SHUNCOM
Wireless Everywhere

Product manuals

—SZ05-ZBEE embedded wireless communication module

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Contents

I Introduction

The boat SZ05 series of embedded wireless communication module integrated ZigBee protocol standards radio frequency transceivers and microprocessors. It has the characteristics and advantages of long communication distance, strong anti-jamming capability, flexible network and stable performance. Meanwhile, it can achieve point-to-point, multipoint, multi-multipoint transparent data transfer between devices. And the devices communicate with each other forms the network of a star, a branching tree or a net (mesh).

SZ05 series of wireless communication module's data interfaces including: TTL interface and RS232 standard interface. They can send the data by way of broadcast or target address. In addition to achieving the general point-to-point data communication functions, they also can realize the multipoint communication. What's more, the serial communication is so easy and convenient to use that it can reduce the matching process time of inserting the embedded module.

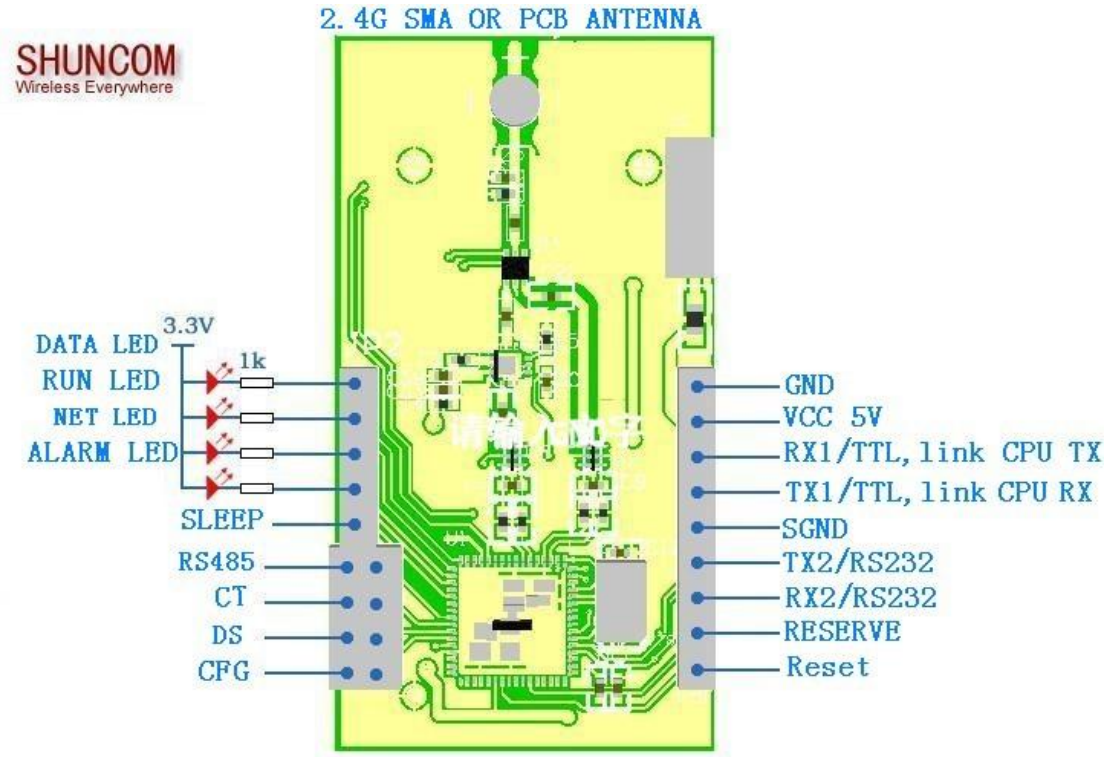
SZ05 series of wireless communication module is divided into three nodes in the network: Central Coordinator, Router and End-Device. They have different functions in the network. The Central Coordinator is the central nodes which can automatically initiate maintain and manage the information of the network. The Router takes the charge of liking network together, transmitting the data and associating with other routers and End-devices. And the terminal nodes only send and receive the data. Central coordinator, a router and terminal node, these three types of devices are the same in hardware but the embedded software is different. In way of jumpers settings or software configuration can realize the different functions of devices.

II Technical specifications

Category	Index name	SZ05 series wireless module
Wireless network	The transmission distance	100 meters - 2,000 meters
	Network topology	Star, tree and chain type, mesh network
	Addressing mode	IEEE802.15.4 / ZIGBEE standard address
	Network ID	255
Data interface	Maximum data packet	256 bytes
	Data interface	TTL , RS232 standard interface
	Serial signal	TxD, RxD, GND

	Serial rate	1,200 ~ 38,400 bps
	Serial calibration	None, Even, Odd
	Data bits,	7, 8
	parity	1
transceiver	Modulation mode	The DSSS direct sequence spread spectrum
	Frequency range	2.405GHz~ 2.480GHz
	Wireless channel	16
	Receiving sensitivity	-94 dbm
	Transmission power	-27dBm~25dBm
	Antenna	The outer SMA antenna or PCB antenna
	Conflict prevention	GTS CSMA - CA and CSMA - CA
power	Input voltage	DC 5V
	Maximum current	70 mA
	Maximum receiving current	55 mA
	Standby current	10 mA
	Power saving mode	110 uA
	Sleep pattern	30 uA
Working environment	Working temperature	-40°C ~ 85°C
	Storage temperature	-55°C ~ 125°C

III Interface



SZ05 series embedded module typical wiring diagram

3.1 Module to the left of pin identification

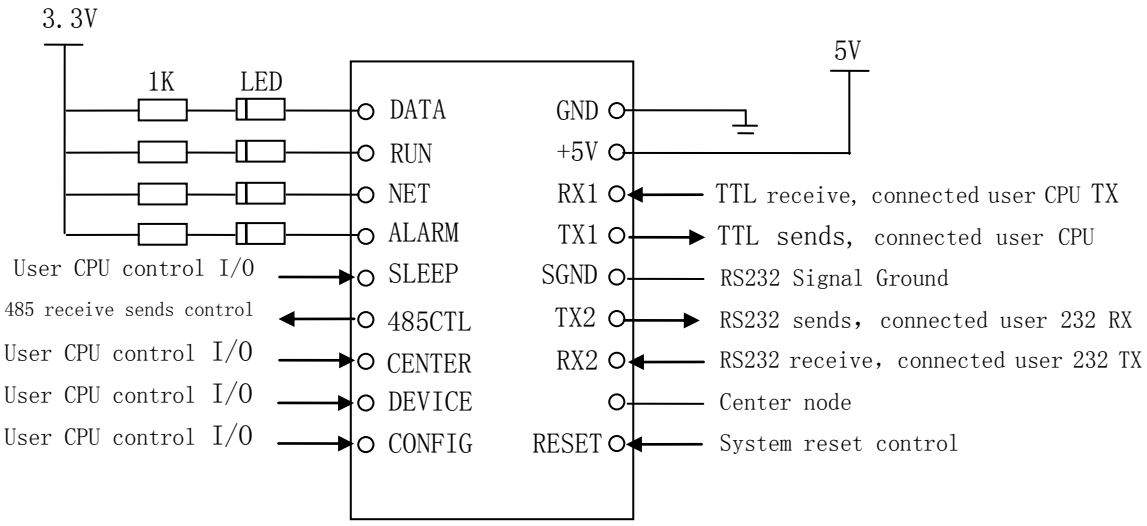
Sequence	Mark	Function	Notes
1	GND	Ground	
2	+5V	Power input is 5V	
3	RX1/TTL	TTL level input	TX output to connect the user system
4	TX1/TTL	TTL level output	RX input to connect the user system
5	SGND	Serial RS232 signal ground	Ground
6	TX2/RS232	Serial RS232 output	Connect the user input 232
7	RX2/RS232	Serial RS232 input	Connect the user output 232

8		System reserved	Vacant
9	RESET	System reset	LOW Reset

3.2 Module to the right of pin identification

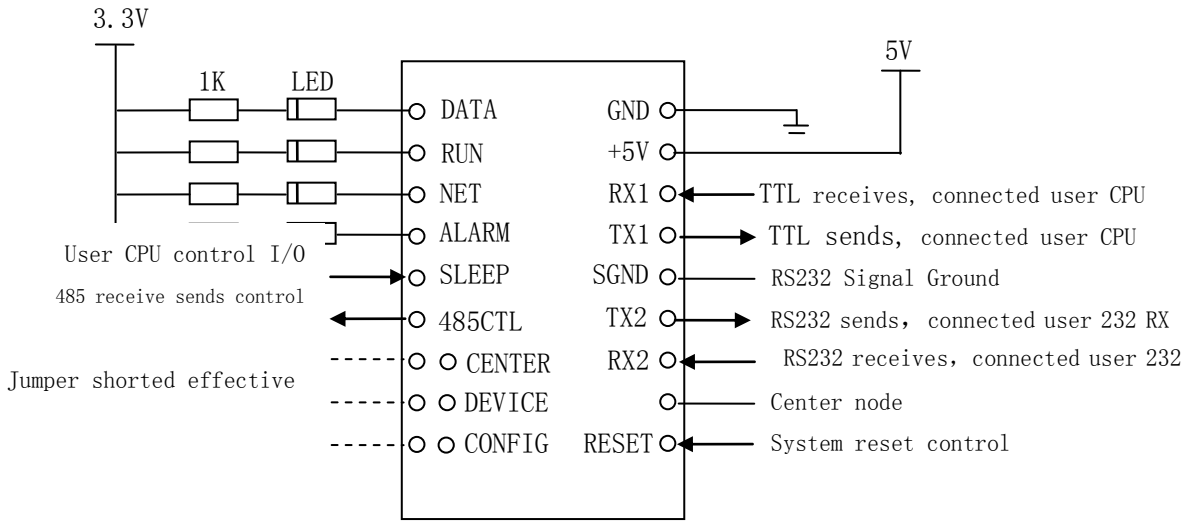
Sequence	Mark	Function	Notes
1	DATA	Sending and receiving data instructions	Low light. the data transceiver is flashing
2	RUN	System running light	Low light. interval of 1second flashes
3	NET	Network indicators	Low light. the center succeeded in building a network node, bright light from the node to connect the network
4	ALARM	System warning light	Low light
5	SLEEP	Low power consumption	Low access to low-power, high level or normal operation of floating
6	485CTL	485 transceiver control	Low output when the module 485 to receive. high output when it sent
7	CENTER	Center node	Low effective or adding the jumper cap becomes a central node. If 7 and 8 are as high level or floating it is the routing node.
8	DEVICE	Terminal node	Low effective or adding the jumper cap into the terminal nodes. If 7 and 8 are as high or floating it is the routing node
9	CONFIG	Configuration interface	Low effective or adding the jumper cap into the system configuration state

3.3 Module wiring diagram



User system wiring one

Wiring One: CPU control of the user system I / O port to control the function of all modules



User system wiring two

Wiring Two: A short jumper connection to control the center node, relay routing node or the terminal node is set into CONFIG mode, if the short jumper was effective, central node or terminal node jumper selection can only be chosen one. If both of them are suspended, the node will be a relay routing node. The suspended state comes into work if CONFIG is set into the configuration state by a short jumper.

3.4 Module control lines

Pin	Module initialization	Valid state	User Control I / O initialization	Control state
DATA	High level 3.3V	Low level	——	——
NET	High level 3.3V	Low level	——	——
RUN	High level 3.3V	Low level	——	——
ALARM	High level 3.3V	Low level	——	——
SLEEP	High level 3.3V	——	High level 3.3V	Low level
485CTL	Low level	——	Connect the 485 chips controller	——
CENTER	High level 3.3V	Low level	High level 3.3V	Low level
DEVICE	High level 3.3V	Low level	High level 3.3V	Low level
CONFIG	High level 3.3V	Low level	High level 3.3V	Low level 3 seconds
RESET	High level 3.3V	Low level	High level 3.3V	Low level

3.5 Power Interface

The standard operating voltage of SZ05-ZBEE wireless communication module is DC-5V. The normal operating voltage range is from5V to 12V.

Notes: The power of positive and negative can not be reversed. Otherwise they will burn out the module.

3.6 Data interface

SZ05-ZBEE wireless communication module offers two standard interfaces: RS232 interface and TTL interface. The working interfaces of serial port RS232 are TX, RX and GND. However, the TTL working interfaces are TX and RX. And the TTL level is 3.3V.

System default data interface parameters：

Serial port parameters	Default Set
Serial Rate	9,600
Serial check	None
Data bits	8
Stop bit	1

3.7 Node type configuration

SZ05-ZBEE wireless communication module has three node types: center node, relay routing node and the terminal node. A short jumper connection is to control the center node, the relay routing node or the terminal node, if the short jumper is effective, the center node or the terminal node can be only chosen one. This node will be the relay routing node if the two short jumpers are suspended.

3.8 Configuration interface

If CONFIG jumper shorted or external control line of SZ05-ZBEE wireless communication module gets into the low level state in 3 seconds, the system will come into the configuration state. Being high level or floating is the working state. Configuration interface is used for some parameters to be configured. The default configuration of Serial RS232 is as follows:

Serial port parameters	Default Set
Serial Rate	38,400
Serial check	None
Data bits	8
Stop bit	1

Configuration interface settings

The configuration mode of SZ05-ZBEE wireless communication module can be divided into super-terminal configuration mode and the computer network management configuration mode. The state of the two models is classified as follows:

Instructions state	Instructions meaning
Super- terminal configuration mode	Data, operation, network and alarm light flicker at the same time
Computer network management configuration mode	Alarm light flashes in 1 second interval. Running lights flashes normally. Data light don't flicker.

Super- terminal configuration mode means entering the computer's super terminal to do the module settings.

Computer network management configuration model is the protocol specification which can provide the system interface for the user to carry on the software integration.

The steps of the Super-terminal configuration mode

1. Open the computer's HyperTerminal and set HyperTerminal as follows: 38400 baud, 8 data bits, check NONE, stop bits 1, flow control none.
2. CONFIG jumper shorted or external control line comes into the low level.
3. Power to devices.
4. Entering the device configuration mode.

Notes: Being the configuration mode, the serial port is configured: 38400 baud, 8 data bits, check NONE, stop bit 1. So the computer's serial port settings must be 38400 baud, 8 data bits, check NONE, stop bit 1, flow control NONE.

IV Module configuration

Equipment configuration options are as follows:

Configuration options	Chinese options	Configuration	The default parameters
CHANNEL	A communication channel	Use Netcom channel	0x0F
NET_TYPE	Network type		Mesh network
NODE_TYPE	Device type		Relay route
NET_ID	Network ID	Use Netcom number	0xFF
TX_TYPE	Sending mode		radio
MAC_ADDR	Device address	Different device has different address	——
DATA_TYPE	Data type		HEX

DATA_BIT	Data bits,		8
BAUD_RATE	Baud rate		9,600
PARITY	Data validation		NONE
TIME_OUT	Serial overtime		0x05 ms
SRC_ADDR	Data source address		Not output

4.1 Communication channel set

Channel	Configuration instructions	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	Recommended 4, 9, 14 or 15 channels, which can avoid WIFI interference.
G	AUTO mode to choose the best channel	

4.2 NET_TYPE network type

NET_TYPE options	Network type	Configuration	notes
MESH	Mesh network	Master-slave network and the network must have only one center node.	In the same network, the network type must be set the same.
STAR	Star nets		

LINE_1	Chain type nets ID=1		
LINE_2	Chain type nets ID=2		
LINE_3	Chain type nets ID=3		
LINE_4	Chain type nets ID=4		
PEER	Peer-to-peer network	Master-slave network No center node	

4.3 NODE_TYPE device type

NODE_TYPE options	Network types	Configuration	note
PAN_COORD	Center node		There must be a center node in the network.
ROUTER	Relay route	It has the terminal equipment functions, too.	
END_DEVICE	Terminal equipment		

SZ05-ZBEE wireless communication module has three types: the center node, the relay routing node and the terminal node. A short jumper connection is to control the center node, the relay routing node or the terminal node, if the short jumper connection is effective, the center node or the terminal node can be only chosen one. This node will be the relay routing node if the two short jumpers are suspended.

4.4 The network number NET_ID Settings

NODE_TYPE options	ID range	Configuration	notes
NET_ID	00—FF	The whole network's ID must be the same.	

In a network, ENTER NET_ID # 2, then click "setup". ENTER the ENTER

4.5 Data sent TX_TYPE mode Settings

TX_TYPE options	Send mode	Configuration	notes

BROADCAST	Broadcast mode	No target address	If target address is 2 bytes MAC address, it must be added before the packet.
MASTER—SLAVE	Master-slave mode	The center node must have target address. Non-central nodes haven't target address and default send the data to the center node.	
POINT—POINT	peer-to-peer	Target address must	

4.6 Equipment MAC_ADDR address

MAC_ADDR options	ID range	Configuration	note
MAC_ADDR	0000—FFFE	The address of center node is 0000	The whole network cannot have the same address nodes.

Input the net 4 device address and then press "ENTER" to finish the setup.

4.7 DATA_TYPE data types

DATA_TYPE options	Data types	Configuration
ASCII	ASCII	It must be set if has the target address. If broadcast way without settings.
HEX	Hex	

4.8 DATA_BIT set

DATA_TYPE options	Data types	Configuration
7+1+1	7 bit data + 1 check + 1 stop bits	To combine with data validation to set
8+0+1	8 bit data +0 check + 1 stop bits	

8+1+1	8 bit data +1 check + 1 stop bits	

4.9 Serial BAUD_RATE set

BAUD_RATE options	Baud rate range	Configuration
1,200	1,200-3,8400	Choose match baud rate
38,400		

4.10 DATA_PARITY set

DATA_PARITY options	Equipment types	Configuration
NONE	No calibration	Select the match calibration type
EVEN	Parity checking	
ODD	Parity checking	

4.11 Serial TIME_OUT set

TIME_OUT options	Equipment types	notes
TIME_OUT	1-255ms（Hexadecimal display）	Serial overtime time.

4.12 SRC_ADDR data source address set

SRC_ADR options	Data source address	Configuration
NOT OUTPUT	Not output source address	According to the application to choose whether to output source address of data packets
HEX	Hexadecimal output	

ASCII	ASCII output	

The formats of Hexadecimal output source address: 2 bytes of data source address + valid data.
The formats of ASCII mode output source address: 4 bytes of data source address +valid data.

V Data sending instructions

5.1 Data sending mode

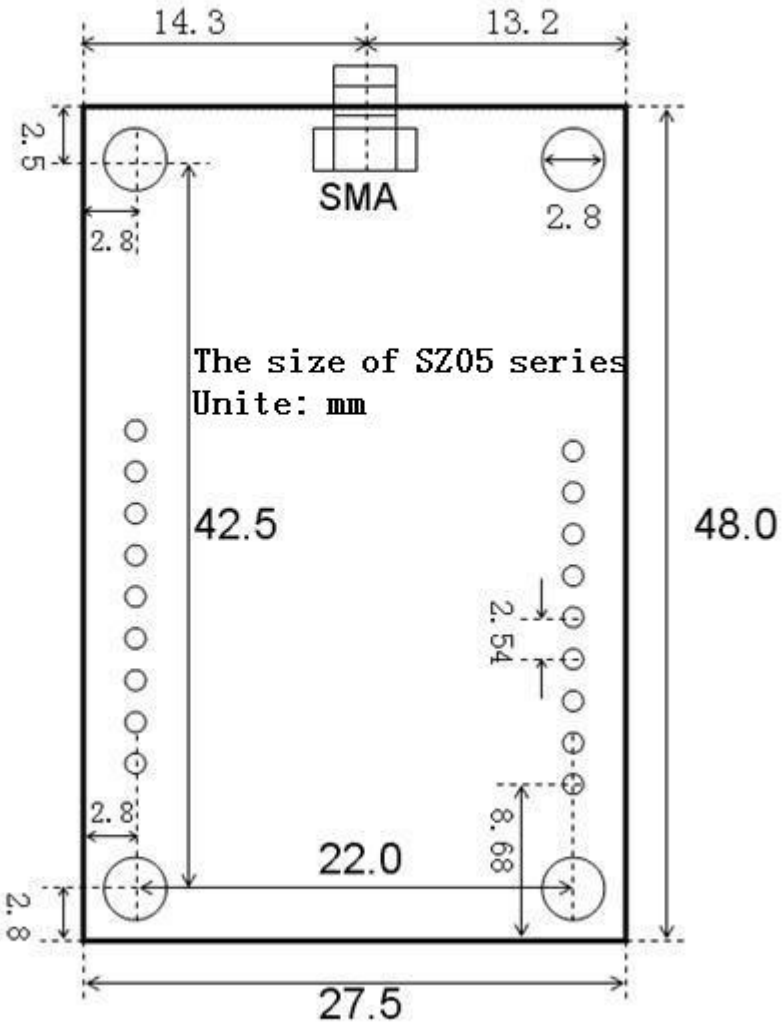
Module type	Send mode	Goal node	Send mode
Center node	radio	All non-central node within the network	Data directly
	Master-slave or peer-to-peer	Target address node	Target address + data
Non-central node	radio	All non-central node	Data directly
	Master-slave	Center node	Data directly
	peer-to-peer	Target address node	Target address + data

5.2 Data transmission frame format

Send mode	Data coding	Data frame format
Data directly		Do not make any changes
Target address + data	Hexadecimal target address	2 bytes target address + data
	ASCII target address	4 bytes target address + data

VI Installation of equipment

6.1 Module installation dimensions



SZ05 series of embedded module dimensions

6.2 Working instructions

Z05-ZBEE wireless communication module provides four working status LED indication interfaces which are data, network operating system transceiver, network state and alarm interface. The four lights instructions are as follows:

indicator	Indication state	Meaning of the indication
Data,	Light or extinguish	Data receive or send once
running	Light in 1 second interval	System runs normally
	extinguish	System doesn't work or haven't connect the electricity or has something wrong with the system
Network,	light	Center node successfully connects the network, and other nodes have joined the network
	extinguish	Not connected network
alarm	extinguish	Work normally
	light	System abnormal or system was in a special state

Special state of the system:

Instructions	Instruction meaning
Data, operation, network and alarm light flash disorderly or irregularly	Initial system operation but without initial operation parameters
Data, operation, network and alarm light flash at the same time	System into the super terminal configuration mode
Alarm light flashes in 1 second intervals, running light flashes normally, and the data light doesn't flash	System enters the configuration mode of computer network management

6.3 Cautions

1. The model does not have waterproof function. Please don't directly install the product in the outdoor and moist place,

2. This product is a wireless electronic product, please don't install it in the metallic shield shell and try to install in the open, no obstacles place.

3. This product is installed outdoor, if the surrounding is compare open, please install the lightning rod in case of lightning.