SIM5300E_Sleep_Mode_Application

Development Kit

Hardware Design

Reference Design

Software Design

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Revision History

Date	Version	Description of change	Author
2016-11-04	1.00	New Version	Xiuyu.zhang
2016-11-10	1.01	Update the format	Xiuyu.zhang

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FIGURE INDEX

1   INTRODUCTION

SIM5300E can enter into sleep mode automatically to conserve power when some condition satisfied. From working mode to sleep mode, the module takes less than 3 seconds. During sleep mode, SIM5300E can still receive paging, SMS and voice call from network.

This document describes what conditions are required to make the module enter into sleep mode and how to wake up the module or how to wake up the host by module.

2   SCOPE OF THE DOCUMENT

This document intends to describe the following modules:

● SIM5300E

● SIM5300EA

This document is based on the SIM5300E, and also works on the SIM5300EA.

3   SLEEP CONDITION

After the at command, at+csclk=1, has been transmitted to the module. Several hardware and software conditions must be satisfied together in order to let SIM5300E enter into sleep mode:

1) UART condition

2) USB condition

3) Software condition

3.1 UART CONDITION

Even one does not use UART interface, one must take care of this condition yet, one can use DTR pin as UART sleep indicator.

Host device can use DTR as an indicator to let SIM5300E enter into sleep mode or wakeup from sleep mode.

UART will ready to enter into sleep mode if DTR pin is pulled up.

UART will ready to exit from sleep mode if DTR pin is pulled down.

NOTE:

The connections to TXD and RXD of SIM5300E module should be floated or pulled up to make sure the successful sleep mode entry.

3.2 USB CONDITION

If one uses USB interface one must take care of this condition, otherwise just let this interface unconnected.

If host CPU supports USB suspend mode, there is nothing need to be done, since the USB controller will send suspend command to module if the BUS is idle for some time.

If host CPU doesn't support USB suspend mode, host needs to cut off VBUS line in order to let module enter into sleep mode. One can use a host GPIO to control a digital switch on/off.

NOTE:

Even with the USB suspend mode, the windows XP has not supported the function yet, whereas the Windows 7/8/10 systems could support the sleep function. In the windows XP system, one could only cut off VBUS line to enter the sleep mode.

3.3 SOFTWARE CONDITION

SIM5300E must be in idle mode (no data transmission, no audio playing, no other at commands running and so on) in order to let SIM5300E enter into sleep mode.

4 WAKEUP CONDITION

4.1 WAKEUP SIM5300E

SIM5300E can exit from sleep mode automatically when the following events happened:

1) SMS received

2) Incoming call happened

SIM5300E can exit from sleep mode manually when the following events are happened:

1. UART event

   Pulling DTR to low level or sending at commands to SIM5300E through main serial port.

NOTE:

The DTR operation is suggested.

The module will miss several first bits through the way of sending at commands, as those bits are used as the operation of waking up.

2. USB event

   Host could send commands to module when in suspend mode or Host connects the USB interface when host cuts off the VBUS line.

4.2 WAKEUP HOST

In UART SIM5300E uses RI pin to wake up the host only when incoming call happened, SMS received, and URC reported.

RI pin will stay high normally, and has three patterns to wake up the host:

When URC reported, this pin will change to low, and keep low for 120ms. Then it will change to high automatically.

When a SMS reported, this pin will change to low, and keep low for 120ms when a SMS is received. Then it will change to high.

When call reported, this pin will change to low. When any of the following events occur, the pin will change to high:
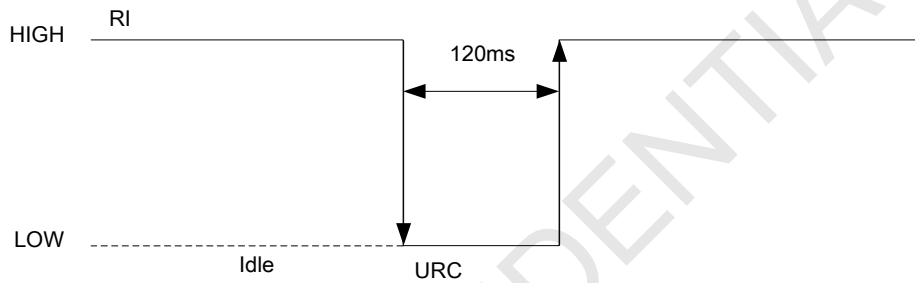
(1)Establishing the call

(2)Hanging up the call

Figure 1: UART RI behavior when URC reported (Null Modem)
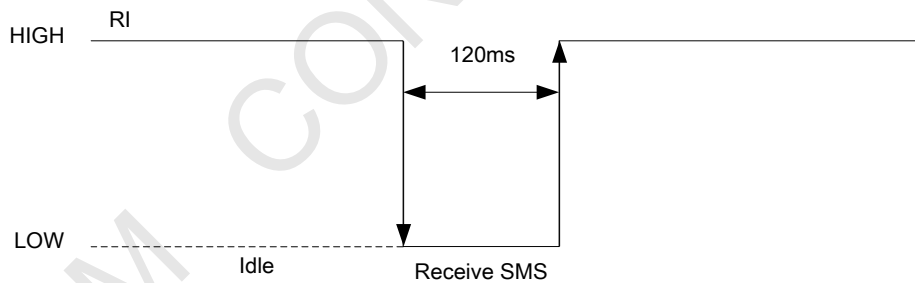

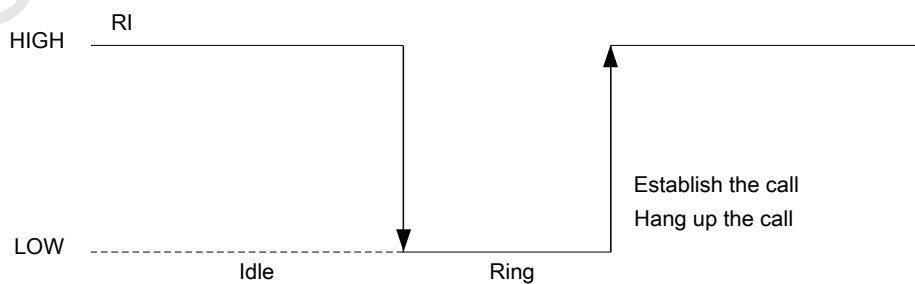**Figure 2: UART RI behavior when SMS received (Null Modem)**

Figure 3: UART RI behavior when incoming call happened (Null Modem)

5   DESIGN GUIDE

Figure 4 below is the reference circuit of the USB suspend mode interface.
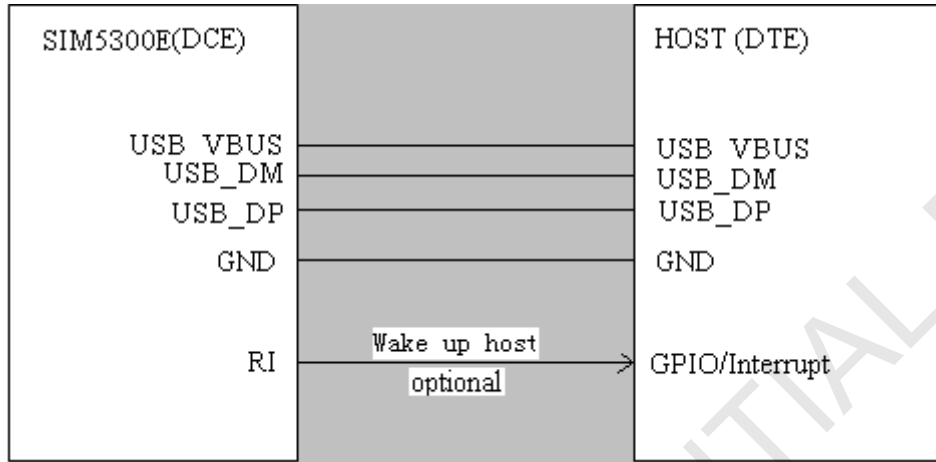

Figure 4: USB suspend mode interface connection

Figure 5 below is the reference circuit of no USB suspend mode interface.
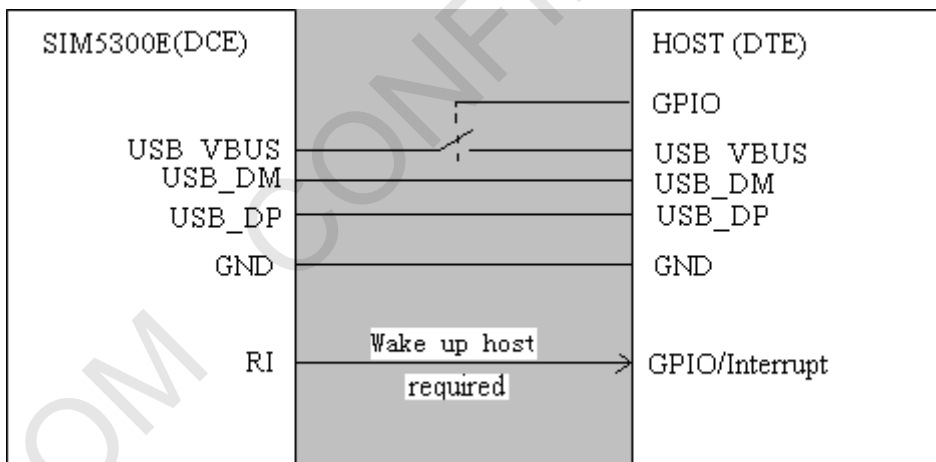

Figure 5: No USB suspend mode interface connection

One can use SIM5300E RI pin to wake up host on module side and use DTR to wake up SIM5300E on host side.
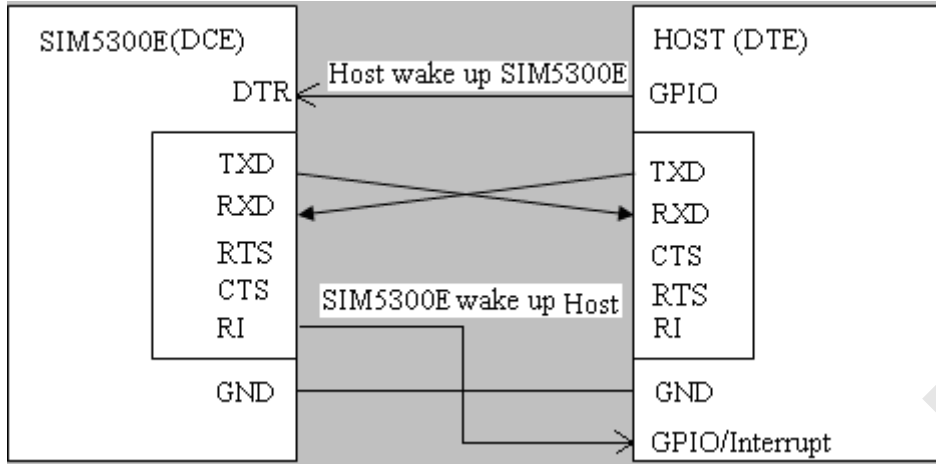Figure 6 below is the reference circuit.

Figure 6: Wake up each other

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