

HF9624

4G PLC Remote Control Serial Server

User Manual

V 1.0



Overview of Characteristic

- ✧ MIPS MCU with 16MB Flash and 64MB SRAM. Run with Linux OpenWrt
- ✧ Support 4G/3G/GPRS, FDD-LTE, TDD-LTE, WCDMA, TD-SCDMA, CDMA2000, CDMA 1X/EVDO, GSM900/1800
- ✧ Support Virtual COM, Virtual Path Connect to PLC for Remote Monitor
- ✧ Two RS232/RS485/RS422 interface to 4G/3G/2G
- ✧ Two Ethernet to 4G/3G/GPRS

- ✧ **Support 802.11bgn Wi-Fi to 4G/3G/GPRS**
- ✧ **Support APN network**
- ✧ **Support VPN (PPTP, L2TP, L2TP+IPSEC)**
- ✧ **Support TCP/IP/Telnet/Modbus TCP Protocol, support TLS/AES/DES3 encryption**
- ✧ **Support Router or Bridge Network Working Mode.**
- ✧ **Support 10/100M Ethernet Auto-Negotiation**
- ✧ **Support Easy Configuration Through a Web Interface or PC IOTService Tool locally or remotely**
- ✧ **Support IOTBridge Management**
- ✧ **Support Web OTA Wireless Upgrade**
- ✧ **Support Wide DC Input 9~36VDC**
- ✧ **Size: 178mm x 95mm x 26mm**

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1. PRODUCT OVERVIEW

1.1. General Description

The 4G serial server device HF9624 provides protocol conversion among RS232/RS485/RS422 interface, Ethernet/Wi-Fi and 3G/4G, which can meet the solutions for serial/network transmission of industrial products. The HF9624 integrates 4G/3G, Wi-Fi, Ethernet, high-speed serial port, RS232/RS485/RS422 interfaces, and it is based on Ecos operation system and contain webpage, TCP/IP stack. It supports remote monitor PLC products of different brand.

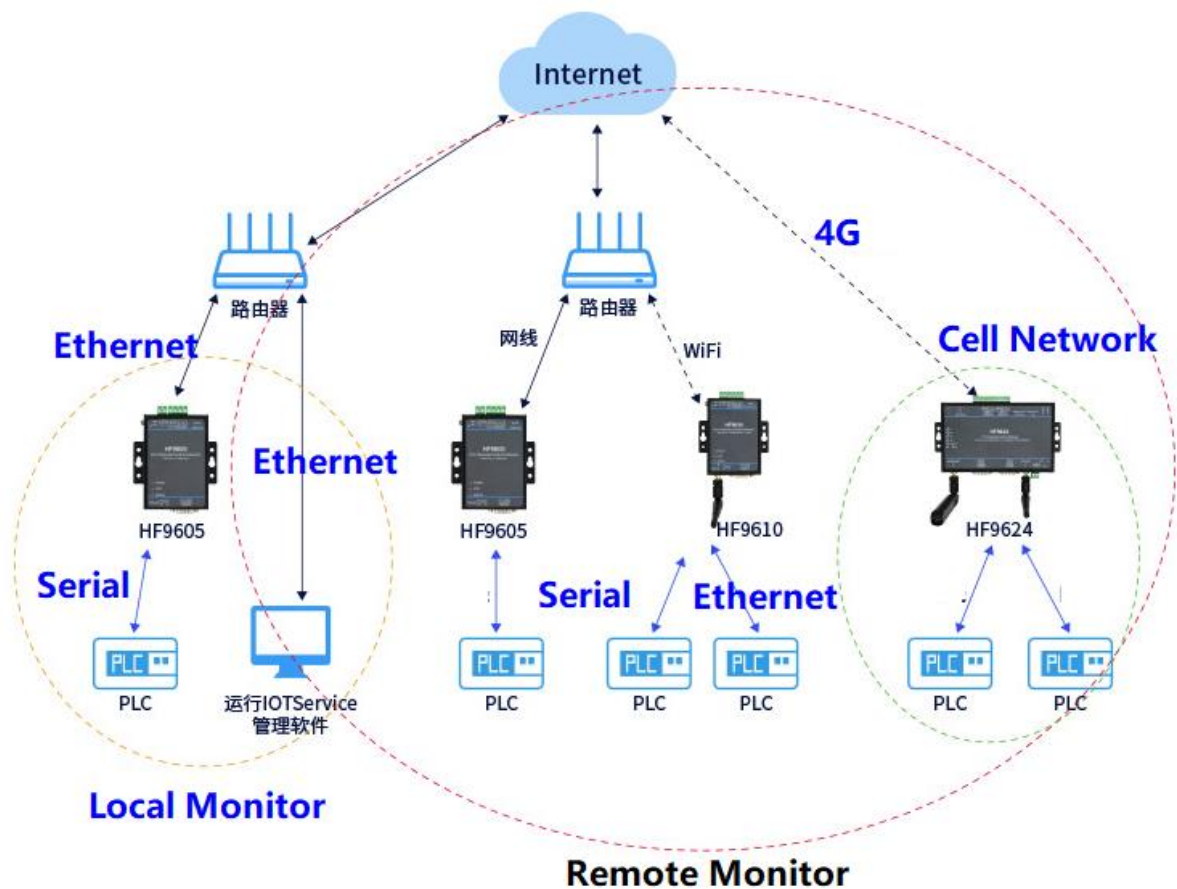


Figure 1. PLC Application

1.2. Device Parameters

Table1. HF9624 & HF9624G Technical Specifications

Item	HF9624
System Information	
Processor/Frequency	MIPS/580MHz
Operating System	Linux OpenWrt

Ethernet Port	
Port Number	2 RJ45 1 WAN/LAN switchable 1 LAN
Interface Standard	10/100 Base-T Auto-Negotiation
Protection	Anti-reverse Power Static: 8KV Contact Discharge, 15KV Air Discharge Surge: Difference-mode 4KV, Common-mode 6KV
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 v1.2 AES 128Bit DES3
Wi-Fi Interface	
Standard	802.11 b/g/n
Frequency	2.412GHz-2.484GHz
Network Mode	AP
Security	WEP/WPA2PSK/WPA2PSK
Encryption	WEP64/WEP128/TKIP/ AES
Tx Power	802.11b: +20dBm(Max.) 802.11g: +18dBm(Max.) 802.11n: +15dBm(Max.)
Rx Sensitive	802.11b: -89dBm 802.11g: -81dBm 802.11n: -71dBm
Antenna	3dBi Stick Antenna
3G/4G Interface	
Transmit Power	Class 4(33dBm±2dB) for GSM900 Class 1(30dBm±2dB) for DCS1800 Class E2(27dBm±3dB) for GSM900 8-PSK Class E2(26dBm±3dB) for DCS1800 8-PSK Class 3(24dBm+3/-1dB) for CDMA BC0 Class 3(24dBm+1/-3dB) for WCDMA Class 2(24dBm+1/-3dB) for TD-SCDMA Class 3(23dBm±2dB) for LTE FDD Class 3(23dBm±2dB) for LTE FDD
LTE	Maximum Support non-CA CAT4 Support 1.4~20MHz RF Bandwidth Downstream Support Multiple Users MIMO FDD: Maximum Upstream Rate 50Mbpsm Maximum Downstream Rate 150Mbps TDD: Maximum Upstream Rate 35Mbpsm Maximum Downstream Rate 130Mbps
WCDMA	3GPP R8 DC-HSPA+ 16-QAM,64-QAM and QPSK Modulation Maximum Upstream 5.76Mbps Maximum Downstream 42Mbps
TD-SCDMA	CCSA Release 3 Maximum Upstream 2.2Mbps Maximum Downstream 4.2Mbps
CDMA	CDMA 1X Advanced Maximum Upstream 1.8Mbps Maximum Downstream 3.1Mbps

GSM/GPRS/EDGE	R99: CSD Transmission Rate: 9.6Kbps/14.4Kbps GPRS: Support GPRS multi-slot class 12 Code Method: CS-1/CS-2/CS-3/CS-4 EDGE: Support EDGE multi-slot class 12 Support up/downstream Code Method: CS1-4, MCS1-9
Serial Port	
Port Number	2
Interface Standard	RS232: DB9 RS485/RS422: 5.08mm connector Support one type of RS232/RS422/RS485 at the same time
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 Hardware RTS/CTS、DSR/DTR(RS232) 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 IOTBridge
Firmware Upgrade	Web
Basic Parameter	
Size	178mm x 95mm x 26mm
Operating Temp.	-25 ~ 85°C
Storage Temp.	-45 ~ 105°C, 5 ~ 95% RH (no condensation)
Input Voltage	9~36VDC
Working Current	~300mA@9V 2A Peak Current

2. HARDWARE INTRODUCTION

The HF9624 unit is a complete solution for serial port device connecting to network. This powerful device supports a 10/100BASE-T Ethernet connection, a full TCP/IP protocol stack, and multiple encryption method to ensure confidentiality.

2.1. HF9624 Interface



Figure 2. HF9624 Interface

Table2. HF9624 Interface Definition

Function	Name	Description
External Interface	2 x RJ45 Ethernet	10/100M adaptive Ethernet LAN connect to lower device(PC or others) WAN connect to upper device(Router LAN) LAN1/WAN1 port can be configured to either LAN or WAN, if WAN network is OK, the data packet will go to WAN prior to 4G.
	2 x RS232/RS422 /RS485	Dual RS232/RS485/RS422 serial port
	SIM Card	Standard SIM card slot
	WIFI SMA Antenna	Connect to Wi-Fi antenna

Function	Name	Description
	Interface	
	4G SMA Antenna Interface	Connect to 4G antenna
	DC/Power Input	DC Power 9~36V Input
LED Indicator	Power	Internal Power Supply Indicator On: Power is OK Off: Power is NG
	Active1~2	UART Port 1 ~ 2 data transfer Indicator Green on: UART receive data Blue on: UART send data Off: No UART data transfer
	NET1~2	Ethernet Port 1 ~ 2 Connection Indicator On: Ethernet is OK Blink: Data is transferring Off: No connection
	Wi-Fi	Wi-Fi Indicator On: Wi-Fi is on. Off: Wi-Fi is off
	DI1~3	Reserved
	Relay1~2	Reserved
	4G/SYS	Operator Network Indicator Fast Blink: Connection is OK Slow Blink: Registering
Button	Reset	Hardware Reset
	Reload	Restore to factory setting Long press this button for 3seconds and loose it to restore parameters to factory setting.

2.2. 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 3. RS232 Pin Defination(Male/Needle Type)

Table3. RS232 Pin 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

2.3. 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.

2.4. RS422 Interface

RS422 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-

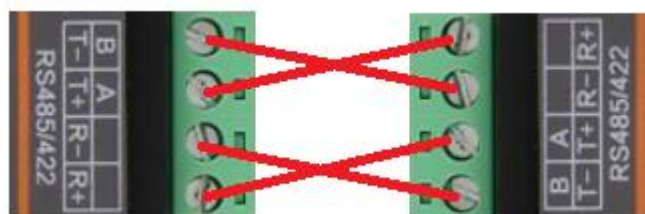


Figure 4. HF9624 RS422 Connection

2.5. RJ45 Interface

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

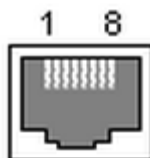


Figure 5. RJ45 Pin Defination

Table4. 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

2.6. Mechanical Size

The dimensions of HF9624 are defined as following picture (mm):

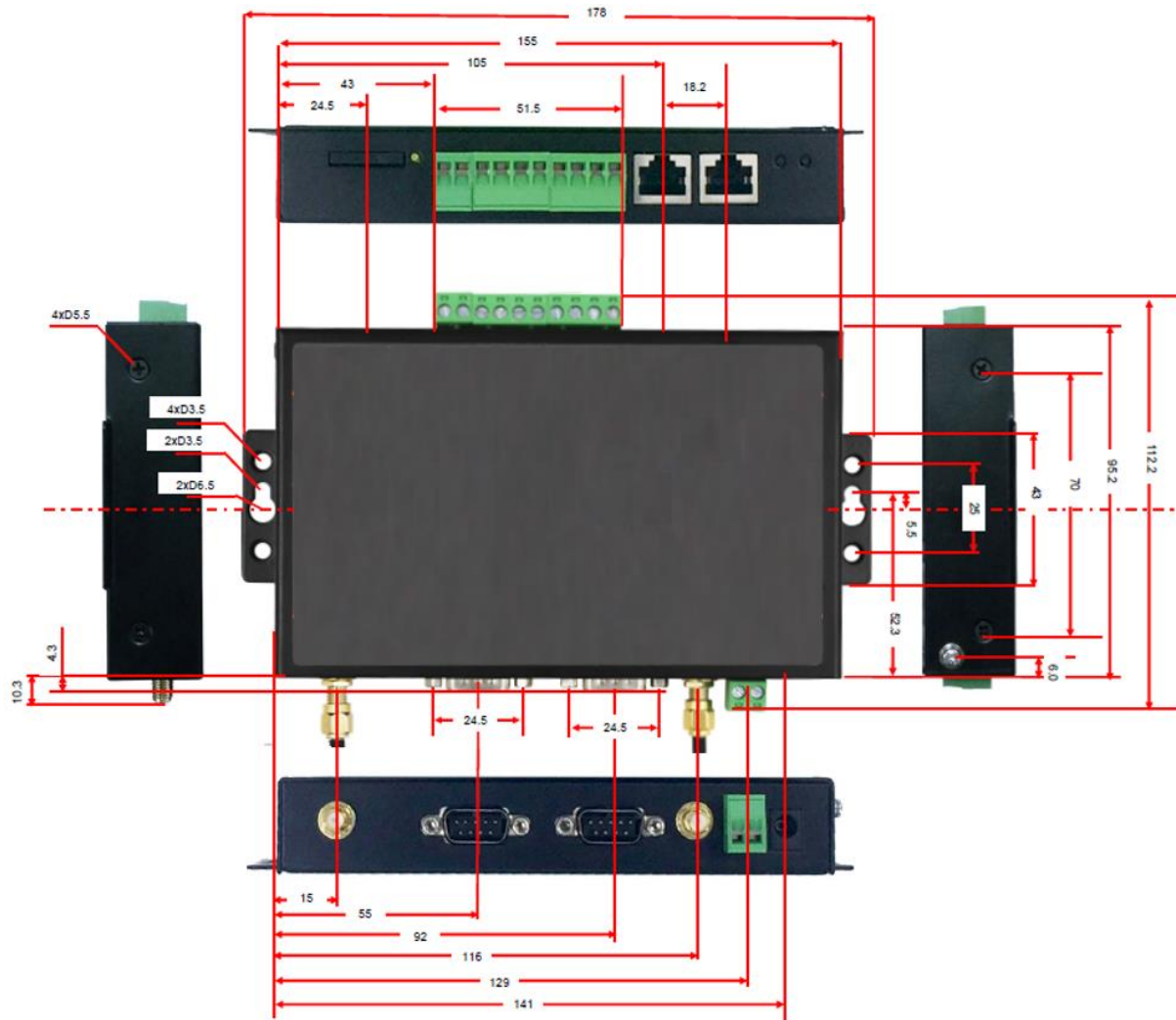


Figure 6. Mechanical Dimension

2.7. Rail Mounting

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

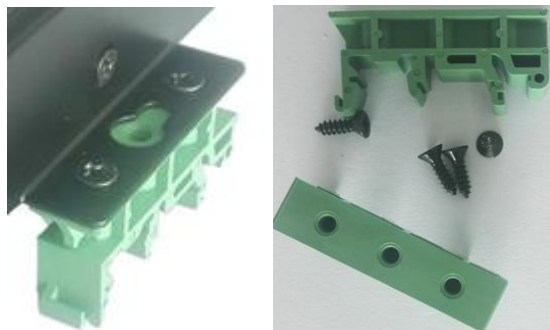


Figure 7. Rail Mounting

3. FUNCTIONAL DESCRIPTION

The HF9624 has the following feature

- Connect customer's device with PC or server via TCP/UDP/Telnet.
- Contain a HTTP web server allow user to configure through browser with PC or phone.
- Config device remotely with IOTBridge

3.1. Basic Network Protocol

The HF9624 device uses the IP address for network communications. If uses the TCP to assure that no data is lost or duplicated. If use UDP to assure that data can be fast and effective to Destination address.

Supported protocols include:

- ARP, UDP, TCP, ICMP, DHCP, Telnet, DHCP, HTTP Server/Client Web socket
- Telnet command configuration, Web server configuration
- Security Protocol: TLS, AES, DES3 encryption

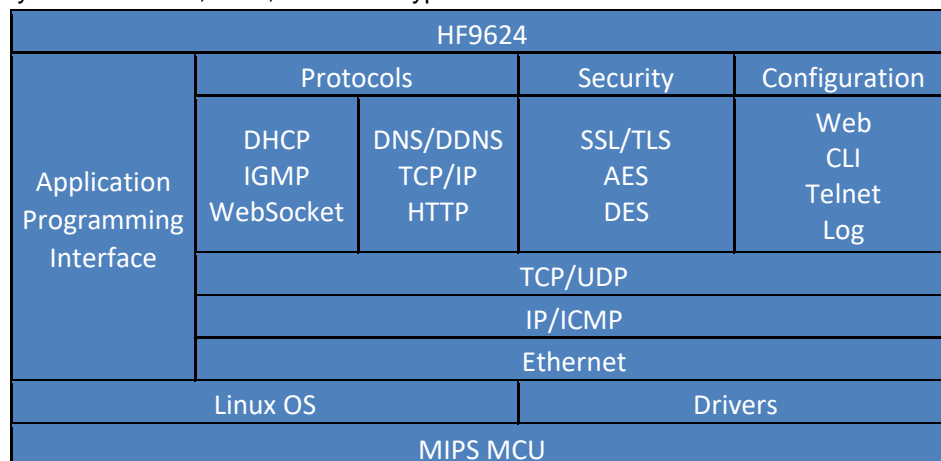


Figure 8. HF9624 Software Protocol Structure

3.2. Wireless Network

Wi-Fi supported product works under AP mode as default.

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.

3.2.1. AP Network

HF9624 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. If 4G network connects well, PLC device will send data to public server shown as follow:

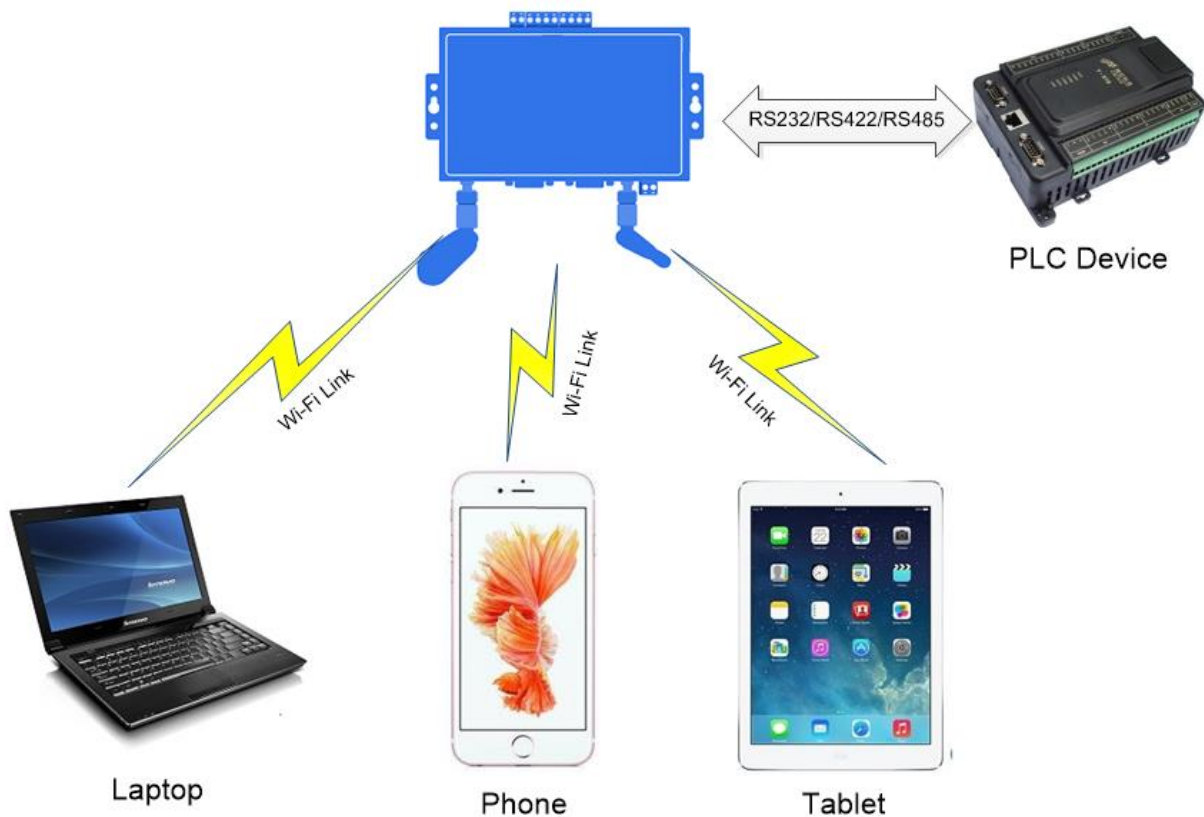


Figure 9. General AP Network

3.2.2. IOTService Software

Open the IOTService after connect to the AP hotspot generated by HF9624 or connect to Product Ethernet port to PC, then configure the parameter.

System Product ID: Software Version: 1.09m RTC Time: NTP Disabled Up Time: 0-Day 0:4:27 Total Free Memory: 34803712 Max Block Size: 61513728	SOCKET SOCKET Name: netp Protocol: TCP-SERVER Status: Server Created Client IP: Recv Bytes: 0 Recv Frames: 0 Send Bytes: 0 Send Frames: 0 Fail Bytes: 0 Fail Frames: 0 UART UART No: UART 1 Config: 115200,8,1,NONE Recv Bytes: 3 Recv Frames: 1 Send Bytes: 0 Send Frames: 0 Fail Bytes: 0 Fail Frames: 0	Network HostName: DHCP: Enable IP Address: 10.247.220.82 Gate Way: 10.247.220.81 DNS: 10.10.100.254 MAC Address: ACCF23EA1138 WiFi State: Disconnected RSSI: 0 <div> <div>Reload</div> <div>Edit</div> <div>Restart</div> </div>
---	---	--

Figure 10. Configure Wi-Fi Parameter

3.2.6. Webpage Configuration

Use PC to connect with HF9624 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.

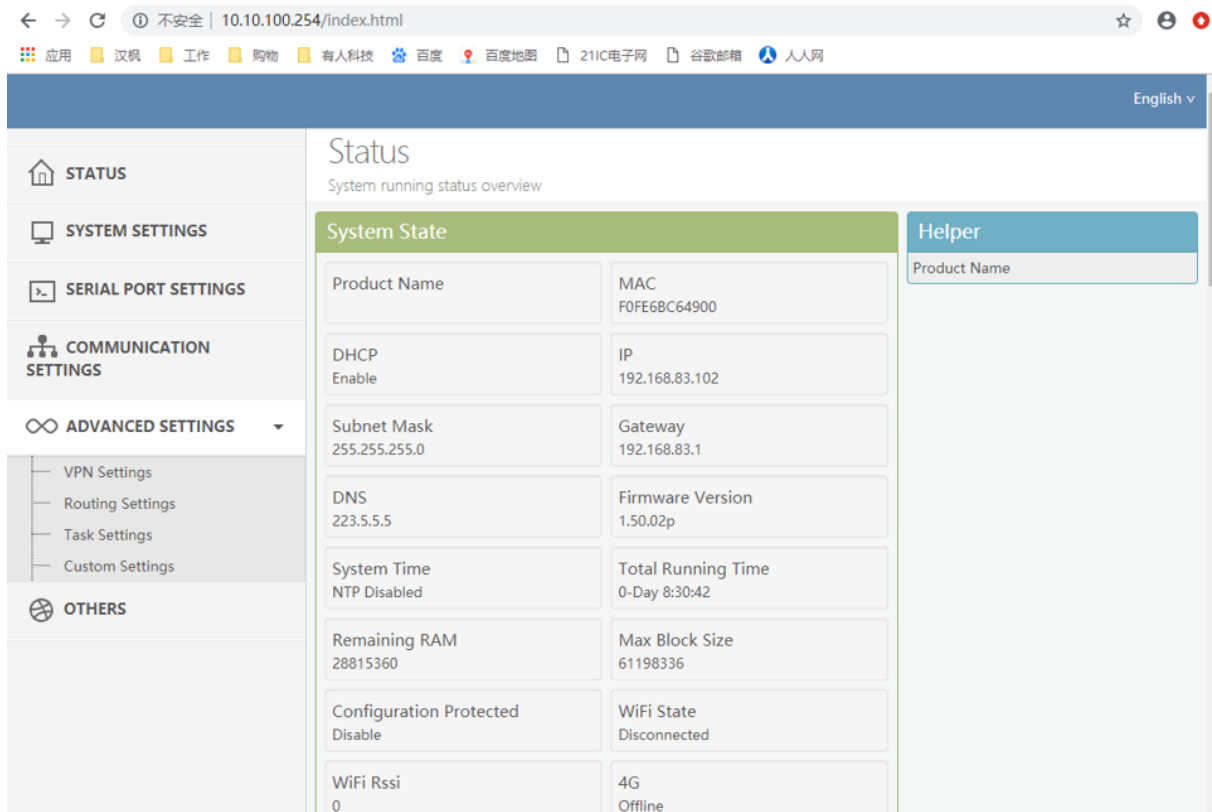


Figure 11. Product Webpage

3.3. Ethernet Interface Function

HF9624 provides with two Ethernet interface(1 LAN and 1 LAN/WAN switchable). By Ethernet interface, user device can easily connect to the public network.

Device Setting

System

User:

Password:

HostName:

DHCP:

IP Address:

Mask:

Gate Way:

DNS:

Network Mode:

Longitude:

Latitude:

SOCKET

SOCKET Name:

Protocol:

Server Addr:

Server Port:

Local Port:

Keep Alive:

Time Out:

Rout:

Buffer Size:

DI/DO Ctrl:

WiFi

Mode:

AP SSID:

AP Key:

AP Channel:

STA SSID:

STA Key:

Mobile Network

APN:

APN User:

APN Password:

VPN:

PPTP VPN Server:

PPTP User:

PPTP Password:

☐ Port Forward Enable

UART

UART No:

Baudrate:

Data Bits:

Stop Bits:

Parity:

Flow Control:

Buffer Size:

LANN

IP Address:

Mask:

DHCP:

Eth Wan:

☐ LAN

Figure 12. WAN/LAN Switch

```

C:\Users\Sam>ipconfig

Windows IP 配置

以太网适配器 以太网:

    连接特定的 DNS 后缀 . . . . . : 
    本地链接 IPv6 地址. . . . . : fe80::b873:7689:f33e:5775%2
    IPv4 地址 . . . . . : 10.10.100.100
    子网掩码 . . . . . : 255.255.255.0
    默认网关. . . . . : 10.10.100.254
  
```

Figure 13. PC Connect to LAN

3.3.1. Ethernet Port with Wi-Fi

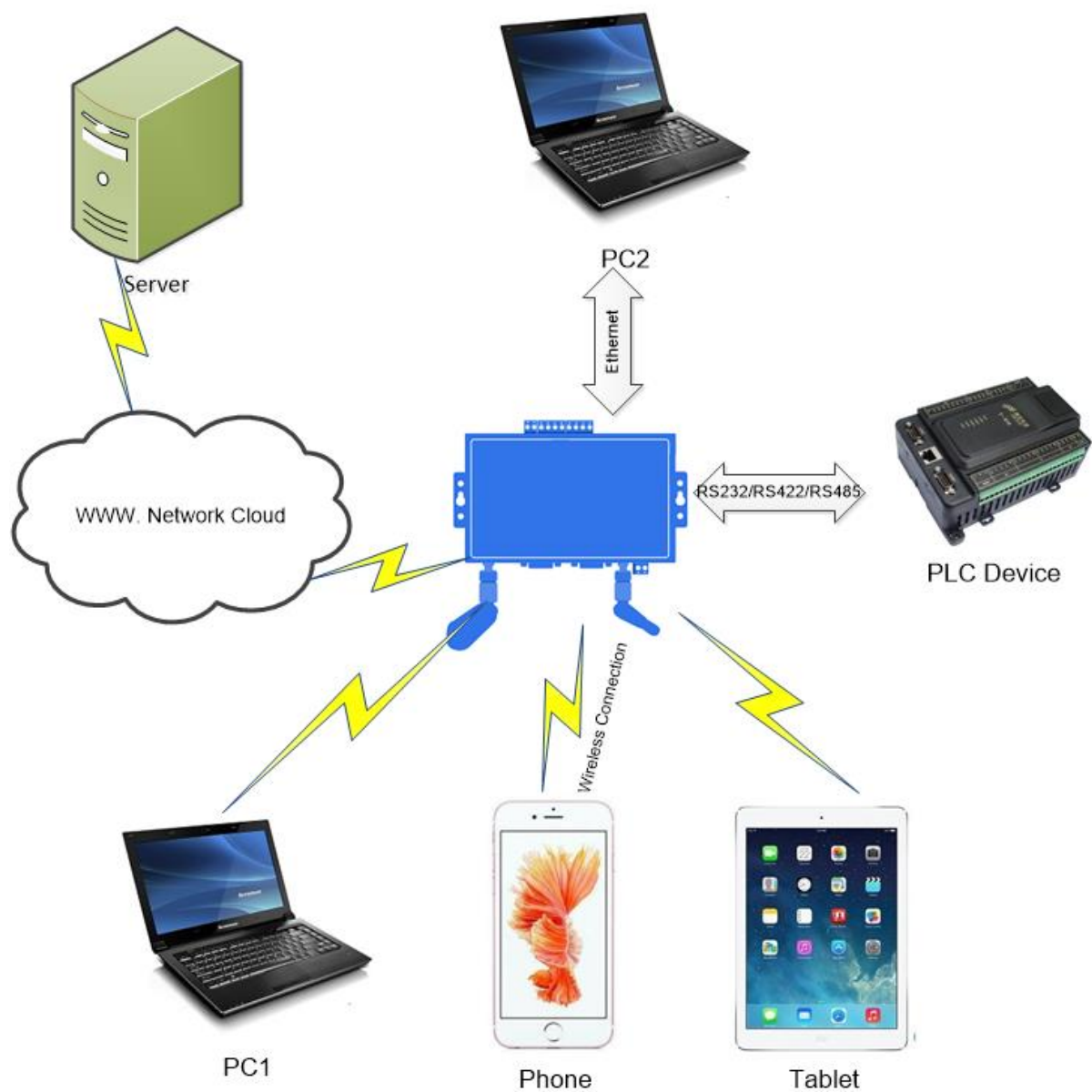


Figure 14. Ethernet Interface Function

HF9624 generates a central network. Each devices' IP address is working under the same segment with HF9624(default as 10.10.100.XXX, can be modified). Devices can communicate mutually, and the devices above can visit public resource normally. Device is equivalent to Wi-Fi/Ethernet/Serial 4G Router.

APPENDIX A:REFERENCES

A.1. Test Tools

IOTService Configure Software:

<http://www.hi-flying.com/download-center-1/applications-1/download-item-iot-service>

UART、Network Test software:

http://www.hi-flying.com/index.php?route=download/category&path=1_4

A.2. Application Notes

http://www.hi-flying.com/index.php?route=download/category&path=1_7

APPENDIX B: CONTACT INFORMATION

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

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

For more information about IOTworkshop modules, applications, and solutions, please visit our web
site www.iotworkshop.com

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