EW1X(EW10 EW11 EW12) Series

RS232/RS485/TTL to Wi-Fi

User Manual

V 1.3

Overview of Characteristic

- ✧ **Support 802.11bgn Wireless Standard**
- ✧ **Support TCP/UDP/Telnet /Modbus TCP Protocol**

- **Support RS232/RS485/TTL to Wi-Fi Conversion, Serial Speed Up to 230400 bps**
- **Support STA/AP/AP+STA Mode**
- **Support SmartLink V8 Smart Config (Provide APP)**
- **Support Easy Configuration Through Web Interface or PC IOTService Tool**
- **Support Security Protocol Such As TLS/AES/DES3**
- **Support Webpage OTA Wirelss Upgrade**
- **Support Internal PCB Antenna**
- **Wide DC Input**
  - **Elfin-EW10, Elfin-EW11, Elfin-EW11,Elfin-EW10-0, Elfin-EW11-0,Elfin-EW12-0: 5~36VDC**
- **Size: 61 x 26 x 17.8 mm (L x W x H)**
- **FCC/CE/SRRC/IC Certificated**

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HISTORY

Ed. V1.0	07-04-2018	First Version
Ed. V1.1	09-18-2018	Fix LED description. Add more attachedment description.
Ed. V1.2	04-19-2019	Update baud rate, add accessories and external antenna.

1. PRODUCT OVERVIEW

1.1. General Description

The Elfin-EW1X provides RS232/RS485/TTL interface to Wi-Fi connectivity. The Elfin-EW1X integrate TCP/IP controller, memory, high-speed serial port and integrates a fully developed TCP/IP network stack and mbed OS. Elfin-EW1X also support remotely configure, monitor with IOTService.

The Elfin-EW1X using highly integrated hardware and software platform, it has been optimized for all kinds of applications in the industrial control, smart grid, personal medical application and remote control that have lower data rates, and transmit or receive data on an infrequent basis.

The Elfin-EW1X integrates all serial to Wi-Fi functionality with 61 x 26 x 17.8mm size.

1.2. Device Paremeters

Table1. Elfin-EW1X Technical Specifications

Item	Parameters
System Information	
Processor/Frequency	160MHz
Flash/SDRAM	2MB/352KB
Operating System	mbed
Network Protocol	
Network Protocol	IP，TCP，UDP，DHCP，DNS，HTTP Server/Client，ARP, BOOTP, AutoIP，ICMP，Web socket, Telnet, uPNP, NTP, Modbus TCP,MQTT
Security Protocol	TLS v1.2 AES 128Bit DES3
Wi-Fi Interface	
Standard	802.11 b/g/n
Frequency	2.412GHz-2.484GHz
Network Mode	STA/AP/STA+AP
Security	WEP/WPAPSK/WPA2PSK
Encryption	WEP64/WEP128/TKIP/ AES
Tx Power	802.11b: +18dBm (Max.) 802.11g: +16dBm (Max.) 802.11n: +15dBm (Max.)
Rx Sensitive	802.11b: -89dBm 802.11g: -81dBm 802.11n: -71dBm
Antenna	Internal:PCB
Serial Port	
Port Number	EW10:1 RS232;EW11:1 RS485;EW12:1 TTL
Data Bits	7,8

Stop Bit	1,2
Check Bit	None, Even, Odd
Baud Rate	TTL: 300 bps~230400 bps
Flow Control	No Flow Control Software Xon/ Xoff flow control
Software	
Web Pages	Http Web Configuration Customization of HTTP Web Pages
Configuration	Web CLI XML import Telnet IOTService PC Software
Basic Parameter	
Size	61 x 26 x 17.8 mm
Operating Temp.	-40 ~ 85°C
Storage Temp.	-45 ~ 105°C, 5 ~ 95% RH（no condensation）
Input Voltage	Elfin-EW10, Elfin-EW11,Elfin-EW11, Elfin-EW10-0, Elfin-EW11-0,Elfin-EW12-0: 5~36VDC
Working Current	~200mA
Power	<700mW

1.3. Key Application

The Elfin-EW1X device connects serial device to networks using the TCP/IP protocol:

- Industrial Automation
- Electricity and Energy
- Rail transit and public facilities
- Building Automation

2. HARDWARE INTRODUCTION

The Elfin-EW1X unit is a complete solution for serial port device connecting to network. This powerful device supports a reliable and proven operating system stored in flash memory, an embedded web server, a full TCP/IP protocol stack, and standards-based (AES) encryption.
Elfin-EW1X serial server for data transfer via Wi-Fi, which makes the data transformation very simple.

Figure 1. Elfin-EW10

Figure 2. Elfin-EW11

Figure 3. Elfin-EW12

2.1. Elfin-EW10 Pins Definition

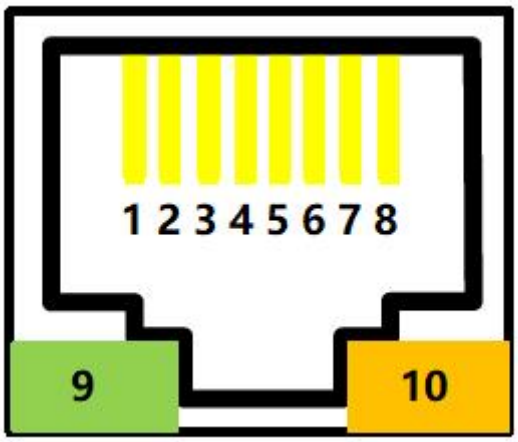


Figure 4. Elfin-EW10 RJ45 Interface Pin

Table2. Elfin-EW10 Interface Definition

Pin	Description	Net Name	Signal Type	Comment
1	GPIO	GPIO	IO	Reserved
2	GPIO	GPIO	IO	Reserved
3	GPIO	GPIO	IO	Reserved
4	Restore to Factory	nReload	I	**Default pulled-high.** **Detailed functions see <Notes>**
5	UART1_TXD	UART1_TXD	O	RS232 Voltage
6	UART1_RXD	UART1_RXD	I	RS232 Voltage
7	Power VCC	VCC	Power	5～18VDC
8	Power GND	GND	Power	
9	**Green LED** Net Status	Net	O	Boot On: Power is OK. 0.1s Off -> 0.1s On: SmartLink Config Mode 0.3s Off -> 3s On: STA mode connect to router or AP mode being connected by other STA. 0.3s Off ->0.3s On: No Wi-Fi Connection
10	**Amber LED** Data Transfer	Active	O	Off: No data transfer 0.3s Off -> 0.9s On: UART TX Output 0.3s Off -> 0.3s On: UART RX Receive On: UART bidirection.

2.2. Elfin-EW11 Pins Definition

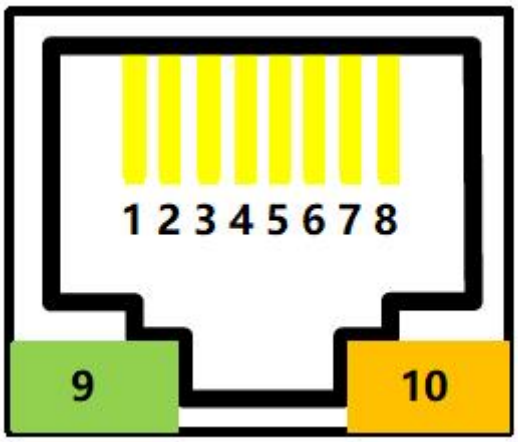


Figure 5. Elfin-EW11 RJ45 Interface Pin

Table3. Elfin-EW11 Interface Definition

Pin	Description	Net Name	Signal Type	Comment
1	Debug TX	UART2_TXD	O	TTL voltage
2	Debug RX	UART2_RXD	I	TTL voltage
3	GPIO	GPIO	IO	Reserved
4	Restore to Factory	nReload	I	**Default pulled-high.** **Detailed functions see <Notes>**
5	UART1_TXD	RS485_A+	IO	RS485 A+
6	UART1_RXD	RS485_B-	IO	RS485 B-
7	Power VCC	VCC	Power	5～18VDC
8	Power GND	GND	Power	
9	**Green LED** Net Status	Net	O	Boot On: Power is OK. 0.1s Off -> 0.1s On: SmartLink Config Mode 0.3s Off -> 3s On: STA mode connect to router or AP mode being connected by other STA. 0.3s Off ->0.3s On: No Wi-Fi Connection
10	**Amber LED** Data Transfer	Active	O	Off: No data transfer 0.3s Off -> 0.9s On: UART TX Output 0.3s Off -> 0.3s On: UART RX Receive On: UART bidirection.

2.3. Elfin-EW12 Pins Definition

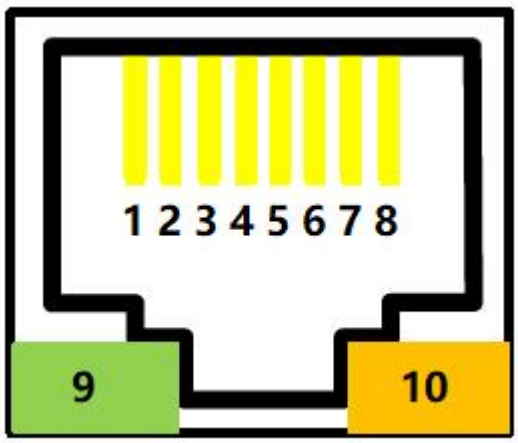


Figure 6. Elfin-EW12 RJ45 Interface Pin

Table4. Elfin-EW12 Interface Definition

Pin	Description	Net Name	Signal Type	Comment
1	GPIO	GPIO	IO	Reserved
2	GPIO	GPIO	IO	Reserved
3	GPIO	GPIO	IO	Reserved
4	Restore to Factory	nReload	I	**Default pulled-high.** **Detailed functions see <Notes>**
5	UART1_TXD	UART1_TXD	O	TTL Voltage
6	UART1_RXD	UART1_RXD	I	TTL Voltage
7	Power VCC	VCC	Power	5～36VDC
8	Power GND	GND	Power	
9	**Green LED** Net Status	Net	O	Boot On: Power is OK. 0.1s Off -> 0.1s On: SmartLink Config Mode 0.3s Off -> 3s On: STA mode connect to router or AP mode being connected by other STA. 0.3s Off ->0.3s On: No Wi-Fi Connection
10	**Amber LED** Data Transfer	Active	O	Off: No data transfer 0.3s Off -> 0.9s On: UART TX Output 0.3s Off -> 0.3s On: UART RX Receive On: UART bidirection.

<Notes>

I — Input; O — Output; I/O: Digital I/O; Power—Power Supply

nReload Pin (Button) function:

1. **After module is powered up, short press this button (0.2< "Low" <1.5s) and loose to make the module go into "SmartLink" config mode, waiting for APP to set password and other information. (See Appendix to download SmartLink APP)**
2. **After module is powered up, long press this button ("Low" > 4s) and loose to make the module recover to factory setting.**

UART1 Debug :

1. **Is used for debug log or firmware program. Baud Rate is 921600.**

2.4. RS232 Interface

Device RS232 does not support hardware flow control. The physical voltage is about ±7V.

2.5. RS485 Interface

RS485 use two wire links, A(DATA+), B(DATA-). Connect A(+) to A(+), B(-) to B(-) for communication. Suggest to connect GND together when interference is very severe.

The RS485 interface support maximum 32 485 device, device. The cable maximum length is 1200 meters. Need to add 120Ohm terminal resistor for over 300 meters.

2.6. Mechanical Size

The dimensions of Elfin-EW1X are defined as following picture (mm):

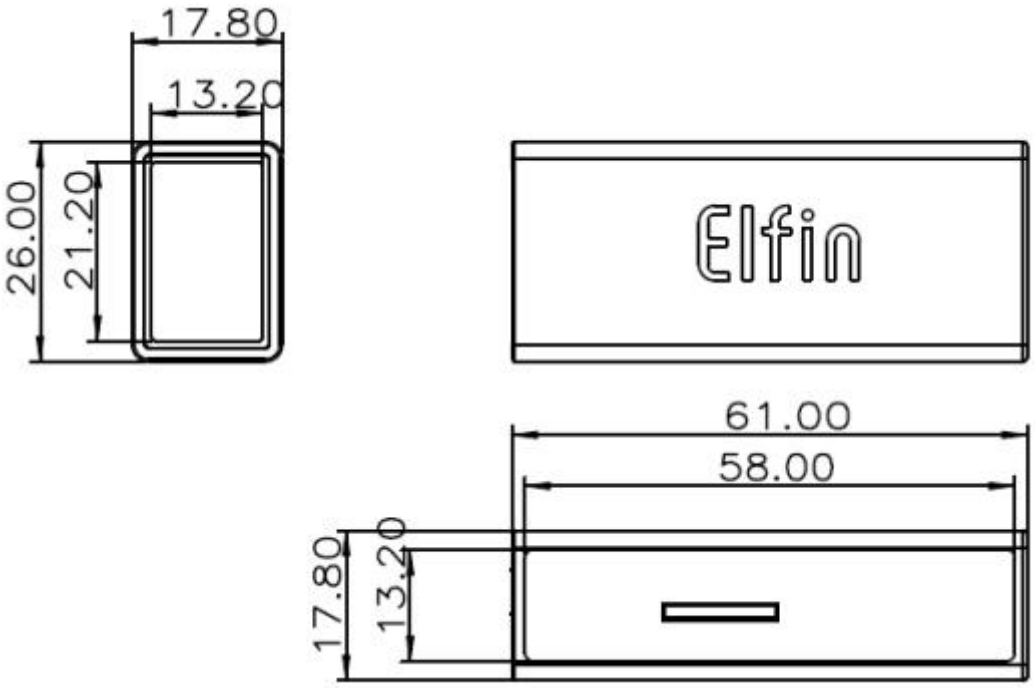


Figure 7. Elfin-EW1X Mechanical Dimension

2.7. RJ45 8PIN Connector

Figure 8. RJ45 8PIN Connector

Figure 9. EW10 +8PIN Connector

Figure 10. EW11+8PIN Connector

2.8. RJ45 4PIN Connector

Figure 11. RJ45 4PIN Connector

Figure 12. EW10 +4PIN Connector

Figure 13. EW11+4PIN Connector

2.9. EW10 Interface Conversion Cable

Figure 14. Interface Conversion Cable

May also make cable according to the following picture.

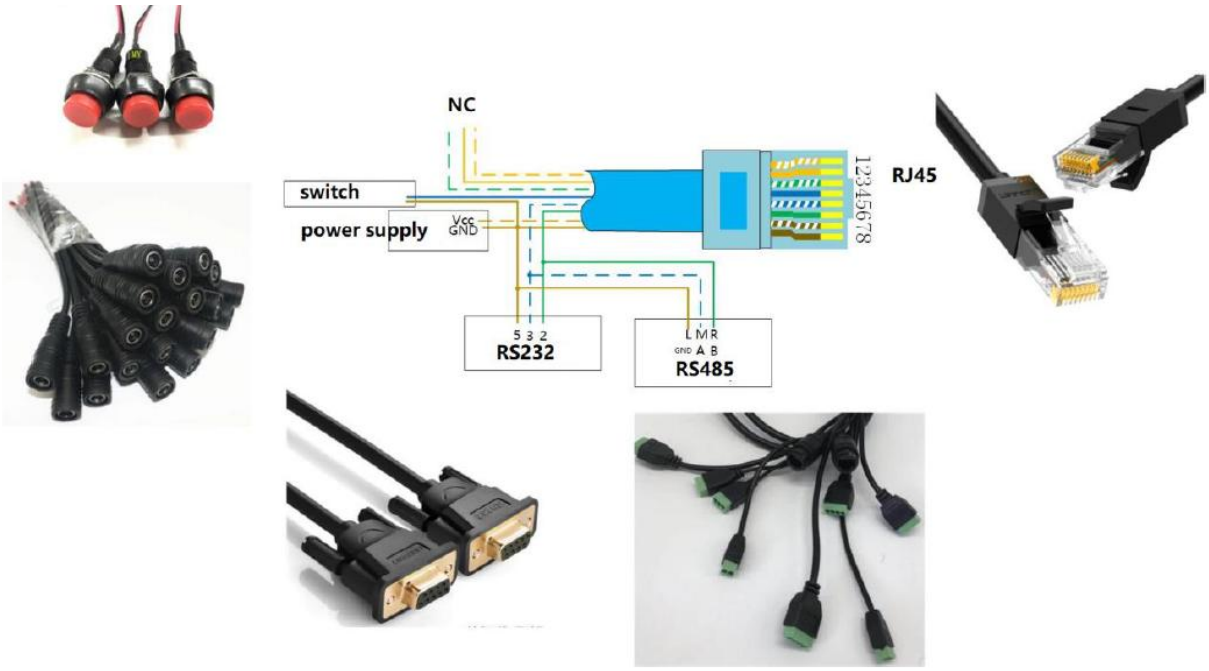


Figure 15. Cable Manufacture Guide

2.10. EW11 Interface Conversion Cable

Figure 16. Interface Conversion Cable

2.11. Fixed Bracket

Figure 17. Fixed Bracket

2.12. Rail Bracket

Figure 18. Rail Bracket

2.13. Bracket

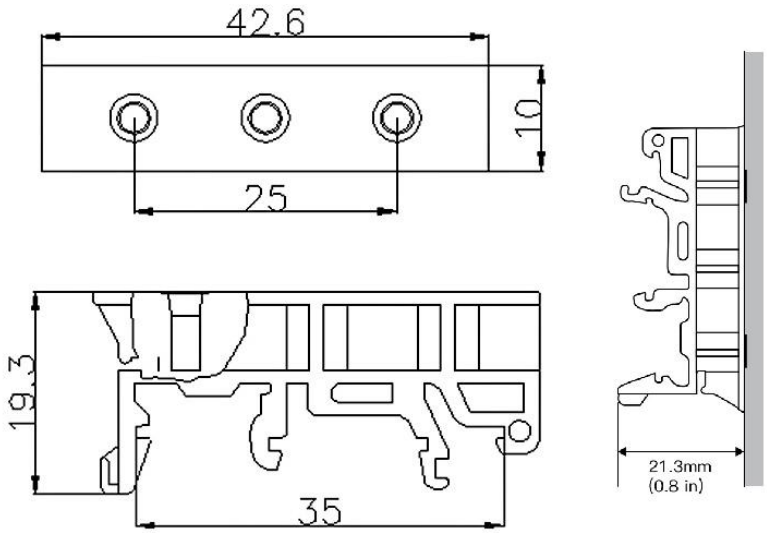


Figure 19. Bracket Size

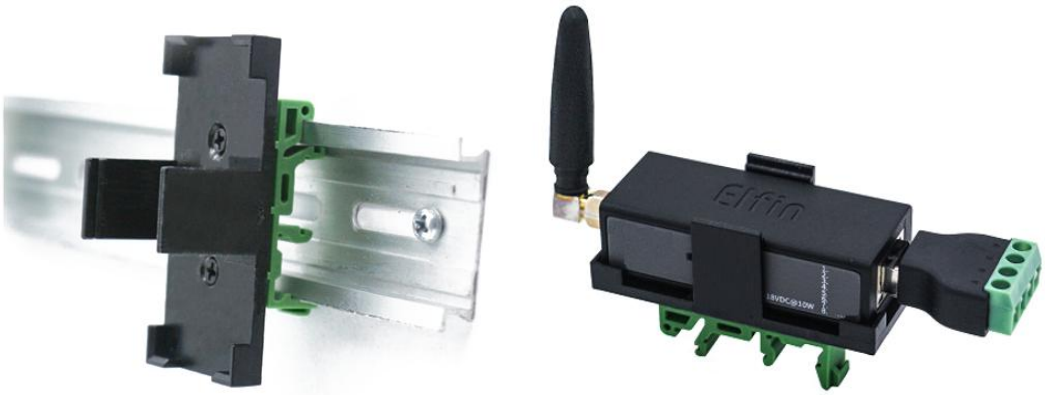


Figure 20. Bracket Install Picture

2.14. Product Installation

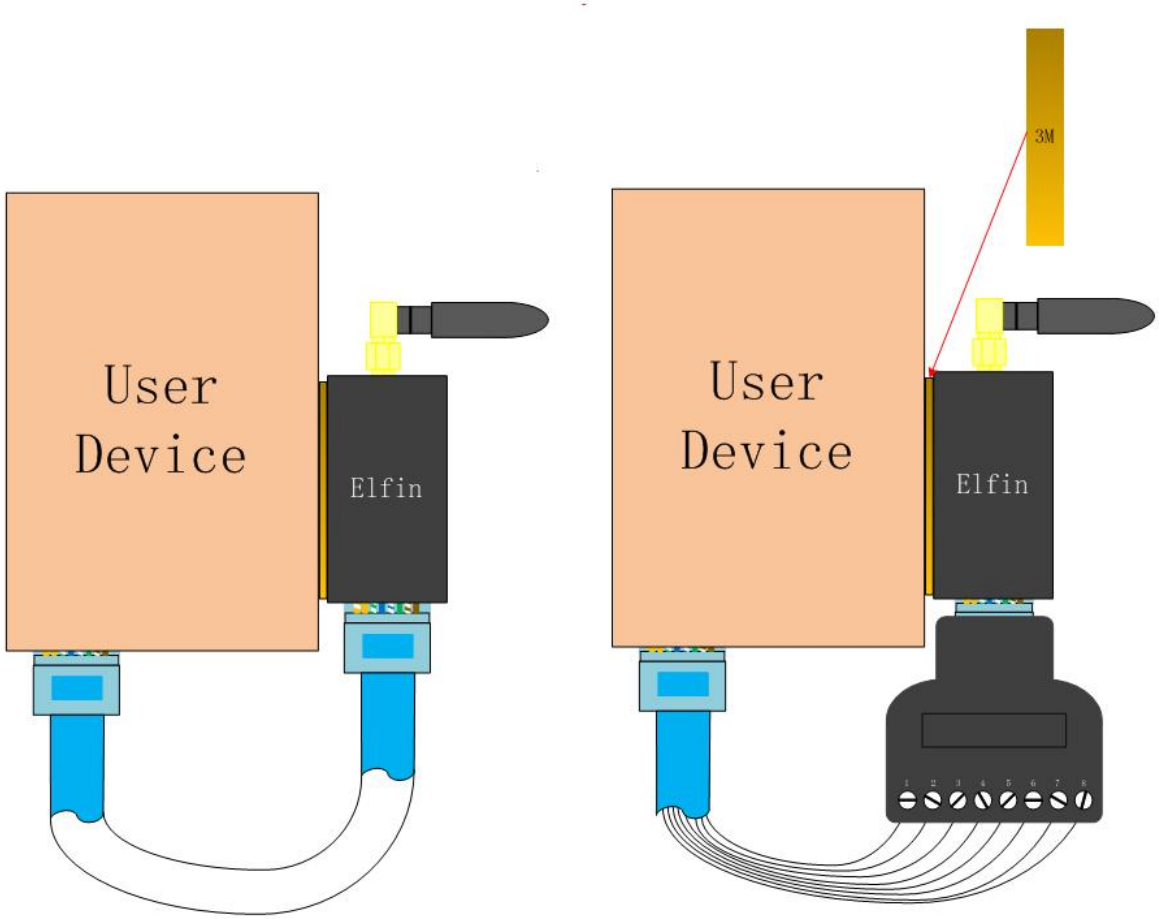


Figure 21. Product Installation

2.15. EVK

EVK indluce one Elfin device, one RJ45 Connector and one screw driver.

Figure 22. EVK Package

2.16. Order Information

Base on customer detailed requirement, Elfin-EW1X provide different configuration version, Details as below:

Function / Model	Power Input	Type	Antenna	UART	UART Number
Elfin-EW10	5~18VDC	Wi-Fi	Internal	RS232	1
Elfin-EW11	5~18VDC	Wi-Fi	Internal	RS485	1
Elfin-EW10-0	5~18VDC	Wi-Fi	External SMA	RS232	1
Elfin-EW11-0	5~18VDC	Wi-Fi	External SMA	RS485	1
Elfin-EW10A	5~36VDC	Wi-Fi	Internal	RS232	1
Elfin-EW11A	5~36VDC	Wi-Fi	Internal	RS485	1
Elfin-EW10A-0	5~36VDC	Wi-Fi	Extermal SMA	RS232	1
Elfin-EW11A-0	5~36VDC	Wi-Fi	External SMA	RS485	1

Figure 23. Elfin-EW1X Product Order Information

3. NETWORK STRUCTURE

3.1. Wireless Network

Product can be set as a wireless STA and AP as well. And logically, it supports two wireless interfaces, one is used as STA and the other is AP. Other STA devices can join into the wireless network through AP interface. So the it can provide flexible networking method and network topology.

<Introductions>

AP: Wireless access point which is the central joint. Usually, wireless router is a AP, other STA devices can connect with AP to join the network.

STA: Wireless station which is terminal of a wireless network. Such as laptop and pad etc.

3.1.1. AP Network

HF2211 can construct a wireless network as AP. All the STA devices will consider the AP as the centre of the wireless network. The mutual communication can be transponded by AP,shown as follow:

Figure 24. General AP Network

3.1.2. STA Wireless Network

Take the following picture as example. When router works in AP mode, HF2211 connects to the user’s devices by RS232/RS485/TTL interface. In this topology, the whole wireless network can be easily stretched.

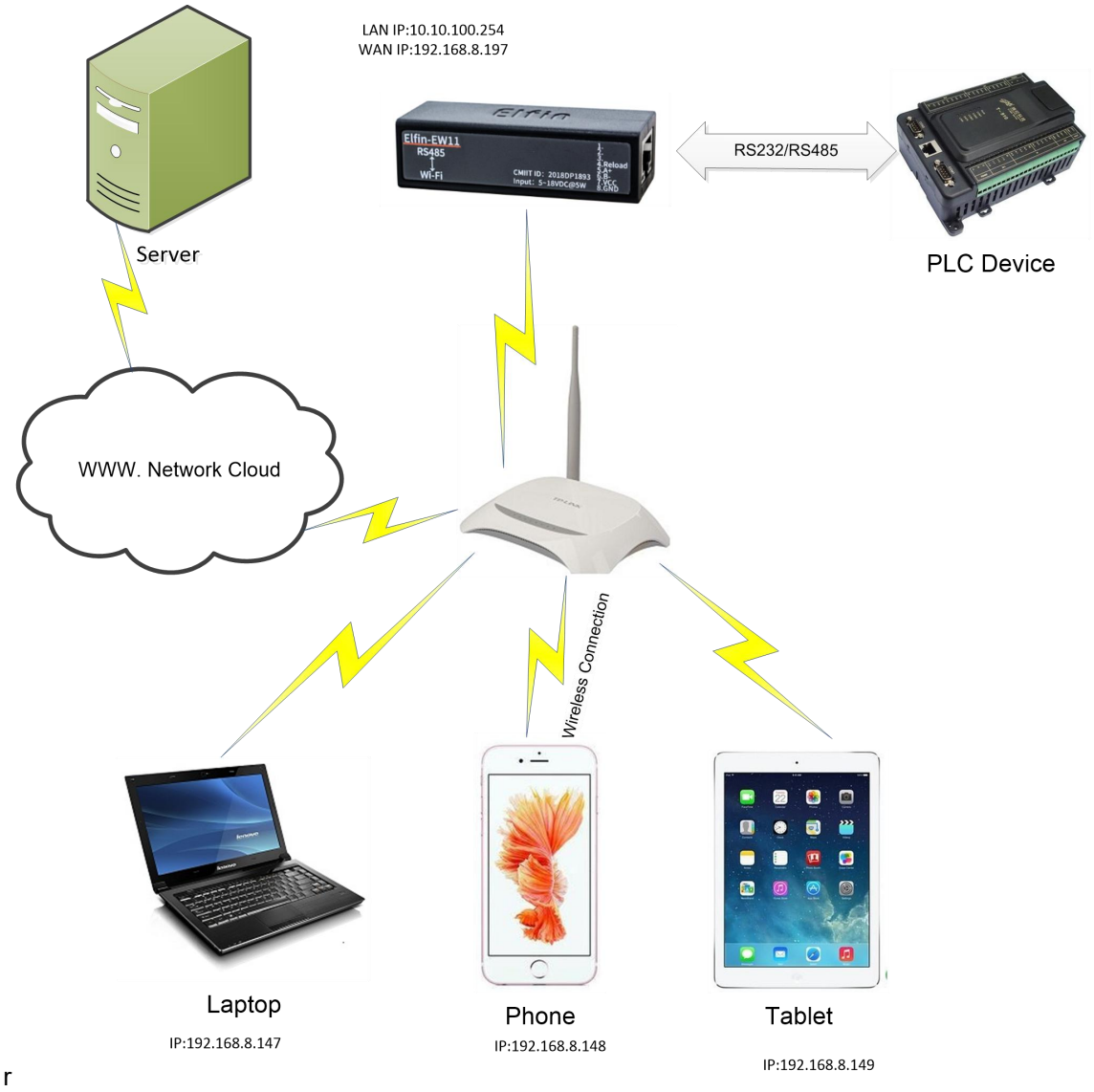


Figure 25. STA Application

3.1.3. AP+STA Wireless Network

HF2211 can support AP+STA method. It can support AP and STA interface at the same time.Shown as follow:

Figure 26. AP+STA Wireless Network

In this picture, open the AP+STA function and the STA interface can be connected to the remote server by the router. Similarly, the AP interface can also be used. Phone/PAD can be connected to the AP interface and to control the serial devices or set itself.

Through AP+STA function, it is convenient to use Phone/PAD to monitor the user’s devices and not change its original settings.

Notes that:

When the AP+STA function is opened, the STA interface needs to connect to other router. Otherwise, STA interface will endlessly scan the router information nearby. When it is scanning, it will bring bad effects to the AP interface, like losing data etc.

AP and STA parts must set to the different sub-network for the product working as APSTA mode.

Does not support Wi-Fi repeater function that means device works in AP+STA(STA connects to router), PC connects to device AP, but can not access to internet (If need this router function, use HF2211/HF2221)

3.1.4. IOTService Software

Open the IOTService after connect to the AP hotspot generated by HF2211 or connect to Product Ethernet port to PC, then configure the parameter.

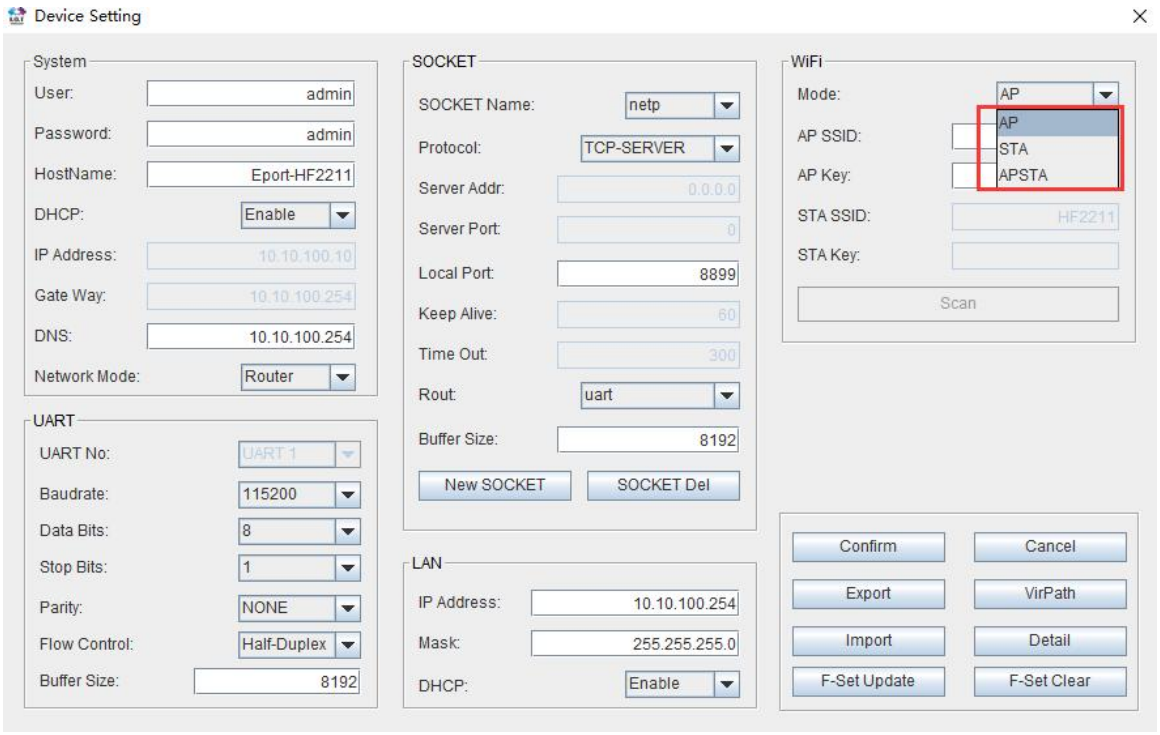
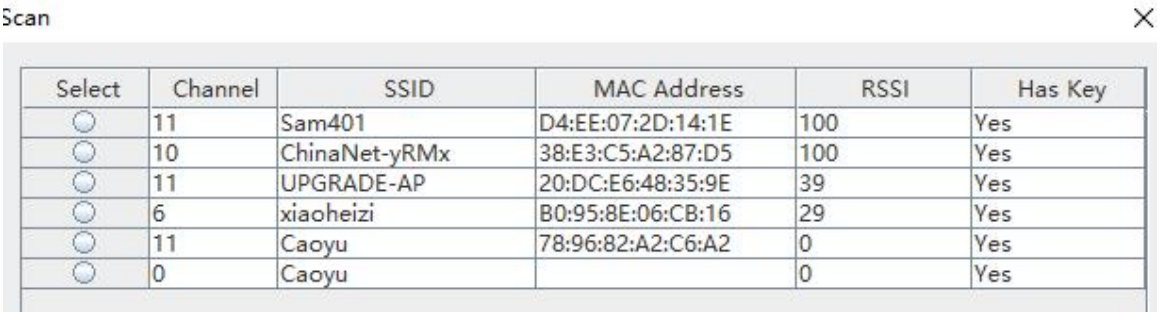


Figure 27. Configure Wi-Fi Parameter



Select	Channel	SSID	MAC Address	RSSI	Has Key
○	11	Sam401	D4:EE:07:2D:14:1E	100	Yes
○	10	ChinaNet-yRMx	38:E3:C5:A2:87:D5	100	Yes
○	11	UPGRADE-AP	20:DC:E6:48:35:9E	39	Yes
○	6	xiaoheizi	B0:95:8E:06:CB:16	29	Yes
○	11	Caoyu	78:96:82:A2:C6:A2	0	Yes
○	0	Caoyu		0	Yes

Figure 28. STA Scan Parameter

3.1.5. Webpage Configuration

Use PC to connect with HF2211 through its AP hotspot or Ethernet connection. Input the default IP(10.10.100.254, default username and password: admin/admin) to login the webpage to configure the parameter.

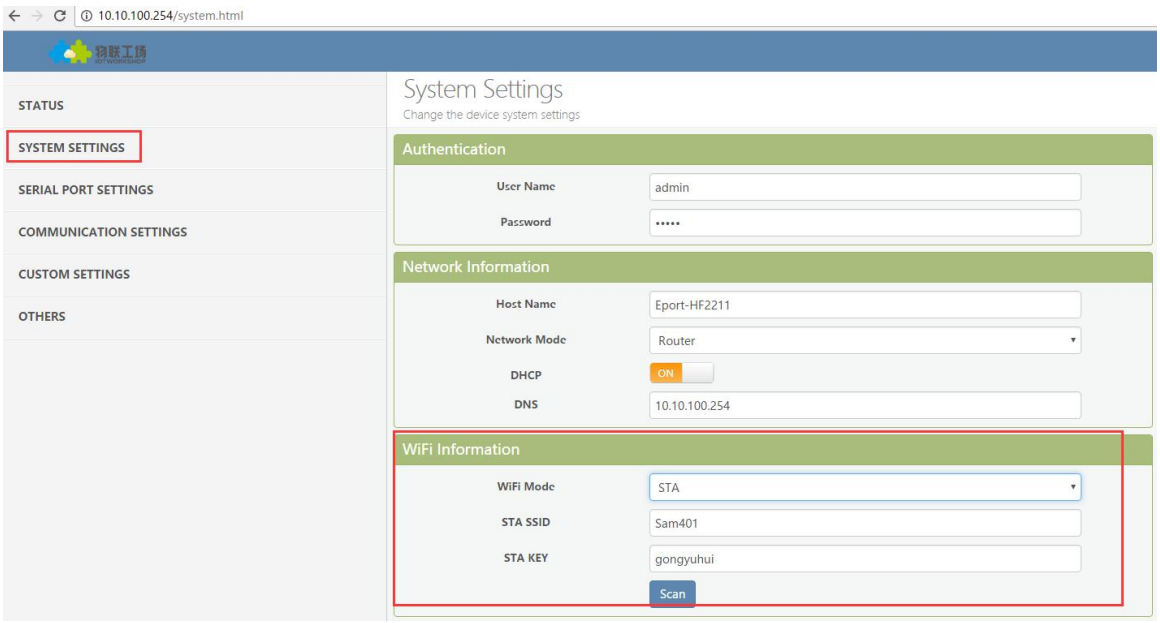
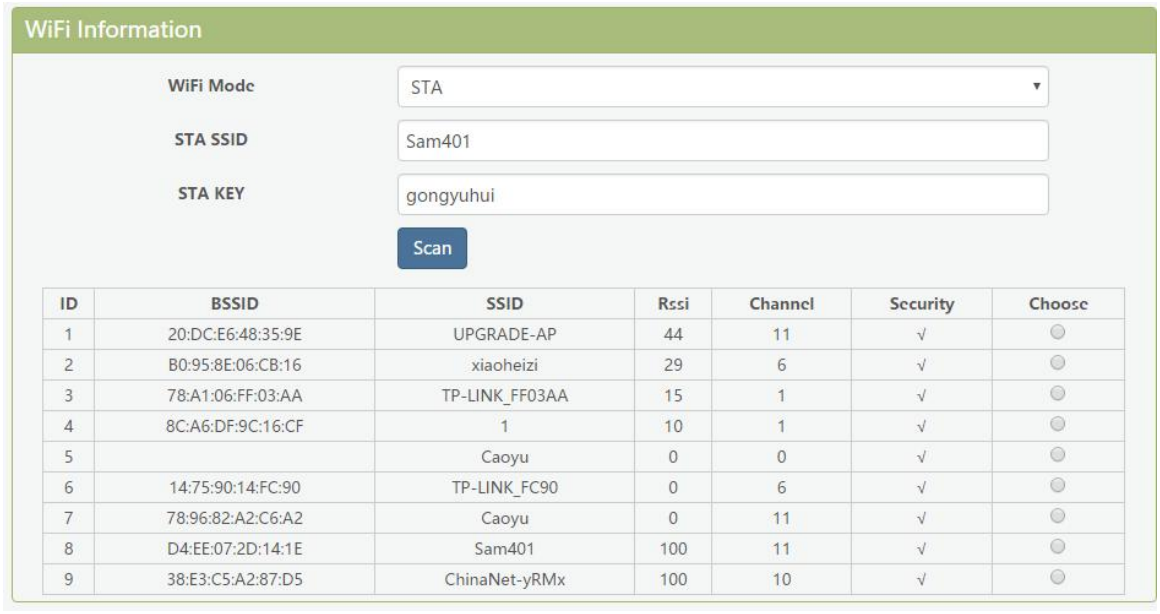


Figure 29. Configure the Wi-Fi Parameter



ID	BSSID	SSID	Rssi	Channel	Security	Choose
1	20:DC:E6:48:35:9E	UPGRADE-AP	44	11	√	
2	B0:95:8E:06:CB:16	xiaoheizi	29	6	√	
3	78:A1:06:FF:03:AA	TP-LINK_FF03AA	15	1	√	
4	8C:A6:DF:9C:16:CF	1	10	1	√	
5		Caoyu	0	0	√	
6	14:75:90:14:FC:90	TP-LINK_FC90	0	6	√	
7	78:96:82:A2:C6:A2	Caoyu	0	11	√	
8	D4:EE:07:2D:14:1E	Sam401	100	11	√	
9	38:E3:C5:A2:87:D5	ChinaNet-yRMx	100	10	√	

Figure 30. STA Scan

4. FUNCTION DESCRIPTION

Refer to “IOT_Device_Series_Software_Funtion” document for more detailed function.

APPENDIX A: CONTACT INFORMATION

Address: Room 1002,Building 1,No.3000,Longdong Avenue,Pudong New Area,Shanghai,China,201203
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