Click | Here
V

This sheet: index

Click | Here
V

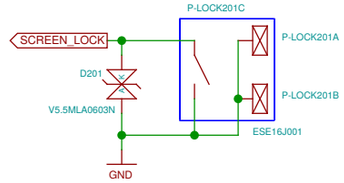
Note regarding I2C addresses:
Addresses in the schematics are provided for convenience.
The authoritative source is
https://neo900.org/git/misc/tree/i2c

Signal 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 becauses 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: 2016-11-12 04:52:29	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 1/37

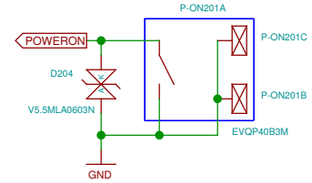
Lock switch

To CPU



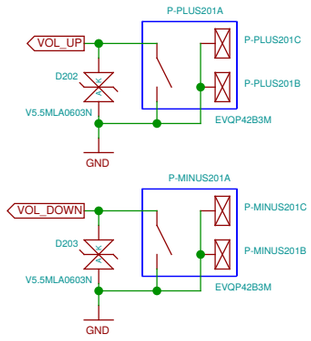
On-off

To companion chip



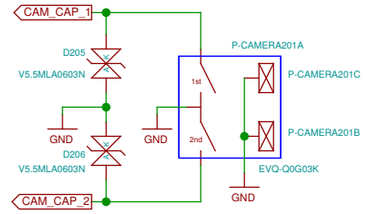
Volume

To keyboard matrix

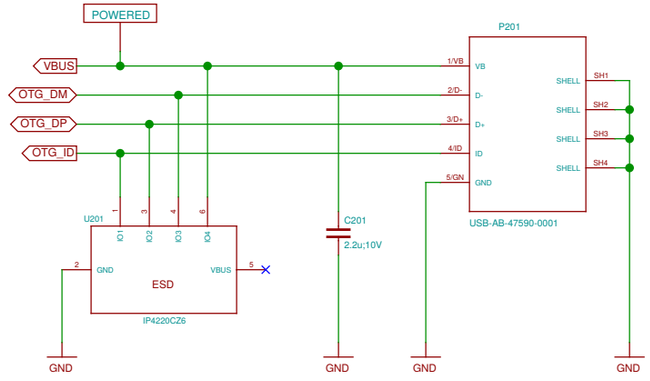


Camera trigger

To CPU

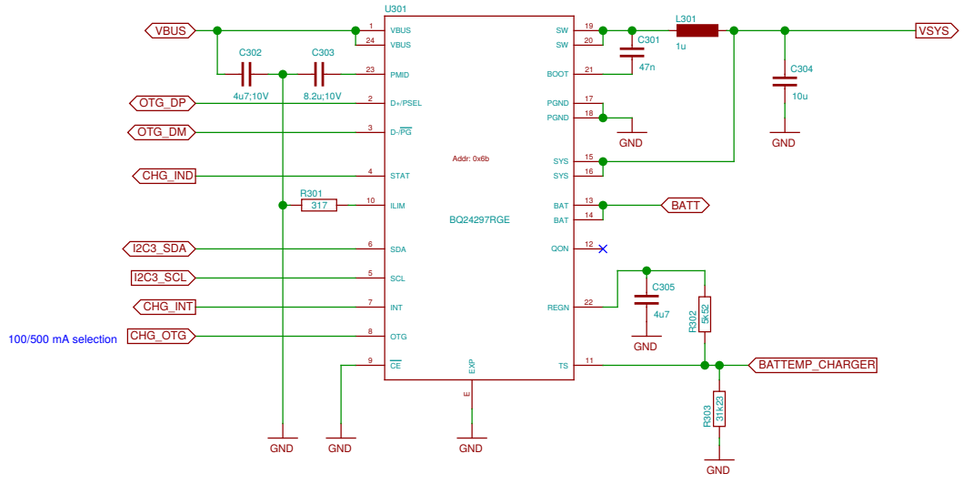


USB OTG connector



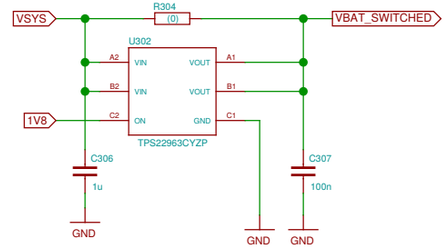
Sheet: /OTG/ File: neo900_SS_2.sch		
Title: OTG		
Size: A3	Date: 2016-11-07 20:19:27	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 2/37

Battery charger with USB OTG

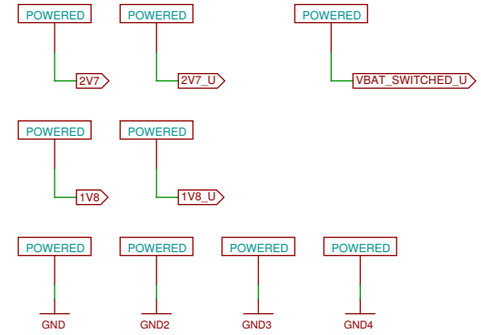


Power distribution and sequencing

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

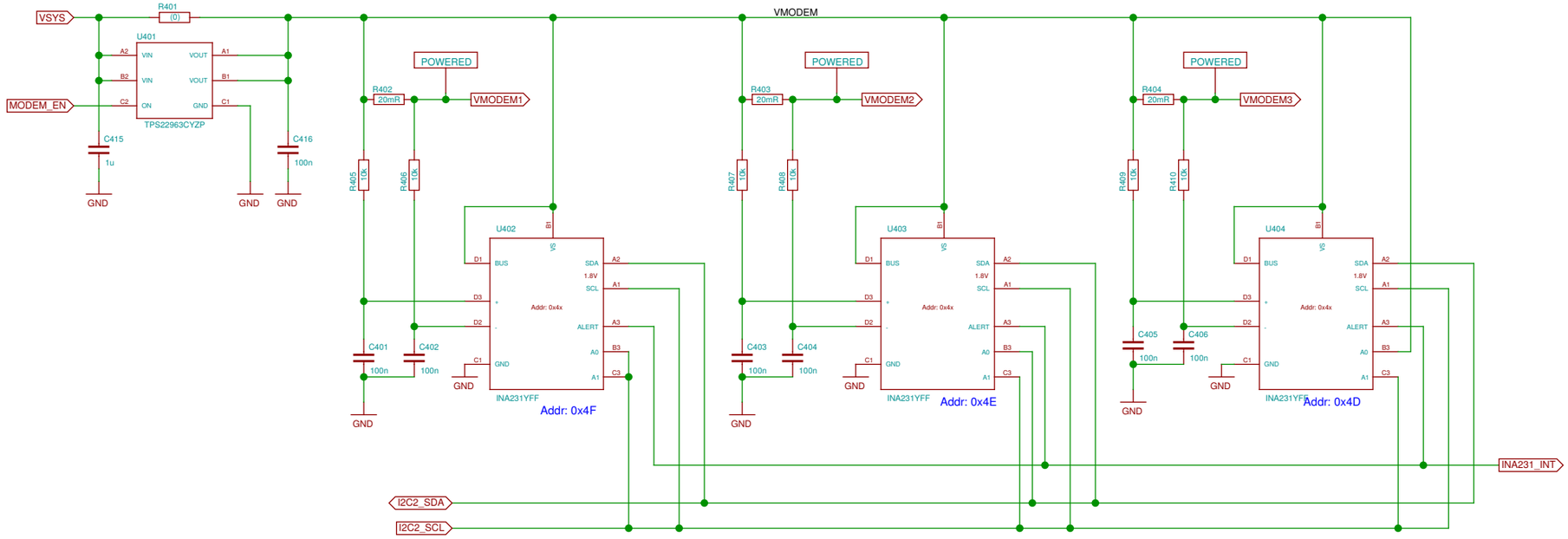


KiCad bureaucracy

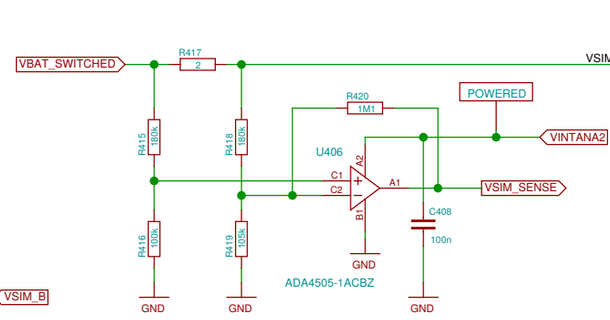


Sheet: /Charger/OTG-Booster/ File: neo900_SS_3.sch		
Title: Charger/OTG-Booster		
Size: A3	Date: 2016-11-07 20:30:05	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 3/37

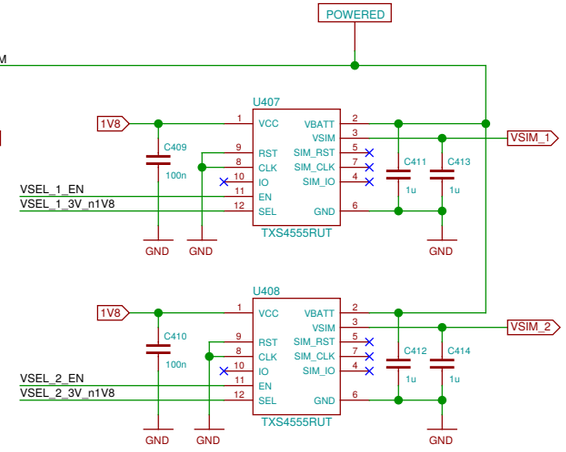
Modem current monitor



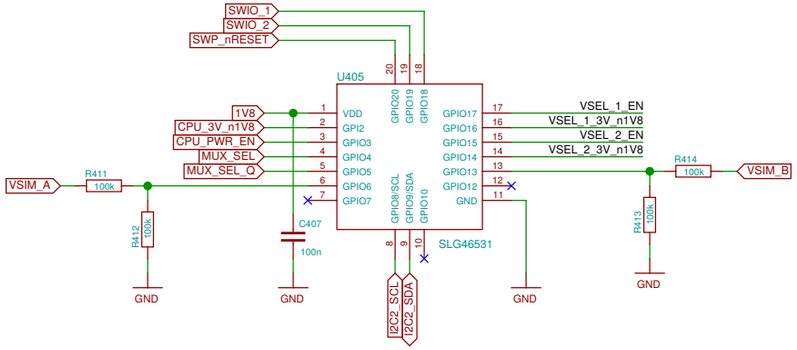
SIM current sensing



SIM power supply

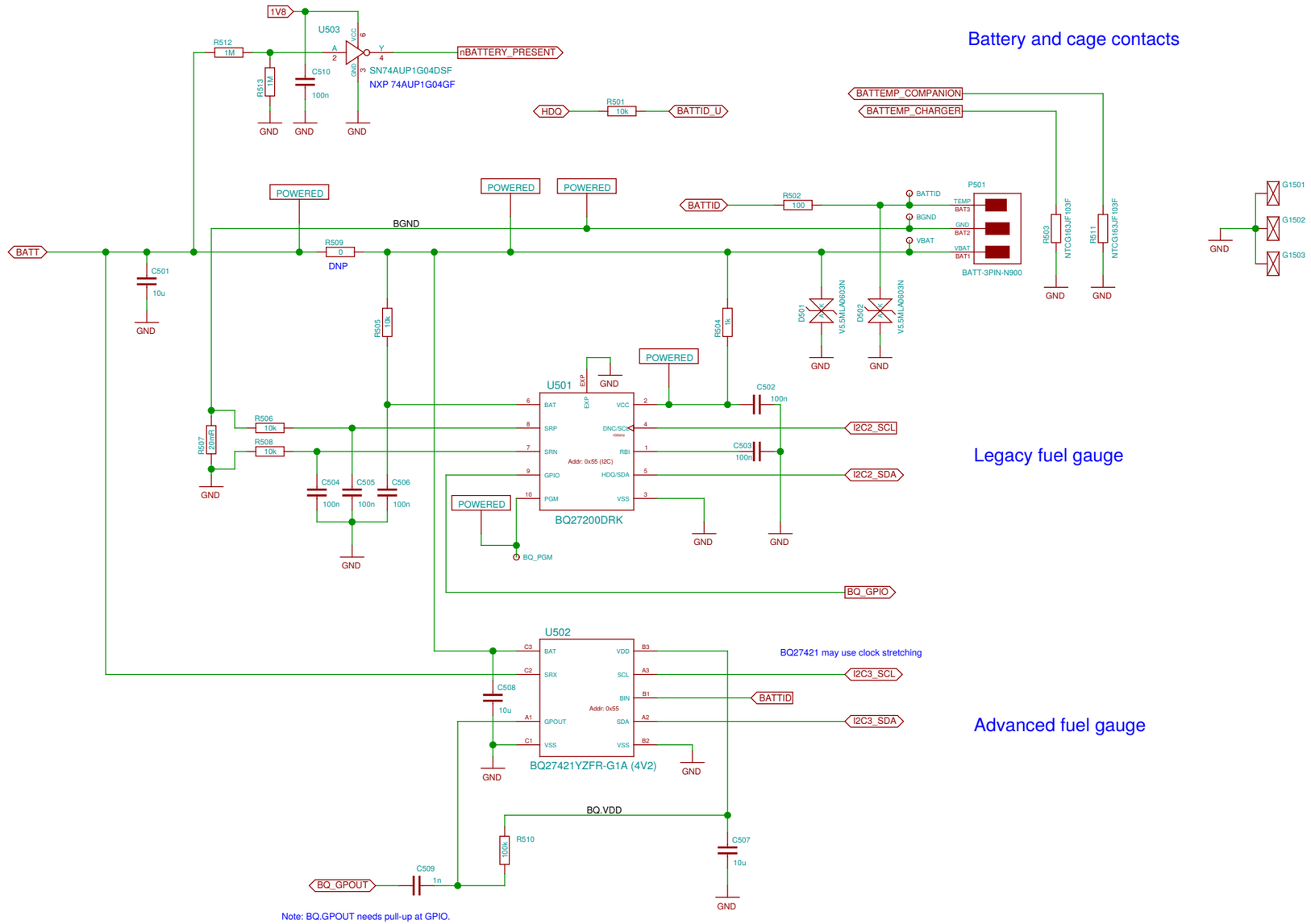


SIM power selection



TODO: update SLG design for changed pins

Sheet: /Modem Power/ File: neo900_SS_4.sch		
Title: Modem Power		
Size: A3	Date: 2016-11-07 20:30:05	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 4/37



Sheet: /Fuel Gauge/ File: neo900_SS_5.sch		
Title: Fuel Gauge		
Size: A3	Date: 2016-11-07 20:30:05	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 5/37

SIM B bus

VSIM_B — TP619 VSIM_B
MODEM_RST_B — TP620 MODEM_RST_B
MODEM_DATA_B — TP621 MODEM_DATA_B
MODEM_CLK_B — TP622 MODEM_CLK_B
MODEM_CD_B — TP623 MODEM_CD_B

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.

M601N (PHS8)
A7 RFU-DNU — TP625 MODEM_A7
F14 RFU-DNU — TP632 MODEM_F14
F15 RFU-DNU — TP633 MODEM_F15
G4 RFU-DNU — TP634 MODEM_G4
H13 RFU-DNU — TP635 MODEM_H13
K12 RFU-DNU — TP636 MODEM_K12
K13 RFU-DNU — TP637 MODEM_K13
L5 RFU-DNU — TP638 MODEM_L5
L6 RFU-DNU — TP639 MODEM_L6
L7 RFU-DNU — TP640 MODEM_L7
L8 RFU-DNU — TP641 MODEM_L8
L9 RFU-DNU — TP642 MODEM_L9
L10 RFU-DNU — TP643 MODEM_L10
L11 RFU-DNU — TP644 MODEM_L11
L12 RFU-DNU — TP645 MODEM_L12
L13 RFU-DNU — TP646 MODEM_L13
N12 RFU-DNU — TP648 MODEM_N12

Pads that are DNU in PHS8 and PLS8.

M601P (PHS8)
F16 RFU-DNU/GPIO10 — TP659 MODEM_F16
G14 RFU-DNU/GPIO7 — TP660 MODEM_G14
G15 RFU-DNU/GPIO8 — TP661 MODEM_G15
G16 RFU-DNU/GPIO9 — TP662 MODEM_G16
H15 RFU-DNU/GPIO5 — TP664 MODEM_H15
J14 RFU-DNU/GPIO1 — TP666 MODEM_J14
J15 RFU-DNU/GPIO2 — TP667 MODEM_J15
J16 RFU-DNU/GPIO3 — TP668 MODEM_J16
M12 RFU-DNU/ADC2 — TP669 MODEM_M12
M13 RFU-DNU/ADC1 — TP670 MODEM_M13

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

M601O (PHS8)
C12 RFU-GND/DNU — TP649 MODEM_C12
C13 RFU-GND/DNU — TP650 MODEM_C13
D12 RFU-GND/DNU — TP651 MODEM_D12
D13 RFU-GND/DNU — TP652 MODEM_D13
D14 RFU-GND/DNU — TP653 MODEM_D14
E12 RFU-GND/DNU — TP654 MODEM_E12
E13 RFU-GND/DNU — TP655 MODEM_E13
E14 RFU-GND/DNU — TP656 MODEM_E14
F13 RFU-GND/DNU — TP657 MODEM_F13
G13 RFU-GND/DNU — TP658 MODEM_G13

R601 0, R602 0, R603 0, R604 0, R605 0, R606 0, R607 0, R608 0, R609 0, R610 0 — GND

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

MCBSP4_DR — TP601 PCM-OUT
MCBSP4_DX — TP602 PCM-IN
MCBSP4_CLKX — TP603 PCB-CLK
MCBSP4_FSX — TP604 PCM-SYNC

M601H (PCM: IN M7, OUT M10, CLK M8, FSC M9) — M601G (PHS8: WSOUT N7, DOUT P7, I2S-EXT MCLK_OUT P8, SCL/KOUT N8)

PHS8 USB: D+ P4 — TP613 MODEM_DP — USB_MODEM_DP
D- P5 — TP614 MODEM_DM — USB_MODEM_DM
VBUS N5 — TP624 VUSB_MODEM — VBAT_SWITCHED

M601K
IGT L16
EMERG_OFF N14 — TP2 EMERG — ON_KEY
PWR_IND M4 — TP615 RESET — PWR_IND
LC_IND H16 — TP616 LC — LC_IND
STATUS B14 — TP617 STATUS — STATUS
WAKEUP H14 — TP618 WAKEUP — MODEM_WAKEUP
VDDLP M15 — C601 47u — GND
VEXT M5
VGNSS K16 — VGNSS
ANT-GNSS_DC D5 — ANT_GNSS_DC
BATT+ N13, P13 — C602 10p, C603 39p, C604 47u — GND — VMODEM3
BATT+GSM N3, N4 — GND — C605 10p, C606 39p, C607 47u — GND — VMODEM1
BATT+WCDMA A4, B3 — C608 10p, C609 39p, C610 47u — GND — VMODEM2

M601C ANT_GNSS E1 — GNSS_IN

MODEM_EMERG — T601 UMGSN (10k+47k, B2 GND, B1, C2, C1, pins 1 2 3 4 5) — GND
MODEM_IGT — MODEM_IGT

M601L / M601M — GND

VSIM_A — K15 — M601J SIM POWER
MODEM_RST_A — L14 — RST
MODEM_DATA_A — K14 — IO
MODEM_CLK_A — L15 — CLK
MODEM_CD_A — M14 — CD

PHS8 M601A:
UART1_RTS — TP605 CTS — N8
UART1_TX — TP609 RX — P11
UART1_CTS — TP606 RTS — N10
UART1_RX — TP610 TX — P12
RING — TP607 RING — P10
TP611 DCD — N9
TP608 DSR — P9
TP612 DTR — P8

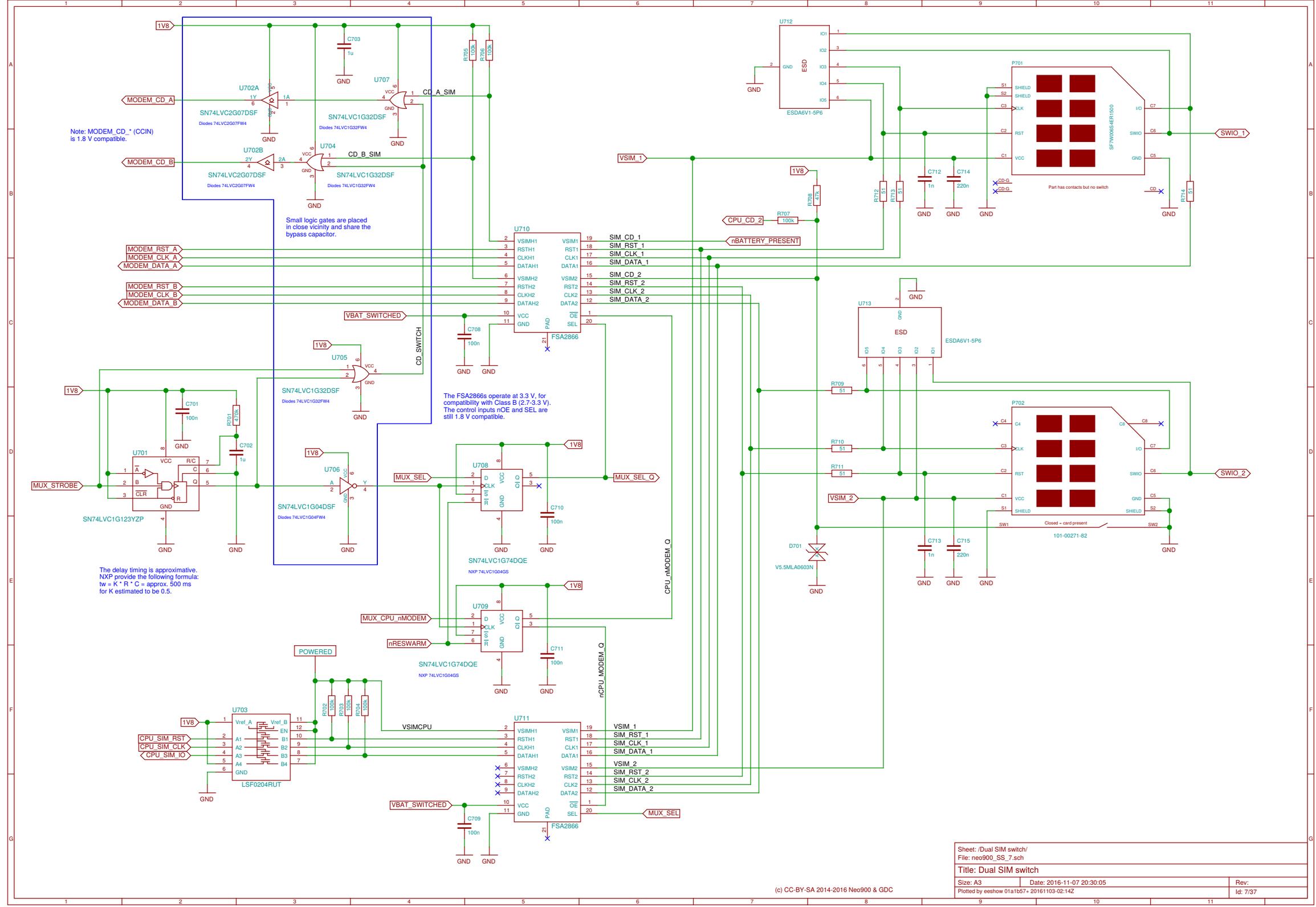
M601B ANT_DRX — A12 — 50 Ohm — J601 — CELL_ANT_DRX — ANT_DRX — GND GND
M601D ANT_WCSM — K1 — 50 Ohm — J602 — CELL_ANT_TRX — CELL_IN — GND GND
M601E

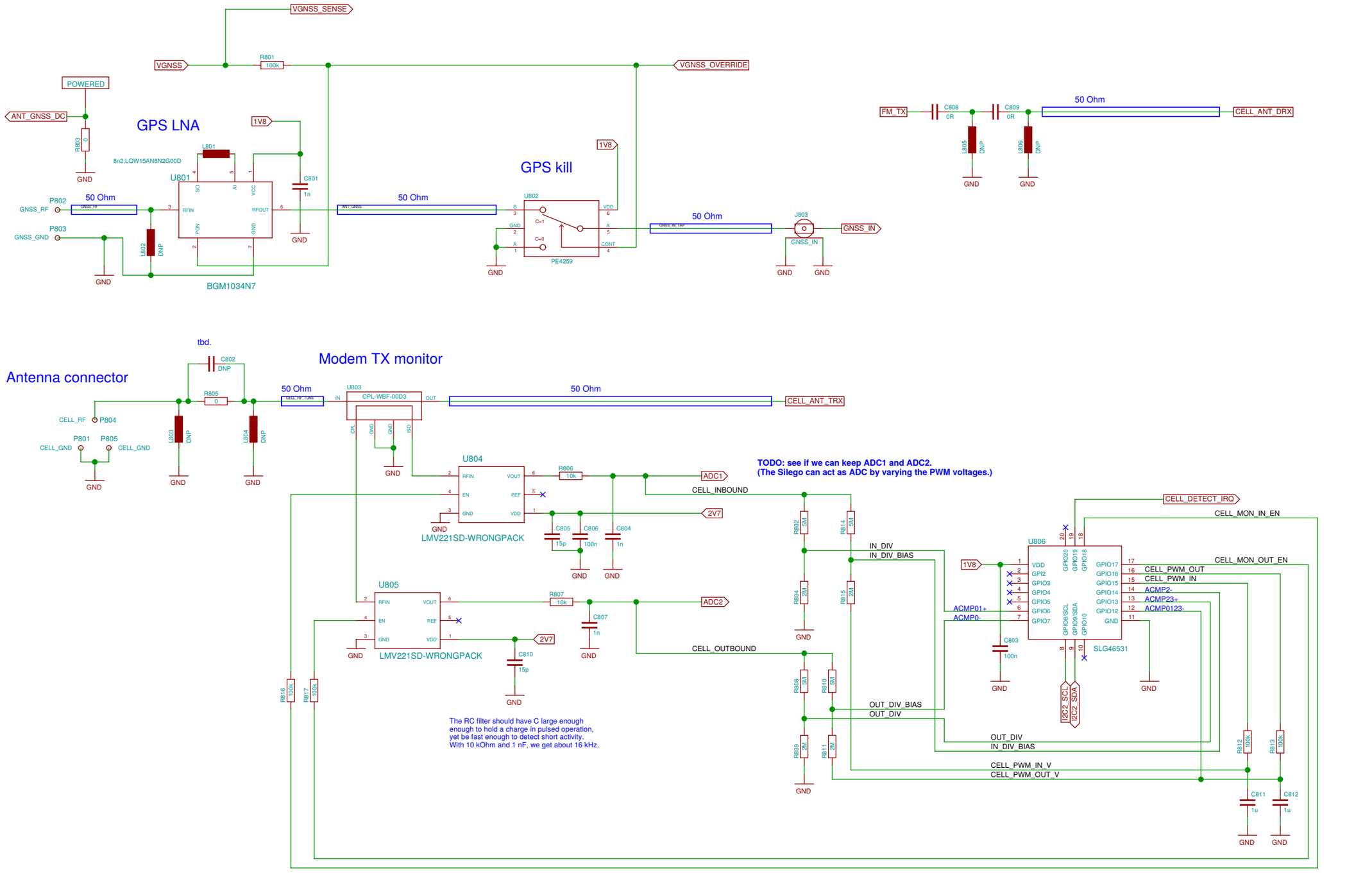
Place taps close to modem

Anti-eavesdropping

M601F (PHS8)
EARP E15, EARN E16
VMIC C14 — VMIC 2.7 V — R611 100k — MODEM_VMIC_SENSE — R612 100k — GND
MICP D15, MICN D16
AGND C15 — GND

Sheet: /3G/4G Modem + SIM/
File: neo900_SS_6.sch
Title: 3G/4G Modem + SIM
Size: A3 | Date: 2016-11-07 20:30:05 | Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z | Id: 6/37


1V8
MODEM_CD_A
MODEM_CD_B
MODEM_RST_A
MODEM_CLK_A
MODEM_DATA_A
MODEM_RST_B
MODEM_CLK_B
MODEM_DATA_B
MUX_STROBE
VBAT_SWITCHED
CD_SWITCH
CD_A_SIM
CD_B_SIM
MUX_SEL
MUX_SEL_Q
MUX_CPU_nMODEM
CPU_nMODEM_Q
nCPU_MODEM_Q
nRESWARM
POWERED
VSIMCPU
CPU_SIM_RST
CPU_SIM_CLK
CPU_SIM_IO
VSIM_1
VSIM_2
CPU_CD_2
nBATTERY_PRESENT
SWIO_1
SWIO_2
SIM_CD_1
SIM_RST_1
SIM_CLK_1
SIM_DATA_1
SIM_CD_2
SIM_RST_2
SIM_CLK_2
SIM_DATA_2
U702A
U702B
U704
U705
U706
U707
U701
U708
U709
U710
U711
U712
U713
U703
P701
P702
SN74LVC2G07DSF
SN74LVC1G32DSF
SN74LVC1G123YZP
SN74LVC1G04DSF
SN74LVC1G74DQE
FSA2866
ESDA6V1-5P6
LSF0204RUT
SF7W008S4ER1500
101-00271-82
V5.5MLA0603N
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: tw = K * R * C = approx. 500 ms for K estimated to be 0.5.
Part has contacts but no switch
Closed = card present
(c) CC-BY-SA 2014-2016 Neo900 & GDC
Sheet: /Dual SIM switch/
File: neo900_SS_7.sch
Title: Dual SIM switch
Size: A3
Date: 2016-11-07 20:30:05
Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z
Id: 7/37

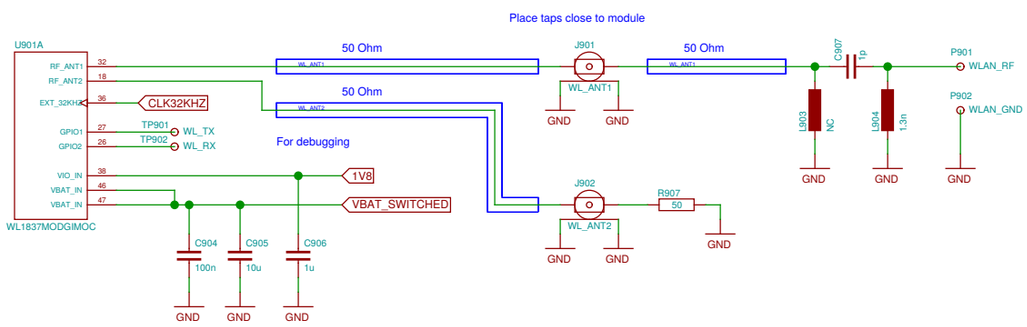


Sheet: /Antenna connections/	
File: neo900_SS_8.sch	
Title: Antenna connections	
Size: A3	Date: 2016-11-11 20:37:14
Plotted by eeshow 01a1b57+ 20161103-02:14Z	Rev:
	Id: 8/37

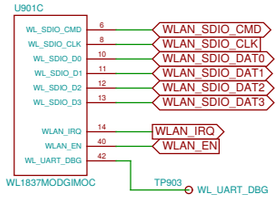
WiLink8

TODO: assign footprints for c-spring contacts

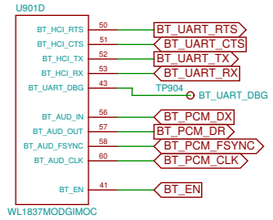
WLAN/BT antenna



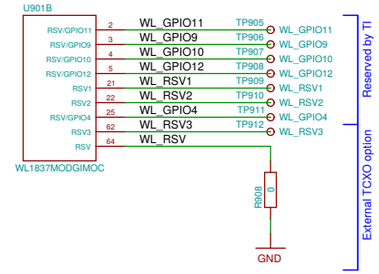
WLAN



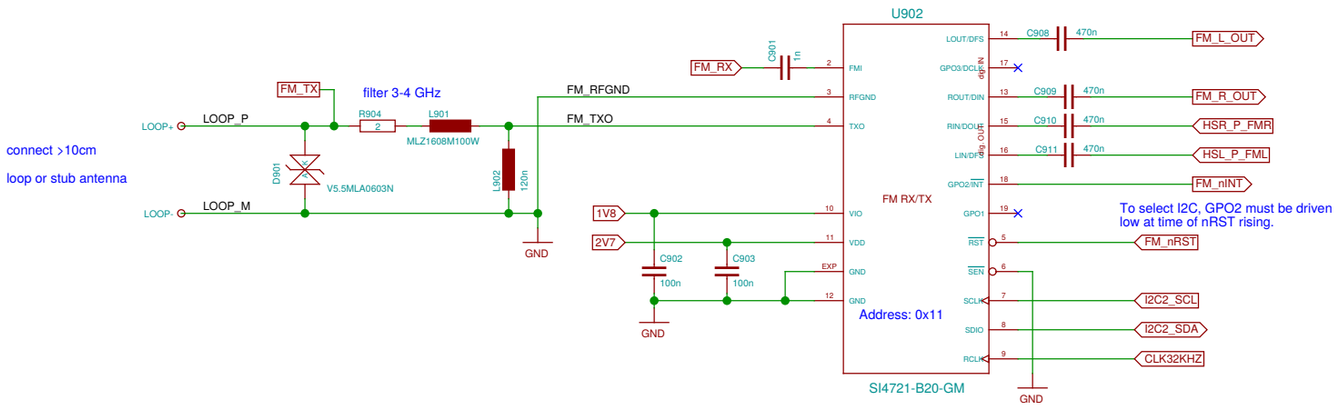
Bluetooth



Reserved / Debugging



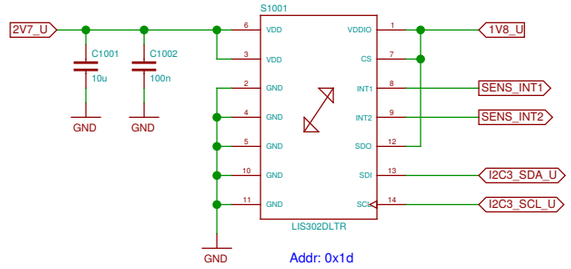
FM Radio (TX/RX)



Si4705 is pin compatible (mostly) but RX-only

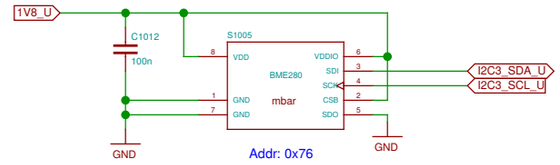
Sheet: /WLAN, Bluetooth, FM/	
File: neo900_SS_9.sch	
Title: WLAN, Bluetooth, FM	
Size: A3	Date: 2016-11-07 20:30:05
Plotted by eeshow 01a1b57+ 20161103-02:14Z	Rev:
	Id: 9/37

Acceleration (legacy)



Addr: 0x1d

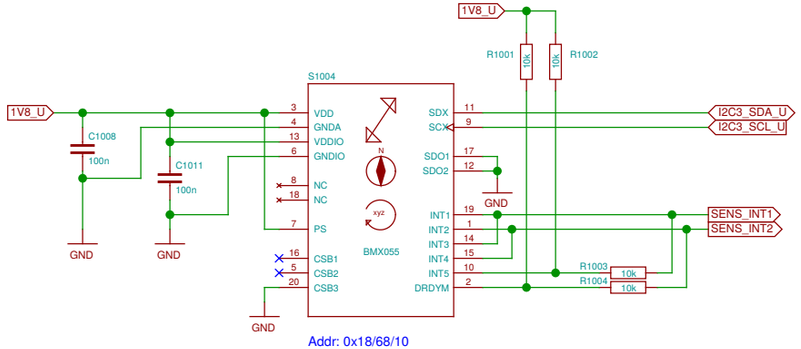
Pressure, humidity



Addr: 0x76

keep away from liquids and extreme temperatures

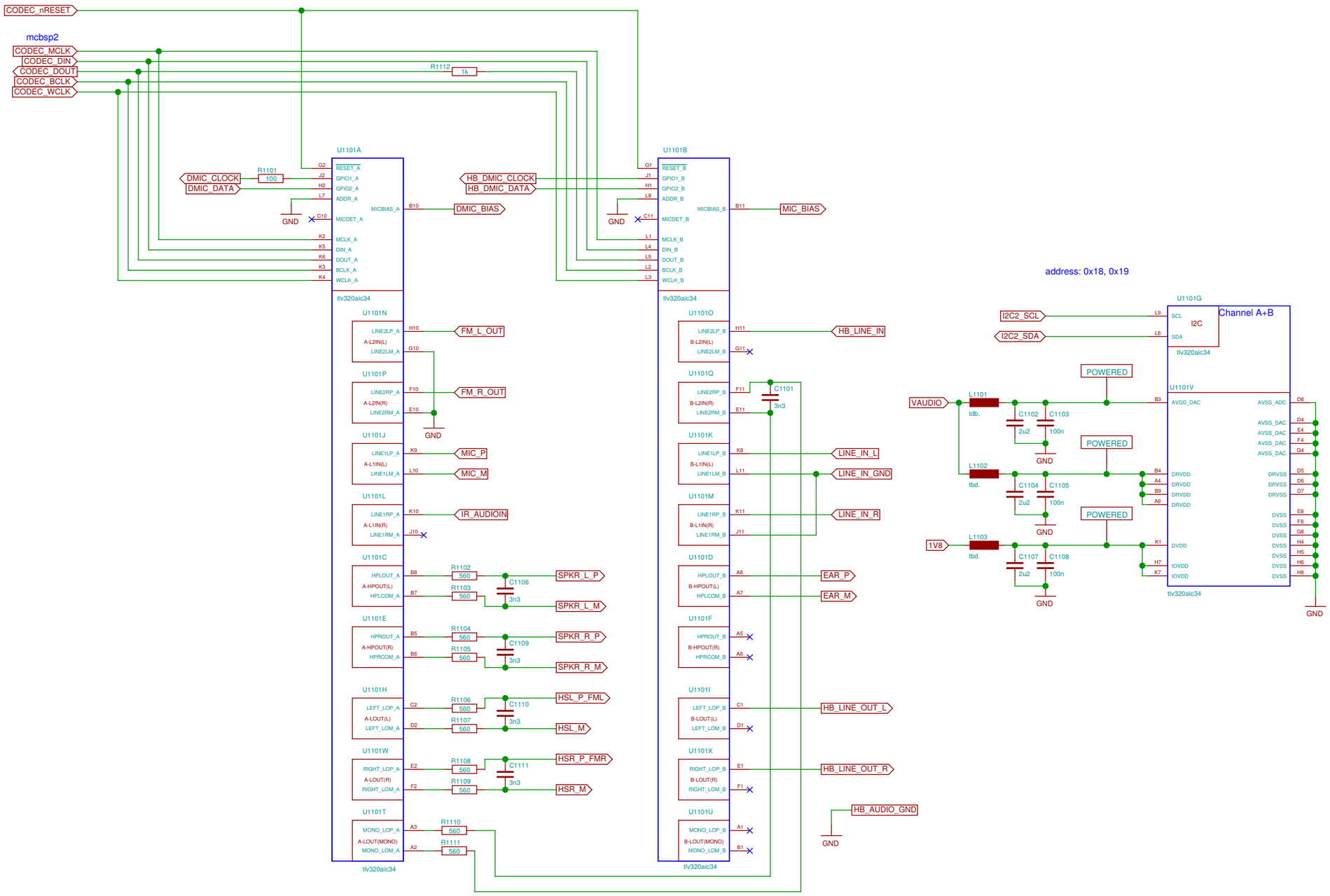
9-axis (acceleration, gyroscope, magnetometer)



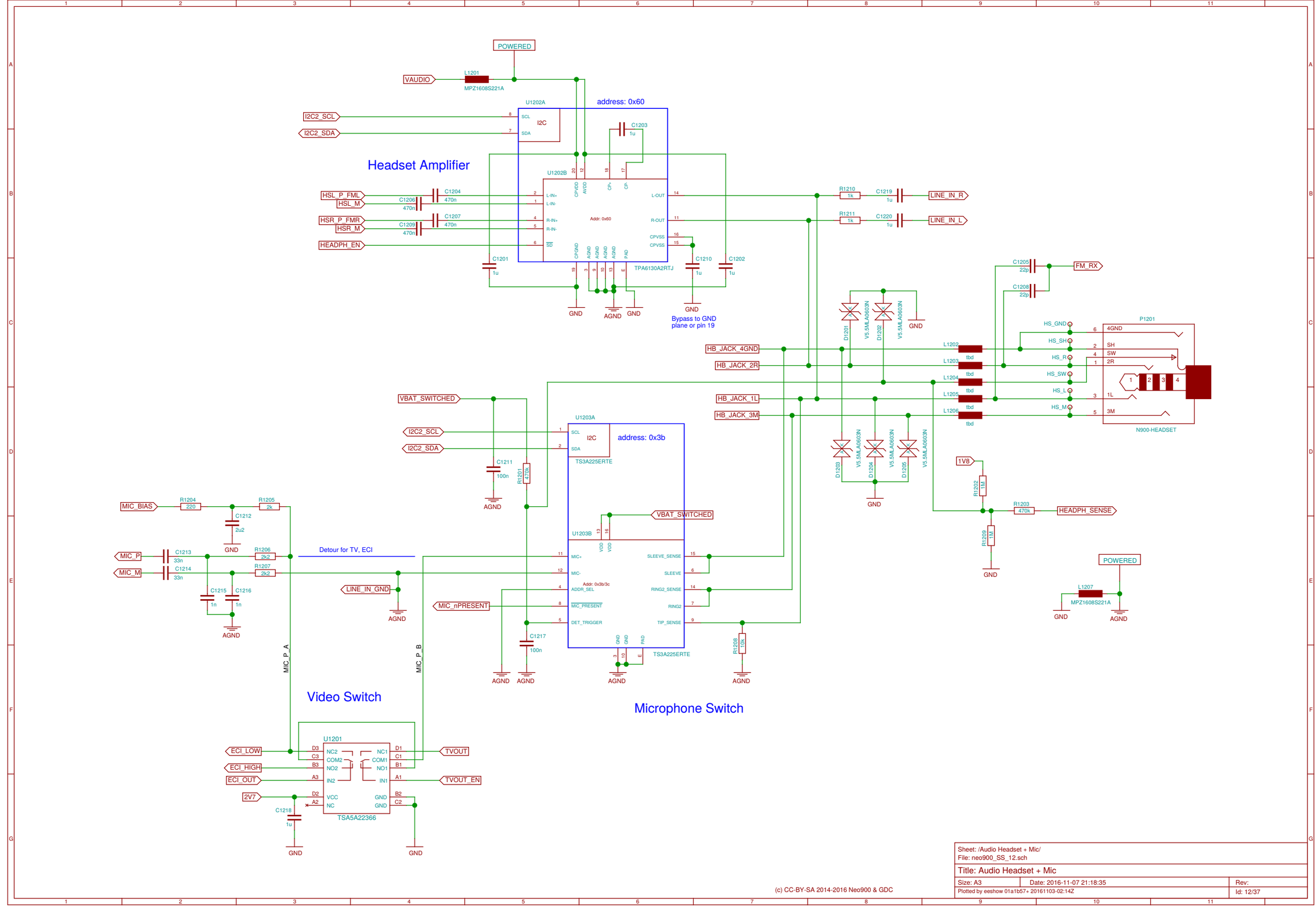
Addr: 0x18/68/10

keep away from magnets and metal

Sheet: /Sensors/ File: neo900_SS_10.sch		
Title: Sensors		
Size: A3	Date: 2016-11-07 20:30:05	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 10/37



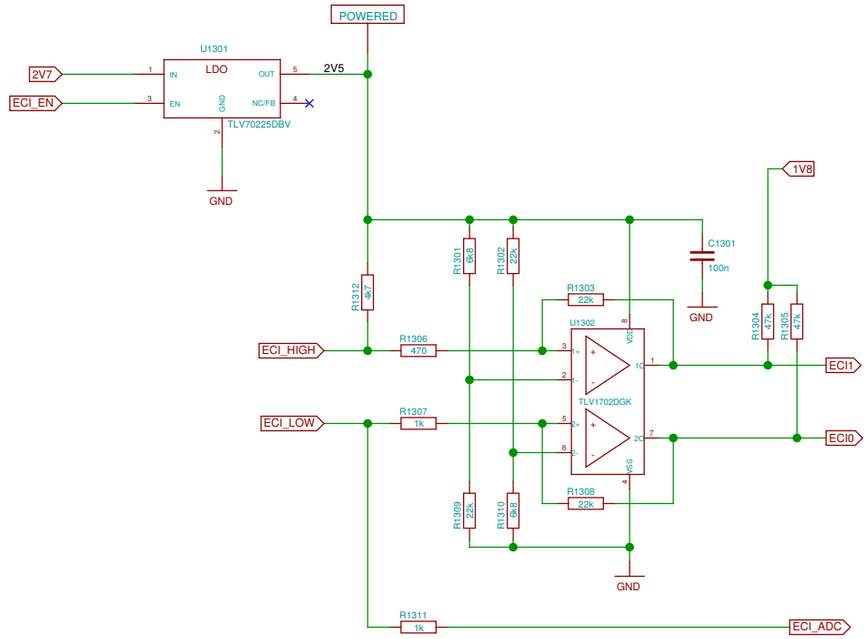
Sheet: /Audio Codec/ File: neo900_SS_11.sch		
Title: Audio Codec		
Size: A3	Date: 2016-11-07 21:17:50	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 11/37



Sheet: /Audio Headset + Mic/
File: neo900_SS_12.sch

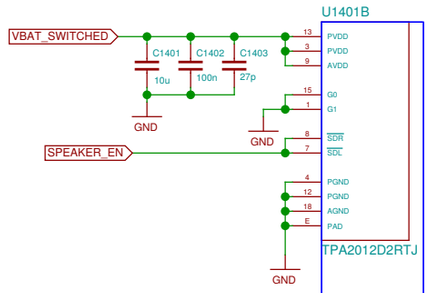
Title: Audio Headset + Mic

Size: A3	Date: 2016-11-07 21:18:35	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 12/37

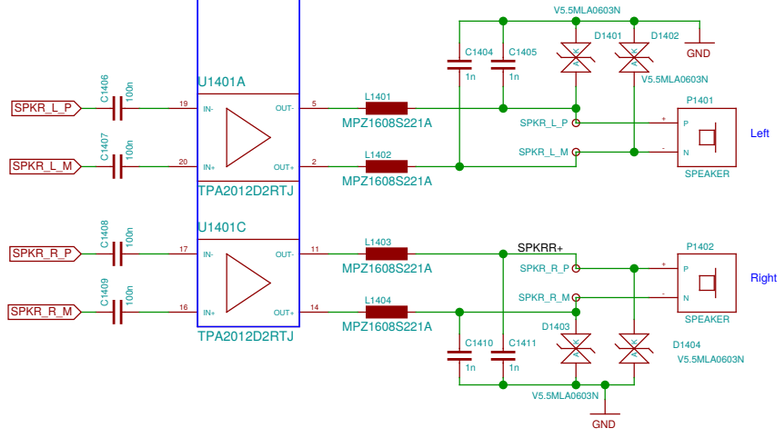


Sheet: /ECI/ File: neo900_SS_13.sch		
Title: ECI		
Size: A3	Date: 2016-11-07 20:30:05	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 13/37

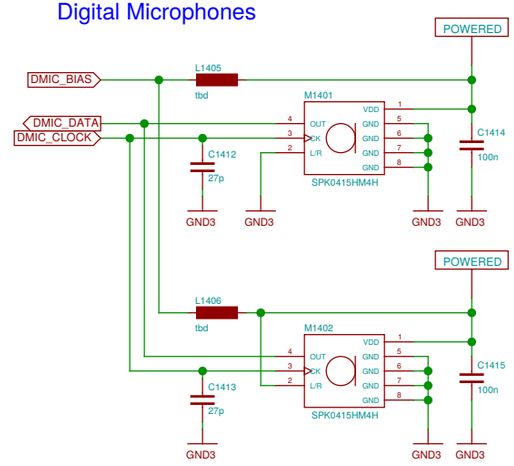
Hands-free



Speakers

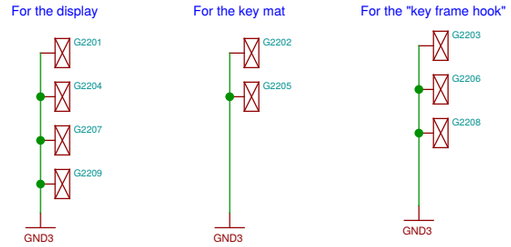


Digital Microphones

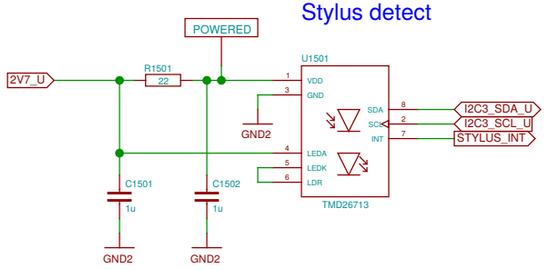


Sheet: /Audio Handsfree/ File: neo900_SS_14.sch		
Title: Audio Handsfree		
Size: A3	Date: 2016-11-07 20:30:05	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 14/37

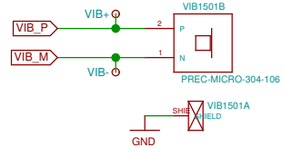
Shield Contacts on UPPER



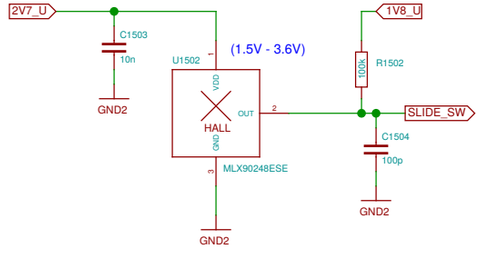
Stylus detect



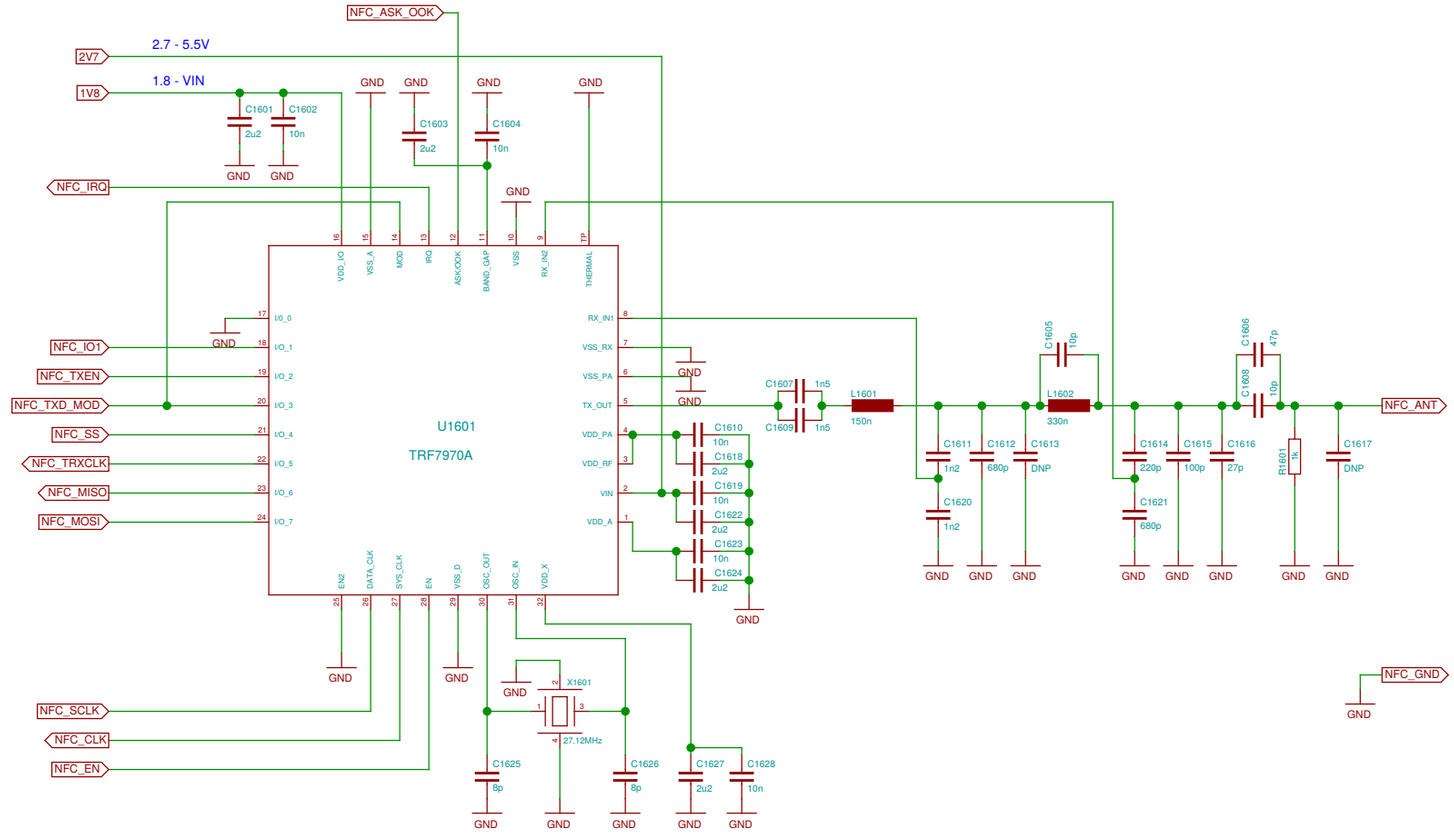
Vibramotor



Slide sensor

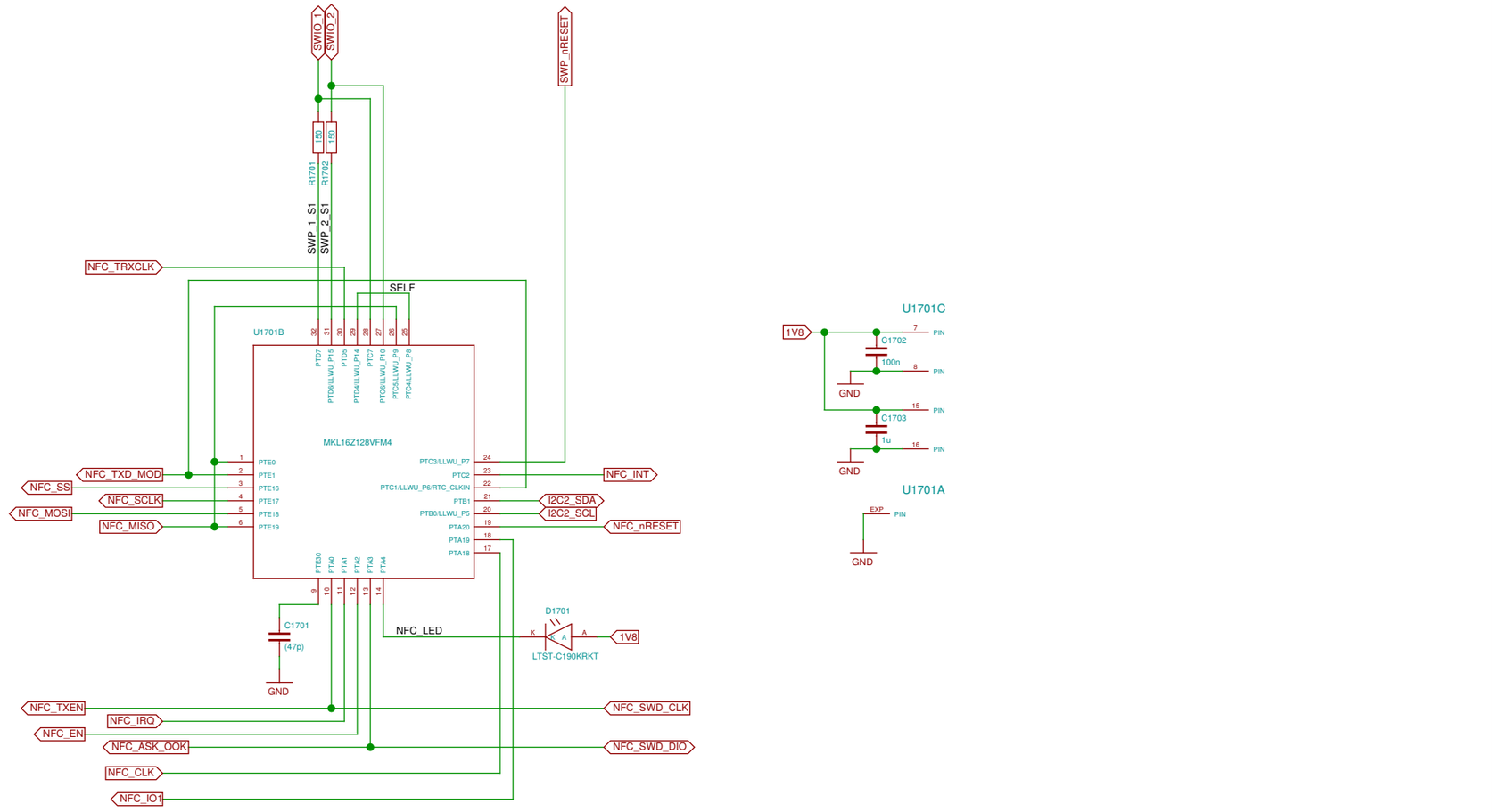


Sheet: /Misc/ File: neo900_SS_15.sch		
Title: Misc		
Size: A3	Date: 2016-11-07 20:30:05	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 15/37



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
Taitien XXCCEINANF-27.120000

Sheet: /RFID/NFC Reader/ File: neo900_SS_16.sch		
Title: RFID/NFC Reader		
Size: A3	Date: 2016-11-07 20:30:05	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 16/37



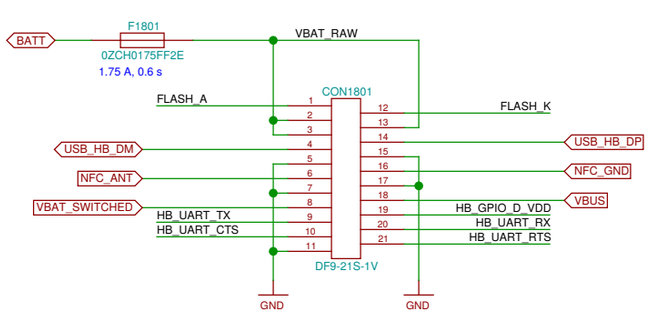
Sheet: /RFID/NFC Controller/
File: neo900_SS_17.sch

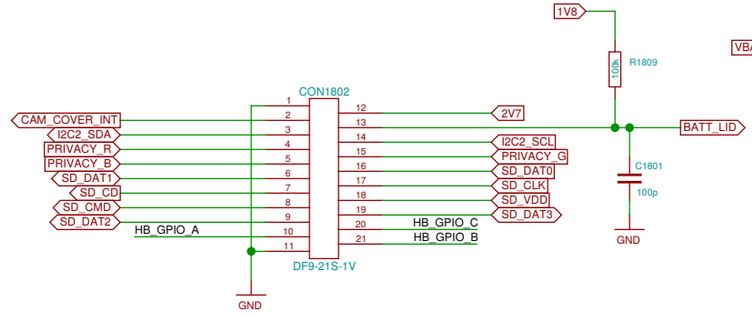
Title: RFID/NFC Controller

Size: A3	Date: 2016-11-07 20:30:05	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 17/37

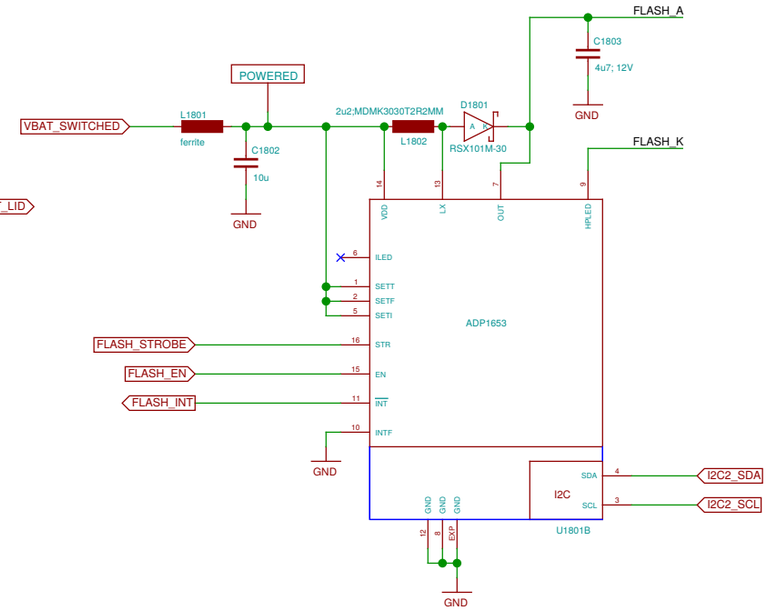
LOWER-BOB Interconnect (LOWER side)

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

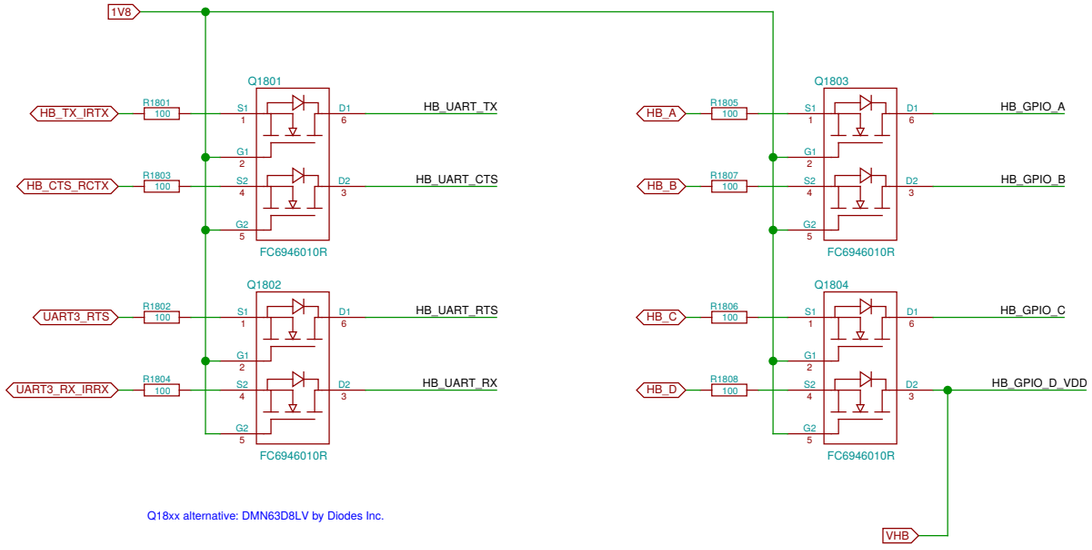




Flash/Torch



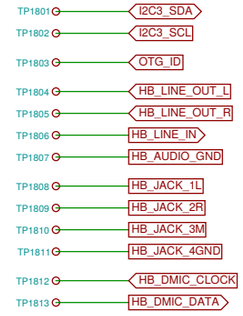
Level shifters for Hackerbus GPIO and UART



Q18xx alternative: DMN63D8LV by Diodes Inc.

Patchfield

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

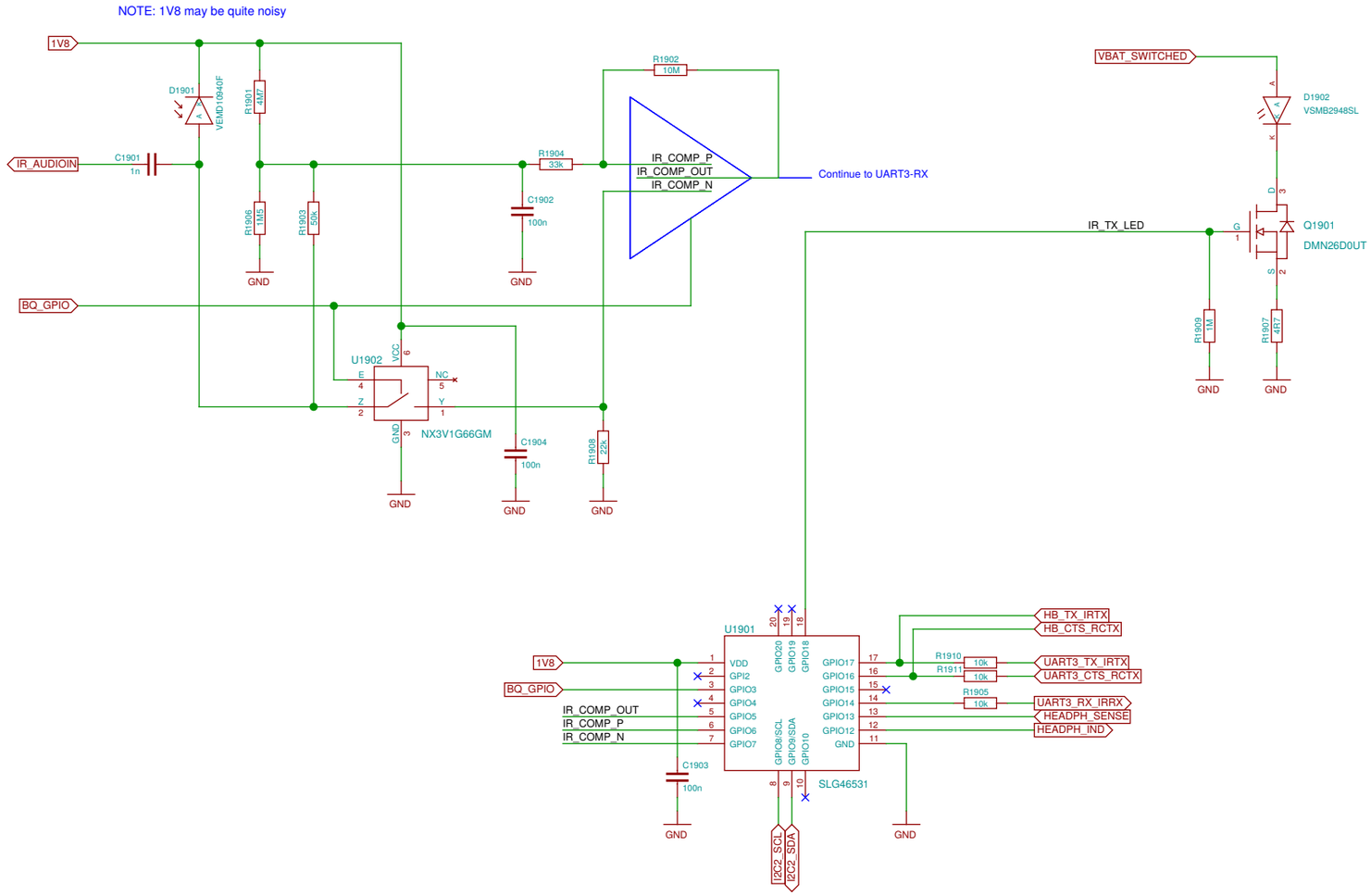


Sheet: /Hackerbus/
File: neo900_SS_18.sch

Title: Hackerbus

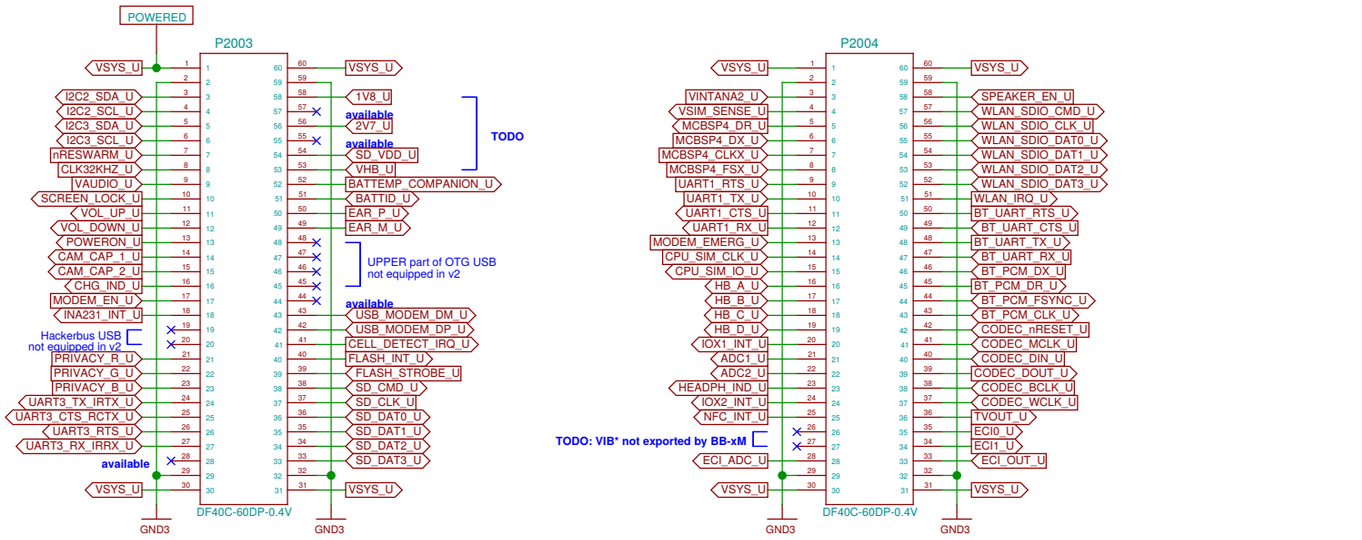
Size: A3	Date: 2016-11-10 11:03:17	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 18/37

TODO: update D1901 footprint



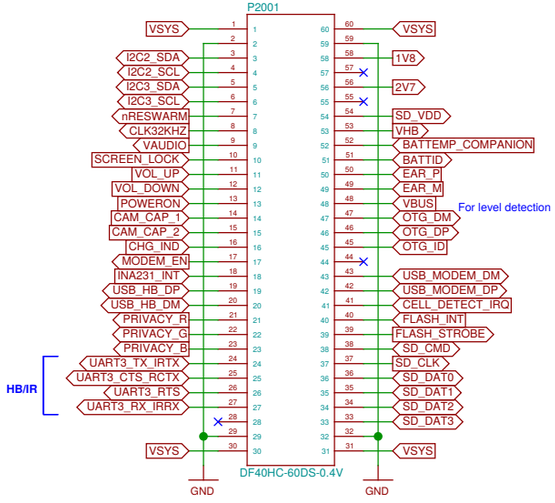
Sheet: /Infrared/ File: neo900_SS_19.sch		
Title: Infrared		
Size: A3	Date: 2016-11-07 20:30:05	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 19/37

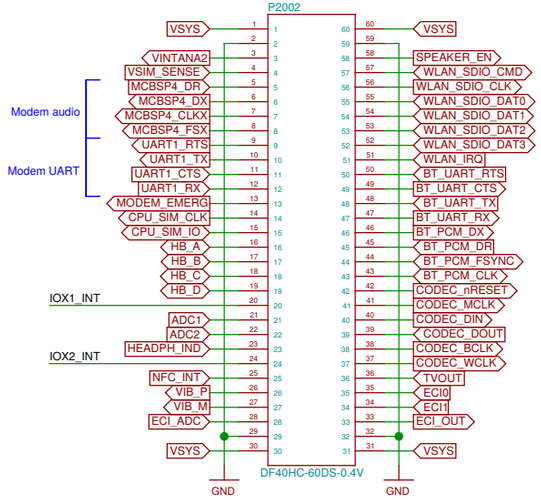
This is just the collection of signals we have.
Proper assignment still pending.

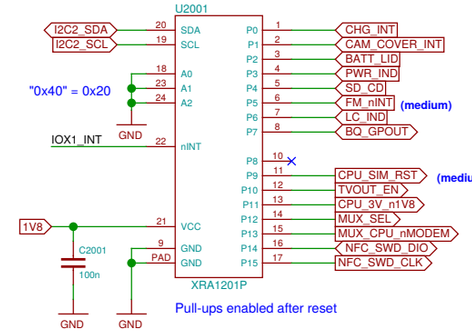


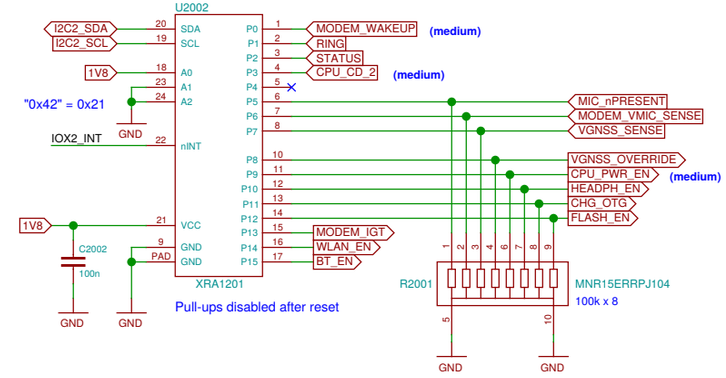
UPPER

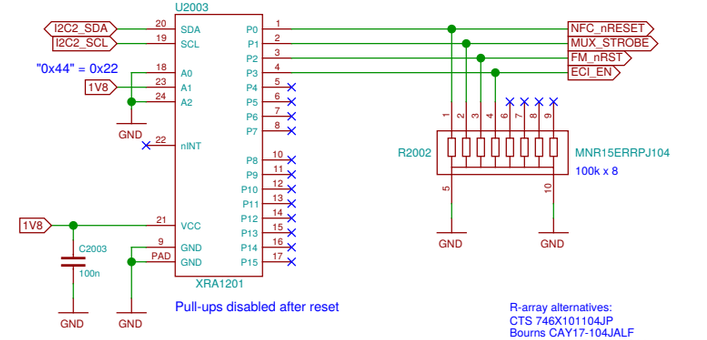
LOWER







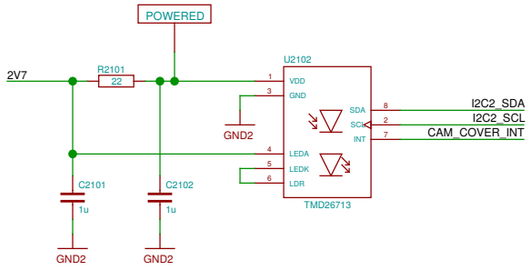




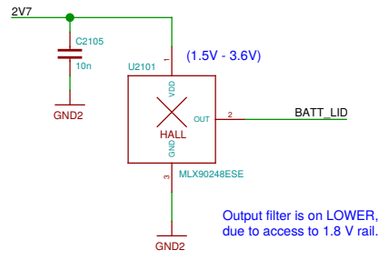
Current rating per contact: 0.3 A

Sheet: /B2B LOWER-UPPER/ File: neo900_SS_20.sch		
Title: B2B LOWER-UPPER		
Size: A3	Date: 2016-11-13 02:17:13	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 20/37

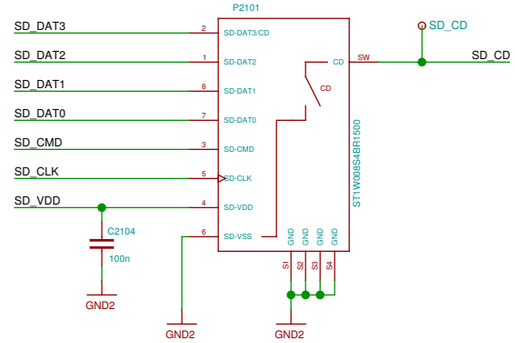
Camera Cover detect



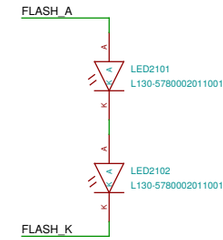
Battery Cover detect



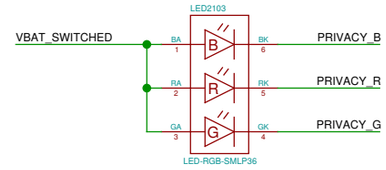
Memory card holder



Camera flash

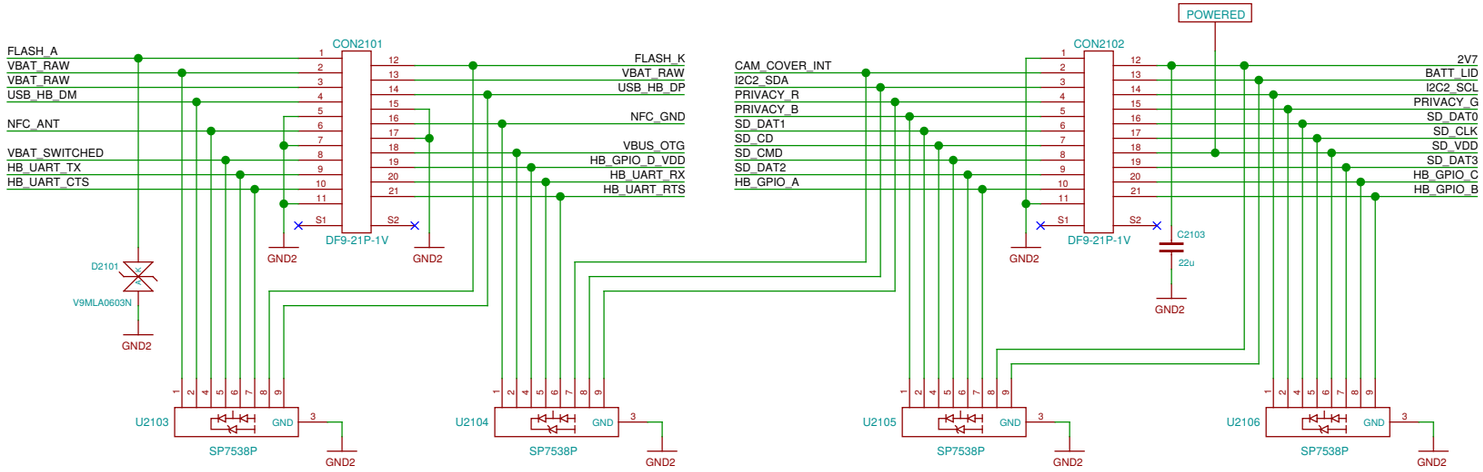


Privacy LED

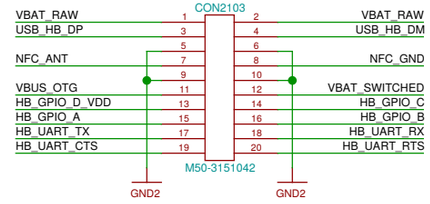


LOWER-BOB Interconnect (BOB side)

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



Hackerbus

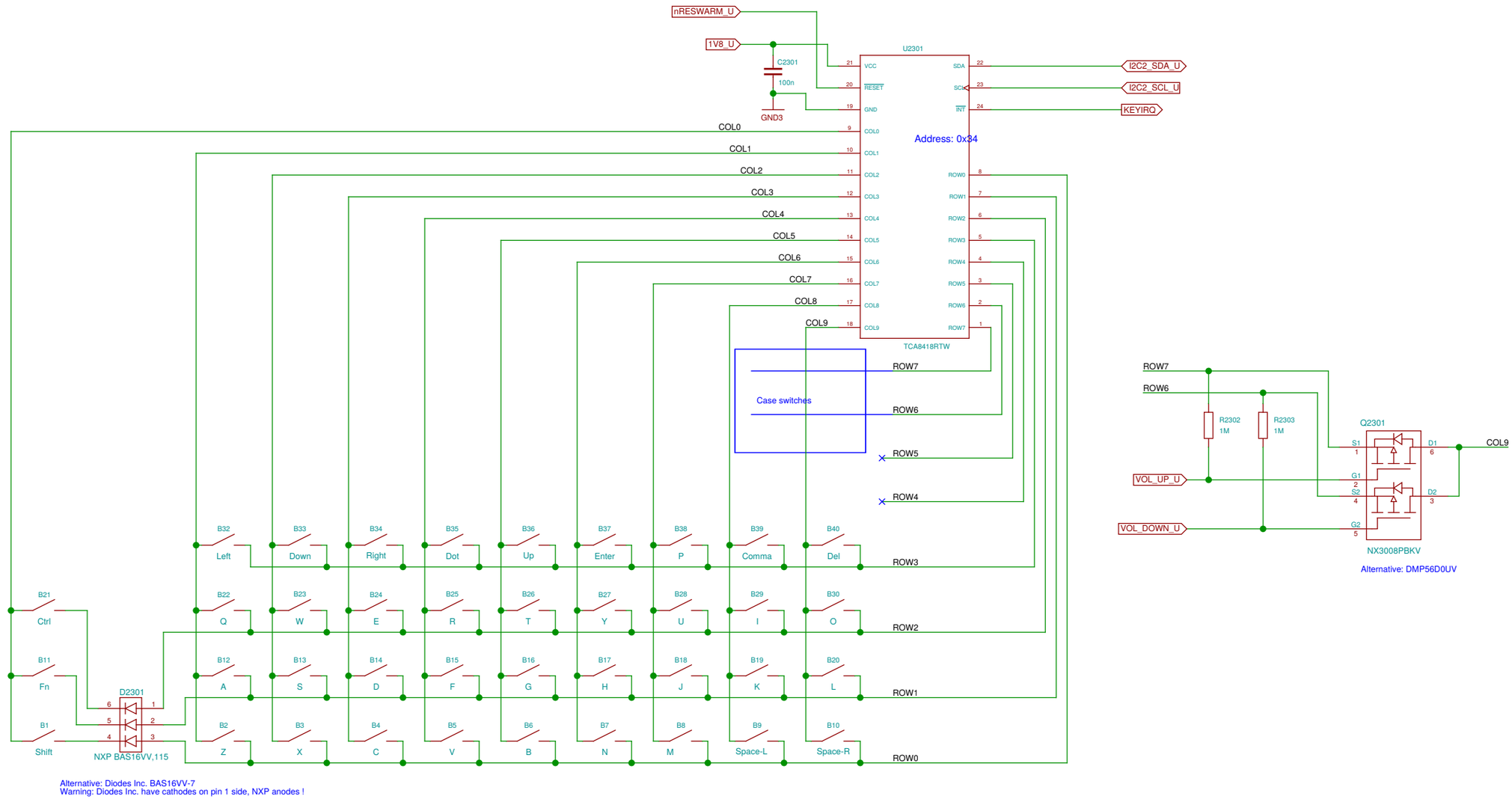


ESD pin assignment is only indicative.
Actual assignment to be defined by layout.

Sheet: /uSD Breakout Board/ File: neo900_SS_21.sch		
Title: uSD Breakout Board		
Size: A3	Date: 2016-11-07 21:37:32	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 21/37

TODO: consider sheet for deletion

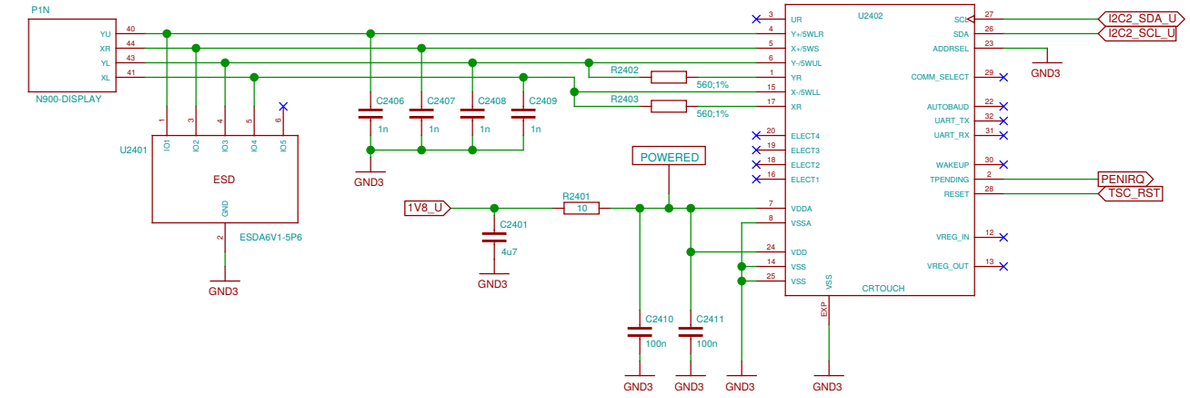
Sheet: /empty/ File: neo900_SS_22.sch		
Title: empty		
Size: A3	Date: 2016-11-07 20:30:05	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 22/37



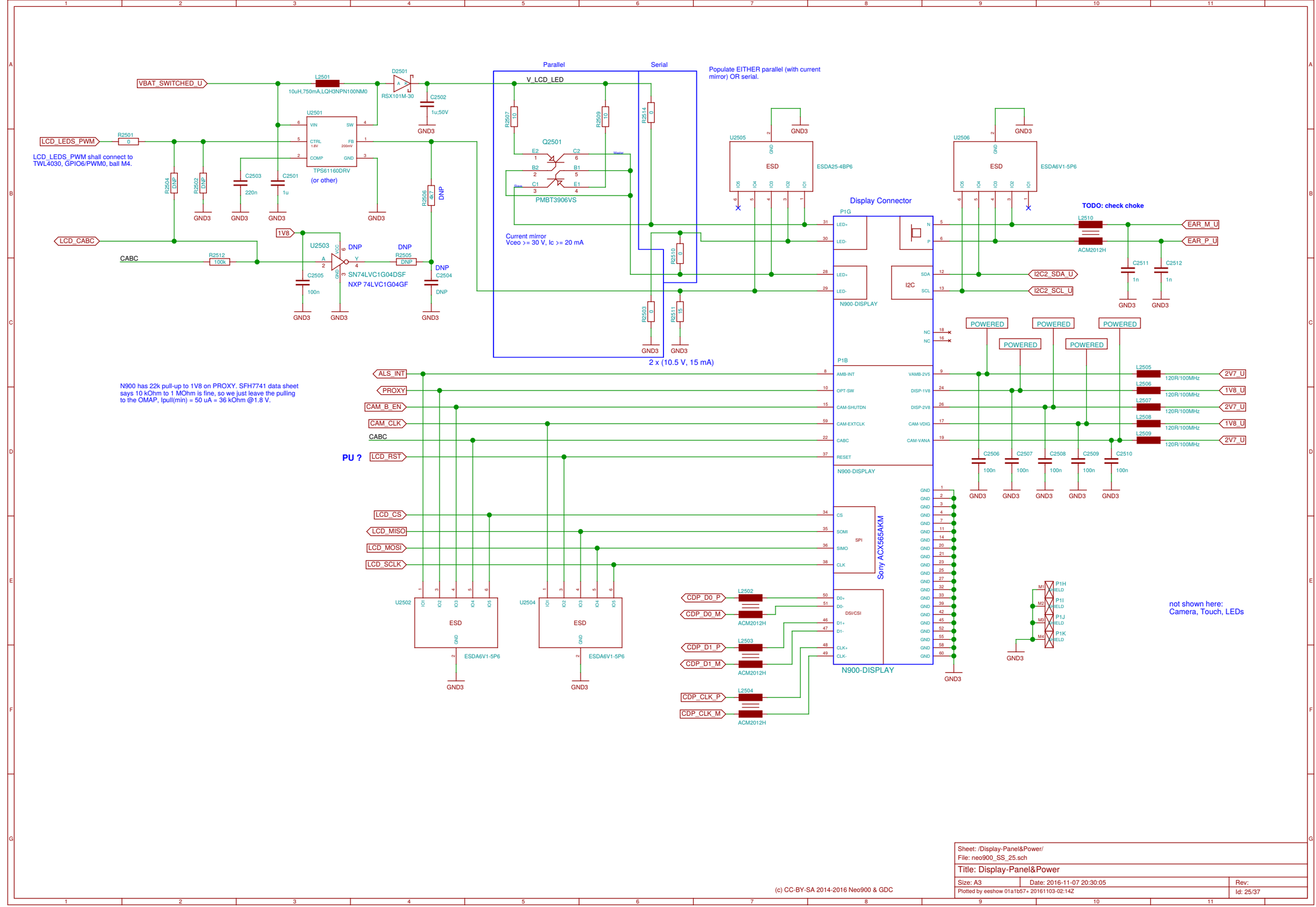
Sheet: /Keypad/ File: neo900_SS_23.sch		
Title: Keypad		
Size: A3	Date: 2016-11-07 20:30:05	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 23/37

Touch screen controller

Resistive Touch (display connector)



Sheet: /Display-Peripherals/ File: neo900_SS_24.sch		
Title: Display-Peripherals		
Size: A3	Date: 2016-11-07 20:30:05	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 24/37



Sheet: /Display-Panel&Power/	
File: neo900_SS_25.sch	
Title: Display-Panel&Power	
Size: A3	Date: 2016-11-07 20:30:05
Plotted by eeshow 01a1b57+ 20161103-02:14Z	Rev:
	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: 2016-11-07 20:30:05	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 26/37

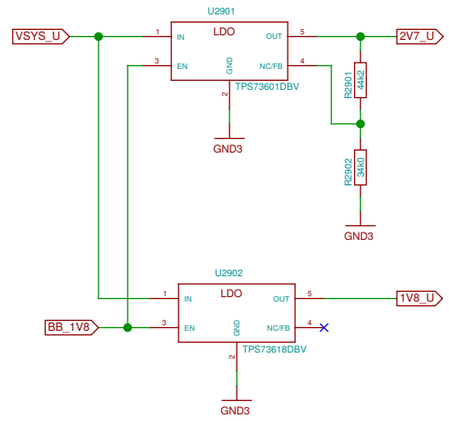
eMMC is not part of v2

Sheet: /eMMC/ File: neo900_SS_27.sch		
Title: eMMC		
Size: A3	Date: 2016-11-07 20:30:05	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 27/37

Companion chip (TPS65950) is not part of v2

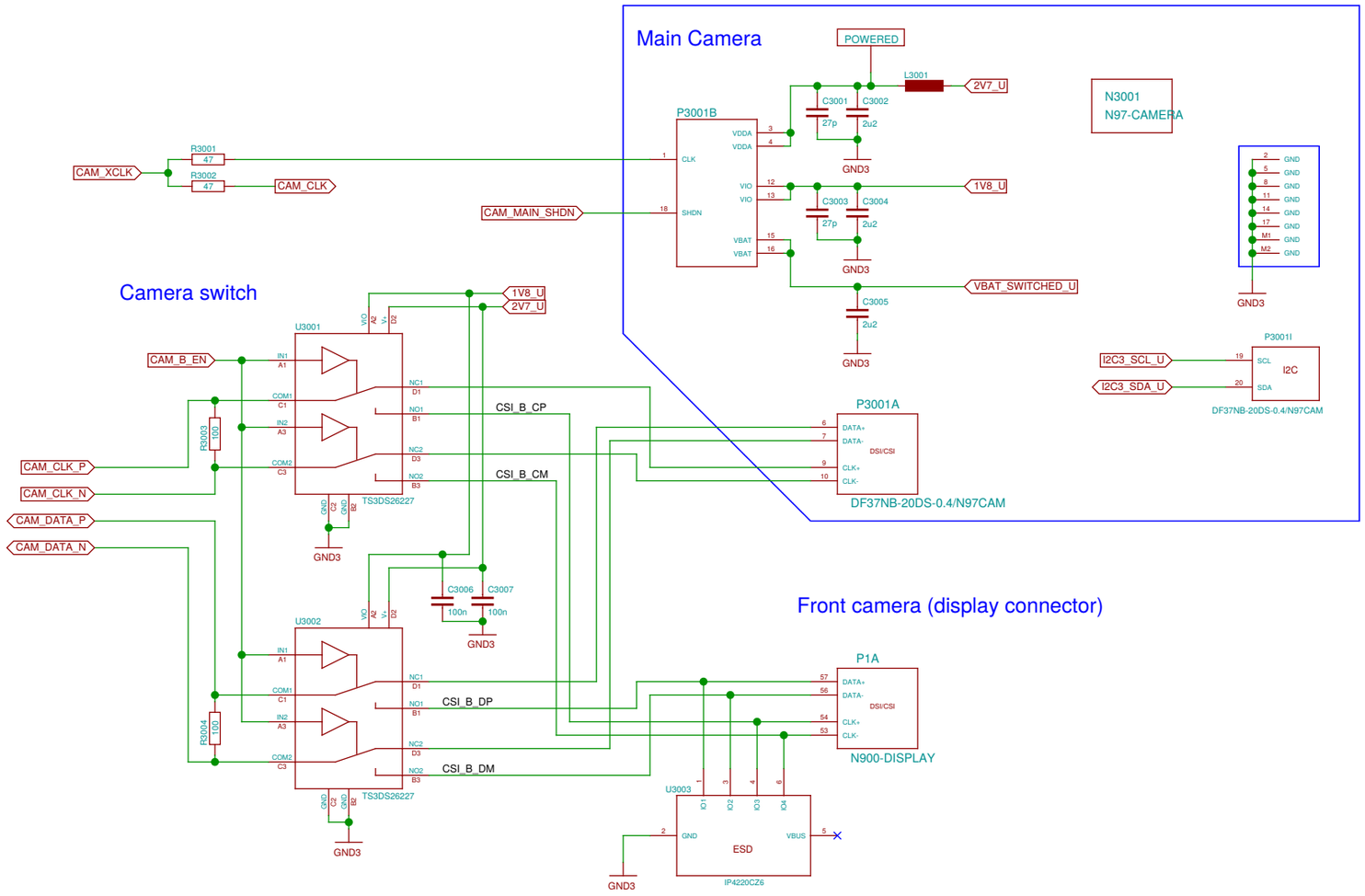
Sheet: /PMU+Codec/ File: neo900_SS_28.sch		
Title: PMU+Codec		
Size: A3	Date: 2016-11-07 20:30:05	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 28/37

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



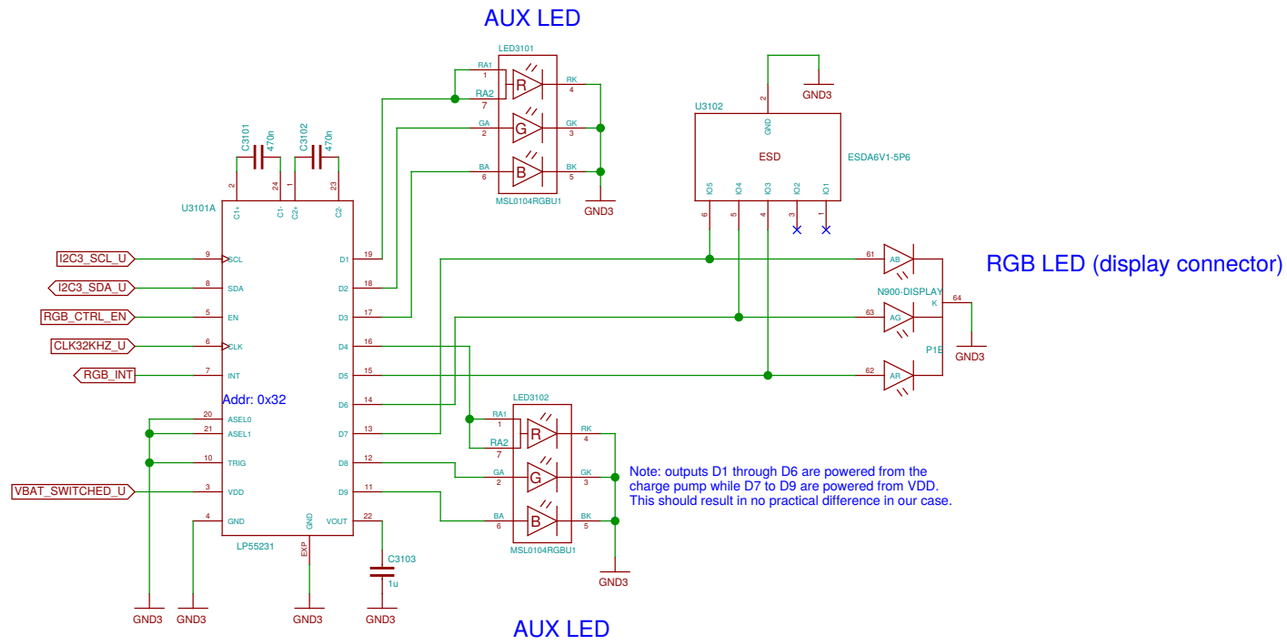
TODO: use REGEN ?

Sheet: /BB-XM Dummy (TWL4030)/ File: neo900_SS_29.sch		
Title: BB-XM Dummy (TWL4030)		
Size: A3	Date: 2016-11-07 20:30:05	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 29/37

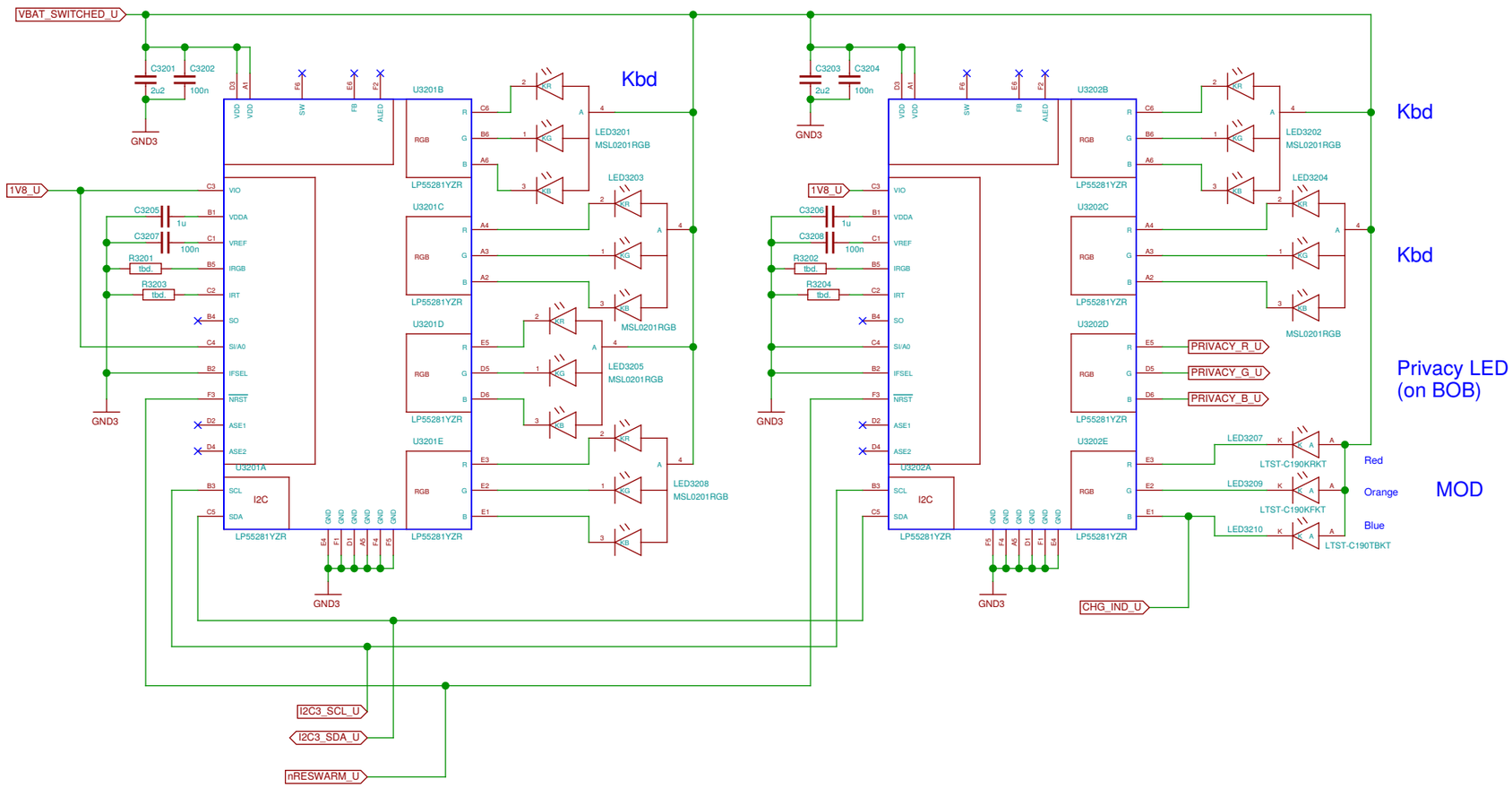


(c) CC-BY-SA 2014-2016 Neo900 & GDC

Sheet: /Camera/ File: neo900_SS_30.sch		
Title: Camera		
Size: A3	Date: 2016-11-07 20:30:05	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 30/37



Sheet: /Fancy LEDs/ File: neo900_SS_31.sch		
Title: Fancy LEDs		
Size: A3	Date: 2016-11-07 20:30:05	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 31/37

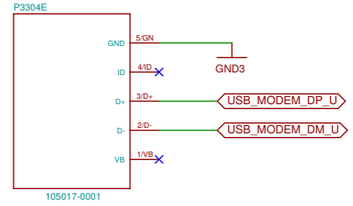


Sheet: /Basic LEDs/ File: neo900_SS_32.sch		
Title: Basic LEDs		
Size: A3	Date: 2016-11-07 20:30:05	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 32/37

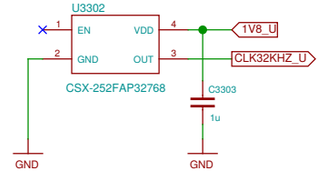
Cleaning up. The connections to BB-xM are on the next sheets.

Modem USB

connect to BB
by some Micro-USB cable

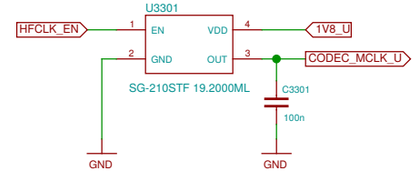


32 kHz clock



Alternative: OYKTGLJANF-0.032768

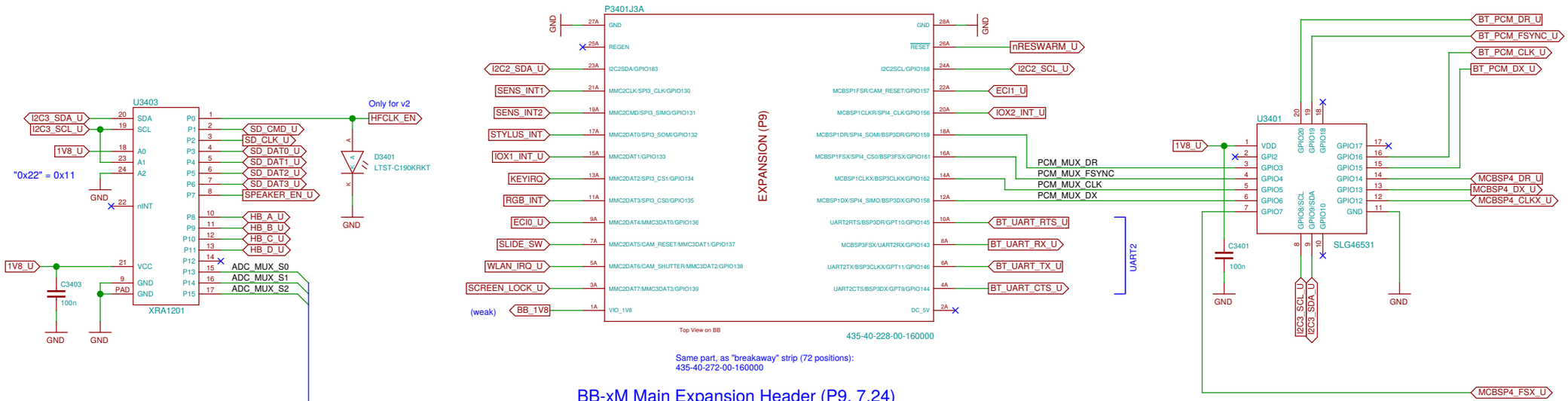
19.2 MHz clock



Alternative: KC2520B19.2000C1GE00

Sheet: /Connector to BB-XM/ File: neo900_SS_33.sch		
Title: Connector to BB-XM		
Size: A3	Date: 2016-11-07 20:13:58	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 33/37

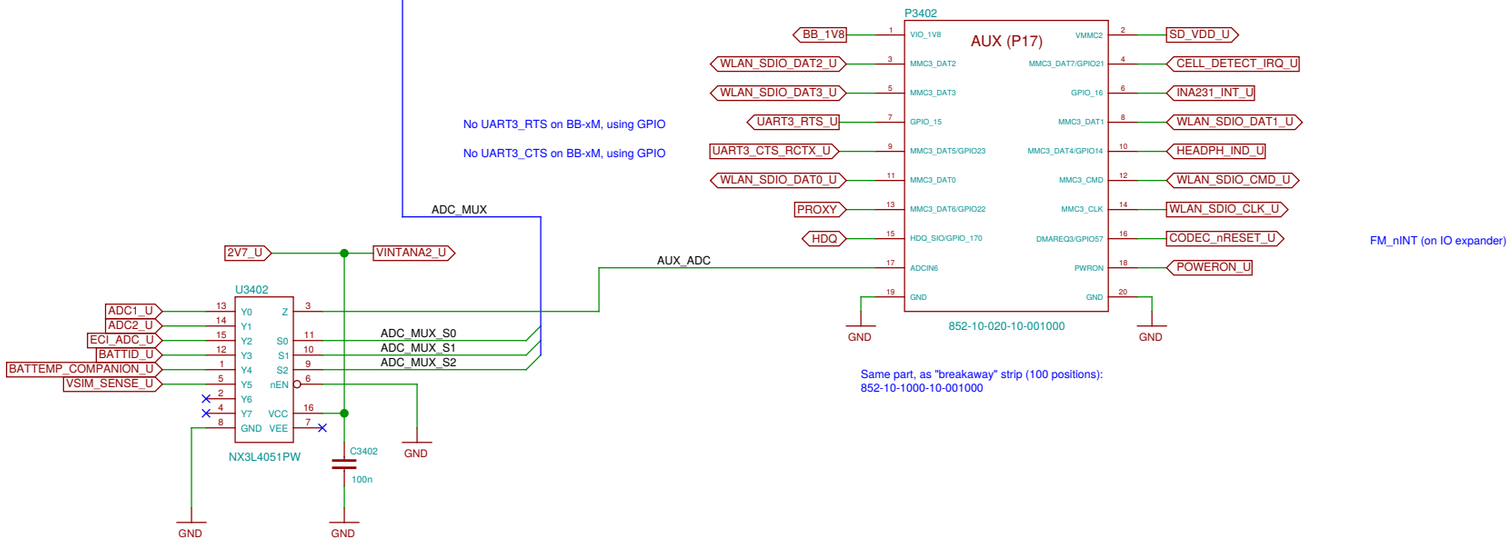
TODO: update pin names in footprint



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

BB-xM Main Expansion Header (P9, 7.24)

Auxiliary Expansion Header (P17, 7.26)

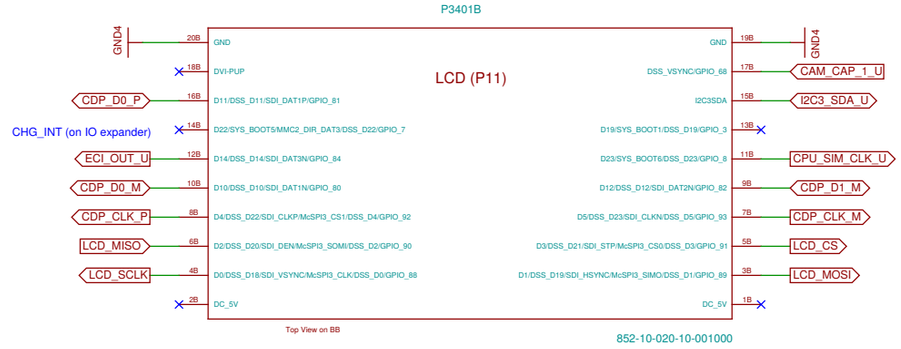


Same part, as "breakaway" strip (100 positions):
852-10-1000-10-001000

Sheet: /BB-XM Adapter (CPU)/ File: neo900_SS_34.sch		
Title: BB-XM Adapter (CPU)		
Size: A3	Date: 2016-11-13 06:02:32	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 34/37

TODO: update pin names in footprint

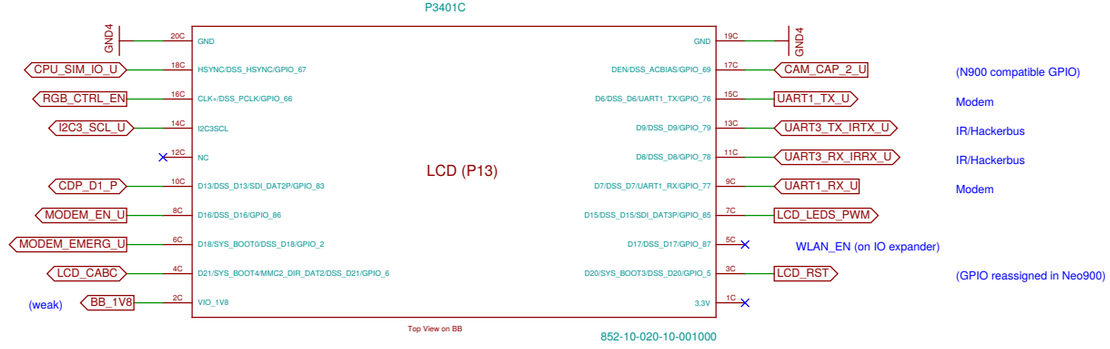
P11 (7.25)



(N900 compatible GPIO)

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

P13 (7.25)



(N900 compatible GPIO)
Modem
IR/Hackerbus
IR/Hackerbus
Modem
WLAN_EN (on IO expander)
(GPIO reassigned in Neo900)

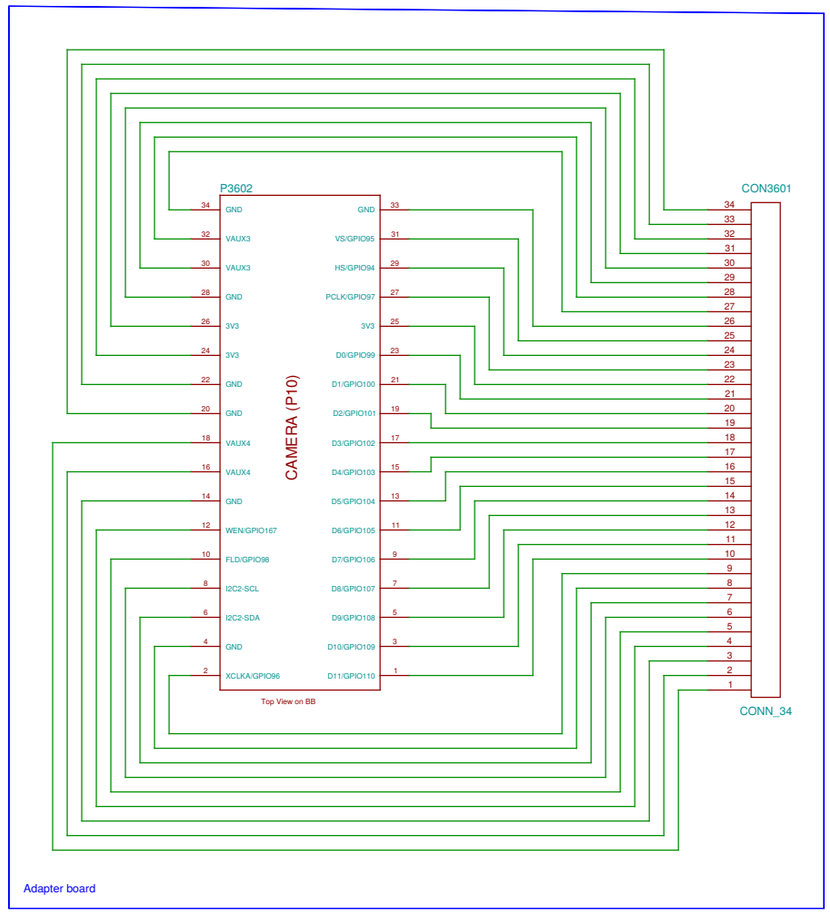
Same part, as "breakaway" strip (100 positions):
852-10-1000-10-001000

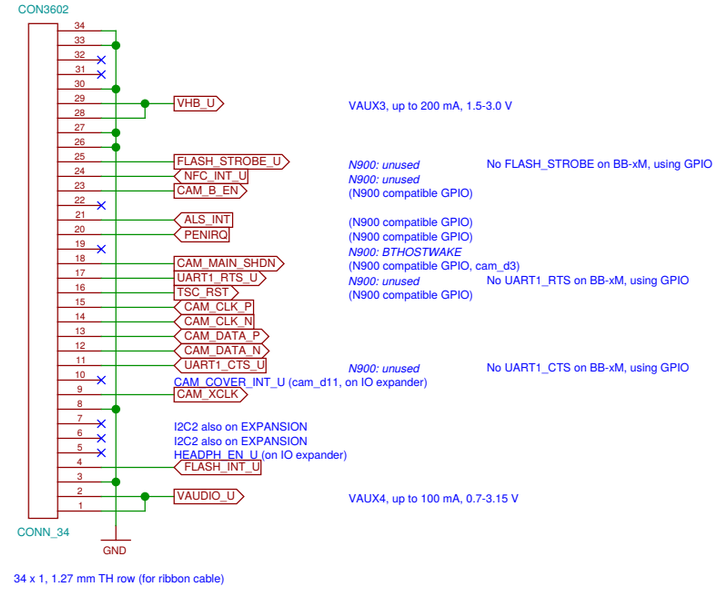
P4 (7.19)

Connect to BB-xM P4.3 (S-Video connector)

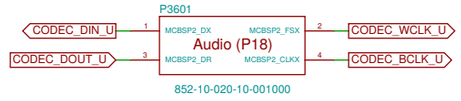
Sheet: /BB-XM Adapter (DISP)/ File: neo900_SS_35.sch		
Title: BB-XM Adapter (DISP)		
Size: A3	Date: 2016-11-13 05:49:13	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 35/37

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: 2016-11-13 06:02:32	Rev:
Plotted by eeshow 01a1b57+ 20161103-02:14Z		Id: 36/37

Molex Jumper cables to connect BB-XM-Adapter to Uppwer board

N3701
15015-0439

CPU

N3702
15015-0439

DISP

N3703
15015-0439

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: 2016-11-07 20:30:05 | Rev:

Plotted by eeshow 01a1b57+ 20161103-02:14Z | Id: 37/37