

RM50xQ Series

Reference Design for Laptop

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	Oscar LIU/ Jumping HE	Initial
1.1	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#.

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1 Reference Design

1.1. Introduction

This document provides the RM50xQ series reference design for laptops, including that for power supply, connection between laptop and RM50xQ series, and (U)SIM interfaces.

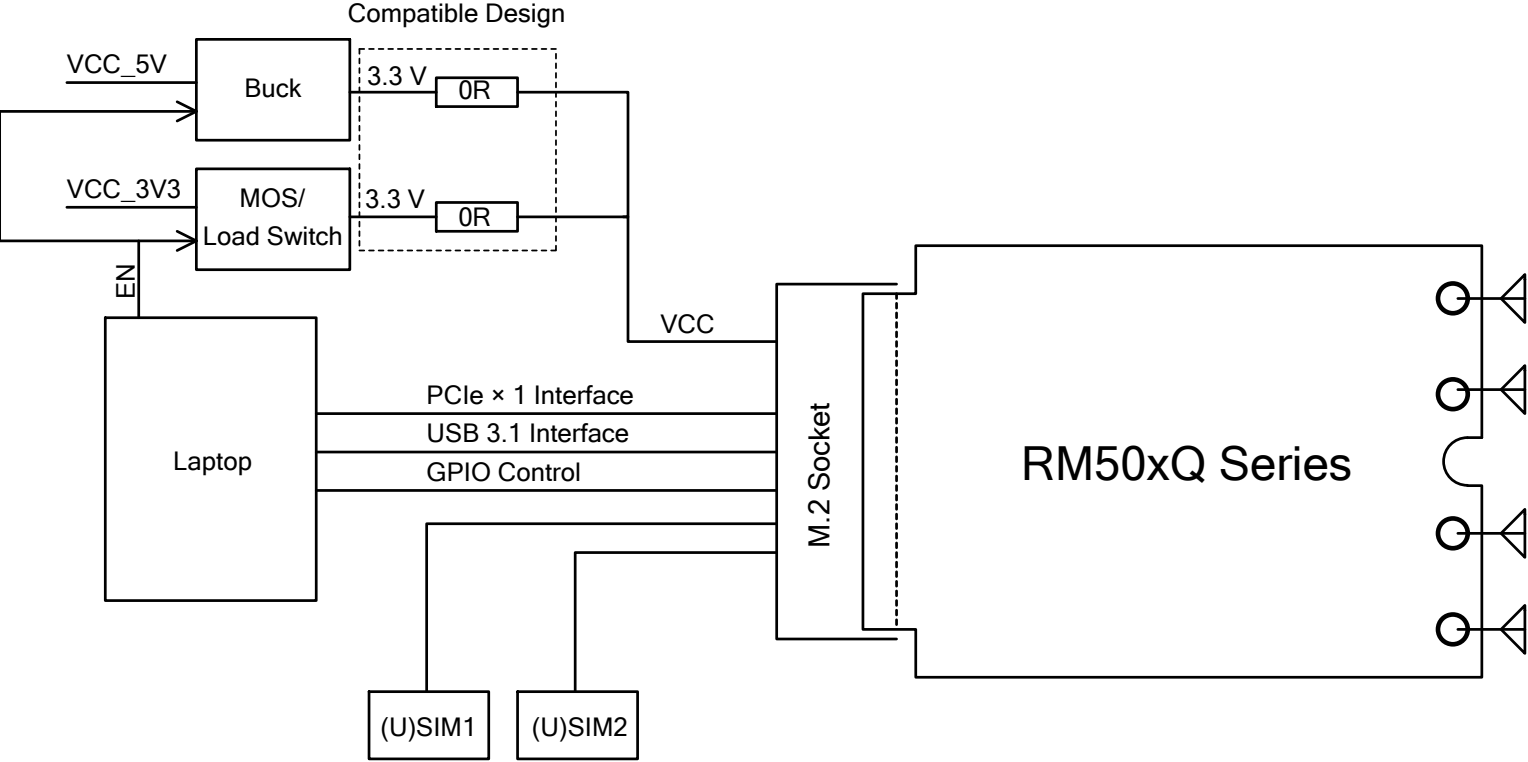
The document is applicable to the following modules:

- RM500Q series
- RM502Q series
- RM505Q-AE

1.2. Schematics

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

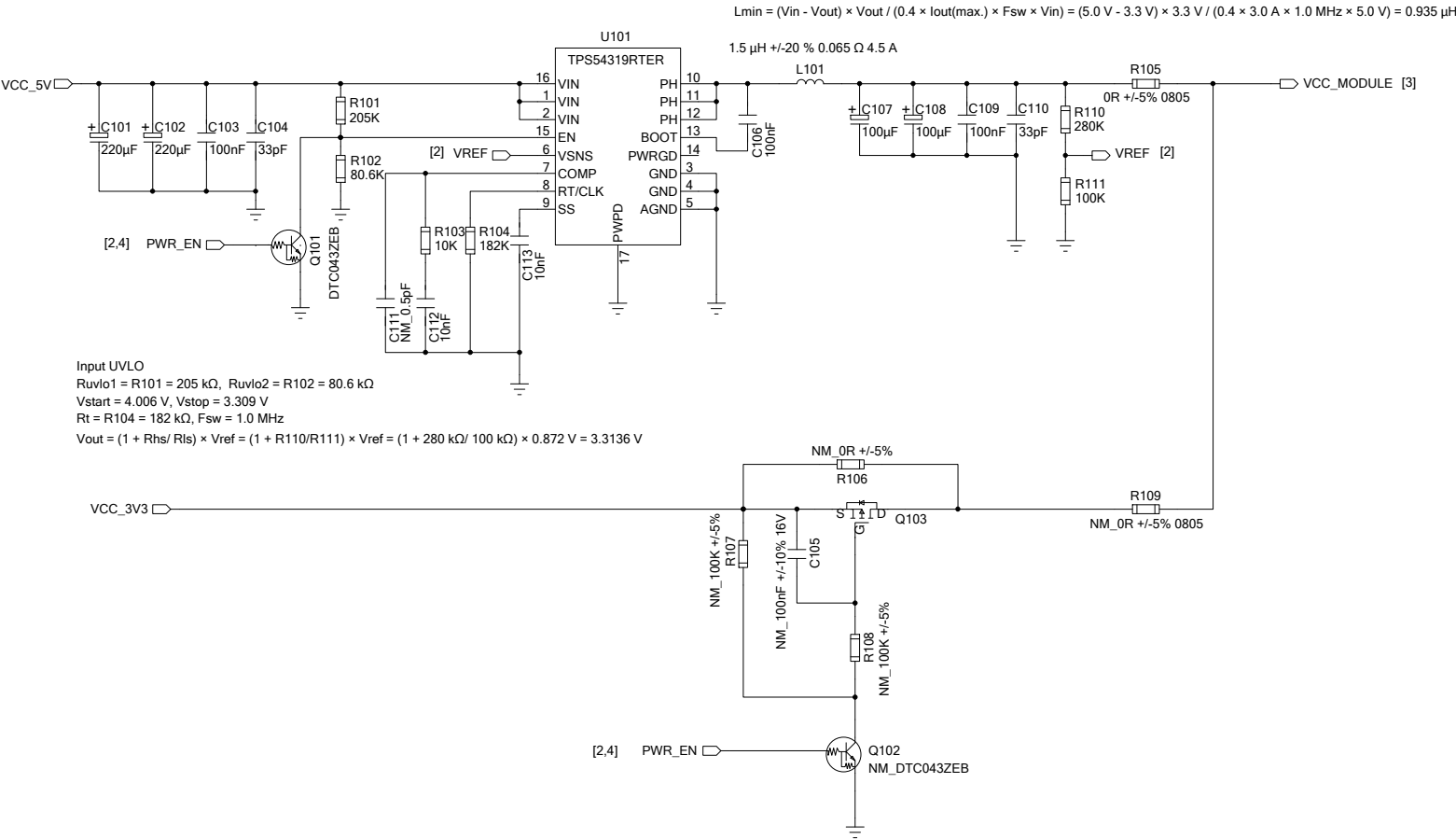
Block Diagram



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

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Power Supply Design



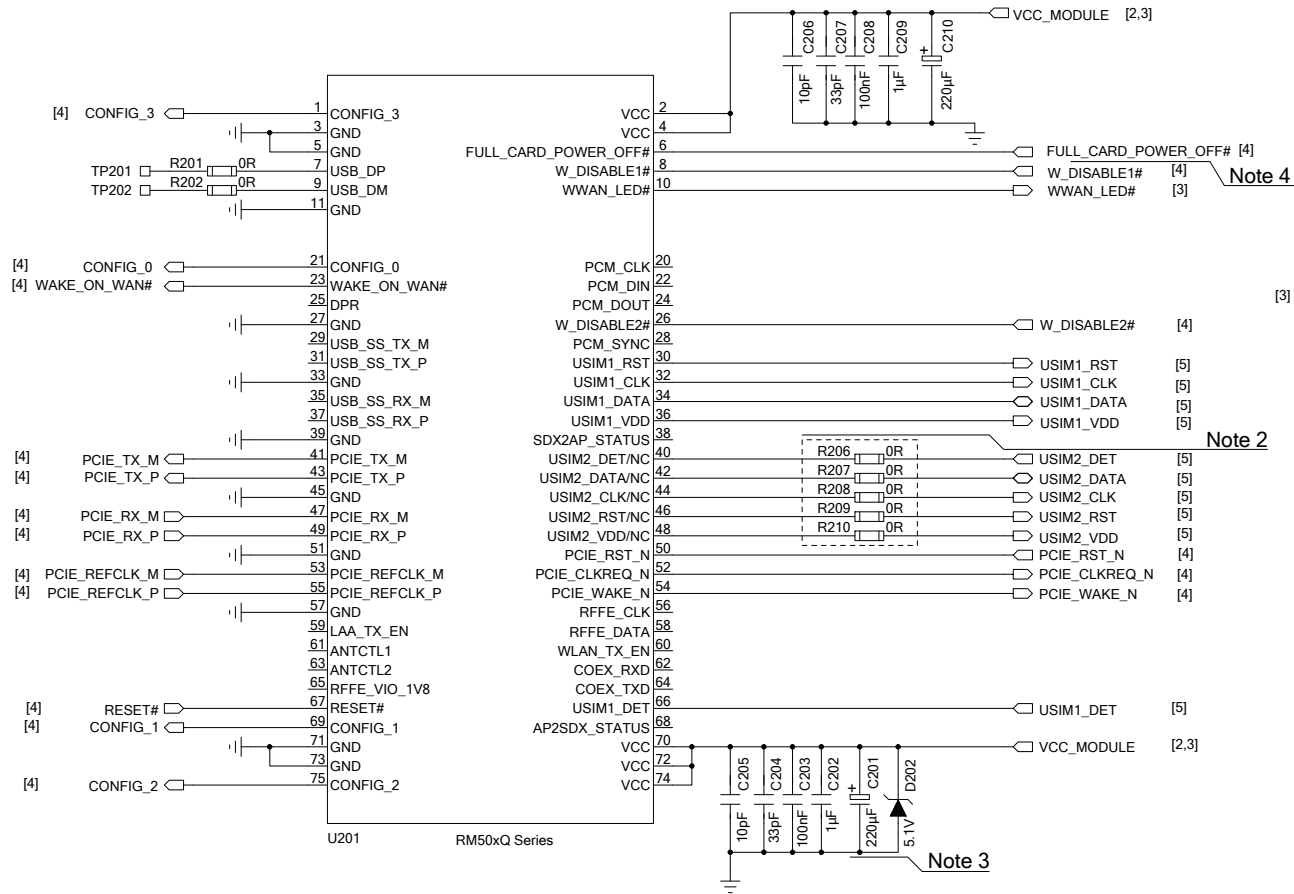
Notes:

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.

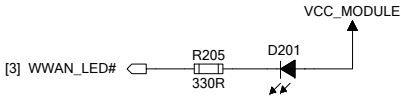
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Connectivity Between Laptop and RM50xQ Series (Part 1)



FULL_CARD_POWER_OFF#	Module
H	Turn On
L	Turn Off



RM50xQ Series

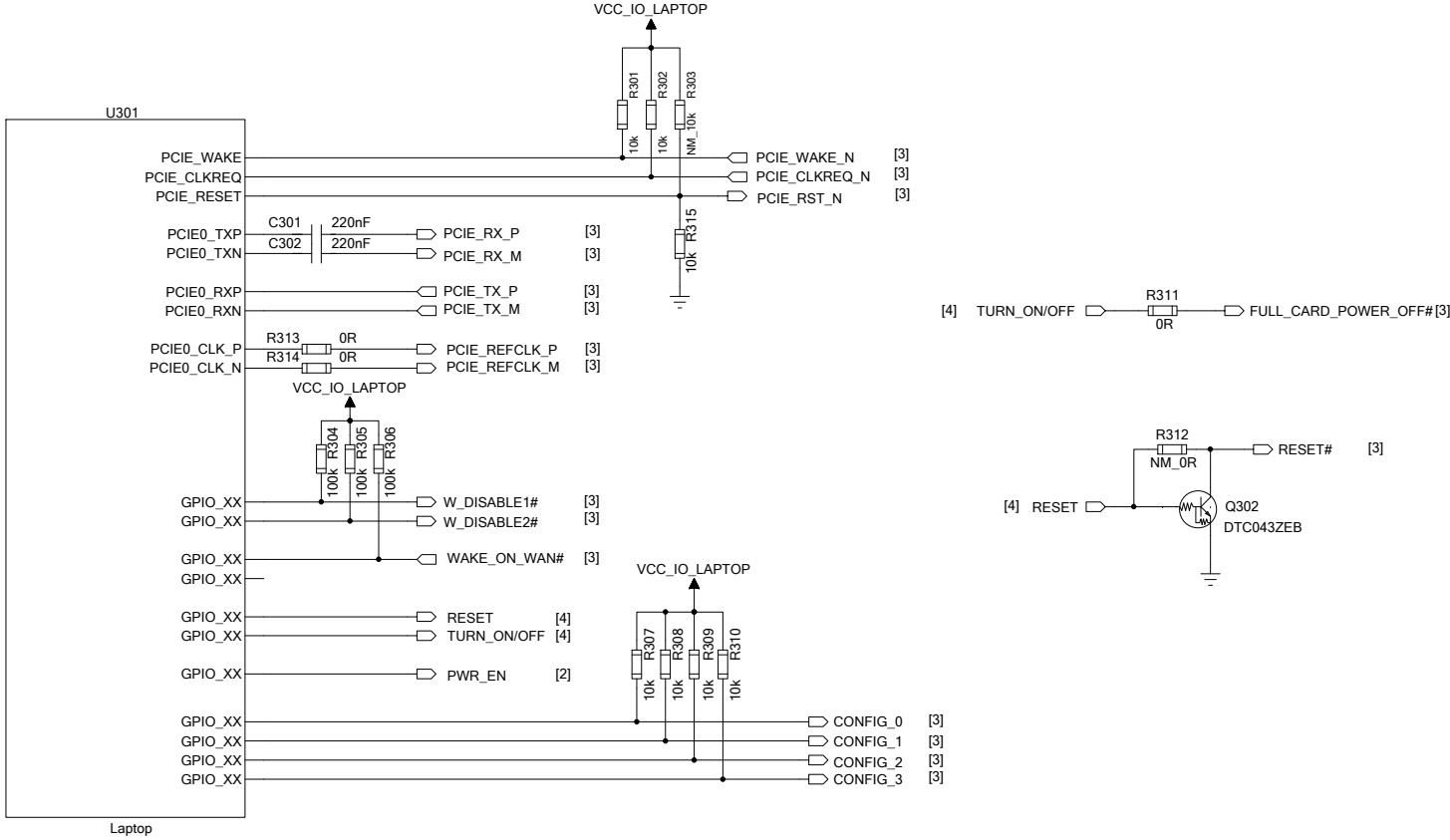
Module	Pin 40, 42, 44, 46, 48
RM500Q-GL	(U)SIM2 Interface
RM502Q-GL	(U)SIM2 Interface
RM500Q-AE	NC
RM502Q-AE	NC
RM505Q-AE	(U)SIM2 Interface
RM500Q-CN	(U)SIM2 Interface

Notes:

- 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.
- R206 to R210 should be placed close to the M.2 socket. If the module has a built-in eSIM, R206 to R210 should not be mounted.
RM500Q-AE & RM502Q-AE do not support (U)SIM2 interface.
- It is recommended to use a zener diode D202 with a reverse zener voltage of 5.1 V and it should be placed close to the module pin.
- Use a laptop GPIO to control FULL_CARD_POWER_OFF# of the module.

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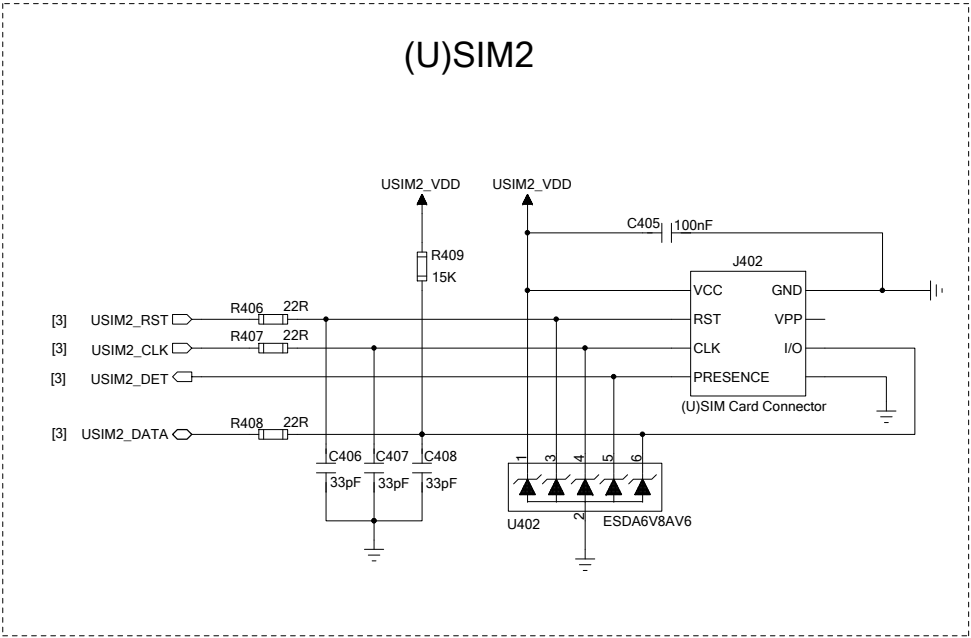
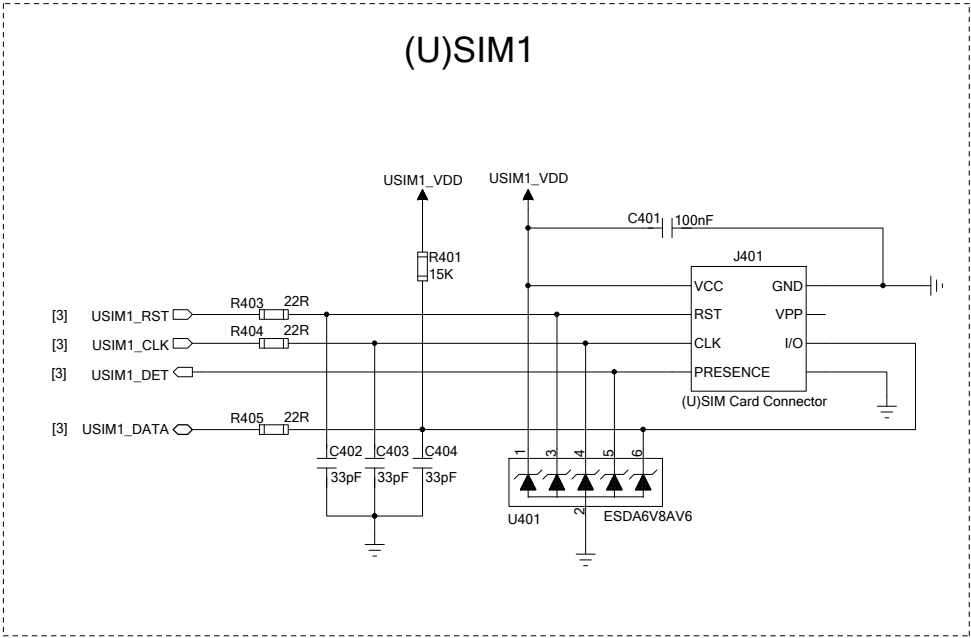
Connectivity Between Laptop and RM50xQ Series (Part 2)



- Notes:
- U301 represents the customer's host.
 - Keep C301-C302 close to the host.
 - The differential impedance of PCIe signal traces should be controlled to 85 Ω .
 - 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



- Notes:
1. The decoupling capacitors of (U)SIM signals and (U)SIM related resistors must be placed close to (U)SIM card connectors.
 2. RM50xQ series module provides the input pin(s) USIM_DET[1:2] to detect (U)SIM cards.
 - 1) 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 corresponding Hardware Design.
 - 2) 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.
 3. R403-R408 are applied to suppress the EMI such as spurious transmission.
 4. 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.
 5. The (U)SIM card connector should be placed near the M.2 socket, because a long trace may lead to wave distortion, which affects the signal quality.

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