

DE2 Power Failure

Diagnostic and Correction



DE2 Capacitor Failure:

This document describes how to diagnose the power failure and determine if TC3 is inoperative. It also explains how to make the board functional by removing TC3.

TC3 Capacitor:

The Altera DE2 Development and Education board was converted to an all lead free product in mid 2006. In the course of this conversion the input power circuitry transitioned from Tantalum to Aluminum Solid Electrolytic capacitors.



Tantalum Cap



Aluminum Solid Electrolytic Cap

Unfortunately there is a relatively rare scenario that can cause one of the input capacitors to receive voltage exceeding its specification. This causes it to fail and prevent power from getting to the board. During this failure the capacitor labeled TC3 may also get hot, issue audible noise, and/or smell like a burning component. After that, the board will not turn on.

Subsequent engineering analysis has determined that TC3 is not necessary to the functioning of the DE2 Board and can be removed. It will not be placed on the DE2 Boards in the future.

Solution:

The end user of the DE2 Board has two choices:

- Return the board for repair to Terasic Technologies – contact information on the last page of this document
- Repair the board themselves - no additional parts are necessary

Note: If the end user attempts to repair the board and has difficulty, Terasic can still be contacted to make the repair. The end user will not be held responsible for damage if the repair is attempted and not successful.

Power Failure Symptom

DE2 is not powered on when a 9V, 1.2A adaptor is plugged in and the red power switch is pressed. i.e. none of the LEDs turn on and/or blink.

Initial Inspection

- Inspect the Capacitor labeled TC3 :
 1. The top appearance of TC3 capacitor may appear dark brown.
 2. The base (black plastic) of TC3 capacitor is separated from TC3 capacitor.
 3. It is also possible that no visible signs will be evident.
- Using a multi meter :
 1. Release the red switch to POWER OFF state (out) as shown in Figure 1. And turn DE2 over to the back side as shown in Figure 2.

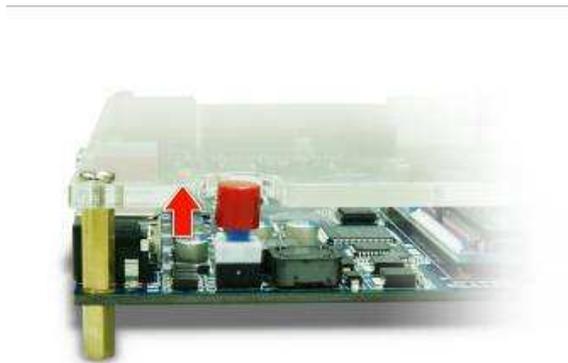


Figure 1

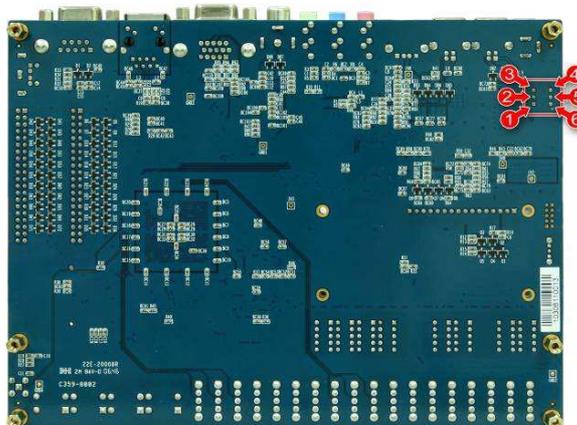


Figure 2

2. Set the multi-meter to measure Ohms and put the black probe on the copper standoff as shown in Figure 3. (this is the board ground) Then measure the pin 3 or pin 6. (Pin 3 and Pin 6 are electrical equivalent points)
 - You can determine if TC3 is damaged if either Pin 3 or Pin 6 is shorted to ground (Please refer to Table 1).

Pin 3 or Pin 6 To Ground	Assertion Result
0 (short)	Damaged TC3
∞ (open)	TC3 OK

Table 1

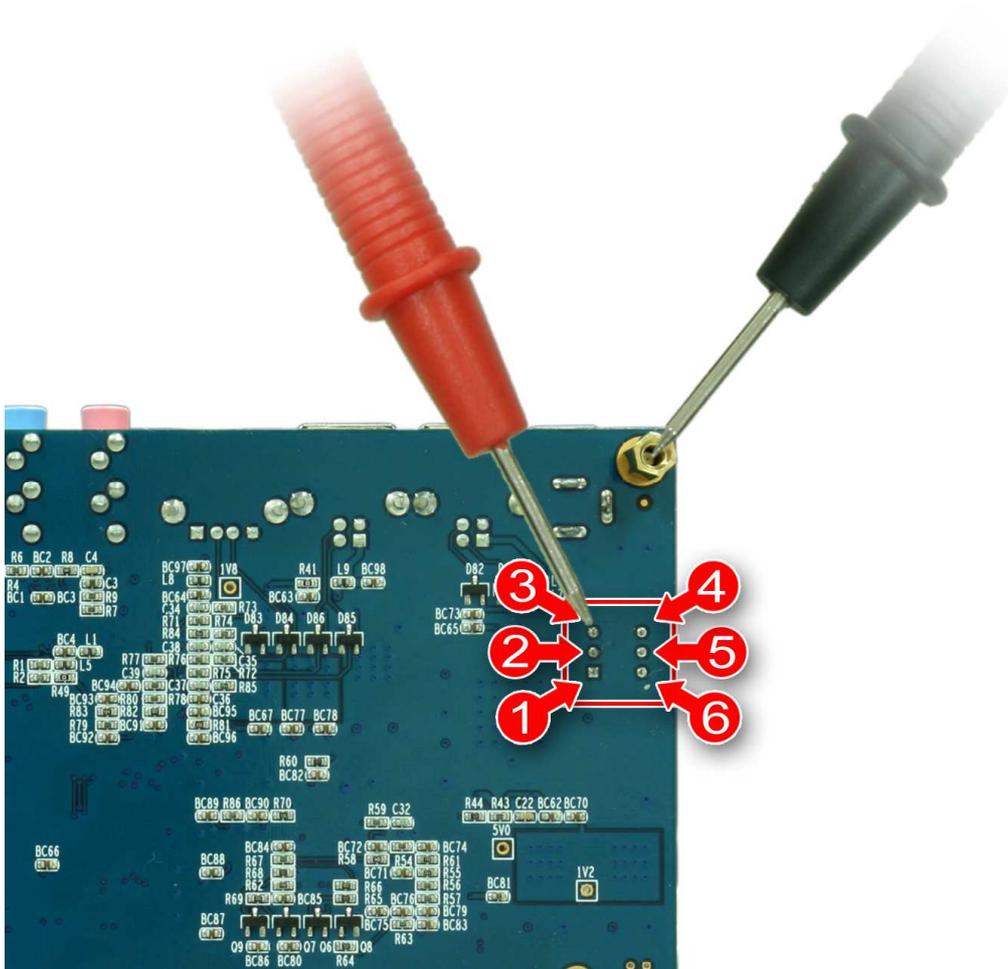


Figure 3

Repair Procedure

- Prepare the following tool sets as shown in Figure 5 :
 1. Two soldering irons. Working temperature is 400°C (for lead-free solder)
 2. A tape of de-soldering wick.



Figure 5. Required tools

- Remove the 4 screws from the corners of DE2 and take off the Plexiglas as shown in Figure 6.



Figure 6

- Heat up the two joints of the TC3 capacitor for 1 ~ 2 minutes with the two soldering irons as shown in Figure 7.

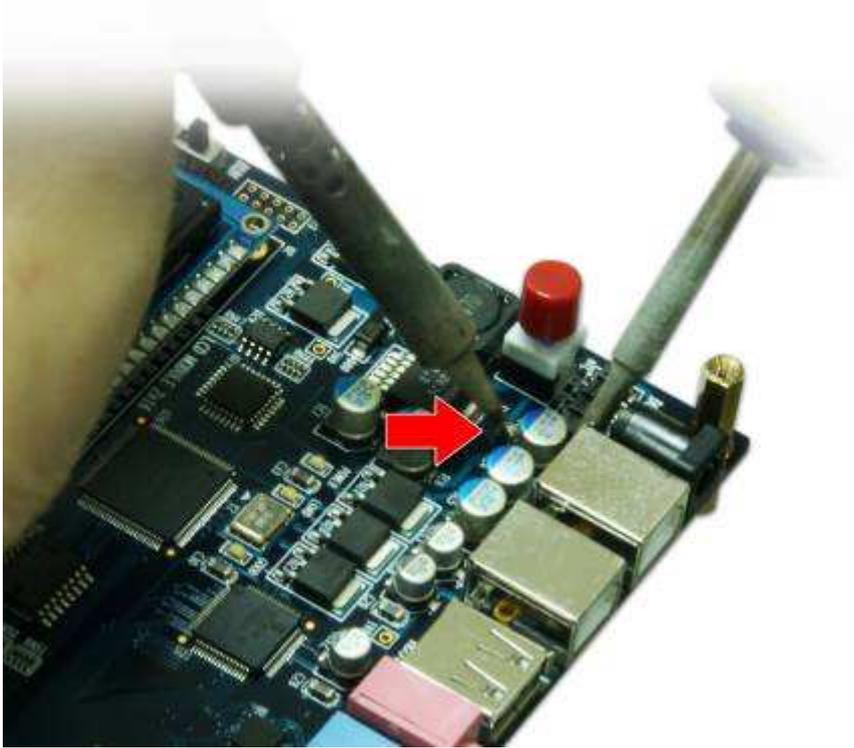


Figure 7

- Use the tips of the two soldering irons to pick up the TC3 capacitor after the capacitor is loosening up as shown in Figure 8.



Figure 8

- Optional: Use desoldering wick to remove the solder.

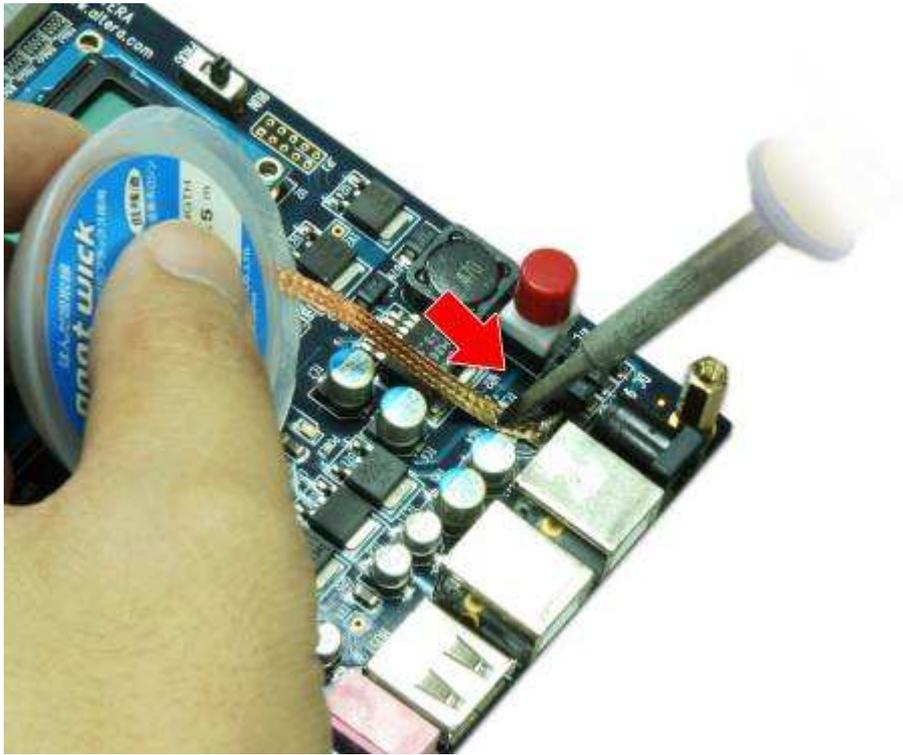


Figure 9

- **Caution : To avoid damaging the pad do not attempt to remove the capacitor if it is not loosening up during the de-soldering process.**
- Finally, reapply power and test the board. If it still does not work, contact Terasic Technologies for additional assistance.

Revision History

Date	Change Log
OCT 2, 2007	Initial Version

Support

Please email to support@terasic.com for any questions