Ebyte industrial grade Wireless Transmitter

E32-DTU (433L37)

User Manual

Content

1.Introduction

1.2. Brief introduction

E32-DTU (433L37) is a high-speed 433M wireless data transmission station (with RS232/RS485 interface), LoRa spread spectrum technology, transparent transmission mode, operating in 410~441MHz band (default 433MHz), operating voltage range of 8V~28V.

LoRa direct sequence spread spectrum technology will bring longer communication distance, and has the advantages of concentrated power density, strong anti-interference ability. The module has software FEC forward error correction algorithm, which has high coding efficiency and strong error correction ability. In the case of burst interference, it can actively correct the interfered data packets, greatly improving the reliability and transmission distance. In the absence of FECs, such packets can only be discarded.

The module has the function of data encryption and compression. The data transmitted by the module in the air has randomness, which makes the data interception meaningless through strict encryption and decryption algorithm. The data compression function has the probability to reduce the transmission time, reduce the probability of interference, improve the reliability and transmission efficiency.

1.3. Features

★ All core components originally imported, compared with the current similar imported digital transmission radio, the most advanced function, the smallest volume, the best price.

★ Using temperature compensation circuit, frequency stability is better than ±1.5PPM.

★ All aluminum alloy shell, compact volume, easy installation, good heat dissipation; Perfect shield design, good electromagnetic compatibility, strong anti-interference ability.

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

★ Built-in watchdog, and precise time layout, once abnormal, the module will automatically restart, and can continue to work according to the previous parameter Settings.

★ The RF core scheme adopts the original imported SEMTECH SX1278 chip, which has been praised by the industry for its ultra-high stability, and is chosen by the majority of customers.

2. Operation

You should prepare:

DTU 电源适配器 天线 连接线
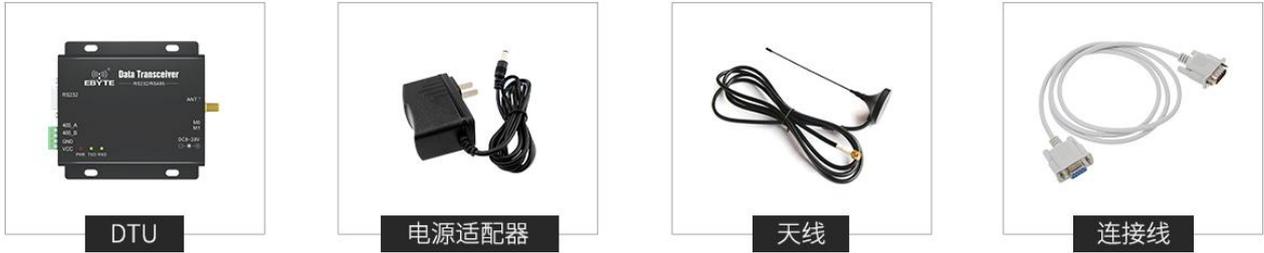
1. Firstly, install the antenna to the data transmission, and then install the power supply, and ensure that the state of the dip switch is correct. The user can choose the pressing mode or the power adapter according to the demand.

2, The use of USB to RS-232, USB to RS-485 or other ways to make the computer and data transmission station connected;

PC

DTU

DTU
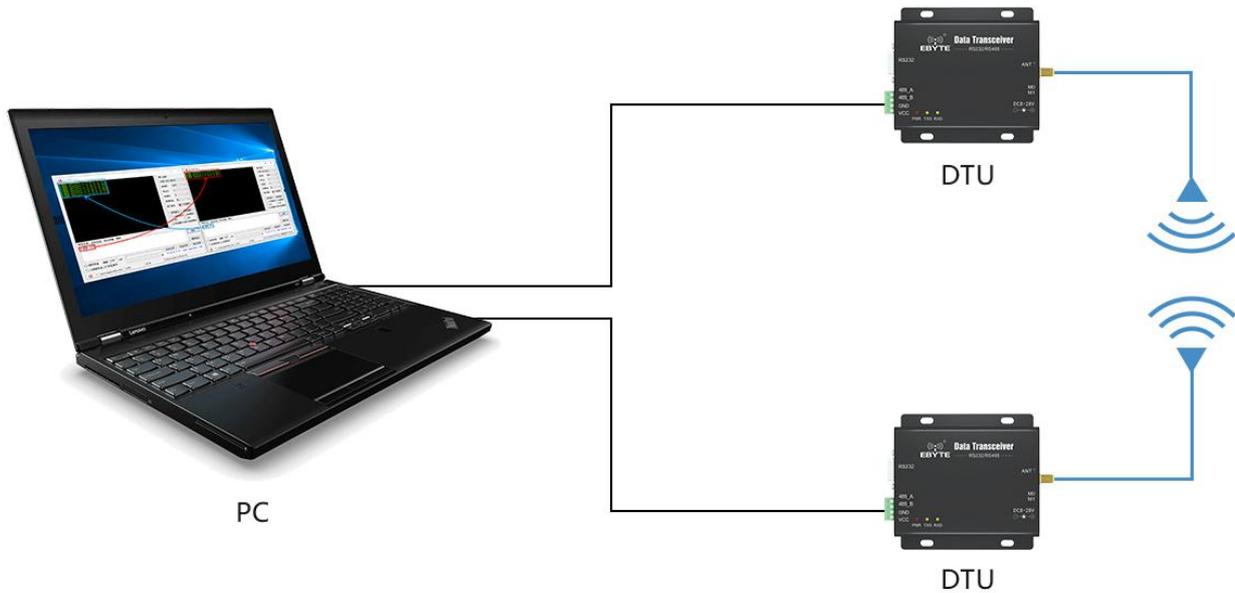
3. Start two serial debugging assistants, select the baud rate of the serial port as 9600bps and the verification mode as 8N1 to realize the serial port transmission through;
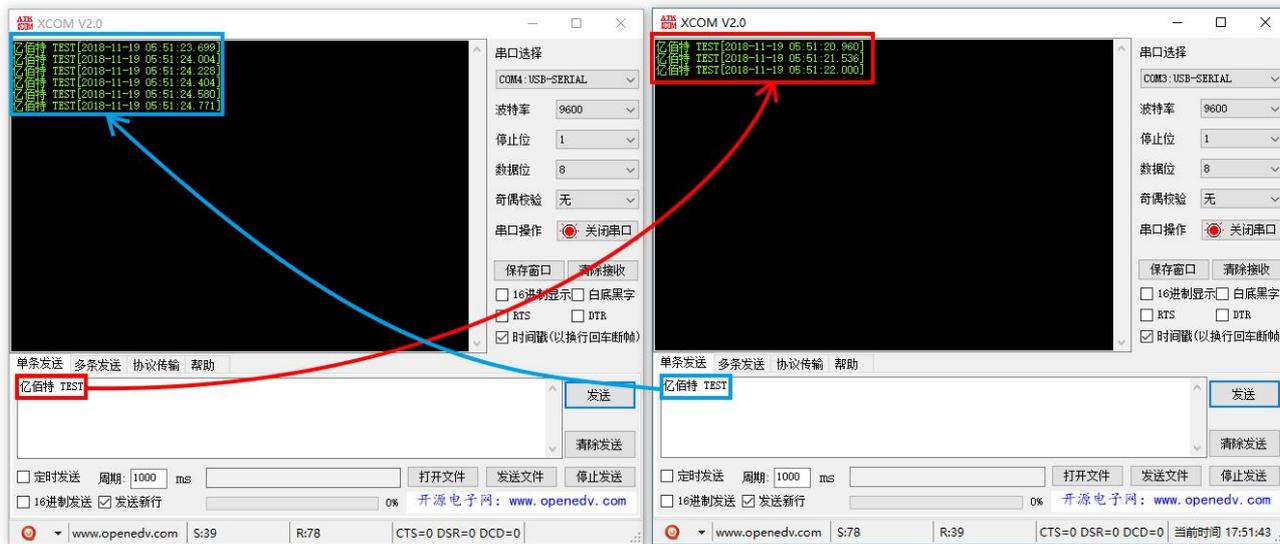
4. If the customer needs to modify the parameters, please switch the data transmission station to the configuration mode and connect it to the computer. Then open the E32-DTU data transmission station configuration software to modify the relevant parameters.

Mode 0 Factory default status   Mode 3 Set parameters
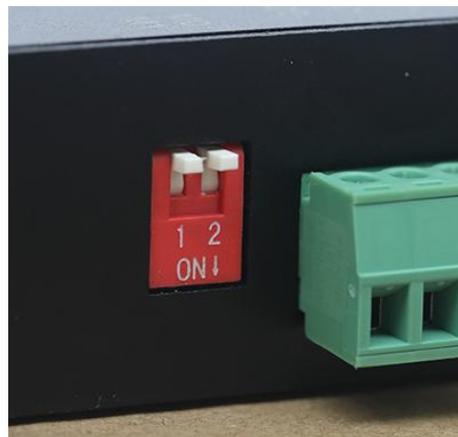
3. Installation parameters

3.1. Structure
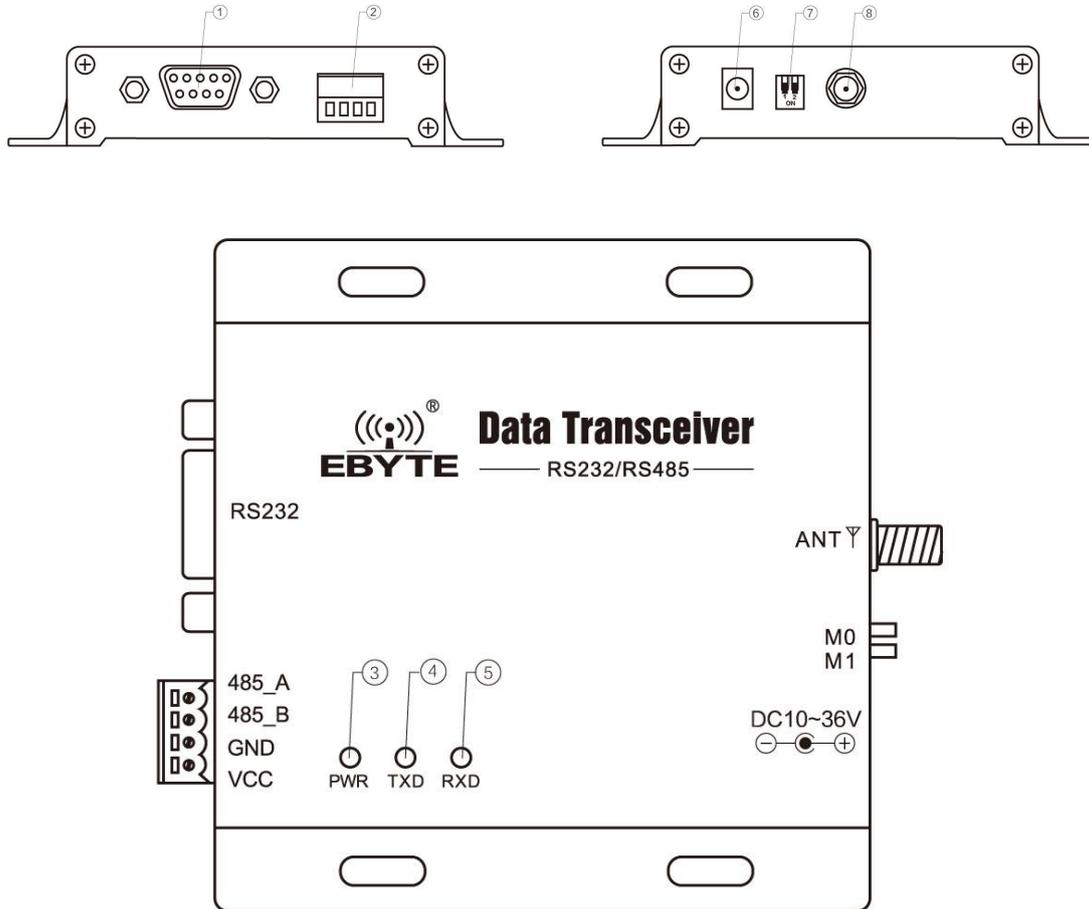
Pin	Name	Function	Description
1	DB-9 female socket	RS-232Interface	Standard RS-232 interface
2	3.81 Wiring terminals	RS-485、power port	Standard RS-485 interface and press-line power interface
3	PWR-LED	Power indicator light	Red, lit when the power is on
4	TXD-LED	Sending indicator light	Blinking yellow when data is being sent
5	RXD-LED	Receiving indicator light	Yellow, blinking when receiving data
6	DC power port	Power interface	Straight insert round hole, outer diameter 5.5mm, inner diameter 2.5mm
7	Dip switch	Dip switch	Operating mode control
8	Antenna interface	SMA-K Interface	Internal hole with external thread, length 10mm, characteristic impedance 50Ω

3.2. **Dimension**
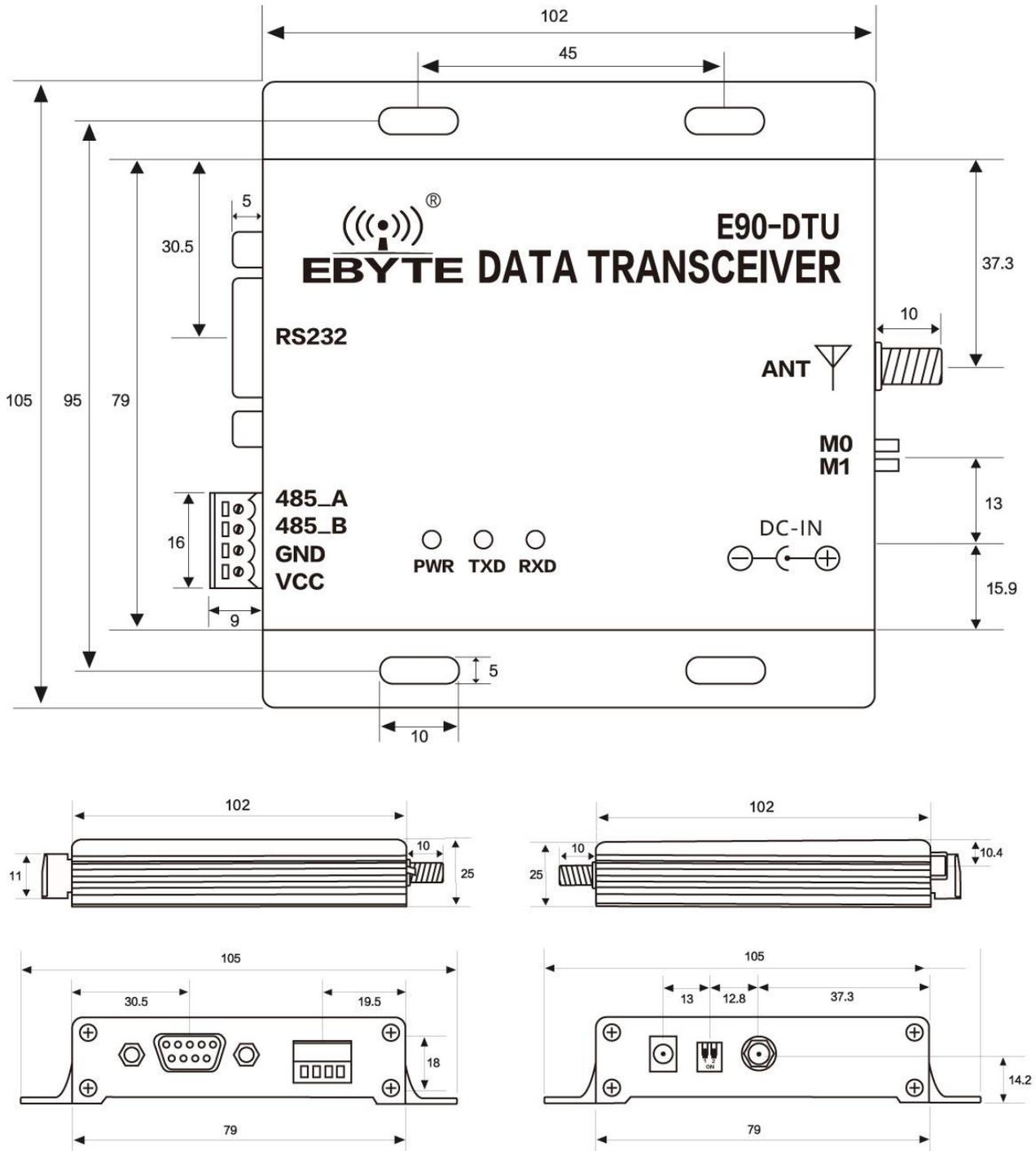
Unit：mm

4. Interface definition

4.1. Power supply Interface
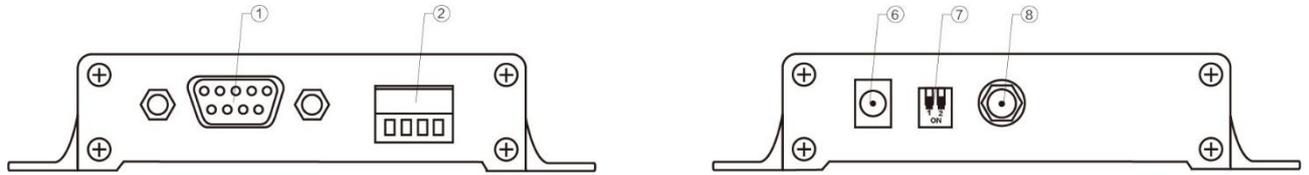
You can select the ⑥ DC power adapter, which provides power with an external diameter of 5.5mm and an internal diameter of 2.5mm.

The VCC terminal and GND terminal in ② can also be used for power supply, just select either of the power supply modes.

E32-dtus can use 8 to 28V DC power supplies. 12V or 24V DC power supplies are recommended.

4.2. RS232 interface definition

The E32-DTU can be connected to the device via RS-232 using a standard DB-9 interface.

4.3. RS485 Interface definition

The E32-DTU can connect terminals 485_A and 485_B in step 2 to terminals A and B of RS-485.
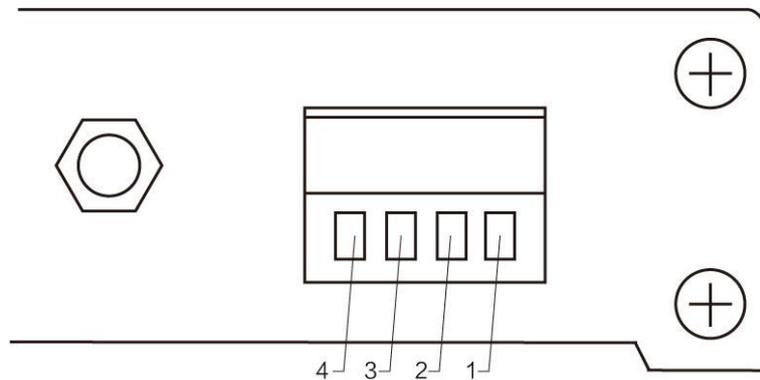
Pin	Standard definition	Function	Description
1	VCC	Press-line power interface, positive pole	Dc ranges from 8V to 28V. 12V or 24V is recommended
2	GND	Press-line power interface, negative terminal	The negative terminal of the power supply is connected with the system and the housing
3	485_B	RS-485 port, port B	RS-485 Port B Connects to port B on the device
4	485_A	RS-485 port, port A	RS-485 Port A Port A connects to port A of the device

▲ Note: Communication failure occurs when the radio station is connected to multiple devices, but does not occur when the radio station is connected to a single device. Connect terminals 485_A and 485_B in parallel with 120Ω resistance.

5. Technical indicators

5.1. Model specifications

P/N	Frequency	Power	Distance	specifications	Application
	Hz	W	km		
E32-DTU (433L37)	433	5	20	LoRa spread spectrum, long distance anti-interference, stable performance	It is suitable for the environment with small data volume, long transmission distance and easy interference

Note: Reference distance test environment: clear weather, open environment without shelter, 12V2A power supply, 5dBi gain suction cup antenna, antenna height 2 meters from the ground, using the factory default parameters.

5.2. General parameters

Number	Matters	Specification	Description
1	Size	124 * 105 * 25 mm	See 3.2. Installation Dimensions
2	Weight	240g	Weight tolerance 9g
3	Working temperature	-40℃ ~ 85℃	Meet the needs of industrial grade use
4	Antenna resistance	50 Ω	Standard 50 Ω characteristic impedance
5	Voltage range	+8 ~ +28V DC	12V or 24V is recommended
6	interface	RS232/RS485	Standard DB9 hole /3.81 terminal
7	Baud rate	Default 9600	The baud rate ranges from 1200 to 115200
8	Address code	Default 0	A total of 65536 address codes can be set

5.3. Frequency Range and Channels

P/N	Default frequency	Frequency range	Channel interval	Channel number
	Hz	Hz	Hz	
E32-DTU (433L37)	433	410~441	1	32，half-duplex

★ If multiple groups of data transmission stations are used for one-to-one communication in the same area, it is recommended that the channel interval of each group of data transmission stations be set at least 2MHz.

5.4. Air data rate

P/N	Default air rate	Levels	Air rate level
	bps		bps
E32-DTU (433L37)	2.4	6	0.3、1.2、2.4、4.8、9.6、19.2

Note: The higher the air speed, the faster the transmission rate, the closer the transmission distance; Therefore, in the case that the speed meets the requirements of use, the lower the airspeed is recommended.

5.5. Current parameters

P/N	Transmitting current mA		Standby current mA	
	12V	24V	12V	24V
E32-DTU (433L37)	1050	540	44	36

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

5.6. Transceiving data length and Sub-packing mode

P/N	Buffer	Sub-package
E32-DTU (433L37)	512 bytes	Automatically send 58 bytes per package

Note: 1. If the data received by the station 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 data received by the radio at one time shall not be larger than the cache capacity;

6. Operating mode

E32-DTU has four operating modes. When there is no harsh and low power demand, it is recommended to configure the station in the general mode (mode 0) for normal communication.The radio is set to general mode (mode 0) by default when it comes out of the

factory.

	Mode	M1	M0	Notes
Mode 0	General mode	On	On	Serial port open, wireless open, transparent transmission
Mode 1	Wake-up mode	On	Off	Air wake up transmission mode, packet with wake up code
Mode 2	Power-saving mode	Off	On	Air wake up receiving mode to save its own receiving power consumption, this mode can not be transmitted
Mode 3	Sleep mode	Off	Off	The module enters hibernation and can receive parameter setting commands

模式 0　　　　　　　模式 1　　　　　　　模式 2　　　　　　　模式 3

★　Note: If there is no need for low power consumption, do not care about wake-up mode (mode 1) and power saving mode (mode 2).

7. Program the DTU

7.1. Diagrammatic Drawing

	Mode	M1	M0	Notes
Mode 3	Sleep mode	Off	Off	The module enters hibernation and can receive parameter setting commands
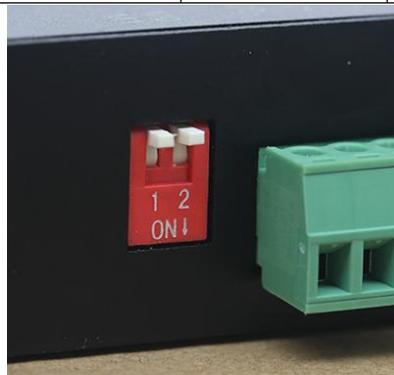
★ 1, programming can only be in a specific working mode (see the table above), programming failure, please confirm the radio working mode is correct.

2. If you do not need complex programming, open the E32-DTU data transmission station configuration software, you can modify the relevant parameters.

7.2.   Parameters setting instruction

| Parameters	Details
Baud rate	The serial port baud rate of radio data transmission station is 1200bps ~ 115200bps.
Parity	Support 8N1: no check. 8E1: parity check; 8O1: odd check; Both are 8 data bits and 1 stop bit.
Air rate	Wireless communication rate, also known as the air baud rate. The air speed is high, the data transmission speed is fast, the time delay of transmitting the same data is small, but the transmission distance will be shorter.
Power	Output power, can be external radiation power. To ensure working efficiency, you are advised to use the maximum power. If the transmitting power is reduced, the communication distance will be shortened and the required current will be reduced.
FEC	The equivalent receiving sensitivity can be improved by about 3dBm by means of complex coding that allows partial correction of lost or disturbed data. Disabling this feature reduces communication latency.
Transmission way	Transparent transmission, what happens is what you get. Fixed point: Send data at a fixed point according to the format.
Wake-up time	This option is not directly related to communication delay. If customers need low power applications, adjust this option as required. In power-saving mode, the longer the wake up time, the lower the power consumption of the receiver and the larger the communication delay.
IO driver	The default value is used. The driver mode of the internal TTL signal is selected.
DTU address	Internal address of wireless data transmission station, unrelated to Modbust address. Radio address the same radio can communicate with each other, can use this feature to achieve software filtering, grouping. The value ranges from 0 to 65535, in decimal notation.
Frequency channel	It is equivalent to the working frequency of radio data transmission station. Each channel corresponds to its different working frequency. Theoretically, different frequency channels cannot communicate with each other. If multiple groups of radio data transmission stations exist in the same area, the communication frequency interval of 2 to 5MHz is recommended.

8. Connection diagram in the testing and application

9. Related products

P/N	Interface	FrequencyHz	Power dBm	Distance km	Features
E32-DTU (433L37)	RS232 RS485	433M	37	20	LoRa spread spectrum, long distance interference
E32-DTU (868L30)	RS232 RS485	868M	30	8	LoRa spread spectrum, long distance interference
E32-DTU (915L30)	RS232 RS485	915M	30	8	LoRa spread spectrum, long distance interference
E32-DTU (170L30)	RS232 RS485	170M	30	8	Wall-piercing King, LoRa spread spectrum Anti-jamming
E32-DTU (868L20)	RS232 RS485	868M	20	3	LoRa spread spectrum, long distance interference
E32-DTU (915L20)	RS232 RS485	915M	20	3	LoRa spread spectrum, long distance interference
E32-DTU (433L30)	RS232 RS485	433M	30	8	LoRa spread spectrum, long distance interference
E32-DTU (433L27)	RS232 RS485	433M	27	5	LoRa spread spectrum, long distance interference
E32-DTU (433L20)	RS232 RS485	433M	20	3	LoRa spread spectrum, long distance interference

10. Practical application

Thedata transmitter of Ebyte is suitable for all kinds of point-to-point, point-to-multipoint wireless data transmission system. For example, smart home, Internet of Things, power load monitoring, distribution network automation, hydrology and hydrological measurement and reporting, tap water network monitoring, city street lamp monitoring, air defense warning control, railway signal monitoring, railway water supply centralized control, oil and gas pipeline network monitoring, GPS Positioning system, remote meter reading, electronic weighing, automatic target reporting, seismic measurement, fire prevention and theft prevention, environmental monitoring and other industrial automation systems, as shown in the figure below:
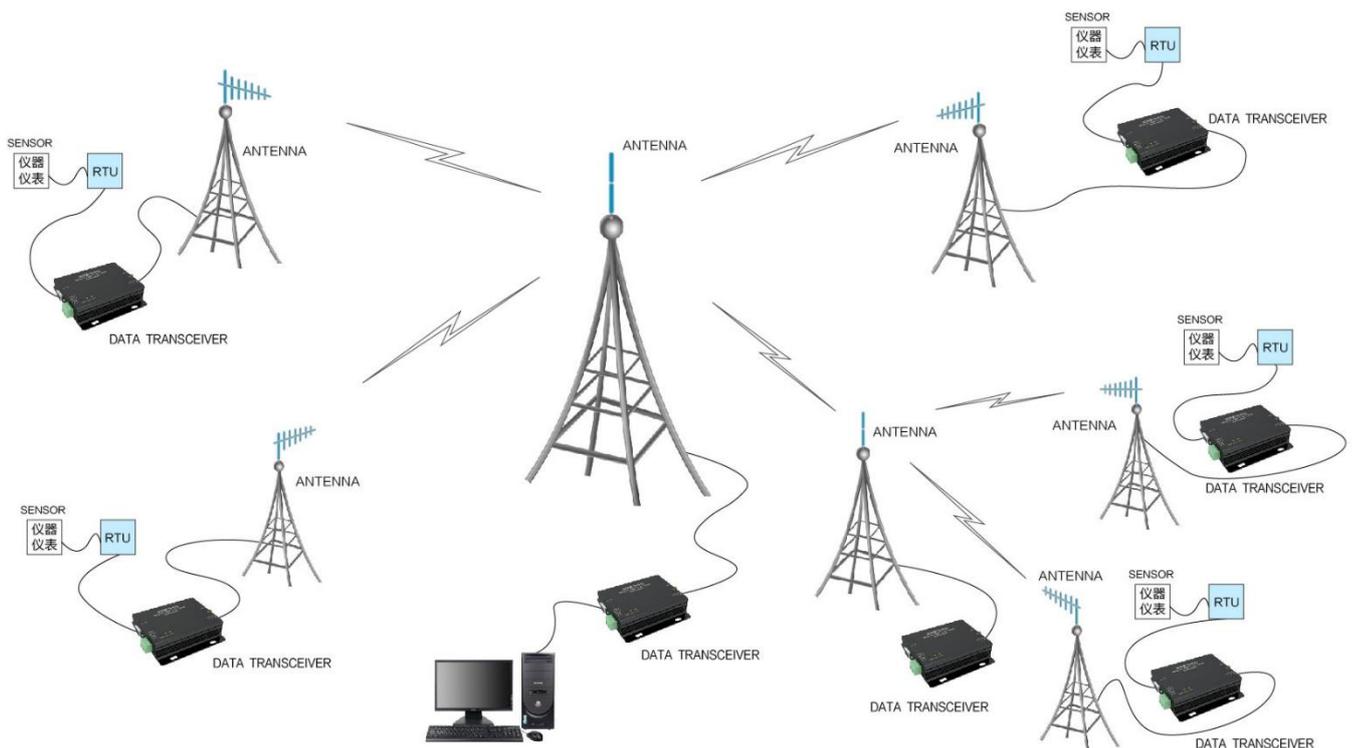
11. Pecaution for use

1. Please take good care of the warranty card of the equipment. The warranty card contains the factory number (and important technical parameters) of the equipment, which is of important reference value for the user's future maintenance and new equipment..

2. During the warranty period, if the station is damaged due to the quality of the product rather than man-made damage or natural disasters such as lightning strikes, it will enjoy free warranty; Please do not repair by yourself. If there is a problem, contact our company. Ebyte team will provide first-class after-sales service.

3.Do not operate this station in the vicinity of some inflammable places (such as coal mines) or explosive dangerous objects (such as detonators).

14,Suitable DC regulated power supply should be selected, which requires strong resistance to high-frequency interference, small ripple and sufficient carrying capacity; It is also best to have over current, over voltage protection and lightning protection functions to ensure the normal work of the data transmission station.

5. Do not use it in an environment beyond the environmental characteristics of the digital transmission station, such as high temperature, humidity, low temperature, strong electromagnetic field or dusty environment.

6. Do not let the data transmission station continuously at full load, or it may burn out the transmitter.

7. The ground wire of the data transmission station should be well connected with the ground wire of the external equipment (such as PC, PLC, etc.) and the ground wire of the power supply, otherwise it is easy to burn out the communication interface, etc.; Do not plug or unplug the serial port with power on.

8. When testing the data transmission station, it must be connected to the matching antenna or 50Ω false load, otherwise it is easy to damage the transmitter; If the antenna is connected, it is better to keep the human body more than 2 meters away from the antenna to avoid injury. Do not touch the antenna during transmission.

9. Wireless data transmission stations often have different communication distances in different environments, which are often affected by temperature, humidity, obstacle density, obstacle volume and electromagnetic environment; To ensure stable communication, you are advised to reserve more than 50% of the communication distance.

10. If the measured communication distance is not ideal, it is suggested to improve the communication distance by analyzing the antenna quality and antenna installation method. Or contact support@cdebyte.com for help.

11. When selecting the power supply, in addition to the need to retain 50% current margin as recommended, more attention should be paid to its ripple should not exceed 100mV.

12. Important statement

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

2. Due to the continuous improvement of the hardware and software of the product, this manual is subject to change without prior notice. The latest version of the manual shall prevail.

3.Environmental protection, everyone's responsibility: In order to reduce the use of paper, only the Chinese part of the manual is printed, the English manual is only available in electronic documents, if necessary, please download from our official website; In addition, if you do not require us to order in bulk, we will only provide product specifications according to a certain percentage of the order quantity. Please kindly understand that not every digital radio station will be equipped with one by one.

13. Revise history

Version	Revision date	Description	Issued by
1.3	2019-12-23	Size	Linson
1.4	2021-08-17	update	xxl
1.5	2021-11-09	update	xxl
1.6	2023-02-23	update	Bin

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