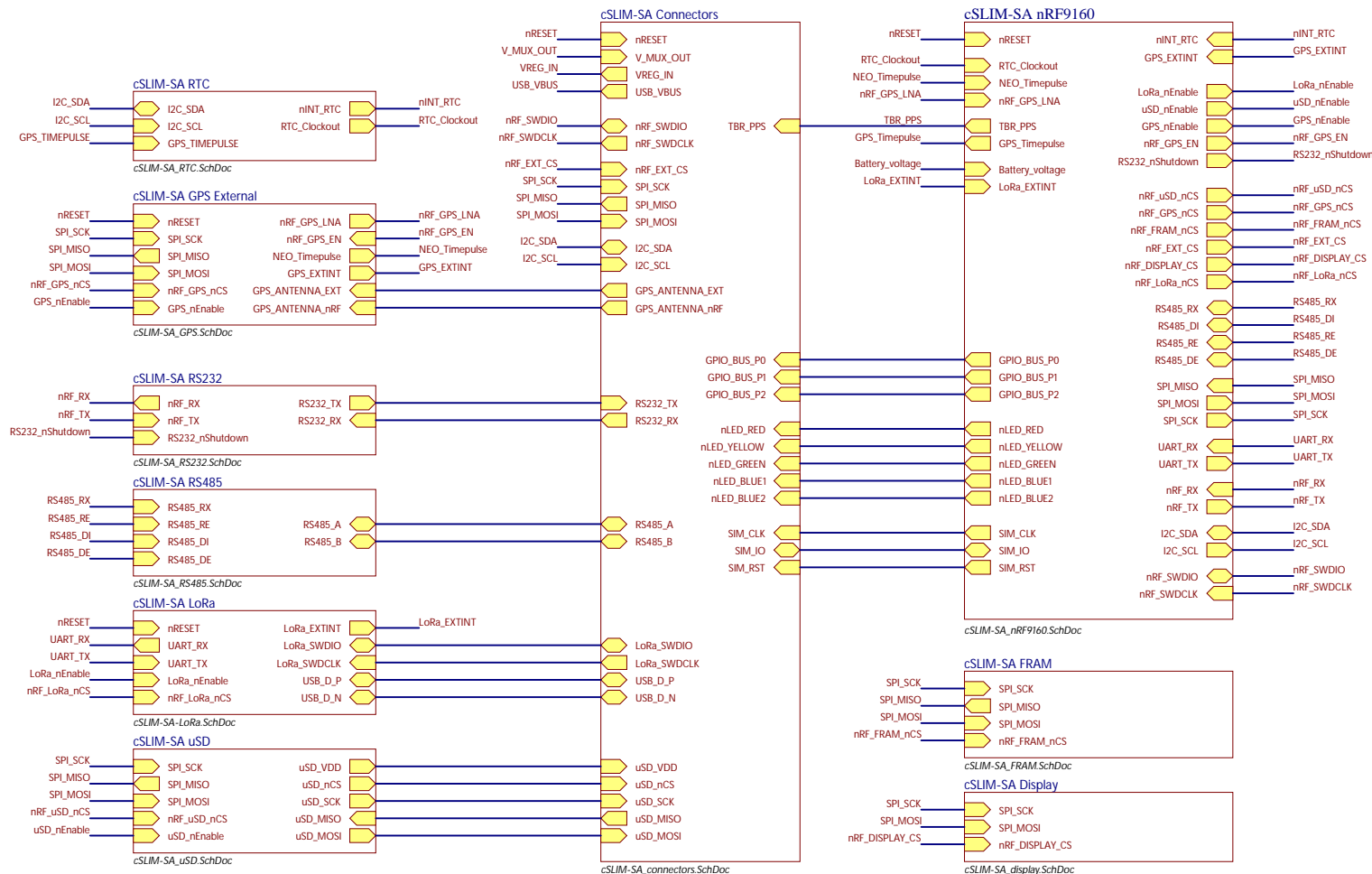
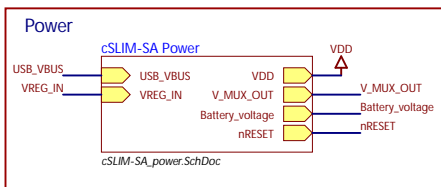


cSLIM-v1 (Stand Alone buoy-controller)

Project 2021 NTNU

Vetle Berg Abrahamsen

Sheet 1: Overview
Sheet 2: nRF9160
Sheet 3: LoRa Module
Sheet 4: RS485
Sheet 5: RS232
Sheet 6: Connectors
Sheet 7: Power
Sheet 8: uSD
Sheet 9: Display
Sheet 10: GNSS
Sheet 11: FRAM
Sheet 12: RTC

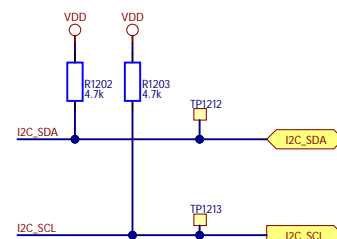
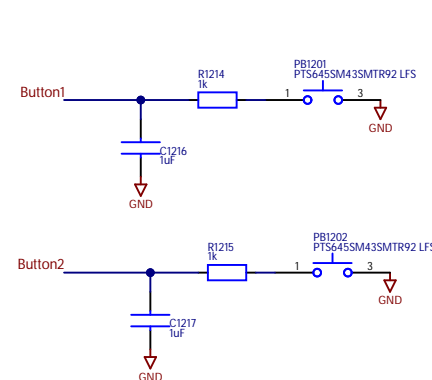
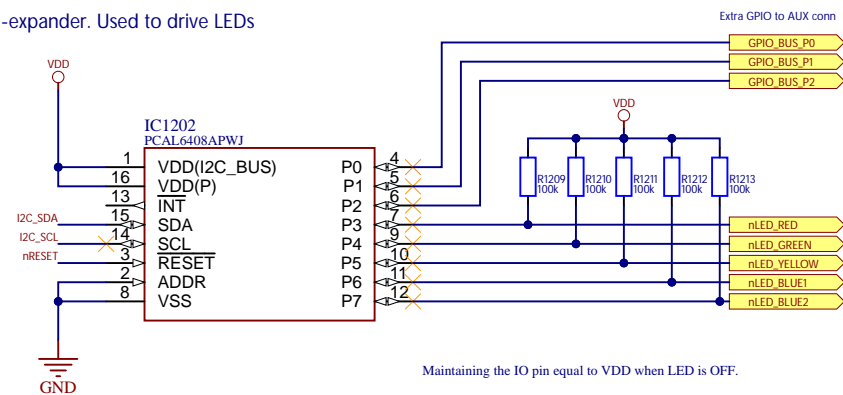
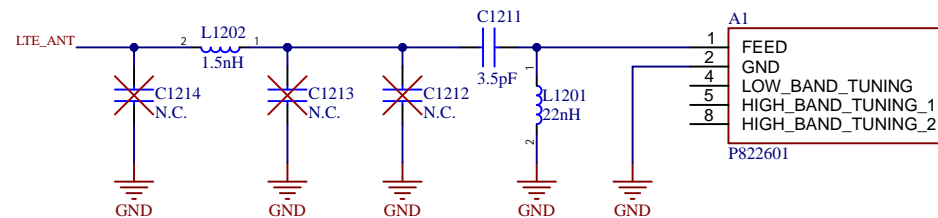
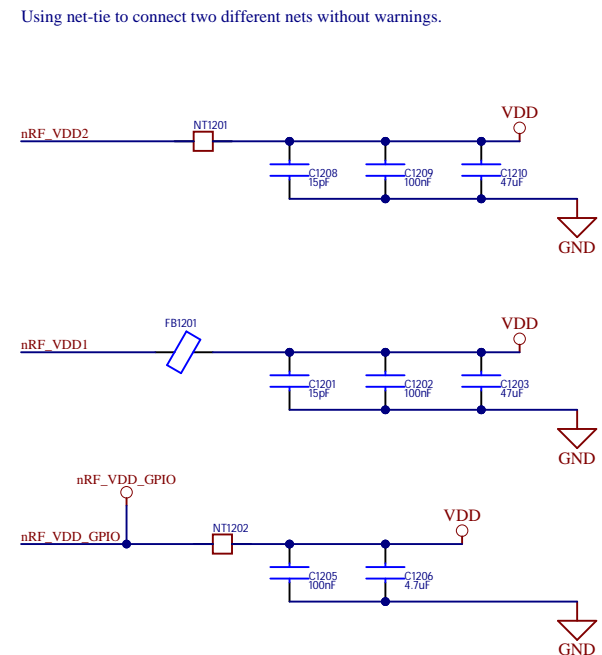
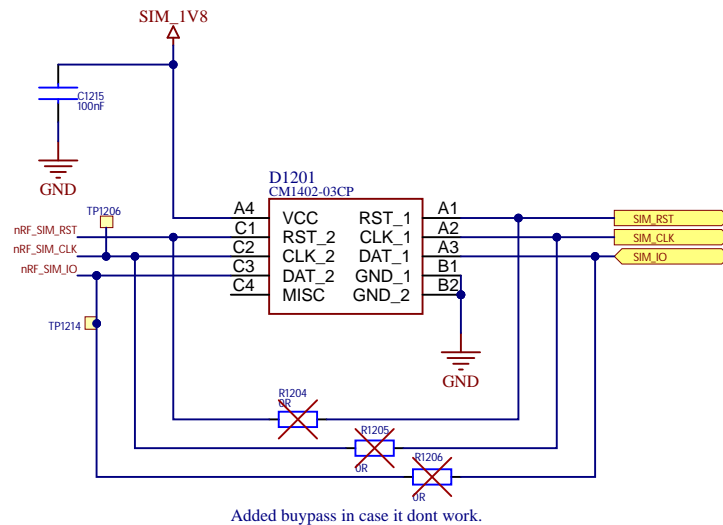
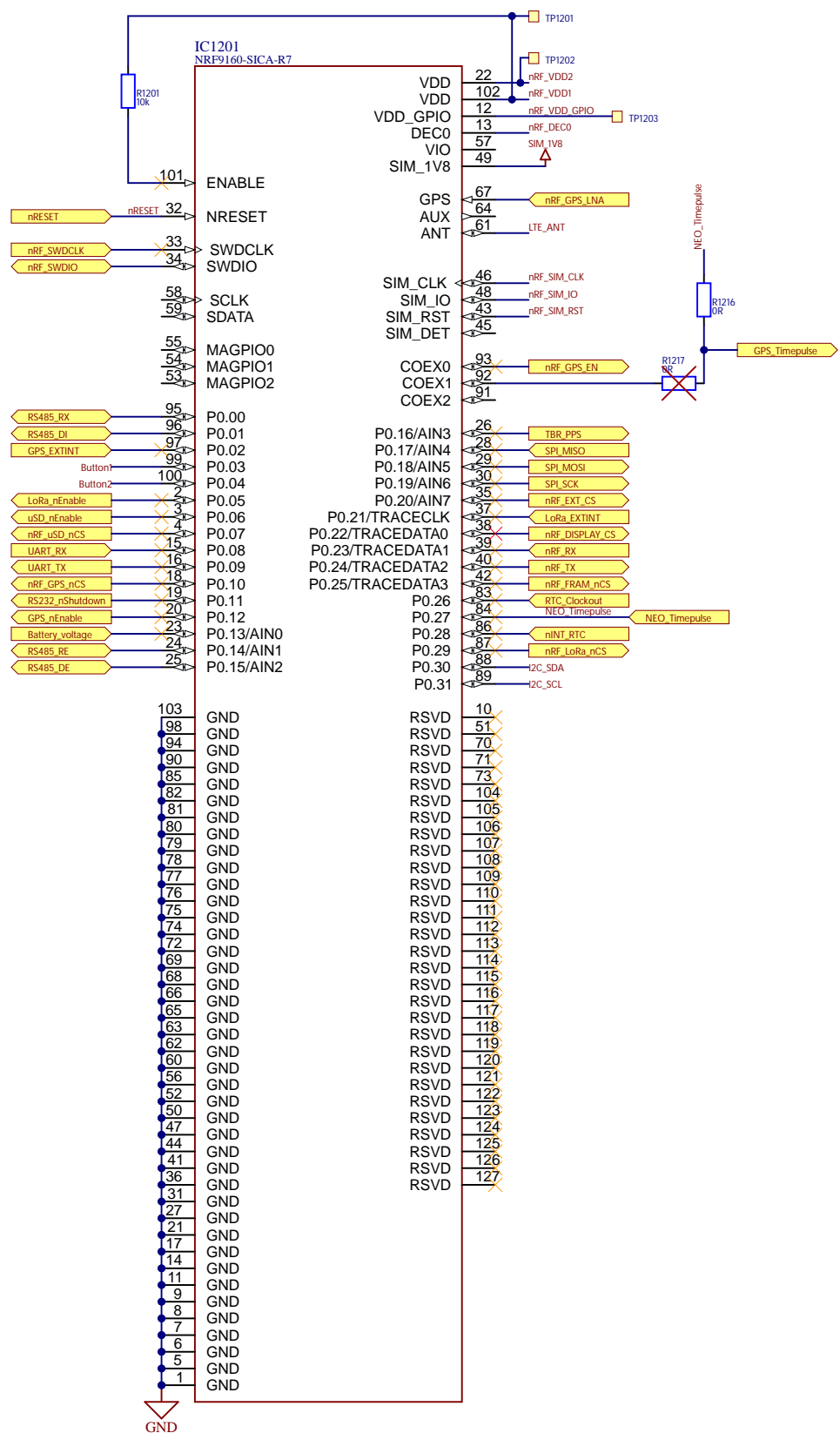


✗ This symbol is used on components that is normally not mounted on the PCB. However, the components will be found in the bill of materials. Hence, schematics should be used together with the bill of material when assembling the pcb.

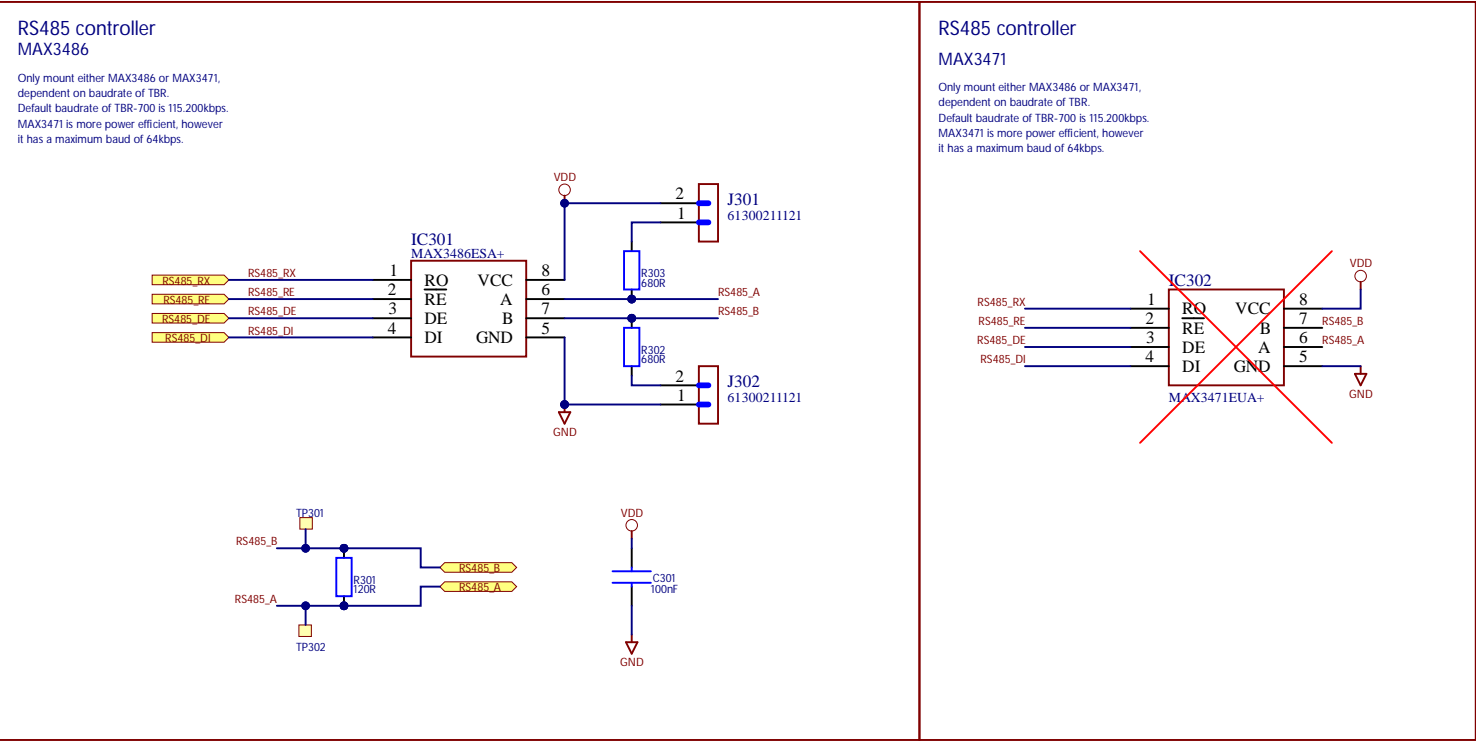
✗ The No ERC object is a design directive. This directive is placed on a node in the circuit to suppress harmless warnings and/or error violation conditions that are detected when the schematic project is compiled.

Based on framework for the cSLIM-shield by Eivind Holen Jølsgard
See Eyvinds Github for schematics and PCB on this link.
https://github.com/eivinhj/cSLIM_nRF9160-DK_shield

	Title cSLIM v1 - Overview		
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Date: 21.01.2022	Sheet 1 of 12		
File: cSLIM-SA.SchDoc	Drawn by: Vetle Berg Abrahamsen		

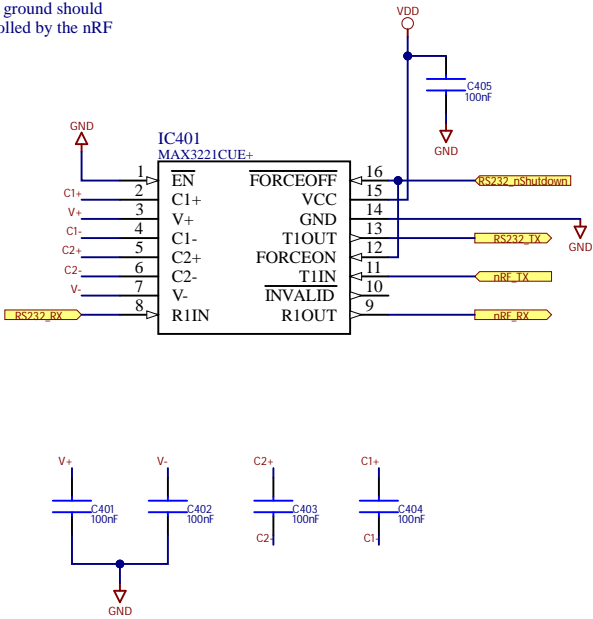


NOTE:
pin 45 (SIM_DET) not used and needs to be left floating.
External pull-up resistor on nRESET not allowed
When internal GPS is used, COEX1 provides 1PPS, only use either R1216 or R1217



RS232 controller

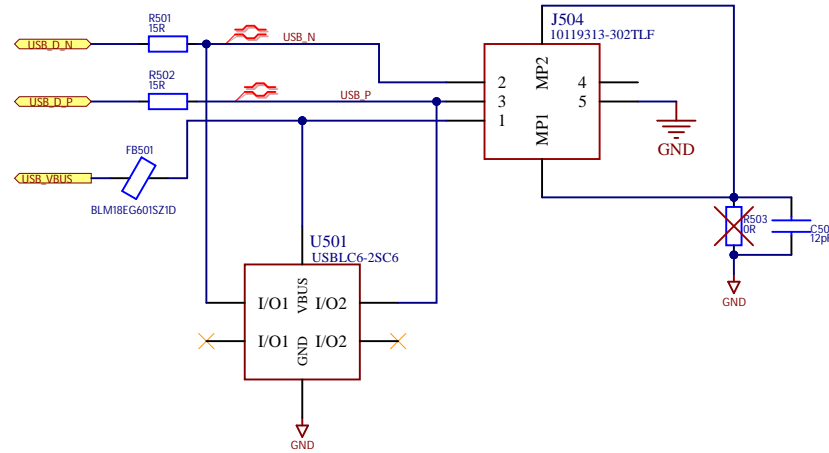
Note: The nEN pin connected to ground should be considered to be controlled by the nRF for future designs



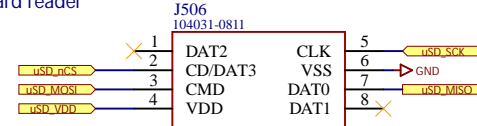
NTNU
cSLIM v1

Title cSLIM v1 - RS232		
Size A4	Number	Revision v1
Date: 21.01.2022		Sheet 5 of 12
File: cSLIM-SA_RS232.SchDoc		Drawn by: Vette Berg Abrahamsen

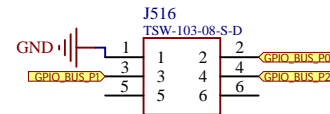
USB Connector



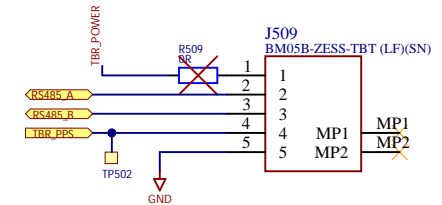
uSD Card reader



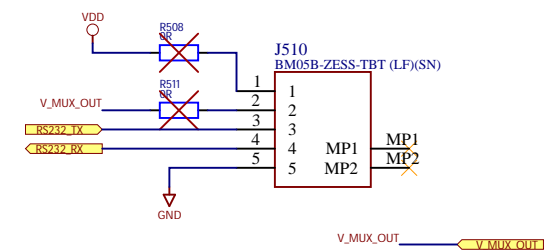
Auxiliary connector



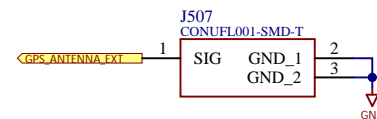
RS485 Connector



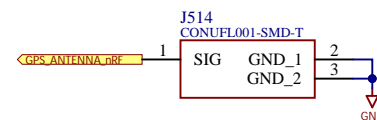
RS232 Connector



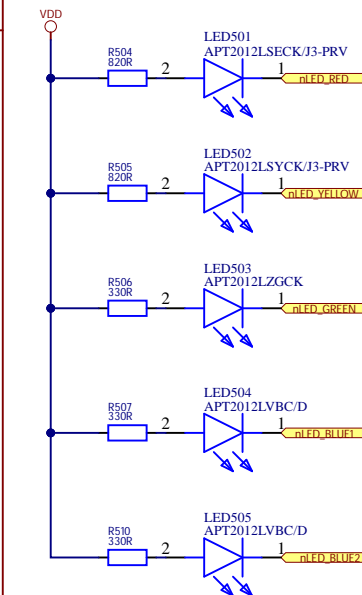
GPS Antenna Connector uBlox



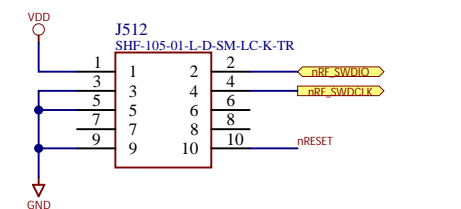
GPS Antenna Connector nRF



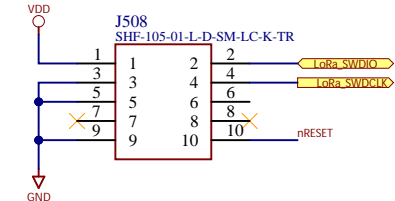
LEDs



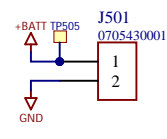
nRF9160 SWD Connector



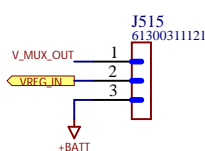
LoRa_module SWD Connector



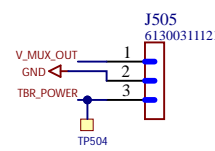
Battery Connector



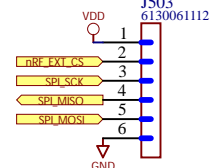
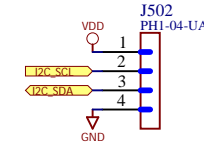
Regulator VIN jumper



External regulator



2.54mm headers for external I2C and SPI devices

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Title

cSLIM v1 - Connectors

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File: cSLIM-SA_connectors.SchDoc

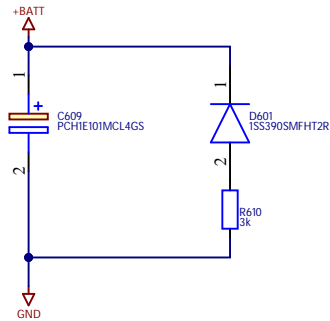
Drawn by: Vette Berg Abrahamsen

A

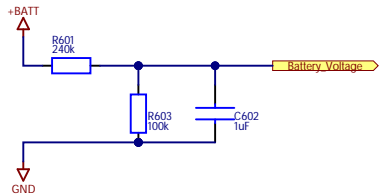
A

Polarization protection

Capacitor for battery supply and diode to protect circuitry of wrong polarization

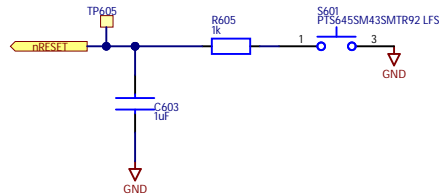


Battery measurement



nRESET signal

RESET button
The nRESET pin of the nRF9160 has a 13kOhm internal pull up

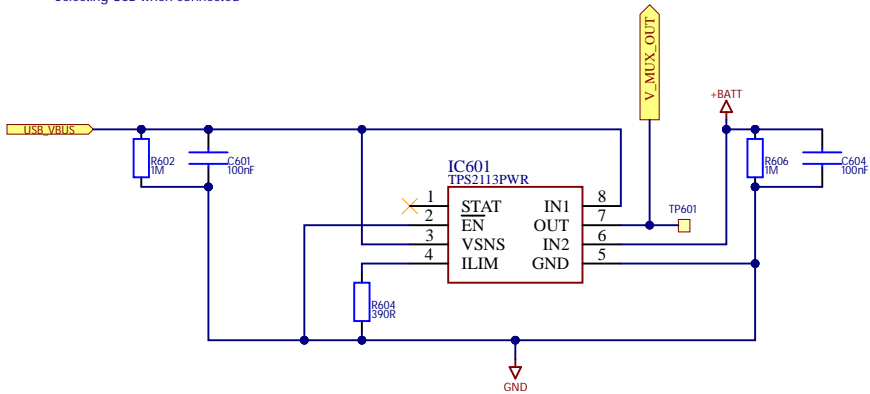


B

B

Power multiplexer

Selecting USB when connected



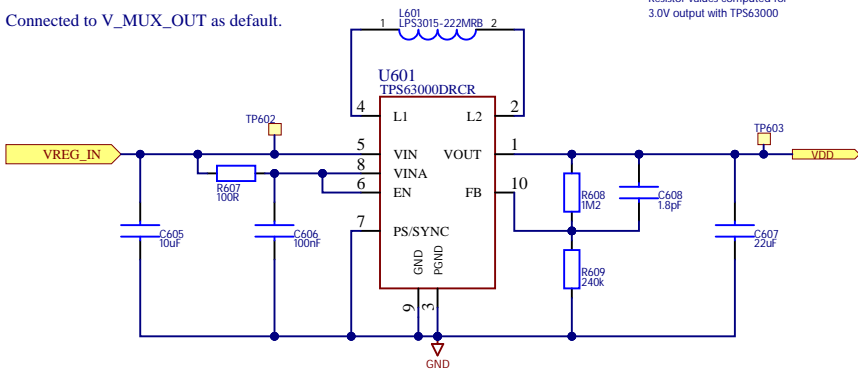
3.3V Buck-Boost regulator

VREG_IN selects either V_MUX_OUT or +BAT as VIN on Buck-boost regulator
Physical jumper J515. This is due to battery related problems where the battery do not get selected by voltage multiplexer, even when USB is not connected.

Connected to V_MUX_OUT as default.

R608 and R609 is not necessary when using TPS63001 as the output voltage is fixed to 3.3V. If another voltage is required use TPS63000 with appropriate resistor values

Resistor values computed for 3.0V output with TPS63000



D

D

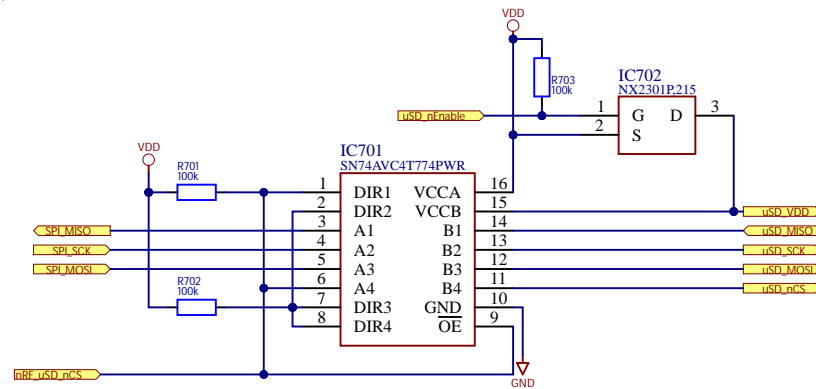


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cSLIM v1

Title cSLIM v1 - Power			
Size A4	Number		Revision v1
Date: 21.01.2022		Sheet 7 of 12	
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uSD LLC

Logic level converter with controlled output enable used to ensure tri-state on MOSI pins when uSD is turned off



NTNU
cSLIM v1

Title

cSLIM v1 - uSD

Size

ze

Number

Revision

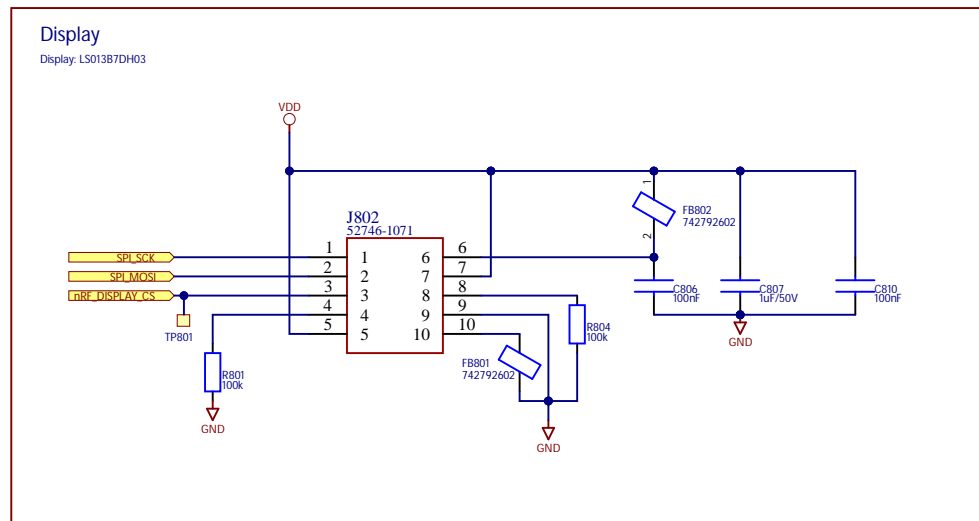
v1

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File: cSLIM-SA_uSD.SchDoc

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NTNU
cSLIM v1

	Title
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cSLIM v1 - Display

Size

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v1

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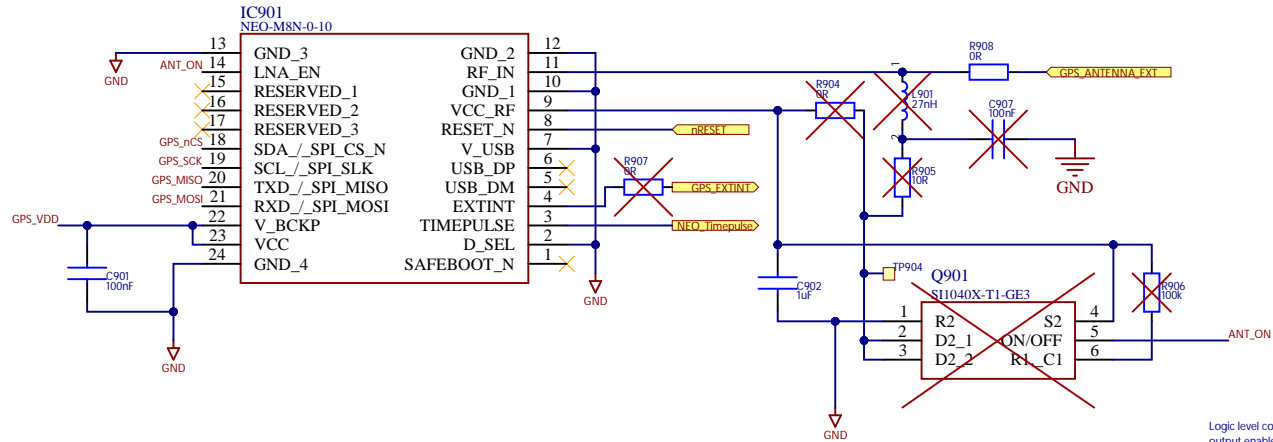
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Ublox GNSS receiver and LLC

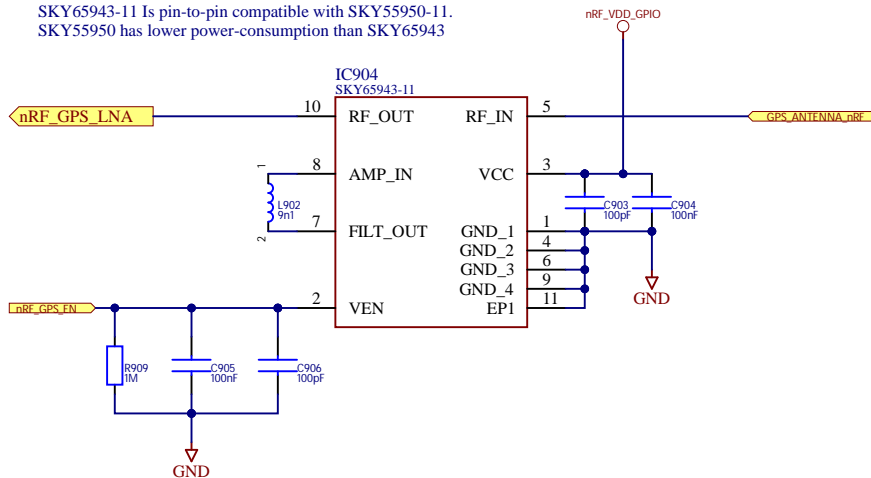
C901, L901, R905, and C902 is only needed with active antenna (Taoglass FXP.611 is passive).R904 can be used instead of C901, C902 and R906 for antenna always on.

Only mounting one of the two GNSS receivers is required. Both can be mounted.

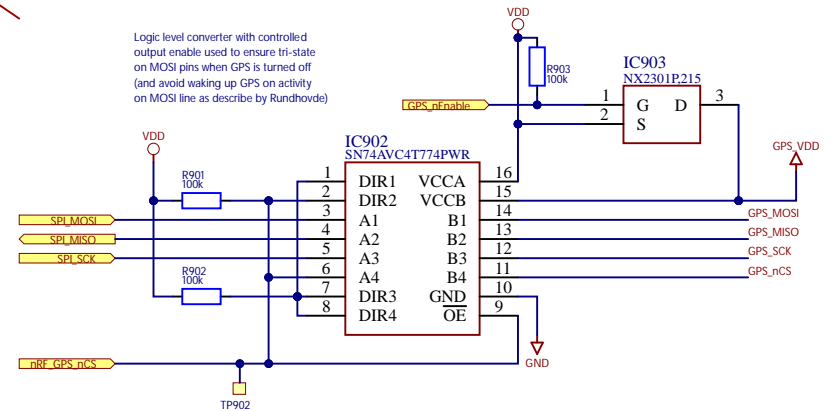


External LNA for internal GNSS receiver

SKY65943-11 Is pin-to-pin compatible with SKY55950-11. SKY55950 has lower power-consumption than SKY65943



Logic level converter with controlled output enable used to ensure tri-state on MOSI pins when GPS is turned off (and avoid waking up GPS on activity on MOSI line as describe by Rundhovde)



cSLIM v1

cSLIM v1 - GNSS

Size A4

Number

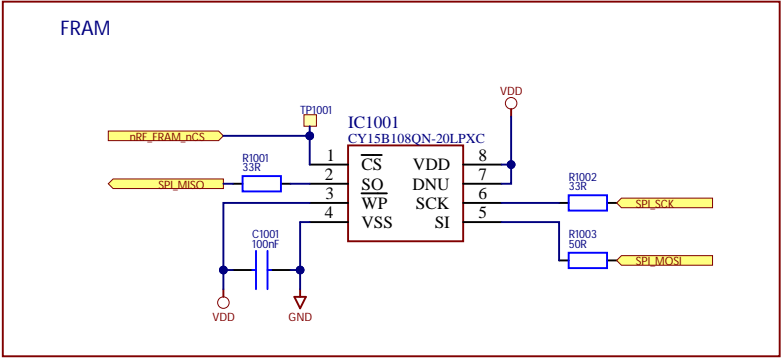
Revision v1


Date: 21.01.2022

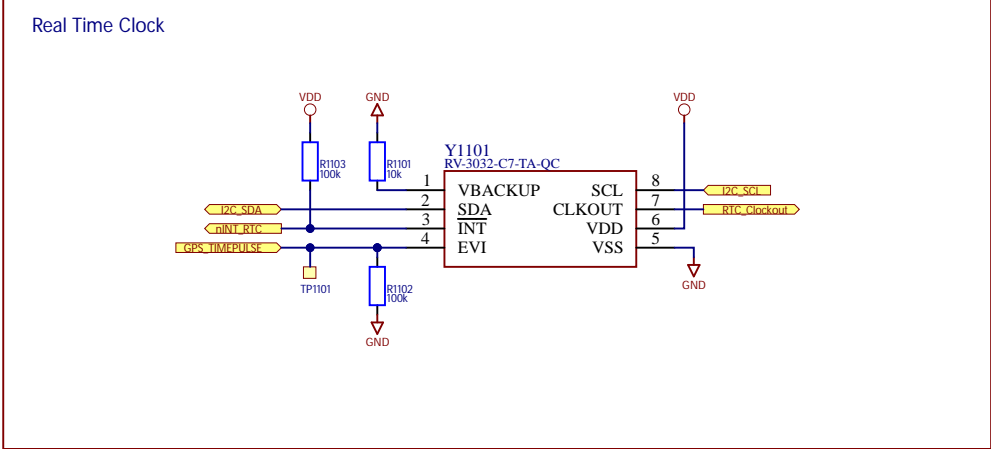
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File: cSLIM-SA_GPS.SchDoc

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 NTNU cSLIM v1	Title cSLIM v1 - RTC		
	Size A4	Number	Revision v1
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File: cSLIM-SA_RTC.SchDoc			Drawn by: Vette Berg Abrahamsen