Wport-W70-X(2MR)

UART To Wi-Fi+BLE Collection Module

User Manual

V 1.2

Product Features

◇ **Supports WiFi 802.11b/g/n wireless standards**

◇ **Adopting RISC architecture SOC chip, with a maximum frequency of 160MHz, 276KB RAM, 2MB Flash, based on FreeRTOS system**

◇ **Support BLE 5.0 for diagnostic or local Bluetooth debugging and data collection functions**

◇ **Supports UART TTL to WiFi data transmission, with a maximum serial port rate of 460800bps**

◇ **Support photovoltaic energy management platforms, web pages or apps to monitor energy data**

◇ **Supports different types of antenna options: built-in PCB antenna, external 1st generation IPEX interface, or external antenna pad**

◇ **3.3V single power supply**

◇ **Size: 22.5 ± 0.2mm x 13.5 ± 0.2mm x 3.5 ± 0.2mm, SMT18 package**

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V 1.1 2023-08-15 correction Pin function description

V 1.2 2024-02-01 Update reference shemetic

1. PRODUCT OVERVIEW

1.1. Overview

The Wport-W70-X (2MR) module adopts a WiFi+BLE data transmission method, which facilitates the collection and monitoring of data from inverters, energy storage and other devices. The protection level is IP65, suitable for harsh outdoor scenarios, and the sub models support different interfaces to adapt to external devices.

Wport-W70-X (2MR) is equipped with rich network protocols and integrated with TTL standard data transmission interfaces, without the need for any driver programs. It is convenient for traditional serial device networking and docking with photovoltaic energy management, suitable for the photovoltaic energy industry.
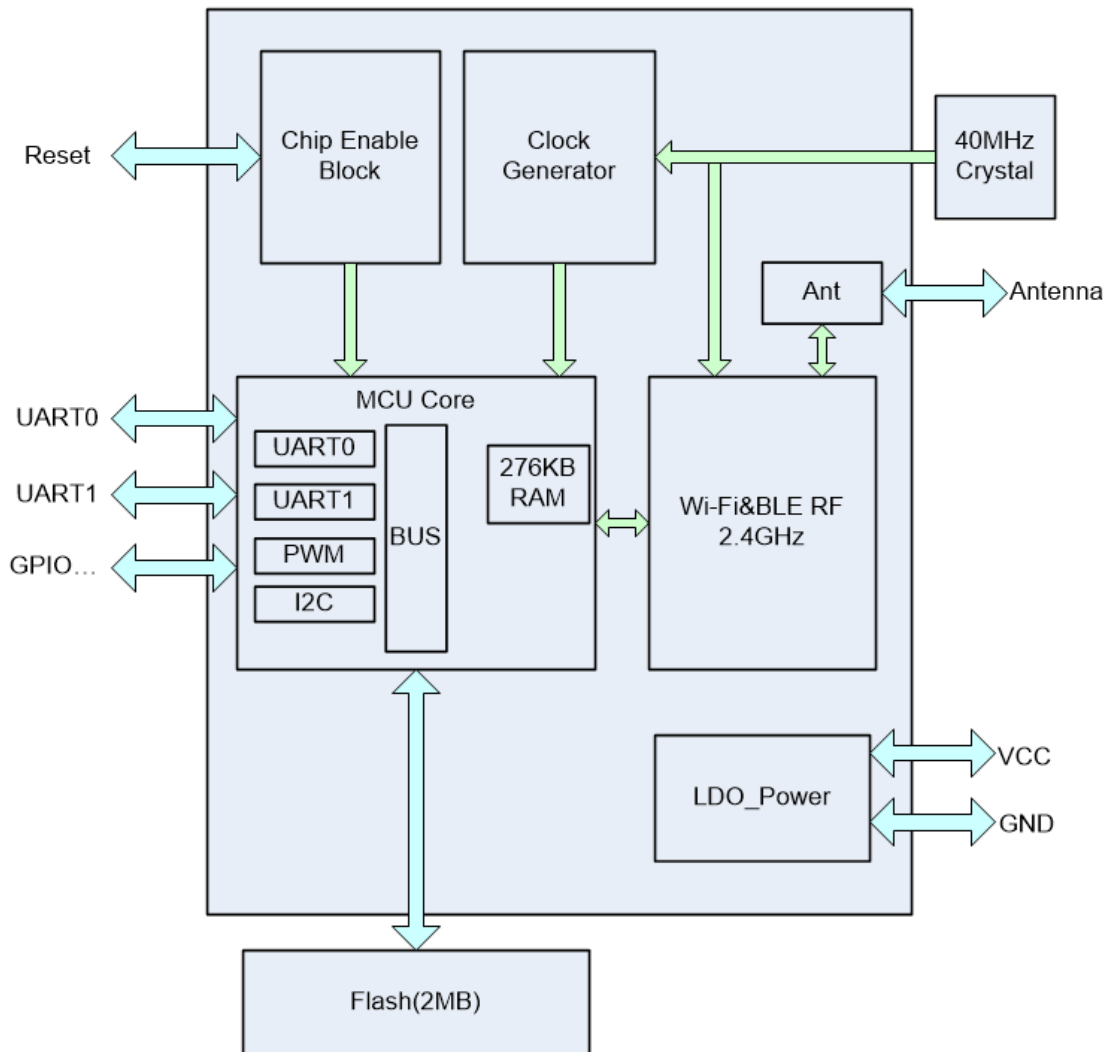

Figure 1.   System Block Diagram

1.2. Product Parameters

Table1.   Wport-W70-X(2MR) Product Technical Parameters

Classification	Parameters
System Information	
Processor/Main Frequency	RISC 160MHz
Flash	2MB
RAM	276KB
Operating System	FreeRTOS
Wi-Fi Interface	
Wireless Standards	802.11 b/g/n
Frequency Range	2.412GHz ~ 2.472GHz
Network Mode	STA/AP/STA+AP
Security Type	WEP/WPA-PSK/WPA2-PSK/WPA3-SAE
Encryption	WEP64/WEP128/TKIP/AES
Transmitting Power	802.11b: +17dBm ± 1.5dBm (@11Mbps) 802.11g: +15dBm ± 1.5dBm (@54Mbps) 802.11n: +14dBm ± 1.5dBm (@HT20, MCS7)
Receiving Sensitivity	802.11b: -96dBm (@1Mbps) 802.11b: -89dBm (@11Mbps) 802.11g: -91dBm (@6Mbps) 802.11g: -76dBm (@54Mbps) 802.11n: -91dBm (@MCS0) 802.11n: -73dBm (@MCS7)
Antenna Option	Internal PCB, external 1st generation IPEX, or external pin pad
BLE Interface	
Wireless Standards	BLE5.0
Frequency Range	2.402GHz ~ 2.480GHz
Transmitting Power	Max 15dBm
Receiving Sensitivity	-97dBm
Antenna Option	Same as Wi-Fi interface
Serial Port	
Number of Port	1+1(Debug)
Interface Standard	TTL 3.3V
Data Bit	7, 8
Stop Bit	1, 2
Check Bit	None, Even, Odd
Baud Rate	TTL: 1200 bps~460800 bps
Flow Control	No flow control
Software	
Collocation Method	APP
Firmware update	Serial port or OTA network upgrade
Basic Parameters	
Size	22.5±0.2mm x 13.5±0.2mm x 3.5±0.2mm
Working Temperature	-40 ~ 85°C -40 ~ 105°C (For high-temperature versions, please contact our company)

Storage Environment	-45 ~ 105°C, 5 ~ 95% RH (No condensation water)
Humidity Sensitivity Level	MSL3
Input Voltage	2.9~3.6V
Average Current	Peak (1ms in 100 milliseconds):<350mA Average (STA, networked standby): 40mA Average (STA, 1KB/s): 60mA Average (AP): 70mA Standby mode: 310uA (Reset pin pulled low)

1.3. Main Application Areas

Wport-W70-X (2MR) connects serial devices to the Internet and transmits serial data in accordance with the TCP/IP protocol.

● Monitoring of photovoltaic solar energy and energy storage;

2. HARDWARE INTRODUCTION

Wport-W70-X (2MR) is a Wi Fi+BLE solution for serial device networking, which enables data transmission through routers, making product integration very easy. It is divided into three models based on the antenna form: -0, -1, and -2.

2.1. Hardware Introduction
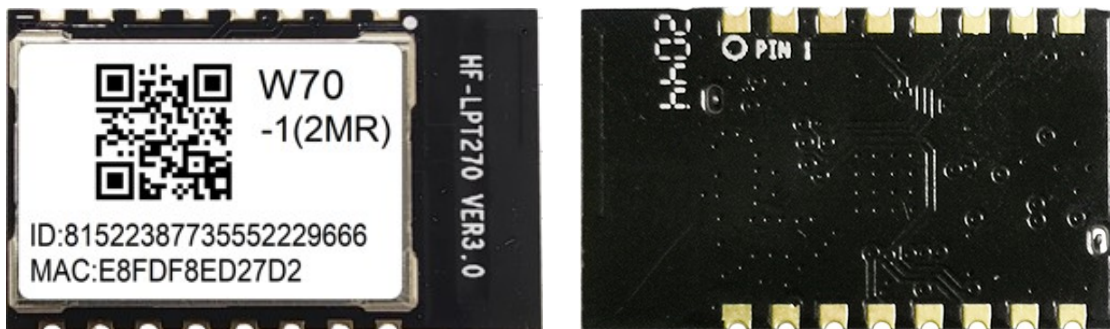
The appearance of the module is as follows.

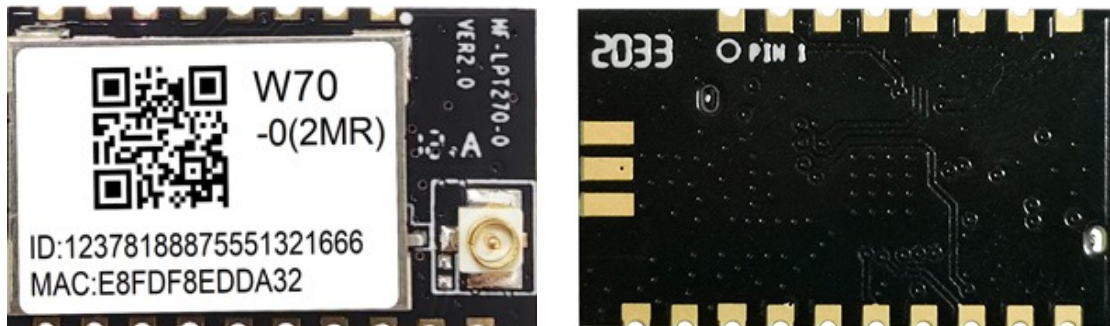

Figure 2.   Wport-W70-1(2MR) Appearance Diagram

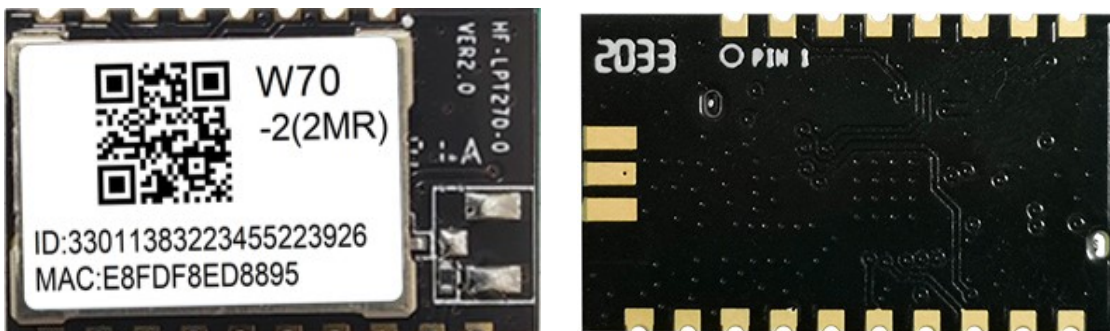Figure 3.   Wport-W70-0(2MR) Appearance Diagram

Figure 4.   Wport-W70-2(2MR) Appearance Diagram
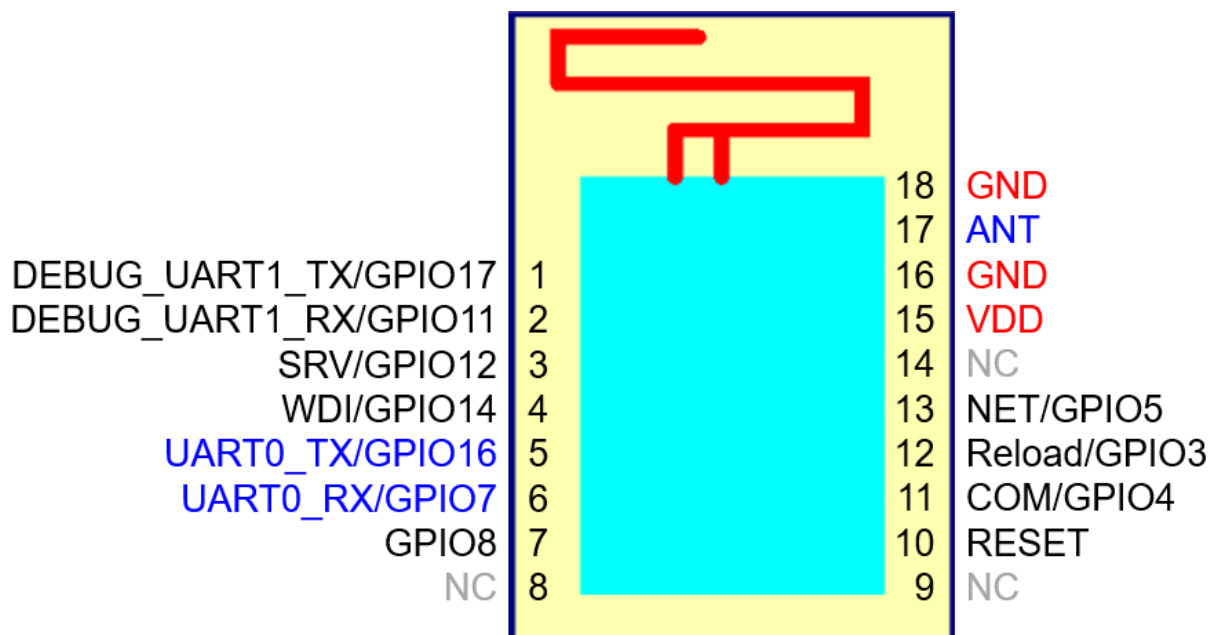
2.1.1. Wport-W70-X(2MR) Pin Definition

Figure 5.　　Wport-W70-X(2MR) Pin Definition

Table2.　　Wport-W70-X(2MR) Pin Function Definition

Pin	Description	Network Name	Signal Type	Note
1	UART1_TX	DEBUG_UART1_TX	O	3.3V TTL debugging serial port 1 output GPIO17
2	UART1_RX	DEBUG_UART1_RX	I	3.3V TTL debugging serial port 1 input GPIO11
3	Server Connection LED	SRV	O	Low effectiveness. On: Connected to server Off: Not connected to the server GPIO12, if not in use, please hang it
4	Dog feeding signal output	WDI	O	Feed dog signal, pull up and down for 300 milliseconds GPIO14, if not in use, please hang it Can do SPI_ CS, DAC, ADC functions
5	UART0	UART0_TX	O	3.3V TTL debugging serial port 0 output GPIO16
6	UART0	UART0_RX	I	3.3V TTL debugging serial port 0 input GPIO7
7		GPIO8	IPD	Default 10K pull-down, start selection: Low level: Starting the program from on-chip Flash High level: Start the program from an external serial port, and use it to burn the program when the chip is empty. **This pin is only used for burning programs during production, and users**

				can keep it suspended.
8		NC		
9		NC		
10	Module Reset	RESET	I，PU	**Low effectiveness** **Hardware reset input pin, with internal reset circuit, no need to add a pull resistor externally**
11	Serial Transmission Indicator Light	COM	O	Low effectiveness Off: No data interaction Off for 0.3 seconds, on for 0.9 seconds: serial port outputs data Off for 0.3 seconds, on for 0.3 seconds: serial port receives data On: Bidirectional sending and receiving. GPIO4，if not in use, please hang it
12	Reset	Reload	IPU	The default height is high. Press and hold this key (>4S) and release it to restore the module to its factory settings.。 GPIO3, if not in use, please hang it
13	Network Status Indicator Light	NET	IPU/O	Low effectiveness Off for 0.3 seconds, on for 3 seconds: Connect to the router in STA mode Off for 0.3 seconds, on for 0.3 seconds: STA is not connected to the routerGPIO5, if not in use, please hang it
14		NC		
15	**+3.3V Power Supply**	**VDD**	**Power**	
16	**Ground**	**GND**	**Power**	
17		ANT	Signal	Only the -0 and -2 external antenna models have these two pins. Antenna pad leads out, see instructions below for details
18	Ground	GND	Power	

 <Description>:

I - Input; O - output; PU - Internal weak resistance pull-up; PD - Internal weak resistance pull-down; Digital I/O; Power - Power supply

2.2. Indicator Light Circuit

Recommend introducing LED lights to indicate the working status of the product, and select some or all of them according to actual needs.
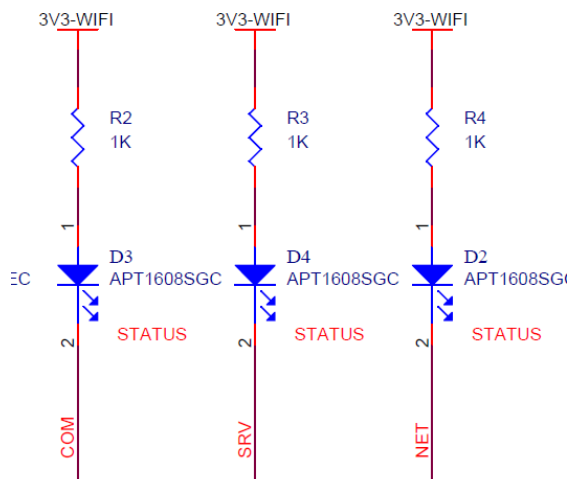
Figure 6.   Low Efficiency Indicator Light

2.3. Wport-W70-X(2MR) Mechanical Dimensions

The dimensions of the Wport-W70-X (2MR) model product are defined as follows (in millimeters).
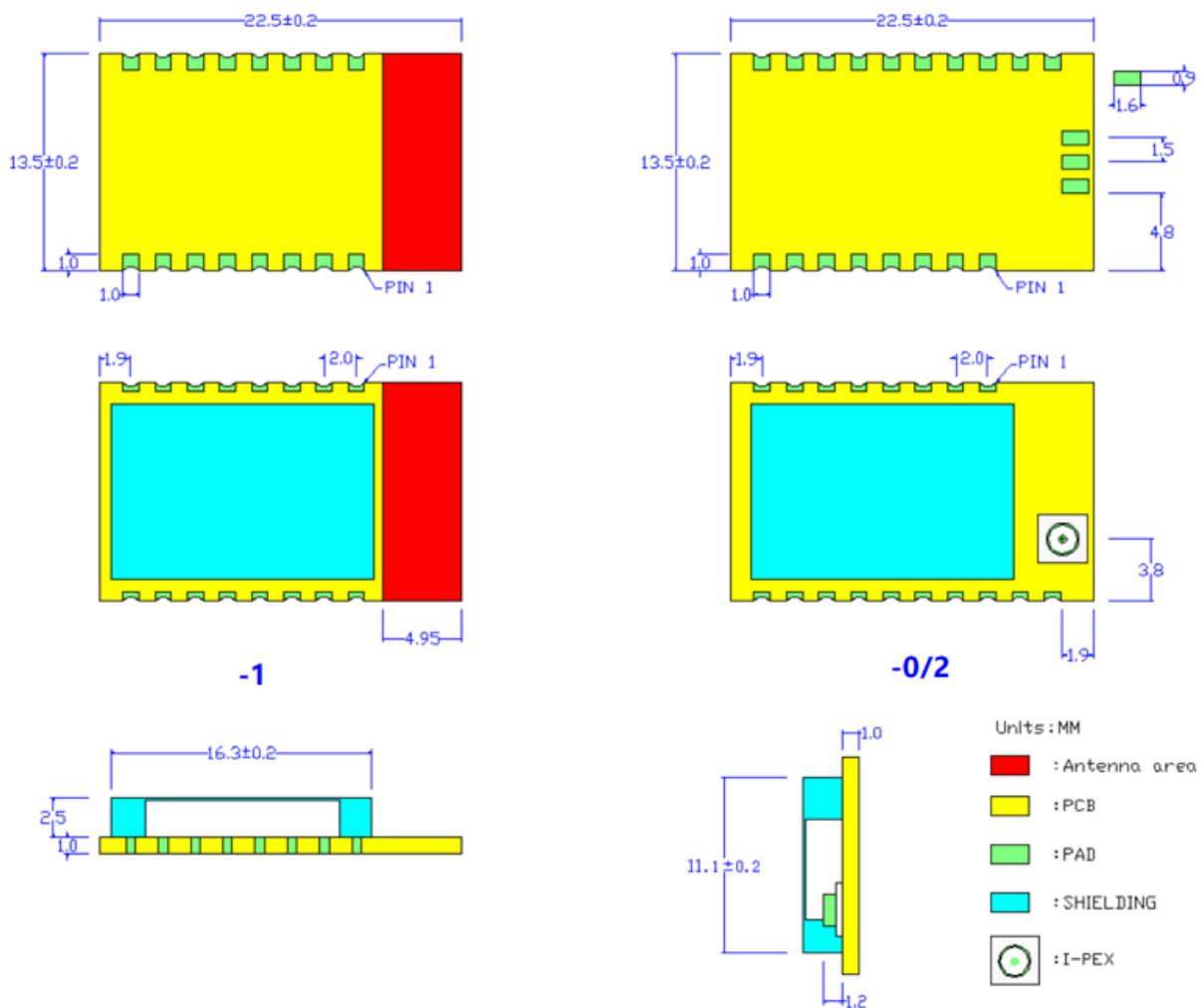
Figure 7. Mechanical Dimensions

2.4. Internal antenna

The module supports built-in antenna options. When customers choose a built-in antenna, they need to follow the following precautions for the built-in antenna and the overall rules for module placement:

➢ On the user's PCB board, components and GND cannot be placed in the module antenna area (as shown in the red area in the figure below). It is also recommended to excavate or protrude the PCB substrate in the antenna area as shown in the figure below.

➢ The antenna should be kept away from metal and at least 16 millimeters away from higher components around it;

➢ The antenna part cannot be covered by a metal shell, and the plastic shell needs to be at least 16 millimeters away from the antenna;

It is recommended to place the module in the following areas of the user board as much as possible to reduce the impact on the antenna and wireless signal. At the same time, please consult technical support personnel to assist in the placement of the module and the layout design of related areas.
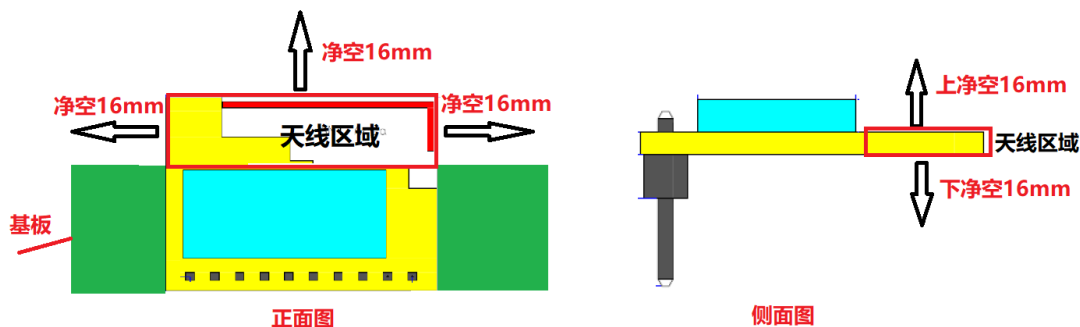

Figure 8. Recommended Placement Area For Module

2.5. External antenna

The module also provides an external antenna interface (with different models of external and internal antennas), which can be selected by the user according to their needs. If an external antenna is used, according to the requirements of IEEE 802.11b/g/n standard, the Wi Fi module needs to be connected to a 2.4G antenna. The parameter requirements for external antennas are detailed in the table, and various specifications of external antennas can also be provided for detailed consultation with sales.
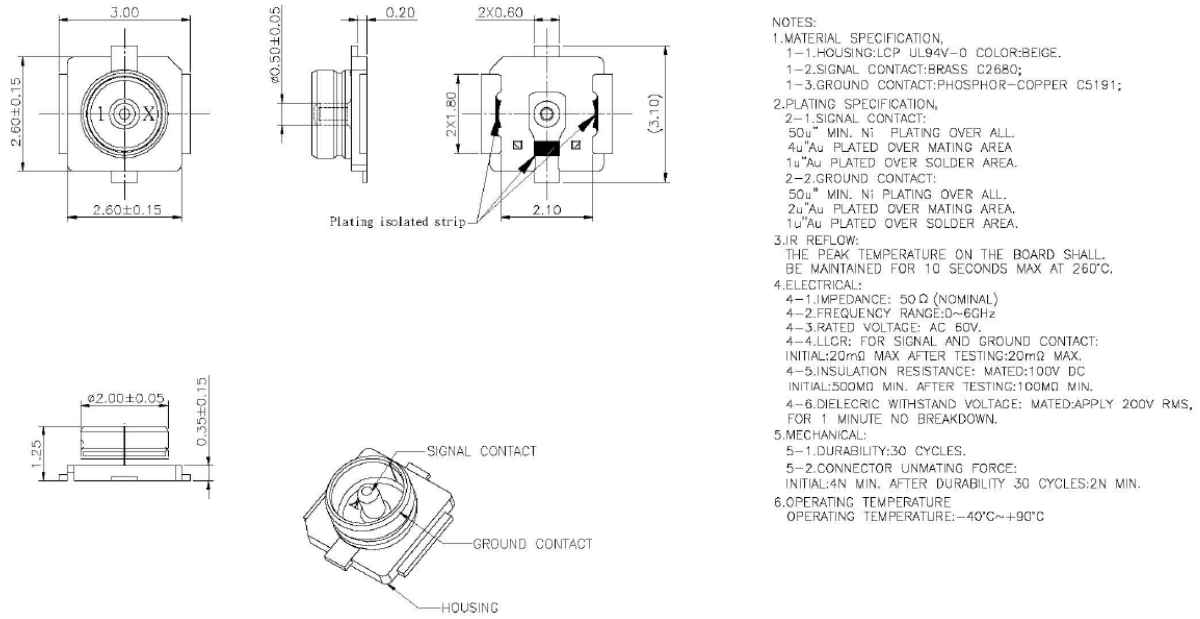
Figure 9.   1st Generation IPEX Pad Size

Table3.   Requirements for External Antenna Parameters

Item	Parameter
Frequency Range	2.4~2.5GHz
Impedance	50 Ohm
VSWR	2 (Max)
Return Loss	-10dB (Max)
Connect Type	I-PEX or populate directly

2.6. Development Suite

Provide evaluation and development kits for customers to quickly familiarize themselves with products and conduct in-depth application development. The following figure shows the appearance of the evaluation development kit. Users can connect modules through USB (USB to UART), UART, or WiFi wireless interfaces, configure parameters, manage modules, and perform functional testing on them. The development kit supports 5VDC input power supply for user debugging and use.
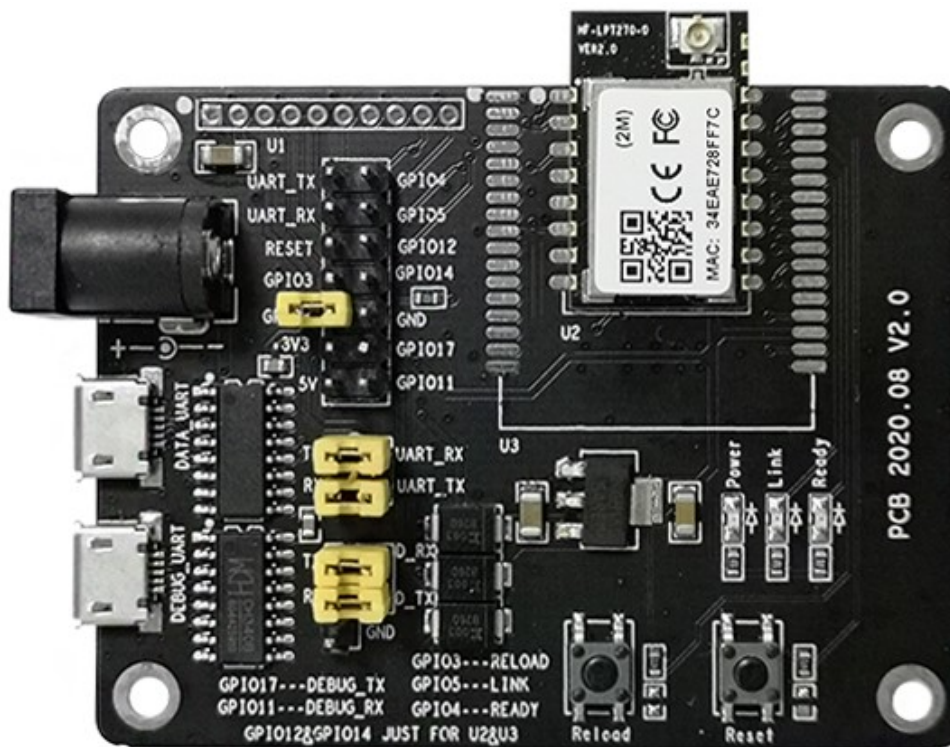
Figure 10.   Development Board

<**Note**>: USB to serial port debugging requires downloading the driver from the website or contacting technical support personnel for specific usage methods.

The description of the external interfaces provided by the evaluation development kit is shown in Table 6:

Table4.   Evaluation Development Board Interface Description

Function	Name	Description
External Interface	DATA_UART	Power supply input and communication serial port 0
	DEBUG_UART	Power input and debugging serial port 1 for log printing
	Power Interface	DC 5V input, usually suspended, but when USB power is insufficient, external power can be supplied.
LED	Power	Power indicator light
	Ready	Serial communication indicator light
	Link	NET indicator light
Button	Reload	Restore factory settings function
	Reset	Reset button

2.7. Product Number

According to customer requirements, Wport-W70-X (2MR) provides different configuration versions, as follows:
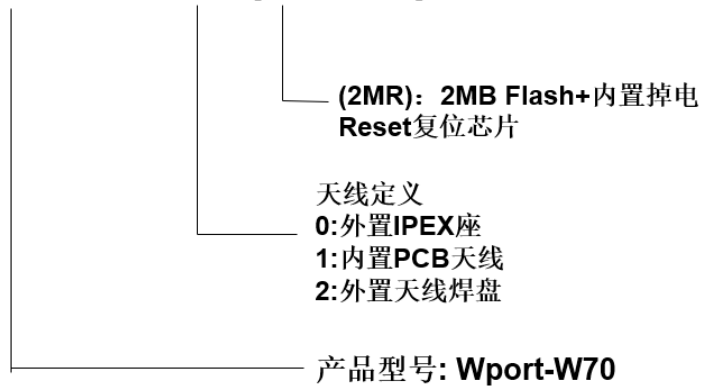
Wport-W70-X (XMR)

(2MR)：2MB Flash+内置掉电
Reset复位芯片

天线定义
0:外置IPEX座
1:内置PCB天线
2:外置天线焊盘

产品型号: **Wport-W70**

Figure 11.　Wport-W70-X(2MR) Product Number Definition

2.8. Typical Applications

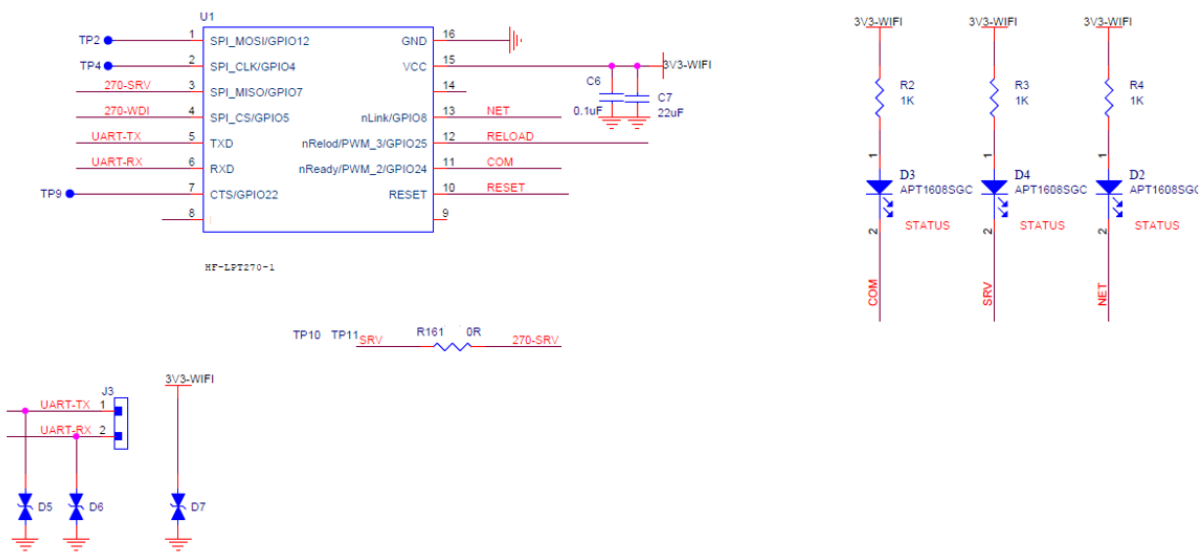### 2.8.1. UART Application Hardware Connection

Figure 12.　UART Application Hardware Connection

<Description>:

COM, SRV, NET - indicator lights, output, effective at low levels.

Select the corresponding indicator light to lead out as needed.

WDI - Watchdog feeding signal.

It can be connected to a 555 timer and can be selected for use according to needs.

Reload - Restores factory default settings, input, low level active.

When the button is pressed, pull the pin to the low level, release it after 4 seconds, restore the module to its factory settings, and then restart. If the pin function is not needed, leave it in a suspended state, i.e. no connection is required.

UART0_ TXD/RXD - Serial port data transmission and reception signal.
Connect to the main control MCU. If the main control MCU is 5V TTL, level conversion is required. Please contact us for detailed information.

3. NETWORK TOPOLOGY

The SWB1 acquisition rod core uses the Wport W70-X (2MR) module, and the product application architecture is shown in the following figure.
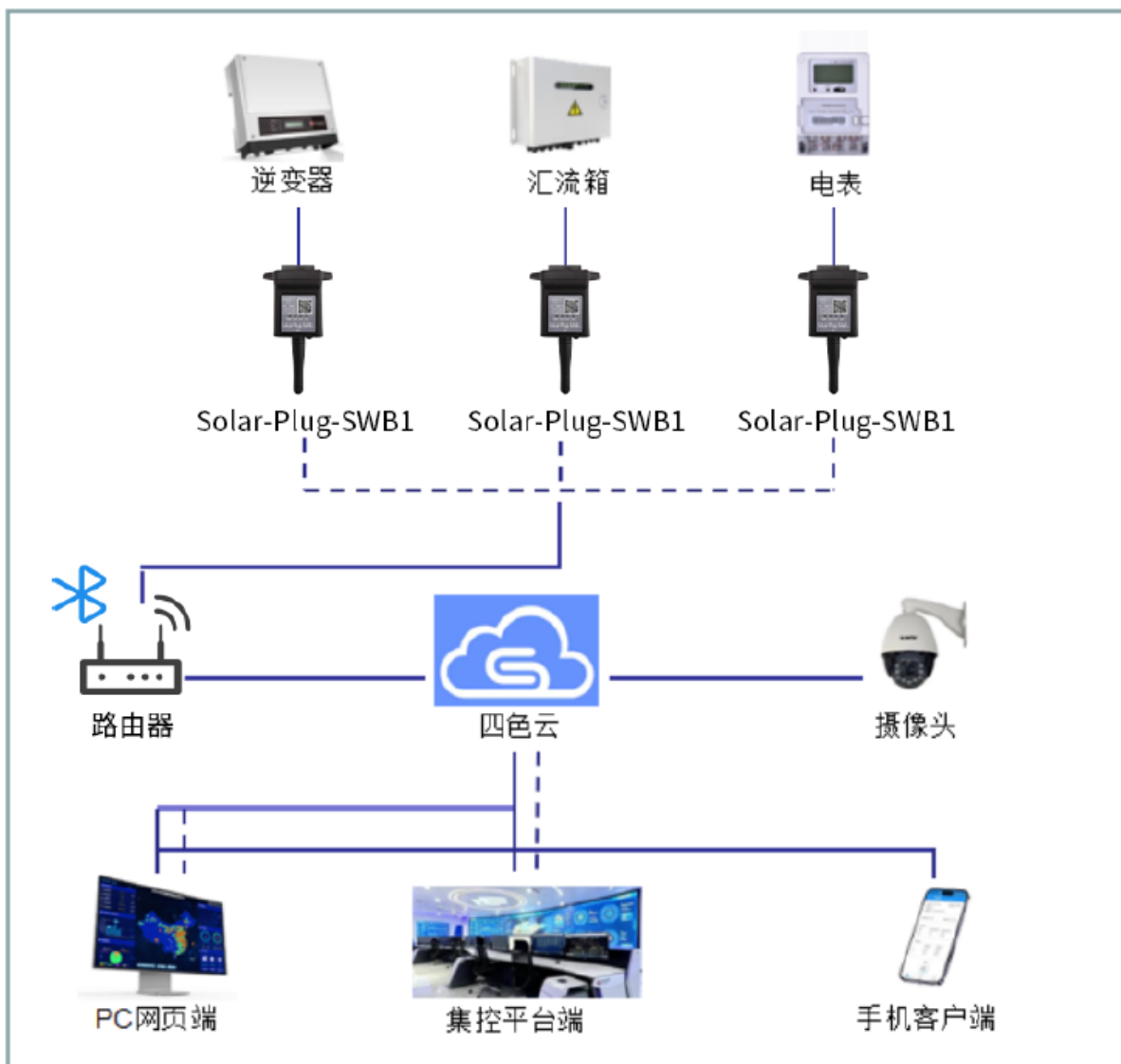

Figure 13.   Product Application Architecture Diagram

APPENDIX A: CONTACT INFORMATION

Website: www.hi-flying.com

Contact person:

Sales: sales@iotworkshop.com
Support: support@iotworkshop.com
Service: service@iotworkshop.com
Business: business@iotworkshop.com