HF2211A Serial Server Device User Manual

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Product Information

Specifications

- MIPS MCU with 4MB Flash and 8MB SRAM
- Run on eCos
- Support TCP/IP/Telnet/Modbus TCP Protocol
- Support RS232/RS422/RS485 to Ethernet/Wi-Fi Conversion
- Serial Speed Upto 230400 bps
- Support STA/AP/AP+STA Mode
- Support Router or Bridge Network Working Mode
- Support Easy Configuration Through a Web Interface or PC IOTService Tool
- Support Security Protocol Such As TLS/AES/DES3
- Support Web OTA Wireless Upgrade
- Wide DC Input 5~36VDC
- Size: 95 x 65 x 25 mm (L x W x H)

Product Usage Instructions

General Description

The HF2211A provides RS232/RS485/RS422 interface to Ethernet/Wi-Fi connectivity to web enable any device. It integrates a TCP/IP controller, memory, 10/100M Ethernet transceiver, high-speed serial port, and a fully developed TCP/IP network stack and eCos OS. The HF2211A also includes an embedded web server used to remotely configure, monitor, or troubleshoot the attached device.

Device Parameters

The HF2211A is the substitute type of HF2211 with the same software function. It integrates all serial to Ethernet functionality with a compact size of 95 x 65 x 25 mm.

FAQ

Q: What is the substitute type of HF2211?

A: The substitute type of HF2211 is HF2211A, which has the same software function.

Overview of Characteristic

- MIPS MCU with 4MB Flash and 8MB SRAM. Run on eCos
- Support TCP/IP/Telnet /Modbus TCP Protocol
- Support RS232/RS422/RS485 to Ethernet/Wi-Fi Conversion, Serial Speed Upto 230400 bps
- Support STA/AP/AP+STA Mode
- Support Router or Bridge Network Working Mode.
- Support Easy Configuration Through a Web Interface or PC IOTService Tool
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HISTORY

- Ed. V1.0 08- 16-2021 First Version
- Ed. V1.1 05- 10-2022 Revision Version

PRODUCT OVERVIEW

General Description
The HF2211A provides RS232/RS485/RS422 interface to Ethernet/Wi-Fi connectivity to web enable any device. The HF2211A integrate TCP/IP controller, memory, 10/ 100M Ethernet transceiver, highspeed serial port and integrates a fully developed TCP/ IP network stack and ECos OS. The HF221 1A also includes an embedded web server used to remotely configure, monitor, or troubleshoot the attached device.
The HF2211 A 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 HF2211A integrates all serial to Ethernet functionality with 95 x 65 x 25mm size. HF2211A is the substitute type of HF2211, software function is the same with HF2211

Device Paremeters

Table 1. HF2211A Technical Specifications

Item	Parameters
System Information	
Processor/ Frequency	MIPS/320MHz
Flash/ SDRAM	4MB/8 MB
Operating System	eCos
Ethernet Port	
Port Number	1 RJ45 1 WAN/ LAN switchable
Interface Standard	10/ 100 Base-T Auto-Negotiation
Protection	8 KV Isolation
Transformer	Integrated
Network Protocol	IP, TCP, UDP, DHCP, DNS, HTTP Server/Client, ARP, BOOTP, AutoIP, ICMP, Web socket, Telnet, uPNP, NTP, Modbus TCP
Security Protocol	TLS v 1.2 AES 128Bit DES3
Wi- Fi Interface	
Standard	802. 1 1 b/g/n
Frequency	2.412GHz-2.484GHz
Network Mode	STA/ AP/ STA+AP
Security	WEP/ WPAPSK/ WPA2 PSK
Encryption	WEP64/ WEP128/ TKIP/ AES
Tx Power	802. 1 1b: +20dBm (Max.)
	802 . 11g: + 18dBm (Max.) 802 1 1n: + 15dBm (Max)
Rx Sensitive	802. 1 1b: -89dBm 802. 11g: -81dBm 802 1 1n: -71dBm
Antenna	3 dBi Stick Antenna
Serial Port	
Port Number	1 RS232/RS485/RS422

Interface Standard	RS2 32 : DB9 RS4 8 5 / RS4 2 2 : 5 . 0 8 mm connector Support one channel of RS2 3 2 / RS4 2 2 / RS4 8 5 .
Data Bits	8
Stop Bit	1,2
Check Bit	None, Even, Odd
Baud Rate	TTL: 2400 bps~230400 bps
Flow Control	No Flow Control Hardware RTS / CTS, DSR / DTR (RS23 2) flow control is not supported 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
Firmware Upgrade	Web
Basic Parameter	
Size	95 x 65 x 25 mm
Operating Temp.	-25 ~ 85°C
Storage Temp.	-45 ~ 105°C, 5 ~ 95% RH (no condensation)
Input Voltage	5~36VDC
Working Current	~200mA
Power	<700mW

Key Application

The HF2211 A device connects serial device to Ethernet networks using the TCP/ IP protocol:

- Remote equipment monitoring
- Asset tracking and telemetry
- Security Application
- Industrial sensors and controls
- Medical devices

- ATM machines
- Data collection devices
- Universal Power Supply (UPS) management units
- Telecommunications equipment
- Data display devices
- Handheld instruments
- Modems
- Time/ attendance clocks and terminals

HARDWARE INTRODUCTION

The HF2211 A unit is a complete solution for serial port device connecting to network. This powerful device supports a 10/ 100BASE-T Ethernet connection, 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.

Interface Definition

Figure 2. HF2211A Interface

Table 2. HF2211A Interface Definition

Function	Name	Description
External Interface	RJ45 Ethernet	10/ 100M Ethernet Default is WAN function in AP mode (Can be configured to LAN Fu nction), connect to router LAN port for network access. In STA mode, it works in LAN function.
	SMA	Antenna SMA Interface
	RS232	RS2 3 2 Communication
	RS485/ RS422	RS4 8 5 / RS4 2 2 Communicaton
	Earth	Protect Earth
	DC Input	DC Power 5 ~ 36 V
LED Indicator	Power	Internal Power Supply Indicator On Power is OK Off Power is NG
	Link	Network Connection Indicator On: Include the following condition. Ethernt 2 connection OK Wi-Fi STA connect to AP Wi-Fi AP being connected by other STA device Off: No network connection
	Active	Data transfer Indicator On Data is transfering. Off No data transfer
Button	Reload	Restore to factory setting Long press this button for 4 seconds and loose it to restore paramet ers to factory setting.
Switch	Protect	Device parameter protect On: Enable protect, working parameter can not be modified. Off: Disable protect

RS232 Interface

Device serial port is male(needle), RS232 voltage level(can connect to PC directly), Pin Order is cosistent with PC COM port. Use cross Cable connected with PC(2-3 cross, 7-8 cross, 5-5 direct, 7-8 no connection), see the following table for pin defination.

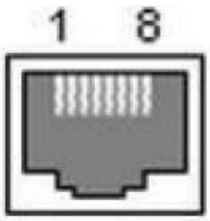


Figure 6. RJ45 Pin Defination

Table 3. RS232 Interface

Pin Number	Name	Description
2	RXD	Receive Data
3	TXD	Send Data
5	GND	GND
7	RTS	Request to Send
8	CTS	Clear to Send

RS485 Interface

RS485 use two wire links, A(DATA+), B(DATA-). Connect A(+) to A(+), B(-) to B(-) for communication. The RS485 interface support maximum 32 485 device, special hardware version can support max 255 device. The cable maximum length is 1200 meters. Need to add 120Ohm terminal resistor for over 300 meters.

RS422 Interface
RS4 22 interface use T+/T-/R+/R-, cross-connect to device as the following picture.

Name	**Description**
TX+	Transfer Data+
TX-	Transfer Data-
RX+	Receive Data+
RX-	Receive Data-

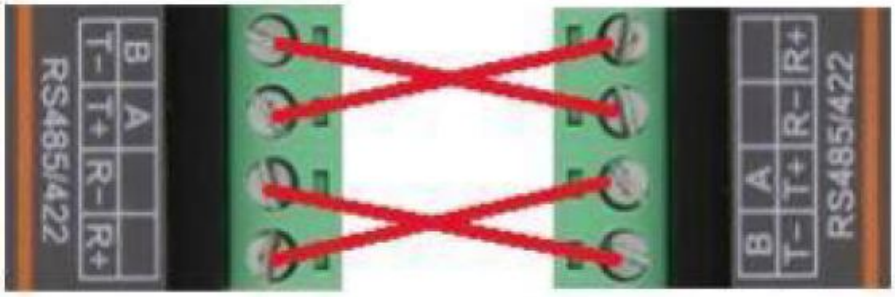


Figure 5. HF2211A RS422 Connection

RJ45 Interface
Ethernet port is 10M/ 100M adaptive, support AUTO MDI/MDIX which means it support direct connecting to PC with Ethernet cable.

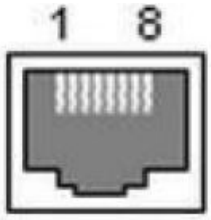


Figure 6. RJ45 Pin Defination

Table 4. RJ45 Interface

Pin Number	Name	Description
1	TX+	Transfer Data+
2	TX-	Transfer Data-
3	RX+	Receive Data+
4	PHY- VCC	Transformer Tap Voltage
5	PHY- VCC	Transformer Tap Voltage
6	RX-	Receive Data-
7	N.C.	None Connect
8	N.C.	None Connect

Mechanical Size
The dimensions of HF2211A are defined as following picture (mm):

Figure 7. HF2211A Mechanical Dimension

Rail Mounting

We support to provide rail for mounting as the following picture.

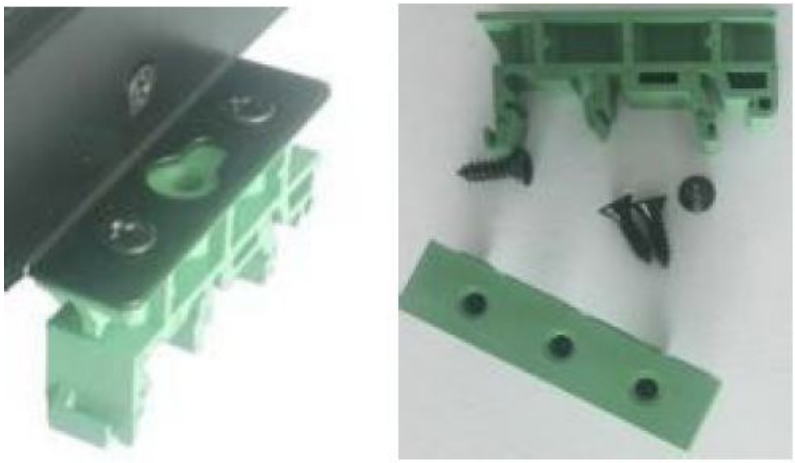


Figure 8. HF2211A Rail

Order Information

HF2211A is defined as following:

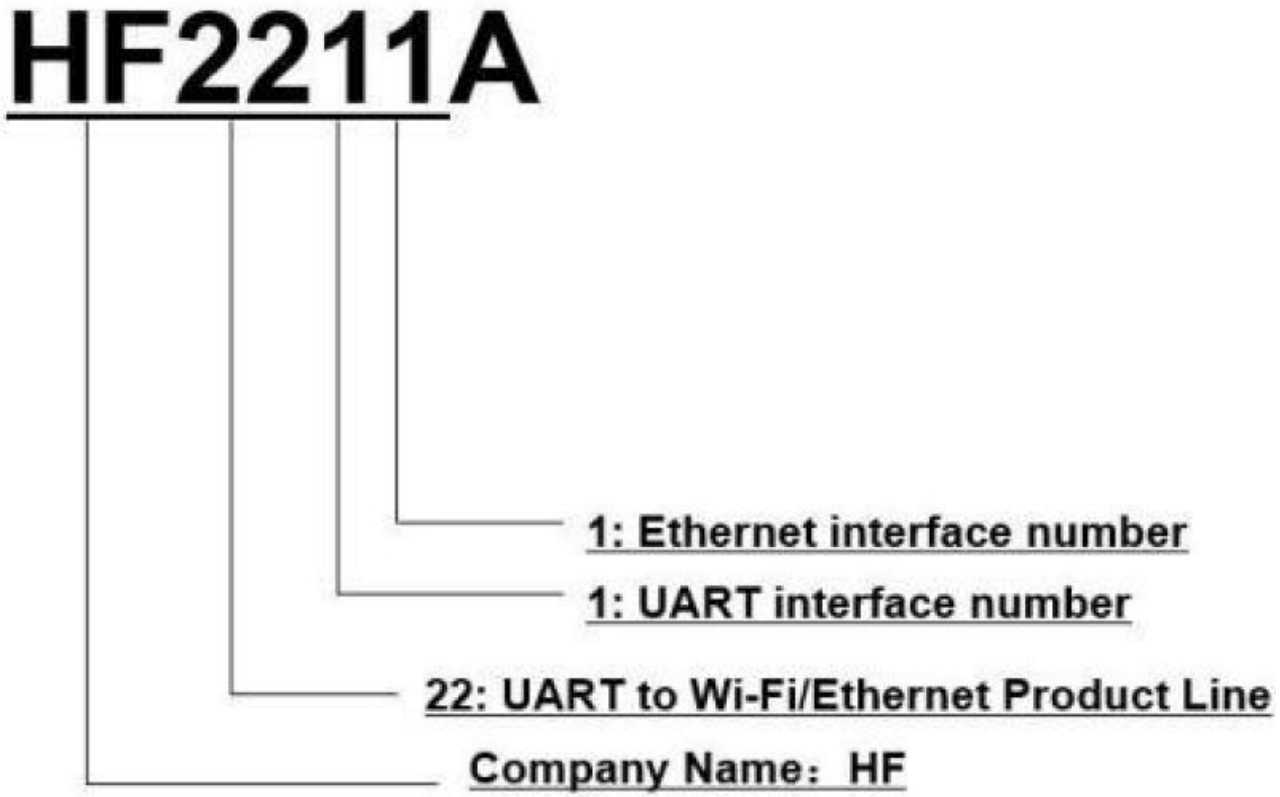


Figure 9. HF2211A Product Order Information

NETWORK STRUCTURE

Wireless Network

HF2211A 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. Functions is as follow:

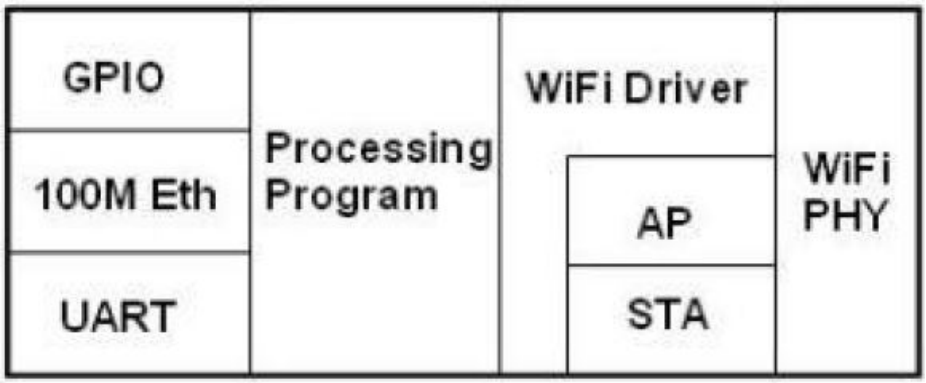


Figure 1 1. HF2211A Function Structure

< 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.

AP Network

HF2 211A 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 12. General AP Network

STA Wireless Network

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

r

Figure 13. STA Application

AP+STA Wireless Network

HF2 211 A can support AP+STA method. It can support AP and STA interface at the same time.Shown as follow:

Figure 14. AP+STA Wireless Network

- In this picture, HF2211 A 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.
- Through AP+ STA function, it is convenient to configure the product. And it solves the problem that the formal product can only configure by serial port.

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.

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

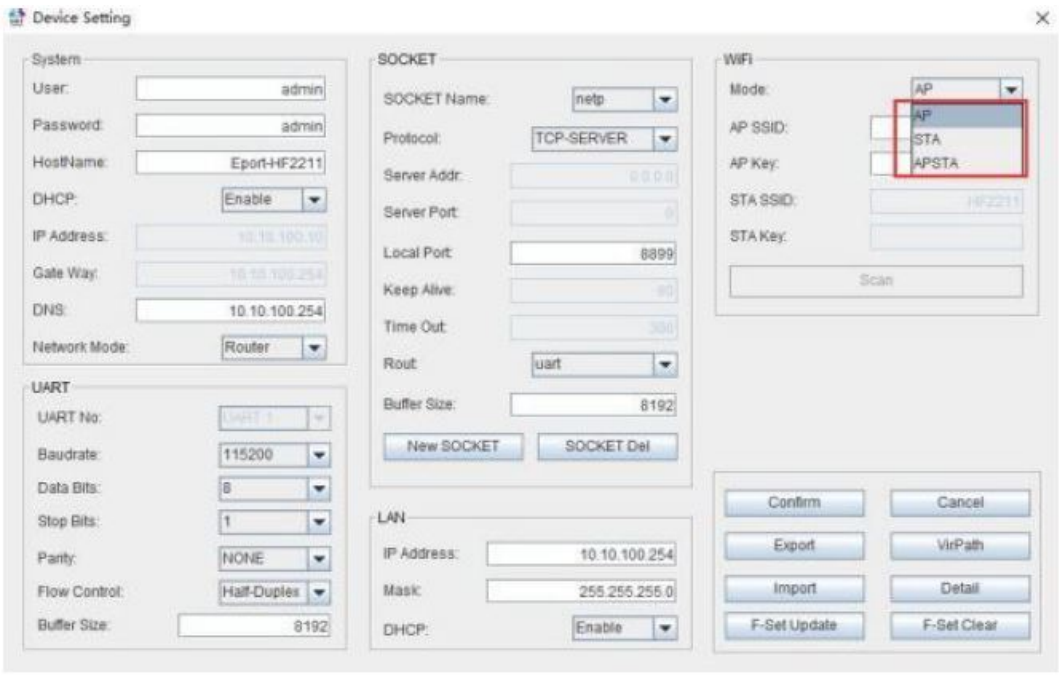


Figure 16. Configure Wi-Fi Parameter

Scan

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 17. STA Scan Parameter

Webpage Configuration

Use PC to connect with HF2211 A 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.

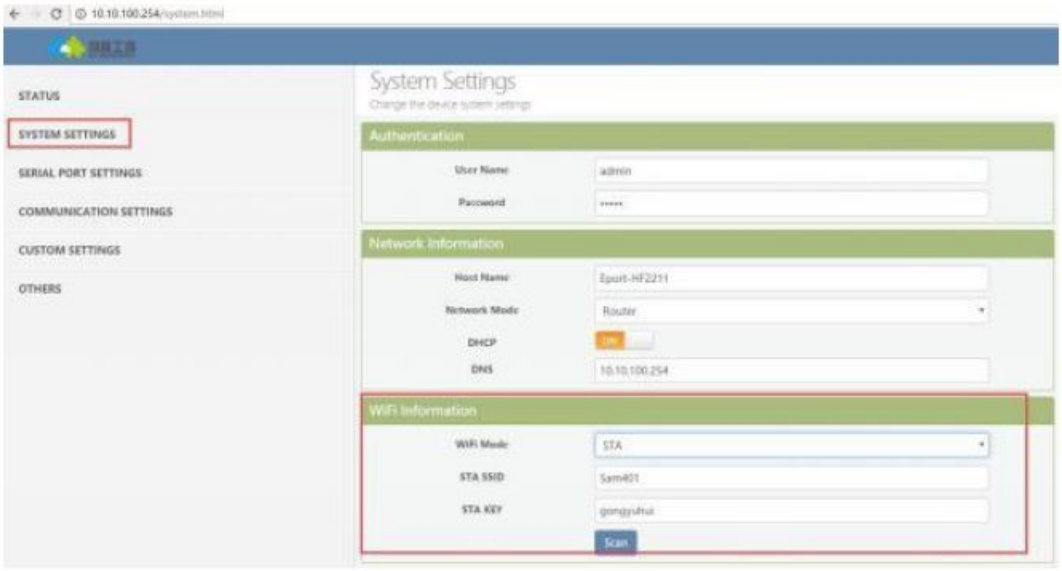
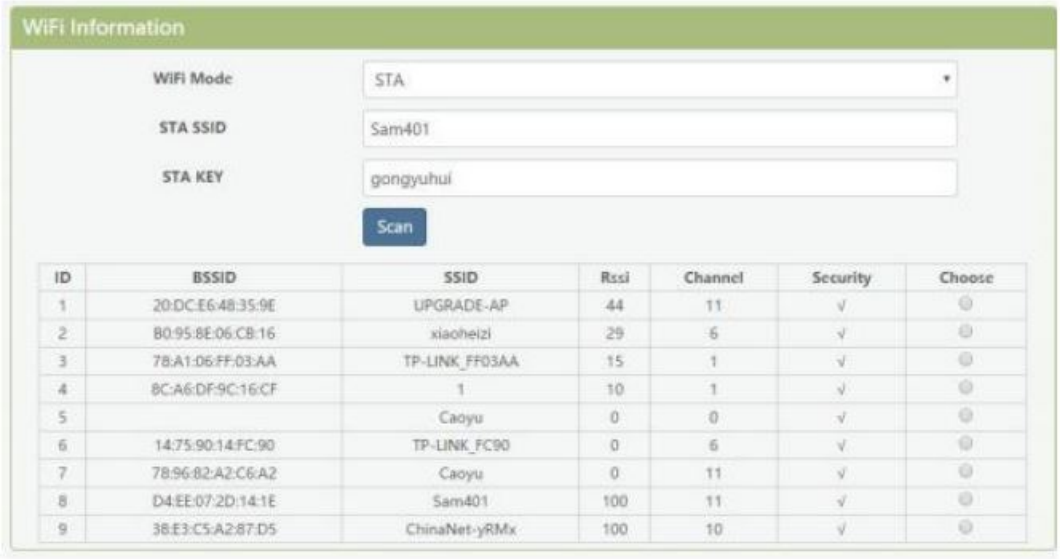


Figure 18. Configure the Wi-Fi Parameter



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 19. STA Scan

Ethernet Interface Function

HF2 211A provides with a 100M Ethernet interface. Through the 100M Ethernet interface, user can achieve the connection among WIFI, serial port and Ethernet port.

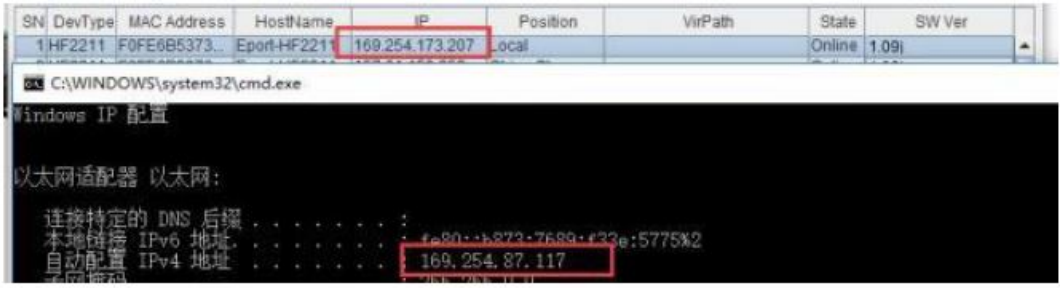
Ethernet Port with Wi-Fi

Figure 20. Ethernet Interface Function

HF2 211 A servers as APSTA and generate a central network. The IP addresses of all the devices and module’ s are in the same network segment.

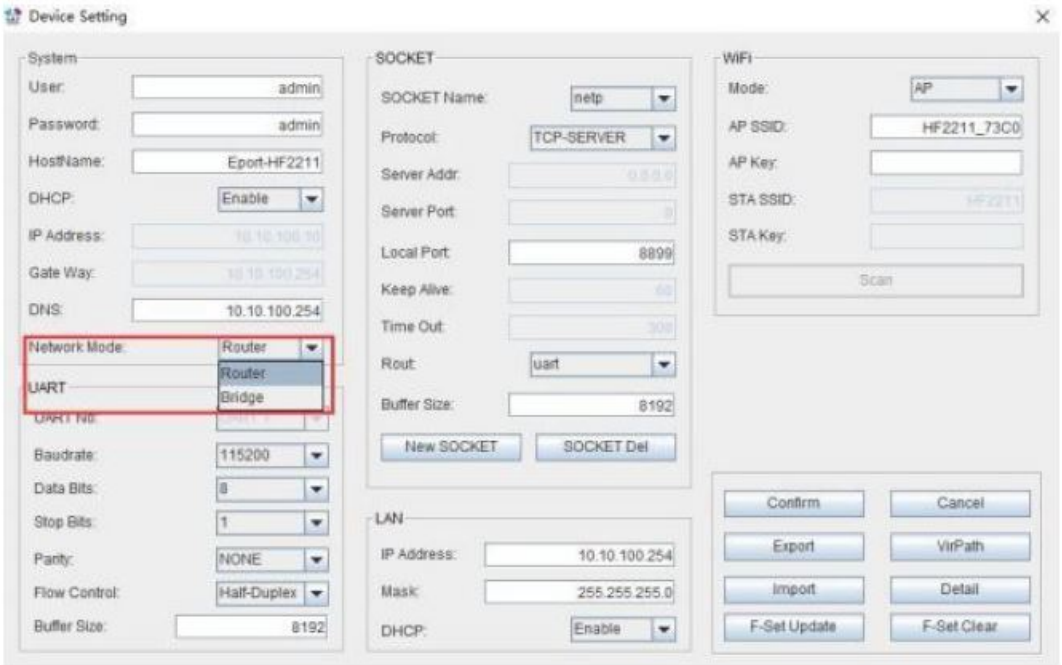
Note

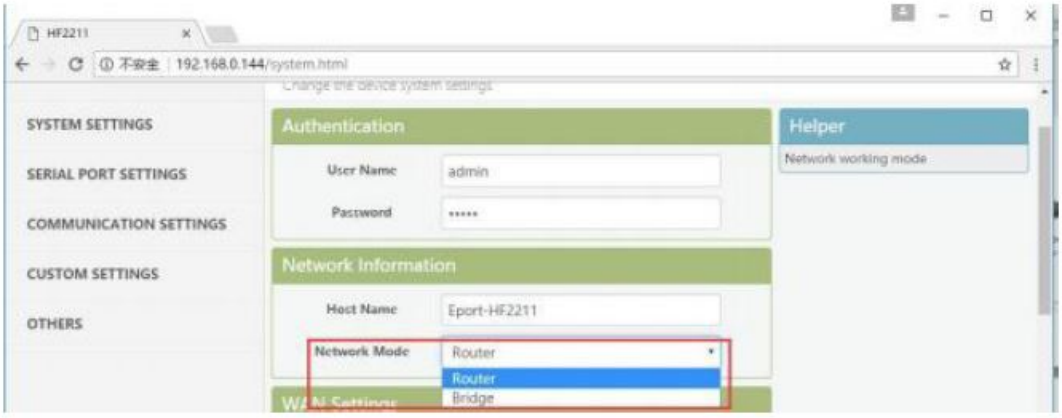
If product works in AP mode, then the Ethernet is working as WAN mode, PC will use Auto-IP to set its IP when connect via Ethernet. Better to change via Wi-Fi, then the PC and other devices are all in same subnetwork. (10.10.100.xxx)



Ethernet Interface Function(Router)

The HF2211 A device Ethernet interface work in router mode. When connect to router, it will get IP address from router(as picture 192. 168. 1. 100). The product itself generate a subnet(10. 10. 100.254 default). The device from the Ethernet interface is assigned with IP address by module (10.10.100.101).Then the device and the PC1 are in the same subnet for network communication. A connection fro PC1 to PC2, but PC2 cannot actively connect to PC1.

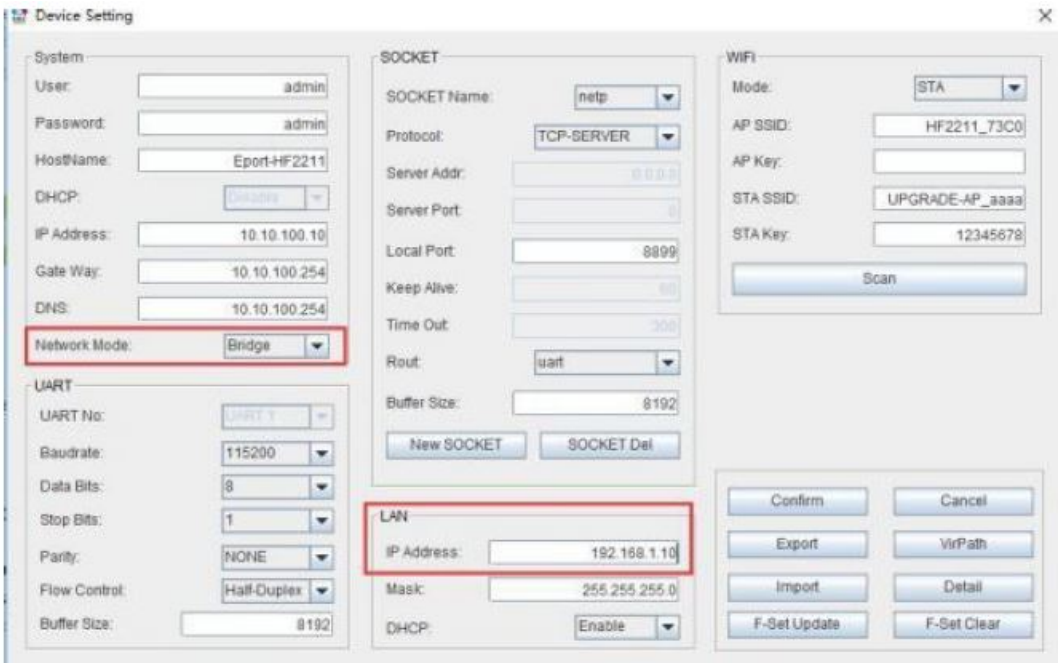




Ethernet Port Function(Bridge)

The HF2211 A device Ethernet interface work in router mode. When connect to router, it will get IP address from router(as picture 192. 168. 1. 101). AT the whole network, the product is like an invisible device. PC1 ad PC2 can communicated mutually without any constraint. But if product needs to connect with other devices, it needs set LAN IP address(192. 168. 1. 10 as picture)

Notes:
Webpage, IOTService, or Cli command to set working mode, by default is router mode. It need reboot when change its working mode



FUNCTION DESCRIPTION

Refer to “IOT_ Device_ Series_ Software_ Funtion” document for more detailed function.

FCC Regulations

- 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, and (2) this device must accept any interference received, including interference that may cause undesired operation.
- 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.
- Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

FCC RF Radiation Exposure Statement
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. To comply with FCC RF Exposure compliance requirements, this grant is applicable to only Mobile Configurations. The antennas used for the transmitter must be installed to provide a separation distance of at least 20cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

http://www.iotworkshop.com

APPENDIX A: REFERENCES

A.1 Test Tools
IOTService Configure Software:
http://www.hi-flying.com/download-center-1/applications-1/download-item-iotservice UART Network Test software:
http://www.hi-flying.com/index.php?route=download/category&path=1_4

APPENDIX B: CONTACT INFORMATION

- **Web: www.iotworkshop.com** or **www.hi-flying.com**

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

Documents / Resources

	HF HF2211A Serial Server Device [pdf] User Manual HF2211A, HF2211A Serial Server Device, Serial Server Device, Server Device, Device

References

- HI-FLYING.COM
- HI-FLYING.COM
- User Manual