Neo_WM620

User Manual

Version V1.0

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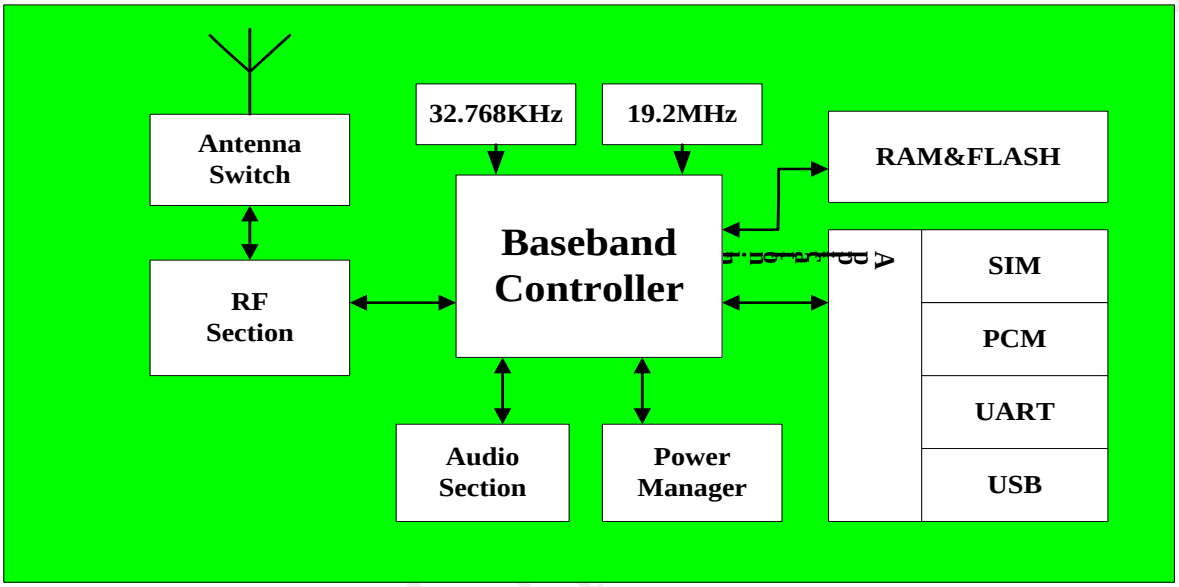
Revision History		
Document Version	**Content Revised**	**Date**
V1.0	First issue	2013.09
V1.1	Add UART description	2013.10

Contents

1 Features and Description

WM620 is a WCDMA module supporting multiple modes of HSDPA/UMTS/EDGE/GPRS/GSM. The HSDPA supports 3.6Mbps downlink data rate and 384Kbps uplink data rate. WM620 provides high-quality data and voice communication, SMS and other functions, widely applied to various industrial and commercial areas. WM620 is SMT module in LCC compact package. It can be easily adapted to standard Mini PCI-E Interface.

1.1 HW block diagram and block description



1.2 Key Features

Specification	Description
Frequency Band	WM620: UMTS2100/1900/900/850MHz GSM850/900/1800/1900 MHz
Sensitivity	-106dBm
Max. transmitter power	GSM/GPRS 850M/900MHz：32±1dBm (Power Class 4) GSM/GPRS 1800MHz/1900MHz：30±0.5dBm (Power Class 1)
	WCDMA: 23±1dBm (Power Class 3) HSDPA:22±1dBm (Power Class 3)
Transient Current	Max 2A
Standby Current (Idle)	<5.0mA
Operating Temperature Range	Normal working temperature: –30°C to + 80°C
Storage Temperature Range	–40°C to + 85℃

Dimension (mm)	30*30*2.7
Power supply	DC power input range 3.3 Volts to 4.2 Volts（recommended 3.9V ）
AT Command	GSM07.07 Neoway extended AT command
Driver	Supporting Windows XP、Linux(2.6.1)、Android
Voice	FR, EFR, HR, AMR Voice Coding , DTMF
SMS	TEXT/PDU
	Point of Point/ Cell Broadcast
Technical Standard	UMTS/WCDMA/GSM/GPRS/EDGE Specification Release ‘99 (3GPP R99) UMTS/WCDMA Specification Release 5 (3GPP R5) HSDPA and equalizer; 3.6Mbps GSM/GPRS/EDGE Specification Release 4 (3GPP R4) GPRS/EDGE Multislot Class 12, Release 4 DTM Multislot Class 11
Data Rate	GSM CS: UL 14.4kbps / DL 14.4kbps GPRS:UL 85.6kbps / DL 85.6kbps EDGE: DL 236.8kbps / UL: 236.8kbps WCDMA CS: UL 64kbps / DL 64kbps WCDMA PS: UL 384kbps / DL 384kbps HSDPA: DL 3.6Mbps / UL 384kbps
Circuit Switched Data	Support CSD
	Support USSD
Supplementary Service	Call Transfer (CFB, CFNA, CFU)
	Call Waiting
	Three-Way Calling

1.3 Pin assignment and description

	Pin NO.	Pin Name	I/O	Pad group	Description	COMMENT
GND	1、12、17、21、24、34、43、45、50、61	GND	PWR		Ground	
NC	2	NC				Reserved
	3	NC				Reserved
	4	NC				Reserved
NC	5	NC				Reserved
	6	NC				Reserved
	7	NC				Reserved
	8	NC				Reserved
NC	9	NC				Reserved
	10	NC				Reserved
	11	NC				Reserved
SIM card interface	13	V_SIM	PWR	1.8V/2.8V	USIM VCC	
	14	SIM_RST	O	1.8V/2.8V	USIM reset	
	15	SIM_DATA	I/O	1.8V/2.8V	USIM data	Needs an external 10K pull-up resistance to V_SIM
	16	SIM _CLK	I/O	1.8V/2.8V	USIM clock	
USB transceiver interface	18	USB_D+	I/O		High-speed USB differential data (+)	
	19	USB_D-	I/O		High-speed USB differential data (-)	
	20	V_USB	PWR		USB Power input	Input range from 3.3 to 5.25 V. Needs a 4.7uF decoupling MLCC Cap to GND
Power	22	VBAT	PWR		Main battery power input	
	23					
Reset	25	RESET_N	DI	VDD_1.8V	Reset input	

Power	26	VDD_1.8V	PWR		Linear regulator 1.8V output	
	27	VDD_2.6V	PWR		Linear regulator 2.6V output	
Audio interface	28	EAR_1P	AO		Earphone amplifier output（+）	
	29	EAR_1N	AO		Earphone amplifier output（-）	
	30	MIC_1N	AI		Microphone difference input1 (-)	
	31	MIC_1P	AI		Microphone difference input (+)	
NC	32	NC				Reserved
	33	NC				
	35	NC				
	36	NC				
	37	NC				
	38	NC				
	39	NC				
	40	NC				
	41	NC				
	42	NC				
ANT	44	ANT_M	AI/A		RF main antenna interface	
	46	ON_OFF	I		Control power-on and power-off	Pulled up internally with a 250k to DVDD; approximately+2.8 V
Indicator Light	47	VRTC	PWR		Coin cell backup voltage input	Range 1.5~3.25VDC,Typical 3.0VDC
	48	SIG_LED	O	VDD_2.6V	Signal show LIGHT	
ADC	49	ADC	AI		12bit ADC input	Input Range：0~2.2V
	51	RING	O	VDD_2.6V	Call and SMS	

					indicating Output	
NC	52	CTS	I	VDD_2.6V	High-speed UART clear to send signal	
	53	RTS	O	VDD_2.6V	High-speed UART ready for receive signal	
	54	RXD	I	VDD_2.6V	High-speed UART receive data input	(allow input 3V)
	55	TXD	O	VDD_2.6V	High-speed UART transmit data output	
	56	NC				Reserved
	57	NC				Reserved
	58	NC				Reserved
	59	NC				Reserved
	60	SLEEP_IN	DI	VDD_1.8V	Sleep control pin input	
	62	NC	NC			Reserved

2 Applicable interface

2.1 Power supply Interface

The Power supply part of the WM620 module contains:

PIN	Signal name	I/O	Function description	Note
22、23	VBAT	PWR	For power voltage input	
47	VRTC	PWR	Coin cell backup voltage input	
26	VDD_1.8V	PWR	Linear regulator 1.8V output	
27	VDD_2.6V	PWR	Linear regulator 2.6V output	

Characteristics of the VBAT are shown in the table 2-1.

Table 2-1, Input voltage characteristics

Status	Min. voltage	Typical voltage	Max. voltage
VBAT	+3.3 VDC	+3.8 VDC	+4.2VDC

NOTE：*Make sure that the VBAT can never exceed 4.5VDC. Voltage higher than 4.5VDC may damage the WM620 module.*

2.1.1 Power Supply Requirements

VBAT is the main power input ranged from 3.3V to 4.2V DC, 3.8V DC is recommended. The average current is less than 500mA@3.8VDC. But in the module's transmitting mode, the largest current can burst up to 1.8A providing the RF power amplifier. The burst current may cause deep voltage drop, and trigger the module into a power reset. Thus a high value and low ESR capacitor must be installed on the VBAT, to avoid or reduce the voltage drop caused by the RF power amplifier.

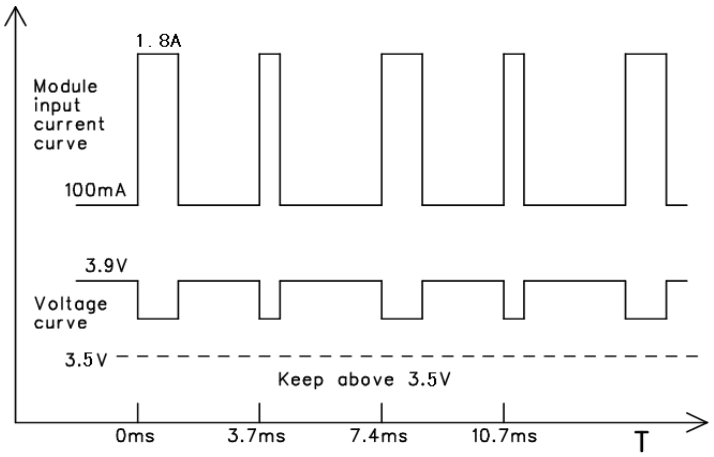
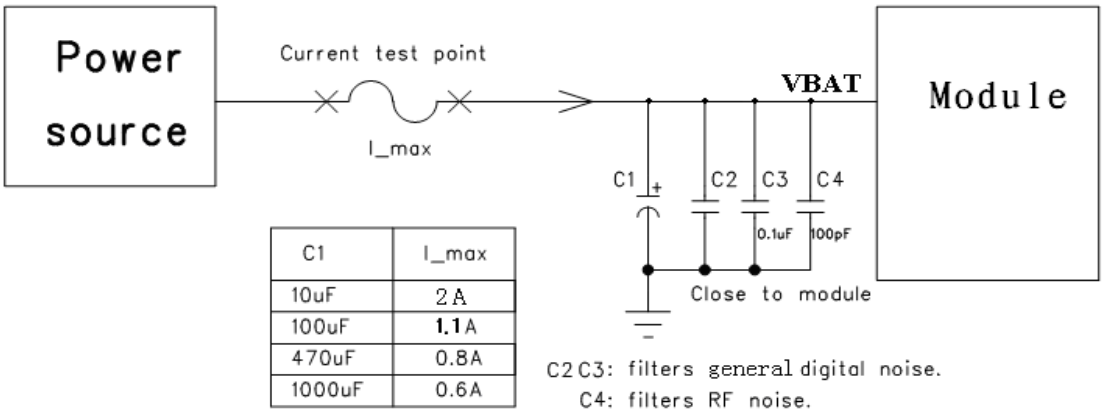


Figure 2-1a, current and voltage curve of VBAT



C1	I_max
10uF	2A
100uF	1.1A
470uF	0.8A
1000uF	0.6A

Figure 2-1b, Schematic circuit for current test

The current test results related to the ESR of the capacitors and the internal resistance of the power source. A **470uF** tantalum electrolytic capacitor or a **1000uF** low ESR aluminum electrolytic capacitor is recommended for C1. Lithium battery is a very low resistance power source. If the VBAT is supplied by a lithium battery, **220uF** or **100uF** tantalum capacitor can fit the current require for VBAT. These 10uF, 0.1uF, 100pF and 33pF MLCC capacitors should be placed close to the VBAT pin.

ESD, Lightning Surge or other interferences can rarely cause the WM620 to stop running. Reset the power supply can recover the module. So the power control is very important in the unattended applications. VCC_EN in figure 2-2 is the switch to control the power.

The recommended design of power supply is shown in figure 2-2a. In this circuit, with the EN pin of LDO/DC-DC, power supply can be controlled by the external MCU or other master device. If the LDO or DC-DC has no EN pin, a low on-resistance P-MOSFET can work as a power switch. The P-MOSFET power switch shown in Figure 2-2b can replace the function of EN pin.

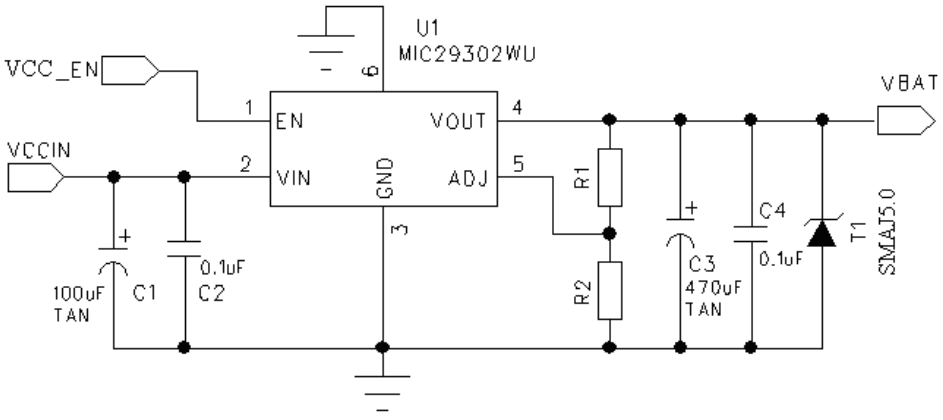


Figure 2-2a

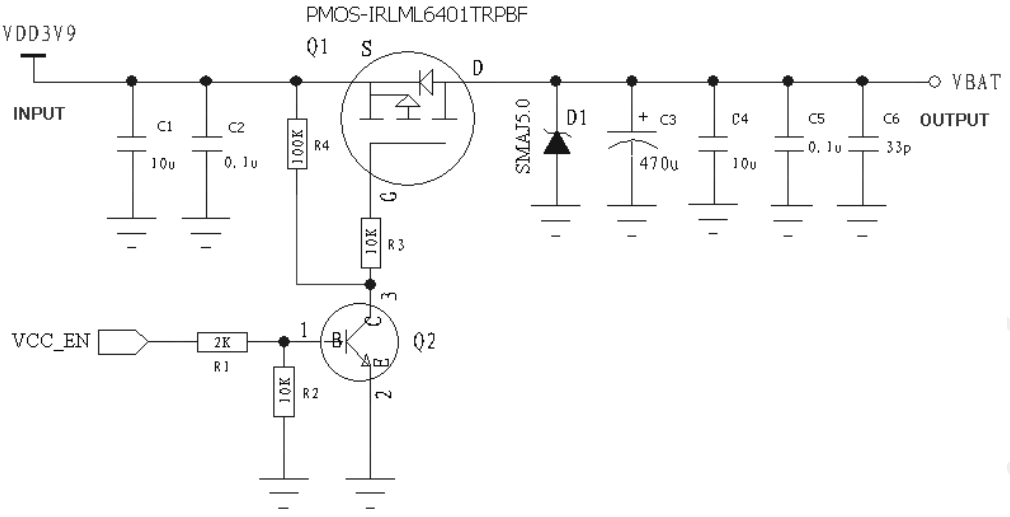


Figure 2-2b

2.1.2 VRTC Interface

VRTC Pin is used as an analog input from the 3 V coin cell for SMPL(Sudden Momentary Power Loss), RTC(Real-time Clock), and crystal oscillator to keep alive power when the module is powered off. A capacitor (rather than a coin cell) can be used if only SMPL is supported (not RTC or XTAL).

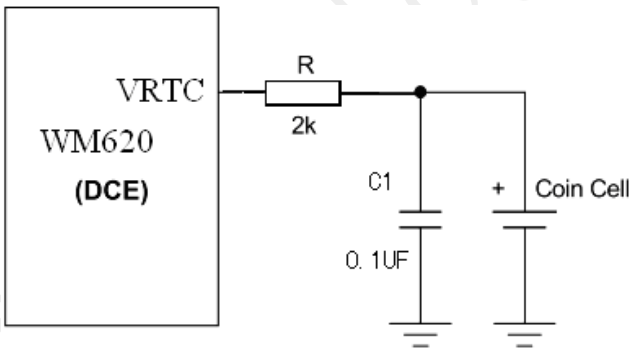


Figure 2-3

VRTC pin is also used as an analog output to charge a coin cell or a capacitor. When supply current is sourced from the main power supply through VBAT pin. The on-chip coin cell charger is implemented using a voltage regulator and series resistor.

If the monitored VBAT drops out-of-range (< 2.55V nominal), the SMPL feature initiates a power-on sequence without software intervention, and then VBAT returns in-range within a programmable interval of between 0.5 and 2.0 seconds. SMPL achieves immediately and automatically recovery from momentary power loss. A valid voltage on VRTC is required to run the SMPL timer.

If a capacitor is used instead of a coin cell, it must be connected between VRTC PIN and the ground, Figure 2-3 shows the reference RTC circuit. The capacitor must be charged to operate properly as the SMPL power source. The capacitor value depends on the SMPL timer setting. Table 2-2 shows the capacitor value of VS SMPL time.

Table 2-2 Keep-alive capacitor values vs. SMPL timer settings

SMPL timer setting	Capacitor value	Capacitor package (X7R)
0.5 sec	1.5 µF	0805
1.0 sec	3.3 µF	0805
1.5 sec	4.7 µF	0805
2.0 sec	6.8 µF	1206

2.1.3 Power Supply Output

The VDD_1.8V and VDD_2.6V pins are two linear regulator outputs. These two pins can supply the same output current of **20mA** (typical value). These two power supplies can be used for logic level conversion circuits between WM620 and external devices, and not recommended as a general-purpose power source for other application circuits.

VDD_2.6V circuit keeps operating while the WM620 module in sleep mode.

2.1.4 Power on Sequences

Figure 2-4 shows the power on sequencing of WM620.

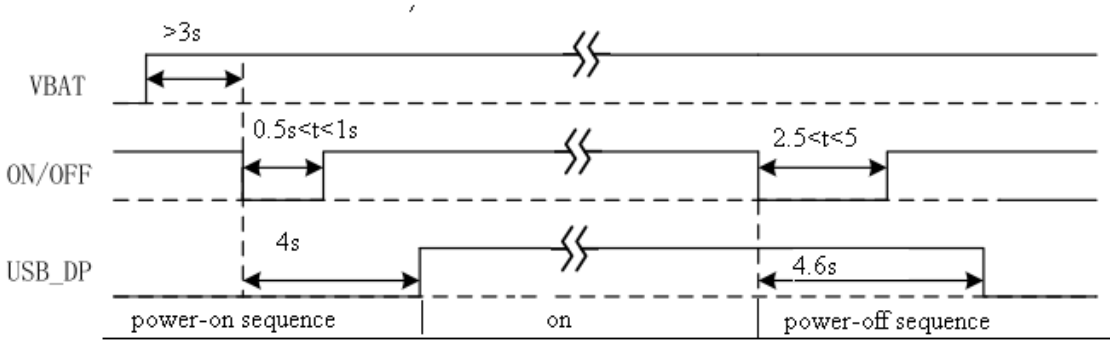


Figure 2-4

2.2 Power ON/OFF and Reset

2.2.1 ON_OFF

ON_OFF is an input pin with an internal pull-up resistance. Launch a valid low level pulse to ON_OFF can control the WM620's system into Start-up or shut-down mode. The pulse width requirement and power on sequence are shown in figure 2-4.

When the WM620 power on, the VDD_2.6V pin would rise up and keep on 2.6V DC, and then the module's serial port will automatically issue a keyword string, means that the module system is running and AT commands is ready.

While the WM620 is in running mode, low level pulse can put the module system into shutdown procedure. And then the module would power off within after 5S.

Instead of ON_OFF pin, An AT command can also shutdown the module. For more specific, please refer to the WM620's AT command manual.

Keeps the ON_OFF low or connecting to GND, WM620 can automatically power up when VBAT is supplied.

High level pulse control circuit of ON_OFF is shown in Figure 2-5：

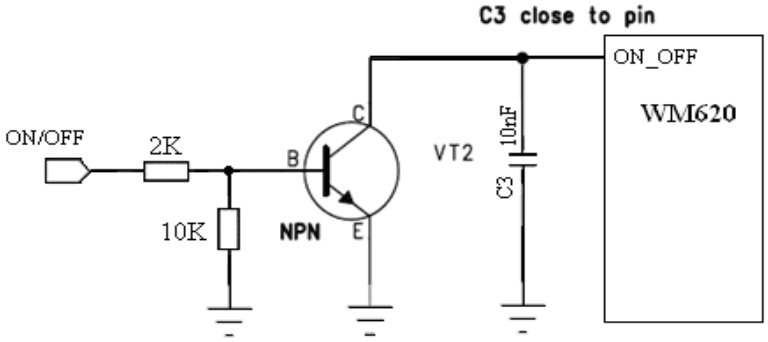


Figure 2-5

2.2.2 RESET_N

RESET_N is an active low signal with an internal pull-up resistance and acts as hardware reset input.

Low level pulse longer than **20mS** can reset the WM620. After reset the module, power on operations, such as launch a low level pulse to the ON_OFF pin, must be done again. The recommended reset pulse is **50ms,** but can not exceed **2S**. Otherwise, the WM620 module will power off.

If keeps the ON_OFF low or connecting to GND, the WM620 can automatically power up after reset the module.

2.3 Module Status Output

2.3.1 LED Indicator

PIN	Signal Name	I/O	Function Description	DC Characteristics (V)		
48	SIG_LED	O	running status indication	Min	typical	max
				-0.3	2.6	2.9

SIG_LED is the WM620's working status output. The SIG_LED pin can supply 8mA drive current. WM620 provide several flash mode to indicate different running status. For more specific, please refer to the WM620's AT command manual.

SIG_LED can drive the LED directly, shown in Figure 2-6a. Figure 2-6b is the reference circuit to increase the brightness of LED. The LED's brightness depends on the value of R1 and VCC.

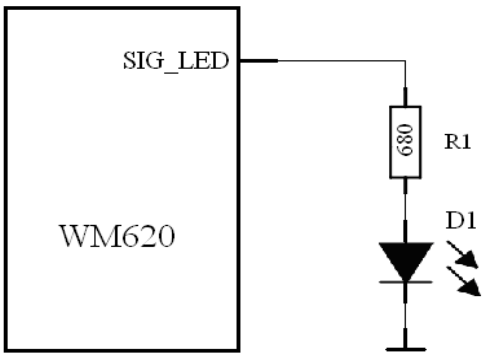


Figure 2-6a

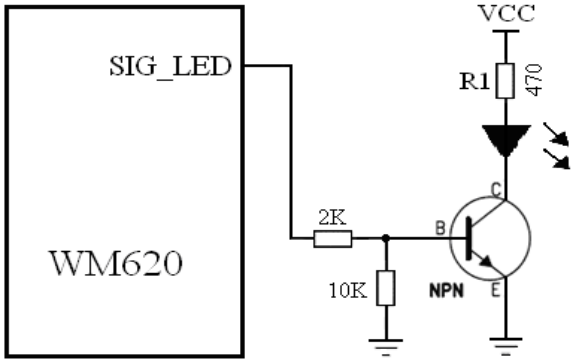


Figure 2-6b

2.3.2 Ring

PIN	Signal Name	I/O	Function Description	DC Characteristics (V)		
				Min	typical	max
51	RING	O	Ring output	-0.3	2.6	2.9

When a phone call is coming, the RING pin will issue several low level pulses. Shows in Figure 2-7.

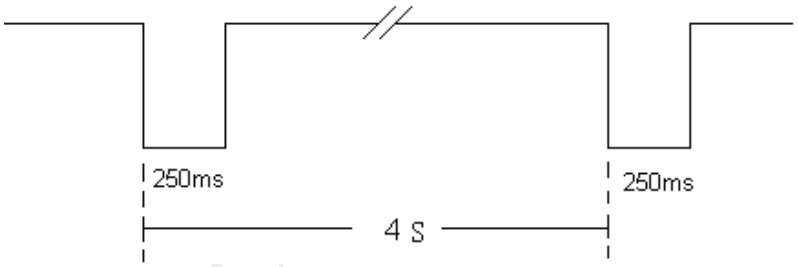


Figure 2-7

When WM620 receives a SMS, the RING pin will issue one low level pulse, Shown in Figure 2-8. The pulse width can be configured through an AT command. For more specific, please refer to the WM620's AT command manual.

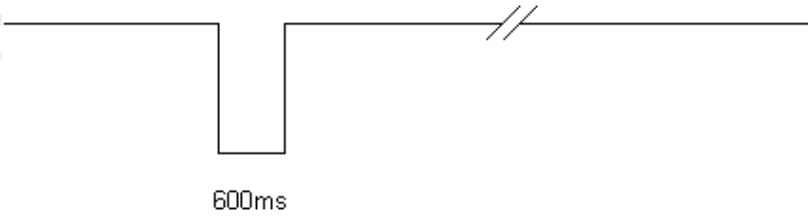


Figure 2-8

2.4 SIM Card

PIN	Signal name	I/O	Function description	Note
13	V_SIM	PWR	SIM ard power output	1.8/3.0V
14	SIM_CLK	DO	SIM card clock output	1.8/3.0V
15	SIM_RST	DO	SIM card reset output	1.8/3.0V
16	SIM_DATA	I/O	SIM card data input/output	1.8/3.0V

WM620 module supports 3V & 1.8V SIM cards. The SIM_DATA pin needs an externally **10K** pull-up **resistor** connected to V_SIM.The SIM_CLK is the clock signal, normally **3.25MHz.** Bifurcation is not recommended at the PCB trace of SIM_CLK.

Include SIM_DATA and SIM_CLK, the traces should be as short as possible and surrounded by the ground copper to reduce the RF interference. The total distributed capacitance, include the junction capacitance of the ESD diode or other device, can't be higher than 120pF.

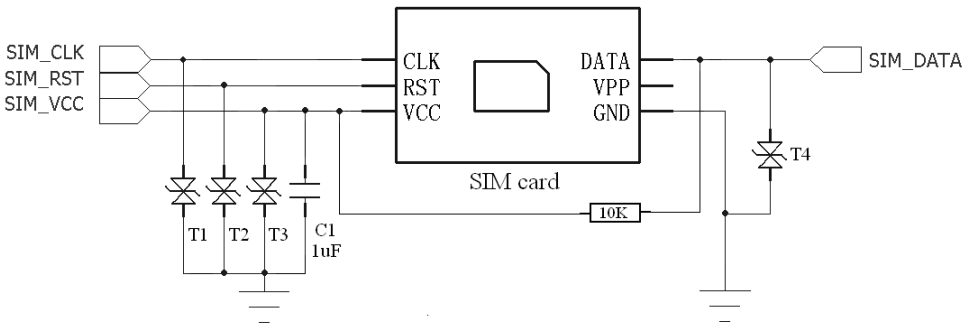


Figure 2-9a, SIM card and ESD devices

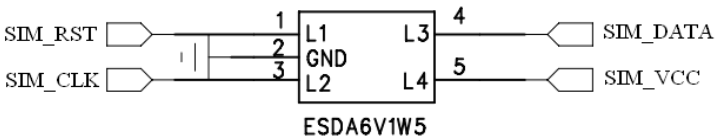


Figure 2-9b, the recommended ESD diode array

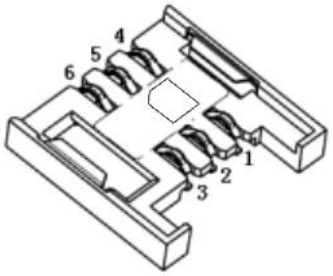


Figure 2-9c, a sample of SIM card socket

PIN1, VCC PIN2, RST PIN3, CLK PIN4, GND PIN5, VPP PIN6, DATA

The SIM card application circuit is shown in Figure 2-9. In automotive electronics or other applications with strong ESD, ESD diodes or ESD varistors are strongly recommended, such as T1 to T4. T1 to T4 should be place closed to SIM card. In some clear applications, SIM card is installed in closed box without human touch, 22~33pF MLCC capacitors can replace the ESD diodes for cost down.

Note：SIM card is very sensitive to RF interference.
Serious RF interference to SIM card will cause the WM620 to miss the detection to SIM card and out of service. So, it is very importance in the PCB design listed as the following message.

- The antenna should be installed a long distance away from the SIM card and SIM card traces.
- The SIM card traces should be routed as short as possible and shielded with GND copper.
- The ESD diodes or capacitors should be placed closed to SIM card.

2.5 USB Interface

Table 2-3, USB Interface

Pin	Pin Name	I/O	Function description	Note
18	USB D+	I/O	High-speed USB differential data, (+)	
19	USB D-	I/O	High-speed USB differential data, (-)	
20	V_USB	PWR	USB Power	Input voltage 3.3 to 5.5V.

The WM620 module is compliant with USB2.0 full speed device. The USB2.0 specification requires the hosts such as PCs to support three USB speeds, namely low-speed (1.5Mbps), full-speed (12Mbps) and high-speed (480Mbps).

The V_USB pin is an analog input. A **4.7μF** decoupling MLCC capacitor to GND is strongly recommended, and should be placed as closely as possible to V_USB Pin. It will increase the USB stability. ESD diodes should be installed to these three signals. Shown in Figure 2-10.

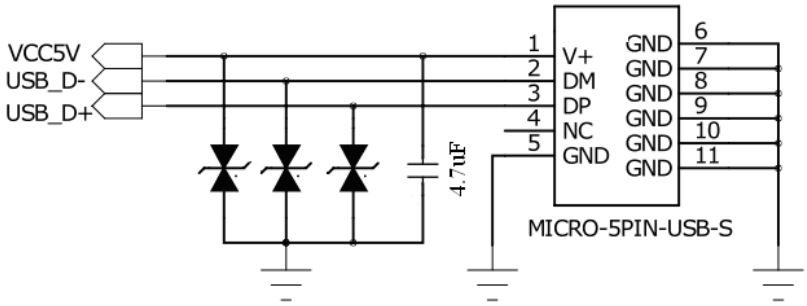


Figure 2-10

Note: The layout design of this USB should comply with the USB 2.0.

- The traces of USB_D+ and USB_D- must be routed as a group of differential pair with 90Ω differential impedance.
- The USB differential pair should be routed side-by-side and on the same layer.
- USB_D+ and D- is a pair of high speed signals, so the trace lengths should match as well as possible.
- Please to connect USB or set aside the relevant test points, to facilitate subsequent upgrade or debugging.

2.6 UART

Pin	Pin Name	I/O	Function description	Note
52	CTS	I	High-speed UART clear to send signal	
53	RTS	O	High-speed UART ready for receive signal	
54	RXD	I	High-speed UART receive data input	(allow input 3V)
55	TXD	O	High-speed UART transmit data output	

2.6.1 Basic Descriptions of UART

UART1 is for AT commands, data sending/receiving, firmware updating, etc.

As a DCE device, the module is connected to DTE as shown in Figure 2-11.

Supported baud rates are 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400bps, and the default is 115200.

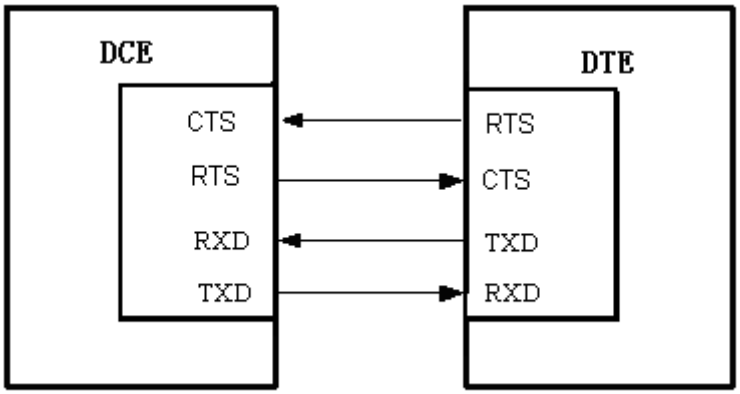


Figure 2-11, Connection between DCE (module) and DTE

The UART of WM620 works at 2.6V CMOS logic level. The voltages for input high level should not exceed 3.0V.

2.6.2 Level Translators for UART

If the UART is interfacing with a MCU that has 3.3V logic levels, resistors should be connected in series with the signals, shown in figure 2-12.

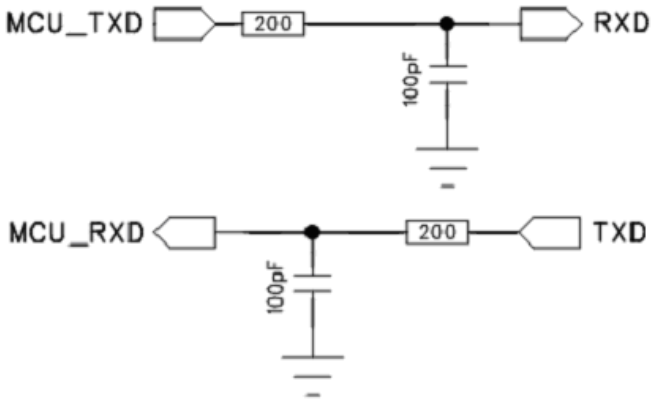


Figure 2-12, Interfacing with 3.3V logic levels of MCU

If the UART is interfacing with a MCU that has 5V logic levels, general level translators are required, for both inputs and outputs. As shown in Figure 2-13.

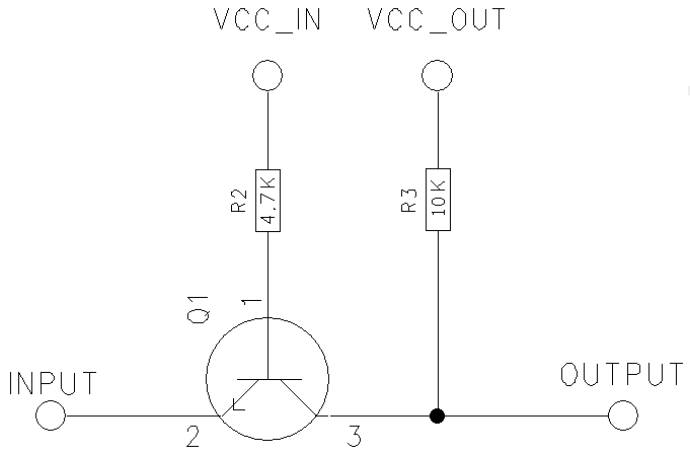


Figure 2-13, Interfacing with 5V logic levels of MCU

Reference components:

R2: 2K-10K. The higher rate the UART works at, the smaller value used

R3: 4.7K-10K. The higher rate the UART works at, the smaller value used

Q1: MMBT3904 or MMBT2222. High-speed transistors preferred.

Used for 5V logic -> 2.6V logic:
While this circuit used between MCU TXD and module RXD, the INPUT signal is connected to MCU TXD, and OUTPUT connected to module RXD. VCC_IN powered from 5V and VCC_OUT powered from 2.6V (module's VDD_2.6V).
Used for 2.6V logic -> 5V logic:
It can be used between module TXD and MCU RXD as well, with INPUT connected to module TXD, and OUTPUT connected to MCU RXD. VCC_IN powered from 2.6V (module's VDD_2.6V) and VCC_OUT powered from 5V. This applies to RING signal as well.

Note:

Avoid sparks and glitches on UART signals while the module is in a turning on procedure.

Avoid sending any data to UART during the beginning of 2 seconds after the module being turned on.

2.7 Audio interface

Table 2-4, Audio interface

PIN	Signal Name	I/O	Function Description	Note
28	EAR_1P	AO	Earphone amplifier output（+）	32Ω Earpiece; typical:35mW
29	EAR_1N	AO	Earphone amplifier output（-）	
30	MIC_1N	AI	Microphone #1 input (-)	
31	MIC_1P	AI	Microphone #1 input (+)	

The WM620's typical audio interfaces are shown in Figure 2-14. The earpiece output pins are connected directly to the earpiece, each with its own bypass capacitor. The capacitor value is selected to optimize performance in each design, but a value of **100pF** or less is expected (**100pF** is used in the example). The output power for the differential ear output is typically 35mW for a full-scale +3dBm sine wave into a 32Ω speaker.

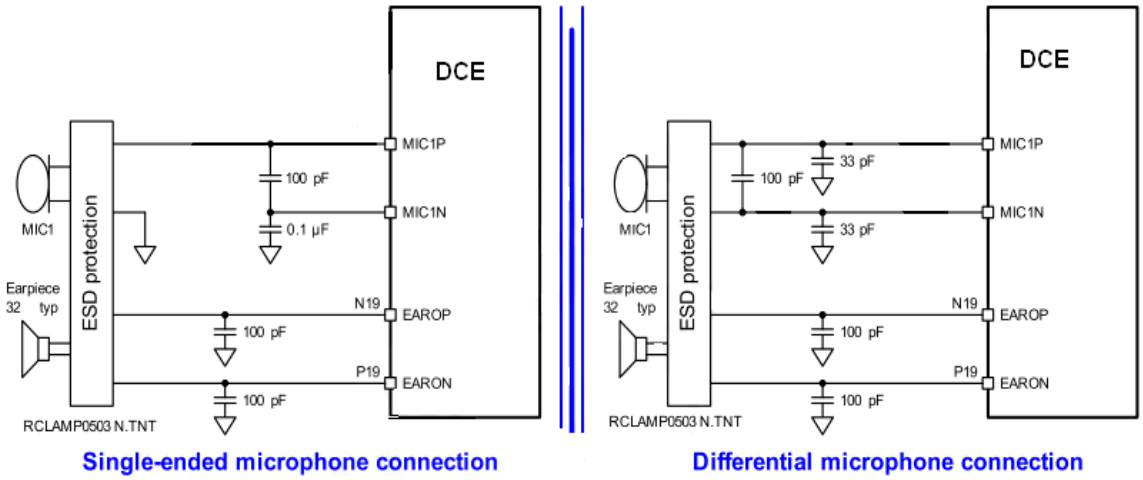


Figure 2-14

3 Mechanics, Mounting and Packaging

3.1 Dimension and PCB layout

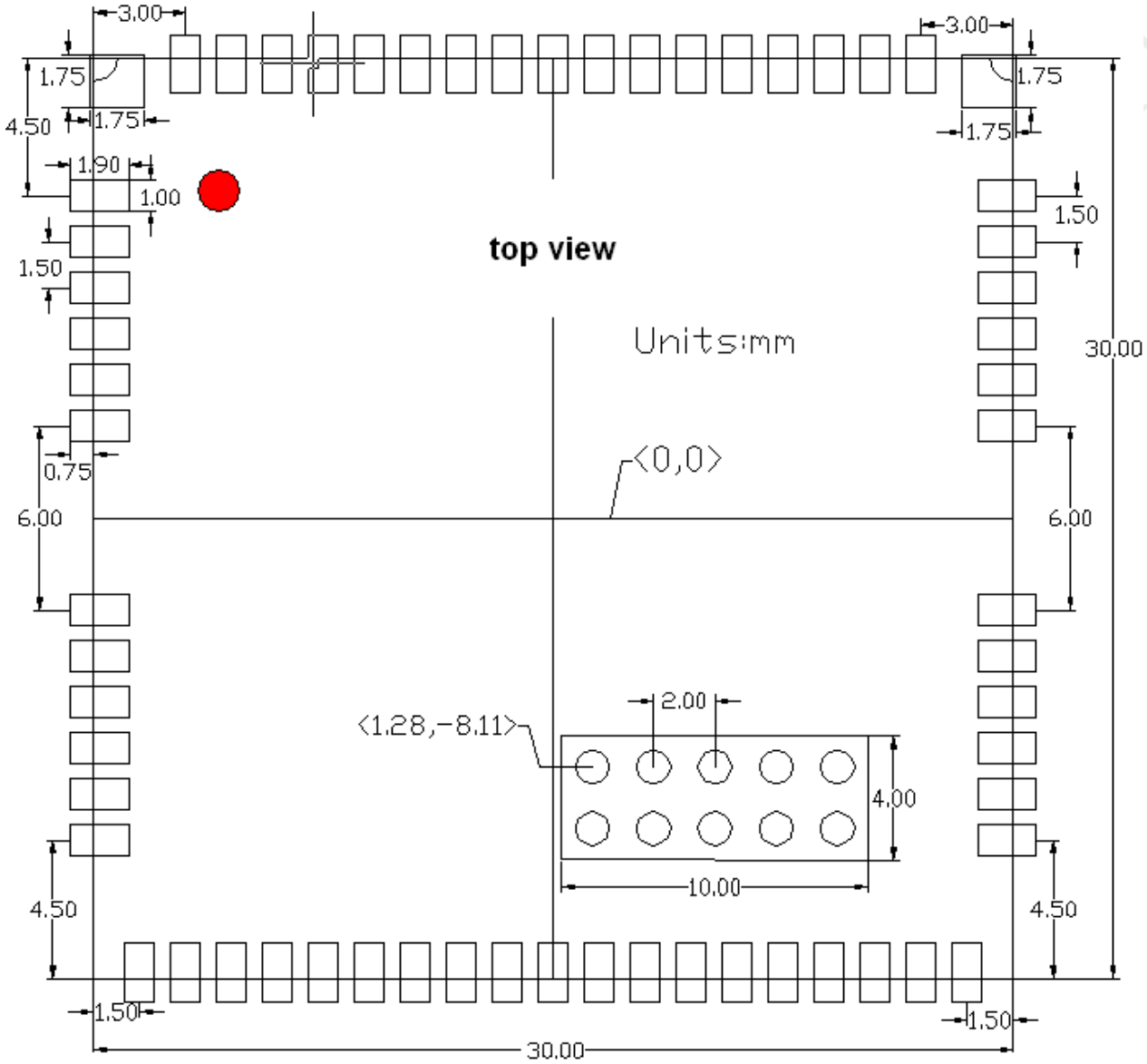


Figure 3-1, WM620 PCB foot print

3.2 Assembly

The WM620 introduces 62 Pin LCC castellation technology, less pin counts and wide pitch, these features are very suitable for low-cost and simple designs with 2 layer PCB. Benefit from it's ultra-compact size and high reliability, WM620 can be easily designed in. Moreover, WM620supports manual soldering, can adapt to mass production and also low quantity perfectly, and has low technical requirement for manufacturing equipment.

3.3 Packaging and solder

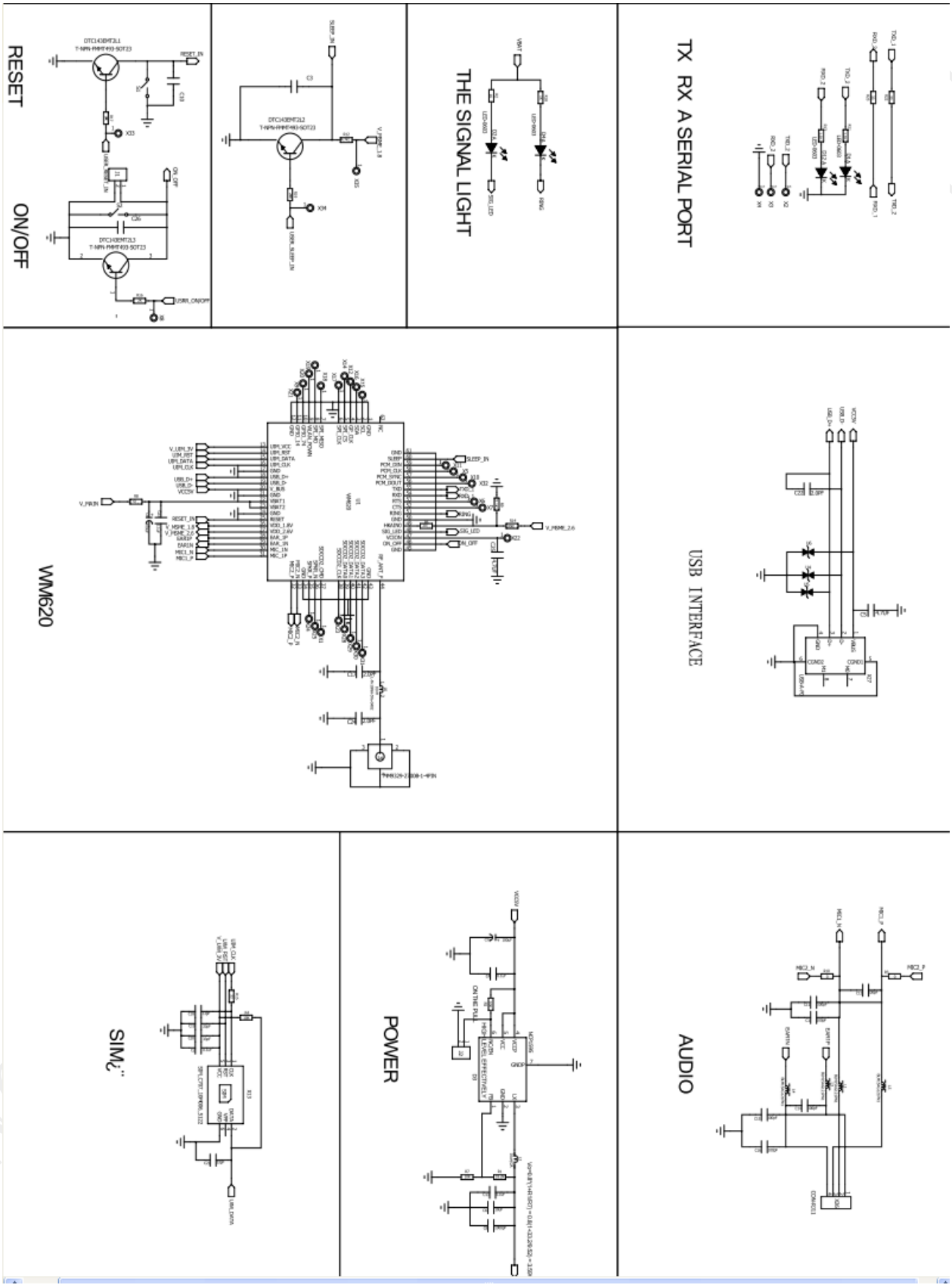
WM620 modules are packaged in sealed bags on delivery to guarantee a long shelf life. Package the modules again in case of opening for any reasons.

If exposed in air for more than 48 hours at conditions not worse than 30°C/60% RH, a baking procedure should be done before SMT. Or, if the indication card shows humidity greater than 20%, the baking procedure is also required. The baking should last for at least 24 hours at 90℃.

In order to prevent the product of from being affected with damp, caused by using the SMT way to perform the furnace welding, in the process of production and use of the costumer, we employ the way of damp-proof packing, such as Aluminum Foil Bag, desiccating agent, Humidity Indicator Cards, Suck plastic trays, and vacuolization. As a result the product is kept dry and its life span will be long.

For more storage and SMT information, please refer to 《Neoway modules' recommendation for SMT and reflow solder》.

4 Typical Application SCH



5 Abbreviations

ADC	Analog-Digital Converter
AFC	Automatic Frequency Control
AGC	Automatic Gain Control
AMR	Acknowledged multirate (speech coder)
CSD	Circuit Switched Data
CPU	Central Processing Unit
DAI	Digital Audio interface
DAC	Digital-to-Analog Converter
DCE	Data Communication Equipment
DSP	Digital Signal Processor
DTE	Data Terminal Equipment
DTMF	Dual Tone Multi-Frequency
DTR	Data Terminal Ready
EFR	Enhanced Full Rate
EGSM	Enhanced GSM
EMC	Electromagnetic Compatibility
EMI	Electro Magnetic Interference
ESD	Electronic Static Discharge
ETS	European Telecommunication Standard
FDMA	Frequency Division Multiple Access
FR	Full Rate
GPRS	General Packet Radio Service
GSM	Global Standard for Mobile Communications
HR	Half Rate
IC	Integrated Circuit
IMEI	International Mobile Equipment Identity
LCD	Liquid Crystal Display
LED	Light Emitting Diode
MS	Mobile Station
PCB	Printed Circuit Board
PCS	Personal Communication System
RAM	Random Access Memory
RF	Radio Frequency
ROM	Read-only Memory

RMS	Root Mean Square
RTC	Real Time Clock
SIM	Subscriber Identification Module
SMS	Short Message Service
SRAM	Static Random Access Memory
TA	Terminal adapter
TDMA	Time Division Multiple Access
UART	Universal asynchronous receiver-transmitter
VSWR	Voltage Standing Wave Ratio

Warning Statement

This equipment 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 correct the interference by one or more of the following measures:

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

You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

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.

Important announcement

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

IMPORTANT NOTE:

This module is intended for OEM integrator. The OEM integrator is still responsible for the FCC compliance requirement of the end product, which integrates this module.

20cm minimum distance has to be able to be maintained between the antenna and the users for the host this module is integrated into. Under such configuration, the FCC radiation exposure limits set forth for an population/uncontrolled environment can be satisfied.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

USERS MANUAL OF THE END PRODUCT:

In the users manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the FCC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following" Contains TX FCC ID: PJ7-1500 ". The FCC part 15.19 statement below has to also be available on the label: This device complies with Part 15 of 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.

To comply with FCC regulations limiting both maximum RF output power and human exposure to RF radiation, the maximum antenna gain including cable loss in a mobile-only exposure condition must not exceed 1dBi in the cellular band and 1dBi in the PCS or WCDMA band.

A user manual with the end product must clearly indicate the operating requirements and conditions that must be observed to ensure compliance with current FCC RF exposure guidelines.

The end product with an embedded WM620 Module may also need to pass the FCC Part 15 unintentional emission testing requirements and be properly authorized per FCC Part 15.

Note: If this module is intended for use in a portable device, you are responsible for separate approval to satisfy the SAR requirements of FCC Part 2.1093.

