Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual

E95-DTU(900SLxx-485)



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

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

Catalog

1.Product Overview 1
1.1 Product introduction 1
1.2 Features 1
1.3 Quick start 2
1.4 Description of each part 4
1.5 Installation size 5
2.Interface definition 5
2.1 Power interface description 5
2.2 Communication interface description 6
3.Technical indicators 6
3.1 Model Specifications 6
3.2 General Specifications 7
3.3 Frequency range and number of channels 7
3.4 transmit power level 7
3.5 air speed class 8
3.6 Current parameters 8
3.7 Send and receive length and subcontracting method 8
4.Detailed function 9
4.1 Fixed-point emission (hexadecimal) 9
4.2 Broadcast transmission (hexadecimal) 9
4.3 broadcast address 9
4.4 listen address 10
5.Operating mode 10
5.1 Transparent transmission mode (mode 0) 10
5.2 WOR mode (mode1) 11
5.3 Configuration Mode(mode2) 11
5.4 Deep sleep mode(mode3) 11
6.Register read and write control 12
6.1 Instruction format 12
6.2 register description 13
6.3 Factory default parameters 16
7.Use of relay networking mode 17
8.Host computer configuration instructions 18
9.Program the radio 19
10.Connection diagram in test and practical application 20
11.related product 20
12.Practical application areas 22
13.Precautions for use 22
14.Important Notice 23
Revise history 24
About us 24

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

Disclaimer and Copyright Notice

EBYTE reserves all rights to this document and the information contained herein. Products, names, logos and designs described herein may in whole or in part be subject to intellectual property rights. Reproduction, use, modification or disclosure to third parties of this document or any part thereof without the express permission of EBYTE is strictly prohibited.

The information contained herein is provided “as is” and EBYTE assumes no liability for the use of the information. No warranty, either express or implied, is given, including but not limited, with respect to the accuracy, correctness, reliability and fitness for a particular purpose of the information. This document may be revised by EBYTE at any time. For most recent documents, visit www.ebyte.com.

Copyright ©2012–2022，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

E95-DTU (900SLxx-485) is a wireless data transmission radio using military-grade LoRa modulation technology. It has a variety of transmission methods and works in the (850.125MHz ~ 930.125MHz) frequency band (default 868.125MHz). The radio provides transparent RS485/RS232 interface , Using plastic shell, rail type installation structure, support 8 ~ 28V (DC) voltage input. LoRa spread spectrum technology will bring longer communication distance and has the advantage of strong anti-interference ability.

As a communication medium, wireless digital radio has a certain scope of application 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, with low cost, installation and maintenance. It has the characteristics of convenience, strong diffraction ability, flexible network structure, and long coverage. It is suitable for occasions such as many and scattered points and complex geographical environment. It can be connected with PLC, RTU, rain gauge, liquid level gauge and other data terminals.

1.2 Features

- Using the latest LoRa technology, the distance is farther and the performance is more powerful than the traditional LoRa digital radio;
- With data encryption, sub-packet length can be set;
- Adopt flame retardant plastic shell, guide rail type installation structure, convenient and efficient installation;
- Use hidden buttons to switch the working mode to avoid false triggering, and the operation of the equipment is more reliable;
- Simple and high-efficiency power supply design, support power adapter or pressure line method, support 8 ~ 28V (DC) power supply;
- The transmit power can reach up to 22/30dBm, and supports multi-level adjustment, all technical indicators meet industrial standards;
- Support Modbus protocol transmission;
- 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;
- Support wireless sending of command data packets, remote configuration or reading of radio station parameters;
- Support communication key function, effectively prevent data from being intercepted;
- It can realize multi-level relay networking, effectively expand the communication distance, and realize ultra-long-distance communication;
- Using temperature compensation circuit, the frequency stability is better than ±1.5PPM;
- Working temperature range: -40℃ ～ +85℃, suitable for all kinds of harsh working environment, real industrial grade products;
- 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 high isolation and high protection;

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

- Powerful software functions, all parameters can be set by programming: such as power, frequency, air rate, address ID, etc.;
- Built-in watchdog with precise time layout, once an abnormality occurs, the radio will automatically restart, and can continue to work according to the previous parameter settings.

1.3 Quick start

You need to prepare two E95-DTU (900SLxx-485)



First, install the antenna for the digital radio, and then install the power supply. The user can choose the power adapter to supply power according to their needs.



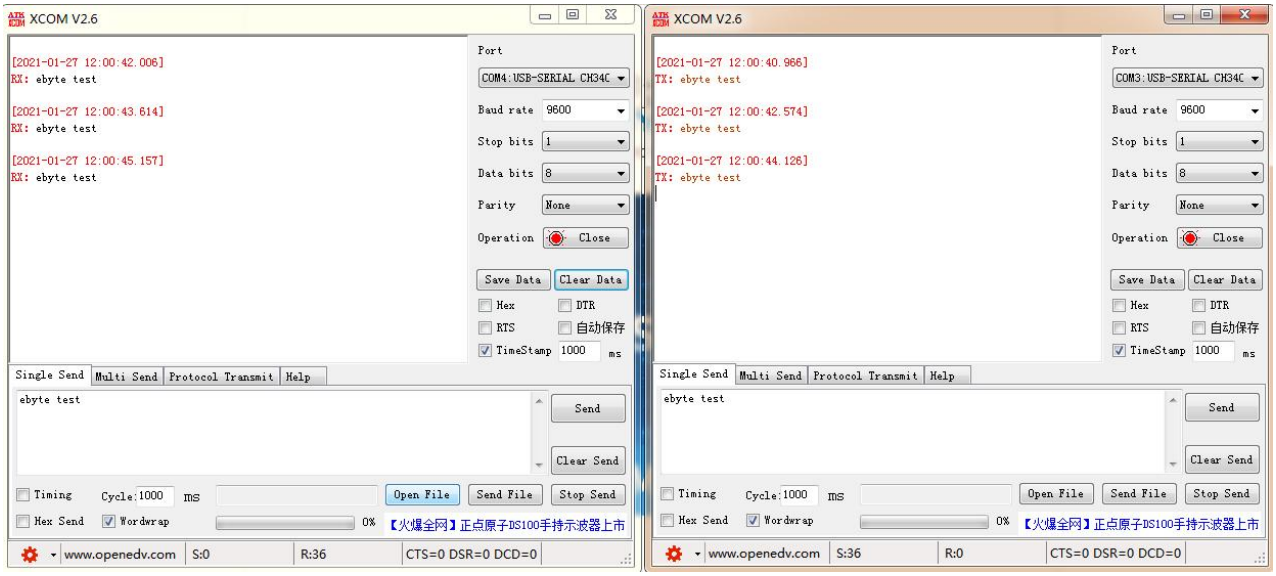
Use USB to RS485 or other methods to connect the computer to the digital radio;



Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

Start two serial port debugging assistants, select the serial port baud rate as 9600bps (default), and check the mode as 8N1, then the serial port transparent transmission can be realized.;



If the customer needs to switch the working mode, it can be controlled by the Mode button to switch between different working modes (M0 indicator light, M1 indicator light). Press and hold the Mode button for about 1ms and then release it to switch the mode once. The mode switching details are shown in the table below:

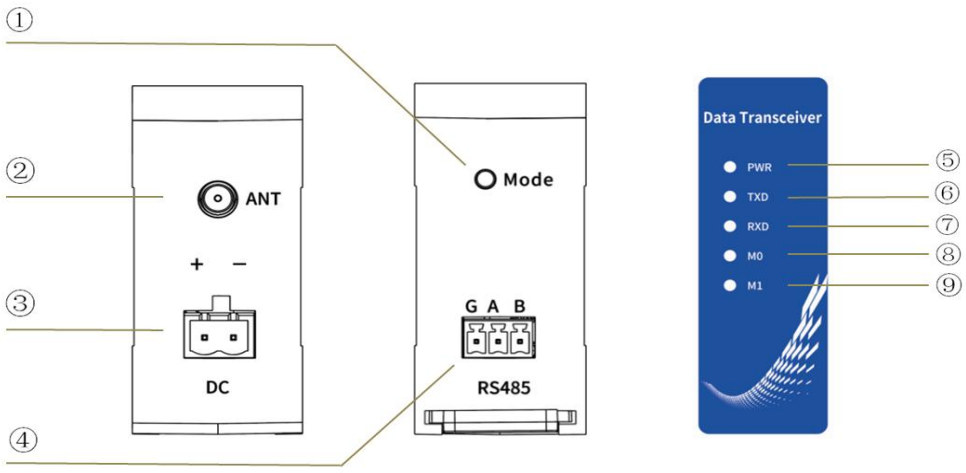
Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

serial number	Catalog	M1	M0	Notes
Mode 0	Transparent mode	Off	Off	Serial port open, wireless open, transparent transmission (factory default mode), support special command air configuration.
Mode 1	WOR mode	Off	On	Can be defined as WOR sender and WOR receiver, support air wake-up
Mode 2	configuration mode	On	Off	The user accesses the register through the serial port to control the working state of the radio, and the user can configure the radio through the host computer configuration software.
Mode 3	sleep mode	On	On	radio goes to sleep

Note: The radio has the function of power-down saving mode (the factory default setting is transparent transmission mode), the user needs to switch the corresponding mode according to the M1 and M0 indicators (effective immediately).

1.4 Description of each part



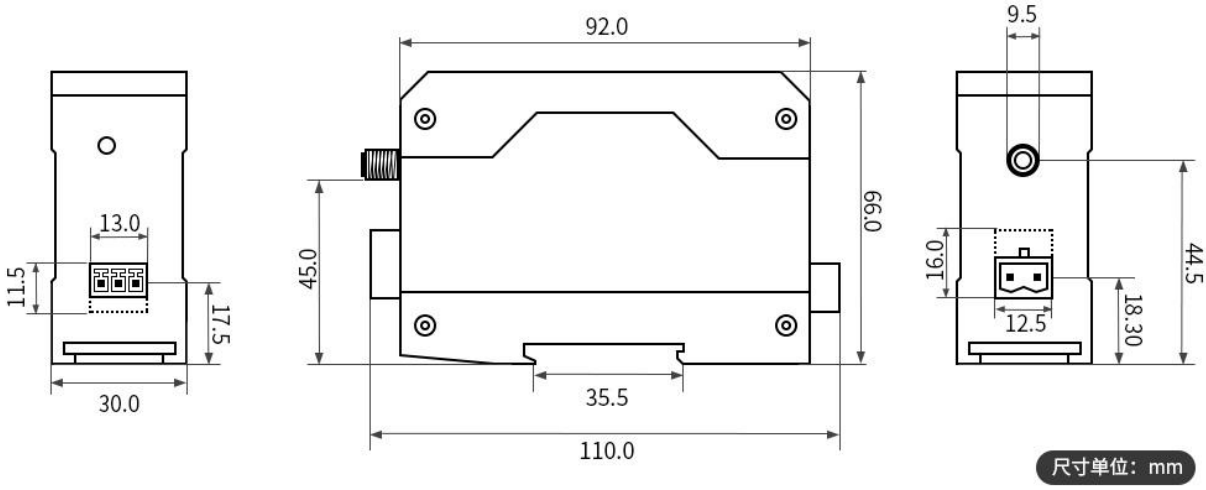
number	name	function	explanation
1	Mode	Mode switch button	Working mode switching control
2	ANT	RF interface	SMA-K, external thread internal hole
3	DC	Power interface	DC power input port, crimped port
4	RS485	RS485 communication port	Standard RS485 interface
5	PWR	Power Indicator	Lights up when the power is turned on

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

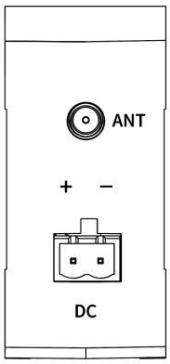
6	TXD	send indicator	Blinks when sending data
7	RXD	Receive indicator	Blinks when receiving data
8	MO	Mode indicator	Working mode indicator
9	M1	Mode indicator	Working mode indicator

1.5 Installation size



2.Interface definition

2.1 Power interface description



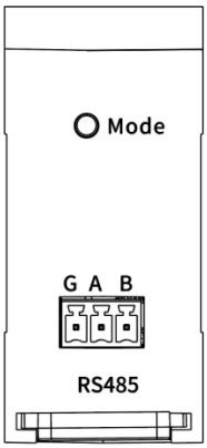
E95-DTU (900SLxx-485) can be powered by 8~28V (DC) power supply, and the wiring port is connected by wiring terminal (2 Pin).

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

2.2 Communication interface description

The E95-DTU (900SLxx-485) can be connected to the device through RS485 using the terminal block.



number	standard definition	function	explanation
1	G	signal ground	Anti-interference, grounding
2	A	RS485 bus A interface	The RS485 interface A interface is connected to the device A interface
3	B	RS485 bus B interface	RS485 interface B interface is connected to device B interface
4	TX	RS232 bus TX interface	The RS232 interface TX interface is connected to the device RX interface
5	RX	RS232 bus RX interface	The RS232 interface RX interface is connected to the device TX interface

Note: When the radio is connected with multiple devices, the communication is not smooth, but there is no such phenomenon when a single device is connected. Please try to connect a 120Ω resistor in parallel between the 485_A terminal and the 485_B terminal.

3.Technical indicators

3.1 Model Specifications

Model Specifications	Frequency	Power	Distance	Specifications	Recommended application scenarios
	MHz	dBm	km		
E95-DTU(900SL22-485)	850.125 ～ 930.125	22	5	New generation LoRa spread spectrum, DC	long-distance, interference-prone environments.

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

				power supply	
E95-DTU(900SL30-485)	850.125～930.125	30	10	New generation LoRa spread spectrum, DC power supply	long-distance, interference-prone environments.

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

3.2 General Specifications

number	name	Specification	explanation
1	Size	92*66*30 mm	See installation dimensions for details
2	Weight	95 g	Weight tolerance 5g
3	Working temperature	-40℃～+85℃	Industrial grade
4	Voltage range	8～28V（DC）	12V or 24V recommended for DC version
5	Communication interface	RS485	RS485
6	baud rate	出厂默认 9600	Baud rate range 1200～115200
7	address code	出厂默认 0	A total of 65536 address codes can be set

3.3 Frequency range and number of channels

Model Specifications	Default frequency	Frequency range	channel spacing	number of channels
	Hz	Hz	Hz	
E95-DTU(900SLxx-485)	850.125M	850.125～930.125M	1M	81，half duplex

Note: In the same area, multiple groups of digital radios are used for one-to-one communication at the same time. It is recommended that each group of digital radios should be set to a channel interval of more than 2MHz.

3.4 transmit power level

Model Specifications	22dBm / 30dBm	17dBm / 27dBm	13dBm / 24dBm	10dBm / 21dBm
E95-DTU(900SLxx-485)	Factory default	√	√	√

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

Note: The lower the transmit power, the closer the transmission distance, but the working current will not decrease proportionally, it is recommended to use the maximum transmit power.

3.5 air speed class

Model Specifications	Default air rate	number of levels	air speed class
	bps		kbps
E95-DTU(900SLxx-485)	2.4k	6	2.4、4.8、9.6、19.2、38.4、62.5

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

3.6 Current parameters

Model Specifications	Emission current mA	receive current mA	sleep current mA
	12V	12V	12V
E95-DTU(900SL22-485)	32.65	14.58	7.29
E95-DTU(900SL30-485)	158.4	15.8	7.73

Note: It is recommended to reserve more than 50% current margin when selecting the power supply, which is conducive to the long-term stable operation of the radio.

3.7 Send and receive length and subcontracting method

Model Specifications	cache size	Subcontracting
E95-DTU(900SLxx-485)	1000 ebytes	32/64/128/240 bytes can be sent by sub-packet setting by command

Notes：

If the data received by the radio at a 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.；

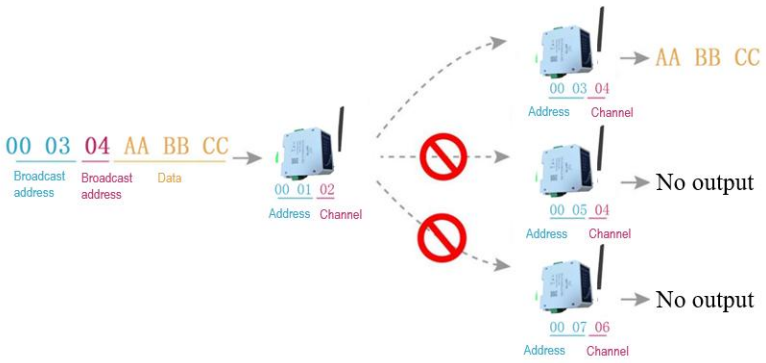
The data received by the radio at a time cannot be larger than the buffer capacity.

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

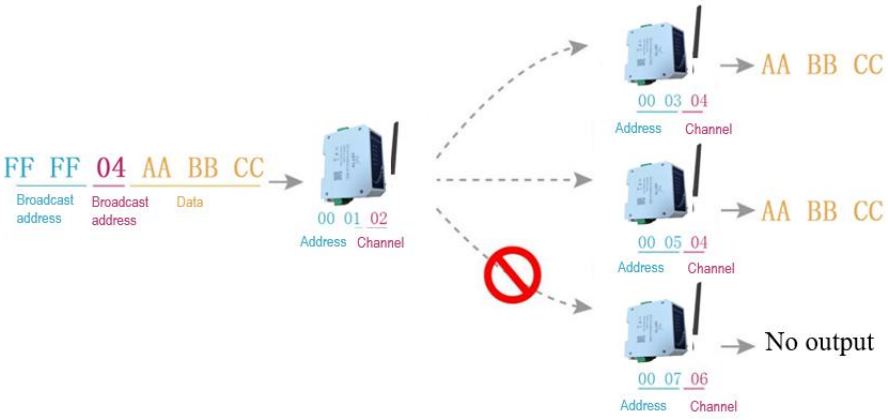
Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

4.Detailed function

4.1 Fixed-point emission (hexadecimal)



4.2 Broadcast transmission (hexadecimal)



4.3 broadcast address

Example: Set the address of radio A to 0xFFFF and the channel to 0x04.

When station A is used as a transmitter (same mode, transparent transmission mode), all receiving stations under the 0x04 channel can receive data to achieve the purpose of broadcasting.

Copyright ©2012–2022，成都亿佰特电子科技有限公司

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

4.4 listen address

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

5.Operating mode

E95-DTU has four working modes. When there is no strict low power consumption requirement, and normal communication is required, it is recommended to configure the radio in the transparent transmission mode (mode 0);The default setting of the radio is transparent transmission mode (mode 0).

number	mode	M1	M0	注释
Mode 0	Transparent mode	Off	Off	Serial port open, wireless open, transparent transmission (factory default mode), support special command air configuration.
Mode 1	WOR mode	Off	On	Can be defined as WOR sender and WOR receiver, support air wake-up
Mode 2	Configuration mode	On	Off	The user accesses the register through the serial port to control the working state of the radio, and the user can configure the radio through the host computer configuration software.
Mode 3	deep sleep mode	On	On	radio goes to sleep

Note: If there is no need for low power consumption, no need to care about the WOR mode (mode 1).

5.1 Transparent transmission mode (mode 0)

Type	When the M0 indicator is off, the M1 indicator is off, and the radio works in mode 0
Transmit	Users can input data through the serial port, and the radio will start wireless transmission.
Receive	The radio wireless receiving function is turned on, and the wireless data will be output through the serial port TXD pin after receiving the wireless data.

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

5.2 WOR mode (mode1)

Type	When the M0 indicator is on, the M1 indicator is off, the radio works in mode 1
Transmit	When defined as a transmitter, a wake-up code for a certain period of time will be automatically added before transmission
receive	Data can be received normally, and the receiving function is equivalent to mode 0

5.3 Configuration Mode(mode2)

Type	When the M0 indicator is off, the M1 indicator is on, the radio works in mode 2
Transmit	Can be configured wirelessly
Receive	Can be configured wirelessly
Configuration	User can access registers to configure radio working status

5.4 Deep sleep mode(mode3)

Type	When the M0 indicator is on and the M1 indicator is on, the radio works in mode 3
Transmit	Unable to transmit wireless data.
Receive	Unable to receive wireless data.

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

6.Register read and write control

6.1 Instruction format

In configuration mode (mode 2: the M1 indicator is on, the M0 indicator is off), the list of supported commands is as follows (when setting, only 9600 and 8N1 formats are supported):：

Number	Instruction format	Detailed description
1	set register	Command: C0+start address+length+parameter Response: C1+start address+length+parameter Example 1: Configure the channel as 0x09 Command Start Address Length Parameter Send: C0 05 01 09 Return: C1 05 01 09 Example 2: Configure the radio address (0x1234), network address (0x00), serial port (9600 8N1), and airspeed (1.2K) at the same time Send: C0 00 04 12 34 00 61 Return: C1 00 04 12 34 00 61
2	read register	Instruction: C1+start address+length Response: C1+start address+length+parameter Example 1: Reading a channel Command Start Address Length Parameter Send: C1 05 01 Return: C1 05 01 09 Example 2: Read radio address, network address, serial port, airspeed at the same time Send: C1 00 04 Return: C1 00 04 12 34 00 61
3	set temporary register	Command: C2 + start address + length + parameter Response: C1 + start address + length + parameter Example 1: Configure the channel as 0x09 Command Start Address Length Parameter Send: C2 05 01 09 Return: C1 05 01 09 Example 2: Configure the radio address (0x1234), network address (0x00), serial port (9600 8N1), and airspeed (1.2K) at the same time

Copyright ©2012–2022，成都亿佰特电子科技有限公司

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

		Send: C2 00 04 12 34 00 61 Return: C1 00 04 12 34 00 61
5	Wireless configuration	Instructions: CF CF + regular instructions Response: CF CF + regular response Example 1: 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 radio address (0x1234), network address (0x00), serial port (9600 8N1), and airspeed (1.2K) at the same time Send: CF CF C0 00 04 12 34 00 61 Return: CF CF C1 00 04 12 34 00 61
6	wrong format	malformed response FF FF FF

6.2 register description

number	Read/write	name	description				notes
00H	Read/write	ADDH	ADDH（default 0）				Station address high byte and low byte; Note: When the station address is equal to FFFF, it can be used as a broadcast and monitoring address, that is, the station 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 the network; When communicating with each other, they should be set to the same.
03H	Read/write	REG0	7	6	5	UART serial rate（bps）	For two radio stations that communicate with each other, the serial port baud rate can be different, and the verification method can also be different; When continuously transmitting large data packets, users need to consider the data blocking caused by the same baud rate, and may even be lost; It is generally recommended that both
			0	0	0	Serial port baud rate1200	
			0	0	1	Serial port baud rate2400	
			0	1	0	Serial port baud rate4800	
			0	1	1	Serial port baud rate9600（default）	
			1	0	0	Serial port baud rate19200	
			1	0	1	Serial port baud rate38400	
			1	1	0	Serial port baud rate57600	
			1	1	1	Serial port baud rate115200	

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

							sides of the communication have the same baud rate.
			4	3	Serial check digit		The serial port modes of both sides of the communication can be different;
			0	0	8N1（default）		
			0	1	8O1		
			1	0	8E1		
			1	1	8N1（equal to 00）		
			2	1	0	wireless air rate（bps）	The air speed of both parties must be the same; The higher the air rate, the lower the delay and the shorter the transmission distance.
			0	1	0	air speed 2.4k（default）	
			0	1	1	air speed 4.8k	
			1	0	0	air speed 9.6k	
			1	0	1	air speed 19.2k	
			1	1	0	air speed 38.4k	
			1	1	1	air speed 62.5k	
04H	Read/write	REG1	7	6	Subcontracting settings		When the data sent by the user is less than the packet length, the serial output of the receiving end is presented as uninterrupted continuous output; If the data sent by the user is larger than the packet length, the serial port of the receiving end will be output in packets.
			0	0	240 ebytes（default）		
			0	1	128 ebytes		
			1	0	64 ebytes		
			1	1	32 ebytes		
			5	RSSI Ambient Noise Enable			After it is enabled, the C0 C1 C2 C3 instruction can be sent in the transmission mode or the WOR transmission mode to read the register; Register 0x00: Current ambient noise RSSI; Register 0X01: RSSI when data was last received (The current channel noise is: dBm =-RSSI/2); Instruction format: C0 C1 C2 C3 + start address + read length; Return: C1 + address address + read length + read valid value; such as: send C0 C1 C2 C3 00 01 return C1 00 01 RSSI
			0	disabled (default)			
			1	Start			
	Read/write		4	3	2	reserve	
			1	0	transmit power		The relationship between power and current is non-linear. At maximum power, the efficiency of the power supply is the highest; the current will not
			0	0	22dBm / 30dBm（default）		
			0	1	17dBm / 27dBm		
			1	0	13dBm / 24dBm		

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

			1	1	10dBm / 21dBm	decrease in the same proportion as the power decreases.
05H		REG2	Channel Control (CH) 0-83 respectively represent a total of 84 channels			Actual frequency = 410.125 + CH *1M
06H	Read/write	REG3	7	Enable RSSI bytes		When enabled, the radio receives wireless data and outputs it through the serial port TXD, followed by an RSSI strength byte.
			0	disabled (default)		
			1	Start		
			6	transfer method		During fixed-point transmission, the radio will identify the three bytes of serial port data as: address high + address low + channel, and use it as the wireless transmission target.
			0	transparent transmission (default)		
			1	fixed point transmission		
			5	Relay function		After the relay function is enabled, if the target address is not the radio itself, the radio will start a forwarding; In order to prevent data return, it is recommended to use in conjunction with fixed-point mode; that is, the destination address and the source address are different.
			0	Disable relay function (default)		
			1	Enable relay function		
			4	LBT enable		After enabling, the wireless data will be monitored before transmission, which can avoid interference to a certain extent, but may cause data delay; The maximum stay time of LBT is 2 seconds, and it will be issued forcibly when it reaches two seconds.
			0	disabled (default)		
			1	Start		
			3	WOR Mode Transceiver Control		Only valid for mode 1; After the WOR receiver receives the wireless data and outputs it through the serial port, it will wait for 1000ms before entering the WOR again. During this period, the user can input the serial port data and return it through the wireless; Each serial port byte will refresh 1000ms time; The user must initiate the first byte within 1000ms.
			0	WOR receiver (default) The transceiver is turned on, and when transmitting data, a wake-up code for a certain period of time is added.		
			1	WOR transmitter The radio cannot transmit data, and works in WOR monitoring mode. The monitoring period is shown below (WOR period), which can save a lot of power consumption.		

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

			2	1	0	WOR cycle	Only valid for mode 1; Period T= (1+WOR)*500ms, the maximum is 4000ms, and the minimum is 500ms; The longer the WOR monitoring interval period, the lower the average power consumption, but the greater the data delay; The sender and receiver must agree (very important)
			0	0	0	500ms	
			0	0	1	1000ms	
			0	1	0	1500ms	
			0	1	1	2000ms	
			1	0	0	2500ms	
			1	0	1	3000ms	
			1	1	0	3500ms	
			1	1	1	4000ms	
07H	Write	CRYPT_H	Key high byte (default 0)				write only, read returns 0; Used for encryption to avoid interception of air wireless data by similar radio stations; The radio will use these two bytes as a calculation factor to transform and encrypt the air wireless signal.
08H	Write	CRYPT_L	key low byte (default 0)				
80H～86H	Read	PID	PID Product Information 7 bytes				PID Product Information 7 bytes

6.3 Factory default parameters

Mode	Factory default parameter value：C0 00 00 62 00 00						
Radio model	Frequency	Address	Channel	Air rate	baud rate	Serial format	transmit power
E95-DTU(900SLxx-485)	850.125MHz	0x0000	0x17	2.4kbps	9600	8N1	22dBm (low power) 30dBm (high power)

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

7.Use of relay networking mode

Number	Relay Mode Description
1	After setting the relay mode through the configuration mode, switch to the general mode, and the relay starts to work.
2	In relay mode, ADDH and ADDL are no longer used as the radio address, but are forwarded and paired corresponding to the NETID respectively. If one network is received, it will be forwarded to the other network. The network ID of the repeater itself is invalid.
3	In repeater mode, the repeater station cannot send and receive data, and cannot perform low-power operation.
4	When the user enters other modes from mode 3 (sleep mode) or during the reset process, the radio will reset the user parameters, during which the AUX output is low.

Relay networking rules description:

1.Forwarding rules, the relay can forward data between two NETIDs in both directions.

2. In repeater mode, ADDH\ADDL is no longer used as a radio address, but as a NETID forwarding pairing.如图：

①primary 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.

②secondary relay

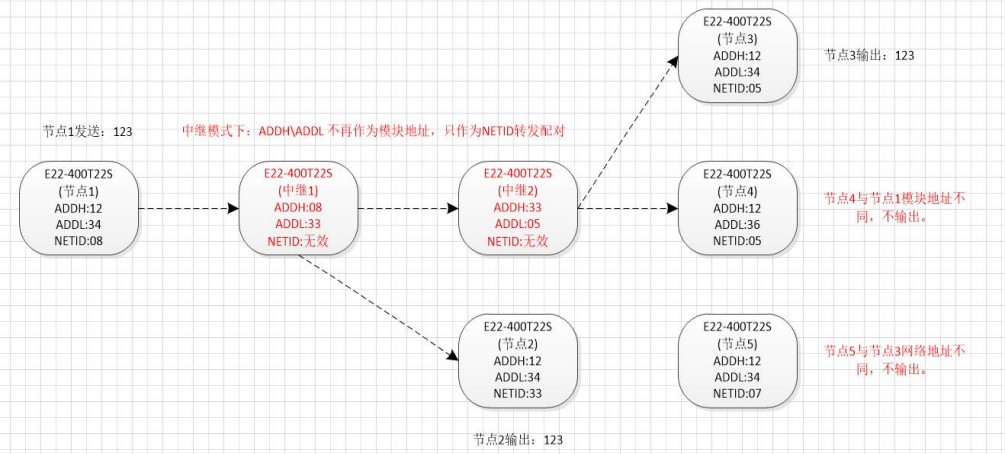
The ADDH\ADDL of relay 2 are 33 and 05 respectively.

So relay 2 can forward relay 1's data to network NETID: 05.

Therefore, node 3 and node 4 can receive the data of node 1. Node 4 outputs data normally, and node 3 and node 1 have different addresses, so no data is output.

③two-way relay

As shown in the configuration: 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.



Copyright ©2012–2022，成都亿佰特电子科技有限公司

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

8.Host computer configuration instructions

The figure below shows the E95-DTU (900SLxx-485) configuration host computer display interface, the user can switch to the configuration mode through the MODE button, and quickly configure and read parameters on the host computer.



- In the configuration of the 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 as follows:：

Network address: 0～65535

Frequency channel: 0～81

Network ID: 0～255

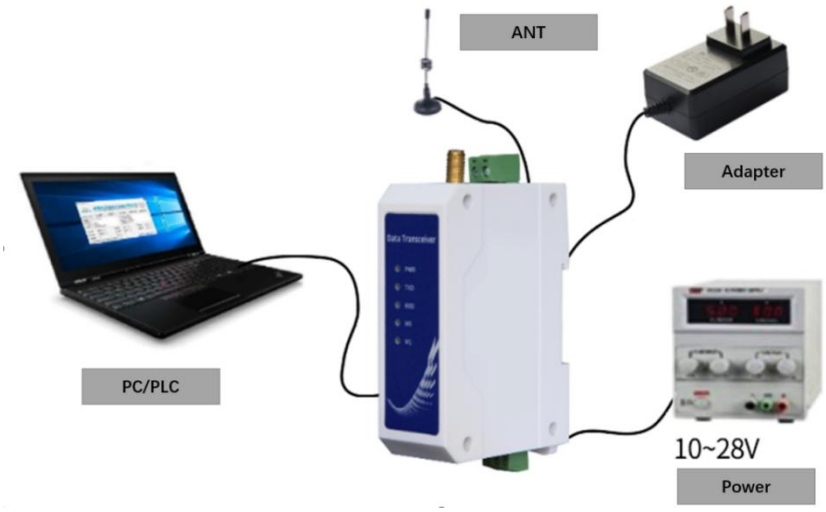
Key: 0～65535

- Users need to pay special attention when using the host computer to configure the relay mode, because in the host computer, each parameter is displayed in decimal mode, so the radio address and network ID need to be converted to decimal when filling in the station address and network ID. If the network ID input by transmitter A is 02, and the network ID input by receiver B is 10, then when relay terminal R sets the radio address, convert the hexadecimal value 0X020A to decimal value 522 and fill in as relay terminal R the station address. That is, the radio address value that the relay terminal R needs to fill in at this time is 522.

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

9.Program the radio



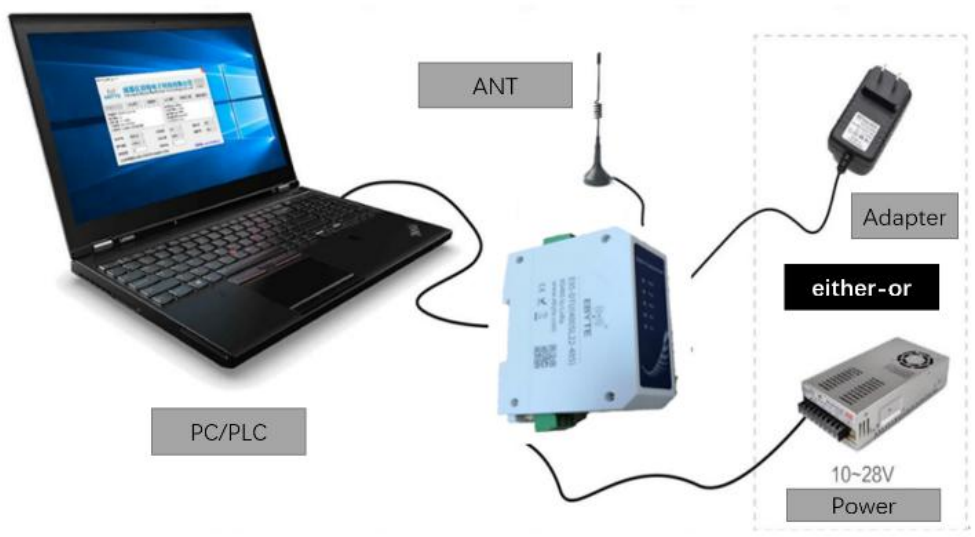
Working mode	M1	M0	Notice
Configuration mode	Light on	Light off	The radio can only be programmed using the configuration software in the current mode

1. Programming can only be carried out in a specific working mode (see the above table). If the programming fails, please confirm whether the working mode of the radio is correct.
2. If you don't need complicated programming to open tconfiguration software, you can modify the relevant parameters.

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

10.Connection diagram in test and practical application



11.related product

Product mode	Interface type	FrequencyMHz	Power dBm	Distance km	Features
E95-DTU(400SL22-485)	RS485	410.125 ～ 493.125	22	5	A new generation of LoRa, rail type, RS485, E90-DTU SL series interoperability, DC power supply
E95-DTU(400SL22-232)	RS232	410.125 ～ 493.125	22	5	New generation LoRa, rail type, RS232, E90-DTU SL series interoperability, DC power supply
E95-DTU(400SL30-485)	RS485	410.125 ～ 493.125	30	10	A new generation of LoRa, rail type, RS485, E90-DTU SL series interoperability, DC power supply
E95-DTU(400SL30-232)	RS232	410.125 ～ 493.125	30	10	New generation LoRa, rail type, RS232, E90-DTU SL series interoperability, DC power supply
E95-DTU(400SL22P-485)	RS485	410.125 ～ 493.125	22	5	New generation LoRa, rail type, RS232, E90-DTU SL series interoperability, high protection, DC power supply
E95-DTU(400SL22P-232)	RS232	410.125 ～ 493.125	22	5	New generation LoRa, rail type, RS485, E90-DTU L series interoperability, high protection, DC power supply

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

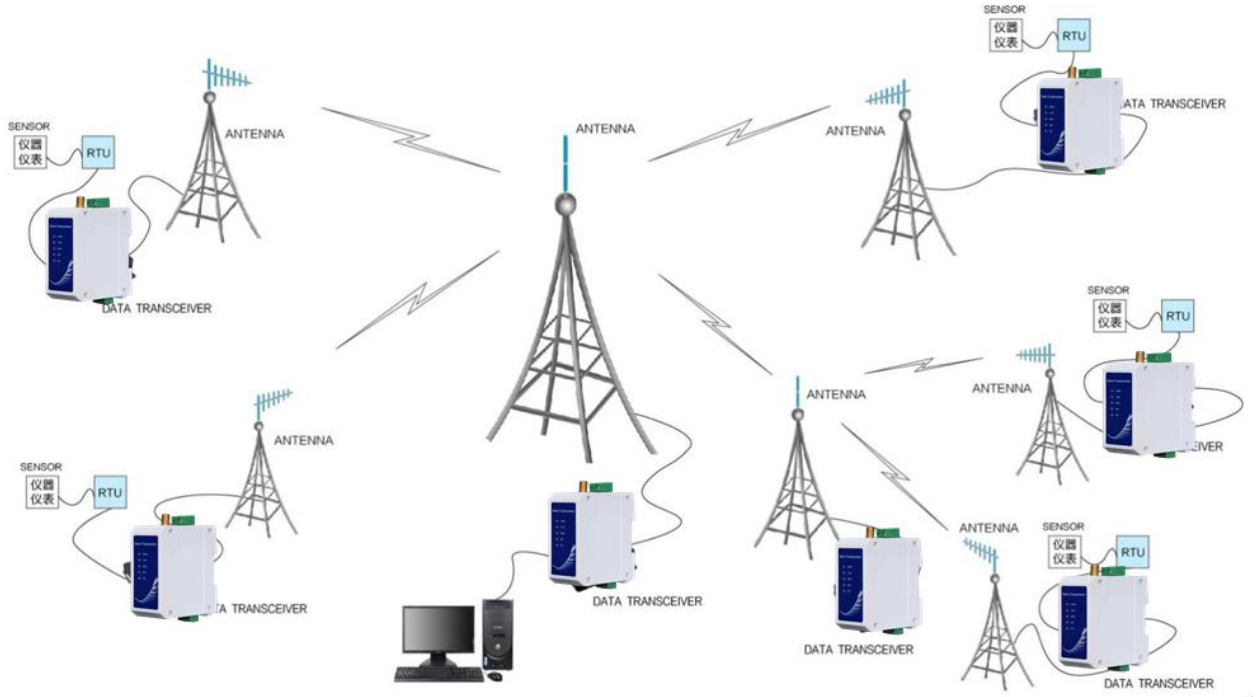
E95-DTU(400SL30P-485)	RS485	410.125 ～ 493.125	30	10	New generation LoRa, rail type, RS232, E90-DTU SL series interoperability, high protection, DC power supply
E95-DTU(400SL30P-232)	RS232	410.125 ～ 493.125	30	10	New generation LoRa, rail type, RS485, E90-DTU SL series interoperability, high protection, DC power supply
E96-DTU(400SL22-485)	RS485	410.125 ～ 493.125	22	5	A new generation of LoRa, rail type, RS485, E90-DTU SL series interoperability, AC power supply
E96-DTU(400SL22-232)	RS232	410.125 ～ 493.125	22	5	A new generation of LoRa, rail type, RS232, E90-DTU SL series interoperability, AC power supply
E96-DTU(400SL30-485)	RS485	410.125 ～ 493.125	30	10	A new generation of LoRa, rail type, RS485, E90-DTU SL series interoperability, AC power supply
E96-DTU(400SL30-232)	RS232	410.125 ～ 493.125	30	10	A new generation of LoRa, rail type, RS232, E90-DTU SL series interoperability, AC power supply

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

12.Practical application areas

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



13.Precautions for use

1. Do not operate the radio in the vicinity of some flammable places (such as coal mines) or explosive dangerous objects (such as detonators for detonation).

A suitable DC regulated power supply should be selected, which requires strong anti-high frequency interference, small ripple, and sufficient load capacity; it is best to have functions such as overcurrent, overvoltage protection and lightning protection to ensure the normal operation of the digital radio. Work.

Do not use it in a working environment that exceeds the environmental characteristics of the digital radio station, such as high temperature, humidity, low temperature, strong electromagnetic fields or environments with large dust.

Do not let the digital radio station be continuously in full-load transmission state, otherwise it may burn out the transmitter.

The ground wire of the digital radio should be well connected with the ground wire of the external equipment (such

Copyright ©2012–2022，成都亿佰特电子科技有限公司

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

as PC, PLC, etc.) and the ground wire of the power supply, otherwise the communication interface will be easily burnt; do not plug or unplug the serial port with power on.

When testing the digital radio, it is necessary to connect a matching antenna or a 50Ω dummy load, otherwise the transmitter will be easily damaged; if the antenna is connected, the distance between the human body and the antenna should be more than 2 meters to avoid injury. Touch the antenna while transmitting.

Wireless data transmission stations often have different communication distances in different environments, and 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%. The communication distance margin of.

If the measured communication distance is not ideal, it is recommended to analyze and improve the communication distance based on the antenna quality and the installation method of the antenna. You can also contact support@cdebyte.com for assistance.

When selecting a power supply, in addition to retaining 50% of the current margin as recommended, it should also be noted that its ripple should not exceed 100mV.

14.Important Notice

Ebyte reserves the right of final interpretation and modification of all contents in this manual.

Due to the continuous improvement of the hardware and software of the product, this manual may be changed without prior notice, and the latest version of the manual shall prevail.

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

Revise history

version	revision date	Revision Notes	Maintenance man
1.0	2022-05-18	initial version	XXN
1.1	2022-06-15	Content revision	XXN

About us

Sales Hotline: 4000-330-990 Company
Tel: 028-61399028
Technical support: support@cdebyte.com
Official website: www.ebyte.com
Company Address: Building B5, No. 199, West District Avenue, High-tech West District, Chengdu City, Sichuan Province

成都亿佰特电子科技有限公司
Chengdu Ebyte Electronic Technology Co.,Ltd.

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

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