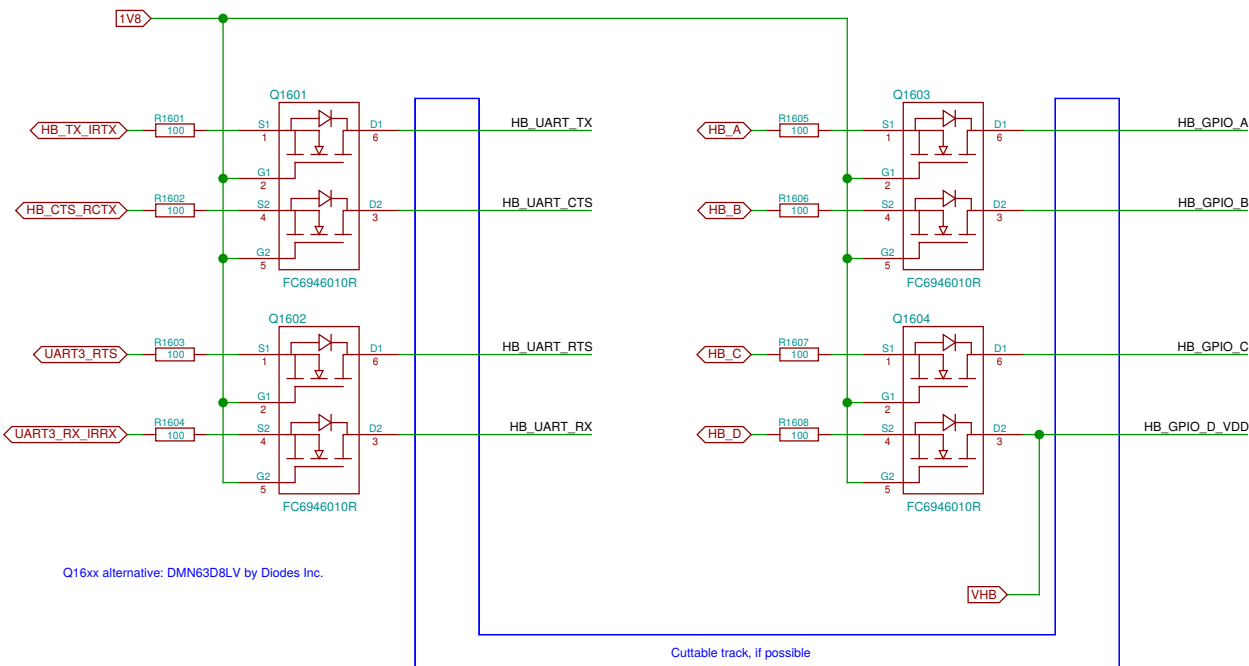
| | | | |
|---|---------------------------|-----------|--|
| Sheet: /B2B LOWER-UPPER/ File: b2b.sch | | | |
| Title: B2B LOWER-UPPER | | | |
| Size: A3 | Date: 2016-11-22 10:44:58 | Rev: | |
| Plotted by eeshow 221aa28 20161208-00:03Z | | Id: 15/25 | |

LOWER-BOB Interconnect (LOWER side)

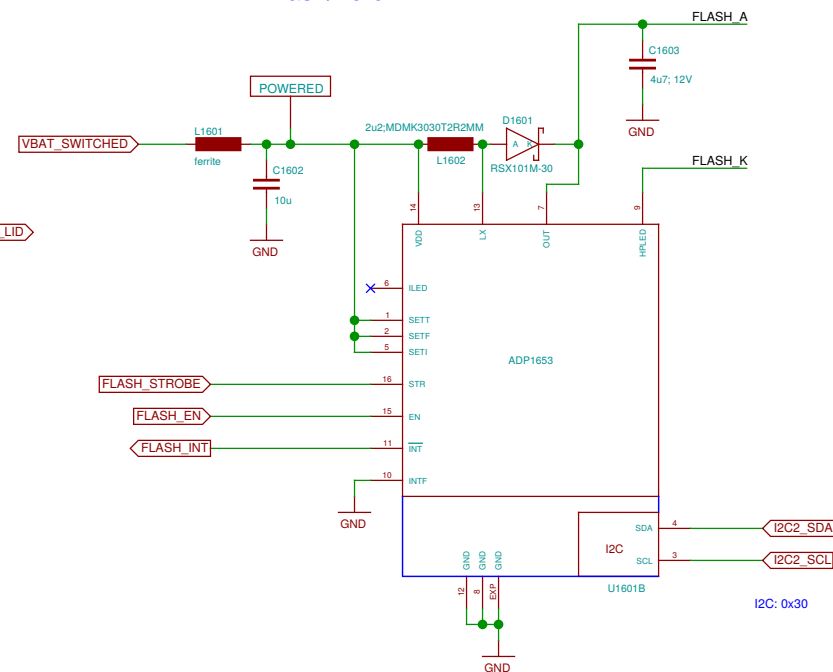
Defined in the Hackerbus specification, <http://neo900.org/stuff/papers/hb.pdf>



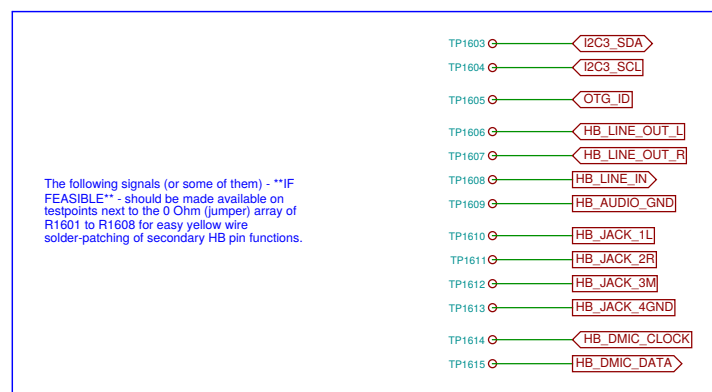
Level shifters for Hackerbus GPIO and UART



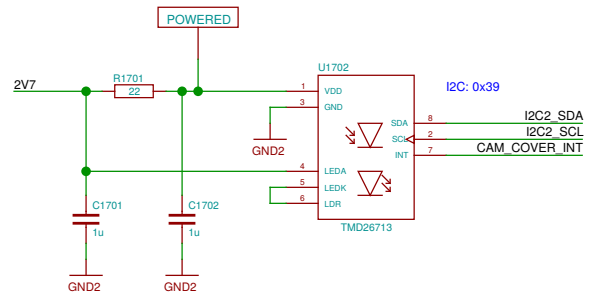
Flash/Torch



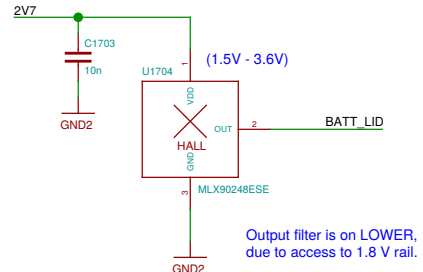
Patch field



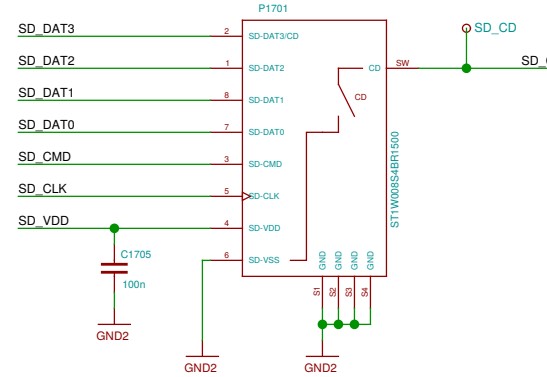
Camera Cover detect



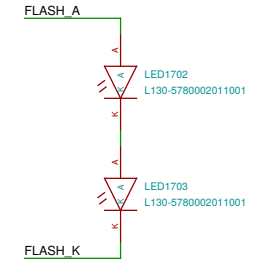
Battery Cover detect



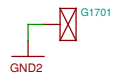
Memory card holder



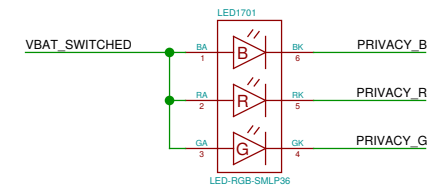
Camera flash



Camera lens plate

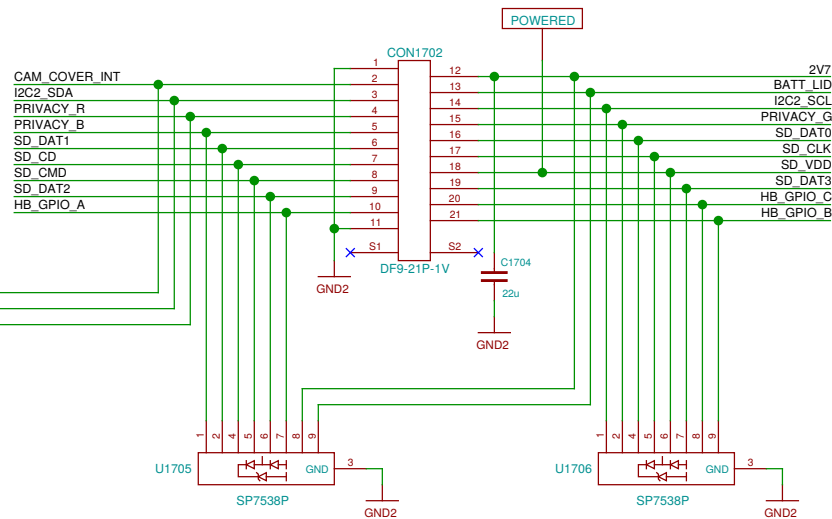
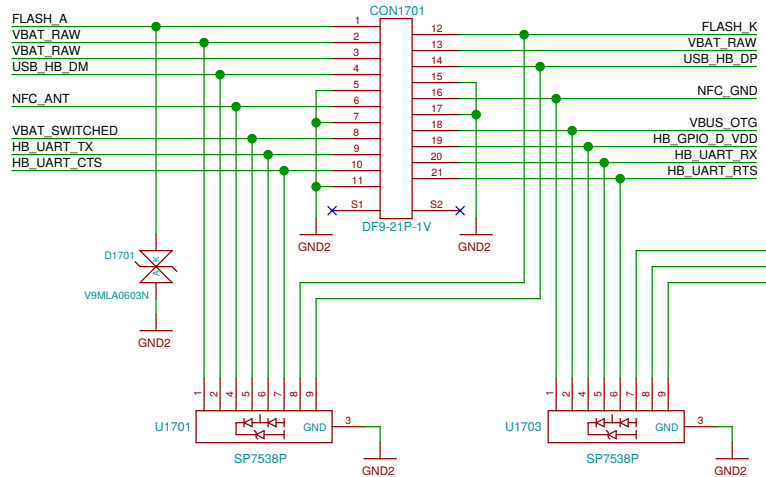


Privacy LED

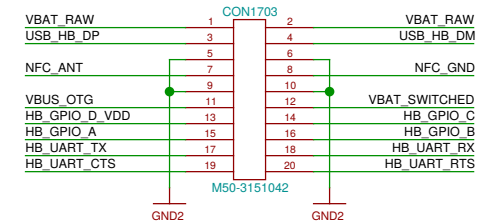


LOWER-BOB Interconnect (BOB side)

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

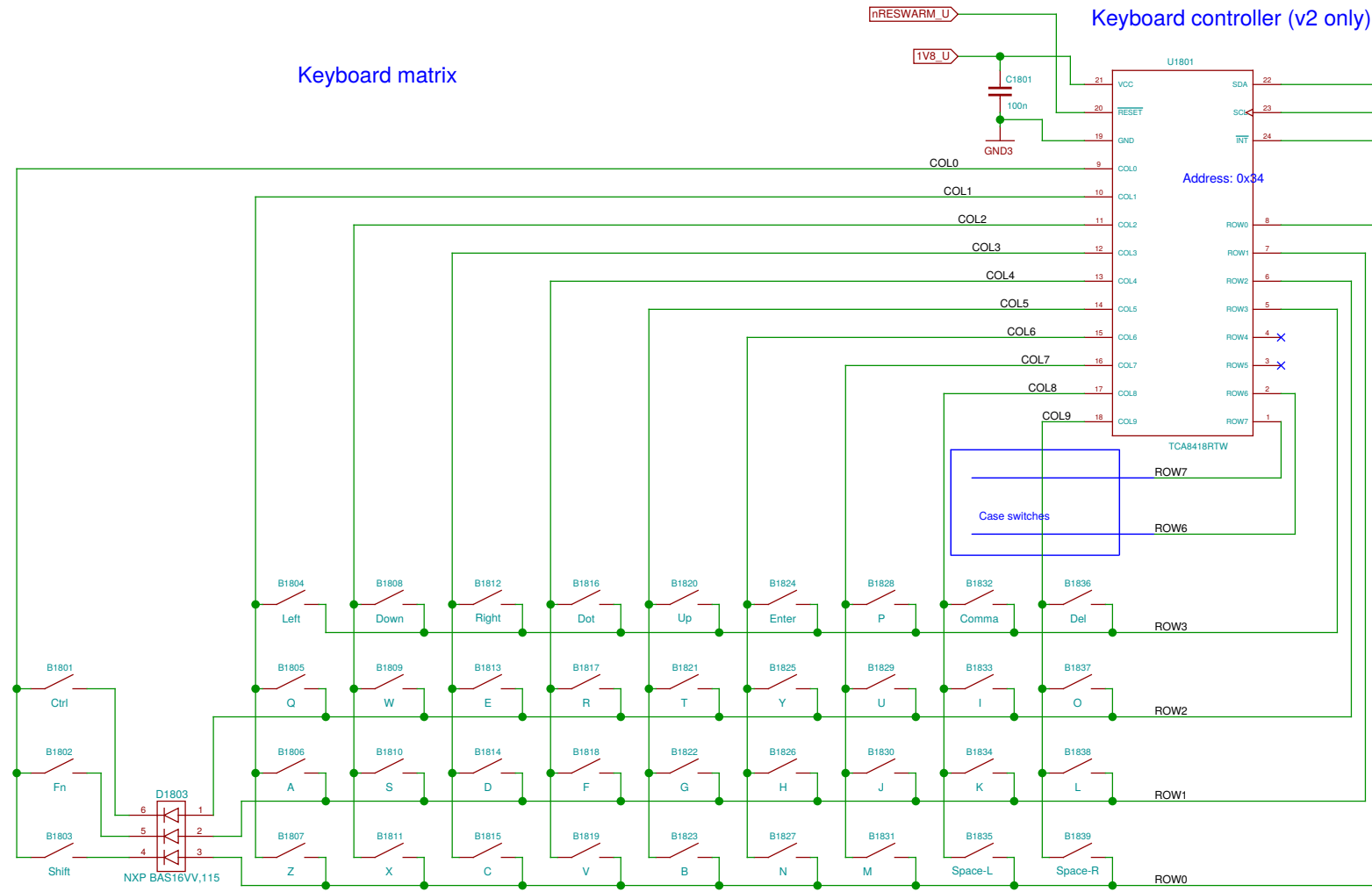


Hackerbus

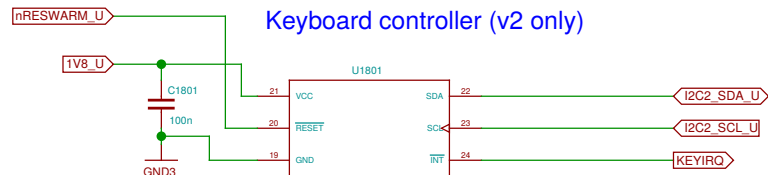


**ESD pin assignment is only indicative.
Actual assignment to be defined by layout.**

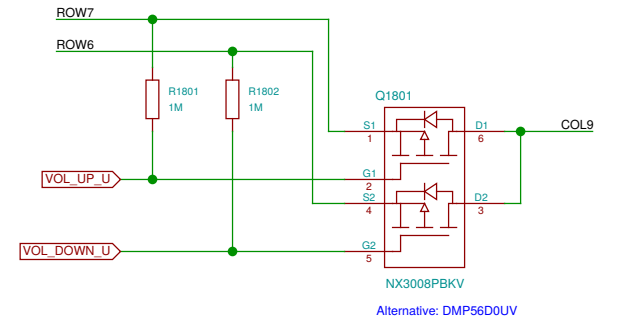
Keyboard matrix



Keyboard controller (v2 only)



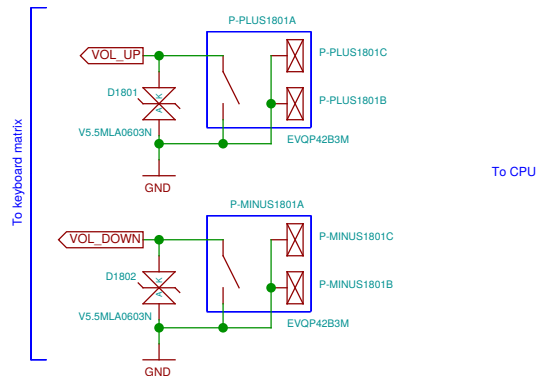
Address: 0x34



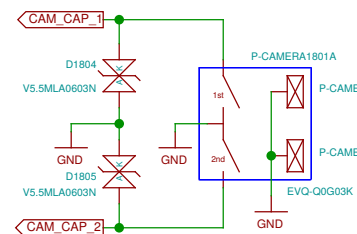
Alternative: Diodes Inc. BAS16VV-7
Warning: Diodes Inc. have cathodes on pin 1 side, NXP anodes !

UPPER
LOWER

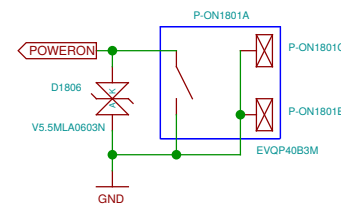
Volume



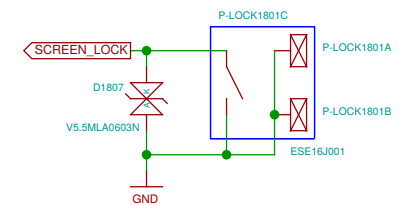
Camera trigger



On-off



Lock switch



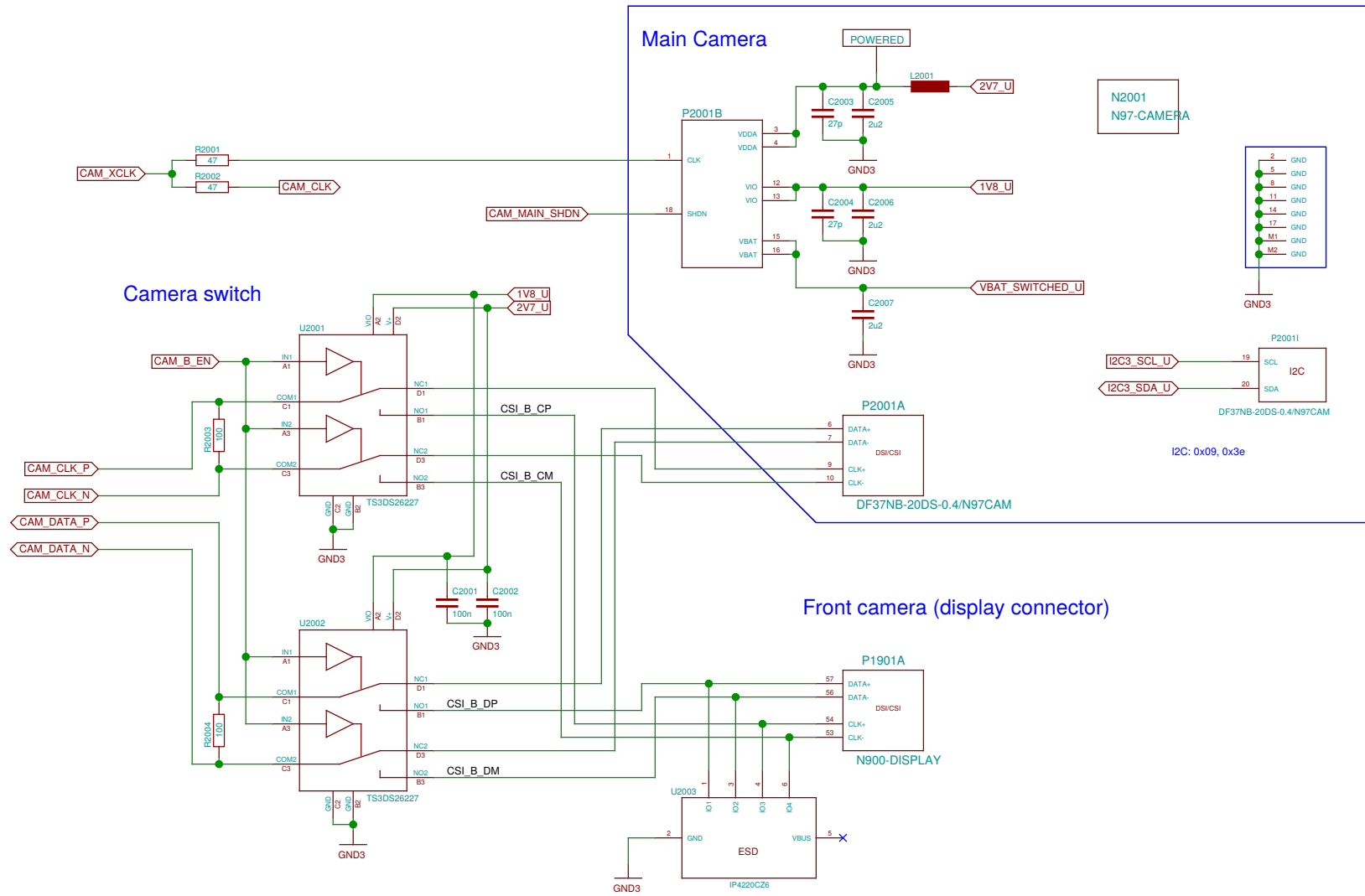
Sheet: /Keypad and buttons/
File: keys.sch

Title: Keypad and buttons

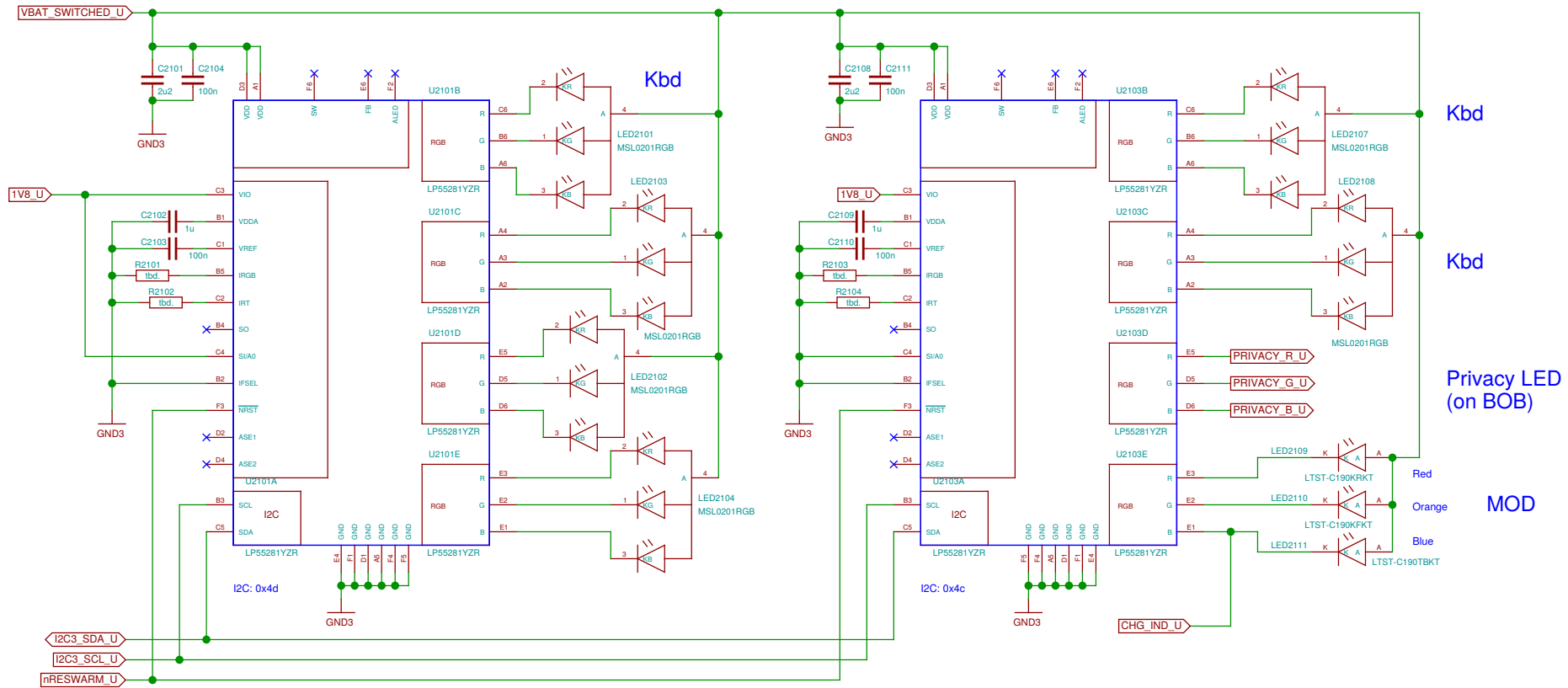
Size: A3 Date: 2016-12-07 23:57:31

Plotted by eeshow 221aa28 20161208-00:03Z

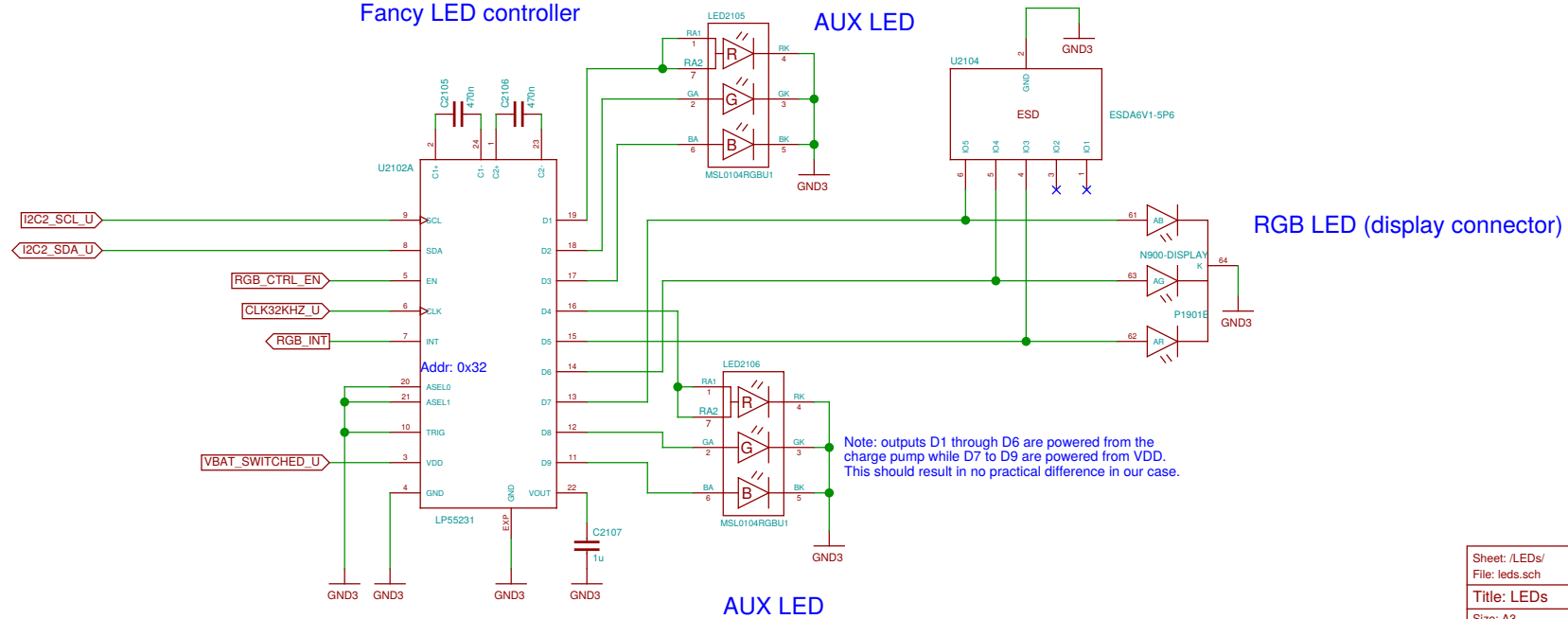
Rev:
Id: 18/25



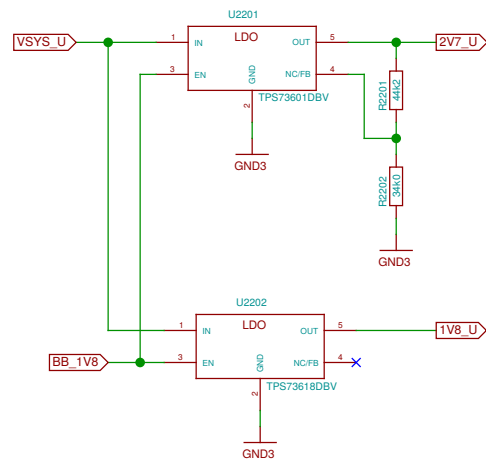
Basic LED controllers



Fancy LED controller



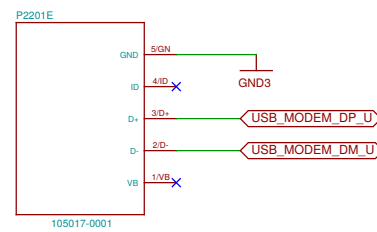
simple capless 400mA LDO for TPS65950 substitute
(only for prototype)



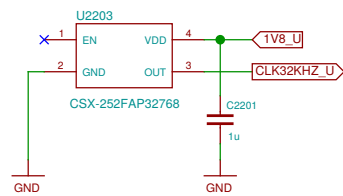
TODO: use REGEN ?

Modem USB

connect to BB
by some Micro-USB cable

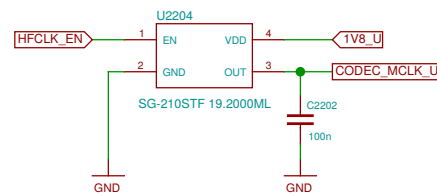


32 kHz clock



Alternative: OYKTGLJANF-0.032768

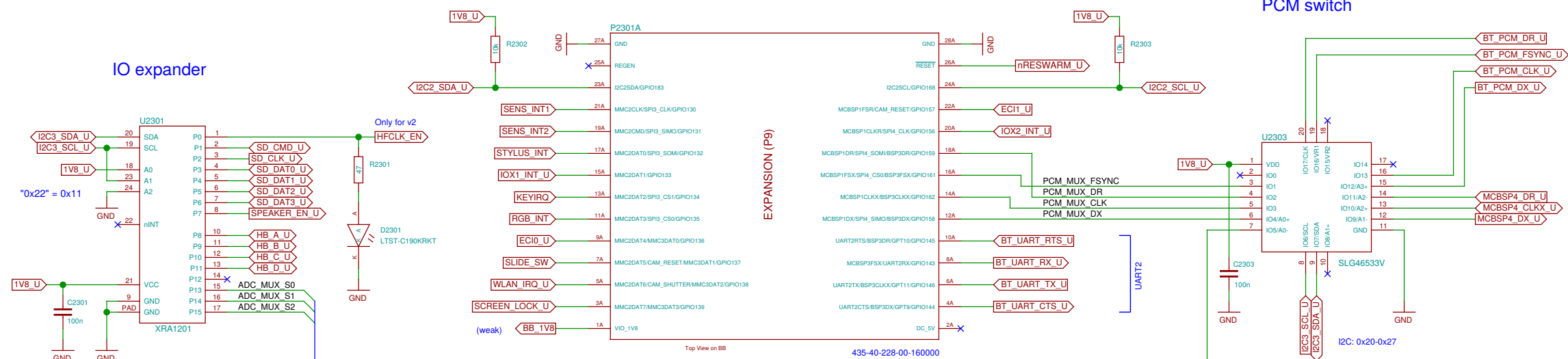
19.2 MHz clock



Alternative: KC2520B19.2000C1GE00

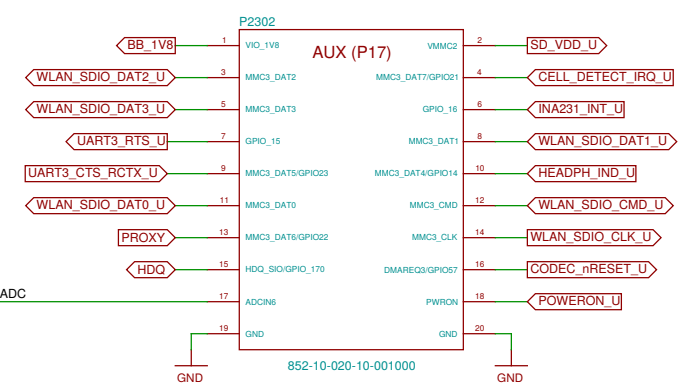
| | | |
|---|---------------------------|-----------|
| Sheet: /Adaptation (v2 only)/ | | |
| File: v2.sch | | |
| Title: Adaptation (v2 only) | | |
| Size: A3 | Date: 2016-11-18 15:49:26 | Rev: |
| Plotted by eeshow 221aa28 20161208-00:03Z | | Id: 22/25 |

BB-xM Main Expansion Header (P9, 7.24)



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

Auxiliary Expansion Header (P17, 7.26)

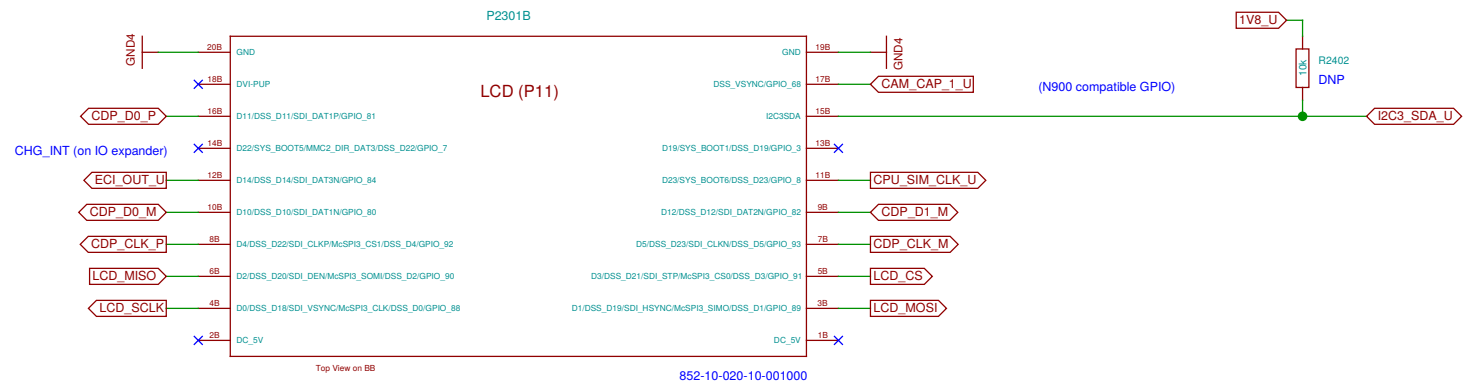


Same part, as "breakaway" strip (100 positions):
852-10-100-10-001000

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

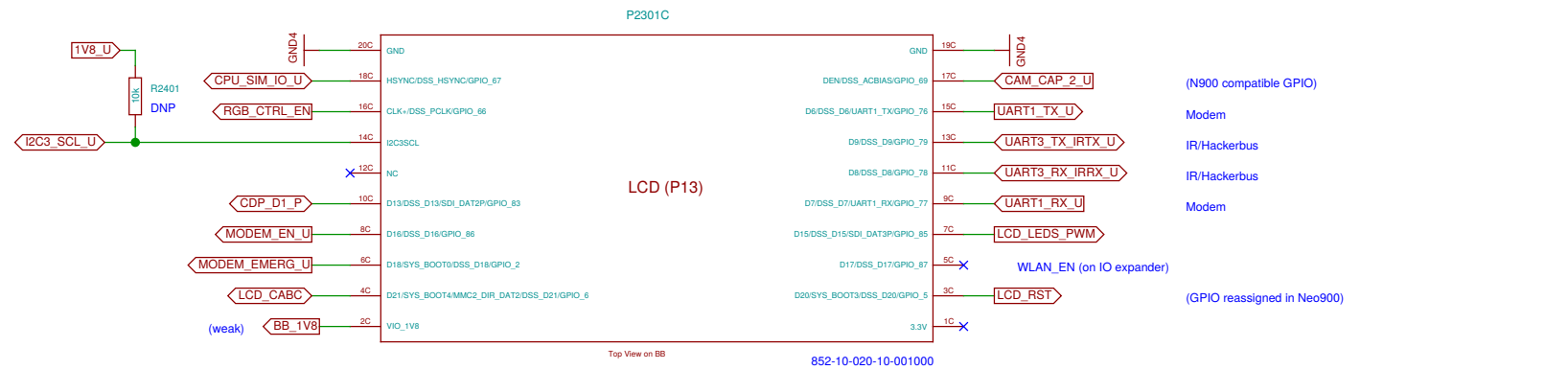
FM_nINT (on IO expander)

P11 (7.25)



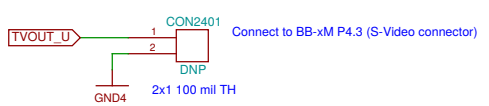
Same part, as "breakaway" strip (100 positions):
852-10-100-10-001000

P13 (7.25)

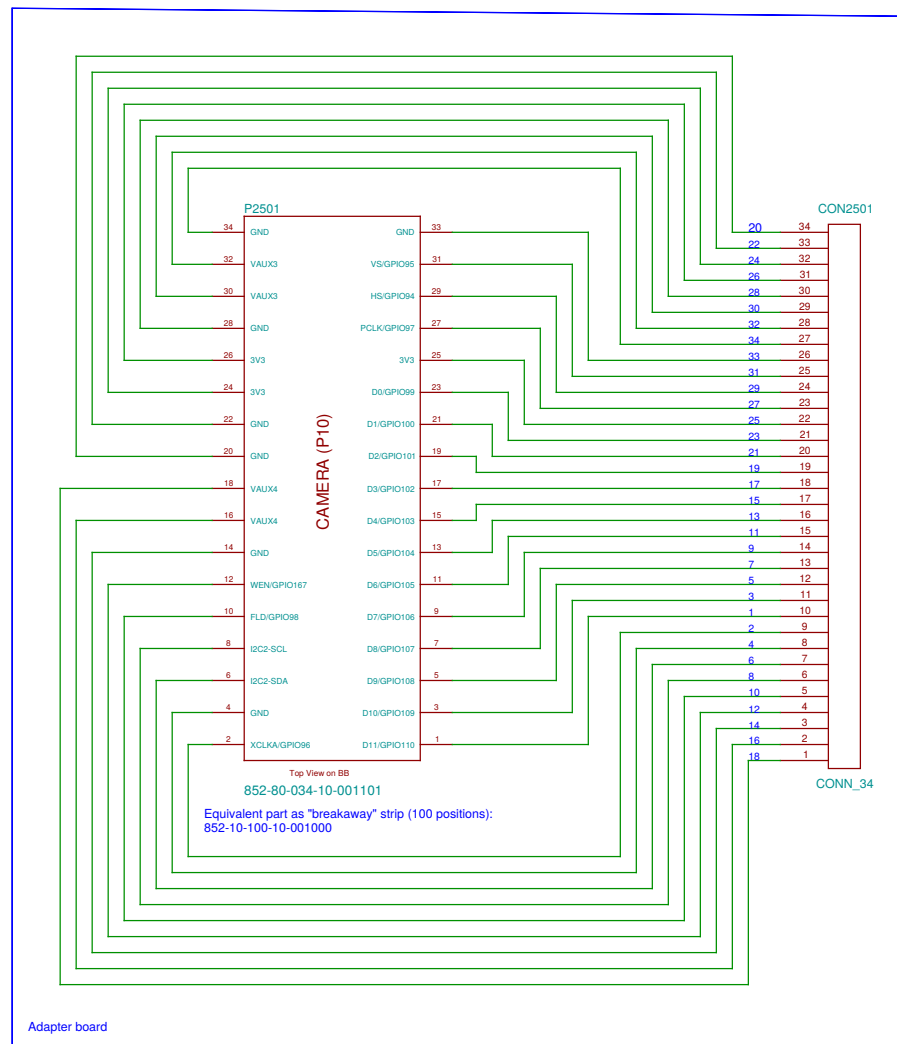


Same part, as "breakaway" strip (100 positions):
852-10-100-10-001000

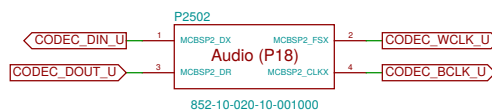
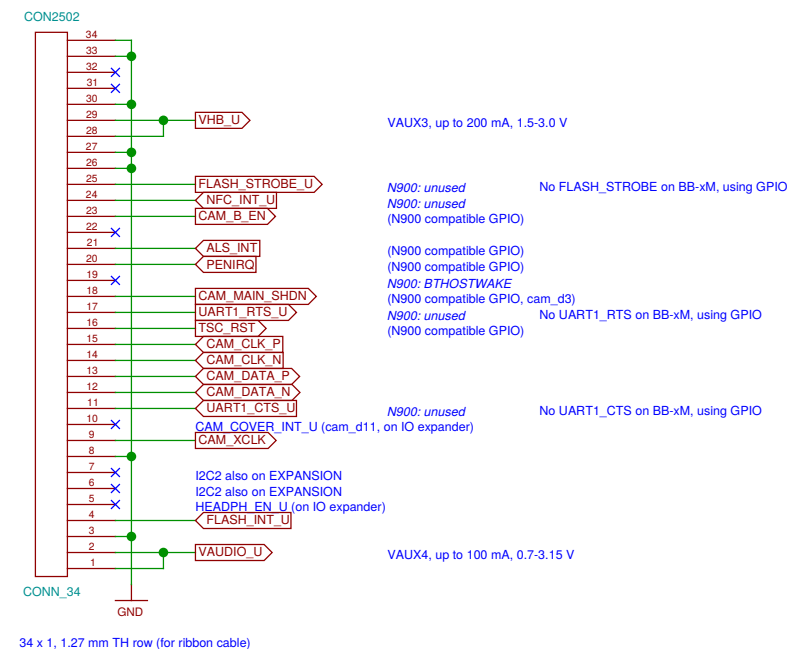
P4 (7.19)



Processor Camera Port Interface (P10, 7.20.3)



Adapter board



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: bbcam.sch

Title: BB-xM Adapter (CAM)

Size: A3 Date: 2016-12-03 14:54:41
Plotted by eeshow 221aa28 20161208-00:03Z

Rev:
Id: 25/25