



WhatsMiner Hydro-Cooling Miner

Repair Manual

V1.0



Shenzhen MicroBT Electronics Technology Co., Ltd..

Forward

About this Document

This Document introduces repair methods for hydro-cooling miners. All pictures and other information are merely for illustrative purposes.

Symbol instruction

Symbol	Instruction
	Provides additional information to supplement the text.
	Alerts to potential dangers that may cause harm if neglected.

Revision history

Version	Revision Content	Release Time
V1.0	First release	20250822

Legal information

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1. Repair Environment Setup and Tooling Requirements

The following content briefly introduces information related to environmental setup and tool requirements.

1.1 Test Program

You need to use Mobxterm for testing. If you do not have this program, please contact our after-sales personnel.

1.2 Test Command

The following content introduces test commands.

Hashboard test:	ft-readchipid
Power on:	echo 1 > /sys/class/gpio/gpio356/value
cable plug to CB port (0&1)	
RST set 1.8v:	echo 1 > /sys/class/gpio/gpio197/value
RST set 0v:	echo 0 > /sys/class/gpio/gpio197/value
cable plug to CB port (2&3)	
RST set 1.8v:	echo 1 > /sys/class/gpio/gpio202/value
RST set 0v:	echo 0 > /sys/class/gpio/gpio202/value

1.3 Test Fixture CB

The test fixture CB (Control Board, abbreviated as “CB”) is a hydro-cooling miner CB (CB4/CB5/CB6).

1.4 Test Cable

The test cable is a hydro-cooling miner original cable.

1.5 Fixture CB Connection

The following figure shows a connection method of a fixture CB.

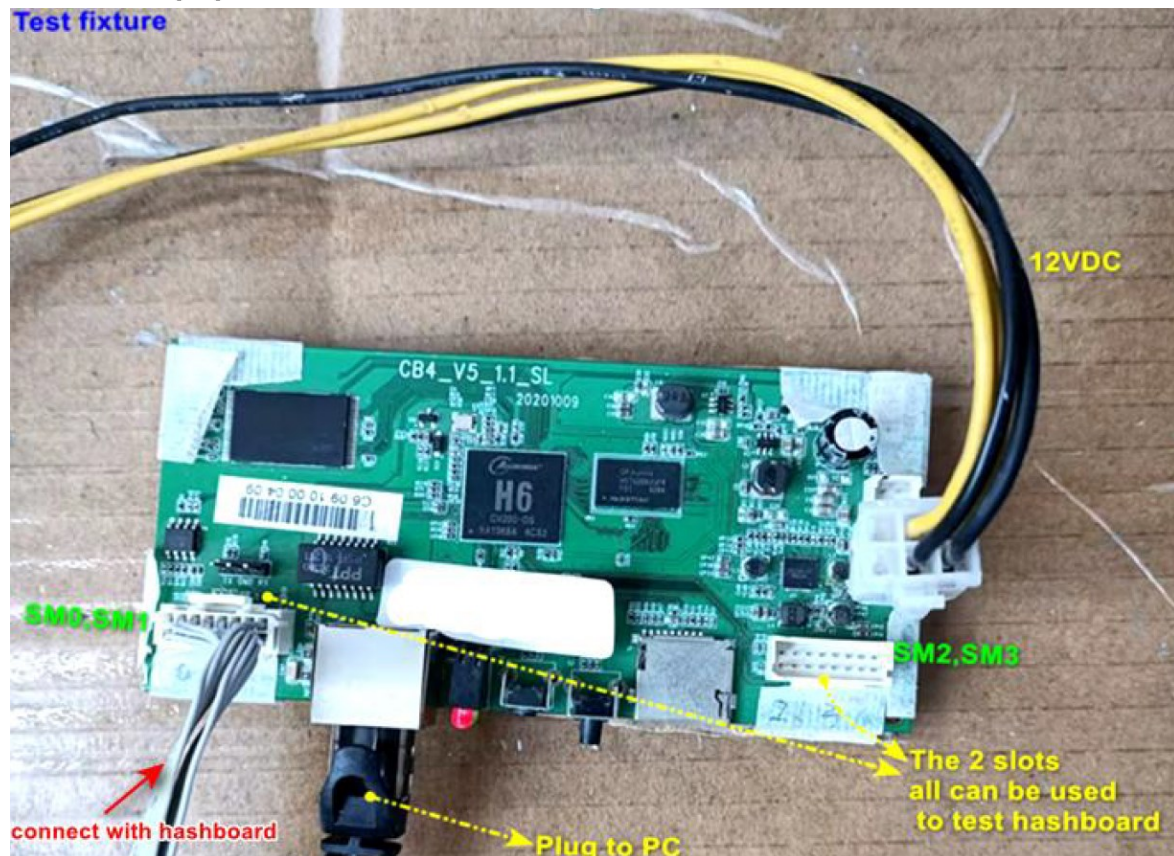


Figure 1-1

1.6 Power Supply Requirements

The test setup requires independent power sources for its components, with the following specifications:

- **Hashboard**
 - Voltage: 42 VDC
 - Current: 15 A
- **Test Control Board (CB)**
 - Voltage: 12 VDC
 - Current: 2 A

1.7 Tools and Accessories

The following tools are required to perform the test and potential rework procedures:

- **Soldering/Rework:** Hot air rework station
- **Measurement Instruments:** Multimeter, and Oscilloscope
- **Hand Tools & Consumables:** Tweezers, Solder Paste, and Solder Flux

2. Introduction to Circuit Principle

2.1 Internal Structure

A hydro-cooling miner comprises three key modules: a three-phase power supply unit, hashboards, and a control board. Both the power supply unit and hashboards are directly equipped with hydro-cooling plates, as illustrated in the figure below.

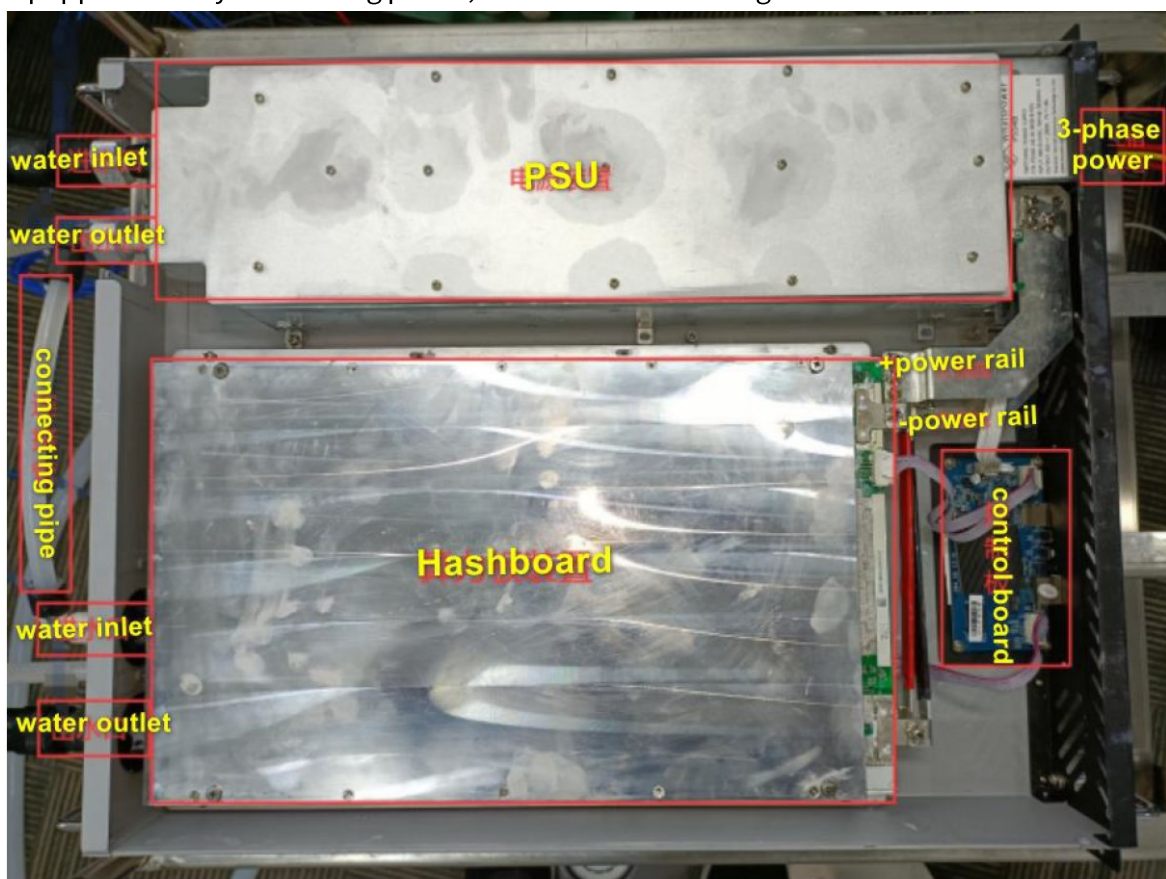


Figure 2-1

2.2 Hashboard Circuit Principle

Power Supply Configuration: Hashboard power inputs are connected in series, as

illustrated in the figure below.

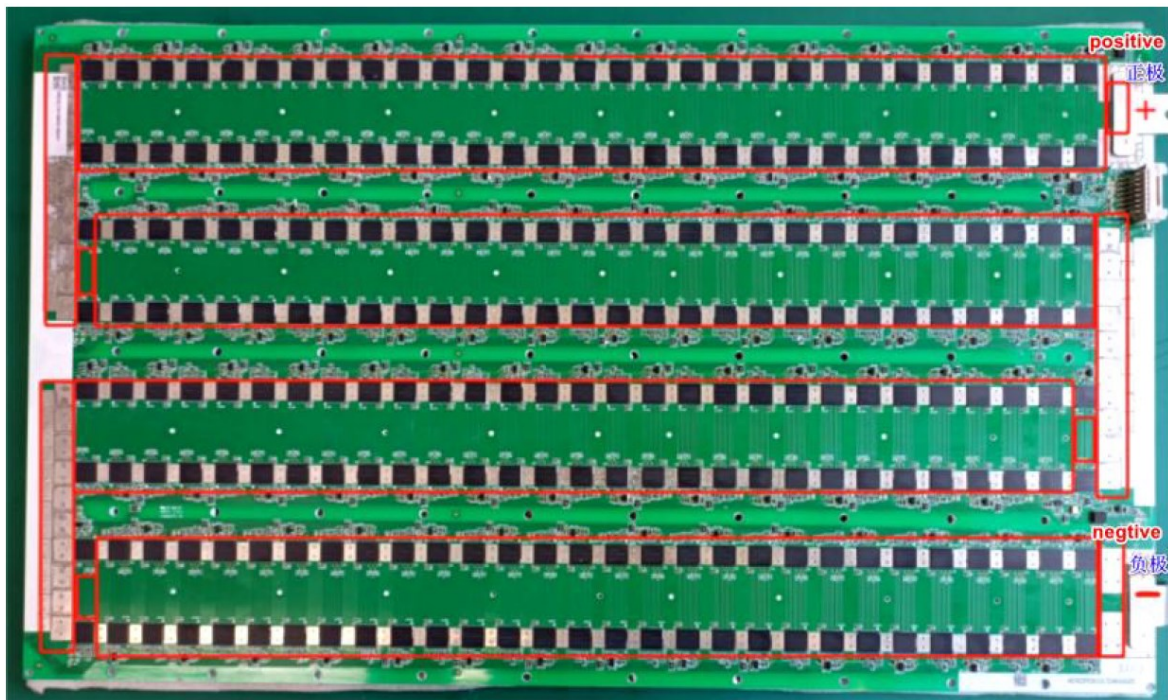


Figure 2-2

Single Flow: A hashboard contains SM0 and SM1.

On SM0: Signals RST, RXD come from a control board; CLK is generated by Y1; (RST, RXD, CLK) are sent from U1 to U116; and TXD is sent back from U116 to U1, and then it passes through UP3 to the control board.

On SM1: RST comes from U116 of SM0; CLK is generated by Y3; RXD is sent by the control board via UP2; (RST, CLK, RXD) are sent from U117 to U232; and TXD is sent back from U232 to U117, and then it passes through UP2 to the control board.

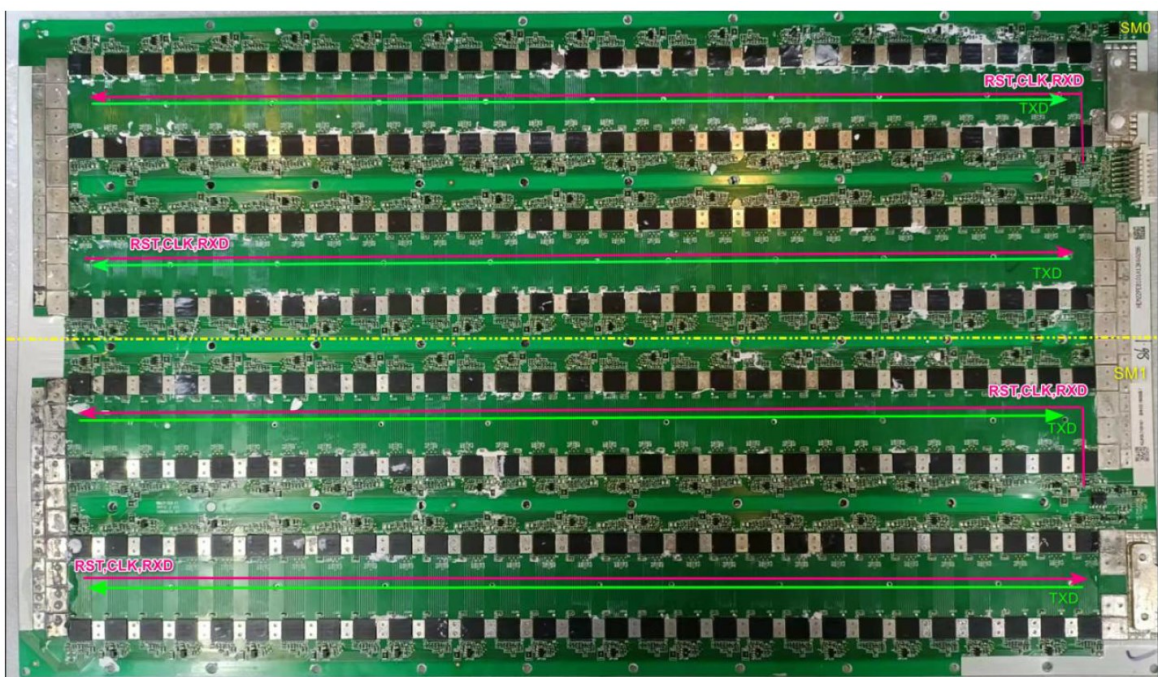


Figure 2-3

2.3 Signals of SM0 Port

The power supply voltage of first 8 LDOs on SM0 is provided by a control board. An initial state is low voltage with no input, and it becomes high voltage when a power on command (echo 1 > /sys/class/gpio/gpio356/value) is executed or a readchipid command is executed. The 8 LDOs obtain the input voltage so that all signals can work properly.

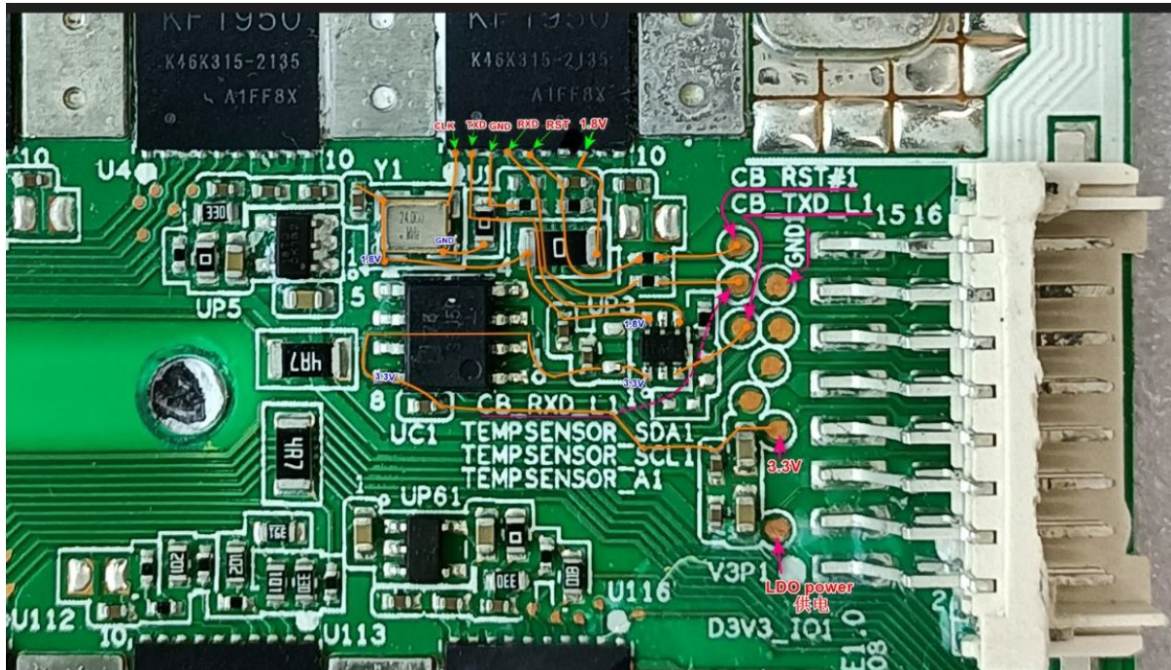


Figure 2-4

2.4 Signals of SM1 Port

RST of SM1 comes from the last chip of SM0, which is U117. CLK is generated by Y3. RXD and TXD are transferred to and from a control board through a UP2 chip. Only RST signals pass through the whole board (SM0 and SM1).

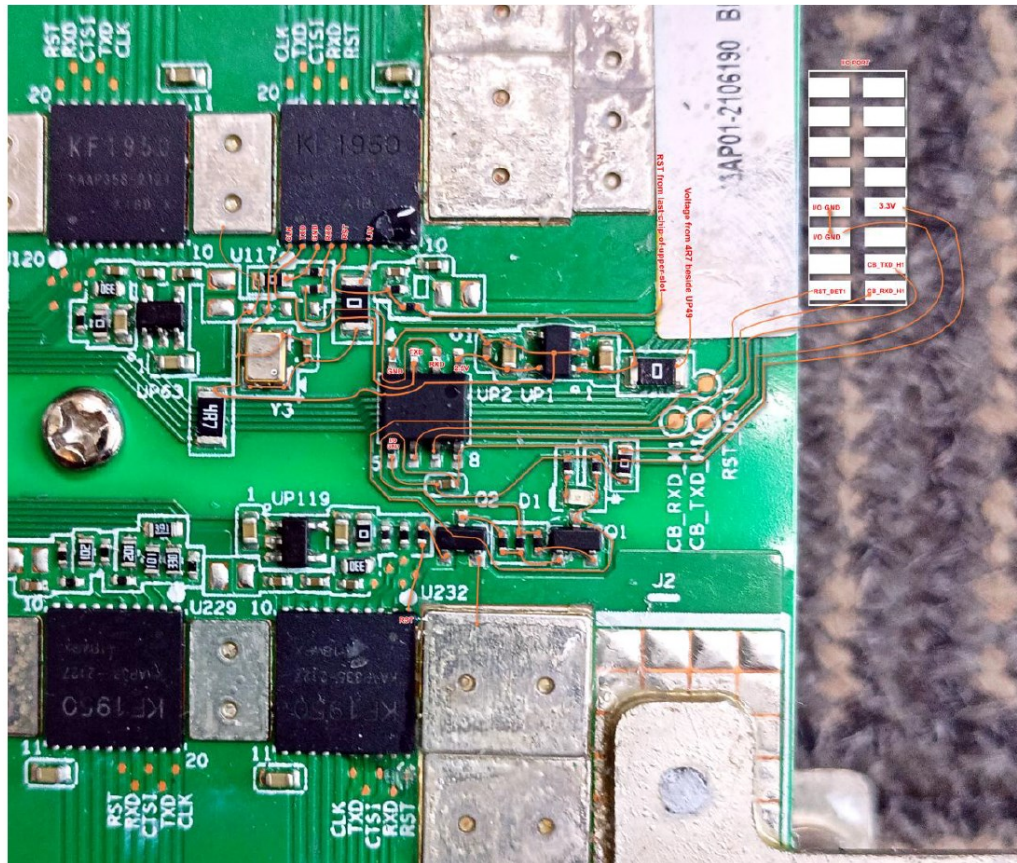


Figure 2-5

3. Test Safety Notice

Given that the power supply utilizes a 3-phase AC input, to ensure personal safety:

The power connections for the test fixture control board and hashboard power supply must use a three-pin plug (with an earth pin) for reliable grounding.

If measuring signals with an oscilloscope, the oscilloscope must use a two-pin plug (without an earth pin).

Refer to the following figure for details.

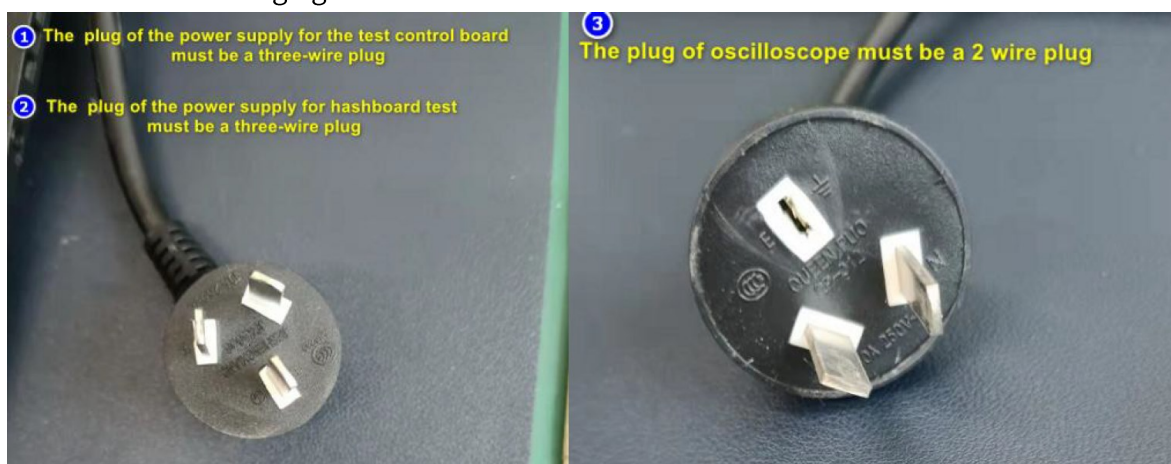


Figure 3-1



Danger: Failure to do so as said above may expose the hashboard to a 110 V AC electric shock hazard.

4. Soldering Requirements

For chip soldering, follow these steps to ensure proper assembly.

Step 1 Preheat the entire board evenly.

This prepares the board for localized heating and minimizes thermal stress.

Step 2 After preheating, focus heat only on the area where the chip replacement is needed.

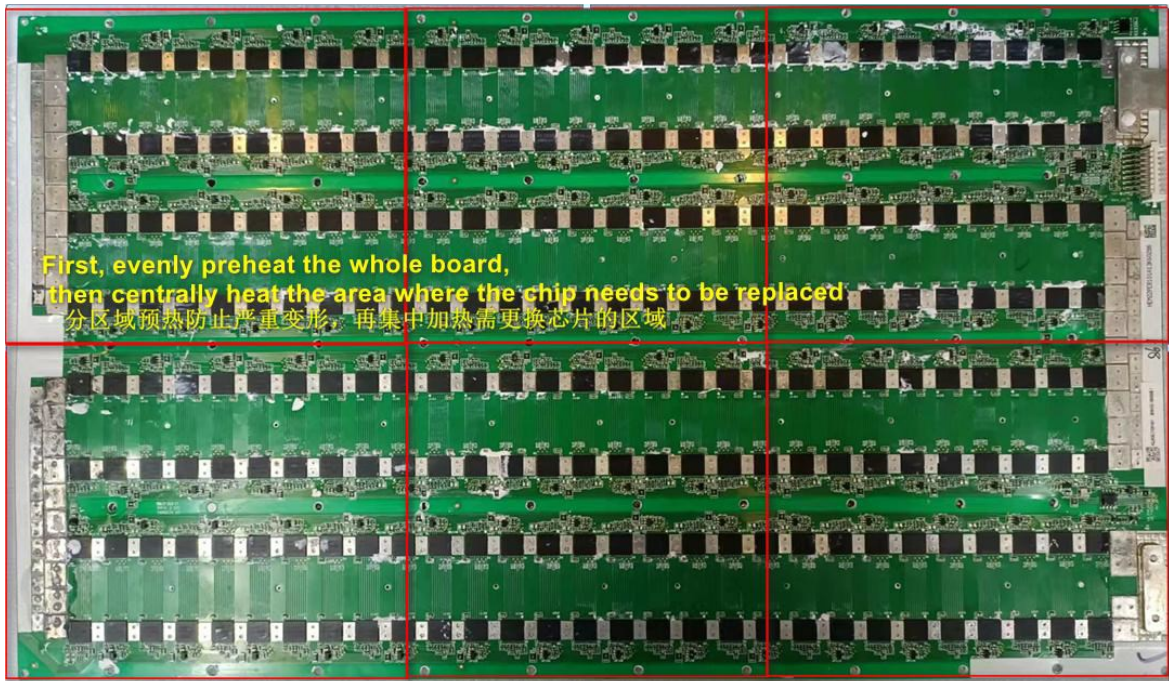


Figure 4-1



Note: If preheating is skipped, thermal deformation may occur. This can cause the following issues:

- Damage to other chips on the board due to uneven heat exposure.
- Pad detachment (the metal pads connecting components to the board may separate from the substrate).
- Complete board failure (rendering the board scrap).

5. Assembly Attention

Handling During Disassembly

When disassembling, do not use your hands to carry inlet or outlet joints of hydro-cooling plates.

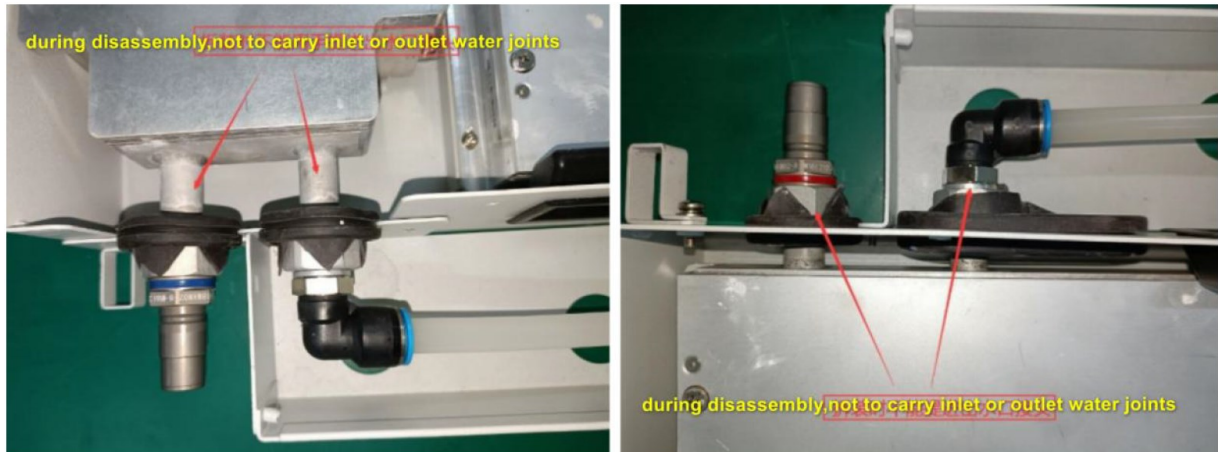


Figure 5-1

Mounting Hashboard to Hydro-Cooling Plates

When installing a hashboard onto a hydro-cooling plate surface, you should tighten all screws evenly (do not skip any screws). This prevents localized poor heat dissipation caused by uneven pressure or missing fasteners.

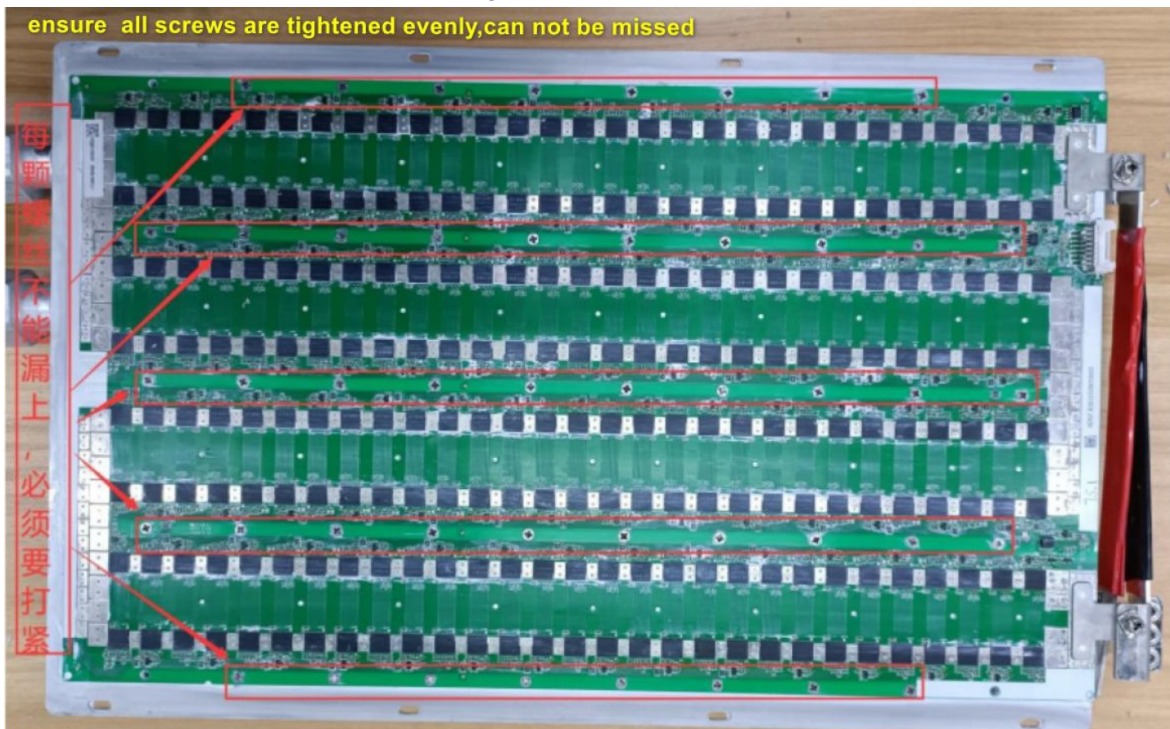


Figure 5-2

6. Fault Analysis and Troubleshooting

Fault	Cause	Repair Analysis
Hashboard not recognized	1. No 3.3 V power supply 2. Unable to read EEPROM	1. Check if a 3.3 V circuit has a short circuit 2. Inspect UC2
Temperature sensor error	1. 3.3 V power supply failure 2. Defective UC1	1. Check 3.3 V power supply 2. Inspect UC1
ChipID read failure	1. RST malfunction 2. CLK malfunction 3. RXD malfunction 4. TXD malfunction 5. LDO power supply failure	1. Check for RST signal breaks 2. Locate faults at CLK signal breakpoints 3. Locate faults at RXD signal breakpoints 4. Locate faults at TXD signal breakpoints 5. Locate faults at LDO power supply breakpoints
High temperature	1. High chip temperature 2. High UC1 temperature	1. Check if all screws are properly tightened 2. Verify that liquid temperature and flow rate are normal
Low hashrate	1. Defective PSU 2. Chip with low nonce	1. Check PSU output voltage, and replace PSU if voltage is low 2. Replace a chip with a low nonce value

The repair method of other circuits is basically the same as M3X series hashboard. You can also refer to the repair manual of the M3X series air cooling miner.

7. Hydro-Cooling Miner Overview

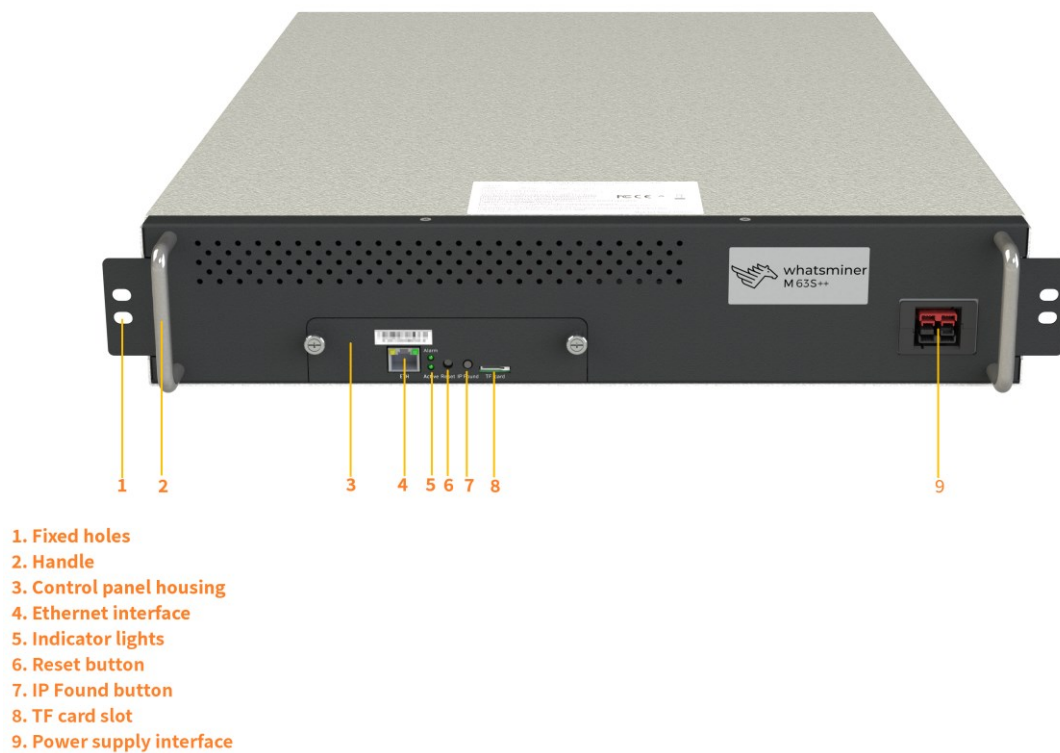


Figure 7-1



Figure 7-2

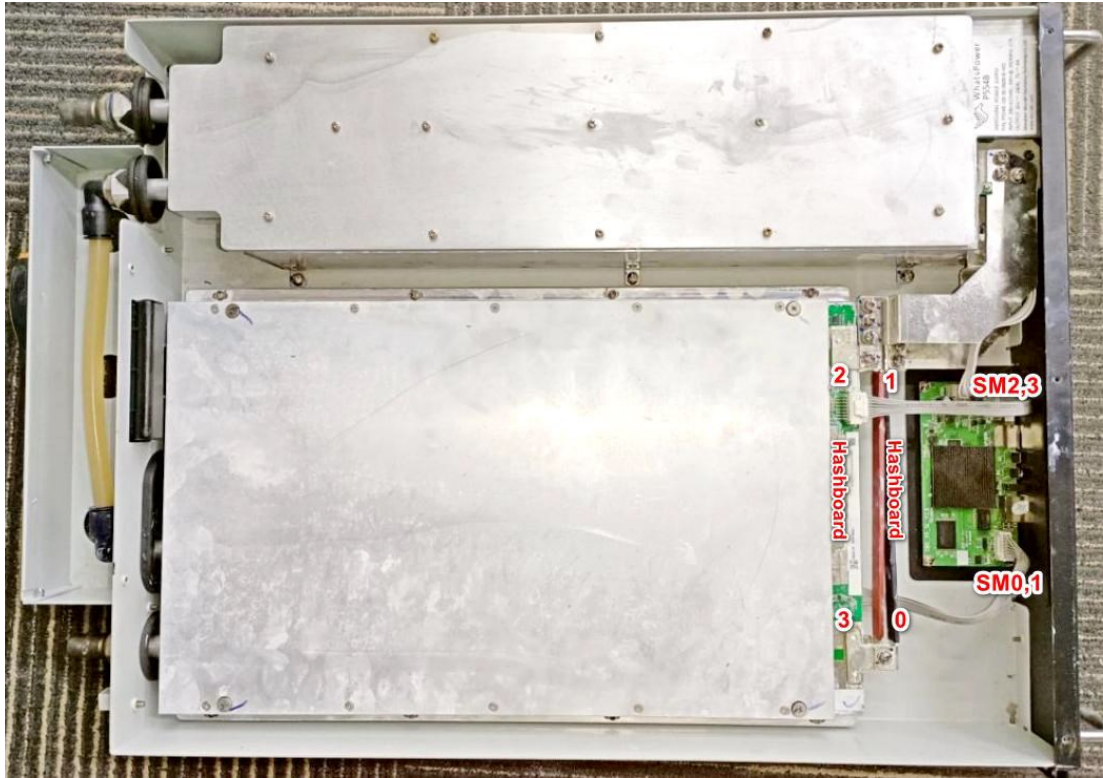


Figure 7-3