GSM EVB User Guide

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About the Document

History

Revision	Date	Author	Description
1.0	2009-06-17	Tracy ZHANG	Initial
1.1	2009-11-12	Yong AN	1. Modified Figure 5, 6, 7 and 10. 2. Added some contents on how to better operate module for customers when module is set to autobauding by default in Chapter 5.2.
2.0	2011-04-15	Roy CHEN	Added Introduction to UART in Section 5.6.
3.0	2013-05-03	Tony WU	Added SD card connector instead of LCD display connector.
3.1	2013-09-23	Tony WU	Optimized Introduction description.
3.2	2014-01-14	Vivian WANG	Added introduction to SD interface.
3.3	2015-05-20	Tony WU	1. Changed module name from "M10" to "GSM" 2. Added applicable modules

Contents

Table Index

Figure Index

1 Introduction

In order to help you to develop applications with Quectel modules, Quectel supplies evaluation board (EVB) for you to test our modules. This document can help you quickly understand the EVB interface specifications, electrical and mechanical details and know how to use it.

This document is applicable for all GSM modules and UC15 module.

1.1. Safety Information

The following safety precautions must be observed during all phases of the operation, such as usage, service or repair of any cellular terminal or mobile incorporating module. Manufacturers of the cellular terminal should send the following safety information to users and operating personnel and to incorporate these guidelines into all manuals supplied with the product. If not so, Quectel does not take on any liability for customer failure to comply with these precautions.

	Full attention must be given to driving at all times in order to reduce the risk of an accident. Using a mobie while driving (even with a handsfree kit) cause distraction and can lead to an accident. You must comply with laws and regulations restrcting the use of wireless devices while driving.
	Switch off the cellular terminal or mobile before boarding an aircraft. Make sure it switched off. The operation of wireless appliances in an aircraft is forbidden to prevent interference with communication systems. Consult the airline staff about the use of wireless devices on boarding the aircraft. If your device offers a Flight Mode which must be enabled prior to boarding an aircraft.
	Switch off your wireless device when in hospitals or clinics or other health care facilities. These requests are desinged to prevent possible interference with sentitive medical equipment.
SOS	Cellular terminals or mobiles operate over radio frequency signal and cellular network and cannot be guaranteed to connect in all conditions, for example no mobile fee or an invalid SIM card. While you are in this condition and need emergent help, please remember using emergency call. In order to make or receive call, the cellular terminal or mobile must be switched on and in a service area with adequate cellular signal strength.

	Your cellular terminal or mobile contains a transmitter and receiver. When it is ON , it receives and transmits radio frequency energy. RF interference can occur if it is used close to TV set, radio, computer or other electric equipment.
	In locations with potencially explosive atmospheres, obey all posted signs to turn off wireless devices such as your phone or other cellular terminals. Areas with potencially exposive atmospheres including fuelling areas, below decks on boats, fuel or chemical transfer or storage facilities, areas where the air contains chemicals or particles such as grain, dust or metal powders.

2 Product Concept

2.1. EVB Top and Bottom View
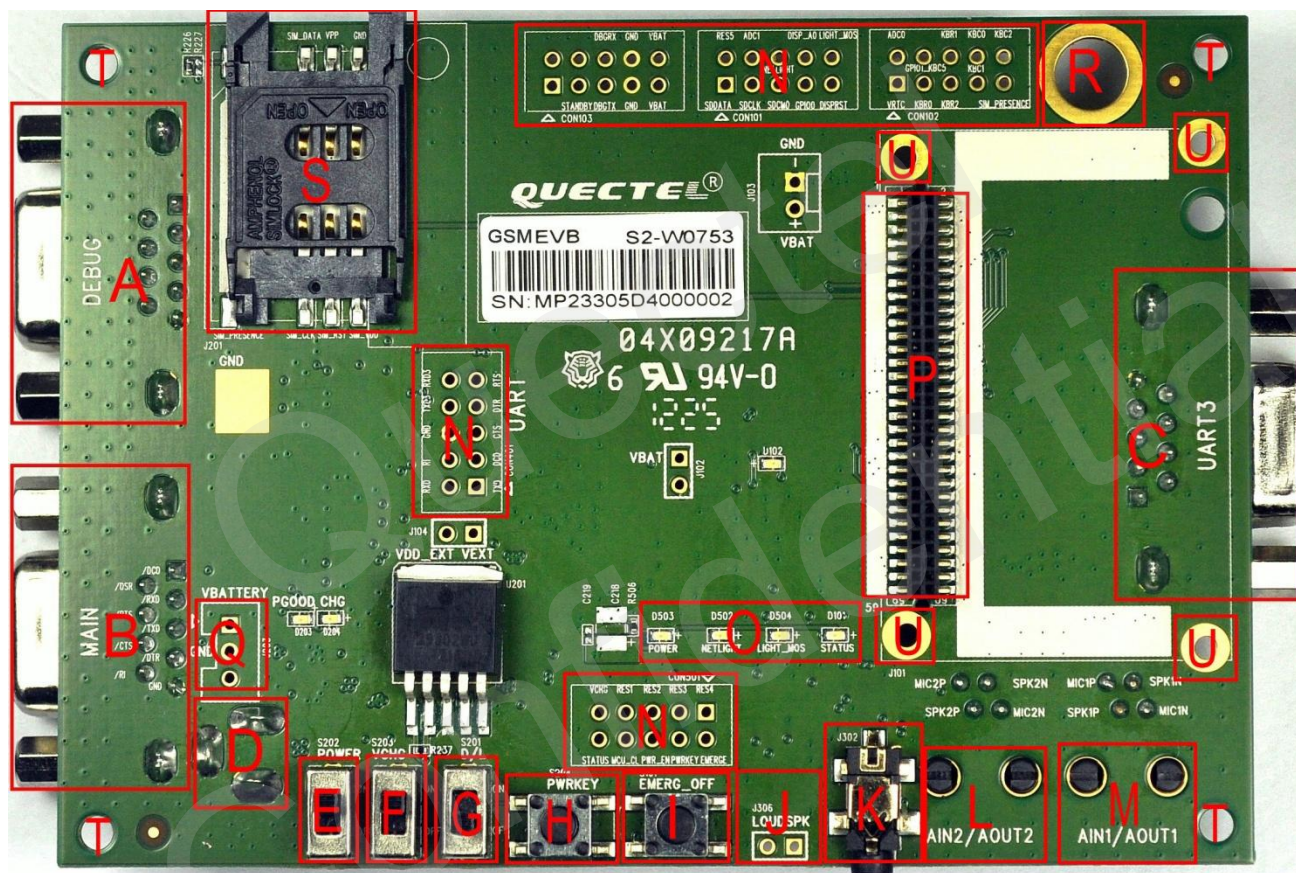
Figure 1: EVB Top View

NOTES

1. Some interfaces and test pins are reserved only for engineers to debug some functions which are not used for customer.
2. Some functions are only supported in certain software versions.
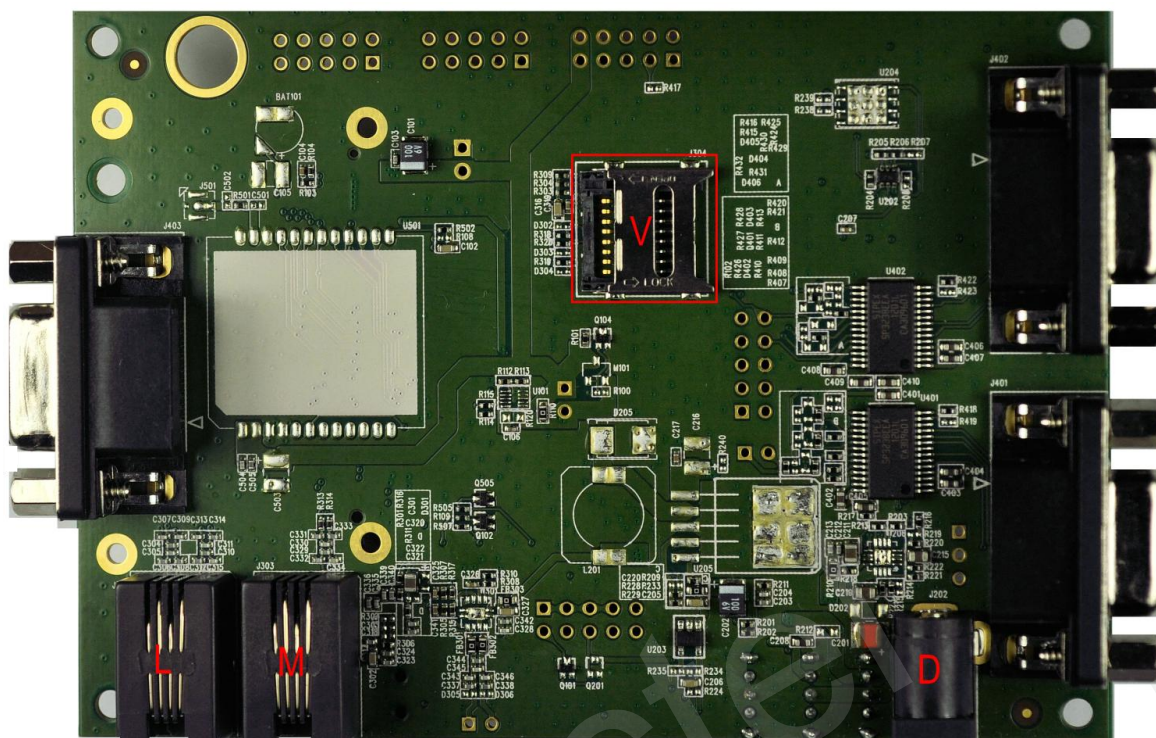
Figure 2: EVB Bottom View

A: Debug port

B: Main port

C: UART port 3

D: Adapter interface

E: POWER switch

F: VCHG switch *(Not used)*

G: D/L switch

H: PWKEY button

I: EMERG_OFF button

J: Loudspeaker interface *(Not used)*

K: Earphone interface

L: Handset interface of audio channel 2

M: Handset interface of audio channel 1

N: Test points

O: LED indicator *(D203&D204 Not used)*

P: 60 pins TE-A interface

Q: Battery interface *(Not used)*

R: Fixture hole for RF cable connector

S: SIM card interface

T: Fixture holes for EVB poles

U: Screw holes for fixing the module

V: T-Flash card interface

Figure 3: Accessories Introduction

A: 5V DC switching adapter

B: USB to UART converter cable

C: Antenna

D: RF cable

E: Earphone

F: Bolts and nuts for fixing module and EVB

G: USB cable

3 Interface Application

3.1. Power Interface
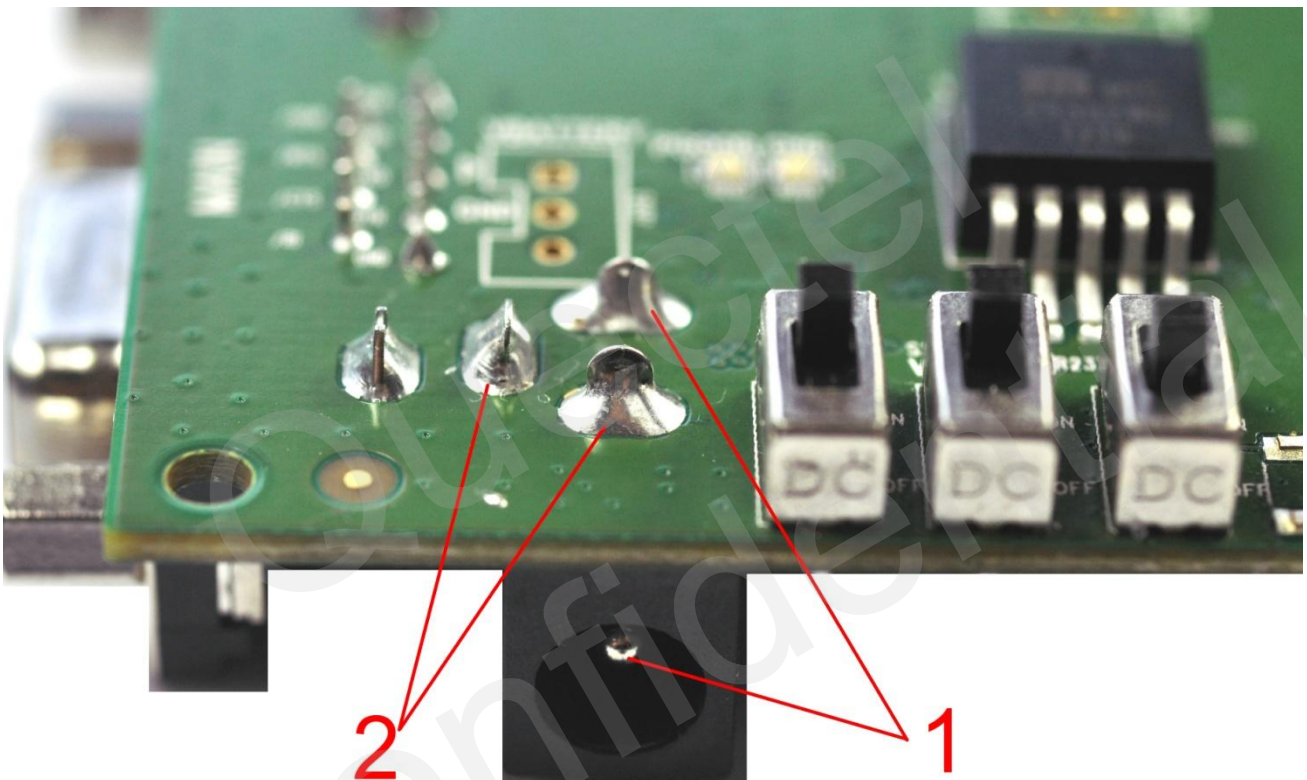
Figure 4: Power Interface

Table 1: Pin Description

Pin	Signal	I/O	Description
1	Adapter input	I	5V/2A DC source input
2	GND		Ground

3.2. Audio Interface
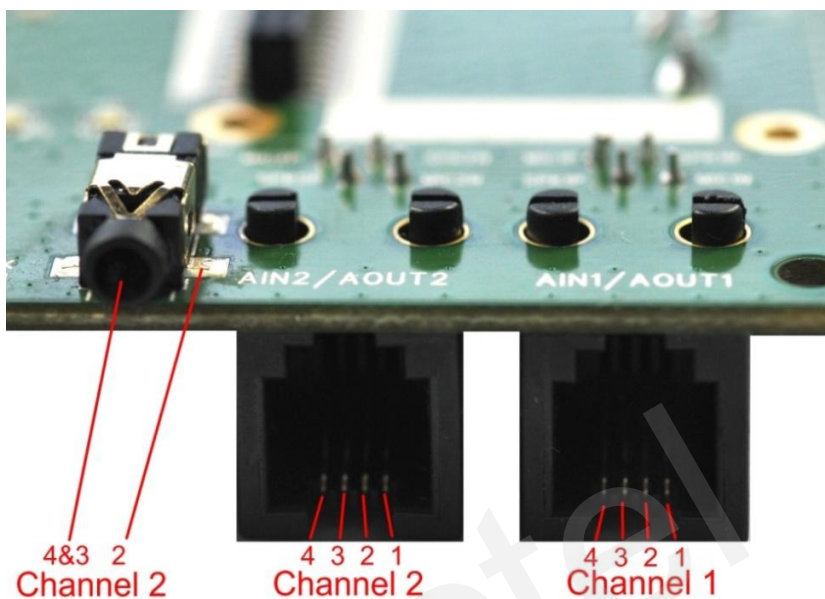
Figure 5: Audio Interface

Table 2: Pins of Audio Channel 2

Interface	Signal	Pin NO.	Description
AIN2/AOUT2	MIC2N	1	Channel 2 for Negative microphone input
	AGND	2	AGND of audio circuits
	SPK2P	3	Channel 2 for Positive receiver output
	MIC2P	4	Channel 2 for Positive microphone input

Table 3: Pins of Audio Channel 1

Interface	Signal	Pin NO.	Description
AIN1/AOUT1	MIC1N	1	Channel 1 for Negative microphone input
	SPK1N	2	Channel 1for Negative receiver output
	SPK1P	3	Channel 1Positive receiver output
	MIC1P	4	Channel 1Positive microphone input

3.3. SIM Card Interface

Figure 6: SIM Card Interface

Table 4: Pins of SIM Card Interface

Pin	Signal	I/O	Description
1	GND		Ground
2	VPP		Not connected
3	SIM_DATA	I/O	SIM card data I/O
4	SIM_CLK	O	SIM card clock
5	SIM_RST	O	SIM card reset
6	SIM_VDD		Power supply for SIM card

3.4. Antenna Interface
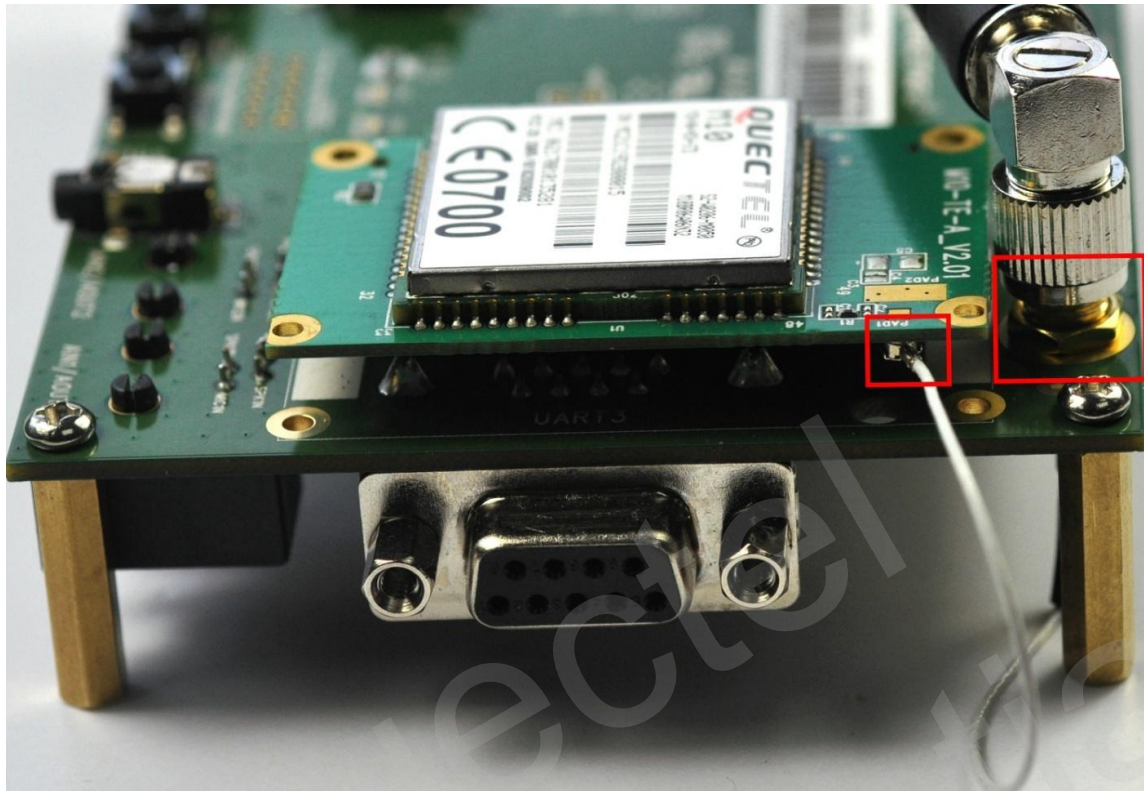
Figure 7: Antenna Interface

3.5. SD Interface

Figure 8: SD Interface

Table 5: Pins of SD Card Interface

Pin	Name	I/O	Description
1	SD_CMD	O	Command signal of SD card output
2	SD_CLK	O	Clock signal of SD card output
3	SD_DATA	I/O	Data output and input signal of SD card
4	SD_VDD		Power supply for SD Card
5	SD_VSS		Ground

The EVB board provides Micro SD card interface, but only supports 1-bit SD mode.

For furthermore details, please refer to the document of Hardware Design.

3.6. Main Port and Debug Port
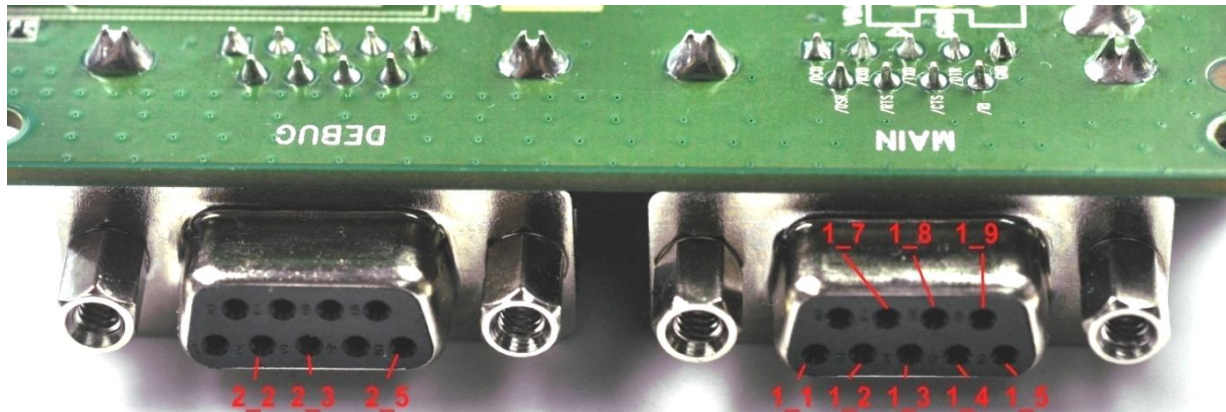
Figure 9: Main Port and Debug Port

Table 6: Pins of Main Port

Pin	Signal	I/O	Description
1_1	DCD	O	Data carrier detection
1_2	TXD	O	Transmit data
1_3	RXD	I	Receive data
1_4	DTR	I	Data terminal ready
1_5	GND		Ground
1_7	RTS	I	Request to send
1_8	CTS	O	Clear to send
1_9	RI	O	Ring indicator

Table 7: Pins of Debug Port

Pin	Signal	I/O	Description
2_2	DBG_TXD	O	Transmit data
2_3	DBG_RXD	I	Receive data
2_5	GND		Ground

3.7. UART3
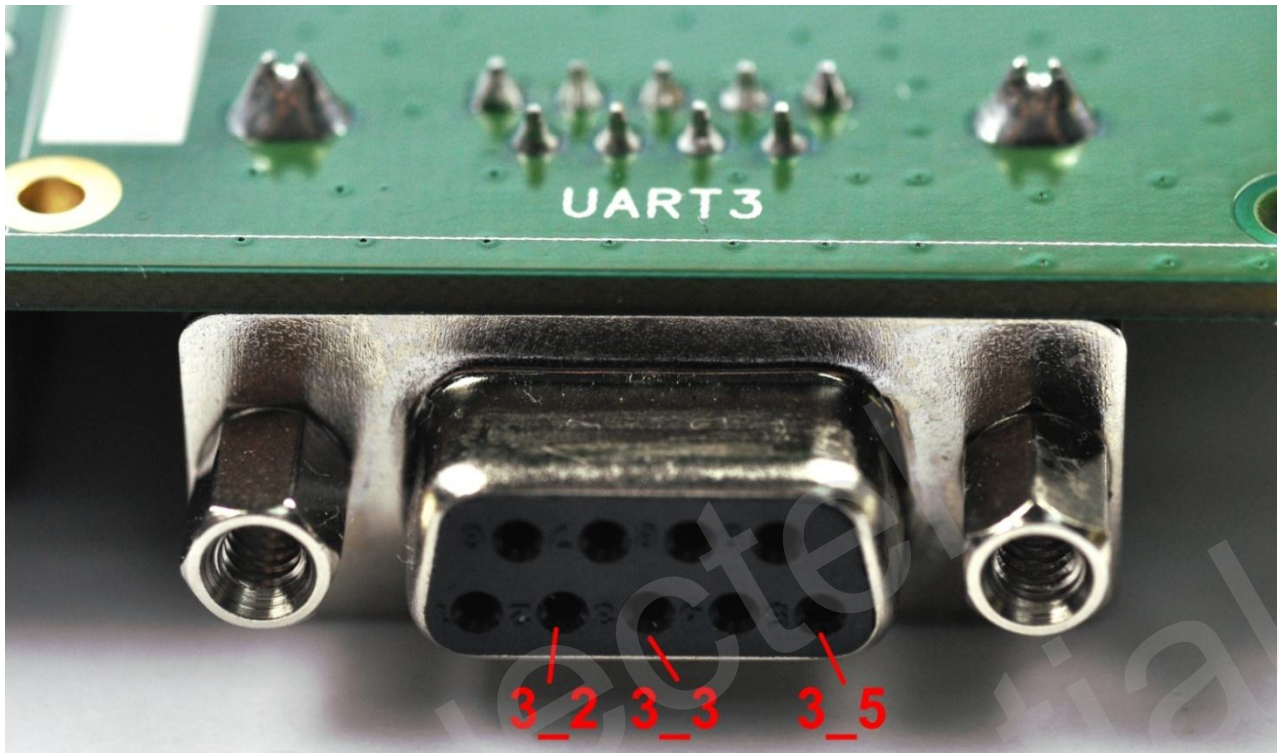
Figure 10: UART3

Table 8: Pins of UART3

Pin	Signal	I/O	Description
3_2	UART3_TXD	O	Transmit data
3_3	UART3_RXD	I	Receive data
3_5	GND		Ground

3.8. Switch
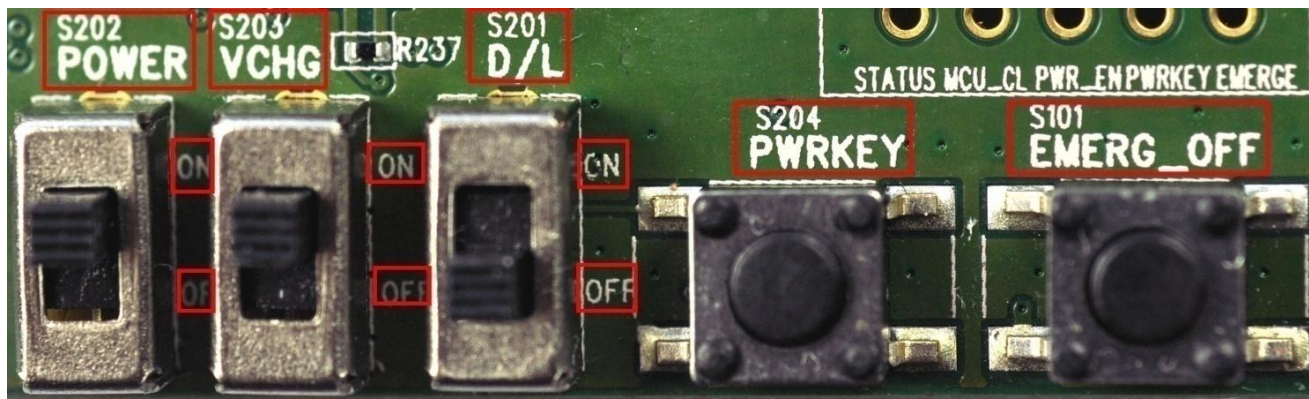
Figure 11: Switch

Table 9: Switch

Part	Name	I/O	Description
S202	POWER	I	Control power supply via adaptor
S203	VCHG	I	Control charging if module has charging function
S201	D/L	I	Pull to "ON" to download firmware
S204	PWRKEY	I	Turn on/off the module
S101	EMERG_OFF	I	Emergency button for shutting down the system

3.9. Indicator LED

Figure 12: Indicator LED

Table 10: Indicator LED

Part	Name	I/O	Description
D503	VBAT ON/OFF indicator	O	Lighten: VBAT ON Extinguish: VBAT OFF
D502	GSM_NET status indicator	O	Flash with different frequency according to different GSM network status
D504	LIGHT_MOS indicator	O	Specially for LIGHT_MOS demo
D101	Module status indicator	O	Indication of module operating status

3.10. Test Point

3.10.1. CON103

Figure 13: CON103 Points

Table 11: Pins of CON103

Pin	Signal	I/O	Description
1	DBG_RXD	I	Receive data
2	GND		Ground
3	VBAT	I	Power supply for module
4	STANDBY		Not used
5	DBG_TXD	O	Transmit data
6	GND		Ground
7	VBAT	I	Power supply for module

3.10.2. CON101

Figure 14: CON101 Points

Table 12: Pins of CON101

Pin	Signal	I/O	Description
1	RES5		Not used
2	ADC1		Not used
3	NETLIGHT	O	NETLIGHT driving output
4	DISP_A0		Reserved
5	LIGHT_MOS	O	Reserved
6	SDDATA	I/O	
7	SDCLK	O	SD card interface
8	SDCMD	O	
9	GPIO0	I/O	General purpose input/output port
10	DISPRST		Reserved

3.10.3. CON102

Figure 15: CON102 Points

Table 13: Pins of CON102

Pin	Signal	I/O	Description
1	ADC0	I	Analog to digital converter
2	GPIO101_KBC5	I/O	
3	KBR1	O	
4	KBC0	I	
5	KBC2	I	Keyboard interface
7	KBR0	O	
8	KBR2	O	
9	KBC1	I	
6	VRTC	I/O	RTC supply
10	SIM_PRESENCE	I	SIM card detection

3.10.4. CON401
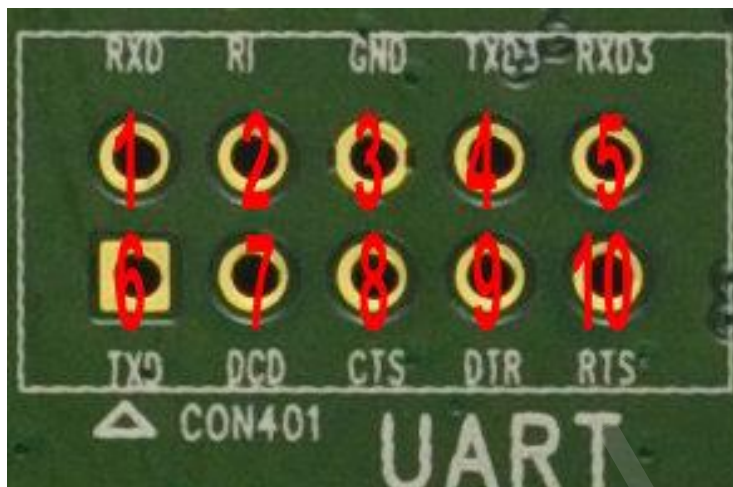
Figure 16: CON401 Points

Table 14: Pins of CON401

Pin	Signal	I/O	Description
1	RXD	I	Receive data
2	RI	O	Ring indicator
3	GND		Ground
4	TXD3	O	UART3 Transmit data
5	RXD3	I	UART3 Receive data
6	TXD	O	Transmit data
7	DCD	O	Data carrier detection
8	CTS	O	Clear to send
9	DTR	I	Data terminal ready
10	RTS	I	Request to send

3.10.5. CON501
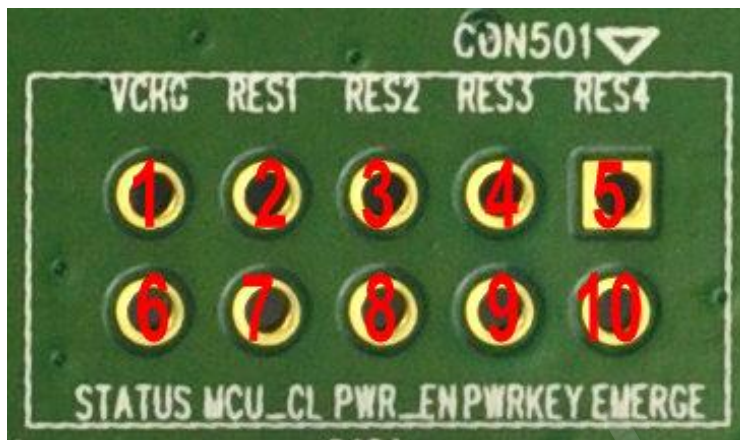
Figure 17: CON501 Points

Table 15: Pins of CON501

Pin	Signal	I/O	Description
1	VCHG	I	Voltage input for the charging circuit
2	RES1		
3	RES2	I	Reserved
4	RES3		
5	RES4		
6	STATUS	O	Module operating status
7	MCU_CL	O	Reserved
8	PWR_EN	O	Power enable control
9	PWRKEY	I	Turn on/off the module
10	EMERGE	I	Shut down the module in emergency.

4 EVB Accessories Assembly

Figure 18: EVB and Accessories

5 Illustration

5.1. Power On

(1) Connect the TE-A to the 60 pins connector on EVB.

(2) Insert the plug of the 5V power adapter.

(3) Turn the Switch S202 to **ON** state, Switch S203 to **OFF** state, and Switch S201 to **OFF** state. The LED D503 on the EVB will be lighted.

(4) Press the PWRKEY for about 2 seconds. The LED D101 will be lighted which indicates the module in working status. With LED D101 is on, the module begins running. Otherwise, please check the circuit.

(5) The LED D502 will be flashing at a certain frequency. The GSM working status of the module can be judged by the LED status.

Please refer to Hardware Design for detailed network status indication.

5.2. Communicate with Module

(1) Connect the main port of EVB to PC's USB port with the USB to UART converter cable.

(2) Open the HyperTerminal (AT command window) on PC. The location of the HyperTerminal in windows XP is: START→program→accessory→communication→HyperTerminal. Set appropriate Baud Rate (such as 115200 bps) and COM number which can be checked by the Device Manager on PC.

(3) Connect an antenna to TE-A with an RF cable.

(4) Insert SIM card into the SIM card socket.

(5) Insert earphone or handset into audio interface.

(6) For power on operation, please refer to chapter 5.1.

(7) After waiting for 2~3 seconds, customer should first input "AT" or "at" string once or more until receiving "OK" from the module in the HyperTerminal.

The module is set to autobauding mode in default configuration. This operation is to synchronize the baud rate between the computer and the module.

(8) Input AT command and the module will execute its corresponding function.

Customer can refer to chapter 7 in document [5] for the details of AT commands. For instance, when input "ATD112;", an emergency call will be established.

5.3. Firmware Upgrade through Main Port

(1) Start the Firmware Upgrade Tool in the PC.

(2) Press the **START** button in the Firmware Upgrade Tool.

(3) Switch the S201 and S202 in the EVB to **ON** state as shown in Figure 18.

After these steps, the firmware refreshing process will be proceeding. For more details, please refer to chapter 7 in document [4].
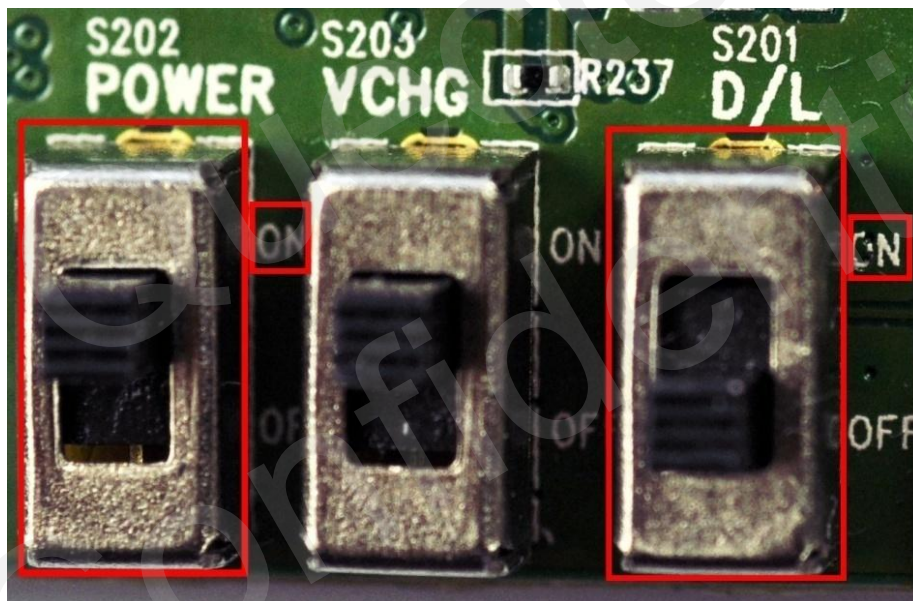

Figure 19: Switches State for Firmware Download

5.4. Turn Off

Press the **PWRKEY** button less than 1 second, the module will be turned off.

5.5. Emergency Off

Press the **EMERG_OFF** button for more than 0.1 second, the module will be shut down immediately. After that, the module can be restarted by pressing the **PWRKEY** button. Please pay attention that this operation is harmful to the whole module system and should only be done in emergency such as failing to turn off the module through the **PWRKEY** button.

5.6. UART3

Module provides two UART ports for achieving Dual UART. One is UART1 which is the main UART; the other is UART 3 which is the assisted UART.

AT+QEAUART=1 is used to enable UART3. For more details, please refer tochapter 7 in document [5].

5.7. Useful Application

If the module has been welded on your PCB, you can follow the steps below to connect the module with our EVB. After that, URAT communication is ready.

Remove the resistance R102 to the place of the resistance R224 to change the power supply.
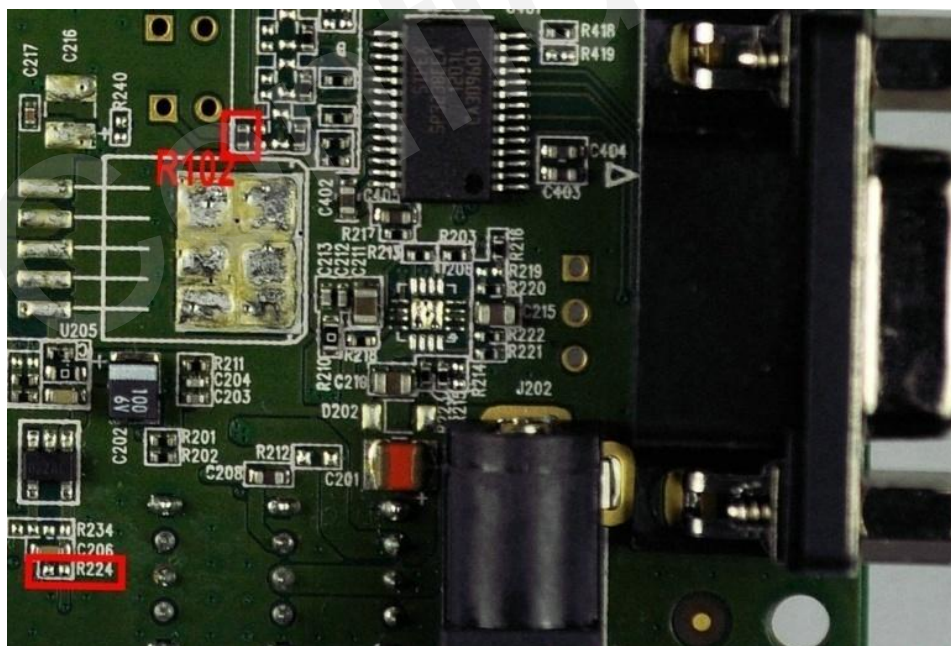

Figure 20: Change the Power Supply

Pull out the module pins of TXD, RXD, VBAT, and GND to the EVB pins of TXD, RXD, VBAT, and GND with 4 wires. Short-circuit the power key to GND for 1s and cut down the connection to run the module.
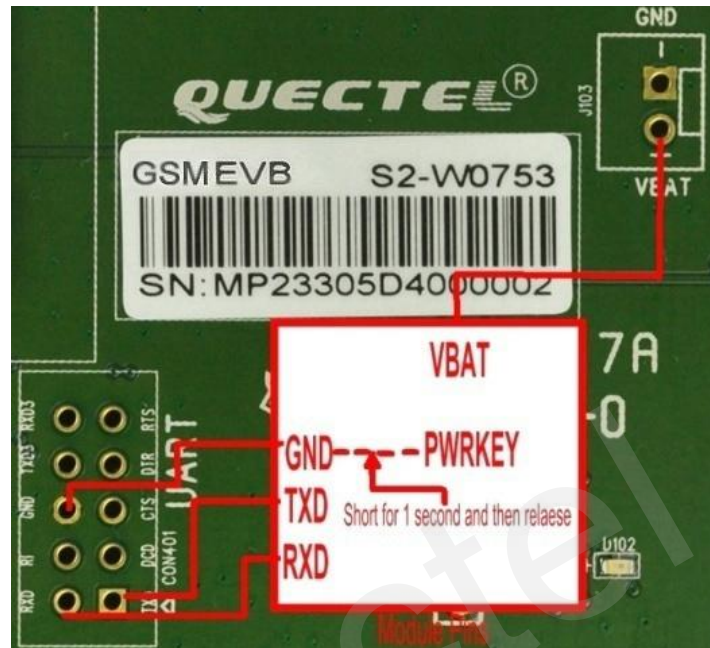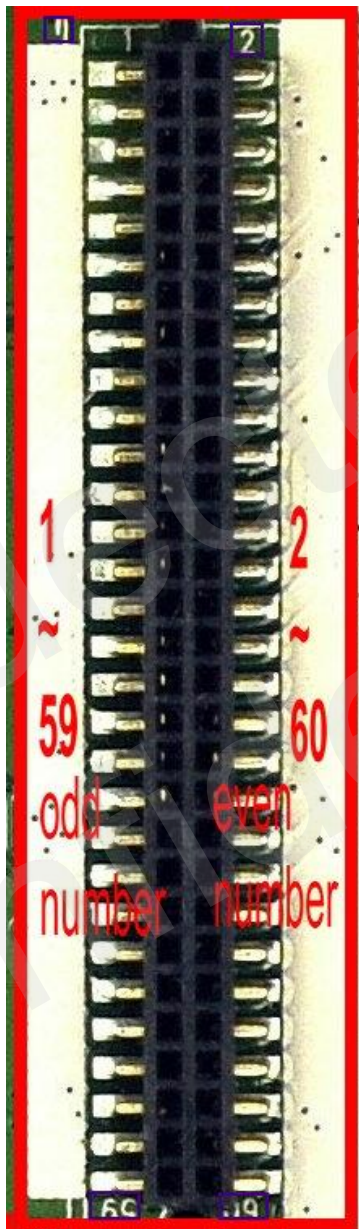

Figure 21: Run the Module

6 60-pin Assignment

Figure 22: DIP Connector of EVB

Table 16: Pin Definition of the 60-pin DIP Connector

Pin NO.	Pin Name	I/O	Pin NO.	Pin Name	I/O
1	VBAT	I	2	GND	
3	VBAT	I	4	GND	
5	VBAT	I	6	GND	
7	VBAT	I	8	GND	
9	VBAT	I	10	GND	
11	VCHG	I	12	ADC0	I
13	ADC1	I	14	VRTC	I/O
15	VDD_EXT	O	16	NETLIGHT	O
17	PWRKEY	I	18	KBR0	O
19	STATUS	O	20	KBR1	O
21	GPIO0	I/O	22	KBR2	O
23	BUZZER	Reserved	24	TXD3	O
25	SIM_VDD	O	26	RXD3	I
27	SIM_RST	O	28	KBC0	I
29	SIM_DATA	I/O	30	KBC1	I
31	SIM_CLK	O	32	KBC2	I
33	SIM_PRESENCE	I	34	LIGHT_MOS	O
35	GPIO1_KBC5	I/O	36	EMERG_OFF	I
37	DCD	O	38	SD_CMD	O
39	DTR	I	40	SD_CLK	O
41	RXD	I	42	SD_DATA	I/O
43	TXD	O	44	DISP_A0	Reserved
45	RTS	I	46	DISP_RST	Reserved
47	CTS	O	48	DBG_RXD	I
49	RI	O	50	DBG_TXD	O
51	AGND		52	AGND	

53	SPK1P	O	54	MIC1P	I
55	SPK1N	O	56	MIC1N	I
57	SPK2P	O	58	MIC2P	I
59	AGND		60	MIC2N	I

7 Appendix A Reference

Table 17: Related Documents

SN	Document Name	Remark
[1]	Quectel_xx_AT_Commands_Manual	AT commands manual
[2]	Quectel_GSM_UART_Application_Note	The document of serial port application note
[3]	Quectel_xx_Hareware_Design	Hardware design
[4]	Quectel_GSM_FW_UPGRADE_AN01	Firmware upgrade application notes
[5]	Quectel_GSM_DUAL_UART_Application_Note	GSMDUALUART application note