

# Everything You Need to Know About Overclocking the Raspberry Pi 400

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Built into a keyboard case, the Raspberry Pi 400 makes for a neat desktop PC. Just plug it into a monitor and you're good to go. But aside from the keyboard case, it's essentially a modified Raspberry Pi 4, using the same Broadcom BCM2711 Cortex-A72 quad-core processor. And, like the Pi 4, you can overclock it if you feel the need for more speed. Today's post will show you how.

As with other Raspberry Pi models running the official Raspberry Pi OS, you can change the CPU clock speed by modifying the config.txt file it uses to set it up at boot time.

First, you should update and upgrade your system. Open a terminal window by clicking the icon on the top menu bar or via **Menu > Accessories > Terminal** and type:

```
sudo apt update && sudo apt upgrade -y
```

## Install monitoring tools

Before you overclock your Pi 400, you'll want to install a few helpful tools. First, install the Neofetch system information tool:

```
sudo apt install neofetch
```

Next, install the Stressberry stresstest tool:

```
sudo apt install stress sudo pip3 install stressberry
```

To view current system information, run:

```
neofetch
```

It will show the default CPU speed as 1.8 GHz. Next, you will want to do an initial stress test at the default clock speed to compare to the overclocked results later. Run this command to test for 100 seconds using all 4 cores:

```
stressberry-run -n "My Test" -d 100 -i 30 -c 4 mytest1.dat
```

After waiting for the base temperature to stabilize, it will run and each line will display the current CPU temperature and frequency (in MHz).

## Edit Config.txt file to overclock

Now let's change the CPU speed settings to start overclocking. Open the config.txt file in the nano text editor:

```
sudo nano /boot/config.txt
```

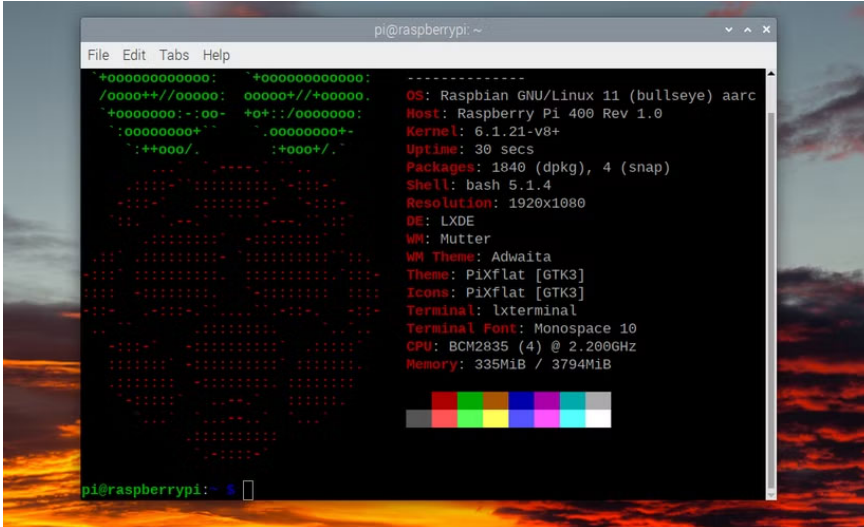
Scroll down to the section that starts with "**#uncomment to overclock the arm**" and delete the line below. Now add the following lines:

```
arm_freq=2000 gpu_freq=750 over_voltage=6
```

Here we are setting the CPU clock speed to 2GHz, increasing the core voltage and also increasing the GPU speed as a bonus. Exit nano and save the settings by pressing **Ctrl + X**, then **Y** and **Enter**. To enable overclocking, reboot the Pi 400:

```
sudo reboot
```

Once it reboots, run the neofetch terminal command again; you should see a new CPU speed of 2.2 GHz.

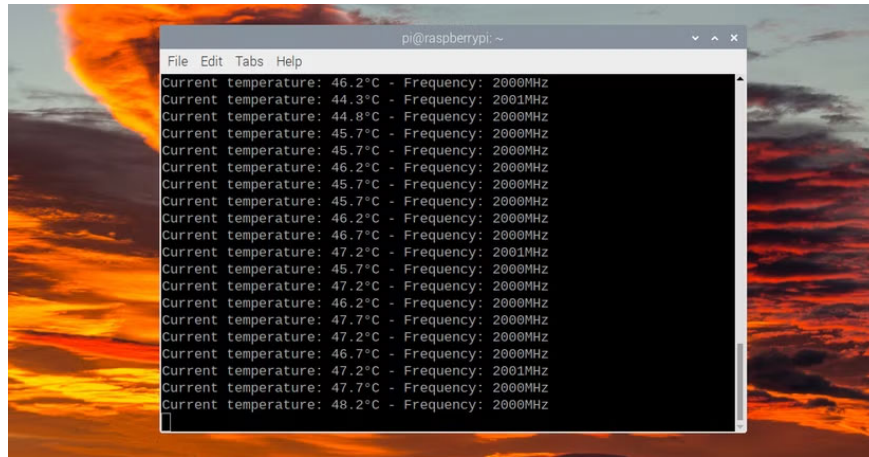


```
pi@raspberrypi: ~
File Edit Tabs Help
+-----+
+oooooooooooo: +oooooooooooo:
/oooo+//oooo: ooooo+//oooo:
+ooooo-:-oo- +o+://ooooo:
:oooooooo+ :.oooooooo+
:++ooo/. :+ooo/.
-----
OS: Raspbian GNU/Linux 11 (bullseye) aarc
Host: Raspberry Pi 400 Rev 1.0
Kernel: 6.1.21-v8+
Uptime: 30 secs
Packages: 1840 (dpkg), 4 (snap)
Shell: bash 5.1.4
Resolution: 1920x1080
DE: LXDE
WM: Mutter
WM Theme: Adwaita
Theme: PiXflat [GTK3]
Icons: PiXflat [GTK3]
Terminal: lxterminal
Terminal Font: Monospace 10
CPU: BCM2835 (4) @ 2.200GHz
Memory: 335MiB / 3794MiB
-----
pi@raspberrypi: ~
```

## Stresstest Pi 400 overclocked

Run the same stresstest as before, using Stressberry:

```
stressberry-run -n "My Test" -d 100 -i 30 -c 4 mytest2.dat
```



```
pi@raspberrypi: ~
File Edit Tabs Help
Current temperature: 46.2°C - Frequency: 2000MHz
Current temperature: 44.3°C - Frequency: 2001MHz
Current temperature: 44.8°C - Frequency: 2000MHz
Current temperature: 45.7°C - Frequency: 2000MHz
Current temperature: 45.7°C - Frequency: 2000MHz
Current temperature: 46.2°C - Frequency: 2000MHz
Current temperature: 45.7°C - Frequency: 2000MHz
Current temperature: 45.7°C - Frequency: 2000MHz
Current temperature: 46.2°C - Frequency: 2000MHz
Current temperature: 46.7°C - Frequency: 2000MHz
Current temperature: 47.2°C - Frequency: 2001MHz
Current temperature: 45.7°C - Frequency: 2000MHz
Current temperature: 47.2°C - Frequency: 2000MHz
Current temperature: 46.2°C - Frequency: 2000MHz
Current temperature: 47.7°C - Frequency: 2000MHz
Current temperature: 47.2°C - Frequency: 2000MHz
Current temperature: 46.7°C - Frequency: 2000MHz
Current temperature: 47.2°C - Frequency: 2001MHz
Current temperature: 47.7°C - Frequency: 2000MHz
Current temperature: 48.2°C - Frequency: 2000MHz
```

This time, you'll see the CPU hit an overclock of 2GHz. It'll also run at a higher temperature - in our tests, it maxed out at 48.2°C, which is well below the throttling level.

## Overclock Pi 400 to higher speed

If you want to push the CPU speed of the Pi 400 even higher, you will need to add the line **force\_turbo=1** to the **config.txt** file to increase the overvoltage value above 6. Note that this will void the warranty.

For example, to overclock the Pi 400 to 2.2 GHz, add these lines to the overclock section of **config.txt** :

```
force_turbo=1 arm_freq=2200 gpu_freq=750 over_voltage=8
```

Save the file as before and reboot. The Pi 400 should boot fine at this overclock and you can run another stress test with Stressberry. In our tests we saw it running at a full 2.2GHz and temperatures reaching 54°C – still well below the tuning range.

Pushing the speed any higher is at your own risk, but YouTuber leepsvideo found that he could run the Pi 400 at 2.4GHz.

However, if overclocking to a certain level causes instability, you should try overclocking at a more modest level. In some cases, the Pi 400 may not even boot into the desktop, usually due to lack of power.

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