LoRa Module Private Protocol Version

F8L10C-03

User Manual

V1.0.0

This manual is applicable to the following products: F8L10C-03LU, F8L10C-03LN, F8L10C-03HU, F8L10C-03HN

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Document Revision History

Date	Version	Description	Author
2026-03-31	V1.0.0	Initial Version	HZP

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Chapter 1 Product Overview

1.1 Overview

The F8L10C-03 series LoRa data transmission module is an embedded wireless data transmission module based on LoRa technology, providing long-range wireless data communication over LoRa networks. It is designed with a low-power domestic XHSC MCU and the Semtech SX1262 chipset. Featuring a compact design, the module is ultra-small with extremely low power consumption, and supports LoRaWAN protocol as well as Four-Faith private protocol.

With its ultra-compact size, the module can be widely applied in M2M industries across the IoT ecosystem, including smart grid, intelligent transportation, wireless utility metering (water, gas, and heat), wireless automatic data acquisition, industrial automation, smart buildings, fire protection, public safety, environmental protection, meteorology, digital healthcare, remote sensing, military, space exploration, agriculture, forestry, water management, coal mining, petrochemical, and other fields.

1.2 Product Features

Industrial-grade Design

- Powered by a high-performance industrial-grade chipset; module firmware supports Four-Faith private protocol and LoRaWAN 1.0.4
- RF chip supports all ISM bands from 150MHz to 960MHz; module supports 410–510MHz and 863–928MHz bands
- ESD protection design compliant with Level 4 electrostatic discharge standards
- Built-in 32MHz industrial-grade high-precision temperature-compensated crystal oscillator (TCXO)
- Low power design with sleep and wake-up modes; minimum current < 2μA
- Maximum transmit power of 22dBm, adjustable in multiple levels (5–22dBm), default 20dBm
- Receiver sensitivity up to -137dBm @125kHz, SF12, CR1
- Power supply: DC 1.8–3.6V
- Supports UART firmware upgrade and remote OTA
- Compact 1.27mm × 10 stamp-hole package (dual-side)
- Multiple baud rates and RF data rates supported
- Supports spreading factors SF5–SF12
- Data rate from 0.3 kbps to 62.5 kbps in LoRa™ mode
- Supports both IPEX connector and pin-type RF output
- Supports hardware reset

1.3 Product Image

1.4 Production Precautions

1.4.1 Moisture Sensitivity Level and Protection Requirements

Four-Faith LoRa modules are moisture-sensitive products. Exposure to humid environments may cause moisture absorption, leading to malfunction. Therefore, all LoRa modules are packaged in vacuum-sealed bags upon shipment, with additional humidity indicator cards and desiccants included inside to prevent moisture damage.

Figure 1-1 Vacuum Packaging Display

Before using the module, check whether the packaging is intact. After opening the package, verify the status of the humidity indicator card inside the vacuum bag. If the following condition occurs, the module must be baked before use:

- Humidity indicator card: the 10% indicator spot turns pink and is no longer blue, as shown below.

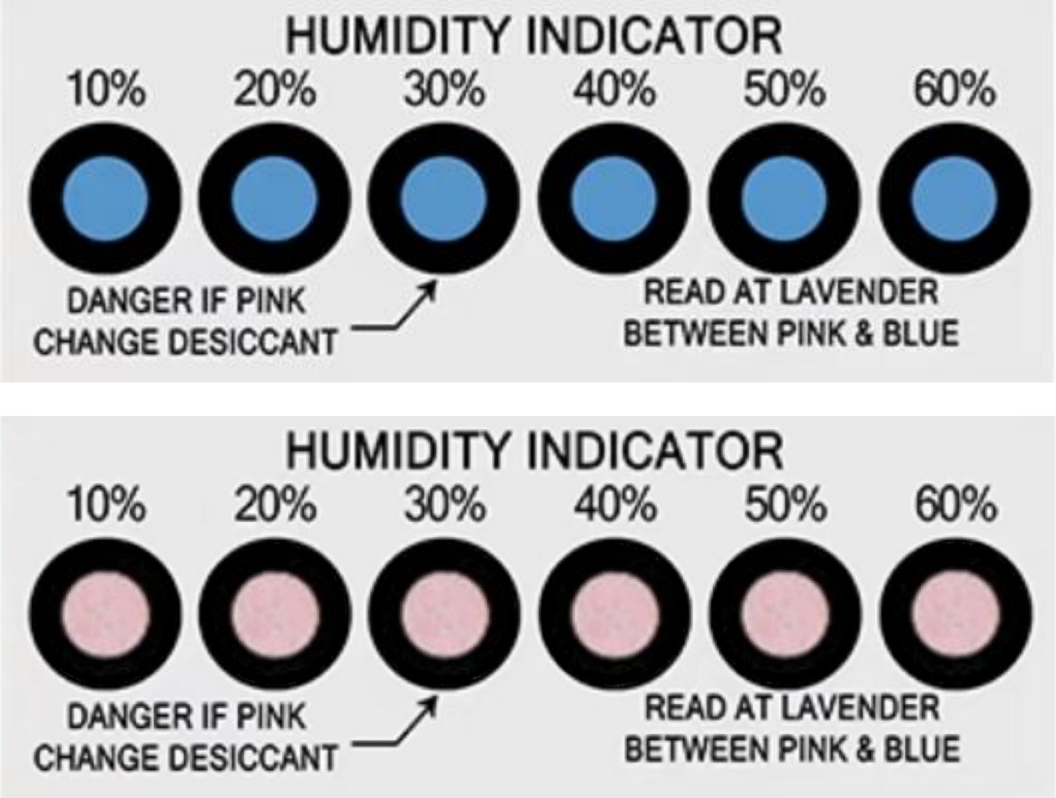


Figure 1-2 Humidity Indicator Card

1.4.2 Floor Life and Temperature/Humidity Control

The LoRa module has a Moisture Sensitivity Level (MSL) of 3, with a floor life of 168 hours.

1) Under workshop conditions of 23°C ±5°C and relative humidity below 60%, the module must undergo reflow soldering or other high-temperature processes within 168 hours after unpacking. Otherwise, it should be stored in an environment with relative humidity below 10% (e.g., a dry cabinet) to maintain dryness.
2) If the workshop temperature/humidity conditions are uncertain or the relative humidity exceeds 60%, SMT reflow must be completed within 24 hours after unpacking. Do not open large quantities of packages in advance.
3) To prevent soldering defects such as blistering and delamination caused by moisture absorption, strict control is required. It is not recommended to expose modules to air for extended periods after opening the vacuum packaging.
4) In cases of vacuum packaging leakage, non-compliance with moisture control requirements after opening, bulk materials, or materials exceeding a 1-year shelf life, pre-baking is required before SMT or rework. Bake at 120°C ±5°C for 24 hours to prevent blistering, cracking, and delamination during high-temperature soldering due to moisture absorption.

5) Before baking, remove the modules from the packaging and place the bare modules on heat-resistant fixtures (do not bake plastic trays or reel packaging). Modules that undergo re-baking must be soldered within 24 hours after baking; otherwise, they should be stored in a dry cabinet. During handling, ensure proper ESD protection and wear anti-static gloves.
6) After baking, when placing bare modules for SMT, the pick-and-place machine should use a tray, as described below:

Method 1: Use a dedicated, size-matched tray. Place the modules on the tray before loading them onto the pick-and-place machine.
Method 2: If a dedicated tray is unavailable, black antistatic carrier tape used for packaging the modules can be employed. Cut multiple strips of equal length and arrange them neatly in a grid on the pick-and-place machine's tray to serve as a temporary tray.

1.4.3 Storage

Recommended storage conditions: Temperature of 23 °C ± 5 °C with relative humidity of 35 %–60 %.
Shelf life (under sealed vacuum packaging): Under the recommended storage conditions, the shelf life is 12 months.

Chapter 2 Module Interfaces

2.1 Module Pin Definition

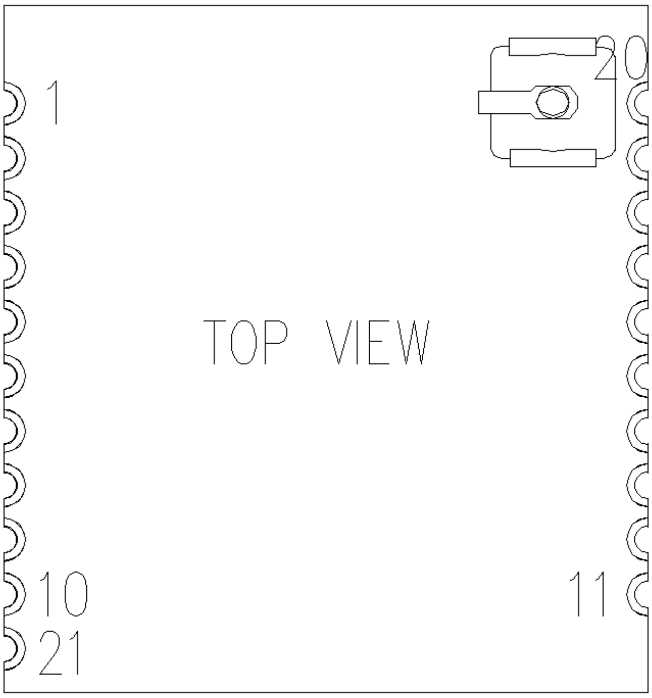


Figure 2-1 Pin Diagram of F8L10C-03 Module

Table 2-1-1 Module Interface Definition

No.	Definition	I/O	Description
1	GND	N/A	Ground
2	VCC	Input	Power Supply
3	D5	I/O	GPIO05/ADC_IN2
4	GND	N/A	Ground
5	D2	I/O	GPIO02/ADC_IN5
6	D10/TXDone	I/O	GPIO10 (Transmission Complete Notification)
7	RX	Input	UART Data In
8	TX	Output	UART Data Out
9	JIMS_SWDIO	Input	Debug Data
10	JTCK_SWCLK	Input	Debug Clock
11	GND	N/A	Ground
12	D11/RXDone	Either	GPIO11 (Reception Complete Notification)
13	STATUS	Either	Sleep Status Indicator
14	D1/SLEEP_RQ	Either	GPIO01 (Sleep Control)/ADC_IN7
15	D3	Either	GPIO03/ADC_IN6
16	D4	Either	GPIO04/ADC_IN4
17	GND	N/A	Ground
18	RESET	Input	External Reset Signal
19	GND	N/A	Ground
20	RF_OUT	N/A	F8L10C-03XN Version RF Input/Output
21	NC	NC	NC

Signal input/output is relative to the module. In the table, pins D1–D5 correspond to IO1–IO5 in the IO application of the configuration tool. The 12-bit ADC reference voltage is 3.3 V, with a measurement range of 0.1–3.3 V and a resolution of 0.01 V.

Note: Signal input/output is relative to the module.

Remarks:

- The sleep control pin is active-high to wake up the module and active-low to enter sleep mode.
- The sleep status indicator pin is high when the module is awake and low when it is in sleep mode.
- The transmission complete notification pin is normally low; it goes high for 10 ms upon transmission completion.
- The reception complete notification pin is normally low; it goes high for 10 ms upon reception completion (default value, configurable via AT commands).

2.2 UART Interface

The module’s serial communication port 1 is a UART interface. The pin definitions are shown in Table 2-2：

Table 2-2 UART Pin Definition

UART Signal Name	Module Pin No.
TX0	8
RX0	7

2.3 GPIO Specifications

The F8L10C-03 module provides 10 GPIO ports. The DC characteristics are shown in Table 2-3：

Table 2-3 GPIO DC Characteristics

Parameter	Min	Typ	Max
Input Voltage for Logic 0 (V)	0	—	<0.3 VBAT
Input Voltage for Logic 1 (V)	>0.7VBAT	—	VBAT

2.4 Absolute Maximum Ratings

Table 2-5 Absolute Maximum Ratings

Parameter	Min	Max	Unit
Supply Voltage	-0.3	3.9	V
Pin Input Voltage	-0.3	3.9	V
Storage Temperature Range	-55	125	°C

Note: Exceeding the absolute maximum ratings may cause permanent damage to the module.

2.5 Antenna Interface

The default version uses a 1st-generation Ipex connector as the antenna interface. For the F8L10C-03LN and F8L10C-03HN versions, Pin 20 is used as the RF input/output.

The module supports two RF interface options: Ipex Gen1 connector and Pin 20 RF output.

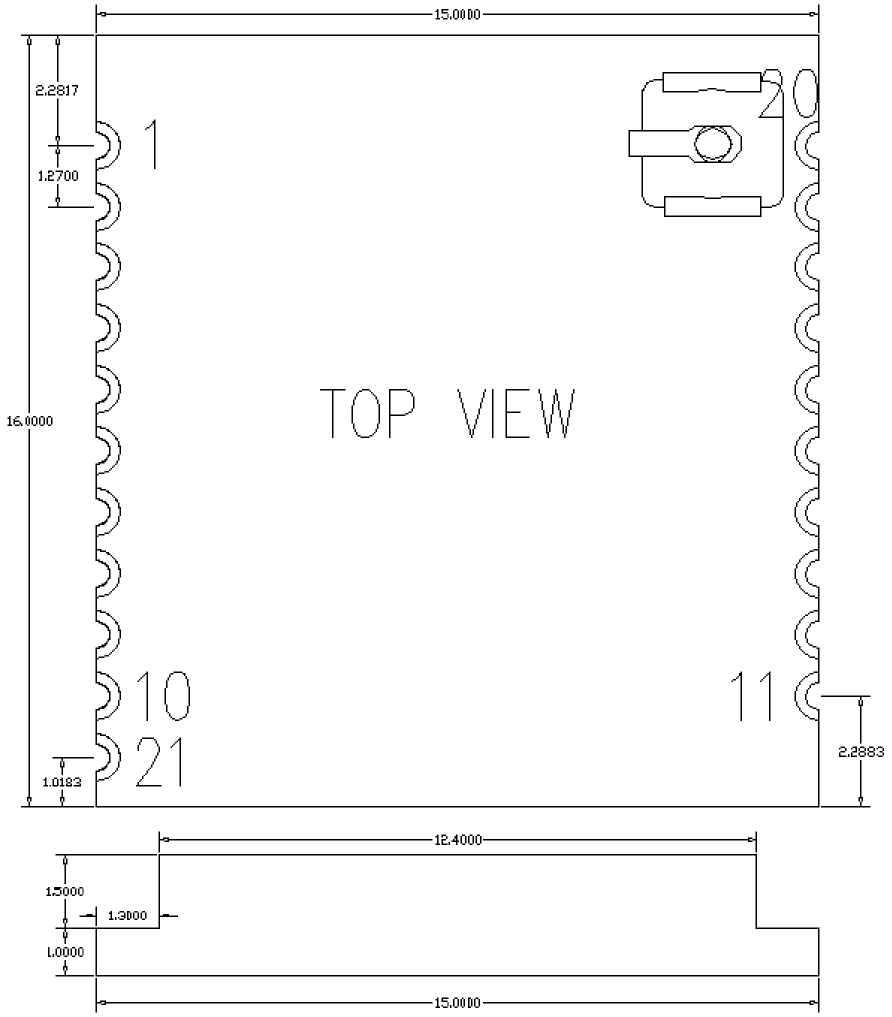
For external antennas, the voltage standing wave ratio (VSWR) should not exceed 2. Use the shortest possible RF coaxial cable to minimize insertion loss. The antenna should be placed away from large metal surfaces to avoid degrading radiation performance.

When using a built-in antenna, sufficient clearance must be reserved in the PCB layout. The antenna should be designed by a professional RF/antenna engineer to achieve optimal radiation performance. Built-in antenna design must consider the terminal's PCB, enclosure, and installation environment. Antennas for different terminals must be designed individually and should not be reused.

The external RF circuitry and antenna design should follow the 50-ohm impedance matching specification or be validated in consultation with our technical support team.

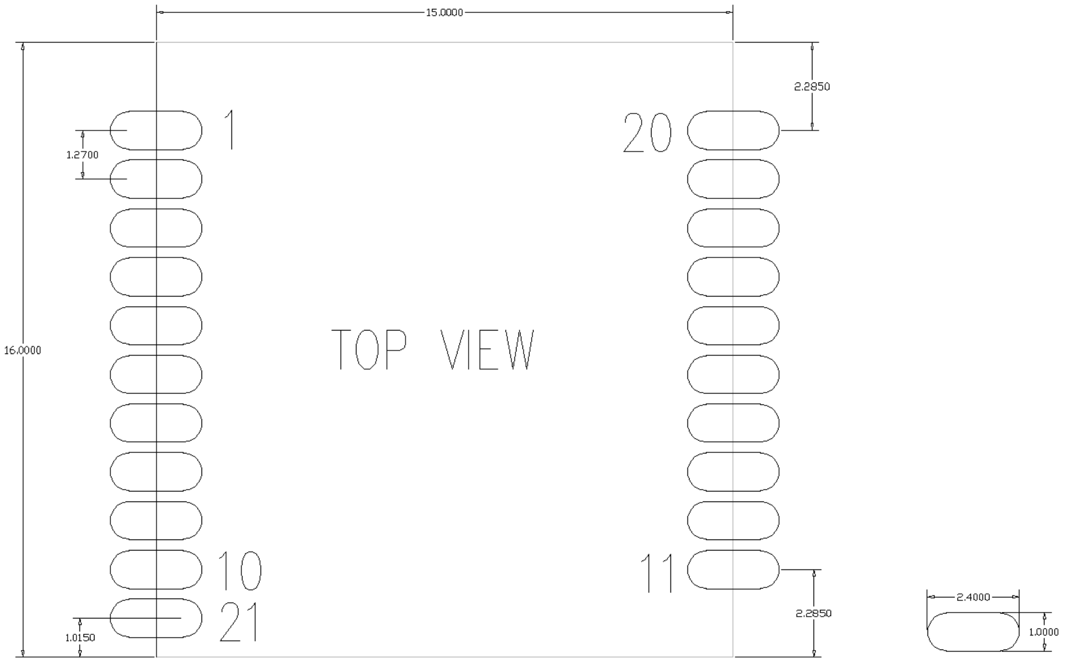
Chapter 3 Module Package

3.1 Module Package Drawing



Note: All dimensions are in millimeters (mm)

3.2 Recommended Packaging Design Dimensions



Note: All marked dimensions are in millimeters (mm)

3.3 Reflow Soldering Temperature Range

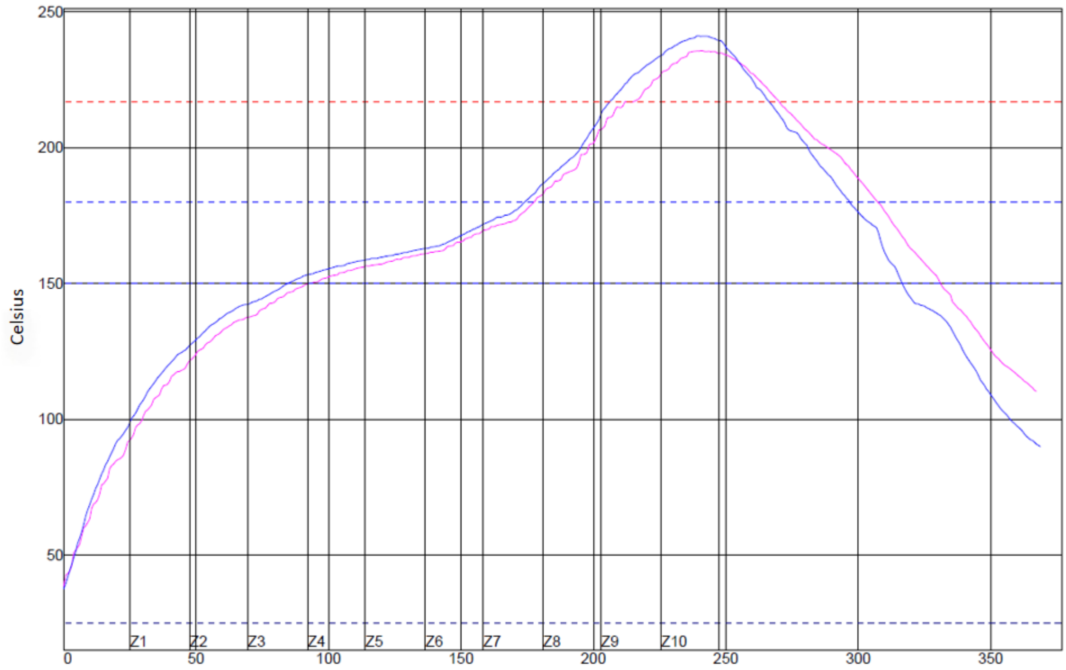
It is recommended to perform soldering according to the IPC/JEDEC J-STD-020B standard.

Soldering Temperature

- When using a constant-temperature soldering iron, the temperature should not exceed 340ºC, and the soldering time for each pin should not exceed 2 seconds.

SMT Temperature Profile

- When using SMT reflow soldering, the following temperature profile is recommended:



PWI=94%		Max Ramp-Up Rate		Max Ramp-Down Rate		Preheat (25–150°C)	
Line Color	2	1.96	-4%	-1.28	72%	93.1	23%
Line Color	3	2.05	5%	-1.43	57%	84.4	2%
Difference		0.09		0.15		8.70	

PWI=94%	Soak Time (150–180°C)	Time Above 217°C (Reflow	Peak Temperature	Ramp Rate: 3°C/s

				Time)				(250–200°C)	
Line Color	2	85.4	-15%	55.5	-27%	235.8	-54%	-1.15	94%
Line Color	3	89.4	-2%	60.5	-14%	241.3	-10%	-1.48	81%
Difference		4		4.5		5.5		0.33	

Chapter 4 Module Interfaces Configuration

4.1 UART Communication Mode

4.1.1 Signal Description

The following standard UART signals are used:

- **TX**: Transmit data
- **RX**: Receive data

4.1.2 Hardware Connection

The UART hardware connection is shown in Figure 4-1

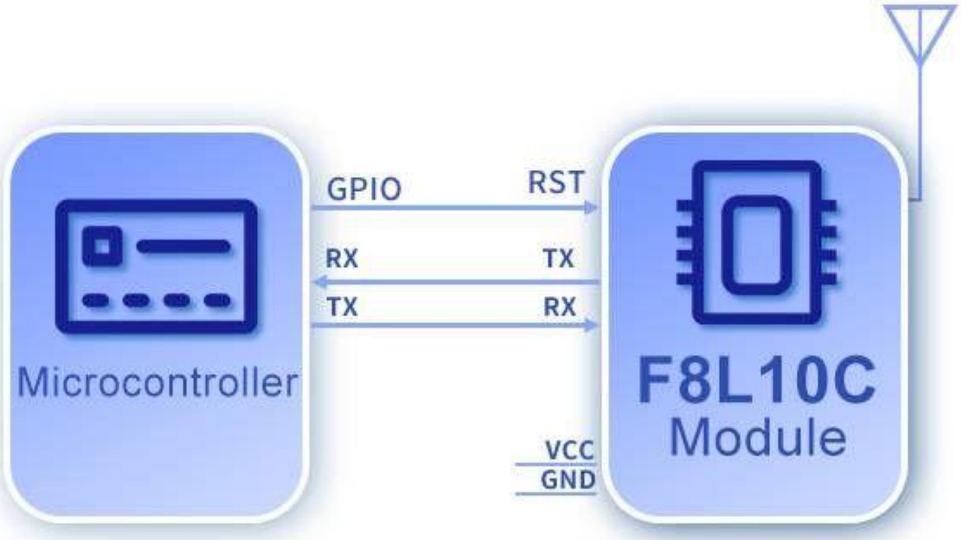


Figure 4-1 UART Interface Connection

Example: As shown in Figure 4-2, a device with a UART interface can be directly connected to the pins of the F8L10C-03 module to form a UART-to-RF communication system.

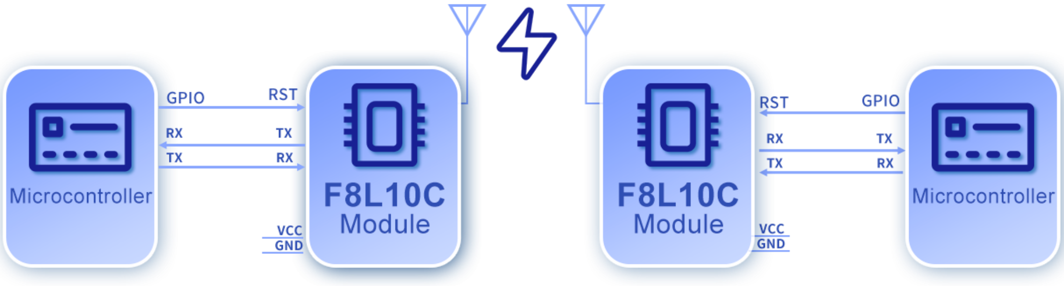


Figure 4-2 Diagram of Communication Between Two Modules

4.1.3 Communication Byte Format

The UART interface communication byte format is shown in Figure 4-3.

Start	D0	D1	D2	D3	D4	D5	D6	D7	Stop

Figure 4-3 UART Interface Communication Byte Format

1. **Communication Interface:** UART
2. **Baud Rate:** 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps
3. **Start Bit:** 1 bit
4. **Data Bits:** 8 bits
5. **Stop Bits:** 1 or 2 bits
6. **Parity:** None / Odd / Even

UART uses asynchronous transmission and reception, allowing simultaneous sending and receiving, enabling full-duplex communication. Data transmission can be initiated either by an external device or by the module itself.

As shown in Figure 4-3, each data byte consists of one start bit (low level), 8 data bits, and one stop bit (high level).

Example: As shown in Figure 4-4, the diagram illustrates UART transmitting the byte 0x1F (decimal 31) in 8-N-1 mode (8 data bits, no parity, 1 stop bit).

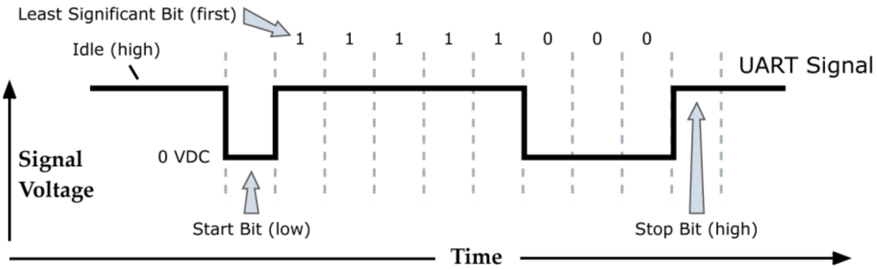


Figure 4-4 Data Transmission Diagram for 0x1F

Chapter 5 Parameters Configuration

5.1 Configuration Connection

Before configuring the F8L10C-03 series module, it is necessary to connect the module to a host device. The host can be a PC, or it can be connected to other devices with a UART interface as shown in Figure 3-1.When connecting to a PC, a dedicated development board for the LoRa module provided by our company can be used (the F8L10C-03 needs to be mounted on an adapter board). The connection diagram is shown in Figure 5-1.

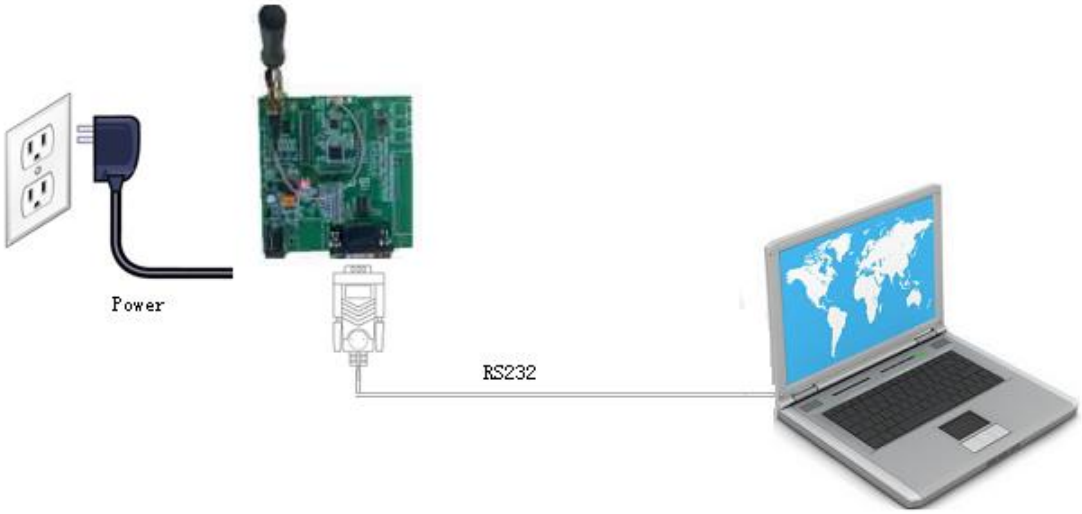


Figure 5-1 Configuration Connection between F8L10C-03 and PC

5.2 Parameter Configuration Method Introduction

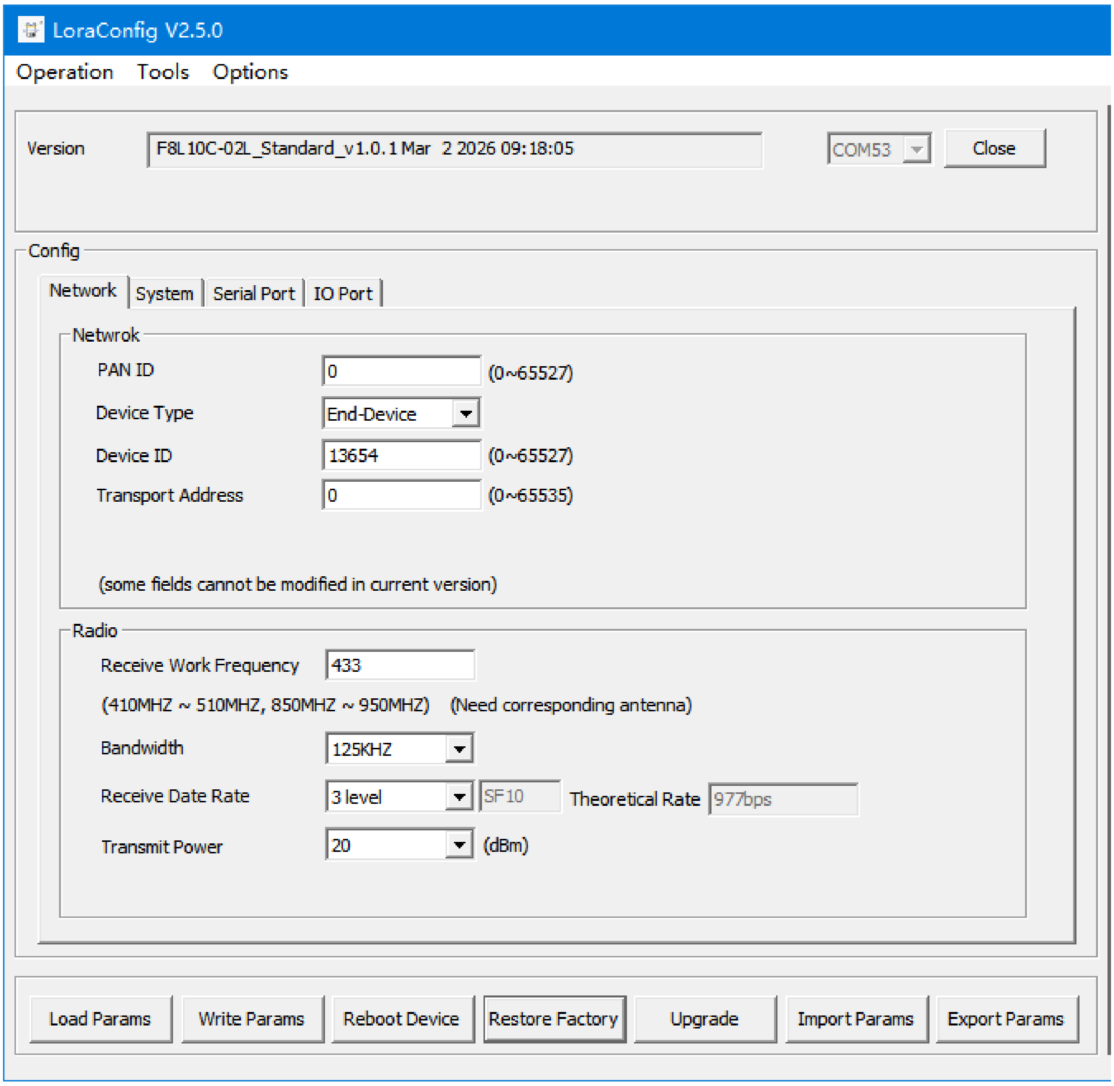
The F8L10C-03 series modules support two configuration methods:

1. **Configuration via the latest Four-Faith LoRa configuration software (LoRaConfig):** All parameters can be configured through the corresponding options in the software interface. This method is suitable when users can conveniently use a PC for configuration.
2. **Configuration via extended AT commands (hereinafter referred to as AT commands):** With this method, users only need a serial communication program to configure all parameters of the F8L10C-03 module, such as HyperTerminal on Windows, or minicom and PuTTY on Linux. Alternatively, users can directly configure the module via their own MCU system. Before using extended AT commands, the module must be set to

configuration mode.

For AT command configuration, please refer to the AT Command Manual.

Configuration via the software is shown in Figure 5-2.



Version: F8L10C-02L_Standard_v1.0.1 Mar 2 2026 09:18:05
COM53

PAN ID: 0 (0~65527)
Device Type: End-Device
Device ID: 13654 (0~65527)
Transport Address: 0 (0~65535)
(some fields cannot be modified in current version)

Receive Work Frequency: 433
(410MHZ ~ 510MHZ, 850MHZ ~ 950MHZ) (Need corresponding antenna)
Bandwidth: 125KHZ
Receive Date Rate: 3 level SF10 Theoretical Rate 977bps
Transmit Power: 20 (dBm)

Figure 5-2 Configuration Interface

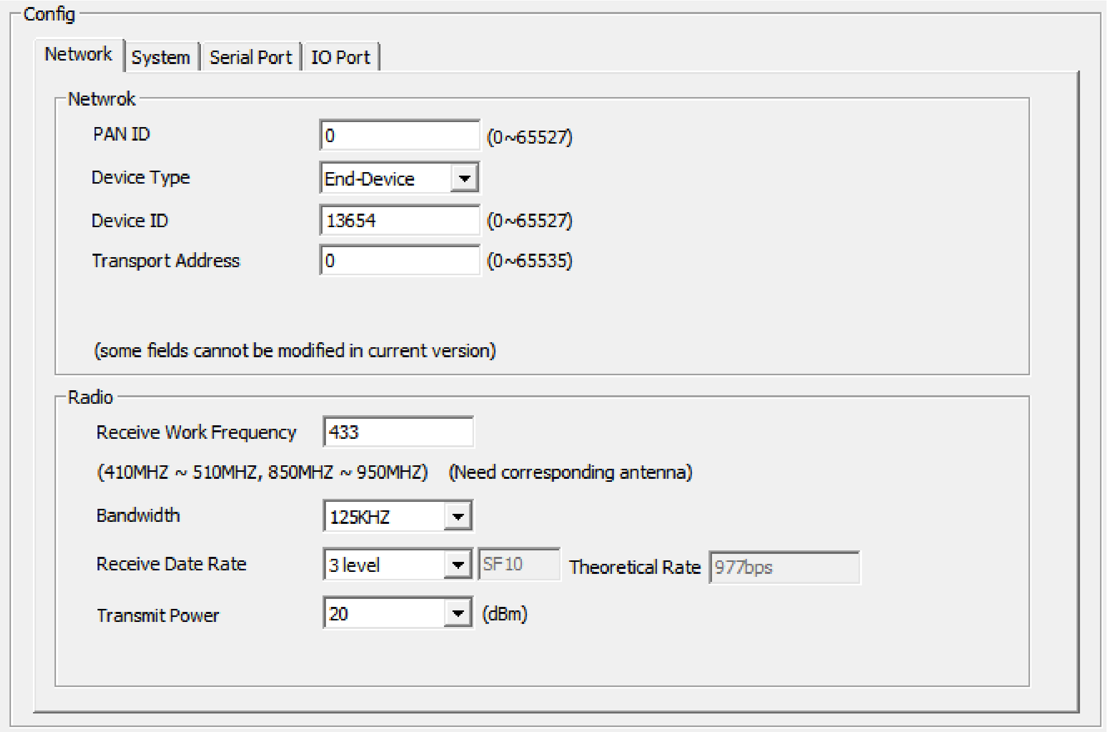
In the toolbar, select **“Options”** and then the submenu **“Serial Port Settings”** to display the parameters of the currently opened serial port. Please select the correct settings in this section and open the serial port. If the button on the right side of the serial port settings shows **“Close Port”**, it indicates that the port is already open; otherwise, please open the port.

After powering on the device, click **“Load Parameters”** in the configuration software. The module will automatically load the current configuration parameters from the device according to the software version and display them in the parameter area. You can then begin configuring all parameters of the F8L10C-03, as shown in Figure 5-2.

5.3 Parameter Description

The following sections mainly describe the configuration items of the F8L10C-03 module using the AT command configuration method.

5.3.1 LoRa Network Parameter



Netwrok

PAN ID: 0 (0~65527)
Device Type: End-Device
Device ID: 13654 (0~65527)
Transport Address: 0 (0~65535)

(some fields cannot be modified in current version)

Radio

Receive Work Frequency: 433
(410MHZ ~ 510MHZ, 850MHZ ~ 950MHZ) (Need corresponding antenna)
Bandwidth: 125KHZ
Receive Date Rate: 3 level SF10 Theoretical Rate 977bps
Transmit Power: 20 (dBm)

5.3.1.1 Network ID

The Network ID is used to distinguish different LoRa networks. Only devices operating on the same channel and using the same Network ID can communicate with each other.

5.3.1.2 Device Type

A node with Device Type 1 (repeater) has relay functionality and requires continuous power supply.

A node with Device Type 2 (terminal) has no relay function and can enter sleep mode.

5.3.1.3 Device ID

Sets the module ID, with a configurable range of 0–65527.

5.3.1.4 Relay Address (Unused)

Note: The F8L10C-03 supports the MESH protocol, and this parameter is not used. To enable relay functionality, simply configure the device type of the relay node as a repeater.

5.3.1.5 Transparent Transmission Address

In transparent transmission mode, serial data can be directly sent to the device with this address. Configurable range: 0–65535.

5.3.1.6 Carrier Frequency

This is the operating frequency for data transmission. Different hardware modules support different frequency bands, generally divided into low-frequency bands (below 525 MHz) and high-frequency bands (above 525 MHz).

Typical frequency ranges include 410–510 MHz and 863–928 MHz, with 1000 kHz per channel. Different regions have different frequency regulations and interference levels, which may affect the bit error rate. Therefore, this value should be adjusted based on actual conditions.

The default value is 433 MHz for low-frequency modules and 868 MHz for high-frequency modules.

5.3.1.7 Transmit Power

The maximum transmit power is 22 dBm. The factory default setting is 20 dBm.

5.3.1.8 Air Data Rate

This defines the data rate over the air, with 8 selectable levels (SF5–SF12). Higher levels correspond to higher data rates, but shorter transmission distances under the same conditions. Therefore, this parameter should be adjusted according to the application environment.

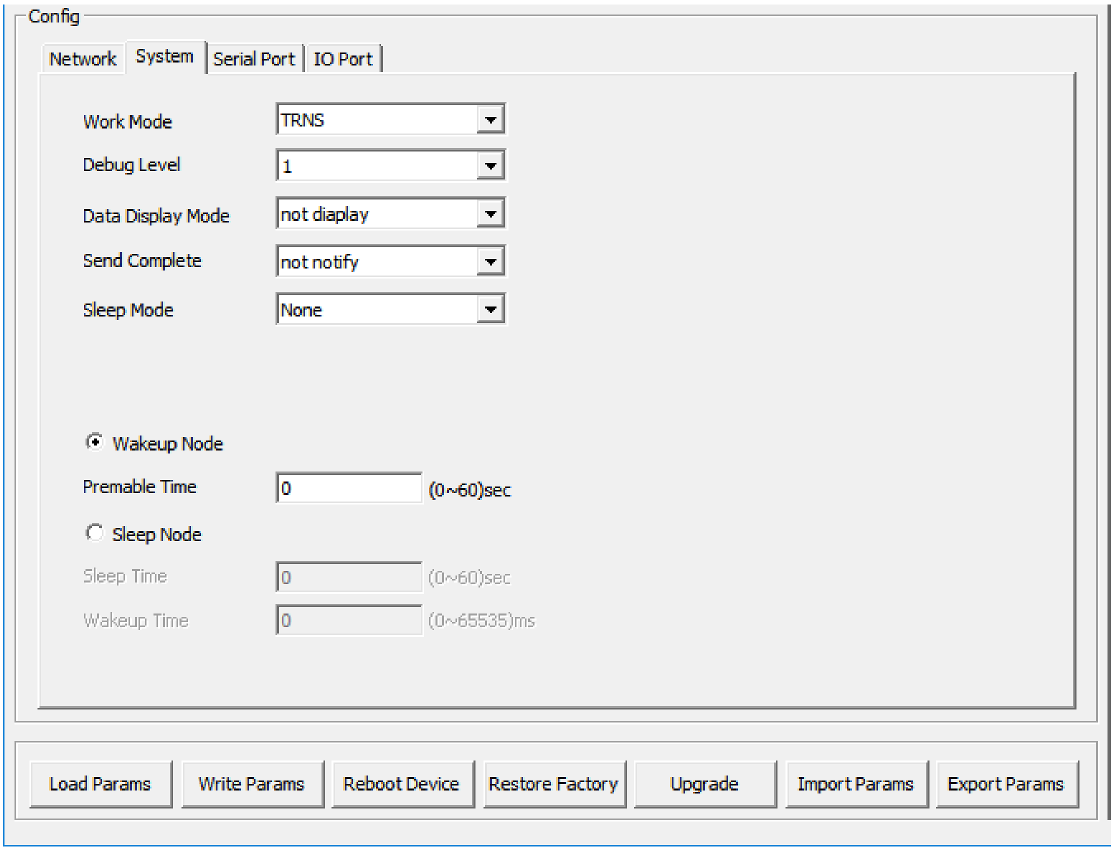
Note: Once the data rate is set, all devices must use the same rate; otherwise, communication will not be possible.

Default value: Level 3. Coding rate: CR 4/5.

Rate Level	Air Data Rate (kbps)	Spreading Factor (SF)	Bandwidth (kHz)
1	0.3	SF12	125
	0.6	SF12	250
	1.2	SF12	500
2	0.6	SF11	125
	1.1	SF11	250
	2.1	SF11	500
3	1.0	SF10	125
	2.0	SF10	250
	3.9	SF10	500
4	1.8	SF9	125
	3.5	SF9	250
	7.0	SF9	500
	3.1	SF8	125

5	6.3	SF8	250
	12.5	SF8	500
6	5.5	SF7	125
	10.9	SF7	250
	21.9	SF7	500
7	9.4	SF6	125
	18.8	SF6	250
	37.5	SF6	500
8	15.6	SF5	125
	31.3	SF5	250
	62.5	SF5	500

5.3.2 System Parameter



Work Mode: TRNS
Debug Level: 1
Data Display Mode: not diaplay
Send Complete: not notify
Sleep Mode: None

● Wakeup Node
Premable Time: 0 (0~60)sec
○ Sleep Node
Sleep Time: 0 (0~60)sec
Wakeup Time: 0 (0~65535)ms

5.3.2.1 Serial Port Operating Mode

The module’s serial port operating modes include “TRNS”, “AT”, “API”, and “MODBUS”. Where:

"TRNS": Transparent transmission mode. In this mode, a transparent destination address must be configured.
"AT": AT command mode. Refer to the AT Command Manual for operation. Typically used for parameter configuration and manual testing.
"API": API operation mode. Refer to the API Command Manual for command formats. The maximum API payload length is 75 bytes.
"MODBUS": MODBUS operation mode. Refer to the MODBUS Command Manual for command formats.
Default value: TRNS

5.3.2.2 Debug Level

The debug level controls the module's log output and includes three levels:
0: No log output
1: Outputs key log information
2: Outputs detailed log information
Default value: 1

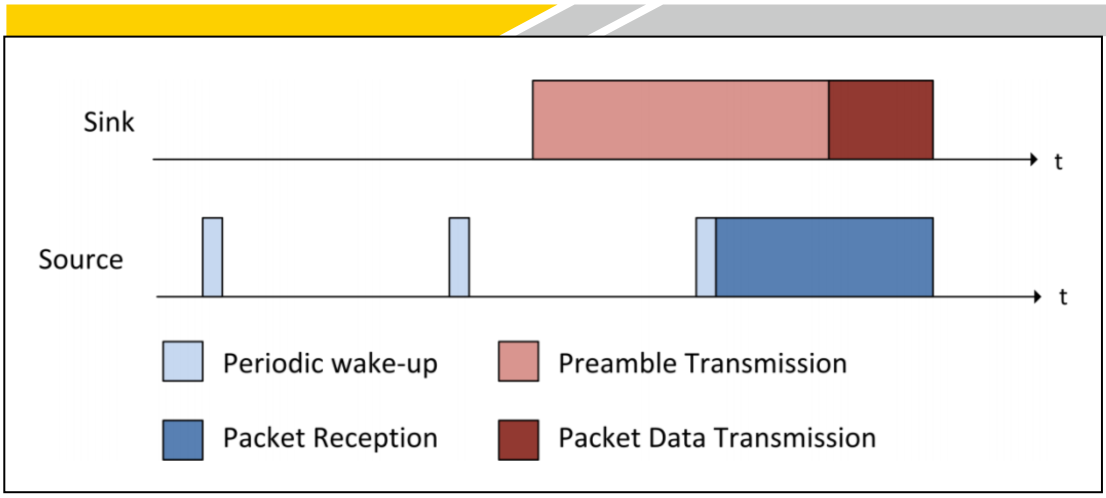
5.3.2.3 Sleep Mode

When the device operates in low-power mode, it can be set to NONE (no sleep), TIME (timed sleep), or DEEP (deep sleep).
In deep sleep mode, the module can only be awakened by resetting via the RST pin or by setting the sleep control pin to a high level.
Default value: NONE

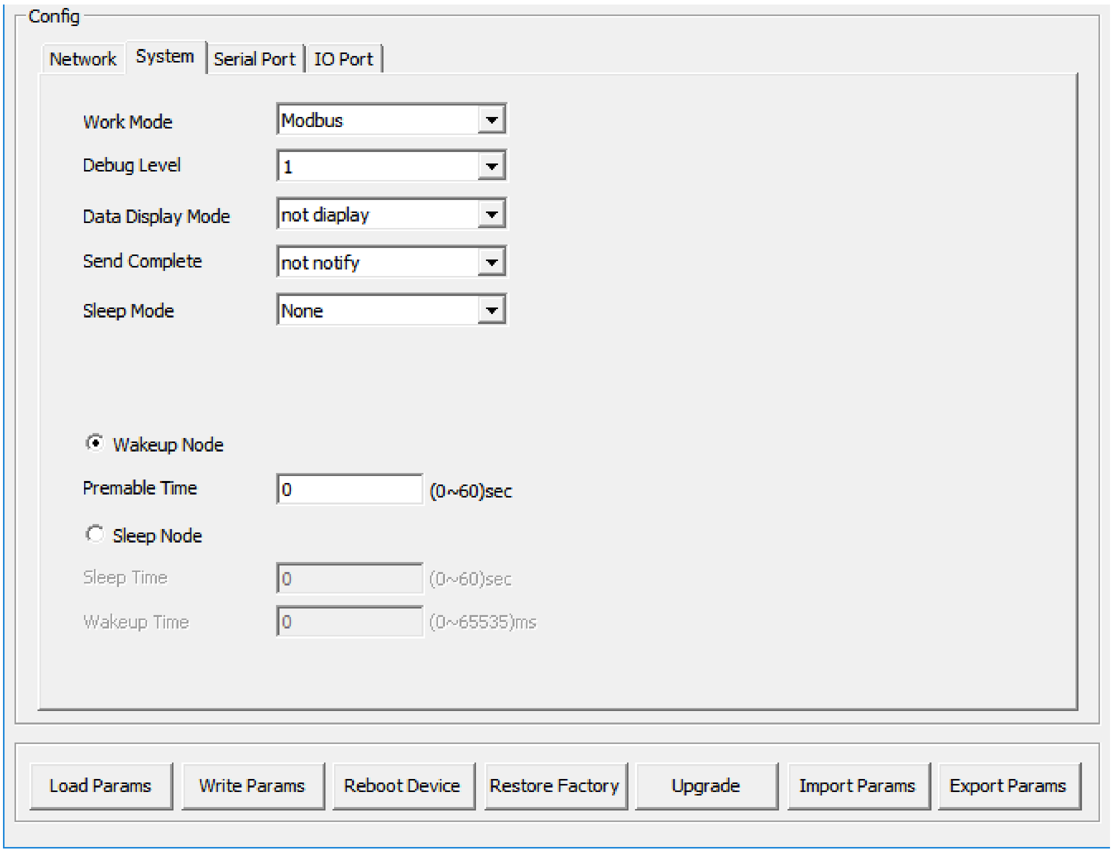
5.3.2.4 Wake-up over the Air

In wireless network applications, there is a low-power operating mode known as wake-up over the air. Even when a node is in sleep mode, it can be remotely awakened via wireless signals to receive data.

The basic principle is that the initiating device adds a long preamble before the valid data. The receiving node periodically wakes up to listen to the network. Once the preamble is detected, it enters the normal receiving process; otherwise, it immediately returns to sleep and waits for the next wake-up cycle.



If wake-up over the air needs to be enabled, configuration should be performed separately for the **wake-up transmitter** and the **sleeping receiver**.



Work Mode: Modbus
Debug Level: 1
Data Display Mode: not diaplay
Send Complete: not notify
Sleep Mode: None

● Wakeup Node
Premable Time: 0 (0~60)sec
○ Sleep Node
Sleep Time: 0 (0~60)sec
Wakeup Time: 0 (0~65535)ms

For the **sleep node using over-the-air (OTA) wake-up**, the parameters **“Wake-up Time”** and **“Sleep Time”** need to be configured:

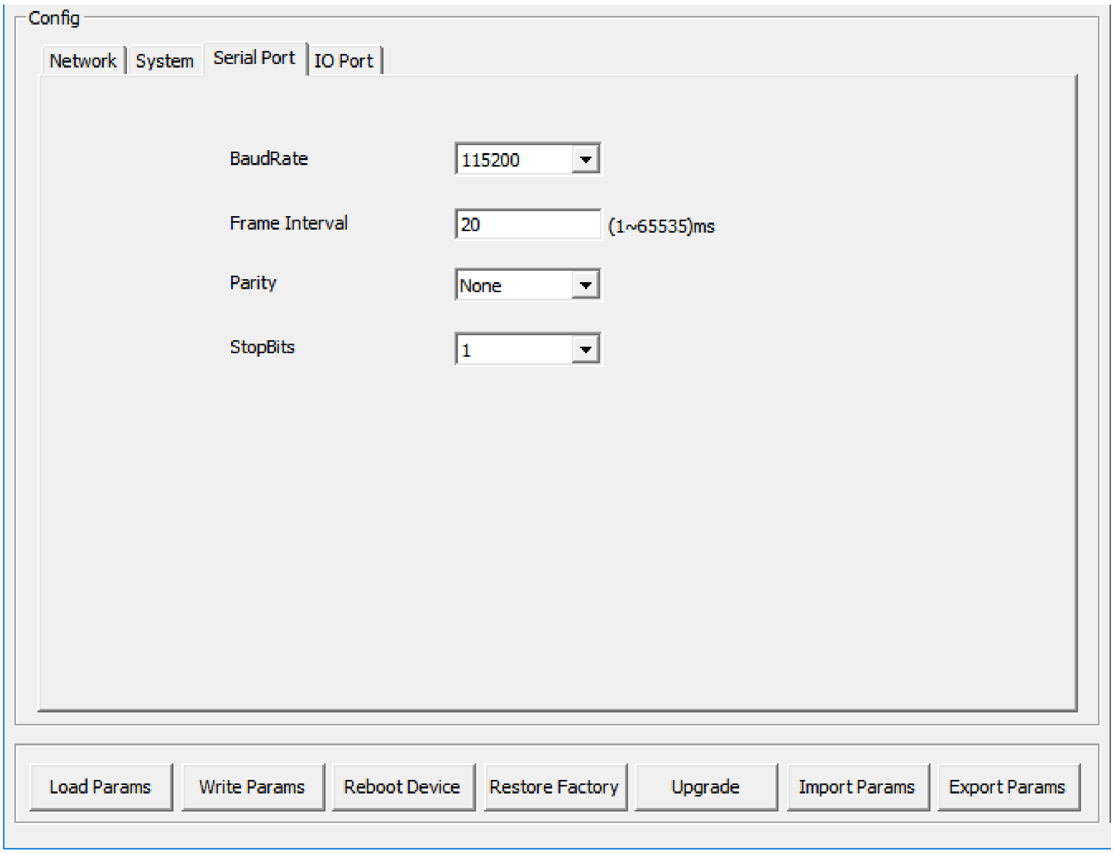
- **Wake-up Time:** The duration (in ms) that the device remains awake after receiving OTA data. After receiving OTA data and completing UART data transmission, the device will stay awake for this period before entering sleep mode.

- **Sleep Time:** The sleep cycle duration (in seconds). Once the device has been in sleep mode for this period, it will wake up to listen for the preamble.

For the **wake-up node (OTA transmitter side)**, the **“Preamble Time”** must be configured. This value must be consistent with the sleep time of the sleep node; otherwise, communication may fail.

5.3.3 Serial Port Parameter

The serial communication parameters can be configured, including baud rate, data bits, parity, and stop bits.
Default values: Baud rate 115200, format 8N1.



BaudRate: 115200
Frame Interval: 20 (1~65535)ms
Parity: None
StopBits: 1

Chapter 6 Reference Circuits

The F8L10C-03 series module is a surface-mount RF module. When designing the circuit board, the module should be treated as a single component unit. Therefore, the following considerations should be taken into account for PCB layout and routing:

PCB Layout

Under the condition of meeting the mechanical structure requirements, the wireless module should be placed away from components that may generate magnetic interference or heat, such as speakers, buzzers, switching power supplies, and inductors. In the module placement area, place as many fast-response capacitors as possible near the power supply interface to prevent transient voltage spikes from damaging the module.

PCB Routing

Data lines should preferably run in parallel on the same layer, with matched lengths as much as possible. Routing within the module area should be avoided, and the integrity of the ground copper plane should be maintained as much as possible.

6.1 Power Supply Reference Circuit

The power supply design of the module is critically important. The F8L10C-03 can be powered by an LDO with low quiescent current and an output current capability greater than 0.5 A. During data transmission, the power supply must remain within the normal operating range; otherwise, the module may malfunction or even suffer permanent damage. Ensure power stability and avoid significant voltage fluctuations.

To prevent excessive voltage drop on VBAT, it is recommended to place, near the VBAT input pin of the module, a parallel combination of a low-ESR capacitor (ESR ≈ 0.7 Ω) with a capacitance of at least 100 µF, along with 100 nF, 33 pF (0603 package), and 10 pF (0603 package) filtering capacitors. A reference circuit for the VBAT input is shown in the figure below.

Additionally, the PCB trace for VBAT should be as short and as wide as possible to minimize equivalent impedance, ensuring that no significant voltage drop occurs under high current at maximum transmit power. It is recommended that the VBAT trace width be no less than 2 mm, and the longer the trace, the wider it should be.

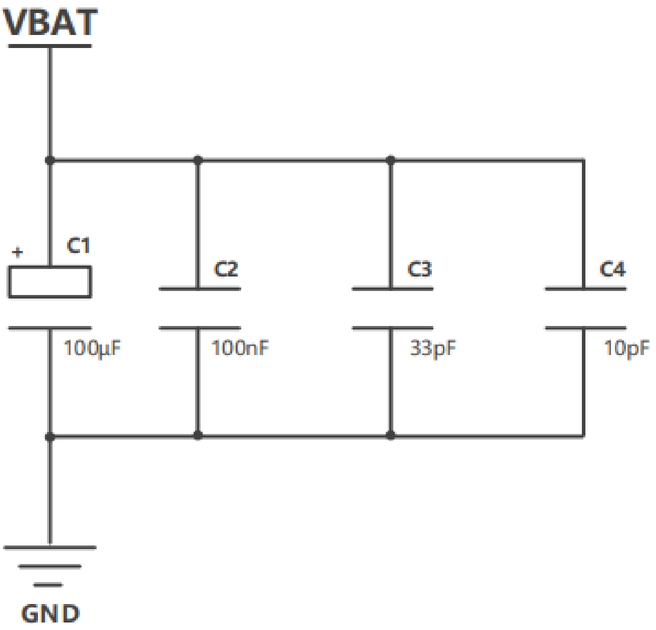


Figure 6-1 VBAT Input Reference Circuit of F8L10C-03

6.2 Serial Communication Reference Circuit

The following describes two types of host systems:

1.PC as Host:

The F8L10C-03 connects to a PC via an RS232 serial port, requiring an RS232 transceiver (e.g., SP3243), as shown in Figure 6-2.

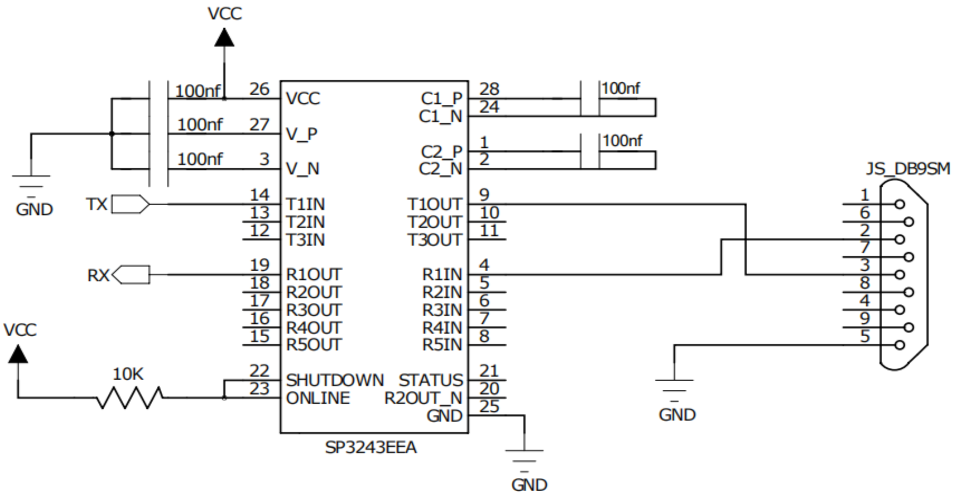


Figure 6-2 Reference Circuit for F8L10C-03 to PC RS232 Connection

2. Industrial PC as Host:

The F8L10C-03 connects to an industrial PC via an RS485 bus, requiring an RS485 transceiver (e.g., SP3485), as shown in Figure 6-3.

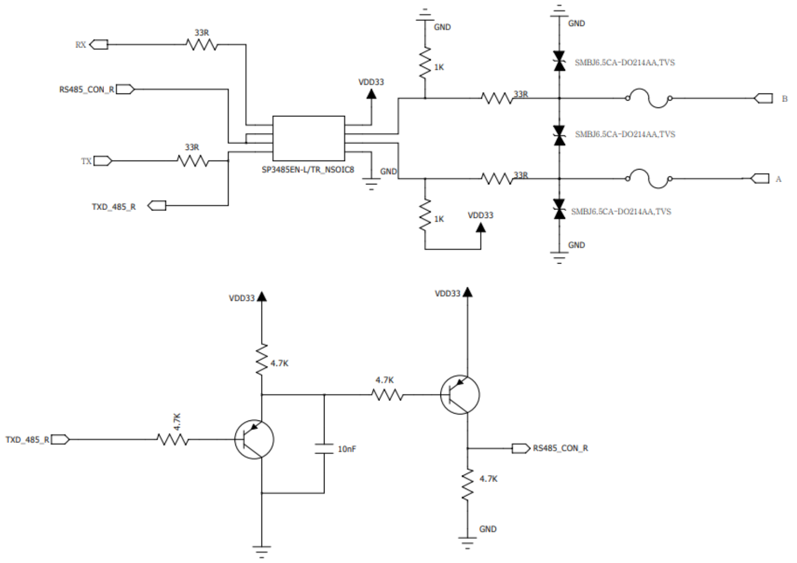


Figure 6-3 Reference Circuit for F8L10C-03 to Industrial PC RS485 Connection

MCU as Host:

If the MCU power supply differs from that of the module, a level-shifting circuit is required. As shown in Figures 6-4 and 6-5, a transistor can be used for level conversion. The resistors shown are for reference only and should be recalculated during design. The diode in the diagram is a Schottky diode (forward voltage drop of 0.3V). If another diode is used, select one with a low forward voltage drop to ensure that the RXD_module input remains below the low-level threshold when receiving a low signal.

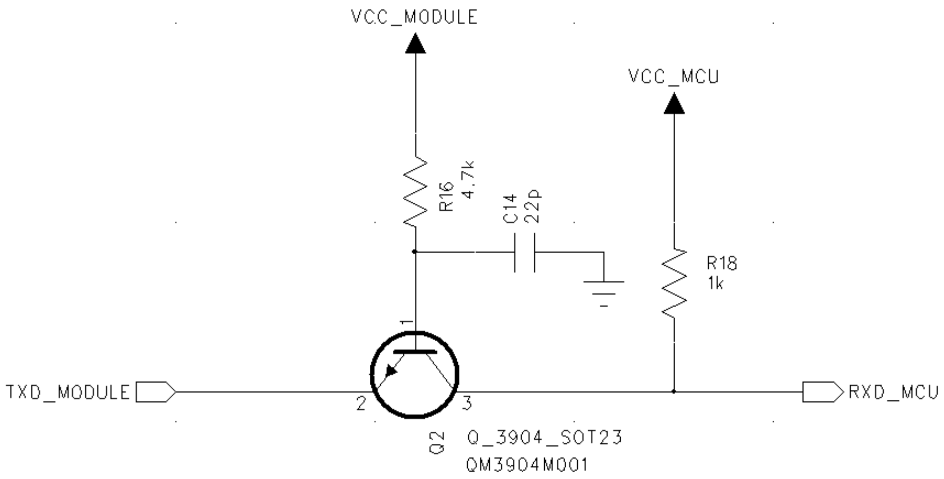


Figure 6-4 UART Interface RX Level-Shifting Reference Design

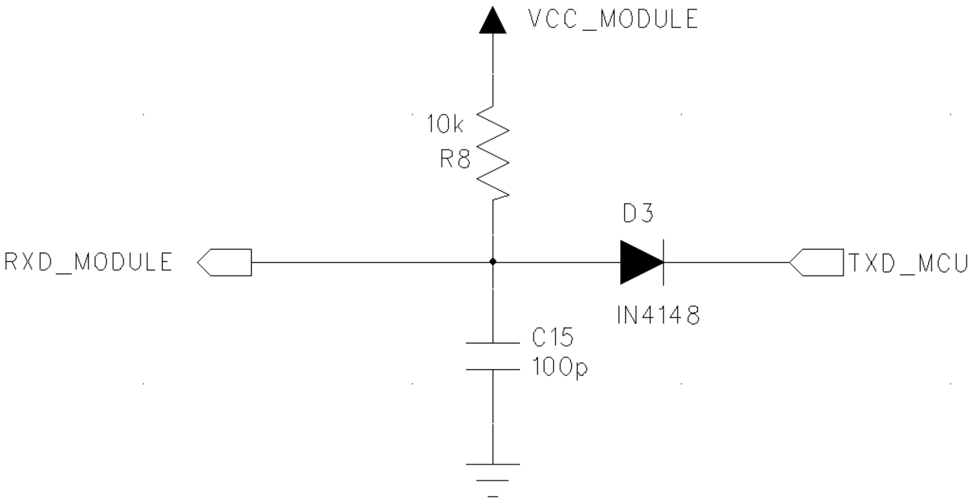


Figure 6-5 UART Interface RX Level-Shifting Reference Design

As shown in Figure 6-6, a dedicated level-shifting IC can also be used for voltage conversion. Various options are available, and users can select according to their needs.

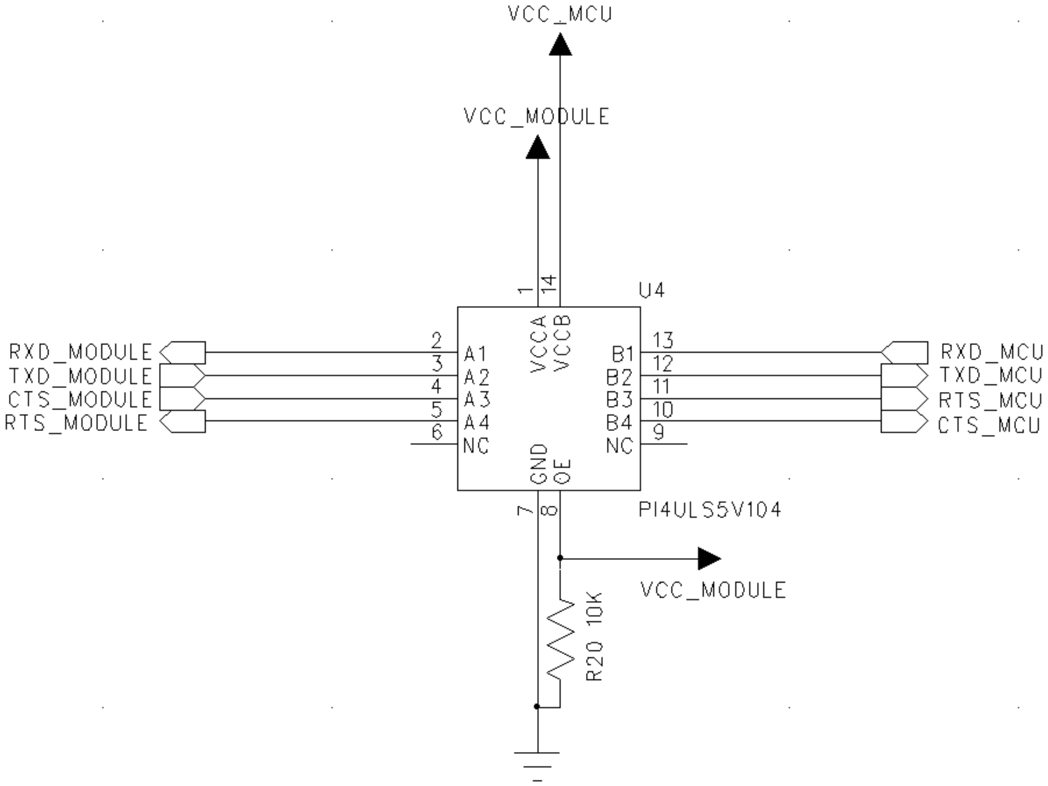


Figure 6-6 UART Interface Level-Shifting IC Reference Design

6.3 I/O Input and Output Control Design

The module’s I/O pins can be used to control LED indicators. Since the output current of standard I/O pins is relatively low, it is recommended to use a transistor for control, as shown below:

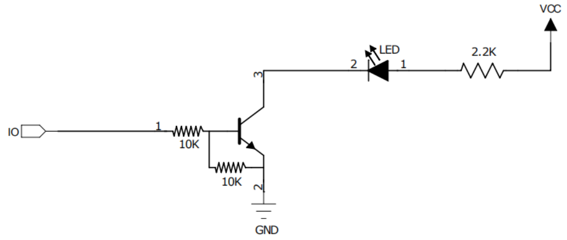


Figure 6-7 LED Control Circuit

6.4 I/O Port Protection Circuit

The module’s I/O pins have default ESD protection levels of HBM ±2000V and CDM ±800V. If higher ESD protection is required, users can add external protection circuits to improve immunity, as shown below:

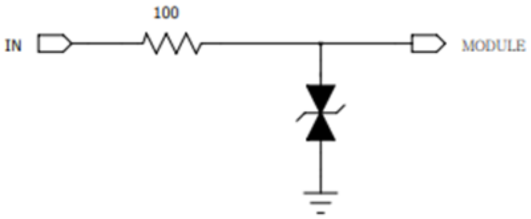


Figure 6-10 I/O Port Protection Circuit

6.5 Reset Circuit

The F8L10C-03 starts automatically upon power-up and does not have dedicated power-on or power-off pins. However, it provides a hardware reset pin (digital input, active low). The reset pulse width must be greater than 200 ms, and the valid low-level voltage must not exceed 0.4V. Due to complex operating environments and long working durations, issues such as system hangs or false connections may occur. Proper recovery mechanisms should be considered in the application design:

1.Manual Reset:

Use a push button to pull the reset pin to ground when pressed and disconnect it when released.

2.MCU-Controlled Reset:

Use an MCU to control a transistor to pull the RESET pin low for hardware reset, as shown below:

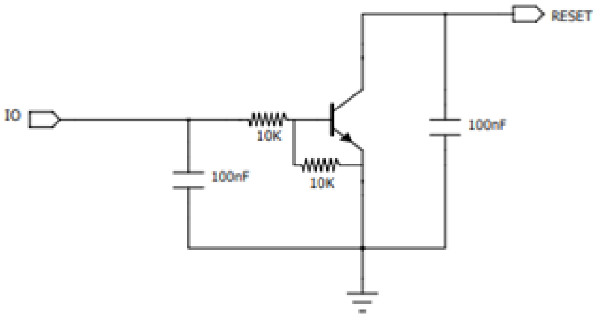


Figure 6-11 MCU-Controlled Transistor Reset Reference Circuit