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Charger/OTG

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Battery

File: battery.sch

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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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Audio Headset, ECI

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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

File: leds.sch

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Sheet: Adaptation (v2 only)



Adaptation (v2 only)

File: v2.sch

Sheet: BB-xM Adapter (CPU)



BB-xM Adapter (CPU)

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Sheet: BB-xM Adapter (DISP)



BB-xM Adapter (DISP)

File: bbdisp.sch

Sheet: BB-xM Adapter (CAM)



BB-xM Adapter (CAM)

File: bbcam.sch

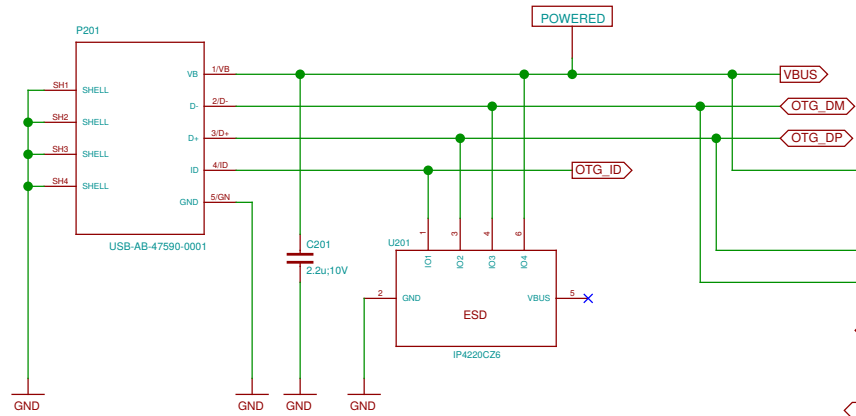
Circuits that exist in the v2 prototype only
and that will not be part of the final design.

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

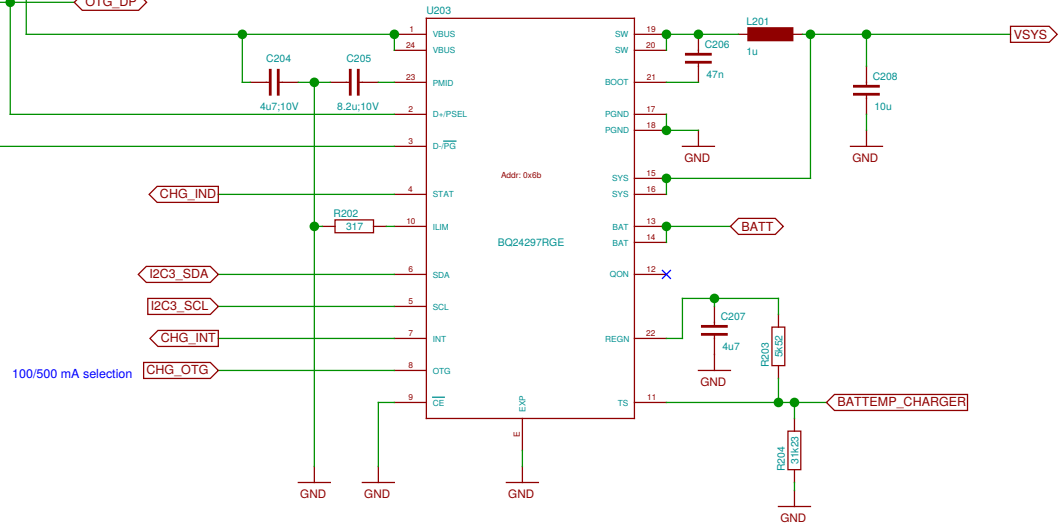
Signals that exist on both LOWER and UPPER (and maybe also BOB)
have a _U suffix on UPPER. No suffix is needed to distinguish
between LOWER and BOB because all BOB components are on
the same sheet and wires connecting them use sheet-local labels.

Sheet: /		
File: neo900.sch		
Title: Neo900		
Size: A3	Date: 2016-11-14 10:27:13	Rev:
Plotted by eeshow a9b66dd+ 20161113-21:01Z		Id: 1/25

USB OTG connector

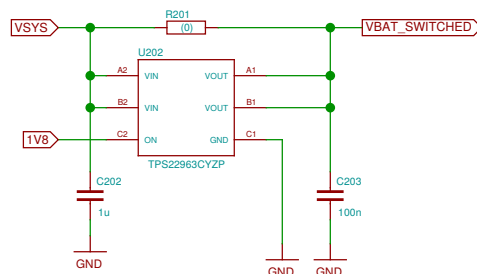


Battery charger with USB OTG

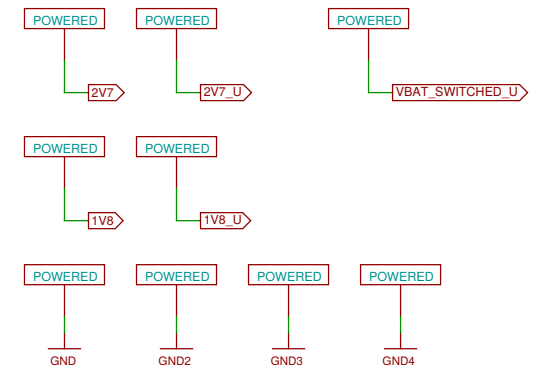


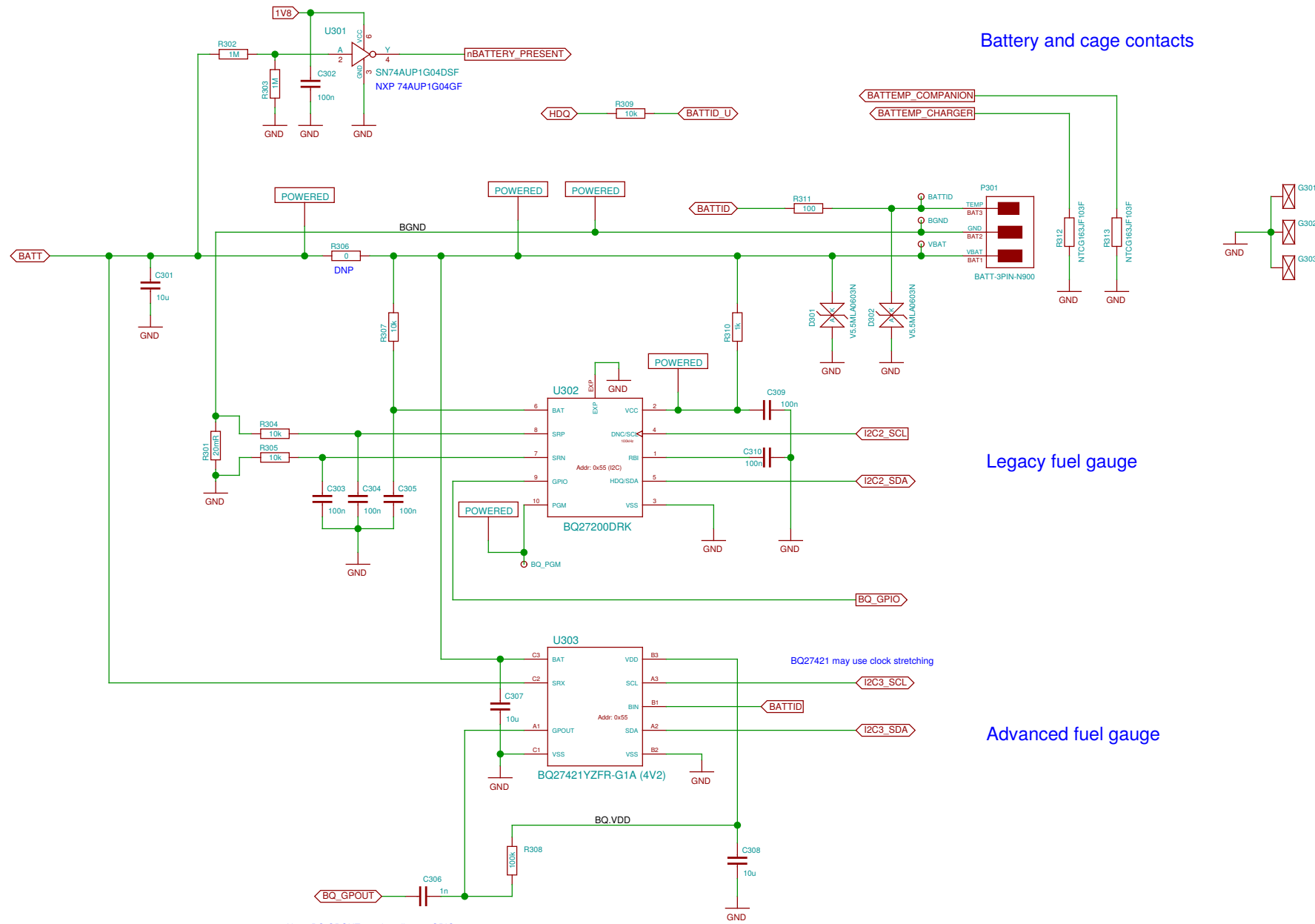
Power distribution and sequencing

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



KiCad bureaucracy





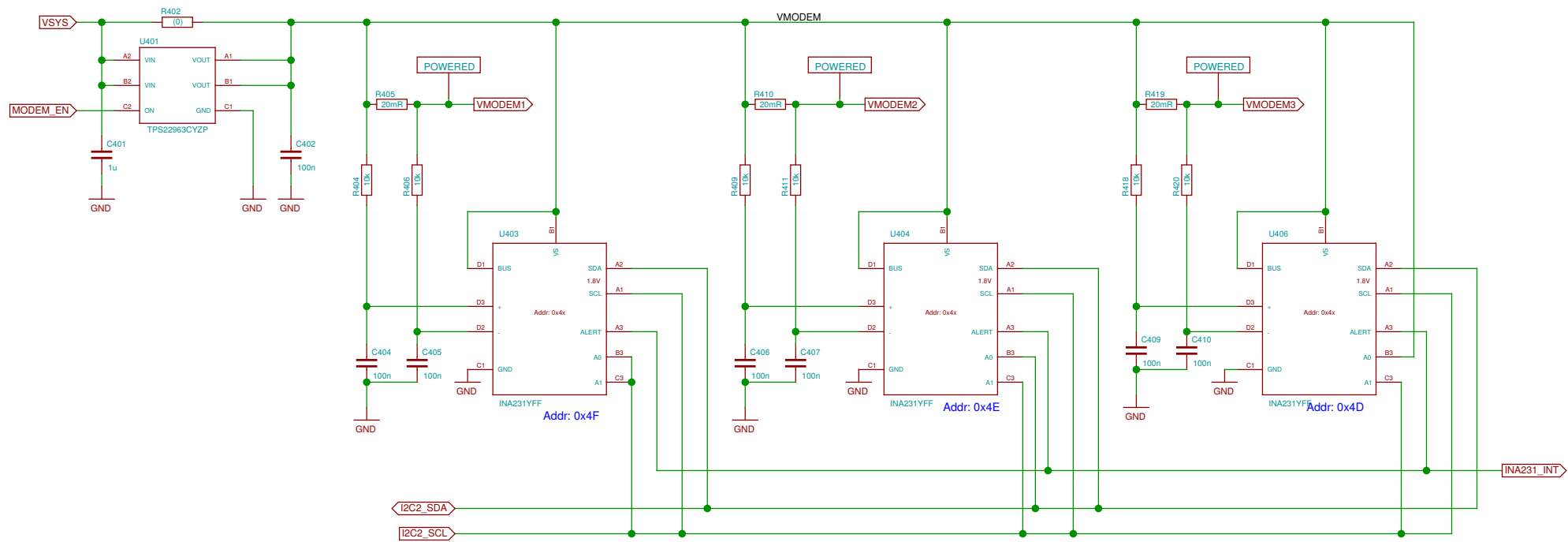
Battery and cage contacts

Legacy fuel gauge

Advanced fuel gauge

Sheet: /Battery/		Date: 2016-11-14 02:39:53	
File: battery.sch		Rev: 3/25	
Title: Battery		Plotted by eeshow a9b66dd+ 20161113-21:01Z	
Size: A3			

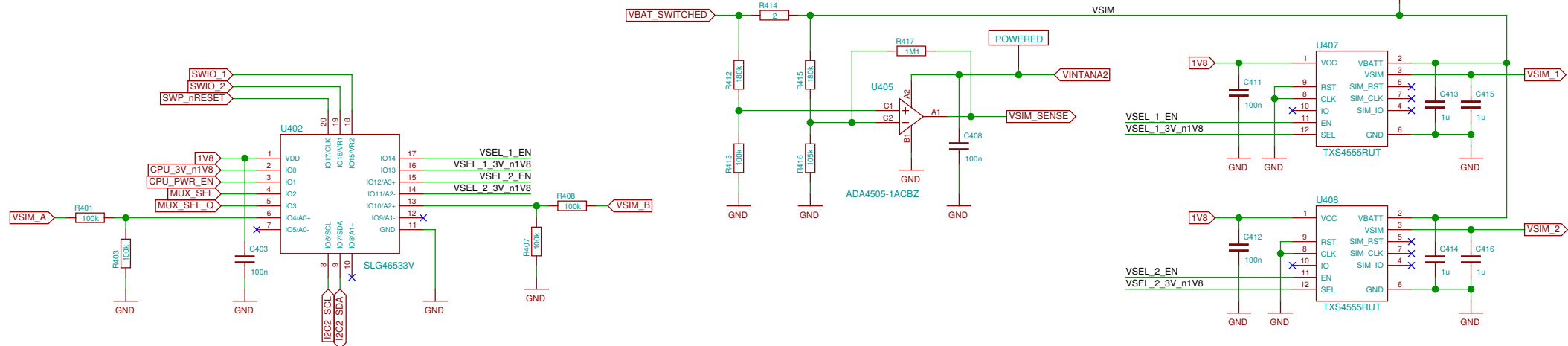
Modem current monitor



SIM current sensing

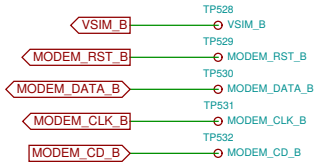
SIM power supply

SIM power selection

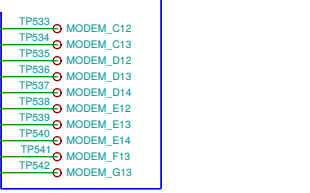
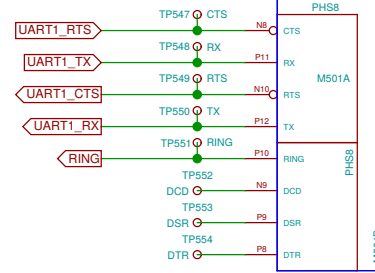
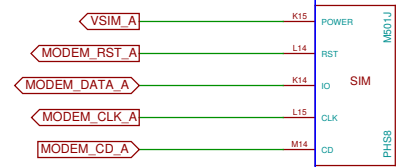
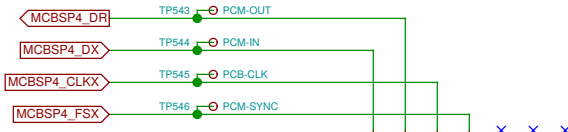


TODO: update SLG design for changed pins

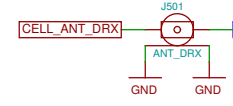
SIM B bus



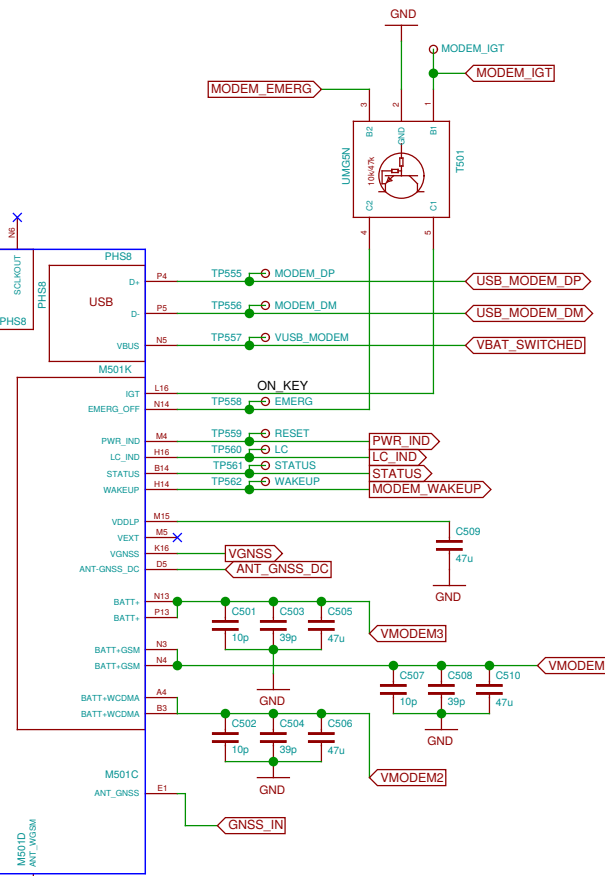
17+10+10 = 37 test points. PCB space permitting, to be arranged in a 6 x 6 + 1 grid with 1.0 mm pitch. This patchfield is to be placed adjacent to the SIM B bus test points.



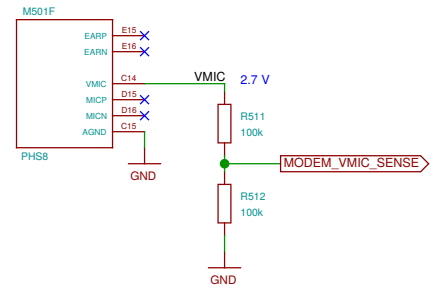
Pads RFU (GND) in PHS8 and RFU (DNU) in PLS8. The resistors indicate cuttable traces.

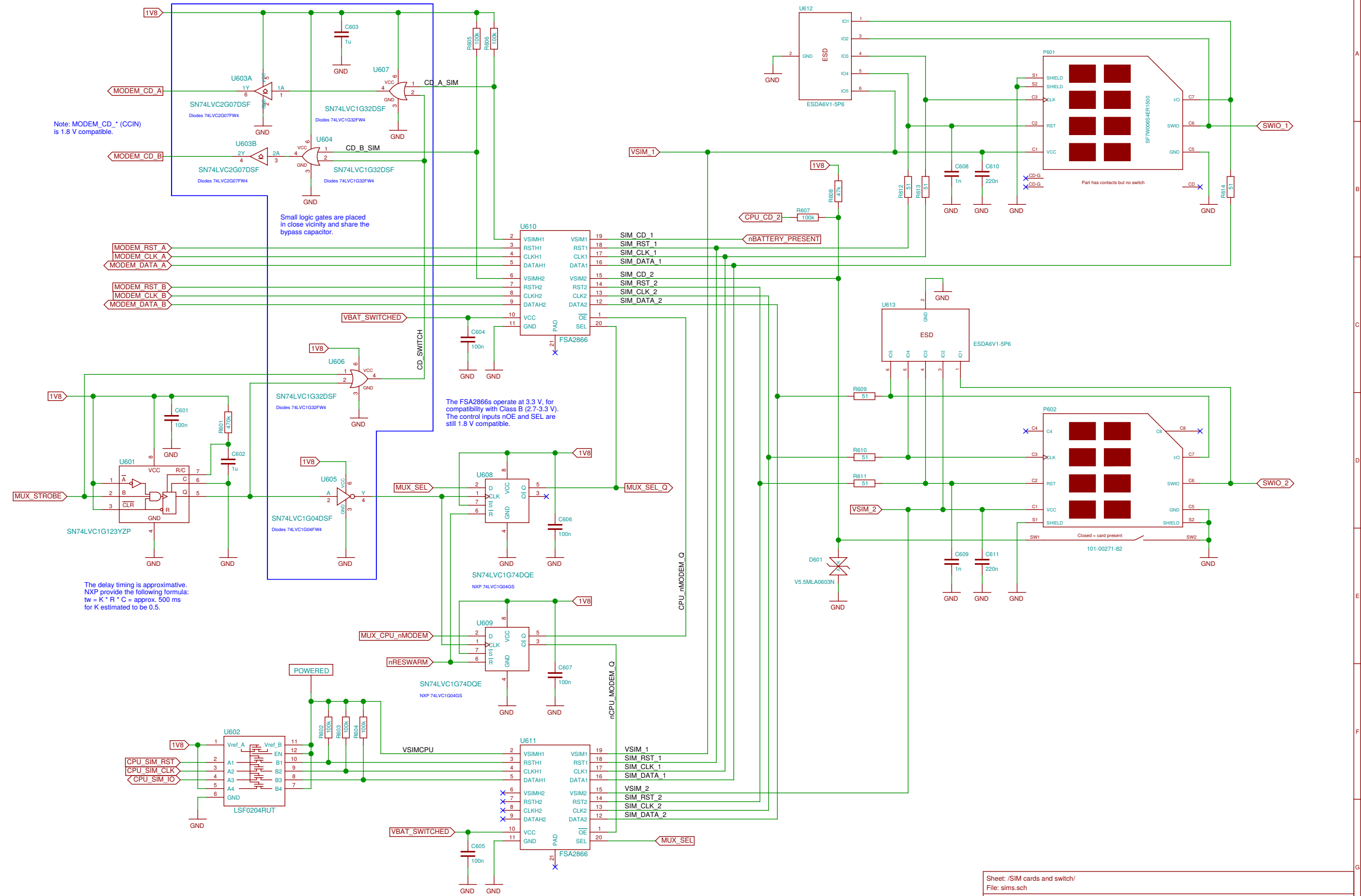


Place taps close to modem



Anti-eavesdropping





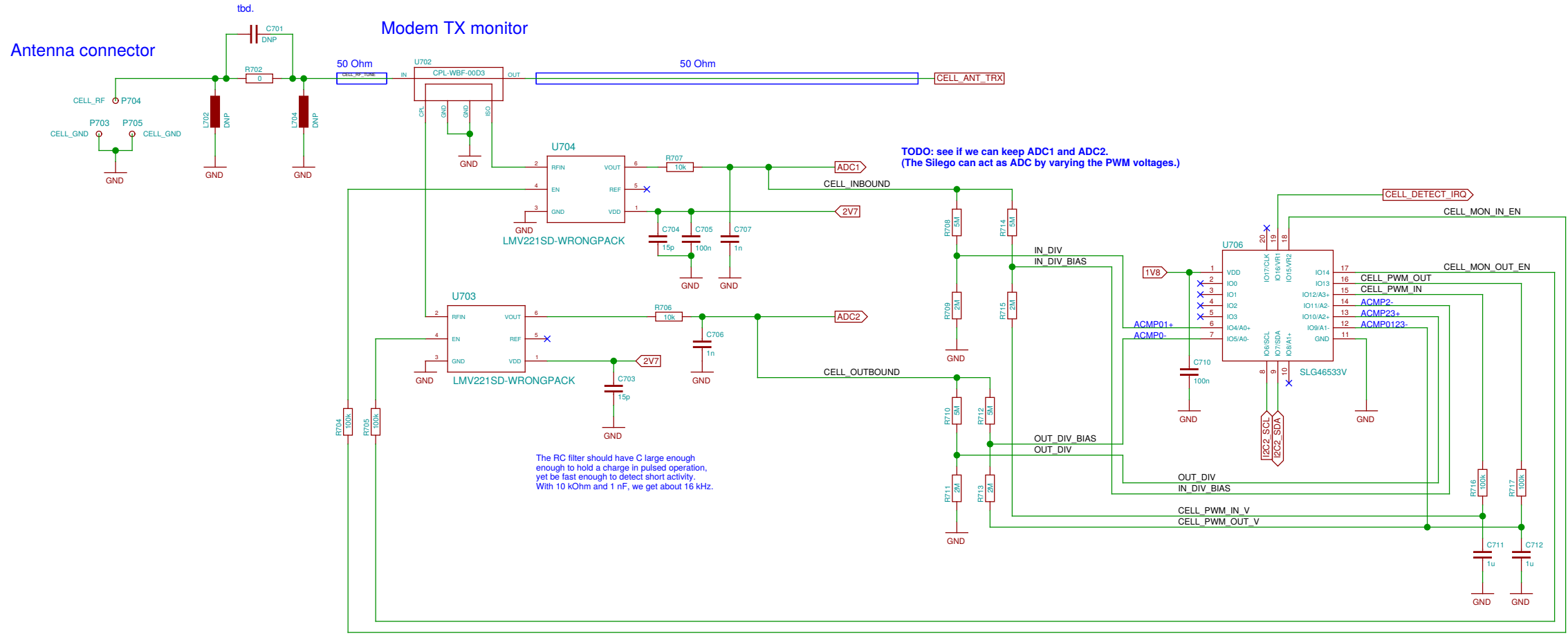
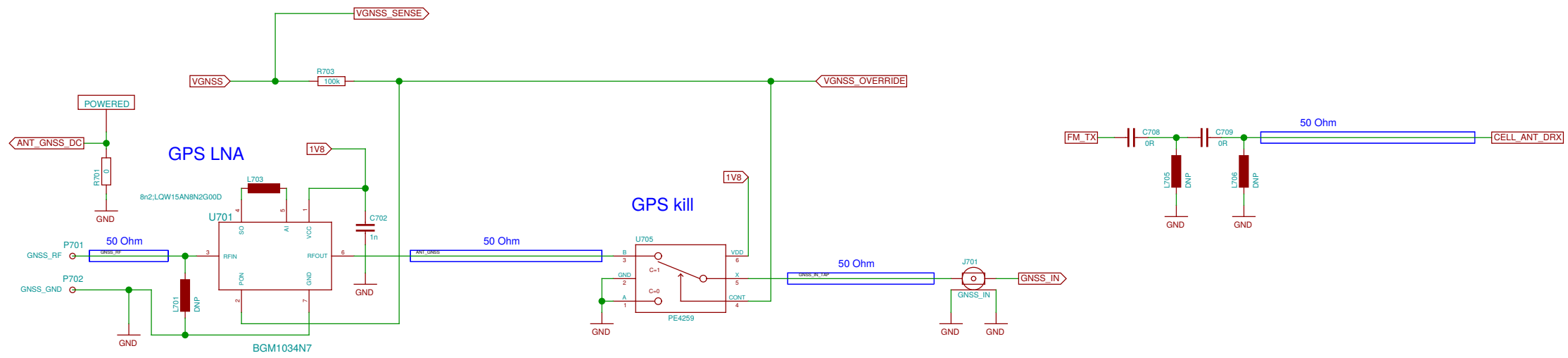
Note: MODEM_CD_* (CCIN) is 1.8 V compatible.

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.

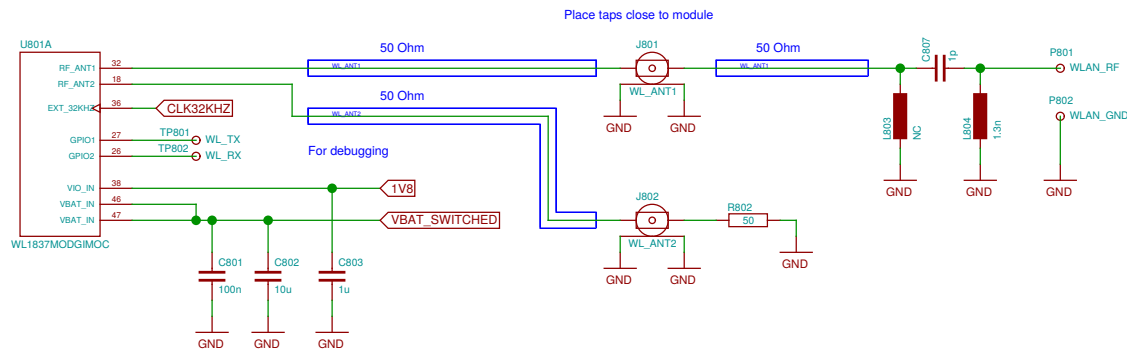
The delay timing is approximative. NXP provide the following formula: $t_w = K * R * C = \text{approx. } 500 \text{ ms}$ for K estimated to be 0.5.

Sheet: /SIM cards and switch/ File: sims.sch		
Title: SIM cards and switch		
Size: A3	Date: 2016-11-14 02:39:53	Rev:
Plotted by eeshow a9b66dd+ 20161113-21:01Z		Id: 6/25

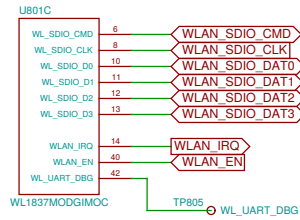


TODO: assign footprints for c-spring contacts

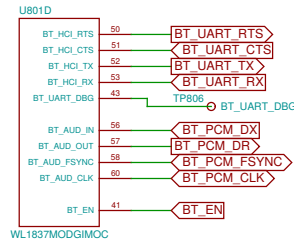
WLAN/BT antenna



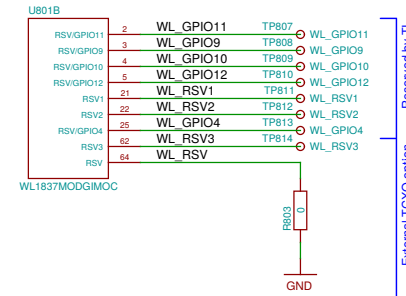
WLAN



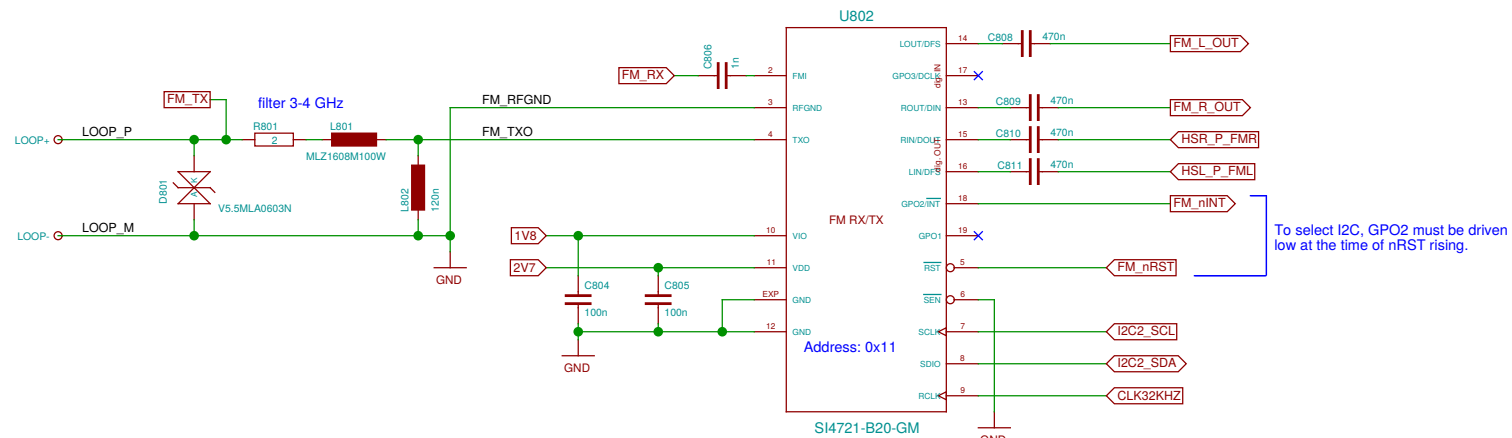
Bluetooth



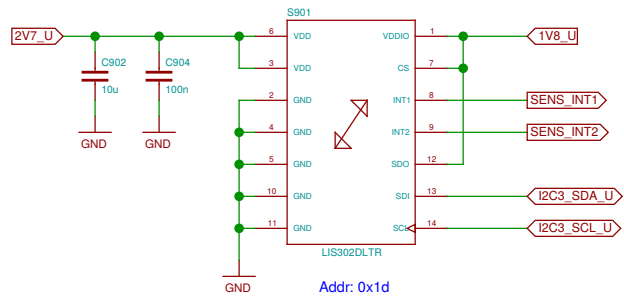
Reserved / Debugging



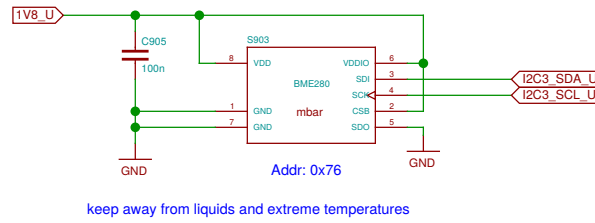
FM Radio (TX/RX)



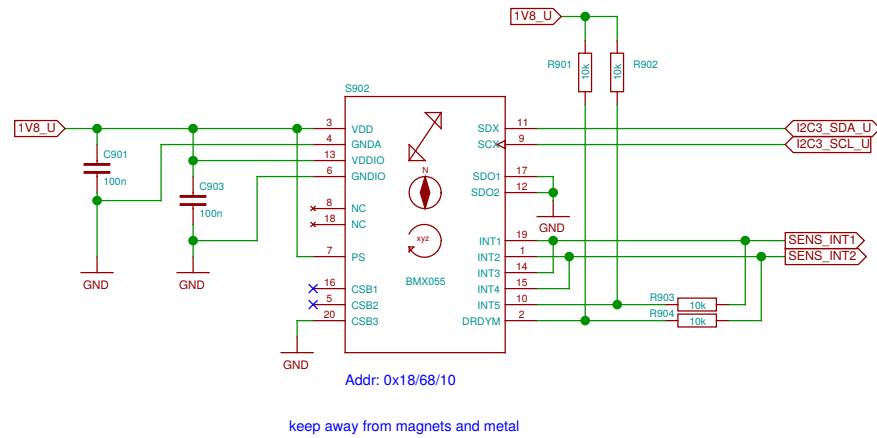
Acceleration (legacy)



Pressure, humidity

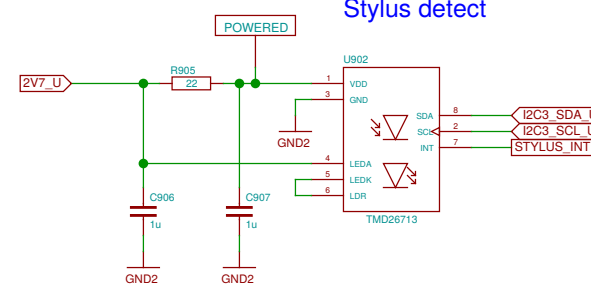


9-axis (acceleration, gyroscope, magnetometer)

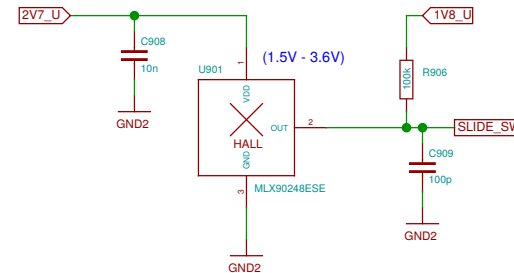


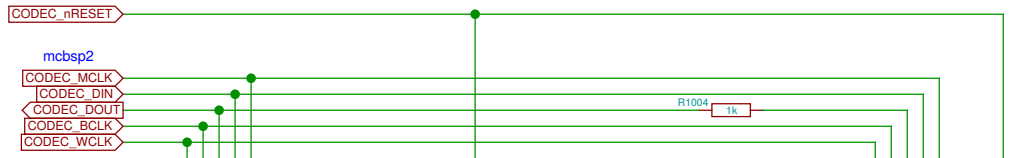
UPPER LOWER

Stylus detect

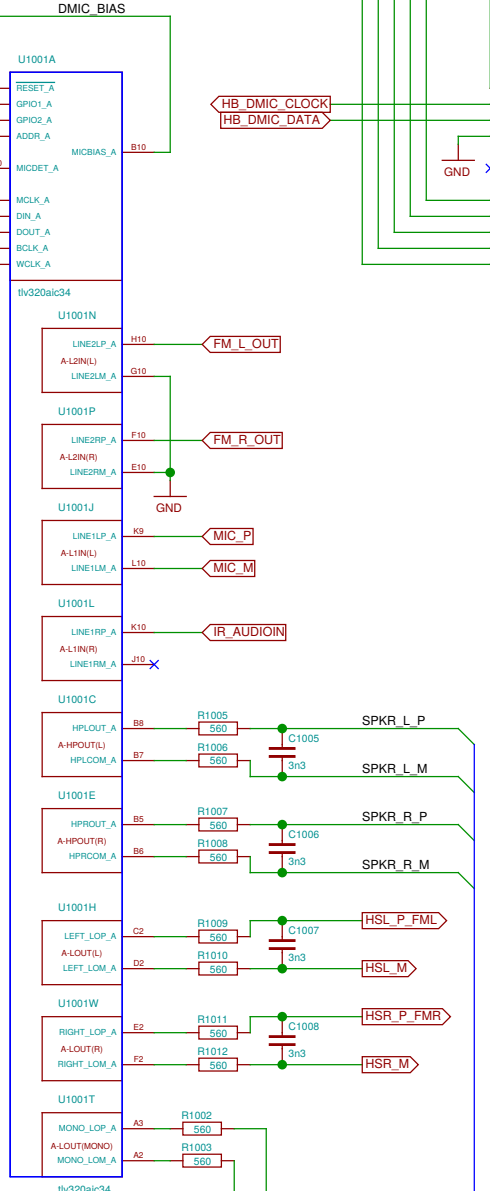
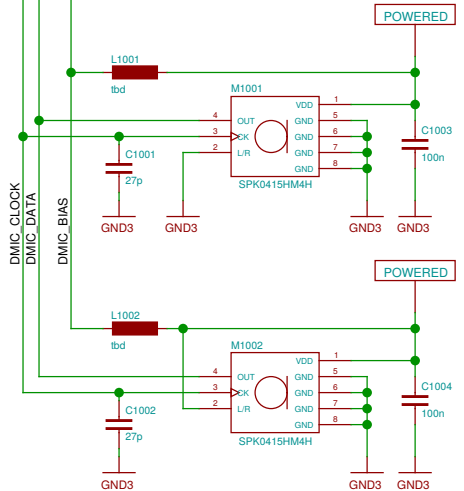


Slide sensor



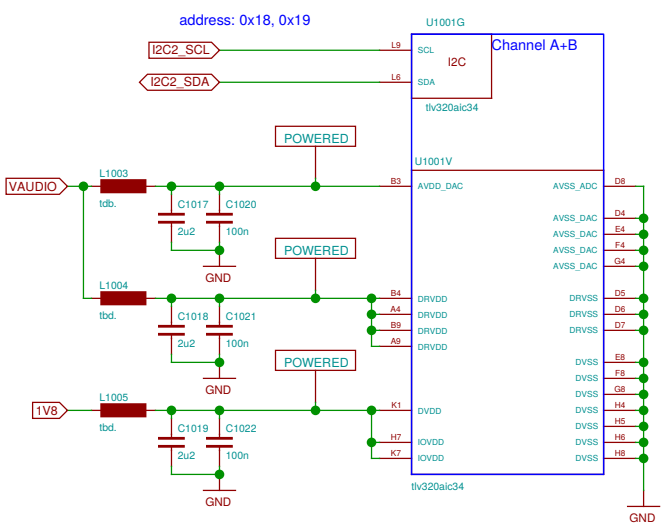


Digital Microphones

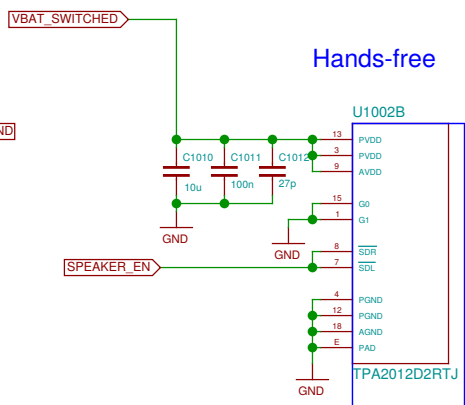


Codec

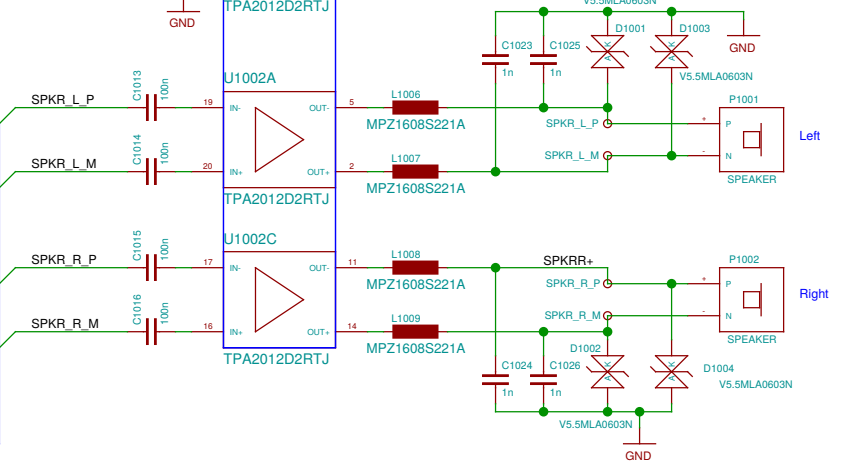
Codec power and I2C



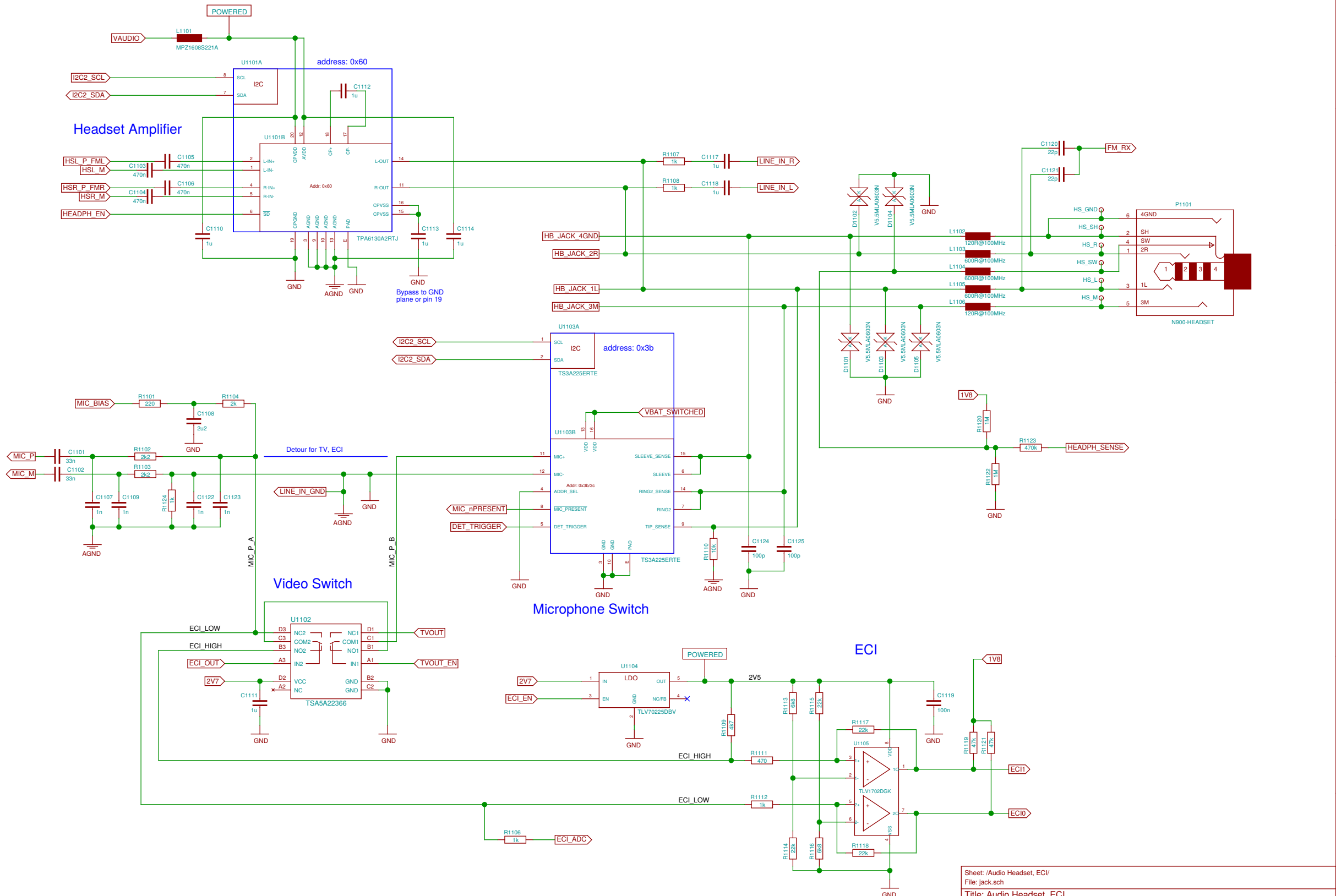
Hands-free



Speakers



Sheet: /Audio Codec/		Date: 2016-11-14 02:39:53	
File: codec.sch		Rev:	
Title: Audio Codec		Id: 10/25	
Size: A3	Date: 2016-11-14 02:39:53	Rev:	
Plotted by eeshow a9b66dd+ 20161113-21:01Z			



Sheet: /Audio Headset, ECI/		File: jack.sch	
Title: Audio Headset, ECI			
Size: A3	Date: 2016-11-14 05:43:01	Rev:	
Plotted by: eeshow a9b66dd+		20161113-21:01Z	
Id: 11/25			

No-Solder Components

N1201
N900 case assembly

N1202
N97-CAMERA-HOLE

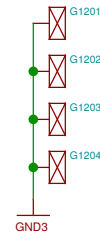
N1205
headset jack

N1203
STENCIL-TOP

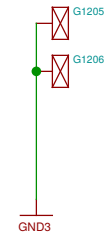
N1204
STENCIL-BOTTOM

Shield Contacts on UPPER

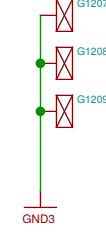
For the display



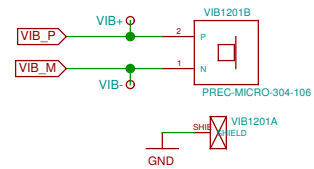
For the key mat



For the "key frame hook"

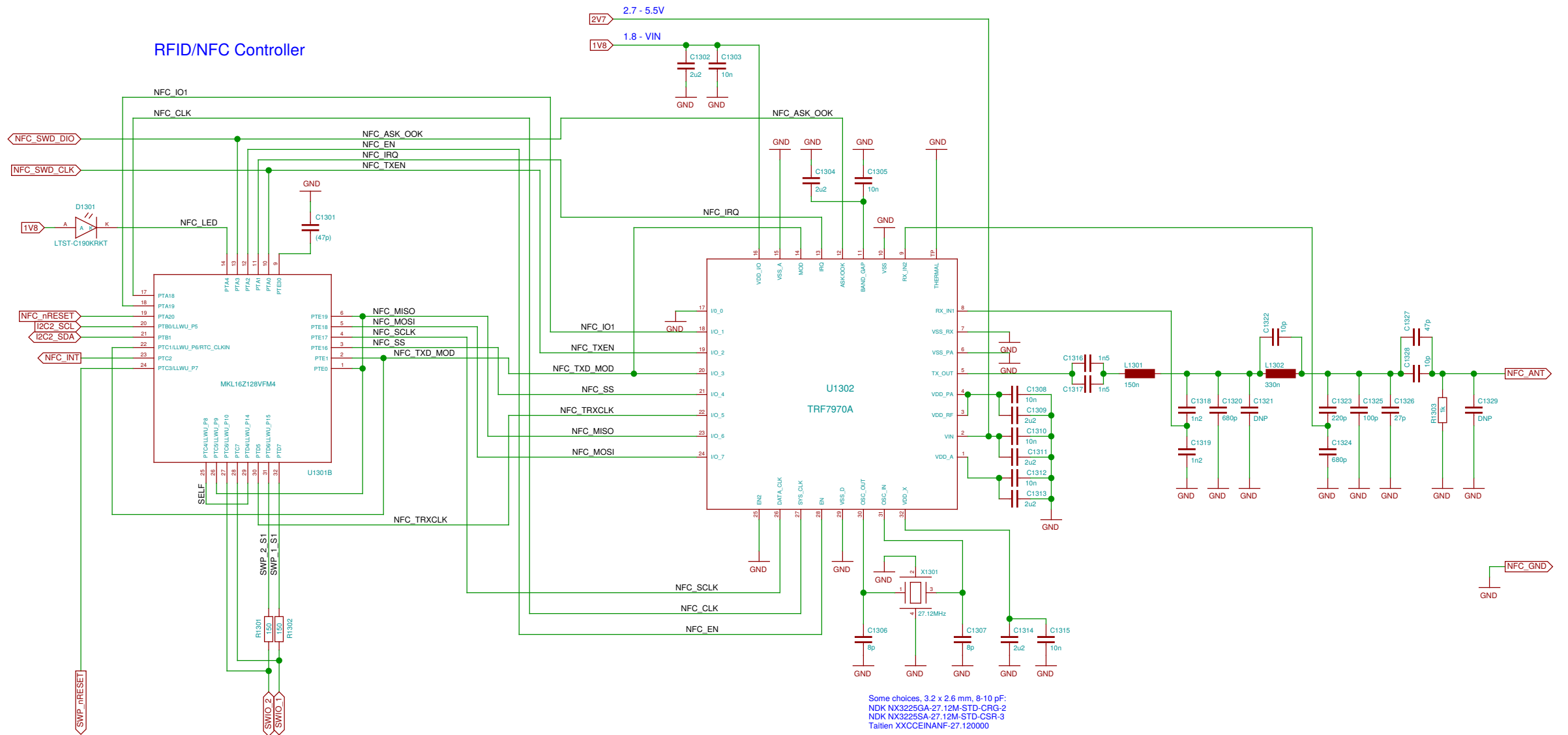


Vibramotor

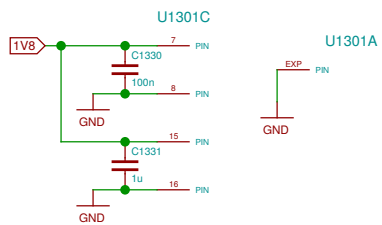


Sheet: /Misc/ File: misc.sch		
Title: Misc		
Size: A3	Date: 2016-11-14 02:39:53	Rev:
Plotted by eeshow a9b66dd+ 20161113-21:01Z		Id: 12/25

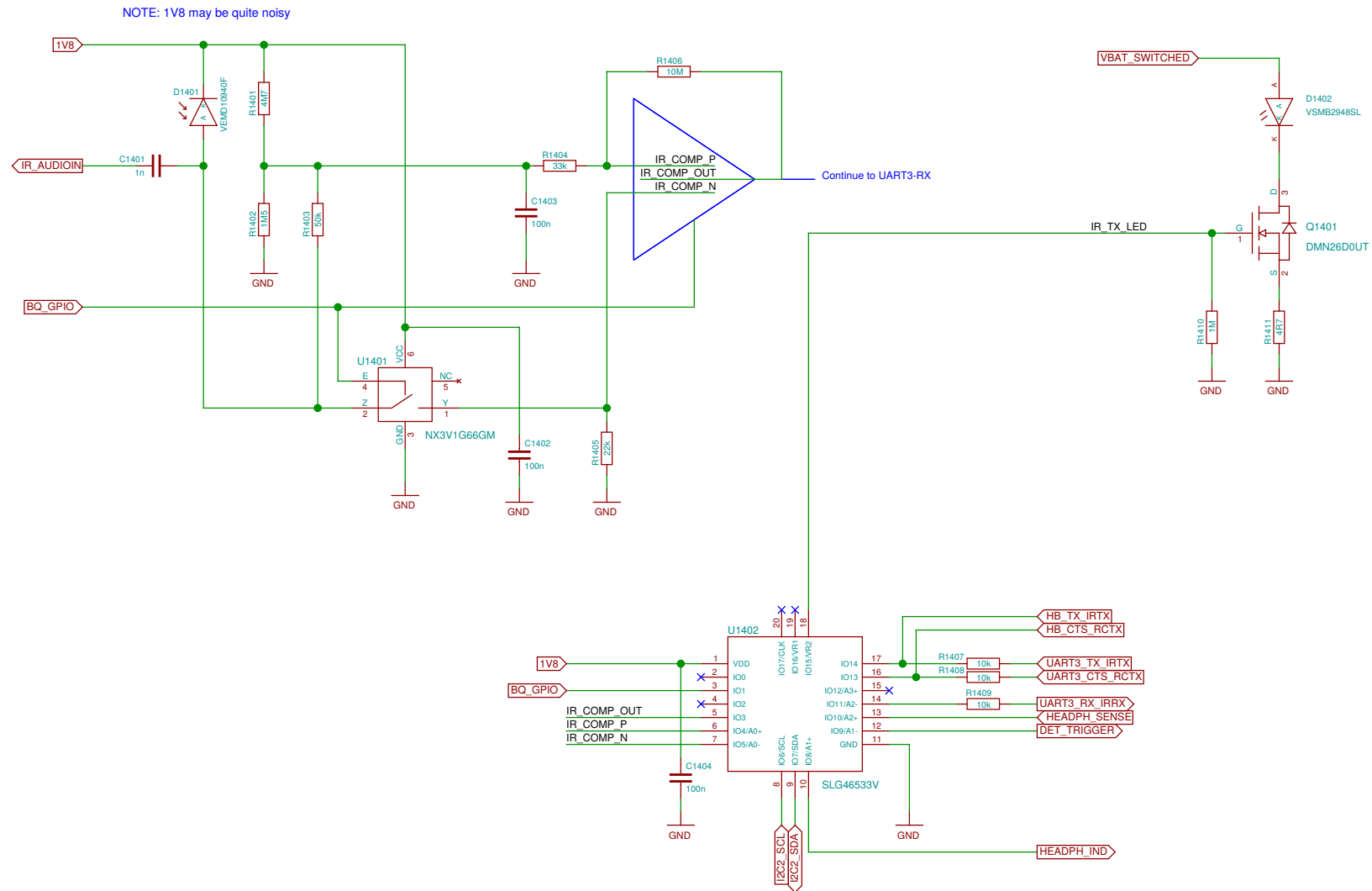
RFID/NFC Transceiver



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
 Taillien XXCCEINANF-27.120000

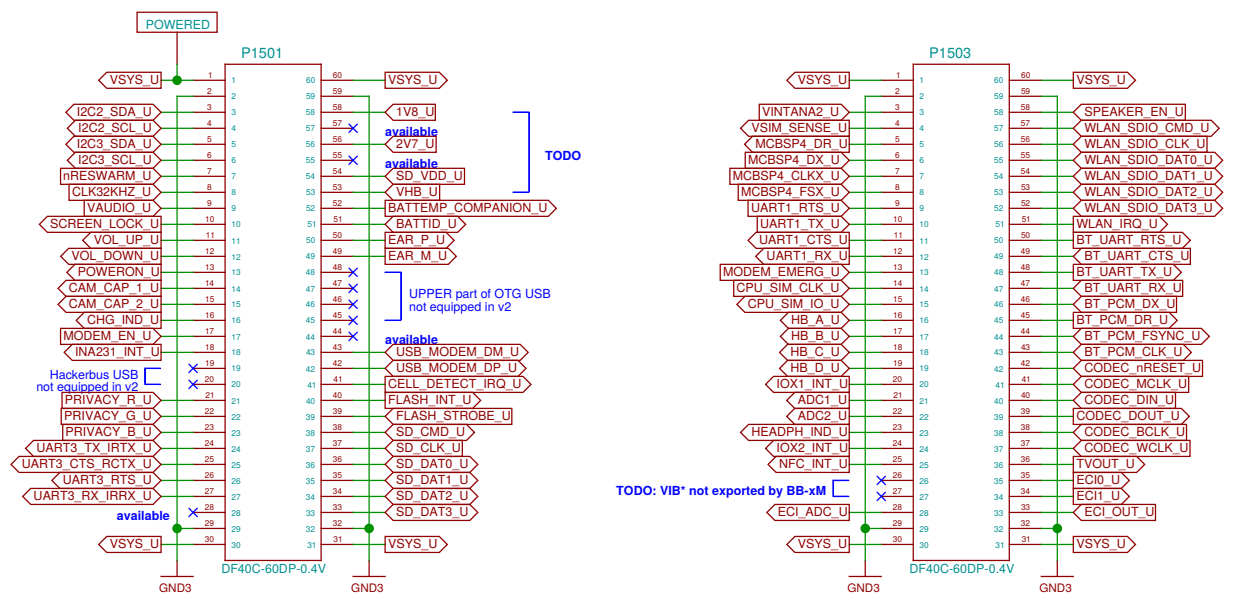


TODO: update D1901 footprint

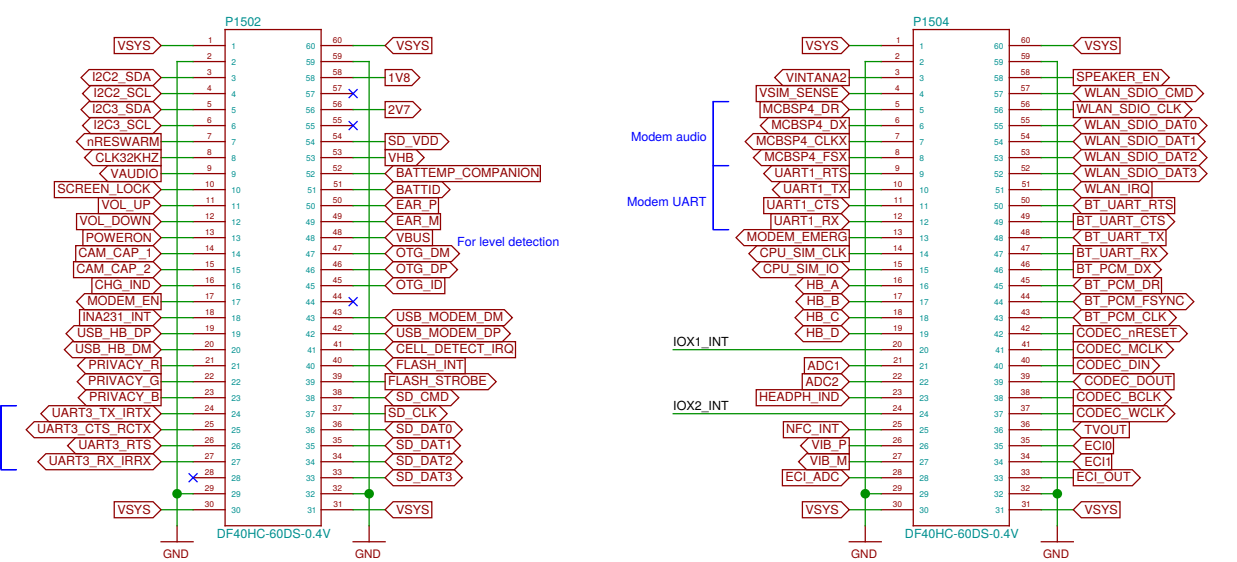


This is just the collection of signals we have.

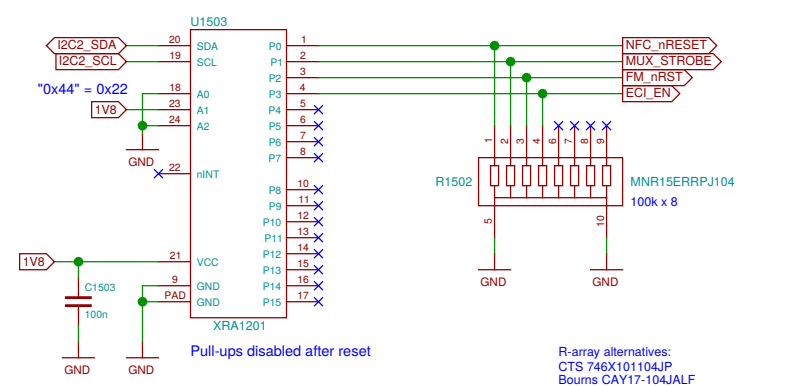
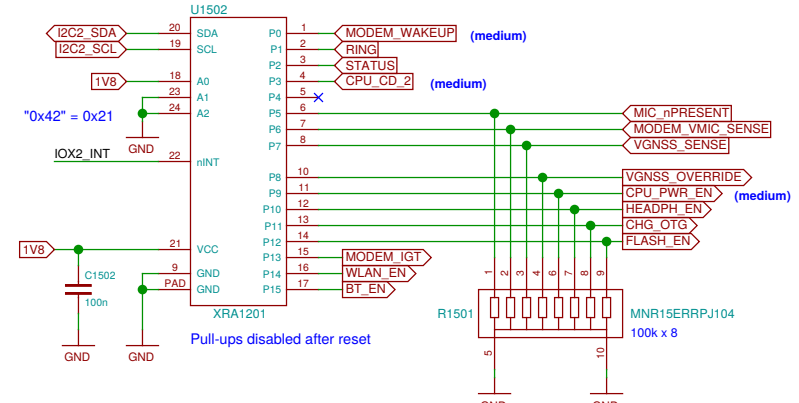
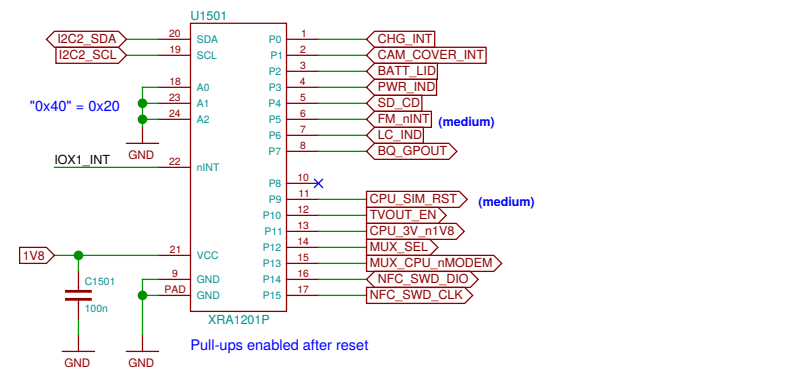
Proper assignment still pending.



UPPER
LOWER



Current rating per contact: 0.3 A

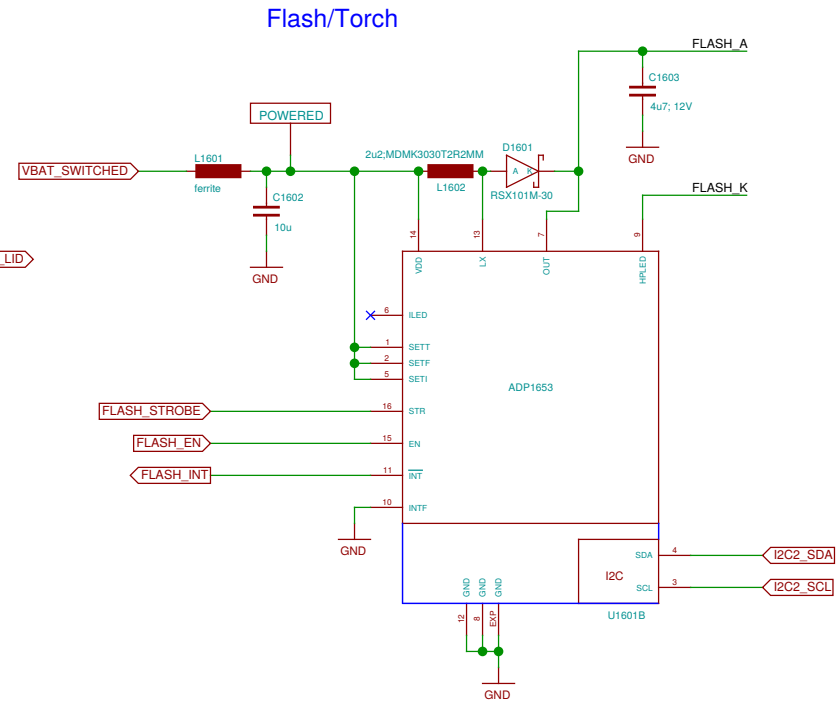
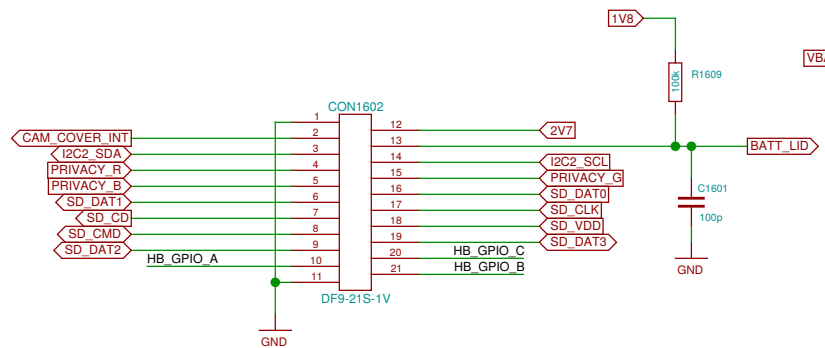
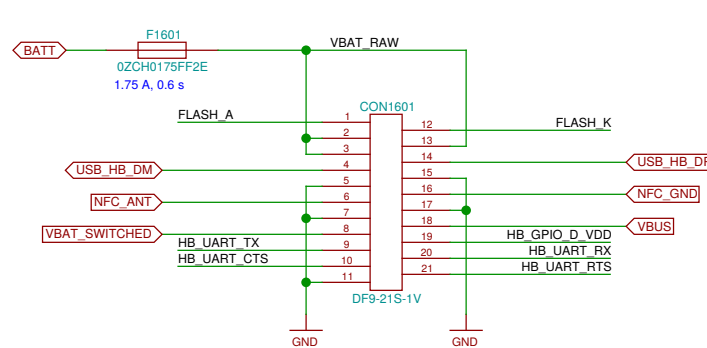


R-array alternatives:
CTS 746X101104JP
Bourns CAY17-104JALF
Panasonic EXB-D10C104J

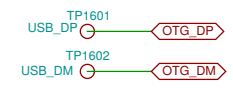
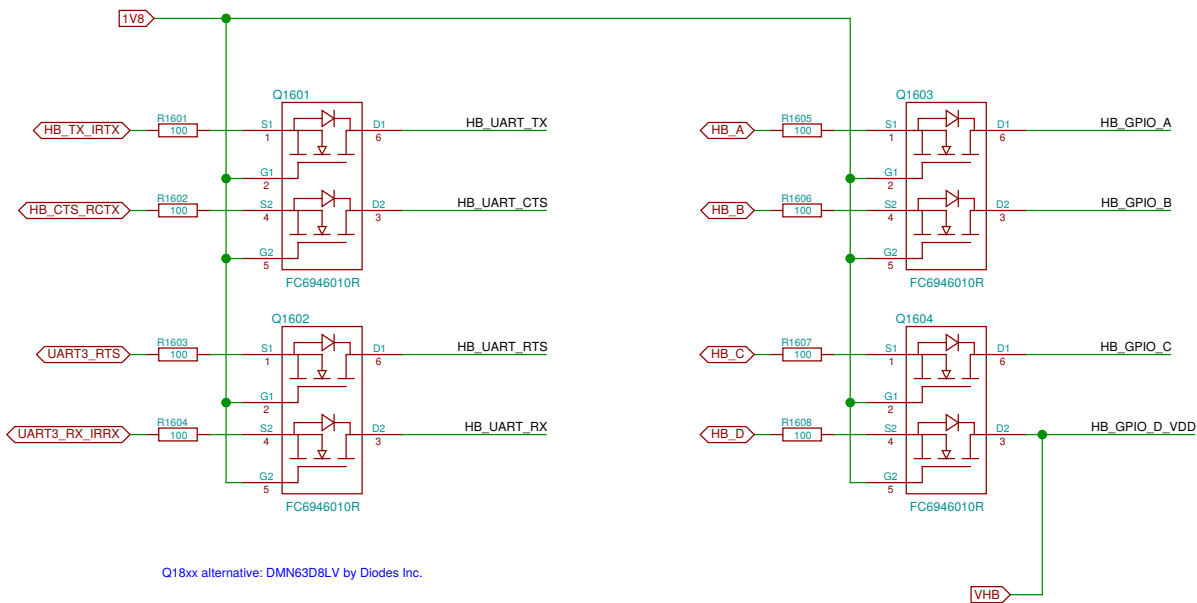
Sheet: /B2B LOWER-UPPER/ File: b2b.sch	
Title: B2B LOWER-UPPER	
Size: A3	Date: 2016-11-14 02:39:53
Plotted by: eeshow a9b66dd+ 20161113-21:01Z	Rev: Id: 15/25

LOWER-BOB Interconnect (LOWER side)

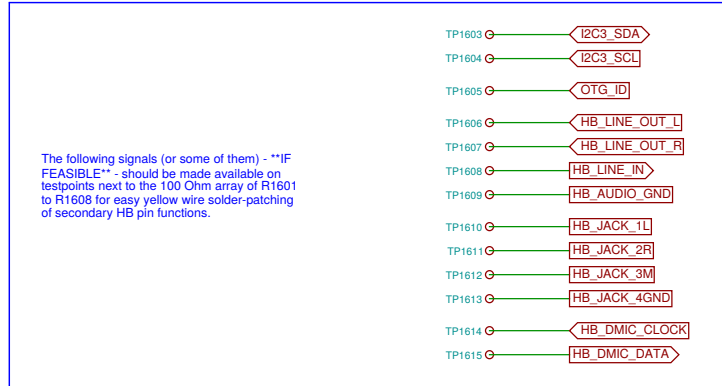
Defined in the Hackerbus specification, <http://neo900.org/stuff/papers/hb.pdf>



Level shifters for Hackerbus GPIO and UART

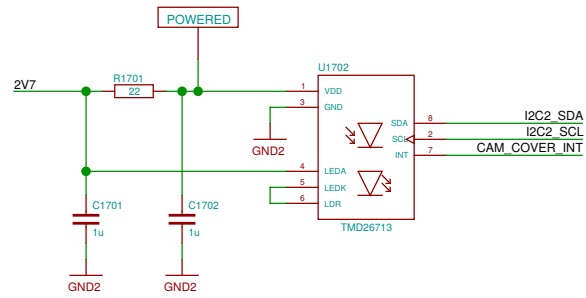


Patchfield

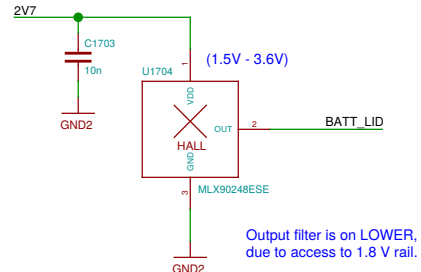


The following signals (or some of them) - **IF FEASIBLE** - should be made available on testpoints next to the 100 Ohm array of R1601 to R1608 for easy yellow wire solder-patching of secondary HB pin functions.

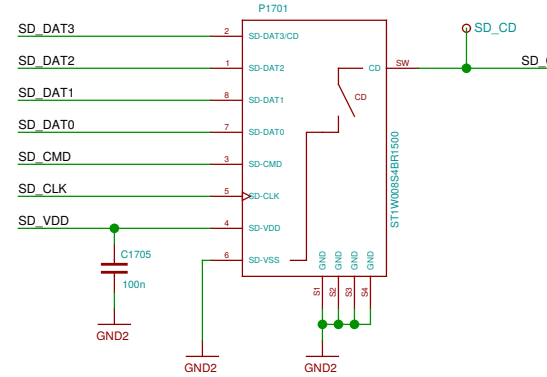
Camera Cover detect



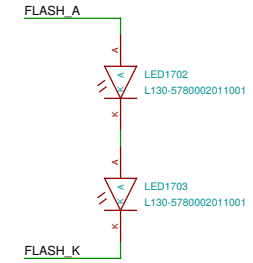
Battery Cover detect



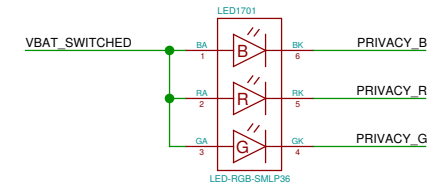
Memory card holder



Camera flash

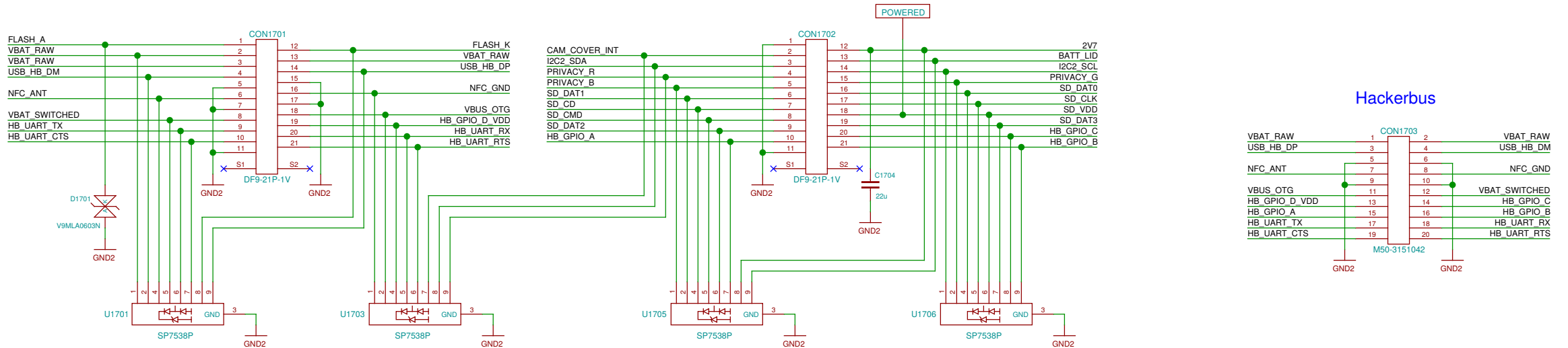


Privacy LED



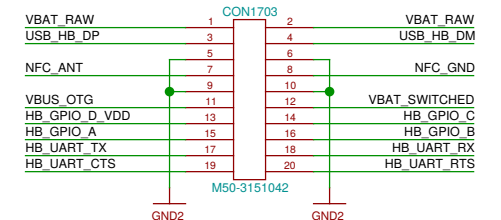
LOWER-BOB Interconnect (BOB side)

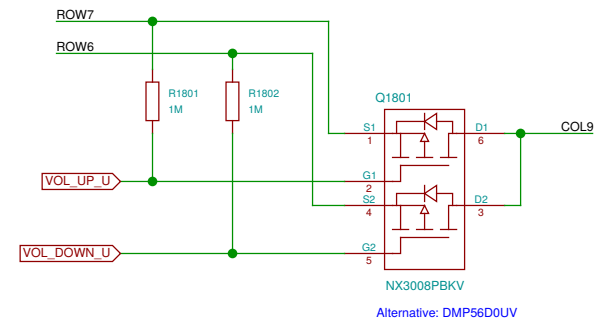
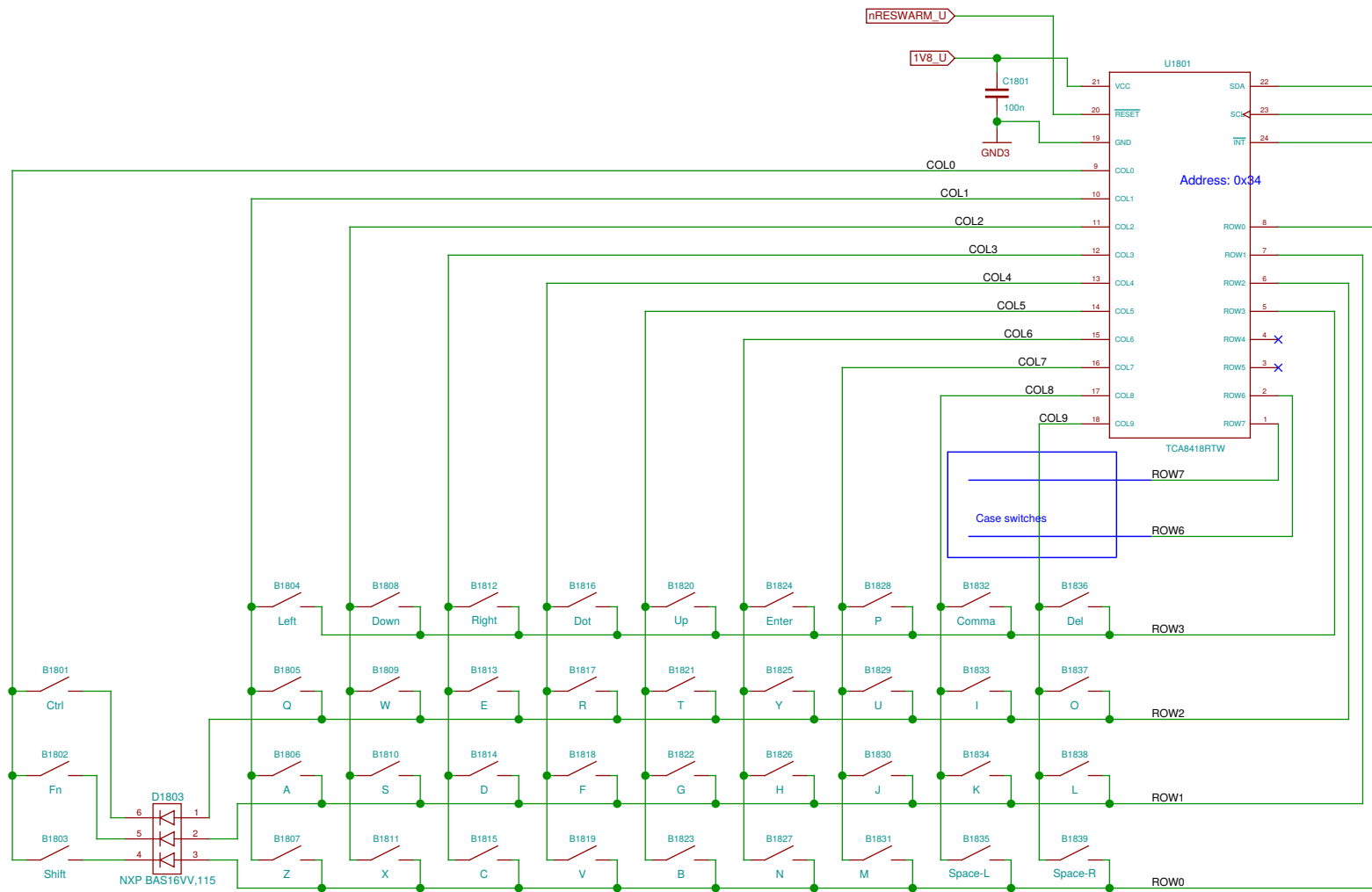
Defined in the Hackerbus specification, <http://neo900.org/stuff/papers/hb.pdf>



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

Hackerbus

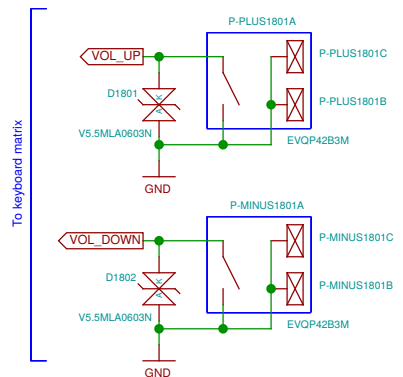




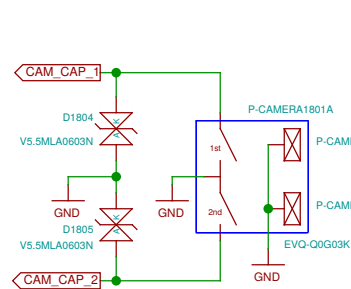
Alternative: Diodes Inc. BAS16VV-7
Warning: Diodes Inc. have cathodes on pin 1 side, NXP anodes !

UPPER
LOWER

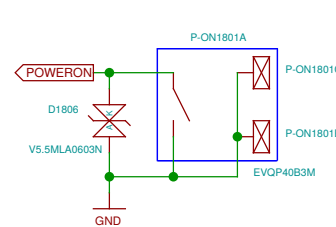
Volume



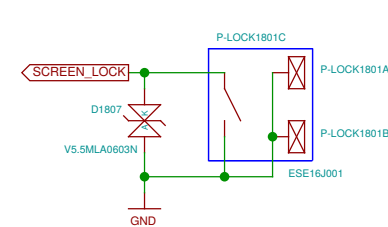
Camera trigger



On-off



Lock switch

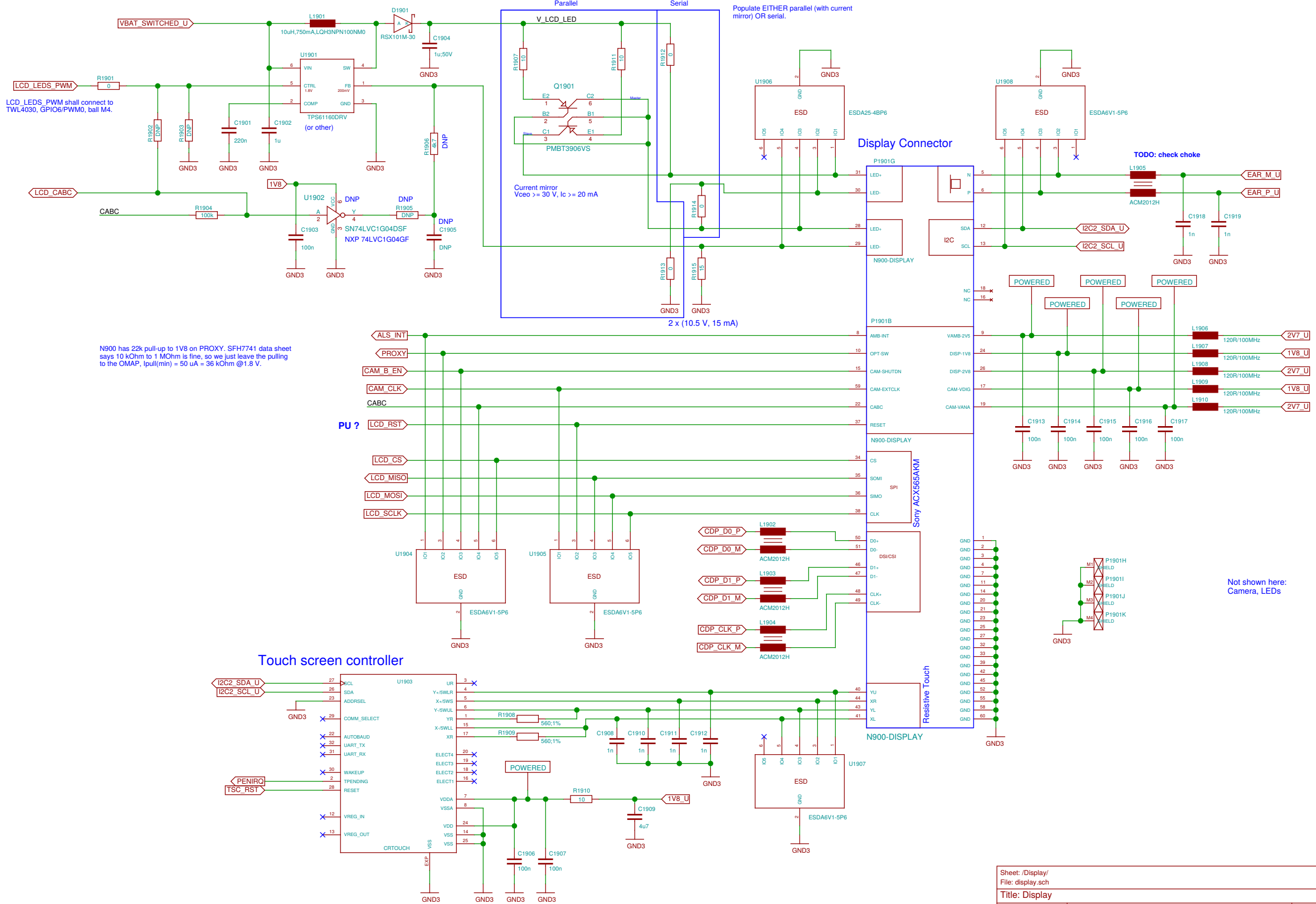


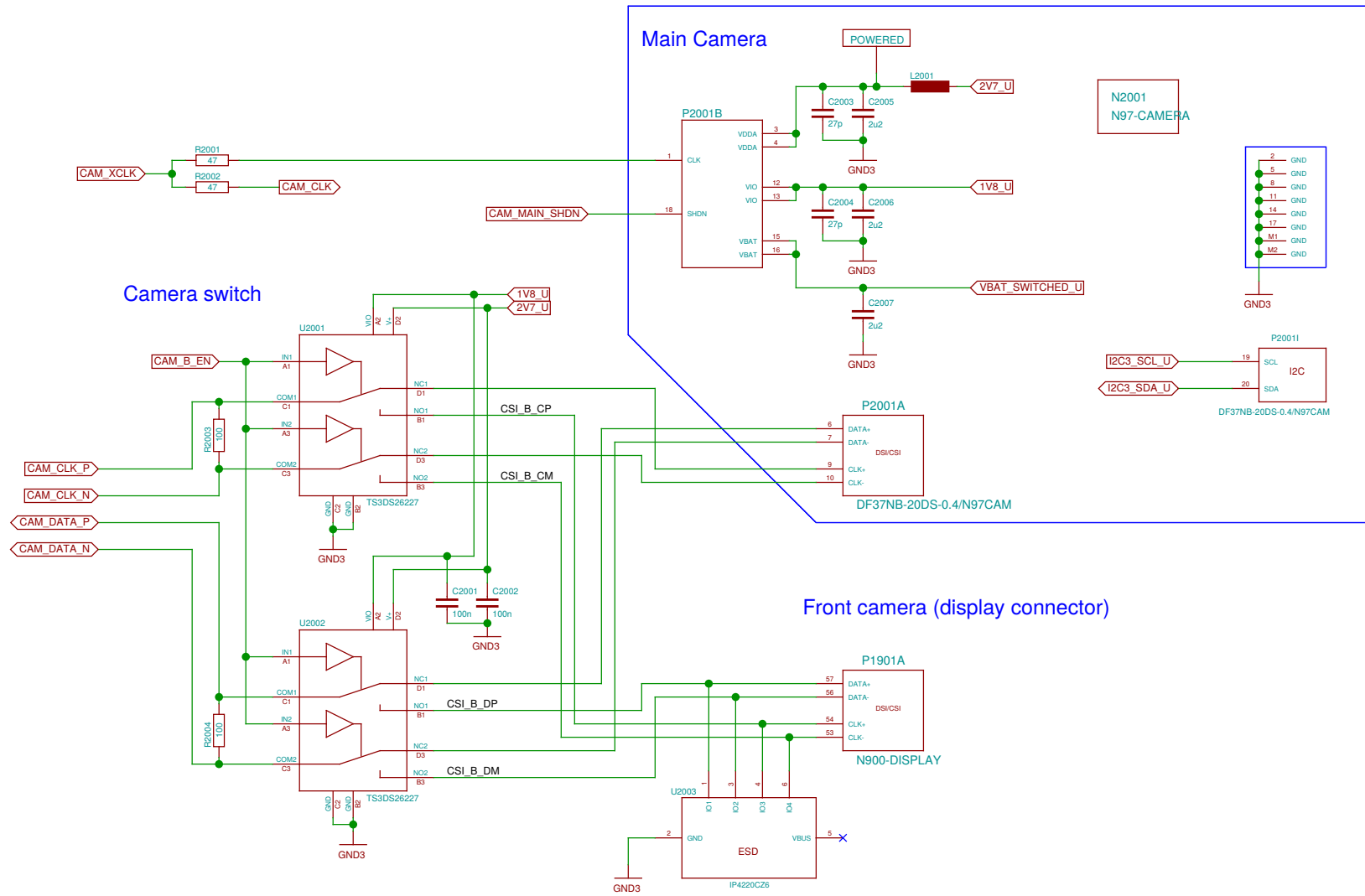
To CPU

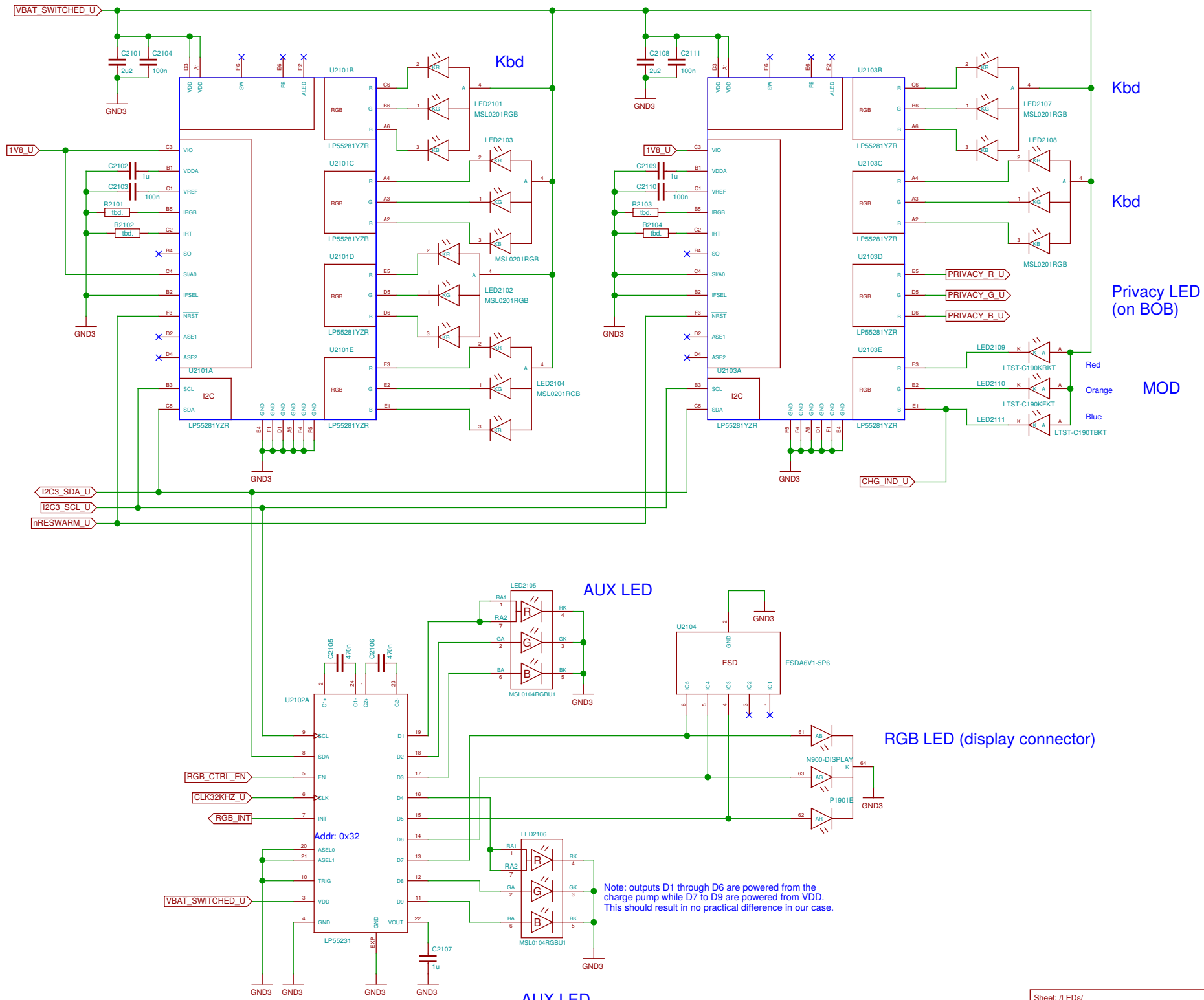
To companion chip

To CPU

Sheet: /Keypad and buttons/		
File: keys.sch		
Title: Keypad and buttons		
Size: A3	Date: 2016-11-14 02:39:53	Rev:
Plotted by eeshow a9b66dd+ 20161113-21:01Z		Id: 18/25

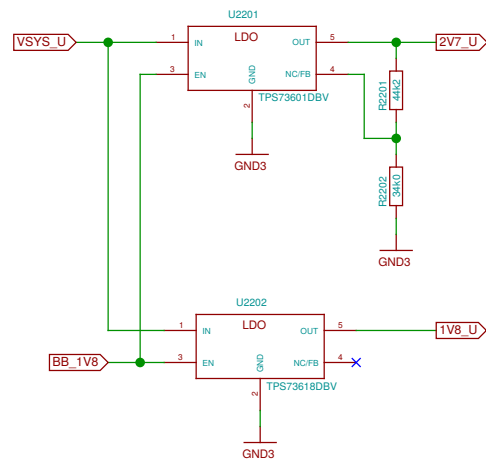






Sheet: /LEDs/		Date: 2016-11-14 02:39:53	
File: leds.sch		Rev: 1	
Title: LEDs			
Size: A3	Date: 2016-11-14 02:39:53		Rev: 1
Plotted by eeshow a9b66dd+ 20161113-21:01Z			Id: 21/25

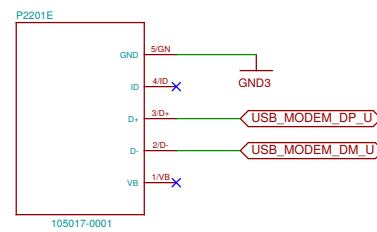
simple capless 400mA LDO for TPS65950 substitute
(only for prototype)



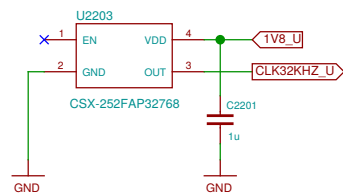
TODO: use REGEN ?

Modem USB

connect to BB
by some Micro-USB cable

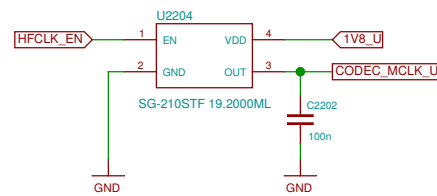


32 kHz clock



Alternative: OYKTGLJANF-0.032768

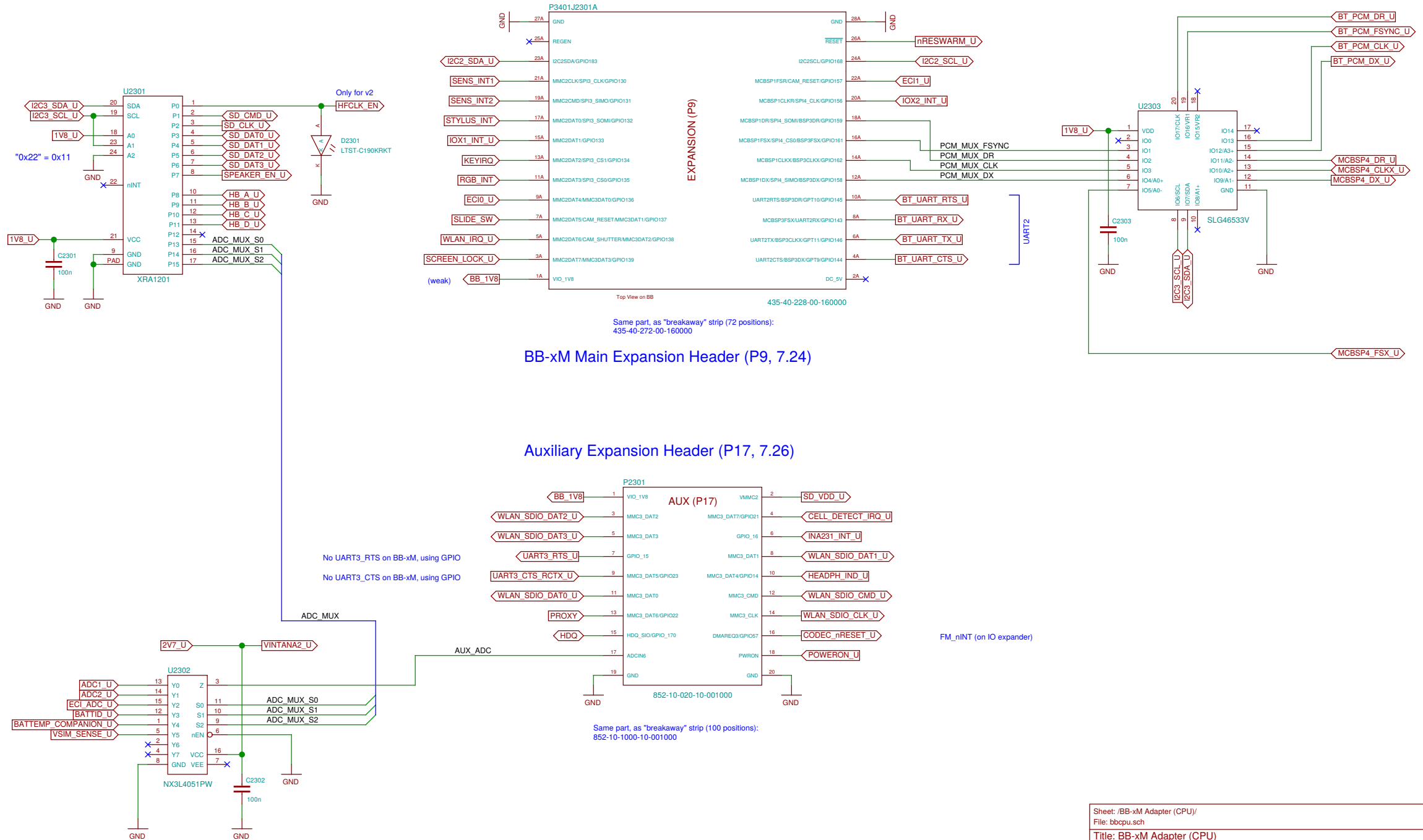
19.2 MHz clock



Alternative: KC2520B19.2000C1GE00

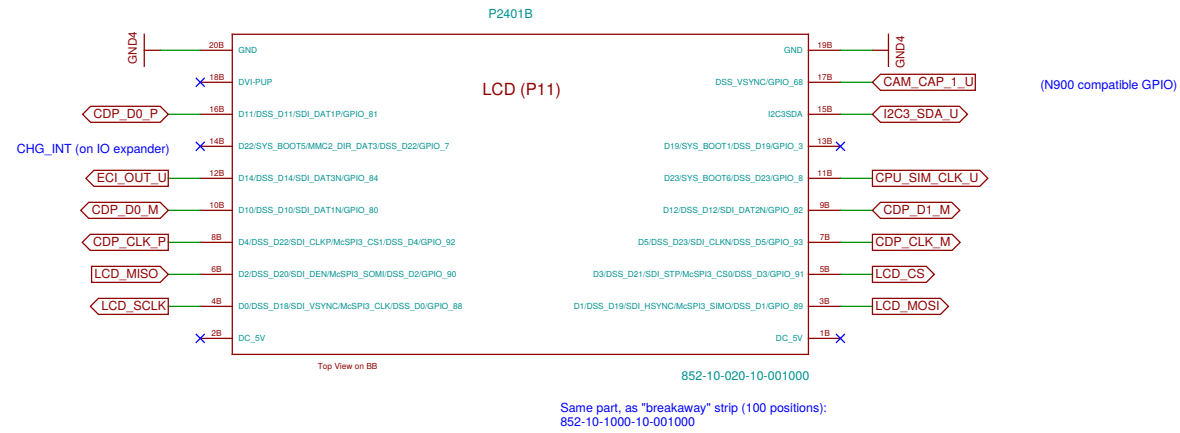
Sheet: /Adaptation (v2 only)/		
File: v2.sch		
Title: Adaptation (v2 only)		
Size: A3	Date: 2016-11-14 02:39:53	Rev:
Plotted by eeshow a9b66dd+ 20161113-21:01Z		Id: 22/25

TODO: update pin names in footprint

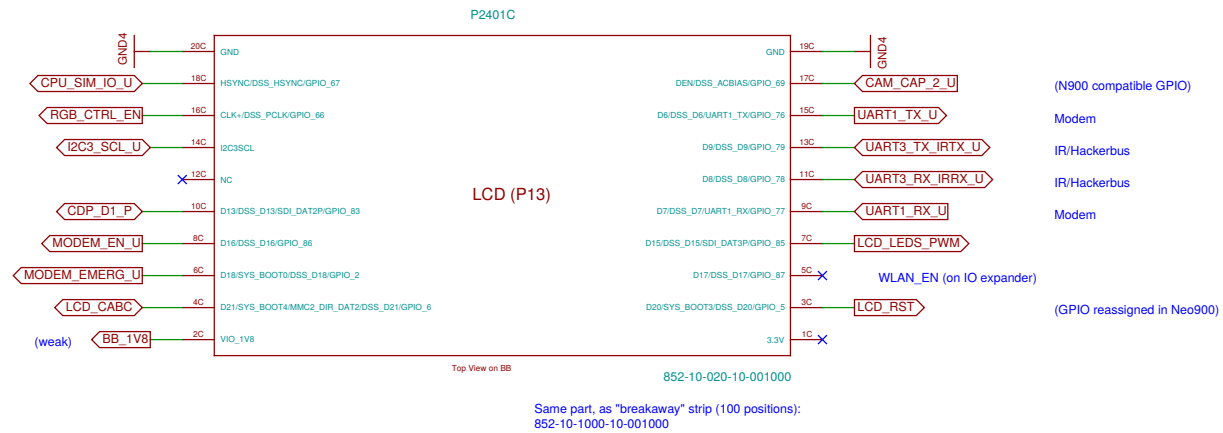


TODO: update pin names in footprint

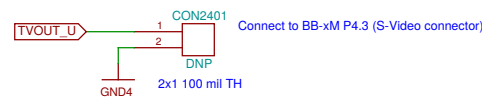
P11 (7.25)



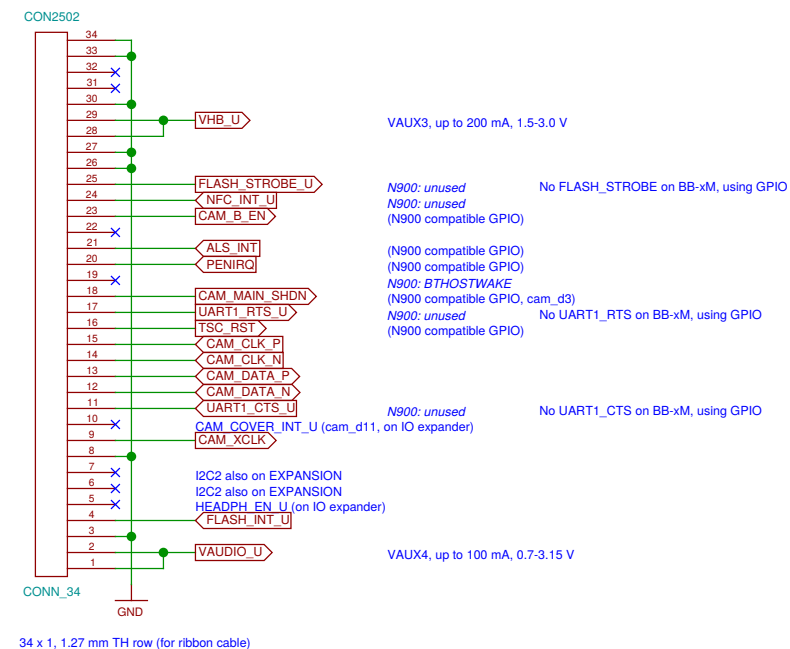
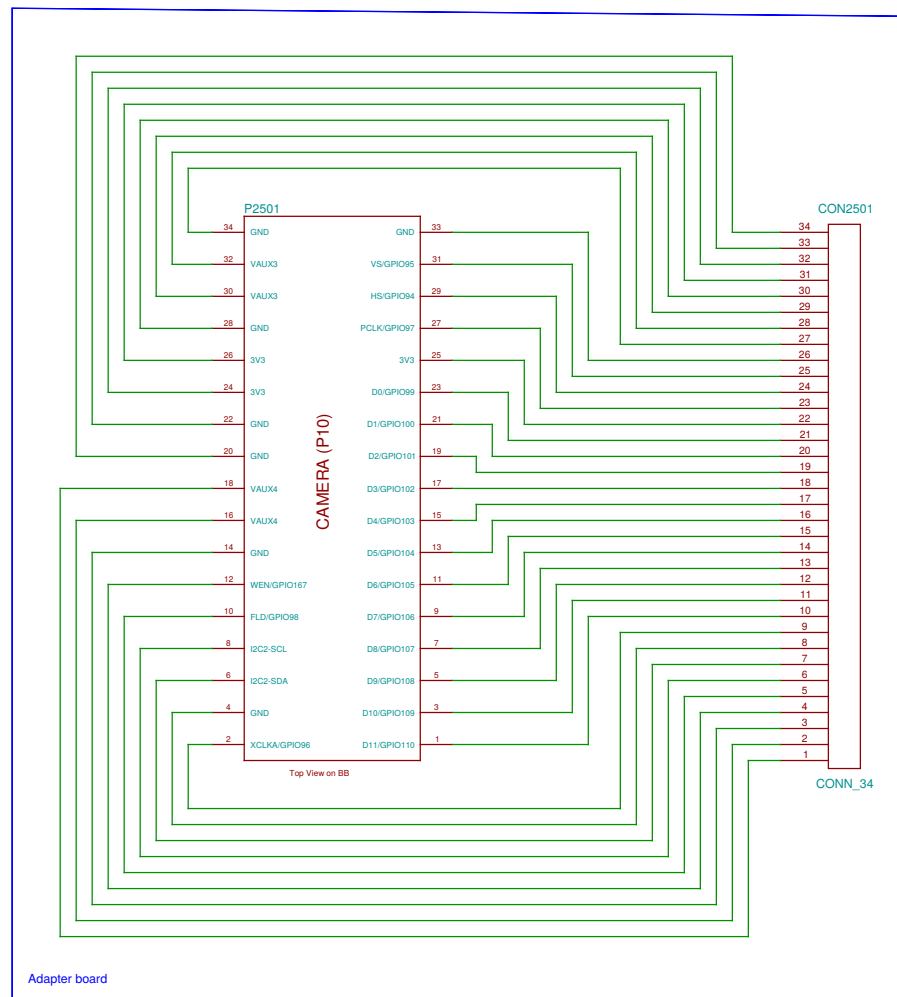
P13 (7.25)



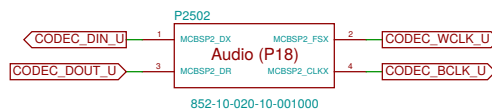
P4 (7.19)



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.