EBYTE

Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual

E610-DTU(433C37)



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1. Overview

1.1 Introduction

E610-DTU(433C37) is a continuous transmission type 433M wireless digital transmission module, built-in high-performance microcontroller and wireless transceiver chip, working in 410 to 441MHz band (default 433MHz), transmitting power 37dBm. Working in the 410 to 441MHz band (default 433MHz), transmitting power of 37dBm, the main function of the module in continuous transmission mode, can be performed in different serial port baud rate uninterrupted transmission, and the receiving end of the data output delay is low, suitable for the need for rapid transmission of a large amount of data scenarios.

Wireless digital transmission radio as a communication medium, and optical fiber, microwave, open-wire, has a certain scope of application: it provides some special conditions in the dedicated network of real-time monitoring signals, reliable data transmission, has a low cost, easy installation and maintenance, strong ability to bypass the shot, the network structure is flexible, the coverage range of the characteristics of the long distance, suitable for the point of much more dispersed, geographically complex and other occasions, can be combined with PLC, RTU, rain gauge, liquid level meter, etc., and can be used to transmit data to and from the network. It can be connected with PLC, RTU, rain gauge, liquid level meter and other data terminals.

1.2 Features

- ★ General mode supports automatic relay networking, multi-level relay is suitable for ultra-long-distance communication, the same area to run multiple networks running at the same time;
- ★Simple and efficient power supply design, support for power supply setter or pressure line mode, support for 8 to 28V power supply;
- ★Temperature compensation circuit, frequency stability better than ±1.5PPM;
- ★Transmit power up to 37dBm (5W), and multi-level adjustable, all technical indicators to meet European industry standards;
- ★ All aluminum alloy shell, compact size, easy to install, good heat dissipation; perfect shielding design, good electromagnetic compatibility, anti-interference ability;
- ★ Power reverse connection protection, over-connection protection, antenna surge protection and other multiple protection functions, greatly increasing the reliability of the radio;
- ★ 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 exception occurs, the radio will automatically restart, and can continue to continue to work in accordance with the previous parameter settings;
- ★Support 0.5k～470kbps data transmission rate;
- ★Built-in PA+LNA+SAW, communication distance up to 17km under ideal conditions;
- ★Support RSSI signal strength indication function for assessing signal quality, improving communication network

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and ranging;

- ★Support users to set their own communication key, and can not be read, greatly improving the confidentiality of user data;
- ★Parameters are saved when power down, and the radio will work according to the set parameters after power up again;
- ★Operating temperature range: -40 ℃ ~ +85 ℃, to adapt to a variety of harsh operating environments, true industrial-grade products;

2. Quick use

You need to prepare

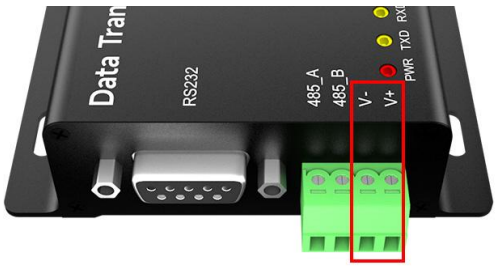








1.First install the antenna to the digital transmission, then install the power supply, and make sure that the status of the dip switch is correct, the user selects the pressure line method or power adapter power supply according to the demand, choose one of the two can be;

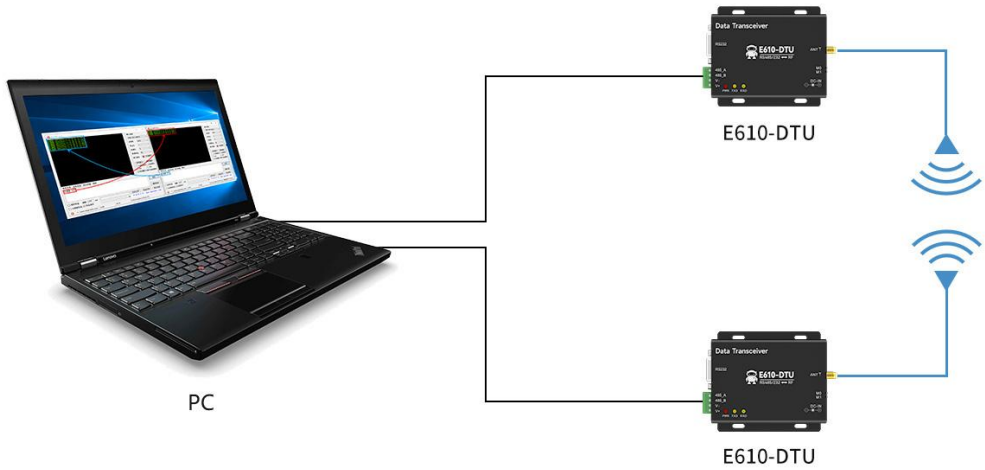




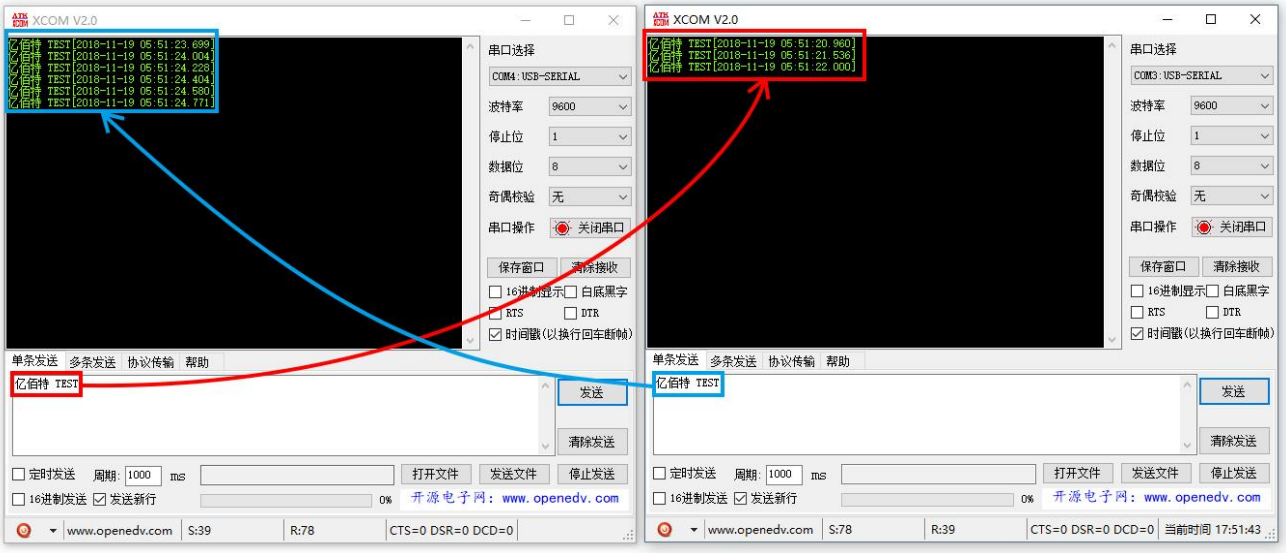
2.Use USB to RS-232, USB to RS-485 or other ways to make the computer and digital radio connected;

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3, start two serial port debugging assistant, select the serial port baud rate of 9600bps, the checksum method is 8N1, you can realize the serial port pass-through;



4, if the customer needs to modify the parameters, please dial the digital radio in the configuration mode and connected to the computer, open the E610-DTU (433C37) digital radio configuration software, you can modify the relevant parameters, after the completion of the configuration, be sure to restore the state of the dial switch before communication.

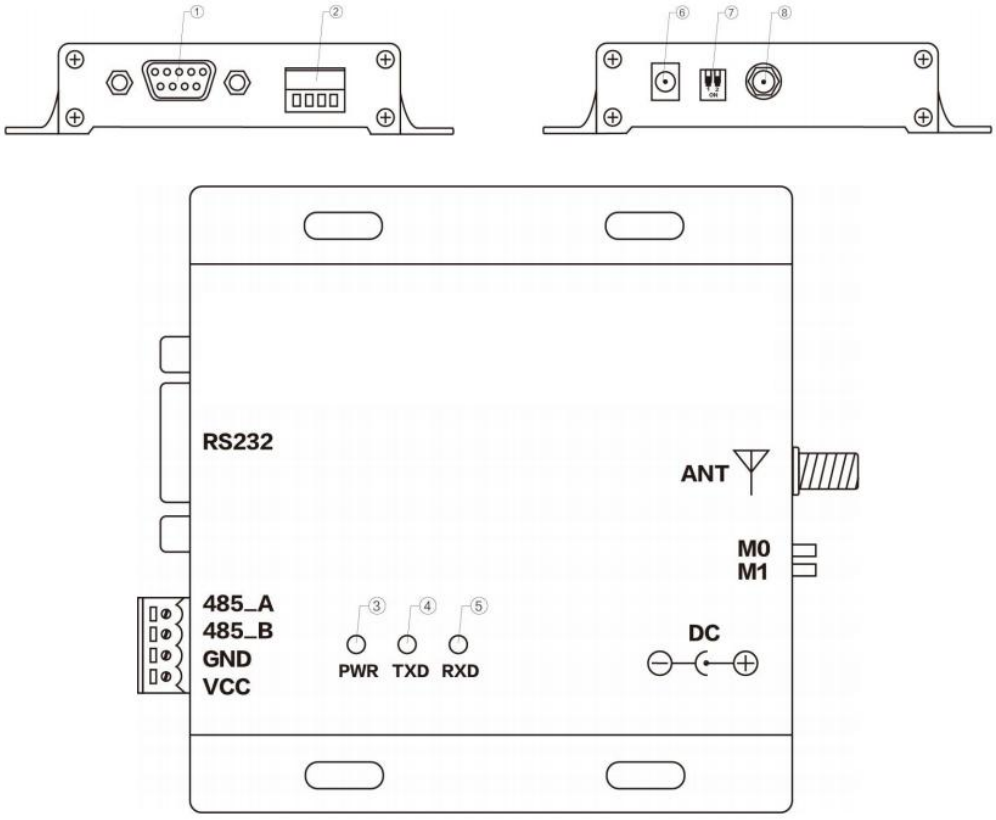


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3. Installation dimensions

3.1 Description of Ministries



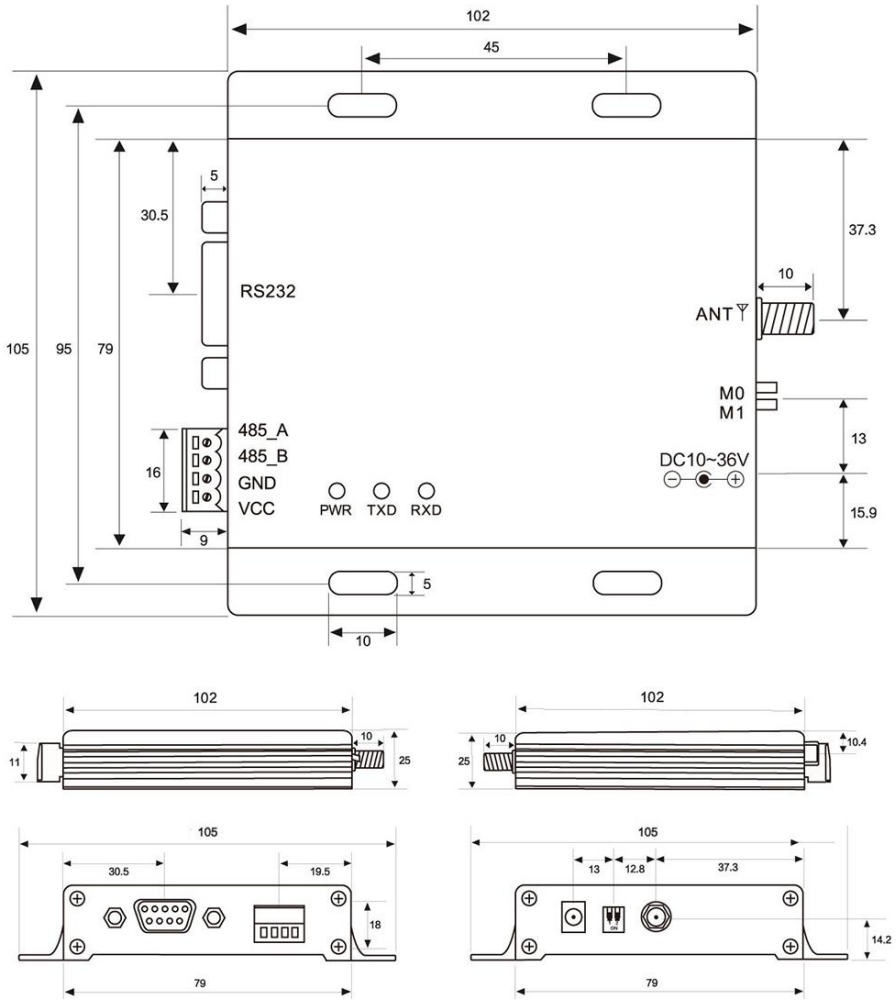
No	Name	Function	Instruction
1	DB-9 Female Sockets	RS232 interface	Standard RS232 interface
2	3.81 Terminal Block	RS485, Power Interface	Standard RS485 Interface with Crimp Power Connector
3	PWR-LED	Power indicator	Red, illuminates when power is on
4	TXD-LED	Transmit indicator	Yellow, blinking when sending data
5	RXD-LED	Receive indicator	Yellow, blinking when receiving data
6	DC Power Connector	Power connector	Inline round hole, outer diameter 5.5mm, inner diameter 2.5mm

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7	DIP Switch	DIP Switch	Operating mode control
8	Antenna Interface	SMA-K connector	External threaded bore, 10mm long, 50Ω characteristic impedance

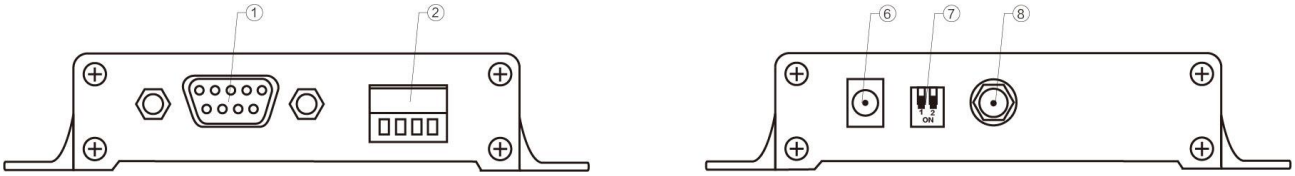
3.2 Installation dimensions



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4. Interface definitions

4.1 Power Interface Description



users can choose to ⑥ DC power supply interface power supply, using the interface for the outer diameter of 5.5mm, inner diameter of 2.5mm power adapter power supply;

can also be powered by the VCC terminal and GND terminal in ②, just choose either one of the power supply methods;

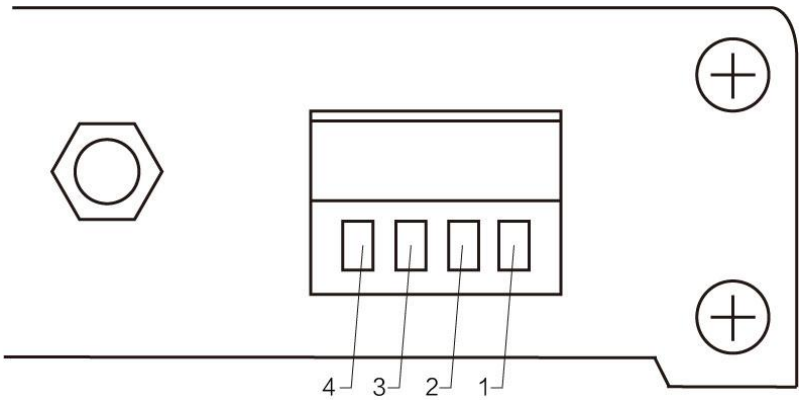
E610-DTU(433C37) can be powered by 8-28V DC power supply, 12V/2A or 24V/1A DC power supply is recommended.

4.2 RS232 Interface Definition

The E610-DTU (433C37) can be connected to the unit via RS232 using a standard DB-9 connector.

4.3 RS485 Interface Definition

The E610-DTU (433C37) can be connected to the RS-485 terminals A and B of the device using the 485_A and 485_B terminals in ② respectively.



No	Standard Definition	Function	Instruction
1	VCC	Crimp Wire Power Connector, Positive	DC 8-28V, 12V or 24V recommended

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2	GND	Crimp Wire Power Interface, Negative	The negative pole of the power supply is connected to the system ground and shell.
3	485_B	RS-485 Interface, B Socket	RS-485 interface B interface is connected to device B interface.
4	485_A	RS-485 Interface, A Connector	RS-485 interface A interface is connected to device A interface.

5. Technical indicators

5.1 Model specifications

Model Specification	working frequency	firing power	reference distance	Specification Characteristics	Recommended Application Scenarios
	Hz	dBm	km		
E610-DTU(433C37)	410M-441M	37	4	High-speed continuous transmission	Suitable for applications with large data volume, support customer Moudbus protocol.
		37	17	General transmission mode	Suitable for small data volume, long distance application environment.

★Conditions: sunny weather, open environment without obstruction, 12V/2A power supply, 5dBi suction cup antenna, antenna height of 2 meters from the ground, using factory default parameters.

5.2 General specification parameters

No	Project	Norm	Instruction
1	Product Size	124*105*25mm	See mounting dimensions for details
2	Weight	240g	Weight tolerance 9g
3	Working Temperature	-40℃ ~ +85℃	Meets the needs of industrial grade use
4	Antenna Impedance	50Ω	Standard 50Ω characteristic impedance
5	Voltage Range	8 ~ 28V DC	12V or 24V recommended
6	Communication Interface	RS232/RS485	Standard DB9 hole type/3.81 terminal block
7	Baud rate	Factory Default 9600	Baud rate range 2400 ~ 230400

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8	Address Code	Factory default 0	Total 65536 address codes can be set

5.3 Frequency range and number of channels

SKU	Factory Default Frequency	frequency range	channel spacing	channel number
	Hz	Hz	Hz	
E610-DTU(433C37)	433M	410 ~ 441M	500K	62, half-duplex

★Note: When using multiple digital transmission radios in the same area to communicate one-to-one at the same time, it is recommended that each group of digital transmission radios set a channel interval of 0.5MHz or more.

5.4 Transmit power levels

SKU	Factory Default	Power not adjustable		
E610-DTU(433C37)	37dBm	-	-	-

★Note: The lower the transmit power, the closer the transmission distance, but the operating current will not be reduced in the same proportion, it is recommended to use the maximum transmit power.

5.5 Airspeed

SKU	Default Air Rate	degree	airspeed rating
	bps		bps
E610-DTU(433C37)	0.5k	17	0.5K、1.5k、3.5k、5.5k、6.5k、11k、13k、21k、26k、42k、51k、82k、76k、125k、160k、410k、470k

★Note: The higher the air rate is, the faster the transmission rate is, but the closer the transmission distance is; therefore, it is recommended that the lower the air rate is, the better, if the rate meets the usage requirements;

★The default air rate is 0.5k in general mode, and the air rate is automatically adapted in continuous transmission mode.

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5.6 Current parameter

Model Specification	Emission current mA		Guard current mA	
	12V	28V	12V	28V
E610-DTU(433C37)	1120	502	54	26

NOTE: It is recommended to maintain a current margin of 50% or more when selecting a power supply, as this facilitates long term stable operation of the radio.

5.7 Length of Receipt and Delivery and Subcontracting Methods

SKU	Cache size	Subcontracting
E610-DTU(433C37)	4096 bytes	efault subpacket 55 bytes

★Note: 1, the above radio's sub-packet transmission situation is only available in general transparent transmission mode, and uninterrupted transmission in continuous transmission mode;

2、If the data received by the radio is larger than the capacity of a single packet, the exceeding part of the data will be automatically assigned to the second transmission until the transmission is completed;

3、The radio can not receive data larger than the cache capacity in a single transmission;

6. Working modalities

E610-DTU (433C37) all have four operating modes, which are configured by dip switches M0 and M1.

Mode (0-3)	M1	M0	Mode Introduction	Remarks
0 Continuous mode	0	0	The radio will automatically calculate the required over-the-air transmission rate according to the user-configured baud rate of the serial port, and the user can transmit data without interruption.	Supports continuous uninterrupted transmission
1 General mode	0	1	The radio will internally execute the user-configured over-the-air transmission rate. It will transmit in packets according to 55 bytes per packet.	General transparent transmission
2 Configuration mode	1	0	The user can access the registers through the serial port to control the radio's operating status.	Requires configuration at baud rate 9600
3 Reserved Mode	1	1	In this mode, the radio will not do any transmitting or receiving.	



模式 0



模式 1



模式 2



模式 3

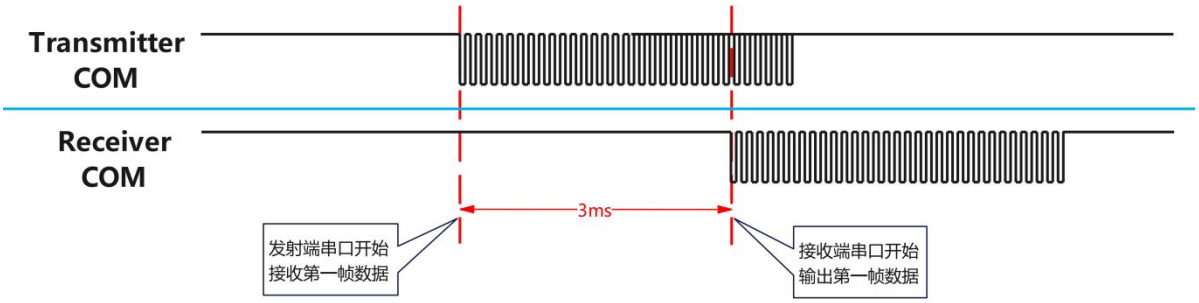
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6.1 Continuous transmission mode (mode 0)

Type	When M0 = 0, M1 = 0, the module works in mode 0
Transmitter	The air rate required for continuous transmission is automatically calculated based on the user-configured baud rate of the serial port;
Receive	The user can input data through the serial port and the module will start wireless transmission.

In continuous transmission mode, the intuitive experience is that the user does not need to wait for all the data to be packaged to transmit the data out, but the module starts transmitting from the first frame of data until the completion of the data that the user needs to transmit. This saves the time of data packing and packetizing and greatly reduces the data delay time.



Data delay schematic (at a serial port baud rate of 115200, sending 22 bytes)

Continuous transmission mode is divided into "Distance Priority" and "Speed Priority" two kinds of continuous transmission strategy for users to choose (please refer to Chapter 7 for details). From the reference data in the following table, we can see that the higher the baud rate of the serial port and the smaller the amount of data being sent, the difference in data latency between the two strategies is not significant. However, once the data reaches thousands of bytes, the problem of data latency will be highlighted.

Serial Port baud rate	consecutive pass strategy	Data delay (ms)		
		1 byte	22 byte	55 byte
2400	Distance priority	77.634	213.094	417.224
	Speed first.	57.267	161.193	161.233
4800	Distance first.	41.396	111.040	216.195
	Speed first.	29.028	81.043	81.043
9600	Distance first.	21.024	55.926	108.611
	Speed first.	15.274	41.675	41.651
19200	Distance first.	10.853	28.355	54.736
	Speed first.	7.973	21.199	21.211
38400	Distance first.	6.160	15.031	28.083
	Speed first.	4.701	11.085	11.080
57600	Distance first.	4.392	10.352	19.101
	Speed first.	3.373	7.569	7.583
115200	Distance first.	2.478	5.364	9.890

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	Speed first.	1.867	3.874	3.890

* Experimental test data will have a slight error, please refer to the actual physical test shall prevail *

6.2 General transmission mode (mode 1)

Type	**When M0 = 1 and M1 = 0, the module operates in mode 1**
Transmitter	Transmission is done in packets at 55 bytes per packet using a user configurable air rate; The user can enter data through the serial port and the module will initiate wireless transmission.
Receive	In the non-transmitting state, data can be received normally.

6.3 User configuration mode (mode 2)

Type	**When M0 = 0 and M1 = 1, the module operates in mode 2**
Transmitter	Only remote configuration commands can be transmitted.
Receive	Only remote configuration commands are received in response.
Configuration	The user can access registers to configure the module operating state.

6.4 Retention mode (mode 3)

Type	**When M0 = 1 and M1 = 1, the module operates in mode 3**
Transmitter	Cannot transmit wireless data.
Receive	Cannot receive wireless data.

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7. Register Read/Write Control

7.1 Command format

The list of supported commands in the configuration mode (Mode 2: M1=1, M0=0) is as follows (only 9600, 8N1 format is supported during setup):

No	command format	particular
1	Setup Registers	Instruction: C0 + start address + length + parameters Response: C1 + start address + length + parameters Example 1: Configure the channel as 0x09 Command Start address Length Parameters Send: C0 05 01 09 Return: C1 05 01 09 Example 2: Configure radio address (0x1234), network address (0x00), serial port (9600 8N1), 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 registers	Command: C1 + start address + length Response: C1 + start address + length + parameters Example 1: Read channel Command Start address Length Parameters 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	Setting Temporary Registers	Command: C2 + start address + length + parameters Response: C1 + start address + length + parameters Example 1: Configure the channel as 0x09 Command Start address Length Parameters Send: C2 05 01 09 Return: C1 05 01 09 Example 2: Configure radio address (0x1234), network address (0x00), serial port (9600 8N1), airspeed (1.2K) simultaneously Send: C2 00 04 12 34 00 61 Return: C1 00 04 12 34 00 61
5	Wireless Configuration (remote target device must be in general mode)	Command: CF CF + regular command Response: CF CF + regular response Example 1: Wireless configuration channel is 0x09 Wireless Command Header Command Start Address Length Parameters Send: CF CF C0 05 01 09 Return: CF CF C1 05 01 09

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		Example 2: Wireless configure radio address (0x1234), network address (0x00), serial port (9600), airspeed (1.5K) 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	formatting error	Format Error Response FF FF FF FF

7.2 Register description

<table>
<tr><th>No</th><th>Read write</th><th>Name</th><th colspan="7">Description</th><th>Remark</th></tr>
<tr><td>00H</td><td>Read/ Write</td><td>ADDH</td><td colspan="7">ADDH (default 0)</td><td rowspan="2">* High and low byte of the radio station address;
* Note: When the radio station address is equal to FFFF, it can be used as a broadcast and listening address, i.e.: the radio station will not be address filtered at this point.</td></tr>
<tr><td>01H</td><td>Read/ Write</td><td>ADDL</td><td colspan="7">ADDL (default 0)</td></tr>
<tr><td>02H</td><td>Read/ Write</td><td>NETID</td><td colspan="7">NETID (default 0)</td><td>* Network address for distinguishing networks;
* When communicating with each other, they should be set to the same。</td></tr>
<tr><td rowspan="17">03H</td><td rowspan="17">Read/ Write</td><td rowspan="17">REG0</td><td>7</td><td>6</td><td>5</td><td colspan="4">UART serial port rate (bps)</td><td rowspan="9">* For two radios communicating with each other in general transmission mode, the serial port baud rate can be different and the checksum method can be different, and it is generally recommended that the baud rates of the two communicating parties are the same;
* The serial port baud rates of two radios communicating with each other in continuous transmission mode must be the same.</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td colspan="4">Serial port baud rate of 2400</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td colspan="4">Serial port baud rate of 4800</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td colspan="4">Serial port baud rate of 9600 (default)</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td colspan="4">Serial port baud rate of 19200</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td colspan="4">Serial port baud rate is 38400</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td colspan="4">Serial baud rate is 57600</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td colspan="4">Serial baud rate is 115200</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td colspan="4">Serial port baud rate is 230400</td></tr>
<tr><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td><td colspan="3">Air Rate (bps)</td><td rowspan="8">* For general transmission mode only, the user needs to choose the wireless transmission rate by himself;
* In continuous transmission mode, this configuration parameter is invalid and is automatically calculated by the radio internally.</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td colspan="3">0.5K (default)</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td colspan="3">1.5K</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td colspan="3">3.5K</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td><td colspan="3">5.5K</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td colspan="3">6.5K</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>0</td><td>1</td><td colspan="3">11K</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td><td colspan="3">13K</td></tr>
</table>

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			0	0	1	1	1	21K		
			0	1	0	0	0	26K		
			0	1	0	0	1	42K		
			0	1	0	1	0	51K		
			0	1	0	1	1	82K		
			0	1	1	0	0	76K		
			0	1	1	0	1	125K		
			0	1	1	1	0	160K		
			0	1	1	1	1	410K		
			1	0	0	0	0	470K		
			1	X	X	X	X	470K		
04H	Read/ Write	REG1	7	6	Serial port parity bit				* Radio serial port calibration type	
			0	0	8N1 (default)					
			0	1	8O1					
			1	0	8E1					
			1	1	8N1 (00 equivalent)					
			5	Channel RSSI Enable					* Applicable to general transmission mode only; * When enabled, the command "C0 C1 C2 C3" can be sent to read the registers in general transmission mode: register [0x00]: current ambient noise RSSI[0]; register [0x01]: RSSI[1] at the last received data; * Conversion formula: dBm = RSSI/2-146; * Instruction format analysis: Send: C0 C1 C2 C3 + start address + read length; Return: C1 + address + read length + read RMS value; [Example 1]: Send C0 C1 C2 C3 00 01, return C1 00 01 RSSI[0]; [Example 2]: Send C0 C1 C2 C3 00 02, return C1 00 02 RSSI[0] RSSI[1]; []. Special Note] The address can only start from 0x00, if you need to read RSSI[1], you can only refer to [Example 2]; if the radio never receives data, the default value of RSSI[1] is 0x00.	
			0	Off (default)						
			1	open						
			4	3	reserve					
			2	Types of Policies in Continuous Transmission Mode					* When speed priority is turned on, the data output delay at the receiving end is reduced by about 60%, but this affects the	
			0	Distance priority (default)						

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			1	Speed Priority				receiving distance. For example, in 115200 baud rate continuous transmission mode, the receiver side can output the first frame data from the transmitter side after 3ms. * At 230400 baud rate, only distance priority is supported.
			1	0	reserve			
05H	Read/ Write	REG2	Channel Control (CH) 0-62 represent a total of 62 channels respectively					* Actual frequency = 410MHz + CH * 0.5MHz, default 433MHz = [0x2E]. * Value range: 410MHz ~ 441MHz, [0x00] ~ [0x3E].
06H	Read/ Write	REG3	7	Receive packet RSSI				* For general transmission mode only; * When enabled, when the radio receives wireless data and outputs it through the serial port TXD, it will follow an RSSI strength byte to indicate the signal strength at the time the data was received; * Conversion formula: dBm = RSSI/2-146。
			0	Off (default)				
			1	On				
			6	Transmission mode				* For general transmission mode only; * For fixed-point transmission, the radio recognizes the first three bytes of the serial port data as: address high + address low + channel, and uses them as the wireless transmission target.
			0	Transparent transmission (default)				
			1	Fixed-point transmission				
			5	Relay function				* For general transmission mode only; * When the relay function is enabled, the radio will initiate a forwarding if the destination address is not the radio itself; * It is recommended to be used in conjunction with fixed-point mode in order to prevent data backhauling; i.e., the destination address is different from the source address.
			0	Off (default)				
			1	On				
			4	3	2	1	0	reserve
07H	Write	CRYPT_H	Key high byte (default 0)					* Write only, read returns 0; used for encryption to avoid interception of over-the-air radio data by similar radio stations; * These two bytes will be used internally by the radio station as a computation factor to transform and encrypt the over-the-air radio signals.
08H	Write	CRYPT_L	Key low byte (default 0)					

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7.3 Factory Default Parameters

SKU	Restore Factory Default Parameters Command: C0 00 09 00 00 00 00 40 00 2E 00 00 00 00 00						
SKU	frequency	address	channel	airspeed	Baud rate	Serial format	Transmit power
E610-DTU(433C37)	433MHz	0x0000	0x2E	0.5kbps	9600	8N1	37dbm

8. Use of Trunked Networking Modes

No	Description of trunking mode
1	After setting the relay mode through the configuration mode, switch to the general mode and the relay starts working.
2	In relay mode ADDH and ADDL are no longer used as radio addresses, but correspond to NETID forwarding pairing respectively, and if one of the networks is received, it is forwarded to the other network; the repeater's own network ID is invalid.
3	In relay mode, the relay radio cannot send and receive data for low-power operation.
4	Entering from mode 3 (sleep mode) or during a reset, the radio resets the user parameters, during which the AUX output goes low.

Description of relay networking rules:

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

2. In relay mode, ADDH\ADDL is no longer used as a radio address and is forwarded as a NETID pair.

As shown in the figure:

① Level 1 relay

"Node 1" NETID is 08.

"Node 2" NETID is 33.

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

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

Meanwhile, node 1 and node 2 have the same address, so the data sent by node 1 can be received by node 2.

② Secondary Relay

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

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

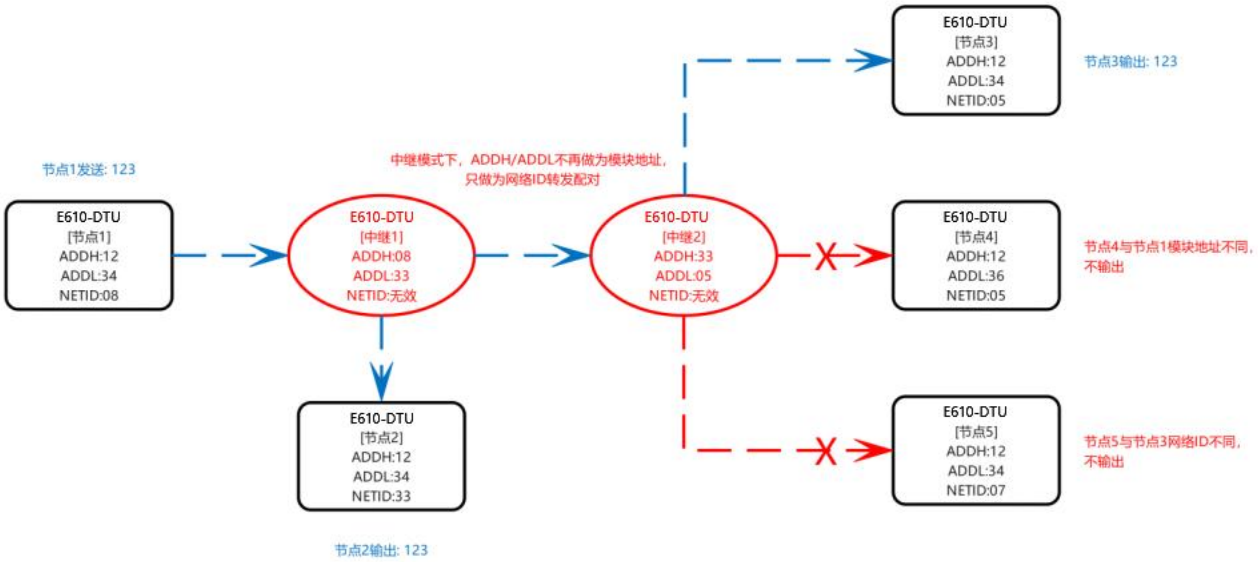
Thus node 3 and node 4 can receive node 1 data. Node 4 outputs data normally, and node 3 has a different address from node 1, so it does not output data.

③ Bidirectional Relay

As configured in the 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 be received by node 1.

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9. Programming the radio

9.1 Schema



Operating Mode	**M1**	**M0**	Note
Configuration Mode	OFF	ON	The radio can only be programmed in the current mode using the configuration software

Note: 1, programming can only be carried out in a specific working mode (see the above table), when programming fails, please make sure that the working mode of the radio is correct.

2、If there is no need for complex programming open the E610-DTU(433C37) digital radio configuration software, you

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can modify the relevant parameters can be.



9.2 Configuration Software Details

The following figure shows the display interface of E610-DTU(433C37) configuration upper computer. Users can switch to the configuration mode through M0 and M1 for quick configuration and reading of parameters in the upper computer.



parameters	Parameter details
Baud rate	The serial port baud rate at which the wireless digital radio operates, 1200bps to 115200bps.
Parity	Supports 8N1: no parity; 8E1: even parity; 8O1: odd parity; all 8 data bits, 1 stop bit.
Air Rate	Wireless communication rate, also called air baud rate. With a high air rate, data is transmitted faster and the time delay for transmitting the same data is small, but the transmission distance will be shorter.

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Frequency Channel	Wireless digital transmission radio working frequency, each channel corresponds to its different working frequency, theoretically different frequency channels can not communicate with each other. If there are several wireless digital transmission radios in the same area, it is recommended that the communication frequency interval is 2 to 5 MHz.
Transmit Power	Output power, that is, the power that can be radiated externally. In order to ensure the efficiency of the work is recommended to use the maximum power, if you reduce the transmission power, the communication distance will become shorter, the need to consume less current.
Station Address	The internal address of the wireless digital radio is independent of the Modbust address. Only stations with the same address can communicate with each other, and this feature can be used to realize software filtering and grouping. Input range: 0 to 65535, decimal number.
Transmission Method	Transparent transmission, what you send is what you get. Fixed point: Send data at a fixed point according to the format.

Note: 1. In the configuration of the upper computer, the radio address, frequency channel, network ID, and key are in decimal display mode; where each parameter takes the value range:

Network address: 0 ~ 65535

Frequency channel: 0 ~ 61

Network ID: 0 ~ 255

Key: 0 ~ 65535

2. Users in the use of the host computer configuration relay mode, need to pay special attention to, due to the host computer, the parameters for the decimal display mode, so the radio address and network ID fill in the need to convert conversion; such as transmitting end A enter the network ID for 02, receiving end B enter the network ID for 10, then the relay end of the R to set the radio address, will be converted from hexadecimal value 0X020A to decimal value 522 as a relay. When the relay R sets the radio address, the hexadecimal value 0X020A will be converted to the decimal value 522 as the radio address filled in by the relay R; i.e., at this time, the relay R needs to fill in the value of the radio address as 522.

10. Firmware Upgrade

- E610-DTU(433C37) supports serial port firmware upgrade, when special after-sales support is needed, you can contact us to get the corresponding firmware for upgrade processing.
- Use USB to RS485 or RS232 tool to connect the corresponding port of the radio. It is recommended to prioritize the RS232 port for upgrading operation.

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11. Connection schematic in testing and practical application



12. Related products

Product Model	Interface	Operating frequency Hz	Transmit power W	Communication distance km	Functional Features
E90-DTU(170L30)	RS232/RS485	170M	1	8	LoRa spread spectrum technology, low-frequency penetration bypassing

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					radiation
E90-DTU(433L30)	RS232/RS485	433M	1	8	LoRa spread spectrum technology, long range anti-interference
E90-DTU(433L37)	RS232/RS485	433M	5	20	LoRa spread spectrum technology, long range anti-interference
E90-DTU(230N27)	RS232/RS485	230M	0.5	5	Low frequency narrow band, penetration bypass, for complex environments
E90-DTU(230N33)	RS232/RS485	230M	2	8	Low Frequency Narrow Band, Penetrating and Winding, for Complex Environments
E90-DTU(230N37)	RS232/RS485	230M	5	15	Low Frequency Narrow Band, Penetrating and Winding, for Complex Environments
E90-DTU(230SL22)	RS232/RS485	230M	0.16	5	New LoRa Spread Spectrum Anti-Jamming, Automatic Relay, Communication Key
E90-DTU(230SL30)	RS232/RS485	230M	1	10	New LoRa Spread Spectrum Anti-Jamming, Automatic Relay, Communication Key
E90-DTU(400SL22)	RS232/RS485	433/470M	0.16	5	New LoRa Spread Spectrum Anti-Jamming, Automatic Relay, Communication Key
E90-DTU(400SL30)	RS232/RS485	433/470M	1	10	New LoRa Spread Spectrum Anti-Jamming, Automatic Relay, Communication Key
E90-DTU(900SL22)	RS232/RS485	868/915M	0.16	5	New LoRa Spread Spectrum Anti-Jamming, Automatic Relay, Communication Key
E90-DTU(900SL30)	RS232/RS485	868/915M	1	10	New LoRa Spread Spectrum Anti-Jamming, Automatic Relay, Communication Key

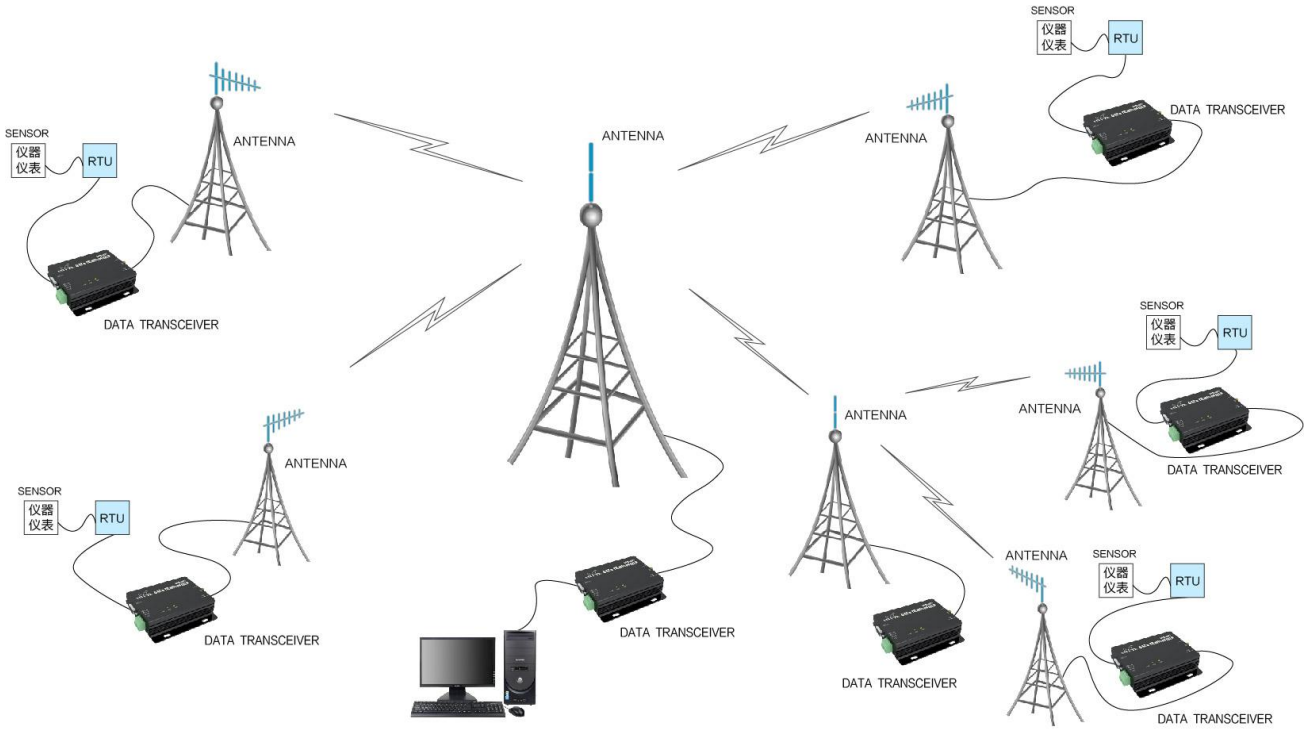
13. Areas of practical application

EBYTE digital transmission 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 condition measurement and reporting, water mains network monitoring, urban street light monitoring, air defense alarm control, railroad signal monitoring, centralized control of railroad water supply, monitoring of oil and gas pipeline network, GPS positioning system, remote meter reading, electronic crane, automatic alarm target, earthquake detection and reporting, fire prevention, environmental monitoring and other industrial automation systems. target reporting, seismic reporting, fire and theft prevention, environmental monitoring

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and other industrial automation systems, as shown in the figure below:



14. Precautions for use

1. Please keep the warranty card of this equipment, the warranty card has the factory number of the equipment (and important technical parameters), for the user's future maintenance and new equipment has an important reference value.
2. Radio in the warranty period, if due to the quality of the product itself and not man-made damage or damage caused by lightning and other natural disasters, enjoy free warranty; please do not repair the user, the problem is to get in touch with our company, Yibaiyi BaiTe provide first-class after-sales service.
3. In some flammable places (such as coal mine) or explosive hazardous objects (such as detonation detonator) in the vicinity, do not operate the radio.
4. Use suitable DC voltage regulator power supply, which is required to have strong resistance to high-frequency interference, small ripple and sufficient load carrying capacity; it is also preferable to have over-current, over-voltage protection and lightning protection to ensure the normal operation of the digital transmission radio.
5. Don't use the digital radio in the working environment beyond the environmental characteristics, such as high temperature, humidity, low temperature, strong electromagnetic field or dusty environment.
6. Don't let the digital radio continuously in full load transmitting state, otherwise it may burn out the transmitter.
7. The ground wire of the digital radio should be well connected with the ground wire of external devices (such as PC, PLC, etc.) and the ground wire of the power supply, otherwise it is easy to burn the communication interface, etc.; do not plug or unplug the serial port with electricity.
8. When testing the digital radio, you must connect a matching antenna or 50Ω dummy load, otherwise the transmitter will be easily damaged; if you connect an antenna, it is better to keep the human body away from the antenna for more than 2 meters to avoid injury, and do not touch the antenna when transmitting.
9. Wireless digital transmission radios often have different communication distance in different environments,

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communication distance is often affected by temperature, humidity, obstacle density, obstacle volume, electromagnetic environment; in order to ensure that you can get stable communication, it is recommended to reserve more than 50% of the communication distance margin.

10. If the measured communication distance is not ideal, it is recommended to analyze and improve the communication distance from the antenna quality and antenna installation. 亦可与 support@cdebyte.com 取得联系, seek help.

11. When selecting the power supply, in addition to the need to retain 50% of the current margin in accordance with the recommendations, it should be noted that its ripple should not exceed 100mV.

15. Revision history

Versions	Revision Date	Revision Notes	Maintaining people
1.0	2024-5-16	Initial Version	Hao

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