HUAWEI 30 mm x 30 mm LGA Module

Development Kit Guide

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About This Document

Revision History

Document Version	Date	Chapter	Descriptions
01	2011-10-20		Creation
02	2014-04-26	All	Updated

Contents

1 Overview

1.1 About This Chapter

This chapter provides a brief description of the 30 mm x 30 mm LGA module development kit (DVK), including:

- Introduction to the DVK
- Components of the DVK

The 30 mm x 30 mm LGA module DVK supports MU509 series, MC509 series, MU609, MU709 series and ME909u series module.

Feature	Implementation	MC509	MU509	MU609	ME909u	MU709
Power Supply	220 V AC to 5 V DC Adaptor (Micro USB Port)	√	√	√	√	√
	Add another two 3 pin-single-row connector. One is 5 V and the other is GND.	√	√	√	√	√
	Input voltage range DC 4.5 V to 5.5 V (typical value is 5.0 V)	√	√	√	√	√
Antenna	GPS	√	X	√	√	√
	AUX	√	X	√	√	√
	Main RF Port	√	√	√	√	√
SIM Ports	SIM card socket	√	√	√	√	√
Audio Ports	Three audio ports including EAR, SPK and PCM	√	√	only PCM	only PCM	only PCM
	Analog Audio Connector is RJ11 Ports	√	√	X	X	X

Feature	Implementation	MC509	MU509	MU609	ME909u	MU709
	The Audio Connector is Earphone Jack, 3.5 mm Audio Jack	√	√	√	√	√
Serial Ports	Three RS-232C Ports	√	√	√	Only for Debugging	Only for Debugging
	Serial port for data communication	Reserved	Reserved	Reserved	Reserved	Reserved
	Serial port for AT command	√	√	√	Reserved	Reserved
	Serial port for debugging	X	X	√	√	√
	Max. baud rate: 230000 bps	√	√	√	√	√
I2C and SPI	Three pins I2C port	Reserved	Reserved	Reserved	Reserved	Reserved
	Five pins SPI port	Reserved	Reserved	Reserved	Reserved	Reserved
RTC	Support a button cell and a capacity	Reserved	Reserved	Reserved	Reserved	Reserved
USB Port	Micro USB Port	√	√	√	√	√
	USB 2.0 (Full speed and High speed)	√	√	√	√	√
GPIOs	Switchable pull up/down resistors (for 5 GPIOs)	Reserved	Reserved	Reserved	Reserved	Reserved
Indicator LED	Power on/off indicator	√	√	√	√	√
	UART TX/Ring indicator 2*3	√	√	√	Reserved	Reserved
	CTS/RTS indicator 2*2	√	√	√	Reserved	Reserved
	Module status indicator	Reserved	Reserved	Reserved	Reserved	Reserved
	Module mode indicator	Reserved	Reserved	Reserved	Reserved	Reserved
	Module sleep indicator	Reserved	Reserved	Reserved	Reserved	Reserved
	USB insert detection (interface board)	√	√	√	√	√
ADC input	2 Analog inputs	Reserved	Reserved	Reserved	Reserved	Reserved
JTAG	On interface board	√	√	√	√	√

Feature	Implementation	MC509	MU509	MU609	ME909u	MU709
HSIC	On interface board	X	X	X	Reserved	Reserved

NOTE
Reserved means features DVK supports but the module does not support now.

NOTE
- For the detailed feature information, you can refer to module's hardware guide.
- In the following chapters and sections, "module" refers to the 30 mm x 30 mm LGA module; "DVK" refers to the 30 mm x 30 mm LGA module development kit.

1.2 Introduction to the DVK

The DVK provides a complete solution based on the data functions of the module.

For designers who adopt the module in their designs, the DVK facilitates their module-based programming and troubleshooting at the project development stage.

The DVK consists of two development boards. One is mother board and the other is interface board.

Consisting of a dedicated interface board and accessories, the DVK provides the following interfaces:

- Two Micro USB interfaces, one is used for power supply and the other is used to communicate.
- Three standard RS-232 interfaces: 4-line (UART 1), 8-line (UART 0) and 2-line (UART 2 only for ME909u series debugging).
- Standard Subscriber Identity Module (SIM) card interface
- Three SMA (Small A Type) antenna connectors

1.3 Components of the DVK

Table 1-1 lists the components of the DVK.

Check the components and their quantities after you obtain the DVK. If any component is missing or damaged, contact with your DVK supplier.

Table 1-1 Components of the DVK

Number	Item	Quantity (pcs)	Category
1	Mother Board	1	Mandatory
2	Interface Board	1	Mandatory
3	Micro USB cable	2	Mandatory

Number	Item	Quantity (pcs)	Category
4	Adapter	2	Mandatory
5	External antenna (698 MHz–960 MHz/1410 MH–2690MHz; ≥–1 dBi; Omnidirectional)	3 (1 for MU509)	Mandatory
6	D3.5 4P Plug Earphone	1	Mandatory
7	RS-232 serial cable	1	Mandatory
8	Handset	1	Optional (Only for MC509 series and MU509 series module)
9	Handset cable	1	Optional (Only for MC509 series and MU509 series module)

2 Installation and Use Guide

2.1 About This Chapter

This chapter describes how to install and use the LGA module's DVK.

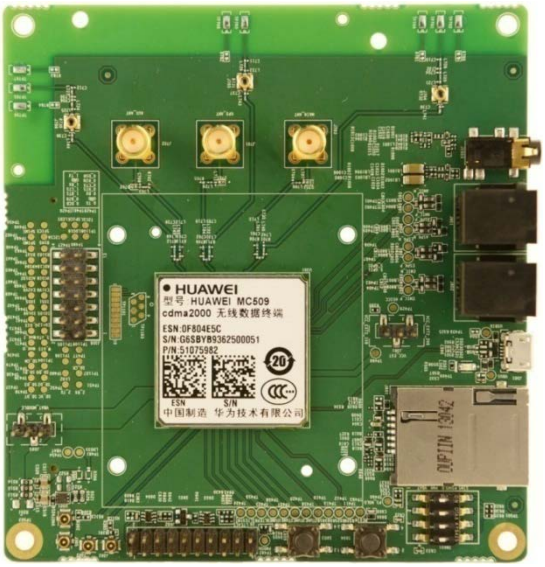
2.2 Setting Up the DVK

There are two boards in DVK. One is the mother board and the other is the interface board. The mother PCBA can be used in all 30 mm x 30 mm LGA series modules, but the interface boards are different among MU509 series, MC509, MU609, MU709 series and ME909u series.

The interface board is ML0ME909UM as shown in the following figure. The 30 mm x 30 mm LGA module is soldered on this board. This document takes MC509 interface board as an example to describe how to install and use the LGA module's DVK.

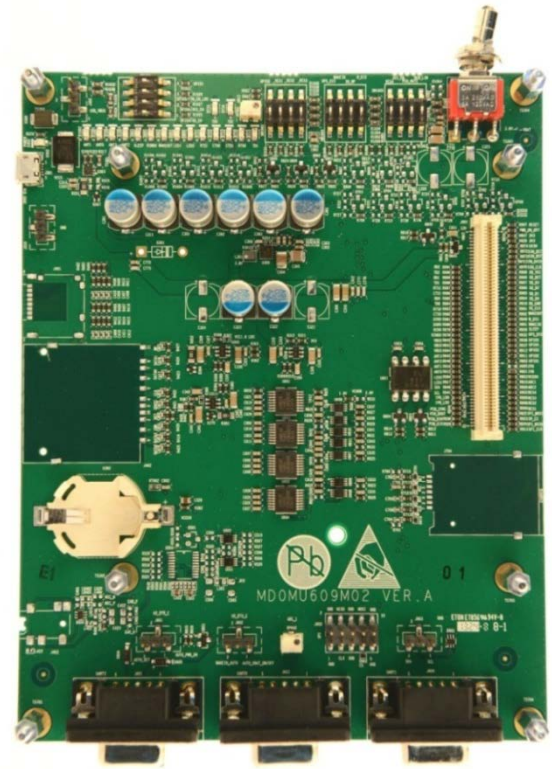
The following figure is the interface board.

Figure 2-1 The interface board



The mother board MD0MU609M02 VER.A is the universal board for different LGA modules. It is as shown in the following figure.

Figure 2-2 The mother board

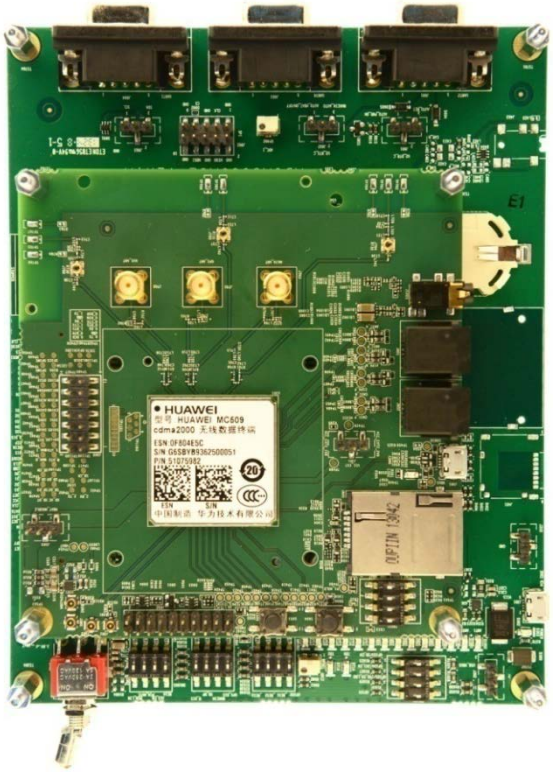


NOTE

The mother board and the interface board should be assembled together as usual, and then modules can work because the mother board supplies power to the interface board.

Please install the DVK by the following instructions.

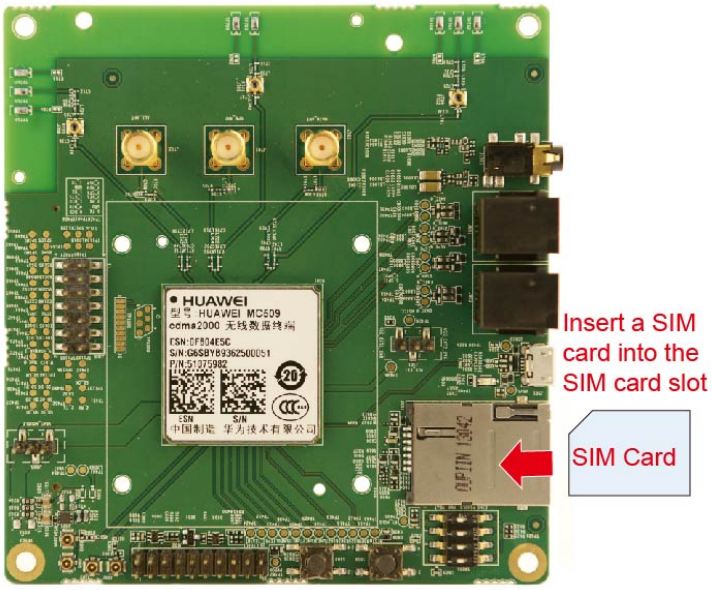
Step 1 The two boards must be assembled together to achieve the function of the DVK.



NOTE

The DVK will be provided to you just as above, so you do not need to do the assembling by yourself.

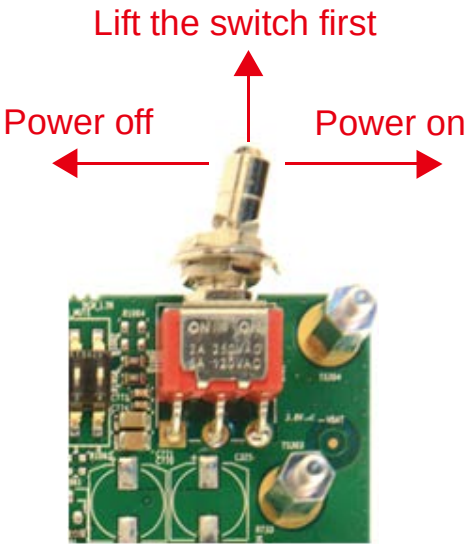
Step 2 Before turning on the module, insert a SIM card into the SIM card slot (if communication is required).



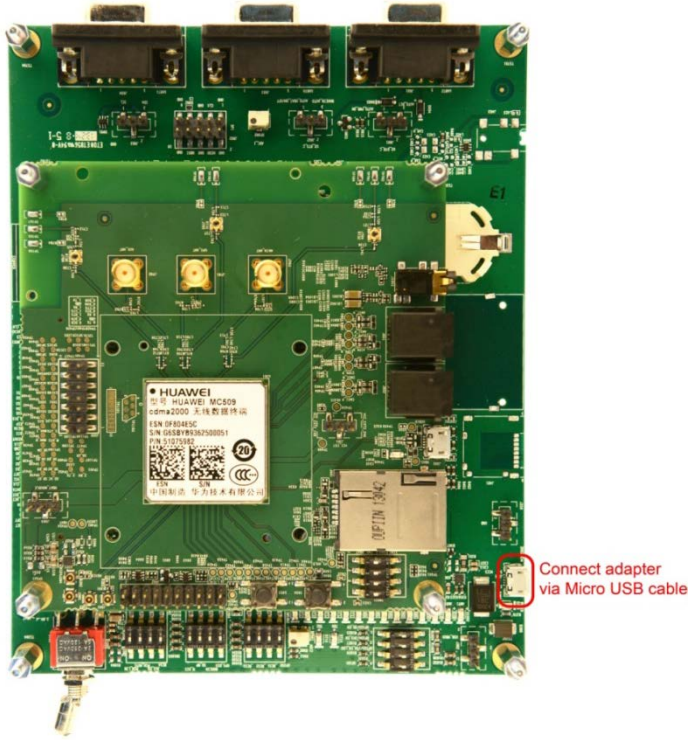
Step 3 The S701 is a power switch which controls the mother board to supply power-on/off for the interface board.

NOTE

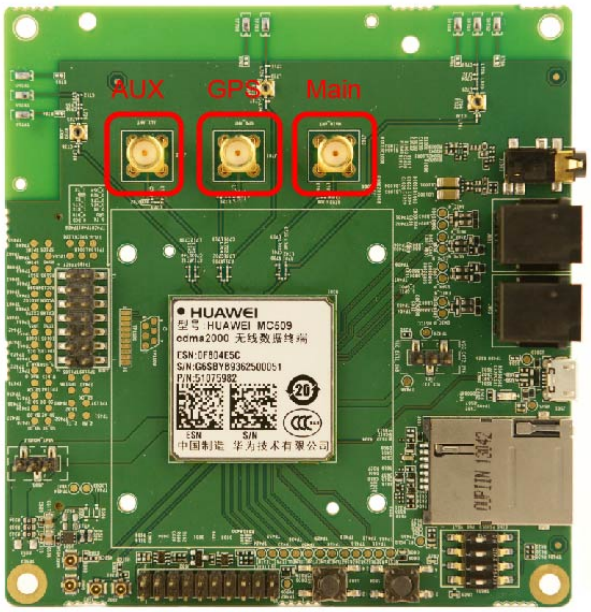
You must lift the switch first and then you can turn the switch right or left.



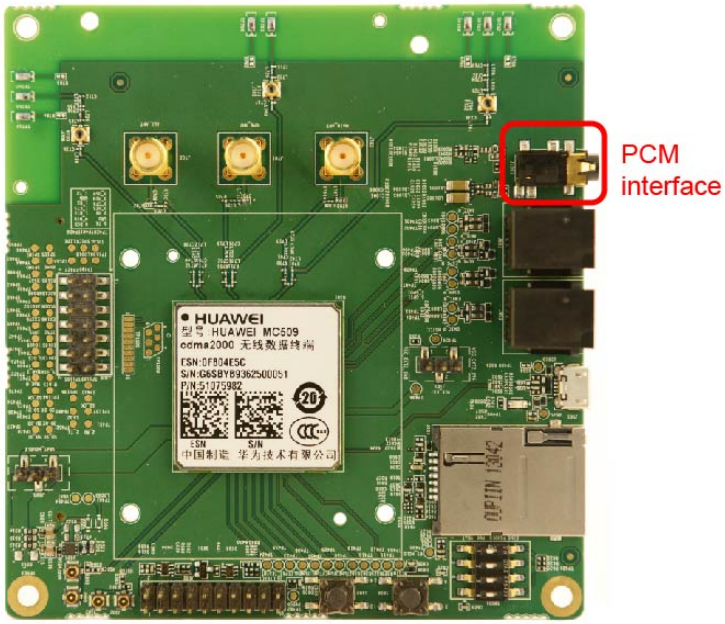
Step 4 Connect the USB cable to the Micro USB port on the mother board of the DVK. The LGA module can be supplied power.



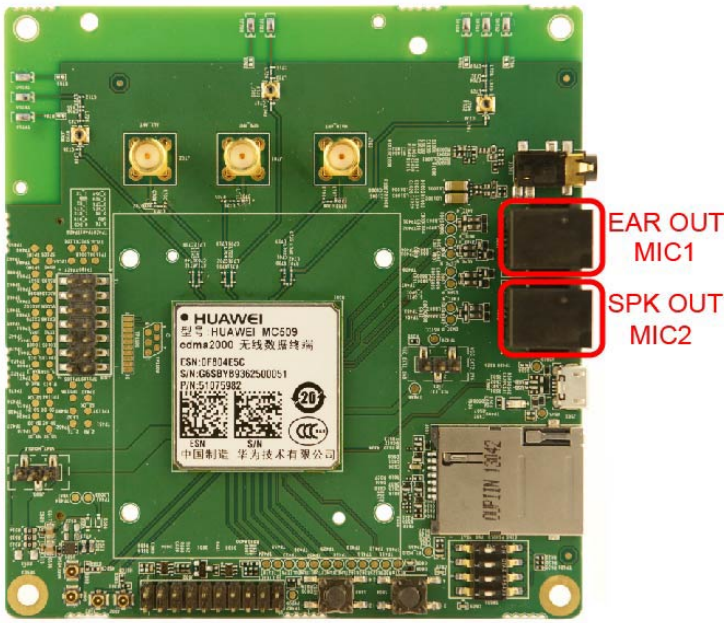
Step 5 If RF communication is required, connect the SMA connectors on the DVK to the external antennas or a radio communication tester by using coaxial cables. The external antennas should be assembled well before turning on the module.



Step 6 Connect a D3.5 4P plug earphone to the audio port to test the PCM function.



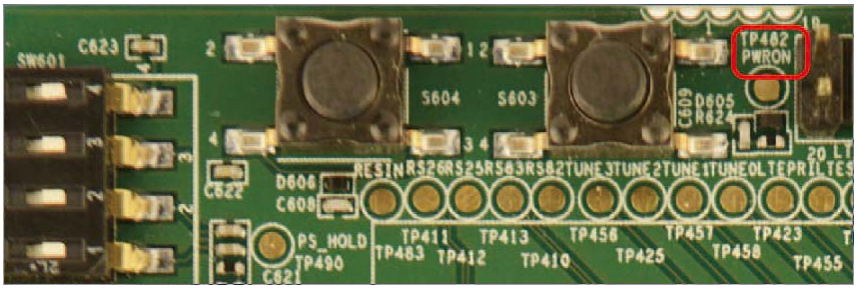
Step 7 Connect a handset with handset cable to the audio port to test analog audio.



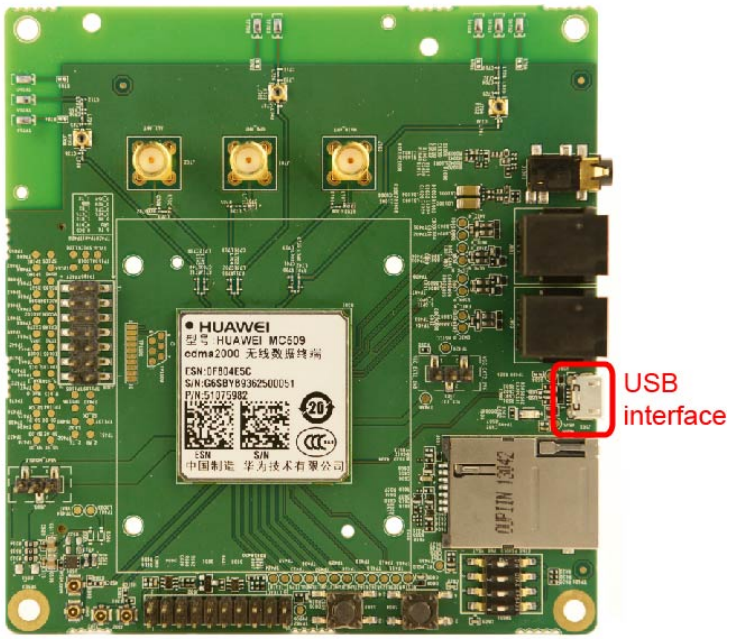
NOTE

Only MU509 series and MC509 series module support analog audio.

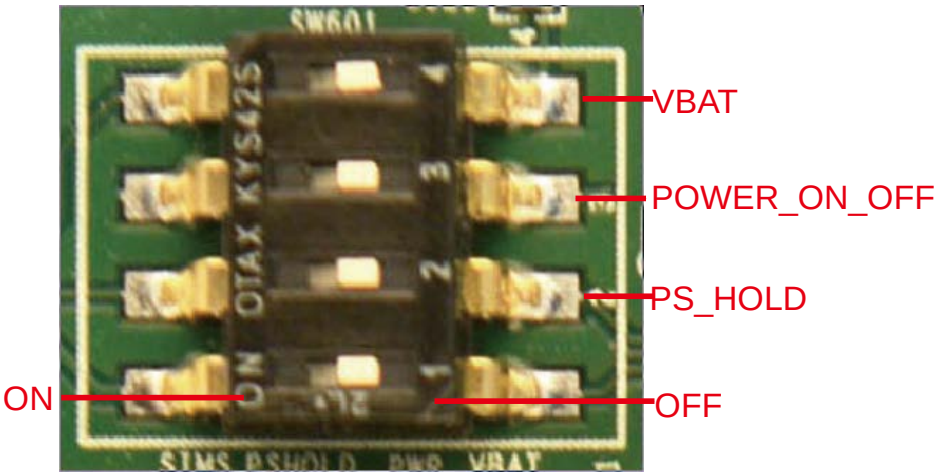
Step 8 Press the POWER_ON_OFF button (silk-screen is PWRON) for 0.5s to 1s, and turn on the module and the module can be powered on. By default, module will be automatically powered on due to SW601 configuration (refer to Step 10).



Step 9 After turning on the module, connect the USB cable to the Micro USB interface on the interface board directly. And the module can communicate with the host through USB interface.



The DIP Switch SW601 explanation:

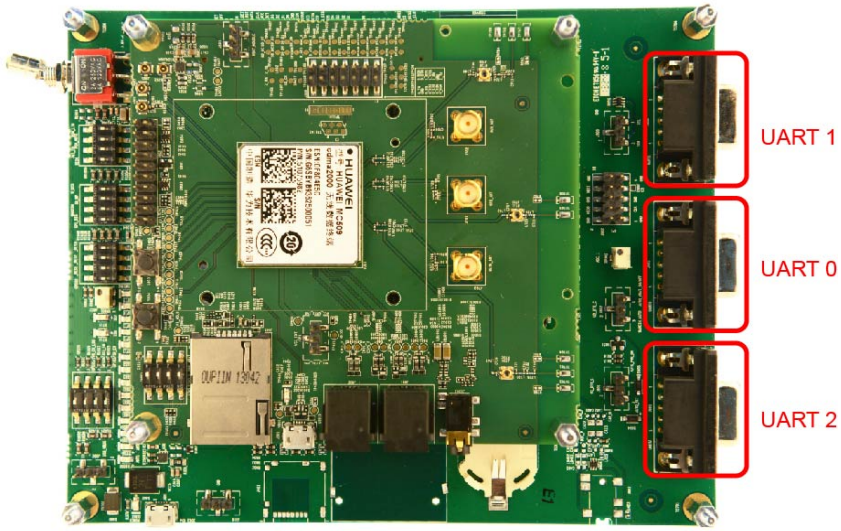


- When the VBAT is toggled to the end of ON, there is a 10 kΩ resistor in parallel with the ends of VBAT and GND.
- When the POWER_ON_OFF is toggled to the end of ON, the POWER_ON_OFF will be pulled down to GND. At this time, once the module is supplied power, it will be turned on automatically.
- When the PS_HOLD is toggled to the end of ON, the PS_HOLD will be pulled up to 1.8 V.

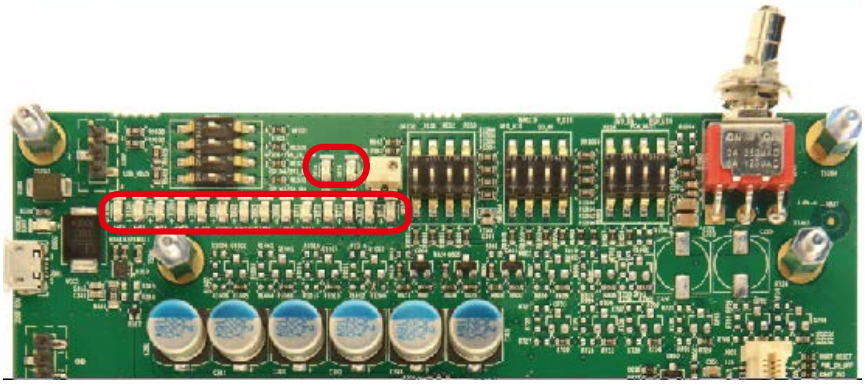
Step 10 Connect the RS-232 serial cable to the DB9 port on the DVK directly. And the module can communicate with the host computer through UART.

NOTE

The DVK can support 3 UART ports but the module cannot support all the UART ports. For example, MC509 and MU509 series only support UART0; MU609 can support UART0 and UART1 but not UART2. Please refer to module's hardware guide which you want to use in hand.



There are some LEDs on mother board to indicate the module working mode. You can see the screen on the board.



Screen Name	Net Name
ANT0	REVERSED FOR ANT_TUNE 0
ANT1	REVERSED FOR ANT_TUNE 1
ANT2	REVERSED FOR ANT_TUNE 2
ANT3	REVERSED FOR ANT_TUNE 3
SLEEEP	SLEEP_STATUS
RING0	UART0_RING

Screen Name	Net Name
WAKEOUT	WAKEUP_OUT
LED1	30 mm x 30 mm LGA PIN 101 (LED_MODE)
LED2	30 mm x 30 mm LGA PIN 91 (LED_STATUS)
RTS1	UART1_RTS
CTS0	UART0_CTS
CTS1	UART1_CTS
RTS0	UART0_RTS
TD1	UART1_TXD
TD0	UART0_TXD
TD2	UART2_TXD

NOTE
Whether LED1 and LED2 are available or not is determined by the module. Please refer to module's hardware guide which you want to use in hand.

The DIP Switch SW1001, SW1002, SW1004 and SW1005 explanation:

- When the DIP Switch is toggled to the end of ON, which means the DIP Switch is conducted and the signals are pulled up to high level.
- When the DIP Switch is toggled to the end of OFF, which means the DIP Switch is not conducted and the signals are pulled down to low level.

Figure 2-3 SW1001

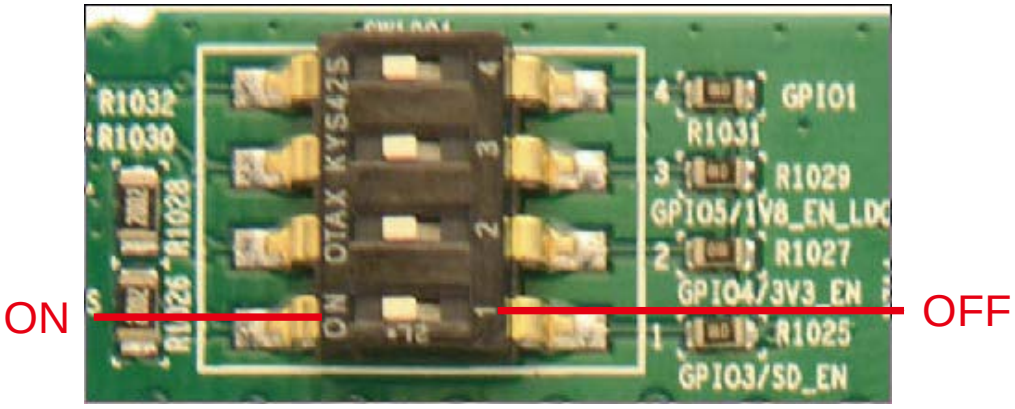
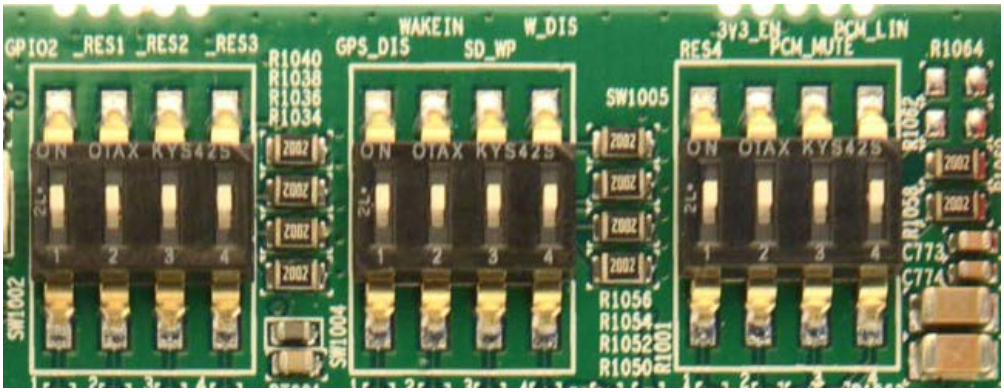


Figure 2-4 SW1002, SW1004 and SW1005



Screen Name	Net Name
GPIO1	30 mm x 30 mm LGA module 51 PIN
GPIO5/1V8_EN_LDO	30 mm x 30 mm LGA module 113 PIN
GPIO4/3V3_EN	30 mm x 30 mm LGA module 109 PIN
GPIO3/SD_EN	30 mm x 30 mm LGA module 105 PIN
GPIO2	30 mm x 30 mm LGA module 55 PIN
RES1	30 mm x 30 mm LGA module 37 PIN
RES2	30 mm x 30 mm LGA module 94 PIN
RES3	30 mm x 30 mm LGA module 95 PIN
GPS_DIS	30 mm x 30 mm LGA module 44 PIN Reserved for GPS control pin.
WAKEIN	WAKEUP_IN
SD_WP	SD card write protection
W_DIS	30 mm x 30 mm LGA module 45 PIN (Control RF function, now MC509 can support this function)
RES4	30 mm x 30 mm LGA module 103 PIN
PCM_MUTE	Reserved
PCM_LIN	Reserved
3V3_EN	Reserved

NOTE
The 3V3_EN, PCM_MUTE and PCM_LIN control function are disabled.

3 Description of the DVK

3.1 About This Chapter

This chapter describes the structure, interface functions, and interface usage of the DVK.

- DVK Structure
- Interface Functions

3.2 DVK Structure

Figure 2-1 and Figure 2-2 show the layout of the DVK (TOP VIEW).

3.3 Interface Functions

3.3.1 Power Interface

Power can be supplied to the DVK by the Micro USB 5 V power supply port in the universal board as showed in chapter 2.2 .

3.3.2 USB Communications Port

The DVK provides one Micro USB port. The module can communicate with PC (or other DTE) through the Micro USB port.

3.3.3 Audio Ports

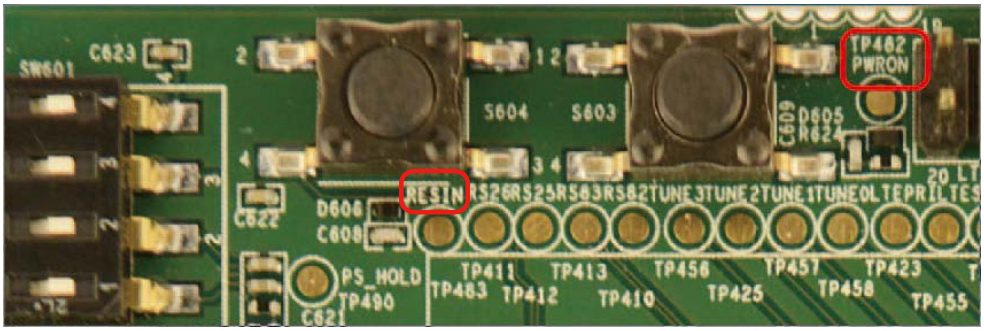
The headset jack is a 3.5 mm HEADSET connector. You can connect a D3.5 4P plug earphone to test the PCM function.

The handset is ready for analog radio which is used in MU509 serials and MC509 serials.

3.3.4 Buttons

The DVK provides a POWER_ON_OFF button (silk-screen is PWRON) and a RESET (silk-screen is RESIN) button.

The right one is the POWER_ON_OFF button, and the left one is RESET button.



POWER_ON_OFF Button

After you press the POWER_ON_OFF button, the module is powered on. After the module is turned on, pressing the POWER_ON_OFF button for more than 2.5s can turn off the module.

RESET Button

When the module is turned on, pressing the RESET button can reset the 30 mm x 30 mm LGA module. For more information on the characteristics of the reset signal, please refer to the module's hardware guide.

3.3.5 SIM Card Interface

The DVK provides a standard push to push SIM card interface on the DVK. The module can support Class B/C SIM card. Before you turn on the module, insert a SIM card into the SIM card slot

For more information on the characteristics of the SIM card interface, please refer to the module's hardware guide.

3.3.6 Antenna Connectors

The DVK provides three antenna connectors: MAIN and AUX SMA RF connectors and GPS coaxial antenna connector. The external antennas should be assembled well before turning on the module.

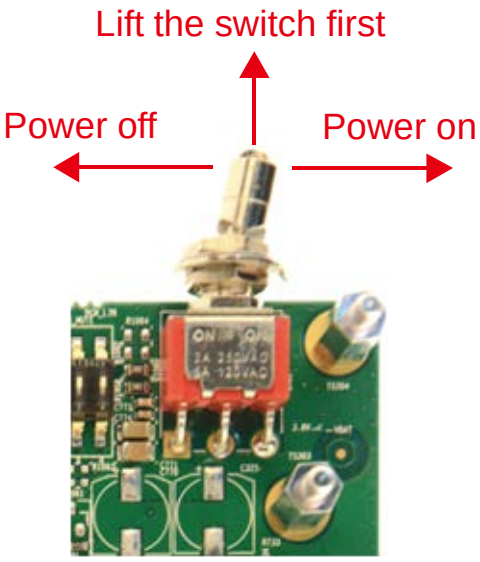
SMA antenna connectors can be connected to an RF tester (CMU200 or Agilent 8960), or directly connected to external antennas for the testing services of the existing network. The GPS coaxial antenna connector can be directly connected to external GPS antenna for the test of GPS performance.

3.3.7 UARTs

The DVK provide one 4-line UART interface, one 8-line UART interface and one 2-line UART interface.

3.3.8 Switch

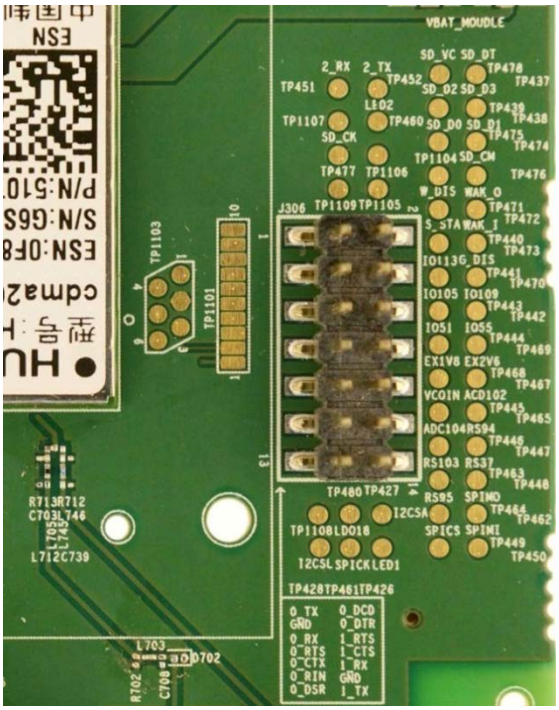
When you want to toggle the switch, please lift the switch first as follow.



3.3.9 Test points

The DVK provides many test points for testing. The signals assignment of test points is shown in Figure 3-1 and Figure 3-2 .

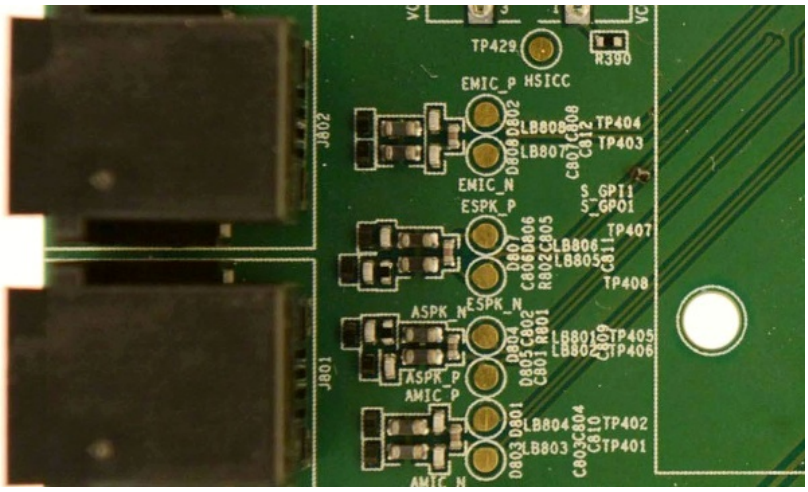
Figure 3-1 Test Points 1



TP No.	Screen Name	Net Name
TP451	2_RX	UART2_RX
TP452	2_TX	UART2_TX
TP471	W_DIS	W_DISABLE
TP472	WAK_O	WAKEUP_OUT
TP473	WAK_I	WAKEUP_IN
TP470	G_DIS	GPS_DISABLE
TP440	S_STA	SLEEP_STATUS
TP441	IO113	GPIO(LGA 113 PIN)
TP443	IO105	GPIO(LGA 105 PIN)
TP442	IO109	GPIO(LGA 109 PIN)
TP444	IO51	GPIO(LGA 51 PIN)
TP469	IO55	GPIO(LGA 55 PIN)
TP468	EXT1V8	VCC_EXT1
TP467	EXT2V6	VCC_EXT2
TP445	VCOIN	RESERVED
TP465	ADC102	ADC(LGA 102 PIN)
TP446	ADC104	ADC(LGA 104 PIN)
TP447	RS94	RESERVED (LGA 94 PIN)
TP463	RS103	RESERVED (LGA 103 PIN)
TP448	RS37	RESERVED (LGA 37 PIN)
TP464	RS95	RESERVED (LGA 95 PIN)
J306_1	0_TX	UART0_TX
J306_2	0_DCD	UART0_DCD
J306_3	GND	GND
J306_4	0_DTR	UART0_DTR
J306_5	0_RX	UART0_RXD
J306_6	1_RTS	UART1_RTS
J306_7	0_RTS	UART0_RTS
J306_8	1_CTS	UART1_CTS
J306_9	0_CTX	UART0_CTS
J306_10	1_RX	UART1_RXD

TP No.	Screen Name	Net Name
J306_11	O_RIN	UART0_RING
J306_12	GND	GND
J306_13	0_DSR	UART0_DSR
J306_14	1_TX	UART1_TXD

Figure 3-2 Test Points 2

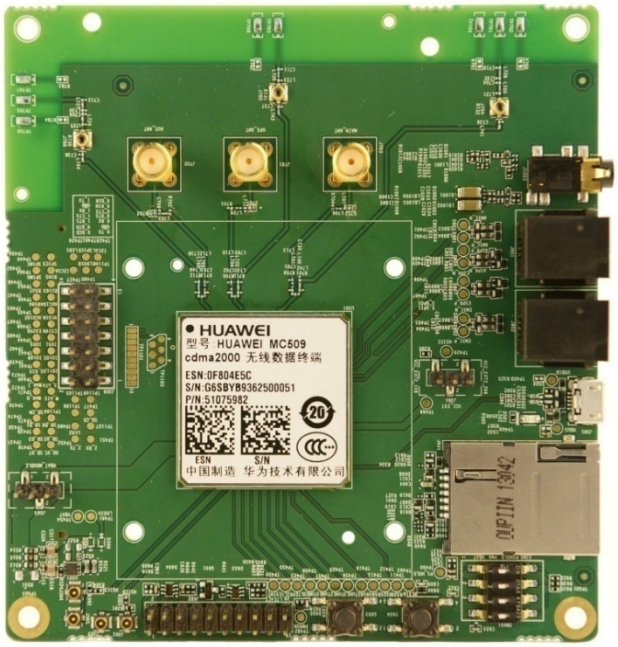


TP No.	Screen Name	Net Name
TP404	EMIC_P	MIC2_P
TP403	EMIC_N	MIC2_N
TP407	ESPK_P	SPK_OUT_P
TP408	ESPK_N	SPK_OUT_N
TP405	AMIC_P	MIC1_P
TP406	AMIC_N	MIC1_N
TP402	ASPK_P	EAR_OUT_P
TP401	ASPK_N	EAR_OUT_N

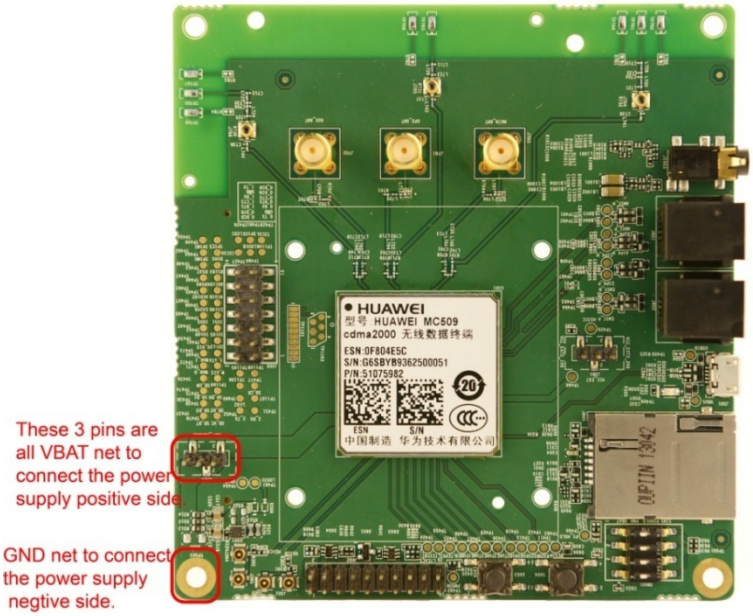
3.4 DVK Application

3.4.1 How to Test the Current of the Module

For the following steps, only the interface board is used.



Step 1 Connect the power supply and interface board as follow:



Step 2 Select the power voltage is 3.8 V and the current range is automatic.

Step 3 Supply power to the interface board and record what you want, such as the current.

NOTE

When you finish a test and want to have another test, please shut down the module and then cut off the supply. Please wait for 10 seconds and then power on the supply again.

4 Acronyms and Abbreviations

Acronym or Abbreviation	Expansion
AC	Alternating Current
CTS	Clear to Send
DC	Direct Current
DIP	Double In-line Package
DTE	Data Terminal Equipment
DVK	Development Kit
GPS	Global Position System
LGA	Land Grid Array
PCM	Pulse Code Modulation
RTS	Request to Send
RF	Radio Frequency
SIM	Standard Subscriber Identity Module
SMA	Small A Type
UART	Universal asynchronous receiver/transmitter
USB	Universal Serial Bus