顺舟科技
WIRELESS SOLUTIONS

The user manual for the series of SZ05 ZigBee Embedded Module

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Contents

1. Overviews of the SZ05 ZigBee Modules

Shuncom the series of SZ05 ZigBee Embedded Wireless Serial Communication Module, using the ZigBee wireless technical, is compliance with the industrial standards. It has advantages of long communication distance, strong anti-jamming, flexible network to make sure transparent data transmission among many devices with self-organizing star, line and mesh network topology.

Shuncom SZ05 ZigBee Wireless Module had been widely applied in industry wireless monitoring communication, such as wireless sensor data acquisition, smart home, IOT, wireless streetlight control, smart grid, wireless automatic meter reading, wireless automatic traffic.

1.1 Appearance

SZ05-STD-PCB

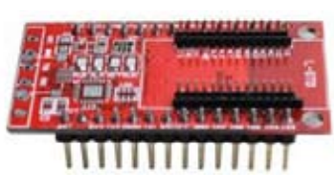
SZ05-STD-SMA

SZ05-ADV-PCB

SZ05-ADV-SMA

SZ05-L-STD

SZ05-L-PRO



SZ05-L Converter Board

ZigBee Evaluation Board

1.2 Key features

Communication: serial ports of RS232, RS485, TTL convert to ZigBee for wireless communication.
Strong wireless features: support Multi hop
Long distance: 2000m at sight
Strong anti-jamming: ISM (Industrial, Scientific & Medical) 2.4G DSSS
Flexible serial port application: transparent format or instruction format transmission, maximal baud rate can be115200
Transmit mode: broadcast or destination address transmission to send data can be selected
Node type: coordinator node, router node or end device can be set
Strong self-organizing network: star, tree, line or mesh
Channels: 16 Direct Sequence Channels. 65535 PAN ID to be selected

1.3 Specifications

SZ05	-xxx	-xxx	-x	-x
Module	Distance	Interface	Plug-in type	Supply voltage
SZ05	-STD (200 m) -PRO (800 m) -ADV (2000m)	232 485 TTL	-Z(double pin header) -X(cable)	5V
Such as:	The module of SZ05-ADV-485-Z means the series of SZ05 Wireless Data Module, transmission distance 2000m at sight, RS485 interface, double pin header.			

1.4 Technical parameters

Name	Notes	SZ05 ZigBee Module
Wireless network	Distance(at sight range)	SZ05-STD(200 M) SZ05-PRO(800 M) SZ05-ADV(2000M)
	Network topology	Star, tree, link and mesh
	Addressing option	IEEE802.15.4/ZIGBEE standard address
	Net ID	00-FF
Data interface	The maximal data packet	100 bytes
	Data interface	RS232, RS485 or TTL

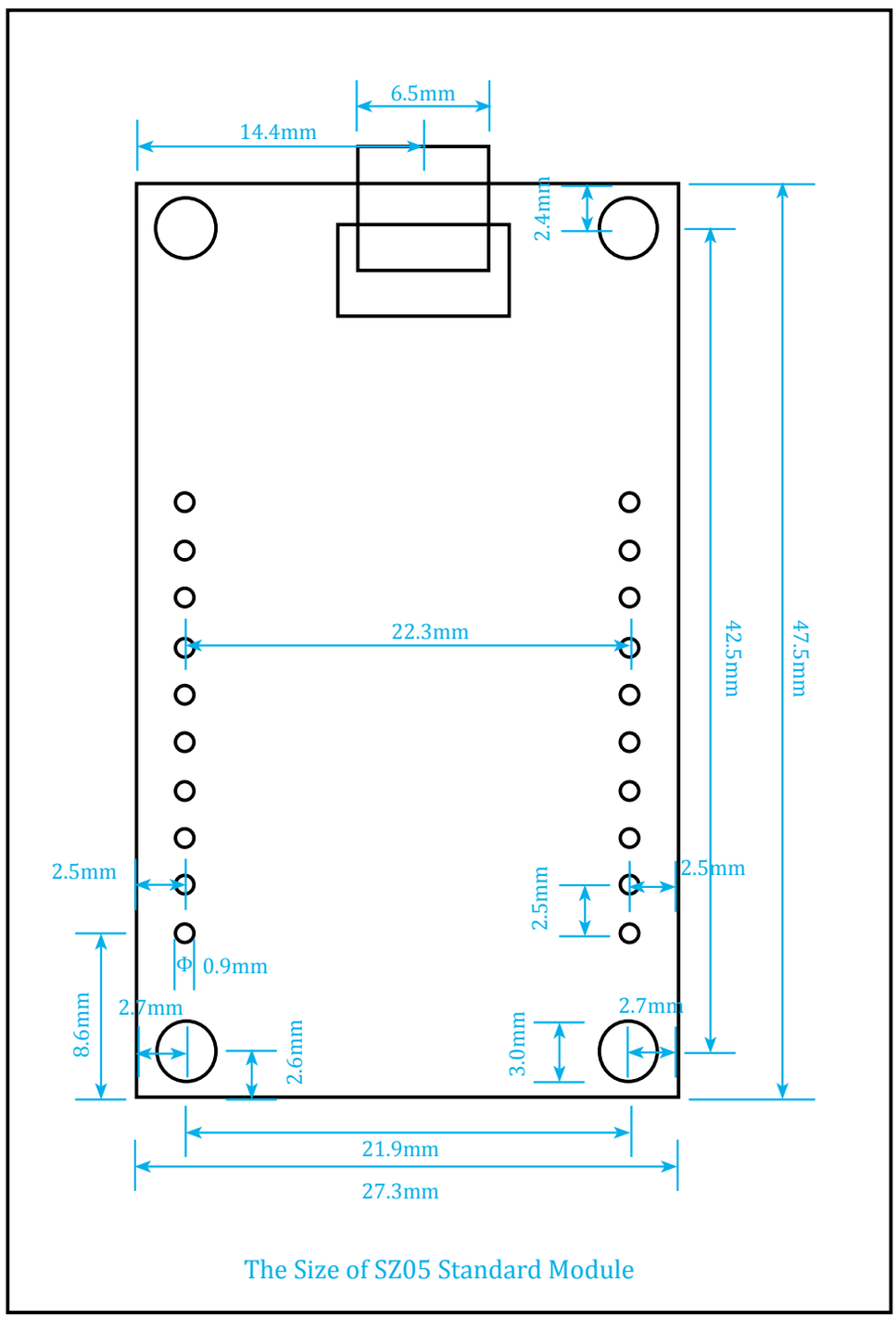
Data interface	Serial Signal	TxD , RxD, GND
	Baud rate	1200~115200bps (optional)
	Serial parity	None, Even, Odd
	Data bit	7, 8
	Parity bit	1
Transceiver	Modulation model	DSSS Direct Spread Spectrum
	Frequency range	2.405GHz~2.480GHz
	Wireless channels	16
	Receiver sensitivity	-92 dBm (SZ05-STD) -92 dBm (SZ05-PRO) -105dBm (SZ05-ADV)
	Transmit power output	3 dBm (SZ05-STD) 18dBm (SZ05-PRO) 25dBm (SZ05-ADV)
	Antenna	SMA or PCB
	Channel detection	CSMA-CA and CSMA-CA of GTS
Power	Supply voltage	DC 5V
	The peak current	50 mA(SZ05-STD) 160mA (SZ05-PRO) 250mA (SZ05-ADV)
Working environment	Working temperature	-40℃-85℃
	Storage temperature	-55℃-125℃

1.5 Dimensions

SZ05 Standard Modules contain SZ05-STD, SZ05-PRO and SZ05-ADV

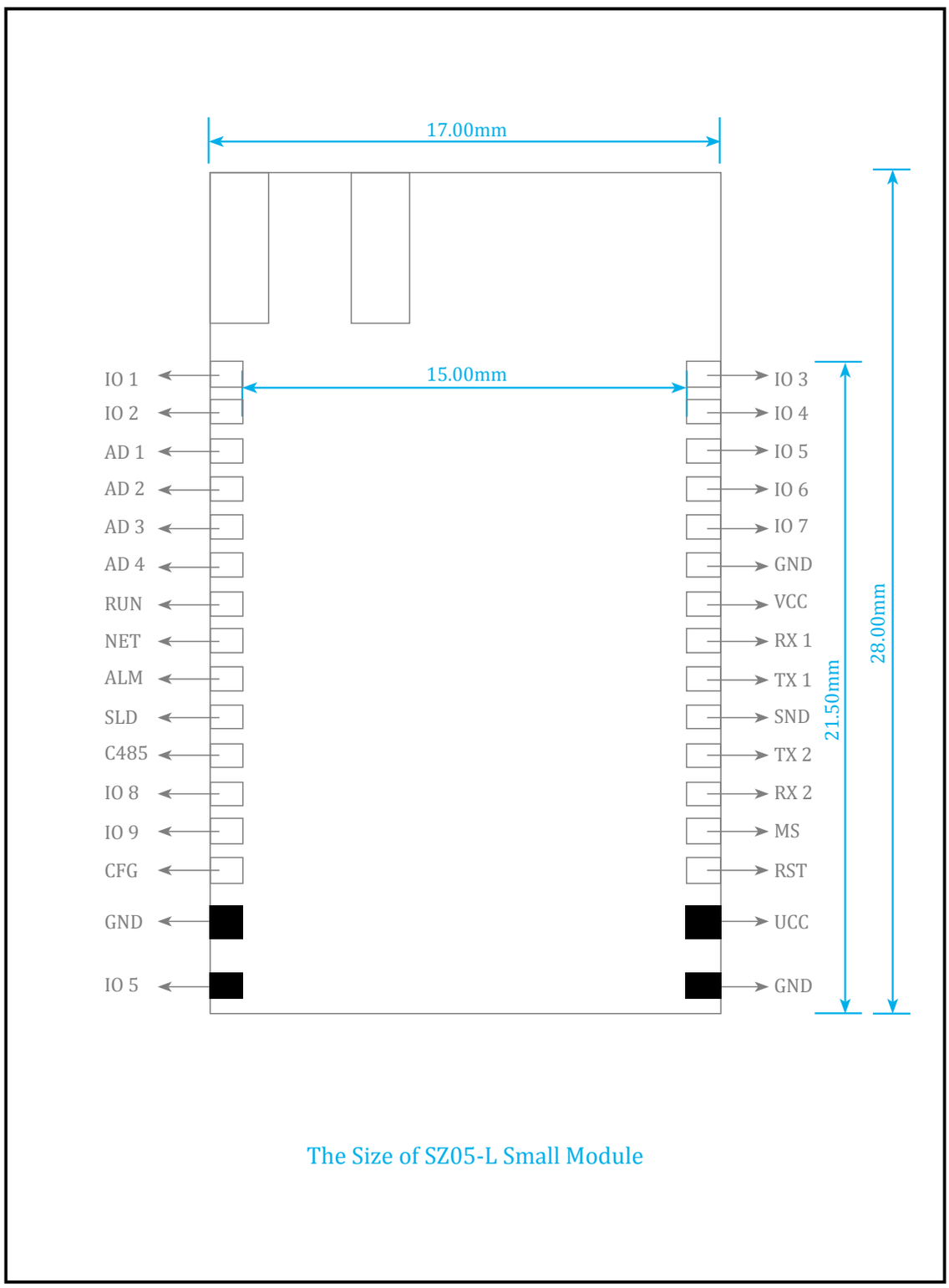
SZ05- L Small Modules include SZ05-L-STD and SZ05-L-PRO

(1) SZ05 Standard Module dimensions:



The Size of SZ05 Standard Module

(2) SZ05-L Small Module dimensions:

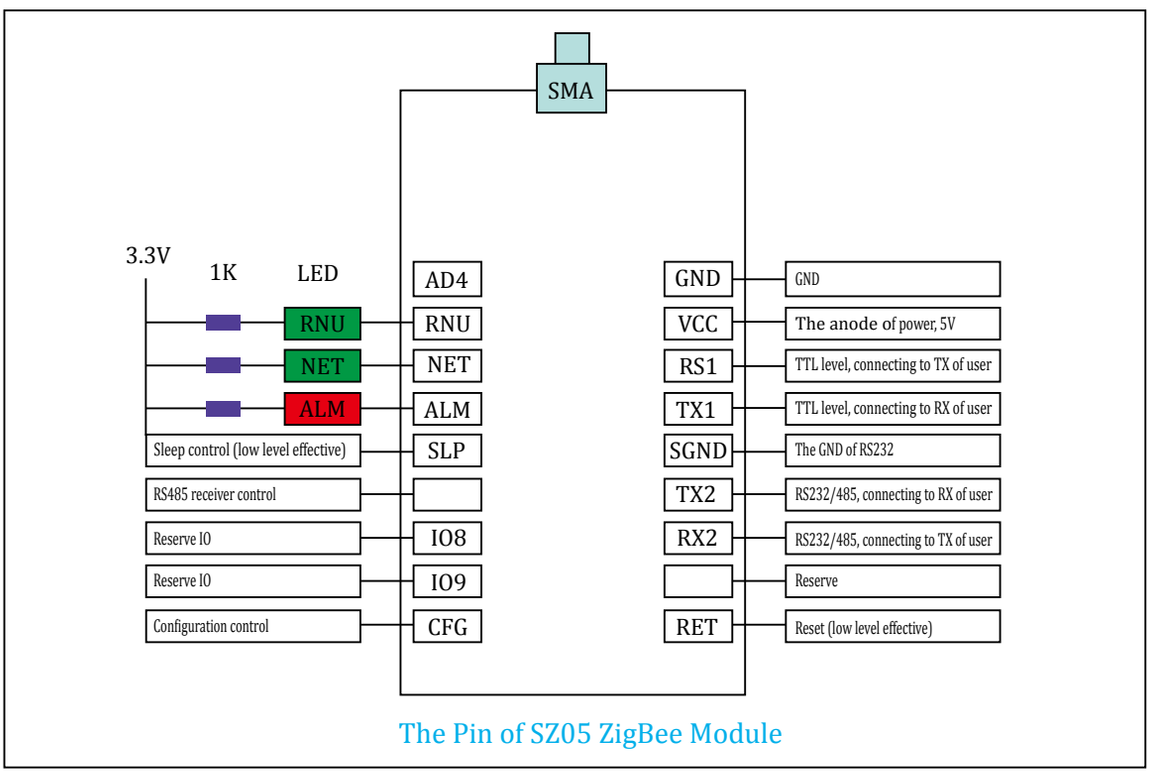


The Size of SZ05-L Small Module

2. Interfaces

2.1 Module mechanical diagram

Shuncom SZ05 ZigBee Module has interfaces of RS232, RS485 and TTL which are vey convenience for equipment connection. Pin connection as follows:



The Pin of SZ05 ZigBee Module

2.2 Left pin

Pin number	Pin name	Functions	Notes
5	AD4		
6	RUN	Run	LED
7	NET	Net	LED
8	ALM	Alarm	LED
9	SLP	Sleep	Low level effective
A			
B	I08	Reserved for IO	
C	I09	Reserved for IO	
D	CFG	Configuration control	Low level effective

2.3 Right pin

Pin number	Pin name	Functions	Notes
15	GND	The anode of power	
16	VCC	The cathode of power	5V
17	RX1	TTL	Links to the TX of user
18	TX1	TTL	Links to the RX of user
19	SGND	The GND of RS232	
1A	TX2	RS232/RS485	Connects RX/A of user
1B	RX2	RS232/RS485	Connects RX/B of user
1C		Reserved	Reserved
1D	RST	Reset	Low level effective

Normally, the required pin connections are VCC, GND, TTL, RS232 or RS485. All unused pins should be left disconnected

2.4 Data interface

SZ05-ZigBee Wireless Module has standard interface of RS232, RS485 or TTL in the hardware. Serial RS232 includes TX2, RX2 and GND. RS485 contains TX2(A+), RX2(B-). TTL interface is TX1 and RX1, and the level of TTL is 3.3V.

Notes:RS232 and RS485 cannot be used at the same time. It is required to be sure that which one interface you want to use when you make the buying .

3. Accessories

3.1 Antenna

Operating frequency baud: ISM 2.4GHz, 2405M—2485M
Interface type: SMA male
Antenna type: Glue stick antenna, Suction cup antenna, Fiberglass antenna
Antenna attachment: the extended cable

 Glue stick antenna	Frequency band: 2.4G Gain:5dBi standing wave: ≪ 1.5 interface: SMA male Long glue stick antenna: length 21CM Short glue stick antenna: length 11CM	 Suction cup antenna	Frequency band:2.4G Gain: 1dBi Standing wave: ≪ 1.5 Interface: SMA male
 Fiberglass antenna	Frequency band: 2.4G Gain: 8dBi Standing wave: ≪1.5 Interface: SMA male	 The extended cable	Application: to convenient to extend the antenna out of the box. Frequency band: 2.4G Length: 1M, 2M, 3M (optional)

Notes: The extended cable and the suction cup antenna should not be more than 3 meters. The suitable length is within 1m. Because the longer cable length, the shorter transmission distance you will get

3.2 Evaluation Board and SZ05-L Converter Board

Shuncom SZ05 ZigBee Evaluation Board is for Standard Module to configurate parameters. And the SZ05-L Converter Board is convenient for the SZ05-L Small Module to mount into the SZ05 ZigBee Evaluation Board.


ZigBee Evaluation Board


SZ05 Standard Module


SZ05 Mounting
to the ZigBee Evaluation Board

SZ05-L Small Module


SZ05-L Converter Board


SZ05-L Small Module Mounting
to the SZ05-L Converter Board
(Called SZ05-L System)


SZ05-L System Mounting
to the SZ05 Evaluation Board

(1) ZigBee Evaluation Board

ZigBee Evaluation Board	Parameters
Specification	Zigbee Evaluation Board
Applicable module	SZ05 Standard Module
Voltage	DC5V~24V
Data interface	RS232, RS485 or USB
Function description	Convenience for user to configurate module; to prevent burning out module in case of wrong wiring connection

(2) SZ05-L Converter Board

ZigBee Converter Board	Parameters
Specification	SZ05-L Converte Board
Applicable module	SZ05-L Small Module
Power supply	DC3.7V~5V
Data interface	Convenience for user to configurate module; to prevent burning out module in case of wrong wire connection
Others	Recommend to use with SZ05 ZigBee Evaluation Board

4. Configuration

4.1 Connecting to the computer

SZ05 ZigBee Module mounting into the ZigBee Evaluation Board, then connect the ZigBee Evaluation Board to computer.

4.2 Entering into the computer hyper terminal.

1. Open the computer hyper terminal (Star→ Programs→Accessories→Communications→Hyper Terminal.) choose right serial port and the configuration is:

Baud rate: 38400, Data Bit: 8, parity: NONE, Stop Bit: 1, Flow: NONE

2. Power on.
3. Press “CFG” for 3 seconds.
4. Alarm light and run light flash at the same time
5. Module is on configuration mode.

4.3 Configuration parameters

1). Address setting

Name	ID	configuration	Notes
MAC_Addr	0000-FFFE	It cannot have the same address within the same network.	the coordinator address must be 0000

Notes: every ZigBee Module has the unique MAC_Address, it is not allowed to share the same address within the same network. We use two bytes to define the MAC address.

2). Node type setting

Node Name	Description
PAN_Coord	It is the coordinator which can select a channel and PAN ID to start the network.
Router	Not only assist in routing data but also having the functions of end_device.
End_Device	Only send data of itself and receive data from the router and coordinator.

3). Network

Net_Type	Notes
Mesh	Mesh, star and line networks are the master-slave networks. They must have a coordinator. All modules within the same network must set the same type of network.
Star	
Line	
Peer	Peer to peer type network does not need coordinator.

Notes: In the same network, the Net_ type must be the same.

4).Network ID setting

NET_ID	Notes
PAN_Coord	The NET_ID must be set to be same in the same network

5). Channel setting

Frequency	Channels	Notes

0-F	0 : 2.405GHz 1 : 2.410GHz 2 : 2.415GHz 3 : 2.420GHz 4 : 2.425GHz 5 : 2.430GHz 6 : 2.435GHz 7 : 2.440GHz 8 : 2.445GHz 9 : 2.450GHz A : 2.455GHz B : 2.460GHz C : 2.465GHz D : 2.470GHz E : 2.475GHz F : 2.480GHz	Recommend to use channel 4, 9, E or F to avoid WIFI interference. The channel should be set the same in the same network.

6). Data type

Data_Type	Notes
ASCII	Can be chosen according to your need
HEX	

7). TX_Type setting

TX_Type	Configuration	Notes
Broadcast	Destination address not required	
Mater-slave	Under mater-slave mode, adding the destination node's address when the coordinator sends data to the non-coordinator. Non-coordinator defaultly send to the coordinator with not requiring the destination address.	Destination address is the two-byte MAC Address, this address will be added in front of the data packet.
Point-point	Adding the destination address in front of data packet when sending data.	

8). Baud Rate

1200-115200 can be set optionally.

9). Data Parity setting

Data_Parity	Notes
None	According to your requirement to choose the suitable parity.
Even	
Odd	

10). Data Bit Setting

Data Bit(data bit +parity +stop bit)	Notes
7+1+1	Choose the data bit setting based on the selection of data parity setting.
8+0+1	
8+1+1	
8+0+2	

11). Data source address

Src_Add	Notes
Not output	Generally, default setting" No Output".
HEX	
ASCII	

12). Default settings

```
SHUNCOM Z-BEE CONFIG:
 MAC_Addr:(H) 7F1A
 Node Name: SHUNCOM
 Node_Type: Router
 Net_Type: Star
 Net_ID:(H) FF
 Channel: 0F
 Data_Type: HEX
 TX_Type:Broadcast
 Baud_Rate: 9600
 Parity: None
 Data_Bit: 8+0+1
 SRC_Addr: NOT OUTPUT

Select To Config:
 1.MAC_Addr    2.Node_name    3.Node_Type   4.Net_Type    5.Net_ID
 6.Channel     7.Data_Type    8.TX_Dst      9.Baud_Rate   A.Parity
 B.Data_Bit    D.Reset       E.Show_All     F.Src_Add
SHUNCOM>
```

Notes: The module will be out of the configuration mode when there is no more operation within 60 seconds. All the settings will stay unchanged.

5. Frequently-used configuration

5.1 The tips for the configuration

(1).The coordinator's address is 0000.The address of the non-coordinators (router and end_device) can be set optionally from 0001 to FFFE, but the routers' addresses must be different in the same network, or else they cannot communicate.

(2). Each network is defined with a unique channel and PAN ID. The channel and the PAN ID must be the same in the unique network. And the baud rate, parity, data bit should be consistent with the connected devices.

5.2 Several typical configuration methods

1) Transparent transmission

The coordinator is set as broadcast, and the router or end_device are set as Master-slave or broadcast (Other parameters please refer to Page 14 configuration).

2) Destination address transmission

① Mater-slave mode

The coordinator, router and end_devicea are set as master-slave mode (Other parameters please refer to Page 14 configuration).

It is required to add destination address when the coordinator sends data to the non-coordinators.

Non-coordinators defaultly sent to the coordinator with not requiring destination address.

② Point-point mode

In this mode, only two devices are allowed to communicate. Add the destination address in front of data packet when sending data.

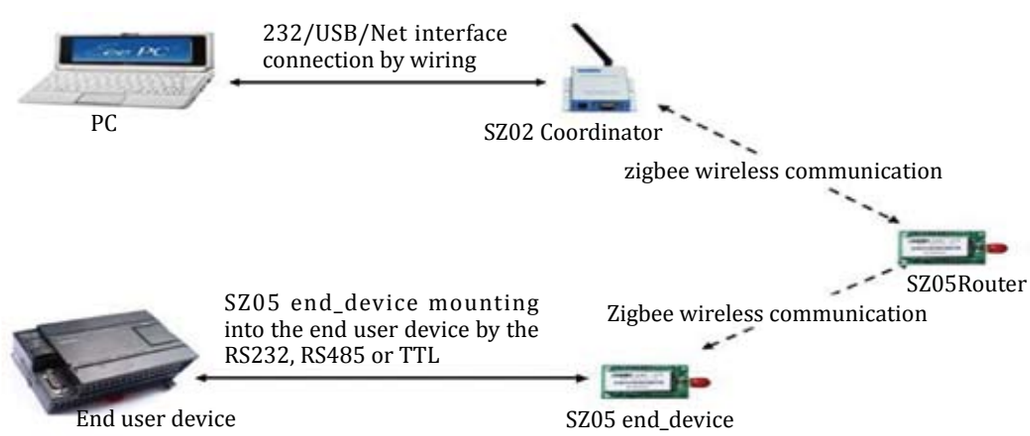
6. Running description

6.1 How to connect the modules

(1) It will need to connect to PC when SZ05 is set to be coordinator.

(2) If SZ05 used as router, it only requires DC power supply then data will be transmitted.

(3) The end_devices connect to user devices. (The end_device also can be set as the router which not only can transmit the data of itself but also have the router functions.)



6.2 Fault description

Symptom	Solution to the problem
Module too hot ,current too strong	Maybe module burn out ,please connect suppliers to check it
Short transmission distance	Check whether there is damage to the antenna, having obstacles will also cause the shorter distance.
Cannot connect to the equipment to communication	Module interface choosing is correct or not. Confirm whether configuration parameters are consistent with the connected devices.
Module cannot communication	Make sure that configuration parameters are consistent with the connected devices.

7. Notes

(1) Power supply is DC5V

(2) Module is not waterproof and not lightning protection.

(3) The anode and cathode of power do not reversed, otherwise it will burn out the module

(4) Module should be installed in anti- static environment , the antenna should be kept away from the metal objects

8. Technical support

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