

Hitchhiker Guide to Hardware Maintenance

Hélder Silva

Porto Summer of Code, 2016

Outline

- ① What?
- ② Why?
 - Heat
 - Throttle
- ③ How?
 - Tools
 - Consumables
 - How to
- ④ Questions?

Cleaning

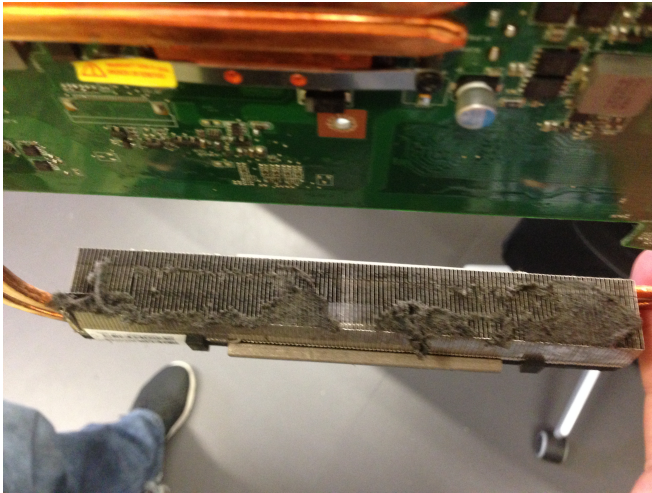
- Remove heat sinks (laptops and desktops)
- Clean the fans and air vents
- Clean old thermal paste
- Apply thermal paste

Heat

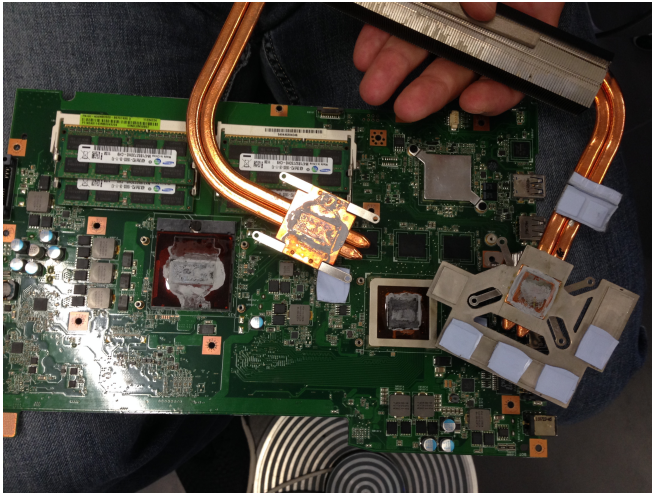
Dust acts as a thermal insulator and reduces airflow, thereby reducing heat sink and fan performance.

Poor heat transfer due to poor thermal contact between components to be cooled and cooling devices.

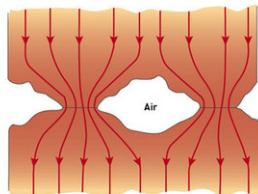
Dust



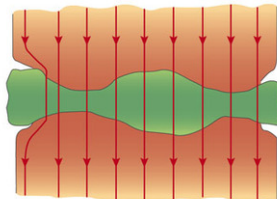
Dry TIM



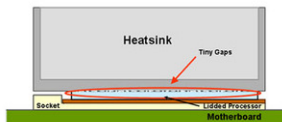
Correct application



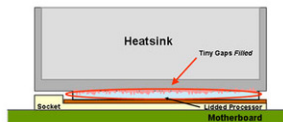
Interstitial air



Thermal interface material



No thermal interface material, tiny gaps exist.



Correct use of thermal interface material fills the tiny gaps.

Throttle

Because high temperatures can significantly reduce life span or cause permanent damage to components, and the heat output of components can sometimes exceed the computer's cooling capacity, manufacturers often take additional precautions to ensure that temperatures remain within safe limits.

Throttling reduces the operating frequency and voltage of an integrated circuit or disables non-essential features of the chip to reduce heat output, often at the cost of slightly or significantly reduced performance.

Damage prevention

Most components can shut themselves down when high temperatures are detected to prevent permanent damage.

This may not completely guarantee long-term safe operation.

Disassembly

- Search for "[model] disassembly" on youtube/google
- Watch
read the instructions (more than once)
- ????
- Profit

Opening

- ESD safe Gloves
- Anti-Static Wrist Strap
- Screwdriver
- Guitar picks
- Tweezers
- Magnetic pad (optional)

Cleaning

- Anti-Static Brush
- Dust Blower
- Microfiber Cleaning Cloths

Consumables

- Alcohol (70% solution is enough but the higher the percentage the better)
- Cotton swabs/balls
- Paper towel
- Thermal paste
- Thermal pads (optional)

What?

Why?

○○○○○○

How?

○○○●○○

Questions?

Disassembly

What?

Why?

○○○○○○

How?

○○○○●○

Questions?

Cleaning

What?

Why?

○○○○○○

How?

○○○○●

Questions?

Thermal Paste

Questions?

Go ahead, ask me anything (hardware related ^^).

Let's GO

HANDS ON =D