GSM Module Digital IO Application Note

GSM Module Series

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About the Document

History

Revision	Date	Author	Description
1.0	2014-09-10	Ray XU	Initial

1 Introduction

This document mainly provides the reference design when the level mismatch occurs between GSM module and digital IO (Input/Output) port on MCU and other peripherals.

This document is applicable to the following modules:

- M10 R3.0
- M72 R3.0
- M95 R2.0
- M85 R2.0
- M66

2 Electrical Characteristics of Digital IO

The electrical characteristics of digital IO and absolute maximum ratings are shown as below tables.

The circuit design between GSM module and digital IO on MCU and other peripherals should comply with the DC characteristic described in the Hardware Design document. Meanwhile, you should make sure the parameters are within the range of absolute maximum ratings.

Table 1: DC Electrical Characteristics

Parameter	Min.	Type	Max.	Unit.
V_{IL}			0.25×VDD_EXT	V
V_{IH}	0.75×VDD_EXT		VDD_EXT+0.2	V
V_{OH}	0.85×VDD_EXT	VDD_EXT		V
V_{OL}			0.15×VDD_EXT	V

VDD_EXT=2.8V

Table 2: Absolute Maximum Ratings

Parameter	Min.	Max.	Unit
Voltage at Digital Pins	-0.3	3.08	V
Voltage at Analog Pins	-0.3	3.08	V
Voltage at Digital/analog Pins in Power Down Mode	-0.25	0.25	V

If the digital IO voltage between module and MCU or other peripherals does not match and exceeds the range of absolute maximum ratings, it may cause some unexpected abnormalities such as overvoltage warning and overvoltage shutdown.

3 Reference Design

If voltage of digital IO on MCU or other peripherals is 3.0V or 3.3V, the resistor dividing method is recommended. You can adjust resistor value to match the digital IO level of GSM module.

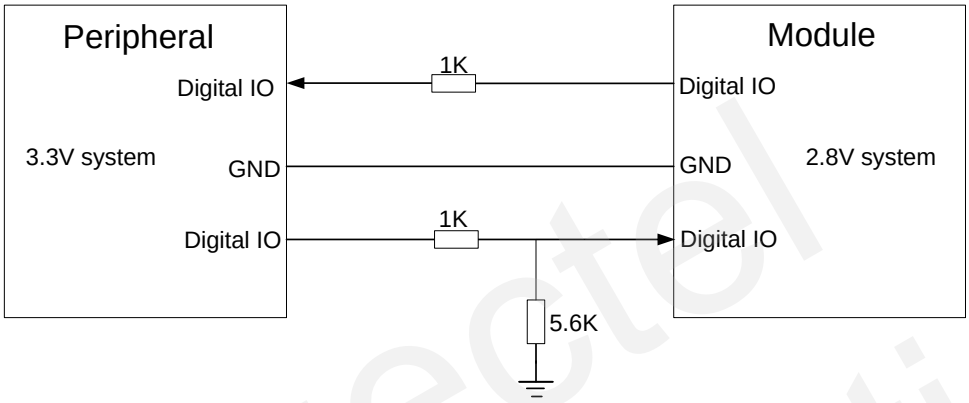

Figure 1: Reference Design for 3.3V IO Match

Take UART as an example, the UART reference design for 3.3V level match is shown as below. If the MCU is a 3V system, please change the 5.6K resistor to 10K. Meanwhile, please pay attention to the direction of digital IO of the module.

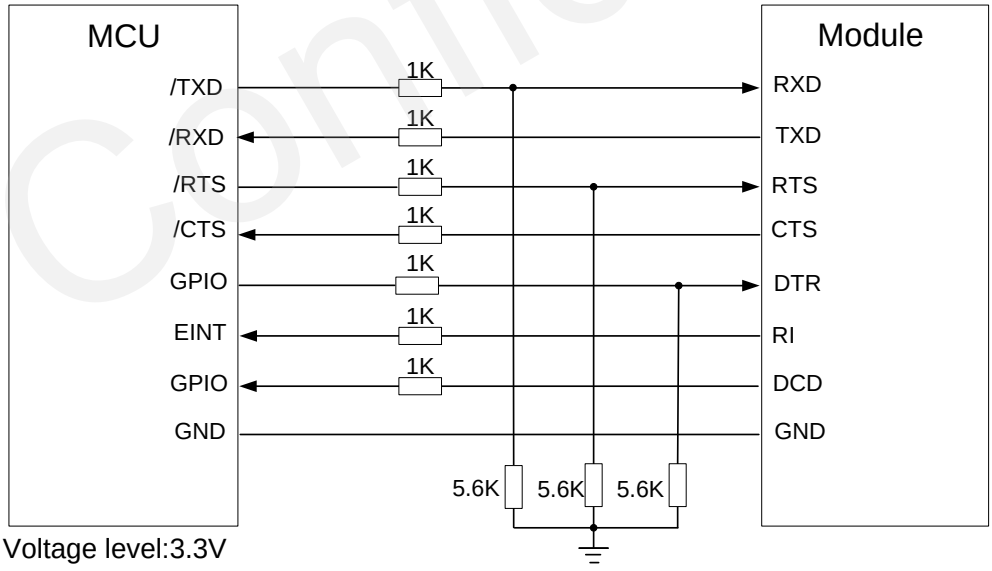

Figure 2: UART Reference Design for 3.3V IO Match

If voltage of digital IO on MCU or other peripherals is up to 5V, the level shifter is recommended. You can visit vendor web to select the correct IC, such as: http://www.maximintegrated.com and http://www.onsemi.com/.

Note that you should assure the IO voltage of level shifter which connects to module is 2.8V. You can use module's VDD_EXT to supply power.

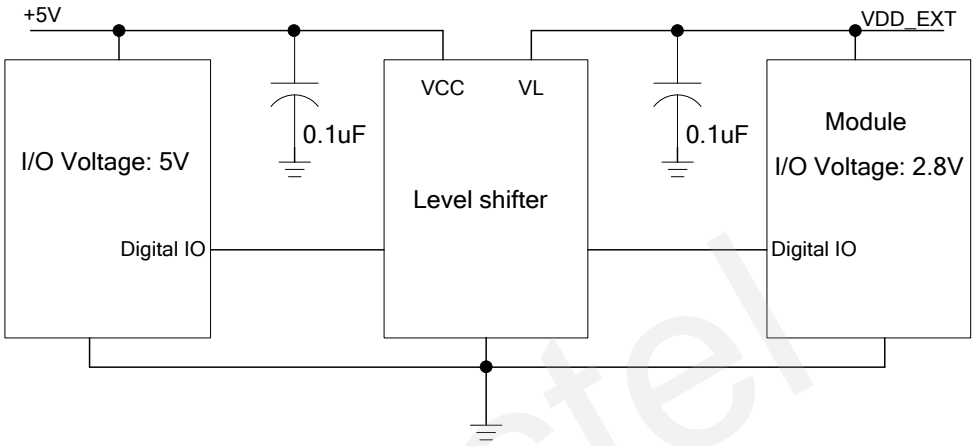

Figure 3: Sketch Map for 5V IO Match

The following figure shows a sketch map between standard RS-232 interface and module. Note that you should assure the IO voltage of level shifter which connects to module is 2.8V.

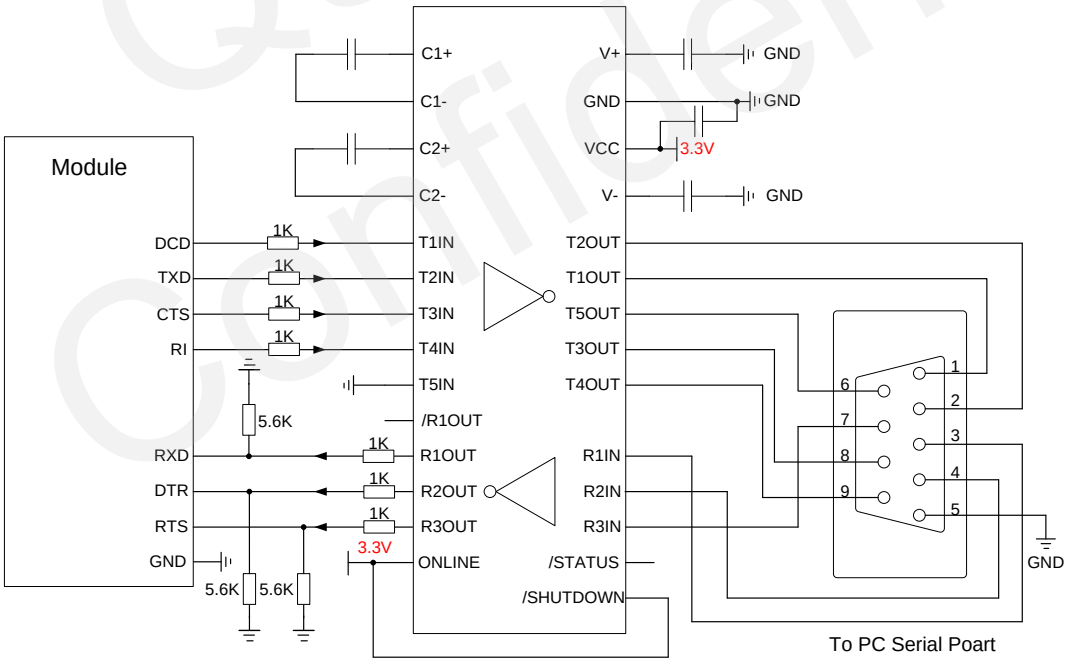

Figure 4: Sketch Map for RS-232 Interface Match

Please visit vendor web site to select correct IC, such as: http://www.maximintegrated.com and http://www.exar.com/.