

# SC60 R1.1&R2.1

## Reference Design

**Smart LTE Module Series**

Rev. SC60\_R1.1&R2.1\_Reference\_Design\_Rev.A

Date: 2018-02-13

Status: Released



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# About the Document

## History

Revision	Date	Author	Description
A	2018-02-13	Oscar LIU/ Danny WU	Initial

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# 1 Reference Design

## 1.1. Introduction

This document provides a reference design for Quectel SC60 module of R1.1 and R2.1 versions.

SC60 R1.1 and R2.1 versions are not available with PMI8952 power management IC.

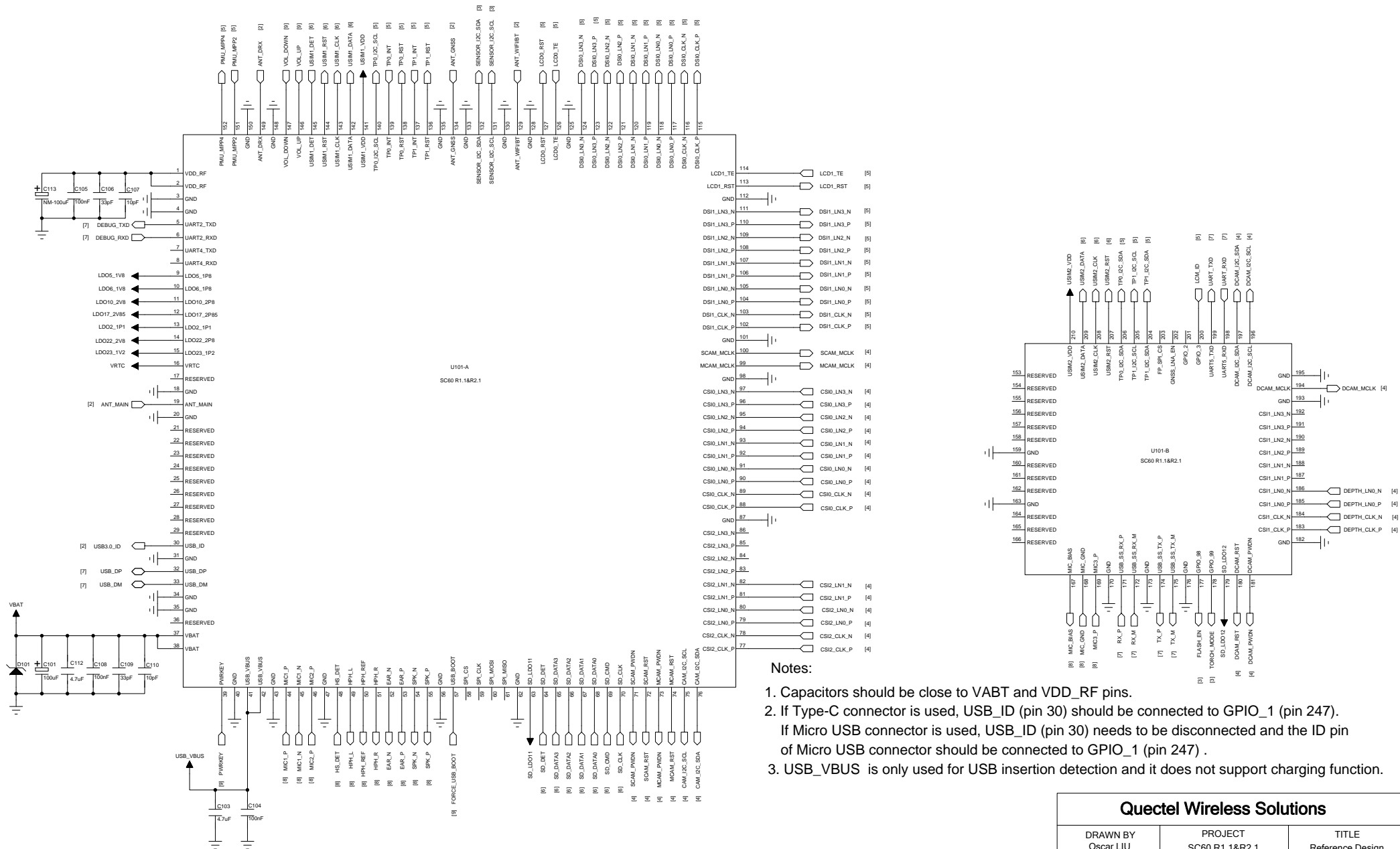
- USB\_VBUS is only used for USB insertion detection, and it does not support charging function.
- If Type-C connector is used, USB\_ID (pin 30) should be connected to GPIO\_1 (pin 247).
- If Micro USB connector is used, USB\_ID (pin 30) should be disconnected, and the ID pin of Micro USB connector should be connected to GPIO\_1 (pin 247).

For more information, please refer to *Quectel\_SC60\_R1.1&R2.1\_Hardware\_Design*.

## 1.2. Schematics

The schematics illustrated in the following pages are provided for your reference only.

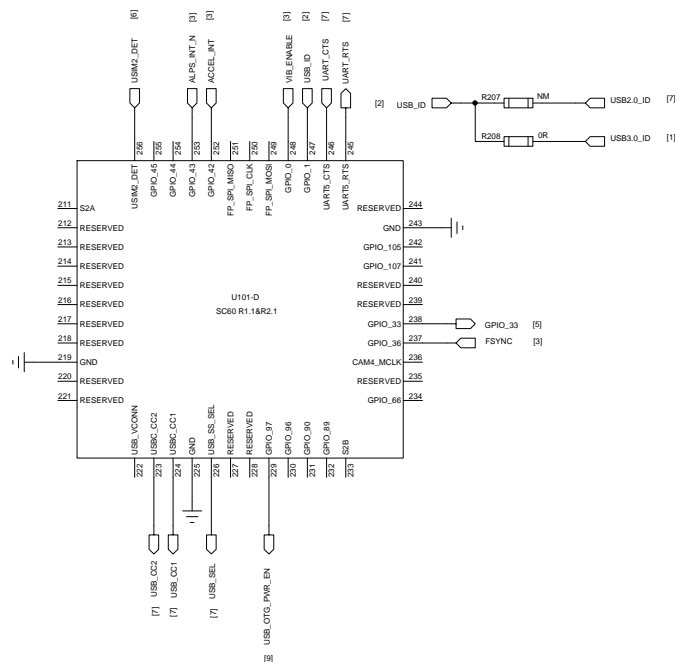
# Module Interface 1



## Quectel Wireless Solutions

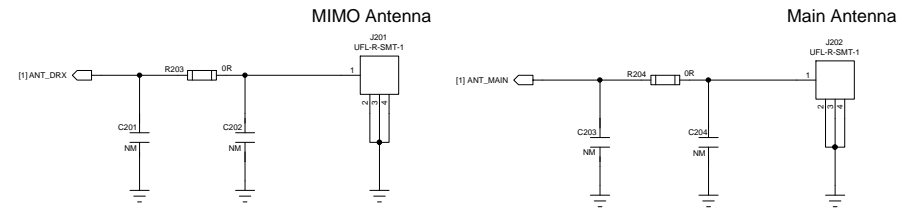
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CHECKED BY Danny WU	SIZE A2	VER A
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# Module Interface 2 and Antenna Interfaces

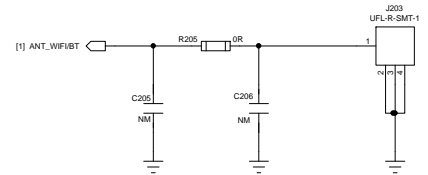


- Notes:
1. Keep all RESERVED and unused pins unconnected.
  2. All GND pins should be connected to ground.

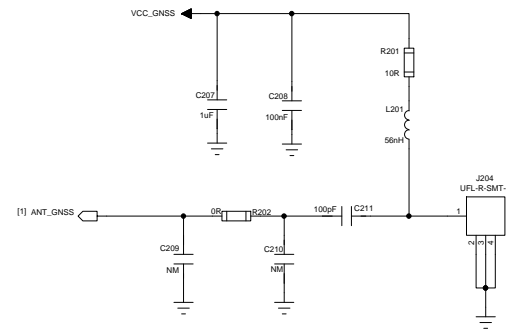
## UMTS/LTE Antennas



## Wi-Fi/BT Antenna



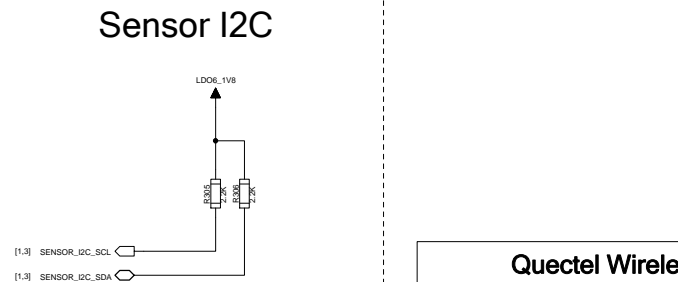
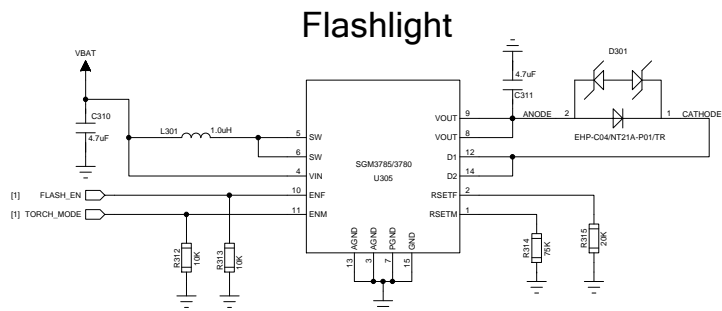
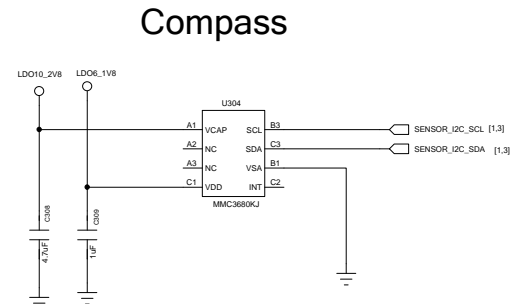
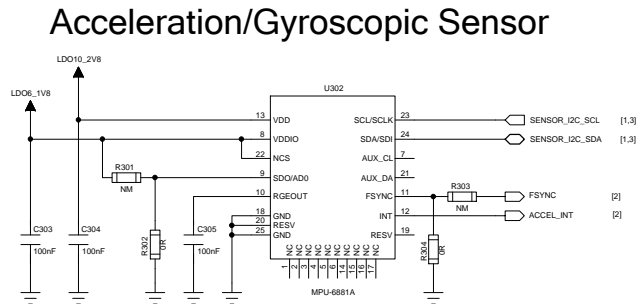
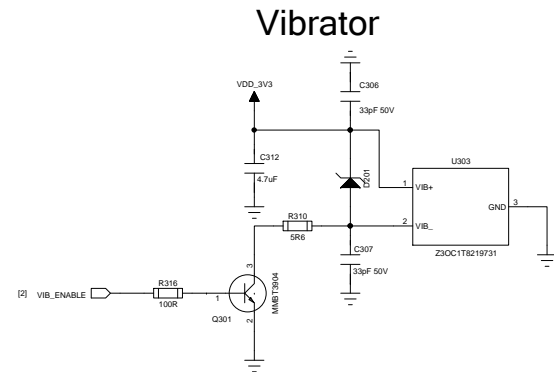
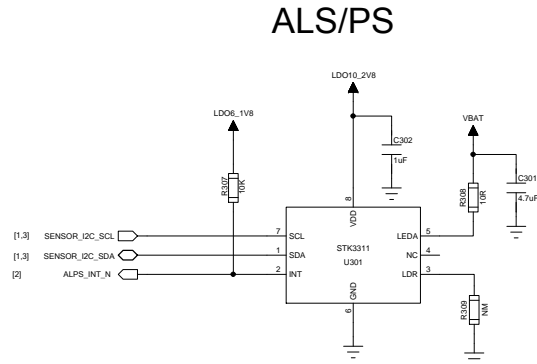
## GNSS Antenna



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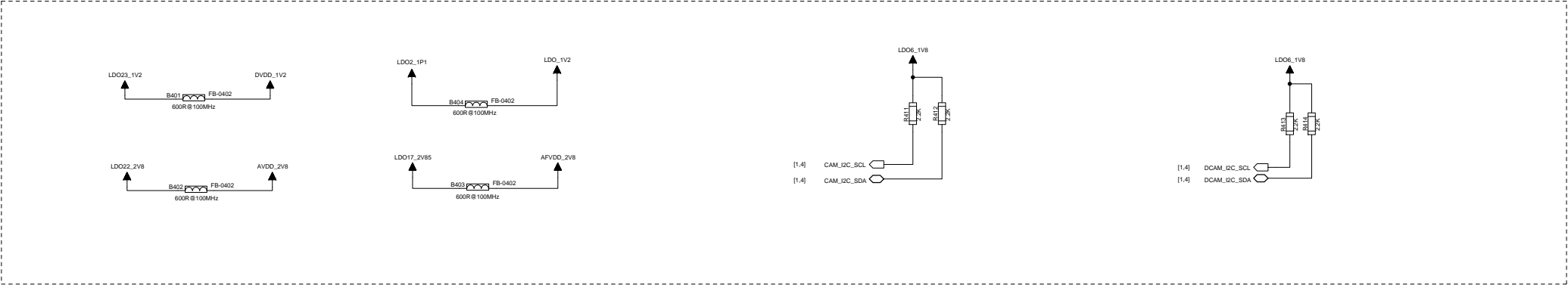
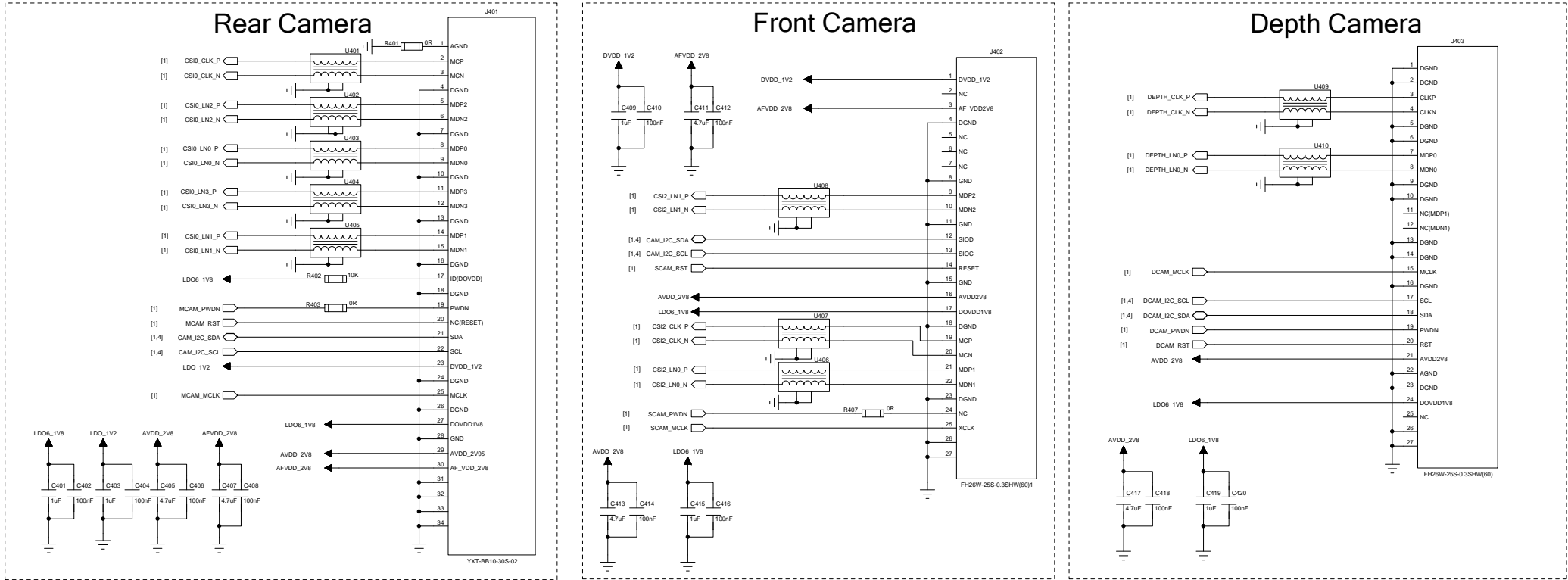
# Sensor Interfaces



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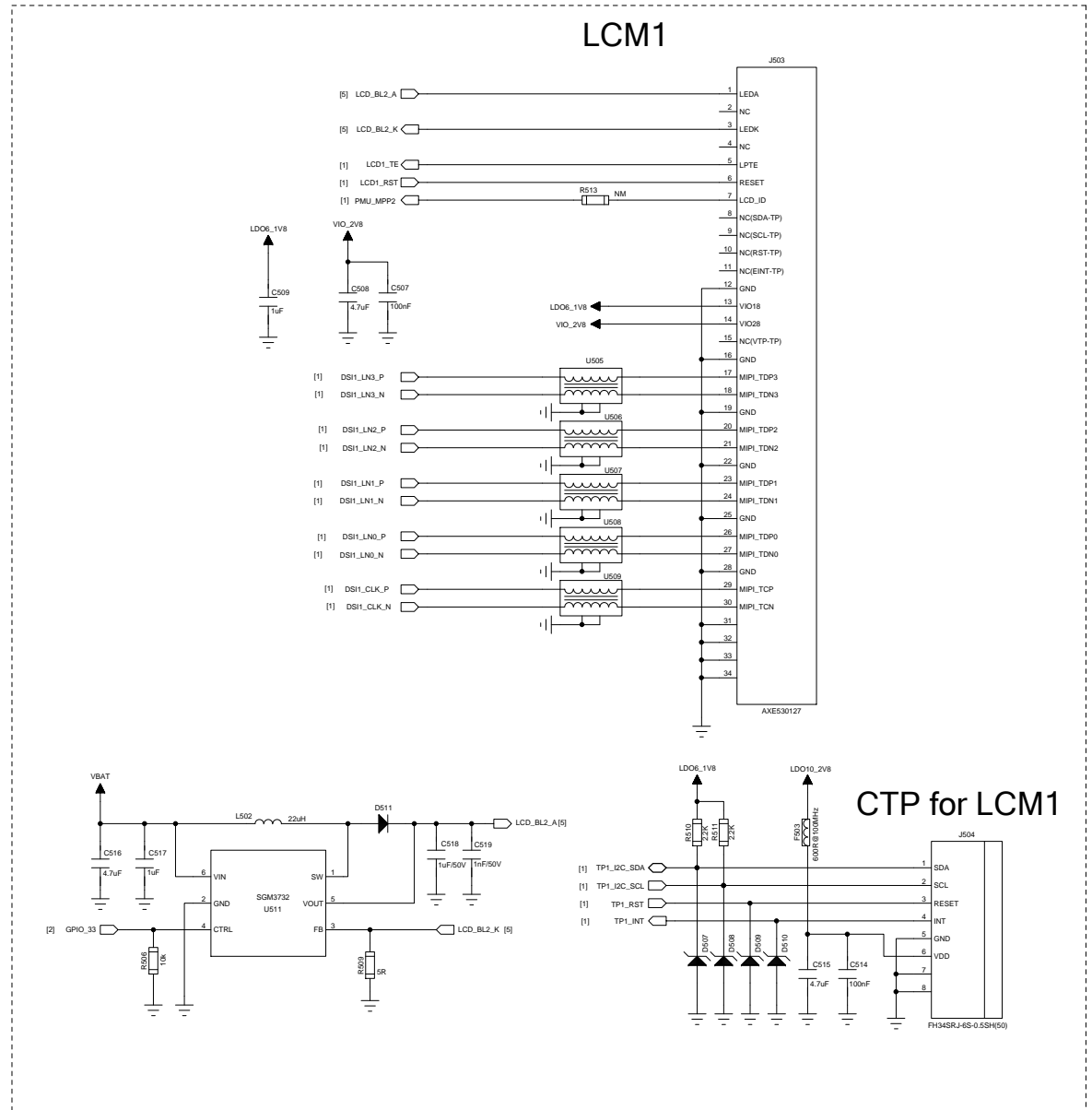
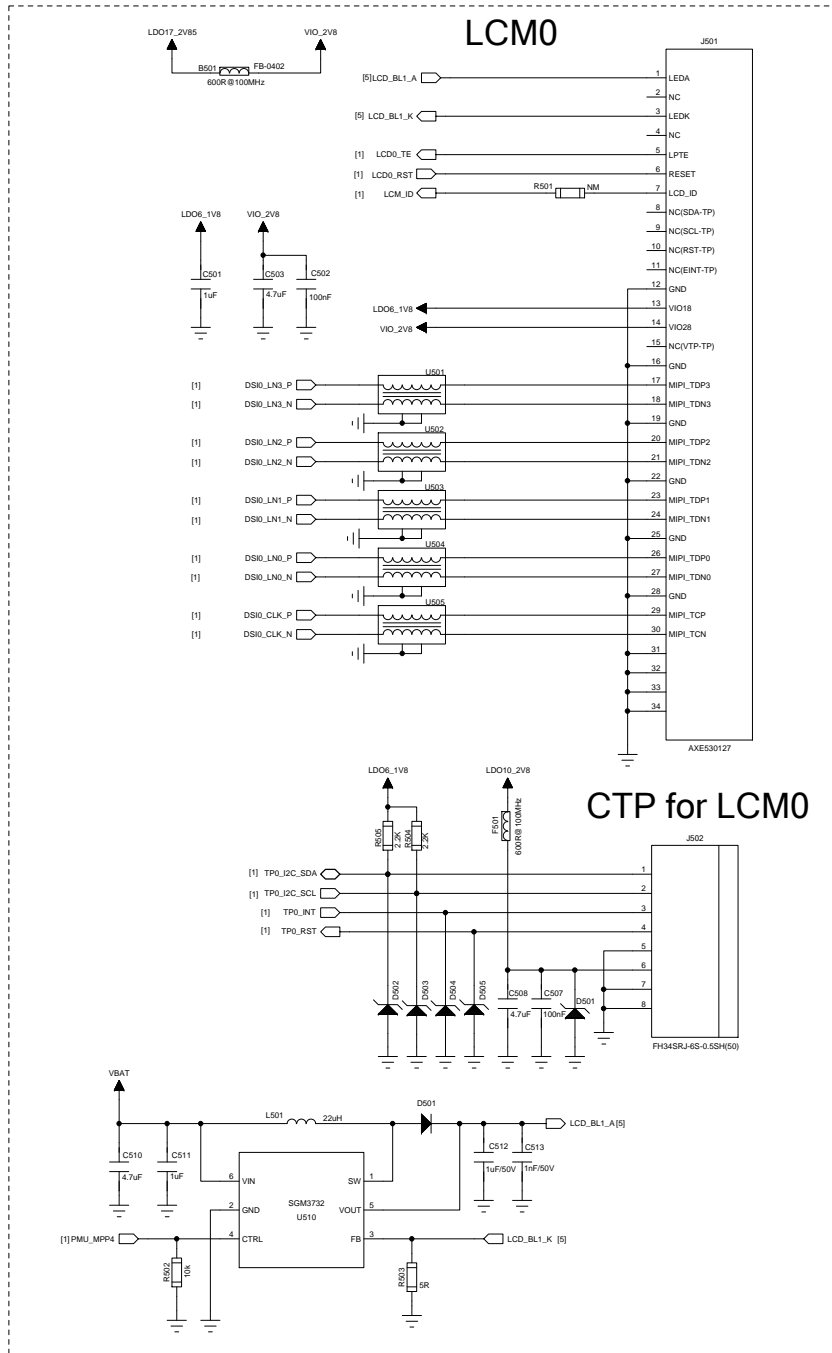


Camera Interfaces



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# LCM and CTP Interfaces

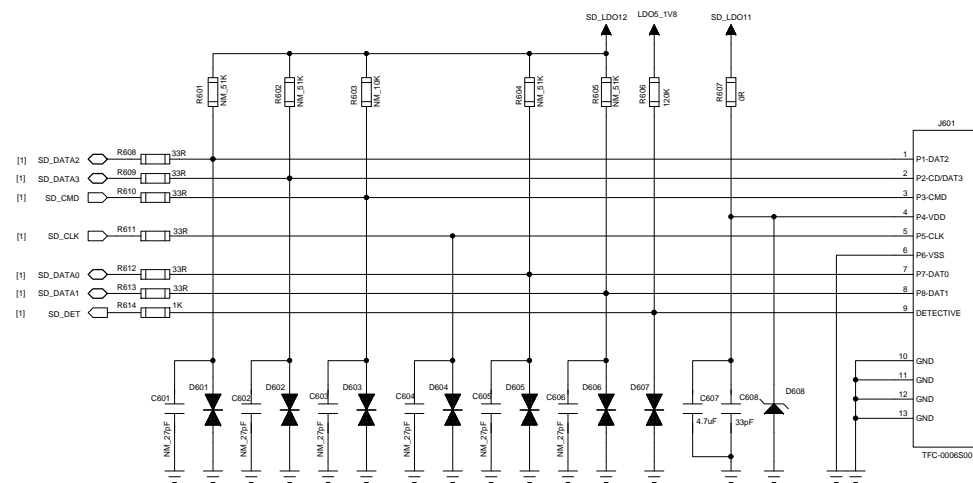


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# (U)SIM and SD Card Interfaces

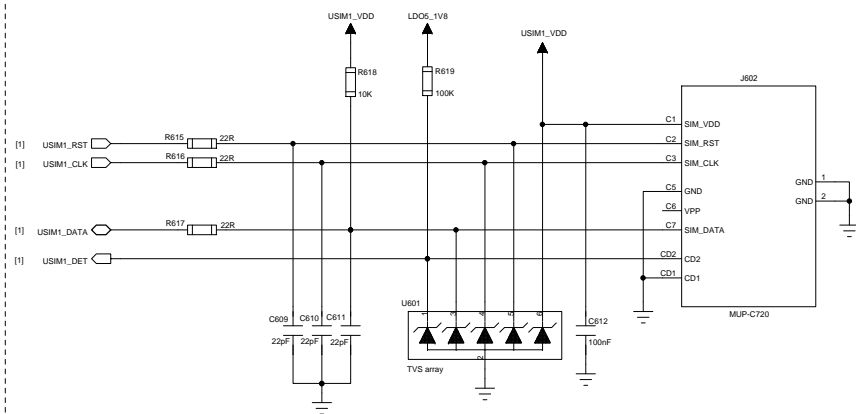
## SD Card



Note:

R608~R613 are applied to suppress the EMI spurious transmission and enhance the ESD protection.

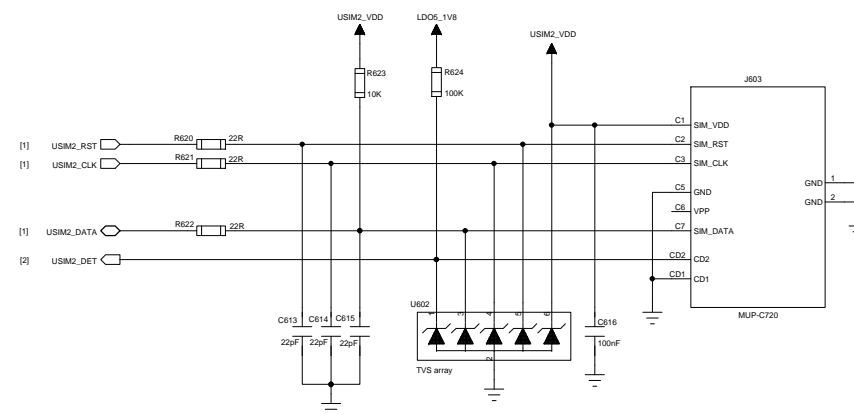
## Main (U)SIM



Note:

R615~R617 are applied to suppress the EMI spurious transmission and enhance the ESD protection.

## Sub (U)SIM



Note:

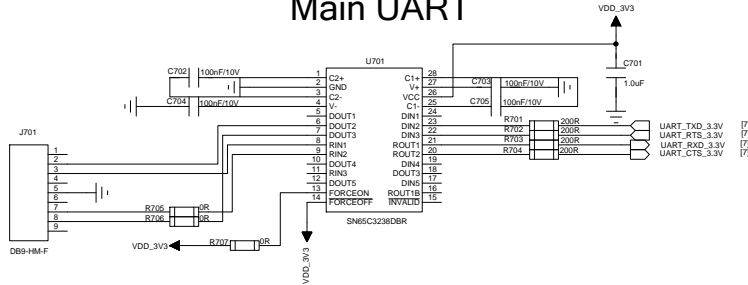
R620~R622 are applied to suppress the EMI spurious transmission and enhance the ESD protection.

## Quectel Wireless Solutions

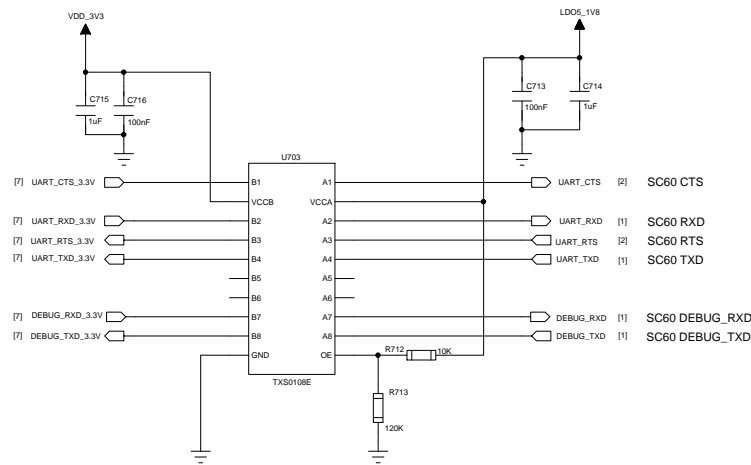
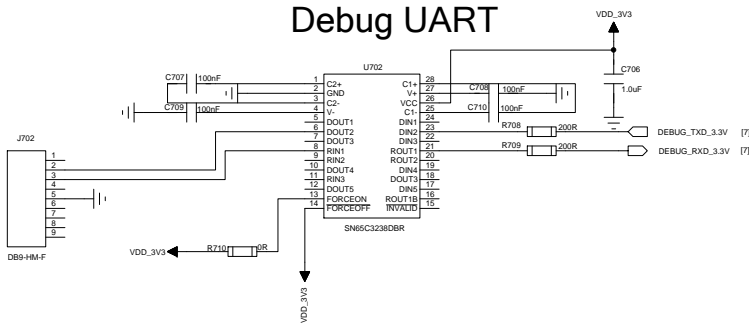
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# USB and UART Interfaces

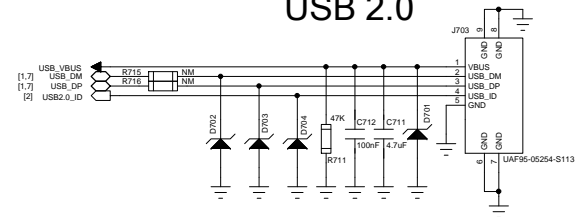
## Main UART



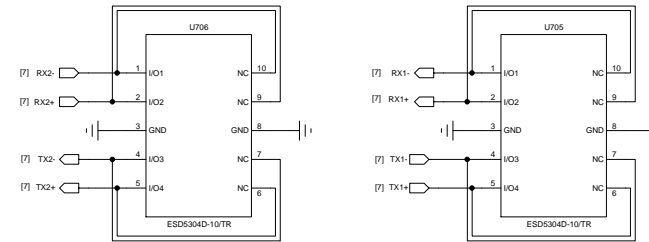
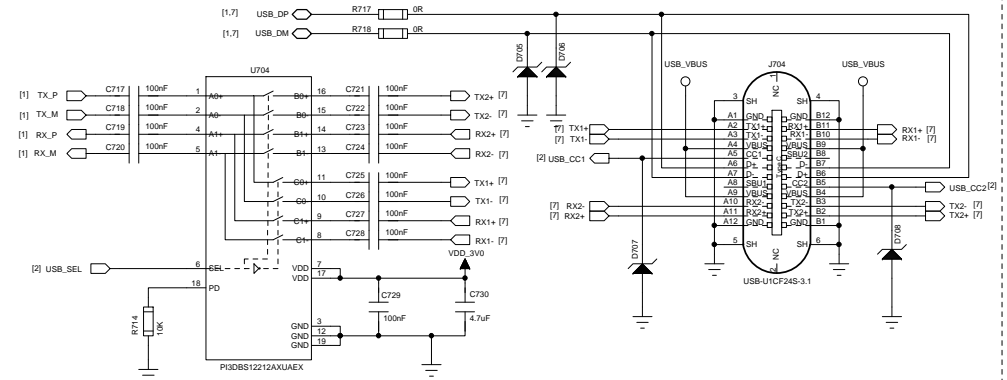
## Debug UART



## USB 2.0



## USB 3.0



### Notes:

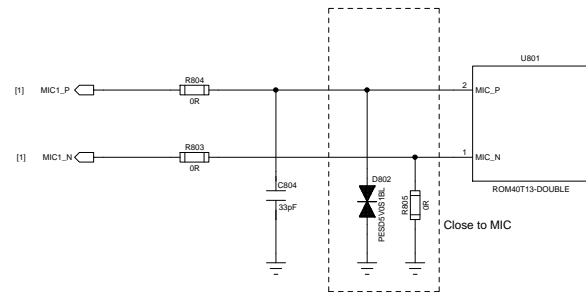
1. If USB 2.0 is supported, R715/R716=0R, R717/R718=NM.
2. If USB 3.0 is supported, R715/R716=NM, R717/R718=0R.
3. It is recommended to add TVS to USB interface.
4. The junction capacitance value of TVS on USB\_DP/DM lines should be less than 2pF.
5. The junction capacitance value of TVS on USB\_TX/RX lines should be less than 0.5pF.

### Quectel Wireless Solutions

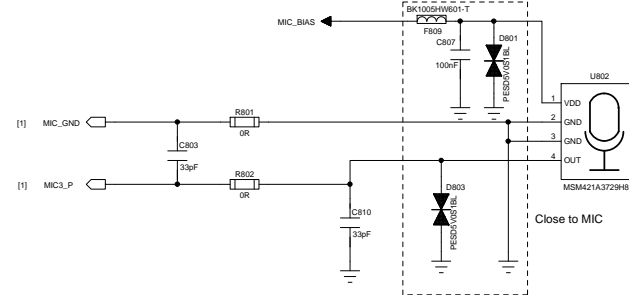
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# Audio Interfaces

## ECM-type Microphone



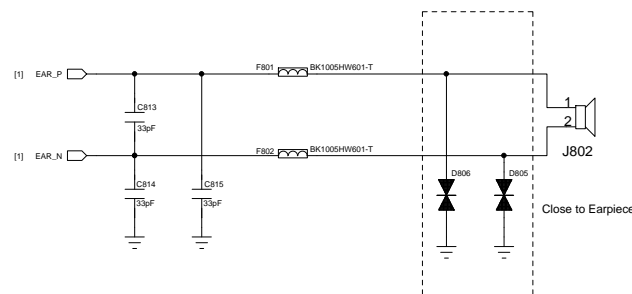
## MEMS-type Microphone



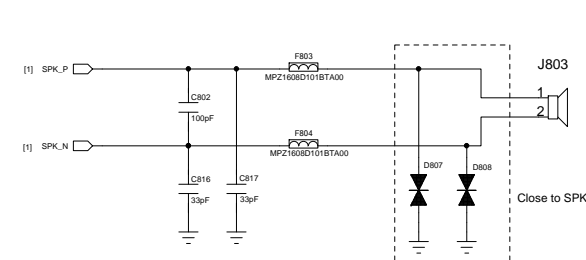
### Notes:

1. The microphone reference design is just for verify that both types of microphones are available.
2. For customer's design, MEMS-type Microphone is recommended.
3. For more details, please refer to *Quectel\_SC60\_R1.1&R2.1\_Hardware\_Design*.

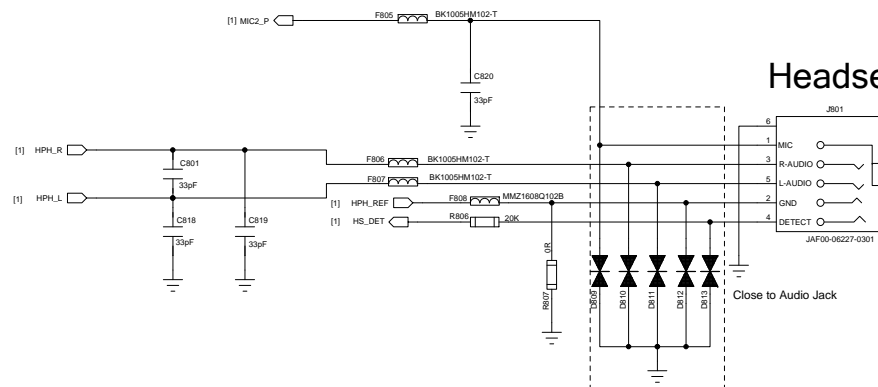
## Earpiece



## Loudspeaker



## Headset



### Notes:

TVS diodes for speaker and earpiece interface pins:

1. The maximum breakdown voltage should be less than 6V.
2. The maximum clamping voltage should be less than 12.5V.

TVS diodes for microphones and Headset interface pins:

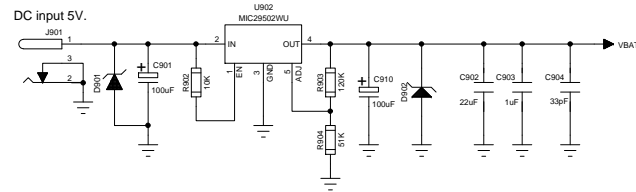
1. The maximum breakdown voltage should be less than 3.6V.
2. The maximum clamping voltage should be less than 6V.
3. Headset interface has a negative swing and requires a bidirectional TVS.

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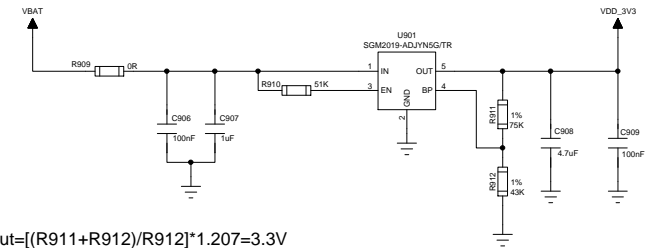
# Power Supply

## DC Power Supply



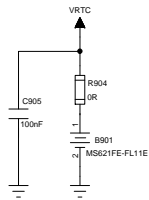
$$V_{out} = (R903/R904 + 1) * 1.24 = 4.15V$$

## Power for 3V3

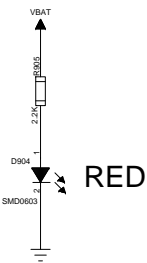


$$V_{out} = [(R911 + R912)/R912] * 1.207 = 3.3V$$

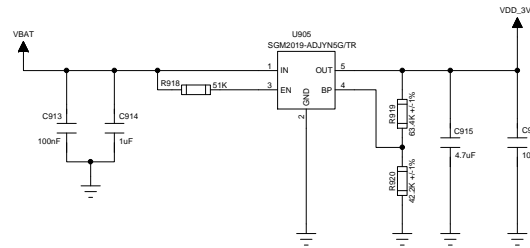
## Backup Battery



## Indicator Lights



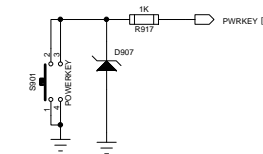
## Power Supply For USB Switch



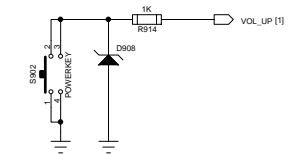
$$V_{out} = [(R919 + R920)/R920] * 1.207 = 3.0V$$

## Keypad

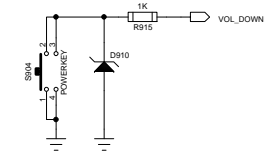
### PWRKEY



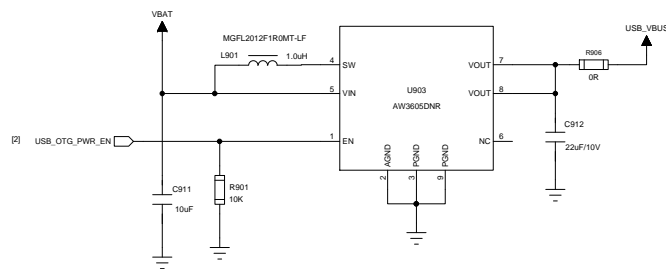
### VOL\_UP



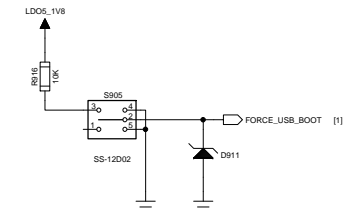
### VOL\_DOWN



## Power Supply for OTG



## FORCE\_USB\_BOOT



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