

RM50xQ Series

Reference Design

5G Module Series

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Status: Released



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About the Document

Revision History

Version	Date	Author	Description
1.0	2020-09-15	Kingson ZHANG	Initial
1.1	2020-09-23	Norton ZHANG	Updated several pin names.
1.2	2021-04-12	Norton ZHANG	<ol style="list-style-type: none"> 1. Updated document's application scope form RM500Q series to RM50xQ series. 2. Updated VCC reference circuit. 3. Updated the pin name of pin 67 from RESET_N to RESET#; pins 2, 4, 70, 72, and 74 from VCC_MODULE to VCC; pin 6 from FULL_CARD_PWR_OFF# to FULL_CARD_POWER_OFF#.
1.3	2021-12-09	Norton ZHANG	Corrected the network connection of PCIE_WAKE_N (Sheet 4).

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1 Reference Design

1.1. Introduction

This document provides the reference design for RM50xQ series module, including that for power supply, module interfaces, AP interfaces and (U)SIM interfaces.

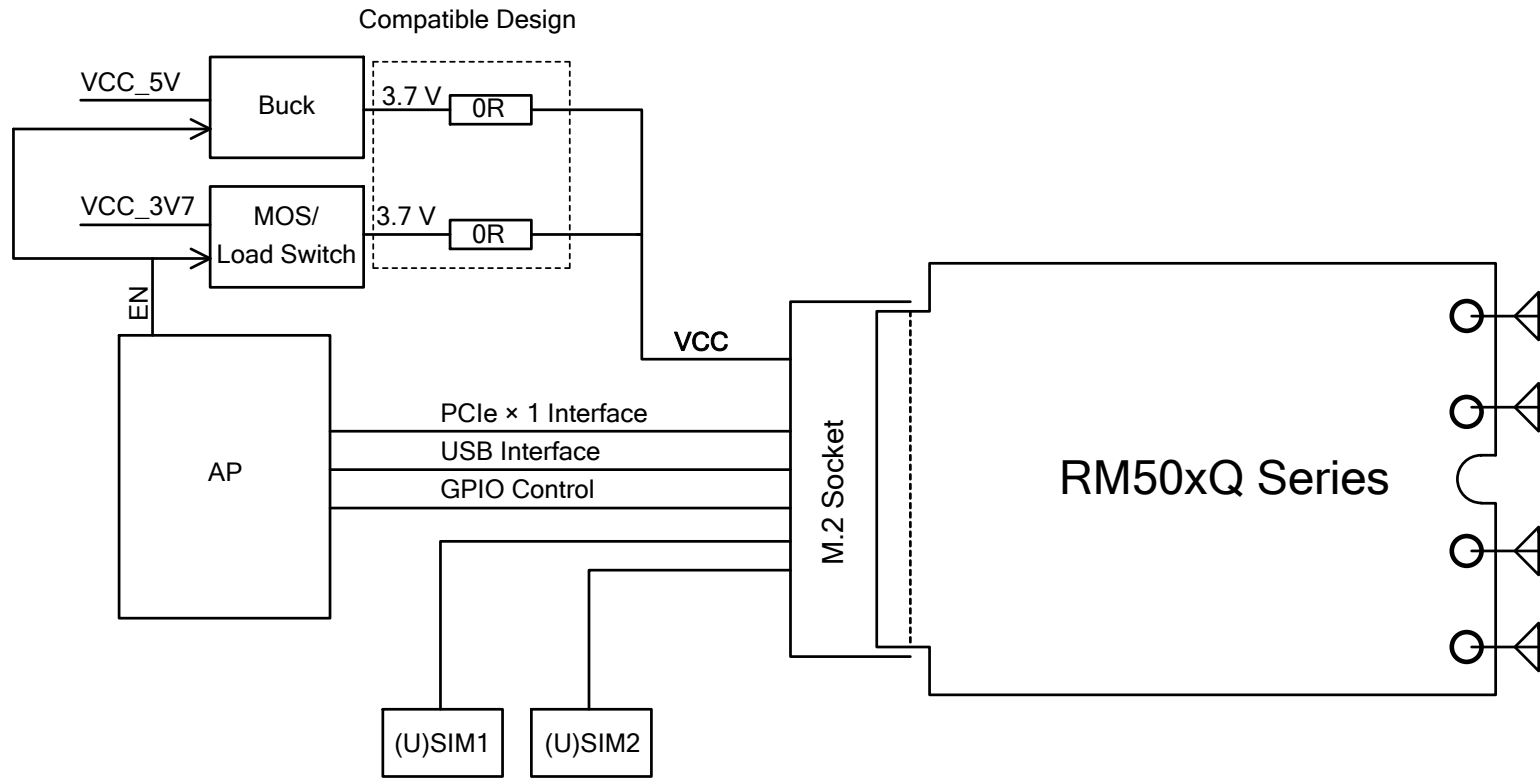
The document is applicable to the following modules:

- RM500Q series
- RM502Q series
- RM505Q-AE

1.2. Schematics

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

Block Diagram



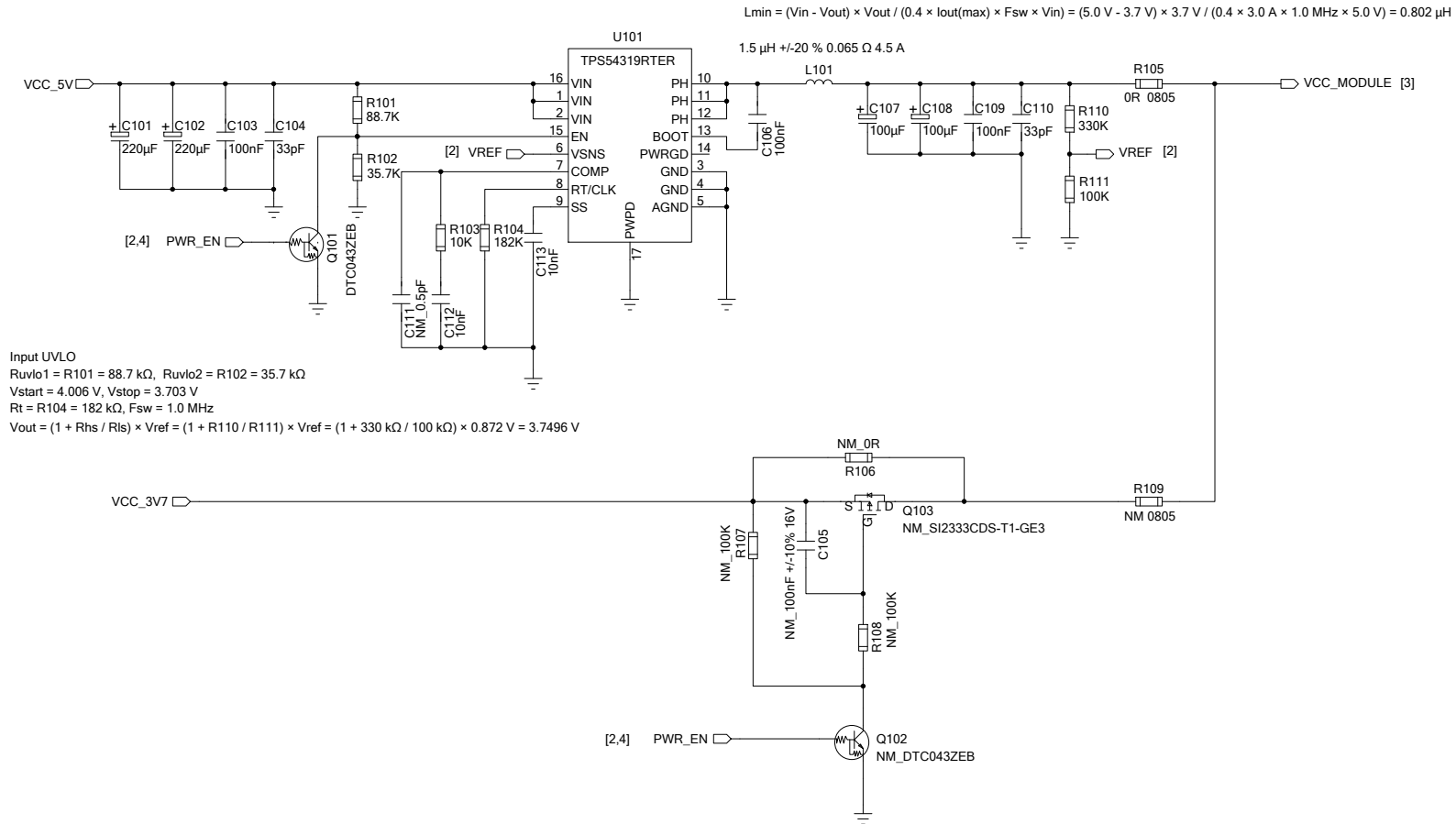
NOTE:

The location of antenna connectors is for reference only. For more details about antenna connectors, see *Quectel_RM50xQ_Series_Hardware_Design*.

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Power Supply Design

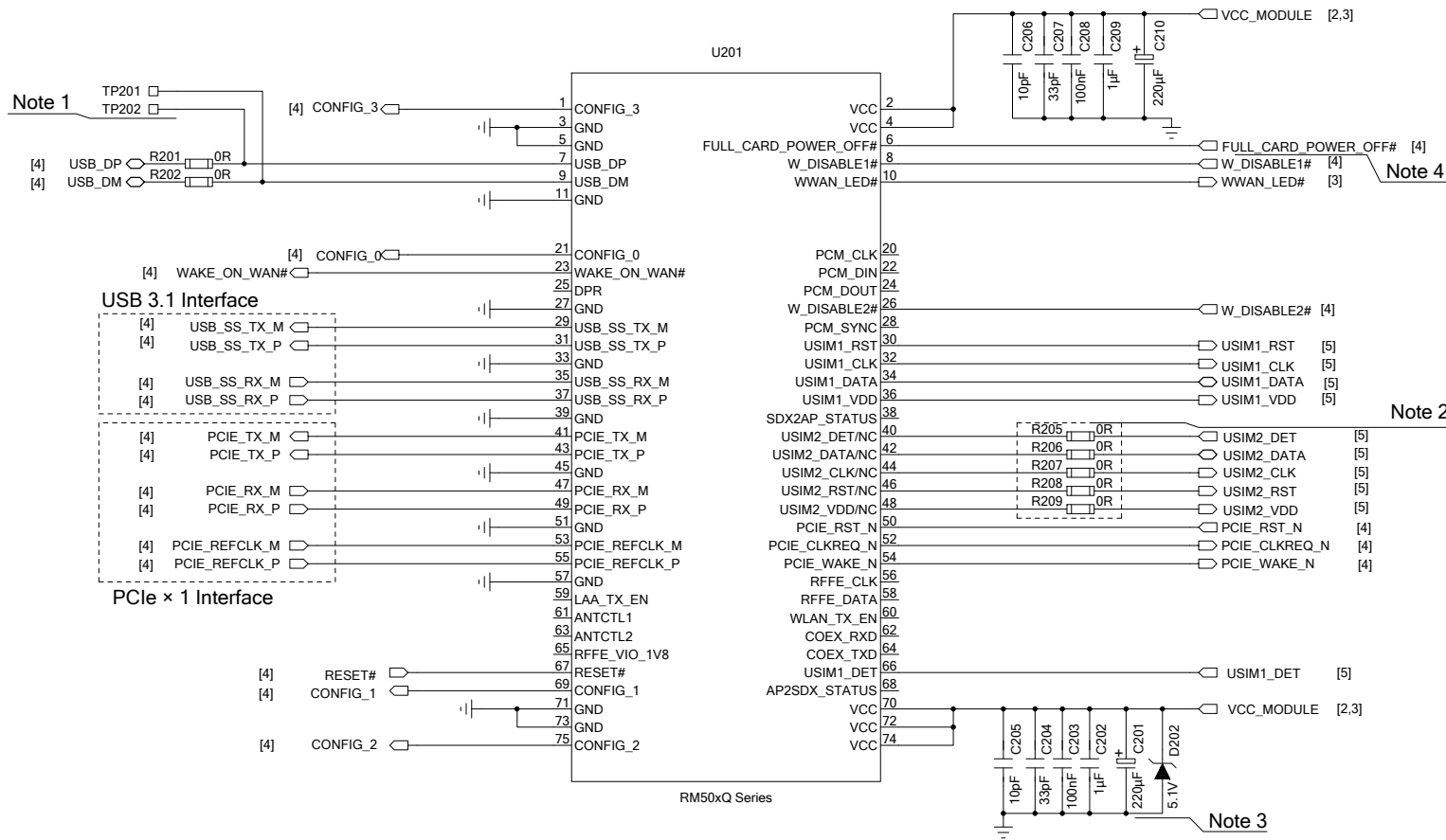


NOTE:

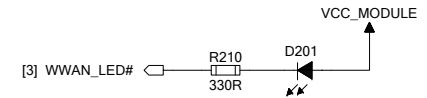
1. The power supply must be able to provide sufficient current up to 3 A or higher.
2. A compatible design is recommended for VCC power supply.

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Module Interfaces



FULL_CARD_POWER_OFF#	Module
H	Turn On
L	Turn Off



Note 2

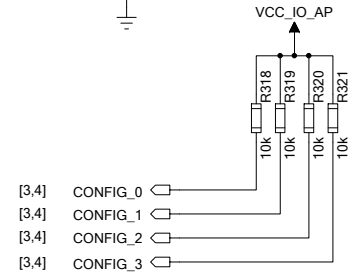
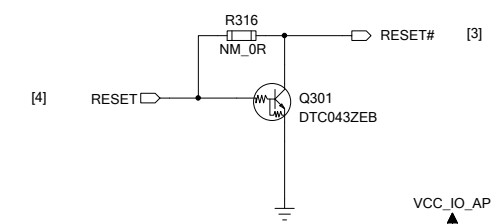
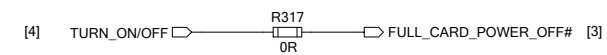
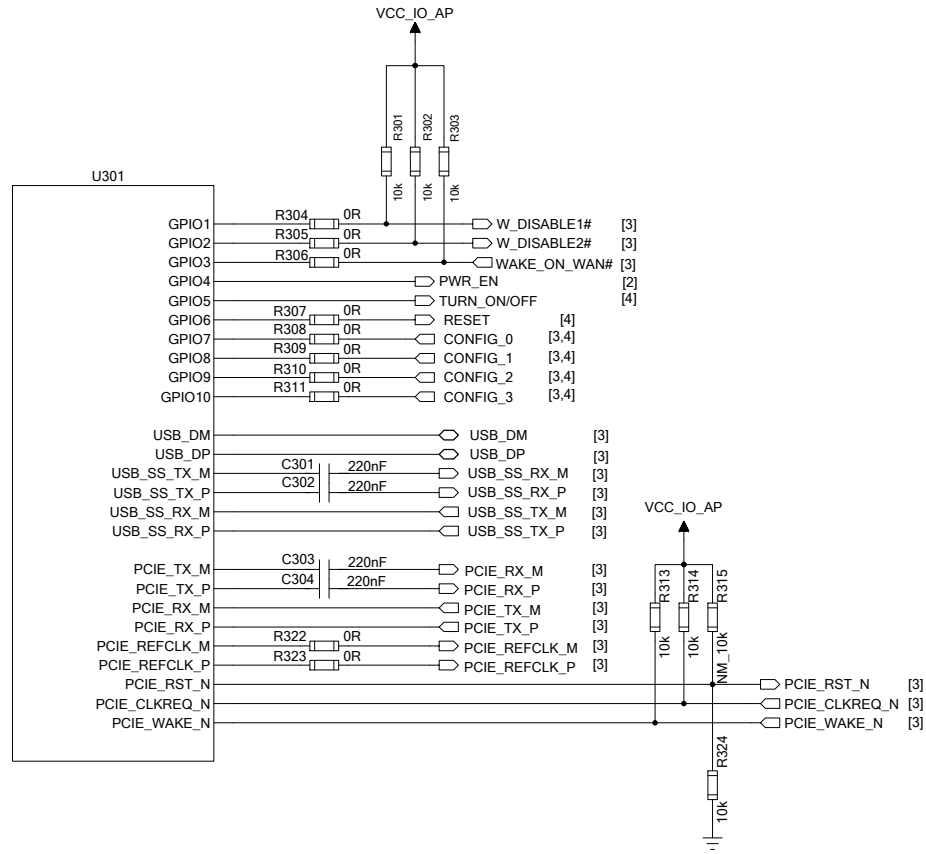
RM50xQ Series	
Module	Pin 40, 42, 44, 46, 48
RM500Q-GL	(U)SIM2 Interface
RM502Q-GL	(U)SIM2 Interface
RM500Q-AE	NC
RM502Q-AE	NC
RM505Q-AE	(U)SIM2 Interface
RM500Q-CN	(U)SIM2 Interface

NOTE:

- It is recommended to reserve test points for the firmware upgrade over USB 2.0 interface and to minimize the stub length of USB test signals.
- R205 to R209 should be placed close to the M.2 socket. If the module has a built-in eSIM, R205 to R209 should not be mounted.
RM500Q-AE & RM502Q-AE do not support (U)SIM2 interface.
- It is recommended to use a zener diode D201 with a reverse zener voltage of 5.1 V and it should be placed close to the module pin.
- Use a AP GPIO to control FULL_CARD_POWER_OFF# of the module.

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AP Interfaces



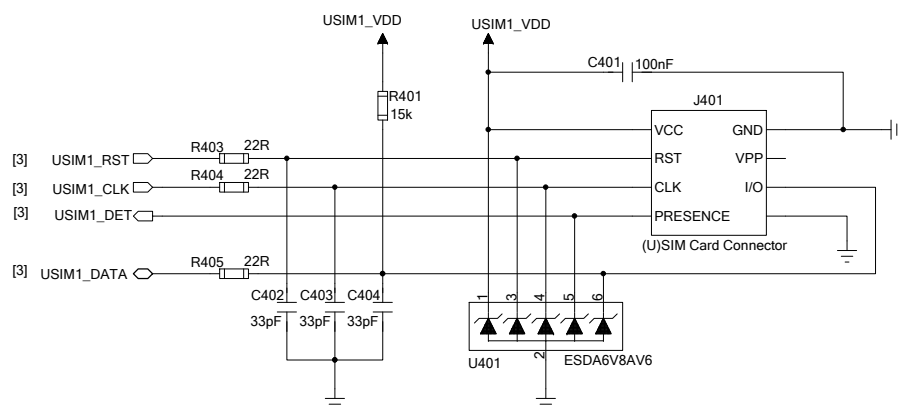
NOTE:

1. U301 represents your host.
2. Keep C301-C304 to the host as close as possible.
3. The differential impedance of USB 2.0/3.1 signal traces should be controlled to 90 Ω.
4. The differential impedance of PCIe signal traces should be controlled to 85 Ω.
5. If a USB connector is used, please keep ESD protection components to the USB connector as close as possible.

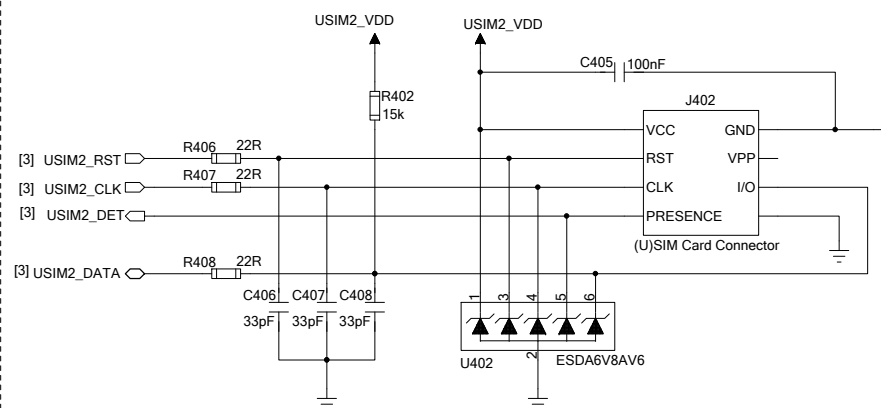
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(U)SIM Interfaces Design

(U)SIM1



(U)SIM2



NOTE:

- The decoupling capacitors of (U)SIM signals and (U)SIM related resistors must be placed close to (U)SIM card connectors.
- RM50xQ series module provides the input pin(s) USIM_DET[1:2] to detect (U)SIM cards.
 - A normally short-circuited (U)SIM card connector is used in this reference design, and high-logic-level detection is supported. For more details, see the corresponding Hardware Design documents.
 - This pin is pulled LOW by default, and will be internally pulled up to 1.8 V by software configuration only when (U)SIM hot-plug is enabled by AT+QSIMDET.
- R403-R408 are used to suppress the EMI such as spurious transmission.
- A ESD diode array with a junction capacitance of lower than 10 pF should be placed as close to the (U)SIM card connector as possible for ESD protection.
- The (U)SIM card connector should be placed close to the M.2 socket, because a long PCB trace may lead to waveform distortion, which affects the signal quality.

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