



# SIM800 Series\_Serial Port \_Application Note

GPRS Module

## **SIMCom Wireless Solutions Limited**

Building B, SIM Technology Building, No.633, Jinzhong Road

Changning District, Shanghai P.R. China

Tel: 86-21-31575100

[support@simcom.com](mailto:support@simcom.com)

[www.simcom.com](http://www.simcom.com)

<b>Document Title:</b>	SIM800 Series_Serial Port_Application Note
<b>Version:</b>	1.03
<b>Date:</b>	2020-06-18
<b>Status:</b>	Released

## GENERAL NOTES

SIMCOM OFFERS THIS INFORMATION AS A SERVICE TO ITS CUSTOMERS, TO SUPPORT APPLICATION AND ENGINEERING EFFORTS THAT USE THE PRODUCTS DESIGNED BY SIMCOM. THE INFORMATION PROVIDED IS BASED UPON REQUIREMENTS SPECIFICALLY PROVIDED TO SIMCOM BY THE CUSTOMERS. SIMCOM HAS NOT UNDERTAKEN ANY INDEPENDENT SEARCH FOR ADDITIONAL RELEVANT INFORMATION, INCLUDING ANY INFORMATION THAT MAY BE IN THE CUSTOMER'S POSSESSION. FURTHERMORE, SYSTEM VALIDATION OF THIS PRODUCT DESIGNED BY SIMCOM WITHIN A LARGER ELECTRONIC SYSTEM REMAINS THE RESPONSIBILITY OF THE CUSTOMER OR THE CUSTOMER'S SYSTEM INTEGRATOR. ALL SPECIFICATIONS SUPPLIED HEREIN ARE SUBJECT TO CHANGE.

## COPYRIGHT

THIS DOCUMENT CONTAINS PROPRIETARY TECHNICAL INFORMATION WHICH IS THE PROPERTY OF SIMCOM WIRELESS SOLUTIONS LIMITED COPYING, TO OTHERS AND USING THIS DOCUMENT, ARE FORBIDDEN WITHOUT EXPRESS AUTHORITY BY SIMCOM. OFFENDERS ARE LIABLE TO THE PAYMENT OF INDEMNIFICATIONS. ALL RIGHTS RESERVED BY SIMCOM IN THE PROPRIETARY TECHNICAL INFORMATION , INCLUDING BUT NOT LIMITED TO REGISTRATION GRANTING OF A PATENT , A UTILITY MODEL OR DESIGN. ALL SPECIFICATION SUPPLIED HEREIN ARE SUBJECT TO CHANGE WITHOUT NOTICE AT ANY TIME.

### **SIMCom Wireless Solutions Limited**

Building B, SIM Technology Building, No.633 Jinzhong Road, Changning District, Shanghai P.R.China

Tel: +86 21 31575100

Email: [simcom@simcom.com](mailto:simcom@simcom.com)

### **For more information, please visit:**

<https://www.simcom.com/download/list-863-en.html>

### **For technical support, or to report documentation errors, please visit:**

<https://www.simcom.com/ask/> or email to: [support@simcom.com](mailto:support@simcom.com)

**Copyright © 2020 SIMCom Wireless Solutions Limited All Rights Reserved.**

# About Document

## Version History

Version	Date	Owner	What is new
V1.00	2013-08-01	YangMing	New version
V1.01	2014-08-05	ChenHaibing	Chapter Scope, Add projects
			Chapter 6.5, Update the Table 3
			Chapter 7, Add dual serial function and AT+CMNRP
V1.02	2016-11-17	Chenhaibing	Chapter 5, modify the software flow control
		Youxiuying	Chapter 7, Add dual serial function of SIM800C and SIM800C-DS
V1.03	2020-06-15	Fumei.zeng /Wenje.Lai	Change the style

## Scope

This document presents the AT command of Serial port operation and application examples. This document can apply to SIM800 series modules with serial port function.

# Contents

<b>About Document .....</b>	<b>3</b>
Version History .....	3
Scope .....	3
<b>Contents.....</b>	<b>4</b>
<b>1 Introduction .....</b>	<b>8</b>
1.1 Purpose of the document.....	8
1.2 Related documents.....	8
1.3 Conventions and abbreviations.....	8
<b>2 Connection.....</b>	<b>9</b>
<b>3 URC Rule.....</b>	<b>11</b>
3.1 Communication with MCU .....	11
3.2 Communication with PC(RS232) .....	12
<b>4 Synchronize Band Rate .....</b>	<b>14</b>
4.1 URC may appended with “DS” .....	15
<b>5 Flow Control .....</b>	<b>16</b>
5.1 Software Flow Control (XON/XOFF flow control) .....	16
5.2 Hardware Flow Control (RTS/CTS flow control).....	17
<b>6 Control Signals.....</b>	<b>18</b>
6.1 CTS.....	18
6.2 RTS.....	18
6.3 DCD .....	18
6.4 DTR .....	18
6.5 RI .....	19
<b>7 Dual Serial Port Function .....</b>	<b>22</b>
7.1 Dual Serial Port Pin Definition.....	22
7.2 Restrictions of AT Command on Dual Serial Port Mode.....	25
7.3 Sleep Mode 1 of Dual Serial Port.....	26
7.3.1 Enter Sleep via UART1 .....	26
7.3.2 Exit Sleep via UART1 .....	26
7.3.3 Enter Sleep via UART2 .....	26
7.3.4 Exit Sleep via UART2.....	27
7.4 Sleep Mode 2 of Dual Serial Port.....	27
7.4.1 Enter Sleep via UART1 .....	27
7.4.2 Exit Sleep via UART1 .....	28
7.4.3 Enter Sleep via UART2 .....	28

7.4.4 Exit Sleep via UART2..... 29

SIMCom  
Confidential

## Table Index

Table 1: Logic levels of the serial port.....	11
Table 2: The voltage of RS232.....	12
Table 3: RI responds.....	19
Table 4: AT+CFGRI Indicate RI when using URC.....	20
Table 5: The dual serial pin of SIM800H and SIM800L.....	22
Table 6: The dual serial pin of SIM800 and SIM800M64.....	22
Table 7: Dual serial port feature.....	23
Table 8: The dual serial pin of SIM800C and SIM800C-DS.....	24
Table 9: AT command restricted on dual serial port mode.....	25

SIMCom  
Confidential

## Figure Index

Figure 1: Connection of the serial interfaces in full modem mode .....	9
Figure 2: Connection of the serial interfaces in null modem mode .....	9
Figure 3: The lever shifter by buffer with open drain outputs .....	12
Figure 4: The lever shifter by transistor for communication with MCU .....	12
Figure 5: The lever shifter by SP3238E for communication with PC.....	13
Figure 6: Synchronizing baud rate flow chart.....	14
Figure 7: Behaviors of RI .....	20
Figure 8: Connection of the serial interfaces.....	24
Figure 9: Connection of the serial interfaces.....	25

SIMCom  
Confidential

# 1 Introduction

## 1.1 Purpose of the document

This document describes the serial interface of the modules and how to take it into account in client's application design. This document can help user quickly understand serial interface of the modules.

## 1.2 Related documents

- [1] SIM800 Series\_AT Command Manual
- [2] SIM800 Series\_TCPIP\_Application Note

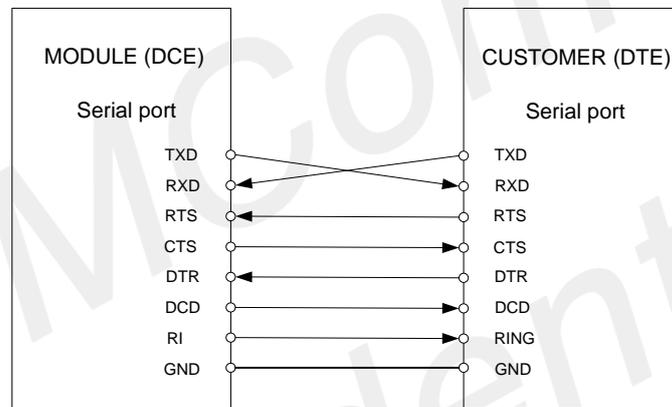
## 1.3 Conventions and abbreviations

Abbreviation	Description
DCE	Data Communication Equipment
DTE	Data Terminal Equipment
UART	Universal Asynchronous Receiver and transmitter

## 2 Connection

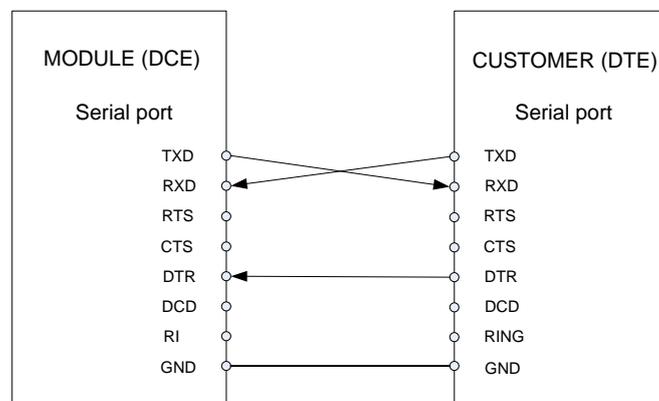
SIM800 series is designed as a DCE (Data Communication Equipment). It provides a full modem serial port which is used for data transmission and for sending AT commands. The serial port contains data lines TXD and RXD, hardware flow control lines RTS and CTS, status lines DTR, DCD and RI. Serial port interface is available which complies with 2.80 Volts interface.

When the module is used in full modem mode for data transmission, all the signal lines should be connected. The following figure shows the connection between module and client (DTE) in full modem mode.



**Figure 1: Connection of the serial interfaces in full modem mode**

When the module is used in null modem (no handshaking) mode for data transmission, only RXD and TXD are used in user's application, other serial pins should be kept open. The following figure shows the connection between module and client (DTE) in null modem mode.



**Figure 2: Connection of the serial interfaces in null modem mode**

**NOTE**

The DTR signal must be pulled to low level voltage when DTE is sending data to module. If DTR does not connect with DTE, DTR must be connected to GND via a 10K resistor.

SIMCom  
Confidential

## 3 URC Rule

The significant levels are 0V (for low data bit or ON condition) and 2.80V (for high data bit or OFF condition). For electrical characteristics please refer to the following table.

**Table 1: Logic levels of the serial port**

Parameter	Min	Max	Unit
$V_{IL}$	0	0.4	V
$V_{IH}$	2.4	3.0	V
$V_{OL}$	0	0.1	V
$V_{OH}$	2.7	3.0	V

If user's MCU or PC's voltage is out of the range, level shifter needs to be used.

### 3.1 Communication with MCU

The module can choose the level shifter by buffer with open drain outputs (e.g. NC7WZ07) or transistor.

**By buffer with open drain outputs:**

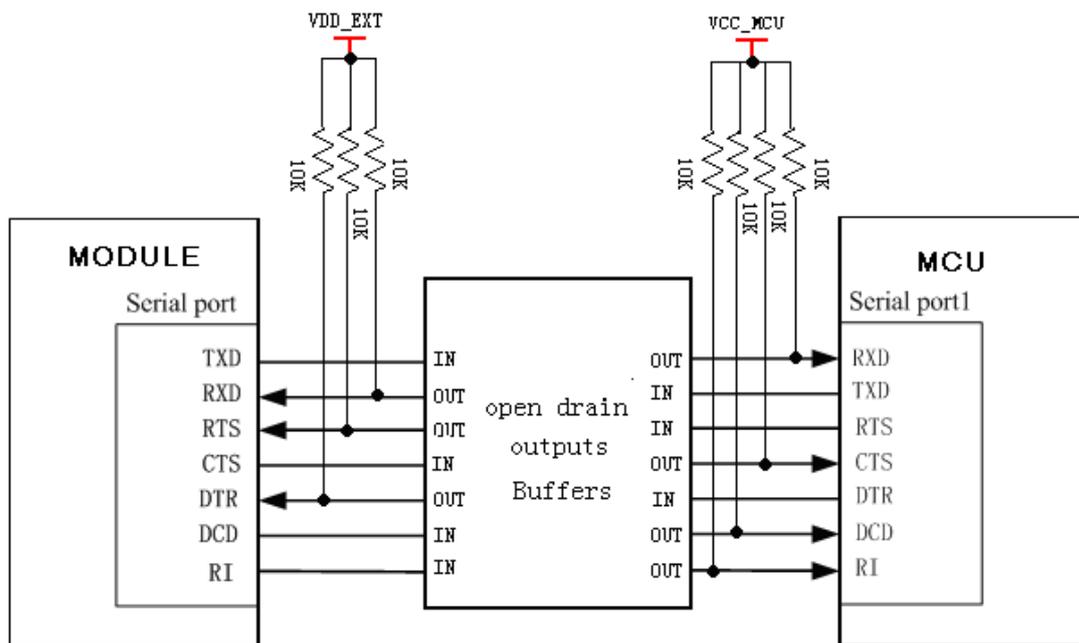


Figure 3: The lever shifter by buffer with open drain outputs

By transistor:

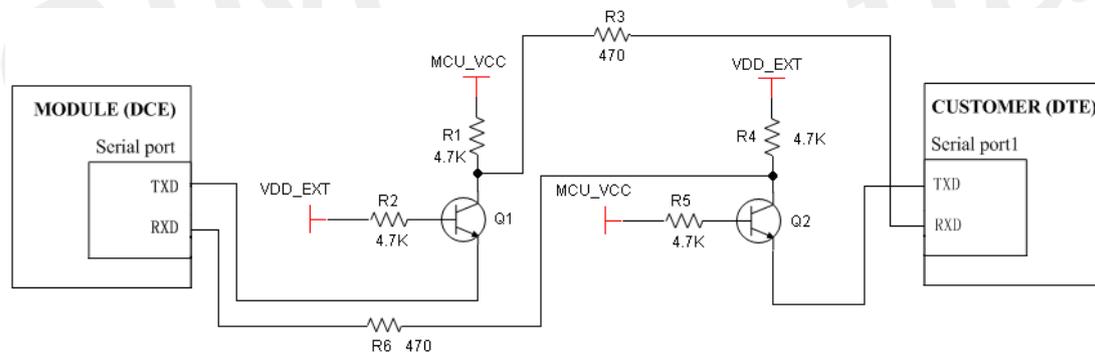


Figure 4: The lever shifter by transistor for communication with MCU

**NOTE**

VDD\_EXT is supplied by the module(2.80V), VCC\_MCU is voltage of user UART interface.

### 3.2 Communication with PC(RS232)

Table 2: The voltage of RS232

Parameter	Transmitter capable	Receiver capable	Unit
Logic 0	+5...+15	+3...+25	V
Logic 1	-5... -15	-3...-25	V
Undefined	-	-3...+3	V

It is suggested doing the level shifter by RS-232 transceivers (e.g.SP3238E or MAX3221 etc.)

Connect all signals:

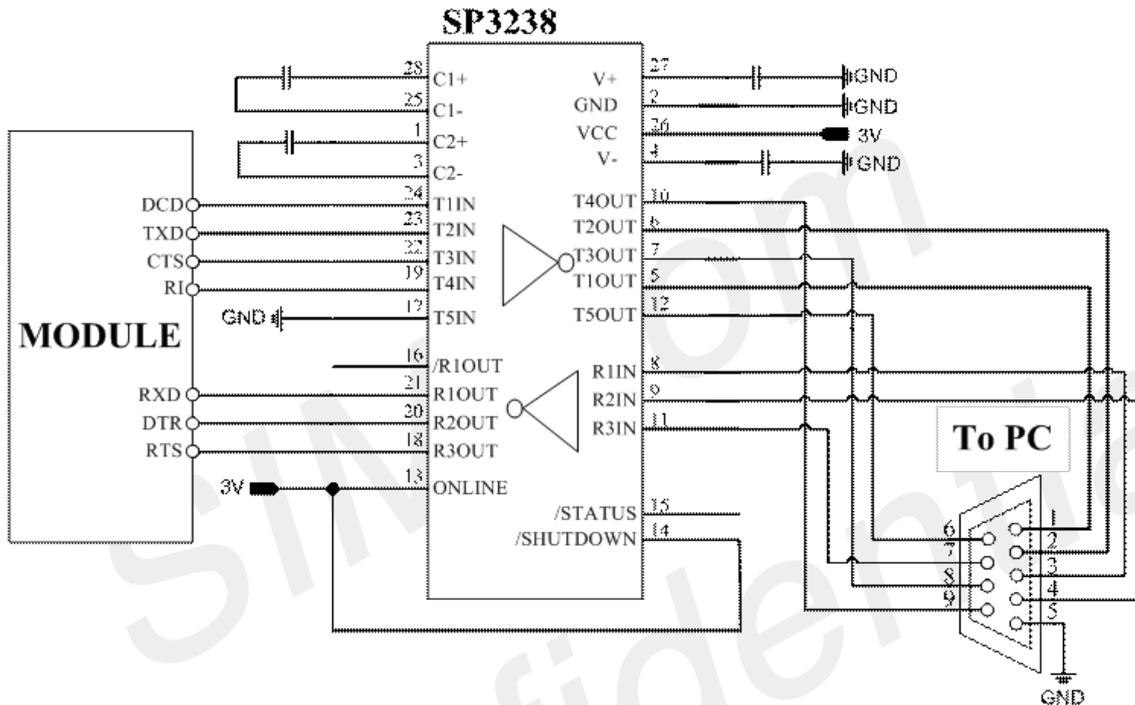


Figure 5: The level shifter by SP3238E for communication with PC

If just RXD and TXD are connected, MAX3221 can be chosen for the level shifter.

## 4 Synchronize Band Rate

SIM800 series is designed in autobauding mode by default. Autobauding allows SIM800 series to automatically detect the baud rate of the host device. In application, host device must to synchronize the baud rate with SIM800 series. Host device must firstly send character "AT" or "at" to synchronize the baud rate. It is recommended to send "AT" until host device receives the "OK" response, which means host device and SIM800 series are correctly synchronized. Once the baud rate is synchronized, it is suggested to use AT command "AT+IPR" to set SIM800 series baud rate according the host baud rate. Following figure shows the flow of synchronization of baud rate between SIM800 series and host device.

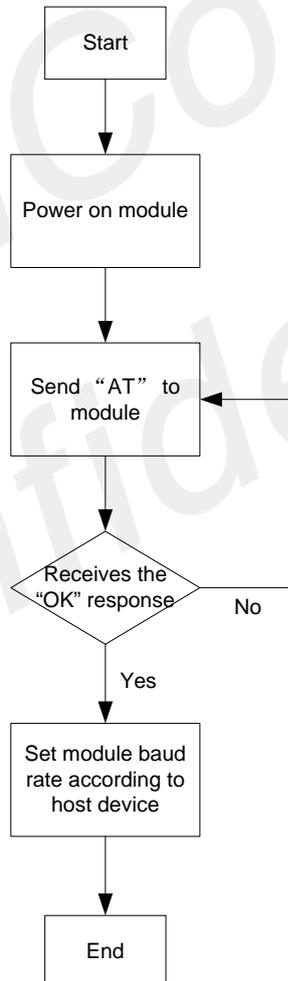


Figure 6: Synchronizing baud rate flow chart

## 4.1 URC may appended with “DS”

Here is a list shows which URC may be appended with “DS”:

	URC on SIM slot 1	URC on SIM slot 2
AT Commands According to GSM07.07	RING	RINGDS
	MO RING	MO RINGDS
	MO CONNECTED	MO CONNECTEDDS
	+CCWA:	+CCWADS:
	+CLCC:	+CLCCDS:
	+CLIP:	+CLIPDS:
	+COLP:	+COLPDS:
	+CPIN:	+CPINDS:
	+CR:	+CRDS:
	+CRING:	+CRINGDS
	+CREG:	+CREGDS:
	+CGREG:	+CGREGDS:
	+CSSI:	+CSSIDS:
	+CSSU:	+CSSUDS:
AT Commands According to GSM07.05	+CUSD:	+CUSDDS:
	+CMTI:	+CMTIDS:
	+CMT:	+CMTDS:
AT Commands for SIM Application Toolkit	+CDS:	+CSDS:
	+STKPCI:	+STKPCIDS:
AT Commands for GPRS	+PDP:	+PDPDS:
AT Commands for IP	+SAPBR:	+SAPBRDS:
AT Commands Special for SIMCom	+CSMINS:	+CSMINSDS:
	+CDRIND:	+CDRINDDS:
	+CSQN:	+CSQNDS:
	Call Ready	Call Ready DS
	SMS Ready	SMS Ready DS

## 5 Flow Control

Flow control is very important for correct communication between the module (DCE) and host device (DTE). In cases of a data or fax call, the sending device is transferring data faster than the receiving side is ready to accept. When the receiving buffer reaches its capacity, the receiving device should be capable to pause the sending device until it catches up.

SIM800 series is designed as no flow control by default. The AT command "AT+IFC" can be used to enable the hardware flow control or software flow control, which are basically two approaches to achieve data flow control.

### 5.1 Software Flow Control (XON/XOFF flow control)

Software flow control sends different characters to stop (XOFF, decimal 19) and resume (XON, decimal 17) data flow. It is quite useful in some applications that only use three wires on the serial interface.

The AT command "AT+IFC=1,1" can be used to enable software flow control in the DTE interface and within module. This setting is stored by AT&W.

Ensure that any communications software package (e.g. ProComm Plus, Hyper terminal or WinFax Pro) uses software flow control.

The following three special character have been used in the software flow control: XON(0x11) ,XOFF(0x13), ESCAPE(0x77). That how to use these function character is list as followings:

When the MCU has received much data from the modem by the serial port and the data can't be handled in time, the MCU can directly send the XOFF to inform the modem to stop sending data.

After the part or all of data have been handled by the MCU, the MCU need send XON to inform the modem continue to send the rest of the data.

Because the data sent to modem may include the character of 0x11, 0x13 and 0x77, the MCU must convert these characters and then send them to modem, or the modem will mistake these data for the control character of XON, XOFF and ESCAPE. The 0x11 convert to 0x77 0xEE two character, 0x13 to 0x77 0xEC and 0x77 to 0x77 0x88. When receiving these data that begin with 0x77, the modem will automatically restore them into the original data.

In the same way, when the modem received much data from the MCU and these data can not be handled in time, the modem will send XOFF to inform the MCU to stop sending data. So it is essential that the MCU is able to monitor the data from the modem whether these are character of XON, XOFF and ESCAPE.

After the part or all of data have been handled by modem, the modem need send XON to inform the MCU continue to send the rest of the data.

Because the data sent to MCU may include the character of 0x11, 0x13 and 0x77, the modem will convert these characters and then send them to MCU, or the MCU will mistake these data for the control character of XON, XOFF and ESCAPE. The 0x11 convert to 0x77 0xEE two character, 0x13 to 0x77 0xEC and 0x77 to 0x77 0x88. When receiving these data that begin with 0x77, the MCU must restore them into the original data to hand them over to upper application.

## 5.2 Hardware Flow Control (RTS/CTS flow control)

Hardware flow control achieves the data flow control by controlling the RTS/CTS line. When the data transfer should be suspended, the CTS line is set inactive until the transfer from the receiving buffer has been completed. When the receiving buffer is OK to receive more data, CTS goes active once again.

The AT command "AT+IFC=2,2" can be used to enable hardware flow control in the DTE interface and within module. This setting is stored by AT&W.

To achieve hardware flow control, ensure that the RTS/CTS lines are present on user's application platform.

### NOTE

The DTR signal must be pulled to low level voltage when DTE is sending data to the module. Otherwise, the CTS signal may always not be asserted by module and the handshaking will not be established.

## 6 Control Signals

### 6.1 CTS

This signal is asserted by the module to inform the DTE device that transmission may begin. RTS and CTS are commonly used as handshaking signals to moderate the flow of data into the module.

### 6.2 RTS

This signal is asserted (low level) to prepare the module (DCE) for accepting transmitted data from the DTE device.

### 6.3 DCD

The AT command AT&C can be used to set DCD function mode. When set "AT&C0", DCD line is always ON (low). When set "AT&C1", DCD line is ON (low) only in the presence of data carrier.

### 6.4 DTR

Module will automatically go into SLEEP mode (set AT+CSCLK=1) if DTR is set to high level and there is no on air and no hardware interrupt (such as GPIO interrupt or data on serial port). In this case, the current consumption of module will reduce to the minimal level. During SLEEP mode, the module can still receive paging message and SMS from the system normally. If DTR Pin is pulled down to a low level, this signal will wake up module from SLEEP mode. The serial port will be active after DTR changes to low level about 50ms. DTR must be held low during the call.

**The AT command "AT&D" can be used to set DTR function mode.**

- When it is set to "AT&D0", TA ignores status on DTR.
- When it is set to "AT&D1", ON (low)->OFF (high) on DTR: module will be changed to command mode when the connected call is remained.
- When it is set to "AT&D2", ON->OFF on DTR and pull DTR to high more than the time that the

setting value by AT+DTR=1: call is disconnected, module is changed to command mode.

TCP/IP applications only support AT+DTR=1 and AT+DTR=0. In TCP/IP application (for more detail, please refer to TCP/IP application NOTE), DTR line of serial port can also be used to switch from data mode to command mode. To use this method, AT+DTR=1 should be set firstly. Pull DTR line to ground for at least 1 second and then pull up, the module will switch from data mode to command mode and OK will be returned which indicates the module is in command mode.

## 6.5 RI

RI responds as table 3.

**Table 3: RI responds**

State	RI respond
Standby	HIGH
AT Commands According to GSM07.07	RING
Calling (include Voice and Data) (NOT controlled by the setting of CFGRI)	<p>If the module is used as caller, the RI will maintain high. But when it is used as receiver, the responses of RI are listed in the following: Change to LOW, then:</p> <ul style="list-style-type: none"> <li>( 1 ) Change to HIGH when call is established;</li> <li>( 2 ) Change to HIGH when ATH command is executed;</li> <li>( 3 ) Change to HIGH when sender hangs up;</li> <li>( 4 ) Change to HIGH when SMS is received.</li> </ul>
SMS (NOT controlled by the setting of CFGRI)	<p>When receiving SMS, the RI will be changed to LOW and hold at low level for about 120 ms, then it is changed to HIGH; meanwhile the module will report following URCs:</p> <ul style="list-style-type: none"> <li>+CMTI:</li> <li>+CMT:</li> <li>+CDS:</li> </ul>
TCPIP (Controlled by the setting of CFGRI)	<p>When execute following TCPIP AT command, the RI will be changed to LOW and hold at low level for about 120 ms, then it is changed to HIGH.</p> <ul style="list-style-type: none"> <li>( 1 )TCP activate the account by the AT+CIICR command</li> </ul>

	<p>( 2 ) TCP deactivate the account by the AT+CIPSHUT command</p> <p>( 3 ) TCP create the connect by AT+CIPSTART command</p> <p>( 4 ) TCP close the connect by AT+CIPCLOSE command</p> <p>( 5 ) TCP send data by AT+CIPSEND command</p> <p>( 6 ) When receiving TCPIP data</p>
FTP (Controlled by the setting of CFGRI)	When FTP reports URCs, the RI will be changed to LOW and hold at low level for about 120 ms, then it is changed to HIGH.
URC (controlled by the setting of CFGRI)	<p>When report following URCs, the RI will be changed to LOW and hold at low level for about 120 ms, then it is changed to HIGH.</p> <p>UNDER-VOLTAGE WARNNING</p> <p>OVER-VOLTAGE WARNNING</p> <p>Call Ready</p> <p>ALARM RING</p>

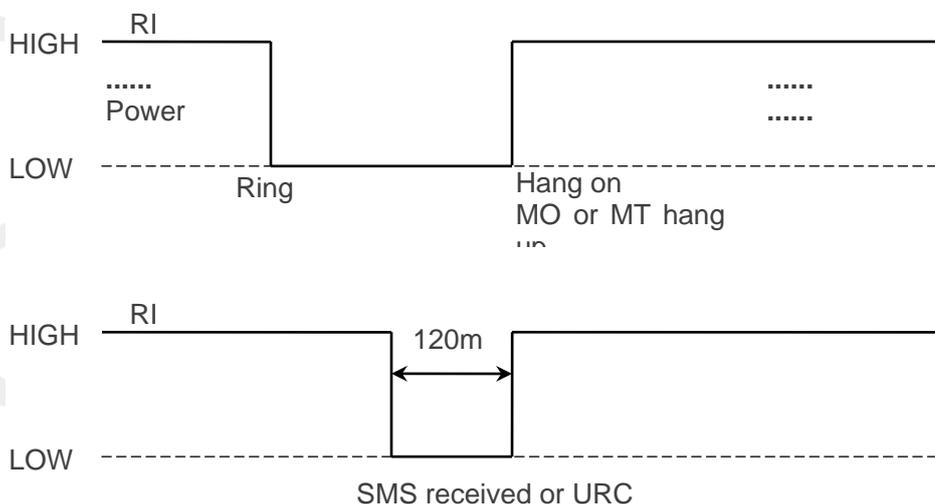


Figure 7: Behaviors of RI

Table 4: AT+CFGRI Indicate RI when using URC

**AT+CFGRI Indicate RI when using URC**

Read Command <b>AT+CFGRI?</b>	Response <b>+CFGRI: &lt;status&gt;</b>  <b>OK</b>
Write Command <b>AT+CFGRI=&lt;status&gt;</b>	Response <b>OK</b> or <b>ERROR</b>
Reference	Note

### Defined Values

<b>&lt;status&gt;</b>	<u>0</u> off 1 on
-----------------------	----------------------

It's recommended connect the RI to an interrupt port of MCU. It can be used for waking up from power saving mode. That means the MCU will receive an interrupt while a falling edge coming on RI.

## 7 Dual Serial Port Function

SM800H, SIM800L, SIM800, SIM800M64, SIM800C and SIM800C-DS support the dual serial port function.

### 7.1 Dual Serial Port Pin Definition

SM800H, SIM800L, SIM800 and SIM800M64 support the dual serial port function, the hardware will support one full serial port (UART2) and one 3-line serial port (UART1) at the same time. This dual serial port function must set by the AT command of "AT+CMNRP=1" on the UART1 port before using. If the customer needs the dual serial port function, the hardware must be designed as the following table:

**Table 5: The dual serial pin of SIM800H and SIM800L**

Serial port1	Name	Pin	Direction	Description
UART1_TXD	TXD	32	out	Used by update software
UART1_RXD	RXD	31	in	
Serial port2	Name	Pin	Direction	Description
UART2_TXD	RTS	33	out	
UART2_RXD	CTS	34	in	
UART2_RTS	UART_RI	68	in	Clear to send
UART2_CTS	UART_DCD	70	out	Require to send
UART2_DTR	UART_DTR	69	in	
UART2_RI	ROW4	63	out	
UART2_DCD	COL4	24	out	

**Table 6: The dual serial pin of SIM800 and SIM800M64**

Serial port1	Name	Pin	Direction	Description
UART1_TXD	TXD	9	out	Used by update software
UART1_RXD	RXD	10	in	
Serial port2	Name	Pin	Direction	Description
UART2_TXD	RTS	8	out	
UART2_RXD	CTS	7	in	
UART2_RTS	UART_RI	4	in	Clear to send

UART2_CTS	UART_DCD	5	out	Require to send
UART2_DTR	UART_DTR	3	in	
UART2_RI	ROW4	40	out	
UART2_DCD	COL4	47	out	

**NOTE**

- 1: The dual serial port function needs two pin of COL4 and ROW4.
- 2: The AT command of AT+CMNRP" only can be executed on UART1.
- 3: Only B05 and later version support dual serial port function.

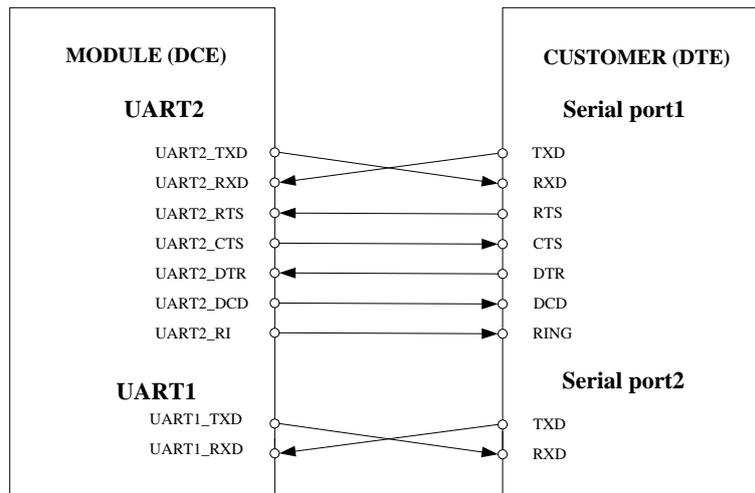
**Table 7: Dual serial port feature**

<b>AT+CMNRP Dual serial port feature</b>	
Read Command <b>AT+CMNRP=?</b>	Response <b>+CMNRP: (0-1)</b>  <b>OK</b>
Read Command <b>AT+CMNRP?</b>	Response <b>+CMNRP: &lt;mode&gt;</b>  <b>OK</b>
Write Command <b>AT+CMNRP=&lt;mode&gt;</b>	Response <b>OK</b> or <b>ERROR</b>
Parameter Saving Mode	AT&W_SAVE
Max Response Time	-
Reference	Note

**Defined Values**

<b>&lt;mode&gt;</b>	<u>0</u> single serial port mode, disable uart port 2.
	1 dual serial port mode, enable uart port 2.

The following figure shows the connection between module and client (DTE), the figure suits for SIM800H, SIM800L, SIM800 and SIM800M64.



**Figure 8: Connection of the serial interfaces**

SM800C and SIM800C-DS support the dual serial port function, the hardware will support one full serial port (UART1) and one 3-line serial port (UART2) at the same time. If the customer needs the dual serial port function, the hardware must be designed as the following table:

**Table 8: The dual serial pin of SIM800C and SIM800C-DS**

Serial port1	Name	Pin	Direction	Description
UART1_TXD	UART1_TXD	1	out	Used by update software
UART1_RXD	UART1_RXD	2	in	
UART1_RTS	UART1_RTS	3	in	Clear to send
UART1_CTS	UART1_CTS	4	out	Require to send
UART1_DTR	UART1_DTR	6	in	
UART1_RI	UART1_RI	7	out	
UART1_DCD	UART1_DCD	5	out	
Serial port2	Name	Pin	Direction	Description
UART2_TXD	UART2_TXD	22	out	
UART2_RXD	UART2_RXD	23	in	

The following figure shows the connection between module and client (DTE), the figure suits for SIM800C and SIM800C-DS.

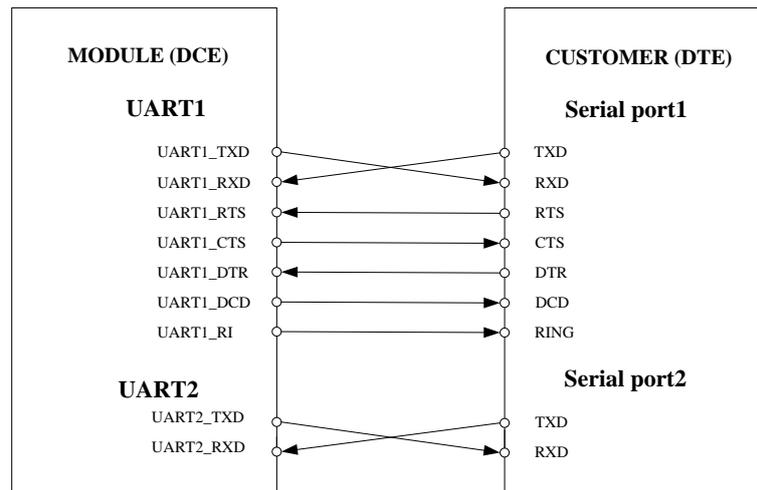


Figure 9: Connection of the serial interfaces

## 7.2 Restrictions of AT Command on Dual Serial Port Mode

When the module works on dual serial port mode, some of AT command can only be executed on one serial port, these AT commands list in following table:

**Table 9: AT command restricted on dual serial port mode**

The following figure suits for SIM800H, SIM800L, SIM800 and SIM800M64.

AT command	UART1	UART2	Note
AT+IFC=2,2	Not support	Support	UART1 don't contain CTS and RTS pin
AT+CSCLK=1	Not support	Support	UART1 don't contain DTR pin
ATD*99# (PPP)	Not support	Support	UART1 will lost data after PPP connected
AT+CSCLK=2	Support	Not support	The RXD of UART2 cannot be used as interruption
AT+CMNRP=0	Support	Not support	
AT+CMNRP=1	Support	Not support	

The following figure suits for SIM800C and SIM800C-DS.

AT command	UART1	UART2	Note
AT+IFC=2,2	Support	Not support	UART2 don't contain CTS and RTS pin
AT+CSCLK=1	Support	Not support	UART2 don't contain DTR pin
ATD*99# (PPP)	Support	Not support	UART2 will lost data after PPP connected
AT+CSCLK=2	Support	Support	

## 7.3 Sleep Mode 1 of Dual Serial Port

This chapter suits for SIM800H, SIM800L, SIM800 and SIM800M64.

On dual serial port mode, the UART1 and UART2 both are autobauding rate (the value of "AT+IPR" is 0). The module cannot enter sleep mode in the absence of synchronous serial port baud rate after module power on. Only the UART1 and UART2 have both synchronized baud rate, the module can enter sleep mode.

### 7.3.1 Enter Sleep via UART1

On dual serial port mode, UART1 only contain 3 lines (TXD, RXD, and GND). Only the sleep mode2 can be used. After setting "AT+CSCLK=2" command, the module will continuously monitor the serial port data signal. When there is no data transfer over 5 seconds on the serial port and there is no on air and hardware interrupts (such as GPIO interrupt), the module will enter sleep mode2 automatically. At this sleep mode, the module also can receive incoming call and new SMS from network.

### 7.3.2 Exit Sleep via UART1

When the module is in sleep mode2 (AT+CSCLK=2), the following methods can wake up it.

- Receive a voice or data call from network.
- Receive a SMS from network.
- Receive external interrupt.
- UART1 receive data (the first character will lose).

#### NOTE

AT command from UART2 can not wake up the module; pull down DTR pin of UART2 can not wake up the module too.

### 7.3.3 Enter Sleep via UART2

Customer can control the module to enter or exit the sleep mode1 (AT+CSCLK=1) by DTR signal. When DTR is in high level and without interrupt (on air and hardware such as GPIO interrupt or data on serial port), the module will enter sleep mode1 automatically. In this mode, the module can still receive paging or SMS

from network but the serial port is not accessible.

### 7.3.4 Exit Sleep via UART2

When the module is in sleep mode1 (AT+CSCLK=1), the following methods can wake up it.

- Receive a voice or data call from network.
- Receive a SMS from network.
- Receive external interrupt.
- Pull down DTR pin.

After module has received incoming call or new SMS, serial port can report URC, but the serial port can not input AT command. Only after the DTR pin of UART2 pull to low level for 50ms, the serial port can input AT command.

#### NOTE

The AT command from UART1 can not wake up the module.

## 7.4 Sleep Mode 2 of Dual Serial Port

This chapter suits for SIM800C and SIM800C-DS.

On dual serial port mode, the UART1 and UART2 both are autobauding rate (the value of "AT+IPR" is 0). The module cannot enter sleep mode in the absence of synchronous serial port baud rate after module power on. Only the UART1 and UART2 have both synchronized baud rate, the module can enter sleep mode.

### 7.4.1 Enter Sleep via UART1

Customer can control the module to enter or exit the sleep mode1 (AT+CSCLK=1) by DTR signal. When DTR is in high level and without interrupt (on air and hardware such as GPIO interrupt or data on serial port), the module will enter sleep mode1 automatically. In this mode, the module can still receive paging or SMS from network but the serial port is not accessible.

After setting "AT+CSCLK=2" command, the module will continuously monitor the serial port data signal. When there is no data transfer over 5 seconds on the serial port and there is no on air and hardware interrupts (such as GPIO interrupt), the module will enter sleep mode2 automatically. At this sleep mode, the module also can receive incoming call and new SMS from network.

#### 7.4.2 Exit Sleep via UART1

When the module is in sleep mode1 (AT+CSCLK=1), the following methods can wake up it.

- Receive a voice or data call from network.
- Receive a SMS from network.
- Receive external interrupt.
- Pull down DTR pin.

After module has received incoming call or new SMS, serial port can report URC, but the serial port cannot input AT command. Only after the DTR pin of UART2 pull to low level for 50ms, the serial port can input AT command.

When the module is in sleep mode2 (AT+CSCLK=2), the following methods can wake up it.

- Receive a voice or data call from network.
- Receive a SMS from network.
- Receive external interrupt.
- UART1 receive data (the first character will lose).

#### NOTE

The AT command from UART2 cannot wake up the module.

#### 7.4.3 Enter Sleep via UART2

On dual serial port mode, UART2 only contain 3 lines (TXD, RXD, and GND). Only the sleep mode2 can be used. After setting "AT+CSCLK=2" command, the module will continuously monitor the serial port data signal. When there is no data transfer over 5 seconds on the serial port and there is no on air and hardware interrupts (such as GPIO interrupt), the module will enter sleep mode2 automatically. At this sleep mode, the module also can receive incoming call and new SMS from network.

#### 7.4.4 Exit Sleep via UART2

When the module is in sleep mode2 (AT+CSCLK=2), the following methods can wake up it.

- Receive a voice or data call from network.
- Receive a SMS from network.
- Receive external interrupt.
- UART2 receive data (the first character will lose).

#### NOTE

AT command from UART1 cannot wake up the module; pull down DTR pin of UART1 cannot wake up the module too.

SIMCom  
Confidential