FIBOCOM

Perfect Wireless Connection

EVK-GT8629 User Manual

Version: V1.0.0

Date: 2013-07-30

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Revision History

Version	Date	Remarks
V1.0.0	2013-07-30	Initial Version

Applicability Table

No.	Type	Note
1	G600	
2	G610	Need adapter, ADP-G610-XXX-YY
3	G620	Need adapter, ADP-G620-XXX-YY
4	G510	Need adapter, ADP-G510-XXX-YY
5	G510S	Need adapter, ADP-G510S-XXX-YY
6	G520	Need adapter, ADP-G520-XXX-YY
7	GTS-4E-60	Need adapter, ADP-GTS-4E-60
8	GTS-4E-70	Need adapter, ADP-GTS-4E-70

Contents

1 Preface

1.1 Scope

This manual introduces evaluation kits of Fibocom module, related technical detail, and testing information about it. It ensures that the user can quickly and conveniently develop wireless communication products by themselves.

1.2 Audience

The target audiences of this manual include engineers and testers who will use Fibocom module to develop wireless communication products.

2 Overview

2.1 Description

The GT8629 development kit can be used for testing Fibocom module after connecting to module via 50-pin connector. It has the following features:

- Two 50-pin connector: one connect to GPRS module, the other one connect to GPS module

- Each pin has a testing point

- Provides three methods to supply power

- The main signal uses LED indicator

- Supports USB interface and RS232 serial port

- Supports trace debugging software

- Two audio interfaces

- Supports SIM card interface

- Provides several buttons and jumper caps

- RF Cable included

- Supports SMA antenna interface

2.2 Specification

Development board	GT8629
DC power adapter	AC 220V / DC 9V/1A Φ2.5mm
Serial port line	DB9
GSM antenna	Frequency: 850/900/1800/1900MHz Impedance: 50ohm Gain: 0 dBi (unity) gain or greater VSWR: Less than: 2.5:1

2.3 Development Board

Power Supply Switch

BATT Power GND

BATT Voltage Input

DC/DC Voltage Input

UART1 interface (USB)

UART1 interface (RS232)

Reset Button

Power on Button

HOST interface (debugging)

SIM card Socket

UART2 interface

1st Audio

2nd Audio

Antenna

SPI interface

GPS USB interface
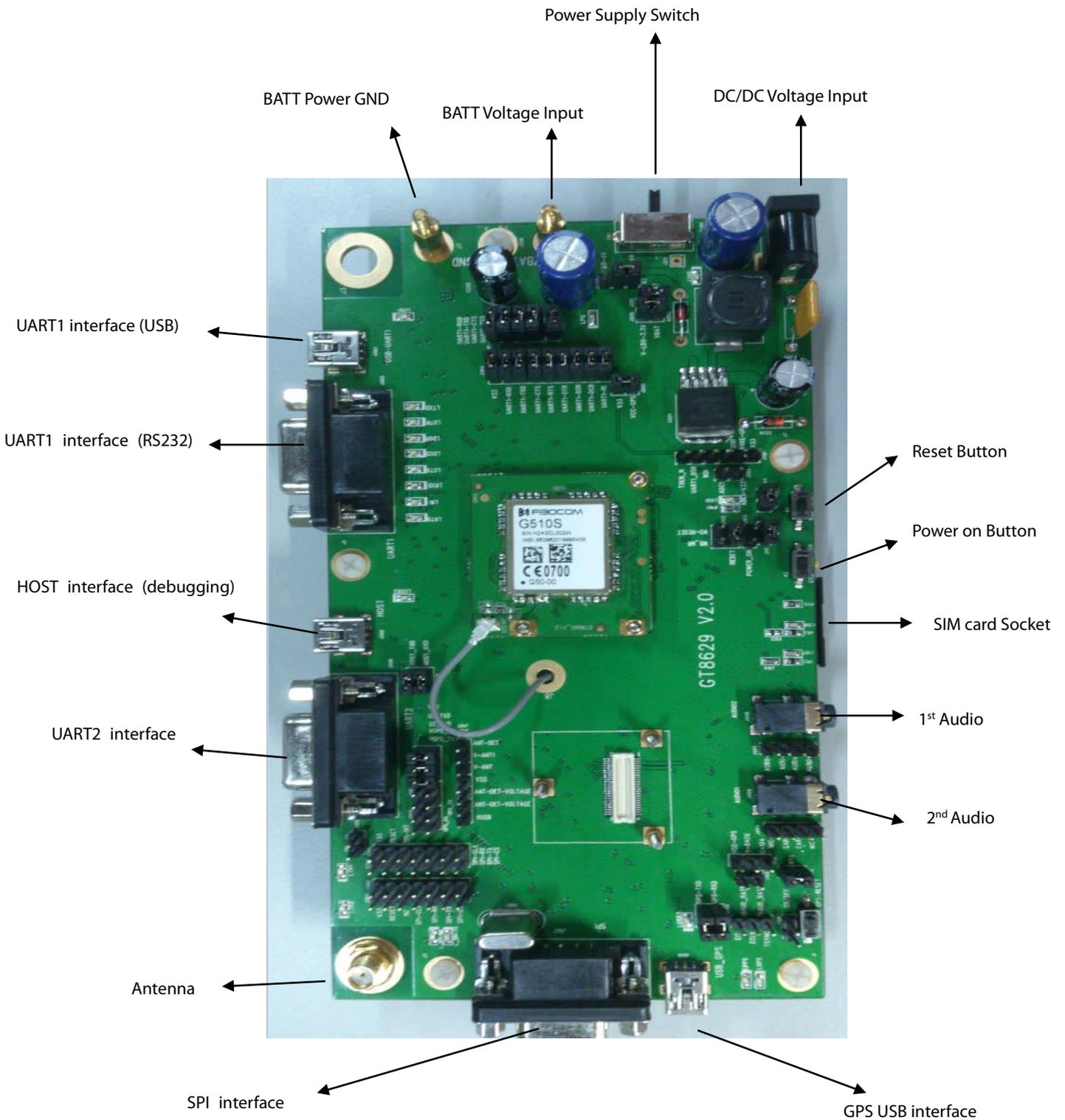
Figure 2-1 Development Board

3 Quick Guide

3.1 Connection

1) Connect antenna transfer line to module RF interface

2) Install the module or adapter on the development board

3) Install GSM antenna to SMA interface

4) Install SIM card

5) Ensure the installation of nine jumper caps J304

6) Ensure the installation of jumper caps J201, J206, J208, J104, J111

7) Ensure the installation of jumper caps J202 (V-4V---LDO-4V)

8) Ensure the installation of jumper caps j102 (RESET)

9) Make sure the power supply switch is in the middle

10) Connect the PC serial port to EVB UART1by a serial port line

11) Plug in the power adapter

3.2 Run HyperTerminal or another Serial's Tools on PC

1) Open the corresponding serial port

2) Set the serial port of HyperTerminal as 115200-8-N-1-None Flow

3.3 Power Supply

1) LV40 indicator is on when power adapter is plugged in

2) The switch is pushed to the direction of DC socket

3) LVDD indicator is on when the module is on

4) Press GSM_POWER_ON button for at least 800mS

5) LPG indicator is on if it successfully powered on.

6) Input AT command in PC HyperTerminal, return OK

7) Input AT+ CSQ, return +CSQ: 31,99 OK

8) The development board and the module works fine.

Please refer to following chapters or AT Command User Manual.

4 Development Board Description

This chapter introduces development board and corresponding functions of the module in details.

4.1 Power Supply

Development board provides three methods to supply the power.

1. Directly supply the power by connected to 4V power externally.

2. AC-DC adapter power supply.

3. Supply the power by USB.

4.1.1 Direct Power Supply

Direct power supply will be loaded on modules. So the voltage range should meet the requirements of GRPS module.

Note: Please use correct voltage to avoid damage to the module.

Power Connector	Description
V40BAT GND	DC power supply. BATT = 3.3 V to 4.5 V 4.0V is recommended Input current > 2.0A
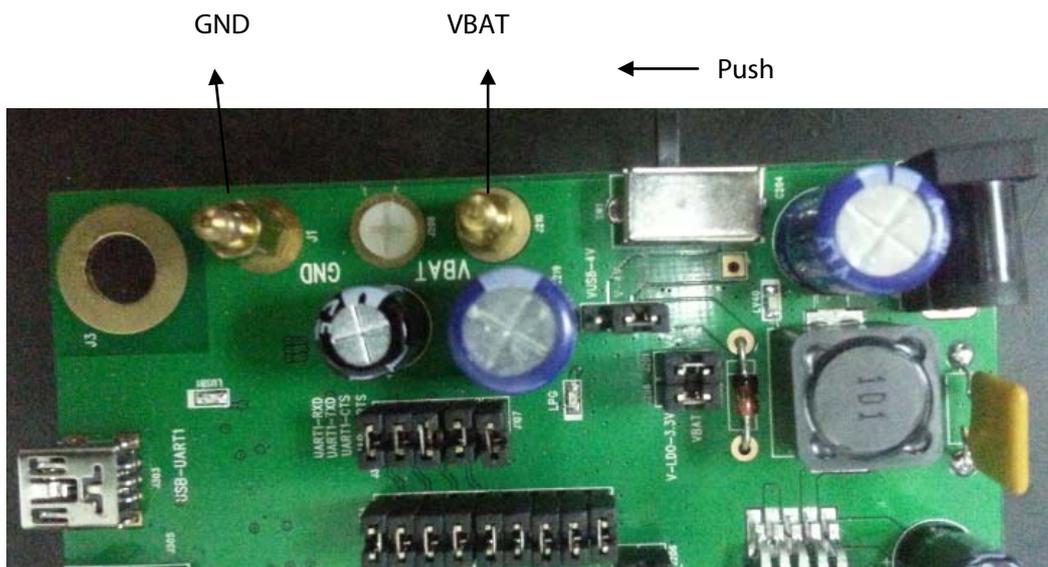
Figure 4-1 Direct Power Supply

4.1.2 AC-DC Adapter Power Supply

After insert outside power supply adapter, the DC/DC set down circuit of development board will on work at once and LV40 LED indicator will be on. It transfers the 4.0V voltage which will supply to the module after turning on the switch.

Power Connector	Description
	Straight insert voltage socket, core is Φ2.5mm; Input voltage:8V~15V; power supply: ≥9W; Development board has over voltage protection, under voltage protection, over current protection, and reverse protection.

4.1.3 Supply the Power by USB

Connect USB-UART1 to PC by a USB cable; jump J202 to VUSB-4V---V-4V.

The 5V voltage of USB interface outputs 4V voltage through the DC-DC circuit, then supply the power to the module.

Note: The power supply of USB is insufficient, when the module works in high power, the voltage may have large fluctuations (about 88mV). We don't recommend you use USB to supply the power.

4.1.4 Others

Jumper cap J201, connect VBAT to V40EXT, supply the power to LED indicators.

There is a LDO chip that produces 3.3V voltage on development board to satisfy GPS module.

Through jumper cap J206, provide 3.3V voltage to other IC.

Figure 4-2 LED Indicator
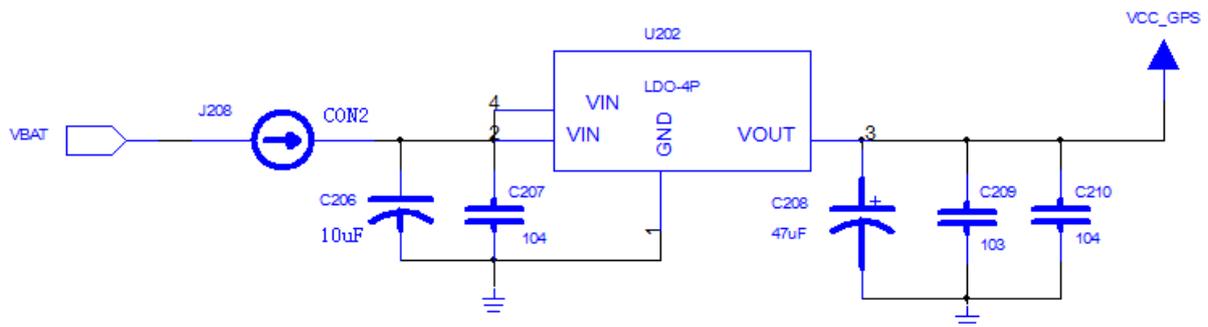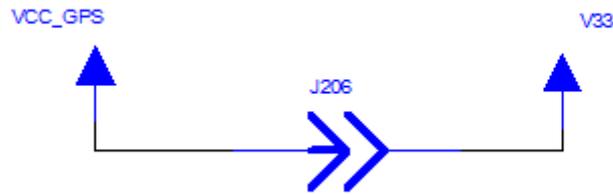
Figure 4-3 3.3V Power Circuit

Jumper Switch	Description
J208	Turn on/ off 3.3V voltage output
J206	Supply the power for other circuit on the development board
J201	Supply the power for some LED indicators

Note: When you test the parameter of current, please take out the three jumper caps. And the tested current will be the current consumed by module only.

4.2 UART1

UART1 and USB-UART1 use the same UART1 interface of the module. Eight LED indicators (LRXD/LTXD/LRI/LDCD/LDSR/ DTR/LRTS/LCTS) can exactly indicate the logic level of each pin in UART interface of the module.

The default value of main UART: 115200-8-N-1.

PC and other DTE equipments can fully satisfy all functions of the module through communication interface and AT command.

Note: You cannot use two interfaces at the same time. Please switch between J301 and J304.

Jumper Switch	Description
J301	Turn on/ off USB-UART1
J304	Turn on/ off UART1

4.2.1 DB9 UART1 Main Interface

This interface is a complete 8-line interface, and it can be connected to PC or other DTE equipments directly. Development board has RS-232 Transceiver SP3238EEA inside.

4.2.2 USB-UART1 Interface

Development board has USB transfer UART interface chip (PL2303), it connects UART1 signal to USB-UART1 interface. It connects four signals (TXD/RXD/CTS/RTS) to UART1 of the module. LUSB1 indicator will be on after USB is inserted.

Note: You need to install driver in some operating system when you use USB.

4.3 HOST UART

Development board has USB transfer UART interface chip (PL2303), it connects HOST UART signal to USB interface. The serial port signal connects to the HOST UARTof GSM module. LUSB2 indicator will be on after USB is inserted.

Jumper Switch	Description
J306	Turn on/ off HOST UART

Note:

- You need to install driver in some operating system when you use HOST.

- HOST UART is supported by G5-Family.

- The HOST UART is used for TRACE and software debugging.

4.4 UART2

This is a DB9 interface. It is compatible with UART of GPS module and UART2 of GSM module.

Connect TXD/RXD signal to module UART via RS-232 transceiver SP3232EEA.

Note: You cannot use these two interfaces at the same time, please switch between J505 and J509.

Jumper Switch	Description
J505	Turn on/off UART2 of GSM module
J509	Turn on/off UART of GPS module

Note: UART2 is supported by G510 only.

4.5 SPI-UART

The development board has a SPI interface. This SPI interface is compatible with the SPI of GSM module and GPS module.

Note: You cannot use these two interfaces at the same time, please switch between J503 and J502.

Jumper Switch	Description
J503	Turn on/off SPI of GSM module
J502	Turn on/off SPI of GPS module

Note: SPI interface is used for TRACE and software debugging of G600 and G610.

The interface simulated SPI to UART, and then transferred to a serial port through RS-232 Transceiver SP3238EEA.

Module SPI ↔ SC161S740 ↔ SP3238 ↔ Interface
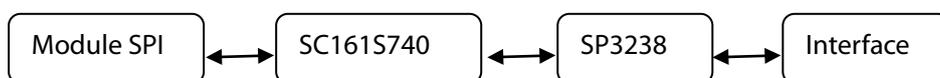
Figure 4-4 SPI transfers to Serial Port

![FIBOCOM logo]

Meanwhile L_SPI_TX/L_SPI_RX indicators on development board can indicate the work state of SPI transfer serial port.

4.6 USB_GPS

Development board has USB transfer UART interface chip (PL2303), it connects RXD/TXD to UART of GPS module. LUSB3 indicator will be on after USB is inserted.

Jumper Switch	Description
J504	Turn on/off UART of GPS module

4.7 Control and Indicate (GSM)

GSM control and indicate interface including: GSM-POWER_ON / GSM-RESET / LPG / VDD.

LPG/VDD directs the state through LED indicator. GSM-POWER_ON / GSM-RESET have corresponding buttons and circuits.

4.7.1 GSM-POWER_ON Circuit
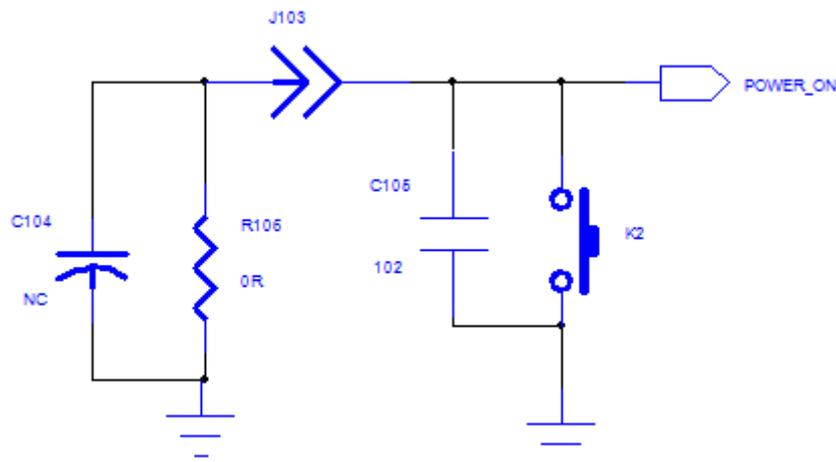
Figure 4-4 GSM-POWER_ON Circuit

Development Board	Description
R106& C104	Power_on pin is pulled up in GPRS module. Connect R106 and C104 externally to turn on the module automatically.
J103	Disable / Enable automatic turn-on
K2 & C105	Manually turn on/off

Note: The interval time should be longer than 5s for the development board to re-power.

4.7.2 GSM-RESET_N Peripheral Circuit
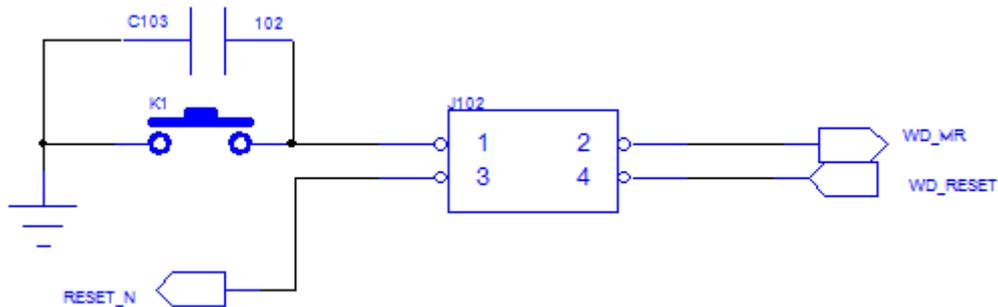
Figure 4-5 Peripheral Circuit of GSM-RESET_N

Development Board	Description
K1&C103	Manually reset the circuit
J102	Jumper (1-3): manually reset

4.7.3 LVDD Indicator

Development Board	Description
J104	Disable / Enable VDD indicator

4.7.4 LPG Indicator

Development Board	Description
J107	Disable / Enable LPG indicator

4.7.5 Power on Process

Development Board	Description	
Power supply	LVDD	Turn off If outside 3.3V voltage acts on any IO interface, it will cause current reperfusion, and affect the normal indicator of VDD.
	LPG	Turn off
Power ON (automatic turn on or press GSM-POWER_ON button)	VDD	Turn on
	LPG	Turn on
Turn off	Press GSM-POWER_ON button more than 3S, and the state of all LED is the same as power off mode.	

4.8 Control and Indicate (GPS)

GPS control and indicate interface including: ON/OFF / GPS-RESET / LPPS.

LPPS directs the state through LED indicator. GPS-RESET has corresponding buttons and circuits. ON/OFF has the corresponding control circuit.

4.8.1 ON/OFF
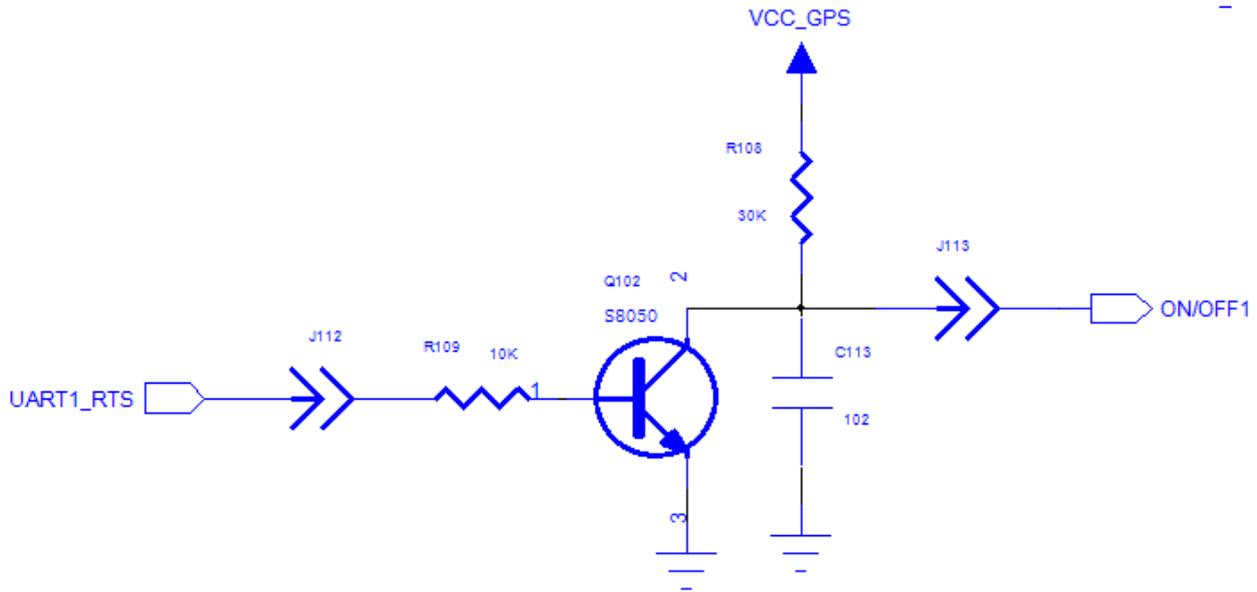
Figure 4-6 GPS ON/OFF Circuit

Development Board	Description
J112&J113	Enable/disable GPS module to wake up/sleep control circuit

4.8.2 RESET
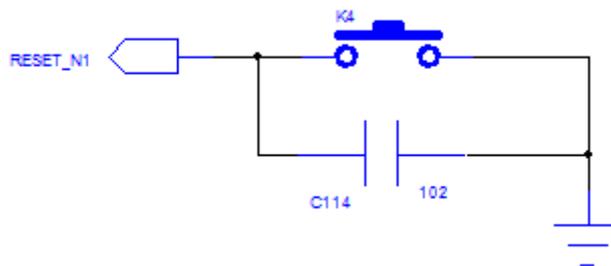
Figure 4-7 GPS RESET Circuit

Development Board	Description
K4 & C114	GPS module manually reset key circuit

4.8.3 LPPS Indicator

Development Board	Description
J206	Enable/disable LPPS indicator

4.9 VBACKUP

The module includes a RTC power supply (VBACKUP). The RTC will continue running after main power supply is cut off. VBACKUP connects to a 220uF standby capacitance via resistance R214, after the power is cut off, it can continue running about seconds

You can directly provide power supply, or put a button battery to ensure the long-time running of real time clock.

4.10 SIM Card Interface

Development board includes a complete SIM card interface circuit.

This circuit supports SIM_CD. Please make sure J111 jumped.

4.11 Audio Interface

There are two audio interfaces: the first audio interface and the second audio interface.

The headphone jack is 3.5mm.

As shown in the following picture:

Figure 4-8 Audio Interface

4.12 ADC Interface

Development board J203 connects to ADC1. You can inquire the voltage after ADC transfer through AT command.

Note: Please remove J203 when you test outside voltage.

4.13 GPS Antenna Test

Development board GT8629 integrated the antenna test circuit of GPS module.

Jumper Switch	Description
J406	Turn on/ off GPS antenna test voltage 3.3V
J407	Turn on/ off GPS antenna test voltage 5V
J401	Jump V_ANT---V_ANT1

5 Performance Testing

5.1 Current Testing

The current of the module is an important parameter.

The development board is design with less current consumption. So it can be test with the module incorporable. The current consumption reflected the module current consumption exactly.

Here are the test procedures:

1) Use the direct power supply

2) Turn off 3.3V power supply (J208)

3) Turn off outside power supply (J201)

4) The main communication interface is USB interface, and provides UART interface voltage through VDD.

5) Turn off LVDD indicator (J104) and LPG indicator (J107)

6) Turn off other interface connections

The sketch map of testing environment:
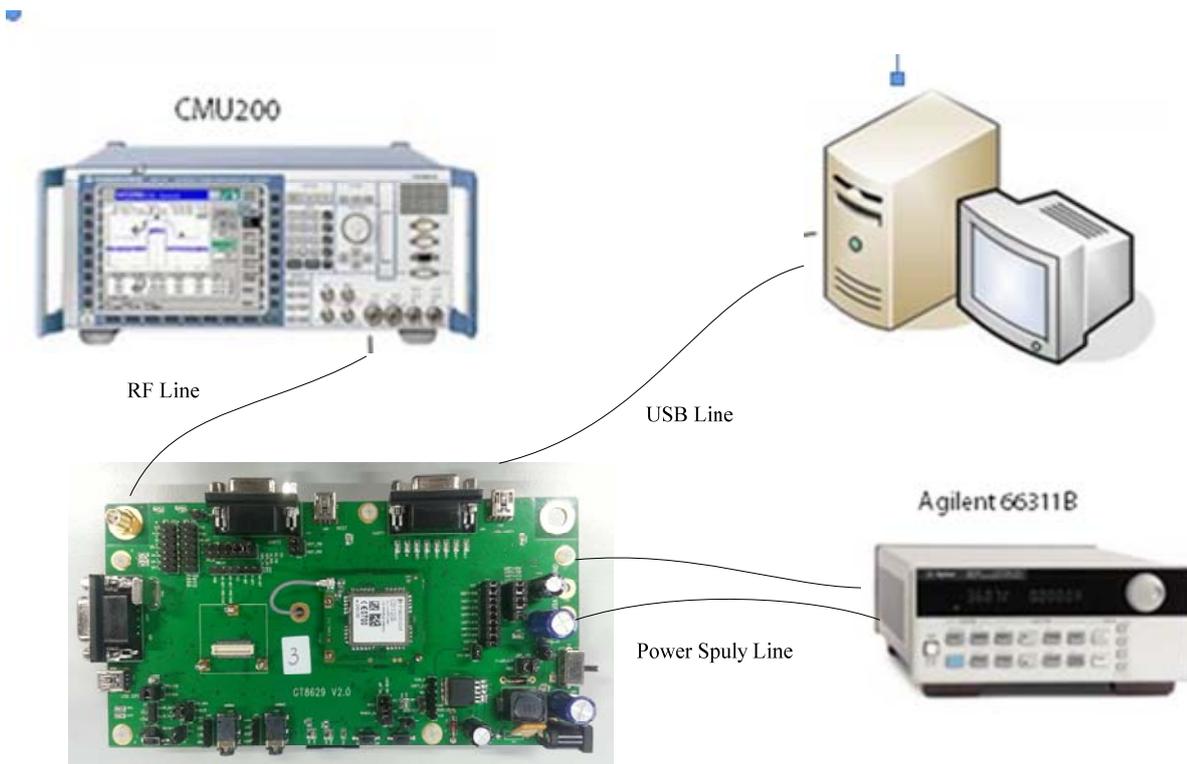
Figure 5-1 Test Environment

Note: It's recommended that the power supply should be used Agilent 66311B or higher level programmable power supply. In this environment you don't need a current meter.

5.2 Current Testing Description

Example: G510

G510 Current Test Internal Standards						Date
Item	Description	Condition	STD-G&T	Unit	Level	Sample A
I off	RTC mode		180.0	uA	★	119.0
GSM 900/1800 current						
I idle	Idle mode	GSM only, DRX=2, -85dBm				
		EGSM900	26.0	mA	★	19.2
		DCS1800	26.0	mA	★	19.5
I idle-RX		MAX	200.0	mA		91.3
I idle-base		base (average)	23.0	mA		18.9
I sleep	Low power mode	EGSM900, -85dBm				
		DRX=2	4.0	mA	★	1.9
		DRX=5	2.5	mA		1.2
		DRX=9	2.0	mA	★	1.0
I sleep-RX		MAX	200.0	mA		135.5
I sleep-base		base (average) *1	1.3	mA		0.5
I gsm-avg	Average current	EGSM900 PCL=5 *2	300.0	mA	★	258.5
	GSM voice	PCL=10	160.0	mA		128.5
	1 Tx slot	PCL=15	130.0	mA		84.5
	1 Rx slot	PCL=19(6.5dBm)	125.0	mA	★	72.5
		DCS1800 PCL=0	255.0	mA	★	165.5
		PCL=5	155.0	mA		95.5
		PCL=10	130.0	mA		74.2
		PCL=15(1.5dBm)	125.0	mA	★	68.3
I gsm-max	Peak current	EGSM900 PCL=5	2000.0	mA	★	1747.5
	GSM voice	PCL=10	740.0	mA		657.5
	1 Tx slot	PCL=15	400.0	mA		293.3
	1 Rx slot	PCL=19(6.5dBm)	315.0	mA	★	191.2
		DCS1800 PCL=0	1565.0	mA	★	953.2
		PCL=5	630.0	mA		381.2
		PCL=10	370.0	mA		197.5

		PCL=15(1.5dBm)	315.0	mA	★	148.2
GSM 850/1900 current						
I idle	Idle mode	GSM only, DRX=2, -85dBm				
		GSM850	26.0	mA	★	21.1
		PCS1900	26.0	mA	★	21.3
I idle-RX		MAX	200.0	mA		90.6
I idle-base		base (average)	23.0	mA		20.7
I sleep	Low power mode	GSM850, -85dBm				
		DRX=2	4.0	mA	★	1.7
		DRX=5	2.5	mA		1.2
		DRX=9	2.0	mA	★	0.9
I sleep-RX		MAX	200.0	mA		135.2
I sleep-base		base (average) *1	1.3	mA		0.5
I gsm-avg	Average current	GSM850 PCL=5 *2	300.0	mA	★	238.5
	GSM voice	PCL=10	160.0	mA		120.6
	1 Tx slot	PCL=15	130.0	mA		82.2
	1 Rx slot	PCL=19(6.5dBm)	125.0	mA	★	71.2
		PCS1900 PCL=0	240.0	mA	★	171.3
		PCL=5	150.0	mA		101.3
		PCL=10	130.0	mA		76.2
		PCL=15(1.5dBm)	125.0	mA	★	68.5
I gsm-max	Peak current	GSM850 PCL=5	2000.0	mA	★	1549.6
	GSM voice	PCL=10	740.0	mA		574.2
	1 Tx slot	PCL=15	400.0	mA		255.4
	1 Rx slot	PCL=19(6.5dBm)	315.0	mA	★	107.8
		PCS1900 PCL=0	1565.0	mA	★	979.5
		PCL=5	630.0	mA		400.2
		PCL=10	370.0	mA		116.2
		PCL=15(1.5dBm)	315.0	mA	★	117.2
GPRS 900/1800 current						
I idle	Idle mode	GPRS, DRX=2, -85dBm				
		EGSM900	26.0	mA	★	18.7
		DCS1800	26.0	mA		18.9

I sleep	Low power mode					
		DRX=2	4.0	mA	★	1.7
		DRX=5	2.5	mA		1.0
		DRX=9　*3	2.0	mA	★	0.8
I gprs-avg	Average current	EGSM900 PCL=5	520.0	mA	★	409.5
	GPRS Class 10	PCL=10	260.0	mA		175.5
	2 TX slot	PCL=15	185.0	mA		97.8
	3 Rx slot	PCL=19(6.5dBm)	165.0	mA	★	76.0
		DCS1800 PCL=0	420.0	mA	★	245.5
		PCL=5	240.0	mA		123.5
		PCL=10	180.0	mA		79.5
		PCL=15(1.5dBm)	170.0	mA	★	70.2
I gprs-max	Peak current	EGSM900 PCL=5　*4	2000.0	mA	★	1675.2
	GPRS Class 10	PCL=10	730.0	mA		625.5
	2 TX slot	PCL=15	400.0	mA		271.9
	3 Rx slot	PCL=19(6.5dBm)	315.0	mA	★	172.1
		DCS1800 PCL=0	1565.0	mA	★	935.5
		PCL=5	615.0	mA		374.5
		PCL=10	360.0	mA		181.5
		PCL=15(1.5dBm)	315.0	mA	★	127.2
GPRS 850/1900 current						
I idle	Idle mode	GPRS, DRX=2, -85dBm				
		GSM850	26.0	mA	★	19.2
		PCS1900	26.0	mA		19.1
I sleep	Low power mode					
		DRX=2	4.0	mA	★	1.8
		DRX=5	2.5	mA		1.2
		DRX=9　*3	2.0	mA	★	0.8
I gprs-avg	Average current	GSM850 PCL=5	520.0	mA	★	374.6
	GPRS Class 10	PCL=10	260.0	mA		173.8
	2 TX slot	PCL=15	185.0	mA		94.4
	3 Rx slot	PCL=19(6.5dBm)	165.0	mA	★	74.5
		PCS1900 PCL=0	420.0	mA	★	261.4

		PCL=5	240.0	mA		128.8
		PCL=10	180.0	mA		82.3
		PCL=15(1.5dBm)	170.0	mA	★	65.5
I gprs-max	Peak current	GSM850 PCL=5 *4	2000.0	mA	★	1544.3
	GPRS Class 10	PCL=10	730.0	mA		572.5
	2 TX slot	PCL=15	400.0	mA		349.1
	3 Rx slot	PCL=19(6.5dBm)	315.0	mA	★	165.8
		PCS1900 PCL=0	1565.0	mA	★	982.4
		PCL=5	615.0	mA		399.8
		PCL=10	360.0	mA		189.5
		PCL=15(1.5dBm)	315.0	mA	★	130.5

Note:

- Test algorithm is only for your reference.

- Max Supply Current and Relative Power level recorded simultaneously

- Pay attention to the condition of GPRS attach

- It is the same Max Supply Current standard at GPRS or GSM

5.3 RF Testing Description

Example: G510

G510 RF Sector(EGSM900) Internal Standards						Date		
						Sample A		
Item	Condition	STD-ETSI	STD-G1	Unit	Level	Channel		
						1	62	124
Frequency Error	EGSM900 PCL=5	<90	<50	Hz	★	-40.9	-40.4	-33.3
	10	<90	<50	Hz		-42.17	-46.2	-42.17
	15	<90	<50	Hz		-43.13	-34.03	-41.71
	19	<90	<50	Hz		-48.43	-35.19	-34.16
RMS Phase Error	EGSM900 PCL=5	<5	<3	°	★	1.1	1.0	0.9
	10	<5	<3	°		1.0	0.9	0.8
	15	<5	<3	°		1.0	0.9	0.8
	19	<5	<3	°		1.0	0.9	0.8
Peak Phase Error	EGSM900 PCL=5	<20	<10	°	★	4.5	4.3	3.5
	10	<20	<10	°		3.2	2.9	2.9
	15	<20	<10	°		3.2	2.8	2.7
	19	<20	<10	°		3.0	3.2	2.7
Transmitter output	EGSM900 PCL=5	33±2	32.5±0.5	dBm	★	32.7	32.6	32.6
power	6	31±3	31±1.5	dBm		31.2	31.0	31.0
	7	29±3	29±1.5	dBm		29.1	29.0	29.0
	8	27±3	27±1.5	dBm		27.2	27.2	27.1
	9	25±3	25±1.5	dBm		25.2	25.1	25.1
	10	23±3	23±1.5	dBm		23.1	23.0	23.0
	11	21±3	21±1.5	dBm		21.0	21.0	21.0
	12	19±3	19±1.5	dBm		19.1	19.0	19.0
	13	17±3	17±1.5	dBm		17.1	17.0	16.9
	14	15±3	15±1.5	dBm		15.1	15.0	15.1
	15	13±3	13±1.5	dBm		13.1	13.1	13.1
	16	11±5	11±2.5	dBm		10.9	11.0	10.9
	17	9 ±5	9 ±2.5	dBm		9.2	9.2	9.2
	18	7 ±5	7 ±2.5	dBm		7.0	6.8	6.7

			19	5 ±5	5 ±3	dBm		4.9	5.0	5.1
Transmitter output	EGSM900	PCL=5			Insde Template		★	PASS	PASS	PASS
burst timing			6		Insde Template			PASS	PASS	PASS
			7		Insde Template			PASS	PASS	PASS
(Pass or Fail)			8		Insde Template			PASS	PASS	PASS
			9		Insde Template			PASS	PASS	PASS
			10		Insde Template			PASS	PASS	PASS
			11		Insde Template			PASS	PASS	PASS
			12		Insde Template			PASS	PASS	PASS
			13		Insde Template			PASS	PASS	PASS
			14		Insde Template			PASS	PASS	PASS
			15		Insde Template			PASS	PASS	PASS
			16		Insde Template			PASS	PASS	PASS
			17		Insde Template			PASS	PASS	PASS
			18		Insde Template			PASS	PASS	PASS
			19		Insde Template			PASS	PASS	PASS
Output RF spectrum	EGSM900	PCL=5		*1	Insde Template		★	PASS	PASS	PASS
(due to switching)			10		Insde Template			PASS	PASS	PASS
			15		Insde Template			PASS	PASS	PASS
(Pass or Fail)			19		Insde Template			PASS	PASS	PASS
								PASS	PASS	PASS
Output RF spectrum	EGSM900	PCL=5		*2	Insde Template		★	PASS	PASS	PASS

(due to modulation)	10		Insde Template			PASS	PASS	PASS
	15		Insde Template			PASS	PASS	PASS
(Pass or Fail)	19		Insde Template			PASS	PASS	PASS
Receiver sensitivity	EGSM900　PCL=5 BER<2.439% & FER<1%	≤-102	≤-108	dBm	★	-109.30	-109.5	-108.8
Signal strength	EGSM900							
	Cell Power=-88(dBm)	22(-3~+2)	22(-2~+2)		★	20	22	20
	Cell Power=-102(dBm)	8(-4~+2)	8(-3~+2)			7	8	7
	Cell Power=-108(dBm)	2(-4~+2)	2(-3~+2)			3	4	4

Note: Test algorithm is only for your reference.

6 RF Antenna

There is SMA RF interface on development board. It is connected to RF interface of the module through a RF cable which transfers SMA to U.FL. The GSM antenna can be connected by the SMA connector.

7 Default Jumper Cap
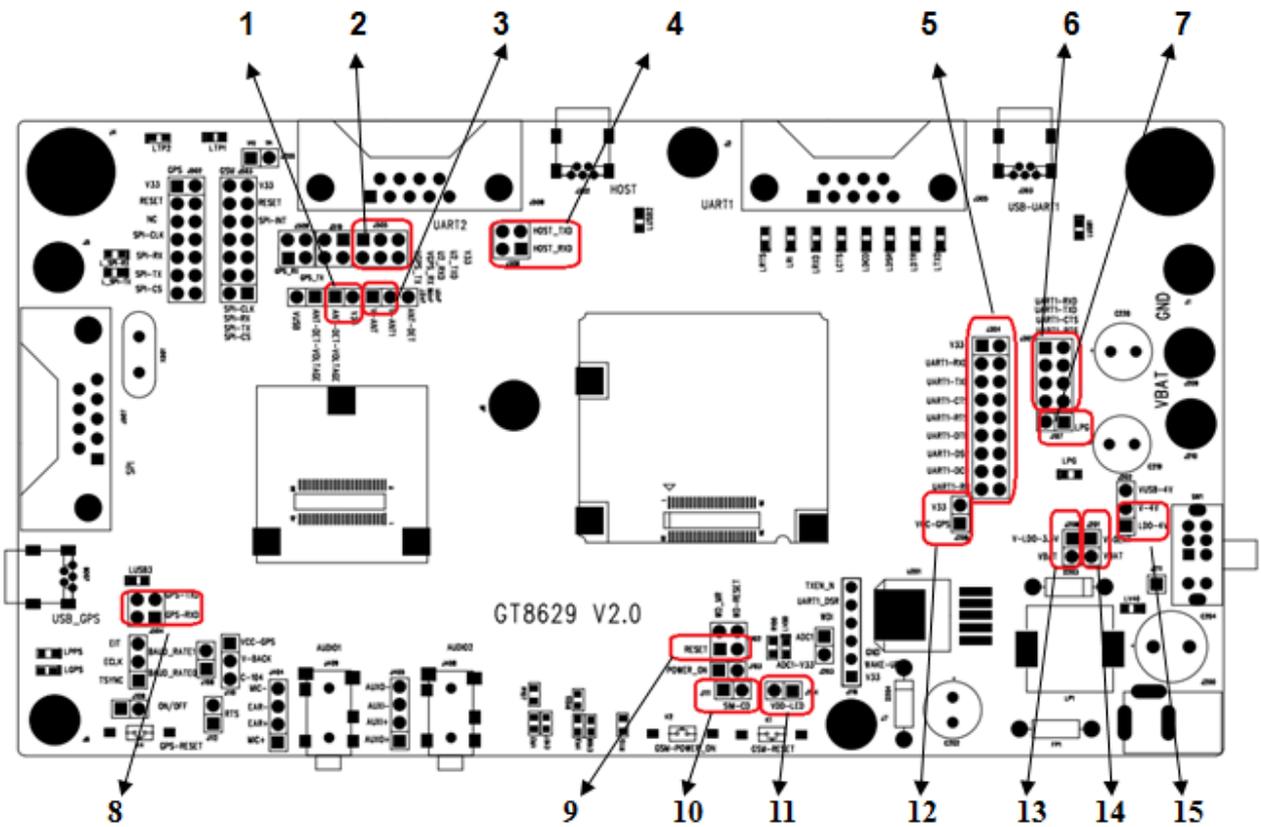
Figure 7-1 Default Jumper Cap

Number	Locate	PCS
1	J406	1
2	J505	3
3	J401(V-ANT---V-ANT1)	1
4	J306	2
5	J304	9
6	J301	4
7	J107	1
8	J504	2
9	J102	1

10	J111	1
11	J104	1
12	J206	1
13	J208	1
14	J201	1
15	J202(LDO_4V---V_4V)	1