# E32-xxxXBX-SC Series Evaluation Kit
# User Manual

## New Generation Package Compatible Sub-1G Wireless Module Kit



Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

# Contents

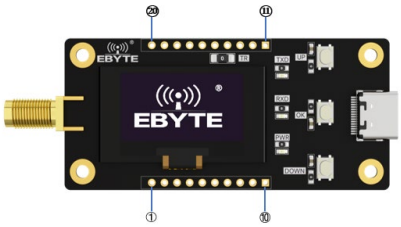
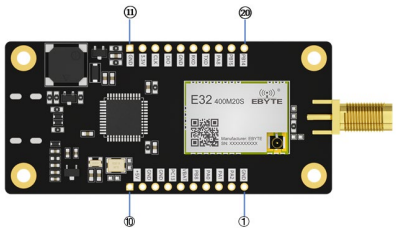
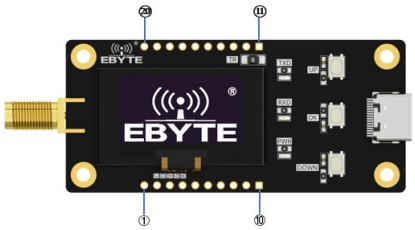
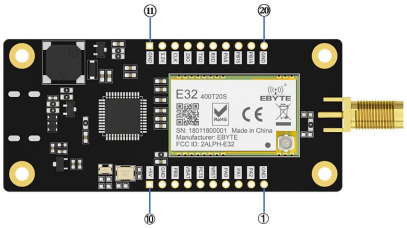
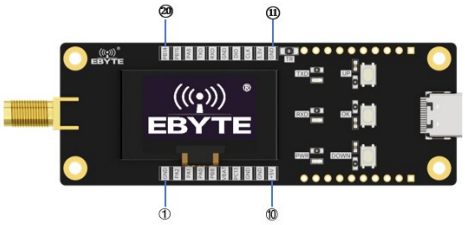
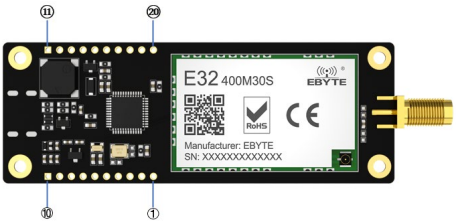
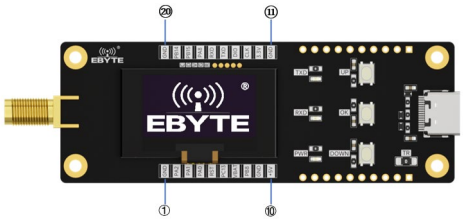
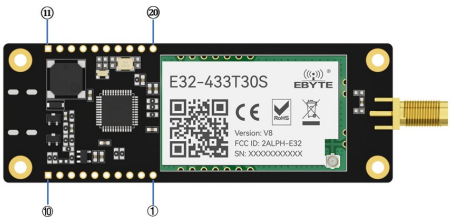
1 Product Overview ..... 2
1.1 Product Description ..... 2
1.2 Pin Definition ..... 3
1.3 Function Introduction ..... 4
1.4 Parameter Introduction ..... 4
1.5 Compatible List ..... 5
1.6 Program Download Interface ..... 5
2 Introduction to the software ..... 7
2.1 Development environment (computer) ..... 7
2.1.1 STM32CubeMX ..... 7
2.1.2 MDK-ARM ..... 7
2.2 Catalog Structure ..... 8
3 Function demonstration ..... 9
3.1 Quick start ..... 9
3.2 Achieve transparent transmission function via USB serial port ..... 12
3.3 Achieve host computer configuration function via USB serial port ..... 13
4 FAQ ..... 14
4.1 Communication range is too short ..... 14
4.2 Module is easy to damage ..... 14
4.3 BER(Bit Error Rate) is high ..... 14
Revision history ..... 15
About us ..... 15

Copyright ©2012–2025，Chengdu Ebyte Electronic Technology Co.,Ltd.


Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

# 1 Product Overview

## 1.1 Product Description

| | Model | Front Side | Back Side |
|---|---|---|---|
| Low Power Kit | E32-xxxMBL-SC |  |  |
| | E32-xxxTBL-SC |  |  |
| High Power Kit | E32-xxxMBH-SC |  |  |
| | E32-xxxTBH-SC |  |  |

The SC series evaluation kits are designed to help users quickly evaluate EBYTE's new generation of package-compatible wireless modules, using STM32F103C8T6 MCUs with available pins pinned out to both sides of the pin header, which allows developers to easily connect a variety of peripheral devices via jumper wires according to the actual needs, facilitating developers to carry out secondary development.

The kit provides complete software application examples to help customers quickly get started with wireless data communication development. Different types of Sub-1G wireless modules can be on-board according to customer requirements. The supported modules are available in pin-compatible packages for quick replacement.

Copyright ©2012–2025，Chengdu Ebyte Electronic Technology Co.,Ltd.


Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

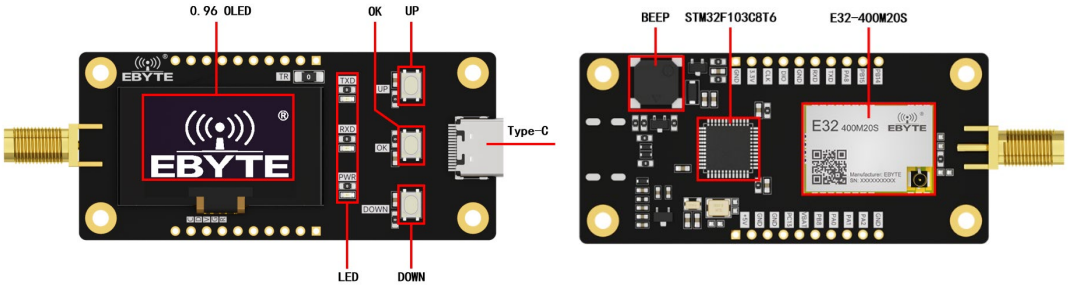
## 1.2 Pin Definition

| Exx-xxxMBL/MBH-SC | | | Exx-xxxTBL/TBH-SC | | |
|---|---|---|---|---|---|
| **Pin No.** | **Pin Name** | **Function** | **Pin No.** | **Pin Name** | **Function** |
| 1 | GND | Ground | 1 | GND | Ground |
| 2 | PA2 | MCU_PA2 Pin | 2 | PA2 | MCU_PA2 Pin |
| 3 | PA1 | MCU_PA1 Pin | 3 | PA1 | MCU_PA1 Pin |
| 4 | PA0 | MCU_PA0 Pin | 4 | PA0 | MCU_PA0 Pin |
| 5 | PB8 | MCU_PB8 Pin | 5 | NRST | MCU Reset Pin |
| 6 | VBAT | MCU_VBAT Pin | 6 | PC13 | MCU_PC13 Pin |
| 7 | PC13 | MCU_PC13 Pin | 7 | VBAT | MCU_VBAT Pin |
| 8 | GND | Ground | 8 | PB8 | MCU_PB8 Pin |
| 9 | GND | Ground | 9 | GND | Ground |
| 10 | +5V | Voltage: 5V DC | 10 | +5V | Voltage: 5V DC |
| 11 | GND | Ground | 11 | GND | Ground |
| 12 | 3.3V | Voltage: 3.3V DC | 12 | 3.3V | Voltage: 3.3V DC |
| 13 | CLK | SWCLK | 13 | CLK | SWCLK |
| 14 | DIO | SWDIO | 14 | DIO | SWDIO |
| 15 | GND | Ground | 15 | TXD | MCU_TXD Input Pin |
| 16 | RXD | MCU_RXD Input Pin | 16 | RXD | MCU_RXD Output Pin |
| 17 | TXD | MCU_TXD Output Pin | 17 | PA8 | MCU_PA8 Pin |
| 18 | PA8 | MCU_PA8 Pin | 18 | PB15 | MCU_PB15 Pin |
| 19 | PB15 | MCU_PB15 Pin | 19 | PB14 | MCU_PB14 Pin |
| 20 | PB14 | MCU_PB14 Pin | 20 | GND | Ground |

Copyright ©2012–2025，Chengdu Ebyte Electronic Technology Co.,Ltd.


Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

## 1.3 Function Introduction




Referring to the above figure of E32-400MBL-SC, all other models of SC series have the same hardware functions.

| | | |
|---|---|---|
| **Display Screen** | 0.96 OLED | Displays the current configuration, test parameters, version information, etc. |
| **Buttons** | UP/UP | Up key, up to check or add, frequency and power settings support continuous point. |
| | OK/OK | Confirmation key to go to the next page or exit the last page |
| | DOWN/DOWN | Down button, downward check or minus, frequency and power settings support continuous point |
| **Indicator** | TXD | Transmit indicator, blinks once for each transmission |
| | RXD | Receive indicator, blinks once for each reception |
| | PWR | Power indicator light, power on always on |
| **Testing Resistance** | TR | Remove the test resistor and test the module current with an ammeter. |
| **Buzzers** | BEEP | Beeps once when key is pressed |

## 1.4 Parameter Introduction

| No. | Parameter | Description | | | | Note |
|---|---|---|---|---|---|---|
| | | **MBL-SC** | **TBL-SC** | **MBH-SC** | **TBH-SC** | |
| 1 | Borad Size | 30*64mm | 30*68mm | 30*85mm | | - |
| 2 | Process | Lead free process, machine mount | | | | Machine stickers can ensure batch consistency and reliability |
| 3 | Antenna port | SMA | | | | - |
| 3 | Power supply | Type-C | | | | USB to Type-C |
| 4 | Operating temperature [℃] | -40 ~ +85℃ | | | | - |
| 5 | Operation Humidity(%) | 10% ~90% | | | | - |
| 6 | Storage Temperature [℃] | -40 ~ +125℃ | | | | - |

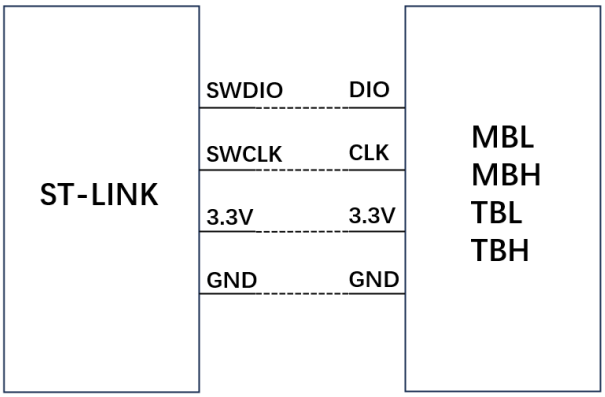
Copyright ©2012–2025，Chengdu Ebyte Electronic Technology Co.,Ltd.


Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

## 1.5 Compatible List

| | | | | |
|---|---|---|---|---|
| Low Power Module | SPI | 1 | E22-400M22S | E22-400/900MBL-SC |
| | | 2 | E22-900M22S | |
| | | 3 | E32-400M20S | E32-400/900MBL-SC |
| | | 4 | E32-900M20S | |
| | | 5 | E220-400M22S | E220-400/900MBL-SC |
| | | 6 | E220-900M22S | |
| | UART | 7 | E22-400T22S | E22-400/900TBL-SC |
| | | 8 | E22-900T22S | |
| | | 9 | E32-433T20S | E32-433/900TBL-SC |
| | | 10 | E32-900T20S | |
| | | 11 | E220-400T22S | E220-400/900TBL-SC |
| | | 12 | E220-900T22S | |
| High Power Module | SPI | 13 | E22-400M30S | E22-400/900MBH-SC |
| | | 14 | E22-900M30S | |
| | | 15 | E32-400M30S | E32-400/900MBH-SC |
| | | 16 | E32-900M30S | |
| | | 17 | E220-400M30S | E220-400/900MBH-SC |
| | | 18 | E220-900M30S | |
| | UART | 19 | E22-400T30S | E22-400/900TBH-SC |
| | | 20 | E22-900T30S | |
| | | 21 | E32-433T30S | E32-433/900TBH-SC |
| | | 22 | E32-900T30S | |
| | | 23 | E220-400T30S | E220-400/900TBH-SC |
| | | 24 | E220-900T30S | |

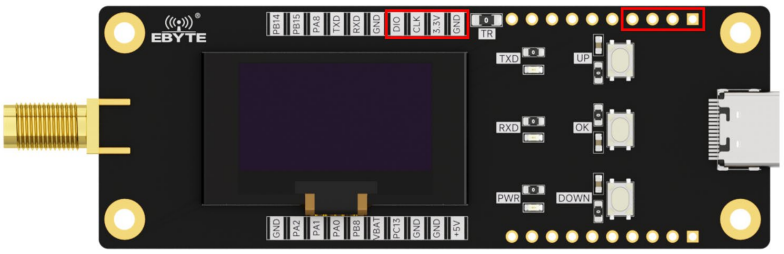
## 1.6 Program Download Interface



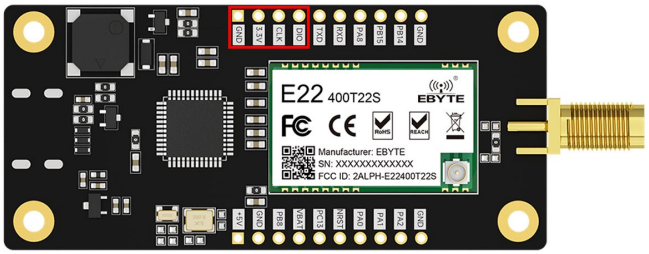

Copyright ©2012–2025，Chengdu Ebyte Electronic Technology Co.,Ltd.


Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

M series take E22-400MBH-SC as an example




T series take E22-400TBL-SC for example




Programs can be burned to the MCU via ST-LINK. Please compile before burning.




Copyright ©2012–2025，Chengdu Ebyte Electronic Technology Co.,Ltd.


Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

# 2 Introduction to the software

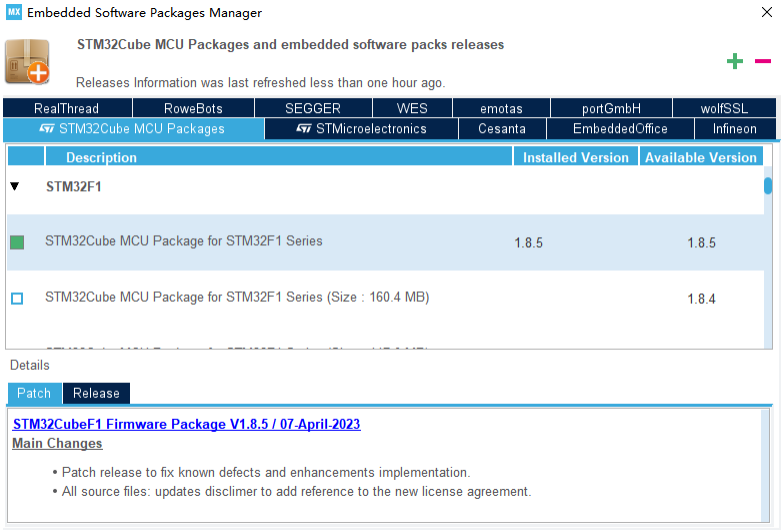
## 2.1 Development environment (computer)

### 2.1.1 STM32CubeMX

Tool recommended version≥ v6.9.2

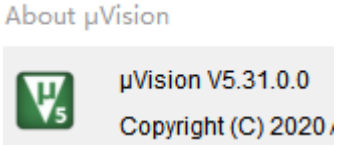



STM32 firmware package version ≥ v1.8.5




### 2.1.2 MDK-ARM

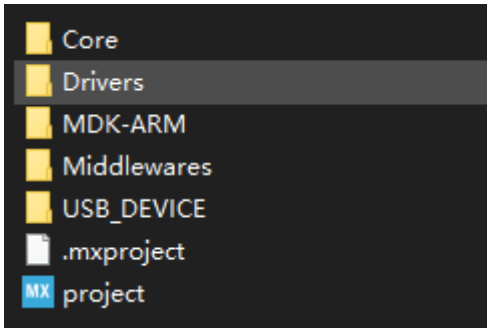
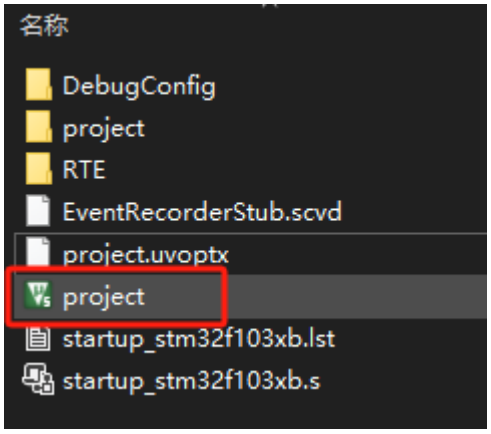
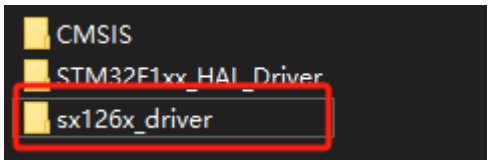
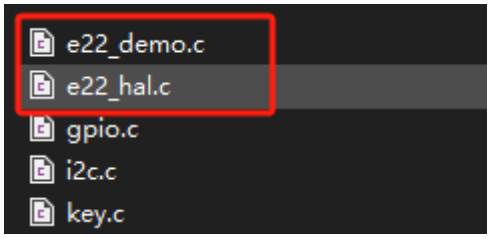
Keil version ≥ v5.31.0




Copyright ©2012–2025，Chengdu Ebyte Electronic Technology Co.,Ltd.


Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

## 2.2 Catalog Structure

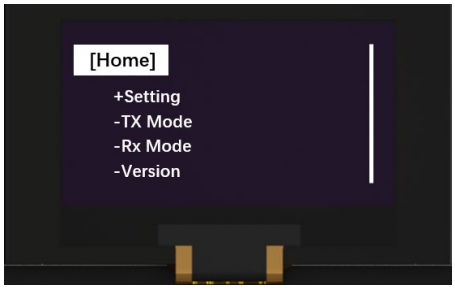
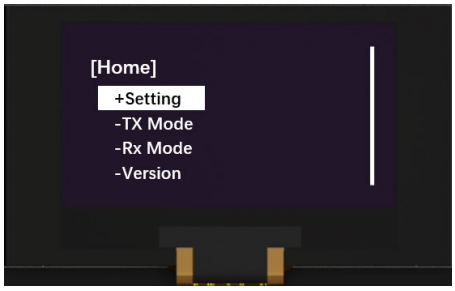
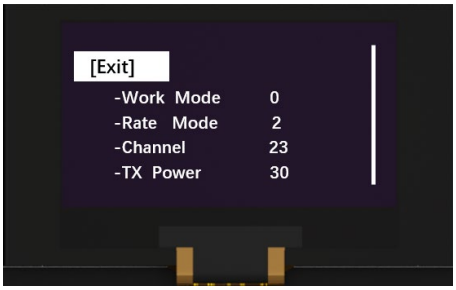
| | Item | Instruction |
|---|---|---|
| 1 | File catalog | You can download the sample project from the official website and open the directory as shown below   |
| 2 | Project initiation | There are startup files under MDK-ARM   |
| 3 | Module Driver | Under the Drivers folder, there are corresponding RF chip drivers sx126x/sx127x/llcc68 and so on.   |
| 4 | Module Applications | The corresponding exx_demo example is available in the Core/Src folder.   |

Copyright ©2012–2025，Chengdu Ebyte Electronic Technology Co.,Ltd.


Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

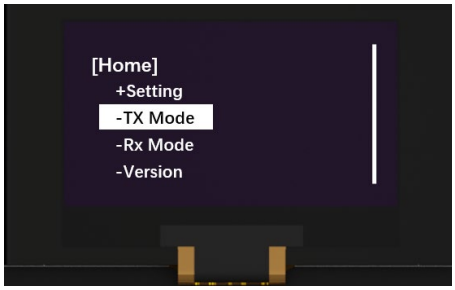
# 3 Function demonstration

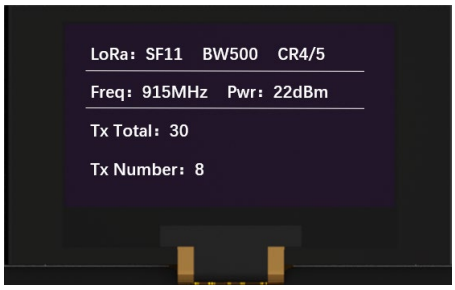
## 3.1 Quick start

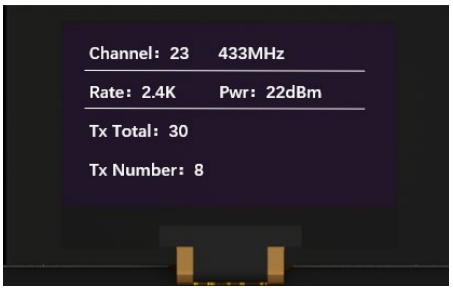
| | Item | Instruction |
|---|---|---|
| 1 | Home page | Default to home page after power on, all configuration parameters restored to default state  |
| 2 | Into the page | By clicking the physical confirmation button, you can go to the corresponding option page   |
| 3 | Basic Parameter Setting | M series Setting page has a variety of LoRa parameters, which can be adjusted according to the needs, and airspeed calculation is recommended to use Semtech official LoRa calculation tool.<br>The difference between T series and M series is only the airspeed configuration.<br> <br>The M-Series configuration is as follows: The T-Series configuration is as follows:<br>   <br>Functional interpretation: |

Copyright ©2012–2025，Chengdu Ebyte Electronic Technology Co.,Ltd.


Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

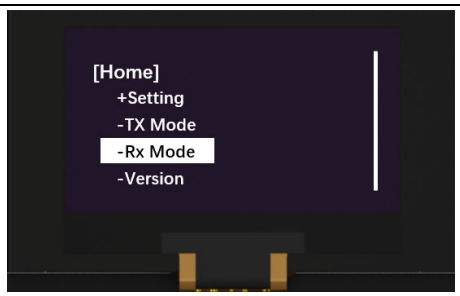
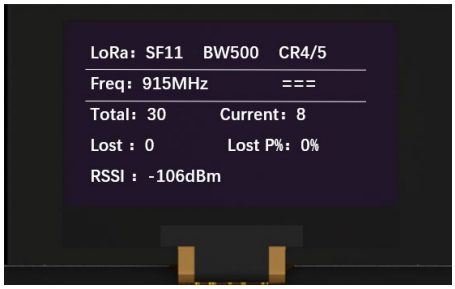
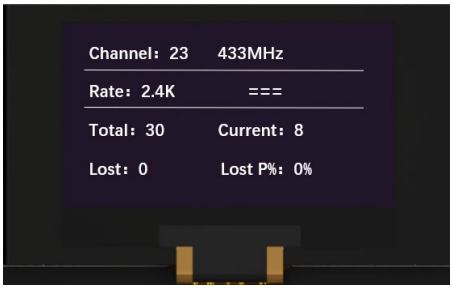
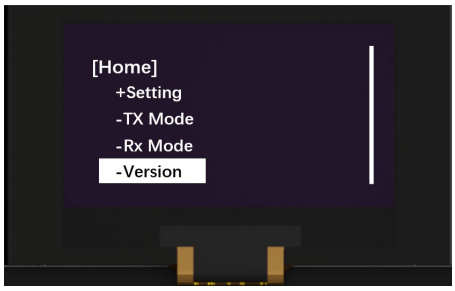
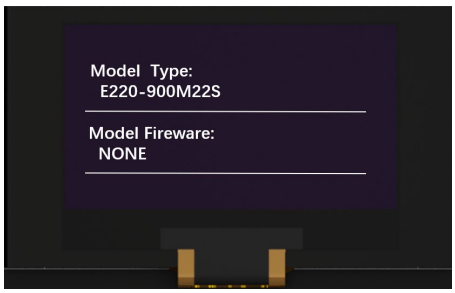
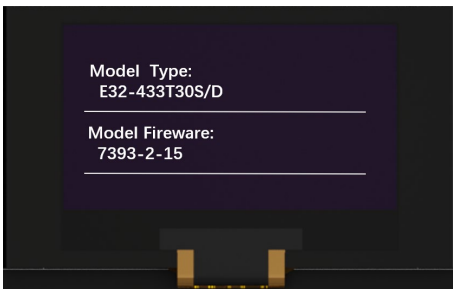
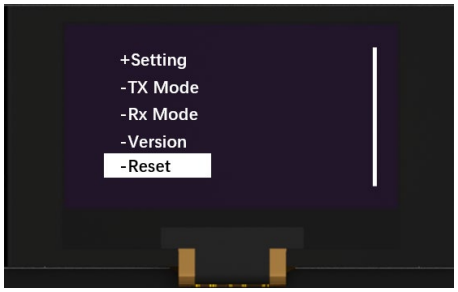
<table>
<tr><td></td><td></td><td>
<table>
<tr><th colspan="3">M Series</th><th colspan="3">T Series</th></tr>
<tr><td>LoRa SF</td><td>symbol rate</td><td rowspan="3">Airspeed needs to be calculated in conjunction with SF, BW, and CR.</td><td>Work Mode</td><td>operating mode</td><td>Select module operating mode</td></tr>
<tr><td>LoRa BW</td><td>channel bandwidth</td><td>Rate Mode</td><td>Rate Mode</td><td>Select Airspeed</td></tr>
<tr><td>LoRa CR</td><td>coding rate</td><td>Channel</td><td>operating channel</td><td>Select Channel</td></tr>
<tr><td>Frequency</td><td>operating frequency</td><td>Select Frequency</td><td>TX Power</td><td>firing power</td><td>Configuring Transmit Power</td></tr>
<tr><td>TX Power</td><td>firing power</td><td>Configuring Transmit Power</td><td>TX Count</td><td>Number of times sent</td><td>Configure the number of transmissions</td></tr>
<tr><td>TX Count</td><td>Number of times sent</td><td>Configure the number of transmissions</td><td>Back Color</td><td>background color</td><td>Reflects the background color of the screen</td></tr>
<tr><td>Back Color</td><td>background color</td><td>Reflects the background color of the screen</td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>4</td><td>Sending Test</td><td>When Tx Mode is entered, it will automatically start to send packets according to the parameters set by the user (default 10 bytes per packet).<br>Pressing “Confirm” in the page will exit and return to the higher page.<br>After sending, press “Down” key to re-send.<br>

<br>The M series TX transmitter interface is as follows: The T series TX transmitter interface is as follows:<br>


</td></tr>
<tr><td>5</td><td>Reception test</td><td>When Rx Mode is entered, it automatically starts to wait for receiving wireless data according to the parameters set by the user.<br>Press the “Confirm” button in the page to exit and return to the previous page.<br>After sending, press “Down” button to start receiving again.</td></tr>
</table>

Copyright ©2012–2025，Chengdu Ebyte Electronic Technology Co.,Ltd.

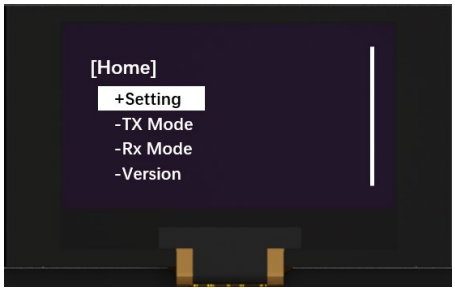
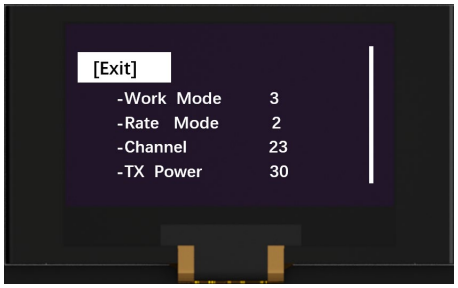
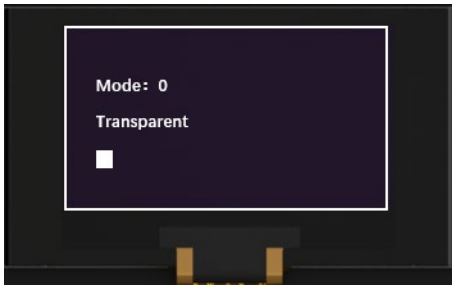
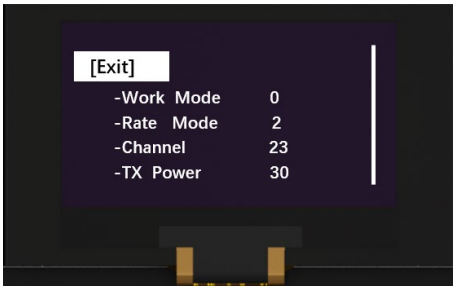

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

| | | |
|---|---|---|
| | | <br>The M series RX receive screen is as follows: The T series RX receive screen is as follows:<br><br> |
| 6 | Version information | Displays basic information such as the module model number. NONE is displayed if there is no firmware inside the M series module;<br><br><br> |
| 7 | Reset | Select Reset, OK to confirm, reset the configuration and return to the home page.<br><br> |

Copyright ©2012–2025，Chengdu Ebyte Electronic Technology Co.,Ltd.


Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

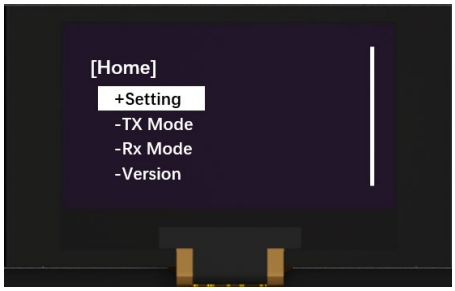
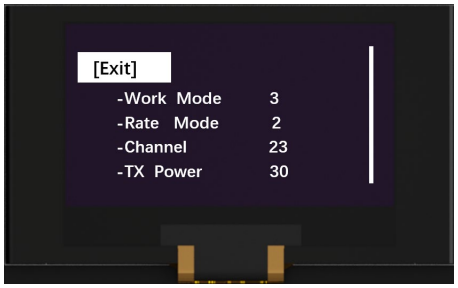
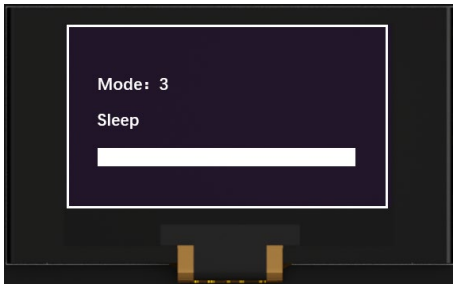
## 3.2 Achieve transparent transmission function via USB serial port

| | Item | Instruction |
|---|---|---|
| 1 | Home page | Default to home page after power on, all configuration parameters restored to default state  |
| 2 | Menu | Press any key to enter the menu page, then press the "DOWN" key to select "Setting," and press the "OK" key to enter the settings mode  |
| 3 | Mode settings | In settings mode, press the "DOWN" key to select "Work Mode," then press the "OK" key to enter mode settings  |
| 4 | Transparent transmission mode | Set the mode to transparent transmission mode, i.e., "Mode: 0 Transparent," and press "OK" to save and return   |
| 5 | Achieve transparent transmission function via USB serial port | Open the serial port tool to achieve transparent transmission function with modules of the same model. Note: At this time, the configuration parameters of the kit are default parameters |

Copyright ©2012–2025，Chengdu Ebyte Electronic Technology Co.,Ltd.


Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

## 3.3 Achieve host computer configuration function via USB serial port

| | Item | Instruction |
|---|---|---|
| 1 | Home page | Default to home page after power on, all configuration parameters restored to default state  |
| 2 | Menu | Press any key to enter the menu page, then press the "DOWN" key to select "Setting," and press the "OK" key to enter the settings mode  |
| 3 | Mode settings | In settings mode, press the "DOWN" key to select "Work Mode," then press the "OK" key to enter mode settings  |
| 4 | Sleep mode | Set the mode to sleep mode, i.e., "Mode: 3 Sleep," and press the "OK" key to save and exit  |
| 5 | Achieve host computer configuration function via USB serial port | Open the corresponding official website host computer to read module parameters and configuration parameters. |

Copyright ©2012–2025，Chengdu Ebyte Electronic Technology Co.,Ltd.


Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

# 4 FAQ

## 4.1 Communication range is too short

- The communication distance will be affected when obstacle exists;
- Data lose rate will be affected by temperature, humidity and co-channel interference;
- The ground will absorb and reflect wireless radio wave, so the performance will be poor when testing near ground;
- Sea water has great ability in absorbing wireless radio wave, so performance will be poor when testing near the sea;
- The signal will be affected when the antenna is near metal object or put in a metal case;
- Power register was set incorrectly, air data rate is set as too high (the higher the air data rate, the shorter the distance);
- The power supply low voltage under room temperature is lower than 2.5V, the lower the voltage, the lower the transmitting power;
- Due to antenna quality or poor matching between antenna and module.

## 4.2 Module is easy to damage

- Please check the power supply source, ensure it is 2.0V~3.6V, voltage higher than 3.6V will damage the module;
- Please check the stability of power source, the voltage cannot fluctuate too much;
- Please make sure antistatic measure are taken when installing and using, high frequency devices have electrostatic susceptibility;
- Please ensure the humidity is within limited range, some parts are sensitive to humidity;
- Please avoid using modules under too high or too low temperature.

## 4.3 BER(Bit Error Rate) is high

- There are co-channel signal interference nearby, please be away from interference sources or modify frequency and channel to avoid interference;
- Poor power supply may cause messy code. Make sure that the power supply is reliable;
- The extension line and feeder quality are poor or too long, so the bit error rate is high.

Copyright ©2012–2025，Chengdu Ebyte Electronic Technology Co.,Ltd.


Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

# Revision history

| Version | Date | Description | Issued by |
|---|---|---|---|
| 1.0 | 2024-09-02 | The initial version | Lei |
| 1.1 | 2024-10-24 | Updated voltage description | Lei |
| 1.2 | 2025-02-18 | Added USB serial port to achieve transparent transmission and host computer configuration functions. | Lei |

# About us

Technical support: support@cdebyte.com

Documents and RF Setting download link: www.cdebyte.com

Thank you for using Ebyte products! Please contact us with any questions or suggestions: info@cdebyte.com

---

Phone: +86 028-61399028

Web: www.cdebyte.com

Address: B5 Mould Park, 199# Xiqu Ave, High-tech District, Sichuan, China

Chengdu Ebyte Electronic Technology Co.,Ltd.

Copyright ©2012–2025，Chengdu Ebyte Electronic Technology Co.,Ltd.



Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000