HUAWEI M.2 Module

Development Kit Guide

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Huawei Technologies Co., Ltd.

Huawei Industrial Base, Bantian, Longgang, Shenzhen 518129, People's Republic of China
Tel: +86-755-28780808 Global Hotline: +86-755-28560808 Website: www.huawei.com
E-mail: mobile@huawei.com
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About This Document

Revision History

Document Version	Date	Chapter	Descriptions
01	2013-03-08		Creation

Contents

1 Overview

1.1 About This Chapter

This chapter provides a brief description of the M.2 module development kit (DVK), including:

- Introduction to the DVK
- Components of the DVK

📖 NOTE
- M.2 is the new name for NGFF (Next Generation Form Factor).
- In the following chapters and sections, "module" refers to the M.2 module; "DVK" refers to the M.2 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.

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

- One 5 V power supply input interface
- Two USB interfaces (one Micro-B receptacle interface and one A-type receptacle interface)
- One standard RS-232 interface: COM1 with 4-line
- One standard Subscriber Identity Module (SIM) card interface
- Two antenna connectors

The M.2 module is fixed to the DVK through the M.2 connector. The signals output from the module are transferred to the DVK for secondary development.

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	DVK	1	Mandatory
2	5 V output AC-DC power supply adapter	1	Optional
3	RS-232 serial cable	1	Optional
4	USB cable	1	Mandatory
5	2-pin jumper	3	Mandatory
6	External antenna	1	Optional
7	Radio frequency (RF) cable (for connecting RF testing instruments)	2	Mandatory

2 Setting Up the DVK

2.1 About This Chapter

The following section describes how to connect the M.2 module to the DVK, and how to setup the DVK to ensure that the module can work normally.

2.2 Setting Up the DVK

Connect the module to the DVK and set up the DVK by these following instructions step by step.

1. Plug the M.2 module onto the DVK by using the M.2 connector.

2. Use the screw to fix the module to the DVK.

3. Turn the dial switch (SW801) to the "off" position (left) as shown in the following figure to ensure the module works normally.
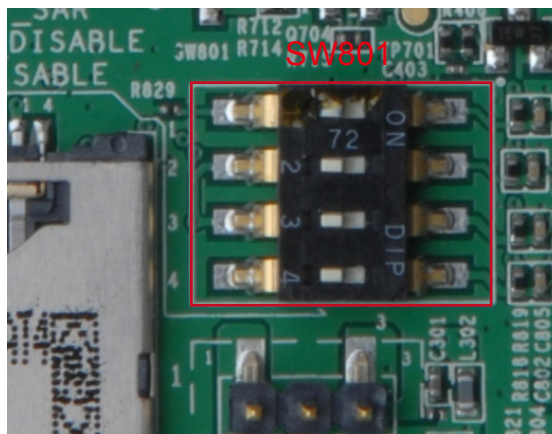
4. Insert a SIM card into the SIM card holder (J402) (if communication is required).
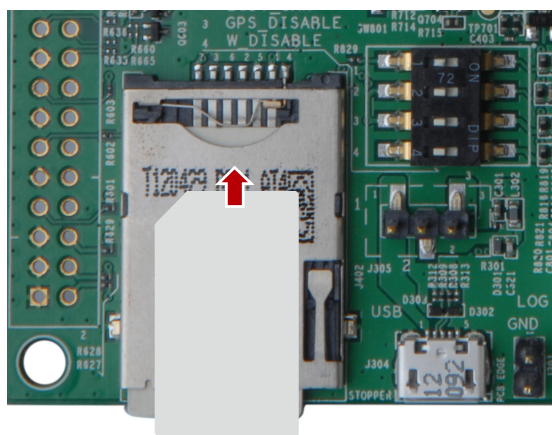
5. If RF communication is required, connect the coaxial connectors on the M.2 module to the RF coaxial connectors on the DVK with RF wires as shown below.

And connect the SMA connectors on the DVK to the external antennas or a Radio Communication Tester using coaxial cables.

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6. Setup the jumpers as shown below to ensure power can be supplied to the DVK by the Micro USB 5 V power supply correctly. (The DVK is recommended to be powered by the Micro USB).
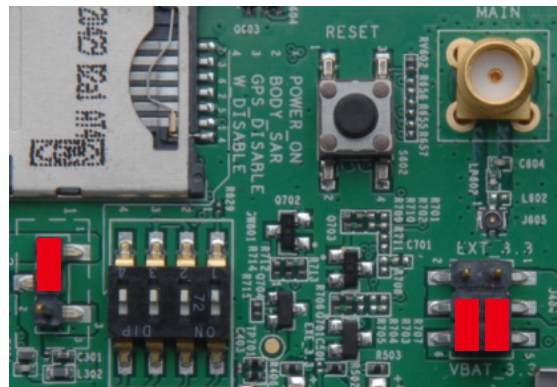
⚠ **CAUTION**

Do not turn on the power until the jumpers are already set up.

7. Connect the USB cable to the Micro USB port on the DVK directly. The DVK can be powered on by the Micro USB. And the module can communicate with the host computer.
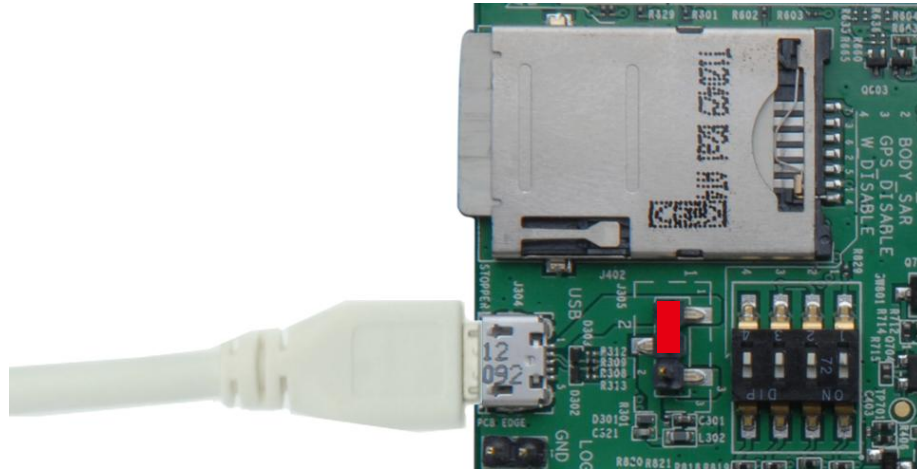
The DVK should be properly setup after completing the steps above.

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 3-1 shows the layout of the DVK.

Figure 3-1 Layout of the DVK
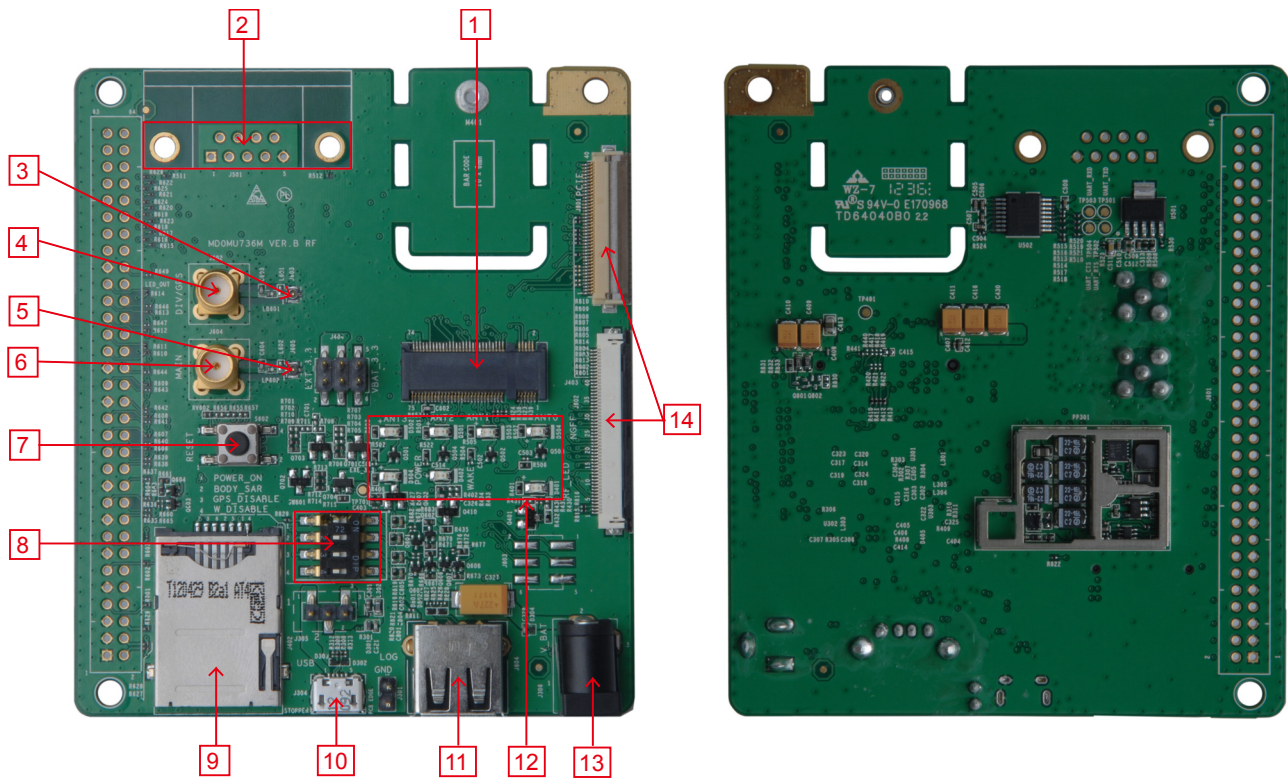
1. M.2 connector
2. Universal asynchronous receiver/transmitter (UART) serial port **(reserved)**
3. DIV/GPS coaxial connector
4. DIV/GPS antenna SMA connector
5. Main coaxial connector
6. Main antenna SMA connector
7. Reset button
8. Dial switch SW801
9. SIM card interface
10. Micro USB port
11. A-type USB port **(reserved)**
12. Light-emitting diode (LED) indicators
13. 5 V power supply input interface
14. ZIF connector **(reserved)**

Figure 3-2 shows the structure of the DVK.

Figure 3-2 DVK structure
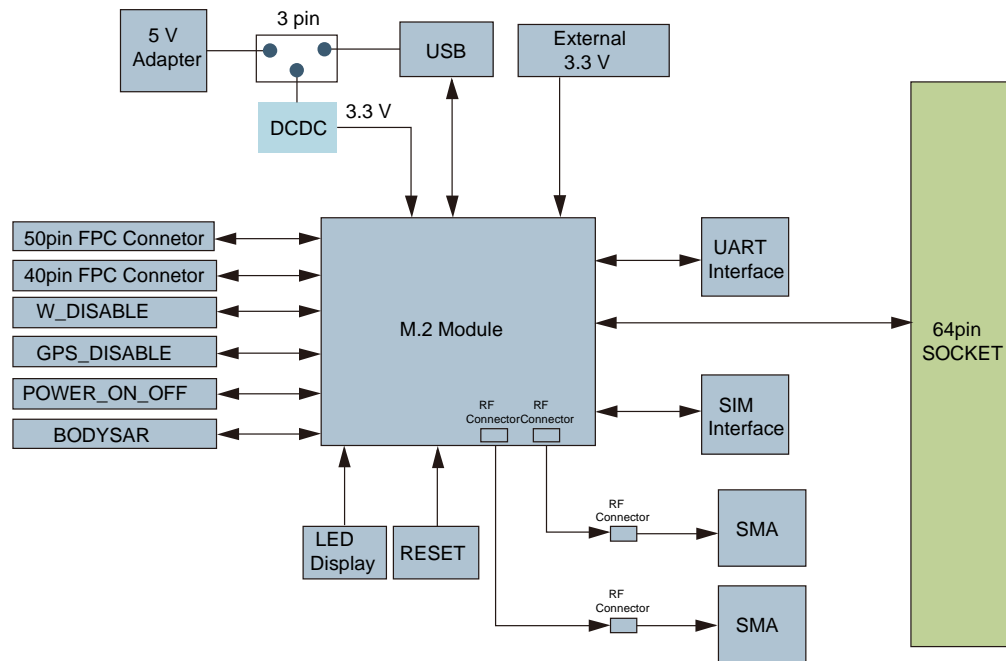
3.3 Interface Functions

3.3.1 Power Interface

Power can be supplied to the DVK by the Micro USB 5 V power supply or 5 V power adapter interface, or external 3.3 V voltage-stabilized power supply.

Power From USB or 5 V adapter (default)

There are three steps to power on the module correctly.

Firstly, select the proper power source.

Connect the pin 1 and pin 2 of the J305 by using a 2-pin jumper, power will be supplied to the DVK by the Micro USB connector.

Connect the pin 2 and pin 3 of the J305 by using a 2-pin jumper, power will be supplied to the DVK by the 5 V power adapter interface.

Figure 3-3 Micro USB Connector and 5 V power supply input interface

MICRO USB   Adapter
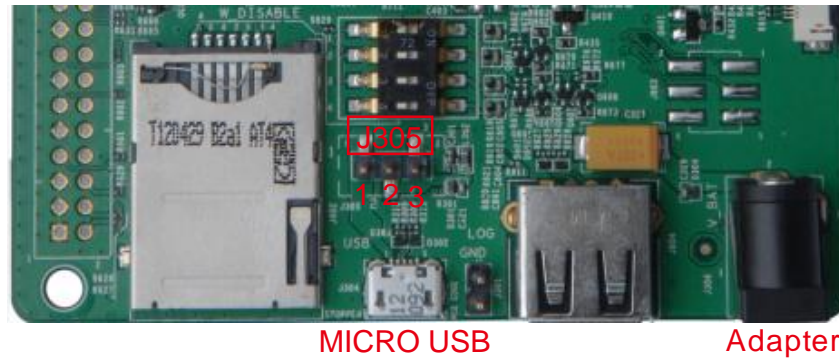
Secondly, connect the pin 2 and pin 3 of the J404 (as shown in Figure 3-4) by a 2-pin jumper.

Figure 3-4 Jump J404 when power is supplied by USB or adaptor
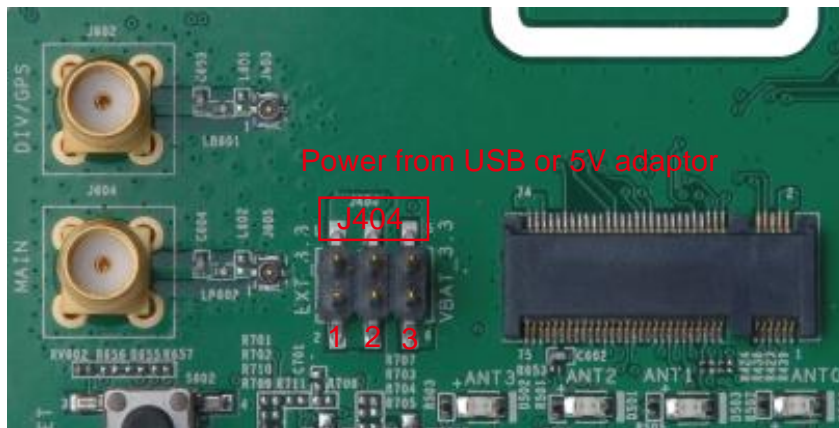
Thirdly, when all jumpers are ready, turn on the USB or the 5 V adaptor.

Power From external 3.3 V (special condition, not recommended)

The DVK can be also powered by external 3.3 V voltage-stabilized power supply connected through J404 (as shown in Figure 3-5). It is not recommended to use this power way.

The following process must be implemented:

Firstly, remove the jumper on the J305.

Secondly, jumper should be set up as shown in Figure 3-5 .

Thirdly, connect external 3.3 V to the pin 1 of J404.

Finally, turn on the power after three steps above are set correctly.

In this case, the power indicator (marked as POWER on the DVK) does not light up.

Figure 3-5 Jump J404 when power is supplied by external 3.3 V voltage-stabilized power supply
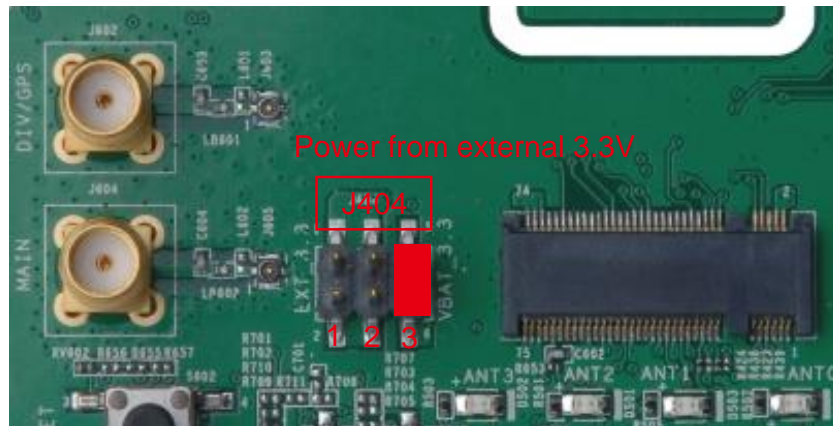
External 3.3V Connect to PIN 1

3.3.2 USB Communications Interface

The DVK provides one Micro USB port and one A-type USB port. The module can only communicate with PC (or other DTE) through the Micro USB port, and the A-type USB port is reserved for future use.

For more information on the characteristics of the USB interface of the M.2 module, please refer to the module's hardare guide.

3.3.3 LED Indicators

The DVK has seven LED indicators: one power indicator and six signal indicators. The description of these indicators is marked on the DVK. Table 3-1 lists the functions of these indicators.

Figure 3-6 LED Indicators
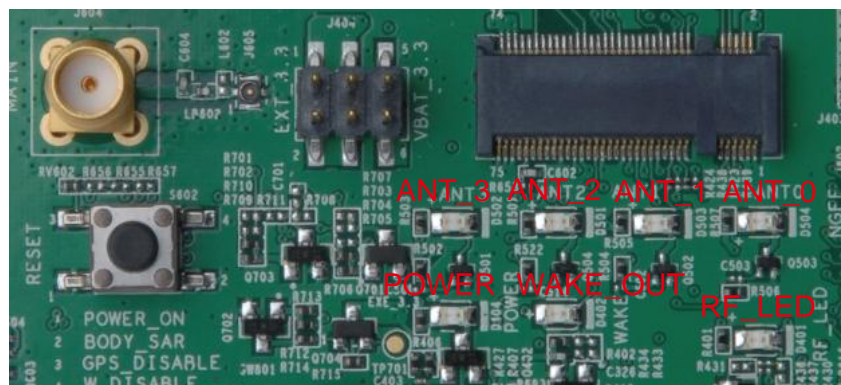
Table 3-1 Functions of the LED indicators on the DVK

Position Number	Mark on the DVK	Color	Function of the LED When It Lights Up
D404	POWER	Green	Indicates that the DVK has been powered on properly.
D401	RF_LED	Green	Indicates the operating status of the module.
D402	WAKE_OUT	Green	Indicates that the wake-up signal output is at low level.
D504	ANT_0	Green	Indicates the ANT_TUNE_0 signal output is at high level.
D503	ANT_1	Green	Indicates the ANT_TUNE_1 signal output is at high level.
D501	ANT_2	Green	Indicates the ANT_TUNE_2 signal output is at high level.
D502	ANT_3	Green	Indicates the ANT_TUNE_3 signal output is at high level.

3.3.4 Buttons

The DVK provides a dial switch (SW801) and a reset button (S602).

Dial Switch (in the off state by default)

Figure 3-7 Dial switch SW801
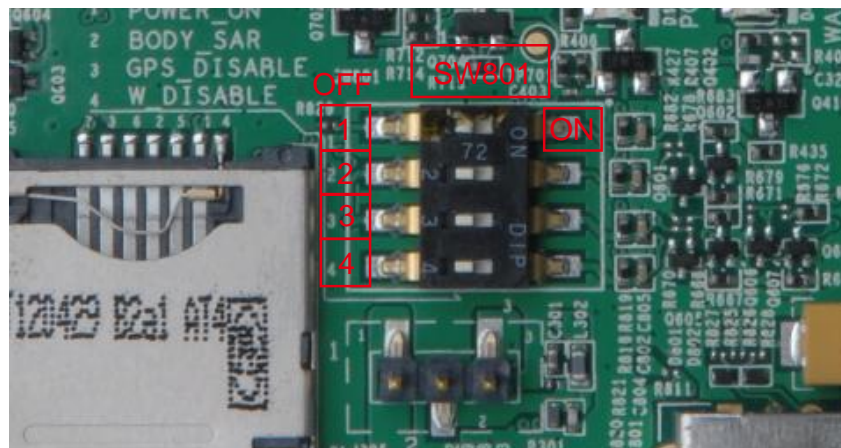
The 4-bit SW801 (as shown in Figure 3-7) has four control signals, the corresponding relationship between switch numbers and signals is shown as the following:

1: POWER_ON_OFF signal

2: BODY_SAR signal

3: GPS_DISABLE signal

4: W_DISABLE signal

When dial the four signals to the off side (1, 2, 3 and 4 side as shown in Figure 3-7), all signals are at the high level. (left=high)

When dial the four signals of SW801 to the ON side, all signals are at the low level. (right=low)

📖 **NOTE**

SW801 is in the turn-off state by default. Therefore, when using DVK, make sure that all these signals are at the high level.

In the normal case, all signals of SW801 should be dialed to the off side and let signals be at the high level.

The following are the functions and usage of the four signals:

1 (POWER_ON_OFF): When POWER_ON_OFF is at high level, the M.2 module is powered on; when at low level, it is powered off. Therefore, when use the DVK, make sure that POWER_ON_OFF is on the off side.

2 (BODY_SAR): When BODY_SAR is at low level, the M.2 module will power drop. Therefore, when use the DVK make sure that BODY_SAR is on the off side.

3 (GPS_DISABLE): When GPS_DISABLE is at low level, the M.2 module GPS function will be off. Therefore, when use the DVK make sure that BODY_SAR is on the off side.

4 (W_DISABLE): Flight mode control signal. When W_DISABLE is at low level, RF function is disabled. Therefore, when use the DVK, make sure that W_DISABLE is on the off side.

For more information on the characteristics of the signals above, please refer to the module's hardware guide.

RESET KEY

Figure 3-8 RESET button on the DVK

The reset button S602 (as shown in Figure 3-8 , marked as "RESET" on the DVK) is used to reset the module. Pressing the reset key can reset the M.2 module.

For more information on the characteristics of the reset signal, please refer to the module's hardware guide.

3.3.5 USIM Card Interface

The DVK provides a standard push to push USIM card interface (as shown in Figure 3-9) on the DVK.

The USIM card interface has seven pins as shown in Figure 3-9 . The following describes the function of the seven pins:

Pin 1 (VSIM_VAR): 1.8 V power supply for SIM card

Pin 2 (SIM_RST): SIM card reset signal

Pin 3 (SIM_CLK): SIM card clock signal

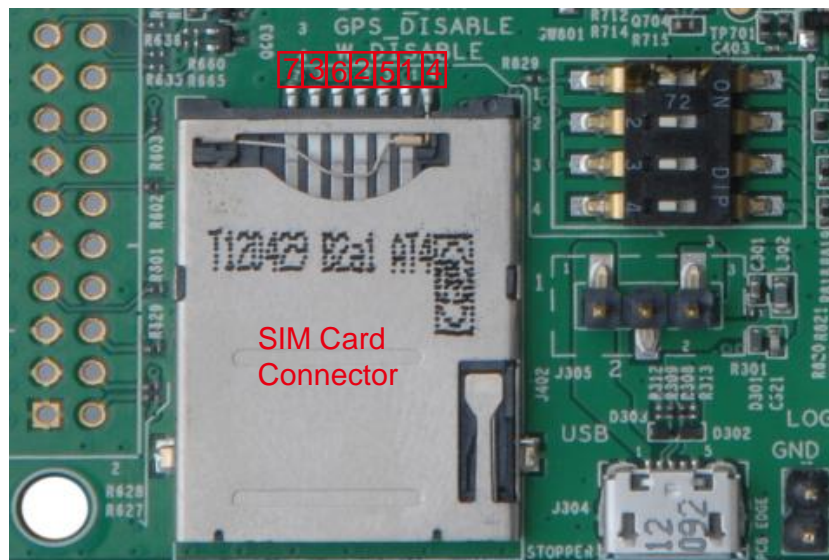Pin 4 (SIM_DET): SIM card detect

Pin 5 (GND): Ground

Pin 6: Not connected

Pin 7 (SIM_IO): SIM card data signal

For more information on the characteristics of the USIM Interface, please refer to the module's hardware guide.

Figure 3-9 SIM card interface in the DVK
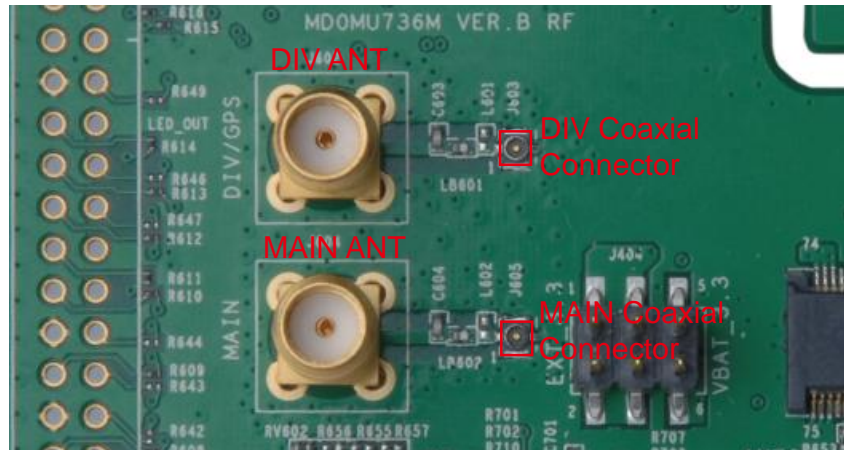

3.3.6 Antenna Connector

The DVK provides two antenna connectors: MAIN coaxial connector and DIV/GPS coaxial connector.

The DVK provides two SMA antenna connectors and two RF coaxial connectors as shown in Figure 3-10 .

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

RF coaxial connectors are used to connect the coaxial connectors on the M.2 module.

Figure 3-10 Antenna interface

Because there is some line loss on the trace (RF wire) between the module and the antenna coaxial connector, when it connects to CMU200 or other equipments for testing the RF parameter, its line loss should be considered. Table 3-2 lists the line loss which should be added on different frequency bands.

Table 3-2 Line loss of the baseboard (using MXHP32HP1000)

Frequency Bands (MHz)	Line Loss (dB)
850	0.4
900	0.4
1575	0.6
1700	0.6
1800	0.6
1900	0.6
2100	0.6

3.3.7 Pin Socket

The DVK provides one 64-pin socket for testing, which is shown in Figure 3-11 . Table 3-3 shows the signal assignment of the socket.

Figure 3-11 64-pin socket
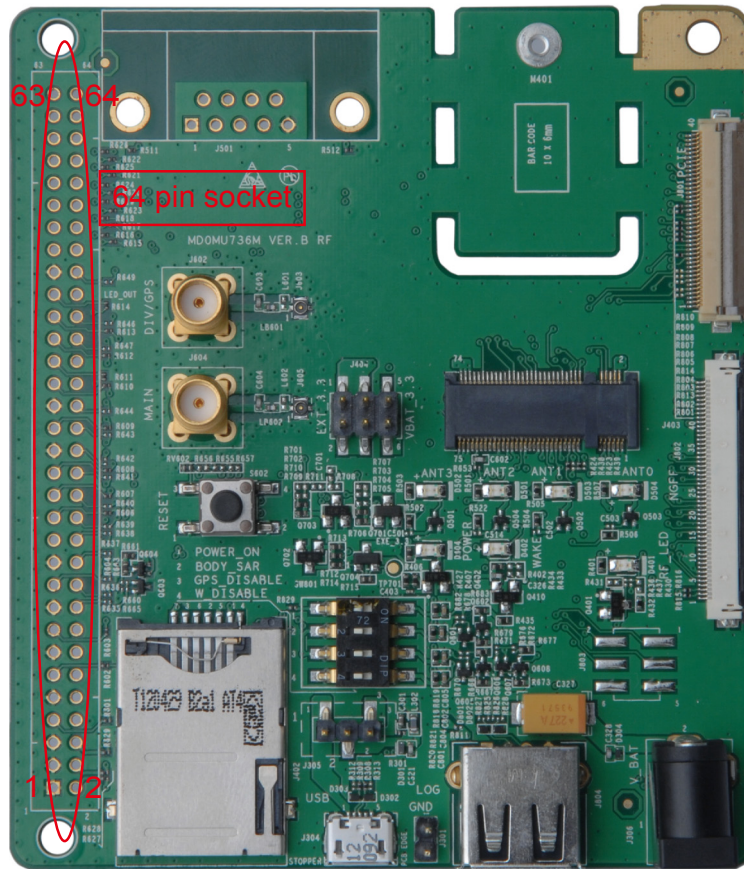
Table 3-3 Signals assignment of socket

Pin	Pin name	Pin	Pin name
1	GND	2	VBAT_3V3
3	GND	4	VBAT_3V3
5	GND	6	VBAT_3V3
7	NC	8	NC
9	GND	10	SIM_DET_IN
11	NC	12	NC
13	GND	14	NC
15	NC	16	NC
17	GND	18	NC
19	NC	20	NC
21	GND	22	NC
23	NC	24	NC

Pin	Pin name	Pin	Pin name
25	ANT_TUNE_2	26	NC
27	BODY_SAR_EINT	28	NC
29	ANT_TUNE_3	30	NC
31	GND	32	NC
33	RESET	34	NC
35	GND	36	NC
37	POWER_ON_OFF	38	NC
39	GPS_DISABLE	40	NC
41	WAKEUP_OUT	42	NC
43	W_DISABLE	44	NC
45	LED_OUT	46	NC
47	GND	48	NC
49	NC	50	NC
51	NC	52	NC
53	NC	54	NC
55	COEX1	56	NC
57	ANT_TUNE_1	58	I2S_CLK0
59	COEX2	60	I2S_RX
61	COEX3	62	I2S_TX
63	ANT_TUNE_0	64	I2S_WA0

3.3.8 Serial Communications Interface

It is reserved for future use.

3.3.9 ZIF Connectors

It is reserved for future use.

3.3.10 UART

It is reserved for future use

3.3.11 Jump Wire Configuration

The DVK has three jump wires, as shown in Figure 3-12 . Table 3-4 lists the usage
and configuration method of the three jump wires.

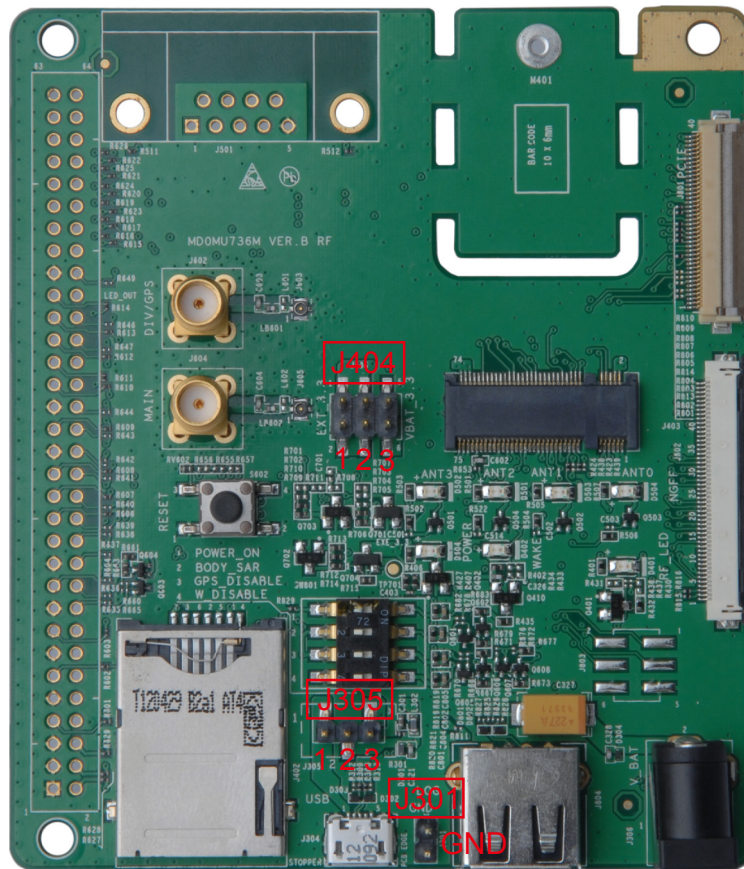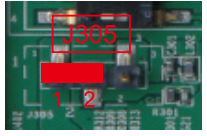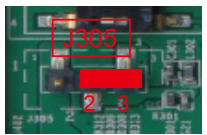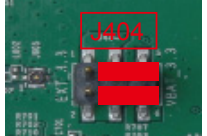**Figure 3-12** Positions of the three jump wires
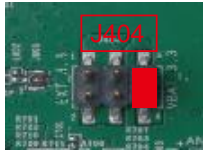
Table 3-4 Pin jump wire configuration

Position Number	Mark on the DVK	Usage and Configuration	Figure
J305	J305	This jump wire is used to select the power supply mode. Configuration is needed. For the USB power supply mode, connect the pin 1 and pin 2.	
		For the 5 V adapter power supply mode, connect the pin 2 and pin 3.	
J404	J404	When power is supplied by USB or a 5 V adapter, the middle two pins must be connected to the right two pins.	

Position Number	Mark on the DVK	Usage and Configuration	Figure
		When power is supplied by external 3.3 V voltage-stabilized power supply, the right two pins should connect to the external 3.3 V power supply.	

4 Acronyms and Abbreviations

Acronym or Abbreviation	Expansion
AC	Alternating Current
DC	Direct Current
DTE	Data Terminal Equipment
DVK	Development Kit
FPC	Flexible Printed Circuit
GPS	Global Position System
LED	Light-emitting diode
M.2	Next Generation Form Factor
RF	Radio frequency
SIM	Standard Subscriber Identity Module
SMA	Small A Type
UART	Universal asynchronous receiver/transmitter
USB	Universal Serial Bus
USIM	Universal Subscriber Identity Module
ZIF connector	Zero Insertion Force connector