

Pi Desktop and SSD.

Initial situation

We will assume that you have a satisfactory setup of OpenPlotter on an SD card, and that you want to run it from a USB-SSD (or HDD !). Hereafter I describe the process using a windows PC (translatters for MAC and Linux platforms are most welcomed !) Warning : you should be familiar with what is a partition and with the CLI (Command Line Interface), or get some support, before trying this process ! You will need a PC, your RPi, an SSD USB or PiDesktop, a sheet of paper and a pencil.

About [element14.com/Pi Desktop](http://element14.com/Pi_Desktop)

This handy kit, in addition to an elegant enclosure, addresses 3 of the raspberry Pi birth stigmas (all due to its rigorous design by costs) :

1. the use of a slower less reliable SD card instead of an HDD,
2. absence of RTC (but not a problem when using OP with a GPS),
3. and the lack of a decent on-off switch.

The kit, combined with a downloaded software package covers points 2 & 3, but you still have to format your SSD, and to transfer the OP package to it. I tried without success to apply recipes found on the net, and these repeated failures inspired me this approach, which worked !

So now, my SD card is only used to boot, everything else being run from the SSD.

OK, let us see how it happened !

Step 1 – On the PC

Do a backup of your SD card to your PC using an SD card reader and [Win32DiskImager](#) (select **READ to File**). This will create a 'your_name.img' file. (But, of course, you already have one) ! This step is **very important**, don't miss it !

Step 2 - On the PC

Connect your SSD to your PC, and Format it using [SDformater tool](#) . It will be formatted in FAT32. If, like me, you use a Pi Desktop mSSD, you will need 2 micro USB cables (1 for power, one for signal). Make note, for next step, of the [drive letter](#) allocated by Windows.

Step 3 - On the PC

Using Win32DiskImager (**WRITE to Device**), burn (place) the image file obtained in step 1 to the SSD, after having checked carefully that you will write to the proper device ! Once you are done, you may also create an extra backup SD card, if you don't have one already, just in case !

Step 4 - Raspberry Pi : Install gparted and launch it

Place your SD card in its RPi slot, connect your USB-SSD to the Pi (via the expansion card with PiDesktop), and boot up (from the SD card).

Connect your RPi to the internet, install and launch 'gparted' to visualize and handle the partitions and (hidden) volume names :

In a terminal window type and run these 3 commands :

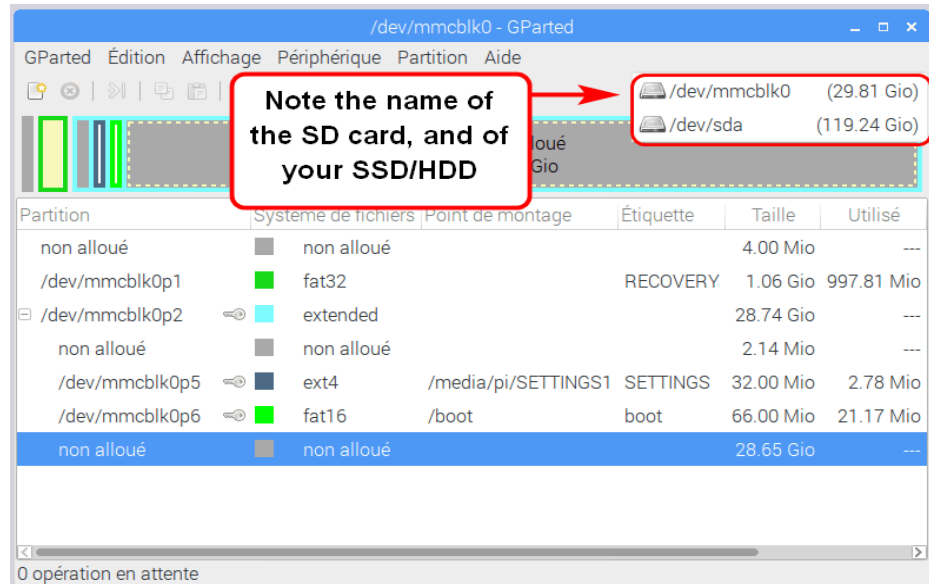
```
sudo apt-get update  
sudo apt-get install gparted  
sudo gparted
```

This will launch gparted (you will find a launcher in the Preferences menu).

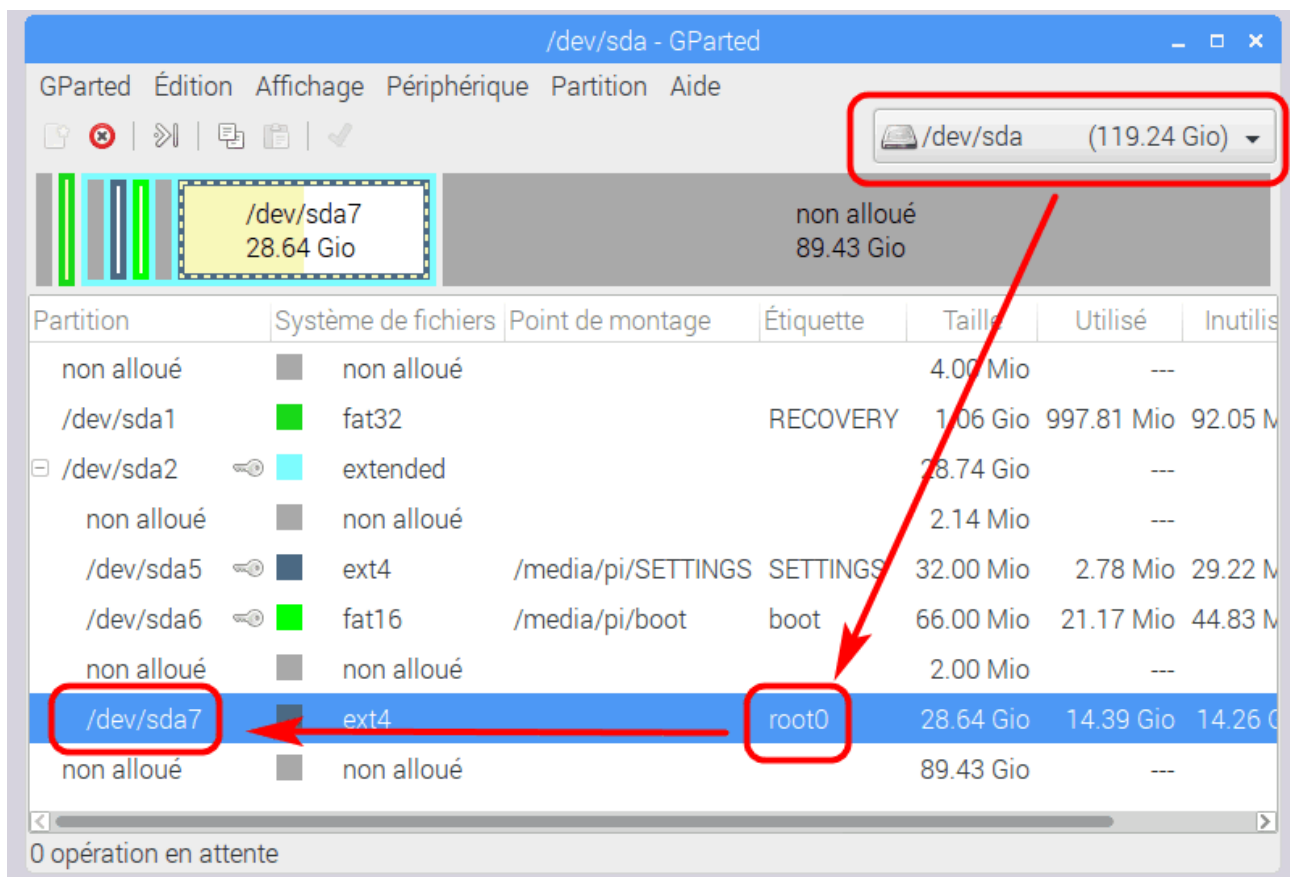
Gparted is a powerful tool, be careful when using it !

Looking gparted window, make note of the volumes names, in my case :
"/dev/mmcblk0" = SD,
and
"/dev/sda" = SSD.

Only the sizes will tell you which is which !



Select your SSD, "/dev/sda" in my case, to note which is the root partition (in my case '/dev/sda7').



Close gparted, we are almost done!

Step 5 - Raspberry Pi : in a terminal edit cmdline.txt

We must now instruct the RPi to boot on the SSD : edit /boot/cmdline.txt with your favorite text editor (nano, leafpad) :

```
sudo nano /boot/cmdline.txt
```

(don't forget the sudo to tell you are the boss) !

Instead, if you are not familiar with nano you can use leafpad, always with sudo of course :

```
sudo leafpad /boot/cmdline.txt
```

Carefully *, only change the root declaration

- from root=/dev/mmcblk0p7
- to root=/dev/sda7 (in my case)

(*) a mistyping will destroy your SD, sending you back to Step 3 !

Once done, save the changes, quit the text editor, and reboot the Pi.

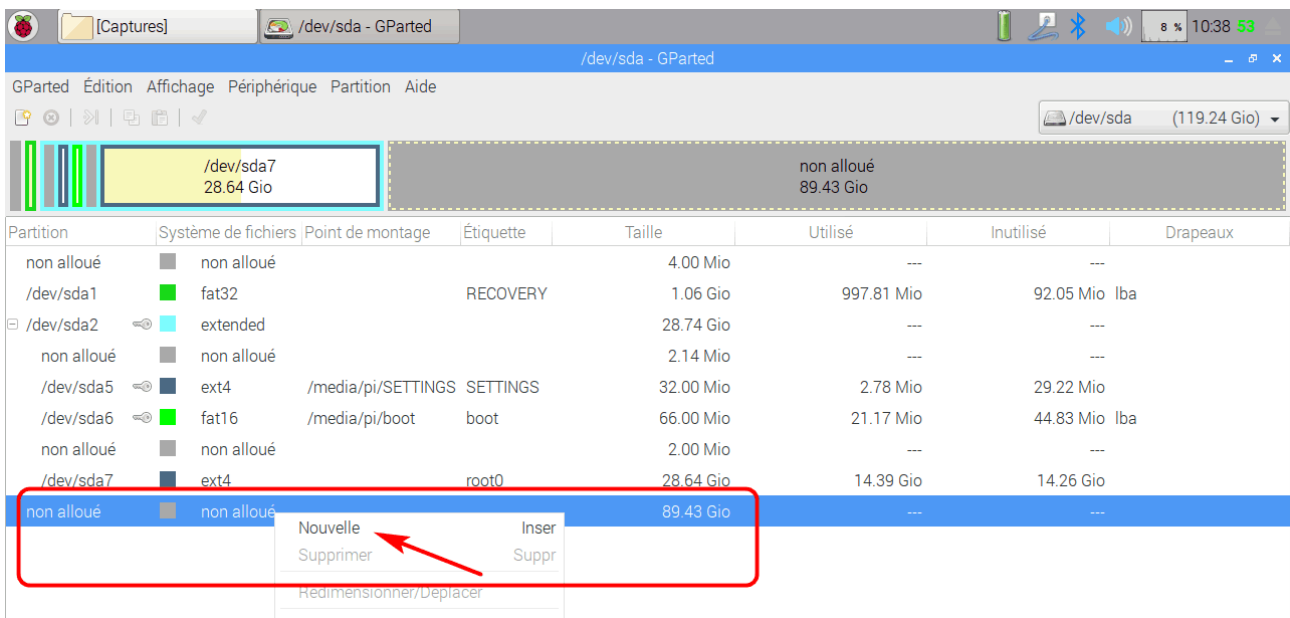
Et voilà, now you will boot from the SSD !

PS : Using gparted, I suppressed the 'root' partition from the SD card, to be sure I now boot from the SSD. Not mandatory !

Any other attempt to touch a partition in the SD card ended in a "kernel panic" followed by a return to Step 3 !

Step 6 - Raspberry Pi, gparted again to use unallocated space

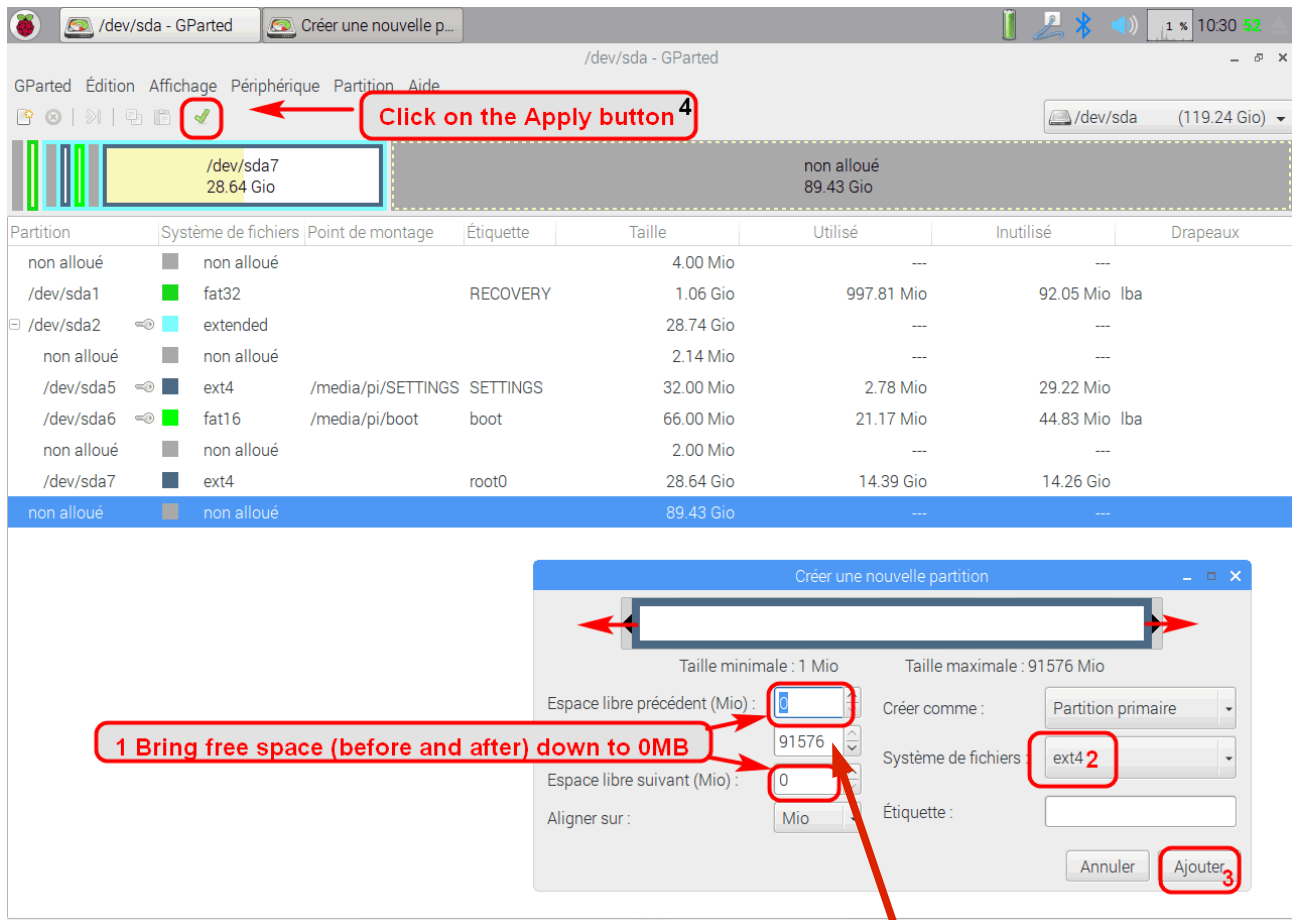
I'm still struggling on how to extend the sda7 root partition using the non allocated area. Should be easy, but... (step 7 maybe...).



Selected the large non allocated space, create a new partition, (file system : ext4) : select the proper line, right click, select new, (or create ?),

In the opening window, give it all available space, select file system ext4, then click Add.

Nota Bene : Gparted will take note of those actions, and will only perform them once you click on the 'apply' button (giving you a chance to renounce) :

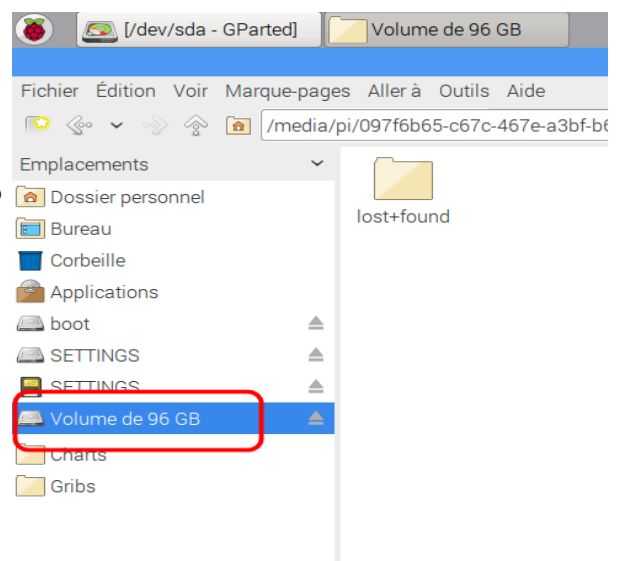


(Resulting size, in my case, as I used an SSD of 128 GB, and a 32 GB SD)

When done, note the name of the partition (for me /dev/sda3), close gparted, reboot, and pass the following command in a terminal window :

```
sudo chown pi /dev/sda3
```

Open the file manager, you now have a new space to store what you want !



Conclusion on the SSD

Now my RPi (and yours ?) boot from the SSD.

There is also a possibility not to use an SD at all, but it requires you to write in a write once memory, which is non reversible : you will never more boot that RPi from a SD card, and should the process fail your RPi will be DEAD ! It makes me really too nervous, as I remember my father's words :

Best is the enemy of Good !

Carrying a backup SD card with you will prevent you against both any SD or SSD failure.

I performed OpenPlotter update 17.0 to 17.1 on the SSD without any problem. Same for OpenCPN and its plug-ins. Now I can hardly wait for V1 (Update or new img file ?).

For me the partition expansion is still an open pending point (above step 6)...

The temperature issue

I installed in the enclosure, in addition to the RPi and to the SSD + adapter board, the DC Power step down (10..30 to 5.2 VDC). Not surprisingly, once the enclosure was closed the CPU temperature rose slowly from 45°C to 85°C !

Well I had to open widely the once elegant box, drilling large holes, and to add a fan (30x30 mm 5v). Though, after a few minutes, the fan became much too noisy to be invited on board, so I added ~~one~~ two diodes to drop the fan voltage from 5.2V to 3.8 V, the temperature stabilized around 45°C but it is still quite audible ... That fan is the cheap sleeve bearing type, I'm waiting for a ball bearing type ...

I'll keep you informed !

Is it worth doing it ?

I would say yes, if the pending point can be solved (expansion of the root partition, fan noise issue,. OP team is working on the on/off switch and on an enclosure, we can prevent SD problems with a few backup cards,