

Pre-sale Technical Support

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The process of power maintenance includes the following four aspects:

1. Clear failure phenomenon;
2. Recall the principle of power supply and estimate the cause of the power failure.
3. Find a suitable test method, find out the specific reasons and repair;
4. For the failure reasons and maintenance methods that are not listed in the maintenance manual, make additional records.

The first step of the above process is to clearly understand the phenomenon of power failure. For the power supply in the customer's hands, if the field is not available, after obtaining the customer's first fault feedback, look for the maintenance manual and analyze it with the schematic diagram. The reason for this, to find out the additional fault phenomena that may be caused by the reason, to communicate with the customer again, to ask the customer in detail whether there is an additional phenomenon of the above analysis, to make further fault judgments.

The second step of the above process requires that the maintenance personnel must be familiar with the working principle of the power supply, so that a fault phenomenon can be immediately located to the relevant circuit; and the third step requires the maintenance personnel to have an accurate and safe test method and test. Tools to find specific reasons; for quick and accurate maintenance in the future, the fourth step is what maintenance personnel must do.

After the above three steps are all completed and no errors are found, related test tools and test methods are used to test whether the signal voltage of the partial circuit is abnormal. Whether it is due to device damage, if no error is found, then The reason for this failure is not on this circuit. It is necessary to further find the manual and analysis principle.

Maintenance mainly includes two aspects: pre-sale maintenance and after-sales maintenance. Most of the pre-sales maintenance is based on welding errors and device quality problems. These issues can be strictly controlled, so that the pre-sale maintenance is reduced to zero; pre-sale maintenance focuses on checking whether the diodes and electrolytic capacitors in the relevant circuit are soldered back, and whether LM358 and LM393 are welded. Welding reverse, the voltage regulator is welded and so on. In particular, external soldering should be carefully examined. To compare the circuit boards in normal operation, check whether the layout of the two circuit boards is consistent. When there is no solder layout error, compare the nominal value of the non-electrolytic capacitors and the color ring resistance. color ring.

Pre-sale maintenance also has partial assembly mistakes. After passing through a strong-power test and assembling into a complete machine, it is necessary to check whether the assembly is faulty. If it is determined that there is no human reason for assembly, it is basically possible to determine whether the connection line is relevant or relevant. The device has problems, locate the relevant circuit's connection lines and related devices, and carefully check the test.

Most of the after-sales repairs are based on device damage, but there is no lack of improper use by customers. The problem of after-sales maintenance is nearly saturated. Therefore, most of the problems can be solved by inquiring manuals. However, maintenance personnel must also update the manual to solve problems and solutions that are not mentioned in the manual.

1 Pre-sale maintenance:

1.1 Comparison board related pre-sales maintenance

Additional information:

After the self-test and washing of the comparative plate after the welding was completed, the failure rate was very low. The comparator board is mainly responsible for the charging and discharging of the power supply. If there is a problem during the charging and discharging of the power supply, the comparator board must be replaced first to determine the source of the fault and then to perform maintenance.

Phenomenon: Unlimited charging

Reason 1: Comparison of multi-plate soldering, the main performance of IC2-LM393

2 feet, 6 feet, or R11 and GND welding;

Reason 2: Compare plate 393 is welded to 358;

Cause 3: IC2-HA358 is inserted on the motherboard, or 358 is damaged.

Cause 4: Diodes D17 and D18 have reverse welding, and 9.1K resistors have welding errors.

Phenomenon: The charging voltage is obviously not enough, even 0V, but the charging feedback is correct

Cause 1: IC2-HA358 on the motherboard is damaged Check the following: Apply weak current 12V, test 358 pin 7, if the voltage is greater than 2V, determine 358 damage, at this time, charging voltage is 0V;

Reason 2: 680K resistor on the motherboard, that is, R17 soldering error is 68R or 680R, phenomenon: charging to about 3V;

Cause 3: The motherboard D13, electrolytic capacitor C12 welding error;

Reason 4: 9.1K resistor welding error at 500W;

Cause 5: The parameter settings in the control are incorrect and the AT2404 is damaged.

Phenomenon: The power tube temperature is significantly higher than other power sources during the burn-in test

Reason 1: Compare the soldering error of transistor C1008 on the board;

Reason 2: Compare the on-board resistor R1 soldering error.

Phenomenon: In the weak test, there is no frequency output, or the frequency cannot be adjusted to the correct state

Cause 1: The 203 potentiometer on the motherboard is not properly adjusted and there is no frequency output.

Reason 2: Comparison board has non-electrolytic capacitor soldering error;

Cause 3: Weak current test Check the SG2525 pin 10 level. If it is high, check the relevant drive section.

Cause 4: Pins 2 and 16 of the comparison board are soldered to GND. Check the voltage of pin 2.

Phenomenon: The charging voltage is almost normal, but there is no charging feedback

Reason: Comparison board diode D4-1, the original patch diode welding.

1.2 Pre-sale maintenance of IGBT board

Phenomenon: weak test, IGBT no frequency output

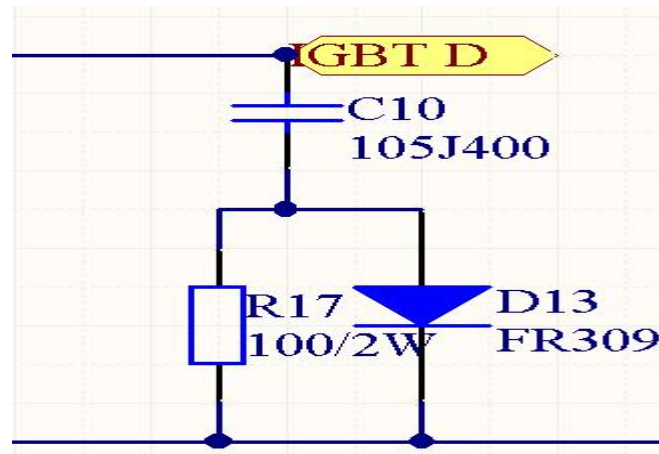
Cause 1: The SG2525 pin 10 is high, that is, there is a problem with the drive. Check whether the resistance of the resistor R7 is correct. Check if the optocoupler IC2 is soldered correctly. If the 10th pin is low, check the SG2525 pin 1 and 2 pin voltage relationship is correct. Check whether the welding state of resistor R8 is correct.

Check whether the nominal value of the capacitance and resistance around SG2525, especially resistor R5, is correct.

Cause 2: The SG2525 is damaged. (Unusual)

Phenomenon: IGBT explodes and bursts during high-power test

Cause 1: The diode D13 of the RCD snubber circuit is reversed, the capacitance is not correct, or the resistance of the resistor is too large. The RCD snubber circuit is shown below:



Phenomenon: High-power test, IPL power board AC-DC module and IGBT connected +12V power cord burst

Reason: IGBT's D12-DSEP12-12A fast recovery diodes are soldered back to ground. FRD breakdown can also cause a burst.

1.3 Pre-sales of Main Board

Phenomenon: weak waveform test output

Cause 1: Check whether the direction of the resistance RS1 is reversed or the resistance is abnormal.

Cause 2: IC2-HA358 on the main board is damaged. Check the following: Apply weak current 12V, test 358 pin 7, if the voltage is greater than 2V, determine 358 damage;

Cause 3: Find the comparator board. Check the voltage value of each pin according to the “Compatibility Board Interface Schematic and Reference Voltage” document. If there is any discrepancy, replace the comparator board (see “Comparator Board Interface Diagram and Reference Voltage” in Appendix 1).

Cause 4: The IRF630 is damaged (here for the 800W-IPL power board), the IRF630 (V11 and V12) is replaced, and the C1008 and 4148 in the subsequent stages of T2 and T3 are compared. If there is a large deviation in the nominal value, replace the IRF630 with a digital multimeter. Diode gear detection, testing table pen twice).

Phenomenon: High-power test, a charge power tube explosion, showed through

The sound is crisp, and the sound is loud. For the driving part, replace all components of the drive

circuit. This type of direct communication will destroy the scene of the circuit and basically cannot find the reason. It needs to be added. The sound is boring, and the sound is not loud. Only the power tube is damaged, and the surrounding drive circuit components are in good condition. It can be basically determined that the inductance is saturated.

Phenomenon: Successful lighting, AC contactor action, but feedback error

Reason: After checking that the connection is OK, you can basically confirm that the 5.1V regulator tube is welded to 4148

Phenomenon: Charging failed

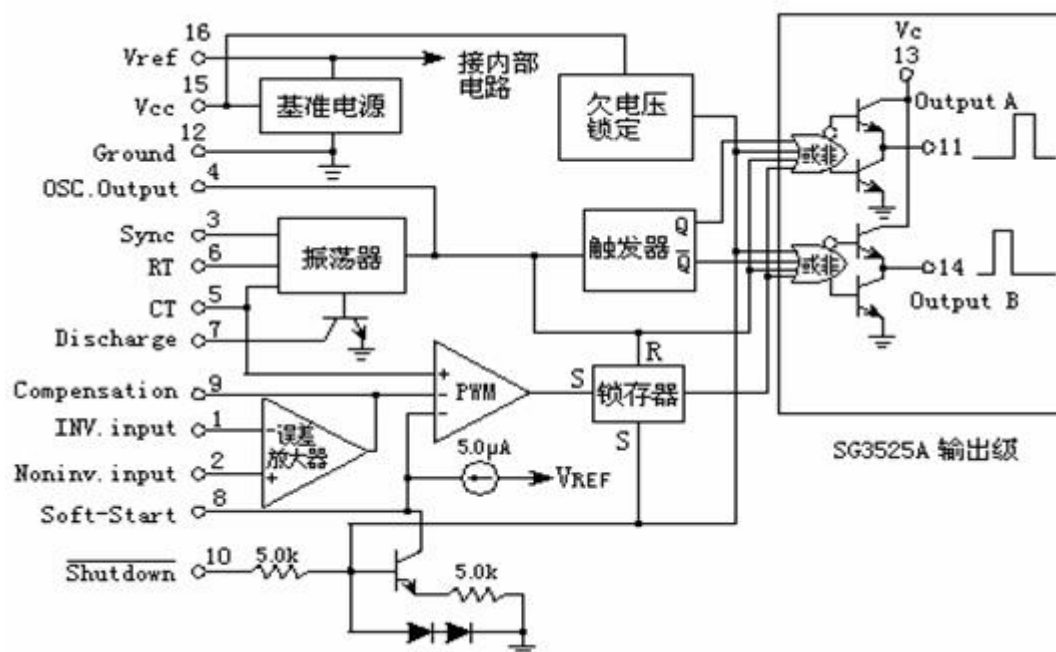
Cause: Check the relevant part of the comparison board.

Phenomenon: Strong test of the whole machine, tripping at 220V/110V (technical)

Cause: Rectifier bridge is short-circuited. Check if there is a short circuit between each pin of rectifier bridge D25XB60.

1.4 KA3525 (SG2525) Column

Of the four components of the IPL photonics power supply, three relate to the KA3525. Therefore, it is necessary to make a brief description of the use of the KA3525. The following figure shows the 3525 internal structure



The KA3525 pins 1, 2, and 9 relate to the duty cycle of the output. Among them, pins 1 and 2 pass through an internal error comparator and are output to the pin 9. Therefore, in a circuit using a dead zone, such as a comparison board, KA3525 on the simmer board, in order to ensure the stability of the dead zone, the 9th foot to be connected with capacitance; and IGBT board does not require dead time, so the 9th foot can be suspended; KA3525 normal work, the state is the first foot voltage is less than The second pin voltage, because three circuits, 2 feet connected to

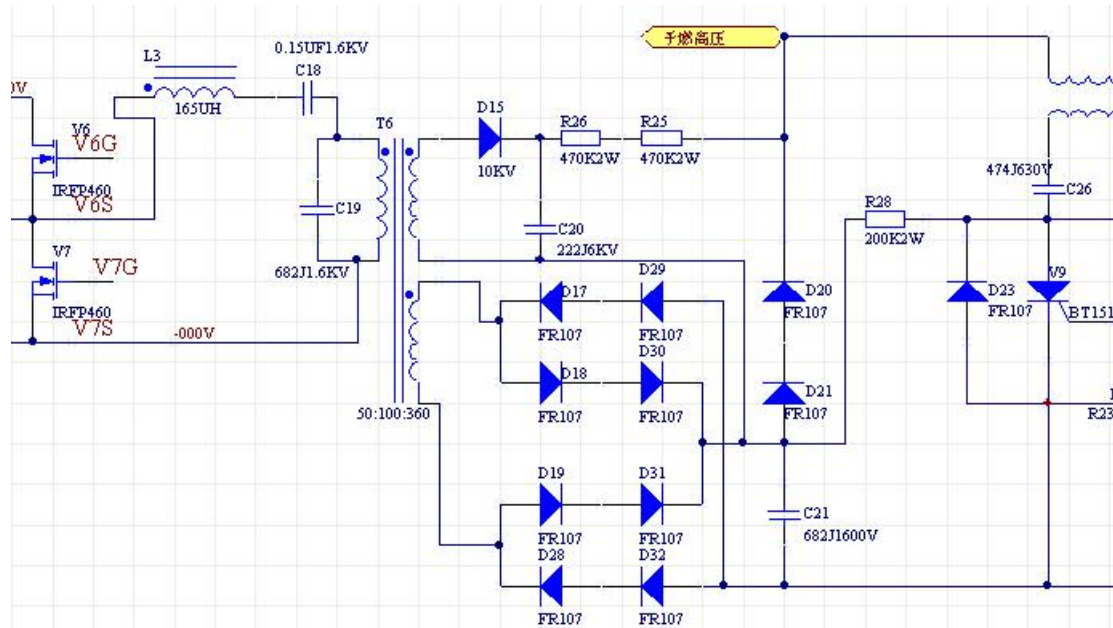
the 16 feet, 1 foot is usually grounded, even in the simmer board, when in normal working condition, the 1 foot voltage is also close to 0V, therefore, 2 feet The normal working state is about 5V, the voltage of 1 foot is about 0V, the 9th foot should be high level, when KA3525 does not work, in addition to checking the state of the 10th foot starting foot, also check the 1st, 2nd, 9th The voltage status of the foot; the voltage between pin 5 and pin 7 of the KA3525 determines the duty cycle of the output. Because the IGBT board has only one output, there is no need to adjust the duty cycle, so the pin 5 and pin 7 are shorted. There are 300R resistors in the 5th pin and 7th pin of the KA3525 of the comparison board and the burn board, and the duty ratio is large. 4:6; if the resistor is short-circuited, it is likely to cause the through-thru of the power tube; the resistance of the pin 6 of the KA3525 connects with the output frequency of the KA3525. The larger the resistance, the lower the frequency. If the resistance is incorrectly soldered, It may also cause the KA3525 not to work. The KA3525 pin 10 is the start pin. During normal operation, it is low level. When the 10 pin is high, the KA3525 does not work.

KA3525 Pins 11 and 14 are 180-degree phase output pins. The levels of the two are reversed. The 12th pin is GND pin. The pin 13 of KA3525 pin is used to provide the load current. Generally, the 10---30R resistor is used if the motherboard power. The GS pin voltage is too low, rise time, fall time too slow; or IGBT GS voltage is too low, the resistance is a suspect object, 500W once had a welding error.

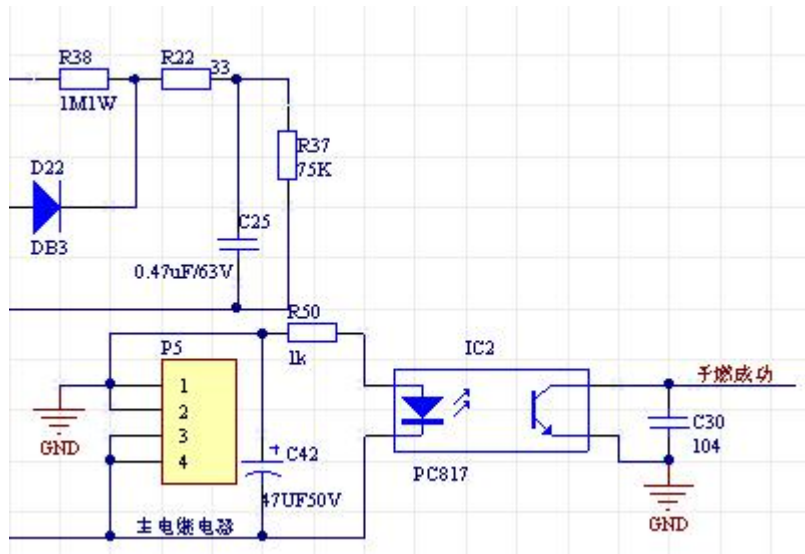
1.5 300W Laser Power Supply Related Pre-sales Maintenance

Phenomenon: Strong test, pre-ignition unsuccessful, lighting test error (failure) (technique)

Cause: The EI33 (L3), EI40 (T6), and 8 FR107 (rectified parts) and feedback optocoupler PC817 (IC2) are damaged. As shown in the figure below, pay special attention to checking D23 (FR107) for damage.

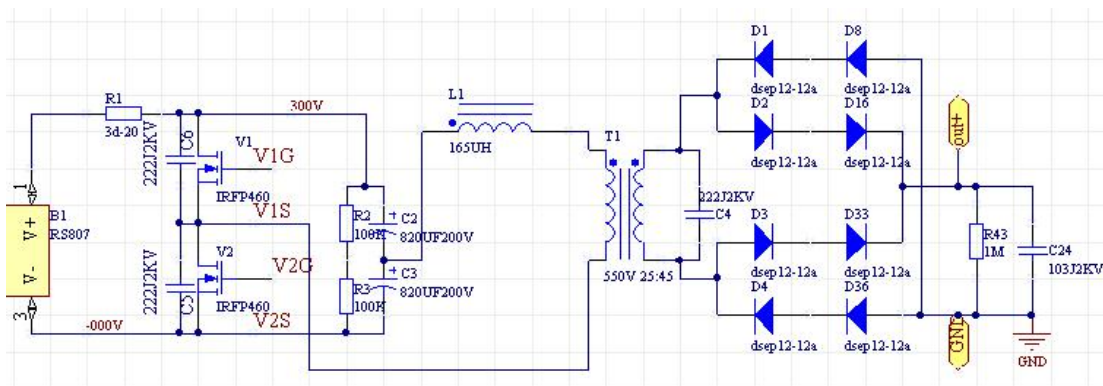


The following figure shows a successful pre-ignition feedback circuit. Sometimes it can be pre-ignited, but it cannot be fed back correctly. The PC817 must be replaced.



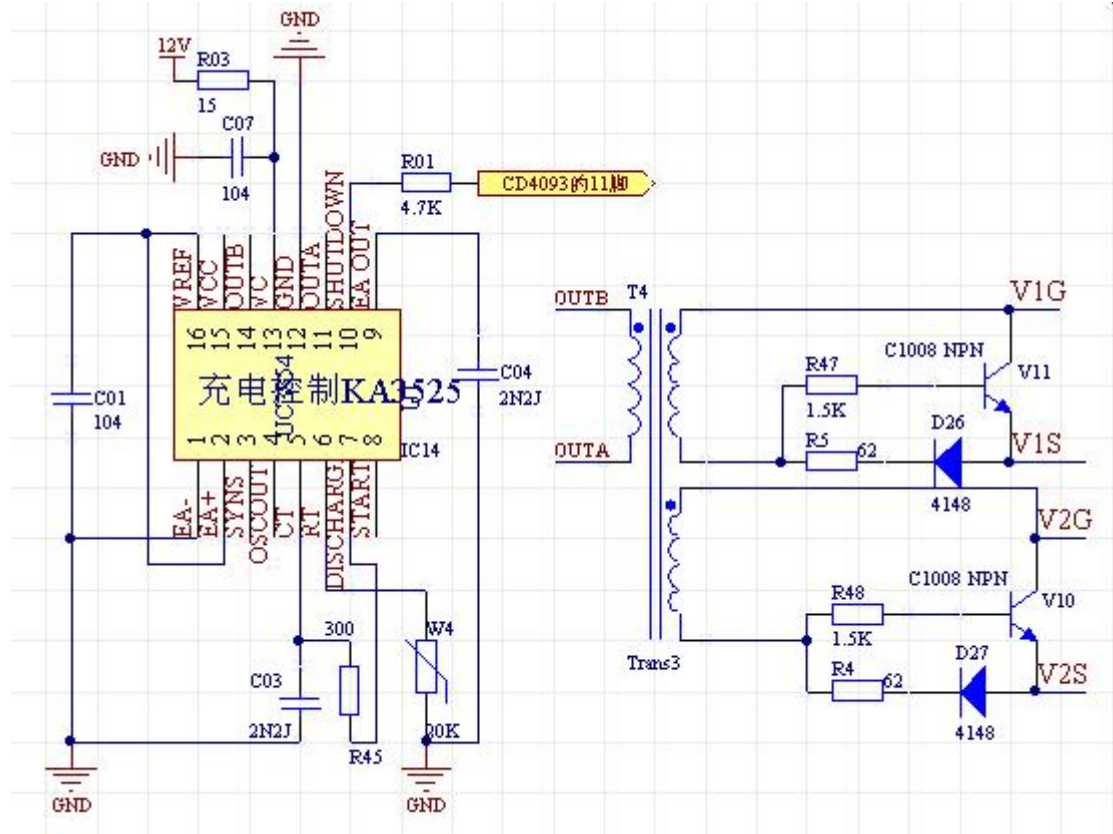
Phenomenon: Strong test, can't charge, there is a problem with charging circuit (technique)

Cause: The EI40 inductor (L1) and PQ50 transformer (T1) are damaged, and the rectifier diode HER308 (8) is damaged. The following figure shows a charging-related schematic diagram. GDN and OUT+ are connected to the negative and positive electrodes of the charging capacitor, respectively.



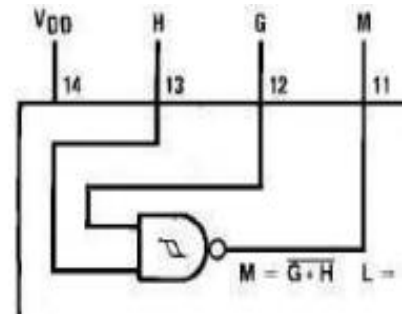
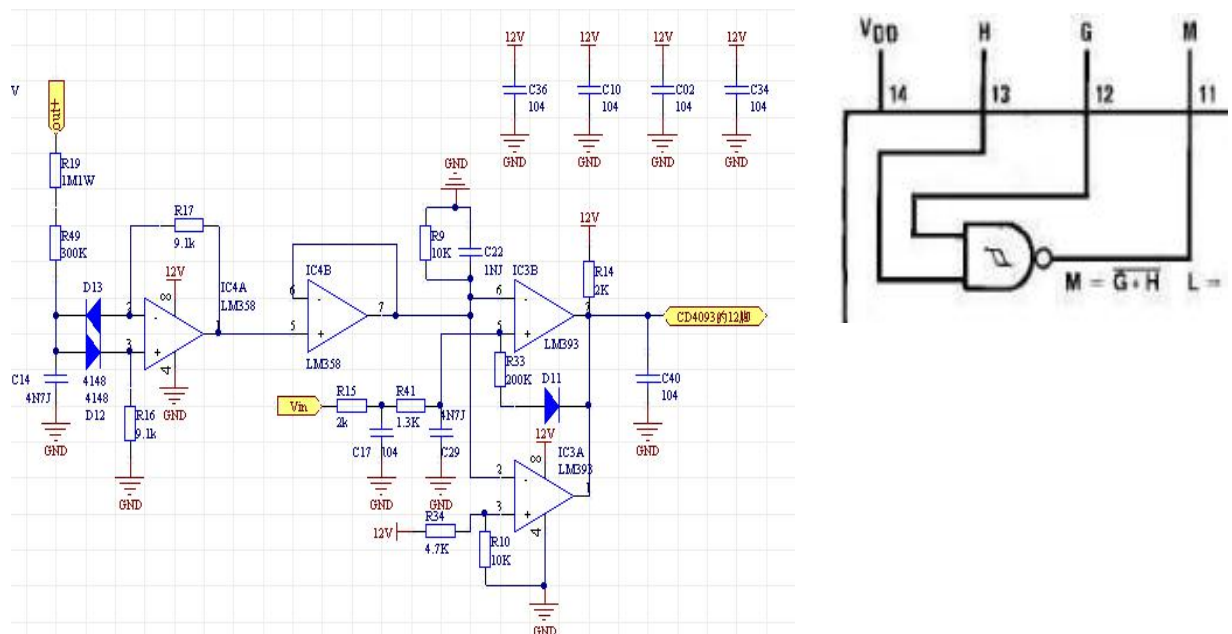
Phenomenon: Weak current test, charging part IRFP460 without driving waveform (technique)

Cause: The LM393 is damaged. The inspection method is as follows. On the weak current, measure the voltage of pin 12 (GND) of KA3525 and pin 11 of CD4093 with DC voltage range of multimeter. The normal value should be zero; if the measured value is about 11V, check the first pin of LM393 and The voltage of the 7th foot to the earth, the normal value is about 11V; if the measured value is about 3.93V, then change the LM393.



Charging part of the driving circuit 1

The CD4093 consists of four Schmitt trigger circuits with two inputs. Each circuit is a 2-input NAND gate with a Schmitt trigger function. As shown in the lower right figure, each gate is turned on and off at different points on the rising and falling edges of the signal. The difference between the rising voltage (V_{PT}) and the falling voltage (V_N) is defined as the hysteresis voltage (ΔV_T).



Phenomenon: weak current test, resistor R03 (15 Ω) burned (technically)

Reason: C03 timing capacitor soldering error, CT, RT and frequency related.

1.6 Controller Pre-sale Maintenance (Technology)

Phenomenon: controller power on, buzzer sounds weak, 5V and GND short circuit

Cause 1: The bile capacitor E in the LM2576 module circuit is damaged (1 case).

Cause 2: The 100uH inductor in the LM2576 module circuit is damaged and appears as a weak clock. The stopwatch ticks off and it is estimated that the inductor cannot reach the over current capability.