Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual

E34-DTU (2G4D20)

Content

1.Introduction

1.1. Brief Introduction

E34-DTU(2G4D20) is a wireless data transceiver based on 100mW, working frequency:2.4~2.518GHz, The use of serial port for data sending and receiving reduces the threshold of wireless application. Its power density is concentrated, transmission distance is long, high speed, full duplex, two-way simultaneous communication and file transmission are supported, Voltage supply ranges from 8V to 28V.

E34-DTU (2G4D20) is a typically high speed transmission, under a variety of baud rate, can achieve full-duplex features (bidirectional transceiver) at the same time, unlimited package long, support continuous transmission, support file transfer module has the function of data encryption and compression module of data transferred in the air, randomness, through strict encryption algorithm, making data intercepted lose their meaning and function of data compression has probability and reduce transmission time, reduce the probability of interference, improve the reliability and efficiency

Wireless digital radio as a medium of communication, as well as fiber optic microwave open wire, there is a certain scope of application: it provides some special conditions, private network monitoring signals in real-time and reliable data transmission, with low cost easy installation and maintenance diffraction ability strong network structure characteristics of flexible range far, for scattered points and more complex geographical environment and so on occasion, but with PLC, RTU, rain gauge data terminal connected level gauge, etc.

1.2. Features

★ All core components are originally imported; our transceiver modems have much advanced functions with smaller size and lower cost.

★ The top TX power is 100mW, all technical parameters meet European industrial standards.

★ Temperature compensators are adopted to make the frequency stability better than ±1.5PPM.

★ Operation temperature range: -40℃ ~ +85℃, applicable for various harsh environment, it is real industrial grade products.

★ Aluminum alloy case, compact size, great heat dispersion; good shielding, prime electromagnetic compatibility and strong anti-interference.

★ Power reverse & overload protection and antenna surge protection functions significantly improve the reliability.

★ Parameters can be configured by programming, such as TX power, frequency point, air data rate, address and so on.

★ Ultra-low power consumption, standby current is only 50mA (even lower under power-saving and sleep modes), TX current ≤0.2A .

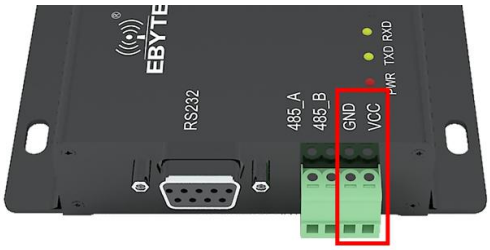
★ Embedded watch-dog and precise time layout, modem will restart automatically upon abnormal situation and work with previous parameters.

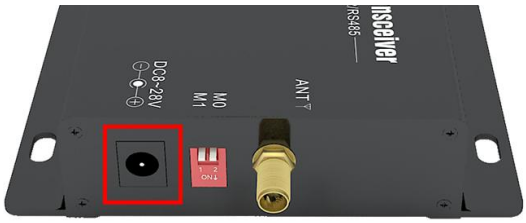
★ The transceivers adopt original nRF24L01P+ chip, customers highly comment the products because of the super reliability.

2. Operation

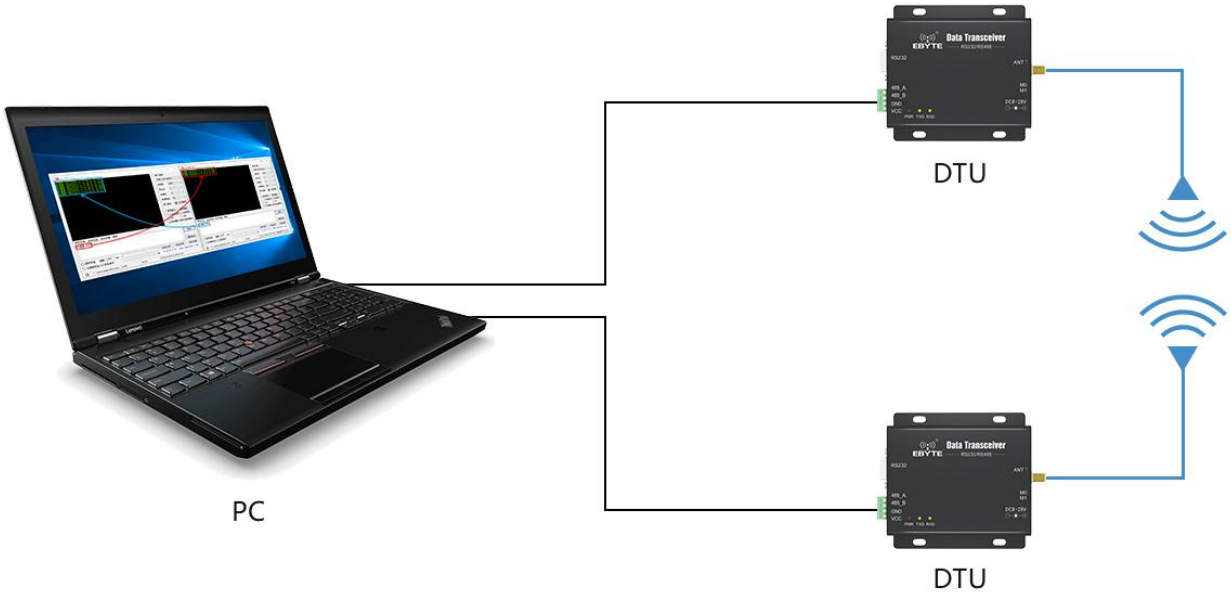
Main parts

1、 First step is to mount antenna, then battery, making sure the dial switch is on its right status. User gets on the power by choosing either VCC/GND or power adapter.

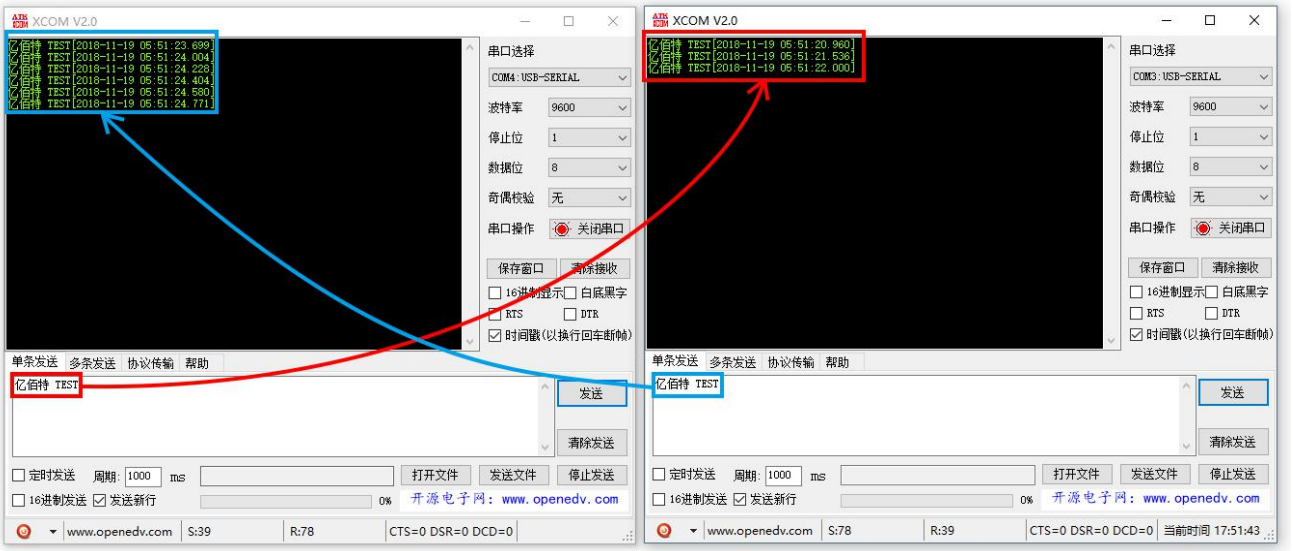




2、 Using USB-(RS232) converter or USB-RS(485) converter or other way to link computer and DTU.



3、 Firing up two XCOMs, choosing Baud rate 9600bps, 8N1, the setting which serial port transmission can be achieved.



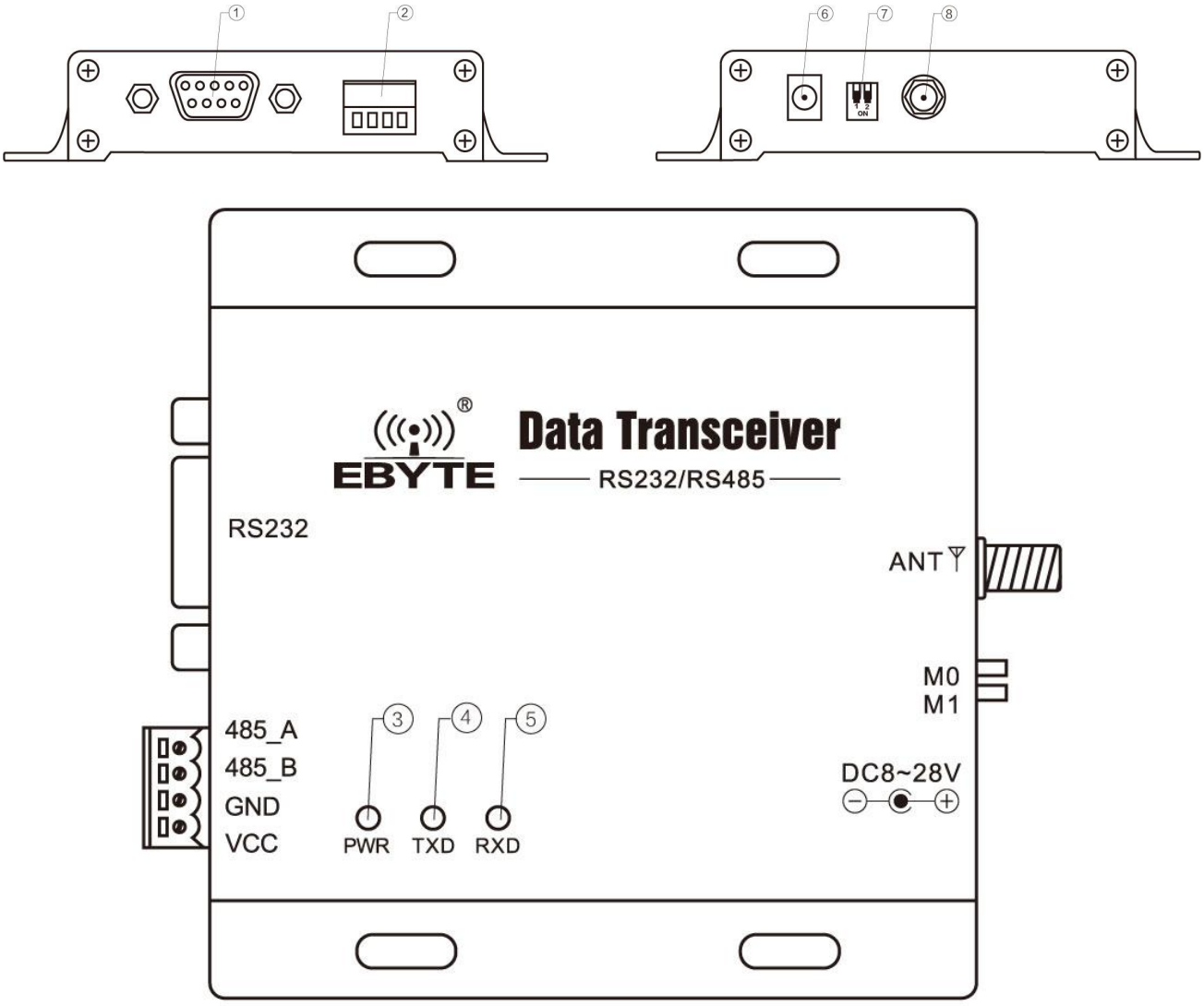
4、 User needs to open the mode switch first before link DTU with computer if the user want to modify parameters. Firing up E34-DTU 数传电台配置软件 (E34-DTU parameter configuration application) to modify related parameters. The mode switch must be reopened to achieve transmission after the configuration.

Mode 0 Default

Mode 3 Parameter setting

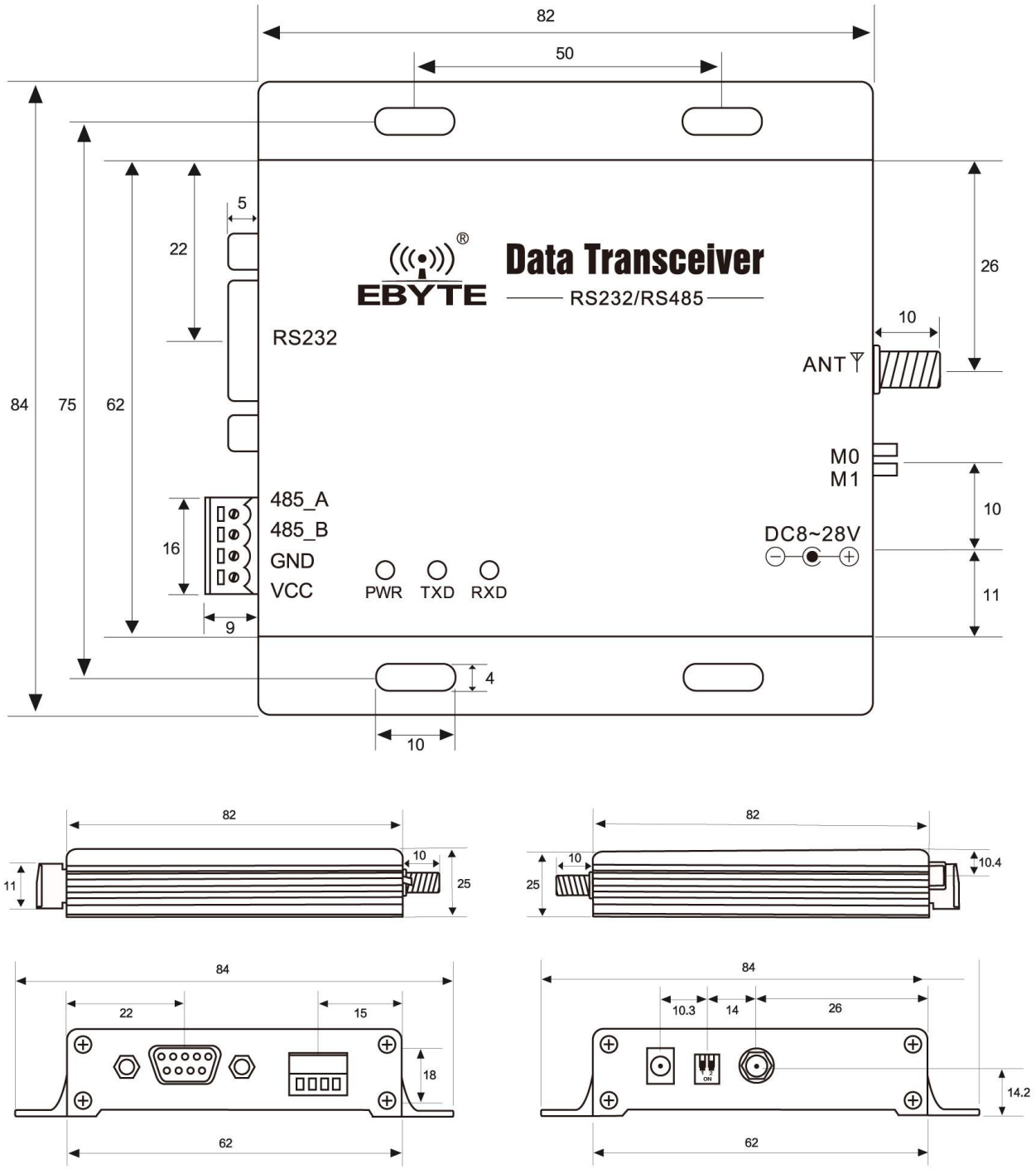
3. Installation Specifications

3.1. Structure



Pin NO.	Name	Function	Description
1	DB-9 female socket	RS-232 interface	Standard RS-232 interface
2	3.81 terminal block	RS-485, power interface	Standard RS-485 interface and pressure line power interface
3	PWR-LED	Power LED	Red, lit when the power is on
4	TXD-LED	Transmit LED	Yellow, blinks when sending data
5	RXD-LED	Receive LED	Yellow, blinks when receiving data
6	DC power interface	Power interface	In-line round hole, outer diameter 5.5mm, diameter 2.5mm
7	DIP switch	DIP switch	Controlled by working mode
8	Antenna interface	SMA-K interface	external thread, 10mm, 50Ωcharacteristic impedance

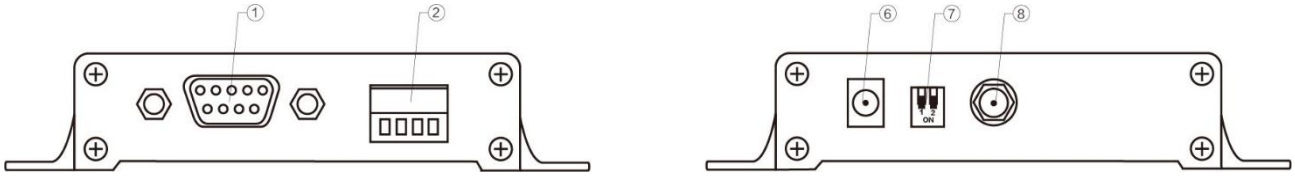
3.2. Dimension



Unit: mm

4. Interface Defination

4.1. Power interface definition



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 choose the VCC and GND terminal power supply, only choose any one of the power supply is OK;

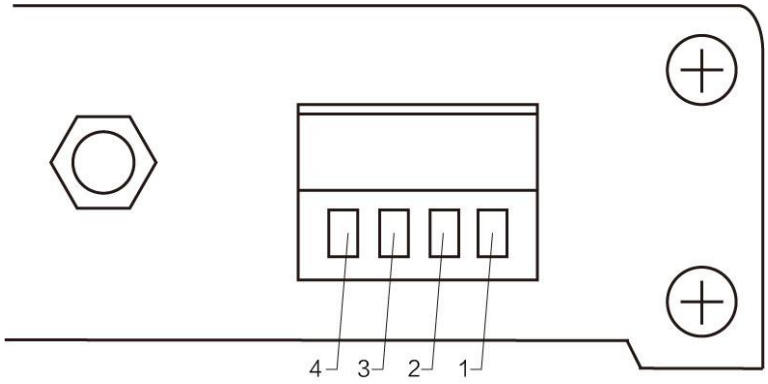
E34-DTU can use 8~ 28V DC power supply, but it is recommended to use 12V or 24V DC power supply.

4.2. RS232 Interface definition

The E34-DTU can be connected to the device via RS-232 using the standard DB-9 interface.

4.3. RS485 Interface definition

E34-DTU can connect the 485_A terminal and 485_B terminal with the device RS-485 A terminal and B terminal.



★

Pin NO.	Definition	Function	Description
1	VCC	Crimping power interface, positive	10~ 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 indicators

5.1. Model specifications

Model	Frequency	Transmit power	Distance	Specifications	Application
	Hz	W	km		
E34-DTU(2G4D20)	2400MHz	0.1	2	Full duplex, bidirectional simultaneous transmission	Suitable for open environment with few obstacles

★ 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 parameters

NO.	Model	Specification	Description
1	Size（H*W*D）	82 * 62 * 25mm	See more at 3.2 Dimension
2	Weight	131g	Tolerance: 4.5g
3	Temperature	-40℃ ~ 85℃	Meet industrial level
4	Antenna impedance	50 Ω	Standard 50 Ω characteristic impedance
5	Supply voltage	+10 ~ +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	Default 9600	from 1200 to 115200 bps
8	Address	Default 0	65536 configurable addresses

5.3. Frequency range and channels

Model	Default frequency	Frequency range	Channel spacing	Channels
	Hz	Hz	Hz	
E34-DTU(2G4D20)	2400	2400 ~ 2505MHz	-	16，full duplex

★ 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. Transmit power level

Model	1.3mW	5mW	25mW	100mW
E34-DTU(2G4D20)	√	√	√	√

★ 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. Current parameters

Model	Transmitting current mA		Standby current mA	
	12V	24V	12V	24V
E34-DTU(2G4D20)	145	87	50	39

★ 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.

5.6. Transceiver Length and Sub-packing Mode

Model	Buffer	Sub-package
E34-DTU(2G4D20)	1024Byte	Half duplex: automatic subcontracting 29 bytes send full duplex: unlimited packet length

★ Note:

1. When the receiving data is more than a single packet capacity, the beyond part will be automatically assigned to the second transmission until it is completed;
2. The data transceiver cannot receive data which is more than the buffer capacity;

6. Operating mode

E34-DTU(2G4D20) has four operating modes, if low power consumption is not required, normal communication is recommended to configure the data transceiver for the normal mode (mode 0);
The factory default is normal mode (mode 0).

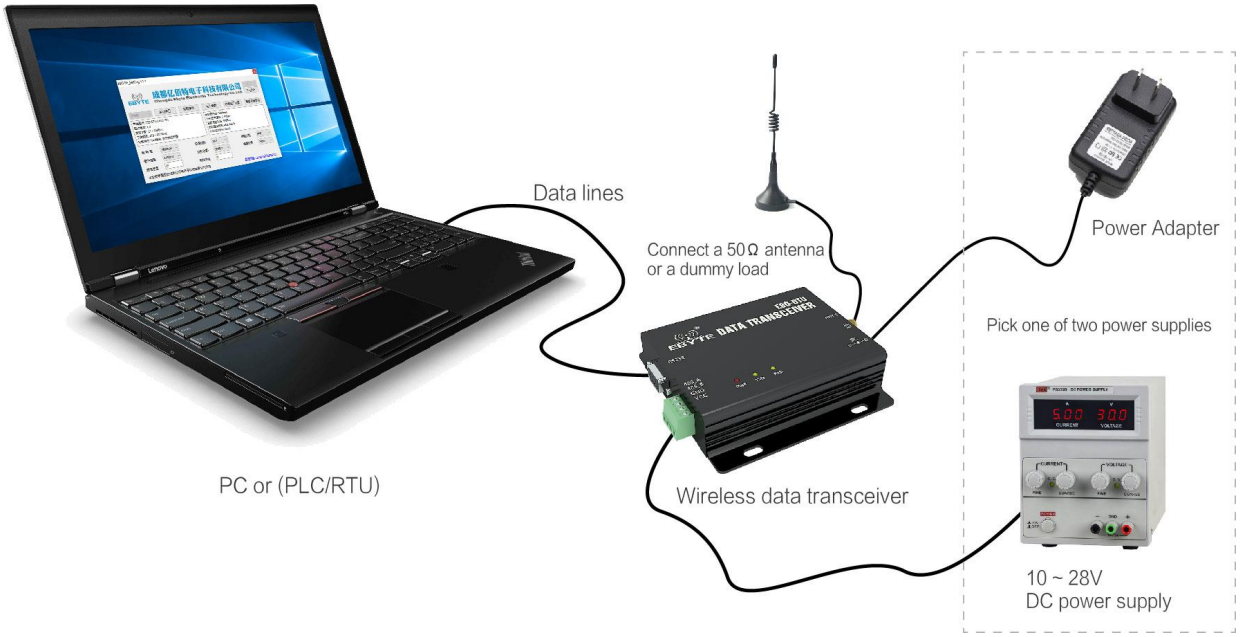
	Categories	M1	M0	Description
Mode 0	Half duplex	ON	ON	Serial port open, wireless open, transparent transmission, half duplex operation
Mode 1	Full duplex	ON	OFF	Serial port open, wireless open, transparent transmission, full duplex operation

Mode 2	Preservation	OFF	ON	Meaningless
Mode 3	Setting	OFF	OFF	Receiving the parameter setting command

★ Note: no need to care about the wake-up mode (mode 1) and power saving mode (mode 2) if it doesn't request low power consumption.

7. Connection diagram when programming

7.1. diagrammatic drawing



	Mode	M1	M0	Description
Mode 3	Setting	Off	Off	Receiving the parameter setting command

★ Note:

1.programming can only be carried on in a specific mode(see above), if fails, please confirm the work mode.

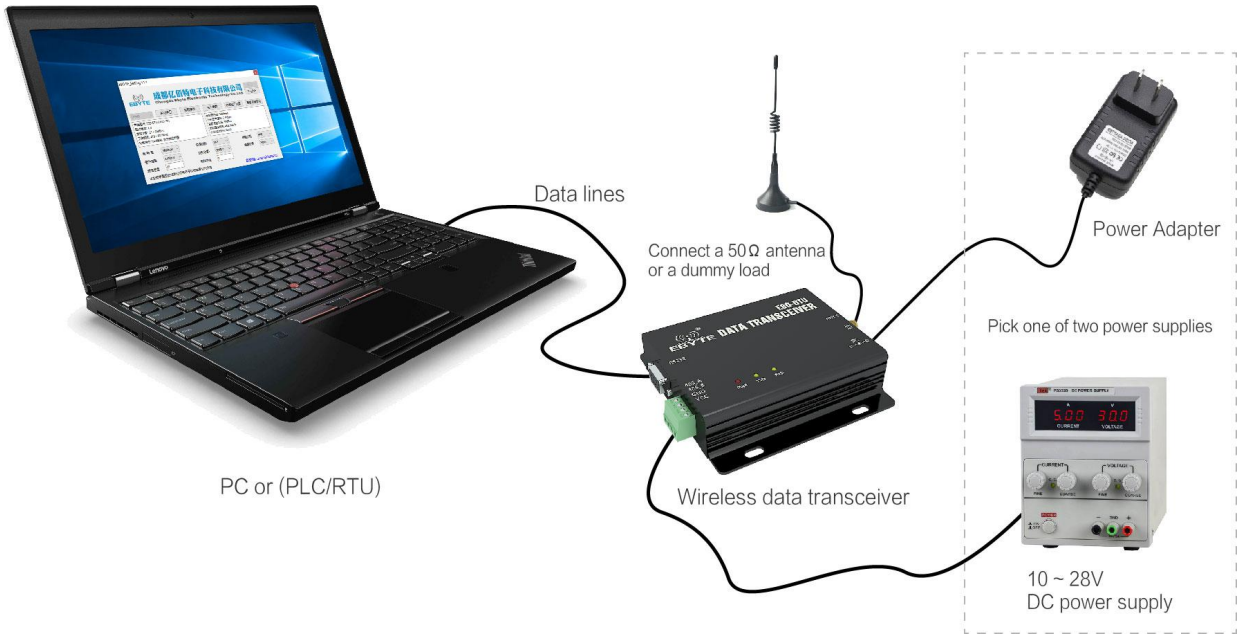
2.If there's no complicated programming, opening the E34-DTU 数传电台配置软件 (E34-DTU parameter configuration application) to modify parameters.

7.2. Parameter setting instruction

Parameter	Description
Baud rate	The serial port baud rate of a wireless data station at work， 1200bps ~ 115200bps。
Odd-even check	Support 8N1:no check ；8E1:even-check；8O1:odd-check；Both are 8-bit data bits and 1-bit stop bits.
Air data rate （bps）	Wireless communication rate, also known as air baud rate air rate high, data transmission speed, transmission of the same data time delay is small, but the transmission distance will become shorter. 64kbps is the most recommended value

Transmitting power	In order to ensure the working efficiency, it is recommended to use the maximum power. If the transmitted power is reduced, the communication distance will become shorter and the required current will be reduced
FEC	The lost or interfered data can be partially corrected by complex encoding, which can improve the equivalent receiving sensitivity by about 3dBm. Turning off this function can reduce the communication delay.
Transmission mode	Transparent transmission, and send-as-received fixed points, broadcasting is not supported
Wake Up Time	There is no direct relationship with the communication delay. If the customer needs low-power applications, this option shall be adjusted as required to ensure the communication stability. This parameter is self-adaptive and needs no attention from the user.
IO driven	By default, select the internal TTL signal drive mode。
Station Address	Internal address of wireless data station, stations with the same address as those independent of Modbus address can communicate with each other. This feature can be used to realize software filtering grouping input range :0~65535, decimal number.
Frequency Channel	It is equivalent to the working frequency of wireless data transmission station. Each channel corresponds to its different working frequency. Theoretically, different frequency channels cannot communicate with each other.

8. Connection diagram in test and application

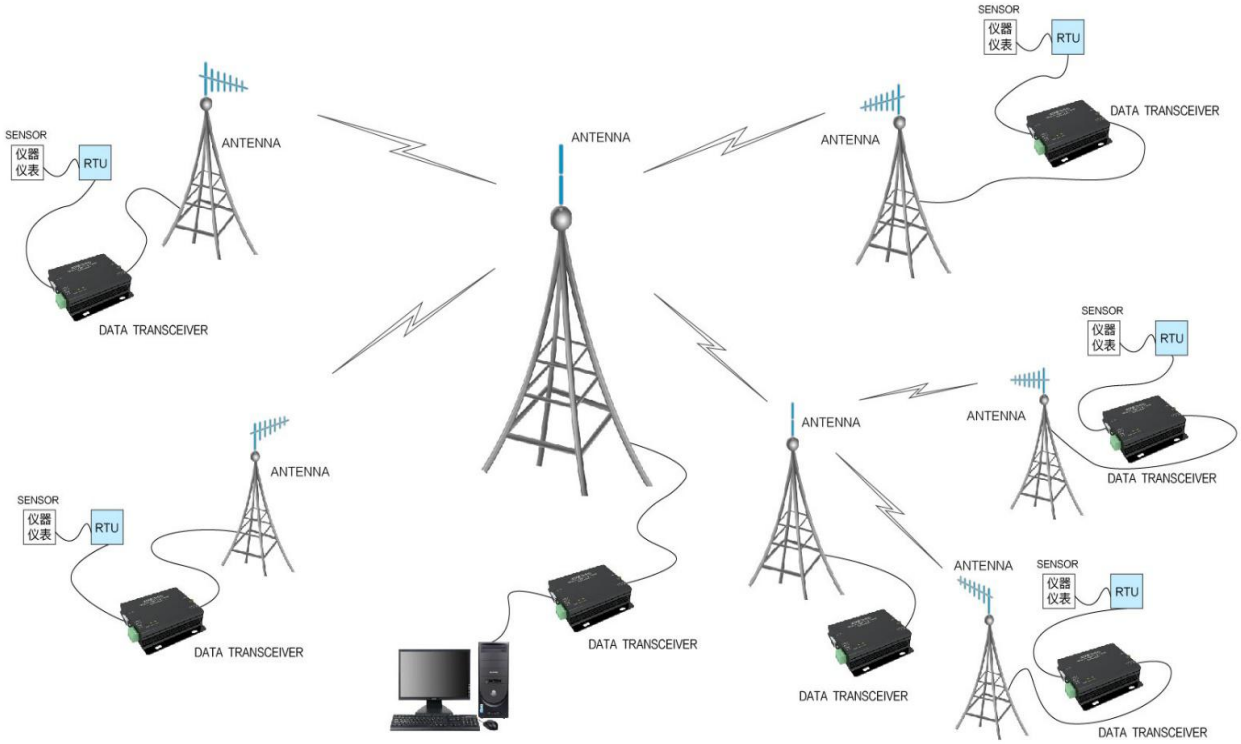


9. E32-DTU series

Mode No.	Interface	Frequency Hz	Tx power dBm	Distance km	Function feature
E34-DTU(2G4H27)	RS232 RS485	2.4G	27	5	Automatic frequency hopping, automatic packet loss retransmission
E34-DTU (2G4D20)	RS232 RS485	2.4G	20	2	Full duplex, two-way simultaneous transmission.
E34-DTU (2G4H20)	RS232 RS485	2.4G	20	2.5	Automatic frequency hopping, automatic packet loss retransmission

10. Practical application

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.Note

1. Please keep the warranty card of the equipment which includes the factory number (and important technical parameters) and is important for user's future maintenance and new equipment.

2. Transceiver during the warranty period, if the quality of the product itself rather than man-made damage or lightning and other natural disasters caused by damage, enjoys free warranty; please do not repair by yourself, the problem and please contact with our company when problem occurring, we offer the first-class after-sales service.

3. Please do not operate the transceiver in some flammable places such as coal mines or near explosive atmospheres (such as detonators).

4. Please use the appropriate DC power supply, high frequency interference ability, small ripple, and enough load capacity are required; it’s better to have over current, over voltage protection and lightning protection and other functions to ensure that transceiver working properly.

5. Please do not use it in the working environment beyond the transceiver environmental characteristics , such as high temperature, humidity, low temperature, strong electromagnetic fields or dust larger environment.

6. Please do not continuously keep transceiver to transmit in full capacity, or the transmitter might be damaged.

7. Please connect the ground with the external ground of the power supply (such as PC, PLC, etc.) , otherwise it is easy to burn out the communication interface; do not plug the interface with power supplying.

8. When testing, please connect the antenna or 50 Ω load, otherwise transceiver will be damaged easily ;the distance from the antenna is better than 2 meters, so as to avoid harm, please do not touch the antenna when transmitting.

9. Wireless data transceiver has different communication distance in different environments, communication distance is influenced by temperature, humidity, obstacle density, obstacle volume and electromagnetic environment; in order to ensure stable communication, it is recommended to reserve at least 50 % of the communication distance.

10. When communication distance is not perfect, it is recommended to improve the antenna quality and the installation mode of the antenna. You can send mail to support@cdebyte.com for support.

11. When choosing power supply, it is recommended to keep at least 50% current left and the ripple must not exceed 100mV.

12.Important statement

1. CDEBYTE reserves the right of final interpretation and modification of all the contents of this manual.

2. As the hardware and software products continuously improving, this manual may subject to change without notice, please refer to the latest version.

3. Everyone is responsible for protecting the environment: to reduce the use of paper, we only provide electronic documents of the English manual, if necessary, please go to our official website to download; In addition, for special requirements, we agree to offer certain amount of documents according to order quantity, not every data transceiver are supplied with one manual, please understand;

Revision history

Version	Date	Description	Issued by
1.00	2018/8/30	Initial version	huaa
1.10	2019/4/2	Model No. split	molly

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