



SIMCom WCDMA Wireless Module

SIM5xxx_Current_Leakage_Application_Note



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Version history

Date	Version	Description of change	Author
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1 Introduction

User should pay more attention to SIM5xxx leakage current. When the module is powered off, the voltage of all digital interfaces (PCM UART, etc) connected with peripheral devices should be less than 0.3V. Otherwise, high level voltages maybe occur in some GPIO pins because of current leakage from above digital interfaces. So if customer uses a GPIO of the module to detect whether the module is turned on or not, there will cause feint.

This document describes how to avoid these problems caused by current leakage.

2 Scope of the document

The following SIM5XXX modules are related in this document.

- SIM5215/SIM5216
- SIM5218
- SIM5320

3 Design guide

SIMCom recommends some reference design according to the functions of module. These digital interfaces contain PCM, UART, I²C, SD and some dedicated GPIOs. Current leakage may occur if there are some defects in user's design.

3.1 UART interface

If SIM5xxx serial port is used to communicate with PC, a CMOS and RS232 level converter chip is needed. SP3238ECA (provided by Sipex Corporation) is recommended in the reference circuit as below. SP3238ECA can be turned off through the S204 to prevent leakage current.

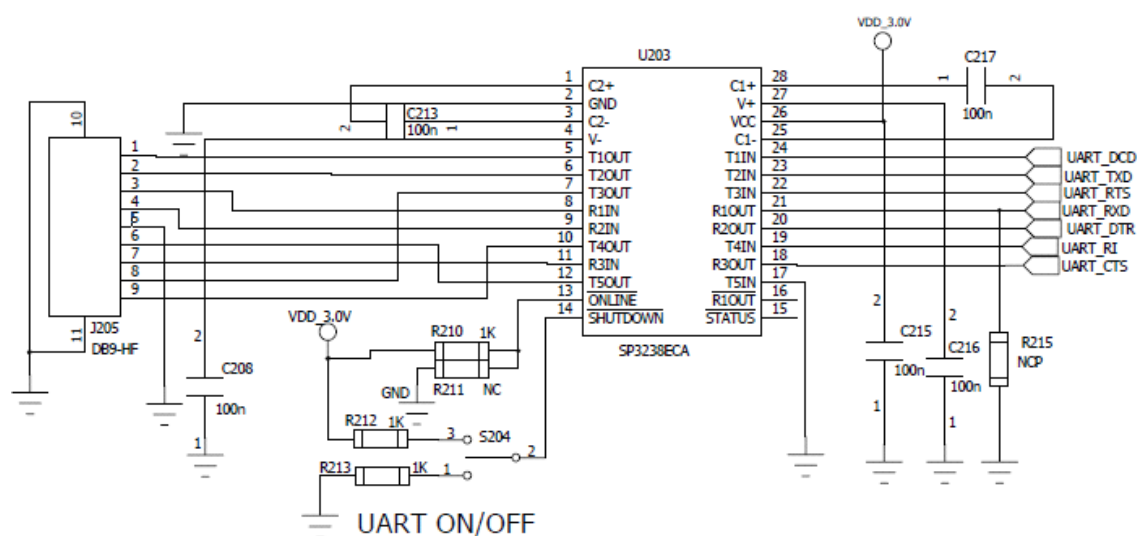


Figure 1: UART Circuit (RS232 chip)

If the serial port communicates with the MCU directly, the UART data lines should not be pulled up by the MCU when module is turned off, otherwise the leakage current will occur.

If UART port is used in Null Modem, UART data lines(except UART_TXD and UART_RXD)can be reconfigured as GPIOs. In this case, user must ensure that these data lines can not be pulled up by external device, otherwise the leakage current will occur.

3.2 I²C interface

I²C_SDA and I²C_SCL of SIM5xxx module have been pulled up with two 2.2kR resistors to 2.6V level in module. So user must not pull them up in users' application circuit, otherwise the leakage current may occur.

3.3 SD interface

If some modules provide MMC/SD interface, the VREG_AUX pin of module is recommended to power the SD card. VREG_AUX is a 2.85V LDO power output by default, rated for 250mA. The reference circuit is shown as below.

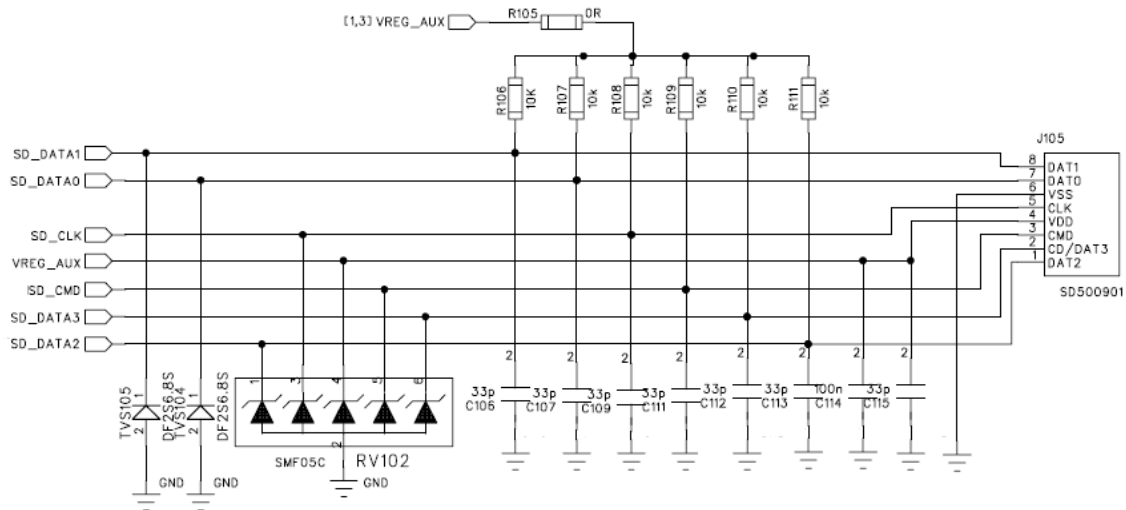


Figure 2: SD Circuit

If an external power supply is used for SD card, VREG_AUX is also recommended to enable the power supply. The reference circuit is shown as below.

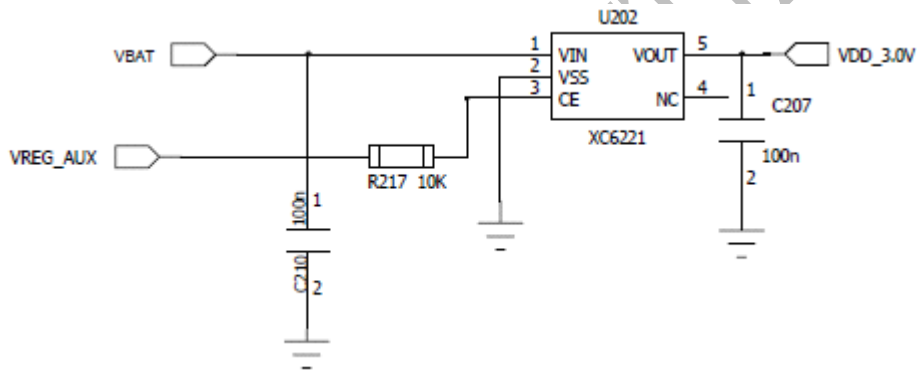


Figure 3: SD power supply Circuit

If module SD interface is pulled up by external power in Figure 3 or by VDD_3.0V from the above U202 but which is enabled by external level, leakage current may occur.

3.4 RF control

GPIO4 of SIM5xxx module is configured to enable or disable flight mode by default. GPIO4 has been pulled up to 2.6V level in module. So user must not pull them up in users' application circuit, otherwise current leakage may occur.

3.5 GPIO

There are some GPIOs reserved by SIMCom module for user's application circuit. Module can communicate with host or other processor by these GPIOs. Use them correctly can prevent current leakage occurrence. If a GPIO is configured as input, current leakage may occur if user pulls them up in application circuit. So it is not needed to pull them up.

3.6 Power on Indicator

Because of current leakage, if some dedicated GPIO is used as the module power on indication, an error detection may generate. We recommend use the VREG_AUX pin of the module as a power-on indicator. VREG_AUX is a 2.8V LDO when module is in power-on status, and 0V when it is in power-off status. So it can well be used for module power on/off indication. The reference circuit is shown as below.

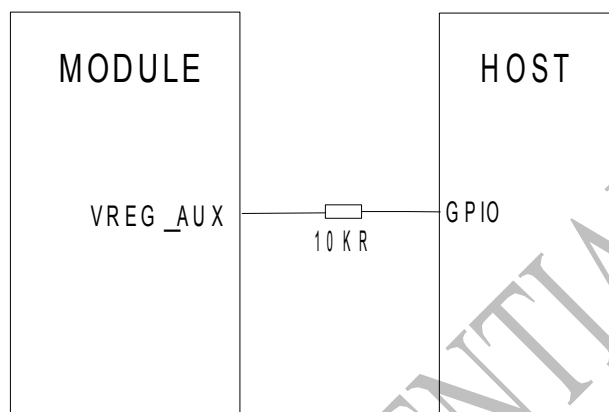


Figure 4: Power on Indicator

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