



Lenovo Thinkpad T61 Cleaning
Maintenance:
Cleaning the CPU Heatsink &
Thermal Paste Application

ThinkPad

By Hearst555

Notes:

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This article is...

Version 1.1.0 (3rd September 2010)

Change Log:

- Cover refresh! <3
- Size optimised! Now comes with 88% less fat! :D

Version 1.0.0 (18th May 2010) – Initial version

Brief Intro

My Lenovo Thinkpad T61 became a little humid of late so I decided to give it a clean. I also thought of giving it some fresh new thermal paste since the earlier paste I used seemed to be ineffective (Akasa Hi-Spec 450). Since some people on the forum have asked how to open and apply new thermal paste on their Thinkpad I decided to do a little tutorial with lots of pictures. As they say, a picture is worth a 1000 words so why not?

Caution! Word of Warning! Small print blah blah blah...

While cleaning your Thinkpad is a good thing there will be an element of risk that such activity can damage and nullify your Lenovo warranty. If your system is still in warranty then it's probably best to wait it out until it expires. That said, if you don't feel confident about going inside your system even if it's out of warranty then it's probably best to leave it alone and seek professional advice to maintain your Thinkpad computer.

If you're willing to go through the process however then good for you (yay!) No doubt it's rewarding to have a clean and cool system that will extend the life of your Thinkpad computer. Since Thinkpad's are one of the easiest PC's to open and self maintain it should be a doddle to perform. However you will be doing so at your own risk, I won't be held liable for any damages, loss of use, loss of income etc. should things go awry. You have been warned! (@__@)

Checklist

Before you start it's ideal to have the following items ready:

- A Thinkpad! (For this tutorial I'm specifically doing the Thinkpad T61 14.1" Widescreen model)
- Copy of the Lenovo Hardware Maintenance Manual relevant to your model.
- Screwdriver set (Jewellers/Precision Screwdrivers are highly recommended)
- Small container to put your screws in so you don't lose them.
- Thermal Paste/Pads (I'm using Arctic Silver 5 paste)
- Small Thin Card (i.e. Unwanted Cards) to spread the thermal paste.
- TIM Cleaner / Isopropyl Alcohol (Isopropyl for me)
- Q-Tips (or Cotton Buds) and some wipes.
- Compressed Air Can
- Sticky Tape
- Light Powered Vacuum Cleaner. (Optional)
- Digital Camera (Optional - Helps forgetful people like me!)

Word of Advice!

Before you touch the major components of your system board, reduce the risk of electrostatic damage by discharging yourself. You can do this by placing your hands on a metal object for a few seconds before working. If you have an anti-static wrist strap then feel free to use that also.

Try to avoid using magnetic screwdrivers while working inside of your system. Magnetic fields can also cause damage to some sensitive devices inside your system so try to use standard screwdrivers and tweezers as much as you can, no matter how lovely and convenient the magnetic screwdriver are!

This guide is specifically created for the Lenovo Thinkpad T61 14.1" Widescreen model though it can apply to other models. However certain components and locations may vary so it's best to look up on the Hardware Maintenance Manual first before proceeding.

Step 1: First switch off your Thinkpad, unplug and remove the battery. Flip it round and locate the screws underneath with the Memory/Keyboard/CPU logo and take them out. Under Figure 1, the locations are highlighted in red for T61 14.1" Widescreen models specifically. Also unscrew the two screws near the top left and right corner, this is highlighted in blue so that we can remove the keyboard bezel.

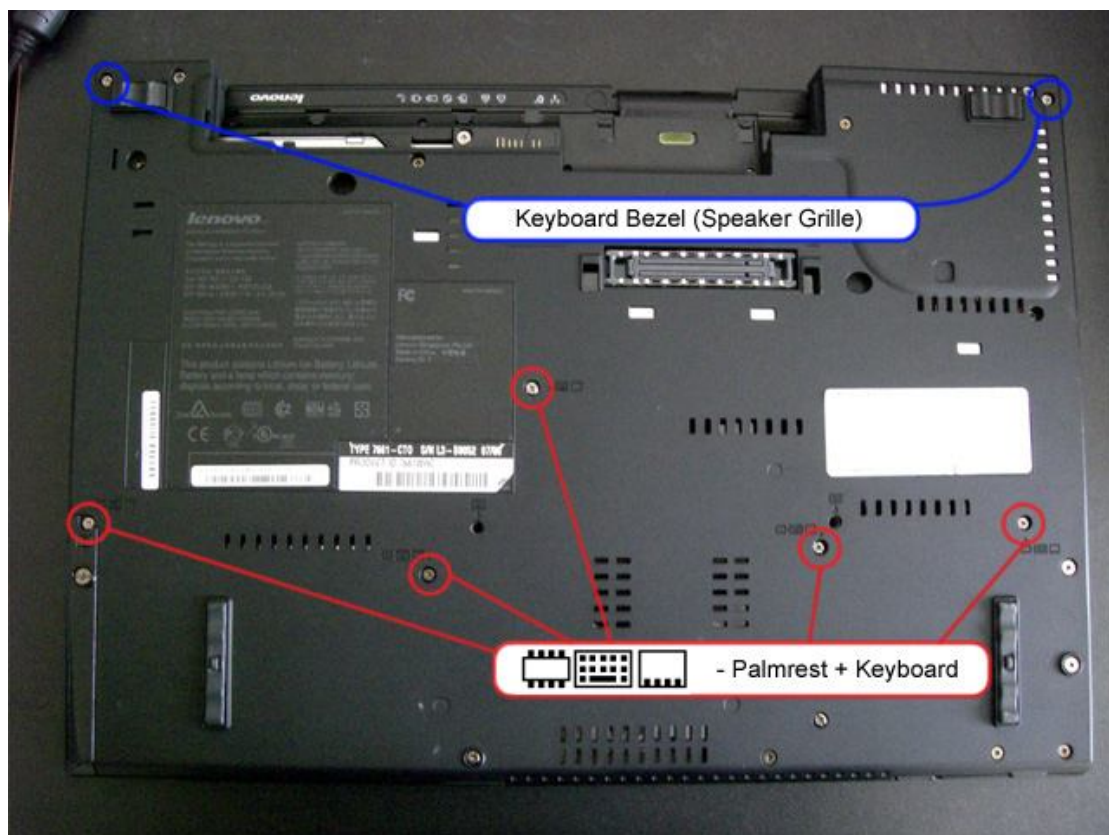


Figure 1: Screws location of Thinkpad T61 14.1" Widescreen Model

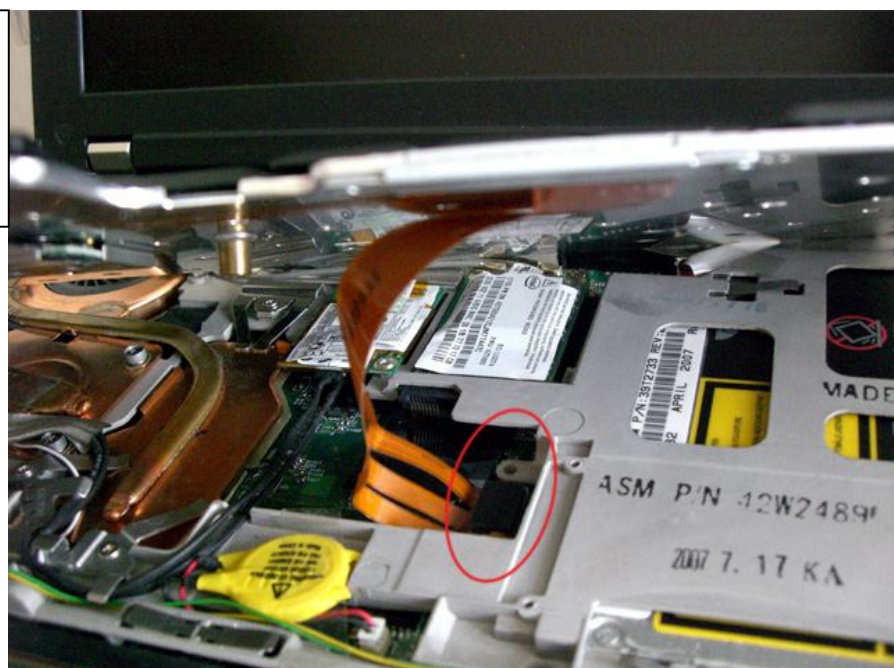
Step 2: Flip round the Thinkpad and open the LCD lid. Gently grasp the side of the palm rest and pry it up slowly. Don't tug it with full force though, we got a hidden Ultranav cable underneath that needs to be disconnected (See Fig 2). Disconnecting it is very easy, just pull the small square block from the socket and it's disconnected.



Figure 2: Sneaky Cable Alert! Thankfully it's easy to disconnect.

Step 3: Gently lift the keyboard, like the palm rest there is a another cable connected underneath (Fig 3). This one is a little bit tricky but gently lift the tab and pull it out to disconnect from the system.

*Figure 3:
Locate the
small tab and
gently lift it
up.*



Step 4: Remove the screws from the keyboard bezel located near the speaker along with the CPU fan plate shown in the picture. (Fig 4)



*Figure 4:
Unscrew the
fan plate and
the Keyboard
bezel.*

Step 5: Grasp the side of the keyboard bezel and pull until it unclips from the Thinkpad chassis (It's flimsy so be careful not to snap it.) Then gently pry the keyboard bezel at a slight angle away from the LCD screen (Fig 5).



Fig 5: Unclip from the side, lift at a slight angle towards the LCD then pull out.

You should have the following pieces so far...



Step 6: Next is to release the screws from the speakers (fig 6). At the moment my speaker has some polka dot dust sitting on but nothing but a good wipe will clean it off. With the Thinkpad T61 since we're only want to clean the CPU area you only need to concentrate on the left speaker and not the right speaker (you can leave it as it is).



Figure 6: Remove the screws from the left speaker only. The right one is unnecessary so you can leave it alone.

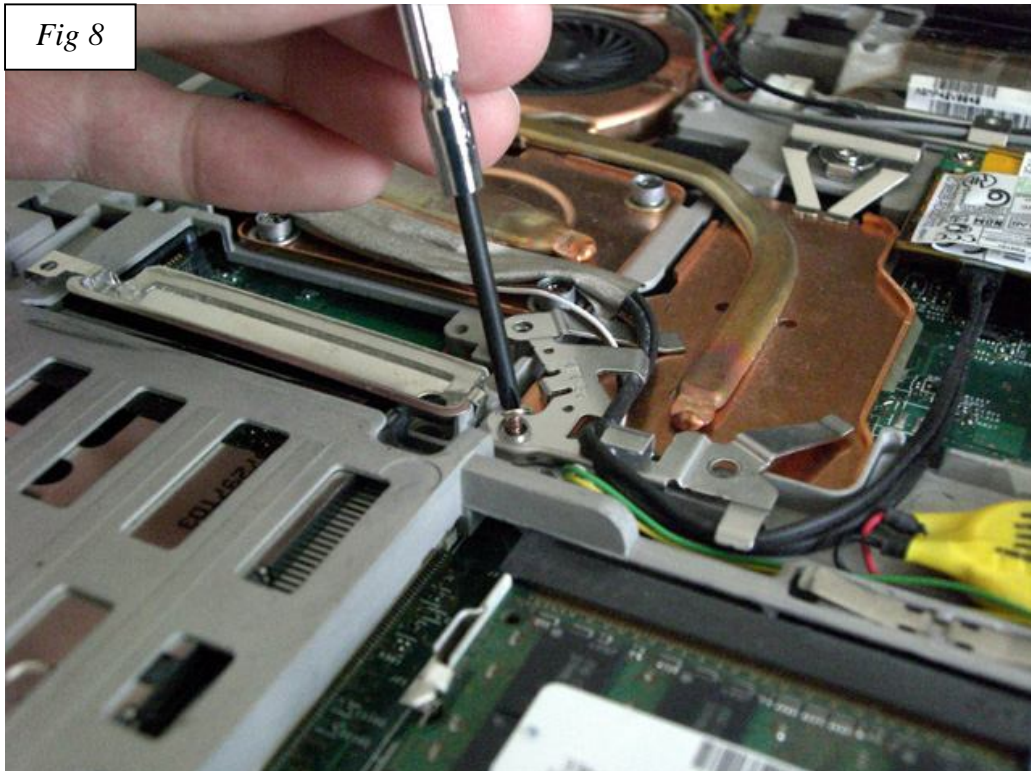
Step 7: You may find some sticky tape that's holding some wires on the CPU heatsink so take it out (see fig 7).

Fig 7



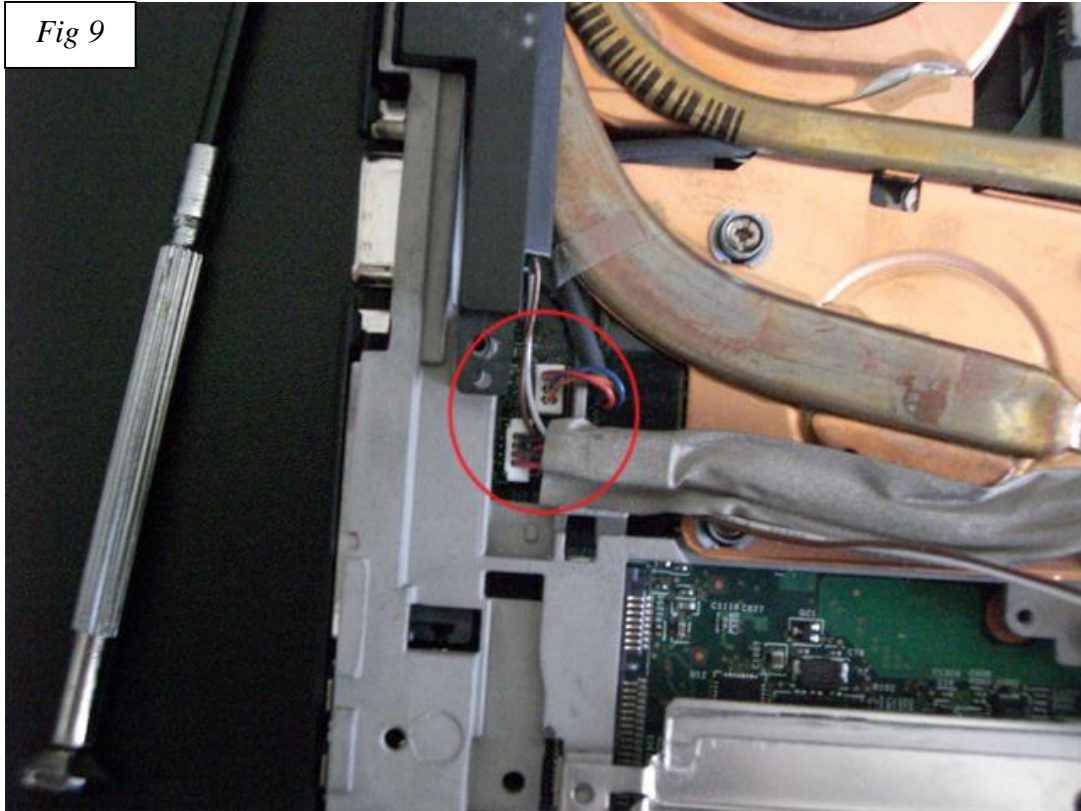
We then need to remove a metal plate that's holding the CPU heatsink down as well as the wires connected towards the left speaker (fig 8). Remove the 3 screws and take out the metal plate.

Fig 8



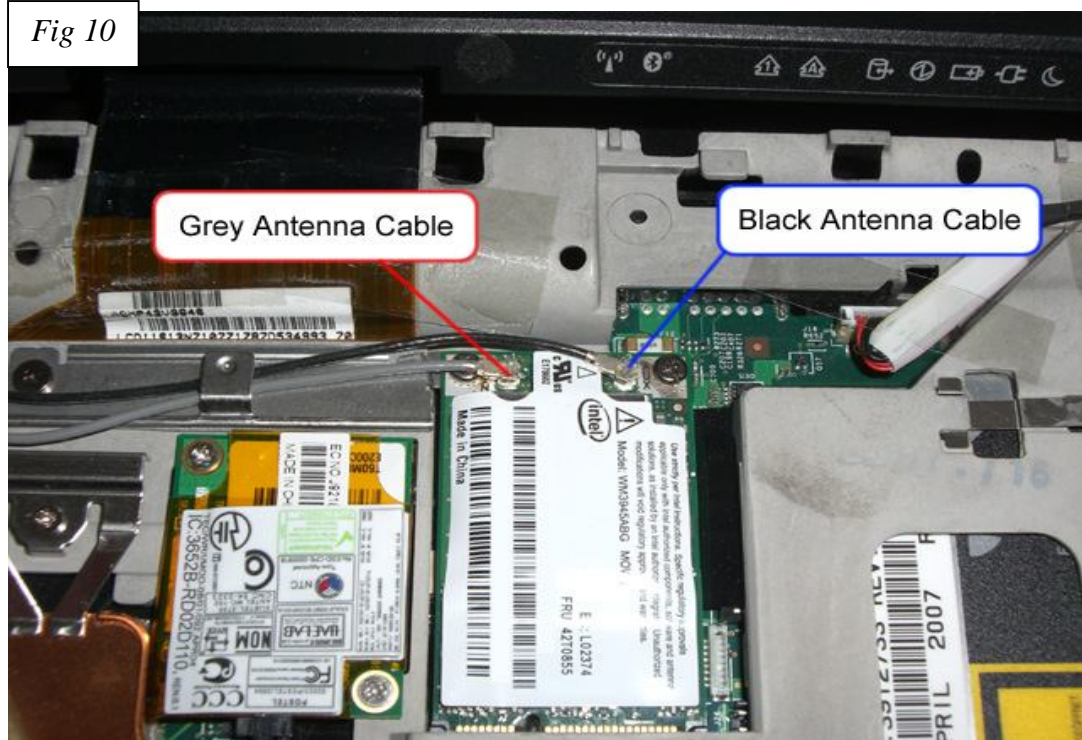
Step 8: Take out the wires connected to the two ports near the left speaker (fig 9).

Fig 9



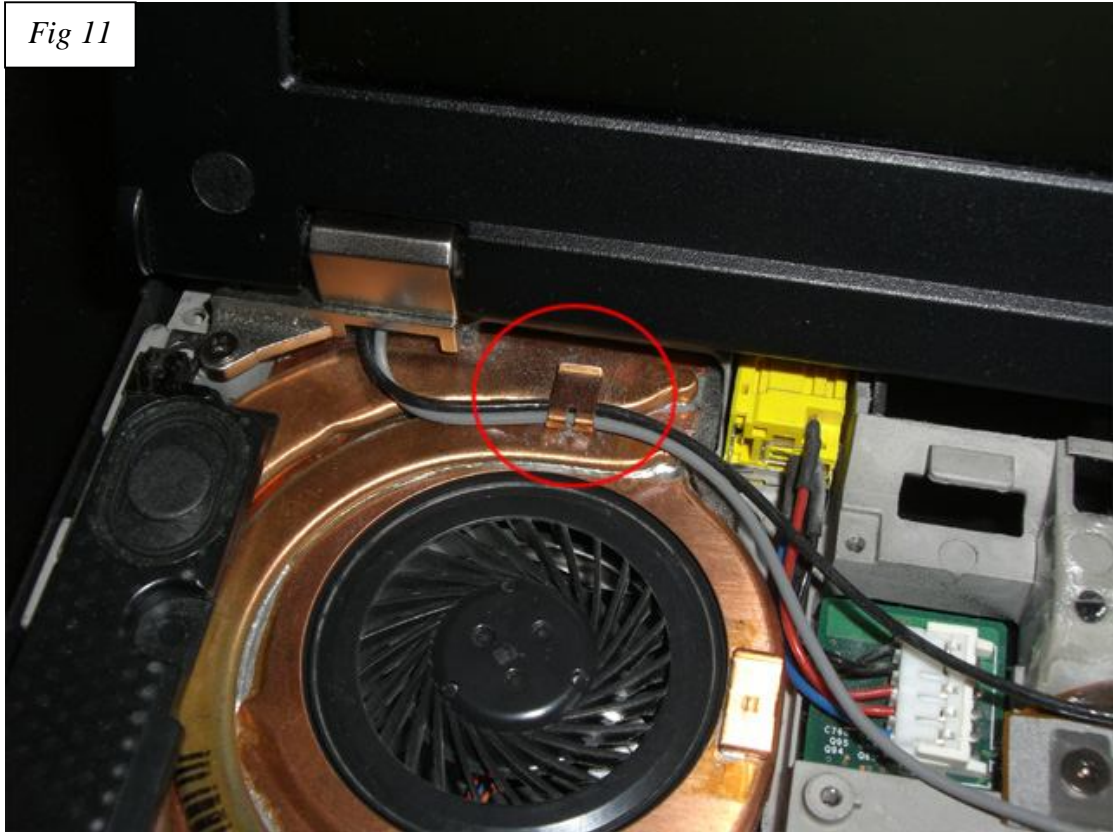
Step 9: Now we need to concentrate on the wireless antennas. My Thinkpad T61 comes with the Intel 3945ABG Wireless Card though certain models may have different cards which may be different from the image below (fig 10). Regardless, take note of where the antenna wires are connected then disconnect it from the wireless card by pulling it away. If you have the same wireless card as mine, then the 1st socket is for the grey antenna wire while the 2nd socket is for the black antenna wire.

Fig 10



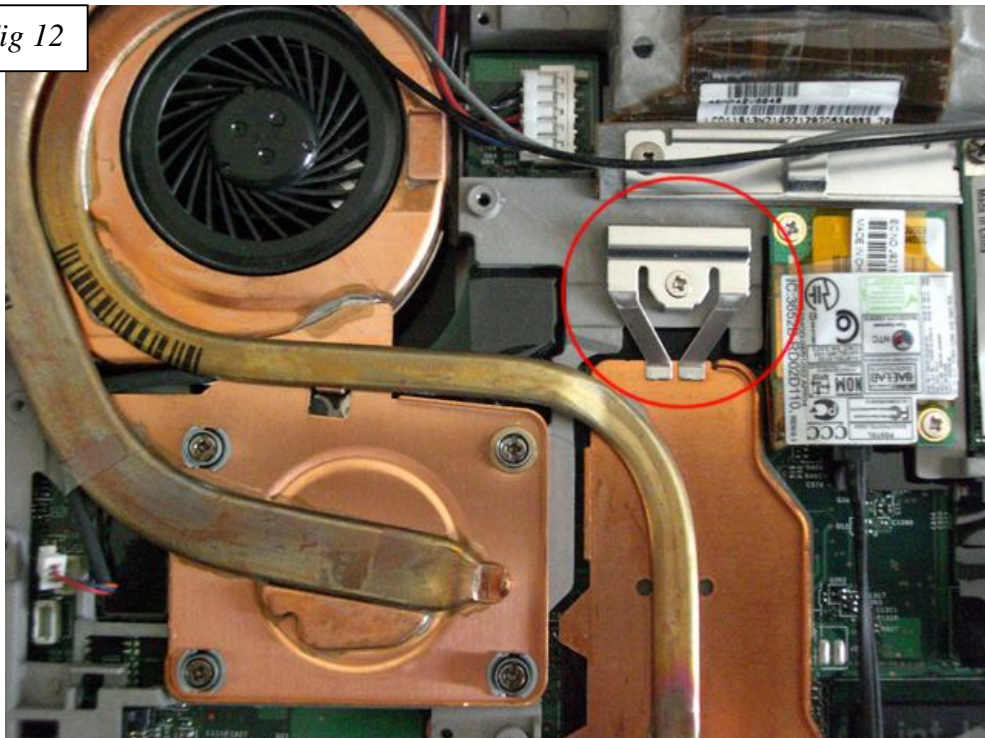
Once that is removed don't forget to guide the antenna wires away from the CPU Heatsink (fig 11).

Fig 11



Step 10: The last piece that we need to remove before we can access the CPU and Chipset is a small metal plate with a single screw highlighted in red (fig 12). Remove this piece and keep it in a safe place.

Fig 12



Step 11: Remove the remaining screws from the CPU fan and heatsink, then lift it up at an angle and pull it away towards you. You should now be able to see the CPU and the chipset (fig 13).

Fig 13

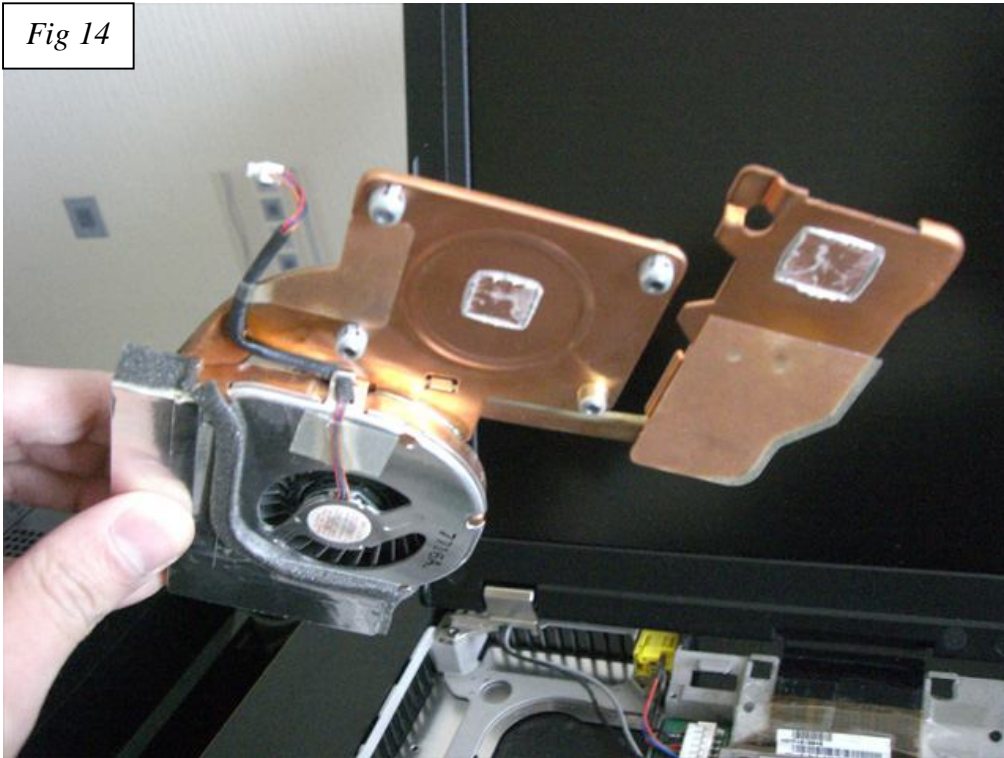


After 11 steps we finally made it to the CPU and chipset. The images below doesn't seem to show that it's in great shape so it's time to put that right!



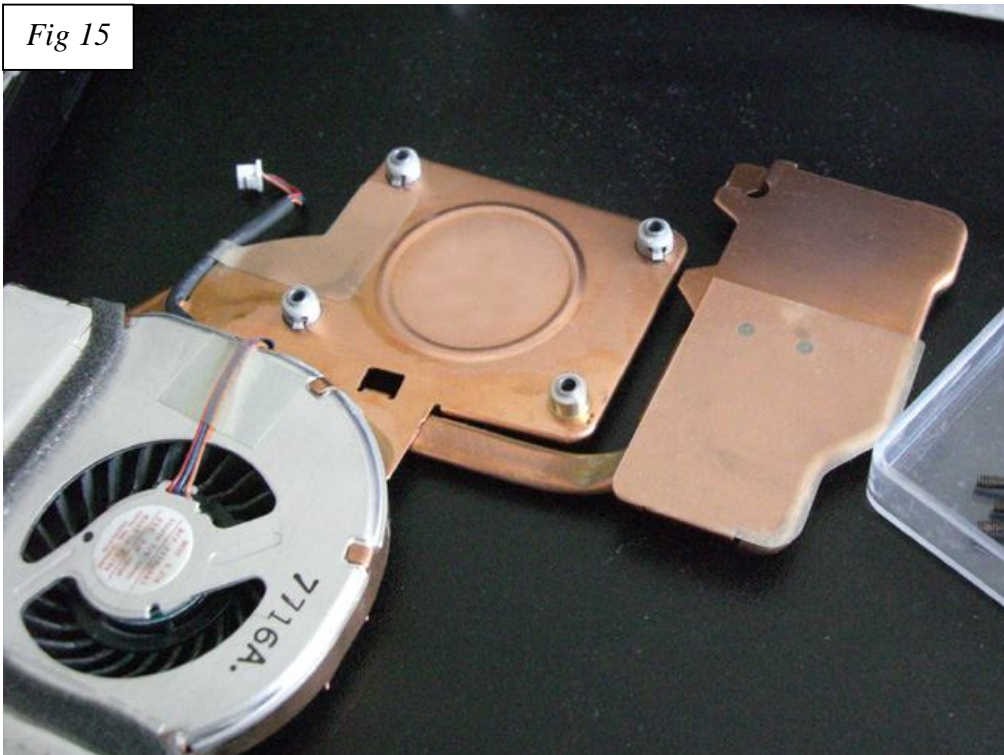
Step 12: Let's concentrate with the CPU fan and heatsink first. Grab some TIM cleaner or Isopropyl Alcohol and clean out the gunk that's left behind (fig 14). I used Isopropyl Alcohol for this application.

Fig 14



It should be nice and shiny after a couple of wipes using Isopropyl Alcohol (Fig 15). Grab a can of compressed air and spray at the vents to clear any blocked dust in a well ventilated area. If you don't have compressed air cans around then you can use a light powered vacuum cleaner to take out any clogged dust in the vents instead.

Fig 15



Step 13: Now let's concentrate on the CPU. You can leave the CPU as it is if you want but I wanted to take it out. To take out the CPU get a flat head screwdriver and unscrew a short amount counter clockwise (fig 16). The CPU socket should move gradually upwards and releases the CPU lock. From here, carefully lift up the whole CPU upwards but be careful not to bend the CPU pins!

Fig 16

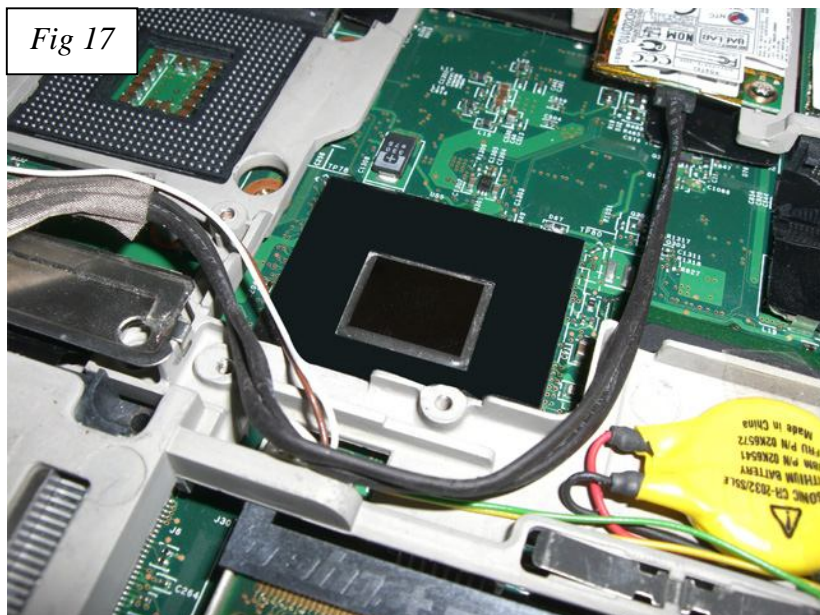


To clean out the processor, I use a combination of wipes and Q-tips dabbed with Isopropyl Alcohol to clean out the old thermal paste. Once done, gently prop the CPU back on the socket and lock the CPU socket by screwing slightly in clockwise direction. You should see the socket going down slightly during this.

Step 14: Next is to clean up the chipset alongside the CPU. You can't detach this one so you have to clean it up as it is (fig 17).

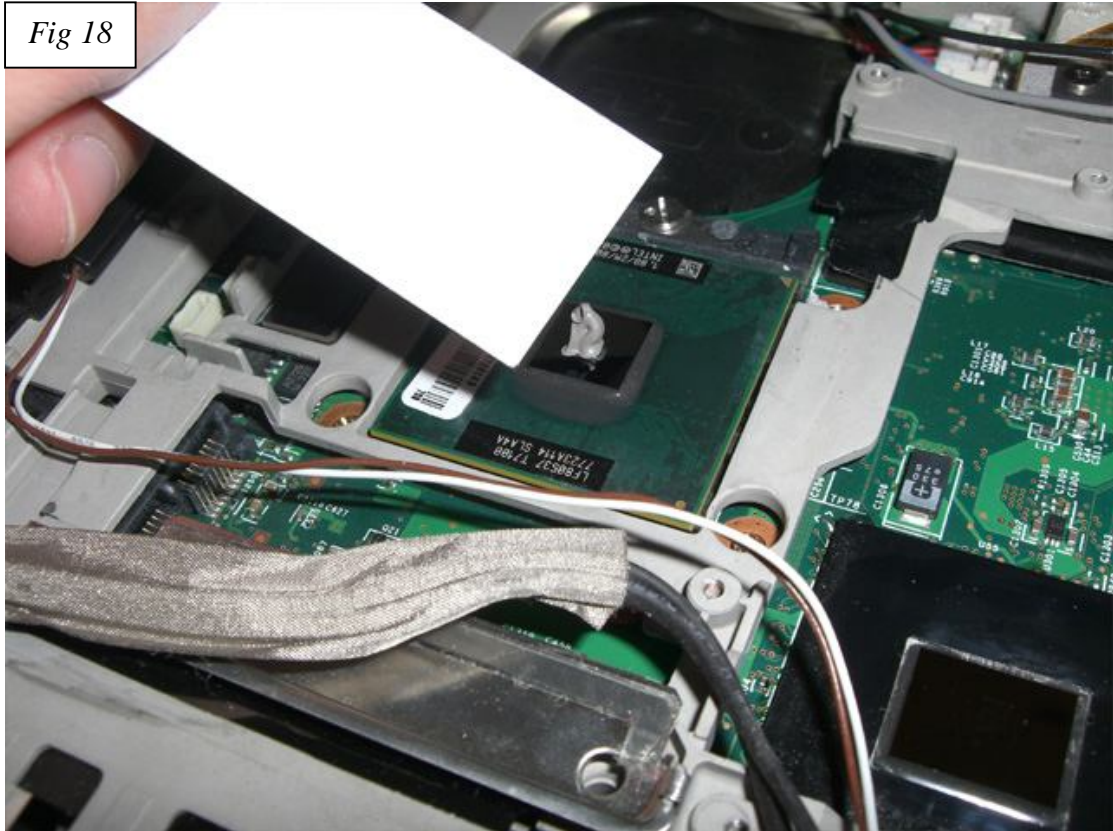
Again use a combination of Q-tips and wipes alongside with TIM cleaners or Isopropyl Alcohol to do the job.

Fig 17



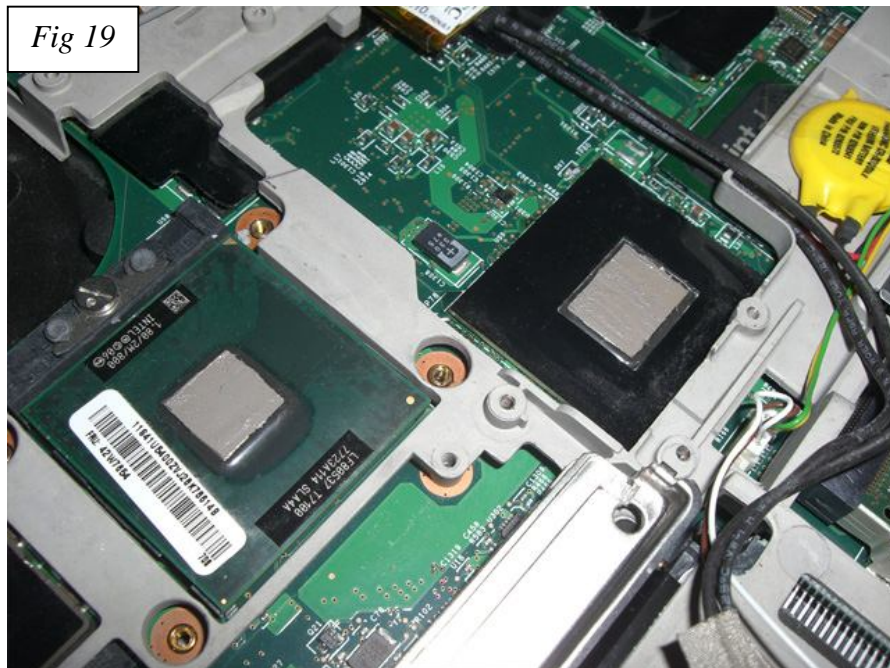
Step 15: Make sure the CPU and chipset are clean and dry, then grab your thermal paste of choice (I'm using Arctic Silver 5 on mine) and put a tiny amount on the processor die. With a small card, carefully spread it to cover the area of the whole die (fig 18). Make sure it's spread evenly and don't over apply. Too much paste doesn't improve cooling, in fact it actually makes it worse so make it nice and thin. Certain paste may be more viscous than others so may be trickier to apply, if it does get messy then get some Q-tips and wipe off any excess where necessary.

Fig 18



Step 16: OK I admit, I'm not the best thermal paste spreader in the World but you should get something like in the image below (fig 19).

Fig 19



Step 17: Once applied it's basically just reversing the steps of the tutorial. Perform the following:

- Replace CPU fan and heatsink carefully. Apply slight pressure and apply the 4 screws back on. (If you can't remember for the CPU fan it's the 2nd biggest one or "M2 9.5mm black" screws as the hardware manual calls them.)
- Route the wireless antenna cable from the LCD screen, underneath the hook of the CPU fan (fig 11) and guide it towards the wireless card and reconnect. For Intel Wireless 3945ABG users, if you can't remember which socket see "fig 10".
- Replace the small metal plate shown in "fig 12" on top of the chipset heatsink.
- Reguide and organise the modem wires and speaker wires underneath the small metal plate and re-screw it back on with the 3 "M2 3mm silver" screws shown in "fig 8".
- Re-connect the CPU fan, speaker and modem cables into their respective socket shown in "fig 9".
- Get a small bit of sticky tape and apply it to the modem/speaker wires similar to that of "fig 7". I mean you not going to ask Lenovo for a FRU part number of that tape aren't you?
- Screw the left speakers back into place (see fig 6).
- Carefully align the keyboard bezel. Now this can be tricky but you'll know it's done correctly when the bezel is completely smooth when locked in place. If you feel there's some sort of hump near the middle then it is done incorrectly. To make sure it's done properly, flip over the notebook with the bezel slightly in place and make sure the clips from the keyboard bezel are locked in (fig20).



Top Picture - Shows clips from left side of notebook.
Bottom Picture - Shows clips from right side of notebook.



- Once the clips are in, simply reapply the keyboard bezel to the Thinkpad chassis from the sides. You should hear a firm click to tell it's in place (fig 21). Afterwards reapply the screws for both the keyboard bezel and the CPU fan plate attached on the bezel.

Fig 21



Fig 22



Place the keyboard back in underneath the keyboard bezel and reconnect the cable (see fig 3). Before you do anything else let's make sure we haven't fried our beloved Thinkpad! Get a power source and switch it on, hopefully it will boot up as if nothing happened shown in fig 22. If so congratulations, the clean up and fresh paste operation is successful! Safely shut it down and remove any power sources afterwards. If it doesn't power on, go back a few steps and make sure all the connectors are placed in correctly, it's easy to miss out the vital connections such as the CPU fan cable if not careful!

- Replace the palm rest and reconnect the Ultrabay cable shown in “Fig 2”. Align it carefully and make you hear a firm click on the sides when you press it down.
- Flip the notebook round and replace all the remaining screws back in (see fig 1).
- Place the battery back in.
- You might as well give the monitor the squeaky clean treatment, get a damp cloth or wipe to remove any fingerprints and dust.
- Give the exterior a nice clean too!
- That’s it! You’re done!

That’s pretty much all there is to it for cleaning and replacing thermal paste on the Thinkpad (or specifically the T61). Bear in mind that with certain paste there is a “break-in” period so don’t expect instant spectacular results until you use it for a while. Here’s the picture of my cleaned up T61 decked out with a spectacularly dim screen...at max brightness (>__<). Oh well you can’t have everything! (fig 23 haha)

Anyway I hope this guide has been of use to you, and who knows I may prop up some more guides should I do anything else with my T61 (or a newer Thinkpad maybe? ☺). This is Hearst555 signing out!

*Fig 23:
Ker-ching!
All done!*

