



Part 05

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Extra Configuration On Your Raspberry Pi

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Less writing

To prevent your Raspberry Pi's from writing a lot of data, and thus, wearing the SD card, you can do a couple of things.

- **tmpfs**

The first one is to mount a few folders in RAM as `tmpfs`. The folders are the folders where temp files and logging is written to. This means that you won't have syslog available, but most of the time that is not a problem.

Edit `/etc/fstab`

```
sudo nano /etc/fstab
```

and add the following:

```
tmpfs /tmp          tmpfs defaults,noatime,nosuid,mode=1755,size=10m    0 0
tmpfs /var/tmp      tmpfs defaults,noatime,nosuid,mode=0755,size=10m    0 0
tmpfs /var/log      tmpfs defaults,noatime,nosuid,mode=0755,size=10m    0 0
tmpfs /run          tmpfs defaults,noatime,nosuid,mode=0755,size=100m   0 0
```

When you have finished press [Ctrl] + X. This will ask if you want to save the modified files. Press 'Y' and then hit [Return] to save the file with the same name.

This will mount the above folders in RAM, with a max size of 10 megabyte. The `noatime` option means that the access time of a file is not updated, saving a lot of writes as well. You should also add the `noatime` option to your other partitions, for example on a standard Raspbian:

```
proc /proc          proc defaults 0 0
/dev/mmcblk0p1 /boot             vfat ro,noatime 0 2
/dev/mmcblk0p2 /                 ext4 defaults,noatime 0 1
```

Here the `/boot` partition is also mounted read only (`ro`). The `noatime` option is added. Issue a `mount -a` command or reboot the machine to make this active.

- **Disable swap**

Linux divides its physical RAM (random access memory) into chunks of memory called pages. Swapping is the process whereby a page of memory is copied to the preconfigured space on the hard disk, called swap space, to free up that page of memory. The combined sizes of the physical memory and the swap space is the amount of virtual memory available.

Swapping causes a lot of writes to the SD card. You would want to turn it off to save writes. The downside of this is that when there is not enough RAM available the linux OOM (Out Of Memory) killer will randomly kill processes to save RAM.

Raspbian by default has a swap file, dynamically managed by the `dphys-swapfile` utility. You can turn off this utility by issuing the following commands:

```
dphys-swapfile swapoff
dphys-swapfile uninstall
update-rc.d dphys-swapfile remove
```

After a reboot the swap will be gone, which you can check with the `free -m` command:

```
              total        used        free     shared    buffers     cached
Mem:           484          243         241           0          42         162
-/+ buffers/cache:          38         446
Swap:           0           0           0
```

- **fsck at every boot**

My Raspberry Pi's have a cronjob which reboots them once every seven days. This to apply kernel updates and just a general good procedure to see if all still works after a reboot. By default, `fsck` checks a filesystem every 30 boots (counted individually for each partition). I decided to change this to every boot, so disk problems might be found earlier and possibly fixed earlier.

To set up an `fsck` at every boot, execute the following command:

```
sudo tune2fs -c 1 /dev/mmcblk0p2
```

Where `/dev/mmcblk0p2` is the Linux Raspbian partition.

NB: To reboot every day at midnight, type

```
sudo crontab -e
```

and add this line

```
0 0 * * * /sbin/reboot
```

When you have finished press [Ctrl] + X. This will ask if you want to save the modified files. Press 'Y' and then hit [Return] to save.

Adding SAMBA for file access from your PC

To view handle files on a Pi from a Windows PC you need to install and configure a package called SAMBA, which allows a UNIX file system to be seen by a Windows network client. The following steps are based in information from http://elinux.org/R-Pi_NAS

```
sudo apt-get -y update
sudo apt-get -y install samba samba-common-bin
sudo cp /etc/samba/smb.conf /etc/samba/smb.conf.old
```

Edit /etc/samba/smb.conf

```
sudo nano /etc/samba/smb.conf
```

add at the end of the file a definition of a share named "MyShare":

```
[MyShare]
comment = My Share for log files
path = /var/log
read only = yes
guest ok = yes
```

If you want write access, replace "read only" with "writeable"

```
writeable = yes
```

I found that I needed to grant access to the /var/log directory, which I did with a

```
chmod 777 /var/log -
```

Doubtless there are tighter protections I could have used. Now restart the Samba server

```
sudo /etc/init.d/samba restart
```

You now access the files from Windows just like any other network share, for example

```
C:\>dir \\RasPi-1\MyShare

Volume in drive \\RasPi-1\MyShare
Volume Serial Number is 04CA-A6BD

Directory of \\RasPi-1\MyShare

24/11/2012 12:03 <DIR> .
24/11/2012 12:03 <DIR> ..
24/11/2012 14:25 112,661 peerstats.20121124
24/11/2012 14:25 33,443 loopstats
24/11/2012 14:25 112,661 peerstats
24/11/2012 14:25 33,443 loopstats.20121124
4 File(s) 292,208 bytes
2 Dir(s) 1,826,832,384 bytes free
```

Installing Geany

To install the Geany Editor run following commands from a terminal:

```
sudo apt-get -y install geany
```

Installing Imagemagick

To install Imagemagick, run following commands from a terminal:

```
sudo apt-get -y install imagemagick
```

If you have a PNG format image that you want to convert to JPEG; this can be achieved from the command line:

```
convert file.png file.jpeg
```

To resize an image to 150 pixels width, height is adjusted to scale

```
convert file.png -resize 150 150-file.png
```

To resize image to 150 pixel height and allowing width to scale accordingly:

```
convert file.png -resize x150 150-file.png
```

Installing office applications

If you like to use your Raspberry Pi as a full computer, you might find the lack of office applications disheartening. While our favourite open source office suite will always be LibreOffice, as Winkleink rightly points out above, it's not the leanest or fastest option to use on your credit card-sized PC.

AbiWord is an excellent Microsoft Word clone that has all the features you need in a package light enough to run smoothly on your Pi. To install it all you need to do is type:

```
sudo apt-get -y install abiword
```

in a terminal window.

You'll find it installed under 'Office' once it's installed

If you need to crunch numbers as well as letters, Gnumeric is by far the most popular Linux solution, which adds the capabilities of Microsoft's Excel application to your Raspberry Pi's repertoire. To install it simply type the following into a terminal window:

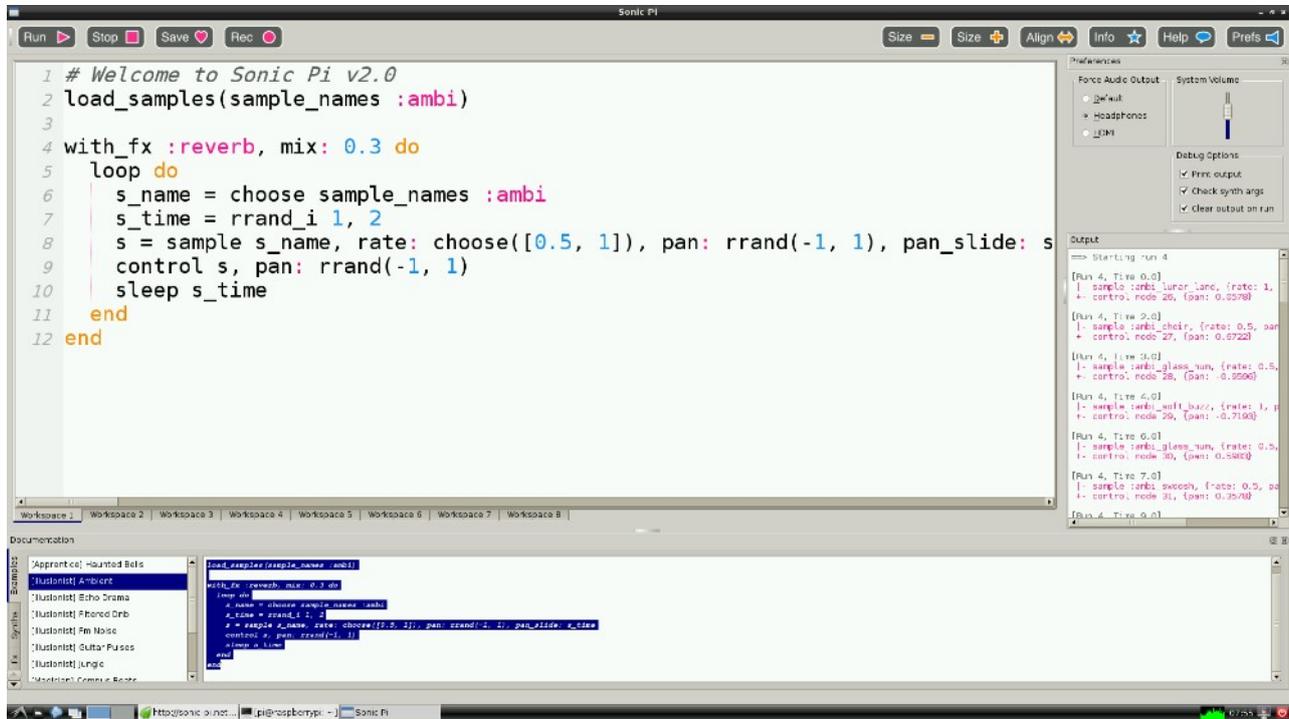
```
sudo apt-get -y install gnumeric
```

Like Abiword, you need to be within the Raspberry Pi's desktop environment to use Gnumeric.

Installing Sonic Pi 2

Another essential piece of software for your Raspberry Pi is Sonic Pi 2. It allows you to make music with your Raspberry Pi using easy-to-learn code.

There's a wide range of effects and capabilities added with Sonic Pi 2, including the ability to live code music, use samples and emulate even more cool synths.



Installing the latest (stable) pre-release version of Sonic Pi 2 is really easy. Within a terminal window, type the following to download the package:

```
wget http://sonic-pi.net/sonic-pi-RC11.tar.gz
```

Next, unpack the 'tarball':

```
tar -xvzf sonic-pi-RC11.tar.gz
```

Then run it by typing:

```
./sonic-pi/bin/sonic-pi
```

You can find a really comprehensive getting started guide for Sonic Pi 2 on The Raspberry Pi Foundation's resources page.

Cleanup packages

When you install a package, `apt-get` retrieves the needed files from the hosts listed in `/etc/apt/sources.list`, stores them in a local repository (`/var/cache/apt/archives/`), and then proceeds with installation.

In time the local repository can grow and occupy a lot of disk space. Fortunately, `apt-get` provides tools for managing its local repository: `apt-get`'s `clean` and `autoclean` methods.

`apt-get clean` removes everything except lock files from `/var/cache/apt/archives/` and `/var/cache/apt/archives/partial/`. Thus, if you need to reinstall a package `apt-get` should retrieve it again.

`apt-get autoclean` removes only package files that can no longer be downloaded.

```
sudo apt-get -y clean
sudo apt-get -y autoclean
```