F8L10ST LoRaWAN User Manual	Document version	
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F8L10ST LoRaWAN Terminal User Manual

Model	Product category
F8L10ST-A-L	Disposable lithium battery，frequency：410-510 MHz
F8L10ST-A-H	Disposable lithium battery，frequency：863-928 MHz
F8L10ST-B-L	Rechargeable lithium battery，frequency：410-510 MHz
F8L10ST-B-H	Rechargeable lithium battery，频段：863-928 MHz

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Note: There may be differences between different types of accessories and interfaces, whichever is the actual product

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Chapter 1 Brief Introduction of Product

The F8L10ST is a wireless data transmission terminal based on LoRa spread spectrum technology, which satisfies the various sensor data transmission terminals conforming to the interface.

The product adopts high-performance industrial-grade LoRa solution, with embedded real-time operating system as software support platform, providing rich interfaces such as RS232 and RS485 (or RS422) interfaces, which can be directly connected to serial devices to realize transparent data transmission. I / O, 2 ADC and other functions, while providing 12V power output to meet sensor power supply; equipment low power design, support for lithium battery power, solar power, DC24V power supply.

The product has been widely used in the M2M industry in the IoT industry chain, such as smart buildings, smart cities, smart fire, smart power, smart agricultural irrigation, soil moisture, landscaping, smart forestry, aquaculture and indoor and outdoor environmental monitoring. Sensor field。

1.1working principle

The block diagram of F8L10ST is as follows：

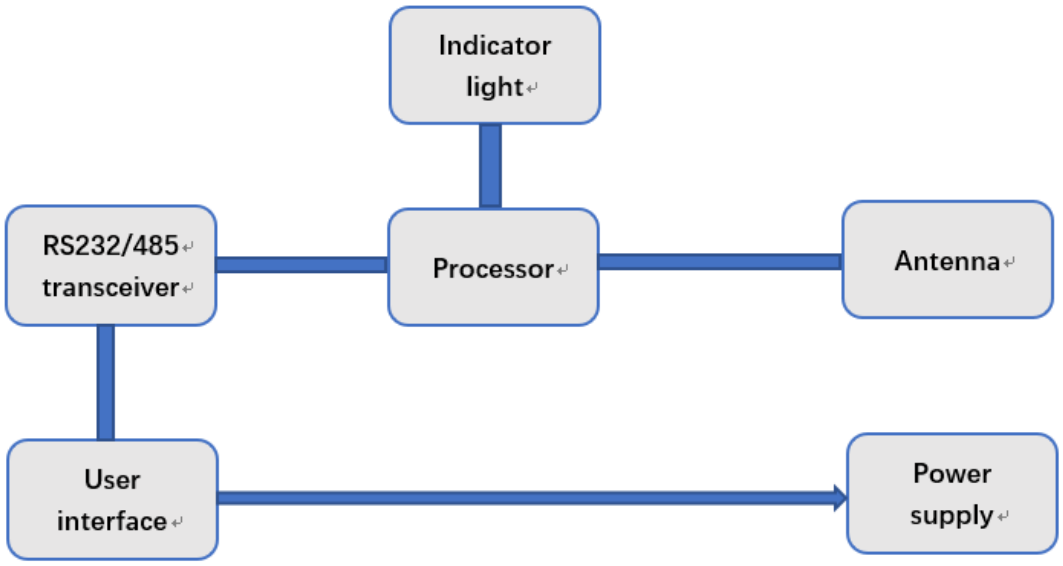

Figure 1-1 F8L10ST structure diagram

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1.2 Indication introduction

LoRa terminal provides an indicator light indicating the status is as follows:

Indicator light	Status	Explanation
D9	OFF	Power off、sleep
	ON	Normal operation
	Blink	Join network

1.3 Button introduction

LoRa Terminal provides 2 buttons：

Button	explanation
ON/OFF	Power ON/OFF
RST	Reset to factory

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Chapter2 Feature introduction

2.1 Configure Connection

Before configuring the LoRa terminal, you need to connect the LoRa terminal to the PC for configuration through the RS232 serial cable or RS232-485 conversion cable, as shown below:：

Figure 2-1 Configure connection between F8L10ST and PC

2.2 Parameters introduction

There are two ways to configure parameters of F8L10ST:

- Through special configuration software: all configurations are configured through the corresponding entries in the software interface. This configuration is suitable for users who are comfortable to configure with a PC.
- Configure by extending AT command: In this configuration mode, users only need to have serial communication program to configure all parameters of F8L10ST, such as HyperTerminal under WINDOWS, minicom under LINUX , putty, etc. ,or directly configure Lora terminal by the user's microcontroller system. The F8L10ST needs to enter the configuration mode before configuring the F8L10ST with the extended AT command.

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Configure F8L10ST by configuration software，as shown in Figure 2-2:

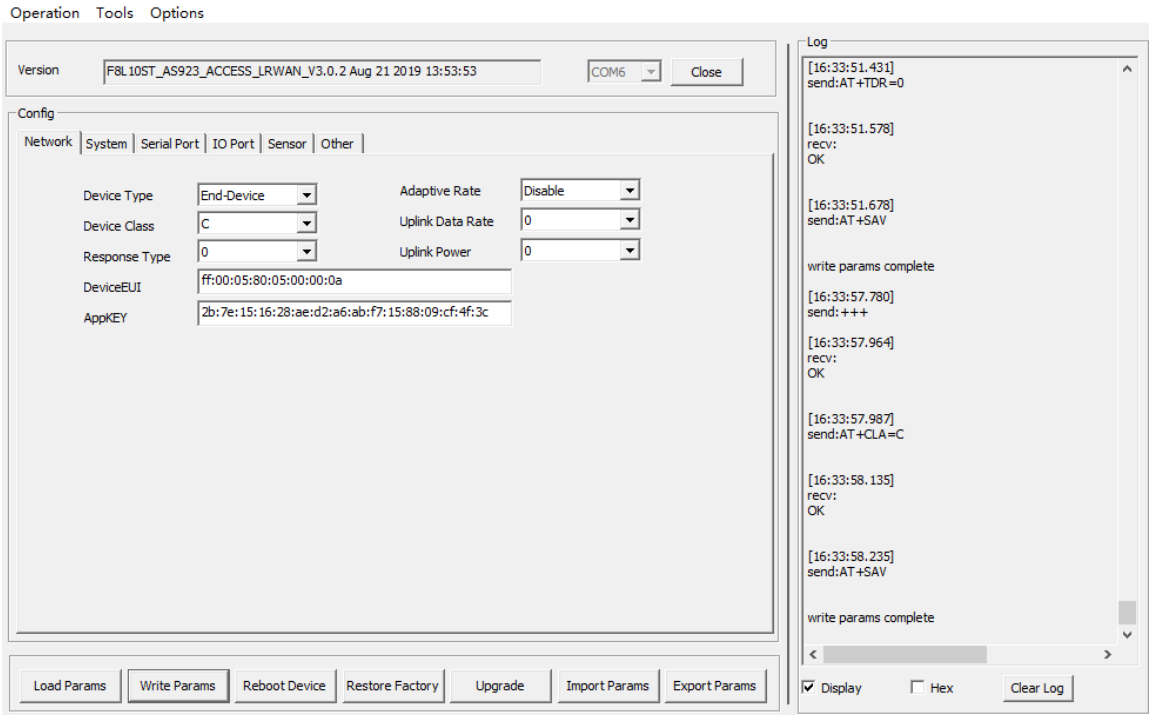

Figure 2-2 Configuration interface

Default baudrate is 115200，If the actual serial port parameters of the F8L10ST are not consistent, please close the serial port, select the "Options" in the upper left corner of the configuration tool to configure the serial port, and then open the serial port after the configuration; if the right button in the serial parameter setting column is displayed as "Close the serial port" , indicating that the serial port is already open, otherwise pls open the serial port.

Main interface including Network Parameters、System Parameters、Serial Parameter, IO Parameters、Sensor、and other attribute configuration，Logs，F8L10ST Configuration area. Logs show the device log information of the current configuration process.

The operation parts are mainly "Load Parameters", "Write Parameters", "Restart Device", "Restore Factory Settings", "Upgrade", "Import Parameters" and "Export Parameters".

After the serial port is opened, the F8L10ST is selected to load the parameters. The current configuration parameters are automatically loaded into the device. The parameters are displayed in the parameter area on the left. You can start to configure all the configuration parameters in the F8L10ST, as shown in Figure 2-2.

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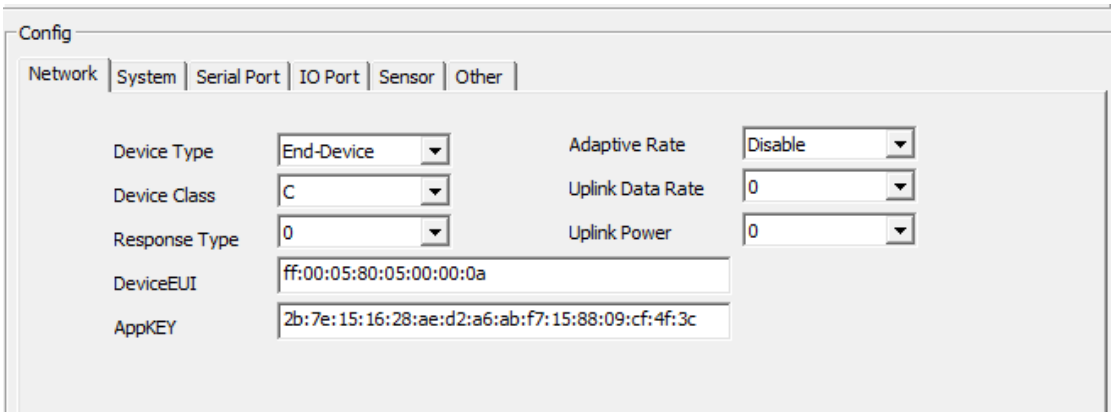
2.3 Function details

2.3.1 Network parameters :

Mainly including LoraWan key(DeviceEUI、AppKEY and AppEUI), network type, and RF parameters of the LoRaWAN terminal. After filling in the relevant content, click “Write Parameter” and “Restart Device”. Some commands need to be restarted to take effect. For details, please refer to the F8L10 LoRaWAN AT Command Manual. V1.1.9" and above, the content is as follows:

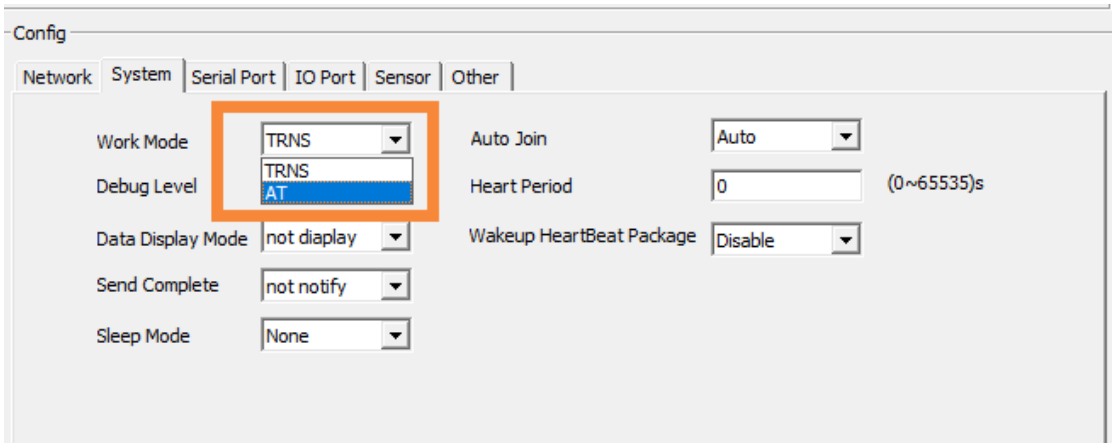


- Device type: It is divided into terminal, repeater, and blind zone terminal. The default configuration is terminal. For details on the usage of repeater and blind zone terminal, see 2.3 Relay Function.
- Device class type: Class A and Class C are now supported.
- Message response type: Whether the server responds after the data is sent.
- Device EUI, AppKey, and AppEUI: The related parameters of the network can be obtained from Four-Faith technical engineer.
- Rate adaptation: The ADR speed adjustment mechanism of LoRaWAN is applicable to non-mobile terminals (modules); the server will send command to adjust terminal (module) rate according to the signal-to-noise ratio of the uplink data of the terminal, so that the terminal rate and transmission power can be adjusted to optimal state; however, it should be noted that this mechanism may cause the packet loss since the server will adjust the rate and the transmit power，pls use with caution.
- Uplink data rate: The parameter is the rate class. You can refer to the official LoRaWAN Regional Parameter Manual V1.0.3 to obtain the spreading factor (SF) and bandwidth (BW) of the corresponding rate class.
- Uplink transmit power: The parameter is the transmit power level. You can refer to the official LoRaWAN Regional Parameter Manual V1.0.3 to obtain the transmit power value (dBm) of the corresponding transmit power class.

2.3.2 System parameters

Mainly set the application parameters of the LoRaWAN terminal: working mode, sleep mode, heartbeat package, etc. After filling in the relevant content, click "write parameters",

"restart device", some commands need to be restarted to take effect. For details, please refer to the F8L10 LoRaWAN AT Command Manual. V1.1.9 and above documents. If you need to use the AT command for a long time, you can set the terminal to AT mode. The content is as follows:



- Work mode：there are transparent mode and AT mode. Transparent mode ：After the network is added, the data can be directly sent through the serial port and forward to the server; if it is not added, it will refuse to send; AT mode: can configure and operate device via AT command, For details, please refer to "F8L10 LoRaWAN". AT Command Manual V1.1.9 or above.
- Debug Level：Default 0，In case of problems such as fail to add network, you can improve debug level to print logs to troubleshoot .。
- Signal strength display: default is not displayed. display can see the signal strength and signal-to-noise ratio of the received signal.
- Heartbeat packet period: The default is 0s，the heartbeat packet is not sent. The heartbeat packet mainly reports the battery capacity and RSSI value.
- Wake up the heartbeat packet: Set whether to send the heartbeat packet after each wakeup.。

2.3.3 Serial port

Data interval is 20ms，which is not open to modification.

- Serial port1：to configure RS232 parameters of termina.

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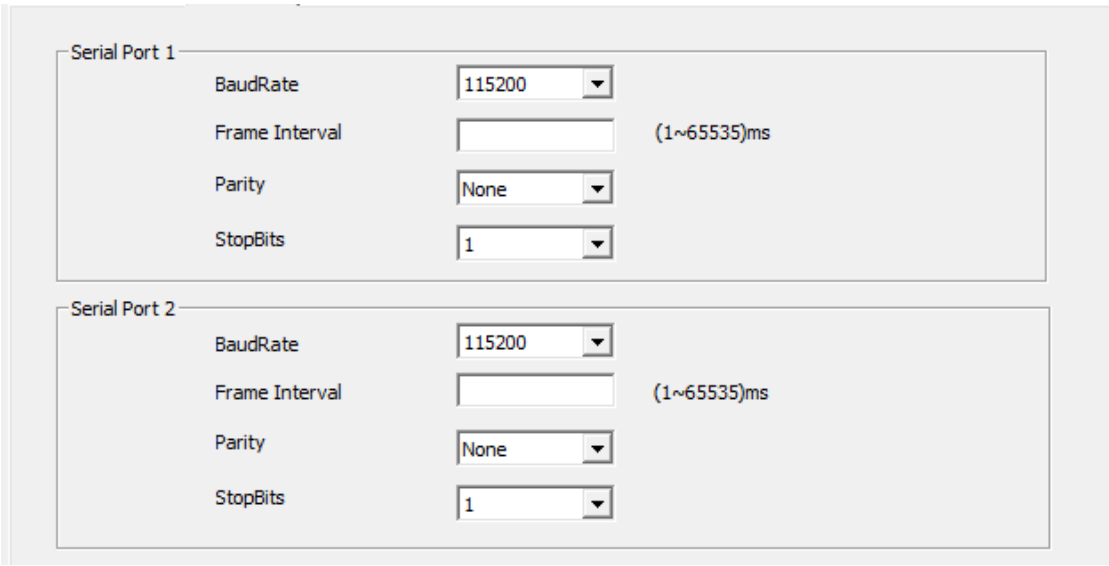
- Serial port2：to configure RS485 parameters of terminal，can be used to connect sensor device；Serial port 2 baudrate can be configured according to the actual baudrate of the sensor。



Default: baudrate 115200，attribute 8N1。

2.3.4 Digital input(D1、D2)

- IO mode：D1、D2 can set in not used、input、output（high or low level）。
- Reporting method：when set timing report，will report data with this interval，set period to 0 default not report.you can also set report when IO port level change
- Data format：Text and HEX
- Report interval：D1、D2 data reporting period.
- High level report：when D1、D2 high level to report.
- Low level report：when D1、D2 low level to report.

（Note：data content is up to 20 bytes when D1、D2 high or low report.）

As the following figure shows. the data is reported once every 60 seconds. If D1 is high, it will report 56789. If D1 is low, it will report 01234. When D2 level changes, when D2 is high level, it will report 0x00 0x00 0x00. when D2 is low level, it will report 0x11 0x11 0x11。

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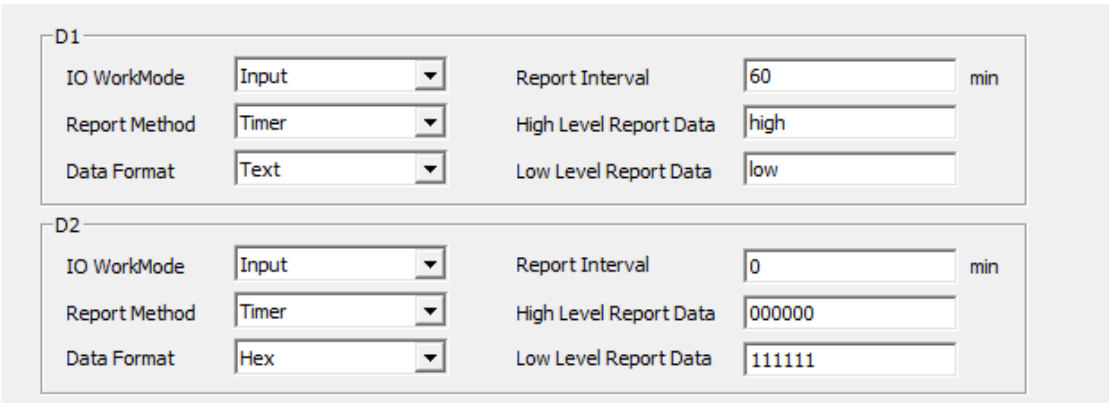
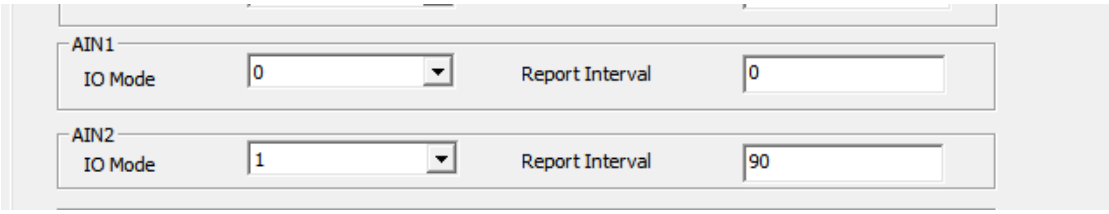


2.3.5 Analog input(AI、A2)

A1、A2（pin 10、11）can be configured as analog input（A1 voltage input0-5V，A2 current input 0-20mA）

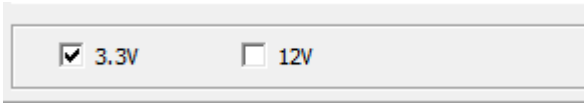
- IO mode ： can set to 0（not used ）or set 1（ADC mode）。
- Report interval：report data with this interval，set period to 0 default not report。

As following figure A1 and A2 configured,the ADC value is collected and reported every A2 every 90 seconds,The A1 port is not used.



2.3.6 Voltage output（3.3V、12V）

- V33(pin12)：when checked, will output voltage 3.3V
- V12(pin14)：when checked, will output voltage 12V



2.3.7 Sensor parameters

This configuration item is used by the user to configure the serial port command sent to the sensor. It can be configured with 10 lines. Each command can be configured with a maximum of 20 bytes. The data format is hexadecimal.

When the user configures the item, the serial port periodically polls and sends the configured sensor command in the cycle of the acquisition cycle. If the item is not configured, that is, all 10 items are empty, the module uses the acquisition cycle as the cycle, and the serial port periodically sends the default command.

As follows: Configure the first sensor command as: 0x11 0x11 0x11 0x11 0x11 0x11

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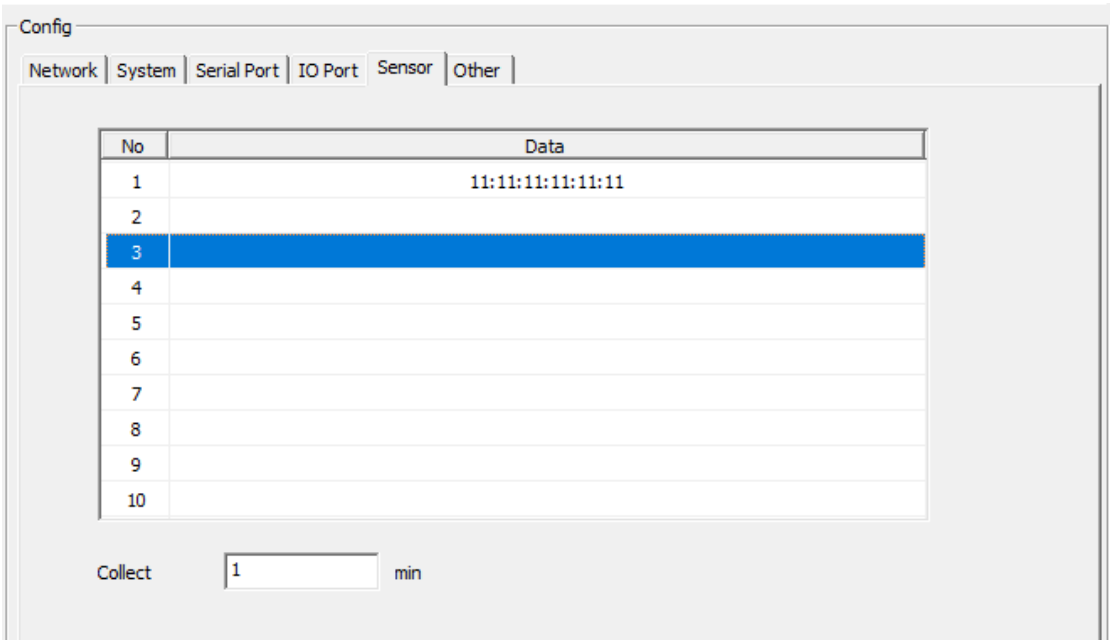

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