

Document Name: **U6300 User Manual**

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# 1. Introduction

## 1.1 Overview

The LONGSUNG HSPA U6300 series module, powered by Qualcomm MSM6290 chipset, can be integrated into any devices for 3G mobile applications. It provides phone book, SMS、 audio and GPS(voice service and GPS functions are only available in the U6300\_001 module) as well as high speed internet access to HSUPA, HSDPA and UMTS networks worldwide.

The U6300 module complies with the technical standard listed below:

- HSUPA

  - 3GPP R6, up to 5.76Mbps UL Category 6

- HSDPA

  - 3GPP R6, up to 7.2 Mbps DL Category 8

- UMTS

  - Up to 384 Kbps DL and UL

- EDGE

  - 3GPP R4, Class 12, up to 236.8 Kbps DL and 118.4Kbps UL

- GPRS

  - Up to 85.6 Kbps DL and 42.8 Kbps UL

It supports the frequency bands: UMTS 850/1900/2100 MHz and GSM/GPRS/EDGE 850/900/1800/1900 MHz.

## 1.2 Application scenario

The HSPA U6300 series module support phone book, SMS, audio, GPS and Internet access functions. The application of U6300 is as follows:

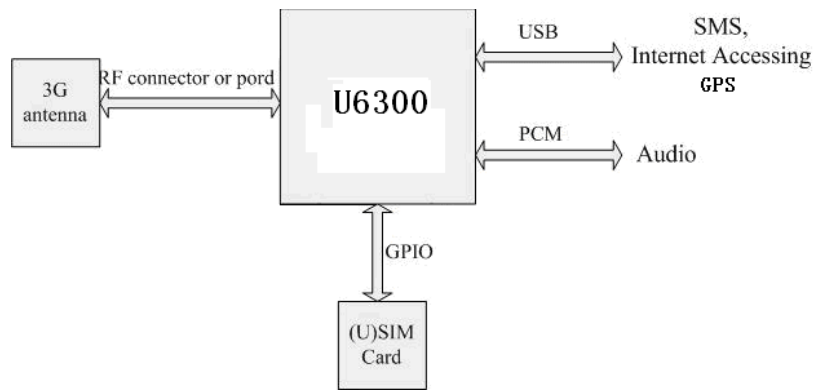


Figure1-1 U6300 application scenario

## 2. U6300 interfaces

### 2.1 U6300 interface summary

The HSPA module U6300 supports for multimode operation: HSDPA, HSUPA, tri-band UMTS (850/1900/2100 MHz) and quad-band GSM (850/900/DCS1800/PCS1900 MHz). The size of U6300 is 50.9×29.9×4.5mm. And the appearance is shown in Figure 2-1 and Figure 2-2.



Figure 2-1 The front view of U6300

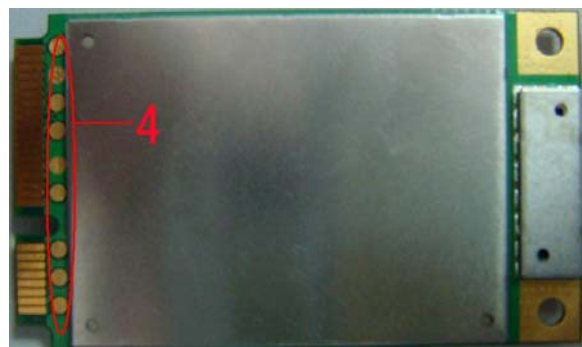


Figure 2-2 The rear view of U6300

The antenna pads are shown as part 1 in the Figure 2-1, the below one is for the main antenna, and the upper one is for the diversity antenna; The antenna pad which is shown as part 2 in Figure 2-1 is for GPS application; A miniPCIe interface is shown as part 3 in Figure 2-1; U6300 module also offers some test points, they are shown as part 4 in Figure 2-2

#### 2.1.1 Test points

The test points of U6300 are displayed in figure 2-3, and the definition of each point is listed in table 2.1.

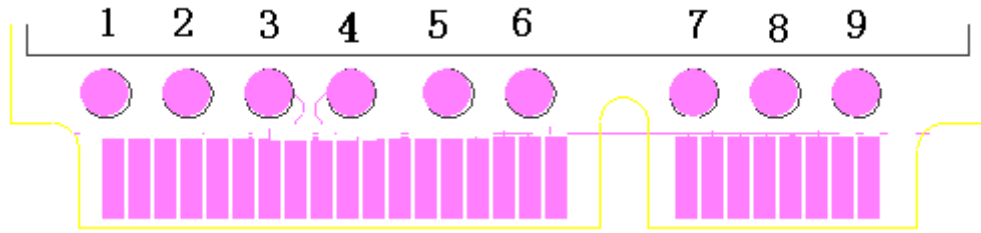


Figure 2-3 Test points of U6300

Table 2.1 The definition of U6300 test points

SN	Definition
1	U6300 Power Input
2	GND
3	USB DATA+
4	USB DATA-
5	GND
6	USIM Card Reset
7	USIM Card Clock
8	USIM Card Data
9	USIM Card Power

## 2.1.2 Mini PCIe Interface

A Mini PCIe Interface is used, two primary data interfaces are defined for PCI Express Mini Card: PCI Express and USB. For more information, please refer to the *PCI Express® Mini Card Electromechanical Specification Revision 1.1*. Figure 2-4 show the Mini PCIe Interface.

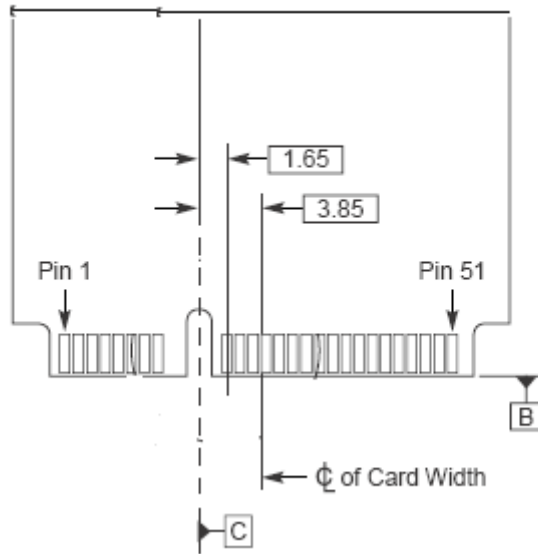


Figure 2-4 The Mini PCIe Interface

For protecting the connector from electro-static, it is better to use the ESD element. And the ESD element should be as close as possible to connector. The definition of the PINs in Mini PCIe Interface is listed in table 2.2 below.



Figure 2-5 The Mini PCIe Interface pin sequence of U6300

Table 2.2 The definition of Mini PCIe Interface

SN	Definition	Description	Remark
----	------------	-------------	--------

1	MIC_P*	MIC Data+	Audio Interface
3	MIC_N*	MIC Data+-	Audio Interface
5	SPK_OUT_P*	Speaker Out+	Audio Interface
7	SPK_OUT_N*	Speaker Out-	Audio Interface
9	GND	Ground	
11	VREG_MMP*	Power Output	2.6V
13	VCOIN*	VRTC	RTC Power Supply
15	GND	Ground	
17	KPD_PWR_N*	Power On Key	Active Low
19	UART_CTS*	CTS of UART	UART Interface
21	GND	Ground	
23	UART_RXD*	Rx of UART	UART Interface
25	UART_RTS*	RTS of UART -	UART Interface
27	GND	Ground	
29	GND	Ground	
31	UART_TXD*	Tx of UART	UART Interface
33	EXT_RST_N*	External Reset to U6300	
35	GND	Ground	
37	GND	Ground	
39	3.3VAUX	Power Supply	
41	3.3VAUX	Power Supply	
45	PCM_CLK*	PCM CLK	PCM Interface
47	PCM_DIN*	PCM Data Input	PCM Interface
49	PCM_DOUT*	PCM Data Output	PCM Interface
51	PCM_SYNC*	PCM Synchronization	PCM Interface
2	3.3VAUX	Power Supply	
4	GND	Ground	
6	GPIO_TBD2*	GPIO TBD	GPIO For Reserved
8	VREG_USIMCARD	RUIM Power	RUIM Interface
10	RUIM_DATA	RUIM Data	RUIM Interface

12	RUIM_CLK	RUIM CLK	RUIM Interface
14	RUIM_RESET	RUIM Reset	RUIM Interface
16	I2C_SCL*	IIC Clock	IIC Interface
18	GND	Ground	
20	W_DISABLE_N	External Disable signal	Active low signal. This signal is used by the system to disable radio operation on add-in cards that implement radio frequency applications
22	AUXADC1*	ADC Input	Analog signals input via this pin, this signal can be used by U6300
24	3.3VAUX	Power Supply	
26	GND	Ground	
28	I2C_SDA*	IIC Data	IIC Interface
30	UART_DCD*	DCD Signal of UART	UART Interface
32	UART1_RI*	Ring Of UART	UART Interface
34	GND	Ground	
36	USB_DM_IN	USB Data-	USB Interface
38	USB_DP_IN	USB Data+	USB Interface
40	GND	Ground	
42	LED_WWAN	Led control Signal	Active low signal
44	GPIO_TBD1*	GPIO TBD	GPIO For Reserved
46	UART_DTR*	DTR of UART	UART Interface
48	UART1_DSR*	DSR of UART	UART Interface
50	GND	Ground	
52	3.3VAUX	Power Supply	

**Notes:** \* Only support on LCT\_U6300\_001

### 2.1.3 RF interface

U6300 uses HRS's U.FL-R-SMT-1(10) RF connector on the module side. There are three RF connector on U6300, from right to left: main antenna / GPS antenna\* / diversity antenna.

The RF connector is showed in figure 2-6.



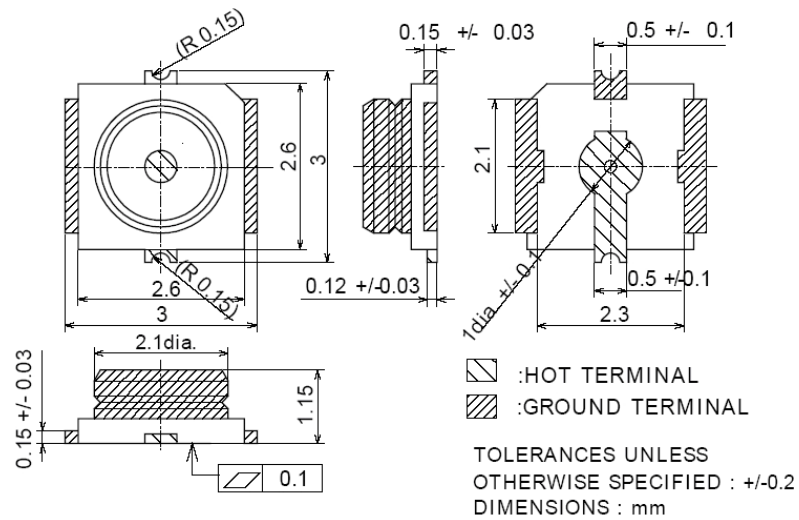


Figure 2-6 The sketch map of RF connector

Notes: \* Only support on LCT\_U6300\_001

## 2.2 U6300 interface application

U6300 supplies multifold functional interface by a Mini PCIe Interface, such as , USIM card interface, USB interface, audio interface\*, UART interface\*, PCM (Pulse Code Modulation) interface\*, IIC interface\* and power supply interface and so on. The detail information will be given in the follow sections.

Notes: \* Only support on LCT\_U6300\_001

### 2.2.1 RF antenna interface

The impedance of RF antenna is 50Ω.

The three connector is on the top of U6300;

For minimizing the wasting of RF cable, user should pay more attention to make choice. We suggest choosing the cable that satisfies:

- GSM850/900<1dB
- DCS1800/PCS1900<1.5dB
- UMTS2100/ UMTS1900/ UMTS850<1.5dB

And the antenna should satisfy the table below:

Item Parameter			
Plus(dBi)	GSM	DCS	UMTS
	0.5	1	1
Type	Omni directional antenna		

## 2.2.2 Power supply and earth

The power supply needed by U6300, is listed as follow:

1. DC:3.3V $\pm$ 9%, the power for U6300 working;
2. The earth point: GND;

The description of U6300 Power and GND pins is shown in the table 2.3 below.

**Table 2.3 The description of U6300 Power and GND pins**

Power input	SN. of the Mini PCIe Interface
3.3VAUX	2, 24, 39, 41,52
GND	4, 9, 15, 18,21, 26, 27, 29, 34, 35, 37, 40, 43, 50

## 2.2.3 USB interface

### 2.2.3.1 Description

U6300 offers a high-speed USB interface by Mini PCIe Interface, which submits to USB 2.0 protocol. The detail information is given in table 2.4 below.

**Table 2.4 U6300 USB interface description**

Signals offered by USB interface	The name of the correlative pins in Mini PCIe Interface	SN. of the Mini PCIe Interface	Description
USB_VBUS	.3VAUX	2, 24, 39, 41,52	USB power
DM	USB_DM_IN	36	USB Data-
DP	USB_DP_IN	38	USB Data+
GND	GND	4, 9, 15, 18,21, 26, 27, 29, 34, 35, 37, 40, 43, 50	GND

### 2.2.3.2 Reference circuit

The reference circuit of USB interface is shown in figure 2-7.

- 1) For getting the steady-going USB power supply, it is recommended that a 10uF (C406) filter capacitor and a 22pF (C407) filter capacitor should be used.
- 2) For reducing the BER of USB transmission, it is recommended to add a resistor with values below  $10\ \Omega$  to the DM and DP in USB interface. Just like the resistors R408 and R409 in figure 2-7.
- 3) For avoiding the electro-static in USB interface, it is recommended to use the ESD element. Just like the voltage dependent resistors RV406, RV407 and RV408 with the static capacitance values below 3pF.

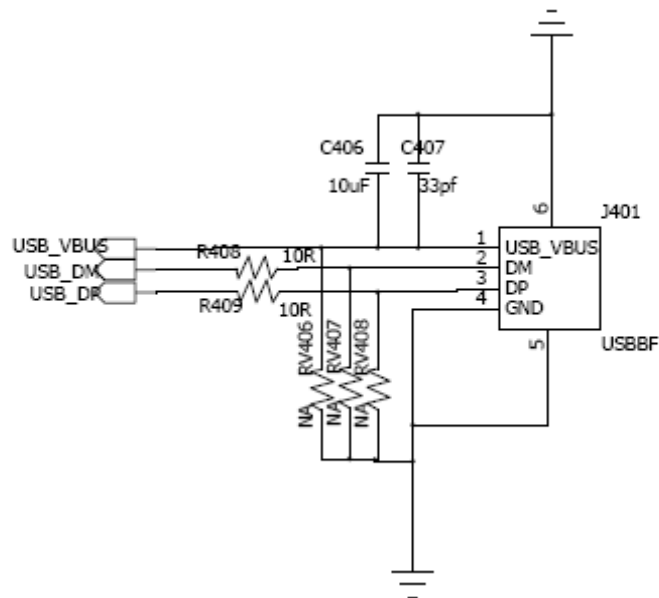


Figure 2-7 The reference circuit of USB interface

4) The USB interface input the voltage from USB\_IN .For keeping the USB in U6300 module working unfailingly, a voltage protection circuit should be added by user between the USB\_IN of USB interface and the USB\_VBUS PIN of U6300. It is shown in figure 2-8 with the red circle 2. In the voltage protection circuit, D603 is a Zener diode with a breakdown voltage value of 5.1v which could keep the voltage on the USB\_VBUS PIN of U6300 not more than 5.1v. D602 is a Schottky Diode, and R621 is a resistor with the value 1KΩ . On the other hand the voltage coming from the USB\_IN also could be converted by using a DC/DC converter to 3.6v and then be sent to VBAT PIN of U6300. It is shown in figure 2-8 with the red circle 1.

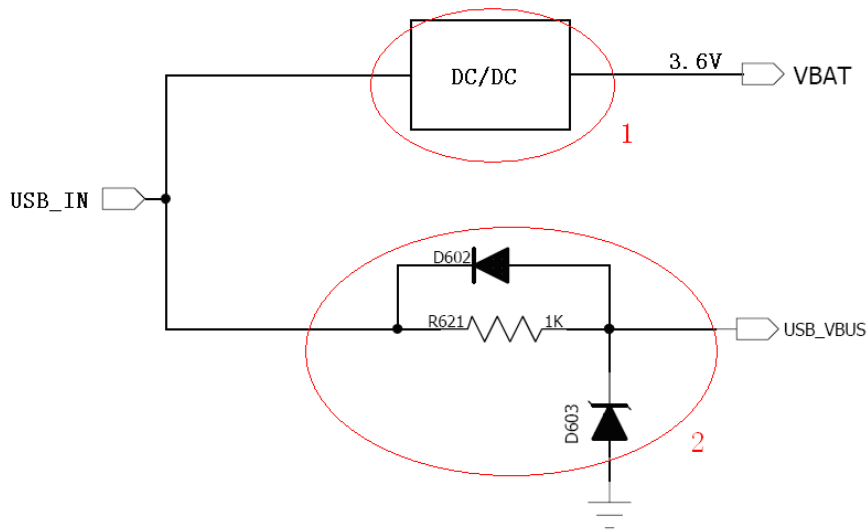


Figure2-8 The reference of voltage protection circuit

## 2.2.4 USIM interface

U6300 supports GSM850/GSM900/DCS1800/PCS1900 and UMTS2100/UMTS1900/UMTS850 operation mode. The UMTS mode submits to 3GPP R99(2002.9) criterion, and the GSM/GPRS/EDGE mode submits to CMCC GSM/GPRS criterion. USIM card as well as SIM card can be used.

### 2.2.4.1 Description

U6300 offers USIM card interface by Mini PCIe Interface. And it can be used in both UMTS and GSM/GPRS/EDGE networks. The table 2.5 gives the more detail information.

Table 2.5 U6300 USIM card interface description

Signals offered	The name of the correlative	SN. of the Mini PCIe	Description
-----------------	-----------------------------	----------------------	-------------

by	pins in	Interface	
<b>USIM interface</b>	<b>Mini PCIe Interface</b>		
DATA	RUIM_DATA	10	RUIM card data
CLK	RUIM_CLK	12	RUIM card CLK
RST	RUIM_RESET	14	Reset signal
VCC	VREG_USIMCARD	8	RUIM card power
GND	GND	4, 9, 15, 18,21, 26, 27, 29, 34, 35, 37, 40, 43, 50	GND

## 2.2.4.2 Reference circuit

The reference circuit of USIM interface is shown in figure 2-9.

- 1) The DATA line of USIM is connected to SIM power by a pull-up resistor, and the reference value is 15K  $\Omega$ .
- 2) For avoiding the instantaneous voltage overflowing, the resistor with the reference value 22  $\Omega$  can be used for the DALA, CLK and RST. Just like the resistors R307, R308 and R309 in figure 2-8.
- 3) For avoiding the electro-static in USIM socket, it is recommended to use the ESD element to the DATA, CLK and VCC. Just like the voltage dependent resistors RV301, RV302, RV303 and RV304 in figure 2-8. And the ESD element should close to the USIM socket as close as possible.
- 4) For getting the more smooth USIM power supply, it is recommended to use the filter capacitors. Just like C311 and C312 in figure 2-8, and their reference values are 33pF and 100nF.
- 5) In order to remove the unwanted peak signal and the elimination high frequency interference which produces on RST and CLK, the filter capacities (C310, C309) can be placed in RST and the CLK end, the reference value is 33pF.

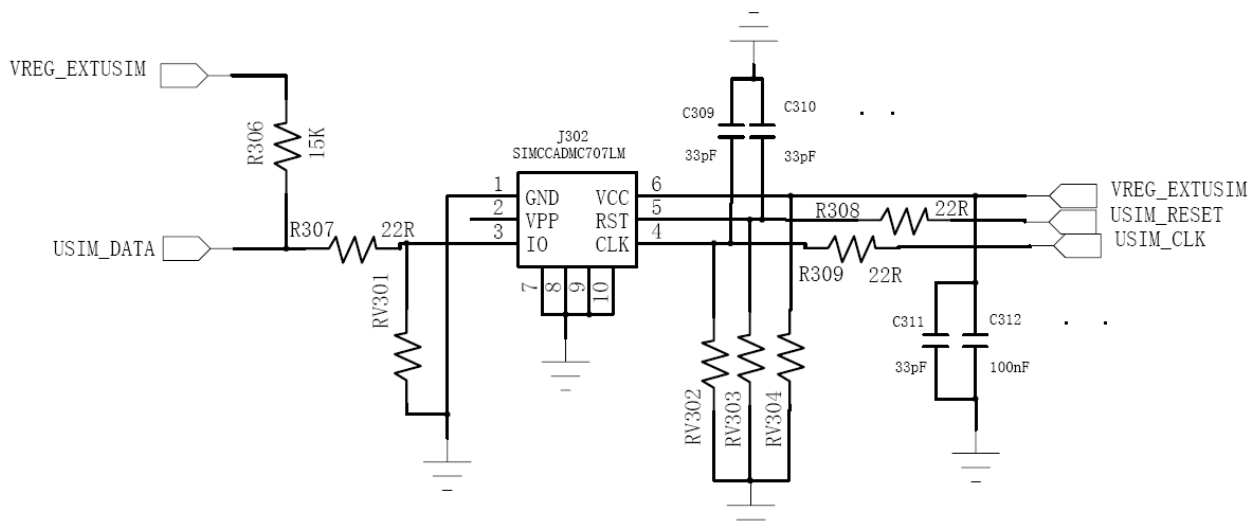


Figure 2-9 The reference circuit of USIM interface

## 2.2.5 Audio interface\*

The audio signals here include a pair of input difference signals (MIC1\_P, MIC1\_N) and a pair of output difference signals (EAR1OP,EAR1OR) . And the Audio interface here includes the earphone jack and the test points.

### 2.2.5.1 Description

The audio signals offered by U6300 are described in the table 2.7 below.

Table 2.7 U6300 audio signal description

The name of the correlative pins in Mini PCIe Interface	SN. of the Mini PCIe Interface	Description
SPK_OUT_P	5	Audio output data+
SPK_OUT_N	7	Audio output data-
MIC_P	1	Audio input data+
MIC_N	3	Audio input data-

### 2.2.5.2 The connection between audio I/O and earphone

The audio I/O signals offered by U6300 can be connected to a stereo earphone jack. The more detail information about connection between earphone jack and the Mini PCIe Interface is shown in table 2.8 below. And the information about test points is shown in table 2.1 above.

Table 2.8 The connection between earphone jack and the Mini PCIe Interface

The PIN name of earphone jack	he name of the correlative pins in Mini PCIe Interface	SN. of the Mini PCIe Interface	Description
Left Speaker	SPK_OUT_P	5	The left output of stereo
Right Speaker	SPK_OUT_N	7	The right output of stereo
MIC	MIC_P	1	The microphone input
PGND	GND	50	Analog ground signal

### 2.2.5.3 The connection between audio I/O and phone handle

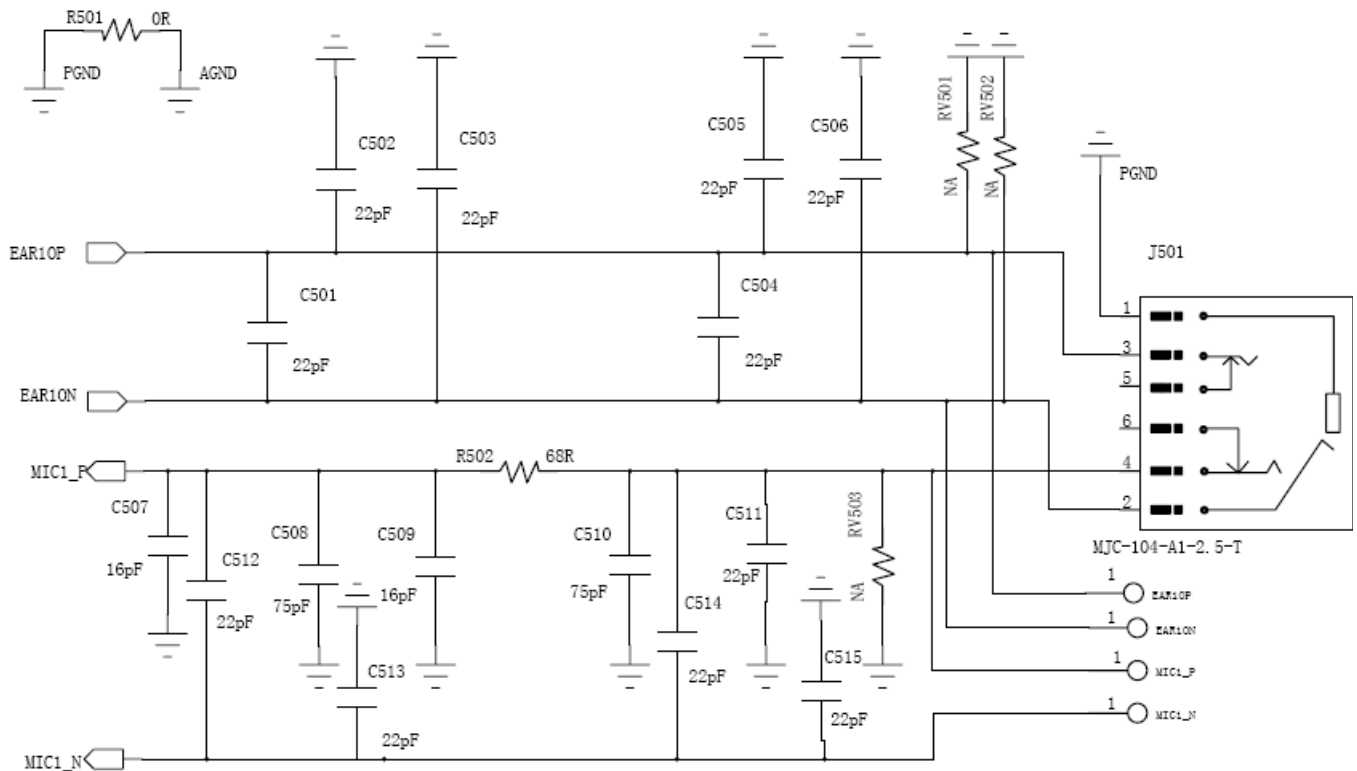
The audio I/O signals offered by U6300 can be connected to a phone handle. The more detail information about connection between phone handle and the Mini PCIe Interface is shown in table 2.9 below.

**Table 2.9 The connection between phone handle and the Mini PCIe Interface**

Signals offered by phone handle	The name of the correlative pins in Mini PCIe Interface	SN. of the Mini PCIe Interface	Description
EAR_P	SPK_OUT_P	5	Audio output data+
EAR_N	SPK_OUT_N	7	Audio output data-
MIC_P	MIC_P	1	Audio input data+
MIC_N	MIC_N	3	Audio input data-

### 2.2.5.4 Reference circuit

The reference circuit of audio interface is shown in figure 2-11.



**Figure 2-11 The reference circuit of audio interface**

- 1) The audio output signals, a pair of difference signal, export to two receivers. And they are not the real traditional dimensional sound.
- 2) It is recommended to use the smoothing capacitor or smoothing circuit for reducing the undesired signal between different frequency bands. Just like what is shown in figure 2-9.
- 3) For avoiding the electro-static, it is recommended to use the ESD element. Just like the voltage dependent resistors RV501, RV502 and RV503 in figure 2-10.
- 4) Designers needs gets up the acoustic train signaling analogous circuit ground terminal and the entire digital circuit earth end connection, bead or 0 ohm resistance can be used.
- 5) In the chart J501 is a four section of earphone jack schematic diagram electric circuit, you can see audio output signal connecting difference signal while audio input signal connecting one negative signal.

## 2.2.6 PCM interface and IIC interface\*

U6300 offers Micro the PCM interface and the SPI interface by Mini PCIe Interface. And the SPI interface is simulated by GPIO PIN.

### 2.2.6.1 PCM interface description

The information about PCM interface offered by U6300 is described in table 2.10 below.

**Table 2.10 U6300 PCM interface description**

<b>Signals offered by PCM</b>	<b>The name of the correlative pins in Mini PCIe Interface</b>	<b>SN. of the Mini PCIe Interface</b>	<b>Description</b>
SYNC	PCM_SYNC	51	PCM Synchronous Signal
CLK	PCM_CLK	45	PCM CLK
D ATA_IN	PCM_DIN	47	PCM Input
D ATA_OUT	PCM_DOUT	49	PCM Output

### 2.2.6.2 IIC interface description

U6300 offers the IIC interface for user. Two operating modes with different transfer rates, Standard-mode: up to ~100 kbps, Fast-mode: up to ~400 kbps. The detail information is given in table 2.11 below.

**Table 2.11 U6300 IIC interface description**



Signals offered by IIC	The name of the correlative pins in Mini PCIe Interface	SN. of the Mini PCIe Interface	Description
I2C_SCL	I2C_SCL	16	IIC Clock signal
I2C_SDA	I2C_SDA	28	IIC Data signal

**Notes: The IIC Bus 2.2K pull up resistance have been integrated in U6300.**

## 2.2.7 UART interface\*

U6300 offers a UART interface (RS232) by Mini PCIe Interface for debugging.

### 2.2.7.1 Description

The information about UART interface offered by U6300 is described in table 2.12 below.

**Table 2.12 U6300 UART interface description**

Signals offered by UART	The name of the correlative pins in Mini PCIe Interface	SN. of the Mini PCIe Interface	Description
DTR	UART_DTR	46	
DSR	UART1_DSR	48	
DCD	UART_DCD	30	
RI	UART1_RI	32	
Rx	UART_RX	23	
RTS	UART_RTS	25	
CTS	UART_CTS	19	
GND	GND	4, 9, 15, 18,21, 26, 27, 29, 34, 35, 37, 40, 43, 50	

### 2.2.7.2 Reference circuit

The reference circuit of UART interface is shown in figure 2-12.

- 1) As the UART of U6300 can only supply TTL level while the PC serial port level is the RS232 level, the signal level between them must use level transformation chip. The reference IC is SP3238EEA which produces by SIPEX, as

shown in Figure 2-11. J401 is a 9 needle serial port plugs, we can use it to connect U6300 and PC.

2) For avoiding the electro-static, it is recommended to use the ESD element to the signal line of the UART socket. Just like the voltage dependent resistors RV401, RV402, RV403, RV404 and RV405 in figure 2-11. And the ESD element should close to the socket as close as possible.

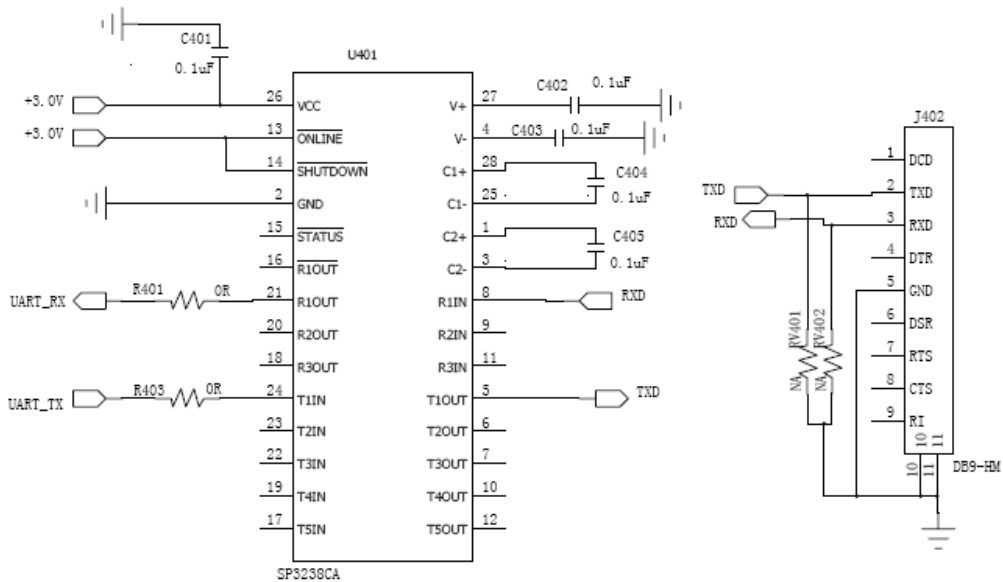


Figure 2-12 The reference circuit of UART interface

## 2.2.8 LED control

### 2.2.8.1 Description

There is a pins for LED control in the Mini PCIe Interface. And the detail information is given in table 2.13 below.

Table 2.13 U6300 LED control description

The name of the correlative pins in Mini PCIe Interface	SN. of the Mini PCIe Interface	Description
LED_WWAN	42	Led control Signal

And the U6300 status displayed by LEDs is listed in table 2.14 below.

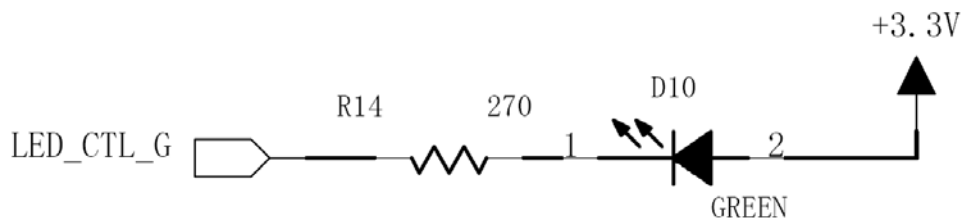
Table 2.14 LED display description

LED S	tatus	Description
Green	Flicker quickly (100ms On/800ms Off)	Networks searching

	Flicker slowly(100ms On/3000ms Off)	Registered in 3G networks
	Always On	Connected to 3G networks, but no data transmitting
	Off	Closed or error(No SIM card or failed in registering networks )

## 2.2.8.2 Reference circuit

The reference circuit for LED is shown in figure 2-13.



**Figure 2-13 The reference circuit of LED control**

- 1) The LED control pin connects to the cathode of LED. And the anode of LED connects to the +3.3v power in figure 2-12.
- 2) The value of electrical current must be below than 10mA. And the reference value is 5mA. So the current-limiting resistor may be used. Just like the resistor R14 in figure 2-12
- 3) The reference circuit given is for the Green LED, and it is the same for the Red one.

## 2.2.9 Others\*

U6300 also offers some other functional interfaces besides those which have been described above.

These signals are listed in table 2.15 below.

**Table 2.15 The other signals offered by U6300**

The name of the correlative pins in Mini PCIe Interface	SN. of the Mini PCIe Interface	Description
KPD_PWR_N	17	Power on key, active low
EXT_RST_N	33	Reset signal for U6300
AUXADC1	22	External Analog signal input
VREG_MSMP	11	VREG_MSMP Output, 2.6V
VCOIN	13	Standby battery input

- 1) U6300 offers a power supply named VREG\_MSMP, its value is +2.6V and the Max. value of electric current is 100mA.

2) U6300 offers a power input pin named VCOIN for backup battery. The anode of the battery connects to VCOIN, and the cathode puts to earth.. While U6300 being powered off, the backup battery will power the real time clock, the Crystal Oscillator Circuit and the SMPL timer. And while U6300 being powered on, the battery will be charged up. The voltage offered by battery must be less than 3.6V.

For only keeping the SMPL (Sudden momentary power losing) timer while Sudden momentary power losing, a capacitor can be used inside of battery. And the correlativity between the capacitance and the holding time is listed in table 2.16.

**Table 2.16 the correlativity between the capacitance and the holding time**

<b>The capacitance</b>	<b>The Packaging (X5R)</b>	<b>The holding time</b>
1.5uF	0805	0.5
3.3uF	0805	1.0
4.7uF	0805	1.5
6.8uF	1206	2.0

- 3) KPD\_PWR\_N is used for power on U6300 module. And U6300 will be start-up just by putting the KPD\_PWR\_N to earth.
- 4) EXT\_RST\_N is used for reset the U6300 module. And U6300 will be reseted just by putting the KPD\_PWR\_N to earth.
- 5) U6300 supplies one ADC channel AUXADC1, which can be used to detect some external analog signal, such as battery voltage, temperature and so on. The voltage range of the AUXADC1 is : 0~2.6V

**Notes: \* Only support on LCT\_U6300\_001**

**The device does not operate at temperatures below -20°**

## **3. U6300 key features**

The U6300 module has features such as internet access, SMS, GPS, phone book and audio. The features are described in following sections. For detail information about AT commands, please make refers to the related documents.

### **3.1 Internet access**

AT commands can be used for querying/setting the network band, selecting network mode, setting the network search mode, setting register mode, querying network signal strength, setting APN and so on. The related AT commands are

listed as follows:

·Network Band Set: AT+ BNDPRF =<nv441>, <nv946>

·Network Band Query: AT+BNDPRF?

·Network Mode Set: AT+MODODR=<mode >

·Network Mode Query: AT+MODODR?

·SIM LOCK status: AT+NWLCK?

·Network Mode Service Query: AT+MODPRF?

·Network Query: AT+PSRAT

·PIN and PUK Remain Times Query: AT+CPNNUM

·APN Set: AT+CGDCONT=1,"IP","CMNET"

·Dial up Access: ATDT\*99\*\*\*1#

·Network Disconnecting: ATH

The users need to use PPP protocol for internet access besides AT commands. The PPP protocol can be provided by customers or API functions offered by OS, such as the RasDial function in Windows OS.

**DWORD RasDial(**

**LPRASDIALEXTENSIONS** [dialExtensions](#),

**LPTSTR** [phoneBookPath](#),

**LPRASDIALPARAMS** [rasDialParam](#),

**DWORD** [NotifierType](#),

**LPVOID** [notifier](#),

**LPHRASCONN** [pRasConn](#)

**);**

## 3.2 SMS

The SMS feature is implemented by AT commands. You can set the service center address, switch message format, enable/disable receiving message report, delete message, preview message, receive/send message and so on.

The related AT commands are listed as follow:

- New Message Indication: AT+CNMI
- Message Send: AT+CMGS
- Message Preview: AT+CMGPR
- Message Delete: AT+CMGD
- Message format Switch: AT+CMGF
- Service Center Address Set: AT+CSCA
- Receiving Message Report enable/disable: AT+CNMI=2,1,0,1,0

### 3.3 GPS

GPS functions are only available in the U6300\_001 module. The related AT command as follow:

- AT+GPSFIX originate GPS request
- AT+GPSCFG configure GPS parameter

### 3.4 Phonebook

The Phonebook feature is implemented by AT commands. You can set the phonebook storage location, read phone number, write phone number and delete phone number and so on.

The related AT commands are listed as follow:

- AT+CPBS=<storage> set the storage location
- AT+CPBR=<index> read phone number
- AT+CPBW=[<index>][,<number>,<type>,<text>]] write phone number on the phone.
- AT+CPBW=[<index>] delete phone number.
- AT+CPBF=<findtext> find the phone number according to the findtext.

### 3.5 AUDIO PCM data path selection

The audio functions are only available in the U6300\_001 module. The related AT command as follow:

The function make user can select audio PCM data path. The user use the related AT commands to select AUDIO PCM data path and so on. The related AT commands as follow:

- AT+PCMAUDIO=0 select the audio path in the U6300;
- AT+PCMAUDIO=1 select the external PCM path.
- AT+PCMAUDIO? check the current audio path in use.

## 4. Application Illustration

### 4.1 Dial-up procedure

The type “S” means the AT Command sent to U6300, and the type “R” means Respond from U6300.

SN. T	ype	AT Command/Respond	Explain
1	S	AT+CPIN?	SIM card querying
2	R	READY	
3	S	AT+CPNNUM	PIN And PUK querying
4	R	PIN1=3; PUK1=10; PIN2=0; PUK2=8	
5	S	AT+NWLCK?	SIM LOCK querying
6	R	+NWLCK: NETWORK UNLOCKED	
7	S	AT+CIMI	Get IMSI
8	R	460020177608847	IMSI, by which APN is selected
9	S	AT+CGDCONT=1,"IP","CMNET"	Set APN
10	R	OK	
11	S	ATDT*99***1#	Dial-up
12		PPP protocol	

### 4.2 SMS

#### 4.2.1 Message Format

U6300 supports two kinds of message format, PDU and TEXT which can be set by AT command AT+CMGF, AT+CMGF=0 means PDU format, and AT+CMGF=1 means TEXT format.

#### 4.2.2 Set Message Storage Location

The command AT+CPMS=<mem1>,<mem2>,<mem3> is used to set message storage location.

<mem1>, <mem2>, <mem3> can be set as SM and ME, SM means SIM card, ME means the U6300 module.

<mem1>: The parameter set here means memory storage used as read and delete message function. It can be operated

by the followed AT commands: AT+CMGL, AT+CMGR and AT+CMGD;

<mem2>: The parameter set here means memory storage used as writing and send message function. It can be operated by the followed AT commands: AT+CMSS and AT+CMGW;

<mem3>: Received messages will be storage in this memory if routing to PC is not set;

**Response:**

**If no error:**

+CPMS:<used1>,<total1>,<used2>,<total2>,<used3>,<total3>

OK

<used1, 2, 3> Number of messages currently storage in <mem1, 2, 3>

<total1, 2, 3> Number of message capacity of <mem1, 2, 3>

**If error:**

+CMS ERROR:<err>

The command AT+CPMS? is used to display the remained capacity of memory.

AT+CPMS?

**Response:**

**If no error:**

+CPMS:<mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3> OK

**If error:**

+CMS ERROR

### 4.2.3 PDU Format

#### Sending:

The type “S” means the AT Command sent to U6300, and the type “R” means Respond from U6300.

SN. T	ype	AT Command/Respond	Explain
1	S	AT+CSCS=" UCS2"	Select TE character set
2	R	OK	
3	S	AT+CMGF=0	Select message PDU format
4	R	OK	
5	S	AT+CMGS=26	Send message



		0011000D91683198916718F3000000CC8329BFD0 65DDF72363904 <ctrl-Z>	
6	R	+CMGS: 2 OK	Send successfully

## Writing message to memory:

The type "S" means the AT Command sent to U6300, and the type "R" means Respond from U6300.

SN.	Type	AT Command/Respond	Explain
1	S	AT+CMGW=26> 0011000D91683198916718F3000000CC8329BFD0 65DDF72363904 <ctrl-Z>	Write a message
2	R	+CMGW: 6 OK	Memory location index 6 of the stored message is returned.

## Receiving message:

+CMTI: "SM",0

Means new received message in the memory located from index 0.

## Reading message:

The type "S" means the AT Command sent to U6300, and the type "R" means Respond from U6300.

SN.	Type	AT Command/Respond	Explain
1	S	AT+CMGR=0	Read message has been received in the memory location index 0
2	R	+CMGR: 0,,24 0891683108200905F0240D91683198916718F3000 880509111258023047A7A8C03 OK	Read successfully

## Deleting message:

The type "S" means the AT Command sent to U6300, and the type "R" means Respond from U6300.

SN. T	ype	AT Command/Respond	Explain
1	S	AT+CMGD=0	Delete message from preferred memory location index 0.
2	R	OK	Delete successfully

## 4.2.4 TEXT Format

### Sending:

The type "S" means the AT Command sent to U6300, and the type "R" means Respond from U6300..

SN. T	ype	AT Command/Respond	Explain
1	S	AT+CSCS=" GSM"	Select TE character set
2	R	OK	
3	S	AT+CMGF=1	Select message TXT format
4	R	OK	
5	S	AT+CMGS="13572034257" > 1233455664788666555 <ctrl-Z>	Send message
6	R	+CMGS: 4  OK	Send successfully

### Writing message to memory:

The type "S" means the AT Command sent to U6300, and the type "R" means Respond from U6300..

SN. T	ype	AT Command/Respond	Explain
1	S	AT+CMGW="13572034257" > 11111114 <ctrl-Z>	Write a message
2	R	+CMGW: 8	Memory location index 8 of the stored

		OK	message is returned.
--	--	----	----------------------

## Receiving message:

+CMTI: "SM",1

Means new received message in the SIM card located index is 1.

## Reading message:

The type "S" means the AT Command sent to U6300, and the type "R" means Respond from U6300.

SN. T	ype	AT Command/Respond	Explain
1	S	AT+CMGR=8	Read message has been received in the memory location index 8
2	R	+CMGR: 0,,24 +CMGR: "STO UNSENT","13572034257", 11111114 OK	Read successfully

## Deleting message:

The type "S" means the AT Command sent to U6300, and the type "R" means Respond from U6300. The type "S" means the AT Command sent to U6300, and the type "R" means Respond from U6300.

SN. T	ype	AT Command/Respond	Explain
1	S	AT+CMGD=8	Delete message from preferred memory location index 8.
2	R	OK	Delete successfully

## 4.2.5 SMS Service Center Address Setting

The user can set the SMS service center address, TP-Validity-Period and SMS Data Coding Mode.

SN. T	ype	AT Command/Respond	Explain
1	S	AT+CSCA="+8613800201500",145	Set the SMS service center address, and the address will be kept in SIM card.
2	R	OK	

3	S	AT+CSMP=17,167,0,8	Set the TP-Validity-Period as 167 ( 24 hours) ,and the SMS Data Coding Mode as UCS2
4	R	OK	

**Remark:**

- 1) TP-MTI supports SMS-DELIVER, SMS-SUBMIT and SMS-STATUS-REPORT, while not support SMS-DELIVER-REPORT, SMS-SUBMIT-REPORT and SMS-COMMAND.
- 2) TP-PID is 0 by default while TPDU is sending or saving.
- 3) The Min. length of <pdu> is 8 and the Max. length of <pdu> is 164 while TPDU is sending or saving,.
- 4) The parameter <stat> can only be 2 for the command AT+CMGW.
- 5) In TEXT Format, the parameter <fo> can be 17 and 49, the parameter <pid> can only be 0, the parameter <dcs> can be 0~31 and the parameter <vp> can be 0~255 for AT+CSMP command
- 6) In TEXT Format, the parameter <stat> can only be "STO UNSENT" for the command AT+CMGW

## 4.3 PHONE BOOK

### 4.3.1 Set Phone Book Storage Location

Phone book storage location can be set by AT command AT+CPBS. The AT command can be used in three ways. Performing AT+CPBS? will return the current storage location of the phone book. Such as +CPBS:<storage>[,<used>,<total>].The parameter <total> indicated how many phone numbers can be stored on the phone. The parameter <used> indicates how many phone numbers have been stored. Performing AT+CPBS=? will return all the storage type which the phone supports. Such as **+CPBS:** (list of supported <storage>s).

We can use AT+CPBS=<storage> to set storage location. There are six types storage location. It's follow as:

- "LD" --store the recently call number which have dialed (SIM).
- "MC" --store the recently call number which haven't answered.
- "RC" --store the recently call number which have been answered.
- "ON" -- store the phone number of itself.
- "ME" --NVRAM storage
- "SM" --SIM storage

### 4.3.2 Read Phonebook entries

When you want to read phonebook entries, you can use AT command AT+CPBR.

Performing AT+CPBR=? will list of supported index, phone number length and text length.

Performing AT+CPBR=<index1>[,<index2>] will return the content of the phonebook entry of index1. If we use

index1 and index2 at the same time ,it will return all the entries between index1 and index2. Such as  
[+CPBR:<index1>,<number>,<type><text>[[...]<CR><LF>+CPBR:<index2>,<number>,<type><text>]]  
The parameter <type> include 129 and 145.145 indicate which is a international phone number. 129 indicate which is a unknown type number.  
The parameter <text> is the tag of the number.

### 4.3.3 Write phonebook entry

When you want to write a phonebook entry on the phone, you can use AT commande AT+CPBW.  
Performing AT+CPBW=? will return list of supported index, max length of phone number, list of supported phone number types and max length of text.  
We can use the command “AT+CPBW=[<index>][,<number>[,<type>[,<text>]]]” to write number on the phone. If the parameter <number> is NULL, the command will delete the phone number on the phone of index.

### 4.3.4 Find phonebook entries

We can use AT command AT+CPBF when we want to find the entry according to the text.  
Performing AT+CPBF=? will return the max length of phone number and the max length of text. Such as +CPBF:[<nlength>],[<tlength>].  
When we want to find a entry, we can give the text of the phone number ,and according to the text, we use AT+CPBF=<findtext> to find the number we want.

## 4.4 AUDIO

Audio functions are only available in the U6300\_001 module.

### 4.4.1 AUDIO PCM data path selection

We can use one of two option to select audio PCM data path.

- 1) audio path in the U6300.
- 2) the external PCM interface.

The audio PCM data could be routed to external PCM interface and be input from external PCM interface. In this case, the audio path in the U6300 will be switch off. If user wants to use the external PCM audio path, then a CODEC IC must be used, and be connected to the external PCM interface of the U6300.

The AT command AT+PCMAUDIO can be used to select which audio path we want to use:

- AT+PCMAUDIO=0, will select the audio path in the U6300;
- AT+PCMAUDIO=1, will select the external PCM path.
- AT+PCMAUDIO? will check the current audio path in use.

All the values will not be saved after power off U6300,the default value is 0 while power on the U6300 , namely the default audio path is the audio path that in the U6300.

## 4.4.2 Originate Call

ATD<str>[;] Mobile originate call to dial a number. <str>: string of dialing digits, dialing digits:0~9  
<;> only required to set up voice call , return to command state.

The Max length of dialing digits is 20; The prefix "+" is not counted to the length of dialing digits.

## 4.4.3 Answer a incoming call

ATA using the command can answer a incoming call.

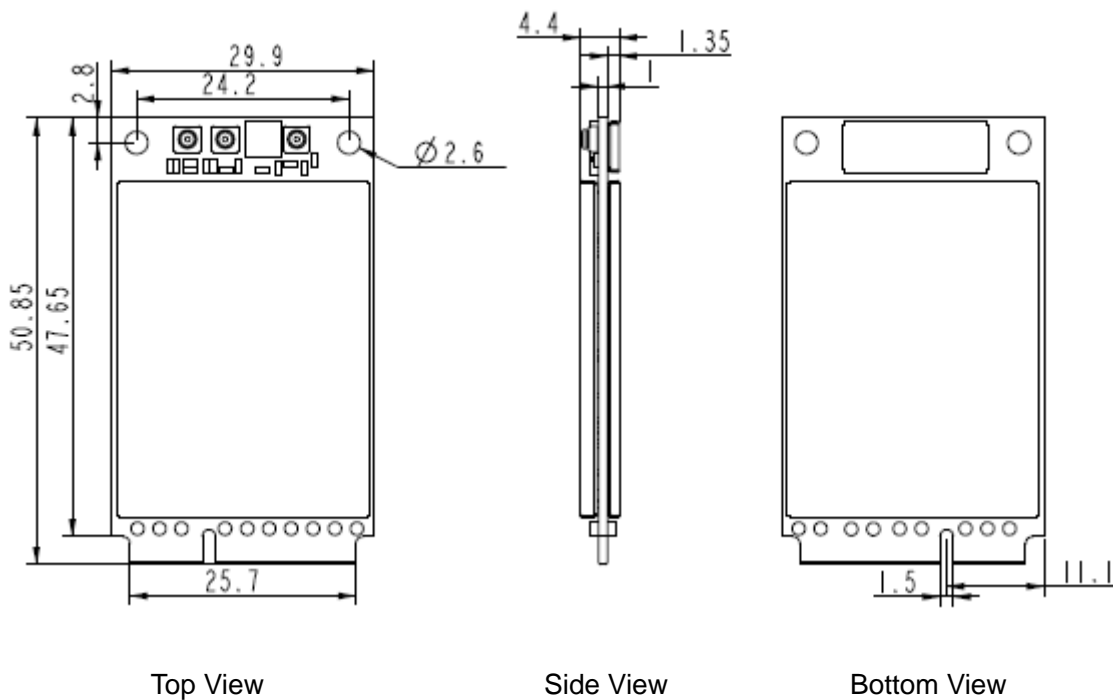
ATA responds coming call by RING. It will display the calling phone number if CLIP (Calling Line Identity Indication Presentation) function is set. ATA will return NO CARRIER for responding hang up after connection.

## 4.4.4 Disconnect call

AT+CHUP using the command can disconnect a connection.

## Appendix: Mechanical dimensions of U6300

The following are Mechanical dimensions of U6300 bottom view, side view and top view. (Unit: mm)



## **FCC Regulations:**

● This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

● This device has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### **▶ RF Exposure Information**

This Modular Approval is limited to OEM installation for mobile and fixed applications only. The antenna installation and operating configurations of this transmitter, including any applicable source-based time-averaging duty factor, antenna gain and cable loss must satisfy MPE categorical Exclusion Requirements of §2.1091.

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons, must not be collocated or operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter product procedures.

The end user has no manual instructions to remove or install the device and a separate approval is required for all other operating configurations, including portable configurations with respect to 2.1093 and different antenna configurations.

Maximum antenna gain allowed for use with this device is 2.5 dBi.

When the module is installed in the host device, the FCC ID label must be visible through a window on the final device or it must be visible when an access panel, door or cover is easily re-moved. If not, a second label must be placed on the outside of the final device that contains the following text: "Contains FCC ID: WH7U6300".