



# Temporarily Repair a Lost Cause Graphics Card by Heating it up in an oven

A graphics card circuit board can have bad solder joints under the GPU die. This can be temporarily fixed by heating the board in an oven.

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## INTRODUCTION

Graphics cards "burn out" and are not usable after 5-10 years of operation. As these "burn outs" occur, some graphics cards can be recovered temporarily using these steps.

While following this guide, be careful - this procedure can potentially damage your GPU beyond repair. Applying heat to a video card for a continuous amount of time will melt the solder connections and potentially repair any damaged solder points.

**CAUTION: Be cautious of toxic gas that is created when heating up plastic, solder, and electrical components. Always wear protective clothing and gloves when handling heated materials. Ensure you properly ventilate the area you are working in and do not breathe in toxic fumes.**

### TOOLS:

- Arctic Silver Thermal Paste (1)
- credit card or piece of cardboard to spread paste (1)
- Liquid Soldering Flux (1)
- oven tray / crate (1)
- Phillips #0 Screwdriver (1)
- working oven with fan and temerature setting (1)

### PARTS:

- Aluminum Foil (1)

## Step 1 — Check the Warranty

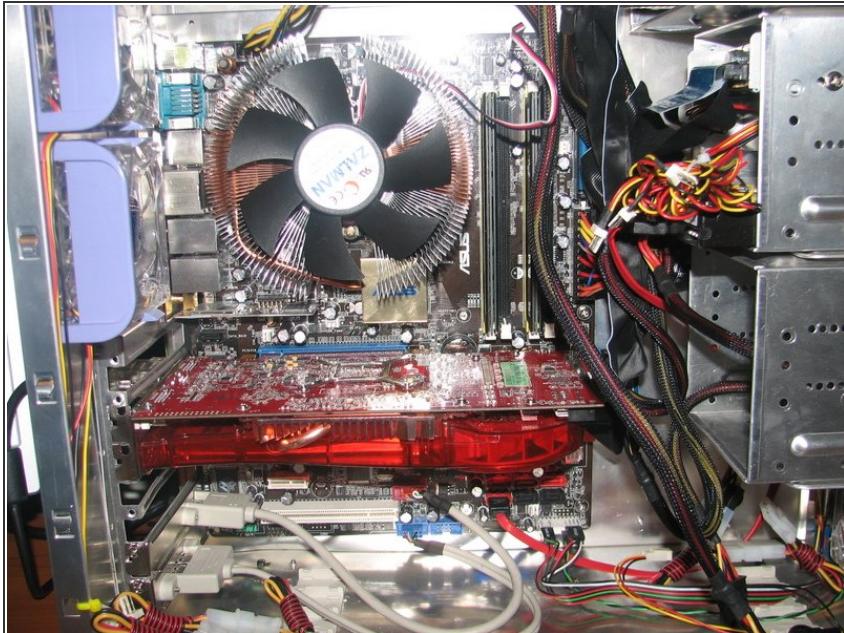
<p>Compiled a list, with a bit of help via google etc, if you can add any comments positive or negative then I'll amend the list accordingly. I've done a bit of research, in order of the best Gigabyte, EVGA, Galax/KFA2, PNY, MSI, Zotac, all provide good RMA service.</p> <p>If within the first 28 days of purchase you should have a replacement or refund within the DOA period. According to SOGA 1979, all repairs/replacements should be done within a reasonable amount of time, so in theory, all manufacturers should be able to do this within 30 days.</p>		
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Manufacturer	RMA Office	Warranty Cover and RMA Turnaround Info.
EVGA	UK - England Direct Support: 01788 247 298	European Warranty Details: <a href="http://eu.evga.com/support/warranty/">http://eu.evga.com/support/warranty/</a> Step-Up program Transferable / Global Warranty, all details here: <a href="http://www.evga.com/articles/006">http://www.evga.com/articles/006</a> KR products is 3 years, or register within 30 days, you can directly upgrade warranty ER part numbers offer 10 year warranty automatically upon registration within 30 days Replacements are sent out within 1-3 business days of receiving the product from you EVGA have Advanced RMA in Europe where you can have the replacement shipped to you within 3 or 4 days of submitting the Advanced RMA request. You have 30 days for EVG
KFA2 (GALAX)	UK - Wales, Ystrad Mynach Direct Support: 0845 644 6644	2 Year Warranty (Around 7 working days turnaround) KFA2 is Galax's European brand
Gigabyte	UK - England, Milton Keynes	3 Year Warranty (Around 5 working days turnaround) Note: Gigabyte require postal order or cash for £15 to pay for return shipping of the re
MSI	Netherlands	3 Year Warranty (Typically 10 upto 25 days RMA, you need to contact the retailer if the R
PNY	France	3 Year Warranty (Around 3 Working Days RMA)
Zotac	Hong Kong	5 Year Warranty registered with Zotac - Product must be registered within 14 days of
Sapphire	Hungary	2 Year Warranty (Sapphire can take over 30 days, you need to contact the retailer if the R
PowerColor	Netherlands	2 Year Warranty (Powercolor can take over 30 days, you need to contact the retailer if the R
Gainward	Germany	2 Year Warranty (Gainward can take over 30 days, you need to contact the retailer if the R
Inno3D/Force3D	Hong Kong	2 Year Warranty (Inno3D can take over 30 days, you need to contact the retailer if the R
HIS	Hong Kong	2 Year Warranty (HIS can take over 60 days, you need to contact the retailer if the R
Asus	Czech Republic	3 Year Warranty (Asus can take upto 6 weeks, you need to contact the retailer if the R
POV	Netherlands	3 Year Warranty (credit/exchange for an equal product it will be exchanged to a com Products older than 24 months will be repaired at a cost of £25 + 19% Tax provided b
Club 3D	Netherlands	RMA via retailer only - 2 Year Warranty (Depends which retailer you bought it from as
Palit	Hong Kong	RMA via retailer only - 2 Year Warranty (Depends which retailer you bought it from as
XFX	Hong Kong	RMA via retailer only - 2 Year Warranty (Depends which retailer you bought it from as



**Send the card back to the manufacturer for repairs if the warranty is valid.** This procedure will void your warranty.

- Check to see if your warranty is valid. This can be done by looking up the serial number of your graphics card for retail cards in most situations. **For OEM video cards, the warranty is tied to the system and may expire sooner than a retail card.**

## Step 2 — Remove the card from the System



- If the card is still installed into the system, begin by removing the card.

## Step 3 — Parts and Materials



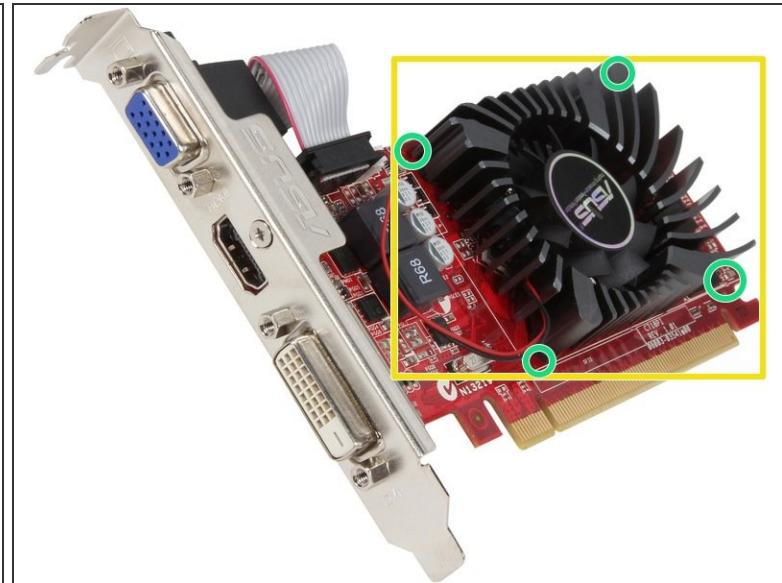
- Precision screwdriver(s): usually Phillips #0 and/or #1.
- Aluminum foil to cover heat sensitive components while propping the card up onto the tray.
- Thermal paste to replace the paste afterwards.
- Paper towels to rub any excess of old heatsink compound from the components. (Alcohol wipes work as-well)
- An oven.
- A baking tray.

## Step 4 — Oven Preparation



- Preheat the oven to 385F (195C).
- *(i)* Experiment with lower heats first, and increase temperature as necessary.  
*(i)* If you've already finished this guide once and are baking again, increase the temperature slightly - 395F (200C) or 400F (205C).
- Most of these temporary repairs only consist of the expanding/shrinking of bumps under the surface mount of the graphics chip. Therefore, a lower heat may work as well.

## Step 5 — Card Dissassembly



- While the oven is pre-heating:

(i) Locate specific guides for disassembling your GPU if these steps are inapplicable to your GPU.

- Remove the screws or clips holding your fan and any duct-work to the video card.
- Gently take the fan/duct-work off.
- Remove any old heatsink compound from the chips (using a paper towel).

! Place the screws in a safe place.

! Remove plastic components. Plastic will melt in the oven, and produce toxic fumes.

! Elevate GPU around the edges, never let the components touch any surface.

## Step 6 — Solder Melting Point

**Table I** The melting point of solder samples measured by DSC

Samples	Melting temperature (°C)
Sn-3.5Ag (as-received)	219.1
Sn-3.5Ag (ball milled for 120 h)	219.5
Sn-3.5Ag-0.7 nanoCu (ball milled for 120 h)	215.0
Sn-3.5Ag-3.0 nanoCu (ball milled for 120 h)	213.6

⚠ Use any provided times as an estimate - different materials melt at different temperatures.

⚠ Heat the GPU slowly.

ⓘ GPU completion times: PS: 3-6 minutes, Xbox: 4-6 minutes, desktop boards: 12 minutes, laptop boards: 8 - 12 minutes, GFX: 8 - 15 minutes.

ⓘ Be patient. If your oven has a window, check if the solder has melted visibly.

- Set the timer on your oven for 5 -10 minutes.

## Step 7 — Heat the GPU

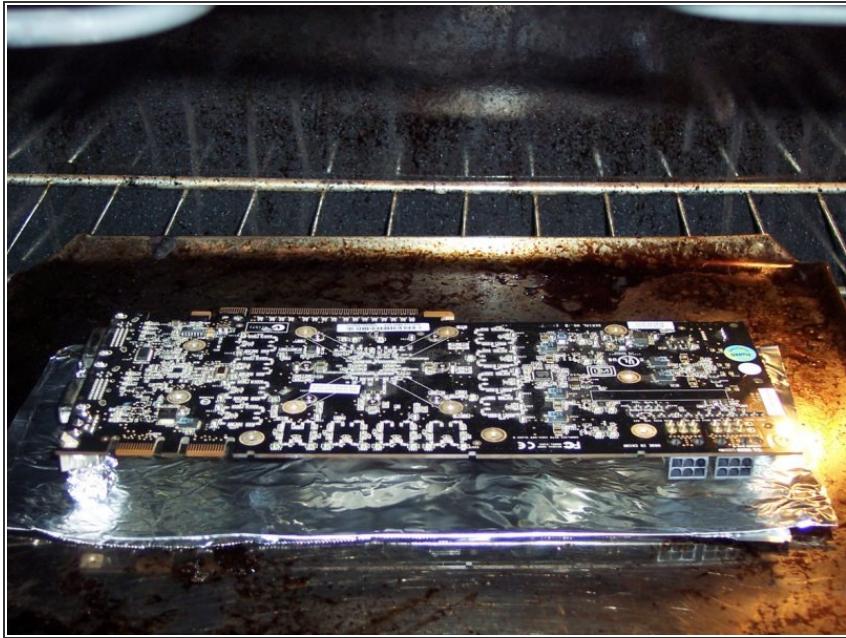


**⚠** Prevent the GPU components from touching any surface by elevating the edges of the card with foil.

**⚠** Do not leave the oven unattended.

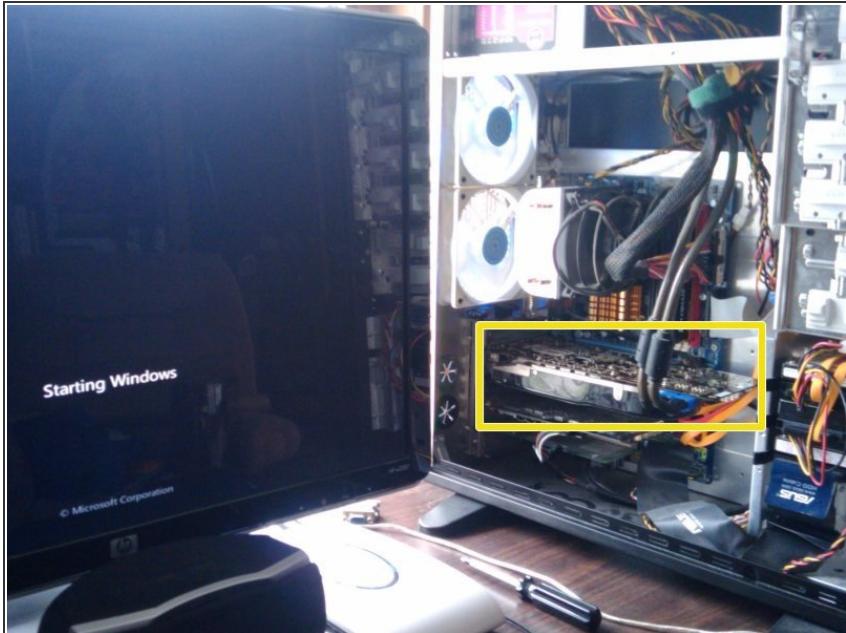
- Place the GPU on a baking sheet with the side with most of the chips facing up.
- Place the baking sheet or dish in the middle of the oven.

## Step 8 — Venting and Cooling



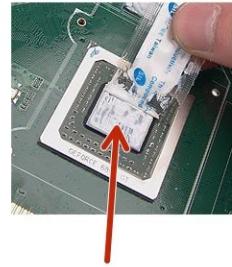
- Vent the oven 5 - 10 times by opening the door. This will regulate temperature.
- ⚠ Movements can cause liquid solder to solidify incorrectly and ruin the card.
- ⓘ You will notice a smell from the molten solder/flux.
- ⚠ Do not use fans for cooling.

## Step 9 — Test the GPU



- You have 2 options:
  - 1. Test the card quickly without reinstalling the fan/heatsink.
- ⚠ Do not operate the GPU with heatsink/fan removed for more than 30 seconds.
- 2. Reinstall the fan/heatsink, then test the card.
- Repeat steps 2-9 if GPU fails test.
- Proceed to step 10 if GPU passes test.
- ⓘ Most people will want to test the card to see if it powers on and passes the POST.

## Step 10 — Installing Heatsink



- Apply thermal paste onto the main chip or on the connection side of the fan.
- Place the heat-sink over the GPU carefully, lining up any screws or clips.
- Apply heatsink on thermal pads as applicable.

**i** Use only a small amount of heatsink and spread evenly using a card, or apply pressure evenly when connecting components.

**★** If there is thermal tape or pads that were removed for the reflow, place these back in their original position.

## Step 11 — Reinstalling Fans/ Cleaning GPU



**⚠** Insert and tighten all the screws carefully. They are quite small, and the PCB may be damaged if the screws are over tightened.

- (i)** Tighten the screws in an alternating pattern. E.G. Top left, Bottom right, Top right, Bottom left. With more than 4 screws, use a "Star" pattern when tightening the screws ensuring all screws are evenly tightened.
- Clean off any noticeable dust on the GPU.

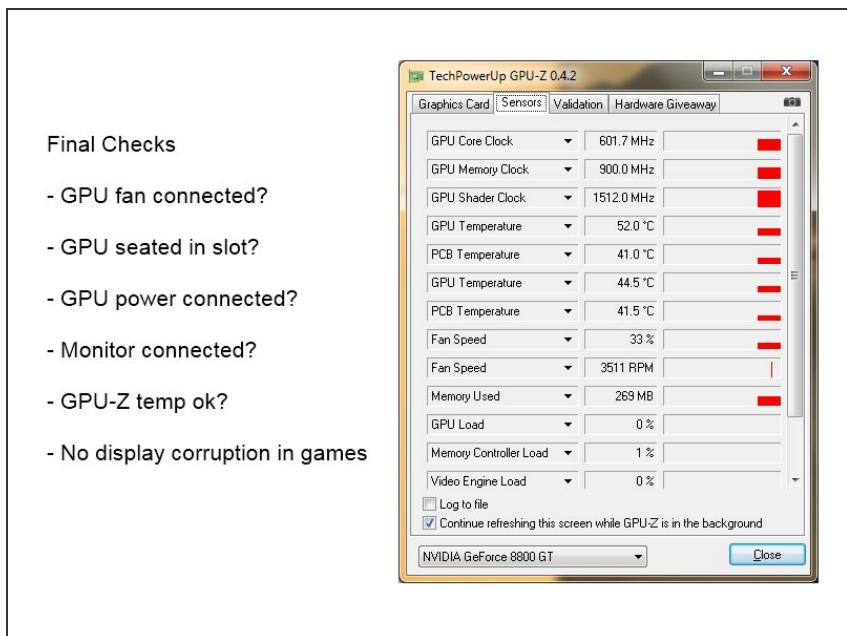
## Step 12 — Reinstall GPU



- Reinsert GPU into GPU slot on motherboard.
- Monitor GPU temperatures while PC is at idle, opening programs, while performing intensive tasks.

 GPUs overheat at around 90C

## Step 13 — Final Check



### Final Checks

- GPU fan connected?
- GPU seated in slot?
- GPU power connected?
- Monitor connected?
- GPU-Z temp ok?
- No display corruption in games

- Verify that the fan was reconnected (if there is one).
- Verify that the fan spins when the PC is powered up.
- Verify the GPU works and is detectable by the system.

 A good program to get is GPU-Z. it can display the GPU temperature on supported cards.