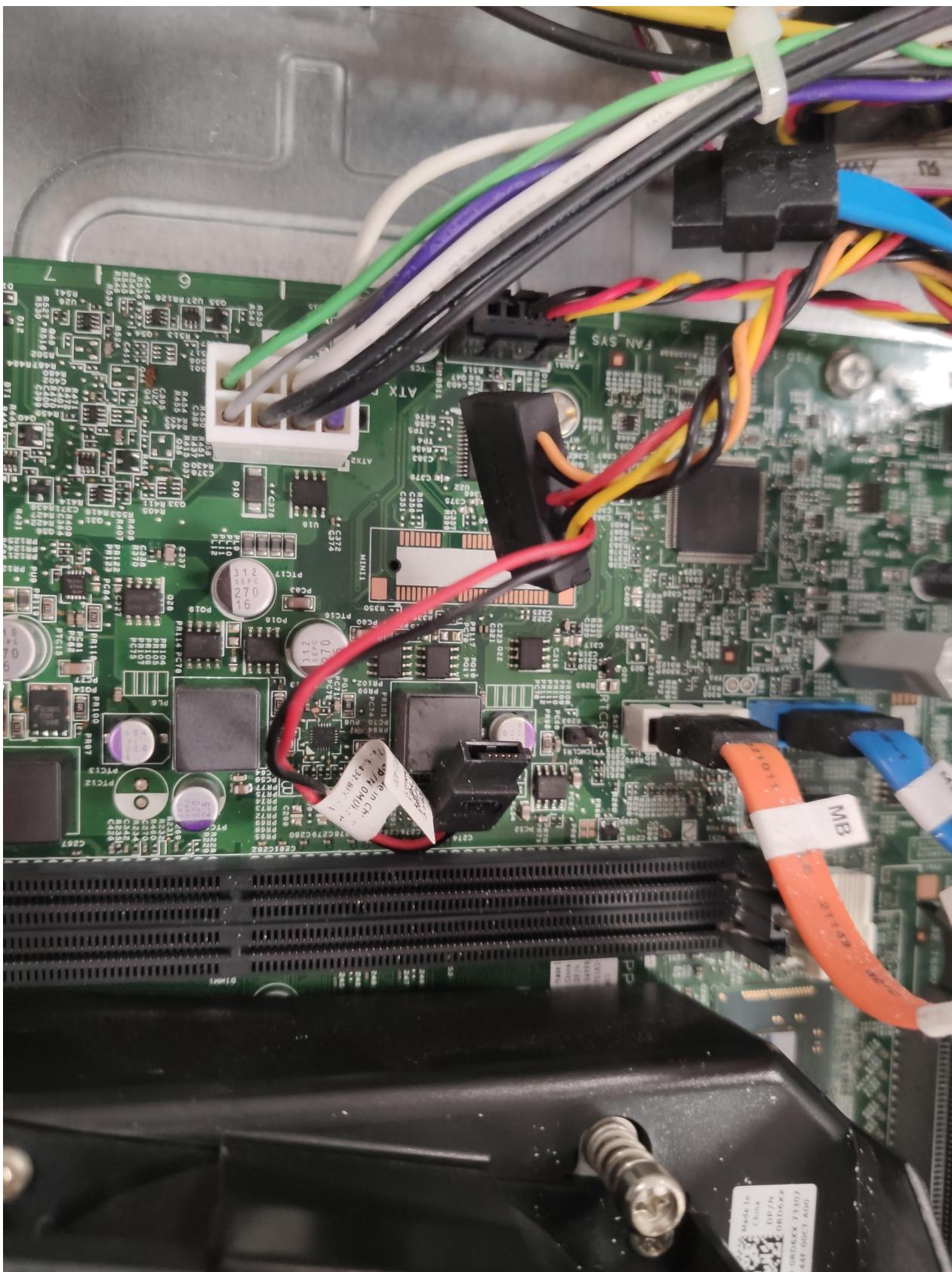


Hardware Overview

- Motherboard



- PC power supply



- Hard Disk Drive



- PCI Card



- Optical disk drive

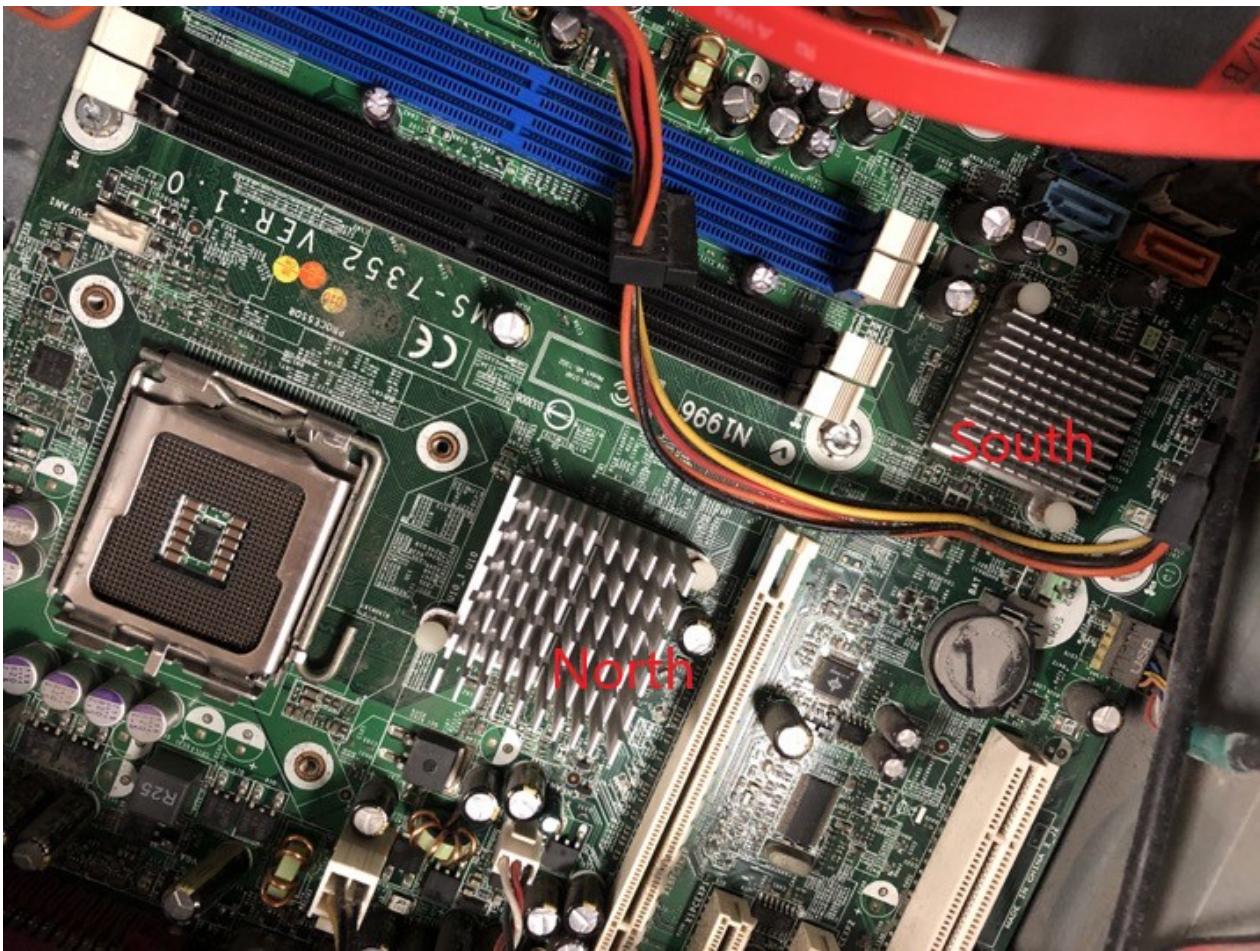


On the motherboard, we have:

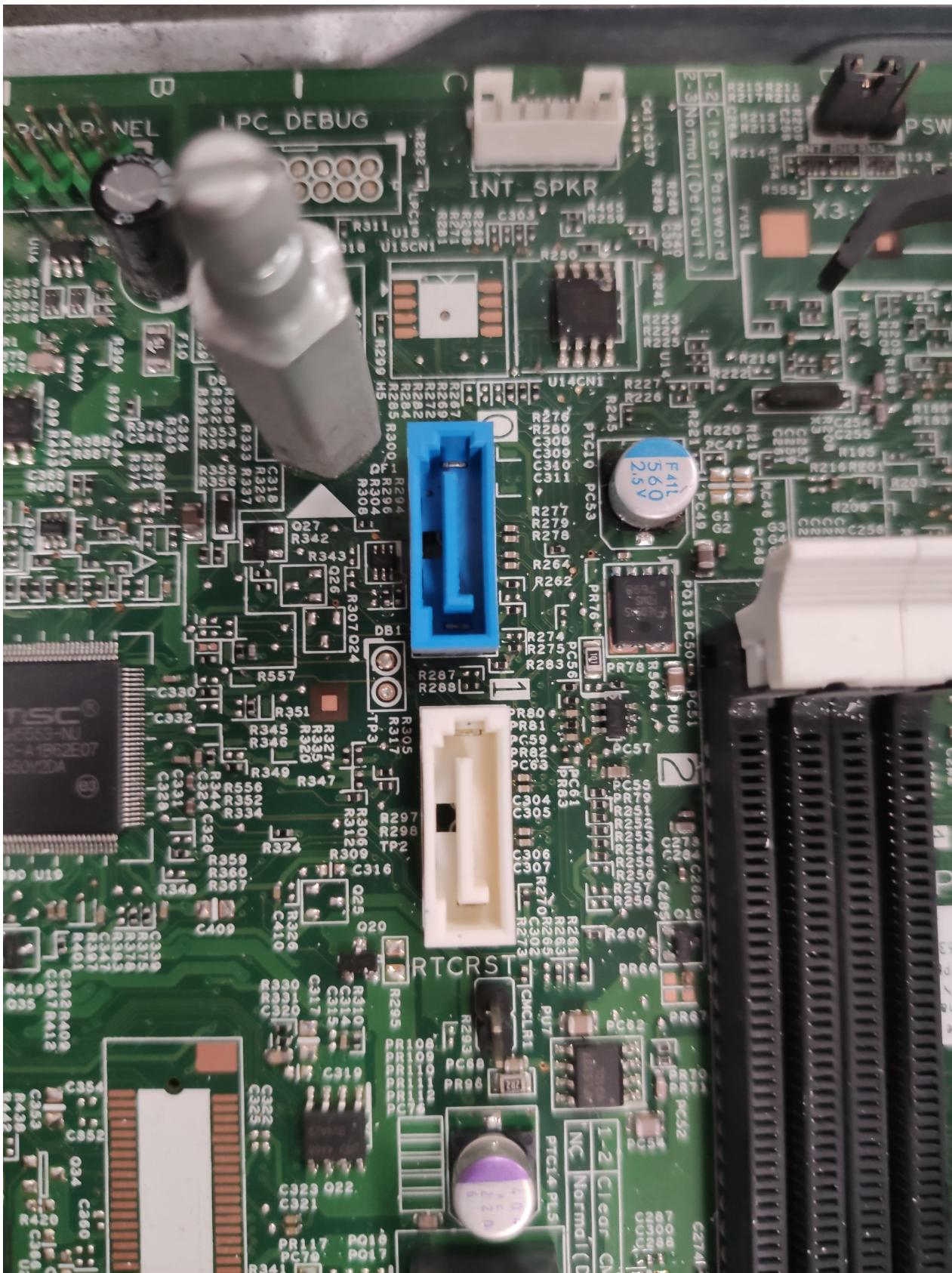
- RAM



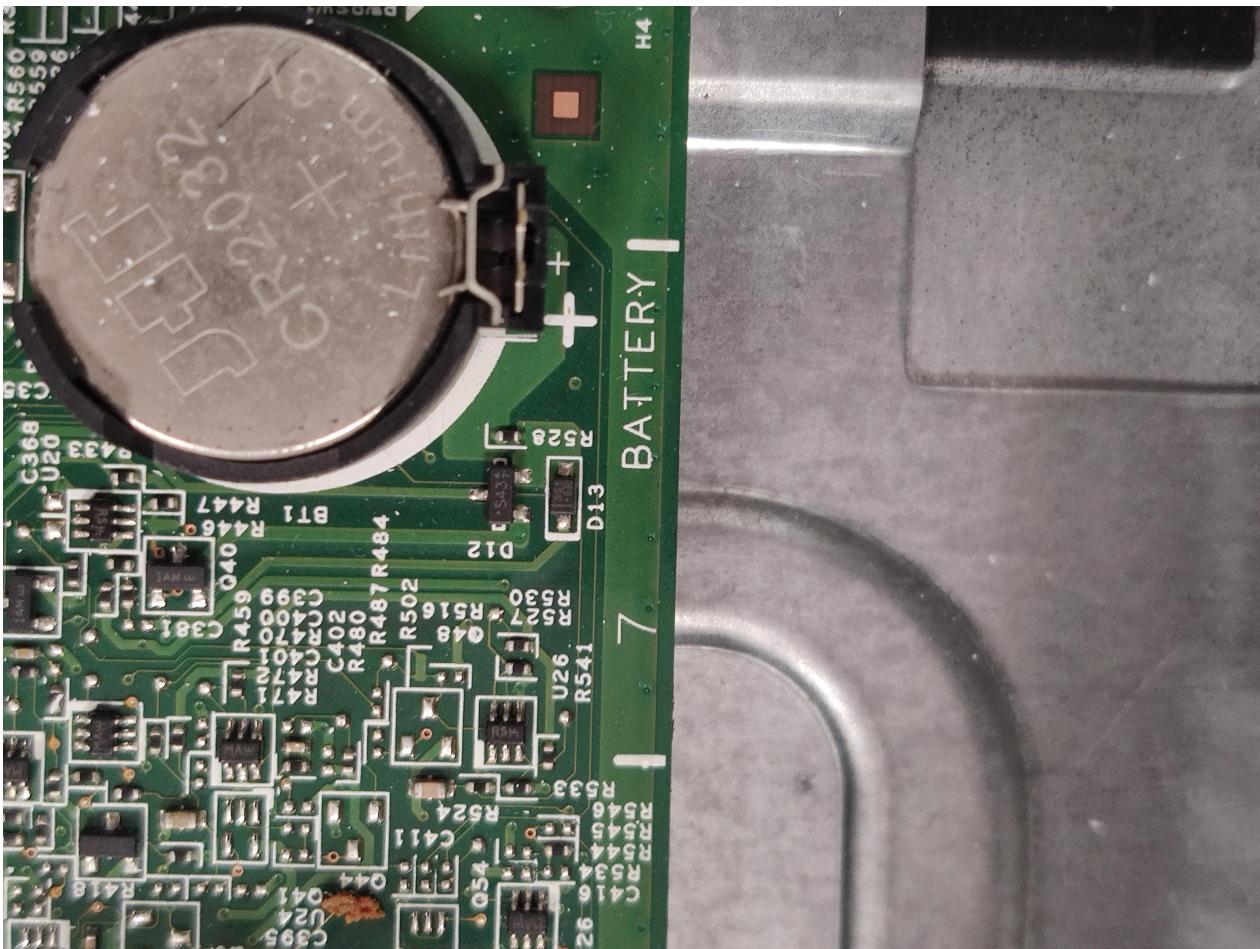
- The North and South bridges



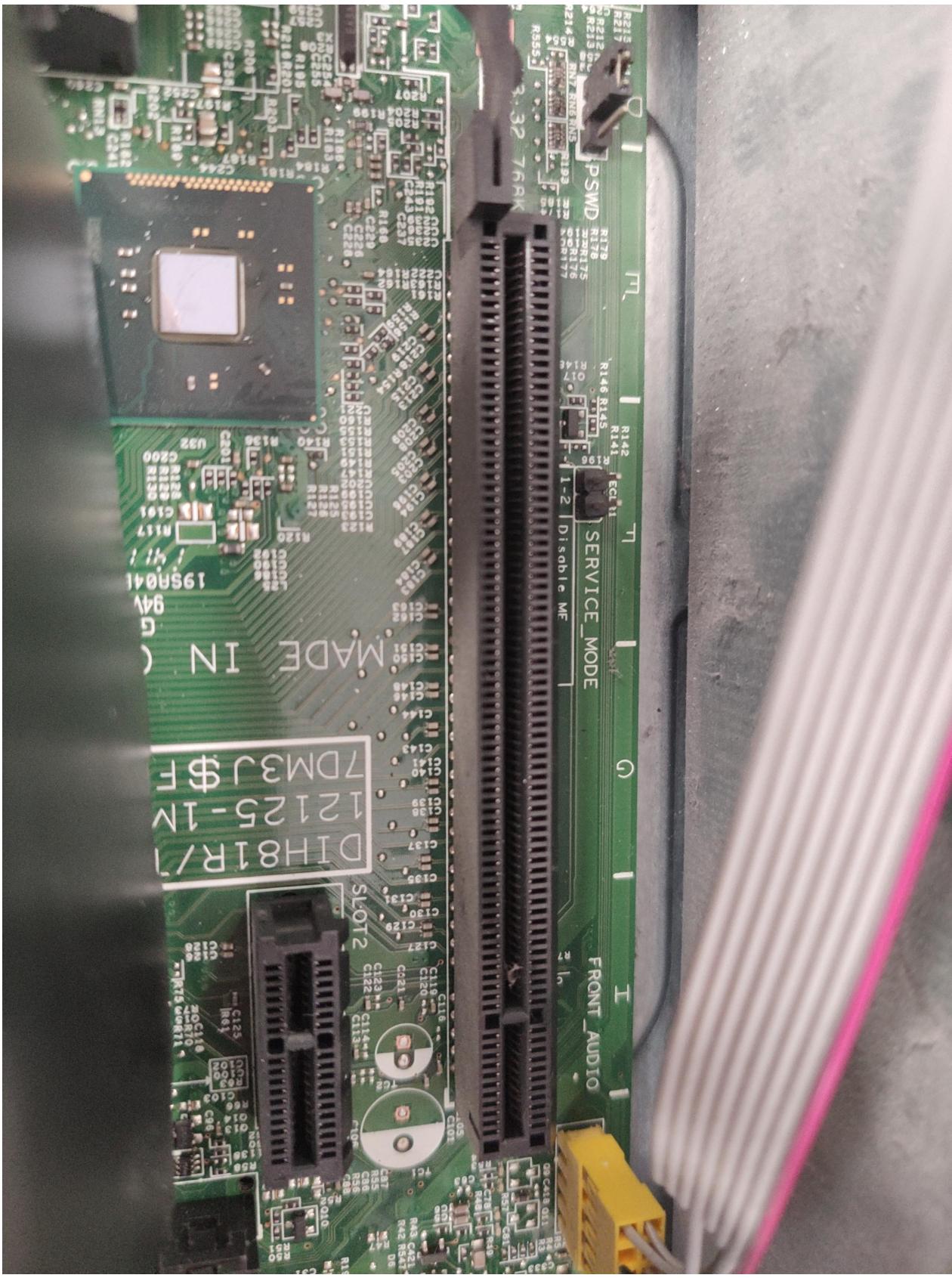
- A SATA socket



- The battery



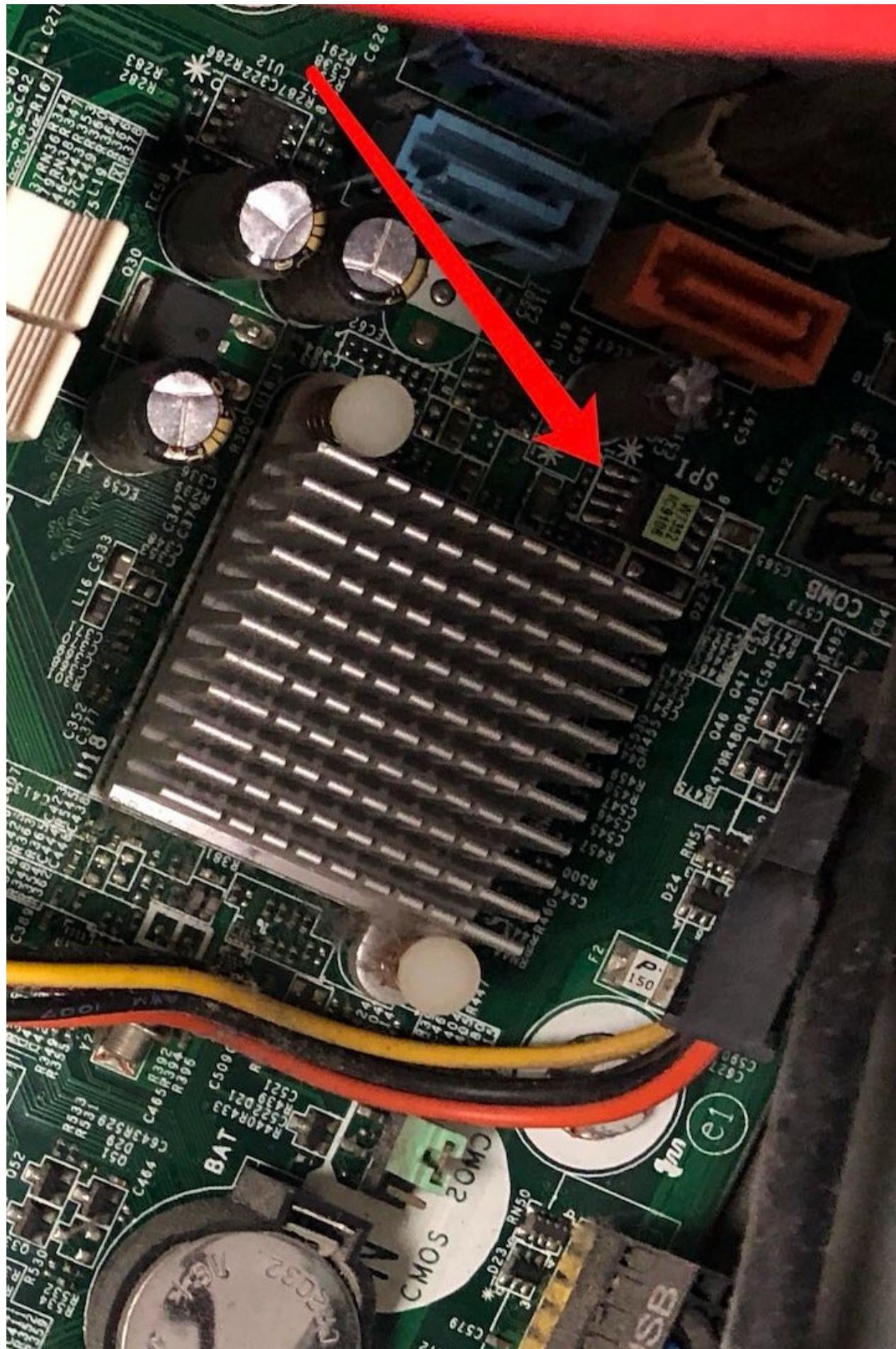
- A PCI/PCI-e slot



- CPU



- The BIOS



Questions:

- **Where is the CPU hidden, and why?**

CPU is hidden under the fan to protect the CPU and cool down the CPU at the same time.

- **What are the North and South bridges?**

North bridge is a component on the motherboard to communicate between CPU and other parts and connect the South bridge with the CPU. South bridge is a component on the motherboard to control IO operations.

- **How are the North and South bridges connected together?**

They are connected by an internal bus.

- **What is the BIOS?**

BIOS is short for Basic Input & Output System. In computing, BIOS is firmware used to perform hardware initialization during the booting process, and to provide runtime services for operating systems and programs.

- **Take out the CPU, rotate it and try to plug it back in a different position, is that working?**

No. It must be inserted with the right position to start successfully.

- **Explain what overclocking is?**

In computing, overclocking is the practice of increasing the clock rate of a computer to exceed that certified by the manufacturer.

- **What are pins on a PCI/PCI-e card and what are they used for?**

It's a connection to connect a PCI card with the motherboard. There are pins with various functions on a PCI card, such as VDC, power, ground and so on.

- **Before PCI-e became a common standard many graphics cards were using Accelerated Graphics Port (AGP), explain why.**

AGP is twice the bandwidth of PCI, and it can assist 3D computer graphics acceleration.

Tasks

- mkdir, touch, mv, cp, ls

```
touch test
mkdir dir
mv test dir/test.txt
cp dir/test.txt dir/test_copy.txt
ls dir/*
```

- grep

```
grep -rl "127.0.0.1" /etc
grep -rE "(pastrol)|(root)" /etc/passwd
```

- find

```
find /etc -atime -1
find /etc -name "*netw*"
```

- redirection

- `>` : Redirect std output into a file with its name specified on the right of `>`. Override the original content in the file.
- `>>` : Redirect std output into a file with its name specified on the right of `>>`. Append the output after the original content in the file.
- `<<<` : Here Strings. Pass the strings on the right as the std input of the command on the left.

- `>&1` : duplicate the file descriptor on the left to a copy file descriptor 1
 - `2>&1 >` : Only redirect the std output to file
 - `tee` : Redirect the std input into a file and print it in the std output.
- `xargs`
 - `xargs` build and executes command from std input
 - `|` embeds within a pipe
- `head, tail`
 - `head` : output the first n lines of files
 - `tail` : output the last n lines of files
 - `tail -f` to live display a file while new lines are written into the file.
- monitor the system
 - `ps` : report a snapshot of the current processes
 - `top` : provide a dynamic real-time view of a running system. It can display system summary information as well as a list of processes or threads currently being managed by the Linux kernel.
 - `free` : Display amount of free and used memory in the system
 - `vmstat` : Report virtual memory statistics
 - shell difference
 - `sh` : original shell
 - `bash` : most common used official shell on Linux system
 - `csh` : shell written in C
 - `zsh` : shell with more advanced and useful features
- `$`
 - `$0` : the first argument
 - `$1` : the second argument
 - `$n` : the $(n - 1)_{th}$ argument
 - `$?` : exit code from the previous command
 - `$!` : process ID of the most recently executed background pipeline
- `PS3`
 - It's an environment variable in bash that can be used to define a custom prompt for the select loop inside a shell script.

```
PS3="Select a day (1-4): "
select i in mon tue wed exit
do
  case $i in
    mon) echo "Monday";;
    tue) echo "Tuesday";;
    wed) echo "Wednesday";;
    exit) exit;;
  esac
done
```

In this way, it will display "Select a day (1-4):" instead of the default prompt.

- `iconv`
 - `iconv` converts text from one character encoding to another. It reads in text in one encoding and outputs the text in another encoding. If no input files are given, or if it is given as a dash (-), `iconv` reads from standard input. If no output file is given, `iconv` writes to standard output.
- temp variable

- `#{temp}`: the number of chars in `$temp`
- `{temp%%word}`: the content of `$temp` exclude the longest matching pattern given by `word`
- `{temp/pattern/string}`: the content of `$temp` after the pattern given by `pattern` is substituted by the pattern given by `string`
- FS
 - `/` : the root directory
 - `/bin` : user binary files for system programs and utilities
 - `/boot` : files essential for booting the system
 - `/etc` : system configuration files
 - `/lib` : system libraries required by the binary files in `/bin`
 - `/media` : when new media devices are inserted into the computer, a corresponding directory will be created here with corresponding files in the media
 - `/mnt` : temporary mounted files.
 - `/usr/bin` user binary files for user applications
 - `/usr/share` : architecture-independent shareable text files
 - `/usr/lib` : user libraries required by the binary files in `/usr/bin`
 - `/usr/src` : system-related source files
 - `/proc` : special system files related with process and kernel
 - `/sys` : an interface to the kernel that provides kernel-view information and configuration settings
 - `/srv` : data for services provided by the system
 - `/opt` : subdirectories for optional software packages
 - `/var` : variable data, typically system logging files.
 - `/sbin` : files for system maintenance or administrative tasks
 - `/dev` : contains device files
 - `/vmlinuz` linux kernel executable
 - `/initrd.img` a link to the latest installed initrd

Game

Please check `game.sh`.