



ZTE MG2636 Module Hardware Design User Manual

Version: V1.0

ZTE CORPORATION



This user manual is for MG2636 module

Copyright Statement

Copyright © 2010 by ZTE Corporation

All rights reserved.

No part of this publication may be excerpted, reproduced, translated or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without the prior written permission of ZTE Corporation.



is the registered trademark of ZTE Corporation. All other trademarks appeared in this manual are owned by the relevant companies.

ZTE Corporation reserves the right to make modifications on print errors or update specifications in this manual without prior notice.

ZTE Corporation keeps the right to make the final explanation to this manual.

1.0-TY edition in Apr. 2010

With strong technical force, ZTE Corporation can provide CDMA/GPRS module customers with the following all-around technical support:

1. Provide complete technical documentation;
2. Provide the development board used for R&D, test, production, after-sales, etc.;
3. Provide evaluations and technical diagnosis for principle diagram, PCB, test scenarios;
4. Provide test environment;

ZTE Corporation provides customers with onsite supports, and also you could get supports through telephone, website, instant communication, E-mail, etc.

The module website module.ztemt.com.cn provides the relevant industry information and module technical documentation. The authorized module customers could download the latest technical documentation for our website. If you have more requirements, you could send an E-mail to module@zte.com.cn. You can also call us at 0755-86140899 for more supports.

Preface

Summary

This user manual is for MG2636 modules. It takes MG2636 modules for example to give the reference to the relevant hardware and mechanical design. This manual could instruct the users how to quickly and conveniently design different kinds of wireless terminals based on this type of module.

Target Readers

- System designing engineers
- Mechanical engineers
- Hardware engineers
- Software engineers
- Test engineers

Brief Introduction

This manual contains 4 chapters. See the table below:

Chapter	Contents
1. General Description	Introduces MG2636 module's basic functions, principle diagrams, application diagrams, the relevant documents for reference.
2. PIN Definitions	Introduces MG2636 module's PIN name and functions.
3. Description of Hardware Interface	Introduces the design of the hardware interface on each part of MG2636 modules.
4. Mechanical Design	Introduces MG2636 module's appearance diagram and assembly diagram.

Update History

The update history records the document's update descriptions every time. The updates of all previous versions will be contained in the latest version.

Document Version V1.0 (2010-04-22)

The document is formally released on Apr. 22, 2010.

Contents

1	General Description.....	7
1.1	Functions.....	7
1.2	Principle Diagrams.....	9
1.3	Application Diagrams.....	10
1.4	Relevant Documents.....	11
1.5	Acronyms.....	11
2	PIN Definitions.....	14
2.1	Module's PIN Diagram.....	14
2.2	50-Pin B2B Connector Interface Definitions.....	15
3	Decription of Hardware Interfaces.....	18
3.1	Summary.....	18
3.2	Power and Reset.....	18
3.2.1	Power.....	18
3.2.2	Power On/Off.....	19
3.2.3	Reset.....	20
3.3	COM Port.....	20
3.4	SIM Card Interface.....	21
3.5	Audio Interface.....	22
3.5.1	Microphone.....	23
3.5.2	Receiver.....	23
3.6	DAI (Digital Audio Interface).....	23
3.7	Network Status LED Interface.....	24
3.8	Antenna Interface.....	24
4	Mechanical Design.....	26
4.1	Appearance Diagram.....	26
4.2	Assembly Diagrams.....	26
4.2.1	MG2636 Module's Assembly Diagram Dimensions.....	27
4.2.2	B2B Connector Socket.....	27

Figure Contents

Figure 1-1 Module’s principle diagrams.....9

Figure 1-2 Module’s application diagrams10

Figure 2.1 Module’s PIN Diagram.....14

Table Contents

Table 1-1 Table of functions7

Table 1-2 Table of Acronyms11

Table 2-1 50-Pin B2B Connector Interface Definitions15

1 General Description

This user manual is for MG2636 modules. Refer to this manual to make your hardware and mechanical design fully compatible with GSM/GPRS applications, except for antenna design. With the function of voice, SMS and data service, ZTE MG2636 module can be used for data transmission, wireless POS, security and surveillance, lottery terminal, intelligent metering system, wireless fax, small switch, tobacco communication system, campus communications, wireless AD, wireless media, medical surveillance, direct discharge station surveillance, railway terminals, intelligent home appliances and vehicle-mounted monitoring, etc.

This manual describes MG2636 module's logic structure, hardware interface & major functions, and provides references to the hardware and mechanical design.

1.1 Functions

Table 1-1 Table of functions

Basic functions	Descriptions	
Work frequency (Dual band: EGSM9000/ DCS1800)	EGSM900	Transmit (uplink: MS→BTS): 880~915 MHz
		Receive (downlink: BTS→MS): 925~960 MHz
	DCS1800	Transmit (uplink: MS→BTS) : 1710~1785 MHz
		Receive (downlink: BTS→MS): 1805~1880 MHz
Max. Tx power	EGSM900: Class4 (2W)	31~35dBm (typical value: 33 dBm)
	DCS1800: Class1 (1W)	28~32dBm (typical value: 30 dBm)
Rx. Sensitivity	<-106 dBm	
Work temperature	Normal work temperature: -20°C~+55°C	
	Expanded work temperature: -30°C~+70°C	
	Storage temperature: -40°C~+85°C	
Voltage	3.4V~4.7V (recommended value: 3.8V)	
Power consumption (current)	Power off current: 50uA	
	Standby average current: 2.5mA	
	GPRS Class10 (MAX): 300mA	
Application interface (50Pin B2B connector)	UART0 interface (8-wire hardware flow control, max. data rate: 921600bps), support download and data communication	
	UART1 interface (4-wire hardware flow control, max. data rate: 921600bps)	
	Standard SIM card interface (1.8V/3.0V), support R-UIM	
	2CH analog audio I/O interface, using differential signals	
	1CH serial digital audio interface, using PCM encoding analog audio signal to digital signal	
	Power management interface (including power interface and charge interface)	
	Network status indication interface (different network status indicated by LED's different flashing modes)	
	Power on-off interface (externally power on/off the module through the interface (indirect switch power))	
	Reset interface (externally reset the module through the interface)	

Antenna interface	MURATA: MM9329-2700RA1 50-ohm antenna connector
	Antenna's welding pad
Protocol	Support GSM/GPRS Phase2/2+
AT command	Refer to《AT Command Set User Manual of ZTE Corporation's MG2636 modules》
Voice	Support FR, EFR, HR and AMR audio encoding
	Support hands-free talk, echo suppression function
SMS	Support MO and MT
	Support Point to Point and cell broadcast
	Support TEXT and PDU
GPRS	GPRS CLASS 10
	Encoding method: CS 1,CS 2,CS 3,CS 4
	Max. downlink transmitting rate: 85.6 kbps
	Max. uplink transmitting rate: 42.8 kbps
	Support PBCCH and virtual online;
	Embedded TCP/IP protocol: support multi-link, provides ACK and large capacity cache;
Circuit domain data service	Support CSD data service, max. data rate: 14.4Kbit/s
	Support USSD
Supplementary service	Incoming caller ID presentation, call forwarding, call held, call waiting, etc.
Physical features	Dimensions: 35±0.10 x 32.5±0.10 x 3.85±0.20 mm
	Weight: 7.0 g
ROHS environment protection	Meet the requirements of ROHS
CE certification	Meet the requirements of CE

1.2 Principle Diagrams

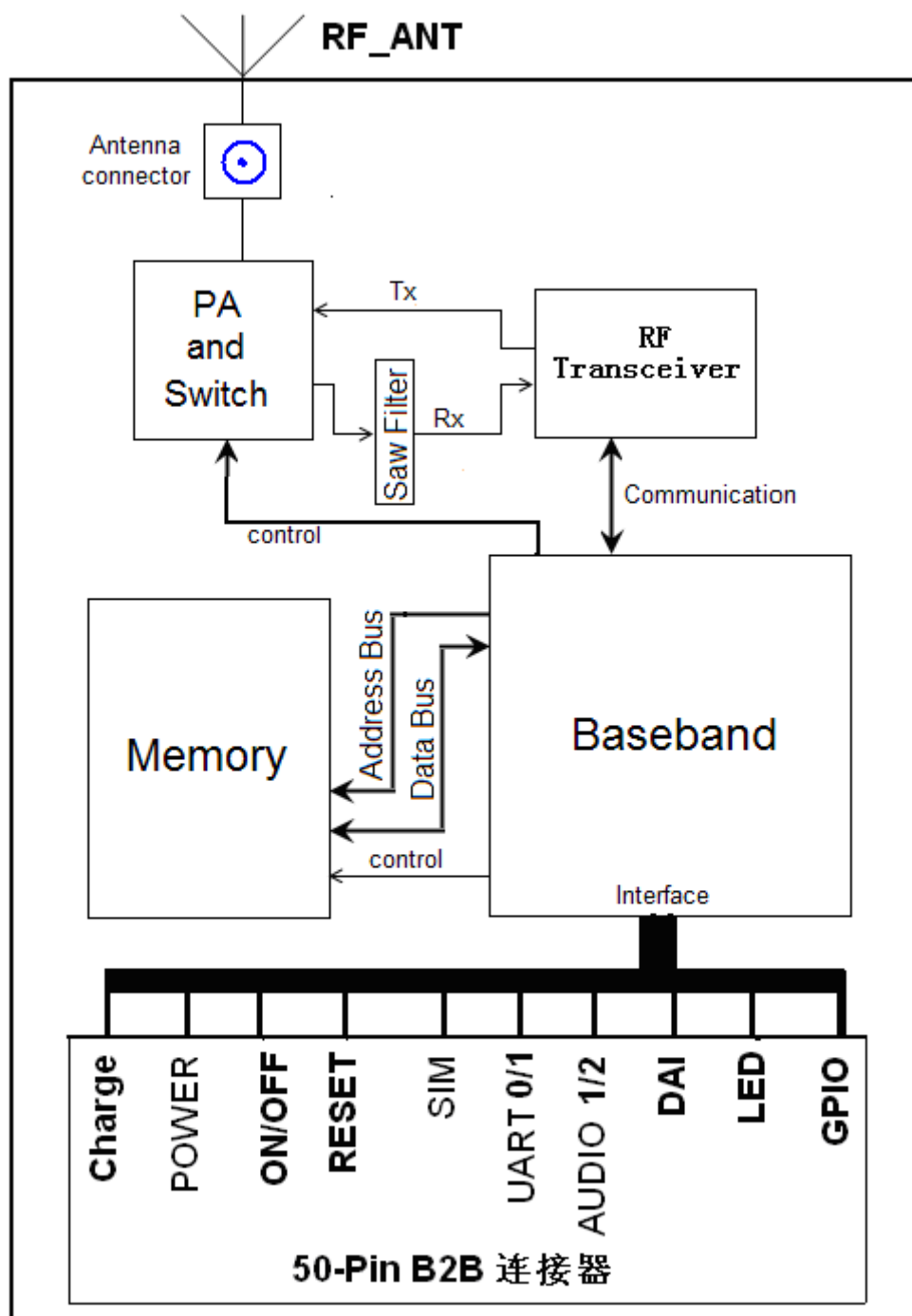


Figure 1-1 Module's principle diagrams

1.3 Application Diagrams

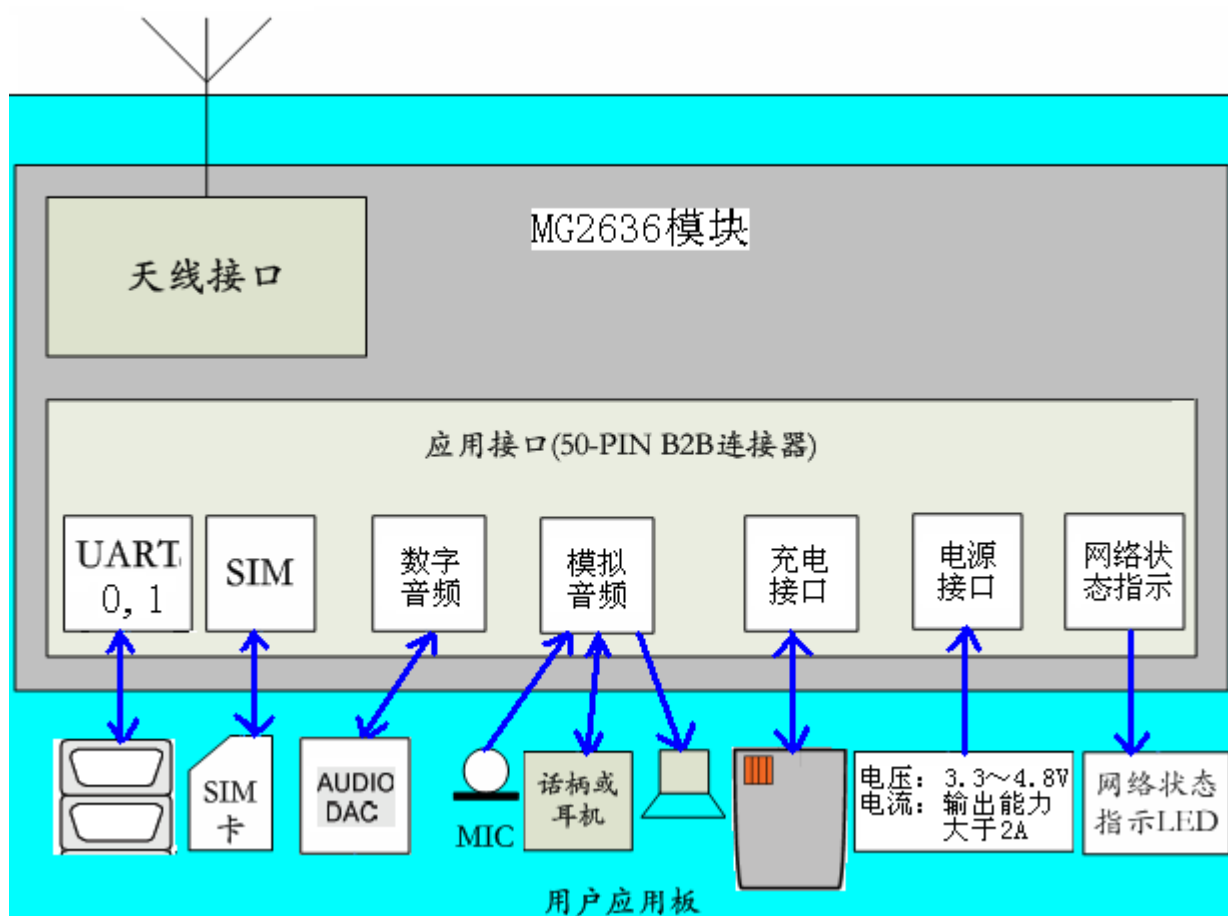


Figure 1-2 Module's application diagrams

1.4 Relevant Documents

- 《AT Command Manual for ZTE Corporation's MG2636 Modules》
- 《ZTE Corporation GPRS modules FAQ》
- 《Wireless modules' Test References》

1.5 Acronyms

Table 1-2 Table of Acronyms

A		
ADC	Analog-Digital Converter	模数转换
AFC	Automatic Frequency Control	自动频率控制
AGC	Automatic Gain Control	自动增益控制
ARFCN	Absolute Radio Frequency Channel Number	绝对射频信道号
ARP	Antenna Reference Point	天线参考点
ASIC	Application Specific Integrated Circuit	专用集成电路
B		
BER	Bit Error Rate	比特误码率
BTS	Base Transceiver Station	基站收发信台
C		
CDMA	Code Division Multiple Access	码分多址
CDG	CDMA Development Group	CDMA 发展组织
CS	Coding Scheme	译码图案
CSD	Circuit Switched Data	电路交换数据
CPU	Central Processing Unit	中央处理单元
D		
DAI	Digital Audio interface	数字音频接口
DAC	Digital-to-Analog Converter	数模转换
DCE	Data Communication Equipment	数据通讯设备
DSP	Digital Signal Processor	数字信号处理
DTE	Data Terminal Equipment	数据终端设备
DTMF	Dual Tone Multi-Frequency	双音多频
DTR	Data Terminal Ready	数据终端准备好
E		
EDGE	Enhanced Data Rate for GSM Evolution	提高数据速率的 GSM 演进技术
EFR	Enhanced Full Rate	增强型全速率
EGSM	Enhanced GSM	增强型 GSM

EMC	Electromagnetic Compatibility	电磁兼容
EMI	Electro Magnetic Interference	电磁干扰
ESD	Electronic Static Discharge	静电放电
ETS	European Telecommunication Standard	欧洲通信标准
F		
FDMA	Frequency Division Multiple Access	频分多址
FR	Full Rate	全速率
G		
GPRS	General Packet Radio Service	通用分组无线业务
GSM	Global Standard for Mobile Communications	全球移动通讯系统
H		
HR	Half Rate	半速率
I		
IC	Integrated Circuit	集成电路
IMEI	International Mobile Equipment Identity	国际移动设备标识
ISO	International Standards Organization	国际标准化组织
ITU	International Telecommunications Union	国际电信联盟
L		
LCD	Liquid Crystal Display	液晶显示器
LED	Light Emitting Diode	发光二极管
M		
MCU	Machine Control Unit	机器控制单元
MMI	Man Machine Interface	人机交互接口/人机界面
MS	Mobile Station	移动台
MTBF	Mean Time Before Failure	平均故障间隔时间
P		
PCB	Printed Circuit Board	印刷电路板
PCL	Power Control Level	功率控制等级
PCS	Personal Communication System	个人通讯系统
PDU	Protocol Data Unit	协议数据单元
PLL	Phase Locked Loop	锁相环
PPP	Point-to-point protocol	点到点协议
R		
RAM	Random Access Memory	随机访问存储器
RF	Radio Frequency	无线频率

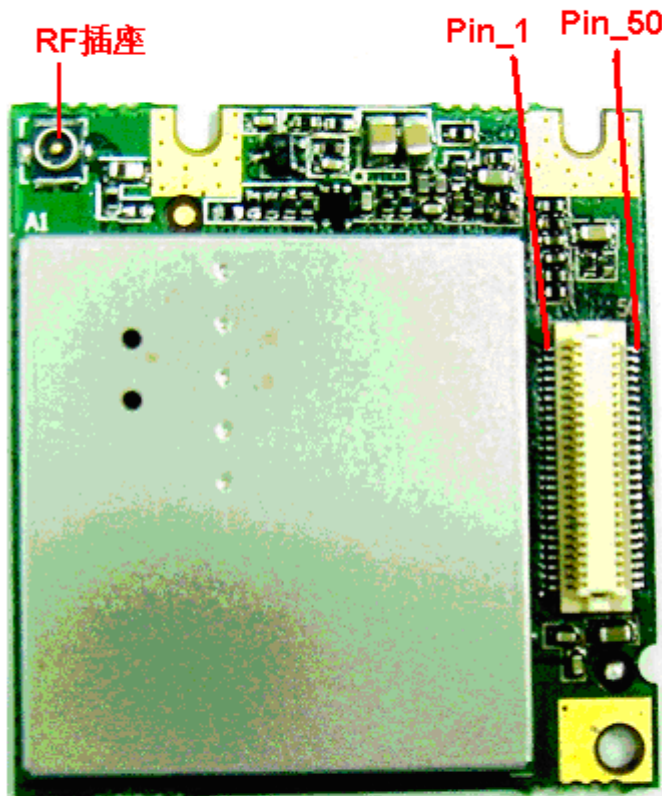
ROM	Read-only Memory	只读存储器
RMS	Root Mean Square	均方根
RTC	Real Time Clock	实时时钟
S		
SIM	Subscriber Identification Module	用户识别卡
SMS	Short Message Service	短消息服务
SMT	Surface Mount Technology	表面安装技术
SRAM	Static Random Access Memory	静态随机访问存储器
T		
TA	Terminal adapter	终端适配器
TDMA	Time Division Multiple Access	时分多址
TE	Terminal Equipment also referred it as DTE	终端设备，也指 DTE
U		
UART	Universal asynchronous receiver-transmitter	通用异步接收/发送器
UIM	User Identifier Management	用户身份管理
USB	Universal Serial Bus	通用串行总线
USIM	Universal Subscriber Identity Module	用户识别模块
V		
VSWR	Voltage Standing Wave Ratio	电压驻波比
Z		
ZTE	ZTE Corporation	中兴通讯股份有限公司

2 PIN Definitions

Adopting 50-Pin B2B connector interface, MG2636 module has 50 pins with the distance 0.5mm between the pins.

2.1 Module's PIN Diagram

Figure 2.1 Module's PIN Diagram



1	SIM-CLK	SPK2_N	50
2	SIM-UCC	SPK2_P	49
3	SIM-DATA	SPK1_P	48
4	SIM-RST	SPK1_N	47
5	ISENSE	MIC2_N	46
6	SIM-GND	MIC2_P	45
7	DAIRXD	MIC1_P	44
8	DAISYNC	MIC1_N	43
9	DAICLK	AGND	42
10	DAITXD	PWRKEY_N	41
11	DAIRST	SYSRST_N	40
12	BATT_TEMP	DCD0	39
13	SIG_LED	CTS1	38
14	RXD1	CTS0	37
15	RXD0	RTS1	36
16	TXD1	DTR0	35
17	TXD0	RTS0	34
18	BAT_BACKUP	DSR0	33
19	CHRIN	RING0	32
20	GATEDRV	VDDIO	31
21	GND	BATT+	30
22	GND	BATT+	29
23	GND	BATT+	28
24	GND	BATT+	27
25	GND	BATT+	26

2.2 50-Pin B2B Connector Interface Definitions

Table 2-1 50-Pin B2B Connector Interface Definitions

Functions	PIN No.	Definitions	I/O	Descriptions
1	SIM-CLK	O	SIM card clock	
2	SIM-VCC	O	SIM card power	Max. output current 20mA
3	SIM-DATA	I/O	SIM card data	
4	SIM-RST	O	SIM card reset	
5	ISENSE	AI	Current inductor detect current	
6	SIM-GND	P	SIM card GND	SIM card's GND PIN and SIM-GND PIN must connect with the module's power GND.
7	DAIRXD	I	DAI: receive data	internal pull-down(51.1KΩ)
8	DAISYNC	O	DAI: frame SYNC	
9	DAICLK	O	DAI: clock	internal pull-down(51.1KΩ)
10	DAITXD	O	DAI: transmit data	
11	DAIRST	O	DAI: reset	internal pull-down(51.1KΩ)
12	BATT_TEMP	AI	Battery ID or battery temperature detection	Analog input voltage range: 0~2.8V
13	SIG_LED	O	Network signal LED	High level LED ON, need externally connect dynatron driver
14	RXD1	O	UART1 corresponding to DTE's RXD	internal pull-down(75KΩ)
15	RXD0	O	UART0 corresponding to DTE's RXD	internal pull-down(75KΩ)
16	TXD1	I	UART1 corresponding to DTE's TXD	internal pull-down(75KΩ)
17	TXD0	I	UART0 corresponding to DTE's TXD	internal pull-down(75KΩ)
18	BAT_BACKUP	P	Real-time clock (RTC) backup power	Connect button battery or large capacitor. Input: 2.2~5V; max. output: 2.6~2.85V; under POWER DOWN mode, min. input: 1.3V.
19	CHRIN	P	External charge power detection input	4.2V~8V (recommended 5.5V), external connect the charge power with the current no less than 800mA. This pin is just used as diction. And It will be hung out when not used.

20	GATEDRV	O	Battery charge control switch	Valid at low level
21	GND	P	GND	
22	GND	P		
23	GND	P		
24	GND	P		
25	GND	P		
26	BATT+	P	Work current anode input	3.4V~4.7V (recommended 3.8V), as the module transmits with the max. power, the current will instantly reach 1.6A. The min. value of BATT+ voltage is no lower than 3.3V, and the current no lower than 2A.
27	BATT+	P		
28	BATT+	P		
29	BATT+	P		
30	BATT+	P		
31	VDDIO	O	Module output digital interface voltage	Typical value: 2.85V(MIN: 2.75V,MAX: 2.95V,MAX current: 150mA). There is voltage output only as the module is powered on. And It will be hung out when not used.
32	RING0	O	UART0 corresponding to DTE's RING	internal pull-down(75KΩ)
33	DSR0	O	UART0 corresponding to DTE's DSR	internal pull-down(75KΩ)
34	RTS0	I	UART0 corresponding to DTE's RTS	internal pull-down(75KΩ)
35	DTR0	I	UART0 corresponding to DTE's DTR	internal pull-down(75KΩ)
36	RTS1	I	UART1 corresponding to DTE's RTS	internal pull-down(75KΩ)
37	CTS0	O	UART0 corresponding to DTE's CTS	internal pull-down(75KΩ)
38	CTS1	O	UART1 corresponding to DTE's CTS	internal pull-down(75KΩ)
39	DCD0	O	UART0 corresponding to DTE's DCD	internal pull-down(75KΩ)
40	SYSRST_N	I	Module's reset	Valid at low level, need externally connect dynatron driver. It's recommended to parallel connect 0.1uF capacitor to GDN for ESD protection near 50-pin B2B connector.

41	PWRKEY_N	I	Module's power on/off	Valid at low level, need externally connect dynatron driver.
42	AGND	P	GND	
43	MIC1_N	AI	1CH audio input cathode	Default audio I/O is the first channel. Usually the first channel is used for the receiver and the second channel used for headset or hands-free.
44	MIC1_P	AI	1CH audio input anode	
45	MIC2_P	AI	2CH audio input anode	
46	MIC2_N AI	2CH audio input cathode		
47	SPK1_N	AO	1CH audio output cathode	
48	SPK1_P	AO	1CH audio output anode	
49	SPK2_P	AO	2CH audio output anode(right ear)	
50	SPK2_N	AO	2CH audio output cathode(left ear)	

Note: 1) I—representing digital signal input PIN; O—representing digital signal output PIN;
AI—representing analog signal input PIN; AO—representing analog signal input PIN;; P—representing power PIN;

2) UART0 and UART1 are named by DCE PIN signals.

3 Description of Hardware Interfaces

3.1 Summary

This chapter introduces MG2636 module's each function & its operation descriptions, and provides the designing sample.

- Power interface
- Charge interface
- Power on/off interface
- Reset interface
- UART interface (2CH)
- SIM Card
- Audio Interface (2CH analog audio interface)
- DAI interface (1CH digital audio interface)
- Network signal indication interface
- Antenna interface
- Other

3.2 Power and Reset

3.2.1 Power

MG2636 GSM module requires VBAT and real-time clock BAT_BACKUP to work normally. For details, please see the following table 3-1 Power PIN Interface Definitions.

Table 3-1 Power PIN Interface Definitions

PIN No.	Signal Name	I/O	Descriptions of Functions	Remarks
21~25	GND	P	GND	
26~30	BATT+	P	Work Power Anode Input	3.4V~4.7V (recommended 3.8V), as the module transmits with the max. power, the current will instantly reach 1.6A. The min. value of BATT+ voltage is no lower than 3.3V, and the current no lower than 2A.
18	BAT_BACKUP	P	Real-time Clock (RTC) Backup	Connect button battery or large capacitor. Input: 2.2~5V; max. output: 2.6~2.85V; under POWER DOWN mode, min. input: 1.3V.

MG2636 module requires external power supply and the power supply voltage ranges from 3.4V~4.7V (typical value 3.8V). The external power supplies the power to the module through B2B connector's VBAT PIN. As the module transmits with the max. power, the current will instantly reach

about 1.6A and VBAT voltage will fall down, however the min. value of BATT+ voltage must be no lower than 3.4V. The external power can provide the current required at MAX. Tx. Power, and it's recommended to use LDO or switch power with the output current larger than 2A and a 100uF energy storage capacitor is parallel connected at the power end of the module. In order to guarantee the supply of current, use 5PIN on the power loop as the power supply and GND return current respectively.

BAT_BACKUP is real-time backup input interface of MG2636 GSM module. As VBAT is ON, real-time clock could supply power through VBAT; as VBAT is not ON, BAT_BACKUP will supply the backup power for real-time clock. BAT_BACKUP can use the battery to supply the power and the battery voltage ranges from 2.8~5V. If the backup battery is not used, it could externally connect the capacitor. The value of capacitor decides the clock's duration as VBAT is not ON. The calculation formula is as below: $t=C/15$; t represents the real-time clock's duration (unit: s), and C represents the value of capacitor (unit: uF). The required current is about 15uA as MG2636 modules maintains the real-time clock function upon the power cut-off. The following figure is the charge reference circuit of RTC backup battery or capacitor.

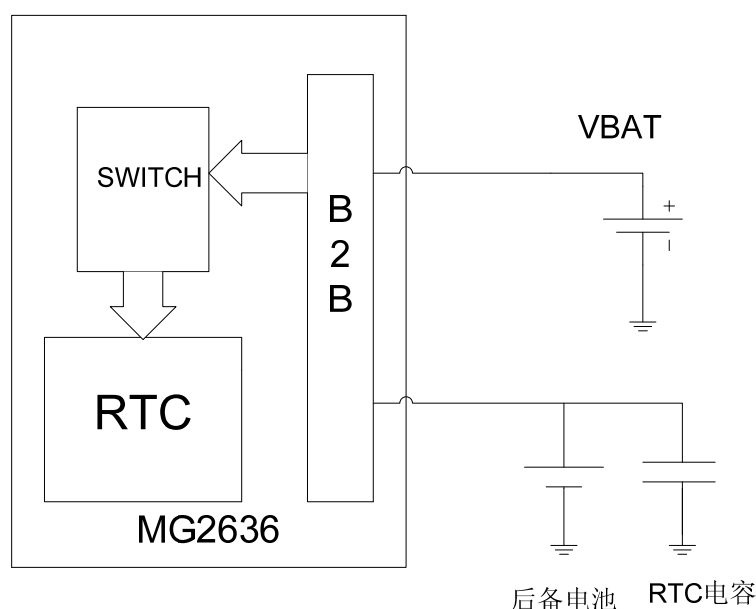


Figure 3-1 MG2636 Module's RTC Backup Battery/Capacitor Reference Circuit

AS VBAT> backup battery, it can charge the backup battery, and the charging cut-off voltage is 3.3V; as the battery does not work, RTC work current is 15uA.

3.2.2 Power On/Off

The module is under power-off status after it's normally powered on. To turn on the module, provide a 2000-3000mS low level pulse to PWRKEY_N pin when the module is OFF.

In Data mode, if you connect VCHG to VPH_PWR, the module will be automatically powered on.

It's specially noted that PWRKEY_N is valid at low level, which is required externally to connect dynatron driver. It's recommended to parallel connect 0.1uF capacitor to GDN for ESD protection near 50-pin B2B connector

3.2.3 Reset

SYSRST_N PIN is used to reset the module's main chip, and SYSRST_N signal needs to be pulled down 200ms to reset the module. Likewise, this pin is required externally to connect dynatron driver and parallel connect 0.1uF capacitor to GDN to prevent SYSRST_N signal from external interference. And it's noted that the wiring of 50pin connector must be as short as possible.

3.3 COM Port

The module provides 1CH serial interface, supports 8-wire serial BUS interface or 4-wire serial BUS interface or 2-wire serial interface. The module communicates with the external devices and inputs AT commands through UART interface. UART supports programmable data width, programmable data stop bit, programmable parity check or no check, and UART port supports from 300bit/s to 921.6kbit/s baud rate. The default baud rate is 115200bit/s and it supports baud rate storage upon power drop.

MG2636 module can directly connect the same signal name of DTE devices. Please see table 3-2 module UART signal names and figure 3-2 for the connection diagram between the module and DTE device.

Table 3-2 MG2636 module UART external device's signal names and functions

PIN No.	Signal Name	I/O	Descriptions of Functions	Remarks
32	RING0	O	UART0 port, corresponding to DTE's RING port	Internal pull-up(75KΩ)
33	DSR0	O	UART0 port, corresponding to DTE's DSR port	Internal pull-up(75KΩ)
34	RTS0	I	UART0 port, corresponding to DTE's RTS port	Internal pull-up(75KΩ)
35	DTR0	I	UART0 port, corresponding to DTE's DTR port	Internal pull-up(75KΩ)
36	RTS1	I	UART1 port, corresponding to DTE's RTS port	Internal pull-up(75KΩ)
37	CTS0	O	UART0 port, corresponding to DTE's CTS port	Internal pull-up 75KΩ)
38	CTS1	O	UART1 port, corresponding to DTE's CTS port	Internal pull-up(75KΩ)
39	DCD0	O	UART0 port, corresponding to DTE's DCD port	Internal pull-up(75KΩ)

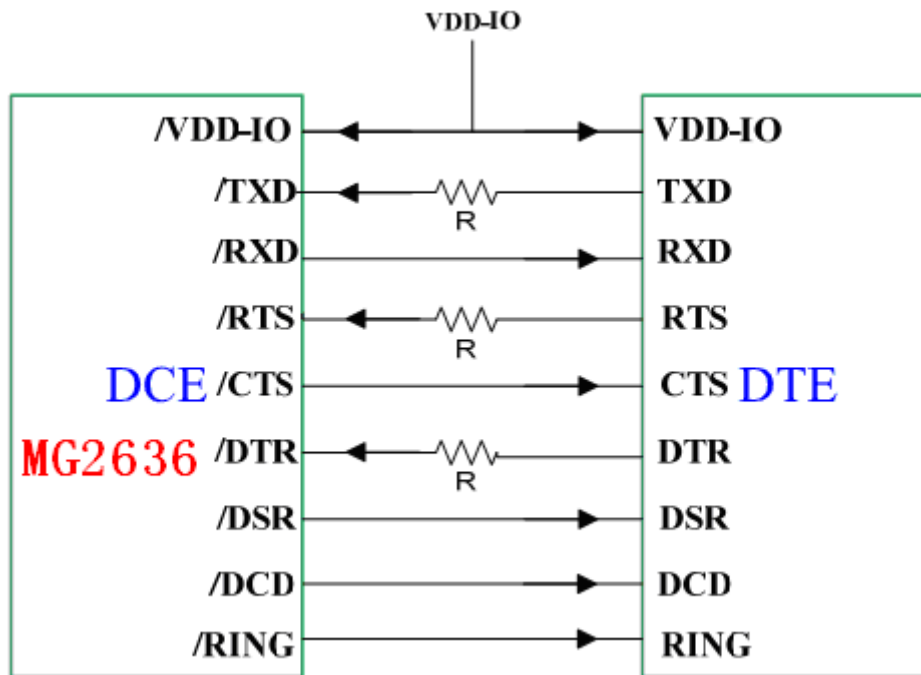


Figure 3-2 MG2636 module external DTE device's circuit connection diagram

MG2636 module can communicate with RXD and TXD of single chip microcomputer to compose the simplest 2-line mode. It's noted that MG2636 module's PIN level typical value is 2.8V, and interface level range 2.4V~3.1V.

Likewise, the module can also communicate with the standard RS232 device. Due to the different interface level, 232 chip must be added for level conversion, e.g., use MAX3232 for 2-wire serial port and use MAX3238 for 8-wire serial port. The connection is the same as DTE device above.

3.4 SIM Card Interface

The module supports 1.8V/3V UIM card, and there are 4 pins at the terminal of the card. VREG_RUIM is used to supply the UIM card. It's strongly recommended to add ESD to protect the UIM card in hostile environments. FV2 in figure 4-4 is ESD protection device:

MG2636 module baseband processor integrates SIM card interface conforming to ISO 7816-3 standard, and it's compatible with SIM card with two voltages 1.8V/3.0V and reserves SIM card interface signal on B2B connector.

Users should note that SIM card's electrical interface definitions are the same as SIM card socket's definitions. See table 3-3 for MG2636 module's B2B connector's interface definitions.

Table 3-3 MG2636 module's SIM card signal

PIN No.	Signal Name	I/O	Descriptions of Functions	Remarks
1	SIM-CLK	O	SIM card clock	
2	SIM-VCC	O	SIM card power	Max. output current 20mA
3	SIM-DATA	I/O	SIM card data	
4	SIM-RST	O	SIM card reset	
6	SIM-GND	P	SIM card GND	SIM card's GND PIN and SIM-GND PIN must connect with the

				module's power GND.
--	--	--	--	---------------------

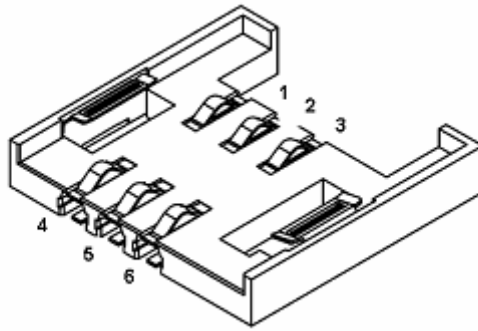


Figure 3-3 Standard SIM card PIN Definitions

As shown in figure 3-4, the module connects the external SIM card and SIM-VPP could directly connect SIM-VCC. 33 ohm resistor on 3 wires has been parallel connected with the capacitor to guarantee the compatibility of SIM card with different electrical performances; meantime it can also meet the requirements of EMC test standards.

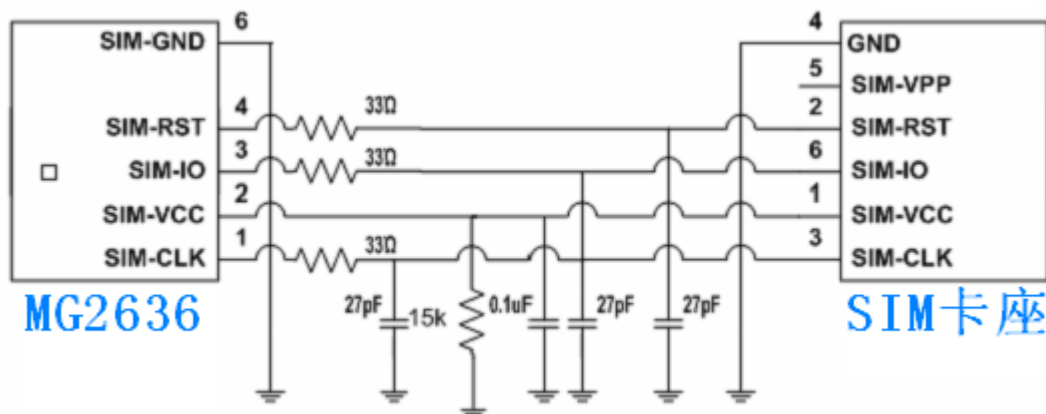


Figure 3-4 Connection Diagram of MG2636 module and external SIM card

Besides, since SIM card design should meet the requirements of ESD electrical performances to avoid the damage of SIM card, it's recommended to add TVS component on 4-CH SIM card signal, meantime, the signal wire need first pass TVS component and enter the module's baseband processor to avoid the damage of module.

3.5 Audio Interface

MG2636 GSM module supports 2CH audio signal input/output. When it's used for hand held devices, the hand held MIC, hand held receiver or hands-free speaker, headset MIC, headset receiver could be divided. See table 3-4 for the audio interface signals.

Table 3-4 MG2326 module's audio input signals

PIN No.	Signal Name	I/O	Descriptions of Functions	Remarks
43	MIC1_N	AI	1CH audio input cathode	1st channel is the default audio input/output. Usually 1 st channel used for receiver, 2 nd channel used for
44	MIC1_P	AI	1CH audio input anode	
45	MIC2_P	AI	2CH audio input anode	
46	MIC2_N	AI	2CH audio input cathode	
47	SPK1_N	AO	1CH audio output cathode	
48	SPK1_P	AO	1CH audio output anode	

49	SPK2_P	AO	2CH audio output anode (right ear)	headset or hands-free.
50	SPK2_N	AO	2CH audio output anode (left ear)	

3.5.1 Microphone

The two microphone interfaces MIC1 and MIC2 are both differential interfaces, which could also be used for single-end input. It's recommended to use differential mode and meet the requirements of differential signals during the wiring layout and the wiring must be as short as possible to reduce the noises. These two inputs are coupled in AC domain and added a 1.8V offset voltage inside, and they should directly connect with the microphone.

ON the circuit design, add 33pF filter capacitor to the audio signal wire to reduce the interferences caused by the external antenna; meantime add TVS components accordingly.

3.5.2 Receiver

The receiver interfaces are SPK_1 and SPK_2. SPK_1 is differential interface with 32Ω resistance; SPK_2 is the single-end interface with 32Ω resistance. Due to the differences between SPK_1 and SPK_2, SPK_1 is usually used as hand hold device's Receiver, and SPK_2 is used for headset's left/right ears.

Note: Differential design of audio signals could suppress the noise, and the PCB wiring must be as short as possible. The differential signals must be kept far away from the power, RF and antenna circuit.

3.6 DAI (Digital Audio Interface)

DAI digital audio interface adopts PCM encoding from analog signal to digital signal, which could connect with devices for digital audio communications, such as Bluetooth device, and it is convenient for users to develop peripheral audio communicating system.

Table 3-5 MG2636 module DAI

PIN No.	Signal Name	I/O	Descriptions of Functions	Remarks
7	DAIRXD	I	DAI: Rx data	Internal pull-down ($51.1K\Omega$)
8	DAISYNC	O	DAI: frame SYNC	
9	DAICLK	O	DAI: clock	Internal pull-down ($51.1K\Omega$)
10	DAITXD	O	DAI: Tx data	
11	DAIRST	O	DAI: reset	Internal pull-down ($51.1K\Omega$)

3.7 Network Status LED Interface

MG2636 GSM module provides a network status LED interface (SIG_LED), which outputs pulse signal to control the blinking frequency of LED and indicate different network status through the definitions of LED's blinking modes. For details, please refer to table 3-6.

Table 3-6 MG2636 module's network status definitions

SIG_LED PIN Output Status	Work or Network Status
Output high level	Module startup
Continue high level	Module calling
Continue low level	Deep sleep
Period 1s, high level output 0.1s	No SIM card, not enter PIN or searching network
Period 3s, high level output 0.1s	Registered to network, IDLE
Period 0.125s, high level output 0.1s	GPRS data transmitting

SIG_LED PIN output status is defined according to the software protocol, and users could judge the module's work status according to SIG_LED status.

SIG_LED PIN is common I/O port, which can't directly drive LED, and it needs to work with dynatron. For detailed circuit, please see figure 3-5.

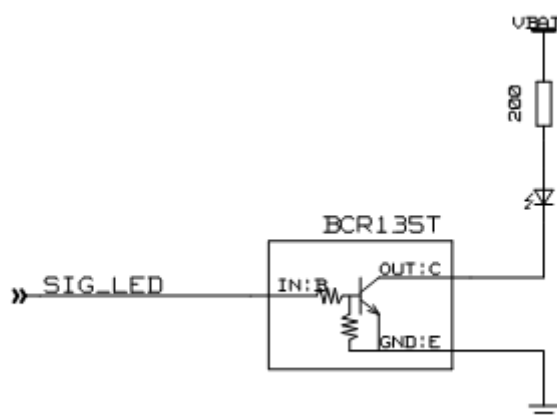


Figure 3-5 SIG_LED driver LED reference circuit

3.8 Antenna Interface

The module provides two kinds of antenna interface:

- PCB welding pad
- Antenna test socket

PCB welding pad adopts 50Ω RF shield cable to connect the module and the antenna, in order to reduce the cost. However, this method can not completely shield the electromagnets, which might have slight influence on RF signal quality. Please note that there should not be strong radiation near the welding pad. Meantime, during the welding, make sure the core of RF shield cable must connect with RF welding pad, and RF shield cable's shield metal mask must be welded to the module's GND. During the welding, the GND must be welding securely, otherwise, the core is easily broken due to the shaking of shield cable. See figure 3-6 for RF welding pad antenna.



Figure 3-6 MG2636 module RF welding pad antenna

The antenna test socket is used for the module's calibration and test. The contact resistance is small and the shielding is good. An exclusive 50Ω socket to SMA connection cable is used to connect the module and the antenna. The antenna test socket's resistance is 50Ω. The antenna test socket's part number is MM9329-2700B. Please refer the socket manufacturer's manual to select the relevant antenna to connect the plug and module.

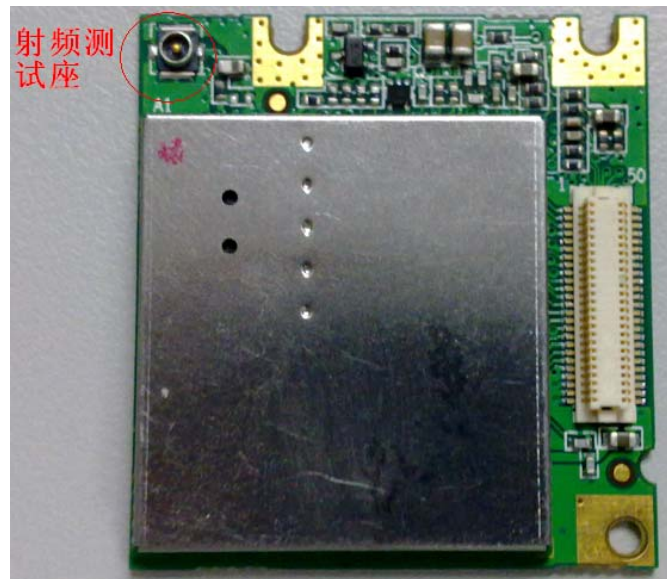


Figure 3-7 MG2636 module's RF test socket

4 Mechanical Design

4.1 Appearance Diagram

MG2636 module's appearance

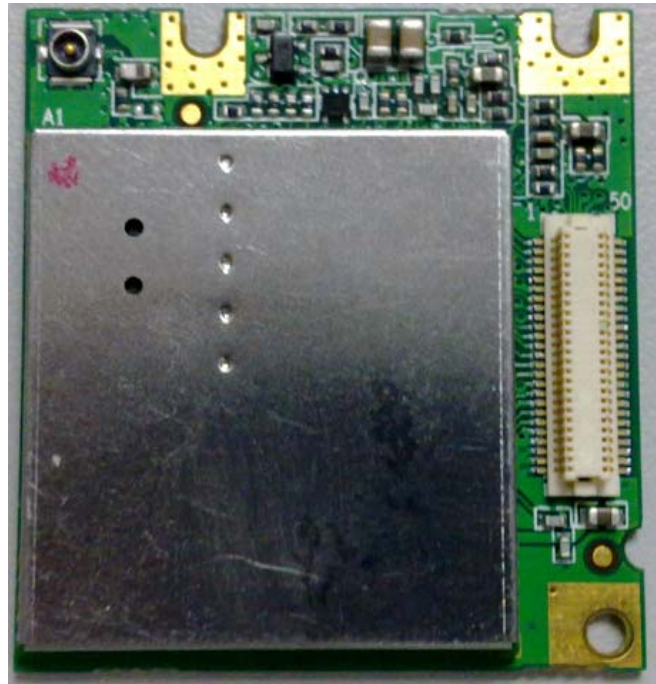


Figure 3-8 MG2636 module's appearance

- Dimensions (LxWxH) : $35\pm0.10 \times 32.5\pm0.10 \times 3.85\pm0.20$ mm
- Weight: 7g

4.2 Assembly Diagrams

4.2.1 MG2636 Module's Assembly Diagram Dimensions

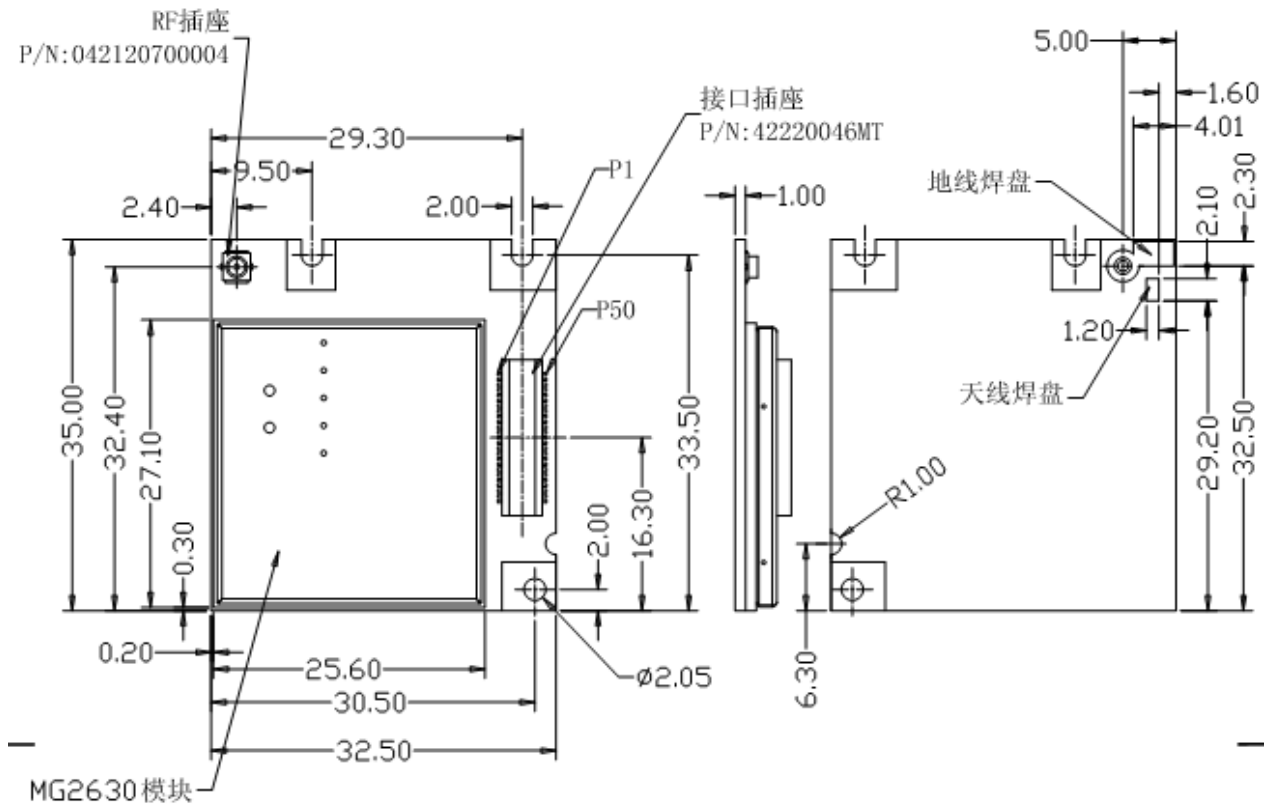


Figure 4-2 MG2636 Module's Assembly Diagram

Technical requirements: 1) *Dimensions. Representing check the dimensions;
2) tolerances $\pm 0.1\text{mm}$.

4.2.2 B2B Connector Socket

In order to meet the requirements of electrical performances of B2B connector, users should select the proper connector. The part number of the connector for MG2636 module is DF12C(3.0)-50DS-0.5V(81). Users can refer to DF12C(3.0)-50DS-0.5V(81) specifications to search for the matched connector.

Remarks: DF12C (3.0)-50DS-0.5V (81) is Shenzhen JieRong Technology Co., Ltd.

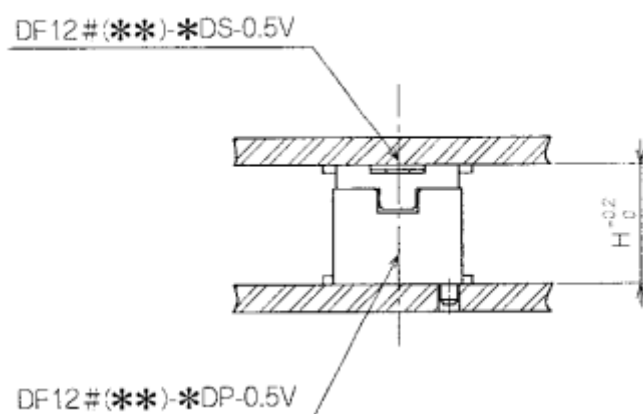


Figure 4-3 MG2636 module connector's assembly status

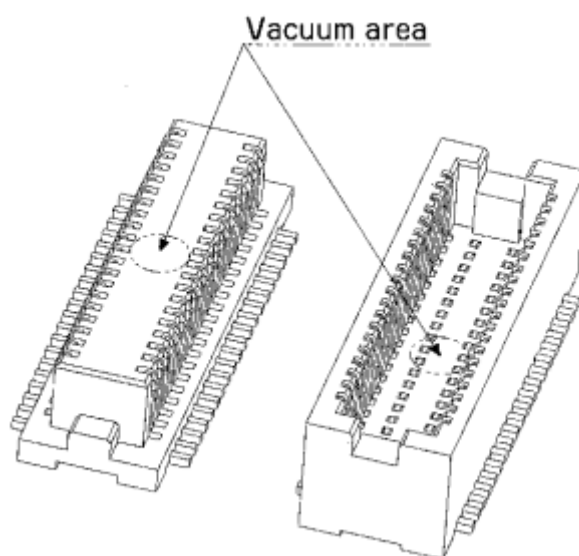


Figure 4-4 MG2636 module connector's relevant appearance diagram