

Zigbee Module

Model: DRF1605, main functions: serial (UART) Zigbee wireless data transfer transparent transmission(Module factory default setting isRouter, The user can switch toCoordinator)

Zigbee Module Features

Automatic network: All of the module power is automatically networking, network modules, such as power-down, network with self-healing capabilities

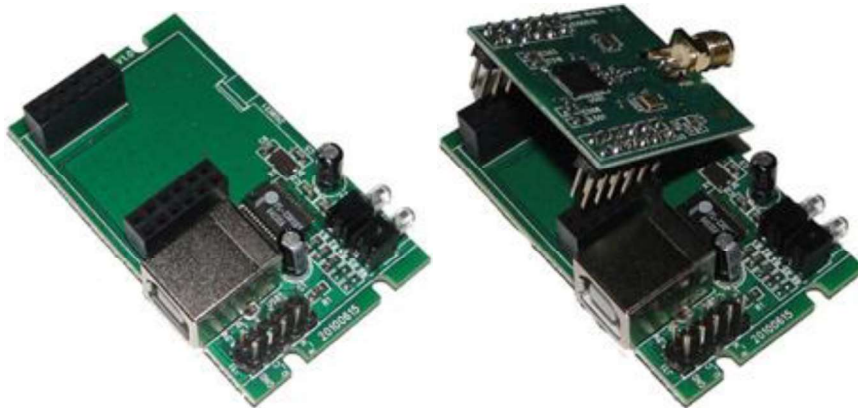
Data transmission:Through the serial port to any node in the data between Communication:

1, transparent data transmission:Coordinator data received from the serial port will be automatically sent to all nodes; a node receives data from the serial port will be automatically sent to the Coordinator;

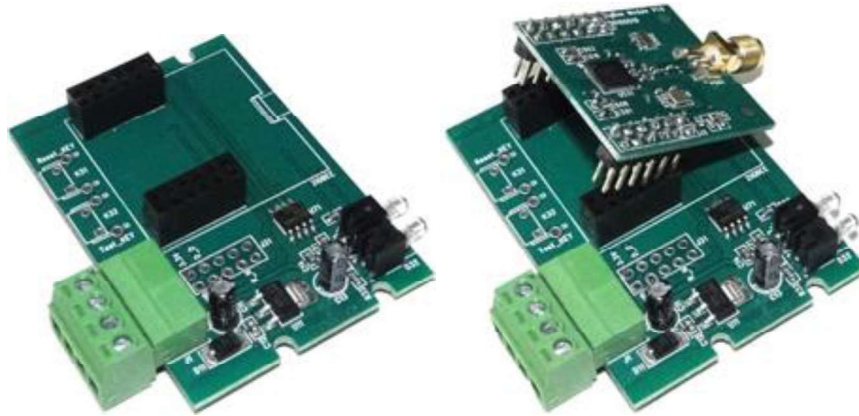
2, command mode, data transfer between any node: data transfer format is: 0xFD (data transfer command) + 0x0A (data length) + 0x73 0x79 (destination address) + 0x01 0x02 0x03 0x04 0x05 0x06 0x07 0x08 0x09 0x10 (data, Total 0x0A Bytes).

Easy to use: Users do not consider the ZigBee protocol, like using the same serial line using the wireless module

The module can be used with USB floor, no external power supply, USB port power supply and data transfer (USB to serial port), it is strongly recommended to buy DRF1605 Zigbee module, buy at least one USB chassis for easy debugging and configuration modules.



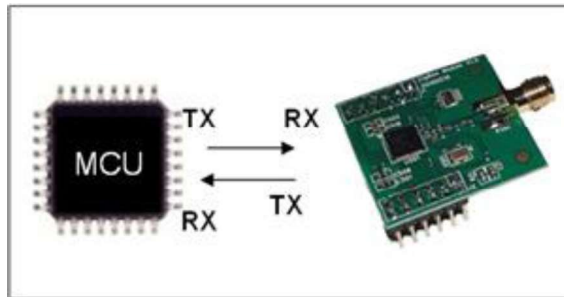
The module can be used with the RS485 chassis, The UART will DRF1605H mouth into a standard half-duplex RS485 interface Can be directly connected to the RS485 device.



DRF1605 standard pin spacing is 2.54 or $2.54 * n$, so it can be directly plugged into the board using a wildcard, to facilitate the development



DRF1605 easily connect with the MCU, full support for 51, ARM, X86, MIPS other core MCU, as long as there are serial MCU can:

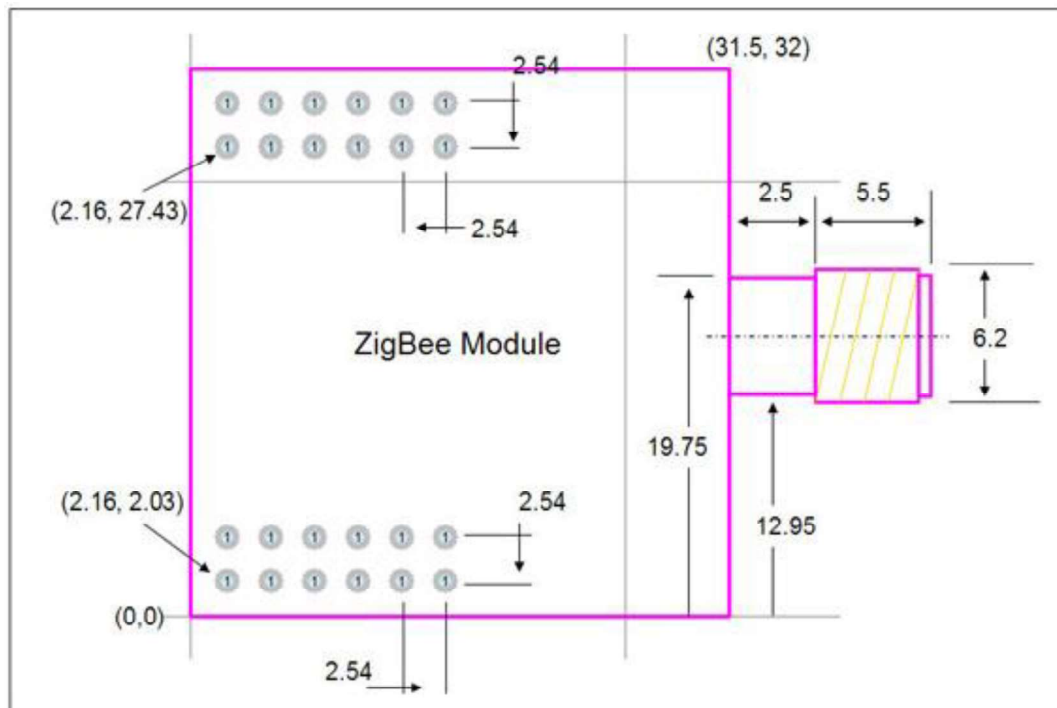


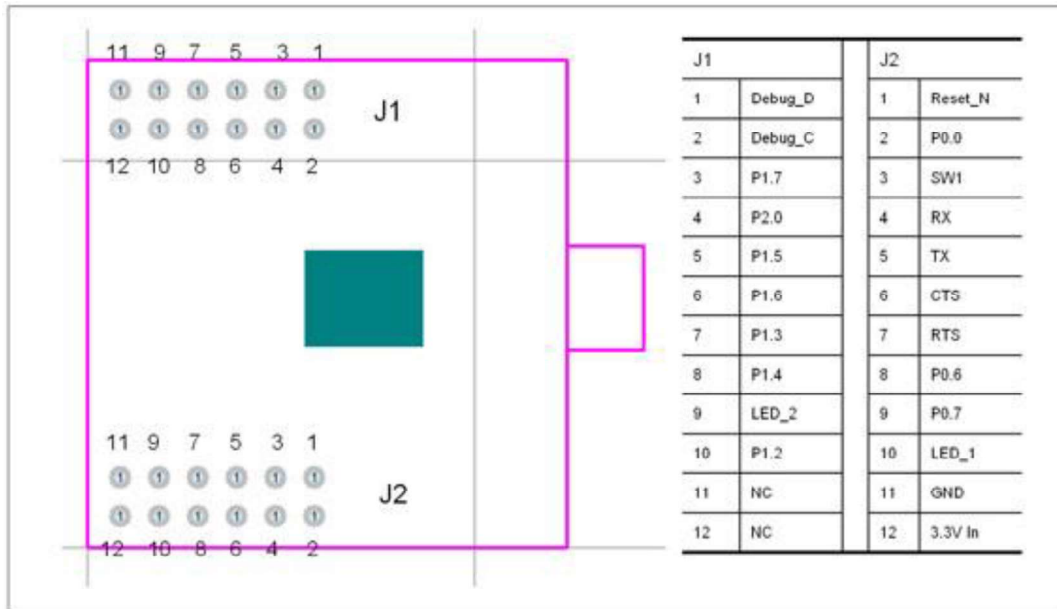
ZigbeeModule parameters

- > Input voltage: DC 2.6V-3.3V
- > Temperature Range:-40C-85C
- > Serial rate: 38400bps (default), you can set 9600bps, 19200bps, 38400bps,

57600bps, 115200bps

- > Wireless Frequency: 2.4GHz (factory default is 2460MHz), Users can change the channel via the serial port commands (2405MHz-2480MHz, step length: 5MHz)
- > Wireless Protocol: ZigBee2007
- > Transmission distance: visual distance 400 m
- > Emission current: 34mA (max)
- > Receive Current: 25mA (max)
- > Low-power mode: Module which no low-power mode, the client can be customized low-power applications
- > Receiver sensitivity:-96DBm
- > Main chip: CC2530F256, 256K Flash, TI's latest generation ZigBee SOC chip
- > Configurable Node: can be configured as Coordinator or Router, the factory default setting for Router? Li AN ID = 0x199B
- > Built-in RS485 direction control, RS485 chip can directly drive
- > RS232 chip can directly drive
- > Direct Drive USB to RS232 chip
- > Net Weight: 7.4g

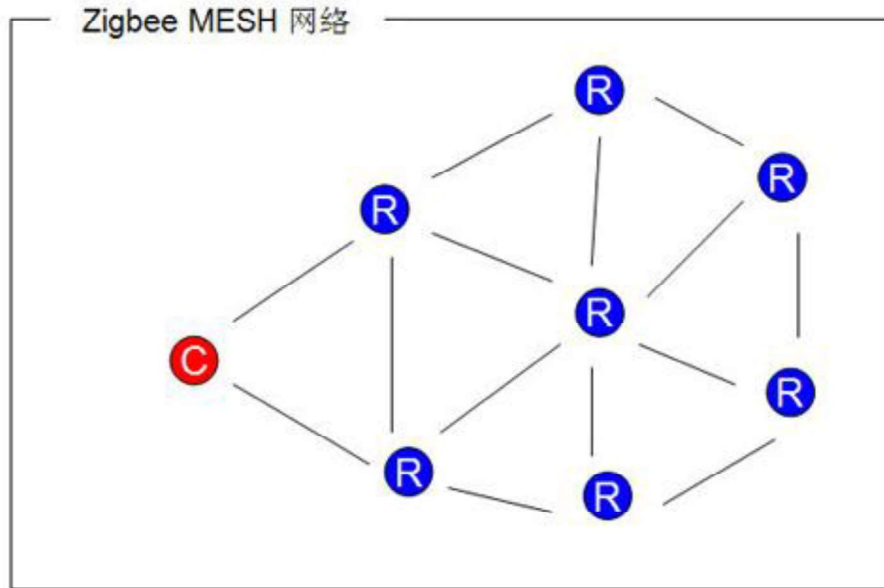




ZigbeeNetworking module

Zigbee network typically consists of three nodes:
Coordinator: To create a Zigbee network and to join the network node for the initial allocation of addresses, each Zigbee network needs and requires only a Coordinator;
Router: Also known as full-featured Zigbee nodes that can forward data, play the role of routing, you can also send and receive data, as a data node, but also to maintain the network, after adding a node to assign addresses;
End Device: Terminal nodes, usually defined as battery powered low power devices, usually only periodically transmit data, no data are received.

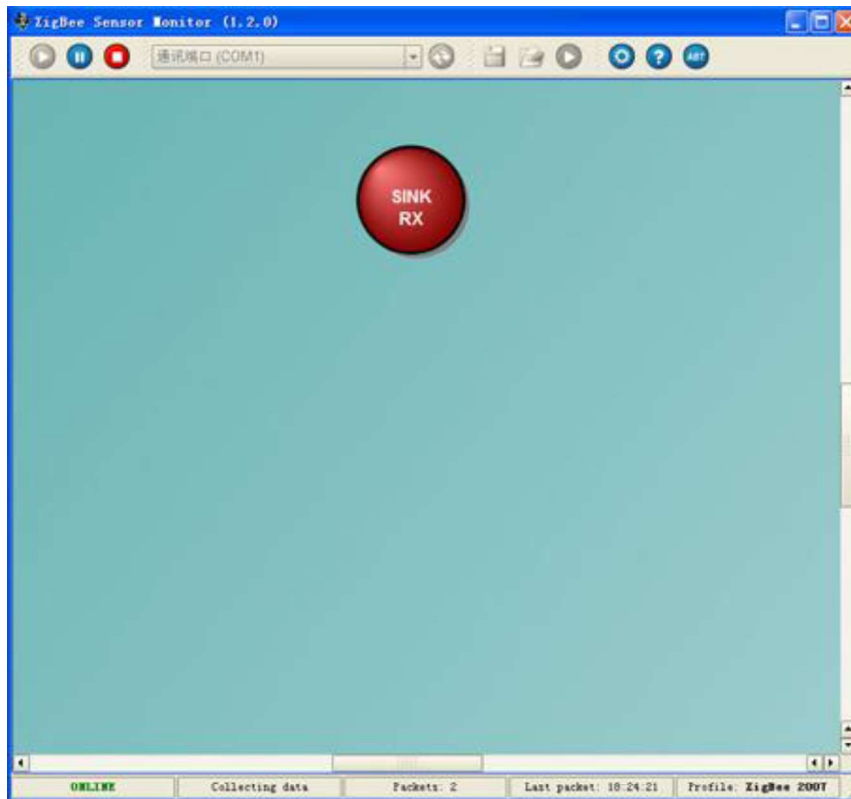
The main function of this section Zigbee module is wireless data transmission, that is, each node can send and receive data at any time, so the node configuration only Coordinator, Router (**The factory default for the Router, users can set up their own configuration software or script node type you want**), As shown in the connection network, such a network is often referred MESH network (ie: mesh), each node can send and receive data, while other nodes can act as a router, and that all data transmission route are calculated automatically, without user intervention.



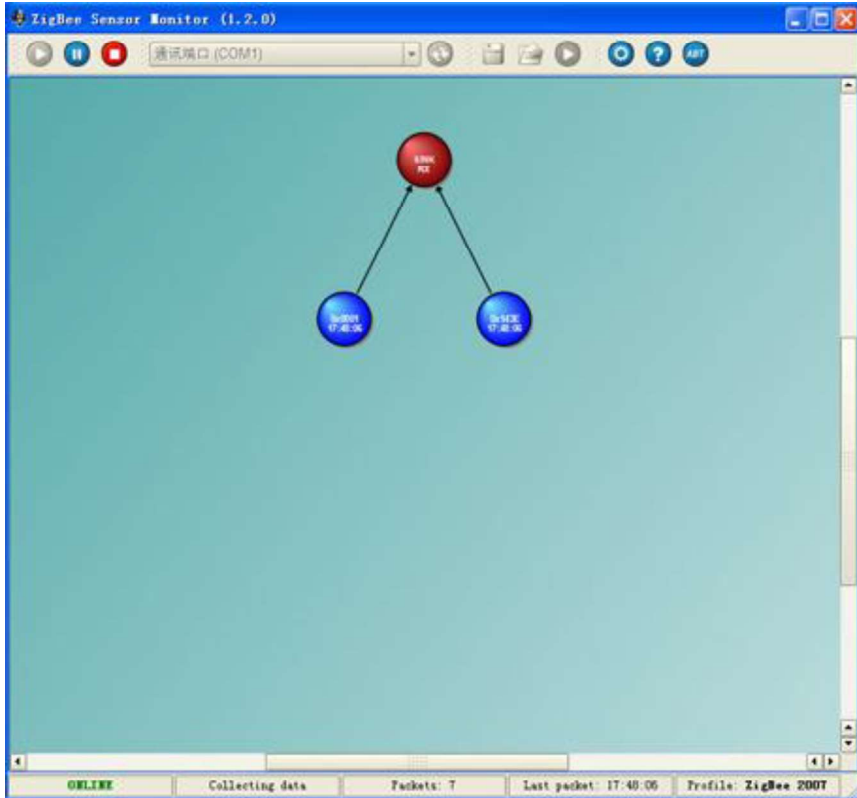
First use Zigbee module, please give Coordinator power, then power to the Router, Router after power on, it will automatically find and join the Zigbee network, you can use the TI Sensor Monitor software to observe the morphology Zigbee network, the software download address is:dtkc.cn/download.html.

Use these steps:

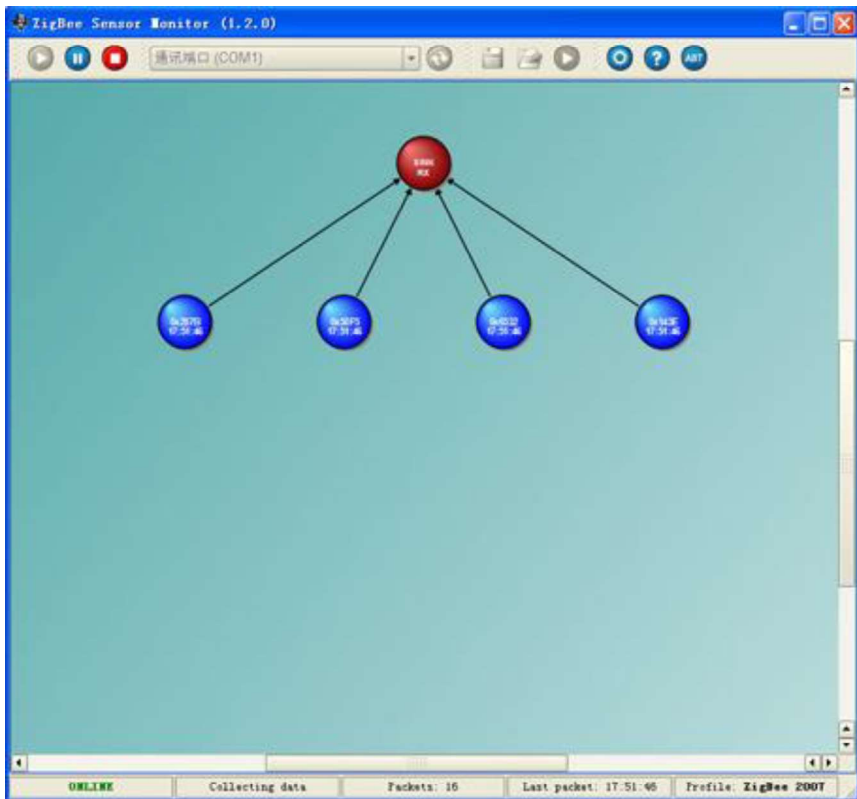
1,Will Coordinator Module Through the serial port to connect to PC, Open TI Sensor Monitor Software, Select Coordinator Connect serial number, and click RUN Icon Run, then you can see expressed Coordinator The icon turns red, indicating Coordinator And PC Connection is successful. (Note: TI Sensor Monitor Software only supports serial port baud rate 38400);



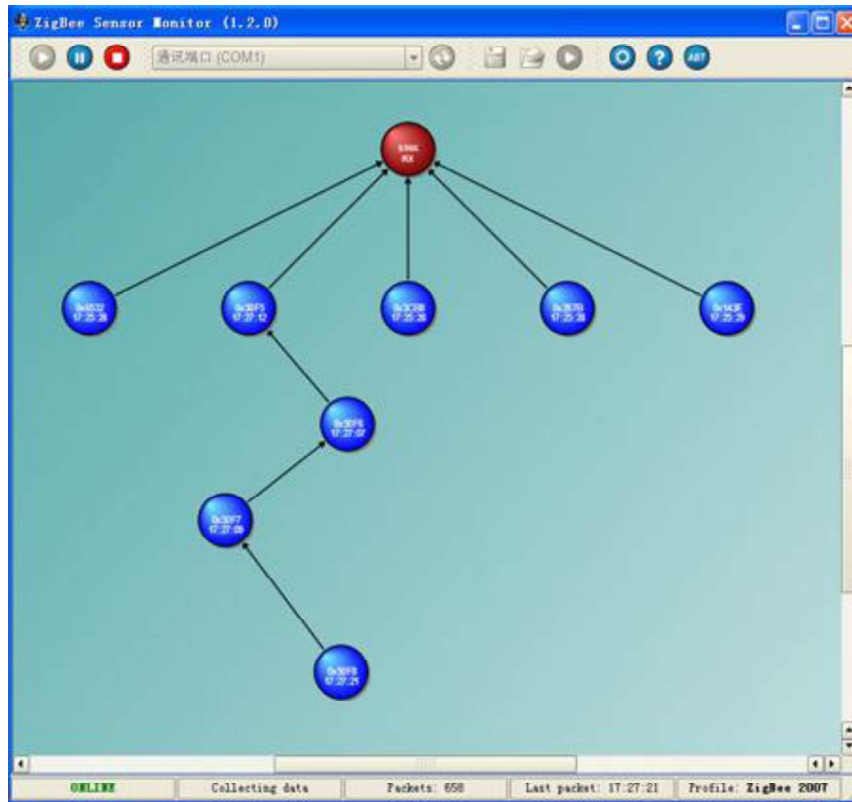
2,Will be a Router Module is powered and click TEST Button, then, Router Module sends an analog data to Coordinator, Coordinator Will be sent to this data through the serial port PC And TI Sensor Monitor Software in the network structure shown in the following figure. (DRF1605 of TEST Buttons are J2 The first 3 Foot (SW1), What can be shorted to ground)



3 Similarly, the other RouterModule power, they will automatically find and join the network, press TEST Button after the network is structured as follows:



4,Coordinator Can bind directly to Router, Beyond the future, the other Router Through previous Router Continue to join the network, each Router Other acceptable Router Join the network and assign address:



ZigBeeModule data transmission

DRF1600 Series ZigBee module data transfer function is very simple to use, there are two kinds of data transmission:

(1), transparent data transmission:

As long as the first byte transmitted is not 0xFE, 0xFD or 0xFC, then automatically enter data transparent transmission mode;

Coordinator data received from the serial port, it will automatically be sent to all nodes;

A node receives data from the serial port, it will automatically be sent to the Coordinator;

(2), point to point data transmission:

ZigBee between any node within the network, through peer-to instructions, transferring data;

Instruction format: 0xFD + data length + target address + data

1, transparent data transfer: (transparent data transmission is the most important DRF1600 Series modules feature)

(1), as long as the first byte transmitted is not 0xFE, 0xFD or 0xFC, then automatically enter data transparent transmission mode;

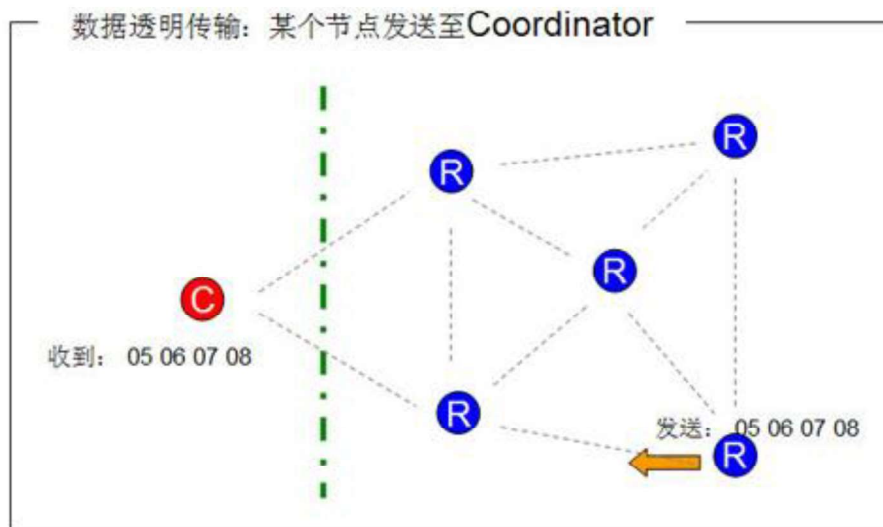
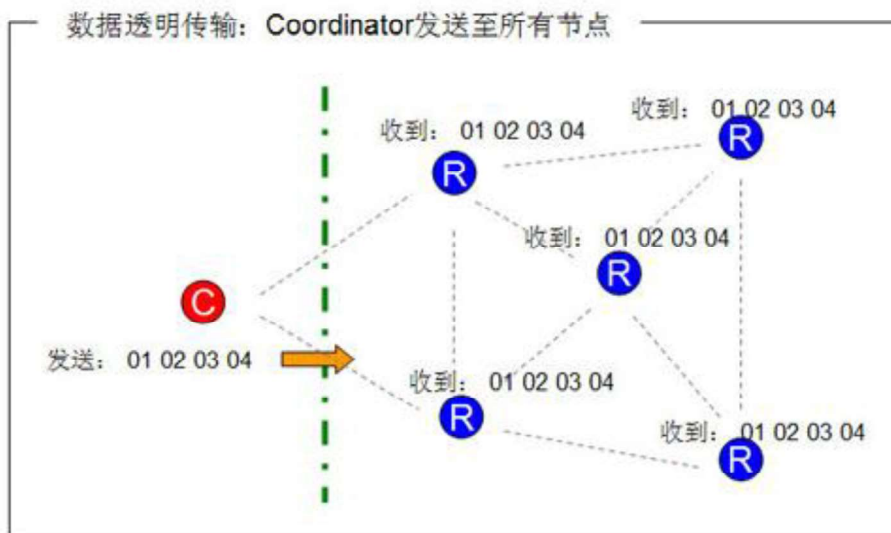
(Extension: As long as the packet header and setup instructions are not the same, will be treated as transparent data transmission, it is recommended that the user through the data

Next transmitted data packet of the first byte set to a non FE, FD, or FC, as A7)

(2), Coordinator of the data received from the serial port, it will automatically be sent to all nodes; a node receives data from the serial port, it will automatically be sent to the Coordinator;

(3), between any one node and Coordinator, similar to the cable directly (in most cases, can be a Coordinator, 1 Router directly instead of a RS232 cable);

(4) to support variable-length packets (without setting), the maximum does not exceed 256 bytes / packets, each packet recommended general application within 32 bytes.



Transparent data transfer performance:

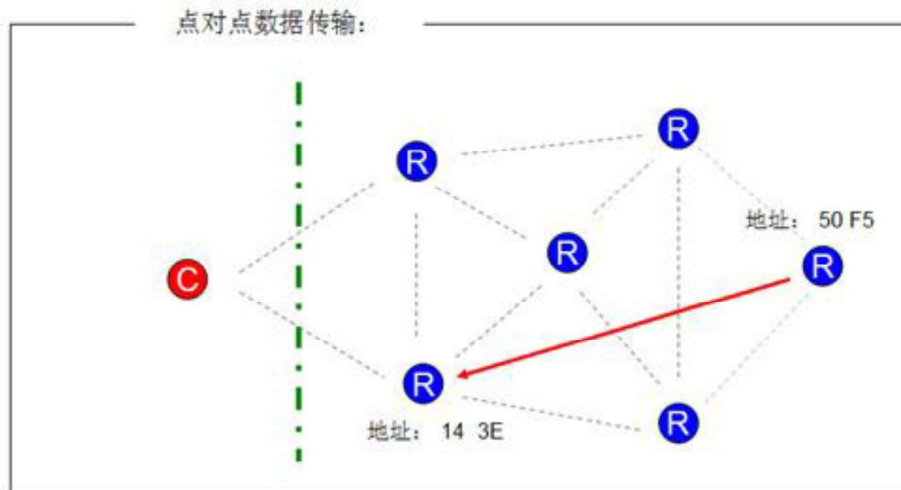
Data transfer direction	Packet length	Fastest interval
Router→Coordinator	16Byte	20 ms
	32Byte	20 ms
	64Byte	20 ms
	128Byte	50 ms
	256Byte	200 ms
	> 256Byte	Can not transfer
Coordinator→Router	16Byte	100 ms
	32Byte	100 ms
	64Byte	100 ms
	128Byte	200 ms
	256Byte	500 ms
	> 256Byte	Can not transfer
Test conditions:		
<ul style="list-style-type: none"> • Room temperature and laboratory conditions • Distance between modules 2Meter, A good signal • Baud rate 38400(Most preferably baud rate) • Continuously sending, receiving 100KBytes, no error, continuous testing 10Secondary • Test Software: serial debugging assistant SSCOM3.2 		

With the increase in the transmission distance between modules, the transmission rate will be reduced

Coordinator→Router is broadcast, transmission rate will be slower
General application, we recommend that each packet 32Byte interval 200-300ms Transmission

2, point to point data transmission:

The following diagram, for example, briefly point to point data transmission: (data from 0x50F5 sent to 0x143E)



Send command format:

Data transfer instruction (0xFD) + data length + target address + data (up to 32 Bytes)

Length of 32 bytes of data to support variable length.



Such as sending:

FD0A14 3E01 02 0,304,050,607,080,910

FD: Data Transfer Instructions

0A: data area data length of 10 bytes

14 3E: Destination Address

01 0,203,040,506,070,809 10: Data

Receive Data Format:

Receiving all the data to the transmitting side and at the end to increase the source address (two bytes)



If the received data is:

FD0A14 3E01 02 0,304,050,607,080,91050 F5

FD: Data Transfer Instructions

0A: data area data length of 10 bytes

14 3E: destination address of the sender, recipient addresses itself

01 0,203,040,506,070,809 10: Data

50 F5: sender's address, that address data sources

Point data transmission for any node in the network between:

1, even Coordinator power can also be passed between the Router-point instruction is transmitted;

- 2, Router to join the network, the address (Short Address) will not change;**
- 3, the length byte data area must be equal to the length of the data, or data transmission errors (as transparent transmission, sent to the Coordinator);**
- 4, up to 32 bytes of data in the data area, or data transmission errors (as transparent transmission, sent to the Coordinator);**
- 5, the target address = FF FF, was broadcast, it will be sent to all nodes within the network;**

Destination Address = 0000, then sent to the Coordinator

Peer data transfer performance:

Data transfer direction	Packet length	Fastest interval
Router→Router	32Byte	40 ms
Coordinator→Router	32Byte	40 ms
Router→Coordinator	32Byte	40 ms

Test conditions:

- 1, Room temperature and laboratory conditions**
- 2, Distance between modules 2Meter, A good signal**
- 3, Baud rate 38400 (Most preferably baud rate)**
- 4, Continuously sending, receiving 100KBytes, no error, continuous testing 10Secondary**
- 5, Test Software: serial debugging assistant SSCOM3.2**

Zigbee Network Features

- 1, each Coordinator allowing six Router join the network and assign addresses, each allowing six Router Router can join the network and assign addresses, a total of six layers deep, up to 9330 nodes**
- 2, Coordinator is used to create the network, the first time, Coordinator need to power up;**
- 3, A Zigbee network formation, even Coordinator power, Router can communicate between;**
- 4, a Zigbee network formation, even Coordinator power outages, but also through the new node has access network Router joined by the Router to assign addresses;**
- 5, Zigbee network is created, the network address of the Router (Short Address) is constant, but this node to the other network, assign a new network address, which will become, not recommended Short Address as a module identification;**
- 6, Zigbee module's MAC address (IEEE address) is a globally unique identifier can be used as the module;**

ZigbeeModule settings

Setting instructions are as follows (all values have been under hexadecimal number):

No.	Instruction	Function	Return	Need to restart?
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1	<p>FC 02 91 01 XX XX XY (XY =Ago6Bytes and retain low8Position, the same below)</p>	<p>Set the modulePAN IDTo a certain valueXX XX</p> <ul style="list-style-type: none"> • If the modulePAN IDSetFF FF: If it isCoordinatorAfter reboot automatically generate a newPAN ID If it isRouterAfter reboot automatically find the new network to join Can not be set toFF FE • ResetPAN IDAfter (or the same value after reset) 	<p>XX XX Eg: Input:FC 02 91 01 12 34 D6 Returns:12 34</p>	Be
		<p>If it isCoordinatorWill be cleared to join the network nodes If it isRouter, Has joined the network clearing and re-locate and join the network</p>		
2	<p>FC 00 91 02(Directive Cancel)</p>			