ZEUS MINING
CRYPTO MINING PRO

Antminer S17 Hash Board Repair Guide [EN]

How to Repair Antminer S17 Hash Board?

Antminer S17 hash board Maintenance Guide

Date of the version: 2019-7-2

Document type: Repair plan

Content of this volume: It mainly describes the troubleshooting of S17 various faults, and explains how to use the test tools for accurate positioning.

★ The copyright of this article belongs to Bitmaintech Pte Ltd. (Bitmain). The article shall solely be reprinted, extracted or used in any other ways with the permission of the copyright owner. Please contact Bitmain official customer service if there is any need of reprinting or quoting.

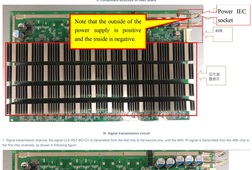
I. Service tools

1. General electric screwdriver
2. Fluke 15s+ Multimeter, Tweezers, VI-v-2 test fixture, S17 chiseled with WPM power supply
3. Heat gun (welding temperature is 260±2 degrees), **Note: the temperature marked here is the actual temperature**
4. Thermostat soldering iron (welding temperature ≥ 300-350 degrees)
5. Environment-friendly scaling powder, lead-free low temperature (melting point 150 degrees) solder stick, anhydrous alcohol, water for cleaning panel.
6. CMOS low temperature solder paste, BMI38TBM1 3# planting steel mesh fixture
7. Cooling fan.

If you need to repair Antminer S17, in addition to the necessary tools mentioned above, you also need general-purpose BGZD-desoldering stations, tin scrapers and other efficient tools.

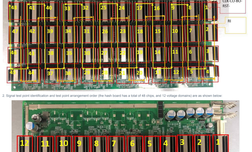
Of course, the chisel may be more troublesome, you can also choose the convenient Bitmain Antminer hash board repair bundle

II. Component structure of hash board

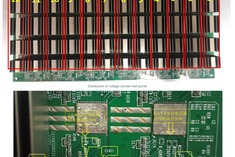


III. Signal transmission circuit

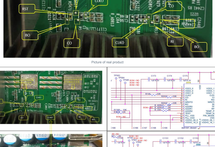
1. Signal transmission channel, the signal CLK-BO1-BI1-CO is transmitted from the first chip to the second one, until the 48th. IR signal is transmitted from the 48th chip to the first chip reversely, as shown in following figure:



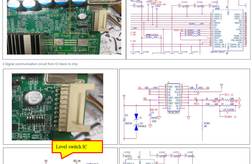
2. Signal line and port identification and test point arrangement order (the hash board has 4 out of 80 chips, and 10 voltage domains are as shown below:



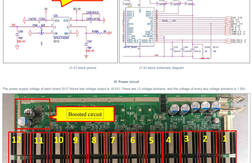
Distribution of voltage domain test points



Picture of hair protect



3.Signal communication circuit from IO block to chip

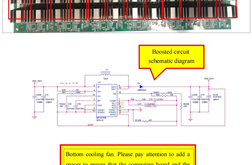


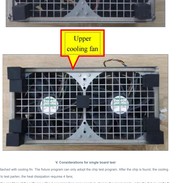
J1-IO block picture

J1-IO block schematic diagram

IV. Power circuit

The power supply voltage of each board (S17 feature test voltage output is 16.8V). There are 10 voltage domains, and the voltage of every two voltage domains is 1.55V.





V. Considerations for single board test

1. The hash board is not attached with cooling fin. The fixture program can only adjust the chip test program. After the chip is found, the cooling fan is attached.
2. If the hash board needs to test pattern, the heat dissipation requires a fans.
3. After sales, the miner is the condition of the software whose frequency needs to change the repair mode under the fixture.Config file S_1 that is, the eeprom data is not cleared when testing.

```
add_10 = 0.1x
add_voltage_value=10

# [ ]s repair mode (do not overwrite cgminer eeprom
info)
repair_mode='1'

# [ ]s dump all lost nonce
Dump_Lost_Nonce='1'
```

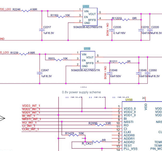
VI. Single board test troubleshooting example

6. 1 single board fixture test ASIC-IO

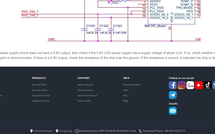
Fixture analysis:

1. Whether the fixture cable and the hash board are in good contact.
2. If it fits the S17 hash board, all IP should have a voltage of 16.8V when testing the fixture.
3. When the fixture test is performing, whether there is a voltage between the 10 voltage domains, and **the base circuit is normal**.

4. If there is no voltage between the voltage domains, the voltage of the voltage domain is 0V, and the voltage of the voltage domain is 0V. If it is high level, then check whether the 1 pin of IO is high level. If IO is low level and a voltage of 3.3V is measured, the voltage of the voltage domain is not damaged.



PIC schematic diagram



10.5V output control circuit

3.2 If the power supply is normal and the voltage of voltage domain is also available, then measure the IR signal of the chip to check if the IR signal has a voltage of 1.8V. When measuring the IR signal, it should be measured from the test point of the last chip, and if the last one has voltage, then measure the 22R chip for IR. 1.8v fly-wire connection to the IR signal of the chip. If there is no IR signal, it proves that the chip is damaged, so please replace the chip. If the IR signal is normal, the power supply circuit. The 1.8V power supply circuit is obtained through voltage division by the voltage domain and then supply power to the LDO 1 pin. The LDO's 5 pin outputs 1.8V, clean voltage domain has one 1.8V LDO supplying power for the chips. If there is no output, there should be a problem with the LDO. If 1.8V is normal, measure the resistance of the power supply to the ground of the voltage domain. If the resistance is 0, it indicates that the chip is damaged. If the resistance is not 0, it is normal and there is no problem in soldering. It should be that the chip is damaged. Measure the nominal chip on a good board after planting tin, and then verify if there is no IR signal, it proves that the chip is damaged, so please replace the chip.

1.8V supply circuit

3.3 Fault phenomenon ASIC-IT

Analysis: ASIC-IT:

1. Single board test can find 2 chips, indicating that the IR signal is normal. The 8th chip cannot be found, so we shall directly measure the voltage of the 7th chip (VIN-VOUT). If there is no voltage, it proves that the power supply is normal. If CLK does not have a voltage of 0.9V, then check the power supply circuit of CLK.

2. CLK circuit analysis: If CLK does not have 0.9V, first check whether the load chip voltage domain 0.9V power supply is normal. The 0.9V power supply circuit is obtained by voltage domain division and then supply power to the same way as 1.8V power supply mode. It can output 2A maintenance method (we refer to the 1.8V maintenance method (note that every two chips among the 4 chips of each domain of S17 can provide 2.8V LDO power supply, and every LDO supplies 2 chips).

0.9v power supply scheme

If the 0.9V power supply circuit does not have a 0.9V output, then check if the 0.9V LDO power supply has a supply voltage of about 2.2V. If so, check whether the LDO is still stable (stick or short-circuited). If there is a 0.9V output, check the resistance of the chip over the ground. If the resistance is zero, it indicates the chip is damaged.

© 2022 Zeus Mining Shenzhen Technology Co., Ltd. All rights reserved.