The user manual for

ZigBee Data Communication Device

Contents

1. Overview of the SZ02 ZigBee Data Communication Device

Shuncom SZ02 ZigBee Wireless Data Communication Device is ZigBee-Advanced Module which is integrated with zigbee 2.4G RF modem and MCU. It is designed to operate within the ZigBee protocol and support the unique needs of low-cost, low-power wireless sensor networks. The device requires minimal power and provides reliable delivery of data between remote devices. It has the features of long distance communication, strong anti-jamming capability and flexible network.

SZ02 ZigBee Data Communication Device has the serial ports of RS232, RS485 or USB. It can realize point-to-point, point-to-multipoint,star or mesh network to transmit data.

SZ02 ZigBee Data Communication Device defines three different device types: coordinator, router and end device. A coordinator can select a channel and PAN ID to start the network. A router can assist in routing data. The end_device always transmit and receive RF data through its parent, cannot route data. But the hardware is the same to them, what you need to do is entering into the computer hyper terminal to set them as the coordinator, the router or the end_device accordingly.

1.1 Appearance.

RS232

RS485

USB

Net

1.2 Dimensions

1.3 Key features

Communication: serial ports of RS232, RS485, USB or NET convert.
Strong wireless features: support Multi hop .
Long distance: 2000m at sight.
Strong anti-jamming: ISM (Industrial, Scientific & Medical) 2.4 GHz frequency band.
Flexible serial port rate: Baud Rate can be set from 1200 to 115200.
Transmit mode: broadcast or destination address transmission.
Node type: coordinator, router or end device can be set.
Strong self-organizing network: star, tree, train or mesh .
Channels: 16 Direct Sequence Channels. 65535 PAN ID to be selected.

1.4 Specifications

Device	Distance	Interface	Power supply	Shell
SZ02	200M	RS232 RS485 RS422 USB NET (optional)	5V-24V	L(Aluminum)
	800M			
	2000M			
Such as: SZ02-2K-RS485-L,it means SZ02 ZigBee Data Communication Device, transmission distance 2000M at sight, RS485 interface, Aluminum shell.				

1.5 Technical Parameter

Performance	Technical Parameter
Distance (at sight range)	SZ02-200 (200M) SZ02-800 (800M) SZ02-2K (2000M)
Operating **frequency** band	ISM 2.4 GHz
Modulation	DSSS direct sequence channels
Wireless channels	16
Channel detection	CSMA/CA
Network topology	Point-to-point, point-to-multipoint, star ,tree and Mesh
Network capacity	65535
The maximal data packet	100 bytes
Transmission type	Broadcast or destination address to send
Baud rate	1200-115200bps (optional)
Supply voltage	DC 5V-24V
Receiver sensitivity	-92dBm (SZ02-200) -92dBm (SZ02-800) -105dBm(SZ02-2K)
Transmit power output	3dBm (SZ02-200) 18dBm (SZ02-800) 25dBm (SZ02-2k)
The peak current	50mA (SZ02-200) 160mA(SZ02-800) 250mA(SZ02-2K)
Data Interface	RS232, RS485, USB, NET
Antenna	Glue stick antenna or suction cup antenna

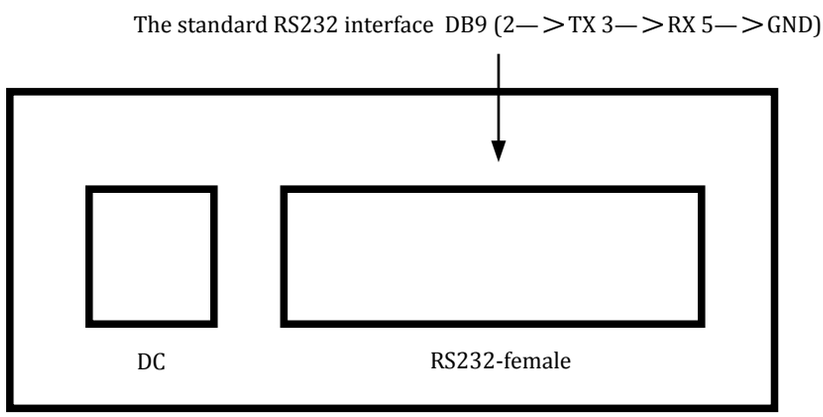
2. Interfaces

In order to satisfy user-friendly installation for clients, there are RS232, RS485, RS422, USB or Net to be chosen.

2.1 The bottom interfaces

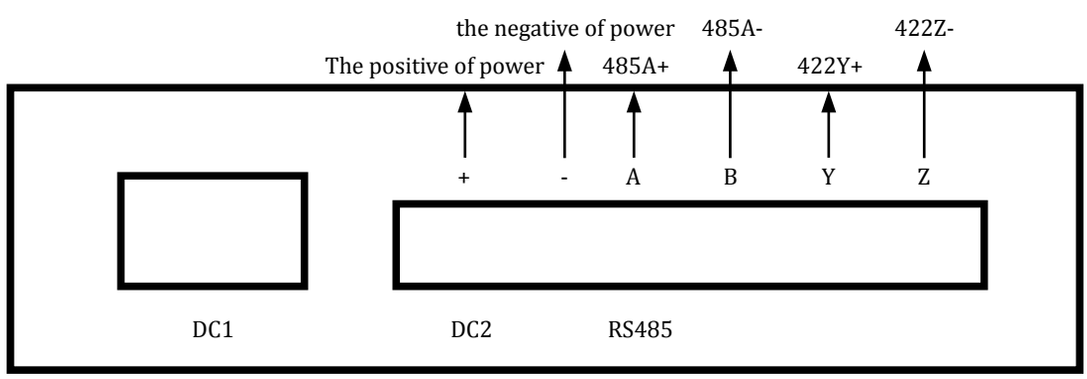
(1) RS232 interface: the standard RS232 interface is DB9, The pins are as follows:

2 —>TX 3 —>RX 5 —>GND



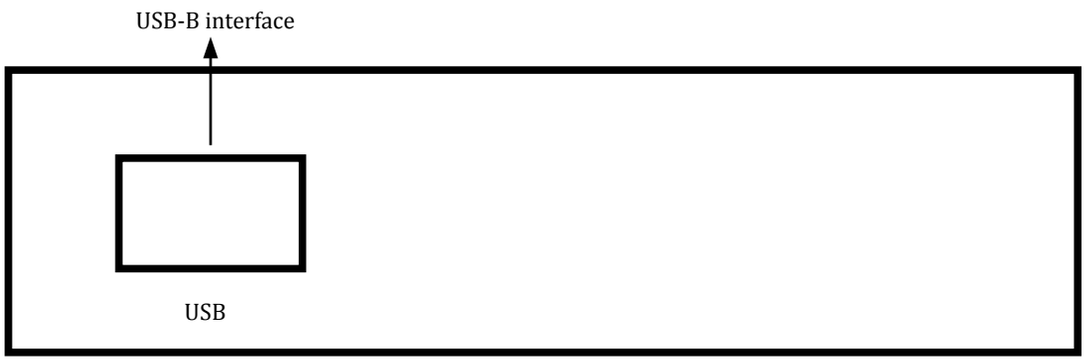
(2) RS485 interface: It is the standard RS485 interface, the wires connect as follows:

A —>485A+ B —>485B-
Y —>485Y+ Z—>485Z-

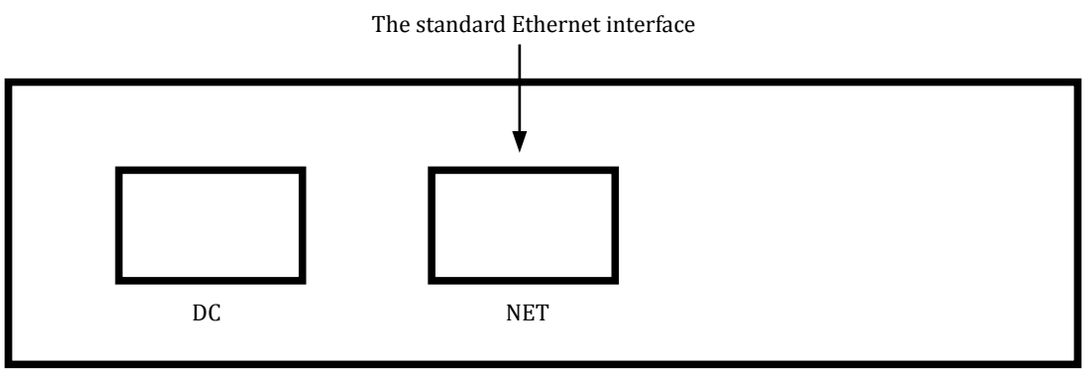


Notes: End user can use either DC1 or DC2 as power supply, they are just different at the wire connection.

(3) USB interface: The standard USB-B interface is convenient to link computer or IPC.

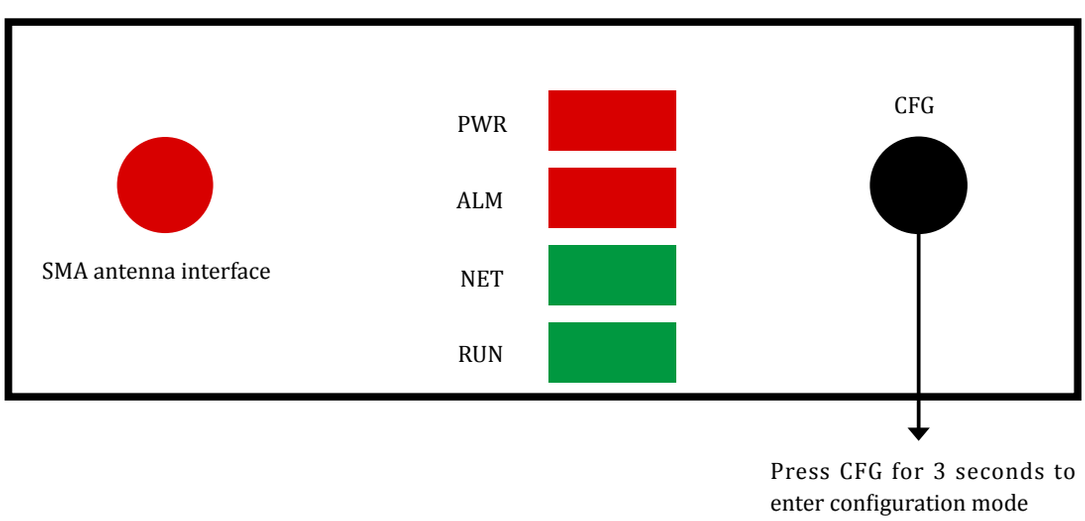


(4) The standard NET interface:



2.2 The upside interfaces

There are 4 LED lights on the upside of the module to indicator the module's operating conditions.



3. Accessories

3.1 Antennas

Operating Frequency band: ISM 2.4 GHz, 2405M—2485M
Interface type: SMA male
Antenna type: Glue stick antenna, Suction cup antenna, Fiberglass antenna
Accessory: The extended cable

 Glue stick antenna	Frequency band: 2.4G Gain: 5dBi Standing wave: ≤1.5 Connector: 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 Connector: SMA male
 Fiberglass antenna	Frequency band: 2.4G Gain: 8dBi Standing wave: ≤1.5 Interface: SMA	 The extended cable	Application: used to extend antenna out of box. Frequency band: 2.4G Length: 1M, 2M, 3M (optional)

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

3.2 Power supply

We use standard DC12V as our power supply, the device also works under DC5V-24V.

Warning: be aware that mis-connect the positive and the negative of power will cause the device damage.

4. Configuration

4.1 Connecting to the computer

Please make sure the wire connection is correct before connecting to computer, especially the 485 wires. Meanwhile, make sure the power supply is stable.

4.2 Entering 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. Device 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 in the same network.	the coordinator address must be 0000

Notes: Every ZigBee Device 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 coordinator.

3). Network

Net_Type	Notes
Mesh	Mesh, star and line networks are the master-slave networks. They must have a coordinator. All devices 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
0000--FFFF	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-coordinators 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 optional according to your need.

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. The router or end_device are set as mater-slave or broadcast (Other parameters please refer to page 12 configuration).

2) Destination address transmission

① Mater-slave mode

The coordinator, router and end_device are set as master-slave mode (Other parameters please refer to page 12 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. Destination address must be added in front of the data package when sending data.

6. Running description

6.1 Indicator lights

There are four lights to indicate the operation situations of the SZ02 device

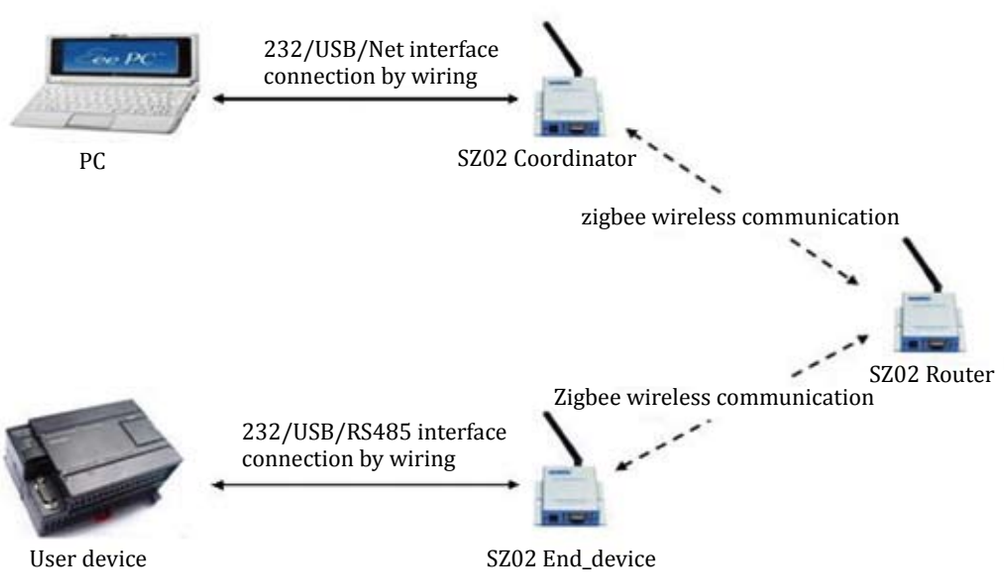
Indicator lights	Indicate status	Notes
Run	Flashing interval of 1 second	Run ok
	off	Not run, power off or system failure
Net	On	For the coordinator, the net light is always set to be on. For the non-coordinator, the net light means successfully in the network.
	off	Not connect to the network
Alarm	On	System failure or enter a special state
	off	Run ok
Power	On	Power supply ok
	off	Power off

6.2 How to connect the devices

(1) It will need to connect to PC when SZ02 is set to be coordinator.

(2) If SZ02 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)



6.3 Description of the fault

Symptom	Solution to the problem
Run, net ,alarm, power LED light off	Check the power supply
Run, net ,alarm, power LED light on	Maybe the main chip burn out, please contact your supplier.
Smoke from device	Maybe power supply is too high, power off device to check connection.
Cannot connect to the network	Please check the configuration parameters to make sure channel and PAN_ID are the same.
Cannot get into configuration mode	Check if device is in configuration mode, which you can tell from indicate LEDs, power LED always on, RUN and Alarm LEDs are flashing at the same time. If not, check wire connection and serial port setting.

7. Notes

(1) Power supply is under DC5V-24V.
(2) SZ02 Device is not waterproof
(3) The anode and cathode of power do not reversed, otherwise it will cause the device damage
(4) The SZ02 Device should be installed in anti- static environment , the antenna should be kept away from the metal objects

8. Technical support

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