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SIMCOM WCDMA Wireless Module

SIM5xxx_Sleep_Mode_Application_Note

Document Title:	SIM5xxx_ Sleep_Mode _Application_Note
Version:	1.02
Date:	2011-08-16
Status:	Release
Document Control ID:	AN SIM5xxx_Sleep_Mode_Application_Note_V1.02

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Version history

Date	Version	Description of change	Author
2010-11-08	1.01	Origin	3G team
2011-08-16	1.02	Add SIM5320 description.	3G team

1 Introduction

SIM5XXX can enter to sleeping mode for reducing power consume. SIM5XXX will enter sleeping mode automatically when peripheral equipment of SIM5XXX stops working, and module has no on air or audio activity required and no hardware interrupt (such as GPIO interrupt or data on serial port). From working mode to sleeping mode, the module takes about 15 to 20 seconds. In sleeping mode, SIM5XXX can still receive paging or SMS from network. This document describes what conditions are required to make the module enter sleeping mode.

2 Scope of the document

This document intends to describe the following SIM5XXX modules.

•SIM5215/SIM5216

•SIM5218

•SIM5320

3 Using SIM5XXX USB interface

SIM5XXX USB interface is connected with a host CPU. SIM5XXX could enter sleep mode when the host CPU supports USB suspend mode or cut off USB_VBUS, otherwise it could not enter sleep mode.

NOTE: SIM5XXX can enter sleep mode when module detect it's RXD being low level. SIM5XXX RXD is pulled down by 15k ohm inside SIM5XXX. Please don't connect if RXD is not used.

3.1 Host CPU supports USB suspend mode

The host and the SIM5XXX module are both in sleep mode, the host can wake-up the module at any time. The module can wake-up host via USB interface when the module receives a SMS or a voice or data call from network. UART_RI of the SIM5XXX module is optional and can be used to wake-up host also. User can refer to chapter 5 to understand UART_RI behavior.

Figure 1 below is the reference circuit of the USB suspend mode interface.

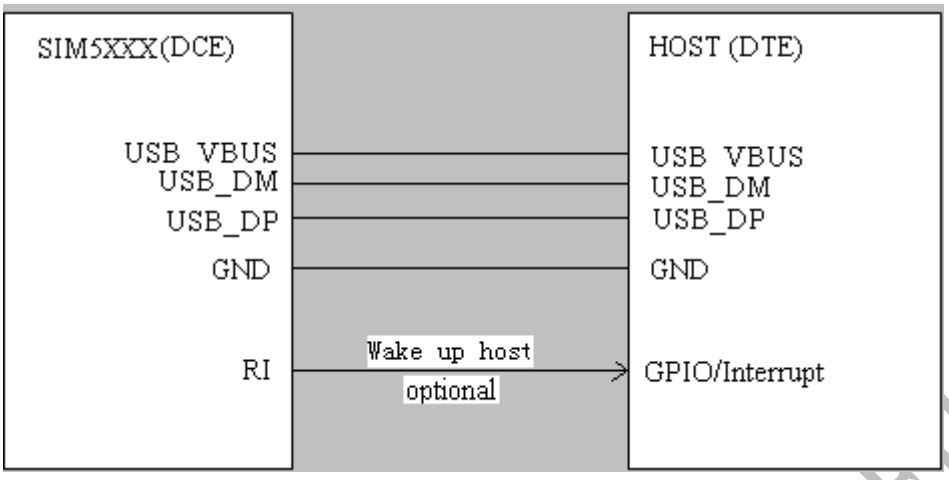

Figure 1: USB suspend mode interface connection

NOTE: We can provide technical support about USB suspend on Windows mobile,WIN-CE and linux for customer.

3.2 Host CPU don't support USB suspend mode

If host CPU don't support USB suspend mode, the SIM5XXX module can enter sleep mode by cutt ing off USB_VBUS line. User can use a host GPIO to control an analog switch on/off. UART_RI of the SIM5XXX module can be used to wake-up host, then host turn-on the analog switch to enable USB communications. User can refer to chapter 5 to understand UART_RI behavior.
Figure 2 below is the reference circuit of no USB suspend mode interface.

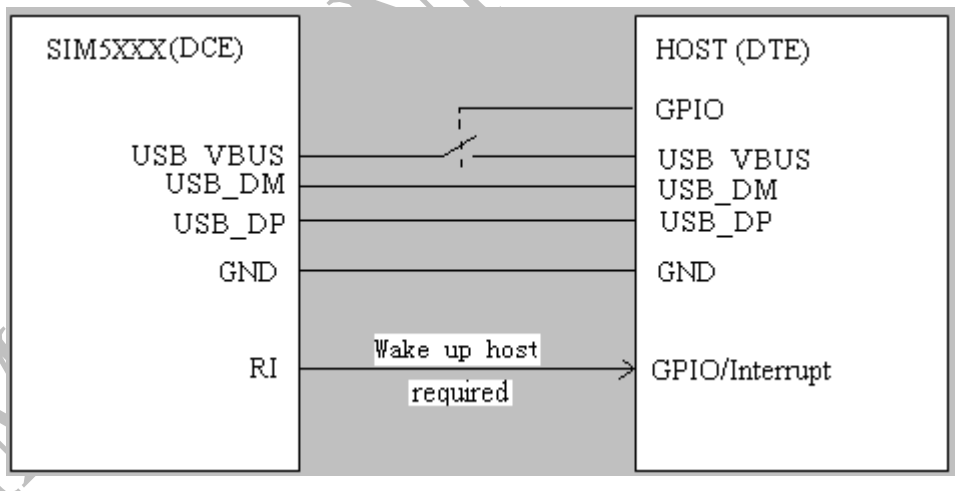

Figure 2: No USB suspend mode interface connection

4 Using SIM5XXX UART interface

SIM5XXX UART interface is connected with a host CPU , it can not enter sleep mode until SIM5XXX RXD is pulled down by the host CPU . When module is in idle mode, user can pull the module RXD to low level by the host CPU TXD. Figure 3 below is the reference circuit of the

UART interface.

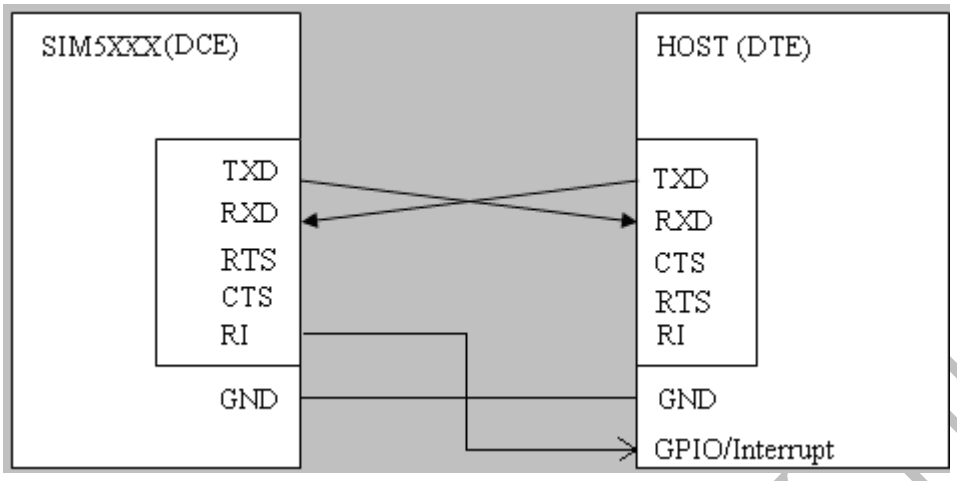

Figure 3: UART interface connection(Null mode)

NOTE: SIM5XXX RXD must be pulled down by the host CPU TXD. SIM5XXX will be waked up immediately if SIM5XXX RXD is high level.

5 Design guide

SIM5XXX in sleep mode can reduce power consumption. SIM5XXX can be waked up and drive RI to low level when it receives a voice or data call and a SMS from network. So user can use SIM5XXX RI pin to wake up host if module and host are both in sleep mode. Host can wake up SIM5XXX via pulling our GPIO0 or DTR low level. Figure 4 below is the reference circuit.

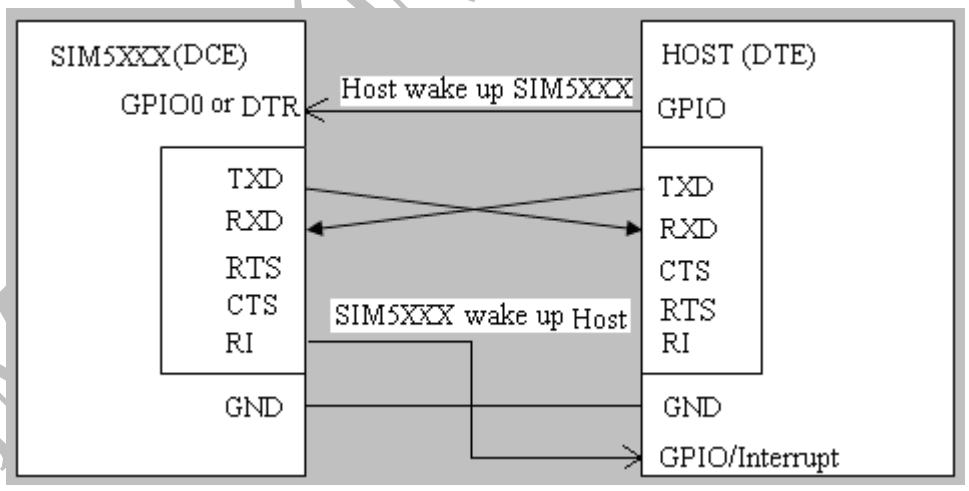

Figure 4: Wake up each other

5.1 Using RI to wake-up host

If serial port is used in Null Modem, the pin “RI” can be used as an interrupt pin. Normally it will stay high but in certain condition such as SMS receiving, incoming voice (CSD, video) call or URC reported, the pin “RI” will be set low to inform the host, and it will stay low until the host clear this

interrupt with AT command (AT+CRIRS).

NOTE:

1 If user set the AT + CFGRI =0(Default setting), the pin "RI" will be set low by receiving SMS , incoming voice (CSD, video) call and any URC report.

2 If user set the AT + CFGRI =1, the pin "RI" will be set low by receiving SMS and incoming voice (CSD, video) call only.

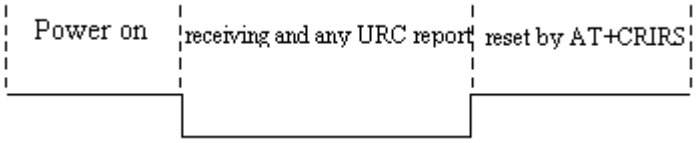

Figure 5: UART_RI behavior(Null Modem ,AT + CFGRI =0)

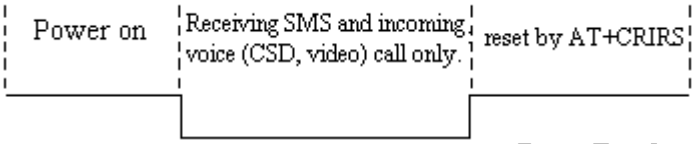

Figure 6: UART_RI behavior(Null Modem ,AT + CFGRI =1)

If using seven lines(Standard Modem) to setup communication between devices, the pin "RI" is different. First it stays high, when a voice (CSD) call coming, the pin "RI" is set to low for about 5900ms, then it is set high again about 100ms. The situation will repeat until that the call is answered or hung up. After the call is answered or hung up, the pin "RI" is set high.

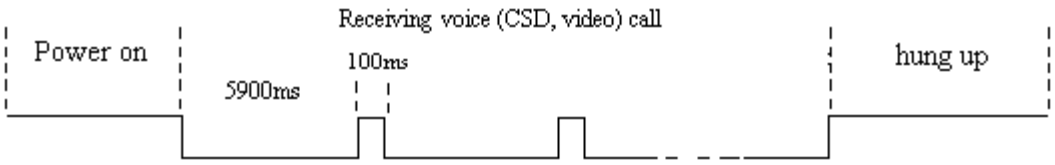

Figure 7: UART_RI behavior(Standard Modem)

NOTE:

1 SIM5XXX RXD must be pulled down and host CPU must support USB suspend mode when UART and USB interface are used at the same time. Otherwise SIM5XXX could not enter sleep mode.

2 For SIM5XXX, GPIO0, GPIO2, GPIO3 and GPIO5 can be multiplex as PCM function. If GPIO0 is used for PCM function, user must use DTR to wake up SIM5XXX.

3 Please reference SIM5xxx_Waking_up_Application_Note for detailed information about waking up SIM5XXX from sleep mode.

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