Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual



EWD95M-xxxSLxx(xxx)

All rights to interpret and modify this manual belong to
Chengdu Ebyte Electronic Technology Co., Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Contents

Disclaimer ..... 错误！未定义书签。
1. Product Overview 4
1.1 Product Introduction 4
1.2 Features 4
1.3 Quick Start 5
1.4 Description of each part 7
1.5 Installation dimensions 11
2. Technical indicators 12
2.1 Model Specifications 12
2.2 General Specifications 12
2.3 Frequency range and number of channels 13
2.4 Transmit Power Level 13
2.5 Air Speed Class 13
2.6 Current parameters 13
2.7 Sending and receiving length and subcontracting method 14
3. Detailed explanation of functions 14
3.1 Fixed-point transmission (hexadecimal) 14
3.2 Broadcast transmission (hexadecimal) 15
3.3 Broadcast Address 15
3.4 Listening Address 15
4. Working Mode 15
4.1 Transparent transmission mode (mode 0) 16
4.2 WOR mode (mode 1) 16
4.3 Configuration Mode (Mode 2) 16
5. Register read and write control 16
5.1 Instruction Format 16
5.2 Register Description 18
5.3 Factory default parameters 21
6. AT commands 21
6.1 AT command table 21
6.2 AT parameter analysis 24
7. Use of relay networking mode 25
8. Host computer configuration instructions 26
9. Firmware Upgrade Instructions 27
10. Program the Radio Station 28
11. Connection diagram in testing and actual application 29
12. Practical Application Fields 30
13. Precautions for use 30
Revision History 31
About us 31

Copyright © 2012–2025 , Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Disclaimer and Copyright Notice

The information contained herein, including the URLs for reference, is subject to change without prior notice. This document is provided "as is" without any warranties, including but not limited to warranties of merchantability, fitness for a particular purpose, and non-infringement, as well as any warranties implied by proposals, specifications, or samples mentioned elsewhere. The company shall not be liable for any claims, including liabilities arising from the use of information in this document that may infringe upon any patent rights. No intellectual property license, either express or implied, is granted herein by estoppel or otherwise.

All test data stated in this document are obtained by Ebyte Laboratory, and actual results may vary slightly.

All trade names, trademarks and registered trademarks mentioned herein are the property of their respective owners.

This product is strictly prohibited from being used in military applications and life safety-related scenarios. The user shall bear full responsibility for any unauthorized use.

Chengdu Ebyte Electronic Technology Co., Ltd. reserves the right of final interpretation.

Notice :

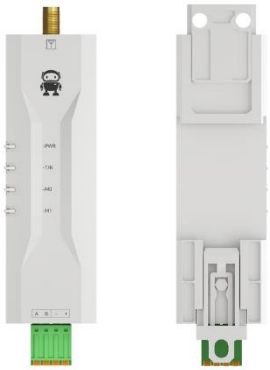
The content of this manual may be modified due to product version upgrades or other reasons. Chengdu Ebyte Electronic Technology Co., Ltd. reserves the right to revise the contents of this manual without prior notice. This manual is intended solely for operational guidance. While every effort has been made to ensure the accuracy of the information herein, the company does not warrant that the content is entirely error-free. All statements, information and recommendations contained in this manual shall not constitute any express or implied warranties whatsoever.

Copyright © 2012–2025 , Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1. Product Overview

1.1 Product Introduction



EWD95M-xxxSLxx(xxx) [①] is a wireless data transmission radio using military-grade LoRa modulation technology . It has multiple transmission modes and operates in two frequency bands: 410.125 MHz to 493.125 MHz and 850.125 to 930.125 MHz. It supports intercommunication with our E22 series modules. The radio provides a transparent RS485/RS232 interface, uses a plastic shell, and a guide rail installation structure, and supports 8 to 28V (DC) wide voltage input . LoRa spread spectrum technology will bring a longer communication distance and has the advantage of strong anti-interference ability.

As a communication medium, wireless data transmission radio has a certain scope of application, just like optical fiber, microwave and open wire: it provides real-time and reliable data transmission of monitoring signals in private networks under certain special conditions. It has the characteristics of low cost, easy installation and maintenance, strong diffraction ability, flexible networking structure and long coverage. It is suitable for occasions with many dispersed points and complex geographical environment, and can be connected with data terminals such as PLC, RTU, rain gauge and liquid level meter.

1.2 Features

★ Adopting the latest Lo Ra technology, it has a longer range and more powerful performance than traditional Lo Ra digital radios;

★ Support serial port firmware upgrade, which makes firmware update more convenient;

★ Support AT commands, which makes it more convenient to use;

★ Ultra-small size, 80*28*28.5mm, easy and quick to install;

★ EWD95M-xxxSLxx(xxx) can reach 10 km under ideal conditions ;

★ With data encryption, the sub-packet length can be set;

★ Adopt flame-retardant plastic shell and guide rail installation structure, which is convenient and efficient to install;

★ Use hidden buttons to switch working modes to avoid false triggering, making the equipment more reliable.

★ Simple and efficient power supply design, supports power adapter or wire pressing, supports 8~28V (DC) power supply;

★ The transmission power is 22/30dBm and supports multi-level adjustment. All technical indicators meet industrial standards.

★ Supports data transmission rates of 2.4K to 62.5Kbps;

★ Support Modbus protocol transmission;

★ Support RSSI signal strength indication function, which is used to evaluate signal quality, improve communication network, and measure distance;

★ Support LBT function, the radio automatically waits for transmission according to the current environmental noise intensity. Greatly improve the communication success rate of the radio in harsh environments;

★ Supports wireless sending of command data packets to remotely configure or read radio station parameters;

Copyright © 2012–2025 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

★ Supports communication key function to effectively prevent data from being intercepted;

★ It can realize multi-level relay networking, effectively extend the communication distance, and achieve ultra-long-distance communication;

★ Working temperature range: -40℃ ～ +85℃, adaptable to various harsh working environments, a true industrial-grade product;

★ Multiple protection functions such as power reverse connection protection, over connection protection, antenna surge protection, etc. greatly increase the reliability of the radio;

★ The communication port and power interface adopt isolation and high protection;

★ Powerful software functions, all parameters can be set by programming: such as power, frequency, air rate, address ID, etc.

★ Built-in watchdog and precise time layout. Once an abnormality occurs, the radio will automatically restart and continue to work according to the previous parameter settings.

① Note: EWD95M-xxxSLxx(xxx) is the nominal value of multiple models. For detailed models, please refer to Section 2.1

1.3 Quick Start

① You need to prepare two sets of DTU debugging components, including EWD95M-xxxSLxx(xxx) , antenna, DC 5V~28V power adapter, USB to RS232/RS485 (or other methods), and connecting cable (including 4PIN 3.81 Phoenix terminal male head) 2 pieces each.

② First, install the antenna for the digital radio . Then power on the DTU through the power adapter and connect the cables, A+/TX to A/T, B-/RX to B/R.



③ Finally, connect the computer to the two digital radios via USB to RS232/RS485 (or other methods);

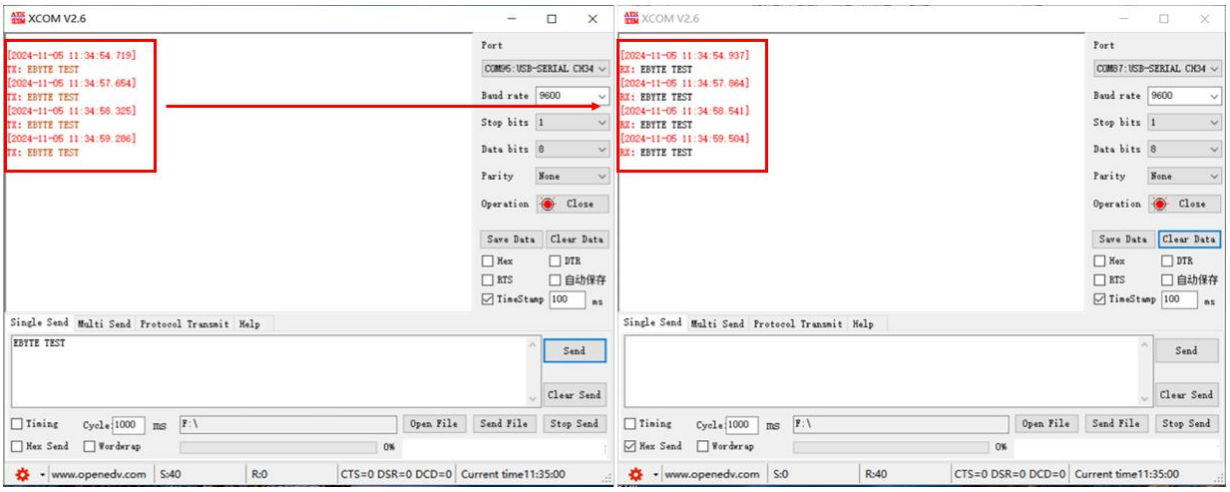


④ Start two serial port debugging assistants, select the serial port baud rate as 9600bps (default) and 8N1, and switch the DTU to transparent transmission mode.

⑤ Enter data, check HEX SEND, send data in hexadecimal format, both directions are available.

Copyright © 2012–2026 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000



⑥ If the customer needs to switch the working mode, he can use the Mode button to control the different working modes (M0 indicator light, M1 indicator light). Pressing Mode once means switching the mode once. The details of mode switching are shown in the table below:

Serial number	category	M1	M0	Notes
Mode 0	Transparent mode	Lights out	Lights out	Serial port is turned on, wireless is turned on, transparent transmission (factory default mode), and special command air configuration is supported.
Mode 1	WOR Mode	Lights out	Lights on	Can be defined as WOR sender and WOR receiver, support air wake-up
Mode 2	Configuration Mode	Lights on	Lights out	The user accesses the registers through the serial port to control the working status of the radio. The user can configure the radio through the host computer configuration software.

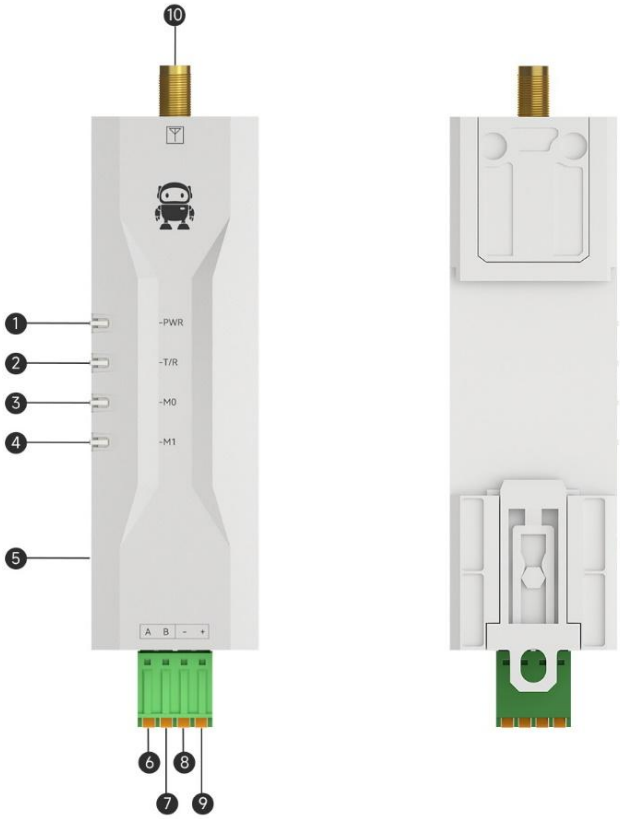
Note: The radio has a power-off saving mode function (the factory default setting is transparent transmission mode). Users need to switch to the corresponding mode according to the M1 and M0 indicator lights (effective immediately).

Copyright © 2012–2026 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1.4 Description of each part

1.4.1 RS485 interface



Serial number	name	Function	illustrate
1	PWR	Power indicator	Lights up when the power is on.
2	T/R	Send/Receive Indicator	The flashing light is red when sending data and green when receiving data.
3	M0	Mode indicator	Working mode indicator light.
4	M1	Mode indicator	Working mode indicator light.
5	Mode	Mode switch button	Working mode switching control.
6	A	RS485 Signal A	RS485 Signal A
7	B	RS485 Signal B	RS485 Signal B
8	-	GND	Negative power supply
9	+	VCC	Power supply positive (DC 8～28V)
10	ANT	RF Interface	SMA-K, external threaded inner hole.

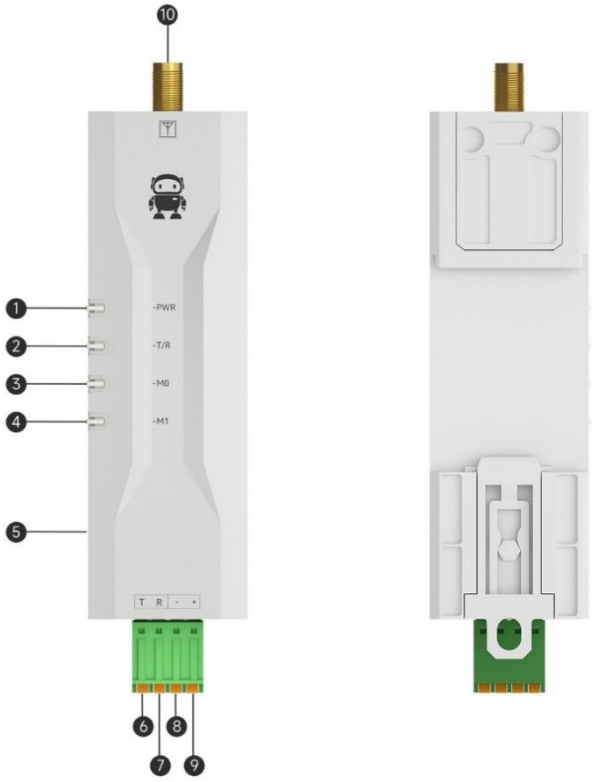
★ Note: If communication is not smooth when the radio is connected to multiple devices, but not when connected to a single device, try connecting a 120Ω resistor in parallel between the 485_A terminal and the 485_B terminal.

★ EWD95M-xxxSLxx(xxx) can be powered by 8~28V (DC) power supply, and the wiring port is connected by terminal block.

Copyright © 2012–2026 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1.4.2 RS232 interface



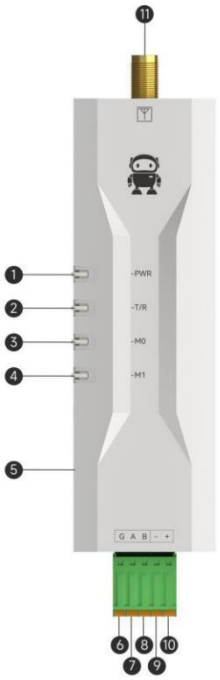
Serial number	name	Function	illustrate
1	PWR	Power indicator	Lights up when the power is on.
2	T/R	Send/Receive Indicator	The flashing light is red when sending data and green when receiving data.
3	M0	Mode indicator	Working mode indicator light.
4	M1	Mode indicator	Working mode indicator light.
5	Mode	Mode switch button	Working mode switching control.
6	T	RS232 bus TX interface	RS232-TX interface
7	R	RS232 bus RX interface	RS232-RX interface
8	-	VCC	Negative power supply
9	+	GND	Power supply positive (DC 8～28V)
10	ANT	RF Interface	SMA-K, external threaded inner hole.

★ EWD95M-xxxSLxx(xxx) can be powered by 8~28V (DC) power supply, and the wiring port is connected by terminal block.

Copyright © 2012–2026 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1.4.3 High protection isolated RS485 interface



Serial number	name	Function	illustrate
1	PWR	power light	Light ates when power is on.
2	T/R	Send / receive the indicator light	Flash light is red when sending data and green when receiving data.
3	MO	Mode indicator light	Operating mode indicator light.
4	M1	Mode indicator light	Operating mode indicator light.
5	Mode	Mode switch button	Working mode switching control.
6	G	GND	Ground.
7	A	The RS485 signal A	Standard RS485 interface.
8	B	The RS485 signal B	Standard RS485 interface.
9	-	GND	DC power input port, voltage line port.
10	+	VCC	DC power input port, voltage line port.
11	ANT	radio frequency interface	SMA-K，External thread inner hole.

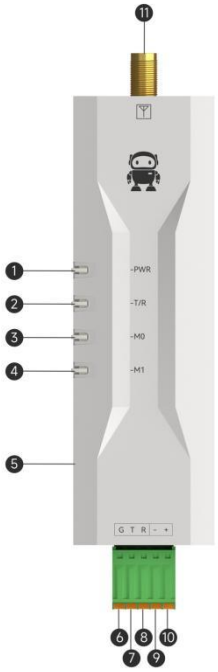
★ Note: When the radio station is connected to multiple devices, but not with a single device, try to parallel 120 Ω resistance between terminal 485_A and 485_B terminals.

★ EWD95M-xxxSLxxP(xxx) can be powered by 8~28V (DC) power supply, and the wiring port is connected by a terminal (2 Pin).

Copyright © 2012–2026 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1.4.4 High protection isolated RS232 interface



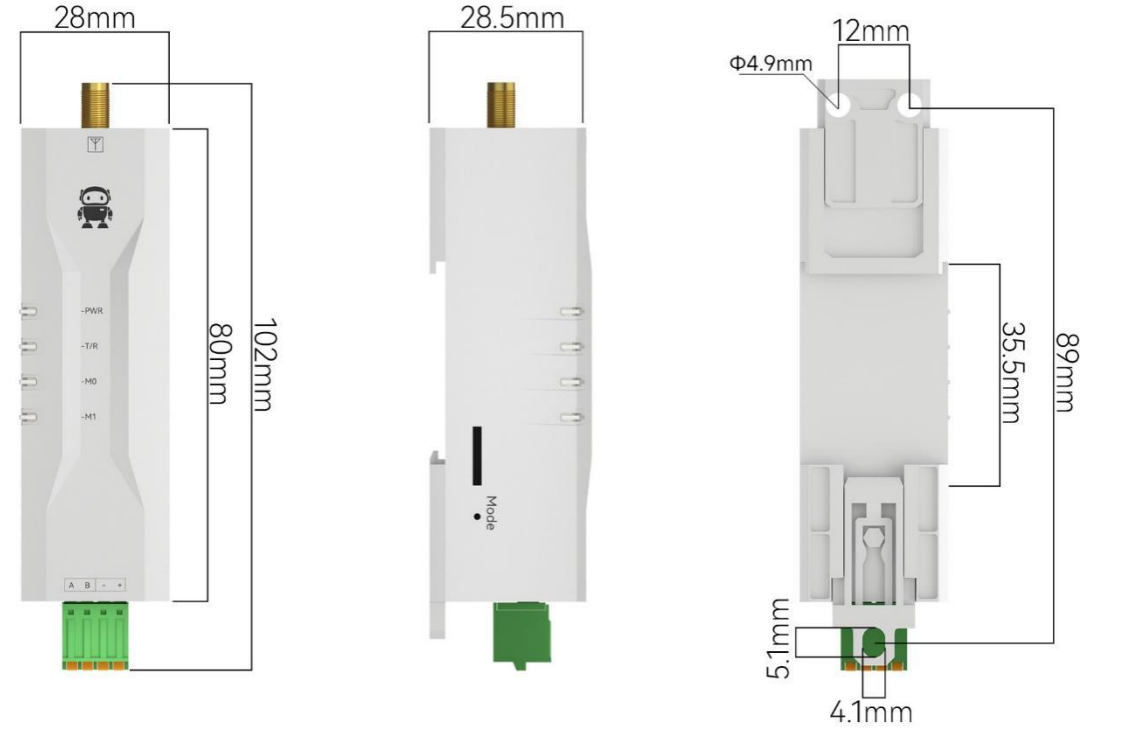
Serial number	name	Function	illustrate
1	PWR	Power light	Light ates when power is on.
2	T/R	Send / receive the indicator light	Flash light is red when sending data and green when receiving data.
3	MO	Mode indicator light	Operating mode indicator light.
4	M1	Mode indicator light	Operating mode indicator light.
5	Mode	Mode switch button	Working mode switching control.
6	G	Signal ground	Anti-interference, grounding.
7	T	The RS232 bus TX interface	RS232 interface The TX interface is connected to the device RX interface.
8	R	The RS232 bus RX interface	RS232 interface The RX interface is connected to the device TX interface.
9	-	GND	DC power input port, voltage line port.
10	+	VCC	DC power input port, voltage line port.
11	ANT	Radio frequency interface	SMA-K，External thread inner hole.

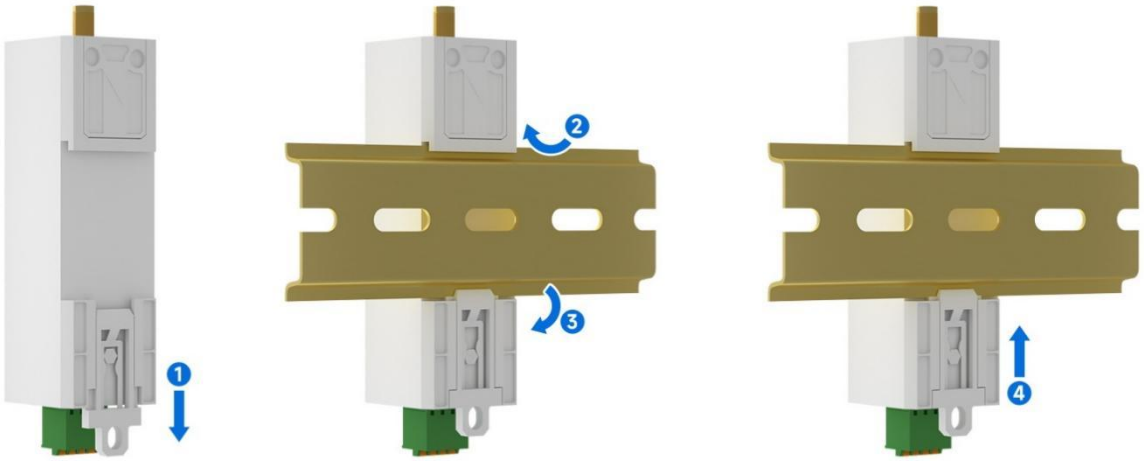
★ EWD95M-xxxSLxxP(xxx) can be powered by 8~28V (DC) power supply, and the wiring port is connected by a terminal (2 Pin).

Copyright © 2012–2026 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1.5 Installation dimensions





Copyright © 2012–2026 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

2. Technical indicators

2.1 Model Specifications

Model Specifications	Operating frequency	Transmit power	Reference distance	Air speed	Technical characteristics
	Hz	dBm	km	bps	
EWD95M-400SL22(485) EWD95M-400SL22(232)	410.125 ～ 493.125 M	twenty two	5	2.4 ~ 62.5k	New generation LoRa spread spectrum technology
EWD95M-400SL22P(485)	410.125 ～ 493.125 M	twenty two	5	2.4 ~ 62.5k	New generation LoRa spread spectrum technology , isolated and highly protected.
EWD95M-400SL 30 (485)	410.125 ～ 493.125 M	30	10	2.4 ~ 62.5k	New generation LoRa spread spectrum technology
EWD95M-900SL22P(485)	850.125～ 930.125M Hz	twenty two	5	2.4 ~ 62.5k	New generation LoRa spread spectrum technology , isolated and highly protected.

★ Note: Sunny weather, open environment without obstructions, 12V/1A power supply, 5dBi suction cup antenna, antenna height 2 meters from the ground, use factory default parameters.

2.2 General Specifications

Serial number	project	Specification	illustrate
1	Product size	80*28*28.5mm	See installation dimensions for details
2	Product Weight	32g	Weight tolerance 2g
3	Operating temperature	-40℃～+85℃	Industrial Grade
4	Voltage range	8～28V (DC)	The DC version is recommended to use 12V or 24V
5	Communication interface	RS485/RS232	RS485 or RS232, choose one, please refer to the product label
6	Baud rate	Factory default 9600	Baud rate range: 1200～115200
7	Address code	Factory default 0	A total of 65536 address codes can be set

Copyright © 2012–2026 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

2.3 Frequency range and number of channels

Model Specifications	Default frequency	Frequency range	Channel spacing	Number of channels
	Hz	Hz	Hz	
EWD95M- 400 SLxx x (xxx)	433.125M	410.125～493.125M	1M	84, half-duplex
EWD95M- 900SLxx x (xxx)	868.125M	850.125～930.125M	1M	81, half-duplex

★ Note: When using multiple groups of data radios for one-to-one communication in the same area, it is recommended that the channel spacing of each group of data radios be set to more than 2MHz.

2.4 Transmit Power Level

Model Specifications	0 (factory default)	1	2	3
EWD95M-xxxSL 22x (xxx)	22dBm	17dBm	13dBm	10dBm
EWD95M-xxxSL 30x (xxx)	30 dBm	2 7dBm	24 dBm	21 dBm

★ Note: The lower the transmit power, the shorter the transmission distance, but the operating current does not decrease in the same proportion. It is recommended to use the maximum transmit power.

2.5 Air Speed Class

Model Specifications	Default air rate	Number of levels	Air speed rating
	bps		kbps
EWD95M-xxxSLxx(xxx)	2.4k	6	2.4, 4.8 , 9.6, 1 9.2 , 38.4 , 6 2.5

★ Note: The higher the airspeed setting, the faster the transmission rate and the shorter the transmission distance; therefore, if the rate meets the use requirements, it is recommended that the airspeed be as low as possible.

2.6 Current parameters

Model Specifications	Emission current mA			Receive current mA		
	8 V	12V	28V	8 V	12V	28V
EWD95M- 400 SL 22 (xxx)	94	68	28	9	7	3

Copyright © 2012–2026 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

EWD95M- 400 SL 22P (xxx)	88	59	26	17	11	5
EWD95M-400SL 30 (xxx)	450	280	130	15	10	4
EWD95M - 900SL22P (xxx)	98	65	30	17	11	5

★ Note: When the output power is set to the maximum, it is recommended to retain more than 50% current margin when selecting the power supply, which is conducive to the long-term and stable operation of the radio.

2.7 Sending and receiving length and subcontracting method

Model Specifications	Cache size	Subcontracting
EWD95M-xxxSLxx(xxx)	1000 bytes	The command can be set to send packets of 32/64/128/240 bytes

★ Notice:

1. If the data received by the radio at a single time is larger than the capacity of a single packet, the excess data will be automatically allocated to the second transmission until the transmission is completed;
2. The amount of data received by the radio at one time cannot be larger than the buffer capacity.

3. Detailed explanation of functions

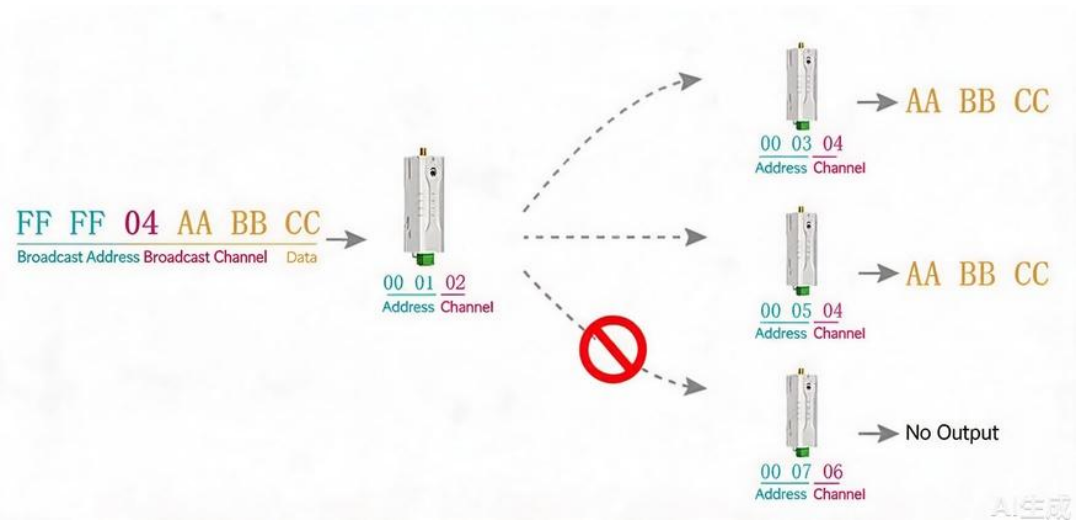
3.1 Fixed-point transmission (hexadecimal)



Copyright © 2012–2026 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3.2 Broadcast transmission (hexadecimal)



3.3 Broadcast Address

- For example: Set the address of radio station A to 0xFFFF and the channel to 0x04.
- When station A is used as a transmitter (same mode, transparent transmission), all receiving stations under channel 0x04 can receive the data, thus achieving the purpose of broadcasting.

3.4 Listening Address

- For example: Set the address of radio station A to 0xFFFF and the channel to 0x04.
- When radio station A is used as a receiver, it can receive all the data under channel 0x04 to achieve the purpose of monitoring.

4. Working Mode

E95M-DTU (xxxSLxxx) has three working modes. When there is no demanding low power consumption requirement and normal communication is required, it is recommended to configure the radio to transparent transmission mode (mode 0);

The default setting of the radio is transparent mode (mode 0) when it leaves the factory.

Serial number	category	M1	M0	Notes
Mode 0	Transparent mode	Lights out	Lights out	Serial port is turned on, wireless is turned on, transparent transmission (factory default mode), and special command air configuration is supported.

Copyright © 2012–2026 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Mode 1	WOR Mode	Lights out	Lights on	Can be defined as WOR sender and WOR receiver, support air wake-up
Mode 2	Configuration Mode	Lights on	Lights out	The user accesses the registers through the serial port to control the working status of the radio. The user can configure the radio through the host computer configuration software.

Note: If there is no low power consumption requirement, you do not need to worry about the WOR mode (mode 1).

4.1 Transparent transmission mode (mode 0)

type	When the M0 indicator light is off , the M1 indicator light is off , and the radio operates in mode 0
emission	The user can input data through the serial port, and the radio will start wireless transmission.
take over	The radio's wireless receiving function is turned on, and after receiving wireless data, it will be output through the serial port TXD pin.

4.2 WOR mode (mode 1)

type	When the M0 indicator light is on and the M1 indicator light is off , the radio operates in Mode 1.
emission	When defined as a transmitter , a wake-up code will be automatically added for a certain period of time before transmission .
take over	Data can be received normally , and the receiving function is equivalent to mode 0

4.3 Configuration Mode (Mode 2)

type	When the M0 indicator light is off and the M1 indicator light is on, the radio operates in mode 2.
emission	Wireless configuration possible
take over	Wireless configuration possible
Configuration	Users can access registers to configure the radio operating status

5. Register read and write control

5.1 Instruction Format

In configuration mode (mode 2: M1 light off , M0 light on), the supported command list is as follows (**when setting,**

Copyright © 2012–2026 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

only 9600, 8N1 format is supported):

Serial number	Instruction Format	Detailed description
1	Setting Registers	Instruction: C0+starting address+length+parameter Response: C1+starting address+length+parameters Example 1: Configure the channel to 0x09 Instruction start address length parameter Send: C0 05 01 09 Return: C1 05 01 09 Example 2: Configure the module address (0x1234), network address (0x00), serial port (9600 8N1), and airspeed (2.4 K) at the same time Send: C0 00 04 12 34 00 6 0 Return: C1 00 04 12 34 00 6 0
2	Read Register	Instruction: C1+starting address+length Response: C1+starting address+length+parameters Example 1: Reading a channel Instruction start address length parameter Send: C1 05 01 Return: C1 05 01 09 Example 2: Read module address, network address, serial port, and airspeed simultaneously Send: C1 00 04 Return: C1 00 04 12 34 00 6 0
3	Setting up temporary registers	Instruction: C2 + starting address + length + parameter Response: C1 + start address + length + parameter Example 1: Configure the channel to 0x09 Instruction start address length parameter Send: C2 05 01 09 Return: C1 05 01 09 Example 2: Configure the module address (0x1234), network address (0x00), serial port (9600 8N1), and airspeed (2.4 K) at the same time Send: C2 00 04 12 34 00 6 0 Return: C1 00 04 12 34 00 6 0
4	Wireless Configuration	Instruction: CF CF + regular instruction Response: CF CF + normal response Example 1: The wireless configuration channel is 0x09 Wireless command header command start address length parameter Send: CF CF C0 05 01 09 Return: CF CF C1 05 01 09 Example 2: Wirelessly configure the module address (0x1234), network address (0x00), serial port (9600 8N1), and airspeed (2.4 K) at the same time Send: CF CF C0 00 04 12 34 00 6 0 Return: CF CF C1 00 04 12 34 00 6 0
5	Format Error	Format Error Response FF FF FF / " =ERR "

Copyright © 2012–2026 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

5.2 Register Description

Serial number	Read and Write	name	describe				Remark
00H	Read/ Write	ADDH	ADDH (default 0)				Module address high byte and low byte ; Note: When the module address is equal to FFFF, it can be used as a broadcast and monitoring address, that is, the module will not perform address filtering at this time
01H	Read/ Write	ADDL	ADDL (default 0)				
02H	Read/ Write	NETID	NETID (default 0)				Network address, used to distinguish networks ; When communicating with each other, they should be set to the same.
0 3H	Read/ Write	REG0	7	6	5	UART serial port rate (bps)	The two modules that communicate with each other can have different serial port baud rates and verification methods ; When transmitting large data packets continuously, users need to consider data blocking or even data loss caused by the same baud rate ; It is generally recommended that both parties in communication have the same baud rate.
			0	0	0	The serial port baud rate is 1200	
			0	0	1	The serial port baud rate is 2400	
			0	1	0	The serial port baud rate is 4800	
			0	1	1	The serial port baud rate is 9600 (default)	
			1	0	0	The serial port baud rate is 19200	
			1	0	1	The serial port baud rate is 38400	
			1	1	0	The serial port baud rate is 57600	
			1	1	1	The serial port baud rate is 115200	
			4	3	Serial port check digit		The serial port modes of the two communicating parties can be different ;
			0	0	8 N1 (default)		
			0	1	8 O1		
			1	0	8 E1		
			1	1	8 N1 (equivalent to 0 0)		
			2	1	0	Wireless air rate (bps)	The air rate of both communicating parties must be the same ; air rate, the smaller the delay and the shorter the transmission distance.
			0	0	0	Air rate 2.4k (default)	
			0	0	1	Air speed 4.8k	
			0	1	0	Air speed 9.6k	
			0	1	1	Air speed 1 9.2k	

Copyright © 2012–2026 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

			1	0	0	Air speed 38.4 k	
			1	0	1	Air speed 62.5 k	
0 4H	Read/ Write	REG1	7	6	Subcontracting settings		The data sent by the user is smaller than the packet length, and the serial port output at the receiving end appears as uninterrupted continuous output ; If the data sent by the user is larger than the packet length, the receiving serial port will output it in packets.
			0	0	2 40 bytes (default)		
			0	1	1 28 bytes		
			1	0	6 4 bytes		
			1	1	3 2 bytes		
			5	RSSI environment noise enable			After enabling, you can send instructions C0 C1 C2 C3 to read registers in transfer mode or WOR send mode ; Register 0x00: Current ambient noise RSSI ; Register 0X01: RSSI when receiving data last time (Current channel noise is: dBm = -(256 - RSSI)) ; Instruction format: C0 C1 C2 C3 + starting address + read length ; Return: C1 + address + read length + read valid value; such as: send C0 C1 C2 C3 00 01 Return C1 00 01 RSSI **(address can only start from 0 0)**
			0	Disabled (default)			
			1	Enable			
			4	3	reserve		
			2	Software mode switching			**If you use our host computer to configure the parameters, this bit will be automatically turned off.** If you do not want to use the button to switch the working mode, you can enable this function and use specific serial port commands to switch the mode. Format: C0 C1 C2 C3 02 + working mode Send C0 C1 C2 C3 02 00 to switch to transparent transmission mode Send C0 C1 C2 C3 02 01 to switch to WOR mode Send C0 C1 C2 C3 02 02 to switch to configuration mode Return: C1 C2 C3 02 + working mode Note: After enabling this function, WOR mode and sleep mode only support 9600 baud rate.
			0	Disabled (default)			
			1	Enable			
			1	0	Transmit power		The relationship between power and current is nonlinear. When the power is at maximum, the power efficiency is the highest . The current does not decrease in the same proportion as the power decreases.
			0	0	22/30d B m (default)		
			0	1	17/27d B m		
			1	0	13/24d B m		
			1	1	10/21d B m		

Copyright © 2012–2026 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

<table>
<tr><td>0 5H</td><td>Read/ Write</td><td>REG2</td><td colspan="4">Channel control (CH)
0-83 represent a total of 8 4 channels (applicable to 400 frequency band)
0-80 represent a total of 81 channels (applicable to 900 frequency band)</td><td>Actual frequency = 410.125 + CH * 1M
Actual frequency = 850.125 + CH *1M</td></tr>
<tr><td rowspan="20">0 6H</td><td rowspan="20">Read/ Write</td><td rowspan="20">REG3</td><td>7</td><td colspan="3">Enable RSSI Byte</td><td rowspan="3">After enabling, the module receives wireless data and outputs it through the serial port TXD, followed by an RSSI strength byte.</td></tr>
<tr><td>0</td><td colspan="3">Disabled (default)</td></tr>
<tr><td>1</td><td colspan="3">Enable</td></tr>
<tr><td>6</td><td colspan="3">Transmission method</td><td rowspan="3">During fixed-point transmission, the module will recognize the first three bytes of the serial port data as: address high + address low + channel, and use it as the wireless transmission target.</td></tr>
<tr><td>0</td><td colspan="3">Transparent transmission (default)</td></tr>
<tr><td>1</td><td colspan="3">Fixed-point transmission</td></tr>
<tr><td>5</td><td colspan="3">Relay function</td><td rowspan="3">After the relay function is enabled, if the destination address is not the module itself, the module will initiate a forwarding ;
To prevent data from being transmitted back, it is recommended to use it in conjunction with fixed-point mode ; that is, the target address and source address are different.</td></tr>
<tr><td>0</td><td colspan="3">Disable relay functionality (default)</td></tr>
<tr><td>1</td><td colspan="3">Enable relay function</td></tr>
<tr><td>4</td><td colspan="3">L BT Enable</td><td rowspan="3">When enabled, wireless data will be monitored before transmission, which can avoid interference to a certain extent, but may cause data delays ;

The maximum stay time of LBT is 2 seconds, and it will be forcibly issued after 2 seconds.</td></tr>
<tr><td>0</td><td colspan="3">Disabled (default)</td></tr>
<tr><td>1</td><td colspan="3">Enable</td></tr>
<tr><td>3</td><td colspan="3">WOR mode transceiver control</td><td rowspan="3">Only valid for mode 1;
1. In the receiving mode of wor, the module can modify the delay time after wake-up, the default time is 0;
2. The receiving end needs to send the command C0 09 02 03 E8 in the configuration mode (C0 is the write command, 09 is the register start address, 02 is the length, 03 E8 is the set delay, the maximum FFFF is 65535ms, and setting it to 0 turns off the wake-up delay.)
3. Data can be sent within the delay</td></tr>
<tr><td>0</td><td colspan="3">W OR Receiver (Default)
Working in WOR monitoring mode, the monitoring cycle is shown below (WOR cycle), which can save a lot of power consumption.</td></tr>
<tr><td>1</td><td colspan="3">W OR transmitter
The module is turned on for transmission and reception, and a wake-up code is added for a certain period of time when transmitting data.</td></tr>
<tr><td>2</td><td>1</td><td>0</td><td>W OR Cycle</td><td rowspan="9">Only valid for mode 1;

Period T = (1+WOR) *500ms , maximum 4000ms , minimum 500ms ;

The longer the WOR monitoring interval is, the lower the average power consumption is, but the greater the data delay is;

The sender and receiver must be consistent (very important)</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>500 ms</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>1000 ms</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>1500 ms</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>2000 ms (default)</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>2500 ms</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td>3000 ms</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>3500 ms</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>4000 ms</td></tr>
</table>

Copyright © 2012–2026 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

0 7H	Write	CRYPT_H	Key high byte (default 0)	Write only, read returns 0 ; Used for encryption to prevent wireless data from being intercepted by similar modules ; The module will use these two bytes as calculation factors to transform and encrypt the wireless signal in the air.
0 8H	Write	CRYPT_L	Key low byte (default 0)	
8 0H ～8 6H	read	PID	Product information 7 bytes	It has been suspended and is only reserved. Please refer to the AT+DEVTYPE and AT+FWCODE commands in section 6.1 .

5.3 Factory default parameters

Factory default parameter values	**Factory default parameter values**						
Radio Model	frequency	address	Channel	Air speed	Baud rate	Serial port format	Transmit power
EWD95M- 400 SL 22x (xxx)	433.125MHz	0x0000	0x 17	2.4kbps	9600	8N1	2 2 dBm
EWD95M- 400 SL 30x (xxx)	433.125MHz	0x0000	0x17	2.4kbps	9600	8N1	30 dBm
EWD95M -900SL 22x (xxx)	868.125MHz	0x0000	0x12	2.4kbps	9600	8N1	22 dBm

6. AT commands

- Parameter configuration or query using AT commands must be performed in configuration mode;
- AT commands are used in configuration mode. AT commands are divided into three categories: command commands, setting commands and query commands;
- Users can query the AT command set supported by the module through "AT+HELP=?". The baud rate used by AT commands is 9600 8N1.
- When the input parameters exceed the range, they will be restricted. Please do not let the parameters exceed the range to avoid unknown situations.

6.1 AT command table

Command Instructions	describe	Example	Example Description
AT+IAP (Use with caution, see Chapter 9 Firmware Upgrade Instructions for details)	Enter IAP upgrade mode	AT+IAP	Enter IAP upgrade mode
AT+RESET	Device restart	AT+RESET	Device restart
AT+DEFAULT	Configuration parameters	AT+DEFAULT	Configuration parameters

Copyright © 2012–2026 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

	restored to default And the device restarts		restored to default And the device restarts

Setting Instructions	describe	Example	Example Description
AT+UART=baud,parity	Set baud rate and parity	AT+UART=3,0	Set the baud rate to 9600, 8N1
AT+RATE=rate	Set air speed	AT+RATE=7	Set the air rate to 62.5K
AT+PACKET=packet	Set packet length	AT+PACKET=0	Set the packet size to 240 bytes
AT+WOR=role	Setting WOR Roles	AT+WOR=0	Set to WOR reception
AT+WTIME=wtime	Setting the WOR period	AT+WTIME=0	Set the WOR period to 500ms
AT+POWER=power	Set the transmit power	AT+POWER=0	Set the transmit power to 30dBm
AT+TRANS=trans	Set the delivery method	AT+TRANS=1	Set to fixed point mode
AT+ROUTER=router	Set Repeater Mode	AT+ROUTER=1	Set to Repeater Mode
AT+LBT=lbt	Set the Listen Before Talk function switch	AT+LBT=1	Set to enable, refer to Section 6.2 LBT Enable for details
AT+LBR=lrssi,ltime	Set the RSSI judgment threshold and maximum waiting time of the LBT function	AT+LBR=-60,2000	Set the detection threshold to -60dBm and the maximum delay time to 2 seconds
AT+ERSSI=erssi	Setting the ambient noise RSSI switch	AT+ERSSI=1	Set to on, refer to Section 6.2 RSSI Environment Noise Function for details
AT+DRSSI=data_rssi	Set the RSSI switch for receiving data	AT+DRSSI=1	Receive data RSSI function is enabled
AT+ADDR=addr	Set module address	AT+ADDR=1234	Set the module address to 1234
AT+CHANNEL=channel	Set the module working channel	AT+CHANNEL=23	Set the channel to 23
AT+NETID=netid	Set Network ID	AT+NETID=2	Set the network ID to 2
AT+KEY=key	Set module key	AT+KEY=1234	Set the module key to 1234
AT+DELAY=delay	Set WOR delay sleep time	AT+DELAY=1000	Set the WOR delay sleep time to 1000ms
AT+SWITCH=switch	Set software switching mode switch	AT+SWITCH=1	Set to on, allowing software switching
AT+SWITCH=switch	Set software switching mode switch	AT+SWITCH=1	Set it up in configuration mode to allow software switching
AT+MODE=mode	Switch working mode	AT+MODE=0	Switch to transparent mode

Copyright © 2012–2026 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Query command	describe	Return to example	Example Description
AT+HELP=?	Query AT command table		Return to AT command table
AT+DEVTYPE=?	Query module model	DEVTYPE=EWM22A-400R22D	Return module model
AT+FWCODE=?	Query firmware code	FWCODE=7453-0-21	Returns the firmware version
AT+UART=?	Query baud rate and checksum	AT+UART=3,0	The return baud rate is 9600, 8N1
AT+RATE=?	Query air speed	AT+RATE=7	The return air speed is 62.5K
AT+PACKET=?	Query packet length	AT+PACKET=0	The return packet is 240 bytes
AT+WOR=?	Query WOR roles	AT+WOR=0	Return to WOR Receive
AT+POWER=?	Query the transmit power	AT+POWER=0	Return transmit power is 22dBm/30dBm
AT+TRANS=?	Query sending mode	AT+TRANS=1	Return to fixed-point mode
AT+ROUTER=?	Query relay mode	AT+ROUTER=1	Return to relay mode
AT+LBT=?	Query the Listen Before Talk function switch	AT+LBT=1	Returns the LBT switch status
AT+LBR=?	Query LBT judgment parameters	AT+LBR=-55,2000	Return judgment parameters
AT+ERSSI=?	Query the ambient noise RSSI switch	AT+ERSSI=1	Returns the ambient noise on/off status
AT+DRSSI=?	Query RSSI output	AT+DRSSI=1	Return channel RSSI function is enabled
AT+ADDR=?	Query module address	AT+ADDR=1234	The returned module address is 1234
AT+CHANNEL=?	Query module working channel	AT+CHANNEL=23	The returned frequency is 433.125M
AT+NETID=?	Query Network ID	AT+NETID=2	The returned network ID is 2
AT+KEY=?	Query module key	Reading is not supported (for security reasons)	Return ERR
AT+DELAY=?	Query WOR delay sleep time	AT+DELAY=1000	Return WOR delay sleep time is 1000ms
AT+SWITCH=?	Query software switching mode switch	AT+SWITCH=0	Software switch mode off
AT+MODE=?	Query the current working mode (can be queried in all modes)	AT+MODE=0	Returns the current transparent mode

Copyright © 2012–2026 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

6.2 AT parameter analysis

When the serial port receives the correct command, the serial port will return "Command = OK", otherwise it will return "=ERR"

Command parameters	Parameter meaning
Baud (serial port baud rate)	0:1200 1:2400 2:4800 3:9600 4:19200 5:38400 6:57600 7:115200
Parity (serial port check bit)	0:8N1 1:8O1 2:8E1 3:8N1
Rate	0:2.4K 1:2.4K 2:2.4K 3:4.8K 4:9.6K 5:19.2K 6:38.4K 7:62.5K
Packet (packet length)	0:240 1:128 2:64 3:32
Role	0: Receive 1: Send
Period/WTIME (WOR period)	0: 500 ms 1:10 00 ms 2:1 500 ms 3: 20 00 ms 4:2 500 ms 5: 30 00 ms 6:3 500 ms 7: 4000ms
Power (transmit power)	0:22dBm/30dBm 1:17dBm/27dBm 2:13dBm/24dBm 3:10dBm/21dBm
Trans (transmission method)	0: Transparent 1: Fixed point
Router (Relay Mode)	0: Disable 1: Enable
LBT (listen before talk)	0: Disable 1: Enable
Lrssi	LBT function detection RSSI threshold -128~0
Ltime	LBT function detection maximum waiting time 1~65535ms
Erssi (Environmental RSSI)	0: Disable 1: Enable
Data_rssi (Data RSSI)	0: Disable 1: Enable
Addr (module address)	Module address 0~65535 (decimal)
400MHz Channel (module channel)	Module channel 0~83 (decimal)
Netid (Network ID)	Module network 0~255 (decimal)
Key	Module key 0~65535 (decimal)
Delay (WOR delay sleep)	Delay sleep 0~65535 (decimal)
SWITCH (software mode switch)	0: Off; 1: On
Mode (Working Mode)	0: Transparent mode 1: WOR mode 2: Configuration mode 3: Sleep mode

Note 1: Modules with different powers have different settings. Please refer to the manual section 6.2 for transmit power.

Copyright © 2012–2026 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

7. Use of relay networking mode

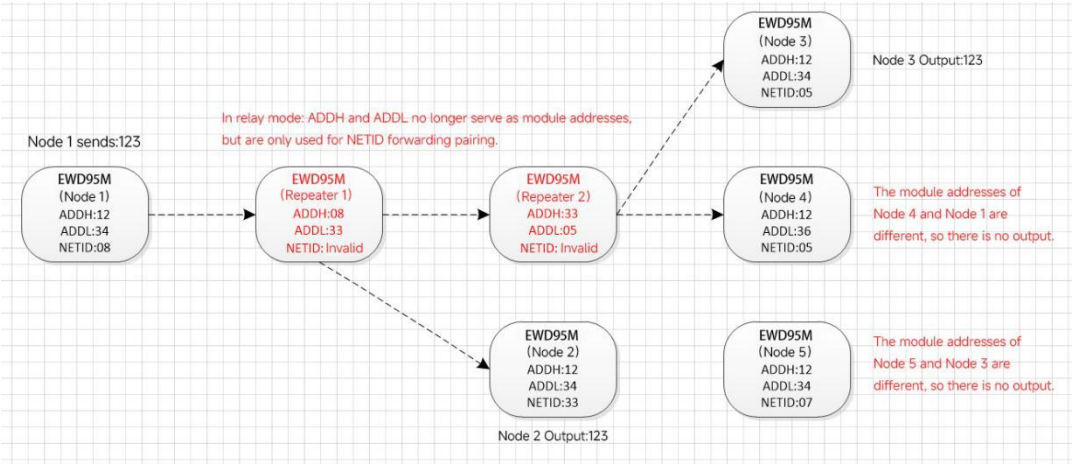
Serial number	Relay Mode Description
1	After setting the relay mode through the configuration mode, switch to the general mode and the relay starts working.
2	In repeater mode, ADDH and ADDL are no longer used as radio addresses, but are forwarded and paired with NETID. If a signal is received from one network, it is forwarded to the other network. The repeater's own network ID is invalid.
3	In the repeater mode, the repeater radio cannot send or receive data and cannot perform low-power operation.
4	When the user enters other modes from Mode 3 (Standby Mode) or during the reset process, the radio will reset the user parameters.

Relay networking rules:

1、Forwarding rules, the relay can forward data bidirectionally between two NETIDs.

2、In repeater mode, ADDH\ADDL is no longer used as the radio address, but as NETID for forwarding pairing.

As shown in the figure:



①First-level relay

"Node 1" NETID is 08.

"Node 2" NETID is 33.

The ADDH\ADDL of relay 1 are 08 and 33 respectively.

So the signal sent by node 1 (08) can be forwarded to node 2 (33)

At the same time, the addresses of node 1 and node 2 are the same, so the data sent by node 1 can be received by node 2.

② Secondary relay

The ADDH\ADDL of relay 2 are 33, 05 respectively.

So relay 2 can forward the data of relay 1 to network NETID:05.

Therefore, nodes 3 and 4 can receive data from node 1. Node 4 outputs data normally, but node 3 does not output data because its address is different from that of node 1.

③Two-way relay

Copyright © 2012–2026 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

As shown in the configuration figure: the data sent by node 1 can be received by nodes 2 and 4, and the data sent by nodes 2 and 4 can also be received by node 1.

8. Host computer configuration instructions

- The figure below shows the configuration interface of the host computer for EWD95M-xxxSLxx(xxx) . Users can switch to configuration mode by pressing the MODE button to quickly configure and read parameters on the host computer.



- In the configuration host computer, the radio address, frequency channel, network ID, and key are all displayed in decimal mode, and the value range of each parameter is:
  Network address: 0-65535
  Frequency channel: 0～83
  Network ID: 0-255
  Key: 0-65535
- When the user uses the host computer to configure the relay mode, special attention should be paid. Since the parameters in the host computer are in decimal display mode, the radio address and network ID need to be converted when filling in. For example, if the network ID input by the transmitter A is 02 and the network ID input by the receiver B is 10, when the relay R sets the radio address, the hexadecimal value 0X020A is converted to the decimal value 522 as the radio address filled in by the relay R. That is, the radio address value that the relay R needs to fill in is 522.

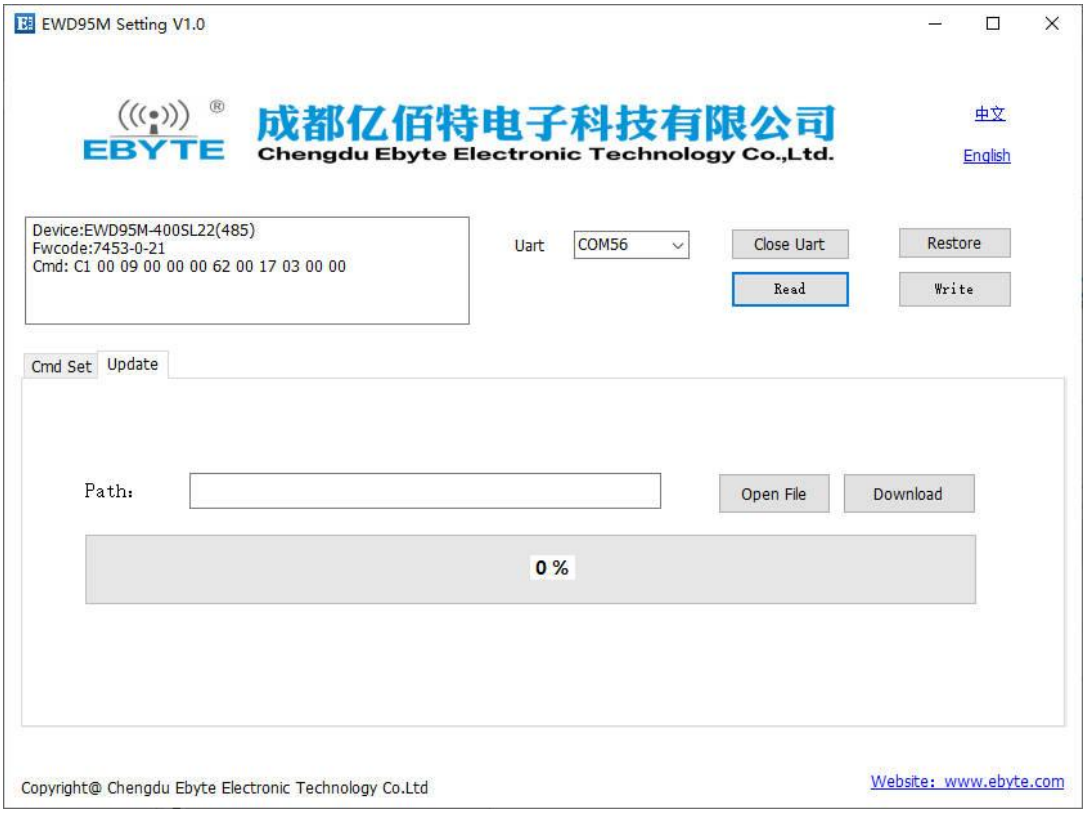
Copyright © 2012–2026 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

9. Firmware Upgrade Instructions

EWD95M series DTU supports serial port firmware upgrade. When special after-sales support is required, you can contact us to obtain the corresponding firmware for upgrade.

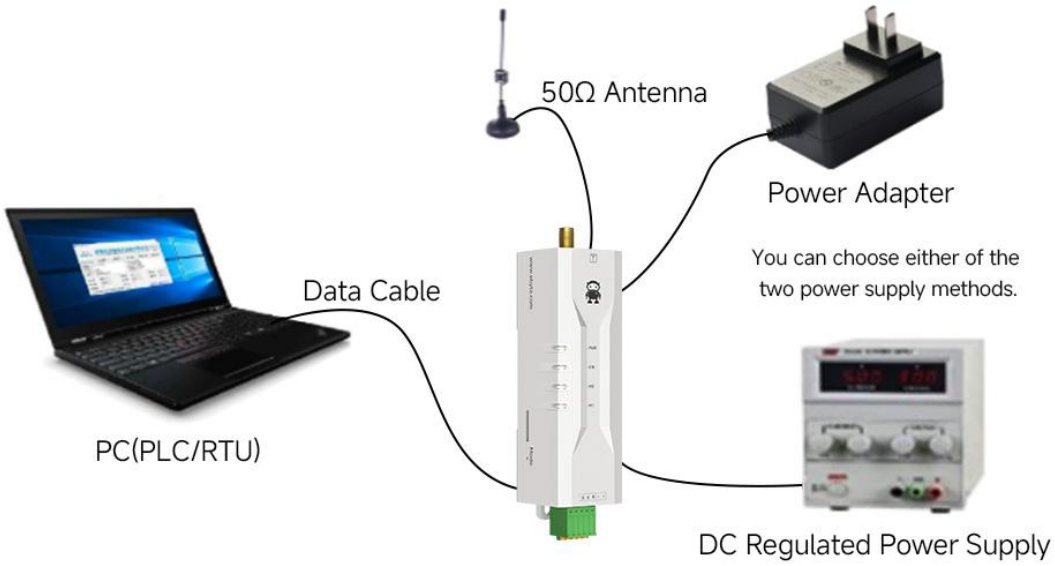
Upgrade method: Use USB to RS232/RS485 tool to connect DTU , and control M0/M1 level to enter configuration mode. Connect DTU through the host computer configuration tool provided by our official website , select IAP upgrade, click the "Open File" button to select the corresponding firmware, and then click to start downloading. When the Please Wait prompt box appears, click Confirm, wait for 5 seconds, confirm to enter the upgrade mode and start downloading. At this time, wait for the progress bar to reach 100% to complete the download . After completion, please manually close and open the serial port again to re-read the parameters.



Copyright © 2012–2026 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

10. Program the Radio Station



Working Mode	M1	M0	Notes
Configuration Mode	Indicator light on	Light off	The radio can only be programmed using the configuration software in the current mode

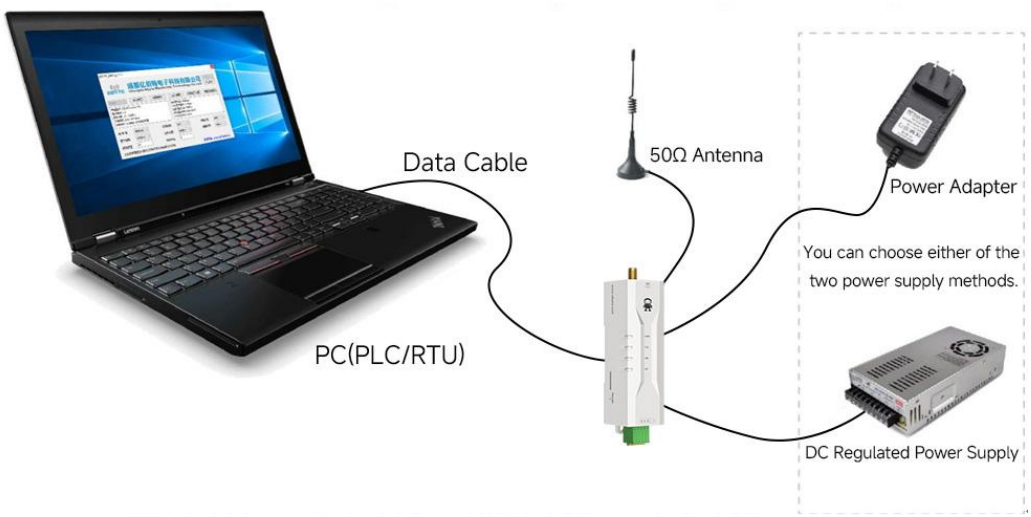
1、 Programming can only be performed in specific working modes (see the table above). If programming fails, please confirm whether the radio working mode is correct.

2、 If no complex programming is required, just open the EWD95M-xxxSLxx(xxx) configuration software and modify the relevant parameters.

Copyright © 2012–2026 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

11. Connection diagram in testing and actual application

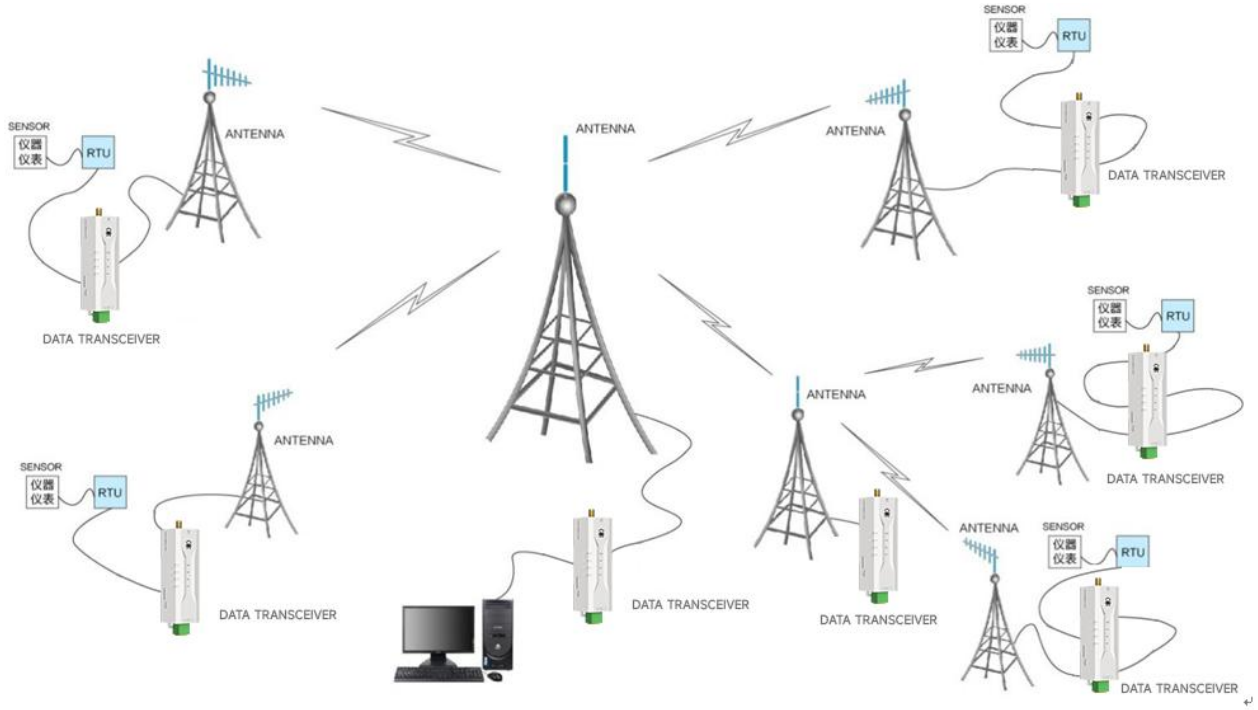


Copyright © 2012–2026 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

12. Practical Application Fields

Ebyte digital radio is suitable for all kinds of point-to-point and point-to-multipoint wireless data transmission systems, such as smart home, Internet of Things transformation, power load monitoring, distribution network automation, hydrological and water conditions monitoring, tap water network monitoring, urban street light monitoring, air defense alarm control, railway signal monitoring, railway water supply centralized control, oil and gas supply network monitoring, GPS positioning system, remote meter reading, electronic crane scale, automatic target reporting, earthquake monitoring, fire prevention and theft prevention, environmental monitoring and other industrial automation systems, as shown in the following figure:



13. Precautions for use

1. Do not operate this radio in flammable places (such as coal mines) or near explosive and dangerous objects (such as detonators).
2. A suitable DC regulated power supply should be selected, which is required to have strong resistance to high-frequency interference, small ripple, and sufficient load capacity; it is best if it also has overcurrent, overvoltage protection and lightning protection functions to ensure the normal operation of the digital radio station.
3. Do not use the device in an environment that exceeds the environmental characteristics of the digital radio, such as high temperature, humidity, low temperature, strong electromagnetic field, or dusty environment.
4. Do not allow the digital radio to continuously operate at full load, otherwise the transmitter may burn out.
5. The ground wire of the digital radio should be well connected to the ground wire of the external device (such as PC, PLC, etc.) and the ground wire of the power supply, otherwise it is easy to burn out the communication interface, etc.;

Copyright © 2012–2026 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

never plug or unplug the serial port when it is powered on.

6. When testing a digital radio station, a matching antenna or a 50 Ω dummy load must be connected, otherwise the transmitter may be easily damaged. If an antenna is connected, the distance between the human body and the antenna should be more than 2 meters to avoid injury. Do not touch the antenna during transmission.
7. Wireless data transmission stations often have different communication distances in different environments. The communication distance is often affected by temperature, humidity, obstacle density, obstacle volume, and electromagnetic environment. In order to ensure stable communication, it is recommended to reserve more than 50% of the communication distance margin.
8. If the measured communication distance is not ideal, it is recommended to analyze and improve the communication distance based on the antenna quality and antenna installation method. You can also contact support@cdebyte.com for help.
9. When selecting a power supply, in addition to retaining a 50% current margin as recommended, you should also pay attention to the ripple not exceeding 100mV.

Revision History

Version	Revision Date	Revision Notes	Maintainer
1.0	2024-11-26	Initial release	Lei
1.1	2024-12-24	Modify the size description Add module interoperability description	Lei
1.2	2025-1-22	Correct the image error	Lei
1.3	2025-2-13	Model Addition	Hao
1.4	2026-6-24	Correct the image error	Hao

About us

Technical support: support@cdebyte.com

Documents and RF Setting download link: https://www.cdebyte.com

Thank you for using Ebyte products! Please contact us with any questions or suggestions: info@cdebyte.com

---

Web: https://www.cdebyte.com

Address: B5 Mould Industrial Park, 199# Xiqu Ave, High tech Zone, Chengdu, Sichuan, China

Chengdu Ebyte Electronic Technology Co.,Ltd.

Copyright © 2012–2026 ,Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000