

# How to install and configure the Debian GNU/Linux on Playstation 3 (PS3<sup>TM</sup>) using only a USB stick

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## Abstract

This article describes how to install and configure Debian GNU/Linux Lenny on a Playstation 3 (PS3<sup>TM</sup>) using only a USB stick.

## 1 Requirements

- Playstation 3 (PS3<sup>TM</sup>) .
- Personal Computer (PC) for download the files and prepare the USB stick.
- USB Keyboard and Mouse (A Wireless USB Keyboard and Mouse is even better)
- USB stick or other USB mass storage device with at last 512 MB or more free space formatted with FAT16 filesystem.
- Debian GNU/Linux PowerPC Lenny RC1 netinst installation media.
- Debian GNU/Linux PowerPC Lenny RC1 USB stick installation media and configuration files.

## 2 Preparation

- Download the Debian Lenny RC1 installation media: `debian-testing-powerpc-netinst.iso`.
- Download the `ps3-debian-files.zip` package with Debian Lenny RC1 USB stick installation media files. The package content:
  - `vmlinuz` (kernel binary) from latest PS3<sup>TM</sup> LDSK<sup>1</sup> iso image.
  - `initrd.gz` (initial ramdisk image)
  - `yaboot.conf` (yaboot configuration file)
  - `boot.msg` (optional boot message)
  - `otheros.bld` the latest ps3-petitboot boot loader.
  - Post-installation configuration files.

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<sup>1</sup>PS3<sup>TM</sup> Linux Distributor's Starter Kit, now obsolete. Can be found here

## 2.1 Preparing the USB stick

- If not already done, format the USB stick with FAT16 filesystem.
- Extract the content of `ps3-debian-files.zip` to the root of USB stick.
- Copy the `debian-testing-powerpc-netinst.iso` to the root of USB stick.

## 3 Installing the OtherOS

- Insert the USB stick in the PS3™ system.
- Select `[System Settings]` under `[Settings]` in the home menu.
- Select `[Install Other OS]`.  
The system searches for the installer. When the installer is found, its content and location will be displayed.
- Check the contents of the installer, and then select `[Start]`. After the installer has been checked, installation will start automatically.

## 4 Formating the HD for the OtherOS

- It's necessary to allot space to the OtherOS. Before format, make sure you have backup of your data in PS3™.
- Format the PS3™ HD:
  - Select `[System Settings]` under `[Settings]` in the home menu and then `[Format Utility]`.
  - Select `[Custom]` and `[Allot 10GB to the Other OS]`.
  - Select `[Quick Format]`, and then `[Yes]`
  - The following message are displayed  
`Format Complete.`  
`Press the X button to restart the system.`
  - Press X button.

## 5 Starting the Debian Installer

- Insert the USB mouse and keyboard into PS3™. If your PS3™ has only two USB ports, insert the USB keyboard.
- Select `[System Settings]` under `[Settings]`, then `[Default System]` and `[Other OS]`.
- The following message are displayed:  
`Do you want to quit the PS3 system and start the other system now?`  
`Yes            No.`
- Select `[Yes]` to restart the PS3™.

## 6 Installing Debian

- After restart, the `ps3-petitboot` screen are displayed.
- On the left of screen are displayed two icons. Using the keyboard `↑` and `↓`, select the USB stick icon and in the right screen are displayed the installation options. Select the first option:

```
Install
/vmlinuz initrd=/initrd.gz root=/dev/ram ro ramdisk_size=12190 --
```

- **Installation Steps:**

- `[!!]` Choose language
  - \* Choose a language: `English - English`
  - \* Choose a contry, territory or area: `other`
  - \* Chosse a continent or region: `South America`
  - \* Choose a country, territory or area: `Brazil`
- `[!!]`Select a keyboard layout
  - \* Keymap tp use for a USB keyboard: `American English`
- `[!!]`Load installer components from an installer ISO
  - \* Continue the install without loading kernel modules? `<Yes>`
- `[!]`Configure the network
  - \* Hostname: `ps3`
  - \* Domanin name:
- `[!]`Configure the clock
  - \* Select a city in your time zone: `Sao Paulo`
- `[!!]` Partition disks
  - \* Logical Volume Manager not available `<Continue>`
  - \* Partitioning method: `Guided - use entire fisk`
  - \* Select disk to partition: `/dev/ps3da - 10.7 GB Unknown`
  - \* Partitioning scheme:
    - All files in one partition (recommended for new users)
    - `/dev/ps3da - 10.7 GB Unknown`
    - `> #1 primary 10.2 GB B F ext3 /`
    - `> #5 logical 501.7 MB F swap swap`
- The following partitions are going to be formated
  - partition #1 of `/dev/ps3da` as `ext3`
  - partition #5 of `/dev/ps3da` as `swap`
- Fishish partitioning and write changs to disk? `<Yes>`
- Write the changes to disks? `<Yes>`
- Installing the base system
- `[!]` Configuring console-common
  - \* Continue without installing a kernel? `<Yes>`
- `[!!]` Set up users and passwords
  - \* Root password: `*****`
  - \* Re-enter root password: `*****`
  - \* Fullname for the new user: `Fabiano Manoel de Andrade`
  - \* Username for your account: `fandrade`
  - \* Choose a password for the new user: `*****`
  - \* Re-enter password to verify: `*****`

- [!] Configure the package manger
  - \* Debian archive mirror country: **Brazil**
  - \* Debian archive mirror: **ftp.br.debian.org**
  - \* HTTP proxy infoirmation (black for nome):
- Configuring apt
  - \* Scanning mirror...
  - \* Please wait...
- Select and install software
- [!] Configuring popularity-contest
  - \* Participate in the package usage survey? **<Yes>**
- [!] Software selection
  - \* Choose software to install: Unmark all items using the space bar and choose **<Continue>**
- [!] Continue without boot loader
  - \* No boot loader installed **<Continue>**
- Finishing the installation
- [!!] Finish the installation
  - \* Installation complete **<Continue>**
- **ps3-petitboot** will be displayed. Select again **Install** an press **Insert** to edit the entry leaving as
 

```
/vmlinux root=/dev/ps3da1
```

 and press enter.
- Debian is inicialized and are displayed the login prompt
 

```
Debian GNU/Linux 5.0 ps3 tty1
```

```
ps3 login:
```

## 7 Configuring Debian

### 7.1 Initial configuration

- Login as root.
- Reconfigure the keyboard layout:
 

```
ps3:~# dpkg-reconfigure console-data
```
- Reconfigure the locales:
 

```
ps3:~# dpkg-reconfigure locales
```
- Configure the apt repositories: We need update the debian package database. The file **/etc/apt/sources.list** contain the information of apt repositories. Edit this file using the nano editor
 

```
ps3:~# nano /etc/apt/sources.list
```

 to looks like:

```
# See sources.list(5) for more information, especially
# Remember that you can only use http, ftp or file URIs
# CDRoms are managed through the apt-cdrom tool.
deb http://ftp.br.debian.org/debian lenny main contrib non-free
deb-src http://ftp.br.debian.org/debian lenny main contrib non-free

deb http://security.debian.org lenny/updates main contrib non-free
deb-src http://security.debian.org lenny/updates main contrib non-free

deb http://ftp.br.debian.org/debian sid main contrib non-free
deb-src http://ftp.br.debian.org/debian sid main contrib non-free
```

Make sure added the the sid repository. Here we have used the brazilian mirror site as debian repository, but choose a debian mirror near to you.

- If you prefer, you can download the edited sources.list file and copy to the right place with the commands:

```
ps3:~# wget http://fisica.ufpr.br/fandrade/ps3/ps3-debian-files/configs/sources.list
ps3:~# cp sources.list /etc/apt/
```

- To avoid the system actualization to debian sid/unstable add the following lines in `/etc/apt/preferences`

```
Package: *
Pin: release o=Debian,a=testing
Pin-Priority: 900

Package: *
Pin: release o=Debian,a=unstable
Pin-Priority: 800
```

- If you prefer, you can download the edited preferences file and copy to the right place with the command:

```
ps3:~# wget http://fisica.ufpr.br/fandrade/ps3/ps3-debian-files/configs/preferences
ps3:~# cp preferences /etc/apt/
```

- Actualization of package database and system:

```
ps3:~# aptitude update
ps3:~# aptitude upgrade
```

## 7.2 Installing a kernel

- Debian powerpc kernel now supports PS3<sup>TM</sup> hardware. So just make the command:

```
ps3:~# aptitude install linux-image-2.6.26-1-powerpc64
```

- Answer <Yes> to the first question and <No> to second.

## 7.3 Configuring yaboot

- Create `/etc/yaboot.conf` with the content:

```
boot=/dev/ps3da
init-message= Welcome to Debian GNU/Linux Lenny
partition=1
timeout=100
```

```
image=/vmlinux
root=/dev/ps3da1
label=debian
read-only
initrd=/initrd.img
append="video=ps3fb:mode:<video mode ID> rhgb"
```

Where you can specify a following special video modes on the PS3™ (if there is no video syntax, auto mode is used):

```
<video mode ID>
0: auto mode , default value
YUV 60Hz 1:480i 2:480p 3:720p 4:1080i 5:1080p
YUV 50Hz 6:576i 7:576p 8:720p 9:1080i 10:1080p
RGB 60Hz 33:480i 34:480p 35:720p 36:1080i 37:1080p
RGB 50Hz 38:576i 39:576p 40:720p 41:1080i 42:1080p
VESA 11:WXGA 12:SXGA 13:WUXGA
```

```
full screen mode: <video mode ID> + 128
dither ON mode : <video mode ID> + 2048
```

- If you prefer, you can download the edited `yaboot.conf` file with video options copy to the right place with the command:

```
ps3:~# wget http://fisica.ufpr.br/fandrade/ps3/ps3-debian-files/configs/yaboot.conf
ps3:~# cp yaboot.conf /etc/
```

## 8 Installing ps3-utils

- This package contains a number of useful and essential utilities needed for running Debian GNU/Linux on a Playstation 3 console. It includes

- \* `ps3-video-mode`: display/change the video mode of the PS3.
- \* `ps3-boot-game-os`: reboot the system into the "Game OS".
- \* `ps3-flash-util`: read and manipulate the system flash ROM of the PS3.
- \* `ps3-dump-bootloader`: dump the "Other OS" bootloader image.
- \* `ps3-rtc-init`: initialize the Linux RTC diff value.

- The package `ps3-utils` was recently uploaded to debian unstable, so to install `ps3-utils` just type:

```
ps3:~# aptitude install ps3-utils
```

## 9 Configuring the sound

- We need install `alsa-base`

```
ps3:~# aptitude install alsa-base
```

- And copy the configuration file

```
ps3:~# mkdir /etc/alsa/cards/
ps3:~# cp /usr/share/alsa/cards/PS3.conf /etc/alsa/cards/
```

## 10 Installing and configuring the graphical interface

- The PS3™ uses the fbdev driver.

```
ps3:~# aptitude install xserver-xorg-video-fbdev xfonts-base xfonts-75dpi
x11-xserver-utils
```

- Edit /etc/X11/xorg.conf. You need to add the following lines:

– In Section "Device"

```
Driver          "fbdev"
Option          "ShadowFB"          "false"
```

– In Section "Screen"

```
DefaultFbBpp    32
DefaultDepth    24
```

– Here is an example of the complete configuration file

```
# xorg.conf (X.Org X Window System server configuration file)
#
# This file was generated by dexconf, the Debian X Configuration tool, using
# values from the debconf database.
#
# Edit this file with caution, and see the xorg.conf manual page.
# (Type "man xorg.conf" at the shell prompt.)
#
# This file is automatically updated on xserver-xorg package upgrades *only*
# if it has not been modified since the last upgrade of the xserver-xorg
# package.
#
# If you have edited this file but would like it to be automatically updated
# again, run the following command:
#   sudo dpkg-reconfigure -phigh xserver-xorg
```

```
Section "InputDevice"
    Identifier      "Generic Keyboard"
    Driver          "kbd"
    Option          "XkbRules"          "xorg"
    Option          "XkbModel"          "abnt2"
    Option          "XkbLayout"         "br"
    Option          "XkbVariant"        "abnt2"
EndSection

Section "InputDevice"
    Identifier      "Configured Mouse"
    Driver          "mouse"
EndSection

Section "Device"
    Identifier      "Configured Video Device"
    Driver          "fbdev"
    Option          "UseFBDev"          "true"
    Option          "ShadowFB"          "false"
EndSection

Section "Monitor"
    Identifier      "Configured Monitor"
EndSection
```

```

Section "Screen"
    Identifier      "Default Screen"
    Monitor         "Configured Monitor"
    DefaultFbBpp    32
    DefaultDepth    24
EndSection

```

- If you prefer, you can download the edited configuration file and copy to right location

```

ps3:~# wget http://fisica.ufpr.br/fandrade/ps3/ps3-debian-files/configs/xorg.conf
ps3:~# cp xorg.conf /etc/X11/

```

- Remember to edit the Section "InputDevice" of the keyboard with your keyboard model and layout.

## 11 Installing a Desktop

- There are so many Desktop environments in linux. The most utilized are gnome, kde and xfce. Choose one Desktop and install:

- To install gnome
 

```
ps3:~# aptitude install gnome-core gdm
```
- To install kde
 

```
ps3:~# aptitude install kde kdm
```
- To install xfce
 

```
ps3:~# aptitude install xfce4 xdm
```

## 12 Restarting the login manager

- To restart gdm

```
ps3:~# invoke-rc.d gdm restart
```

- To restart kdm

```
ps3:~# invoke-rc.d kdm restart
```

- To restart xdm

```
ps3:~# invoke-rc.d xdm restart
```

- The login screen are displayed.

## 13 Notes

- All the configuration files cited in this article are included in `ps3-debian-files.zip`. If you prefer you can mount the USB stick and copy the files from there.
- As an alternative to using the debian kernel package, you can build and install a Linux kernel with PS3™ support from sources. To compile a kernel from official ps3-linux site maintained by Geoffrey Levand, make the commands:



```

ps3:~# cd /usr/src
ps3:~# aptitude install build-essential kernel-package initramfs-tools git-core
ps3:~# git clone git://git.kernel.org/pub/scm/linux/kernel/git/geoff/ps3-linux.git
ps3:~# cd ps3-linux
ps3:~# make ps3_defconfig
ps3:~# make-kpkg --rootcmd fakeroot --append-to-version -1-ps3 --revision 1
--initrd kernel_image
ps3:~# dpkg -i ../linux-image-2.6*.deb

```

- To come back to Game OS (XMB) do the command as root:

```
ps3:~# ps3-boot-game-os
```

- Another way is in ps3-petitboot choose the first option:

```

Gameboot
  Reboot back to the Game OS.

```

## 14 References and further reading

Debian GNU/Linux Installation Guide (PowerPC  
 PS3 Linux Oficial) Site  
 Debian Live for PS3  
 Installing Debian GNU/Linux on PS3(portuguese howto)