

EP06 Reference Design

LTE-A Module Series

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Our aim is to provide customers with timely and comprehensive service. For any assistance, please contact our company headquarters:

Quectel Wireless Solutions Co., Ltd.

7th Floor, Hongye Building, No.1801 Hongmei Road, Xuhui District, Shanghai 200233, China

Tel: +86 21 5108 6236

Email: info@quectel.com

Or our local office. For more information, please visit:

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About the Document

History

Revision	Date	Author	Description
1.0	2018-12-29	Ewent LU	Initial

Contents

About the Document.....	2
Contents.....	3
1 Reference Design.....	4
1.1. Introduction.....	4
1.2. Schematics.....	4

1 Reference Design

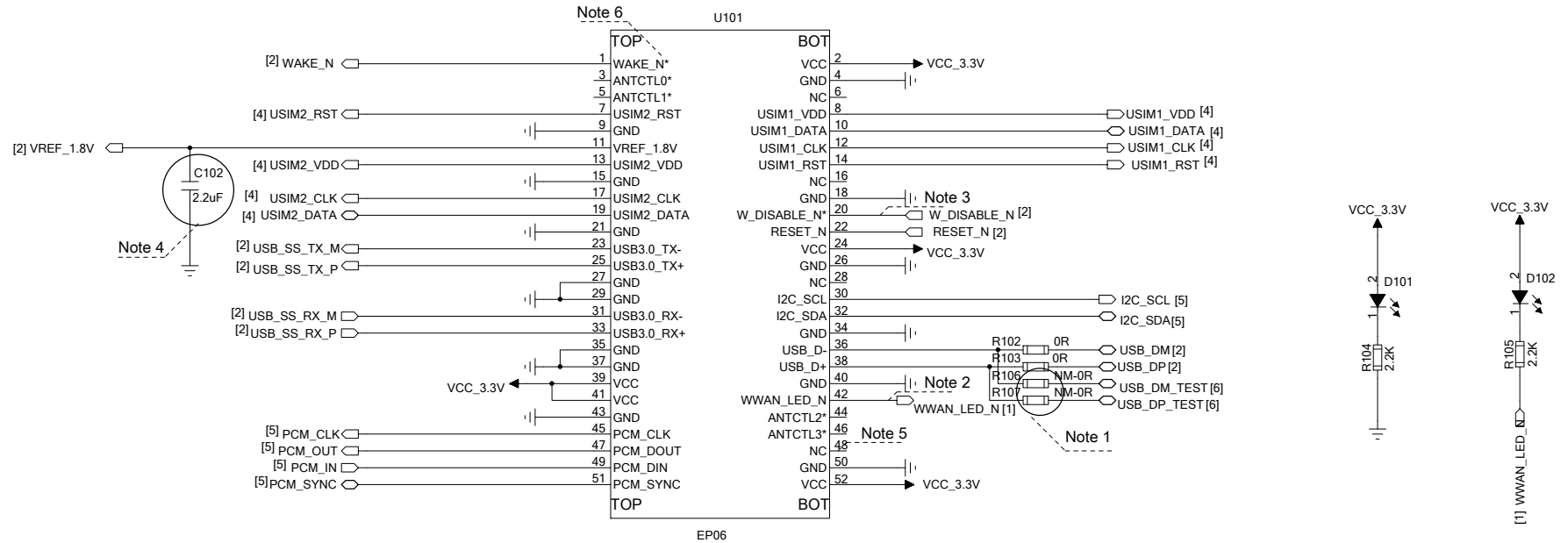
1.1. Introduction

This document provides the reference design for Quectel EP06 module.

1.2. Schematics

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

Module Interfaces



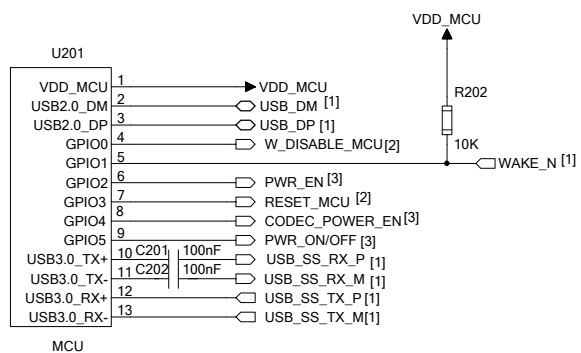
Notes:

1. It is recommended to reserve the test points for upgrading the firmware over USB interface and minimize the stub length of USB test signals.
2. The WWAN_LED_N signal of EP06 is used to indicate the network status of the module, and its maximum sink current is 40mA.
When the pin is at low level, the module has registered on network. When it is at high impedance, there will be no network coverage or the module will not register on network.
3. The W_DISABLE_N* signal is used to disable or enable RF function (not include GNSS).
4. The VREF_1.8V can supply 1.8V voltage for external circuit. If unused, please keep this pin open and C102 unmounted.
5. Keep all NC and unused pins unconnected.
6. "*" means under development.

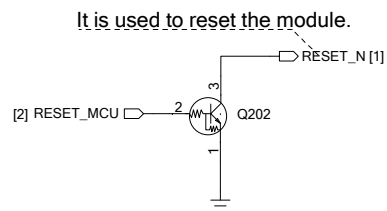
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SHEET	1 OF 6	DATE 2018/12/29

MCU and Other Interfaces

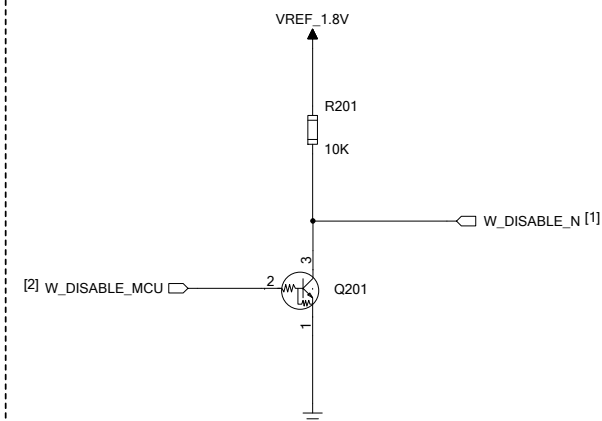
MCU Interface



RESET_N Interface



W_DISABLE_N Interface



Notes:

1. U201 represents customers' MCU.
2. EP06 provides one integrated USB interface which complies with the USB 3.0/2.0 specifications, and supports super speed on USB 3.0, high speed and full speed modes on USB 2.0.
3. Keep C201 and C202 to the MCU as close as possible.
4. The differential impedance of USB 2.0 and USB 3.0 signal lines needs to be controlled as 90 ohm.
5. If USB connector is used, please keep the ESD protection components to it as close as possible.

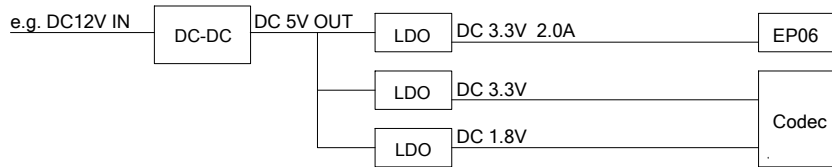
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CHECKED BY Bruce YU	SIZE A2	VER 1.0
SHEET	2 OF 6	DATE 2018/12/29

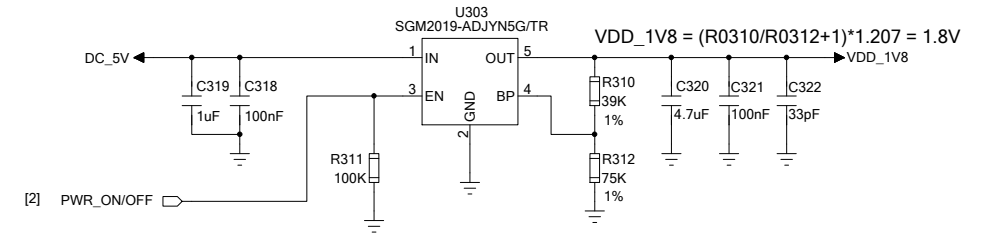
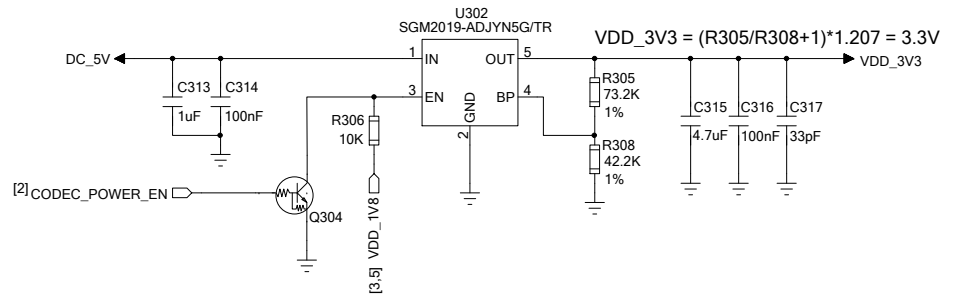
Power Supply Design

DC-DC Application

When the input voltage is above 7V, a DC-DC converter should be used to convert the high input voltage to 5V output, and then the LDOs will generate 3.3V and 1.8V typical voltages.

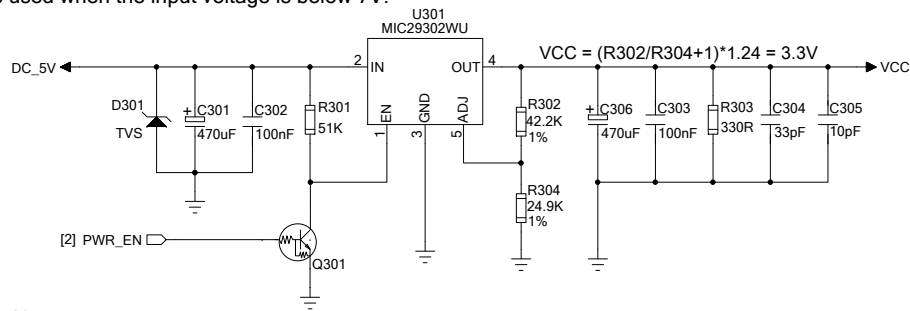


Supply Power for PCM Codec



LDO Application

It is used when the input voltage is below 7V.



Notes:

1. The load current of MIC29302WU is recommended to be greater than 10mA.
2. The power supply must be able to provide sufficient current up to 2.0A or more.
3. The recommended operating voltage of VCC is 3.1V~4.4V.

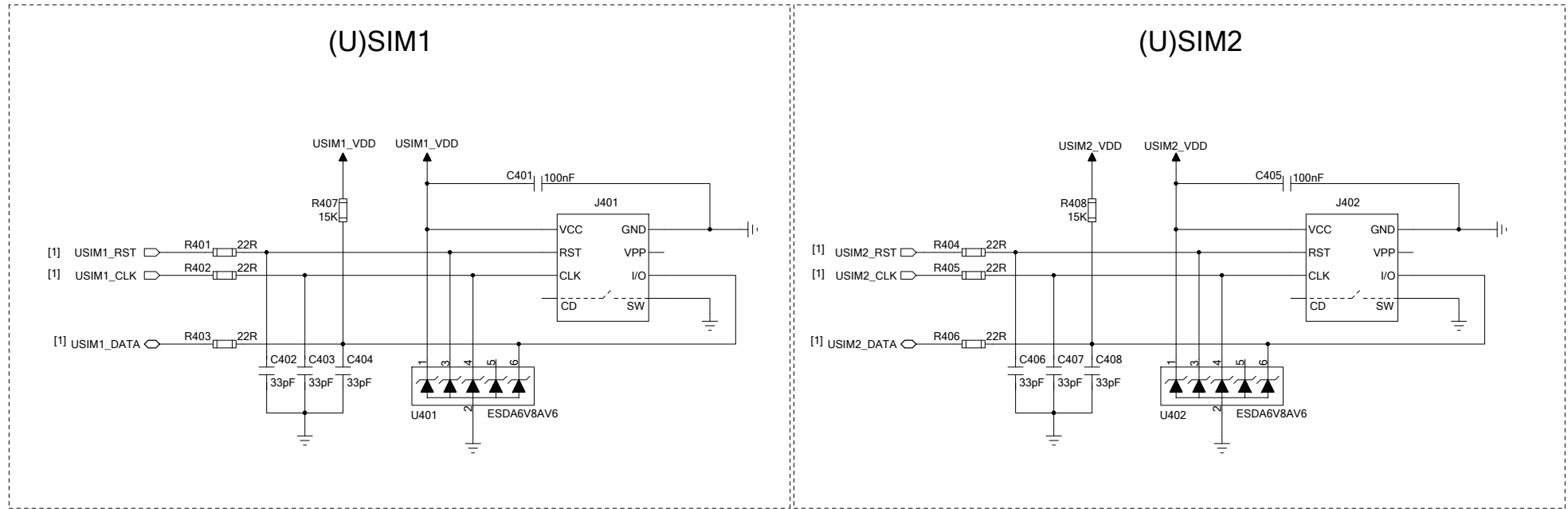
Note:

CODEC_POWER_EN must be at low level in order to ensure stable output voltage of VDD_3V3. When it is at high level, the power supply of VDD_3V3 will be cut off.

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CHECKED BY Bruce YU	SIZE A2	VER 1.0
SHEET	3 OF 6	DATE 2018/12/29

(U)SIM Interface Design



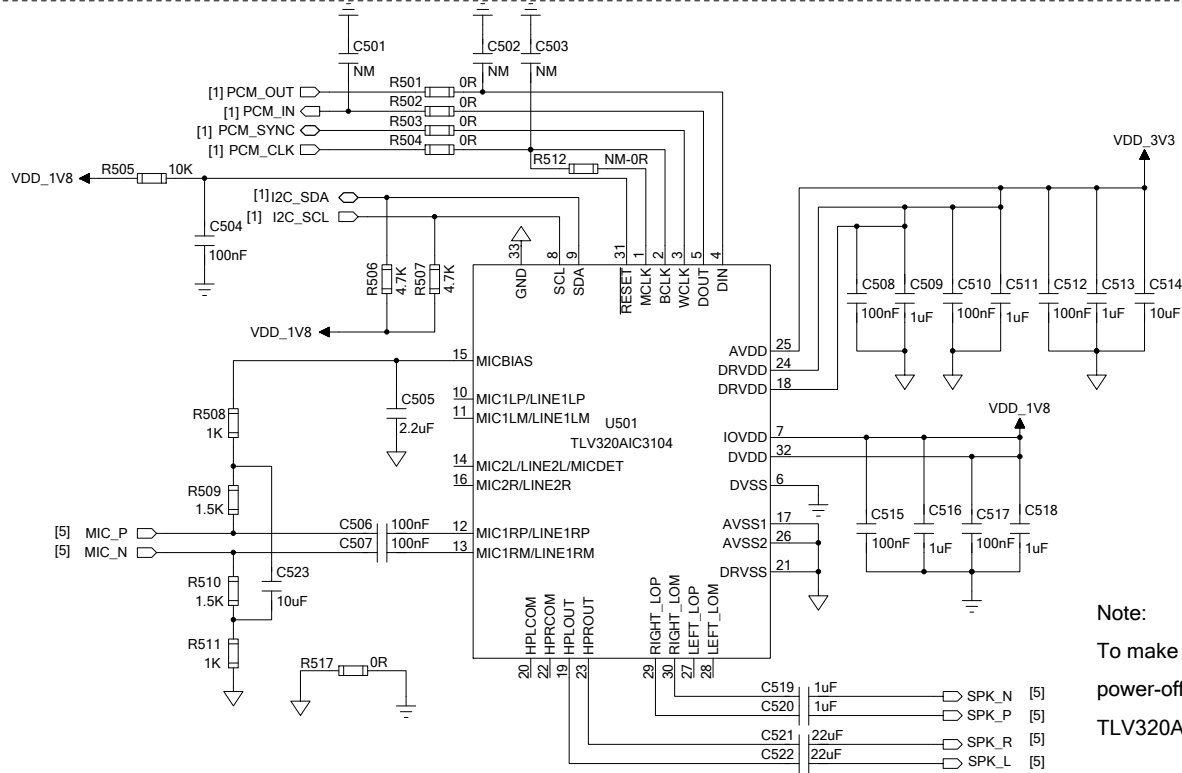
Notes:

1. The decoupling capacitors of USIM1_VDD and USIM2_VDD must be near to (U)SIM card connectors.
2. R401~R406 are applied to suppress the EMI spurious transmission and enhance the ESD protection.
3. It is recommended to take electrostatic discharge (ESD) protection measures near the (U)SIM card connector.
A TVS diode with junction capacitance less than 10pF must be placed as close as possible to the (U)SIM card connector.
4. R407 and R408 can improve anti-jamming capability of the (U)SIM card circuit and should be placed close to the (U)SIM card connector.
5. The (U)SIM card connector should be placed near the Mini PCIe interface, as a long circuit may cause waveform distortion that affects signal quality.

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CHECKED BY Bruce YU	SIZE A2	VER 1.0
SHEET	4 OF 6	DATE 2018/12/29

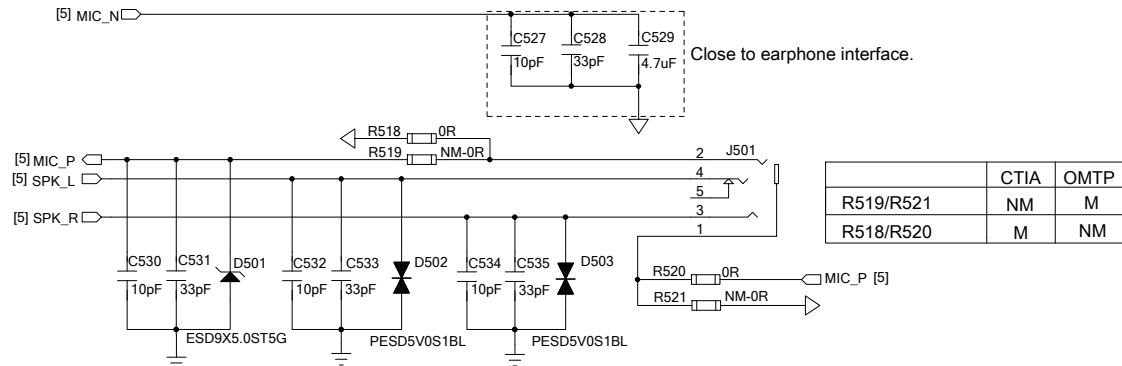
Audio Design



Note:

To make sure the audio function works normally, please follow the power-on and power-off sequences of TLV320AIC3104. For more details, please refer to TLV320AIC3104 datasheet.

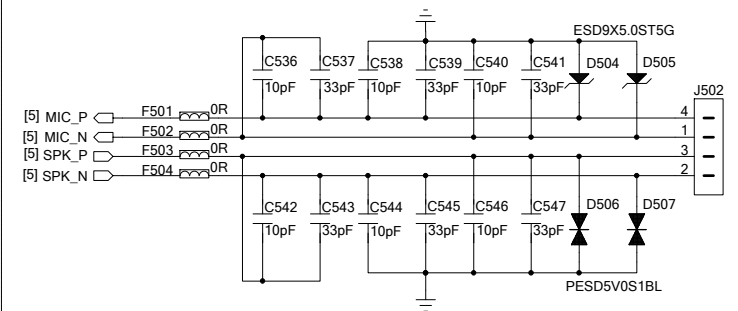
Audio - Earphone Application



Notes:

- The analog output only drives earphone and headset. For devices that need larger power loads, such as speakers, the design for an audio power amplifier should be added.
- The maximum capacitive loading for speaker is 330pF and the maximum capacitive loading for microphone is 250pF.

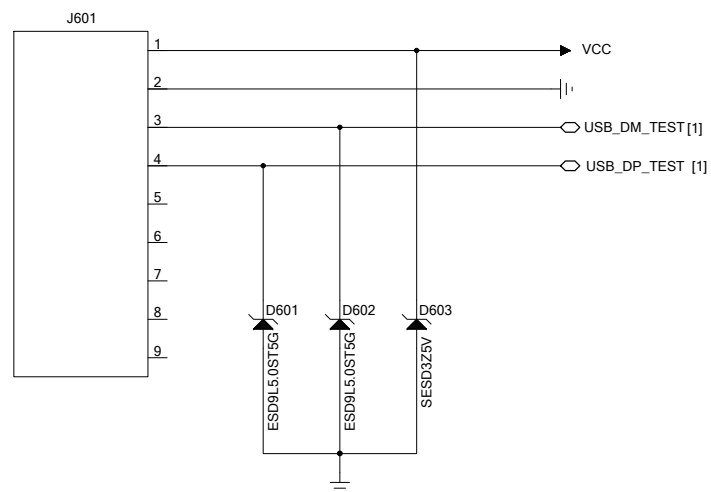
Audio - Handset Application



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SHEET 5 OF 6	DATE 2018/12/29	

Test Points Design



Notes:

1. USB interface can also be used to upgrade firmware.
2. Keep USB test points as close as possible to pin USB_D+ and USB_D-.

Please note that the junction capacitance of ESD protection components on USB data lines might affect the signal.

Typically, the capacitance should be less than 1pF.

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CHECKED BY Bruce YU	SIZE A2	VER 1.0
SHEET	6 OF 6	DATE 2018/12/29