

HLK-SW16K User Manual

Serial to Ethernet application



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1. Description

HLK-SW16K is a new professional remote control terminal from Hi-Link Electronics. It is a connection that implements tcp traversal gateway and establishes communication with remote devices. It can realize the direct connection between the network client and the device without modifying the original communication protocol, which saves the development cycle and improves the user experience.

Compared with the traditional dynamic domain name plus router port mapping method, it has incomparable superiority, eliminating the operations for users to apply for dynamic domain names, port mapping on the router and other frequent operations, so that the device achieves the effect of plug and play.

1.1 Module Basic parameters

Table 1 HLK-SW16K Technical specifications

Basic parameters	
Network standard	Wireless standard: IEEE 802.11n, IEEE 802.11g, IEEE 802.11b
	Wired standard: IEEE 802.3, IEEE 802.3u
Wireless transmission rate	11n: up to 150Mbps 11g: up to 54Mbps 11b: up to 11Mbps
Channel	1-14
Frequency range	2.4-2.4835G
Transmit power	12-15DBM
Interface	2 Ethernet ports, 1 serial port, 1 5V power input interface
Antenna	
Antenna types	External 6DB rod antenna or external 2DB rod antenna (both can be selected)
Function parameters	
WIFI work mode	Wireless network card / wireless access point / wireless router
WDS function	Support WDS wireless bridging
Wireless security	Wireless MAC address filtering
	Wireless safety function switch
	64/128/152 bit WEP encryption
	WPA-PSK/WPA2-PSK, WPA/WPA2 security mechanism

Network management	Remote web management
	Configuration file import and export
	WEB software upgrade
Serial to network	
Maximum transfer rate	500000bps
TCP connection	Max > 20
UDP connection	Max > 20
Serial port baud rate	1200~500000bps (Support non-standard baud rate)
Other parameters	
Status Indicator	Status indication
Environmental standard	Working temperature: -20-70°C
	Working humidity: 10%-90%RH (Non-condensing)
	Storage temperature: -40-80°C
	Storage humidity: 5%-90%RH (Non-condensing)
Other performance	Band bandwidth optional: 20MHz, 40MHz, automatic

1.2 Electrical characteristics

- Input power: 5V
- Input current: 2A
- Relay maximum input voltage: 220V
- Relay maximum input current: 10A
- Input and output: 16 outputs
- Default IP: 192.168.16.254
- Default port number: 8080
- Networking level: no limit

1.3 Mechanical size

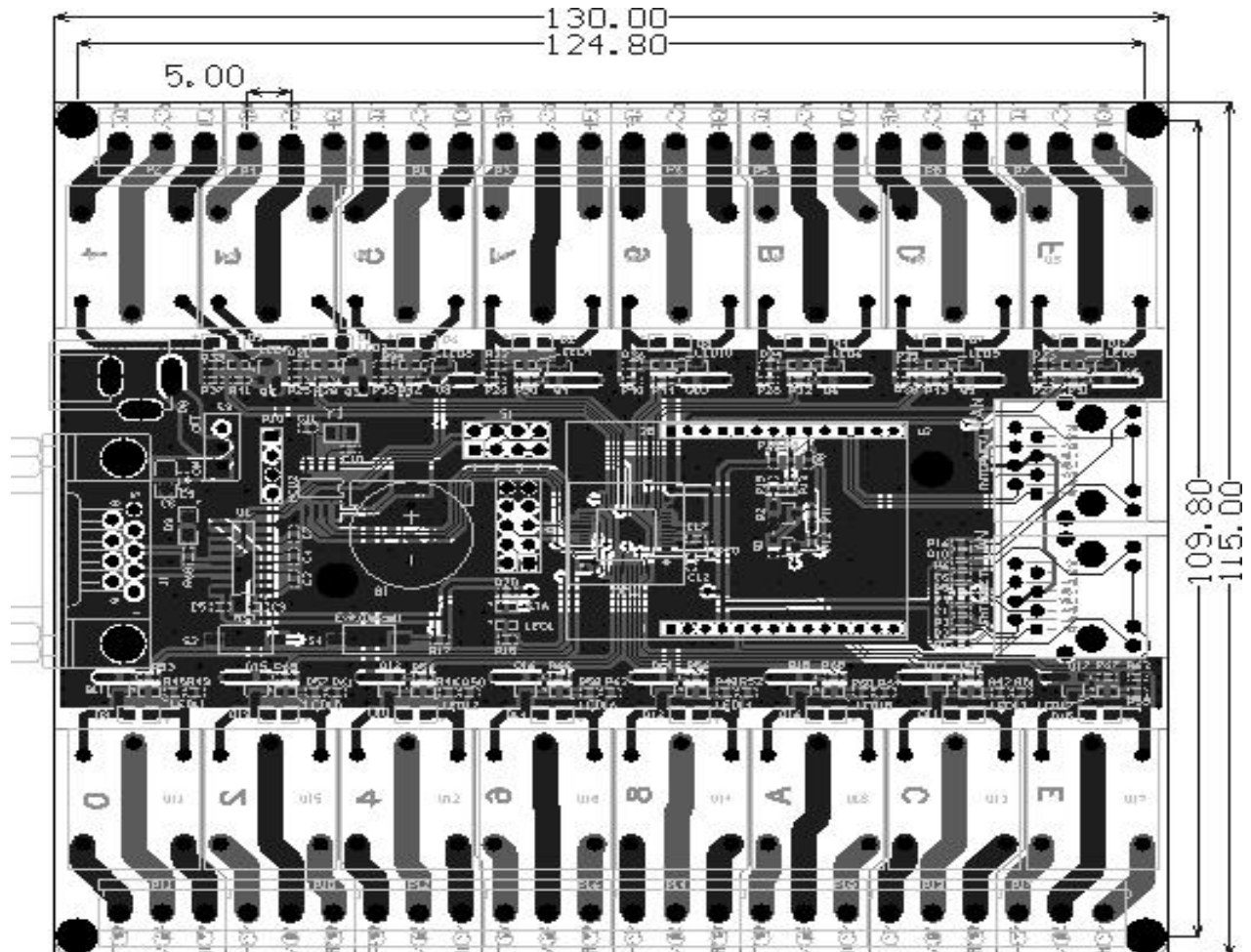


Figure 1

HLK-SW16K Detailed dimension (TOP View)

Note: Module length, width and height are 130×115×19mm

1.4 Hardware description

The function of each part of the board is shown as below:

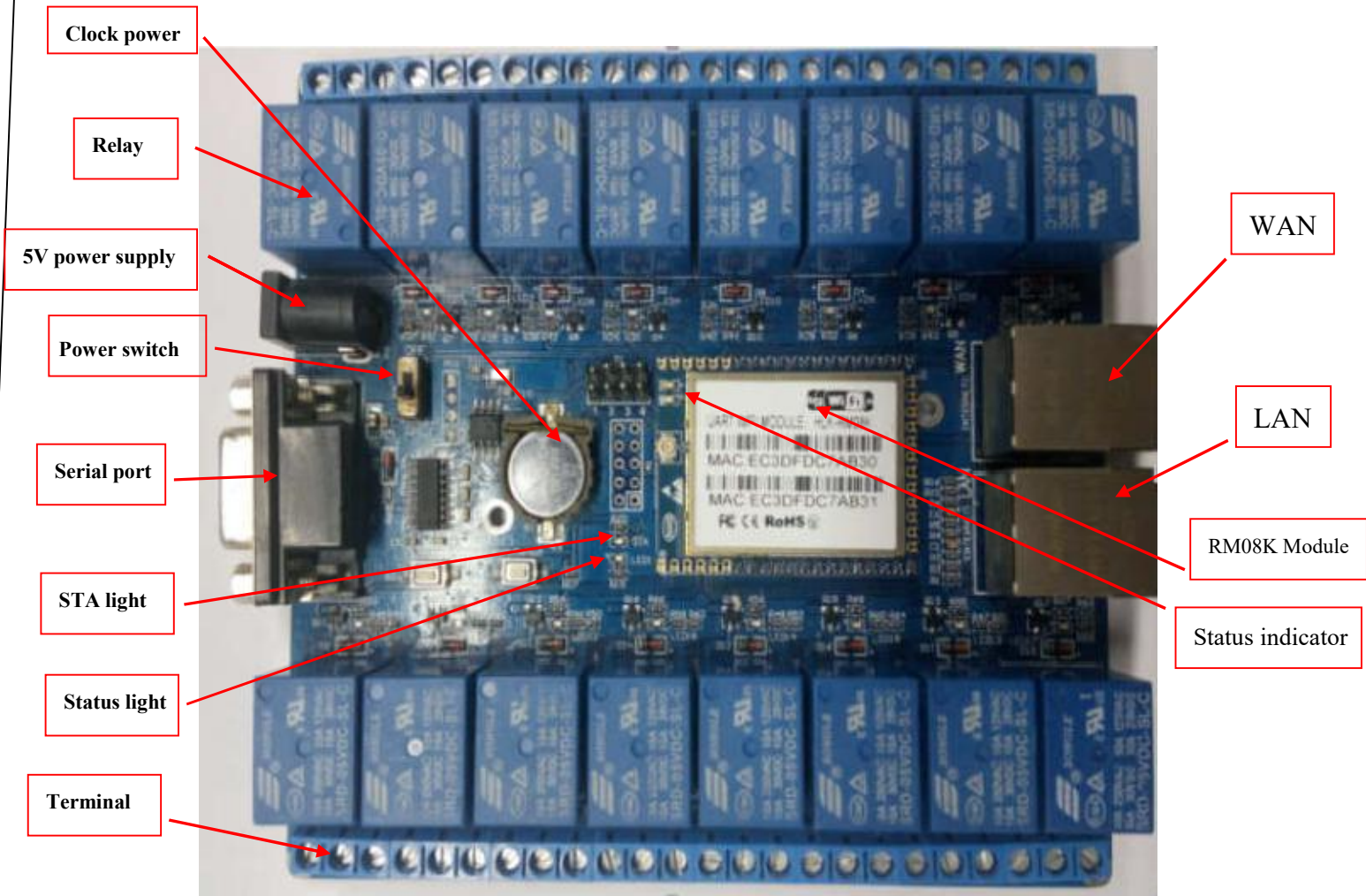


Figure 2

HLK-SW16K Universal Development Test Kit

General Development Test Suite Interface Description

Function	Items	Tab	Description
Peripheral interface	DB9	J1	RS232 interface for data communication and execution of AT commands
	DC5V	P1	DC 5V input, voltage range: 4.5-5.5V
	Status light	LED1	Single-chip microcomputer running status light, and flashes once in 1 second.
	Network port	LAN,WAN	WAN: with router function, LAN: without router function
	Terminal	P1-P8	16 channels 220v, 10A relay
LED	STA	STA	Normally lit after powered on
	WIFI		WIFI indicator, after the wifi module starts, the flashing speeds up
	LED3-18	LED3-18	Indicates the working status of the relay Light: relay work Off: The relay is disconnected
Button	RST	RST	Single chip reset
	Exit/Default	Exit/Default	Short press (0.5-5 seconds): Module enters AT command mode Long press (more than 6 seconds): Restore factory default settings

1.5 Main application areas

- ◆ Hand-held device
- ◆ Remote control
- ◆ Consumer electronics
- ◆ Internet of Things applications
- ◆ Industrial control
- ◆ Medical equipment
- ◆ LED control
- ◆ Sensor networking application

Note: To ensure proper operation, please make sure that you have purchased our HLK-SW16K development kit. As shown in Figure 2 below:






	HLK-RM08K Module
	HLK-SW16K Test board
	2.4G antenna
	5V 2000mA power adapter
	Network cable (optional)

Figure 3

Please connect as shown below:



Figure 4

Please note the correct direction for HLK-RM08K inserted in the board.

2. Product introduction

HLK-SW16K is a new professional remote control terminal from Hi-Link Electronics. It is a connection that implements tcp traversal gateway and establishes communication with remote devices. It can realize the direct connection between the network client and the device without modifying the original communication protocol, which saves the development cycle and improves the user experience.

Compared with the traditional dynamic domain name plus router port mapping method, it has incomparable superiority, eliminating the need for users to apply for dynamic domain names, port mapping on routers, etc., so that the device can achieve plug-and-play effect.

2.1 System principle

The entire system consists of a server, a device-side program, and a client, as shown in the figure:

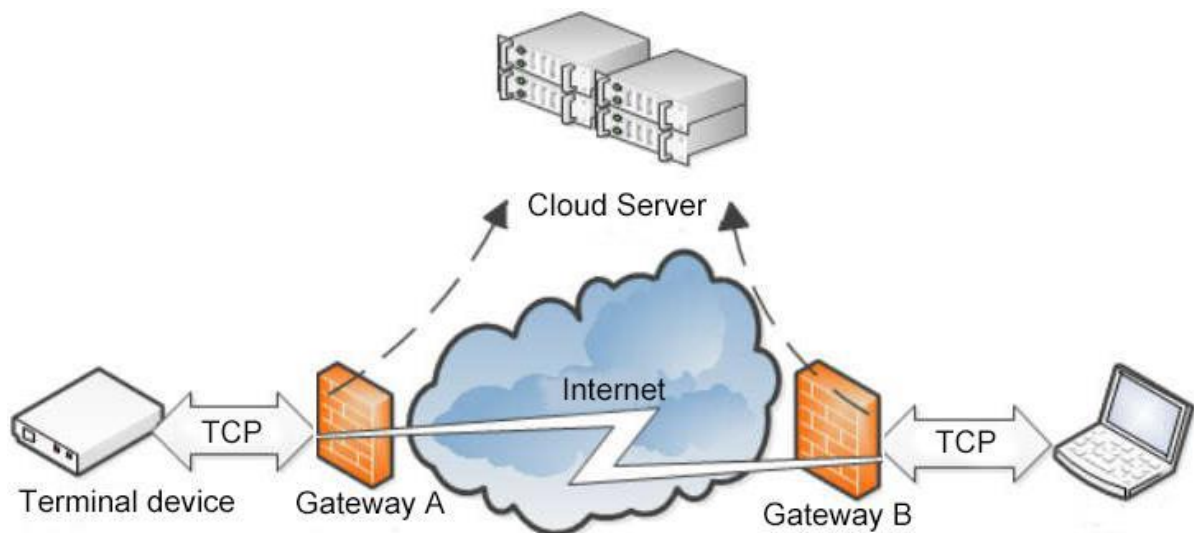


Figure 5

(1) Server

Accept the registration of the device and the client, assist the client to find the device and establish a connection

(2) Device

Automatically connect to the server after the device starts

(3) Client

After running the client, the client will connect to the server and establish connection with the device with the help of the server.

The function of each part of the board is shown in Figure 2.

3. Mobile APP software control relay method

SW16K module connection network can be divided into 3 types, AP connection, network remote connection, and wired connection. You can choose convenient and effective connection method according to individual needs.

3.1 AP connection

Meaning: Access Point, which is the wireless access point, directly searches and connects to the module wifi, so that the server and the client can communicate with each other in order to transfer data. The specific operation method is as follows:

1. Make sure that the module is in the factory default settings. To restore the factory settings, power on the module and wait for 35 seconds. Then press any of the two buttons on the board for more than 6 seconds.

2. Search module WIFI name" (HI-LINK_XXXX) with mobile phone, where "XXXX" is the last 4 digits of the MAC address of the module wifi, as shown in Figure 6, then click on the connection, as shown in Figure 7



Figure 6

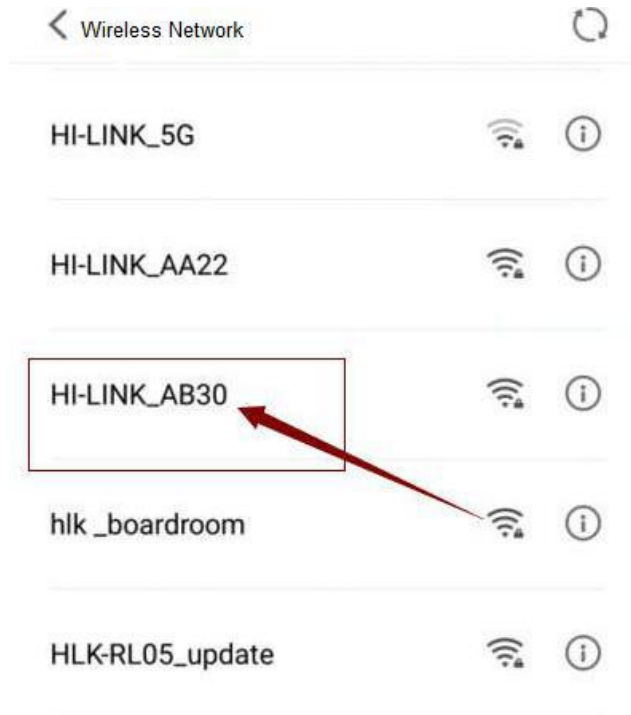


Figure 7

3.2 Wireless remote connection

Meaning: The mobile phone is connected to the 3 / 4G network, and the opening and closing of the relay is controlled remotely through the APP. The specific operation method is as follows:

1. Open the APP and click the "Menu" button in the upper right corner, a prompt box will appear, click "Configure Networking", as shown in Figure 8 and Figure 9:

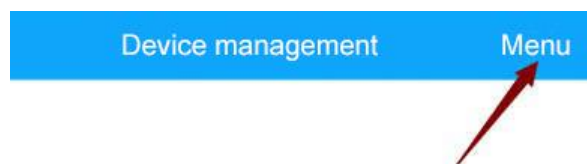


Figure 8

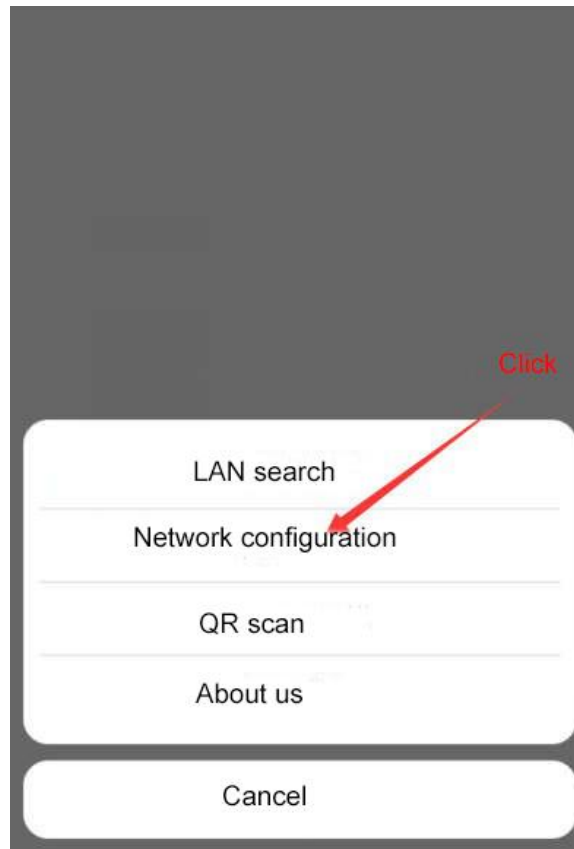


Figure 9

2. Enter the password of the router (Note: If you need to change the routing information, you can click the "Replace other WI-FI" button, as shown in Figure 10)

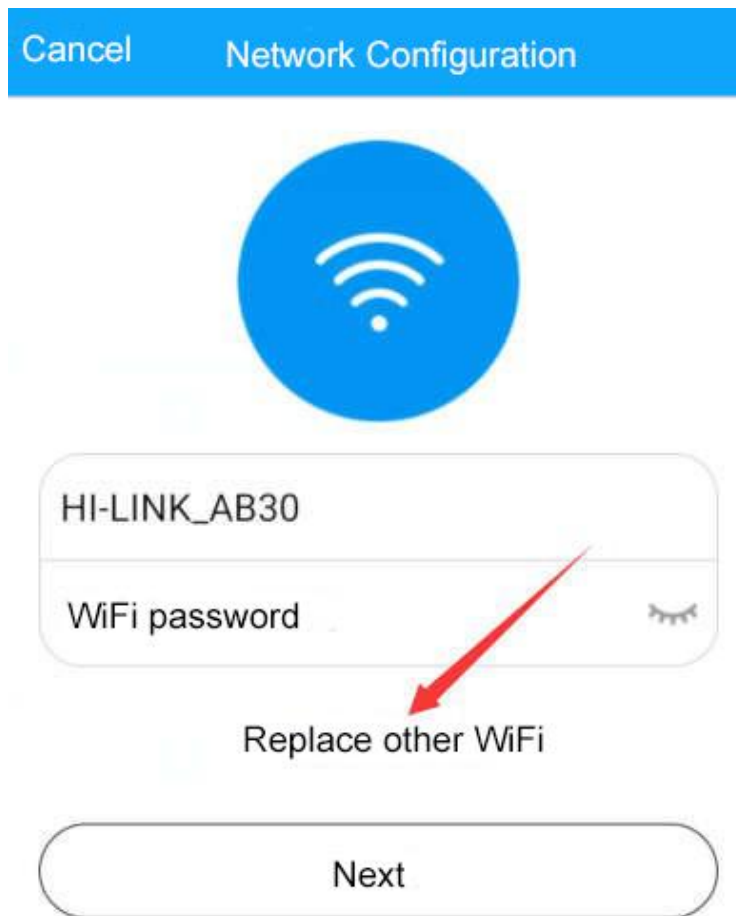


Figure 10

3. Click **"Next"** to enter the HLK-SW16K wifi selection interface, and then click **"Go to set WiFi"** to transfer to the wifi configuration list interface of the mobile phone system. Select **"HLK-SW16K wifi module hotspot"** from the WIFI list (The name of WiFi is explained in step 3.1 above), as shown in Figure 11 and Figure 12:



After connected the wifi hotspot Hi-Link_XXXX
Return back to HLK-SW16K app



Figure 11



Figure 12

4. After returning to the APP, the APP software will automatically perform the network connection operation. If the prompt "Device connection succeeded" HLK-SW16K device is successfully connected to the network, the "module WIFI name" will be hidden and the phone will not search. As shown in Figure 13 and Figure 14:

Note: If you are prompted that the connection to the network has timed out, please return to the device list interface and click "Menu-> Local Area Network Search" in the upper right corner. If you can search out and change the device, it means that the network is successfully configured. If the new device can not be found, please confirm whether the password of the router in the step 2 is correct, re-configure the network, please restore the device to the factory (refer to step 3.1 to restore the factory)!

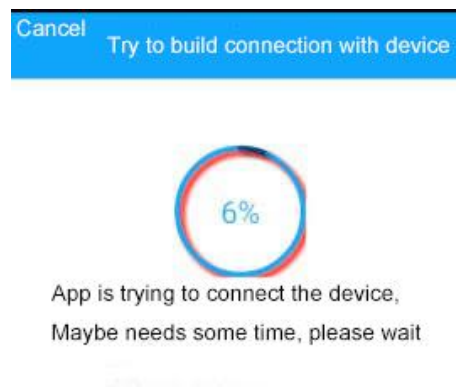


Figure 13

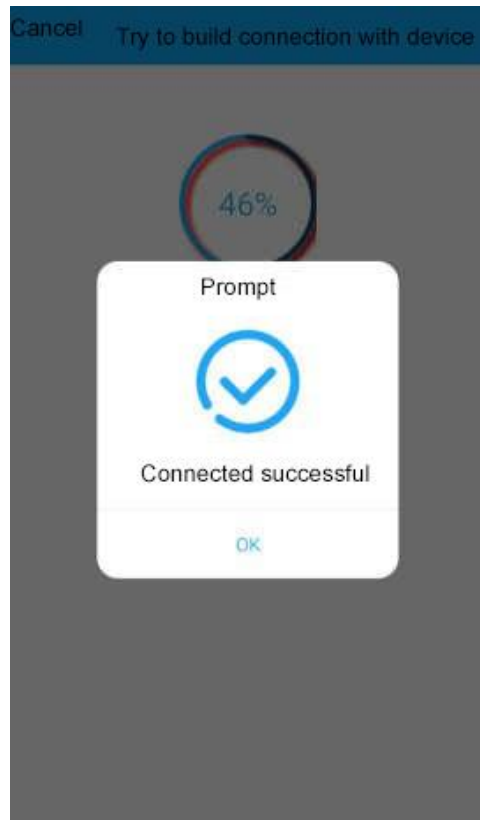


Figure 14

5. Open the 3 / 4G network (or remotely log in to the wireless router wifi) on the mobile phone, log in to the device to control the relay

3.3 Wired connection

Meaning: Connect the **LAN port** of the superior router and the **WAN port** of the module through a network cable to make it communicate and transmit data, and then control it through the APP. The specific connection method is as follows:

Use a network cable to connect the **router's LAN port** and the **module's WAN port** (the location of the network port can be viewed from Figure 15), and then connect the mobile phone to the WIFI of the higher-level router. After successfully connecting to the device, you can control the relay.



Figure 15

4. APP relay controls various functions

The HLK-SW16K network relay APP can effectively remotely control the switch, which can be used for smart home control, giving people a convenient energy saving experience. Users can also modify the settings of different styles of control relays according to their own needs.

4.1 LAN Search

Open the app and click the **"Menu"** button in the upper right corner. A prompt box will appear. Select **"LAN Search"**, as shown in Figure 16:



Figure 16

Search for "SW16 device" and click the "SW16 device" button to log in to the control interface, as shown in Figure 17:



Figure 17

4.2 Configure networking

Configure networking according to step 3.2. Function location, as shown in Figure 16

4.3 QR scan

Scan the QR codes of other devices and add them for management, as shown in Figure 16

4.4 About us

Open the "Menu" button and click the "About Us" button to view the company background information and product characteristics, as shown in Figure 18



Figure 18

4.5 Cancel function

"Cancel the menu" function, as shown in Figure 16

4.6 Delete device, rename, share QR code

Long press the device name to delete the device, rename the device, and share the QR code of the device, as shown in Figure 19, Figure 20, Figure 21 and Figure 22



Figure 19



Figure 20



Figure 21



Figure 22

4.7 Return

The upper left corner returns normally

4.8 Fully open and fully closed

Click the "Button 1" button to control the opening and closing of the relay "1", and click the "Full On" and "All Close" buttons to control the 16 groups of relays "Full On" and "Full Off", as shown in figure 23:



Figure 23

4.9 Time Calibration

SW16 K comes with a clock chip, click “ Time Calibration” You can update the phone time to the SW16k module, as shown in Figure 23.

4.10 Parameter settings

Click "**Parameter Setting**" to enter the setting page, as shown in Figure 24 and Figure 25:

Settings include:

(1) Button selection: Select the button to be modified

(2) Button name: Modify name

(3) Mode selection: default, jog, timing

- Select "**Default Mode**" as the default state.
- Select "**Jog**", you can set the relay off time in "Jog time" option, the unit is "second", and the time range is "**0 ~ 255**" seconds.
- Select "**timing mode**", you can turn on and off the "timing" relay. The set parameters are: **ON or Off action, time and day** (can be set to 9 timing management)

< 返回	按钮: 1 ▾	保存
按钮名称:	1	>
模式选择:	点动	>
点动时间:	10秒	>

Figure 24



Figure 25

5. Precautions for using the module

5.1 The power adapter is connected, why the WiFi light is off

Plug in the power adapter. If there is no wifi light on the module bottom plate, you need to slide the power switch down to use the bottom plate. The "power switch" button is shown as below:



Figure 26

5.2 WIFI indicator flashing meaning?

WiFi starts normally and the WiFi light will blink continuously.

5.3 What is the wifi default password of the module?

Password is 12345678

5.4 What is the maximum input voltage and output current of the relay?

Max input voltage is 220V, max output current is 10A

5.5 What is the purpose of the network ports on the backplane?

WAN: with routing function, LAN: without routing function

5.6 How to restore factory settings?

Press and hold Exit / Default on the bottom panel for more than 6 seconds.

5.7 What is the purpose of the RST button on the backplane?

MCU reset

5.8 Can the module be controlled remotely?

Yes, make sure that the wifi module is connected to the router, and the wifi module can be connected to the Internet, then can be remotely controlled

5.9 What is the stable operating range of the module?

Working temperature: -20-70 °C

5.10 The module is configured in Ethernet mode, why the network port is not available?

After the module is configured in Ethernet mode, the module's wifi and LAN ports are closed. At this time, the module's transparent transmission is a serial port to a network port (WAN port).

5.11 What is the simplest LAN control method?

Wait 15 seconds after powering on the module. After the wifi module is successfully started, the mobile phone connects to the module's wifi, open the APP, and the relay can be LAN controlled.

5.12 Relay working principle

Link as: <http://bbs.hlktech.com/read.php?tid=5506&fid=14>

5.13 SW16K use Video

Link as below:

(1) SW16 module local network control (AP direct connection) demonstration:

https://v.youku.com/v_show/id_XMzc1NDQ1NTY3Mg==.html?spm=a2h0k.11417342.soreresults.dtitle

(2) Demonstration of wired connection of SW16 module:

http://v.youku.com/v_show/id_XMzc1NDQ3NDE0MA==.html?spm=a2h0k.11417342.soreresults.dtitle

(3) Demonstration of remote control of SW16 module:

https://v.youku.com/v_show/id_XMzc1NDQ3NTcwNA==.html?spm=a2h0k.11417342.soreresults.dtitle