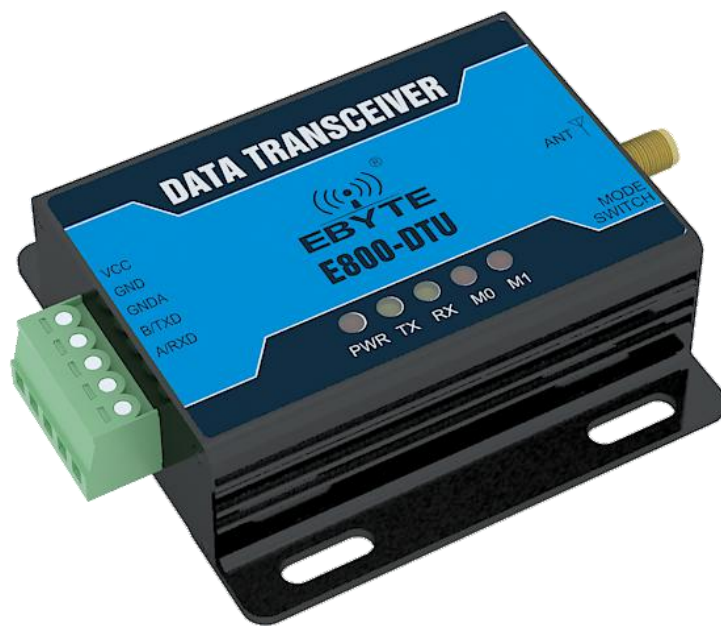# EBYTE Wireless Data Transceiver

E800-DTU

User Instruction Manual

This manual may change with the continuous improvement of the product. Please refer to the latest version of the instruction.

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1. Introduction

1.1 Brief introduction

E800-DTU is a wireless data transceiver with the function of digital data processing, digital modulation and demodulation, FEC, balanced soft decision, etc.. Wireless data transceiver provides transparent RS232 / RS485 interface, different with the analog FM transceiver plus MODEM analog digital transceiver.
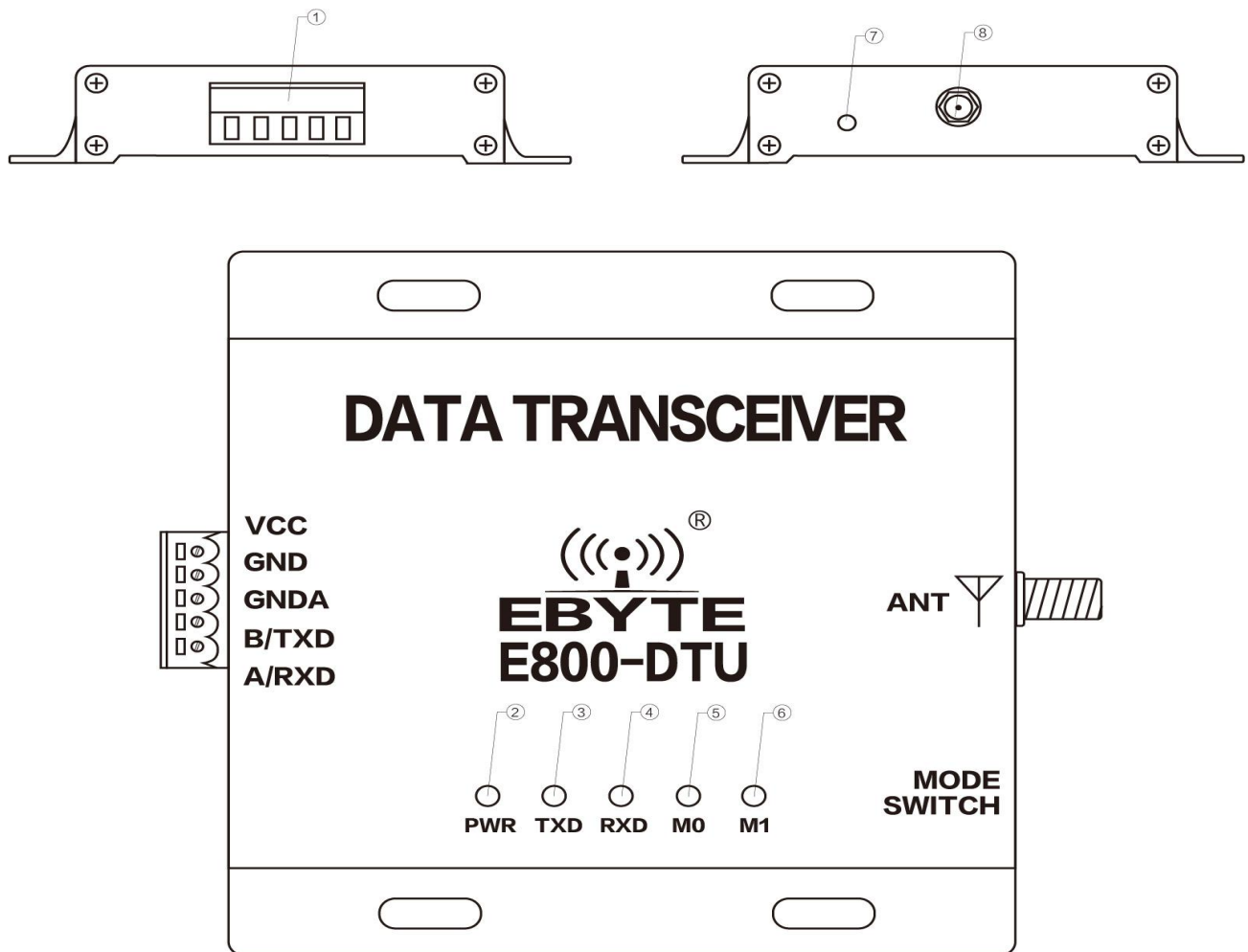
Wireless data transceiver working as a communication medium, as well as the fiber, microwave, the same line, has a certain scope of application: it provides some special conditions in the private network monitoring signal real-time, reliable data transmission, with the features of low cost, convenient installation and maintenance, diffraction ability, flexible network structure,   range of coverage, suitable for the occasion of dot and scatter, complex geographical environment , connecting with PLC, RTU, rain gauge, level gauge and other data terminals.

1.2 Features

❖   All the core components are imported originally , compared with the current imports of digital transceiver , we are the most advanced, most cost effective and the smallest one.

❖   Transmission power is optional, all technical indicators have met the European industry standards.

❖   Use temperature compensation circuit, the frequency stability is better than $\pm$2PPM.

❖   With operating temperature range: -40 ℃ ~ +85 ℃, adapting to a variety of harsh working environment.

❖   All with aluminum alloy shell, compact, easy installation, good heat dissipation; perfect shielding design, good electromagnetic compatibility and strong anti-interference ability.

❖   Power reverse protection, over-protection, antenna surge protection and other multiple protection functions, greatly increase the reliability of the transceiver.

❖   Powerful software features, all parameters can be programmed to set: such as power, frequency, air data rate, address ID, etc.

❖   Ultra-low power consumption, standby current is 20mA (the power consumption of power saving mode and sleep mode is lower), the transmitting current $\leqslant$ 350A (1W).

❖   With watchdog and accurate time layout, in the event of an exception, the module will automatically restart and continue to follow the previous parameters to operate.
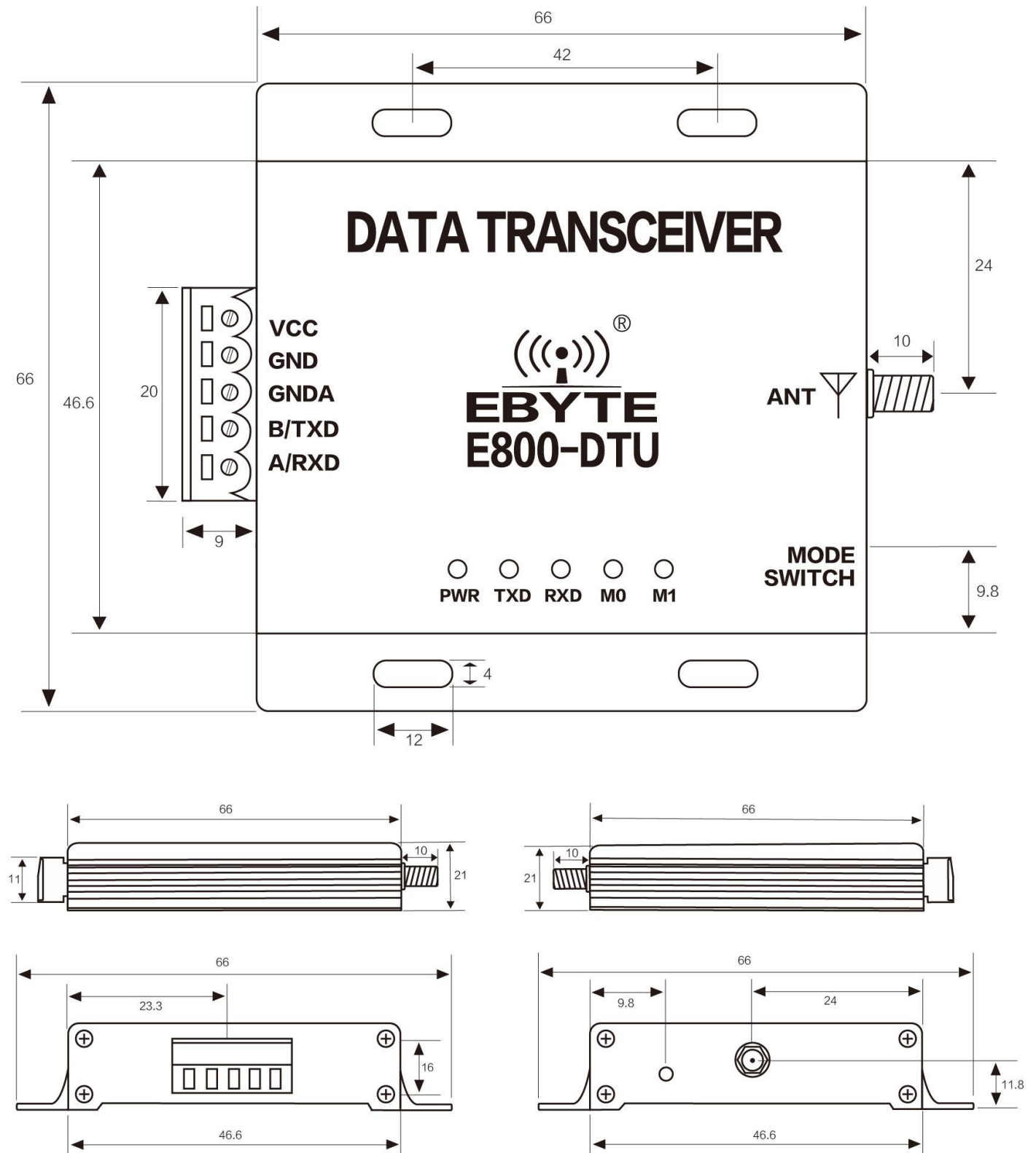
2. Installation Dimension

2.1 Pin description

Pin NO.	Name	Function	Description
1	3.81mm terminal block	UART interface/ Power supply interface	Standard RS-232&485 interface/ Screwing power supply interface
2	PWR-LED	Power LED	Red, lit when the power is on
3	TXD-LED	Transmit LED	Yellow, blinks when sending data
4	RXD-LED	Receive LED	Yellow, blinks when sending data
5	M0-LED	Mode LED	Red,M0 M1 indicate the Operating mode together
6	M1-LED	Mode LED	Red,M0 M1 indicate the Operating mode together
7	Mode switch	Tact switch	Control the Operating mode
8	Antenna interface	SMA-K interface	External thread, 10mm, 50 Ω characteristic impedance

2.2 Dimension
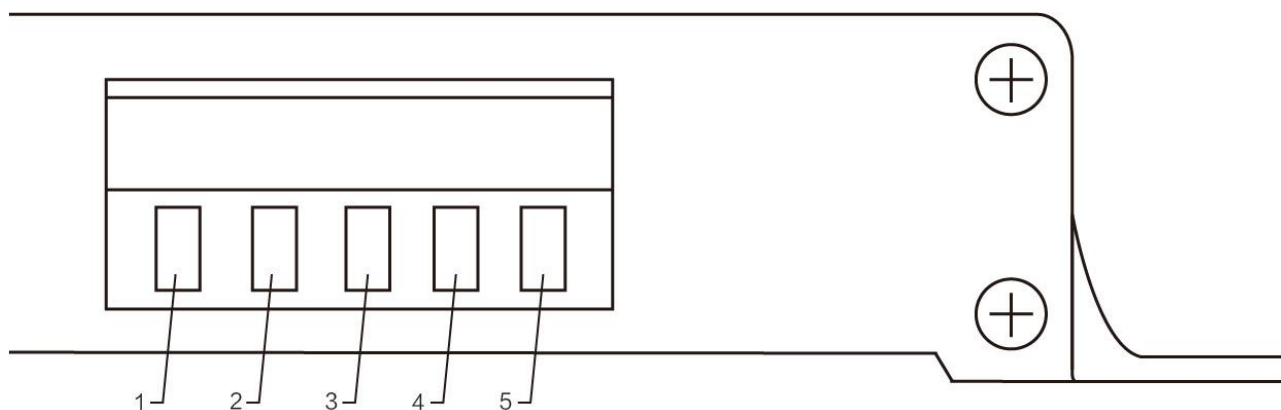
3. Interface definition

3.1 Power interface definition

Users can choose ① the VCC and GND terminal power supply, E800-DTU can use 8~ 28V DC power supply, but it is recommended to use 12V or 24V DC power supply.

3.2 RS232/RS485 interface definition

E800-DTU series products can choose whether RS232 or RS485 to be connected according to product number or back label. How to connect the cable? Choose the corresponding interface in ① 3.81mm terminal block, details below:

Pin NO.	Definition	Function	Description
1	VCC	Screwing power interface, positive	8 ~ 28V DC, 12V or 24V(recommended)
2	GND	Screwing power interface, negative	The power supply negative pole is connected to the system ground and the housing
3	GNDA	RS232 common terminal	Connected to RS 232 device GND
4	B/TXD	Serial port terminal	RS-485: Connected to RS 485 device interface B RS-232: Output terminal,connected to RS 232 device RXD
5	A/RXD	Serial port terminal	RS-485: Connected to RS 485 device interface A RS-232: Input terminal, connected to RS 232 device TXD

★ Note: The transceiver will be in poor communication when connecting multiple devices , while connecting a single device is not, please try to parallel connect a 120Ω resistor between 485_A terminal and 485_B terminal.

4. Technical indicators

4.1 Model specifications

Series	Model	Frequency（Hz）	Transmit power (dBm)	Distance（Km）	Feature	Application
L	L433-485-20	433M	20	3	LoRa Spread spectrum anti-interference	To the environment with small data, far distance
	L433-485-30	433M	30	8	LoRa Spread spectrum anti-interference	To the environment with small data, far distance
	L433-232-20	433M	20	3	LoRa Spread spectrum anti-interference	To the environment with small data, far distance
	L433-232-30	433M	30	8	LoRa Spread spectrum anti-interference	To the environment with small data, far distance
N	N433-485-17	433M	17	2	Narrowband technology	To the environment with medium data, dense deployment
	N433-485-30	433M	30	6	Narrowband technology	To the environment with medium data, dense deployment
	N433-232-17	433M	17	2	Narrowband technology	To the environment with medium data, dense deployment
	N433-232-30	433M	30	6	Narrowband technology	To the environment with medium data, dense deployment
C	C433-485-17	433M	17	1	High-speed continuous transmission	To the environment with large data, supporting Modbus
	C433-485-30	433M	30	2.5	High-speed continuous transmission	To the environment with large data, supporting Modbus
	C433-232-17	433M	17	1	High-speed continuous transmission	To the environment with large data, supporting Modbus
	C433-232-30	433M	30	2.5	High-speed continuous transmission	To the environment with large data, supporting Modbus

★ 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.

4.2 General specification parameters

NO.	Parameter	Specification	Description
1	Size	66 * 66 * 21 mm	L series/ N series / C series
2	Weight	79±1g	L series/ N series / C series
3	Operating temperature	-40℃～+85℃	Long time use above 70 ℃(not recommended)
4	Antenna impedance	50 Ω	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	Default 9600	from 1200 to 115200 bps
8	Address	Default 0	65536 configurable addresses

4.3 Frequency range and channels

Series	Model	Default frequency（MHz）	Frequency range（MHz）	Channel spacing（MHz）	Channels
L	L433-485-20	433	410~441	1	32，Half-duplex
	L433-485-30	433	410~441	1	32，Half-duplex
	L433-232-20	433	410~441	1	32，Half-duplex
	L433-232-30	433	410~441	1	32，Half-duplex
N	N433-485-17	433	425~450.5	0.1	256，Half-duplex
	N433-485-30	433	425~450.5	0.1	256，Half-duplex
	N433-232-17	433	425~450.5	0.1	256，Half-duplex
	N433-232-30	433	425~450.5	0.1	256，Half-duplex
C	C433-485-17	433	425~450.5	0.1	256，Half-duplex
	C433-485-30	433	425~450.5	0.1	256，Half-duplex
	C433-232-17	433	425~450.5	0.1	256，Half-duplex
	C433-232-30	433	425~450.5	0.1	256，Half-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.

4.4 Transmit power level

Series	Model	7 dBm	10 dBm	14 dBm	17 dBm	20 dBm	21 dBm	24 dBm	27 dBm	30 dBm
L	L433-485-20		√	√	√	√				
	L433-485-30						√	√	√	√
	L433-232-20		√	√	√	√				
	L433-232-30						√	√	√	√
N	N433-485-17	√	√	√	√					
	N433-485-30						√	√	√	√
	N433-232-17	√	√	√	√					
	N433-232-30						√	√	√	√
C	C433-485-17	√	√	√	√					
	C433-485-30						√	√	√	√
	C433-232-17	√	√	√	√					
	C433-232-30						√	√	√	√

★ Note: 1. 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.

2. In order to guarantee the transmitting efficiency of, the factory default is the maximum transmitting power.

4.5 Air data rate

Series	Model	Default air data rate (kbps)	Levels	Air data rate(kbps)
L	L433-485-20	2.4	6	0.3, 1.2, 2.4, 4.8, 9.6, 19.2
	L433-485-30	2.4	6	0.3, 1.2, 2.4, 4.8, 9.6, 19.2
	L433-232-20	2.4	6	0.3, 1.2, 2.4, 4.8, 9.6, 19.2
	L433-232-30	2.4	6	0.3, 1.2, 2.4, 4.8, 9.6, 19.2
N	N433-485-17	1.2	8	1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 50, 70
	N433-485-30	1.2	8	1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 50, 70
	N433-232-17	1.2	8	1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 50, 70
	N433-232-30	1.2	8	1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 50, 70
C	C433-485-17	1.2	8	1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 50, 70
	C433-485-30	1.2	8	1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 50, 70
	C433-232-17	1.2	8	1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 50, 70
	C433-232-30	1.2	8	1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 50, 70

★ 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 .

4.6 Current parameters

Series	Model	Transmitting current（mA）		Standby current（mA）	
		12V	24V	12V	24V
L	L433-485-20	60.0	30.0	20.0	10.0
	L433-485-30	310.0	150.0	20.0	10.0
	L433-232-20	60.0	30.0	20.0	10.0
	L433-232-30	310.0	150.0	20.0	10.0
N	N433-485-17	50.0	30.0	20.0	10.0
	N433-485-30	330.0	170.0	20.0	10.0
	N433-232-17	50.0	30.0	20.0	10.0
	N433-232-30	330.0	170.0	20.0	10.0
C	C433-485-17	50.0	30.0	20.0	10.0
	C433-485-30	350.0	180.0	20.0	10.0
	C433-232-17	50.0	30.0	20.0	10.0
	C433-232-30	350.0	180.0	20.0	10.0

★ 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.

4.7. Transceiver Length and Sub-packing Mode

Series	Model	Buffer	Sub-package
L	L433-485-20	512 bytes	Automatically send 197 bytes per package
	L433-485-30	512 bytes	Automatically send 197 bytes per package
	L433-232-20	512 bytes	Automatically send 197 bytes per package
	L433-232-30	512 bytes	Automatically send 197 bytes per package
N	N433-485-17	512 bytes	Automatically send 186 bytes per package
	N433-485-30	512 bytes	Automatically send 186 bytes per package
	N433-232-17	512 bytes	Automatically send 186 bytes per package
	N433-232-30	512 bytes	Automatically send 186 bytes per package
C	C433-485-17	512 bytes	No limitation of package length without sub-package
	C433-485-30	512 bytes	No limitation of package length without sub-package
	C433-232-17	512 bytes	No limitation of package length without sub-package
	C433-232-30	512 bytes	No limitation of package length without sub-package

★ Note:

1. When the receiving data is more than a single packet capacity (100 bytes), the beyond part will be automatically assigned to the second transmission until it is completed;

2. The data transceiver can not receive data which is more than the buffer capacity;

3. If one can not determine the amount of data sent and received, it is recommended to use C series.

5. Operating mode

There are four operating modes, if low power consumption is not required, it is recommended to configure the data transceiver for the normal mode (mode 0). The factory default is normal mode (mode 0).

- When the module is in the default state, buzzer beeps for 500ms, PWR-LED is always on, other LEDs are off after power on;
- When the mode is switched, press the button for about 1s until the buzzer beeps, M0,M1 Mode-LEDs will change and the mode has been switched;
- After the module modifies the operating mode, the current status will be saved when power off;
- M0,M1 LEDs off means "OFF", M0,M1 LEDs on means "ON".
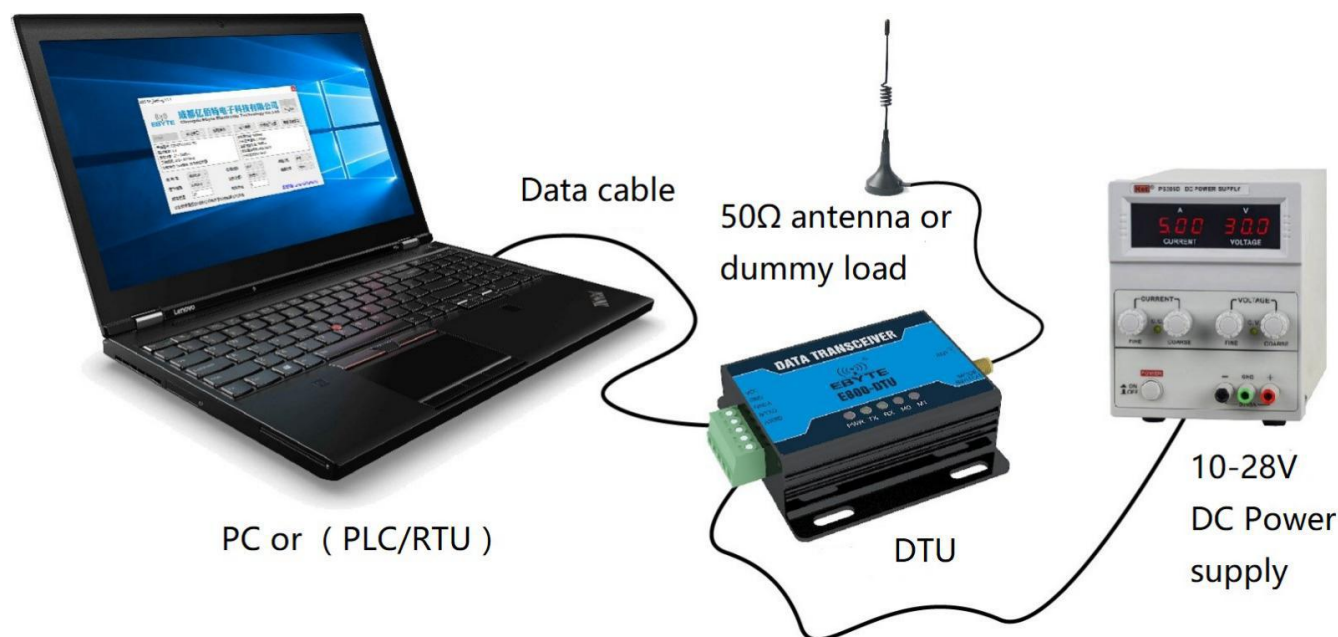
5.1.L series and N series

	Categories	M0	M1	Description
Mode 0	Normal Mode	OFF	OFF	Open UART and RF，transparent transmission is on (factory default)
Mode 1	Wake-up Mode	ON	OFF	Transmitting WOR mode, the packet comes with a preamble code
Mode 2	Power-saving Mode	OFF	ON	Receiving WOR mode, saving receive power, the mode can not be transmitted
Mode 3	Sleep Mode	ON	ON	Parameter setting using the configuration software

★ Note: no need to care about the wake-up mode (mode 1) and power saving mode (mode 2) if power consumption is not a problem.

5.2 C series

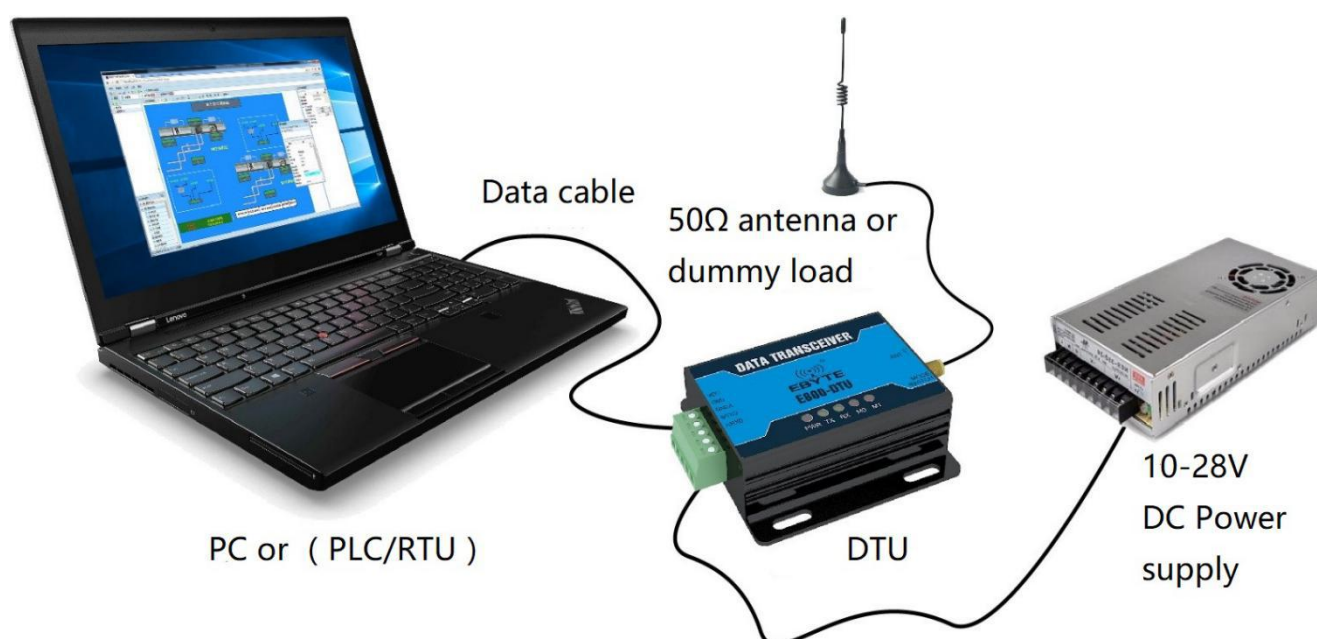|	Categories	M0	M1	Description
Mode 0	Normal Mode	OFF	OFF	Open UART and RF，transparent transmission is on
Mode 1	Reserved Mode	ON	OFF	No meaning, UART and RF are closed
Mode 2	Command Mode	OFF	ON	Parameter setting using the configuration software
Mode 3	Sleep Mode	ON	ON	Enter sleep mode, UART and module are closed

6. Connection diagram when programming

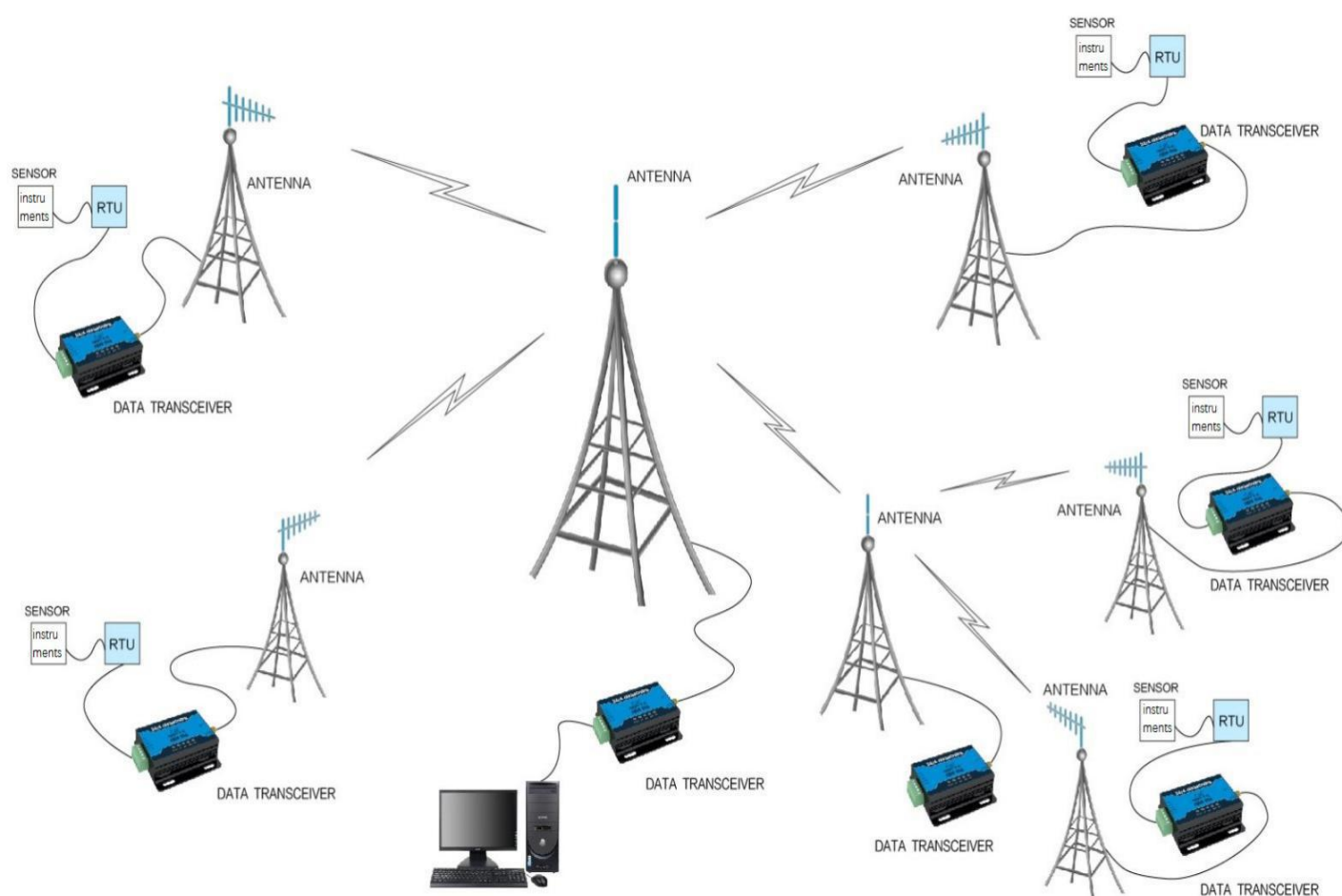| Series	Mode	M1	M0	Description
L	Sleep Mode	OFF	OFF	Only be programmed using the configuration software in the current mode
N	Sleep Mode	OFF	OFF	Only be programmed using the configuration software in the current mode
C	Command Mode	OFF	ON	Only be programmed using the configuration software in the current mode

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

7. Connection diagram in test and practical application

8. Practical application Fields

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:

9. 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.

10. 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;

CDEBYTE after-sales technical support: support@cdebyte.com

For file download and more product information, please visit:www.cdebyte.com/en/

Thank you for using the CDEBYTE products! Any questions or suggestions, please contact: support@cdebyte.com

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