



Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual

E32-DTU(433L33)-V8



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1. Introduction

1.1 Brief introduction

E32-DTU(433L33)-V8 is a wireless modem that adopts military-grade LoRa modulation technology. Due to its advanced modulation method, the communication distance and stability are greatly improved. On the basis of the original built-in power amplifier (PA) and low noise amplifier (LNA), the maximum transmit power reaches 2W and the receiving sensitivity is also improved to a certain extent. Noise amplifier products have been greatly improved. The difference is analog FM radio plus MODEM analog modem, which provides transparent RS232/RS485 interface, working in 433MHz with communication distance up to 12km.

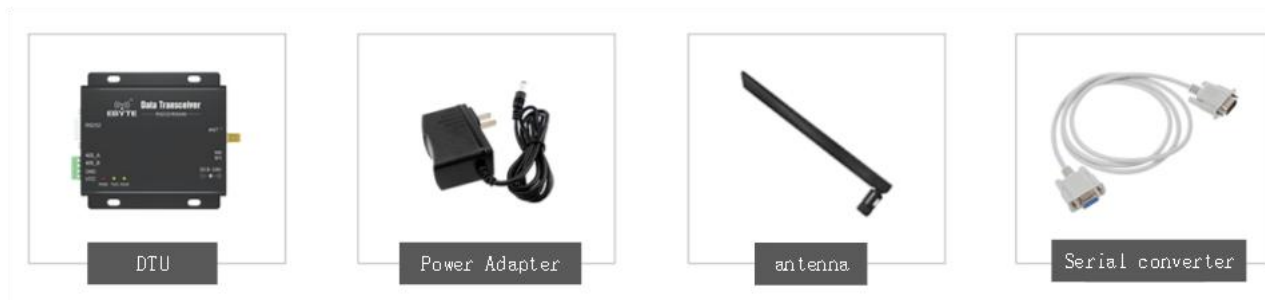
As a communication medium, it has a certain scope of application such as optical fiber, microwave and open wire: it provides real-time and reliable data transmission of monitoring signals in private networks under certain special conditions, with low cost, installation and maintenance. It features convenience, 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

- ★ Adopts military-grade LoRa modulation technology, greatly improves the communication distance and stability;
- ★ Simple and high-efficiency power supply design, power adapter or screwing method available, 8~28V power supply;
- ★ The transmit power is up to 2W, adjustable in multiple levels, and all technical indicators meet European industrial standards;
- ★ Adopts temperature compensation circuit, the frequency stability is better than $\pm 1.5\text{PPM}$;
- ★ Working temperature range: $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$, suitable for various harsh working environments, real industrial grade products;
- ★ All aluminum alloy shell, compact size, easy installation, good heat dissipation; perfect shielding design, good electromagnetic compatibility, strong anti-interference ability;
- ★ Multiple protection functions such as power reverse connection protection, over-current protection, antenna surge protection, etc., greatly increase the reliability;
- ★ 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 exception occurs, the module will automatically restart and continue to work according to the previous parameters.

2 Quick start

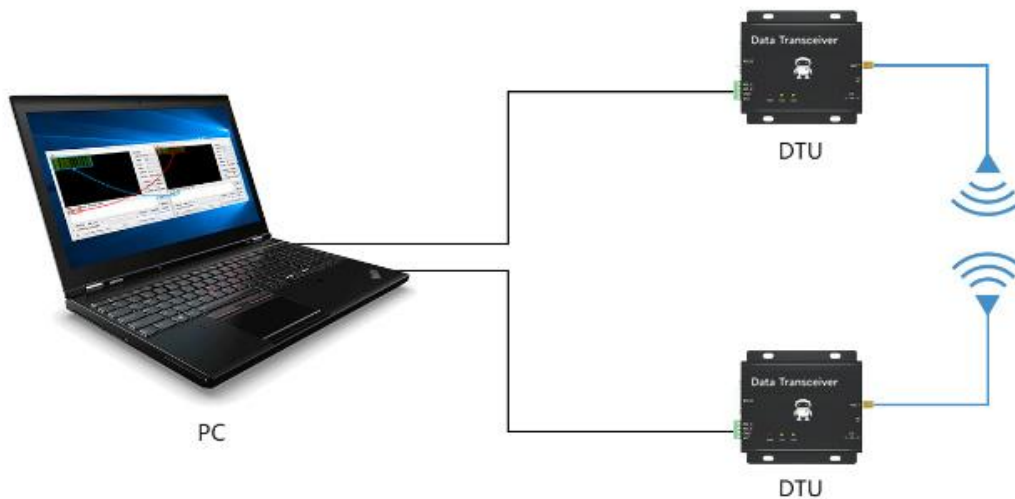
You will prepare items below



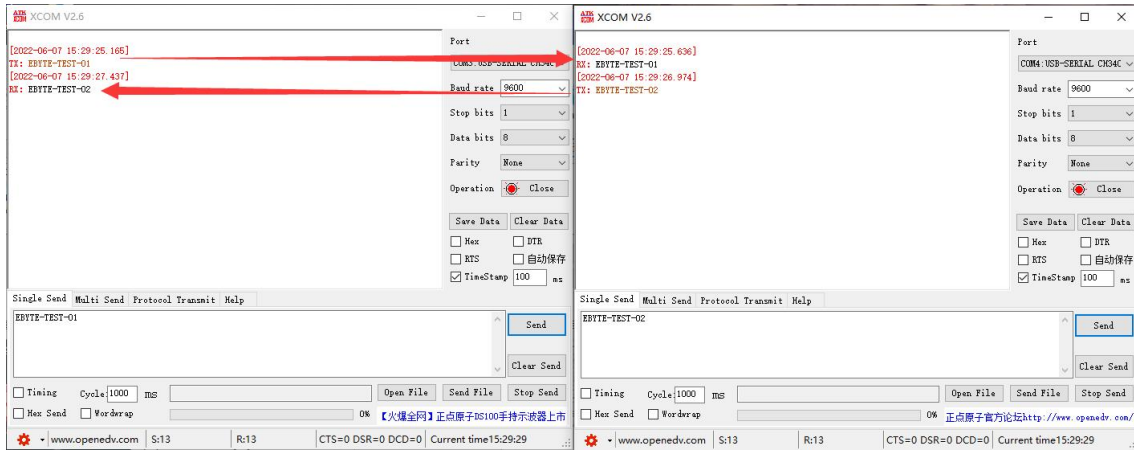
1. First install the antenna for the data transmission, then install the power supply, and ensure that the DIP switch is in the correct state. The user can choose the screwing method or the power adapter to supply power according to their needs;



2 Use USB to RS-232, USB to RS-485 or other methods to connect computer with modem;



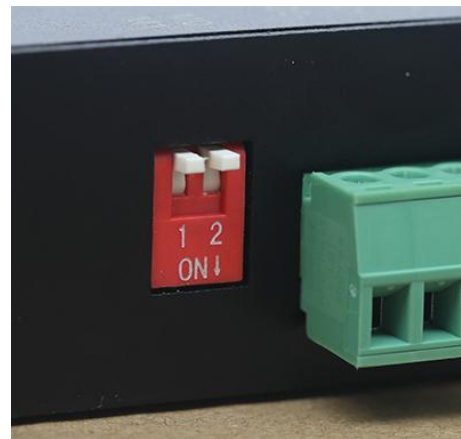
3 Start two serial port debugging assistants, select the serial port baud rate as 9600bps and the verification method as 8N1, then the serial port transparent transmission can be realized;



4 If the customer needs to modify the parameters, please set dip switch in the configuration mode and connect it to the computer. Open the E90-DTU configuration software to modify the relevant parameters. After the configuration is completed, the dip switch state must be restored before communication can be carried out.



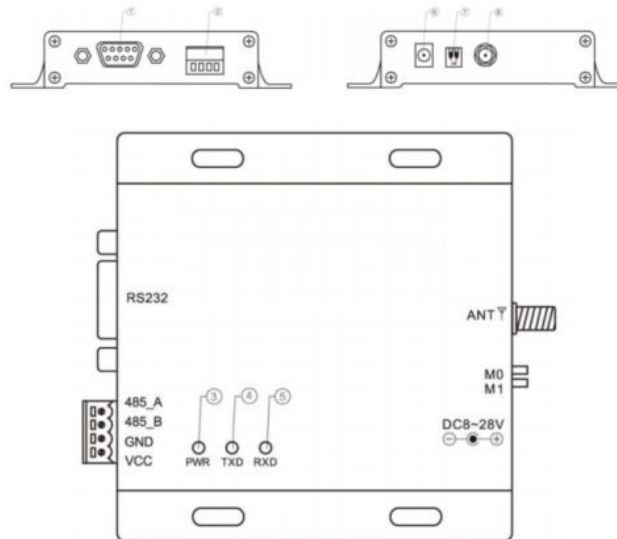
Mode 0 Factory default mode



Mode 3 Parameter configuration

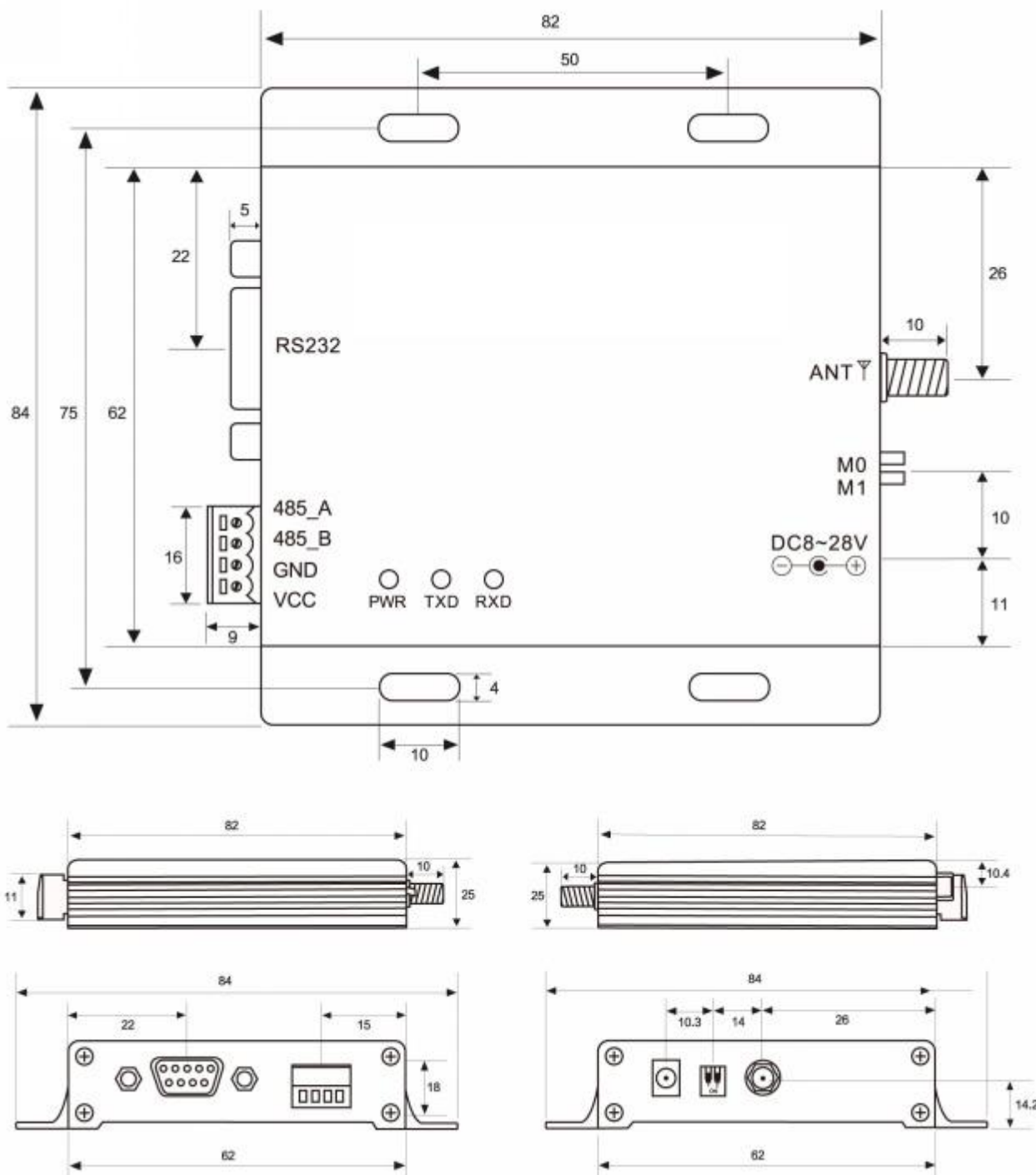
3 Dimensions

3.1 Parts description



Pin	Name	Function	Remarks
1	DB-9 female socket	RS232	Standard RS232 interface
2	3.81 Terminals	RS485, power supply	Standard RS485 interface and screwing power interface
3	PWR-LED	Power Indicator	Red, lights up when the power is on
4	TXD-LED	TX indicator	Yellow, flashes when sending data
5	RXD-LED	RX indicator	Yellow, blinks when receiving data
6	DC power interface	Power interface	DIP round hole, outer diameter 5.5mm, inner diameter 2.5mm
7	DIP switch	DIP switch	Work mode control
8	Antenna interface	SMA-K	External thread inner hole, length 10mm, characteristic impedance 50Ω

3.2 Dimensions



单位: mm

4 Interface definition

4.1 Power interface



Users can choose ⑥ DC power interface, using the power adapter supply with the interface of the 5.5mm outer diameter, 2.5mm diameter;

Also users can choose the VCC and GND terminal power supply from ②, both are optional;

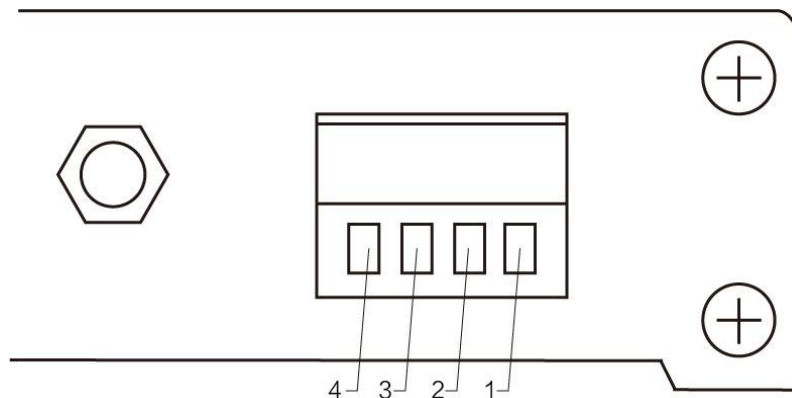
8 ~ 28V DC power supply, it is recommended to use 12V or 24V DC power supply for E32-DTU.

4.2 RS232

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

4.3 RS485

E32-DTU can be connected to the 485_A terminal and 485_B terminal from ② with the RS-485 A terminal and B terminal of other device respectively.



Pin NO.	Definition	Function	Description
1	VCC	Crimping power interface, positive	8 ~ 28V DC, recommended 12V or 24V
2	GND	Crimping power interface, negative	The power supply negative pole is connected to the system ground and the housing

3	485_B	RS-485 interface, interface B	The RS-485 interface B is connected to the device interface B
4	485_A	RS-485 interface, interface A	The RS-485 interface A is connected to the device interface A

Note: The transceiver will be in poor communication when connected to multiple devices, it is recommended to be connected to a single device, please try to use parallel 120Ω resistor between 485_A terminal and 485_B.

5 Technical specification

5.1 Model specification

Model No.	Frequency	TX power	Distance	Features	Recommended application
	Hz	W	km		
E32-DTU(433L33)-V8	433M	2	12	LoRa, anti-interference	Suitable for small data and long-distance application environment

Note: Test condition: in clear and open air without shelters, 12V /2A power supply, 5dBi gain sucker antenna over 2 meters height from the ground, with the factory default parameters.

5.2 General specification parameter

No.	Item	Value	Note
1	Size	82*62*25mm	See more in 3.2. <i>Dimensions</i>
2	Weight	150g	Difference is within 5g
3	Temperature	-40°C~+85°C	Meet industrial request
4	Antenna impedance	50Ω	Standard 50 Ω characteristic impedance
5	Supply voltage	8~28V DC	It is recommended to use 12V or 24V
6	Communication interface	RS232/RS485	Standard DB9 hole / 3.81 terminal block
7	Baud rate	Factory default 9600	From 1200~115200
8	Address code	Factory default 0	65536 configurable address

5.3 Frequency and channel numbers

Model No.	Default Frequency	Frequency Range	Channel Interval	Channel numbers
	Hz	Hz	Hz	

E32-DTU(433L33)-V8	433M	410~441M	1M	32, half duplex
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- ★ Note: In the same area when multiple data transceivers are communicating one to one at the same time, it is recommended to set the channel spacing between each group of data transceivers at 2MHz or more.

5.4 Transmitting power

Model No.	2W	1W	500mW	250mW
E32-DTU(433L33)-V8	Factory default	√	√	√

- ★ Note: The lower the transmit power, the closer the transmission distance, but the working current won't be declined in exact proportion, it is recommended to use the maximum transmit power.

5.5 Air data rate

Model	Default	Levels	Air data rate (bps)
	bps		bps
E32-DTU(433L33)-V8	2.4k	4	2.4k、4.8k、9.6k、19.2k

- ★ Note: The higher the air data rate, the faster the transmission rate, the transmission distance is also closer; when the rate meets the requirements, the lower air data rate, the better quality.

5.6 Current

Model	TX current mA		Standby current mA	
	12V	28V	12V	28V
E32-DTU(433L33)-V8	502	260	10	8

- ★ Note: It is recommended to retain more than 50% of the current margin when selecting the power supply, which will help the data transceiver to work steadily for a long time.

5.7 TX and RX FIFO and sub-packing method

Model No.	Buffer	Sub-packing method
E32-DTU(433L33)-V8	512 byte	Automatically send 58 bytes per packet

★Note: 1. If the data received by the radio station 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;

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

6 Operating mode

There are four operating modes, if low power consumption is not required, for normal communication it is

recommended to configure the data transceiver to the normal mode (mode 0);

The factory default is normal mode (mode 0).

Mode	Categories	M1	M0	Notes
Mode 0	Normal Mode	ON	ON	Open UART Comm port and RF, transparent transmission is on, configuration over air via special command is available.
Mode 1	WOR Mode	ON	OFF	Can be defined as WOR transmitter and WOR receiver, WOR is available.
Mode 2	Configuration Mode	OFF	ON	Users access the register through the serial port to control the working state of the device. The DTU can be configured through the configuration software on computer.
Mode 3	Sleep Mode	OFF	OFF	DTU is in sleep mode.



MODE 0



MODE 1



MODE 2

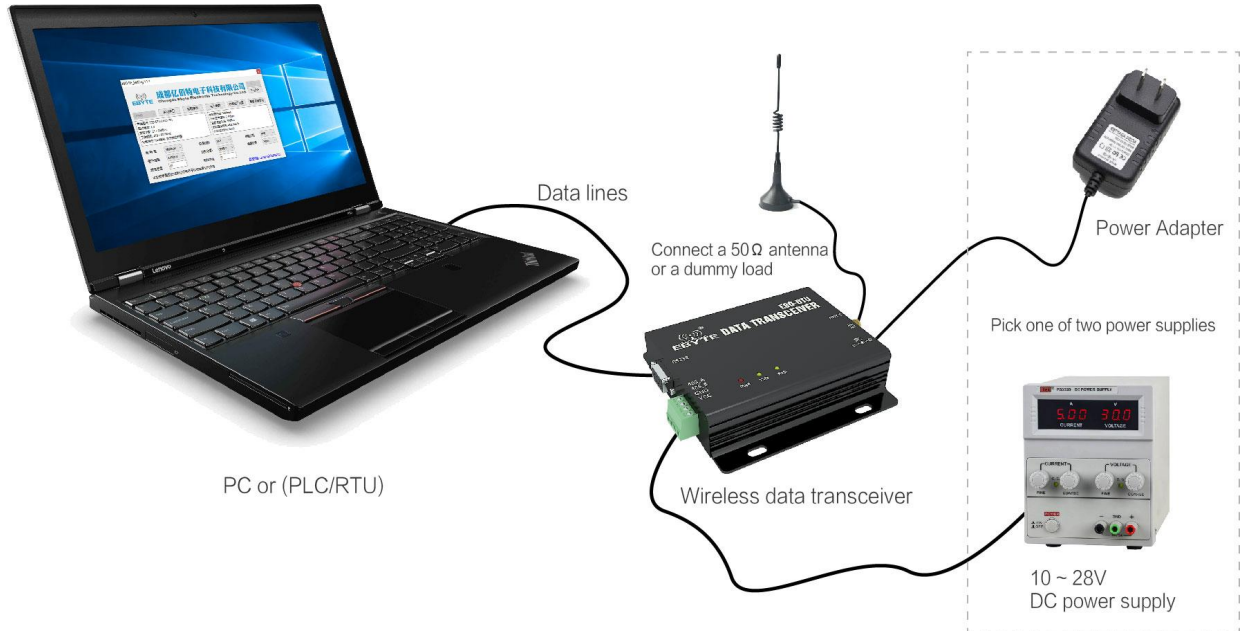


MODE 3

★Note: If there is no need for low power consumption, you don't need to care about the wake-up mode (mode 1) and power saving mode (mode 2).

7 Programming the modem

7.1 Connection diagram



Mode	M1	M0	Note
Sleep mode	OFF	OFF	Programming via the configuration software is available only in this mode

- ★ Note:1, When programming, please check whether the device is in correct operating mode as shown above.
- 2, Users can modify parameters via E32-DTU SL configuration software.



Mode 3 Sleep Mode

7.2 Software for parameter setting



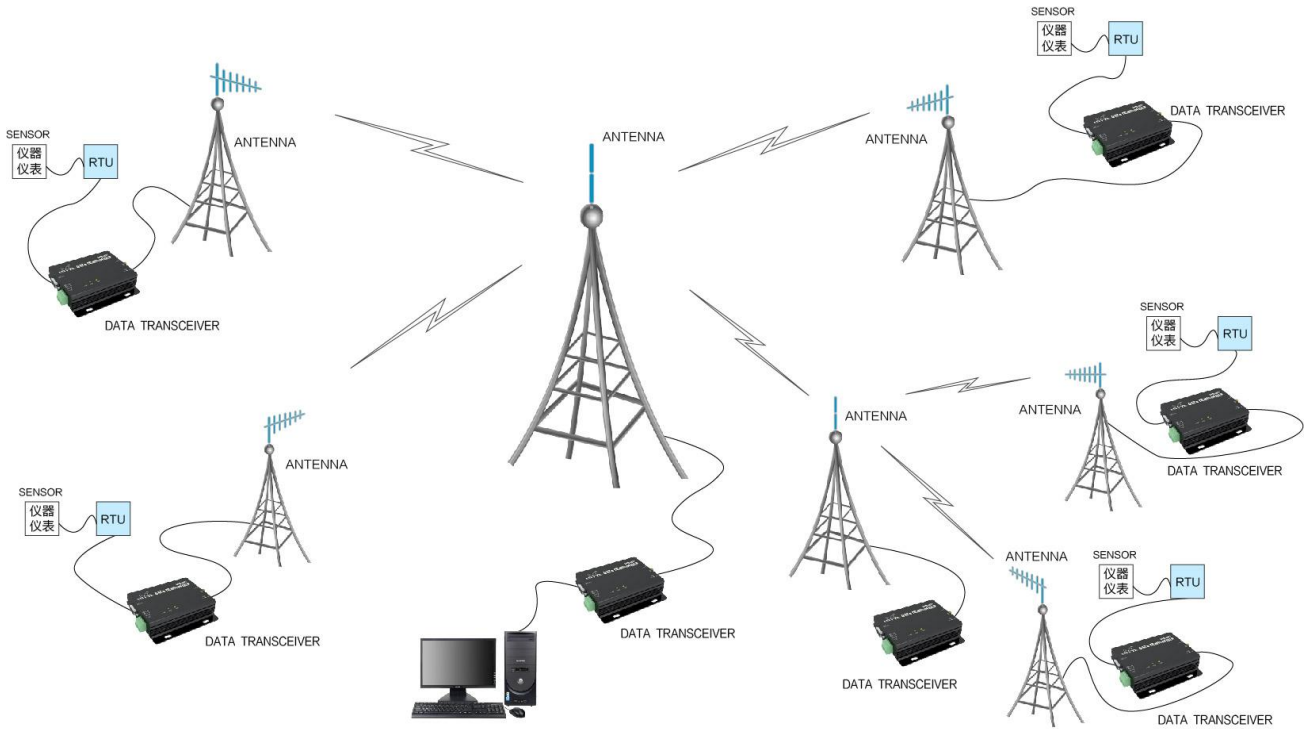
Parameter	Description
Baud rate	The serial port baud rate when the wireless digital radio is working, 1200bps~115200bps.
Parity	Support 8N1: no parity; 8E1: even parity; 8O1: odd parity; both are 8 data bits and 1 stop bit.
Air data rate	Wireless communication rate, also called air data rate.
Frequency channel	The working frequency of the wireless modem, each channel corresponds to its different working frequency, in theory, different frequency channels cannot communicate with each other. If there are multiple groups of wireless modem in the same area, it is recommended that the communication frequency be separated by 2~5MHz.
Transmit power	The output power is the power radiated to the outside. In order to ensure the working efficiency, it is recommended to use the maximum power. If the transmit power is reduced, the communication distance will be shortened, and the current consumed will be reduced.
Modem address	The internal address of the wireless modem has nothing to do with the Modbus address. Only modem with the same radio address can communicate with each other. This feature can be used to realize software filtering and grouping. Input range: 0~65535, decimal number.
Transfer method	Transparent transmission, what you send is what you get. Fixed point: Send data at fixed point according to the format.
Wake-up time	It is not directly related to the communication delay. If customers need low-power applications, they need to adjust this option as required. In the power saving mode, the longer the wake-up time, the lower the power consumption of the receiver, and the greater the communication delay.

9 Related series products

Model No.	Interface	Frequency Hz	TX Power dBm	Distance km	Features
E32-DTU (433L37) -V8	RS232 RS485	410-441M	37	20	LoRa, long distance, anti-interference
E32-DTU (900L30) -V8	RS232 RS485	862-930M	30	8	LoRa, long distance, anti-interference
E32-DTU (900L20)-V8	RS232 RS485	862-930M	20	3	LoRa, long distance, anti-interference
E32-DTU (433L30) -V8	RS232 RS485	410-441M	30	8	LoRa, long distance, anti-interference
E32-DTU (433L20) -V8	RS232 RS485	410-441M	20	3	LoRa, long distance, anti-interference
E90-DTU (433L37) -V8	RS232 RS485	410-441M	37	20	LoRa, long distance, anti-interference
E90-DTU (433L20) -V8	RS232 RS485	410-441M	20	3	LoRa, long distance, anti-interference
E90-DTU (433L30) -V8	RS232 RS485	410-441M	30	8	LoRa, long distance, anti-interference
E95-DTU (433L20-485)-V8	RS485	410-441M	20	3	LoRa, long distance, anti-interference
E95-DTU (433L30-485)-V8	RS485	410-441M	30	8	LoRa, long distance, anti-interference
E96-DTU (433L20-485)-V8	RS485	410-441M	20	3	LoRa, long distance, anti-interference
E96-DTU (433L30-485)-V8	RS485	410-441M	30	8	LoRa, long distance, anti-interference
E800-DTU (400SL20-485)-V8	RS485	410-441M	20	3	LoRa, long distance, anti-interference
E800-DTU (400SL30-485)-V8	RS485	410-441M	30	8	LoRa, long distance, anti-interference

10 Application field

The data transceiver of CDEBYTE is applied for all kinds of point to point, one point to multiple points wireless data transmission system, such as smart home, Internet of things transformation, power load monitoring, distribution network automation, hydrological and hydrological forecasting, water pipe network monitoring, urban street lamps Monitoring, air defense alarm control, railway signal monitoring, centralized control of railway water supply, oil supply pipe network monitoring, GPS system, remote meter reading, electronic crane, automatic reporting, seismic forecasting, fire prevention, environmental monitoring and other industrial automation system, as shown below:



11 Application notes

1. The device may not be operated in the vicinity of some flammable places (such as coal mines) or explosive dangerous objects (such as detonators for detonators).
2. Appropriate DC stabilized power supply should be selected, which requires strong anti-high frequency interference, small ripple, and sufficient load capacity; it also has functions such as overcurrent, overvoltage protection and lightning protection to ensure data transmission.
3. Do not use it in a working environment that exceeds the environmental characteristics of data transceiver, such as high temperature, humidity, low temperature, strong electromagnetic field or dusty environment.
4. Do not let the data transceiver continuously be in full-load transmission state, otherwise the transmitter may be burned out.
5. The ground wire of the data transceiver should be well connected with that of the external equipment (such as PC, PLC, etc.) and of the power supply. Otherwise, it is easy to burn the communication interface; do not plug or unplug the serial port when electrified.
6. When testing the data transceiver, it must be connected with a matching antenna or a 50Ω dummy load, otherwise it will easily damage the transmitter; if the antenna is connected, the distance of the human body from the antenna should preferably exceed 2 meters to avoid injury and cut. Do not touch the antenna while launching.
7. Wireless modem often have different communication distances in different environments. The communication distance is often affected by temperature, humidity, obstacle density, obstacle volume, and electromagnetic environment. In order to ensure stable communication, it is recommended to reserve 50. Communication distance margin above %.
8. If the measured communication distance is not ideal, it is recommended to check the antenna quality and the

installation method of the antenna. You can also contact support@cdebyte.com for assistance.

9. Power supply is required to remain 50% of current, it should be noted that the ripple should not exceed 100mV.

10. Wireless communication products need to be connected with an impedance matching antenna to work properly, even for short-term testing.

About us

Technical support: support@cdebyte.com

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

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