F8L10D-N LoRa Module User Manual

Xiamen Four-Faith Communication Technology Co., Ltd.

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen,Fujian,China.

Files Revised Record

Date	Version	Remark	Author
2016-09-02	V1.0.0	Initial version	ZXZ
2016-11-15	V1.1.0	Modify parameter	XQQ
2016-12-13	V1.1.1	Modify Range parameter	XQQ
2016-12-22	V1.1.2	Modify the package size	XQQ
2017-02-17	V1.2.0	According to the product line adjustment, modify the radio frequency band description. Modify some details of configuration parameters.	LYS
2017-04-19	V1.2.1	Modify the package size parameter and pin definition adjustment	XQQ
2017-10-10	V2.0.0	Change of company address	LXP
2018-06-20	V2.0.1	Modify the Antenna connector part number Remove the D12 SLEEP_RQ definition	SLY
2018-08-06	V2.0.2	Modify the UART parameters Modify the Absolute Maximum Ratings	ZCL
2018-10-11	V2.0.3	Add 1-3 system block diagram	JWZ

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.

Copyright Notice

Trademark Notice

Four-Faith、四信、 

、 

、  are all registered trademarks of Xiamen Four-Faith Communication Technology Co., Ltd., illegal use of the name of Four-Faith, trademarks and other marks of Four-Faith is forbidden, unless written permission is authorized in advance.

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.

Contents

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.

Chapter 1 Brief Introduction of Product

1.1 General

F8L10D-N LoRa module is a kind of embedded device that provides data transfer function by LoRa network. It provides ultra-long range spread spectrum communication.

The product uses high-performance industrial-grade LoRa solution, support transparent data transmission function; low power consumption design, the lowest working current can less than 2uA; supply multil I/O channels, compatible analog in puts and pulse input counters.

It has been widely used on M2M fields, such as electric power, intelligent trafic, wireless metering, industrial automation, telemetry, water supply, environment protection, weather, and so on.

1.2 Features and Benefits

Design for Industrial Application

- High-powered industrial LoRa chip and MCU
- Power input: DC 3.3 ~ 5.0V
- Support a variety of frequency bands around the world
- Low power design, support sleep and wake-up mode
- High receiving sensitivity, communication distance farther

Stability and Reliability

- Built-in watchdog, to ensure long-term stable operation of the system
- Built-in LDO, ensure stable power supply module
- Multi-data automatic packet transmission to ensure the integrity of the data packet is not lost
- Efficient cyclic interleaving error correction coding, maximum error correction 64bit, dual 256-ring FIFO

Standard and Convenience

- Adopt a miniature package, support 2.54mm*7pin spacing stamp hole for SMT and 2*2.0mm*10pin spacing stamp hole for SMT
- Support a variety of antenna connection, U.FL interface / SMA interface Convenient configuration and maintenance interface
- Intelligent data module, power can enter the data transmission status
- Easy to use, flexible, a variety of operating mode selection
- Convenient system configuration and maintenance interface
- Output standard 3.3V TTL level
- Support serial software upgrade

High-performance

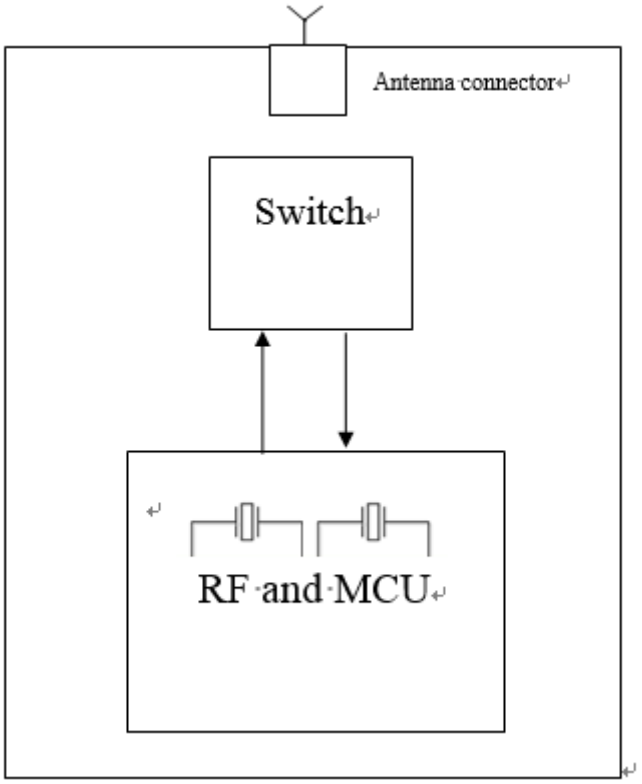
Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.

- Support OTA
- Support for wake-up function in the air
- Support a variety of baud rate, a variety of RF rates
- Flexible power level setting

Application

- Power line on-line monitoring
- Smart parking
- Soil temperature and humidity monitoring
- Intelligent irrigation
- Wireless remote meter reading
- PV array monitoring

1.3 Working Principle



Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.

1.4 Specifications

LoRa Specification

Item	Content
Communication Protocol and Band	863MHz to 870MHz(EU) 902MHz to 928MHz(FCC)
Operating Frequency(EU):	864MHz, 867MHz, 869MHz
Indoor/Urban Range	1km
Outdoor/RF Line-of-Sight Range	3.5km
Transmit Power	864MHz: Maximum EIRP 13.616 dBm 867MHz: Maximum EIRP 13.304 dBm 869MHz: Maximum EIRP 13.492 dBm
Receiver Sensitivity	-140dBm
RF Data Rate	6 level, 0.3、0.6、1.0、1.8、3.1、5.5Kbps
Max Serial Buffer Size	4K Bytes
receiver category	2
NOTE: The blocking levels at the specified frequency offsets shall be greater than the receiver category 2 limits	

Interface Type

Item	Content
UART	Data bits: 8 Stop bits: 1, 2 Checksum: none,odd,even Baud rate: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400,57600, 115200 bps
Antenna connector	• The Antenna connector of F8L10D-N-NS-U：IPEX(U.FL), the characteristic impedance of 50 ohms • The Antenna connector of F8L10D-N-NS-S：SMA, the characteristic impedance of 50 ohms
Install Antenna Type	Stick antenna
Install Antenna Gain	2dBi
Package	Support double row 2 * 2.0mm * 10 pin / single row 2.54mm * 7 pin / SMT half hole
Note: When used an antenna provided by a third party, please use the manufacturer's recommended antenna, and the antenna shall be CE or FCC approval type.	

Power supply

Item	Content
Recommended Power	DC 3.3V/0.5A
Power Range	DC 3.3~5V

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.

Physical Characteristics

Module	Item	Content
F8L10D-N Lora Module	Dimensions	24.4x37.5x4.2 mm（Without antenna and connector）
	Weight	5.0g

Environmental Limits

Item	Content
Operating Temperature	-40~+85ºC(-40~+185℉)
Storage Temperature	-40~+125ºC (-40~+257℉)
Operating Humidity	95%(unfreezing)

RF Exposure Information

RF Exposure	The Maximum Permissible Exposure (MPE) level has been calculated based on a distance of d=20cm between the device and the human body. To maintain compliance with RF exposure requirement, use product that maintain a 20cm distance between the device and human body.

Manufacturer Information

Manufacturer	Xiamen Four-Faith Communication Technology Co., Ltd.
Address	11th Floor,A06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China

EU Regulatory Conformance

Hereby, Xiamen Four-Faith Communication Technology Co., Ltd. Corporation declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.

For the declaration of conformity, visit the Web site www.four-faith.com/certification.

CE

Scope of application

This product can be used across EU member states

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.

Federal Communication Commission Interference Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference.
(2) This device must accept any interference received, including interference that may cause undesired operation.

CAUTION: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.
This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

RF Warning Statement

To comply with FCC RF exposure compliance requirements, the antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.
This device is intended only for OEM integrators under the following conditions:
1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
2) The transmitter module may not be co-located with any other transmitter or antenna. As long as two conditions above are met, further transmitter test will not be required.

However, the OEM integrator is still responsible for testing their end-product for any

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.

additional compliance requirements required with this module installed. To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. For example, if a host was previously authorized as an unintentional radiator under the Declaration of Conformity procedure without a transmitter certified module and a module is added, the host manufacturer is responsible for ensuring that the after the module is installed and operational the host continues to be compliant with the Part 15B unintentional radiator requirements.

The module is limited to OEM installation ONLY. The module is limited to installation in mobile or fixed application. We hereby acknowledge our responsibility to provide guidance to the host manufacturer in the event that they require assistance for ensuring compliance with the Part 15 Subpart B requirements.

IMPORTANT NOTE:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for reevaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: “Contains FCC ID: 2ALUW-F8L10D-N”. The grantee's FCC ID can be used only when all FCC compliance requirements are met.

The following FCC part 15.19 statement has to also be available on the label:
This device complies with Part 15 of FCC rules. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference and
(2) this device must accept any interference received, including interference that may cause undesired operation.

Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user’s manual of the end product which integrates this module.

In the user manual of the end product, the end user has to be informed that the

equipment complies with FCC radio-frequency exposure guidelines set forth for an uncontrolled environment.

The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

The end user manual shall include all required regulatory information/warning as show in this manual.

The maximum operating ambient temperature of the equipment declared by the manufacturer is: -40~+85°C

Installation Guideline

Antenna information
Install antenna: Stick antenna and antenna gain is 2dBi

Note: SMA connector is not a special connector. OEM integrator needs to be reminded that the end product still needs to meet the requirements of 15.203 in the future

Chapter 2 Module Interface

2.1 Module Signal Definition

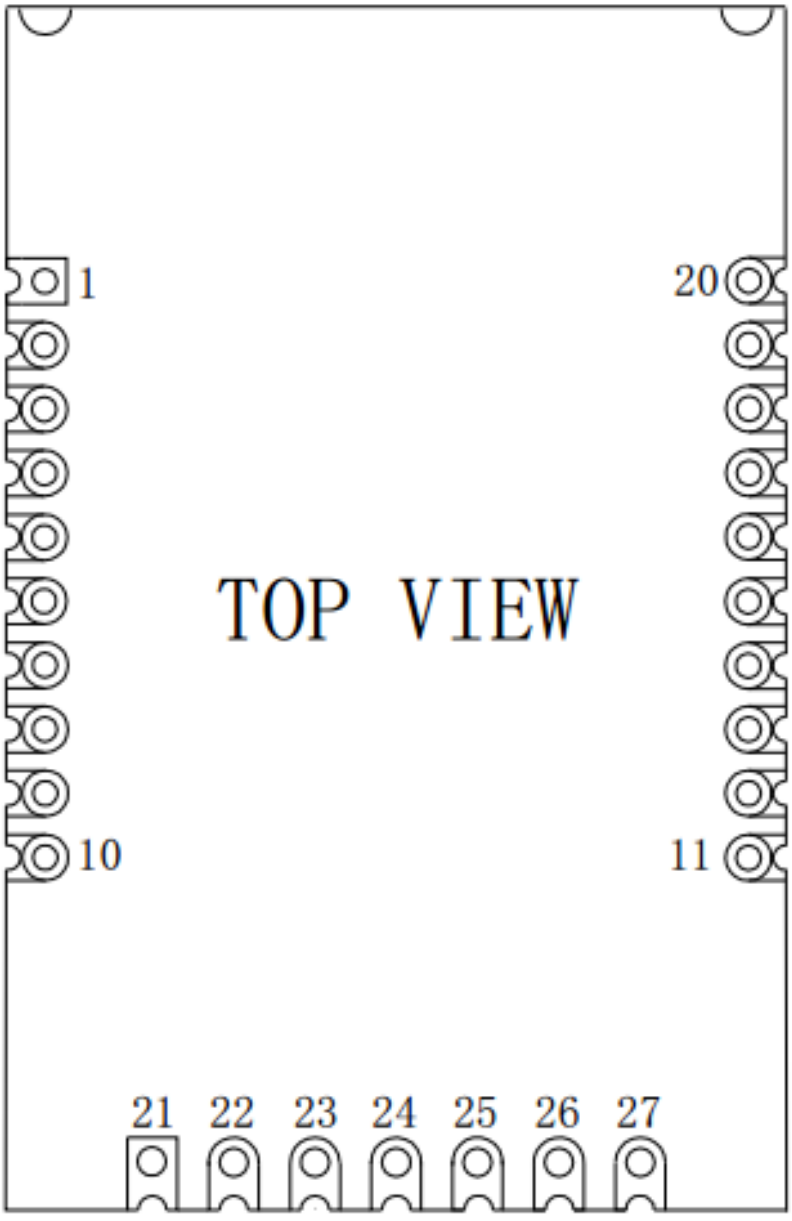


Figure 2-1 Module Pin Diagram F8L10D-N \ F8L10D-E

Table 2-1-1 Module signal definition 1--SMT

Pin Number	Definition	Input /Output	Description

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.
http://en.four-faith.com Tel： +86 592-5907276 Fax：+86 592-5912735

1	VCC	N/A	Power Supply
2	TX	Output	UART Data Out
3	RX	Input	UART Data In
4	D6	Either	GPIO
5	RST	Input	Module Reset
6	D7	Either	GPIO
7	D8	Either	GPIO
8	D9	Either	GPIO
9	D1/SLEEP_RQ	Either	GPIO/SLEEP_CONTROL
10	GND	N/A	Ground
11	D3	Either	GPIO/ADC
12	D12	Either	GPIO
13	STATUS	Either	SLEEP/ON
14	D10	Either	GPIO
15	D2	Either	GPIO
16	D11	Either	GPIO
17	JIMS_SWDIO	Either	Debug Data
18	JTCK_SWCLK	Input	Debug Clock
19	D4	Either	GPIO/ADC
20	D5	Either	GPIO/ADC
21	STATUS	Either	SLEEP/ON
22	D12	Either	GPIO
23	RX	Input	UART Data In
24	TX	Output	UART Data Out
25	RST	Input	Module Reset
26	VCC	N/A	Power Supply
27	GND	N/A	Ground

Note: The signal Input/Output relative to the module.

2.2 UART

The serial communication port 1 is UART.The signal define as **Table 2-2**:

Table 2-2 UART Signal Assignments

UART Signal Name	Pin Number	
TX	2(DIP)	24(SMT)
RX	3(DIP)	23(SMT)

Please reference the chapter 3 for the UART operation details.

2.3 GPIO Specification

The DC characteristics of F8L10D GPIO as the Table 2-3

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.
http://en.four-faith.com Tel： +86 592-5907276 Fax：+86 592-5912735

Table 2-3 GPIO DC Characteristics (Ta=25°C,VCC=3V)

Parameters	Test Conditions	Min	Type	Max
Logic 0 input voltage (V)				0.5
Logic 1 input voltage (V)		2.5		
Logic 0 input current (nA)	Input equals 0V	-50		50
Logic 1 input current (nA)	Input equals VCC	-50		50
I/O-pin pullup and pulldown resistors(kΩ)		30	45	60
GPIO capacity（pF）			5	

2.4 Antenna Interface

F8910D support the way of antenna interfaces.

1) The Antenna connector part number：20279-001E-03/IPEX, as the Figure 2-2:

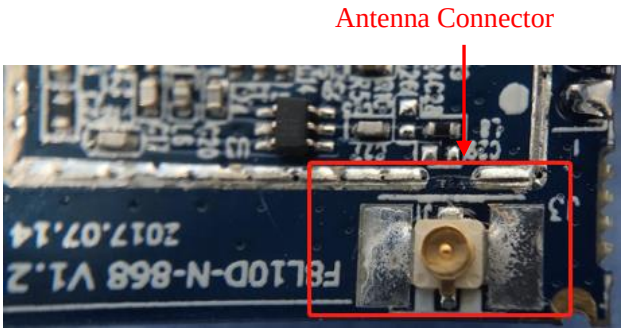


Figure 2-2 Antenna Connector

20279-001E-03/IPEX dimension as the Figure 2-3:

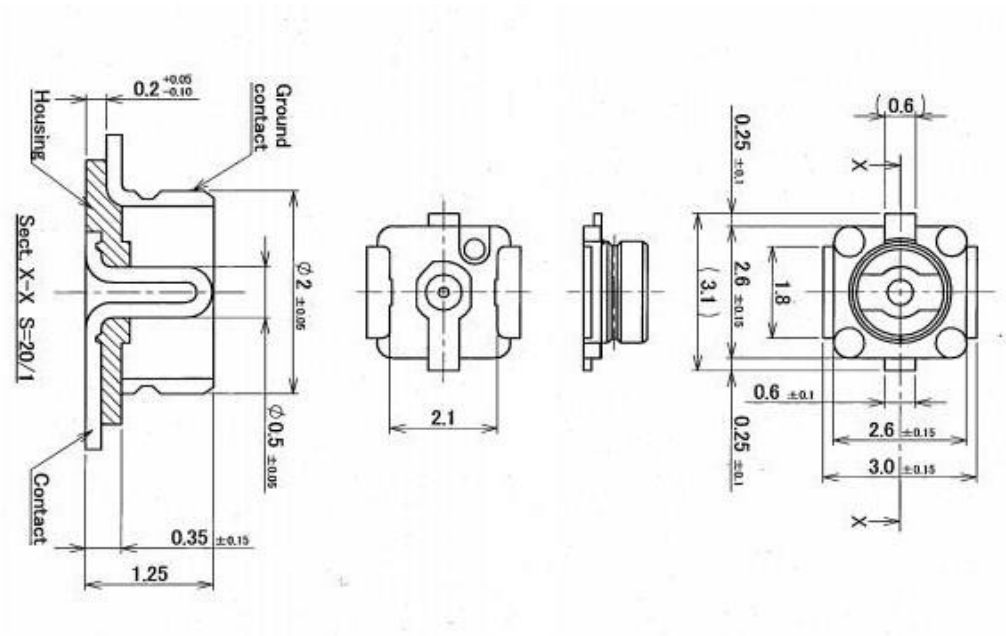


Figure 2-3 The 20279-001E-03/IPEX dimension

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.
http://en.four-faith.com Tel： +86 592-5907276 Fax：+86 592-5912735

2) SMA, as Figure 2-4

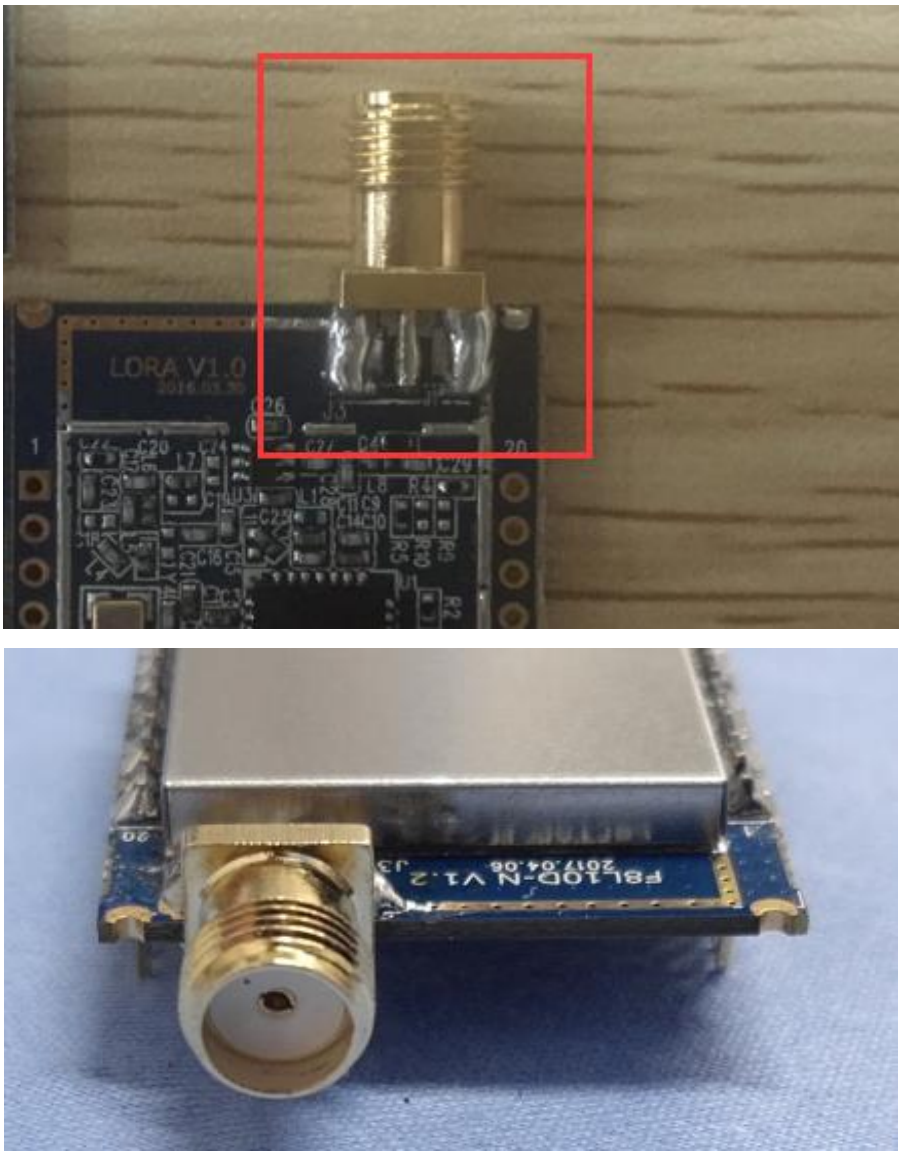


Figure 2-4 SMA master mode

2.5 Antenna Installation

1、 Install the antenna far away from the large area metal and ground.

2、 Keep the antennas visual.

3、 Minimize obstructions between the antennas.

4、 Reduce the extension cords of the antenna.

The performance of different antenna installation types, as the figure 2-5

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.
http://en.four-faith.com Tel： +86 592-5907276 Fax：+86 592-5912735

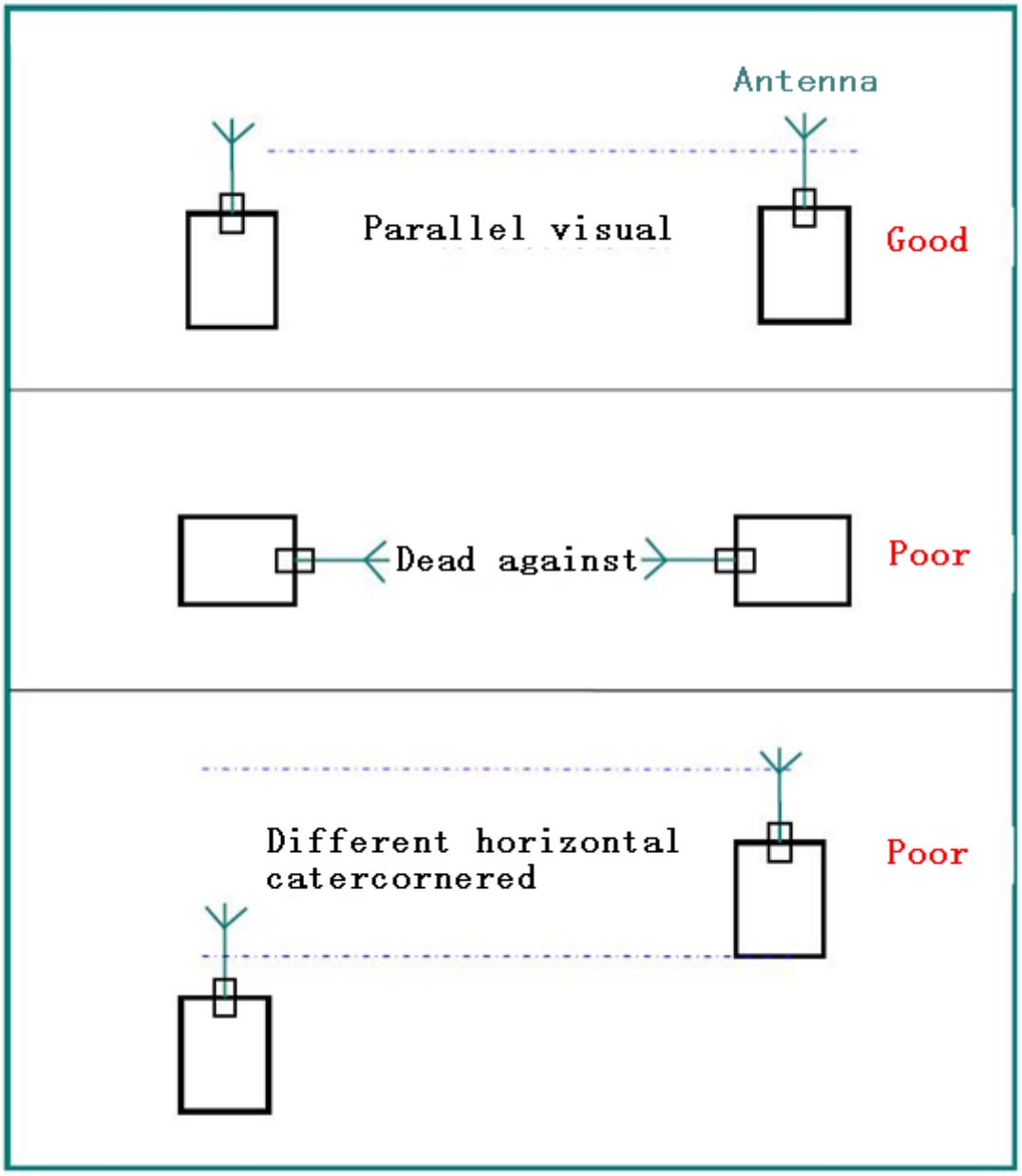


Figure 2-5 Different antenna installation types

2.6 Firmware Performance Specifications

Table 2-4 Firmware Performance Specification

UART	Baud rate	115200 (Default)
	Configuration	8/N/1 (Default)
	Max serial buffer size	4KBytes
	XOR	1-byte XOR
	Command Mode	AT Command
		HEX Command

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.
http://en.four-faith.com Tel： +86 592-5907276 Fax：+86 592-5912735

Network	Max nodes quantity	65000
	Node number range	0～65000 0：The center node 65535：Broadcast
Wake up Mode	External Wake up Mode	
	Timer Wake up Mode	

2.7 Absolute Maximum Ratings

Table 2-5 Absolute Maximum Ratings

Parameters	Min	Max	Unit
Supply Voltage	-0.3	5.5	V
Voltage on any digital pin	VCC-0.3	3.6	V
Input RF level		10	dBm
Storage temperate range	–40	125	°C

Note: Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device.

2.8 Antenna selection

If the customer chooses the aerial, can refer to the following parameter:

Impedance	50 ohm Nominal
Return Loss	-10dBi
VSWR	2.0MAX
Gain	2 dBi

Customers can provide the whole product to the antenna manufacturers in accordance with the selected frequency matching debugging, in order to achieve the best results.

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.
http://en.four-faith.com Tel： +86 592-5907276 Fax：+86 592-5912735

Chapter 3 Communication Interface Operation

3.1 UART

3.1.1 UART signal description

- TX: Data transmit
- RX: Data receive

3.1.2 UART connections

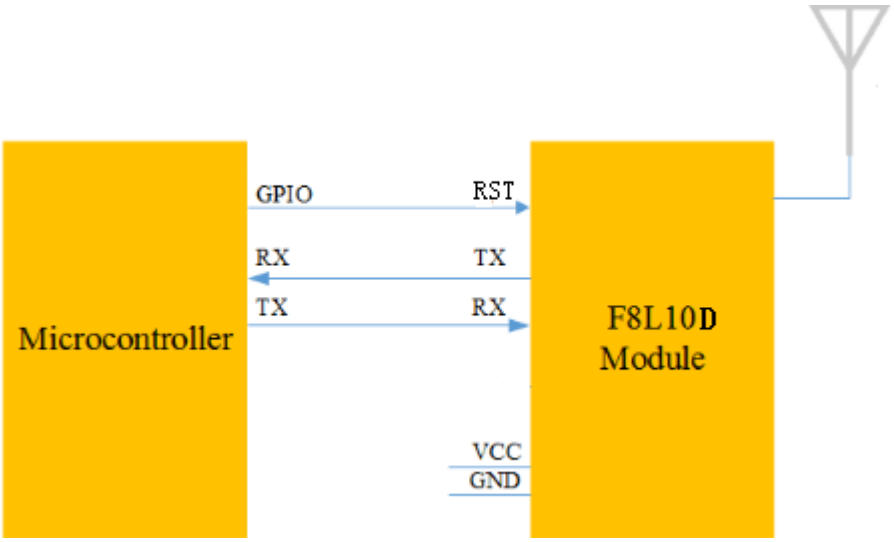


Figure 3-1 UART connection diagram

Note:the device has no hardware flow control by default.

Example: As the figure 3-2, The UART convert to RF system can be set up when the device with a UART interface connect to F8L10D directly.

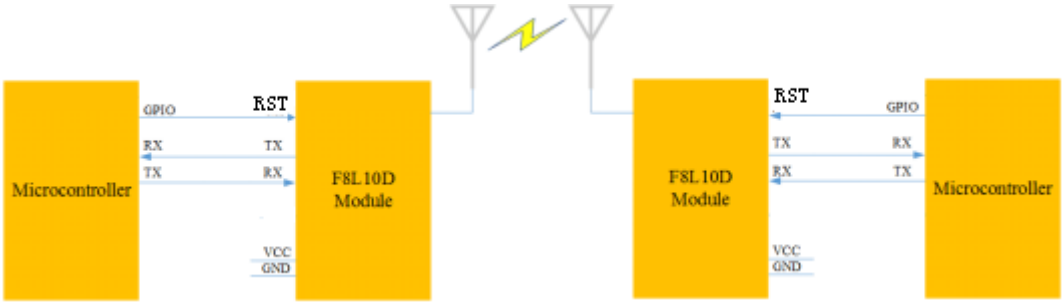


Figure 3-2 The UART convert to RF system

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.
http://en.four-faith.com Tel： +86 592-5907276 Fax：+86 592-5912735

3.1.3 UART Characteristics

UART data format

	Start	D0	D1	D2	D3	D4	D5	D6	D7	Stop

Figure 3-3 Data format

1) Communication interface: UART
2) Baud rate: 300,600,1200,2400,4800,9600 ,19200,38400,57600 ,115200 bps (default)
3) Start bit: 1bit
4) Data bit: 8bit
5) Stop bit: 1bit,2bit
6) Check bit: none,odd,even

UART support full-duplex. The communication can launch by an external device or the module itself.

The 8-N-1 mode, each data byte includes a start bit (low), 8 data, and a stop bit (high). The following figure 3-3 illustrates the serial data bit patterns.The data packet is 0x1F.

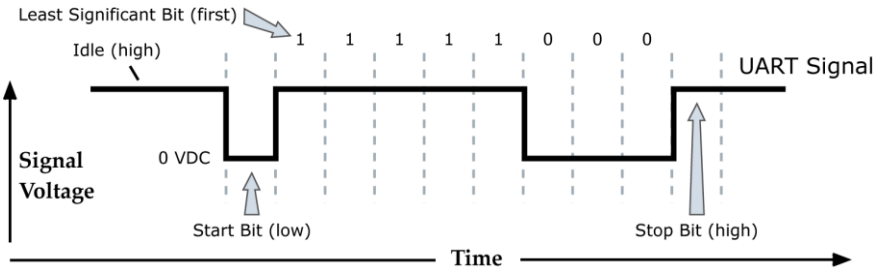


Figure 3-4 0x1F bit patterns

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.
http://en.four-faith.com Tel： +86 592-5907276 Fax：+86 592-5912735

Chapter 4 Parameter Configuration

4.1 Configuration Connection

Before configuration, it's need to connect the F8L10D with a host controller. The host controller could be a PC or other device which contain UART port. You can connect the F8L10D with PC by the Four-Faith F8L10D EVB, as showing in the figure 4-1.

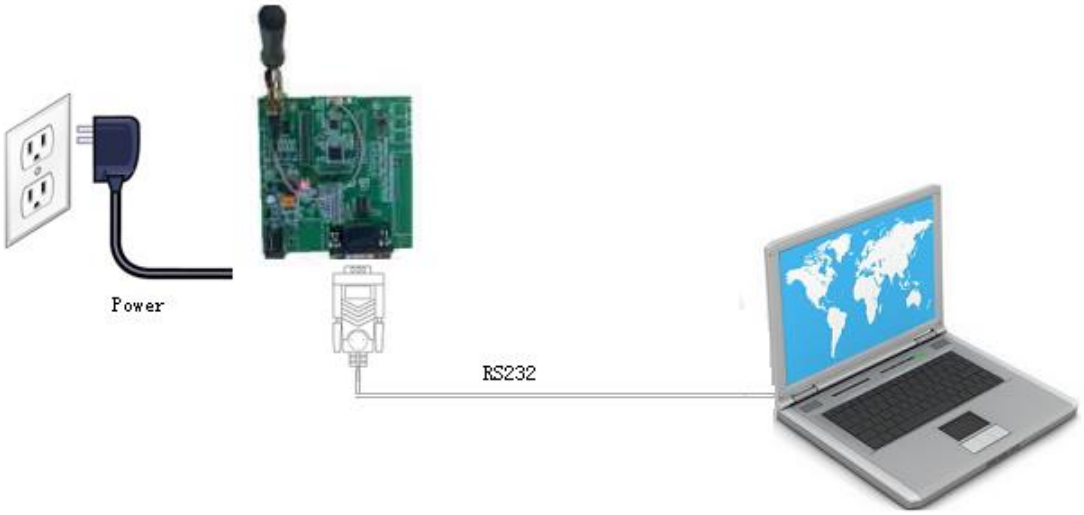


Figure 4-1 F8L10D EVB connect with PC

4.2 Configuration Introduction

There are two ways to configure the device:

- Four-Faith Configuration software tool "LoRaConfig": All the settings are configured through the shipped software tool. It's necessary to have one PC to run this tool.
- Extended AT command: All the settings are configured through AT command, so any device with serial port can configure it. Before configuration with AT command, you should make device enter configure state.

For more details, refer to "*AT command manual*".

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.
http://en.four-faith.com Tel： +86 592-5907276 Fax：+86 592-5912735

Run the configure tool: LoRaConfig.exe, as showing in the figure 4-2

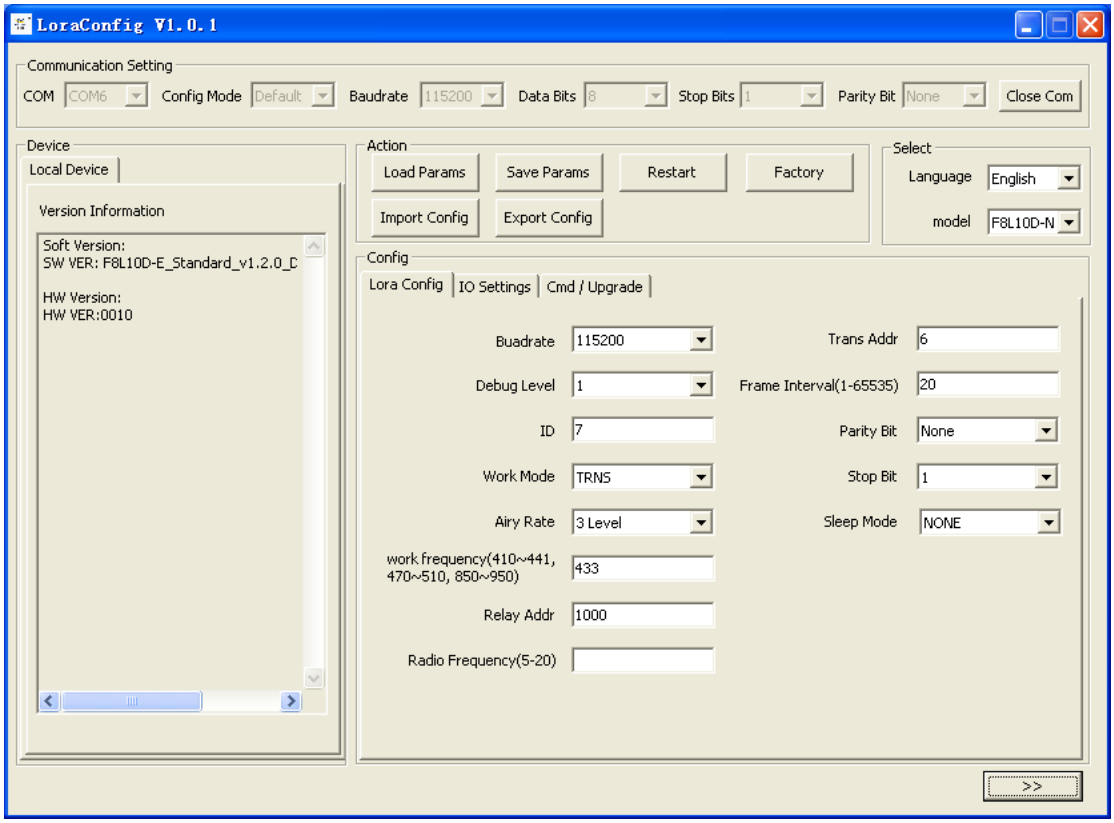


Figure 4-2 LoRa Configuration Tool

The “Communication Setting” column shows the current serial port settings. To configure LoRa modules, please choose the correct serial port parameters, then open the serial port. If the button text is “Close”, it shows the serial port now has been opened. If the text is “Open”, you should open the port first.

When the serial port has beed opened, press “Save Params” button and LoRaConfig.exe will load parameters automatically. Then, you can configure all parameters of LoRa, showed by figure 4-2.

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.
http://en.four-faith.com Tel： +86 592-5907276 Fax：+86 592-5912735

4.3 LoRa Parameters Setting

4.3.1 Serial Com Set

It can set the Serial Com port parameters, such as baud rate, data bit, check bit and stop bit

The default value: baud rate is 115200. Data bit is 8. Check bit is N, and stop bit is 1。

4.3.2 Work Mode

There are three work modes,"TRNS","AT" and "API".

TRNS --Transparent Data to LoRa. The "Transparent Address" must be set。

AT --AT operating mode, refer to "*AT Command Manual*", which is usually used for parameter configuration and manual testing.

API --API operating mode, refer to "*API Command Manual*", whose payload's length must be less than 100 Bytes.

Default value is TRNS.

4.3.3 ID

The ID of LoRa Module, id range is 0~65535

4.3.4 Work Frequency

The data transmission frequency of module. The work frequency bands are divided into low frequency band (525MHz below) and high frequency band (525MHz above) for different modules. Typical operating frequency bands contain 410M ~ 441MHz, 470M ~ 510MHz, 850 ~ 950MHz, etc., 1000KHz for a channel. Different application areas have different frequency band restrictions, so what we should do is to adjust the value to local conditions.

The default value for the low-band hardware module is 433, and the default for the high-band module is 868.

4.3.5 Airy Rate

The Airy Rate is the speed of data transferring. The bigger the Bit Rate, the faster of

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.
http://en.four-faith.com Tel： +86 592-5907276 Fax：+86 592-5912735

the data transfer data speed.

Note: The Bit Rate should keep the same value, while transferring data between two module.

The default is 3.

4.3.6 Radio Frequency

The module without PA can set the radio frequency from 5dBm to 20dBm. But the ones with PA is fixed to 30dBm.

Default value: 20

4.3.7 Relay Address

The relay address will be adopted when the transmission distance between nodes is too long. This parameter is set as the ID of the relay node, and the relay node will help transmit the data to the final destination node.

Default value:1000

4.3.8 Sleep Mode

The module work on different power mode, such as None,Time and Deep.

None sleep mode -- Max power consumption on

Time sleep mode -- wake up the module by RTC timer.

Deep sleep mode -- wake up the module by RST or SLEEP_RQ pin.

When Sleep mode is Time, the Wake-up Time and Sleep Time Must Set.

Default value is None.

When the sleep is set Time Mode, the Wake-up Time is the duration of the module keep activity. The unit is millisecond.

When the sleep is set “Time” Mode, the “Sleep Time” is the duration of the module keep inactivity. The unit is millisecond.

4.3.9 Debug Level

Debug information is used to debug software when there is software problem. As showing in the figure 4-3

0 --- no debug information output

1 --- simple prompt information output

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.
http://en.four-faith.com Tel： +86 592-5907276 Fax：+86 592-5912735

2 --- detail debug information output

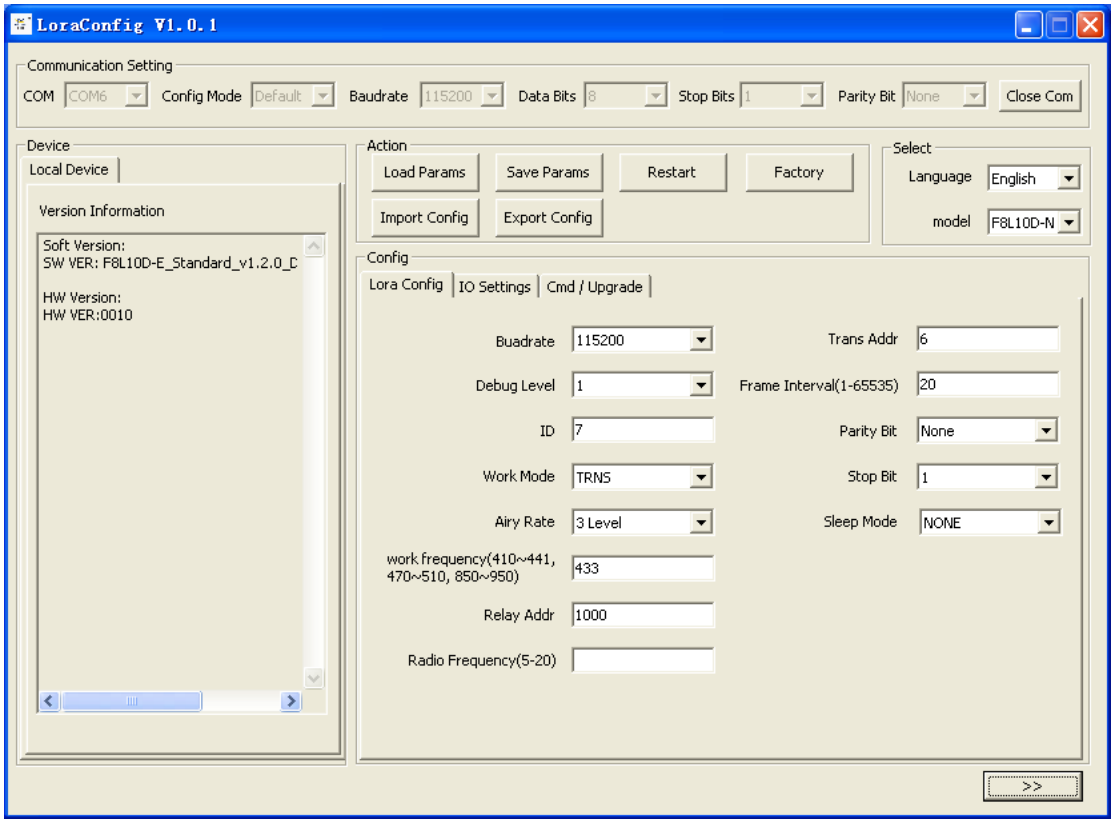


Figure 4-3 LoRa Configuration Tool

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.
http://en.four-faith.com Tel： +86 592-5907276 Fax：+86 592-5912735

Chapter 5 Reference Circuit

5.1 Communication

There are three modes:

1, The host controller support RS232 (such as: PC).The figure 5-1 is the recommend UART convert to RS232 circuit.

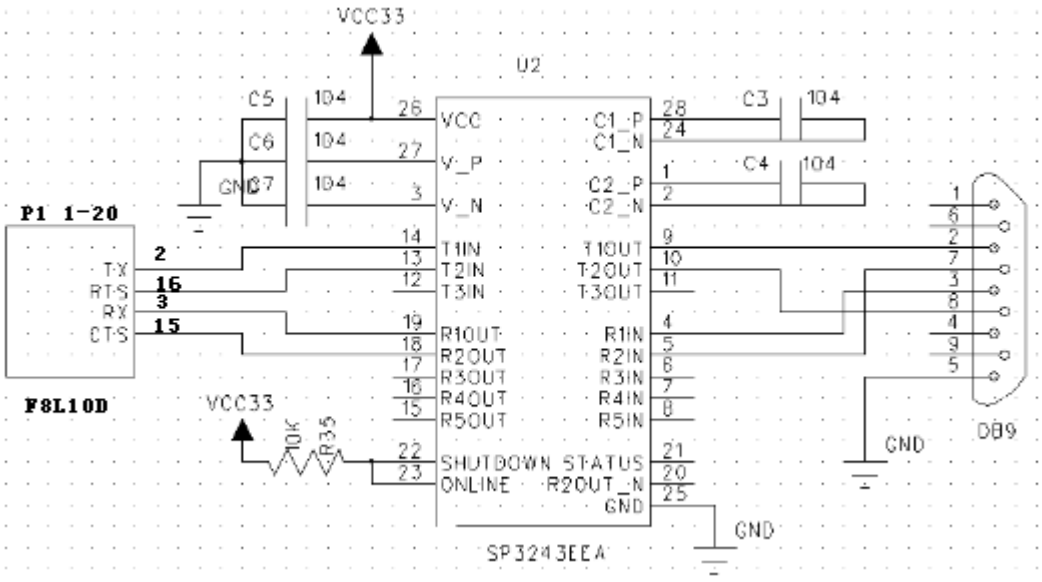


Figure 5-1 UART convert to RS232

2, IPCas host controller: F8L10D and IPC through the RS485 bus is linked together, need to use level conversion chips for level conversion (such as SP3485), as shown in figure 5-2.

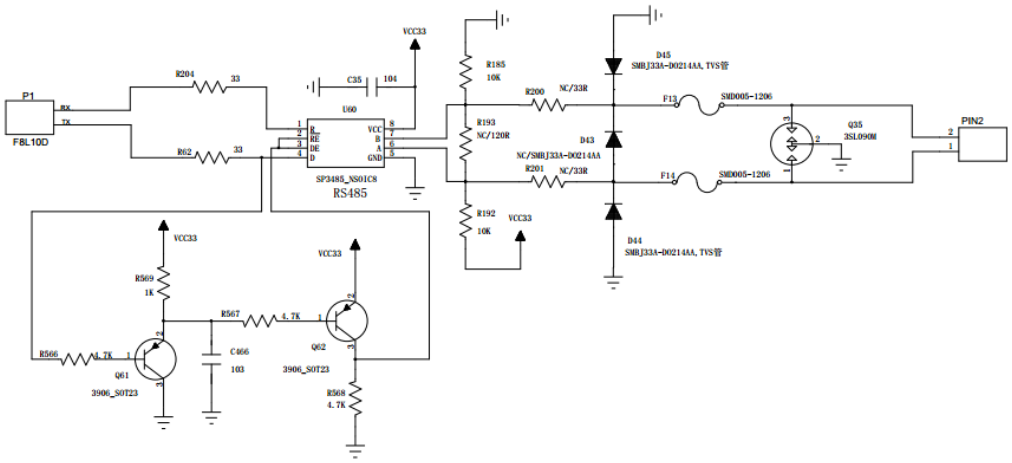


Figure 5-2 F8L10D and IPC RS485 connection reference circuit

3, The host controller support UART.The connection please reference figure 3-1.

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.
http://en.four-faith.com Tel： +86 592-5907276 Fax：+86 592-5912735

5.2 Reset

F8L10D default power-on reset the module immediately, there is no boot and shutdown pins, but provides a hardware reset pin, digital input, active low, if the normal work need to reset the module, need to do this pin .

Module because of the complex operating environment, long working hours, there are crashes, false connections and other unusual problems. When an exception occurs, how to automatically restore, the application module design must be fully considered. We recommend two ways:

1), the module's main power supply can be controlled, turn off the main power supply, and then re-power. This way the most thorough, most reliable, unattended equipment, it is recommended in this way.

2), control RESET pin (reset) is low 200ms, the module hard reset, similar to the processor hard reset. This method is generally used for battery-powered handheld devices, if this method can not be restored, you may need to manually power-off.

For hardware reset circuit design recommendations (strongly recommended to use mode two):

1, the use of micro-button to manually reset, press the reset pin to the ground, open and disconnect the connection to the ground, as shown below.

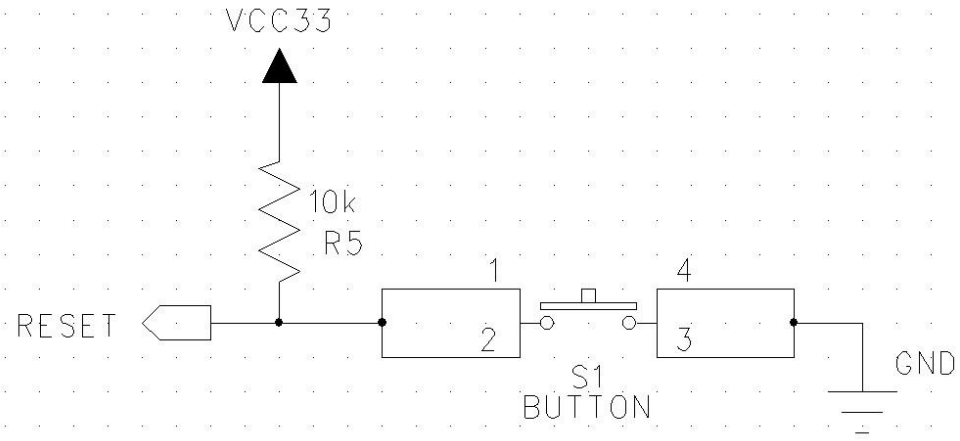


Figure 5-3 Reset Circuit

2, the use of MCU control transistor to pull down the RESET module hardware reset, as shown below:

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.
http://en.four-faith.com Tel： +86 592-5907276 Fax：+86 592-5912735

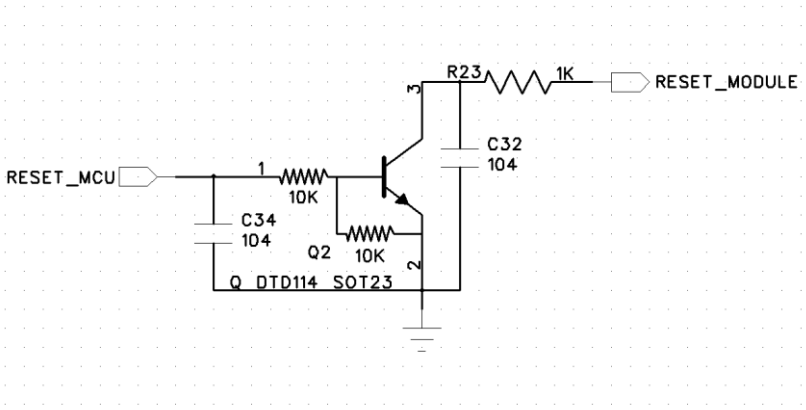


Figure 5-4 MCU Control Triode Reset Reference Circuit

3, RESET hardware reset pulse width of at least 200ms, the effective low level can not be higher than 0.4V, otherwise it may not make the module completely reset.

5.3 GPIO protection circuit

The voltage on any digital pin must be bigger than -0.3V,smaller than VDD+0.3V. If the voltage was bigger than +3.9V, it may damage module immediately. We didn't provide GPIO protection circuit. If you need protect it,the general method is using TVS,as figure below.

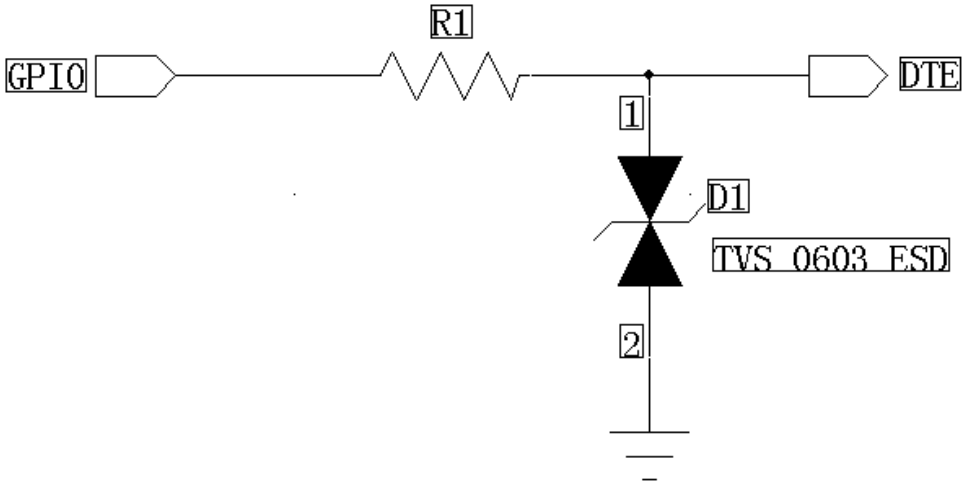


Figure 5-5 TVS protection circuit for digital pin

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.
http://en.four-faith.com Tel： +86 592-5907276 Fax：+86 592-5912735

Chapter 6 Dimension and solder

6.1 PCB Footprint

With shielding cover thickness of about 4.2mm, excluding connectors

F8L10D-N-NS-U/F8L10D-N-NS-S Outline Package, **unit: mm**

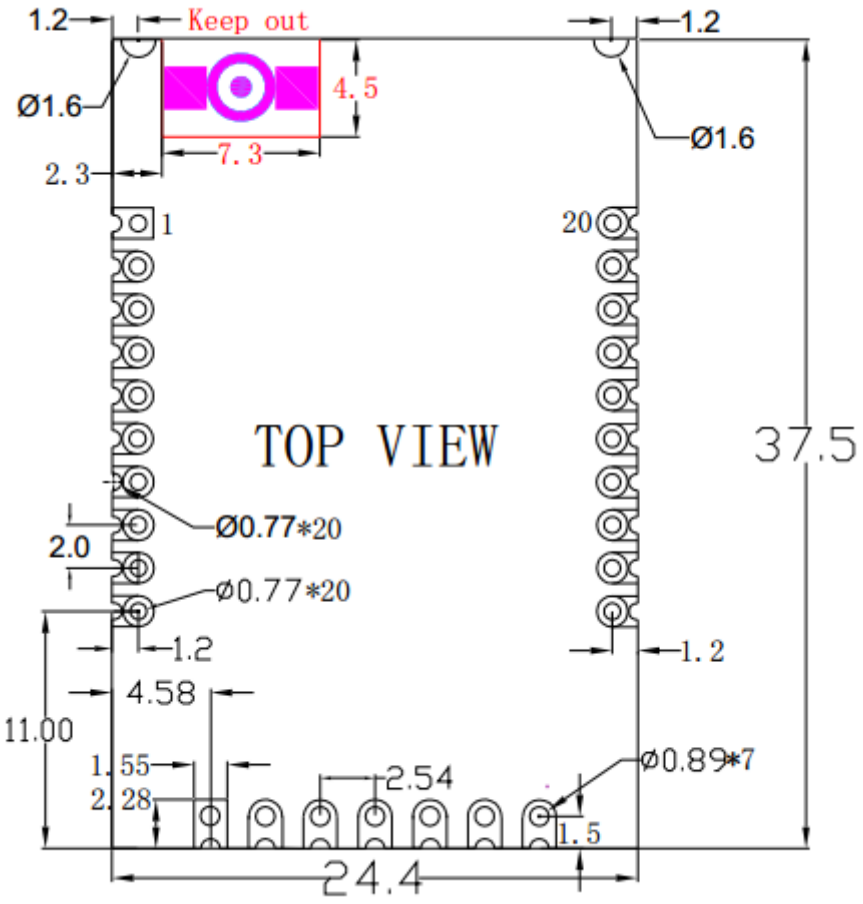


Figure 6-1 F8L10D-N-NS-U/F8L10D-N-NS-S Outline Package

6.2 Re-flow Temperature Specification

Please reference the IPC/JEDEC J-STD-020B for the Re-flow.

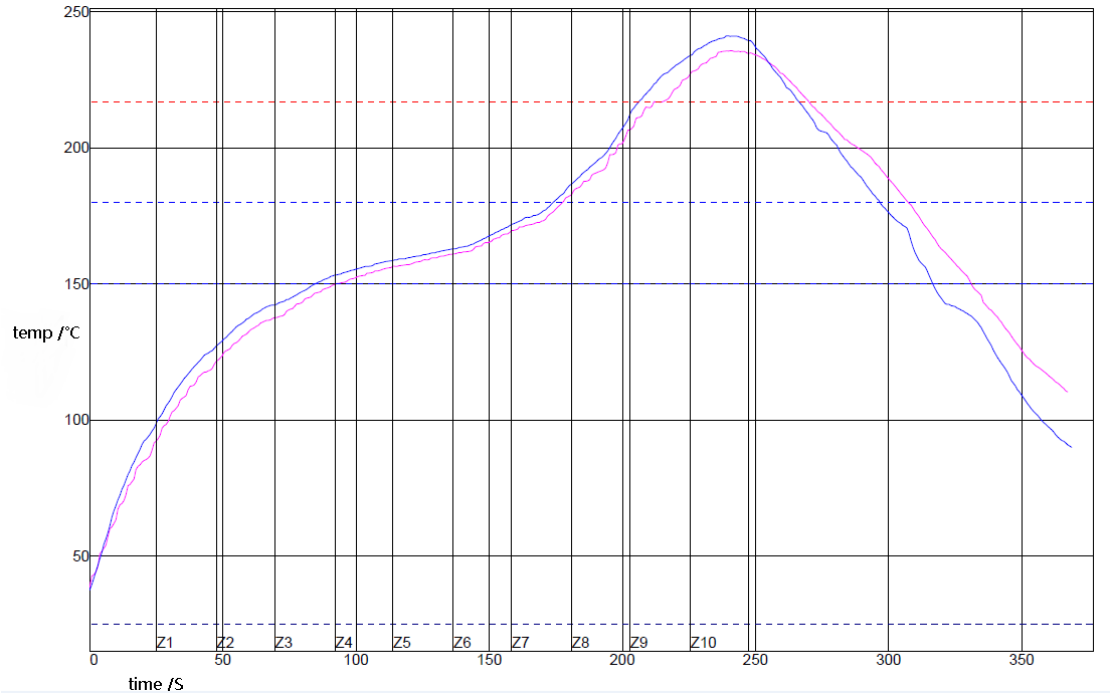
Soldering temperature

Using thermostat soldering iron do not exceed 340℃, and do not more than 2S every pin

Re-flow temperature

Recommend using the temperature profile below for re-flow

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.
http://en.four-faith.com Tel： +86 592-5907276 Fax：+86 592-5912735



PWI=94%		Rising slop		Descending slop		pre-heat 25~150℃	
	2	1.96	-4%	-1.28	72%	93.1	23%
	3	2.05	5%	-1.43	57%	84.4	2%
D-Value		0.09		0.15		8.70	

PWI=94%		Constant 150~180℃		Re-flow 217℃		Maximum temperature		Descending slop 250~200℃	
	2	85.4	-15%	55.5	-27%	235.8	-54%	-1.15	94%
	3	89.4	-2%	60.5	-14%	241.3	-10%	-1.48	81%
D-Value		4		4.5		5.5		0.33	

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.
http://en.four-faith.com Tel： +86 592-5907276 Fax：+86 592-5912735

Chapter 7 Ordering Information

You can contact the sales of Xiamen Four-Faith Communication Technology Co., Ltd to buy the modules or EVB. Please specify the model you need.

Contact Four-Faith:

Xiamen Four-Faith Communication Technology Co., Ltd.
Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen,Fujian,China.
Tel：+86 592-5907276 Fax:+86 592-5912735
Web:en.four-faith.com

Appendix

A1 Notes

A1.1 Serial port's frame interval

Say serial port's baud rate 115200.

The serial port's frame interval is 20 ms. To ensure one packet in a frame, the interval must be smaller than 20 ms。

When the application received serial's data, the frame interval should be greater than 20 ms.

Please modify the frame interval value in other baud rate, corresponding to the case of the baud rate with 115200.

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.
http://en.four-faith.com Tel： +86 592-5907276 Fax：+86 592-5912735

A2 FAQ

FAQ1：Configure parameters fail

Solution: Please check the serial port number and the property of the serial ports, such as baud rate, parity.

FAQ2：With right parameters，but add network fail

Solution：First Check that the antenna installation was OK. Then check the network parameters were correct,such as pan id, node address, physical channel. If everything is all right, try to factory the device,then add network and send data.

FAQ3：In network，but send data fail

Solution：Please check the distance of the two device, make sure the distance is greater then 20 cm. Then confirm that the way of send data is right in the current work mode(eg. AT+TXA or AT+TXH on AT work mode). Please refer to the chapter 4.4.21 和 4.4.2.22

FAQ4：Can not enter sleep

Solution：1. On timer sleep mode, if the sleep time and awake time is 0, then the device will not enter sleep.

2. On deep sleep mode. Please check the sleep control(SLEP_REQ) pin's wire splice is OK and the control level is OK(high level make device sleep, otherwise awake)

Add：11th Floor, A-06 Area, No.370, Chengyi Street, Jimei, Xiamen, Fujian, China.
http://en.four-faith.com Tel： +86 592-5907276 Fax：+86 592-5912735