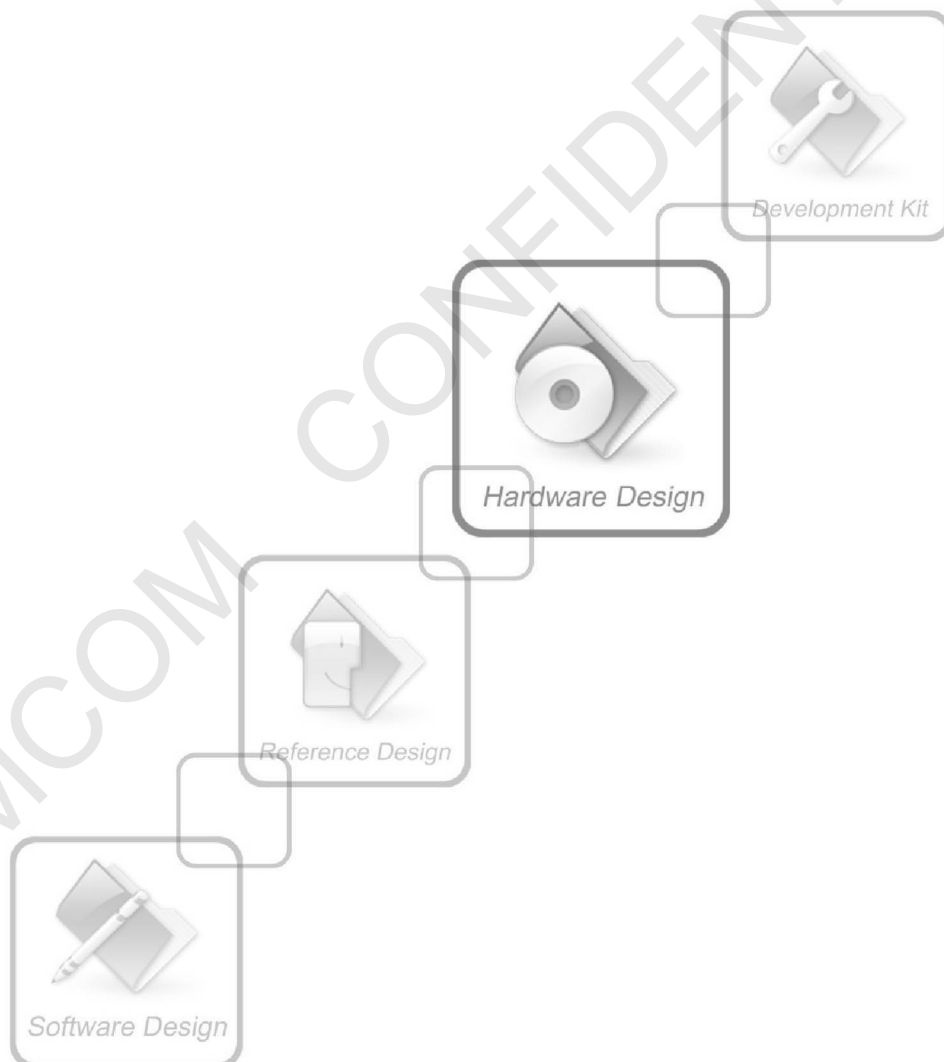




SIM5300E_UART_Application_Note



Document Title	SIM5300E_UART_Application_Note
Version	1.01
Date	2016-11-10
Status	Released
Document Control ID	SIM5300E_UART_Application_Note_V1.01

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 Limited. Copying this document and giving it to others, using the documents contents, and communicating the contents thereof are forbidden without express authority. Offenders are liable to the payment of damages. All rights reserved in the event of grant of a patent or the registration of a utility model or design. All specification supplied herein are subject to change without notice at any time.

Copyright © Shanghai SIMCom Wireless Solutions Ltd. 2016

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

SIMCOM CONFIDENTIAL FILE

CONTENTS

CONTENTS	III
1 INTRODUCTION	1
2 SCOPE	1
3 CONNECTION	1
3.1 HARDWARE INTERFACE	1
3.2 CONNECT TO HOST	2
4 SYNCHRONIZE BAUD RATE	3
5 FLOW CONTROL	5
5.1 HARDWARE FLOW CONTROL (RTS/CTS)	5
5.2 SOFTWARE FLOW CONTROL (XON/XOFF)	5
6 CONTROL SIGNALS	5
6.1 RTS	5
6.2 CTS	5
6.3 DCD	6
6.4 DTR	6
6.5 RI	6
7 APPENDIX	7
A. RELATED DOCUMENTS	7
B. TERMS AND ABBREVIATIONS	7

1 INTRODUCTION

This document describes the UART interface of SIMCom 3G modules. The MAIN port has several features:

- Support both Full modem and Null modem connections.
- Support Hardware flow control.
- Support Software flow control.
- Support Auto baud rate synchronize.
- Support main communication baud rate including: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400, 460800.
- Support autobauding as the following baud rates: From 1200bps to 230400bps.

2 SCOPE

This document describes how to use UART interfaces of SIMCom SIM5300E and SIM5300EA modules. Examples are also given for reference. This document is based on SIM5300E and can also be used on SIM5300EA.

3 CONNECTION

SIMCom 3G modules designed as a DCE (Data Communication Equipment). It provides a null or full modem which is used for data transmission and sending AT commands.

The default baud rate is auto baud rate synchronize.

3.1 HARDWARE INTERFACE

Table 1: Pin Description

Pin type	Pin Name	I/O	Active Voltage	Default Status
UART	UART_RXD	I	High/Low	Pull-Up
	UART_TXD	O	High/low	Pull-Up
	UART_RTS	I	High/low	Pull-Down
	UART_CTS	O	High/low	Pull-Down
	UART_DTR	I	High/low	No pull-up or pull-down (floating)
	UART_DCD	O	High/low	Pull-Up
	UART_RI	O	High/low	Pull-Up

More pin information refers to chapter 5.

Table 2: Logic level

Parameter	Min	Max	Unit
Logic low input	-0.2	0.36	V
Logic high input	1.26	2	V
Logic low output	0	0.2	V
Logic high output	1.6	1.85	V

3.2 CONNECT TO HOST

When the module is used as a null modem for data transmission, only RXD and TXD signal PINs are used, the following figure shows the connection between SIM5300E module and DTE (customer's CPU).

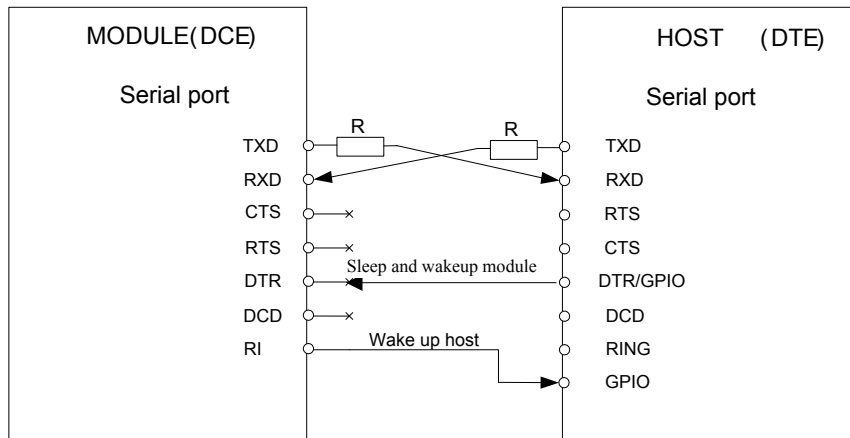


Figure 1: Null modem

When the module is used as a full modem for data transmission, all the signal PIN should be connected, including TXD, RXD, CTS, RTS, DTR, DCD and RI, for the details, please refer to the Control Signals section below. The following figure shows the connection between SIM5300E module and DTE (customer’s CPU).

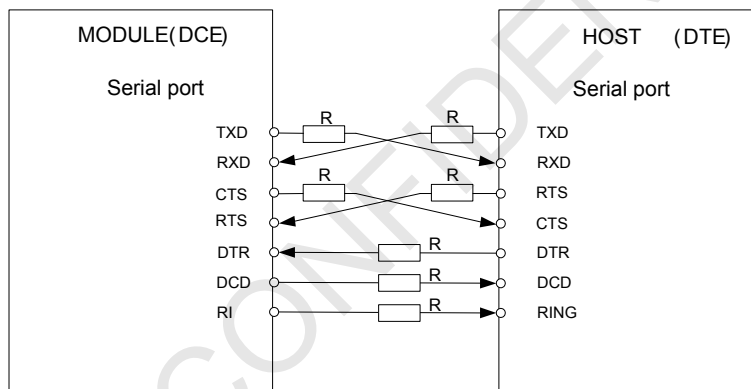


Figure 2: Full modem

Note: For difference devices, the name of RTS PIN maybe confused as CTS PIN, and the name of CTS PIN maybe confused as RTS PIN, the I/O direction of SIM5300E module’s CTS PIN is OUT, and RTS PIN is IN, user can determine the connections by the I/O direction.

4 SYNCHRONIZE BAUD RATE

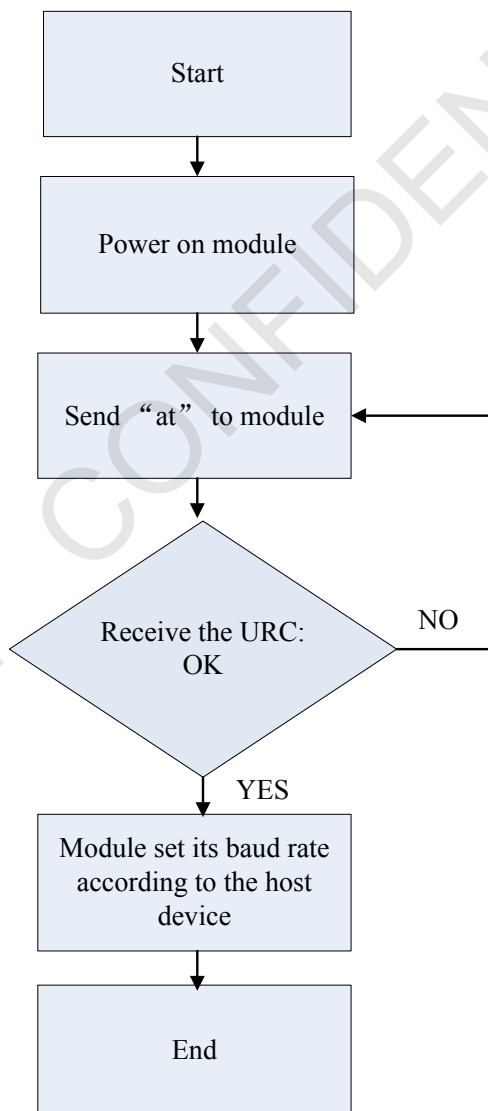
SIM5300E is designed in autobauding mode by default. Autobauding allows SIM5300E to automatically detect the baud rate of the host device. In application, host device must synchronize the baud rate with SIM5300E. Host device must firstly send character “A” to synchronize the baud rate. It is recommended to send “AT” until host device receives the “OK” response, which means host device and SIM5300E are correctly synchronized. Once the baud rate is synchronized, it is suggested to use AT command “AT+IPR” to set SIM5300E baud rate according the host baud rate.

The function is supported in +IPR.

When IPR is set to 0, autobaud is activated.

TA send "AT+IPR=0" command to modem, then TA will be get Autobaud support bitrates ("Autobaud support: (1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400)").

You can use AT command "AT+IPR=x" to set a fixed baud rate among 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400, 460800. But the commands can't be saved in non-volatile memory.



Baud rate synchronization chart

5 FLOW CONTROL

Flow control is very important during the transmission (large data) between the module (DCE) and the terminal device (DTE). When the receiving buffer reaches its capacity, the receiving device should be capable of pausing the sending device until it overflows. SIM5300E modules are designed as no flow control by default, but user can enable this function by AT command.

5.1 HARDWARE FLOW CONTROL (RTS/CTS)

Hardware flow control achieves the data flow control by controlling the RTS/CTS line which follows the RS232 standard. The command “AT+IFC=2, 2” can be used to enable hardware flow control, these settings are stored automatically.

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

5.2 SOFTWARE FLOW CONTROL (XON/XOFF)

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.

The AT command “AT+IFC=1, 1” can be used to enable software flow control, this setting is stored automatically

6 CONTROL SIGNALS

6.1 RTS

When the module is in hardware flow control mode, this signal is asserted (low level) to indicate the preparation of the module (DCE) for accepting transmitted data from the DTE device.

DCE stop transmitting data if RTS PIN is high level, transmission begins or continues when RTS is low level. If RTS goes high in the middle of character transmission, the module (DCE) waits for a completed transmission before stop transmitting data.

6.2 CTS

When this pin is in hardware flow control mode, this signal is asserted by the module (DCE) to inform the DTE device that transmission may begin.

The CTS PIN output high level when the RX FIFO (512 Bytes) level of the module (DCE) is the same or greater than 64, when the Rx FIFO level falls below 64 the CTS PIN output low level.

6.3 DCD

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

When you send the AT command: at+csclk=1 and pull the DTR pin high, the module will enter sleep mode automatically. During the sleep mode, module could get the SMS and phone call as usual. And once you pull down the DTR pin, the module will be waked up immediately and the UART function will resume working.

6.5 RI

This PIN is in WAKEUP_HOST mode by default.

Table 3: RI Respond

State	RI Respond
Standby	HIGH
Voice/Data call	Change to LOW, then: (1) Change to HIGH when call is established. (2) Use AT command ATH, the RI PIN is changed to HIGH. (3) Sender hangs up, change to HIGH. (4) SMS received.
SMS	When receiving SMS, the RI PIN will be changed to LOW level for about 120ms, and then it is changed to HIGH level.
URC	The pin is changed to low, and kept low for 120ms when some URCs are reported. Then it is changed to high.

7 APPENDIX

A. RELATED DOCUMENTS

Table 4: Related documents

SN	Document name	Remark
[1]	SIM5300E_Sleep_Mode_Application_Note_V0.1.doc	Low Power Application Note

B. TERMS AND ABBREVIATIONS

Table 5: Terms and Abbreviations

Abbreviation	Description
UART	Universal Asynchronous Receiver/Transmitter
URC	Unsolicited Result Code
DTE	Data Terminal Equipment
DCE	Data Communication Equipment

CONTACT US:

Shanghai SIMCom Wireless Solutions Ltd.

Add: Bldg A, SIM Technology Bldg., No.633, Jinzhong Road, Changning Dist., Shanghai P.R. China 200335

Tel: +86 21 32523424

Fax: +86 21 32523020

Email: simcom@sim.com

Website: www.simcomm2m.com

SIMCOM CONFIDENTIAL FILE