

# Koi Miner C16 Series

## 锦鲤算力服务器 C16 系列

User Guide 用户使用手册 v1.0

# Table of Contents 目录

<b>1 INTRODUCTION   产品介绍</b>	<b>3</b>
1.1 MINER INTRODUCTION   矿机介绍	3
1.2 CONTROL BOARD INTRODUCTION   控制板功能说明	4
<b>2 OPERATION NOTICE   设备操作注意事项</b>	<b>6</b>
2.1 GENERAL SAFETY PRECAUTION   通用安全注意事项	6
2.2 ENVIRONMENT REQUIREMENT   环境安全	6
2.2.1 Non-Flammable Environment   易燃空气环境	6
2.2.2 Dry Environment   防潮	6
2.2.3 Dust-Free Environment   防尘	7
2.3 ELECTRICAL SAFETY   电气安全	7
<b>3 POWER-ON INSTRUCTION   矿机上电</b>	<b>8</b>
3.1 PREPARATION   矿机上电前准备	8
3.2 INSPECTION   矿机上电前检查	8
<b>4 FINDING IP ADDRESS   查找矿机 IP 地址</b>	<b>10</b>
4.1 CHECK ROUTER AND DHCP SERVER   查看路由器或 DHCP 服务器	10
4.2 MINER MANAGEMENT SOFTWARE   使用矿机管理软件	10
4.2.1 IP Report   矿机 IP 报告	10
4.2.2 Scan Miner   扫描矿机	11
4.3 ALTERNATIVE IP SCANNER   使用其它网络扫描软件	12
<b>5 MINER CONFIGURATION   矿机配置</b>	<b>13</b>
5.1 LOGIN   登录矿机	13
5.2 CONFIGURATION   配置矿机	13
5.2.1 Miner Overview   查看矿机状态	13
5.2.2 Static IP Address   配置静态 IP 地址	15
5.2.3 Setting Up the Pool and Worker Account   修改矿池和矿工账号	19
5.2.4 Firmware Upgrade   固件升级	20

<b>6 FAULT INFORMATION   矿机常见故障</b>	<b>22</b>
6.1 OVERHEATING   矿机启动过热	22
6.2 MINE POOL CONNECTION FAULT   矿机连接矿池失败	22
6.3 FAN FAULT   矿机风扇故障	23
6.4 POWER SUPPLY FAULT   矿机电源故障	23
6.5 HASH BOARD FAULT   矿机计算板故障	24

# 1 Introduction | 产品介绍

## 1.1 Miner Introduction | 矿机介绍

The front view of the KOI C16 is shown in the following figure :

锦鲤 C16 系列矿机外观如图 1 所示:

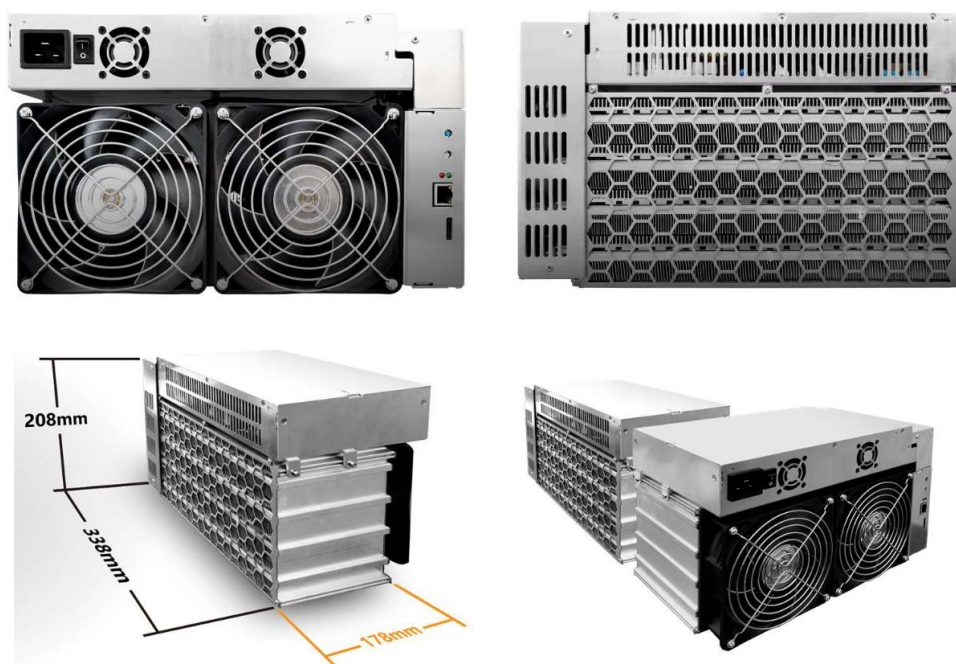


图 1

Table 1 KOI C16 Specification | 表 1 为 KOI C16 参数信息:

Model 型号	C16S
Hashrate 算力	92TH/s $\pm$ 5%
Power 整机功耗	3400W $\pm$ 10%
Power/Hashrate 功耗比	37W/T
Power Supply 电源	Input Voltage: AC 220V-270V 输入电压范围: 交流 220V – 270V
Operation Temperature 工作温度	0 °C ~ +40 °C (0m ~ 2000m elevatio 海拔)
Storage Temperature 存储温度	-40 °C ~ +70 °C
Dimension 整机尺寸	338mm*178mm*208mm

## 1.2 Control Board Introduction | 控制板功能说明



图 2

### Control Board Components:

矿机控制板上包含以下部件：

1、IP report pushbutton: Press the pushbutton for 1 to 2 seconds until the red indicator turns on, C16 will report its IP address to LAN, while the red light flashing.

IP 报告按钮：矿机运行时，按下此按钮 1 到 2 秒钟，看到红色指示灯亮起后松开，矿机会向局域网广播自己的 IP 地址信息，同时红色指示灯会闪烁几秒钟。

2、Reset button: When the miner is running, press the reset button and hold it for 10 to 12 seconds after the red indicator turns on, the miner will restore the factory setting.

复位按钮：用于恢复矿机的出厂设置。矿机运行时，按下此按钮并保持按住，等待 10 秒左右红色指示灯亮起，然后松开按钮，此后矿机会自动恢复出厂设置并重启。

3、Red (Fault) indicator: The flashing red indicator represents a special event or operation error, including fan error, hashboard error, etc. The red indicator is off when C16 is operating normally.

红色指示灯：指示特殊事件或故障。矿机正常工作时红色指示灯处于熄灭状态。在按下 IP 报告按钮或复位按钮后，红色指示灯会亮起或闪烁。当矿机出现算力板故障或风扇故障时，红色指示灯会闪烁。

4、Green (Normal operation) indicator: The green indicator will keep flashing during the start or restart process. When C16 works normally the green indicator will flash with a long time interval.

绿色指示灯：指示矿机正常状态。矿机启动或重启过程中，绿色指示灯会持续闪烁。矿机正常工作时，绿色指示灯长亮，在有算力输出时，绿色指示灯会保持长亮并有间隔的闪烁。

5、Ethernet connector: Provide 100M ethernet connection.

以太网口：支持 100M 以太网连接。

6、SD card slot: Only used by professionals. Do not insert anything, in case it will damage the miner.

SD 卡槽位：仅在矿机出厂之前或由专业人员修复矿机时使用。请勿将 SD 卡插入此槽位，以免造成矿机无法工作或 SD 卡的损坏。

## 2 Operation Notice | 设备操作注意事项

Caution: Before installing, operating, or maintaining C16 equipment, read through this manual and follow all the safety instructions.



请注意：为保障人身和设备安全，在安装、操作和维护设备时，请遵循设备上标识及手册中说明的所有安全注意事项。

### 2.1 General Safety Precaution | 通用安全注意事项

- Personnel who plan to install, operate, or maintain C16 equipment must receive thorough training, obtain required job qualifications, understand all necessary safety precautions, and be able to correctly perform all operations.
- 负责安装维护设备的人员，必须先经严格培训，了解各种安全注意事项，掌握正确的操作方法之后，方可安装、操作和维护设备。
- Do not lift or pull any cable when transporting the equipment. Otherwise, the equipment might be damaged.
- 搬运设备时，严禁提拉数据排线、电源线、风扇线，否则将导致连线和设备损坏。
- Before operating the miner, make sure it has already been mounted on the floor or a stable object such as a mounting frame.
- 操作设备前，应先将设备可靠的固定在地板或其他稳固的物体上，如安装架。

### 2.2 Environment Requirement | 环境安全

#### 2.2.1 Non-Flammable Environment | 易燃空气环境

- Do not place or operate the equipment in a flammable or explosive environment.
- 不得将设备置于易燃、易爆气体或烟雾的环境中，不得在该种环境下进行任何操作。
- Operating any kind of electronic equipment under flammable gases is extremely dangerous.
- 在易燃空气环境中进行的任何电子设备的操作都会构成极度的危险。

#### 2.2.2 Dry Environment | 防潮

- Do not place the equipment in areas prone to water leakage to ensure that there is no condensation inside the equipment. Also, make sure that no liquid enters the product. Otherwise, short circuits will occur and may result in serious injury or death.
- 注意不要将设备放置在容易漏水的地方，确保设备内部无凝露。同时，确保没有液体进入产品。否则，会导致设备短路，造成严重的人身伤害甚至死亡。设备运行时需注意远离水源和湿气，设备进水或者湿气会造成设备电路损坏。

- Do not touch the miner with wet hands.
- 禁止湿手触摸设备。

### 2.2.3 Dust-Free Environment | 防尘

- The equipment should be installed in an environment away from sand and dust sources, such as coal mines, rural roads, farmland, etc.
- 设备安装环境应远离沙尘源，比如：煤矿、乡村公路、农田等。
- Prohibit the equipment from operating in a high-density dust environment.
- 禁止设备运行在高密度灰尘的环境下。

## 2.3 Electrical Safety | 电气安全

- Do not connect or disconnect power cables with power on.
- 禁止带电安装、拆除电源线。
- Before installing or removing a power cable, turn off the power switch.
- 安装、拆除电源线之前，必须先关闭电源开关。
- Before connecting a power cable, check that the label on the power cable is correct.
- 连接电源线之前，必须先确认电源线标签标识正确再进行连接。
- To avoid dropping parts into the miner to cause a short circuit.
- 要防止螺丝掉入机框或机箱内，造成短路。
- Do not install or remove the miner when it is energized.
- 严禁安装或拆除带电设备。



## 3 Power-on Instruction | 矿机上电

### 3.1 Preparation | 矿机上电前准备

Before connecting the power supply, ensure the following devices are ready.

矿机上电之前，请确认以下相关设备已经准备完毕。

#### 1、Power supply Cable | 矿机电源线。



Caution: Must use the original power supply cable to avoid potential serious accidents such as a fire hazard.

请注意：务必使用矿机附带的电源线。使用来历不明的电源线可能引起火灾等严重事故。

#### 2、Computer: Using Mac, Windows, or Linux with a graphical interface are allowed to configure the miner.

计算机：用于矿机的配置操作，可以使用 Mac, Windows 或者带有图形界面的 Linux 系统的计算机对矿机进行配置。

#### 3、Network Switch: When operating multiple miners, a network switch provides internet to all miners by connecting to the router.

网络交换机：当您有多台矿机需要操作时，可以使用网络交换机连接矿机，然后连接路由器。

#### 4、Router: Provide an internet connection.

路由器：用于连接互联网。

#### 5、DHCP Server: C16 is using Dynamic Host Configuration Protocol (DHCP) by default, DHCP is a network management protocol that is used to dynamically assign the IP address, the DHCP server can be a network switch, router, server with gateway function.

DHCP 服务器：矿机默认使用 Dynamic Host Configuration Protocol (DHCP) 协议从网络上获取 IP 地址，根据您使用的网络环境不同，DHCP 服务器可以是具有网关功能的交换机、路由器或者专用的服务器。

### 3.2 Inspection | 矿机上电前检查

Before charging the mining machine, refer to the following correct placement of the mining machine. Please check the connection section and the joints of each connection are closely connected.

矿机上电前，参考如下正确摆放矿机，请检查连线部分，各连线的接头是否连接紧密。



图 3

## 4 Finding IP Address | 查找矿机 IP 地址

Before configuring the miner, the IP address needs to be obtained first. There are some methods following to get the IP address.

矿机正常上电，在进行配置之前，需要首先确定矿机的 IP 地址，有以下几种方法。

### 4.1 Check Router and DHCP Server | 查看路由器或 DHCP 服务器

The IP address of the miner can be obtained by checking the IP address list of the router or DHCP server.

可以通过查看路由器或者 DHCP 服务器的 IP 地址列表来获取矿机的 IP 地址。

### 4.2 Miner Management Software | 使用矿机管理软件

#### 4.2.1 IP Report | 矿机 IP 报告

Ensure the computer and miner are on the same LAN when using the miner IP reporting feature of the miner management software.

使用管理软件的矿机 IP 报告功能，请确保电脑和矿机在同一局域网中。

The screenshot displays the 'IP Report' tab in the Miner Management Software. At the top, there are input fields for 'IP段' (IP Range), '起始IP' (Start IP), '结束IP' (End IP), and '端口' (Port), along with buttons for '扫描' (Scan), '导入列表' (Import List), 'IP管理' (IP Management), and a checkbox for '使用代理' (Use Proxy). Below this, the '矿池相关' (Mining Pool Related) section is active, showing '位置登记' (Location Registration) with fields for '层数' (Level), '位置数' (Location Count), '货架号' (Shelf Number), '层号' (Layer Number), '位置号' (Location Number), '起始位置' (Start Position), and '步长' (Step Length). There are buttons for '停止' (Stop), '跳过' (Skip), '清除' (Clear), and '导出' (Export). The '固定IP' (Fixed IP) section includes fields for '用户名' (Username), '密码' (Password), 'IP段' (IP Range), 'IP范围' (IP Range), and buttons for '跳过IP' (Skip IP) and '设置IP' (Set IP). The '自动跳过存在IP' (Auto Skip Existing IP) section has a checkbox and fields for '子网掩码' (Subnet Mask), '网关' (Gateway), 'DNS', and '下一IP' (Next IP). A table at the bottom lists discovered IP addresses with columns for '序号' (Serial Number), 'IP', 'MAC', '货架号' (Shelf Number), '层号' (Layer Number), '位置号' (Location Number), '新IP' (New IP), and '操作结果' (Operation Result). The table contains one entry with IP 10.10.5.85 and MAC 1CC0E10239FC.

序号	IP	MAC	货架号	层号	位置号	新IP	操作结果
1	10.10.5.85	1CC0E10239FC	6	1	1		

图 4

Run the software on the computer, click the IP Report tab and click the Start button.

如图所示，在电脑上运行软件，点击 IP 报告选项卡，然后点击开始按钮。

Press the IP report button on the control board of the mine machine. When the red indicator is on, the mine opportunity will broadcast its IP address to the LAN. After the computer receives the IP report of the mining machine, the software will display the mining machine IP address in the list.

按下矿机控制板上的 IP 报告按钮，待红色指示灯亮起时松开按钮，矿机会向局域网广播自己的 IP 地址，电脑收到矿机的 IP 报告之后，软件会将矿机 IP 地址显示在列表中。

When you need to find the IP addresses of multiple mining machines, use the software's IP reporting function while recording the location information of the mining machines.  
当您需要查找多台矿机的 IP 地址时，使用软件的 IP 报告功能，同时可以记录矿机的位置信息。

### 4.2.2 Scan Miner | 扫描矿机

Using the scanning machine function of the software as shown in Fig:  
使用软件的扫描矿机功能，如图所示：

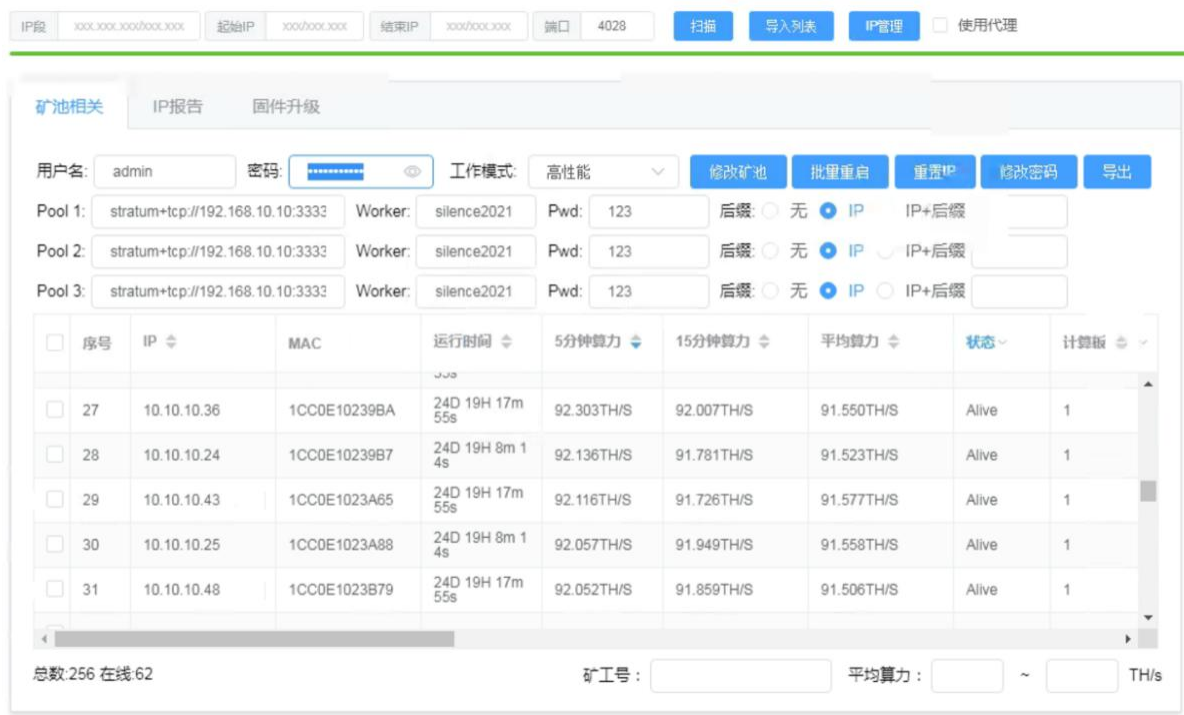


图 5

Enter the IP segment of the LAN at the software interface, start IP and end IP, and click the scan miner button to start the scan.

在软件界面输入局域网的 IP 段，起始 IP 和结束 IP，点击扫描矿机按钮开始扫描。

When the scan is complete, you can view the list of mining machines in the Mine Pool or IP Settings tab.

扫描完成后，可以在矿池或 IP 设置选项卡中查看矿机列表。

### 4.3 Alternative IP Scanner | 使用其它网络扫描软件

There are other IP scanners able to find miners. For example, using Advanced IP Scanner software, which can be downloaded at "<https://www.advanced-ip-scanner.com/>" as shown in Fig: 您也可以使用其它网络扫描软件来查找矿机。比如使用 Advanced IP Scanner 软件，下载地址为：<https://www.advanced-ip-scanner.com/>。软件界面如图所示。

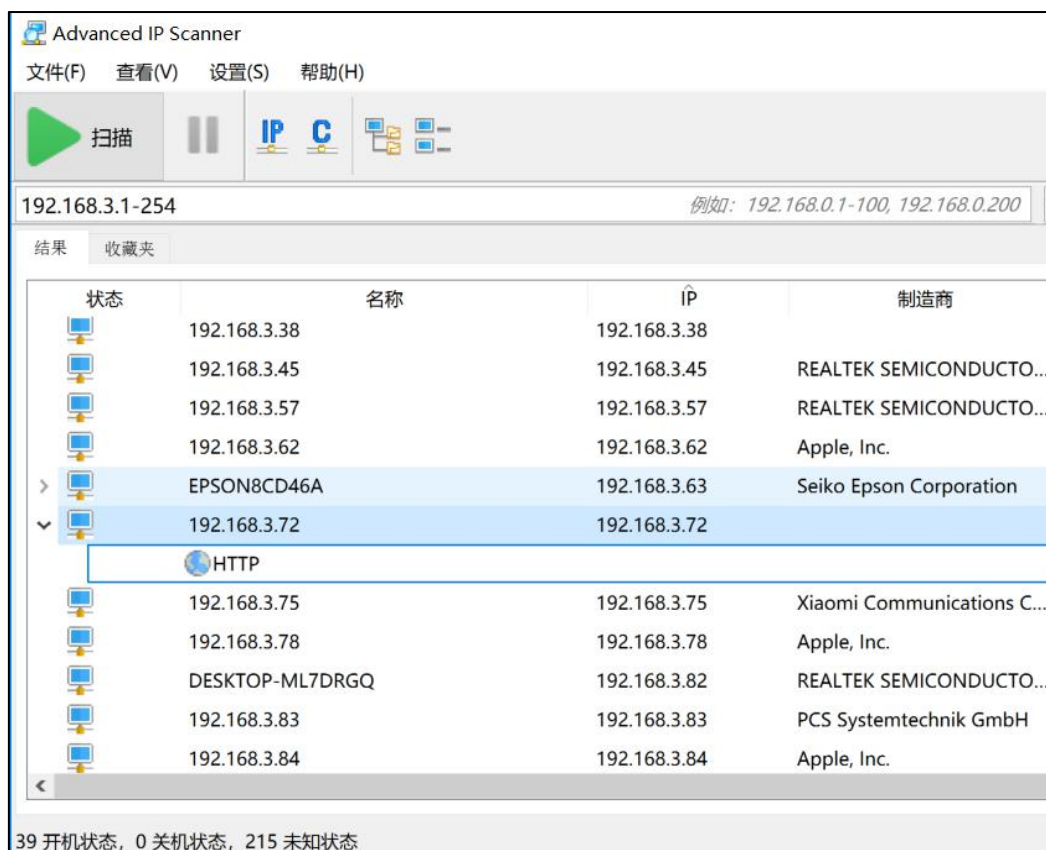


图 6

The miner uses HTTP service by default, double clicking the "HTTP" icon in the list to open the configuration management interface of the miner

矿机默认使能 HTTP 服务，双击软件列表中的 HTTP 图标，可以打开矿机的配置管理界面。

## 5 Miner Configuration | 矿机配置

This chapter describes how to configure the miner by the webpage. Safari, Chrome or Edge are three recommended browsers for accessing the configuration web page of the miner.

本章介绍通过网页配置矿机的方法。在您通过电脑访问矿机的界面时，推荐使用 Safari, Chrome 或 Edge 浏览器。

### 5.1 Login | 登录矿机

Enter the IP address of the miner in the address bar of the browser to open the login web page of the miner, as shown in fig:

在浏览器地址栏输入矿机的 IP 地址，打开矿机的登录界面，如图：

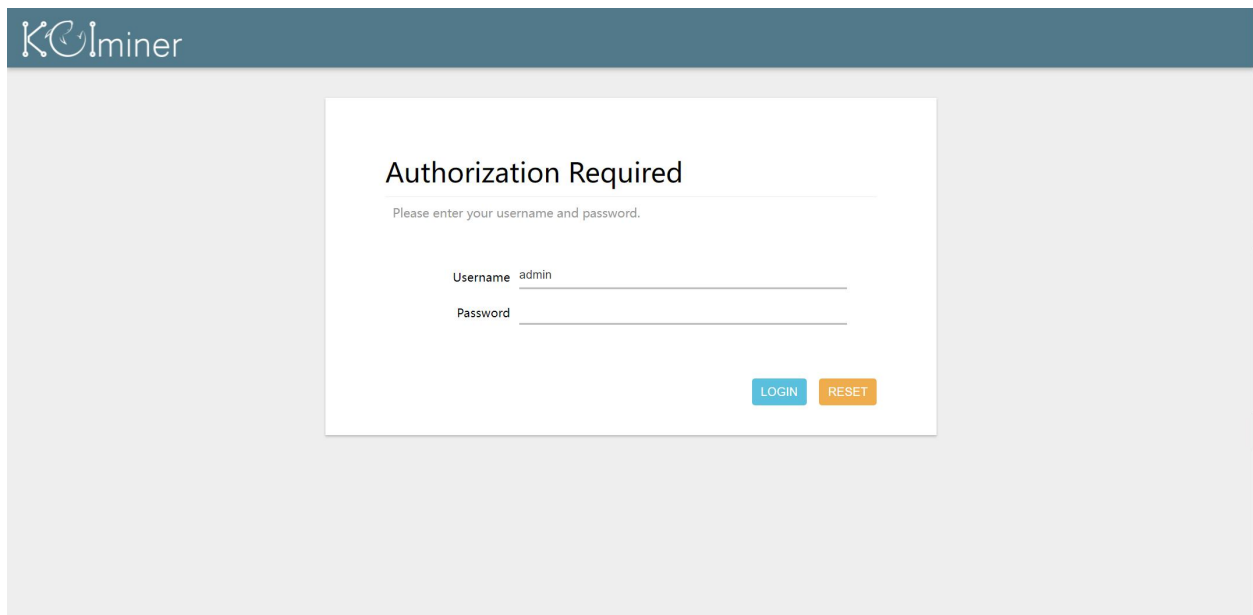


图 7

The initial username is “admin” and the initial password is “Admin@Miner” . Click the Login button to login to the miner configuration webpage after entering the right password.

矿机管理界面的用户名为 “admin” ， 缺省密码为 “Admin@Miner” 。在 Password 一栏填入密码，点击 LOGIN 按钮，登录矿机。

### 5.2 Configuration | 配置矿机

#### 5.2.1 Miner Overview | 查看矿机状态

The home page shows the working status of the mining machine as shown, including the system status (System), mining status (Miner), mining pond state (Pools) and network status (Network).

登录成功后的首页显示矿机的工作状态，如图所示，包括矿机的系统状态 (System)，挖矿状态 (Miner)，矿池状态 (Pools) 和网络状态 (Network)。

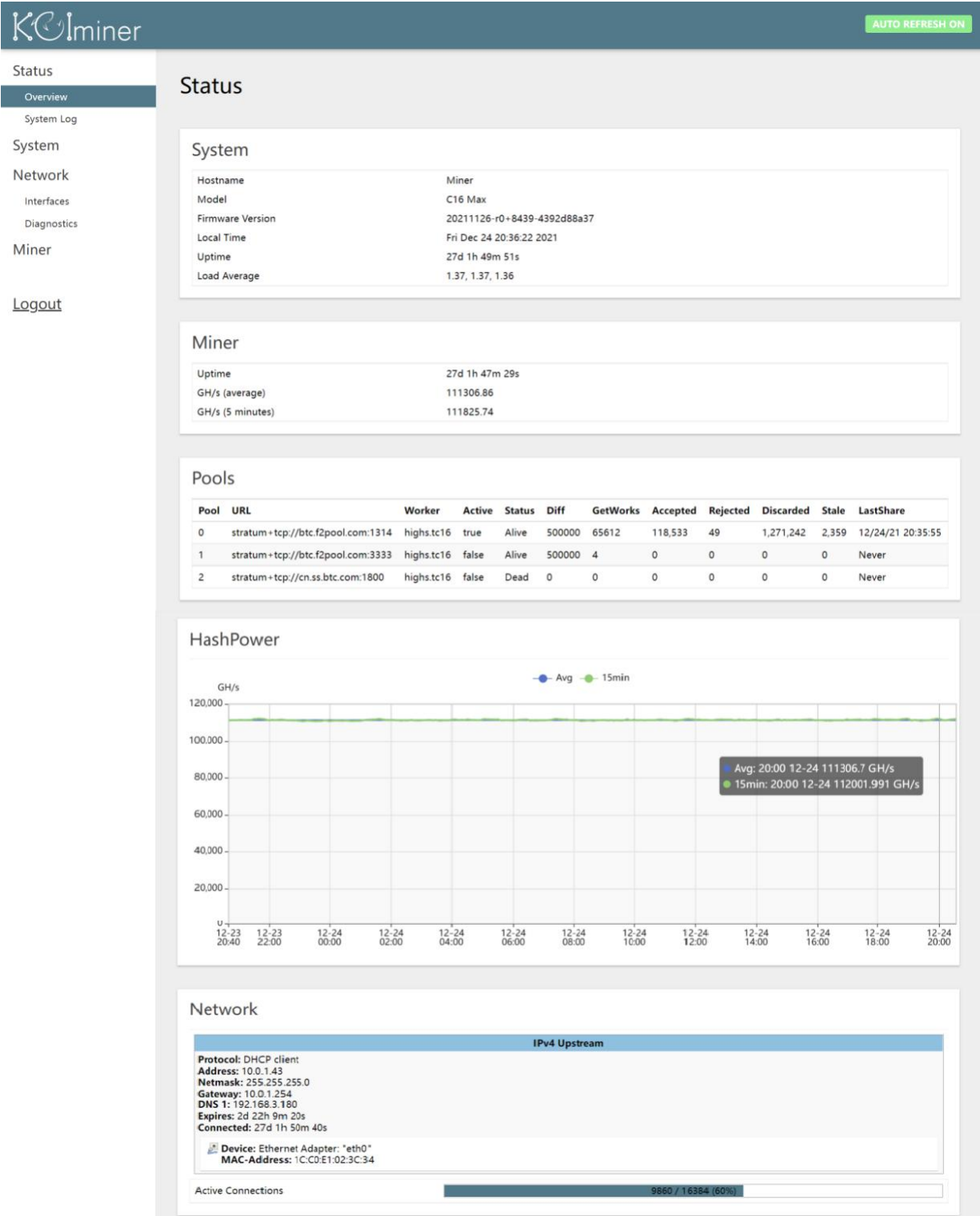


图 8

1、System: Display the mining machine name, model, firmware version and other information.

System: 显示矿机名称, 型号, 固件版本等信息。

Status: Display the mining machine, the average computing power and the 5-minute computing power.

Status: 显示矿机平均算力以及 5 分钟算力。

2、Pools: Displays the mine pool and computing power status. When multiple mine pools are configured, the mine opportunities are connected in the order of 0,1,2, but only one mine pool is in the working state.

Pools: 显示矿池和算力状态。配置多个矿池时, 矿机会按照 0, 1, 2 的顺序依次连接, 但同时只会会有一个矿池处于工作状态; 算力曲线图展示一天算力变化情况。

3、Network: Displays the current IP type (dynamic DHCP address and static Static address), IP address (IPv4 address), subnet mask (IPv4 netmask), Gateway IP address (IPv4 gateway), DNS Server address (Use custom DNS servers), and network card MAC address (MAC-Address).

Network: 显示矿机当前 IP 类型 (动态 DHCP address 和静态 Static address) , IP 地址 (IPv4 address), 子网掩码 (IPv4 netmask), 网关 IP 地址 (IPv4 gateway) , DNS 服务器地址 (Use custom DNS servers)和网卡 MAC 地址 (MAC-Address) 等信息。

Please note that if the machine can not be connected to the pool, the machine will not work. You can click on Network-> Diagnostics on the left menu of the interface and use the tool to diagnose the network connection of the mining machine.

请注意: 若矿机不能连接到矿池, 矿机将无法工作。可以点击界面左侧菜单的 Network -> Diagnostics, 使用其中的工具诊断矿机的网络连接。

### 5.2.2 Static IP Address | 配置静态 IP 地址

Please follow the steps below, if the miner needs to configure a static IP address.

如果需要将矿机配置为使用静态 IP 地址, 请按照以下步骤操作。

1、Click Network-> Interfaces on the left menu of the interface, as shown in Fig:

在界面左侧菜单依次点击 Network -> Interfaces, 如图:



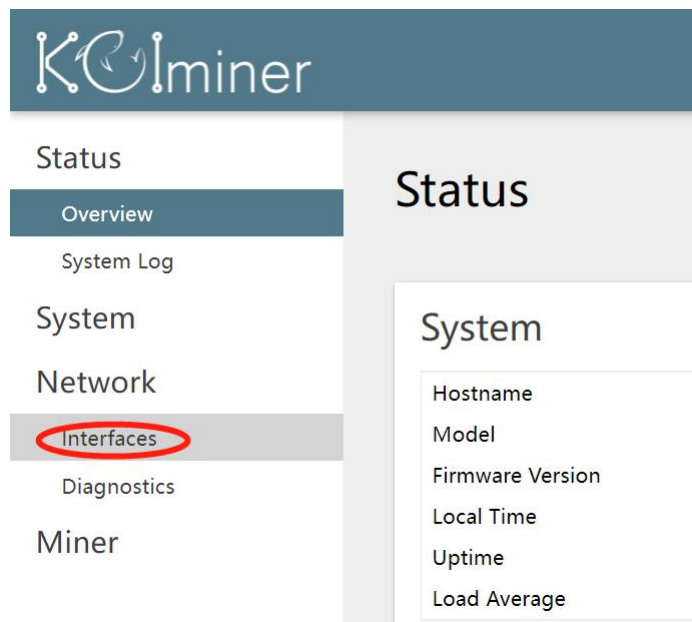


图 9

2、In the Interface Overview list, click the EDIT button at the right of eth0, as shown in Fig:  
在 Interface Overview 列表中，点击 eth0 这一行最右侧的 EDIT 按钮，如图：



图 8

3、In the Protocol column, select Static Address, as shown in Fig:  
在 Protocol 一栏，选择 Static Address，如图：

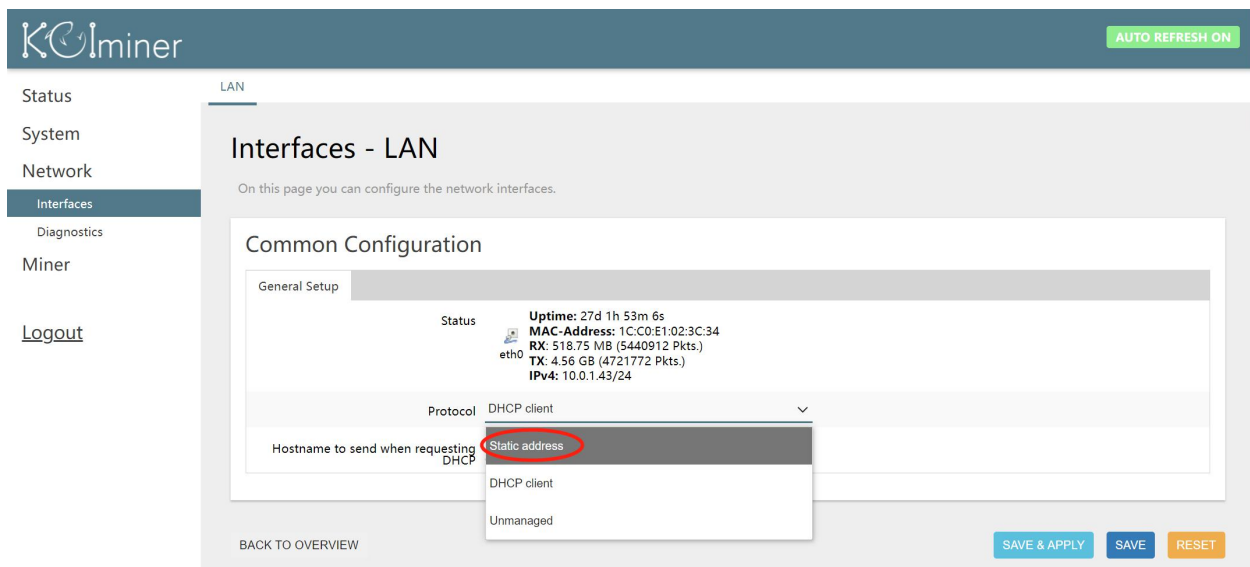


图 10

4、Click the SWITCH PROTOCOL button , as shown in Fig:  
 点击 SWITCH PROTOCOL 按钮，如图：

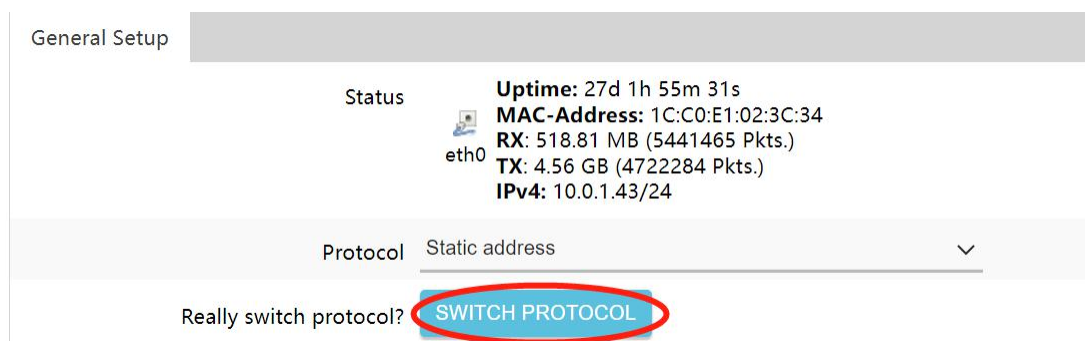


图 11

5、Fill in the static IP address (IPv4 address) that you want to use, subnet mask (IPv4 netmask), gateway IP address (IPv4 gateway), and DNS server address (Use custom DNS servers), see Fig. To add an alternate DNS server address, click on the plus sign icon on the right.  
 依次填写希望使用的静态 IP 地址 (IPv4 address)，子网掩码 (IPv4 netmask)，网关 IP 地址 (IPv4 gateway) 和 DNS 服务器地址 (Use custom DNS servers)，如图。如需添加备用 DNS 服务器地址，请点击右侧的加号图标。

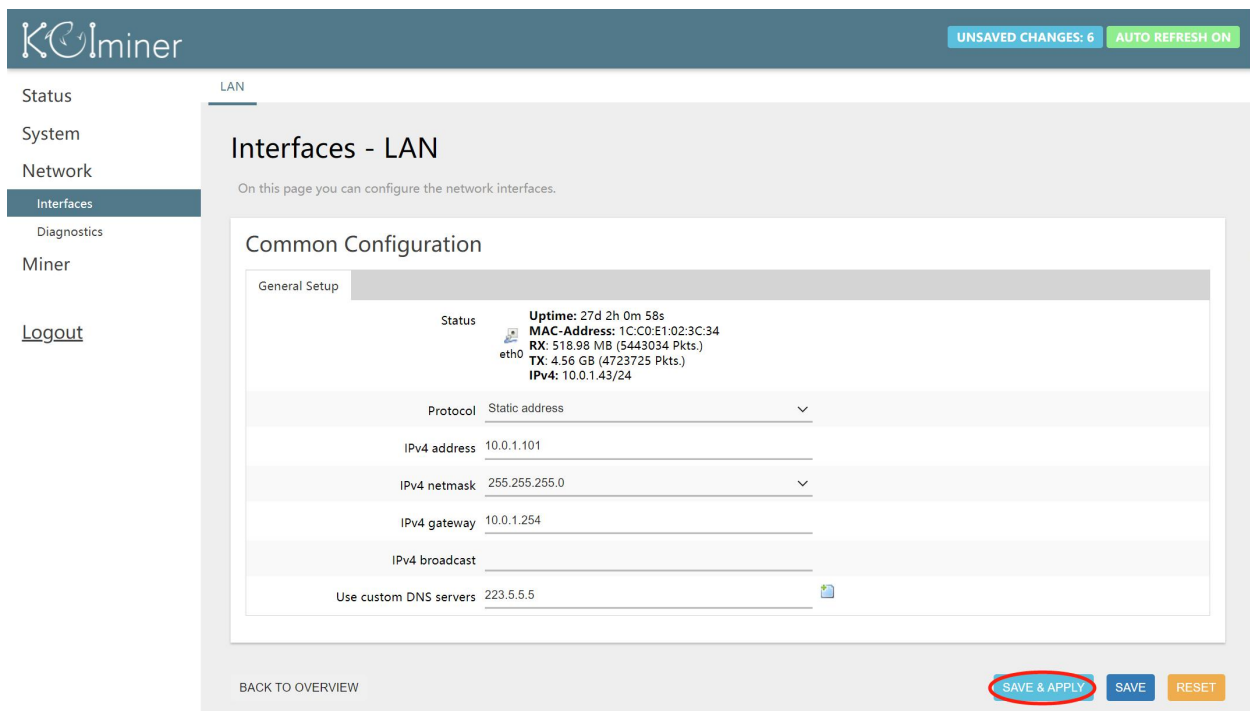


图 12

6、Click the **SAVE & APPLY** button to save the configuration and wait for the page response.  
 点击 **SAVE & APPLY** 按钮，保存配置，等待页面响应。

7、The following prompts may appear. Click the red button (**APPLY UNCHECKED**), wait for the countdown of the page, enter the new IP address in the browser address bar, and check whether the IP address is fixed.

可能会出现如下提示，点击红色按钮（**APPLY UNCHECKED**），等待页面倒计时结束，在浏览器地址栏输入新 IP 地址，检查 IP 地址是否固定成功。

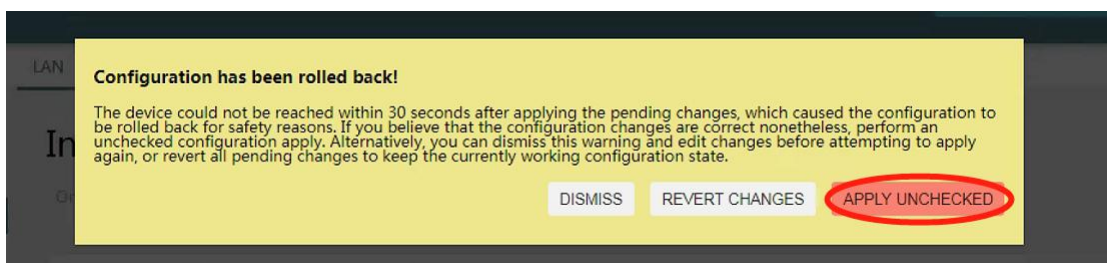


图 13



Note that after you modify the IP address, you need to use a new IP address to log back to the mining machine.

请注意：在修改 IP 地址之后，需要使用新的 IP 地址才能重新登录矿机。

### 5.2.3 Setting Up the Pool and Worker Account | 修改矿池和矿工账号

1、In the left menu of the webpage, click “Configuration” -> “Pools” , as shown in the figure:

在界面左侧菜单依次点击 Miner -> Configuration，如图：

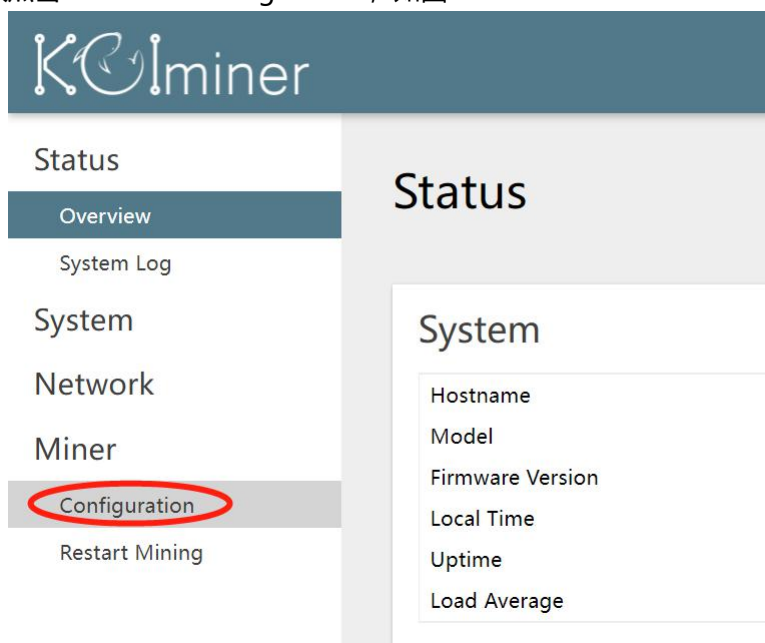


图 14

2、Enter the pond mining address, miner number and password in the figure below. Up to three pools can be configured. After the input is completed, click the SAVE & APPLY button for the mining opportunity to automatically load the new pool configuration and restart the mining procedure.

依次输入矿池挖矿地址，矿工号和密码，如下图。最多可以配置三个矿池，输入完成之后，点击 SAVE & APPLY 按钮，矿机会自动加载新的矿池配置并重启挖矿程序。

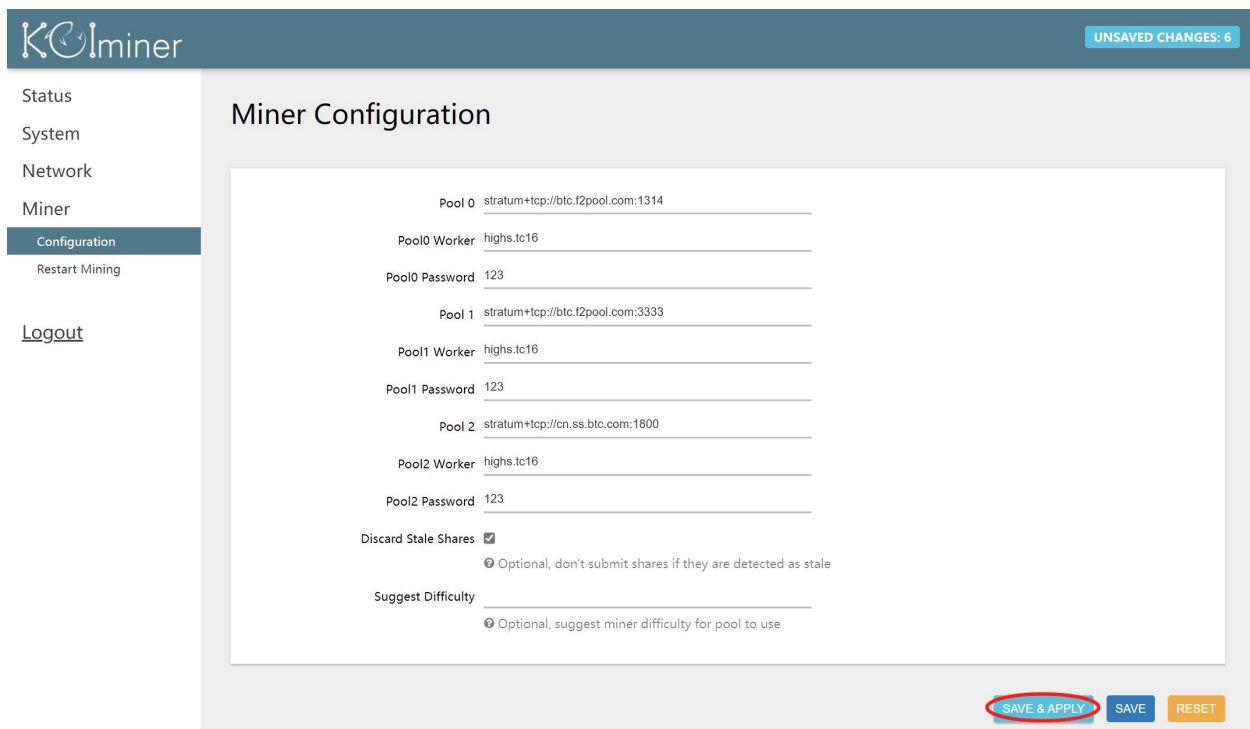


图 15

## 5.2.4 Firmware Upgrade | 固件升级

1、Click System-> Flash Firmware on the left menu of the interface to enter the firmware upgrade interface, as shown in Fig:

在界面左侧菜单依次点击 System -> Flash Firmware，进入固件升级界面，如图：

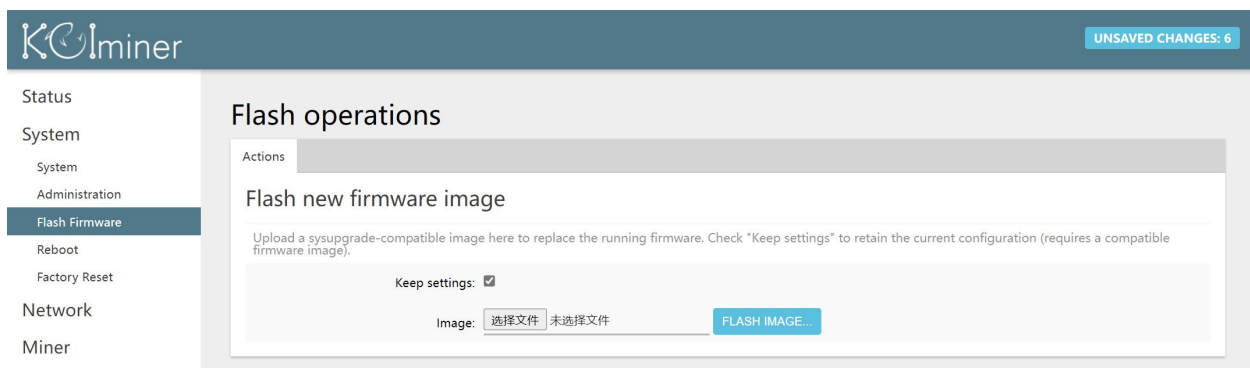


图 16

2、Select the mine machine firmware mirror file to upgrade in the Image column.If you want to upgrade and restore the mine machine factory configuration, remove the check in the Keep settings column.Then click the FLASH IMAGE button to upload the file to the mining machine.The ore opportunity checks the selected files and waits a few seconds before the company needs to reconfirm the system upgrade, as shown in Fig:



## 6 Fault information | 矿机常见故障

This chapter describes the Status-> System Log in the background of the mining machine through the web page, and the common errors are as follows. Recommend that you use the Safari, Chrome, or Edge browser when you access the mine machine interface via your computer.

本章介绍通过网页查看矿机后台的 Status -> System Log，常见报错如下。在您通过电脑访问矿机的界面时，推荐使用 Safari, Chrome 或 Edge 浏览器。

### 6.1 Overheating | 矿机启动过热

The starting temperature of the mining machine should be below 40 degrees, and the air inlet temperature should be reduced for overheating. The common log prompts are as follows:

矿机启动温度需要在 40 度以下，过热需降低进风温度，常见日志提示如下：

```
user.info clover[21664]: board temp: 45.00 C, waiting for cooling
user.info clover[21664]: board temp: 45.00 C, waiting for cooling
user.info clover[21664]: board temp: 45.00 C, waiting for cooling
user.info clover[21664]: board temp: 44.50 C, waiting for cooling
user.info clover[21664]: board temp: 44.50 C, waiting for cooling
user.info clover[21664]: board temp: 44.50 C, waiting for cooling
user.info clover[21664]: board temp: 44.50 C, waiting for cooling
user.info clover[21664]: board temp: 44.50 C, waiting for cooling
user.info clover[21664]: board temp: 44.50 C, waiting for cooling
user.info clover[21664]: board temp: 44.00 C, waiting for cooling
user.info clover[21664]: board temp: 44.00 C, waiting for cooling
```

### 6.2 Mine pool connection fault | 矿机连接矿池失败

Mine pool configuration and network configuration should be checked. the common log prompts as follows:

需检查矿池配置和网络配置，常见日志提示如下：

```
local0.notice cgminer[2962]: Probing for an alive pool
local0.warn cgminer[2962]: Failed to resolve (?wrong URL) btc.ss.poolin.com:1883
local0.warn cgminer[2962]: Failed to resolve (?wrong URL) btc.ss.poolin.com:443
local0.warn cgminer[2962]: Failed to resolve (?wrong URL) btc.ss.poolin.com:25
local0.err cgminer[2962]: No servers were found that could be used to get work from.
local0.err cgminer[2962]: Please check the details from the list below of the servers you have input
```



### 6.3 Fan fault | 矿机风扇故障

The fan0 means the fan connected to the control board, the fan1 means the fan connected to the power supply, the common log prompts as follows:

fan0 表示连接控制板的风扇, fan1 表示连接电源的风扇, 常见日志提示如下:

```
daemon.err clover-miner[17306]: Error: fan 0 failed, counter: 0
user.info clover[17449]: id:0x101
user.info clover[17449]: manufactor id:0x4258
user.info clover[17449]: power name:HEAR3600S12
user.info clover[17449]: 3 board(s) detected
user.info clover[17449]: Clover Miner 0.2.3-0cdcb3c4
user.info clover[17449]: powering down
user.info clover[17449]: HEAR3600S12 disabling power
user.info clover[17449]: ensuring fans' rotating
daemon.err clover-miner[17449]: Error: fan 0 failed, counter: 0
user.info clover[17587]: id:0x101
user.info clover[17587]: manufactor id:0x4258
user.info clover[17587]: power name:HEAR3600S12
user.info clover[17587]: 3 board(s) detected
user.info clover[17587]: Clover Miner 0.2.3-0cdcb3c4
user.info clover[17587]: powering down
user.info clover[17587]: HEAR3600S12 disabling power
user.info clover[17587]: ensuring fans' rotating
daemon.err clover-miner[17587]: Error: fan 0 failed, counter: 0
```

### 6.4 Power supply fault | 矿机电源故障

the common log prompt is as follows:

常见日志提示如下:

```
user.info clover[2387]: boot/warmup failed: 电源故障, 电压不达标: 40 mV, retrying... 1
user.info clover[2387]: HEAR3600S12 disabling power
user.info clover[2387]: board C16-0 : true
user.info clover[2387]: board C16-1 : true
user.info clover[2387]: board C16-2 : true
user.info clover[2387]: booting voltage 350 mV, temp 17.5
user.info clover[2387]: HEAR3600S12 enabling power
user.info clover[2387]: boot/warmup failed: 电源故障, 电压不达标: 50 mV, retrying... 2
user.info clover[2387]: HEAR3600S12 disabling power
user.info clover[2387]: board C16-0 : true
user.info clover[2387]: board C16-1 : true
user.info clover[2387]: board C16-2 : true
user.info clover[2387]: booting voltage 350 mV, temp 17.5
user.info clover[2387]: HEAR3600S12 enabling power
user.info clover[2387]: boot/warmup failed: 电源故障, 电压不达标: 40 mV, retrying... 3
```



## 6.5 Hash board fault | 矿机计算板故障

Multiple restart is invalid, the following communication failure, the common log prompt is as follows:

重启多次无效，出现如下通讯故障，常见日志提示如下：

```
user.warn clover[25466]: SPI Transfer retrying:1
user.err clover[25466]: [spidev1.2/17] transfer failed:ACK not found
user.err clover[25466]: [spidev1.2/17] TX:55 aa 55 aa 5d 88 42 00 50 00 00 00
user.err clover[25466]: [spidev1.2/17] RX:00 00 00 00 00 00 00 00 00 00 00 00
user.warn clover[25466]: SPI Transfer retrying:2
user.err clover[25466]: [spidev1.1/114] transfer failed:ACK not found
user.err clover[25466]: [spidev1.1/114] TX:55 aa 55 aa 5d 4e 42 04 94 00 00 00
user.err clover[25466]: [spidev1.1/114] RX:00 00 00 00 00 00 00 00 00 00 00 00
user.warn clover[25466]: SPI Transfer retrying:2
user.err clover[25466]: [spidev1.1/114] transfer failed:ACK not found
```