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Wireless ad hoc network handheld individual

Operation Guide

Version number: Vcan1401-Mesh20210220

Manufacturer: Shenzhen Huaqia Technology Co., Ltd.

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1、Brief introduction of hand-held illustration leaflet soldier

As a mobile self-organizing network, Vcan1401-Mesh supports any network topology. Unlike traditional wireless networks, it is a wireless broadband system with no center, distributed, multi-hop relay, dynamic routing, strong invulnerability, and good scalability. It uses its own routing protocol internally to complete the wireless communication between nodes through wireless multi-hop forwarding. An ad hoc distributed broadband wireless network transmission system with an efficient MAC layer transmission protocol and a two-layer routing protocol. All nodes are completely equal, without any infrastructure, and can quickly build a dedicated self-organizing network between mobile nodes, provide instant adaptive communication, have excellent broadband performance, and support the real-time transmission of multimedia information such as video coding and audio coding. The system technology has the advantages of strong anti-interference ability, high spectrum efficiency, long transmission distance, anti-fading ability, and strong diffraction ability. It can realize real-time and high-quality wireless two-way data transmission functions in complex and non-line-of-sight environments.

Vcan1401-MeshSeries Technical Features

*There is no need to set up a central station and complex system configuration. After the site is powered on, it will automatically form a network, and the communication can be started in "seconds";

* Arbitrary topology, multi-hop relay, relay forwarding;

* The logical attributes of each node can be flexibly configured;

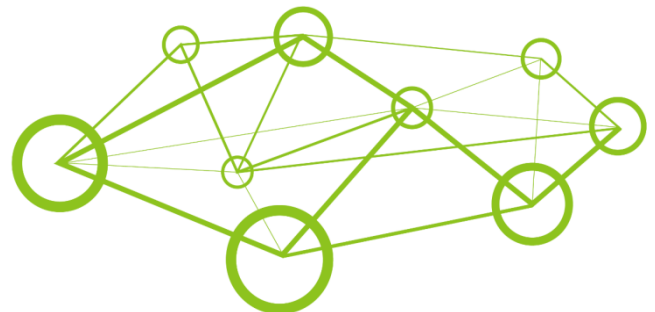
* At present, the same frequency network can support the interconnection of ≥ 32 nodes;

* The channel is encrypted with AES;

* The system data bandwidth peak value is 90Mbps;

* Strong anti-interference ability, high spectrum efficiency, long transmission distance, anti-interference

Strong falling ability, and diffraction ability



2. Technical parameters

- Communication frequency: 1415~1455MHz, adjustable in 1MHz steps;
- Transmission power: 2*30dBm (2*1W), 1dBm step adjustable;
- Bandwidth mode: 5 / 10 / 20 MHz;
- Modulation method: multi-carrier TDD-COFDM;

- Carrier modulation: BPSK/QPSK/16QAM/64QAM (adaptive or fixed);
- Receive sensitivity: -98dBm @ 10MHz;
- Communication distance: 30km (ground-air/air-air line-of-sight), 8km (ground-ground line-of-sight);
- Communication rate: peak 90Mbps (adaptive);
- Transmission delay: Single jump about 2ms;
- Multi-hop capability: up to 8 video jumps;
- Start time: ≤25S;
- Network access time: less than 1 second;
- Routing switching: less than 1 second;
- Data interface: network port x 2, RS232 x 2;
- Wifi supports 2.4G or 5.8G
- Battery power supply: 12V/2A, battery capacity 4000mAh;
- Power consumption: 6~12W
- Protection level: IP65;
- Working temperature: -40~+70°C;
- Size: Length: 155mm*W70mm*H45mm
- Weight: 800g

3、 Equipment List

sequence	name	unit	quantity	Remark
1	Wireless ad hoc network individual host	tower	1	Working frequency: 1410~1460MHz, power: 3dBm*2;
2	gooseneck antenna	attached	2	Working frequency: 1410~1460MHz, gain: 2dBi;
3	RS232 aviation plug control line	root	1	9 pin female
4	RJ45 aviation network cable	root	1	cable
5	18650 battery	Festival	4	
6	charger	individual	1	
7	call headset	individual	1	

		al		
8	2.4G antenna	Only	2	2dBI
9	5.8G antenna	Only	2	2dBI

4. Interface description

4.1 Capacity description



(figure 1)

4.2 Interface description



(figure 2)

- 1) After the antenna is installed, turn on the digital switch of the power supply. After the power is turned on, the red light of the switch power supply is on;
- 2) After the self-organizing network is working, the signal indicator light is on, and the signal is weak for a flashing alarm, and the light is off when the network is disconnected.

4.3 Data interface description



4.4 Battery Installation

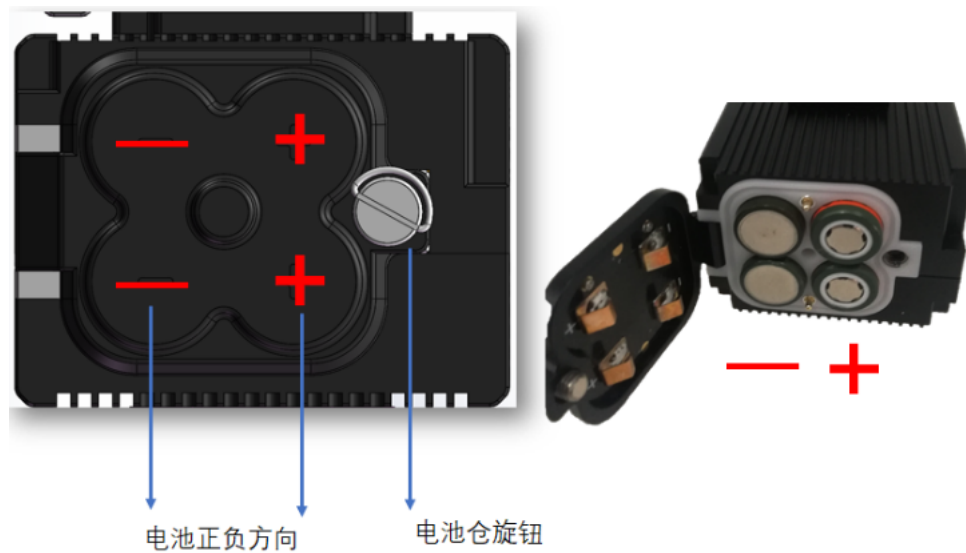


image 3

- 1) **Note: Install the battery or replace the battery when the switch is off;**
- 2) Twist the battery knob, open the battery compartment, and replace the battery, pay attention to the direction and polarity;
- 3) Replace the battery, press the cover tightly, and then turn the screw;
- 4) Keep the battery compartment dry and do not allow water to enter.

4.5 Equipment Installation



5、 Software Operating Instructions

5.1 Basic functions:

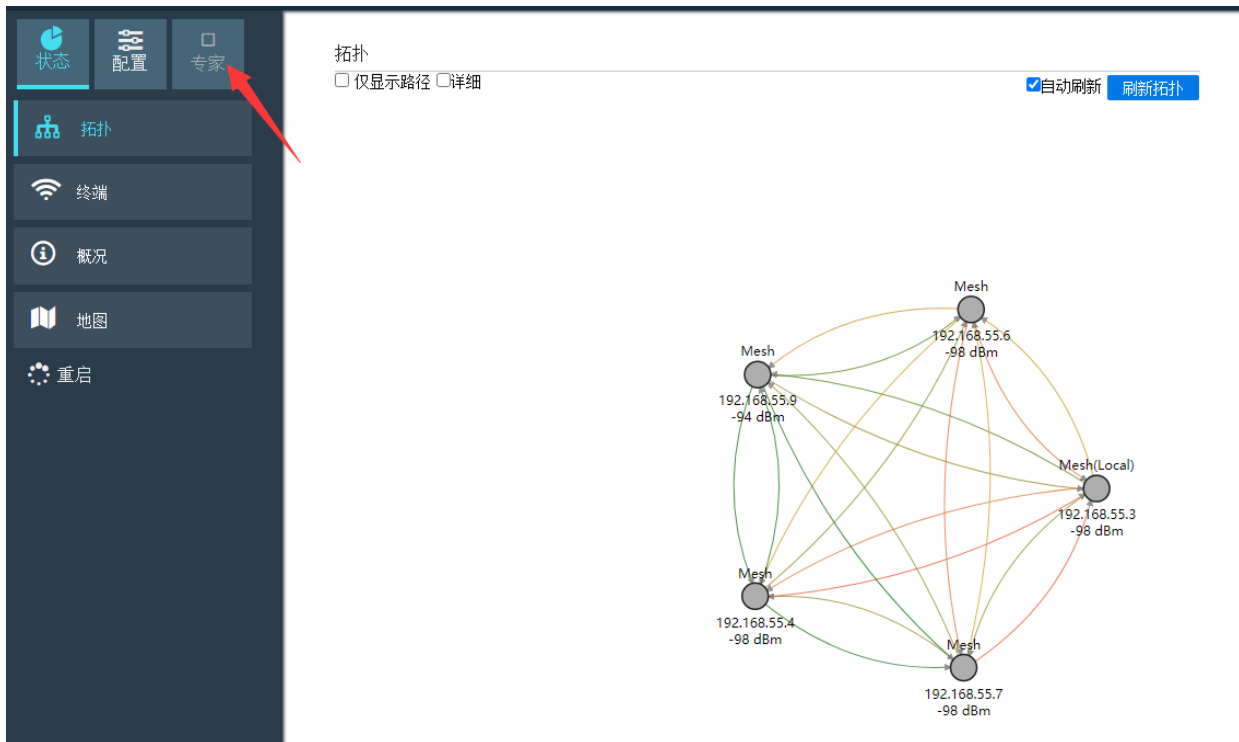
Support 5M, 10M, 20M bandwidth, real-time graphical interface display, real-time map indication, etc.

The software disables DHCP by default, and the default IP address: 192.168.17.1 If you forget the address, please connect the 9th pin of the 26PIN cable to the ground to reset the parameters.

Enter the IP address of the module in the browser, the default username and password are admin, and the software will restart every 12 minutes without authorization. It takes about 20s for the module to connect to the network from power-on. The recommended browser is Chrome.

After entering, it defaults to simple mode, click expert mode to unlock more settings, suitable for professional debugging.

Status section:



Overview:

状态 配置 专家

概况

拓扑



终端

自组网

频谱

地图

重启

 Mesh网络
  设备

设备型号: SUPER-MESH-007 运行时间: 0d 0:5:48 系统时间: 2018/01/01 08:05:45	设备许可: 否 可用内存: 44976kB/65536kB CPU负载: 2.25 1.65 0.77
DHCP: 关闭 IP地址: 192.168.55.3 网关地址:	状态: 已连接 子网掩码: 255.255.255.0 DNS服务器:
BSSID: f2:74:4d:65:73:68 接口: wlan0 < 4 发射功率: 28 dbm 信道(忙/收/发): 26%/21%/1%	MAC: 02:02:03:00:00:03 模式: mesh 信道: 1 <2412 MHz> 本地噪声: -99 dBm

Topology map: (automatic refresh is turned off by default to save bandwidth, you can check automatic refresh)

状态 配置 专家

概况

拓扑

终端

自组网

频谱

地图

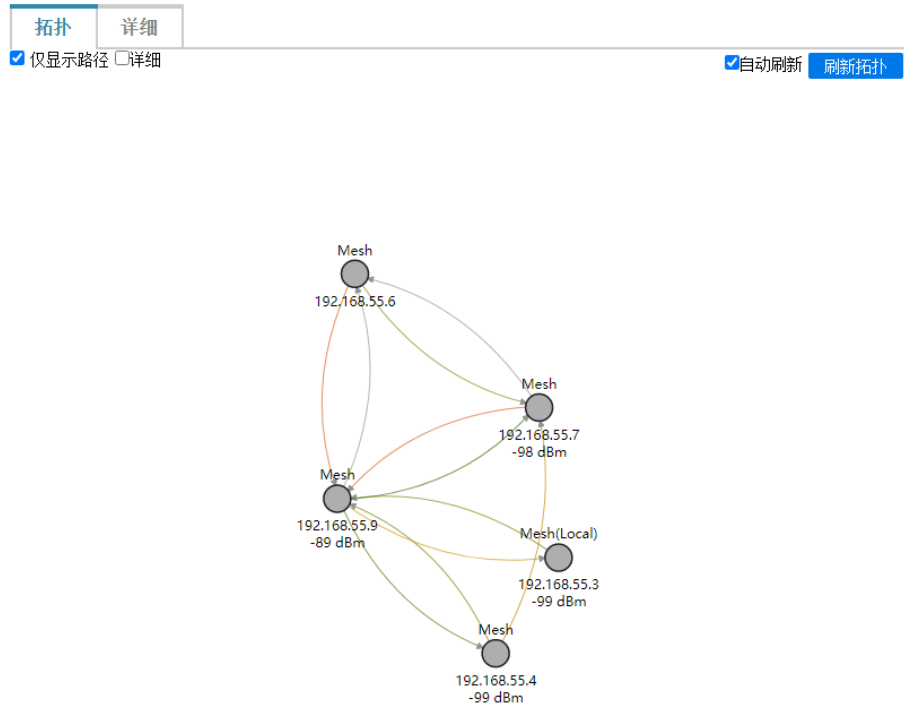
重启

拓扑 详细

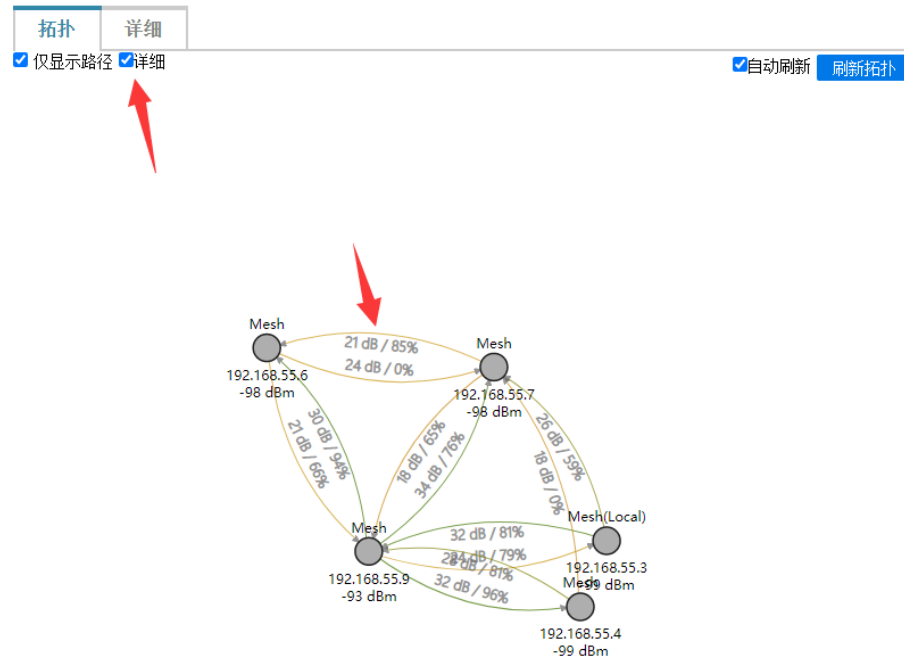
仅显示路径 详细

自动刷新 刷新拓扑

Check only the display path, you can know the direct jump point relationship of each module



Check the details to judge the data connection status of each module. These are displayed dynamically in real time



Click Details: You can know the specific situation of each module directly:

状态 配置 专家

概况

拓扑

终端

自组网

频谱

地图

重启

拓 扑 详 细
刷新详情

[00:02:03:00:00:03]: paths

02:02:03:00:00:07 Nexthop: 02:02:03:00:00:09	02:02:03:00:00:03	62/255
02:02:03:00:00:09 Nexthop: 02:02:03:00:00:09	02:02:03:00:00:03	134/255
02:02:03:00:00:04 Nexthop: 02:02:03:00:00:09	02:02:03:00:00:03	98/255
02:02:03:00:00:06 Nexthop: 02:02:03:00:00:09	02:02:03:00:00:03	59/255

[00:02:03:00:00:03]: peers

02:02:03:00:00:06	02:02:03:00:00:03	-86 dBm/30%
02:02:03:00:00:09	02:02:03:00:00:03	-74 dBm/77%
02:02:03:00:00:07	02:02:03:00:00:03	-85 dBm/47%
02:02:03:00:00:04	02:02:03:00:00:03	-80 dBm/56%

[00:02:03:00:00:04]: paths

02:02:03:00:00:07 Nexthop: 02:02:03:00:00:09	02:02:03:00:00:04	47/255
02:02:03:00:00:09 Nexthop: 02:02:03:00:00:09	02:02:03:00:00:04	201/255

Terminal state:

状态 配置 专家

概况

拓扑

终端

自组网

频谱

地图

重启

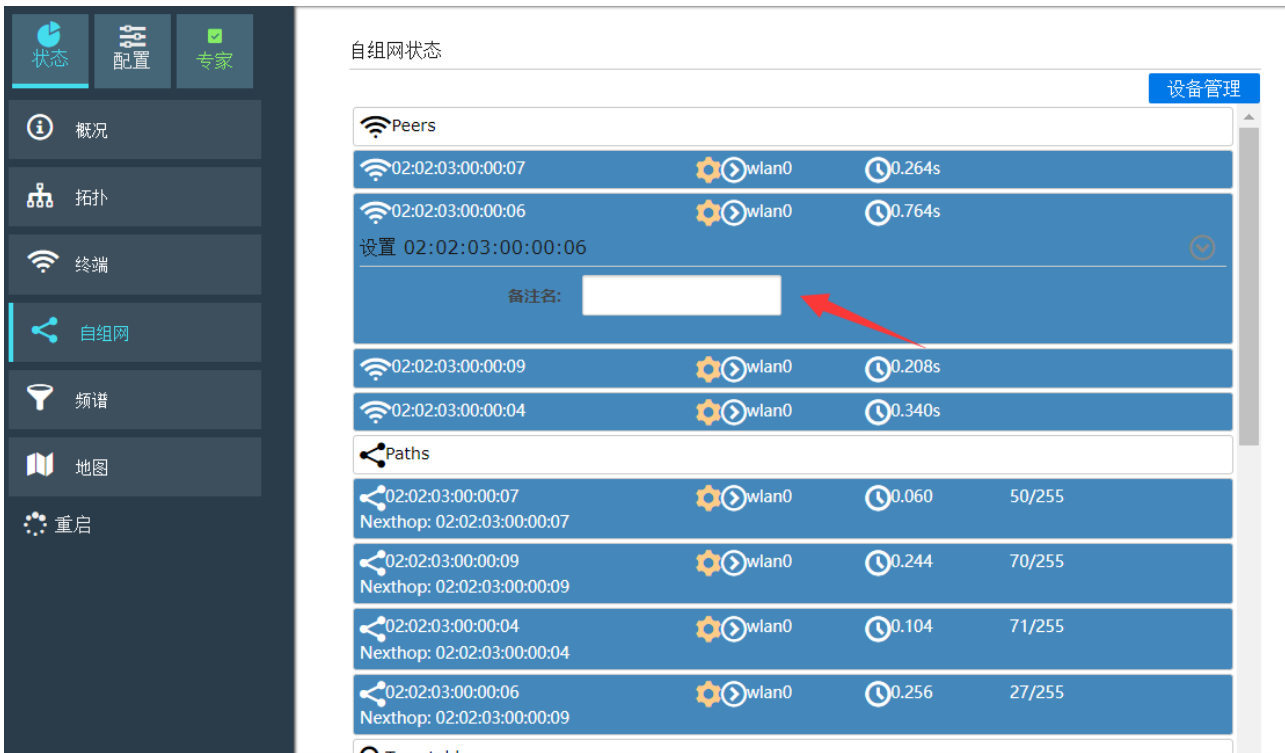
终端状态
设备管理

自动刷新 详细

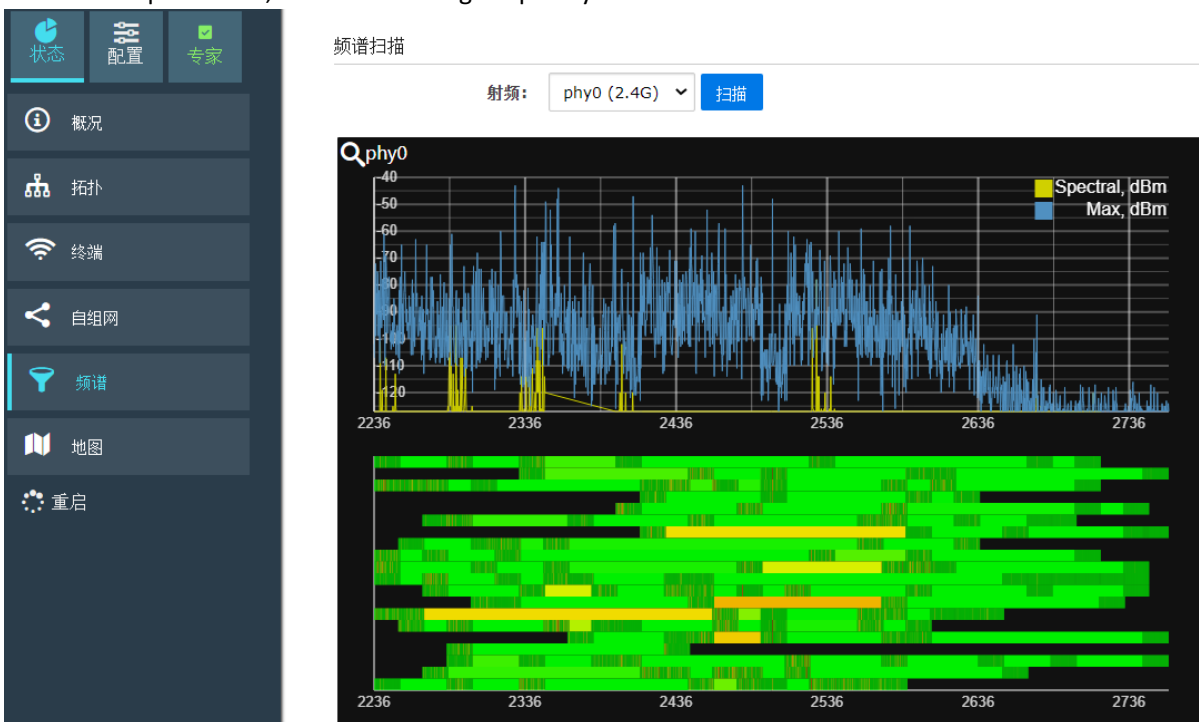
wlan0:mesh

02:02:03:00:00:04 ↓ 0 MB ↓ 13.0 MBit/s MCS 1	-81 [-95, -81] dBm ↑ 0 MB ↑ 13.0 MBit/s MCS 1	CCQ: 56% 52 pkts 375 s
02:02:03:00:00:06 ↓ 0 MB ↓ 13.0 MBit/s MCS 1	-87 [-96, -87] dBm ↑ 0 MB ↑ 0.1 MBit/s	CCQ: 26% 19 pkts 375 s
02:02:03:00:00:09 ↓ 0 MB ↓ 13.0 MBit/s MCS 1	-73 [-86, -73] dBm ↑ 1 MB ↑ 13.0 MBit/s MCS 1	CCQ: 79% 214 pkts 362 s
02:02:03:00:00:07 ↓ 0 MB ↓ 1.0 MBit/s	-82 [-96, -82] dBm ↑ 0 MB ↑ 0.1 MBit/s	CCQ: 0% 0 pkts 27 s

Ad hoc network: You can remark the name, of course, it can also be operated in the terminal state.



Spectrum scanning: Check the interference of each frequency band. Of course, the frequency bands of different modules are purchased, and the scanning frequency bands are different.



Map: (Of course, to know the location information of each terminal, GNSS modules such as GPS or Beidou need to be installed)
Support tile maps, image maps, network maps, etc.

自动刷新 仅显示自身定位 **设置** 语言 简体中文 ▼

瓦片地图: 开启 使用U盘中的瓦片地图.

图片地图: 开启

图片坐标调整: (无) ▼

西南: 纬度: 经度: 格式: 0.000000~18000.000000 S/N/W/E 或 -180.00000000~180.00000000.

东北: 纬度: 经度:

上传图片: 仅支持.jpg(<2M)格式.

+
-
🔄
🗑️

Configuration section:

Mode: 1. MESH node or bridge configuration

状态 配置 专家

模式

Mesh节点

网桥

无线

网络

用户

系统

工具

重启

网络
无线
管理

射频 ⌵

phy0 信道: 6 (2437 MHz) ▼

多跳网络 (Mesh Node) ⌵

指定BSSID: 相同BSSID设备将互连, 不填写将使用默认值。

认证: 开放 Open ▼

网关节点(Gate): 开启 连接其它网络 (如: 有DHCP服务器)。

接入点 (Access Point) ⌵

无线: 开启

无线名称(SSID):

认证: 开放 Open ▼

2. Wireless configuration:



2.1 Transmission power configuration, the power of different products purchased is different.

Channel bandwidth: 5M 10M 20M 40M

Channel: Different channels are used to purchase different products

The coverage distance (meters) needs to be filled in according to the actual situation. If it is set to 3000 meters, it is impossible to actually run to 5000 meters.

Number of Antennas 2

Fixed MCS rate: Can be set to off for automatic selection. If you want stable transmission, it is recommended to set manual, range (MCS0 to MCS15)

Bandwidth, Modulation, Rate

Limit MCS rate: It is recommended to enable it. After enabling it, if the fixed rate is MCS4, the software will automatically select the best modulation method from MCS0 to MCS4 during the test.

		5M	10M	20M	40M
MCS0	BPSK 1/2	1.7M	3.3m	6.5M	13.5M
MCS1	QPSK 1/2	3.2m	6.5M	13m	27m
MCS2	QPSK 3/4	4.8m	9.8m	19.5M	40.5M
MCS3	16QAM 1/2	6.5M	13m	26M	54M
MCS4	16QAM 3/4	9.7M	19.5M	39M	81M
MCS5	64QAM 2/3	13m	26M	52m	108M
MCS6	64QAM 3/4	14.5M	29M	58.5M	121M
MCS7	64QAM 5/6	16M	32.5M	65m	135M
MCS8	BPSK 1/2	3.2m	6.5M	13m	27m
MCS9	QPSK 1/2	6.5M	13m	26M	54M
MCS10	QPSK 3/4	9.7M	19.5M	39M	81M
MCS11	16QAM 1/2	13m	26M	52m	108M
MCS12	16QAM 3/4	19.5M	39M	78M	162M
MCS13	64QAM 2/3	26M	52m	104M	216M
MCS14	64QAM 3/4	29M	58.5M	117M	243M
MCS15	64QAM 5/6	32.5M	65m	130M	270M

From MCS0 to MCS7, two wireless ports send the same data in order to improve the stability during the

movement.

From MCS8 to MCS15, the two wireless ports send different data, which can make the rate X2

If it is in a mobile state, it is recommended to use BPSK or QPSK to transmit data. 16QAM and 64QAM are suitable for use with fixed transmission.

If MCS8 to MCS15 are used, it is recommended that the antennas of the two ports be 90 degrees to each other, for example, one is vertical and the other is horizontal.

If drones are used, MCS0 to MCS2 are recommended.

The greater the bandwidth, the lower the sensitivity. Same goes for modulation.

above rate unitbps

3. Network:

The screenshot shows the 'Network' configuration page. On the left is a sidebar with navigation options: 状态 (Status), 配置 (Configuration), 专家 (Expert), 模式 (Mode), 无线 (Wireless), 网络 (Network), 用户 (User), 系统 (System), 工具 (Tools), and 重启 (Restart). The 'Network' section is selected. The main content area has tabs for '网络' (Network) and '虚拟网络' (Virtual Network). Under '网络', there is a '网络设置' (Network Settings) section with a refresh icon. The settings include: '动态地址 DHCP' (Dynamic Address DHCP) with a checkbox for '开启' (Enable) which is unchecked; '固定IP地址' (Fixed IP Address) set to 192.168.55.3; '固定子网掩码' (Fixed Subnet Mask) set to 255.255.255.0; '网关地址' (Gateway Address) (empty); 'DNS服务器' (DNS Server) (empty); 'VLAN' (empty); '自组网' (Self-organizing Network) with a checkbox for '开启' (Enable) which is unchecked and a note '有线接口加入自组网络' (Wired interface joins self-organizing network); '组播嗅探' (Multicast Snooping) with a checkbox for '开启' (Enable) which is unchecked and a note '仅需在一侧开启' (Only need to enable on one side); 'DHCP服务器' (DHCP Server) with a checked checkbox for '开启' (Enable); '起始地址' (Start Address) set to 192.168.55.100; '结束地址' (End Address) set to 192.168.55.254; and '租期 (秒)' (Lease Time (seconds)) set to 86400.

4. User management:

The screenshot shows the 'User Management' page. The sidebar is the same as in the previous screenshot, but the '用户' (User) section is selected, and a sub-option '管理' (Management) is highlighted. The main content area has a '用户管理' (User Management) header and a '新建' (New) button.

5. System

系统信息

主机名:

备注信息:

位置信息:

地域: 将影响WLAN可用信道等功能。请务必遵循法规按所在地设置。

时间

网络获取时间: 开启

时区:

定时重启: 开启

管理服务

二层设备管理: 开启

远程服务器: 开启

设备

固件升级:

配置导入:

配置导出:

恢复出厂:

The software authorization is here, if there is no authorization, restart every 12 minutes

许可证管理

功能开关

配置重启生效

全许可证测试: 开启 开启后, 设备每12分钟自动重启。

无线高并发: 开启 当前为 每射频4096用户(有Mesh模式/有终端模式)许可。

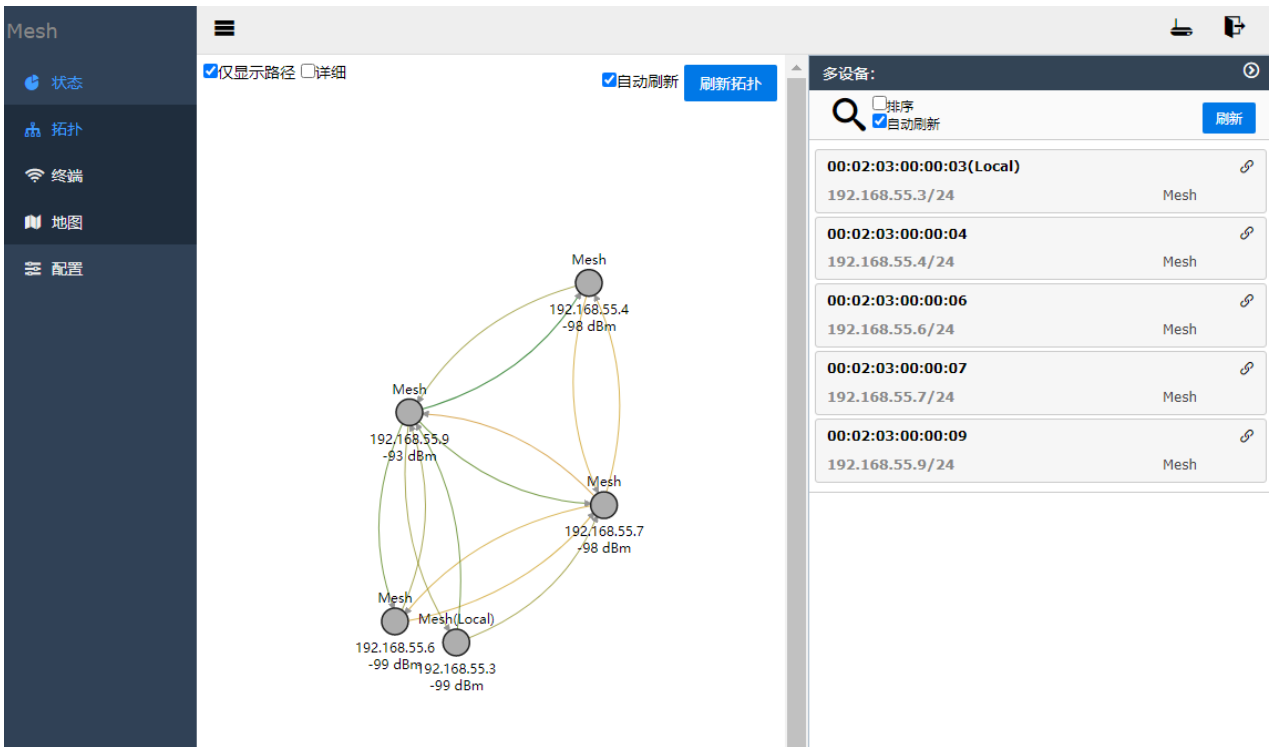
设备UID: 1a1c3fd45be261dc0d98ad99ab81c93c
设备MAC: 00:02:03:00:00:03
更多信息请参考官网: [许可证功能介绍](#)

6. Tools Configure serial port, GPS/Beidou/GNSS, 4G/5G access and other parameters



6.1 Multi-device management, in the upper right corner, you can log in and manage users remotely, and it is also a real-time dynamic interface display or map display.





Here is the introduction of ad hoc network configuration and control under WEB. Of course, you can also provide the code and design the remote control software yourself. For example:

The screenshot shows a device management web interface. On the left is a navigation menu with options: 首页 (Home), 设备 (Devices), 设备管理 (Device Management), 设备固件 (Device Firmware), 配置管理 (Configuration Management), Web Portal, 终端 (Terminal), and 系统 (System). The main area features a search bar and several action buttons: 创建Tag (Create Tag), + 创建组 (Create Group), 重命名 (Rename), 删除 (Delete), and 应用更改 (Apply Changes). Below these are several device groups: test, ttt, 北京 (Beijing), 海淀 (Haidian), and 上海 (Shanghai). At the bottom, there is a 'Tag分组' (Tag Grouping) dropdown. Below the main area is a '设备列表' (Device List) section with a search bar and action buttons: + 添加 (Add), 删除 (Delete), 重启 (Restart), 升级 (Upgrade), and 配置 (Configure). The device list table is as follows:

ID	MAC地址	名称	在线状态	最近上线时间	最近上线地址	固件版本	待升级	绑定配置	操作
1	50:bd:5f:be:a1:f4	test	1	2016-06-12 18:08:02	121.228.138.209	tiny/0.1.0	-	-	👁️ 📄
3	00:01:02:03:04:05	aaa	0	0000-00-00 00:00:00			-	-	👁️ 📄
4	00:01:02:03:04:08	ggg	0	0000-00-00 00:00:00			-	-	👁️ 📄
5	bc:46:99:35:83:62	Empty	1	2016-06-13 10:02:04	58.209.167.252	tiny/0.1.0	-	-	👁️ 📄

At the bottom of the device list, it says '显示第 1 到第 4 条记录, 总共 4 条记录' (Showing records 1 to 4, total 4 records).

The HTTP protocol is adopted, and the penetration ability is strong, and the device can be located at the back end of the firewall and NAT device. Use digital signatures to ensure communication security and prevent counterfeit servers from sending instructions. Optionally encrypt the communication content.

6.2 Serial port software settings:



Select Expert Mode, Tools, UART Interface.

UART接口管理

新建

choose new

UART接口设置

设备:	ttyATH0	模式:	网络
波特率:	ttyATH0	停止位:	1
奇偶校验:	ttyS0	最大数据块长度:	<input type="text"/> 如果设置值, 数据将按块接收和发送。
名称:	ttyUSB0	协议:	UDP
服务器地址:	1	端口:	20003
	192.168.55.100		

未设置时, TCP将作为服务器工作。

Attention, if you use serial port to transmit serial data, you have to choose ttyS0 (COM1 of hardware) and ttyUSB0 (COM2 of hardware), ttyATH0 is invalid, mode: network

Baud rate 115200, stop bit 1, parity none.

Name 1, protocol UDP, IP address, 192.168.55.100 (the IP address here is the IP address of the other device, for example, input the IP of the computer for the computer, and input the IP of the device for the device).

Port 20005, 20003. Choose a port number

The computer's IP is set to a fixed 192.168.17.100

自动获得 IP 地址(O)
 使用下面的 IP 地址(S):

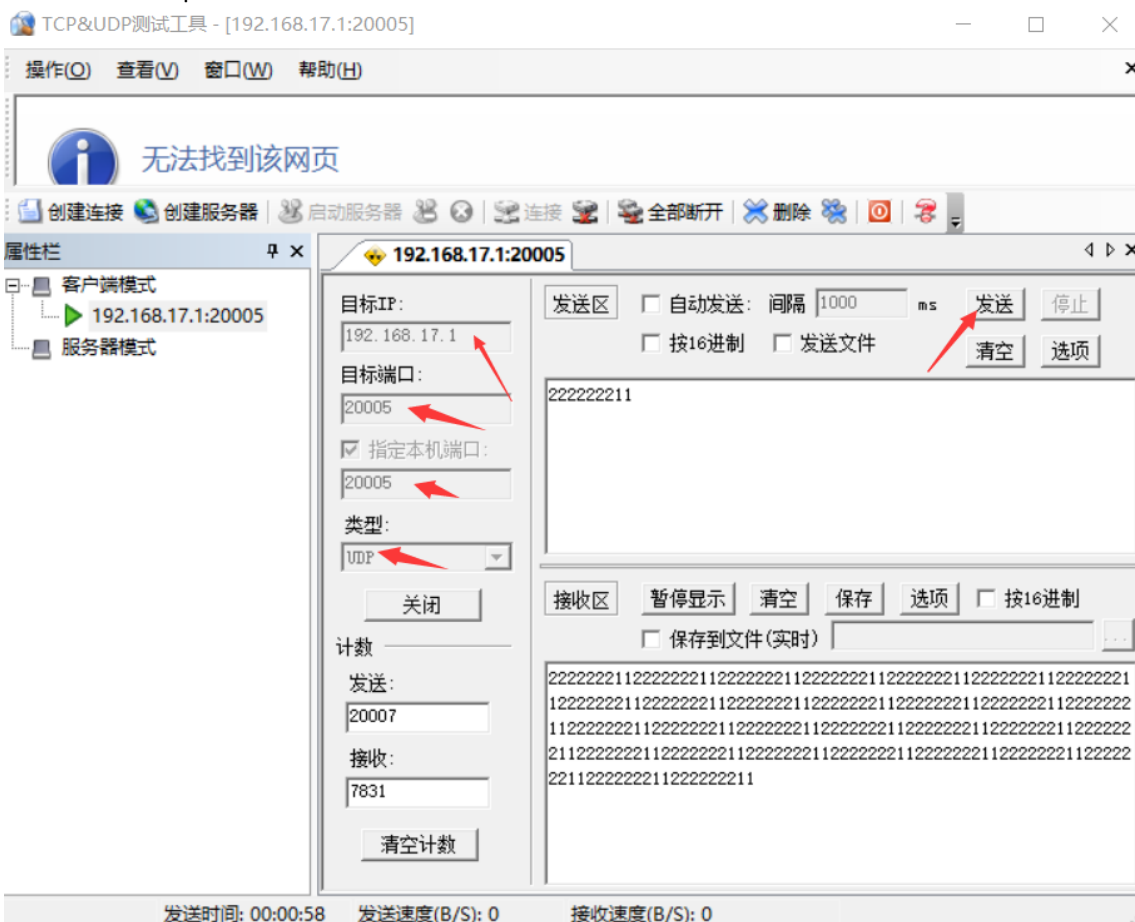
IP 地址(I):
 子网掩码(U):
 默认网关(D):

自动获得 DNS 服务器地址(B)
 使用下面的 DNS 服务器地址(E):

首选 DNS 服务器(P):
 备用 DNS 服务器(A):

退出时验证设置(L) 高级(V)...

Short the TX RX pins of COM1 and COM2 of the device.



Use the TCP UDP test tool to fill in the IP and port of the device.
Send to loop back data.

if unsuccessful

The system recommends upgrading to the latest version first, the latest version is 1.0.2, see the lower left footer.

版本: mesh/0.7.31
设备MAC: 00:02:03:00:00:03

After upgrading the system, restore the factory settings and set up again.

The screenshot shows the 'System Information' (系统信息) configuration page. On the left is a sidebar with menu items: 状态 (Status), 配置 (Configuration), 专家 (Expert), 模式 (Mode), 无线 (Wireless), 网络 (Network), 用户 (User), 系统 (System), 工具 (Tools), and 重启 (Restart). The main content area includes sections for '系统信息' (System Information) with fields for '主机名' (Hostname), '备注信息' (Remarks), '位置信息' (Location), and '地域' (Region) set to 'China'. The '时间' (Time) section has '网络获取时间' (Network Time) and '定时重启' (Scheduled Restart) both set to '关闭' (Off), and '时区' (Timezone) set to '(GMT+08:00) Beijing, Chongqing, Urumqi'. The '管理服务' (Management Services) section has '二层设备管理' (Layer 2 Device Management) checked '开启' (On) and '远程服务器' (Remote Server) set to '关闭' (Off). The '设备' (Device) section has buttons for '固件升级' (Firmware Upgrade) with '上传' (Upload), '配置导出' (Configuration Export) with '下载' (Download), and '恢复出厂' (Restore Factory) with '恢复' (Restore). Red arrows point to the '上传' and '恢复' buttons.

Pay attention to restore the factory settings, the IP address will become the default 192.168.17.1. DHCP is off by default

After recovery, you can turn on DHCP, and then set the IP address. After setting, it is recommended to stick a label on the shell for later maintenance.

The screenshot shows the 'Network Settings' (网络设置) page under the 'Network' (网络) tab. The '动态地址 DHCP' (Dynamic Address DHCP) checkbox is unchecked. The '固定IP地址' (Fixed IP Address) is set to '192.168.17.1'. The '固定子网掩码' (Fixed Subnet Mask) is '255.255.255.0'. The '网关地址' (Gateway Address) field is empty. The 'DNS服务器' (DNS Server) field is empty. The '自组网' (Self-organizing Network) checkbox is unchecked. The 'DHCP服务器' (DHCP Server) checkbox is unchecked. The '组播嗅探' (Multicast Snooping) checkbox is unchecked. Red arrows point to the '动态地址 DHCP' checkbox, the '固定IP地址' field, and the '网关地址' field.