Product Manual

TLSR8258 2.4GHz ZigBee Multifunctional SoC Wireless Module

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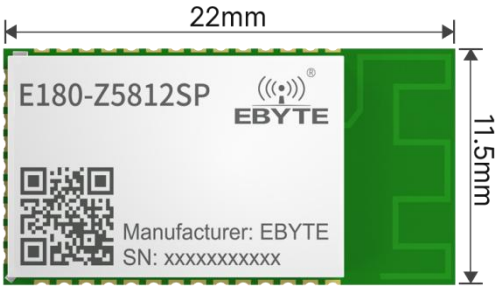
Chapter 1 Overview

1.1 Product Introduction

E180-Z5812SP is a ZIGBEE module designed and produced by Chengdu Ebyte based on TELINK TLSR8258 wireless SOC with small size, low power consumption, high reliability, and working in the 2.4GHz frequency band. The chip comes with a 32-bit high-performance MCU up to 48Mhz. The transmit power can reach up to 12dBm, and its minimum cycle sleep current is 2uA.



TLSR8258 is a wireless microcontroller with great potential to become the first choice for smart furniture, Internet of Things transformation, and industrial automation in the future. Its network characteristics conform to the ZIGBEE 3.0 standard and provide a complete application integration solution based on the IEEE802.15.4 standard ISM frequency band. The product has been tested and certified by a series of authoritative radio frequency instruments, combined with years of market experience and the actual needs of users in this industry, the extremely complex communication protocol of wireless products is integrated into the built-in SoC, it supports serial port transparent transmission mode, and the integration is fast and easy The self-organizing network function of the application provides multiple configurable ADC, IO, and PWM interfaces, which simplifies the complexity and greatly simplifies the complex development process of wireless products, so that your products can be quickly put on the market at a lower cost.

1.2 Features

- Centralized network management: ZIGBEE 3.0 security standard centralized network access mechanism, data security and reliability;
- Large capacity: 512K capacity flash, 64K capacity RAM, network nodes can be expanded to more than 100;
- Role switching: the user can switch the device between the two types of terminal and dormant terminal arbitrarily through serial port commands;
- Support multiple network topologies: point-to-point, star network, MESH network;
- Network self-healing: if the intermediate node of the network is lost, other networks will automatically join or maintain the original network;
- Address retrieval: users can find out the corresponding short address according to the MAC address of the node that has joined the network, and can also find out the corresponding long address of each node in the network according to the short address of the node.
- Data Security: Integrated ZIGBEE 3.0 security communication standard, the network contains multi-level security keys;
- Serial port configuration: The module has a built-in serial port command, and the user can configure (view) the parameters and functions of the module through the serial port command.
- Network PAN_ID change: Any switching of the network PAN_ID, the user can customize the PAN_ID to join the corresponding network or automatically select the PAN_ID to join the network;
- GPIO control: local/remote GPIO level control, 2 IOs can be selected;

- PWM control: local/remote PWM control, 4 PWM channels for users to choose;
- ADC control: local/remote ADC reading, 3 ADC channels for user selection (including power voltage detection);
- One-key restore baud rate: If the user forgets or does not know the baud rate, this function can be used to restore the default baud rate to 115200.
- Serial port receive wake-up: support serial port receive wake-up function, when the module is in sleep state, it will wake up when it receives a frame of data less than or equal to 10 bytes, this data is a wake-up frame for waking up the module and will not be treated as data.
- Module reset: The user can reset the module through the serial port command.
- Restore factory settings: users can restore the factory settings of the module through serial port commands
- Air configuration: users can remotely configure other devices in the network using air configuration commands

1.3 Device Type Introduction

There are four logical device types in the ZigBee network: Coordinator (coordinator), Router (router), End-Device (non-sleeping terminal) and Sleep-End-Device (sleeping terminal). A ZigBee network consists of a Coordinator, multiple Routers, and multiple End_Device (its terminal nodes can be divided into sleep terminals and non-sleep terminals). This product only supports two types of equipment, End-Device (non-sleeping terminal) and Sleep-End-Device (sleep-end-device), and the two types of Coordinator (coordinator) and Router (router) use our E180-Z8910SX/P product.

1.3.1 Non-sleeping terminal

The main task of the terminal device is to send and receive messages, and other nodes are not allowed to connect to the terminal device. The non-sleeping terminal is always in the working state and can receive and send data at any time.

1.3.2 Sleeping terminal

The dormant terminal, when there is no data to send and receive, enters the dormant state, and the dormant current is as low as about 2uA.

When you need to send wireless data or perform command operations, you need to send a wake-up frame through the serial port first, and the length needs to be 5 bytes (it is recommended to use "FF" with 5 bytes of "FF FF FF FF FF" to wake up), and the wake-up time lasts Uart_holdtime Time, the serial port data (configuration command, payload) can be processed during this period. When a frame of serial port data is successfully received, the wake-up timeout counter will be refreshed, and the wake-up duration will be pushed back by Uart_holdtime time, otherwise the device will re-enter sleep. Uart_holdtime defaults to 1000ms and supports HEX instructions to change its value.

Sleeping terminals can also be woken up through the function pin WAKE. WAKE is high by default. Pull down the WAKE pin to wake up the module continuously. Release the WAKE pin to restore the default high level and the module resumes sleep.

When data needs to be received, the data is received through periodic wake-up. The longer the wake-up period is set, the more delayed the reception will be. The wake-up period setting must be less than 30 seconds. If you only need to upload data, you can set the wake-up period to be greater than 30 seconds or longer to reduce power consumption (the default is 10 seconds), such as battery-powered sensors.

1.4 Application scenarios

- Smart home and industrial sensors, etc.;
- Security system, positioning system;
- Wireless remote control, UAV;
- Wireless game remote control;
- Healthcare products;
- Wireless voice, wireless headset;
- Advanced Meter Reading Infrastructure (AMI);
- Automotive industry applications;
- Building automation solutions;
- Agricultural greenhouse automation application;

Chapter 2 Specifications

2.1 Limit parameters

Main Parameters	Performance		Remark
	Min. Value	Max. Value	
Power supply voltage (V)	1.9	3.6	Exceeding 3.6V will permanently burn the module
Blocking power (dBm)	-	10	Less chance of burning when used at close range
Working temperature (℃)	-40	+85	Industrial grade

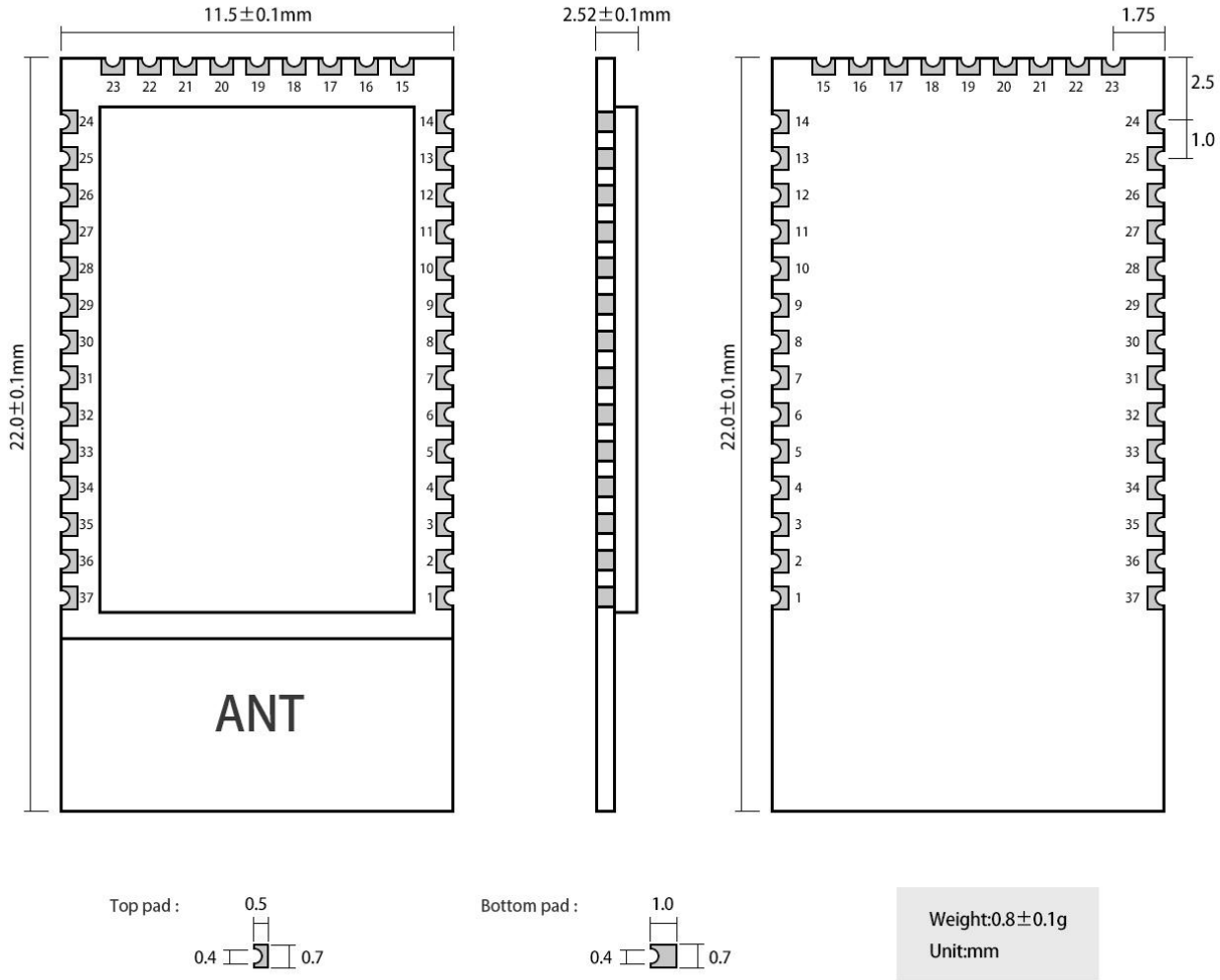
2.2 Working parameters

Main Parameters		Performance			Remark
		Min. Value	Typical value	Max. Value	
Working voltage (V)		1.9	3.3	3.6	≥3.3V guaranteed output power
Communication level (V)			3.3		Using 5V TTL has the risk of burning
Working temperature (℃)		-40	-	+85	Industrial design
Working frequency band (MHz)		2405	-	2480	Support ISM frequency band
power consumption	Emission current (mA)		24		24mA max at 12dbm
	Receive current (mA)		9		
	Sleep current		2.5		The average periodic sleep current is 2.5uA

(μA)				
Maximum transmit power (dBm)		12		
Air rate (bps)		250k		

Main Parameters	Description	Remark
Reference distance	200m	Between two points (zigbee network supports routing multi-hop function, the purpose of extending the transmission distance can be achieved by adding routers).
Weight	0.9g	
Supporting agreement	Zigbee 3.0	
Encapsulation	SMD	
Interface	1.27mm	stamp hole
Full name of IC	TLSR8258F512ET32	
FLASH	512KB	
RAM	64KB	
Kernel	32 bit MCU	
Dimensions	11.5*22mm	
Antenna interface	PCB	Equivalent impedance about 50Ω

Chapter 3 Mechanical Dimensions and Pin Definitions



Pin number	Pin name	Pin direction	Pin usage
1	NC	-	Reserved, directly suspended
2	GND	-	Ground wire, connected to power reference ground
3	NC	-	Reserved, directly suspended
4	PD3(WAKE)	Input	The WAKE pin is mainly used to wake up the dormant terminal. It is at a high level when powered on. When the pin is pulled low externally, the dormant terminal device will be woken up.
5	PD7(TX)	Output	Serial sending port TX
6	PA0(RX)	Input	Serial receiving port RX
7	NC	-	Reserved, directly suspended
8	NC	-	Reserved, directly suspended
9	PD4(MODE)	Input	Working mode switching pin, when the pull-down time is greater than

			500ms, the working mode is switched.
10	PA1(BAUD_R)	Input	The UART_BAUD_RESET pin is used to reset the baud rate of the device. It defaults to a high level when powered on. In any mode, if the pin is pulled down for more than 1000ms, the serial port parameters of the module will restore the default 115200
11	PB1(ACK)	Output	The ACK pin is used to indicate the status of the last user data transmission. The pin is pulled low before the transmission is started, and the pin is pulled high after the transmission is successful.
12	PC0(GPIO0)	Input/Output	GPIO input/output port 0
13	VCC	-	Module power positive reference voltage, voltage range
14	GND	-	Ground wire, connected to power reference ground
15	PB4(GPIO1)	Input/Output	GPIO input/output port 1
16	NC	-	Reserved, directly suspended
17	NC	-	Reserved, directly suspended
18	PB5(AUX)	Output	The AUX pin indicates the current working status of the device. When the pin is low, it indicates that the device is busy, and when it is high, it indicates that the device is idle.
19	NC	-	Reserved, directly suspended
20	NC	-	Reserved, directly suspended
21	PB6(ADC1)	Input	ADC detection port 1
22	PB7(ADC2)	Input	ADC detection port 2
23	NC	-	Reserved, directly suspended
24	NC	-	Reserved, directly suspended
25	SWCLK	Input/Output	Serial debug interface, serial line clock
26	SWDIO	Input/Output	Serial debugging interface, serial data input and output
27	PC2(PWM0)	Output	PWM output port 0
28	PC3(PWM2)	Output	PWM output port 2
29	PC4(PWM3)	Output	PWM output port 3
30	PC1(LINK)	Output	The LINK pin indicates the current network status of the module, and the output high level meter has joined the network
31	NC	-	Reserved, directly suspended
32	PD2(PWM1)	Output	PWM output port 1
33	NC	-	Reserved, directly suspended
34	NC	-	Reserved, directly suspended
35	NC	-	Reserved, directly suspended
36	GND	Input/Output	Ground wire, connected to power reference ground
37	nRESET	Input	Reset pin

Chapter Four Working Mode

4.1 Transmission mode

When the module enters the transmission mode, any data received by the serial port will be sent out wirelessly. The transmission mode is wireless communication between network nodes. The communication methods include unicast, protocol unicast, multicast, protocol multicast, broadcast wait.

4.2 Configuration mode

When the module enters the configuration mode, the data received by the serial port is defaulted as a configuration command, and the function configuration and operation of the device are performed. In the configuration mode, the data received by the serial port of the module is considered to be a HEX command.

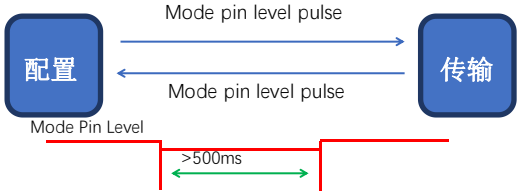
4.3 Mode switching

4.3.1 Instruction switching

The power-on initialization of the module defaults to the transfer mode.
In the transmission mode, when the serial port of the module receives the "2A 2D 2E" character, it enters the configuration mode, and returns to the "7A 7D 7E" character after entering the configuration mode successfully. In the configuration mode, when the serial port of the module receives the "2F 2C 2B" character, the module exits the configuration mode and enters the transmission mode, and returns the "7F 7C 7B" character after successfully entering the transmission mode.

4.3.2 Pin switching

Working mode switching pin PD4, internal configuration pull-up resistor input mode, power-on default high level, in any mode when the mode switching pin PD4 is pulled down for more than 500ms, the module working mode switches, as shown in the figure below Show:



Chapter 5 Sending and receiving methods

5.1 The way of sending data

The module's data transmission methods include unicast, protocol unicast, multicast, protocol multicast, and broadcast.

5.1.1 Broadcast Mode

In broadcast mode, the sending device sends the data received by the serial port to every node in the network, and all devices in the network will receive the data.

5.1.2 Multicast mode

In the multicast mode, first set the group number of the devices in the network in the configuration mode (grouping, restart to take effect), the sending device specifies the target group number in the configuration mode (which group to send the data to), and then The sending device enters the transmission mode and sends the data received by the serial port to the network, and the devices with the same group number in the network will receive the data.

5.1.3 Protocol multicast mode

When the sending device is in transmission mode, the serial port receives data, the first byte indicates the target group number, and the following data indicates effective wireless transmission data. No need to enter the configuration mode to configure the target group number

5.1.4 Unicast mode

In unicast mode, the devices in the network perform point-to-point communication through the network address, and the sending device sends the received serial port data to the target address device, and the target address device can return an ACK to the sending device to indicate that it has received the data. data (sleeping end nodes do not have ACK capability).

5.1.5 Protocol Unicast Mode

When the sending device is in transmission mode, the serial port receives data, the first two bytes represent the short address of the target network, and the following data represent effective wireless transmission data. It is not necessary to enter the configuration mode to configure the target network short address.

Note: When configured as broadcast or multicast, the period of periodic transmission is recommended to be greater than 2000ms, otherwise it may cause data blockage.

5.2 Output method of received data

Received data output mode refers to the way the serial port outputs data after the module receives wireless data;

5.2.1 Transparent output

If the output mode of the configuration device is transparent output, the module will output the original data through the serial port after receiving the wireless data;

5.2.2 Data + short address

When the output mode of the device is data + short address, after the module receives the wireless data, the serial port will output the original data + the short address of the sending device;

5.2.3 Data + long address

When the output mode of the device is data + long address, after the module receives wireless data, the serial port will output the original data + long address of the sending device;

Note: The terminal device can resolve the long address of the sending device such as the coordinator, router and terminal, but the coordinator and router cannot resolve the long address of the terminal sending device

The coordinator and router here are E180-Z8910SX/P products.

5.2.4 Data+RSSI

当设备的输出模式为数据+RSSI，模块接收到无线数据后，串口将输出原始数据+接收到该数据包的 RSSI 值；When the output mode of the device is data + RSSI, after the module receives the wireless data, the serial port will output the original data + the RSSI value of the received data packet;

5.2.5 Data + short address + RSSI

当设备的输出模式为数据+短地址+RSSI，模块接收到无线数据后，串口将输出原始数据+发送设备的短地址+接收到该数据包的 RSSI 值；When the output mode of the device is data + short address + RSSI, after the module receives the wireless data, the serial port will output the original data + the short address of the sending device + the RSSI value of the received data packet;

5.2.6 Data + long address + RSSI

When the output mode of the device is data + long address + RSSI, after the module receives the wireless data, the serial port will output the original data + the long address of the sending device + the RSSI value of the received data packet;

Note: The terminal device can resolve the long address of the sending device such as the coordinator, router and terminal, but the coordinator and router cannot resolve the long address of the terminal sending device
The coordinator and router here are E180-Z8910SX/P products.

Note: The sender supports a single packet with a maximum packet length of 72 bytes

Chapter 6 Application Function and Command Configuration

6.1 Function pins

6.1.1 Detailed explanation of LINK

The LINK pin indicates the current network status of the module. After the device is successfully connected to the network, the current pin is pulled high. When the device has no network or the parent node is lost, this pin is pulled low. External devices can query the network status of the device through the pin level.

6.1.2 Detailed explanation of WAKE

The WAKE pin is mainly used to wake up the dormant terminal. It defaults to a high level when powered on. When the pin is pulled low externally, the dormant terminal device will continue to be woken up. When the pin is released externally, it returns to a high level and enters dormancy. ;The sleep time is determined by the duration of the external pull down of this pin; for non-sleep devices, this pin is meaningless;

6.1.3 Detailed explanation of AUX

The AUX pin indicates the current working status of the device. When the pin is low, it indicates that the device is busy; when the pin is high, it indicates that the device is idle; when the device receives data, the module pulls the AUX pin low and after the AUX_delaytime time, the serial port starts to output Data, used to wake up external control devices, AUX_delaytime defaults to 4ms, can be changed by serial port instructions, and the customer decides according to the wake-up time of the main chip;

6.1.4 Detailed explanation of ACK

The ACK pin is used to indicate the status of the last user data transmission. The pin is pulled low before the transmission is started, and the pin is pulled high after the transmission is successful. The user can judge whether the data has arrived successfully through the state of the pin. This pin function cannot instruct the coordinator to send a broadcast message. (Only works on non-sleeping terminals).

6.1.5 Detailed Explanation of UART_BAUD_RESET

The UART_BAUD_RESET pin is used to reset the baud rate of the device. It defaults to a high level when powered on. In any mode, if the pin is pulled down for more than 1000ms, the module serial port parameters will restore the default 115200 and 8N1.

Function pin	Pin port
LINK	PC1
WAKE	PD3
AUX	PB5
ACK	PB1
UART_BAUD_RESET	PA1

6.2 Wireless remote configuration function

The module supports the remote configuration function, which is identified by the two-byte wireless configuration ID, which is A8 8A by default. The user can modify the remote configuration ID of the module. When the module receives the first two bytes of wireless air data as the wireless configuration ID, the module judges that the data packet is a remote configuration command and executes the operation of the corresponding command. The data packet will not be output through the serial port. Sleeping terminal remote configuration needs to wake up first.

6.3 Description of function parameters

The module provides a wealth of configurable parameters, which can be flexibly used according to actual application requirements to build different forms of networks.

configuration information	Attributes	Parameter range	Function Description
PANID	Read/Write	0x0000～0xFFFF	PANID is the network identifier of ZIGBEE, which is used to determine the identity of the network to which it belongs. All devices in the same network must have the same PANID. When the terminal or router is configured as 0xFFFF, it can join any existing network with the same channel;
Local network address	Read	0x0000～0xFFFF	It is used to distinguish each node in the network. Each device is in the same network, and the local network address must be unique. When not joining the network, the network address of the device is 0xFFFF. After joining, the short address of the device is assigned by the coordinator. The coordinator is fixed at: 0x0000;
Network status	Read	0、2、3	Indicates the network status of the current device, including no network, successfully joined the network, network without parent node;
Destination	Read/Write	0x0000～	The current device communication target (short address)

network address		0xFFFF	can be switched at any time through configuration commands;
Local MAC address	Read	64bitMAC	The MAC address assigned by the network of this module cannot be changed by the user (re-entry network change)
Destination MAC address	Read/Write	64bitMAC	In fixed-point mode, use long address to send
Equipment type	Read/Write	E、S	They are: non-dormant terminal, dormant terminal;
Channel	Read/Write	CH11～26	The physical channel of ZIGBEE work;
Sending mode	Read/Write	0、1、2、3、4、5	Configure the transmission mode of the module, which are: broadcast mode, multicast mode, short address on-demand mode, long address on-demand mode, protocol on-demand, protocol multicast, please refer to the corresponding mode function introduction for details;
Output mode	Read/Write	0、1、2、3、4、5	Configure the data output mode of the module, respectively: Penetrate; Data + short address; data + long address; data+RSSI; Data + short address + RSSI; Data + long address + RSSI；
Transmit power	Read/Write	0dbm～12dbm	The output power of the module has high requirements on power consumption, and the transmission power can be reduced to save average power consumption in occasions where there is no requirement for distance;
Remote Config ID	Read/Write	2 Bytes	It is used to judge whether the data received wirelessly in the air is a remote configuration command. Customers can change the unlimited configuration ID according to their needs. The default is A8 8A;
Local network group number	Read/Write	1～254	Used to configure the group number of the device in the network;
Target network group number	Read/Write	1～254	It is used to configure the group number of the corresponding target when the device is multicasting;
Wakeup period (sleep time)	Read/Write	0～2010 S	It is used to configure the wake-up cycle of the terminal sleep device. The larger the cycle, the lower the overall power consumption, but the greater the delay in receiving data;
Lost parent node reconnection period	Read/Write	1～254 minutes	When the parent node is lost (the coordinator is powered off), the terminal device reconnects to the previous network at regular intervals;

Max. number of reconnections	Read/Write	1～254 times	After the parent node is lost, the maximum number of reconnections. If the reconnection has not been successful, the previous network information will be cleared and the new network will be re-scanned. The scanning period is equal to the reconnection period;
I/O status	Read/Write	high/low	Access/control the level status of the GPIO channel of the module;
PWM	Read/Write	1us～340ms	Access/control the duty cycle and period of the PWM channel of the module;
ADC value	Read	0～3300mv	Read the ADC value of the device, where channel 0 can read the power supply voltage value of the device;

6.5 HEX instruction set

6.5.1 Command rules

Local serial port reading format:

Network parameter reading FE LEN CMD FF

Peripheral parameter reading FE LEN CMD CHANNEL FF

FE : fixed head

LEN: The actual length of DATA

CMD: actual naming ID

CHANNEL: PWM、ADC、GPIO Channel selection when reading

FF：command terminator

read return format：FB CMD DATA

FB : fixed head

CMD: command ID

DATA: parameter

Local serial port configuration format：FD LEN CMD DATA FF

FD : fixed head

LEN: The actual length of DATA

CMD: actual naming ID

DATA: actual parameters

FF：command terminator

Configuration returns：FA CMD

FA: fixed head

CMD: command ID

Returns on read/config access: F7 FF the info does not exist/read/config/format failed

ID Wireless remote reading/configuration format: add wireless configuration ID before the instruction format of local serial port mode

The default is A8 8A (the value can be modified), for example:

The configuration format is A8 8A FD LEN CMD DATA FF

Parameter read format A8 8A FE LEN CMD (CHANNEL) FF

Network operation format：F5 LEN CMD DATA FF

F5 : fixed head

LEN: The actual length of DATA

CMD: actual naming ID

DATA: actual parameters

FF：command terminator

Configuration returns：FC CMD STATUS

FC: fixed head

CMD: actual naming ID

STATUS: 00 Successful operation

01 operation failed

6.5.2 Read instruction set

Command description	Command ID	Command format	Command example
read device type	01	send： FE 01 01 FF return： FB 01 dev_type	send： FE 01 01 FF return： FB 01 03
read network status	02	send： FE 01 02 FF return： FB 02 nwk_state	send： FE 01 02 FF return： FB 02 02
Read network PAN_ID	03	send： FE 02 03 FF return： FB 03 pan_id	send： FE 02 03 FF return： FB 03 FE 5B
Read local network short address	05	send： FE 02 05 FF return： FB 05 Short_Addr	send： FE 02 05 FF return： FB 05 F6 FA
Read local MAC address	06	send： FE 08 06 FF return： FB 06 Mac_Addr	send： FE 08 06 FF return： FB 06 1F 1C 21 FE FF 57 B4 14
Read the short network address of the parent node	07	send： FE 02 07 FF return： FB 07 Coor_shortAddr	send： FE 02 07 FF return： FB 07 00 00
Read parent node MAC address	08	send： FE 08 08 FF return： FB 08 Coor _Mac_Addr	send： FE 08 08 FF return： FB 08 0C 46 0C FE FF 9F FD 90
read network group number	09	send： FE 01 09 FF return： FB 09 group	send： FE 01 09 FF return： FB 09 01
read communication channel	0A	send： FE 01 0A FF return： FB 0A channel	send： FE 01 0A FF return： FB 0A 0B
read transmit power	0B	send： FE 01 0B FF return： FB 0B txpower	send： FE 01 0B FF return： FB 0B 0A
Read serial port baud rate	0C	send： FE 01 0C FF return： FB 0C baud	send： FE 01 0C FF return： FB 0C 09

read sleep time	0D	send： FE 01 0D FF return： FB 0D sleep_time	send： FE 01 0D FF return： FB 0D 54
Read the network short address of the target	23	send：FE 02 23 FF return： FB 23 Dec_ShortAddr	send： FE 02 23 FF return： FB 23 00 00
Read target's netgroup number	24	send： FE 01 24 FF return： FB 24 Dec_netid	send： FE 01 24 FF return： FB 24 00
Read the long address of the target	25	send： FE 08 25 FF return： FB 25 Dec_mac	send： FE 08 25 FF return： FB 25 0A 1C 21 FE FF 57 B4 14
Read system send mode	26	send： FE 01 26 FF return： FB 26 send_mode	send： FE 01 26 FF return： FB 26 02
Read data output mode	27	send： FE 01 27 FF return： FB 27 out_mode	send： FE 01 27 FF return： FB 27 00
Read node rejoin cycle	29	send： FE 01 29 FF return： FB 29 net_rejoinperiod	send： FE 01 29 FF return： FB 29 05
The maximum number of reconnections to read lost parent nodes	30	send： FE 01 30 FF return： FB 30 net_rejoincount	send： FE 01 30 FF return： FB 30 05
Read wireless configuration ID	31	send： FE 02 31 FF return： FB 31 header	send： FE 02 31 FF return： FB 31 A8 8A
Read all network parameters of the device	FE	send： FE 2F FE FF return： FB FE all_info	send：FE 2F FE FF return：FB FE 03 02 FE 5B F6 FA 1F 1C 21 FE FF 57 B4 14 00 00 0C 46 0C FE FF 9F FD 90 01 0B 0A 09 54 00 00 00 0A 1C 21 FE FF 57 B4 14 02 00 FF 05 05 A8 8A
Read remote/local GPIO level	20	Command： FE 03 20 GpioId FF return： FB 20 GpioId In/Out level	send： FE 03 20 00 FF return： FB 20 00 01 01
Read remote/local PWM parameters	21	Command： FE 06 21 PWMId FF return： FB 21 PWMId start/stop Period Period duty duty	send： FE 06 21 00 FF return： FB 21 00 01 0A 3E 63 50
Read local/remote ADC status	22	Command： FE 03 22 adcid FF return： FB 22 adcid voltage1 voltage2	send： FE 03 22 00 FF return： FB 22 00 0C E4
Read firmware version number	34	Command： FE 03 34 FF return： FB 34 FirmwareVersion	send： FE 03 34 FF return： FB 34 82 69 01

Read the delayed printing time of AUX wake-up external MCU	35	send： FE 01 35 FF return： FB 35 AUX_delaytime	send： FE 01 35 FF return： FB 35 04

serial port in wireless receiving state			
Read serial port wake-up hold time	36	send： FE 01 36 FF return： FB 36 Uart_holdtime	send： FE 01 36 FF return： FB 36 64
Read endpoint information	37	send： FE 05 37 FF return： FB 37 Endpoint_info	send： FE 05 37 FF return： FB 37 01 FE B0 05 04
Read trust center connection key	38	send： FE 10 38 FF return： FB 10 TrustCentLinkKey	send： FE 10 38 FF return： FB 38 5A 69 67 42 65 65 41 6C 6C 69 61 6E 63 65 30 39

6.5.2 Configuration instruction set

Configure device type	send：FD 01 01 dev_type FF return：FA 01	send：FD 01 01 03 FF return：FA 01
Configure PAN_ID	send：FD 02 03 pan_id FF return：FA 03	send：FD 02 03 FE 5B FF return：FA 03
Configure network group number	send：FD 01 09 group FF return：FA 09	send：FD 01 09 01 FF return：FA 09
Configure the communication channel	send：FD 01 0A channel FF return：FA 0A	send：FD 01 0A 0B FF return：FA 0A
Configure the sending power (0-10 corresponds to the power)	send：FD 01 0B txpower FF return：FA 0B	send：FD 01 0B 0A FF return：FA 0B
Configure the serial port baud rate	send：FD 01 0C baud FF return：FA 0C	send：FD 01 0C 09 FF return：FA 0C
Configure sleep time (terminal valid)	send：FD 01 0D sleep_time FF return：FA 0D	send：FD 01 0D 54 FF return：FA 0D
Configure the target network short address	send：FD 02 23 dec_addr FF return：FA 23	send：FD 02 23 00 00 FF return：FA 23
Configure the target network group number	send：FD 01 24 netid FF return：FA 24	send：FD 01 24 00 FF return：FA 24
Configure the target long address	send：FD 08 25 dec_mac FF return：FA 25	send：FD 08 25 0A 1C 21 FE FF 57 B4 14 FF return：FA 25
Configure the system sending mode	send：FD 01 26 mode FF return：FA 26	send：FD 01 26 02 FF return：FA 26
Configure the data output mode of the module	send：FD 01 27 mode FF return：FA 27	send：FD 01 27 00 FF return：FA 26
Configure node rejoin cycle	send：FD 01 29 time FF return：FA 29	send：FD 01 29 05 FF return：FA 29

The maximum number of rejoins after a node loses its parent node	send：FD 01 30 time FF return：FA 30	send：FD 01 30 05 FF return：FA 30
Configure Wireless Remote Configuration ID	send：FD 02 31 header FF return：FA 31	send：FD 02 31 A8 8A FF return：FA 31
Configure all network parameters	send：FD 1A FE all_info FF return：FA FE	send：FD 1A FE 03 FE 5B 01 0B 0A 09 54 00 00 00 0A 1C 21 FE FF 57 B4 14 02 00 FF 05 05 A8 8A FF return：FA FE
Configuration Remote/local GPIO input and output status	send：FD 03 20 GpioId In/Out level FF return：FA 20	send：FD 03 20 00 01 01 FF return：FA 20
Configuration Remote/Local PWM Status	send：FD 06 21 PwmId start/stop Period1 Period2 duty1 duty2 FF return：FA 21	send：FD 06 21 00 FF 03 65 02 48 FF return：FA 21
Device restart	send：FD 00 12 FF return：FA 12	send：FD 00 12 FF return：FA 12
Reset	send：FD 00 13 FF return：FA 13	发送：FD 00 13 FF return：FA 13

Configure the AUX to wake up the external MCU serial port delay printing time in the wireless receiving state	send：FD 01 35 AUX_delaytime FF return：FA 35	send：FD 01 35 04 FF return：FA 35
Configure the serial port wake-up hold time	send：FD 01 36 Uart_holdtime FF return：FA 36	send：FD 01 36 64 FF return：FA 36
Configure endpoint information	send：FD 05 37 Endpoint_info FF return：FA 37	send：FD 05 37 01 FE B0 05 04 FF return：FA 37
Configure Trust Center Connection Key	send：FD 10 38 TrustCentLinkKey FF return：FA 38	send：FD 10 38 5A 69 67 42 65 65 41 6C 6C 69 61 6E 63 65 30 39 FF return：FA 38

6.5.3 Network operation instruction set

open network	send：F5 01 40 01 FF return：FC 40 00	send：F5 01 40 01 FF return：FC 40 00
Leave network	send：F5 01 40 02 FF return：FC 40 00	send：F5 01 40 02 FF return：FC 40 00
Create new network	send：F5 01 40 03 FF return：FC 40 00	send：F5 01 40 03 FF return：FC 40 00

Open network: The main coordinator node takes effect, indicating that the open network allows terminals to join for a period of time, and the command configures the "centralized network opening time" parameter. This command is invalid for terminals and dormant terminals, and only the coordinator node (E180-Z8910SX/P) is valid.

Leave network: The coordinator executes this command to clear the original network and create a new network at the same time. The terminal node executes this command to clear the saved network, and then executes the restart or create a new network command to join the new network.

Create a new network: mainly for terminals, execute this command to join a new network, you need to leave the network first and then execute a new network to join a new network.

6.6 HEX parameter description

6.6.1 System sending mode

Read instruction format:

command format	command example
send： FE 01 26 FF return： FB 26 send_mode	send： FE 01 26 FF return： FB 26 02

Configuration instruction format:

command format	command example
send：FD 01 26 mode FF return：FA 26	send：FD 01 26 02 FF return：FA 26

mode：

0x00 broadcast (default);

0x01 Multicast (you need to configure the target group number in configuration mode first)

0x02 Transparent transmission on-demand + short address (you need to configure the target short address in configuration mode first);

0x03 Transparent transmission on-demand + long address (you need to configure the target long address in configuration mode first);

0x04 Protocol on demand + short address (the first two bytes in the transmission mode are the short network address of the target device);

0x05 Protocol multicast (the first byte in transmission mode is the target network group number);

6.6.2 Received data output mode

Read instruction format:

command format	command example
send： FE 01 27 FF return： FB 27 out_mode	send： FE 01 27 FF return： FB 27 00

Configuration instruction format:

command format	command example
send：FD 01 27 mode FF return：FA 27	send：FD 01 27 00 FF return：FA 26

mode：

0x00 Transparent transmission (default);

0x01 Data + short address;

0x02 Data + long address;

0x03 Data+RSSI;

0x04 Data + short address + RSSI;

0x05 Data + long address + RSSI;

Note: When the dormant terminal device receives data, it does not support parsing the long address of the source device. When the terminal device receives data, it can resolve the long address of the source sending device such as the coordinator, router, and terminal, but the coordinator and router cannot resolve the source sending device of the terminal. long address. The coordinator and router here are E180-Z8910SX/P products.

Note: The sender supports a single packet with a maximum packet length of 72 bytes

6.6.3 Network Node Types

Read instruction format:

command format	command example
send： FE 01 01 FF return： FB 01 dev_type	send： FE 01 01 FF return： FB 01 03

Configuration command format：

command format	command example
send：FD 01 01 dev_type FF return：FA 01	send：FD 01 01 03 FF return：FA 01

dev_type：

0x03 Terminal (default)

0x04 Sleep terminal

Changing the configuration of the node type needs to be restarted to take effect. During normal operation, the device configured with the node type will leave the current network and be in a state of no network. After restarting, it will switch to the changed node type. The dormant terminal supports the wake-up function of the serial port receiving pin, and the length of the wake-up frame byte is less than or equal to 5 bytes. It is recommended to use "FF" with 5 bytes of "FF FF FF FF FF" to wake up.

6.6.4 Network Status

Read instruction format:

command format	command example
send： FE 01 02 FF return： FB 02 nwk_state	send： FE 01 02 FF return： FB 02 02

nwk_state：

0x00 No network

0x02 Already joined the network

0x03 Has a network but no parent

6.6.5 Network PAN_ID

Read instruction format:

command format	command example
send： FE 02 03 FF return： FB 03 pan_id	send： FE 02 03 FF return： FB 03 FE 5B

Configuration instruction format:

command format	command example
send：FD 02 03 pan_id FF return：FA 03	send：FD 02 03 FE 5B FF return：FA 03

pan_id：

0x0000～0xFFFE Fixed network PAN_ID

0xFFFF Random network PAN_ID

Note: If the coordinator is configured as 0xFFFF, PANID will be randomly selected to build a network. Terminals and routers configured with 0xFFFF can join any PANID network. PANID parameters need to be configured before joining the network.

6.6.6 Network short address:

Read instruction format:

command format	command example
send： FE 02 05 FF return： FB 05 Short_Addr	send： FE 02 05 FF return： FB 05 F6 FA

Short_Addr：2 Byte Address randomly assigned by the coordinator

6.6.7 MAC address

Read instruction format:

command format	command example
send： FE 08 06 FF return： FB 06 Mac_Addr	send： FE 08 06 FF return： FB 06 1F 1C 21 FE FF 57 B4 14

Mac_Addr： 8 Byte

6.6.8 Parent node network short address

Read instruction format:

command format	command example
send： FE 02 07 FF return： FB 07 Coor_shortAddr	send： FE 02 07 FF return： FB 07 00 00

Coor_shortAddr：2 Byte The short address of the parent node of the current node, if the coordinator is 0x0000

6.6.9 Parent node MAC address

Read instruction format:

command format	command example
send： FE 08 08 FF return： FB 08 Coor _Mac_Addr	send： FE 08 08 FF return： FB 08 0C 46 0C FE FF 9F FD 90

Coor_Mac_Addr：8 Byte The long address of the parent node of the current node

6.6.10 Network group number

Read instruction format:

command format	command example
send： FE 01 09 FF return： FB 09 group	send： FE 01 09 FF return： FB 09 01

Configuration command format：

command format	command example
send：FD 01 09 group FF	send：FD 01 09 01 FF

return：FA 09	return：FA 09

group：Group number range 0x01～0xFE (default 1)

6.6.11 Network Channels

Read instruction format:

command format	command example
send： FE 01 0A FF return： FB 0A channel	send： FE 01 0A FF return： FB 0A 0B

Configuration command format：

command format	command example
send：FD 01 0A channel FF return：FA 0A	send：FD 01 0A 0B FF return：FA 0A

channel：Channel range 0x0B(11)～0x1A(26) (default 11 channels), 0xFF means full channel scan.

Channel The parameters need to be configured before accessing the network.

6.6.12 Transmit power

Read instruction format:

command format	command example
send： FE 01 0B FF return： FB 0B txpower	send： FE 01 0B FF return： FB 0B 0A

Configuration command format：

command format	command example
send：FD 01 0B txpower FF return：FA 0B	send：FD 01 0B 0A FF return：FA 0B

txpower：The transmit power level (00) needs to be configured before accessing the network.

txpower	**Transmit power level （dbm）**	**txpower**	**Transmit power level （dbm）**
00	11.76	06	10.33
01	11.66	07	10.04
02	11.31	08	9.73
03	11.09	09	9.38
04	10.82	0A	9.03
05	10.54		

Note: The actual reference value of transmit power.

6.6.13 Serial port baud rate

Read instruction format:

command format	command example
send： FE 01 0C FF return： FB 0C baud	send： FE 01 0C FF return： FB 0C 09

Configuration command format：

command format	command example
send：FD 01 0C baud FF return：FA 0C	send：FD 01 0C 09 FF return：FA 0C

Baud rate parameter baud comparison table:

Buad	Baud rate	Buad	Baud rate
01	4800	08	76800
02	9600	09	115200(default)
03	14400	0A	128000
04	19200	0B	230400
05	38400	0C	256000
06	50000	0D	460800
07	57600		

Note: To change the baud rate configuration of serial communication, the device needs to be restarted, and the changed baud rate will take effect.

6.6.14 Sleep time

Read instruction format:

command format	command example
send： FE 01 0D FF return： FB 0D sleep_time	send： FE 01 0D FF return： FB 0D 54

Configuration command format(terminal valid)：

command format	command example
send：FD 01 0D sleep_time FF return：FA 0D	send：FD 01 0D 54 FF return：FA 0D

When the node is a dormant terminal, the functions are as follows:

sleep_time： (1~60) Sleep wake-up cycle means 1~60 units (seconds)

(61～255) sleep wake-up cycle means 60+(sleep_time-60)*10 unit (seconds)

The default value of the parameter is 10, which means 10 seconds.

Indicates the dormant period, and also indicates the data request period, and also indicates the heartbeat period. The data sent by the parent node can be received in less than 30 seconds. The shorter the period, the smaller the delay in receiving data; the shorter the period, the faster the switching to the best parent node, and the detection It is also faster to lose a parent node.

When the node is a terminal, the function is as follows:

If the node is a terminal, this parameter indicates the heartbeat period of the terminal and the parent node. The faster the heartbeat period, the faster the terminal switches routes to find the best parent node, and at the same time coordinates to detect the online status of the terminal through the heartbeat;

sleep_time：

Settings	Heartbeat cycle (seconds)
1	3
10	40
20	80
30	160
40	320
50	640
60	1280

Note: If the node is a coordinator and a router, this parameter is invalid;

6.6.15 Parent node save time

time： The parent node saves the data of its child nodes for 30 seconds. If there is a terminal node that needs to receive the data of the parent node, the sleep time configuration cannot be greater than 30 seconds.

Note: This parameter is the parameter of the parent node (router and coordinator), which temporarily saves the buffered data sent to the dormant node. The parent node (router and coordinator) is the E180-Z8910SX/P product

6.6.16 Node Rejoin Period

Read instruction format:

command format	command example
send： FE 01 29 FF return： FB 29 net_rejoinperiod	send： FE 01 29 FF return： FB 29 05

Configuration command format：

command format	command example
send：FD 01 29 time FF return：FA 29	send：FD 01 29 05 FF return：FA 29

Rejoin period: (1~254) Reconnection period range 1~254 unit minute, default 1 minute.

When the node is powered on, it will join the network (if there is no network status) or restore the network (if there is a network without parent node status) in the Rejoin period cycle. When the node detects that the parent node is offline during operation, it will reconnect with the “Rejoin period” period.

When the parameter is 254, it means that no reconnection or periodic network screening will be performed.

6.6.17 Maximum number of attempts to reconnect

Read instruction format:

command format	command example
send： FE 01 30 FF return： FB 30 net_rejoincount	send： FE 01 30 FF return： FB 30 05

Configuration command format：

command format	command example
send：FD 01 30 time FF return：FA 30	send：FD 01 30 05 FF return：FA 30

Rejoin maxcount: (1~254) The maximum number of reconnections ranges from 1 to 254 times, and the default is 10

After the node loses its parent node during operation or has a network without a parent node, try the maximum number of rejoins after power-on. If the previous network has not been restored, the previous network information will be cleared, and the new network will be periodically scanned to join with the Rejoin period. Scanning for a new network consumes more power than restoring the previous network.

When the parameter is 254, it means that when there is a network and no parent node, the reconnection is always performed and the action of clearing the network is not performed.

6.6.18 Wireless remote configuration ID

Read instruction format:

command format	command example
send： FE 02 31 FF return： FB 31 header	send： FE 02 31 FF return： FB 31 A8 8A

Configuration command format：

command format	command example
send：FD 02 31 header FF return：FA 31	send：FD 02 31 A8 8A FF return：FA 31

Remote Header: 0x0000 Indicates that the wireless network configuration is closed，0x0001～0xFFFF Indicates that remote configuration is turned on，The default setting is 0xA88A(0xA8 0x8A)。

6.6.19 User gpio parameters

Read instruction format:

command format	command example
command： FE 03 20 GpioId FF return： FB 20 GpioId In/Out level	send： FE 03 20 00 FF return： FB 20 00 01 01

Configuration command format：

command format	command example
command：FD 03 20 GpioId In/Out level FF return：FA 20	send：FD 03 20 00 01 01 FF return：FA 20

Format of gpio peripheral configuration data (3 Byte): GpioId In/Out level.

gpioid : channel ID

channel ID	GPIO port
00	PC0 port
01	PB4 port

In/Out: Channel output/input mode

0 output

1 input

level: The level status of the channel

0 low level

1 high level

2 turn over

Note: When configured as an input, level indicates the input level value 0 (low level) or 1 (high level), when configured as an output, level indicates 0 (low level), 1 (high level), 2 (electrical level) flat flip) output.

6.6.20 User pwm parameters

Read instruction format:

command format	command example
command： FE 06 21 PWMId FF return： FB 21 PWMId start/stop Period Period duty duty	send： FE 06 21 00 FF return： FB 21 00 01 0A 3E 63 50

Configuration command format：

command format	command example
command：FD 06 21 PwmId start/stop	send：FD 06 21 00 FF 03 65 02 48 FF

Period1 Period2 duty1 duty2 FF return：FA 21	return：FA 21

Pwm Peripheral configuration data format（6 Byte）：PwmId start/stop Period1 Period2 duty1 duty2

PwmId : channel ID

channel ID	PWM GPIO port
0x00	PC2 port
0x01	PD2 port
0x02	PC3 port
0x03	PC4 port

start/stop: Start and stop channel PWM output

0xFF means to start PWM in units of 1mS, the parameter range is 0-340, and the maximum period that can be set is 340mS. When the period parameter is less than 2, the period parameter is 2, and the period is 2mS (2*1mS).

0xFE means to start PWM in units of 0.5uS, the parameter range is 0-3400, and the maximum period that can be set is 1700uS (3400*0.5). When the period parameter is less than 2, the period parameter is 2, and the period is 1uS (2*0.5uS)

0x00 means stop PWM

period： The cycle time of pwm (determine the unit of the cycle and the maximum cycle according to the start/stop byte)

Period1 represents the high 8 bits of the period

Period2 represents the lower 8 bits of the period

duty：The duty cycle time of pwm (according to the start/stop byte determines the unit of the period and the maximum period)

duty1 represents the upper 8 bits of the duty cycle

duty2 represents the lower 8 bits of the duty cycle

Note:

1. The value of the period “period” must be greater than the duty cycle duty. It is recommended that the difference between the period “period” and the duty cycle duty be greater than 2ms. If the period is smaller than the duty cycle, the system will default that the period “period” is equal to twice the duty cycle duty. Here, the duty cycle Duty cycle means high time.
2. The PWM period units of the 4 channels need to be the same, and some of the 4 channels cannot be configured as ms level and some as us level, because the frequency division coefficients of the millisecond level and microsecond level are different, if some are configured as milliseconds level, and some configurations are at the microsecond level, which will cause the frequency division factor to be based on the last configuration.

6.6.21 User adc parameters

Read instruction format:

command format	command example
command： FE 03 22 adcid FF return： FB 22 adcid voltage1 voltage2	send： FE 03 22 00 FF return： FB 22 00 0C E4

Adc peripheral read data format (3 Byte): adcid voltage1 voltage2

adcid：ADC channel ID

channel ID	ADC GPIO port
0x00	VDD supply voltage detection
0x01	PB6 port
0x02	PB7 port

voltage： The read ADC channel voltage value (in mV)

Detectable range 0x0000～0x0E74 (0～3700)

voltage 1 means high 8 bits

voltage 2 means the lower 8 bits

e.g. read value：voltage =0x0C voltage =0xE4

Then the voltage value is：voltage =0x0CE4

Note:

1. If the power supply voltage is the highest 3.3V, the detection range of the ADC can reach the voltage of 3.3V at this time
2. The interval between reading the ADC voltage value of the same device twice must be greater than 10ms

6.6.22 Configure all network parameters

Configuration command format：

command format	command example
send：FD 1A FE all_info FF return：FA FE	send：FD 1A FE 03 FE 5B 01 0B 0A 09 54 00 00 00 0A 1C 21 FE FF 57 B4 14 02 00 FF 05 05 A8 8A FF return：FA FE

all_info：FD 1A FE 03 FE 5B 01 0B 0A 09 54 00 00 00 0A 1C 21 FE FF 57 B4 14 02 00 FF 05 05 A8 8A FF

Node type 03; PANID FE 5B; Network group number 01; Channel 0B; Transmit power 0A; Baud rate 09; Sleep time 54; Destination network short address 00 00; Destination network group number 00; 57 B4 14; System sending mode 02; Data output mode 00; Network open time FF (non-coordinator module does not support it); Rejoin cycle 05; Rejoin times 05; Wireless ID A8 8A;

6.6.23 Read all network parameters

Read instruction format:

send： FE 2F FE FF return： FB FE all_info	send： FE 2F FE FF return： FB FE 03 02 FE 5B F6 FA 1F 1C 21 FE FF 57 B4 14 00 00 0C 46 0C FE FF 9F FD 90 01 0B 0A 09 54 00 00 00 0A 1C 21 FE FF 57 B4 14 02 00 FF 05 05 A8 8A

all_info：FB FE 03 02 FE 5B F6 FA 1F 1C 21 FE FF 57 B4 14 00 00 0C 46 0C FE FF 9F FD 90 01 0B 0A 09 54 00 00 00 0A 1C 21 FE FF 57 B4 14 02 00 FF 05 05 A8 8A

Node type 03; Network status 02; Network short address FE 5B; Local network short address F6 FA; Local MAC address 1F 1C 21 FE FF 57 B4 14; Parent node network short address 00 00; Parent node MAC address 0C 46 0C FE FF 9F FD 90; network group number 01; channel 0B; sending power 0A; baud rate 09; sleep time 54; target network short address 00 00; target network group number 00; ; System sending mode 02; Data output mode 00; Network opening time FF (the coordinator is valid and this module does not support); rejoin cycle 05; rejoin times 05; wireless ID A8 8A;

6.6.24 Configure AUX to wake up external MCU serial port delay printing time in wireless receiving state

Read instruction format:

command format	command example
send： FE 01 35 FF return： FB 35 AUX_delaytime	send： FE 01 35 FF return： FB 35 04

Configuration command format：

command format	command example
send：FD 01 35 AUX_delaytime FF return：FA 35	send：FD 01 35 04 FF return：FA 35

AUX_delaytime: 1~255, the unit is ms, the default parameter is 4ms, that is, after the module receives the wireless data, it first pulls down the AUX pin to wake up the external MCU, and then delays 4ms to output the serial port data to the external MCU.

6.6.25 Configure serial port wake-up hold time

Read instruction format:

command format	command example
send： FE 01 36 FF return： FB 36 Uart_holdtime	send： FE 01 36 FF return： FB 36 64

Configuration command format：

command format	command example
send：FD 01 36 Uart_holdtime FF return：FA 36	send：FD 01 36 64 FF return：FA 36

Uart_holdtime: 1 ~ 255, the unit is 10ms, the default parameter is 100, that is, the serial port will keep waking up for 100*10ms after waking up, and then go to sleep after 1000ms.

6.6.26 Configure endpoint information

Read instruction format:

command format	command example

send： FE 05 37 FF return： FB 37 Endpoint_info	send： FE 05 37 FF return： FB 37 01 FE B0 05 04

Configuration command format：

command format	command example
send：FD 05 37 Endpoint_info FF return：FA 37	send：FD 05 37 01 FE B0 05 04 FF return：FA 37

Endpoint_info：The length data format of 5 bytes is endpoint clusterId_H clusterId_L profileId_H profileId_L

Default parameters endpoint 0x01, clusterId 0xfeb0, profileId 0x0504。

endpoint	clusterId		profileId	
	clusterId_H	clusterId_L	profileId_H	profileId_L
01	FE	B0	05	04

6.6.27 Configure the trust center connection key

Read instruction format:

command format	command example
send： FE 10 38 FF return： FB 38 TrustCentLinkKey	send： FE 10 38 FF return： FB 38 5A 69 67 42 65 65 41 6C 6C 69 61 6E 63 65 30 39

Configuration command format：

command format	command example
send：FD 10 38 TrustCentLinkKey FF return：FA 38	send：FD 10 38 5A 69 67 42 65 65 41 6C 6C 69 61 6E 63 65 30 39 FF return：FA 38

TrustCentLinkKey： 16 bytes in length, the default value is the default key of the ZigBee Alliance, and its value is

0x5A 0x69 0x67 0x42 0x65 0x65 0x41 0x6C

0x6C 0x69 0x61 0x6E 0x63 0x65 0x30 0x39

The device restarts to take effect.

Note: Only the network-connected device holds the same connection key (LinkKey) as the trust center (coordinator) to connect to the network of the trust center (coordinator), and the trust center (coordinator) transmits the network key to the network-connected device , the network access device completes the process of joining the network to obtain the network key for normal communication.

6.6.28 Parameter Description of Firmware Version Command

Read instruction format:

command format	command example
command： FE 03 34 FF return： FB 34 FirmwareVersion	send： FE 03 34 FF return： FB 34 82 58 00

Firmware_version: 82 58 00

82 58 Indicates Telink's 8258 chip

00 Indicates the firmware version number

Chapter Seven Frequently Asked Questions

7.1 The transmission distance is not ideal

- When there is a straight-line communication obstacle, the communication distance will be attenuated accordingly;
- Temperature, humidity, and co-channel interference will increase the communication packet loss rate;
- he ground absorbs and reflects radio waves, and the test effect is poor when it is close to the ground;
- Seawater has a strong ability to absorb radio waves, so the seaside test effect is poor;
- There are metal objects near the antenna, or placed in a metal case, the signal attenuation will be very serious;
- The power register is set incorrectly, and the air speed is set too high (the higher the air speed, the closer the distance);
- The low voltage of the power supply at room temperature is lower than the recommended value, and the lower the voltage, the lower the output power;
- The matching degree between the antenna and the module is poor or the quality of the antenna itself is problematic.

7.2 The module is easily damaged

- Please check the power supply to ensure that it is within the recommended power supply voltage. If it exceeds the maximum value, it will cause permanent damage to the module;
- Please check the stability of the power supply, the voltage cannot fluctuate greatly and frequently;
- Please ensure anti-static operation during installation and use, and high-frequency devices are electrostatically sensitive;
- Please ensure that the humidity during installation and use should not be too high, some components are humidity sensitive devices;
- If there is no special requirement, it is not recommended to use it at too high or too low temperature.

7.3 The bit error rate is too high

- There is co-channel signal interference nearby, stay away from the source of interference or modify the frequency and channel to avoid interference;
- Unsatisfactory power supply may also cause garbled characters, so ensure the reliability of the power supply;

- Poor quality or too long extension cables and feeders will also cause high bit error rates.

Revise History

Version	Revision Date	Revision Notes	Maintenance
1.4	2023-02-23	error correction	Bin
1.5	2023-03-09	error correction	Bin

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