AV Linux 2020.5.10

USER MANUAL

by Glen MacArthur

DISCLAIMER (PLEASE READ) :

Debian/GNU Linux comes with no guarantees so consequentially neither does AV Linux. I accept no responsibility for any hardware/ software malfunctions or data loss resulting from its use. It is important to note that the AV Linux ISO may contain software that is non-free and may be distributed under special licensing arrangements with the original developers, re-distributing the AV Linux ISO with the non-free content included is a violation of these licenses. AV Linux may potentially contain Multimedia Codecs that may be under patent in certain countries, it is the Users responsibility to know the law as it applies to their own respective country before downloading or installing AV Linux.

BOOKMARKS :

ABOUT AV LINUX :

What AV Linux 2020 is, and what it ain't…:

This ***'2020'*** version of AV Linux represents numerous significant changes and differences from previous versions briefly detailed in these notes. Essentially AV Linux is a downloadable and installable shared snapshot ISO image of my own personal Operating System based on Debian/GNU Linux with many customizations and tweaks. This a project I have been working on and refining since about 2007 and it is prepared and pre-configured to be used as an Audio and Video production Workstation OS. It is really intended to just be that simple, an AV production system prepared and shared by a single User with some practical experience in setting such things up. It is NOT intended to be a bona-fide full and proper "Linux Distribution", as its sole maintainer I don't claim to have any unique credentials as a Linux System Administrator and am merely doing this in my spare time as a hobby. The implications of this are that AV Linux is provided 'as-is' with absolutely NO guarantee of any kind to function on any given computer, or any guarantee of regular, sustained or future development .

Now hold on a second, that sounds pretty bleak doesn't it…? Bear in mind that you are reading this statement in a complete User Manual so please let's just mutually understand that I *like* doing this, I *want* to do this, but 'real life' may intervene and I may occasionally need to divert my focus elsewhere and therefore I can't in good conscience make any *promises* about the permanence of AV Linux. OK, phew…I feel better now... are we good?

Components of AV Linux and differences from stock Debian/GNU Linux :

- Originates from 64bit snapshots of Debian's Stable Distribution… *PLUS*
- Trulan Martin's Custom Realtime Preempt Kernel.
- Extensive tuning for best RT Kernel Performance
- CPU governed for performance by default.
- Optional choices of Liquorix or Debian Kernels.
- Sspecial custom packaging not found in default Repositories.
- Full XFCE4 Desktop Environment with attractive customizations.
- falkTX's KXStudio Repositories for up to date Audio Applications.
- Extensive Audio/Video and Administrator-friendly Thunar Custom Actions.
- Complete JACK Audio/MIDI environment with PulseAudio Integration.
- Robust Environment for developers: Compilers, Package scripts, GIT, SVN, BZR, + dev libs.
- Choices of GCC Compilers.
- Mozilla builds of Firefox and Thunderbird.
- Extended Platforms 'Flatpak ' and 'Docker' included.
- Demo versions of Commercial Software.
- 'su' set up to work as it did in pre-'Buster' Debian versions.
- Many customized scripts for convenience..

ISO INFO :

ISO Size Info :

Why is it so big!? <*insert obligatory joke here*>. I often get asked why AV Linux ISO's are significantly larger than <*insert obligatory Distro name here*>. Here are a few reasons:

- My priority is functionality and attention to detail over size for its own sake.
- AV Linux uses a more relaxed ratio for its compressed Live filesystem than mainline Distros.
- 'Bundled' apps that are self-contained are much larger than apps that use the system libraries.
- AV Linux ships with a full development environment for developers and experienced Users.
- Hundreds of hidden Audio Plugins are included, many are fairly large in size.
- None of the extra 'bulk' in AV Linux affects performance, it is still light and efficient to use.

Verifying the ISO Download with MD5sums :

When you download the AV Linux ISO you will see that in the server download folder is the actual '*isotester-avl64-202X.X.X.iso*' file containing the operating system and two accompanying '.md5' and 'sha256' text files. You should download the both the 'iso' and both text files, you should be able to right-click and use 'Save target as' for the md5 file. **Before running AV Linux Live or installing it on your computer you should verify that the 'md5sum' of your ISO download matches the md5sum on the download server**. This will ensure that you have a complete and proper download of the ISO as well as confirming that you haven't downloaded a compromised ISO that has been maliciously tampered with.

For verification we use the 'md5sum' Terminal command. As an example let's say you downloaded the 64bit ISO to the 'Downloads' folder in your User's home folder. Open a Terminal and 'change directory' to the 'Downloads' folder like this:

```
cd Downloads
```

Now run the md5sum command on the downloaded 64bit ISO file :

```
md5sum isotester-avl64-2020.5.10.iso
```

The terminal will calculate the md5 'hash' and then print it in the terminal. It will be a long string of numbers and letters and show the ISO filename at the end. If the hash generated by the terminal matches the hash in the md5 text file you downloaded you are good to go.

Verifying With SHA256sum :

A last minute addition to AV Linux 2020 is the inclusion of even more secure ‘SHA256’ checksum files with the ISO files. These will be in the download folder along with the MD5 files and for an extra measure of safety you can also run ‘sha256sum’ on the downloaded ISO file in the same way as what was just described in the previous section on Md5 files. The main difference is the command changes from ‘md5sum’ to ‘sha256sum’.

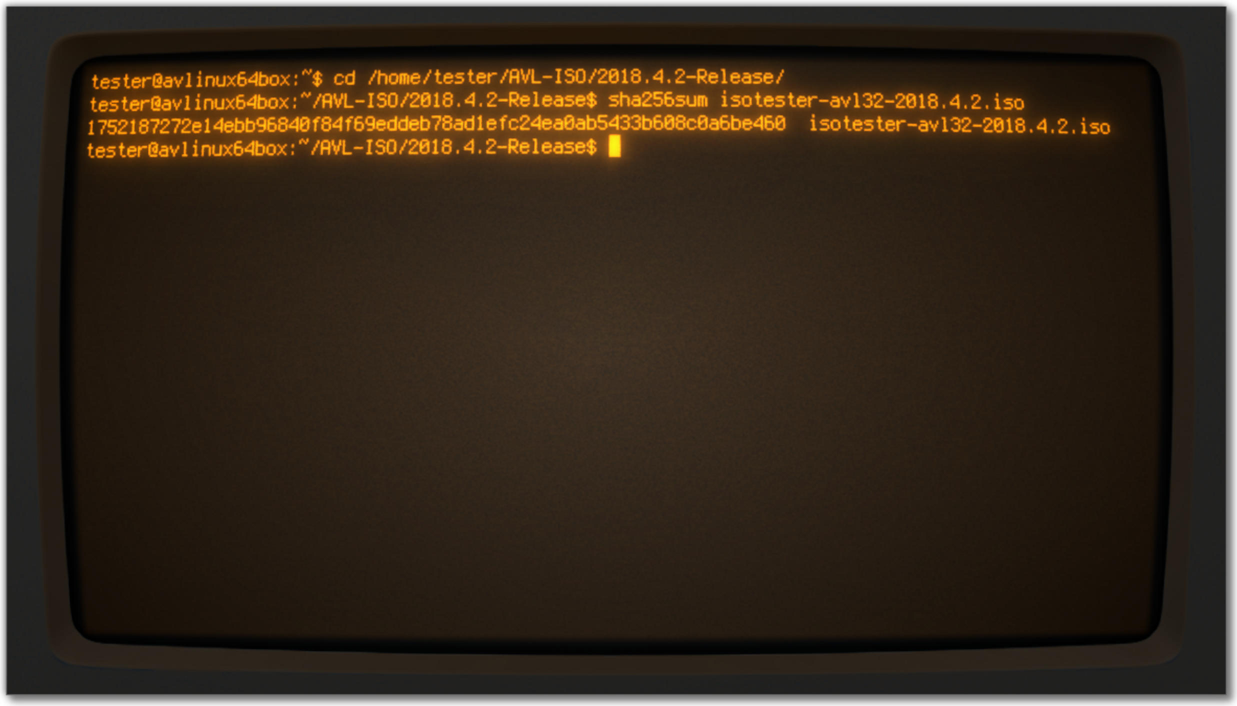
Again using the example of the downloaded 64bit ISO to your 'Downloads' folder in your User's home folder. Open a Terminal and 'change directory' to the 'Downloads' folder like this:

```
cd Downloads
```

Now run the sha256sum command on the downloaded 64bit ISO file :

```
sha256sum isotester-avl64-2020.5.10.iso
```

The terminal will calculate the sha256 'hash' and then print it in the terminal. It will be an even longer string of numbers and letters and show the ISO filename at the end. If the hash generated by the terminal matches the hash in the sha256 text file you downloaded you can be confident you are getting the authentic ISO file.



```
tester@avlinux64box:~$ cd /home/tester/AVL-ISO/2018.4.2-Release/
tester@avlinux64box:~/AVL-ISO/2018.4.2-Release$ sha256sum isotester-avl32-2018.4.2.iso
1752187272e14ebb96840f84f69eddeb78ad1efc24ea0ab5433b608c0a6be460  isotester-avl32-2018.4.2.iso
tester@avlinux64box:~/AVL-ISO/2018.4.2-Release$
```

RUNNING AV LINUX "LIVE"

AV Linux can be used "Live" in 2 different ways with no changes to the host machine operating it, by running it from a LiveDVD or using a Bootable USB Key.

LiveDVD:

- Download the AV Linux ISO file from http://www.bandshed.net/avlinux
- Burn the ISO file to a DVD-R or RW using your existing Burning Software.
- Set your Computer BIOS to Boot from your DVD Drive if it doesn't by default.
- Reboot into the AV Linux LiveDVD.

METHOD 1 - Bootable USB Key with 'DD' (Suggested Method for older non-UEFI Computers):

Requirements:

An existing AV Linux install OR a running AV Linux LiveISO session
PC Capable of booting from USB Key with block sizes greater than 1024mb
At least 4GB USB Key
AV Linux ISO image from here: http://www.bandshed.net/avlinux

Bootable USB Keys can be created with the AV Linux DD LiveUSB Writer in the 'Accessories' Menu. This unique tool uses 'DD' to create an 'ISOhybrid' USB Key. Please note that this tool overwrites any existing USB FAT32 or other filesystem and writes the actual ISOhybrid image itself to the key. This means the Key will no longer be usable for Data storage, however you can use the USB Key Tool to overwrite the ISOhybrid image as many times as you want. This USB Key Tool will only work with ISOhybrid images. The AV Linux ISO comes ready to use as a formatted ISOhybrid image. USB Keys can be returned to normal storage use with 'Gparted'. Rewriting an MSDOS partition table and then formatting the Key to a FAT32 filesystem will allow it to be used for data storage again.

METHOD 2 - Unetbootin Method (STRONGLY Suggested for newer UEFI Computers)

Requirements:

PC Capable of booting from USB Key
At least 4GB USB Key
Latest AV Linux ISO image from here: http://www.bandshed.net/avlinux

This guide is written assuming you are using an existing AV Linux install, however any current distro with GParted and Unetbootin will work. This operation will utilize the entire USB Key so use a key you don't want to share data on other computers with and remove any important data from the key. I would also suggest you use a clean key without any U3 or other proprietary launching software on it, most manufacturers provide utilities to remove this.

STEP 1.
Insert your USB Key into the USB Port but don't mount it (or unmount it) in the File Manager. From the menu go to 'Preferences'-->GParted and launch GParted.

STEP 2.
Using the drop down dialog in the upper right corner of GParted select your USB Key. MAKE SURE YOU KNOW WHICH DRIVE YOUR USB KEY IS!!

STEP 3. (DO WITH CAUTION)
Select any existing Partitions on the Key, Right Click on them and delete them until the Key is completely unallocated space.

STEP 4.
Create a new FAT32 partition on the USB Key equal to or slightly larger than the size of the AV Linux ISO. In the remaining unpartitioned space create an ext2 or ext3 partition and in the 'label' field enter 'live-rw'.

STEP 5.
Click on the checkmark icon at the top of GParted and apply the partitions you have created to the key.

STEP 6.
Once GParted has finished creating your new partitions right click on the FAT32 Partition and select 'Manage Flags' and from the list select 'boot'. When you close the Flags dialog Gparted should quickly rescan and display the boot flag on your FAT32 Partition. Close Gparted.

STEP 7.
Remove your USB Key and then plug it back in. Then open the File Manager, you should see 2 partitions available to mount relating to your USB Key you can mount them both but you only need to mount the FAT32 one. Hint... it is the one not called 'live-rw'.

STEP 8.
From the menu open 'System'--->Unetbootin. Select the Diskimage option and navigate to where you have downloaded or placed the ISO Image file and Click OK. Unetbootin will take several minutes to copy the image and bootloader to your Key.

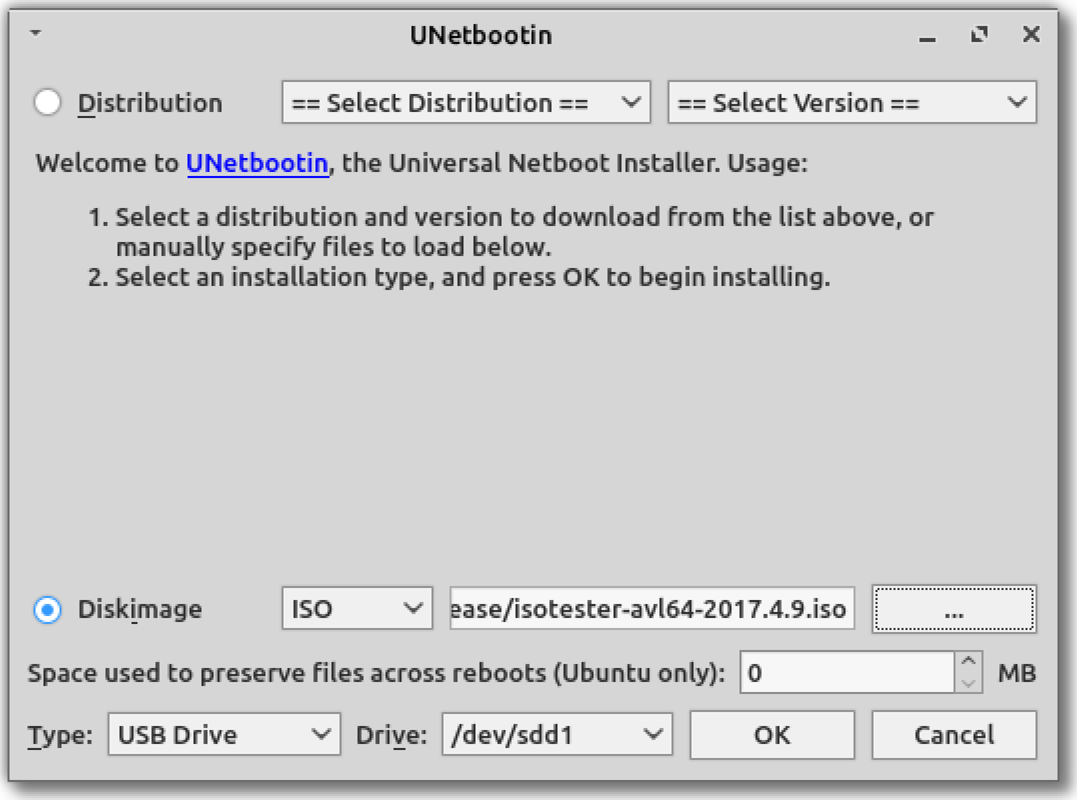
Adding Persistence to the Key (May not work on newer UEFI Computers):

If you simply want AV Linux on a USB Key without persistent storage you can stop here. This will give you the partition AV Linux runs from and a small additional partition to store files on while you are running it. For persistence there are a few more steps and a few things to consider:

- Persistence will dramatically slow bootup time the first boot after enabling it.
- Persistence may cause the system response to be a little slower than a non-persistent Key.
- Installing AV Linux from a persistent Key has NOT been tested and may not work.
- Do not remove your persistent key when prompted until it stops flashing.

STEP 9.
Mount the FAT 32 Partition of your Key (if it isn't already) in the File Manager and navigate to the 'syslinux.cfg' file. Right click on it and open it in Mousepad and modify its text in line 9 like the example below, once done save the edited syslinux.cfg file and you are ready to boot into your new Key. Enjoy!

```
append initrd=/ubninit boot=live config   threadirqs quiet splash persistent --
```



UNetbootin

○ Distribution == Select Distribution == == Select Version ==

Welcome to UNetbootin, the Universal Netboot Installer. Usage:

1. Select a distribution and version to download from the list above, or manually specify files to load below.
2. Select an installation type, and press OK to begin installing.

● Diskimage ISO ease/isotester-avl64-2017.4.9.iso ...

Space used to preserve files across reboots (Ubuntu only): 0 MB

Type: USB Drive Drive: /dev/sdd1 OK Cancel

AV LINUX BASIC BOOTING BIBLE

When Booting an AV Linux ISO :
1. Be patient...This is a large ISO it can take several seconds to start the boot especially on LiveDVD media.

2. Watch for disk activity, if you see nothing immediately on the monitor but there is disk activity it is still working on the boot.

3. Closely observe the Kernel console text output for red text errors, warnings and even many regular console colored errors are normally harmless. AV Linux doesn't use a bootsplash is so the User can monitor what the Kernel is doing at boot.

4. The SliM Login window may take a few seconds to show up, possibly even longer when using a LiveDVD vs a Bootable USB Drive.

5. If the desktop partially loads OR the display resolution is wrong or corrupted it is most likely a Kernel Modesetting/Video Driver issue which is covered in more detail below.

Possible Causes of Boot Failures :

1. A corrupted or broken ISO image on the Project ftp server.
This is extremely unlikely and rare and is easily ruled out by a single successful install by an end-user, AV Linux is pre-tested by a third party before any release is made public to make sure the ftp ISO images are intact and functional.

2. A bad download of the ISO image.
This is not common, but quite possible and can be verified by using the accompanying ISO.md5 or sha256 file from the ftp download folder. Another simple indication is if the file sizes on both the ftp and the downloaded file match perfectly.

3. A bad burn of the ISO to disk media.
This is usually the most likely cause of boot failure and is generally evident when the disk does nothing at all or freezes after displaying a few lines of console text which may be accompanied by numerous console red error messages. Always burn any compressed filesystem media like ISO images at low burn speeds (i.e. 4X or less) and make sure to use good disk media. If a LiveDVD fails try it on a different computer, this is the number one way to discern if your media is bad or not or whether your computer has a specific hardware issue with the LiveDVD.

4. Incompatible Video Hardware and Kernel Mode Setting (KMS).
This issue is generally evidenced by the Kernel completing its console output and dying at the login or unsuccessfully trying to load the Desktop and/or displaying the Desktop at a very low or garbled resolution.

AV LINUX LiveISO LOGIN :

Login Username and Password Required:

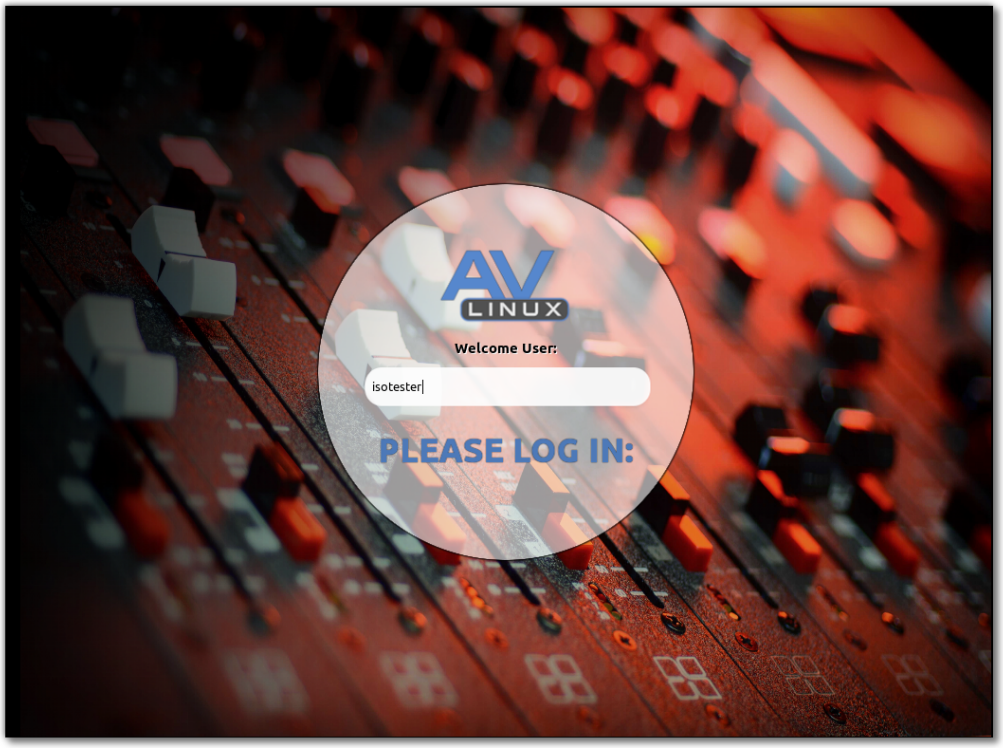
AV Linux 2020 requires a login to the LiveISO, when the LiveISO finishes booting and proceeds into the SliM login screen you will need to enter the following Username and Password:

AV Linux 32bit (No longer developed as of 2020!) :

Username: `isotester`
Password: `avl32`
Root Password: `avl32admin`

AV Linux 64bit :

Username: `isotester`
Password: `avl64`
Root Password: `avl64admin`



LIMITATIONS OF LIVE SESSIONS :

Due to some changes in how AV Linux LiveISO's are built there are now some limitations when running AV Linux live from both DVDs and USB keys. The live session should be looked at as an opportunity to kick the tires of AV Linux, to see how it works, if it supports your PC hardware and to demo some of the great included applications. It is not really recommended to use AV Linux live for actual production for the following reasons:

- The audio latency performance of Live sessions is noticeably higher than that of installs to HDD. The cause for this is unknown but it seems to relate to how the Bootable ISOs are created by Systemback. By default Qjackctl on the Live ISO is set for a conservative latency of 1024fpp, depending on your hardware AV Linux once installed to hard disk should easily run at significantly lower latencies. Performance may potentially be further impeded by the necessary ‘KPTI Meltdown’ kernel security patch.

- The LiveISO contains a well-rounded collection of applications but there are literally thousands more in the included Debian and external repositories that are available after installing AV Linux, if you require applications that are not included on the ISO as provided then you will need an internet connection to enable installing and updating applications.

- By default the AV Linux LiveISO runs in English with the English keyboard map, if you need a different keyboard map during a Live session please see the 'Changing the Keyboard Settings' section of the Manual.

- By default the 'Performance' CPU Governor is enabled, this is an absolute *must have'* setting for working with Audio and may negatively impact battery life to a small degree on laptops.

IMPORTANT PRE-INSTALLATION INFO! :

Systemback and GPT Partition Table Support:

AV Linux 2020 utilizes the Systemback Installer which at the time of this writing does **not** support formatting of and installation to Hard Drives with ‘GPT’ partition tables when using BIOS or legacy-boot mode computers. GPT can however be used in many newer computers in UEFI mode but it has not been tested as widely.

Installation on UEFI Secure Boot Computers:

In the past computer boot management and system hardware configuration outside of the installed Operating System was handled by the ‘BIOS’ (Basic Input Output System) but in recent years as a security feature the ‘UEFI’ (Unified Extensible Firmware Interface) has come to be the new standard. UEFI manages booting with ‘Secure Boot’ software and requires any new Operating Systems to be installed on the computer to have a digitally signed ‘.efi’ file that can be verified by the Secure Boot software. AV Linux has been successfully installed on many UEFI systems but there are reports that some systems do not boot AV Linux with the default UEFI system utility defaults. If you are unable to boot the AV Linux ISO you may need to change the settings in your system BIOS setup utilities, disabling “Secure Boot” or enabling “Legacy Boot” options may solve this issue on some systems.

Make sure to choose “Boot Live System” from the Boot Options!

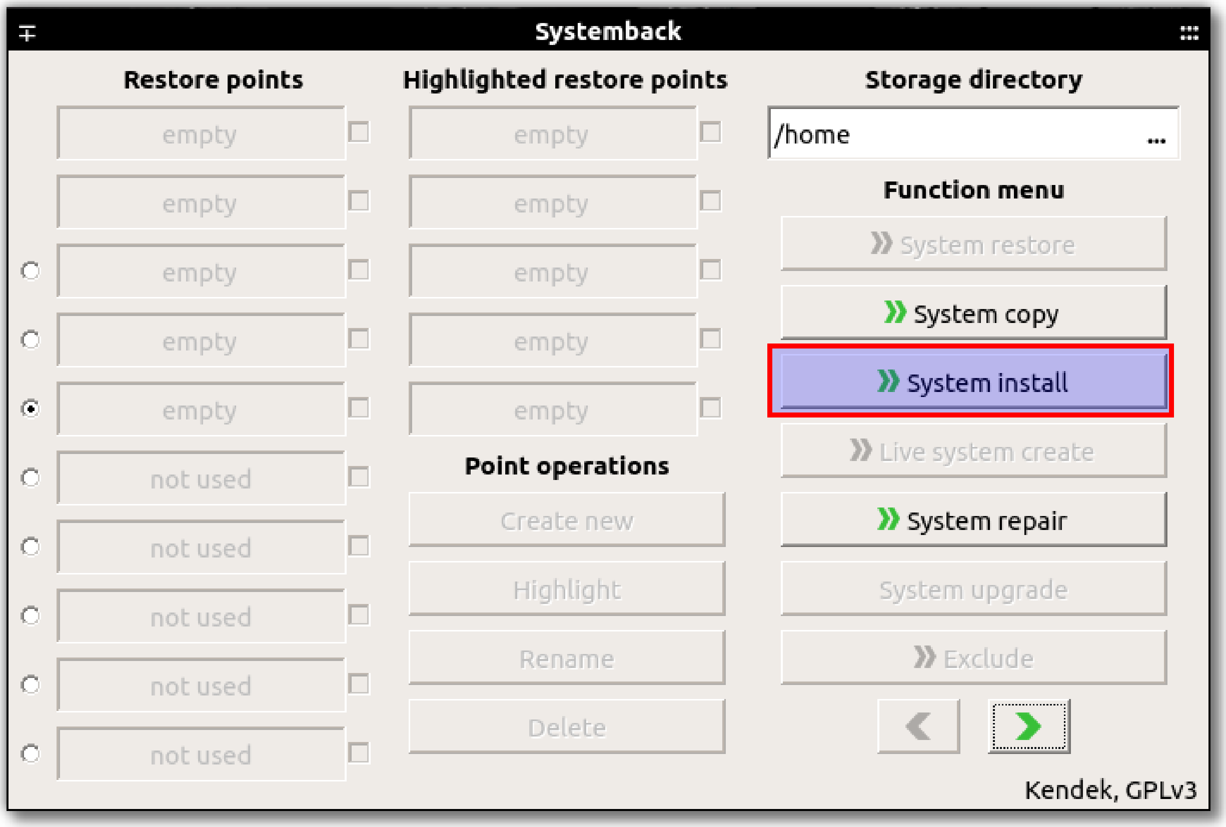
When You Boot the AV Linux ISO at the beginning of the boot you will see the Systemback ‘splash screen’ which will have four options listed, the top two options are “Boot Live System” and “Boot System Installer”. It is strongly suggested to **NOT** install AV Linux using the “Boot System Installer” menu option and to instead choose the top “Boot Live System” option and follow the instructions in the next section closely.

INSTALLING AV LINUX :

***WARNING!!** - The following section involves major system changes like hard drive partitioning etc. There is always a risk of Data loss or corruption when installing a new or different Operating System. *ALWAYS* back up any important Data before making changes to your existing Hard Drive!

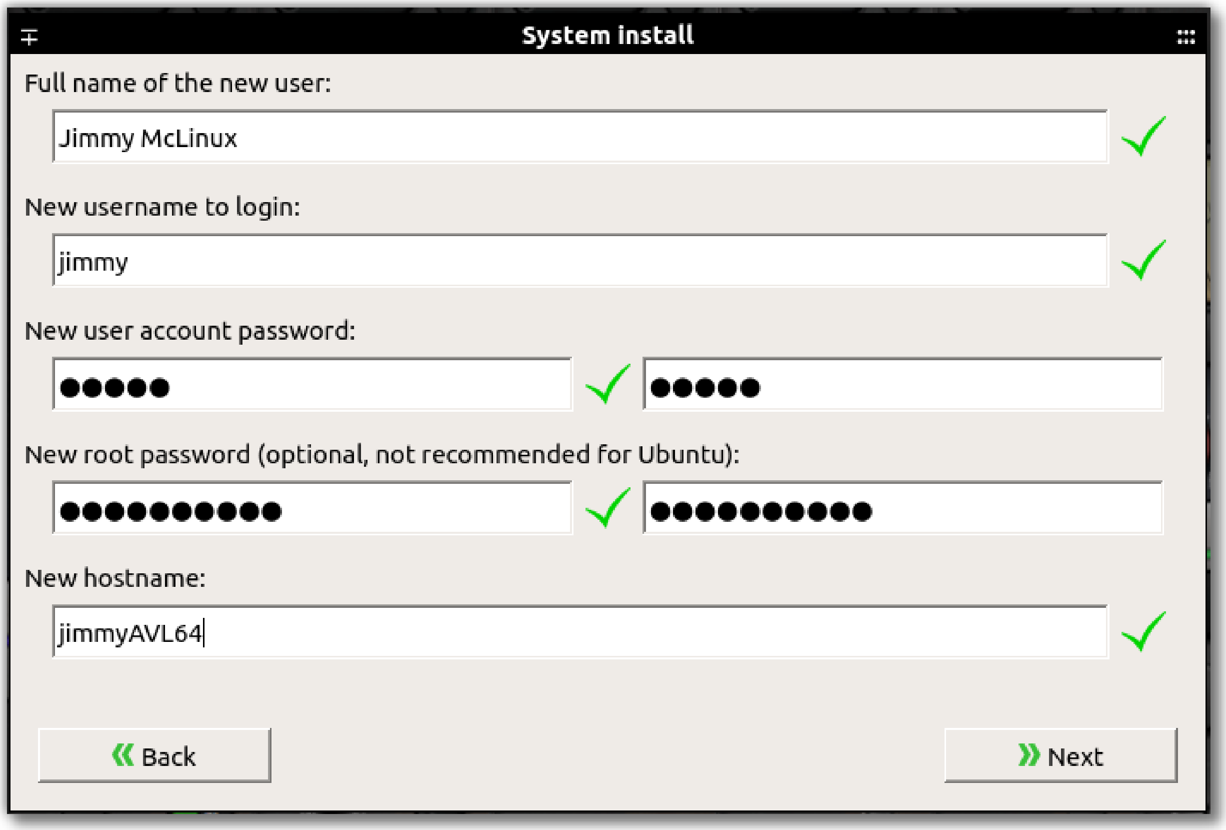
Systemback Installation Info:

Installation of AV Linux is now handled by 'Systemback' which is an excellent Linux Backup utility which contains an Installer as well. While it is not really intended to be an ISO tool for Distribution creation it does the job required to get AV Linux from ISO to the target system. Systemback's installer is not like a complete Distribution installer and does not provide setting up of locales etc. during the install process, it merely provides some basic disk formatting tools, copies the Live ISO Image as-is to the target machine and then installs the GRUB Bootloader. Users who require a locale and language support other than the default English will now find that installing AV Linux and setting it up for non-English locales is a 2-step process: Step 1 is to install the Live ISO. Step 2 is to use the ' AV Linux Assistant' to set up language, keyboard and locales after installing.



Su not sudo :

***PLEASE NOTE!** AV Linux does not use 'sudo' it uses the pure Debian Root Superuser and User method. When installing and setting up AV Linux *you will need to have a separate and unique password for your Root Superuser to administrate the system and a regular User password for normal system use. Further to this AV Linux is set up to behave as Debian versions before Debian 10 "Buster' did and has an added entry in /etc/login.defs on line 104: 'ALWAYS_SET_PATH yes'. If the User wishes to disable this then a comment hash '#' needs to be placed at the beginning of line 104. Be forewarned that many Root apps like Gdebi Package Installer and Synaptic Package Manager will then cease to function as expected!!*



Full name of the new user: Jimmy McLinux ✓

New username to login: jimmy ✓

New user account password: ●●●●● ✓ ●●●●●

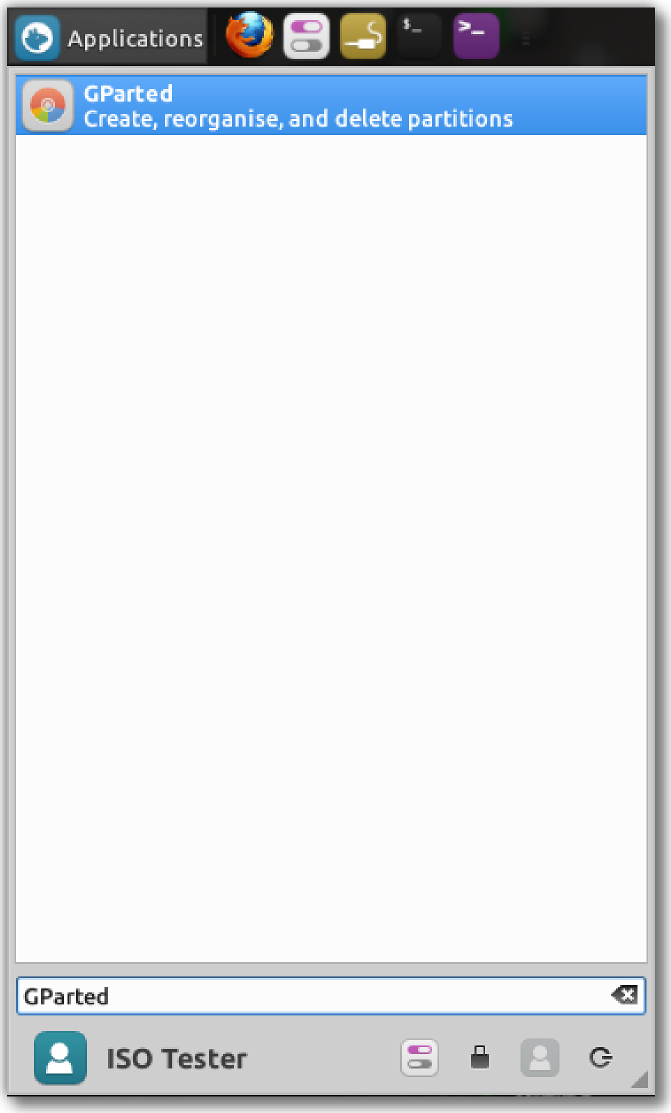
New root password (optional, not recommended for Ubuntu): ●●●●●●●●●●● ✓ ●●●●●●●●●●●

New hostname: jimmyAVL64 ✓

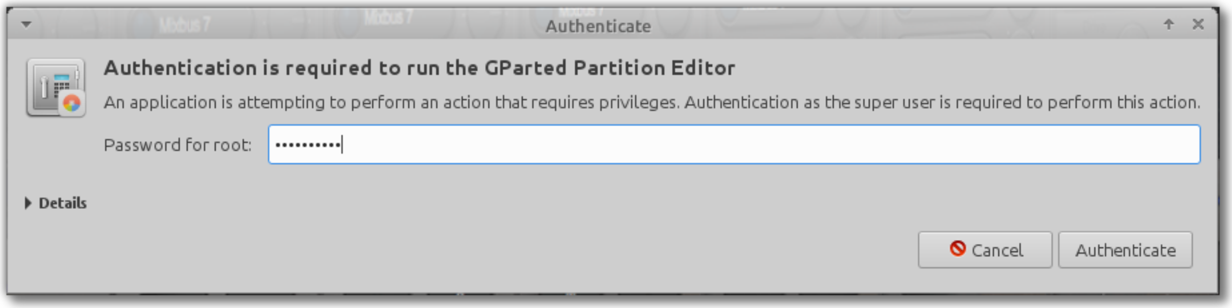
Installation on older BIOS-based Systems or with 'legacy-boot' enabled :

This is an example of installing AV Linux running in a Live session preferably running from a USB Key, this example will go from formatting and partitioning the hard disk all the way through to rebooting into the new system. This is how you would install AV Linux on an older computer with a BIOS that predates UEFI or a computer with a 'legacy-boot' that allows booting without UEFI. **Installing on a UEFI boot computer is covered here.**

Once logged into to a Live session launch Gparted to set up a partition table and create disk partitions to install to. For simplicity and clarity we are assuming AV Linux is the only OS to be installed on the computer and we are using two primary partitions with AV Linux being installed on a single root '/' partition with an additional swap partition.



Gparted will need to run with Root privileges so you need to enter the AV Linux ISO Root password, '`avl64admin`'.

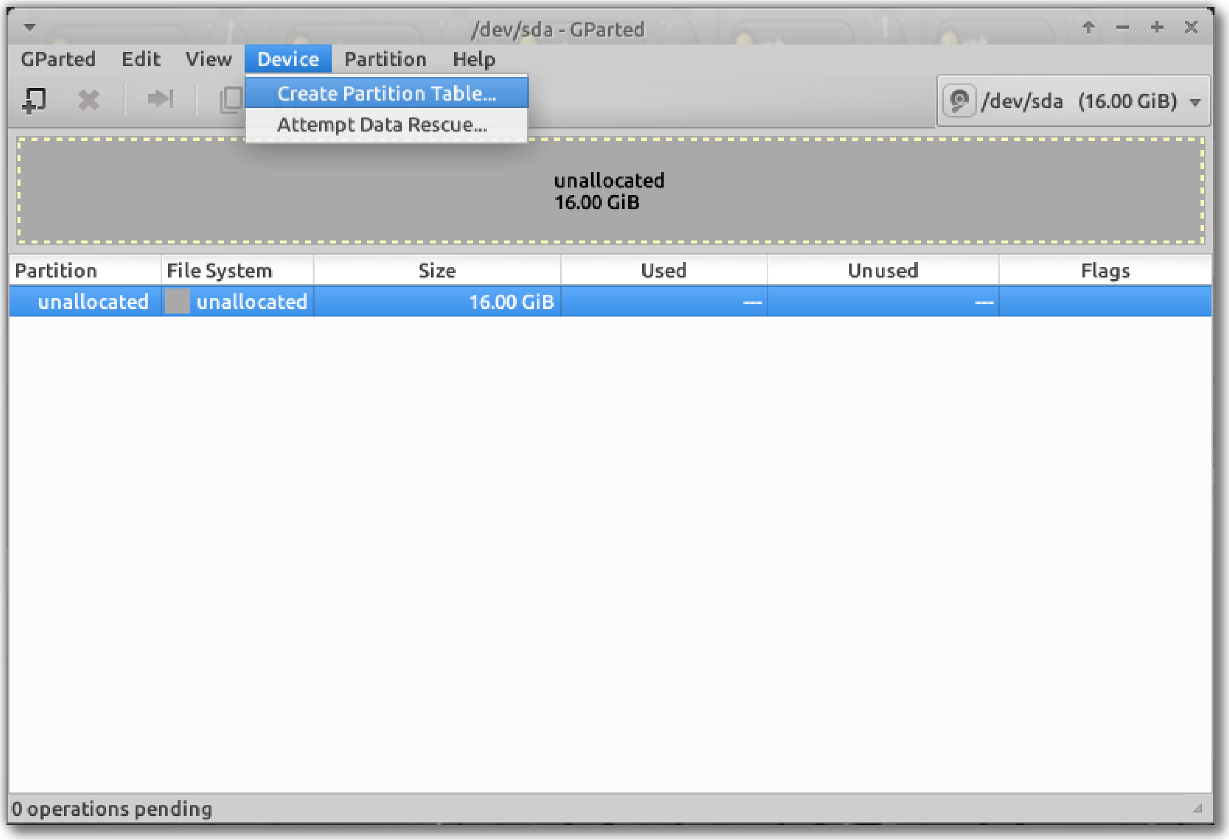


Authentication is required to run the GParted Partition Editor

An application is attempting to perform an action that requires privileges. Authentication as the super user is required to perform this action.

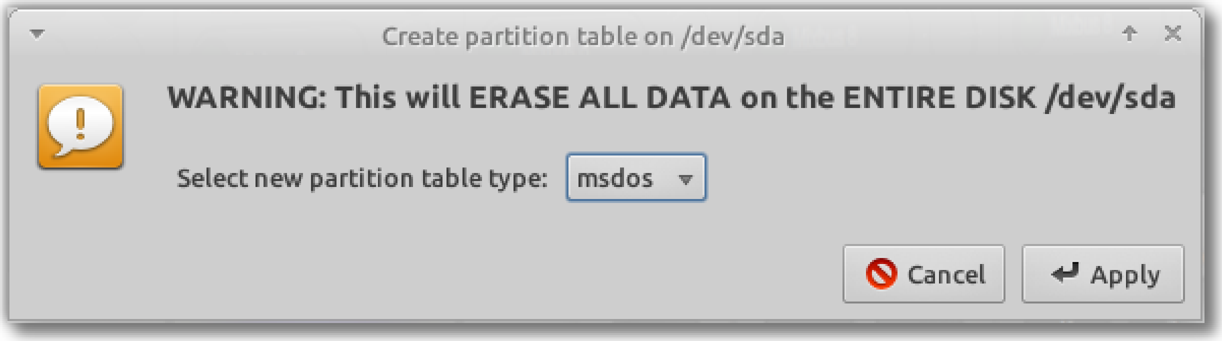
Password for root: ••••••••••

The hard drive in this example case has no partition table or partitions so we are starting from scratch, for this mode of install we want to create an 'msdos' partition table from the Gparted 'Device' menu. *If you are installing to an existing hard disk with data already on it this step will erase all data.*



Partition	File System	Size	Used	Unused	Flags
unallocated	unallocated	16.00 GiB	---	---	

0 operations pending

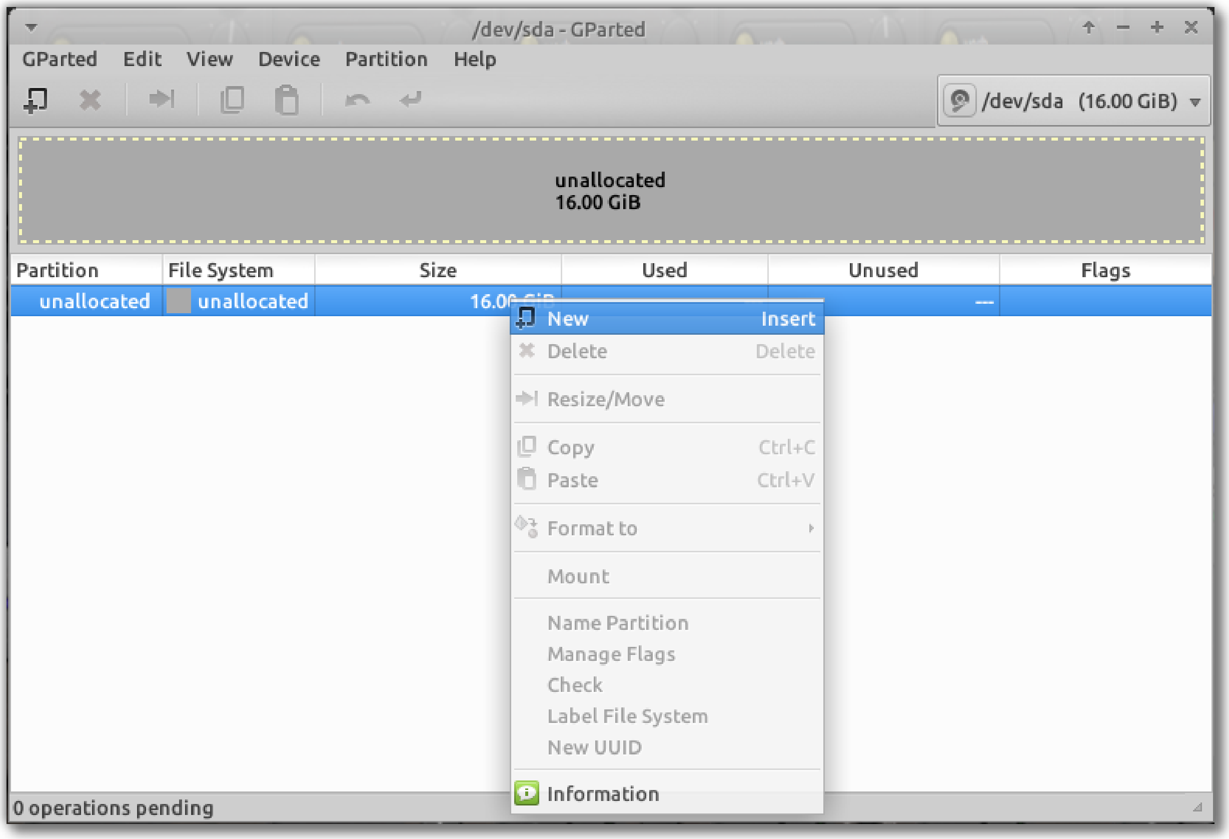


Create partition table on /dev/sda

WARNING: This will ERASE ALL DATA on the ENTIRE DISK /dev/sda

Select new partition table type: msdos

Once the partition table has been written we can right-click on the unallocated space to create our new partitions, we want one ext4 (sda1) partition for the operating system and one linux-swap (sda2) partition.

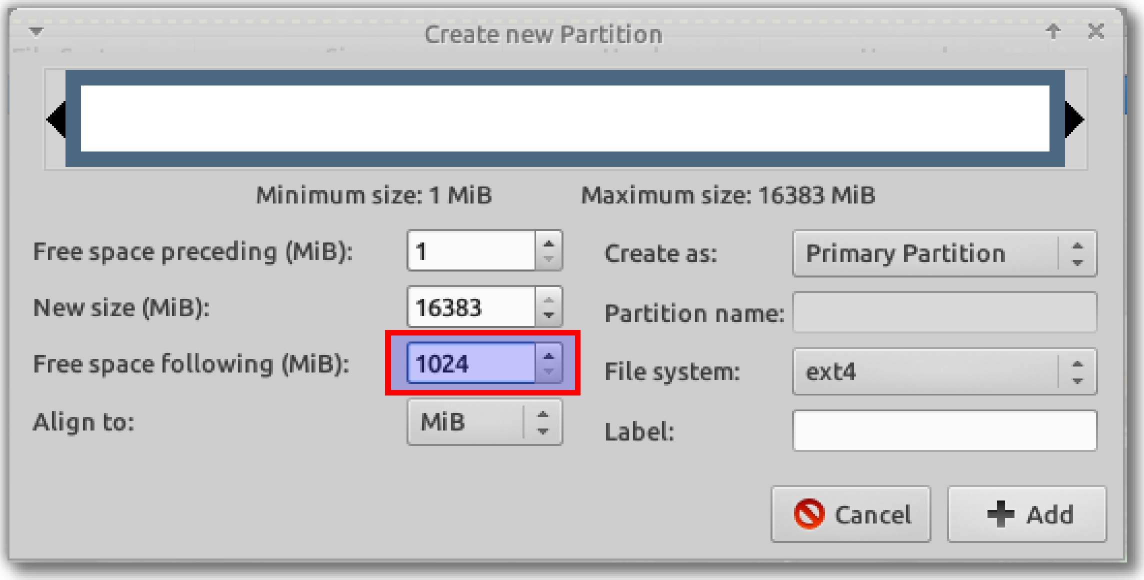


/dev/sda - GParted

Partition	File System	Size	Used	Unused	Flags
unallocated	unallocated	16.00 GiB		---	

0 operations pending

Create an ext4 partition with 1024mb free space following to prepare room to create the linux-swap partition. Once you have created the 1024mb linux-swap partition in the remaining unallocated space click the ‘Apply’ button to write the partitions to the disk.



Create new Partition

Minimum size: 1 MiB Maximum size: 16383 MiB

Free space preceding (MiB): 1

New size (MiB): 16383

Free space following (MiB): 1024

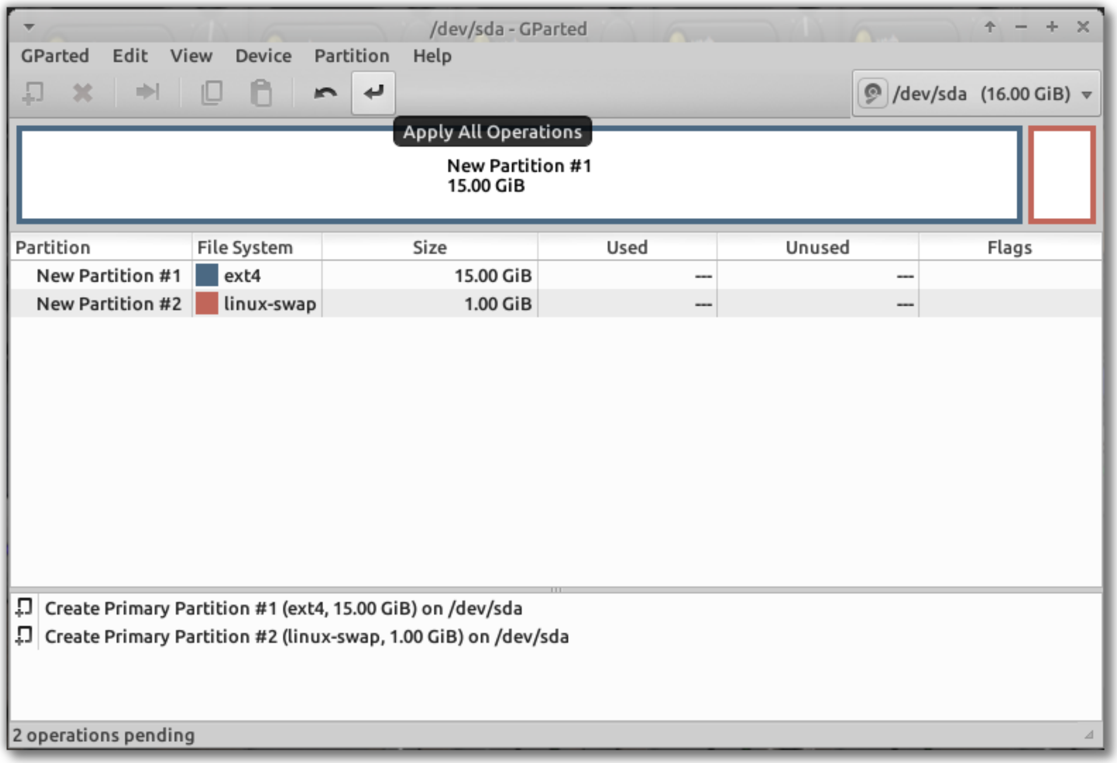
Align to: MiB

Create as: Primary Partition

Partition name:

File system: ext4

Label:

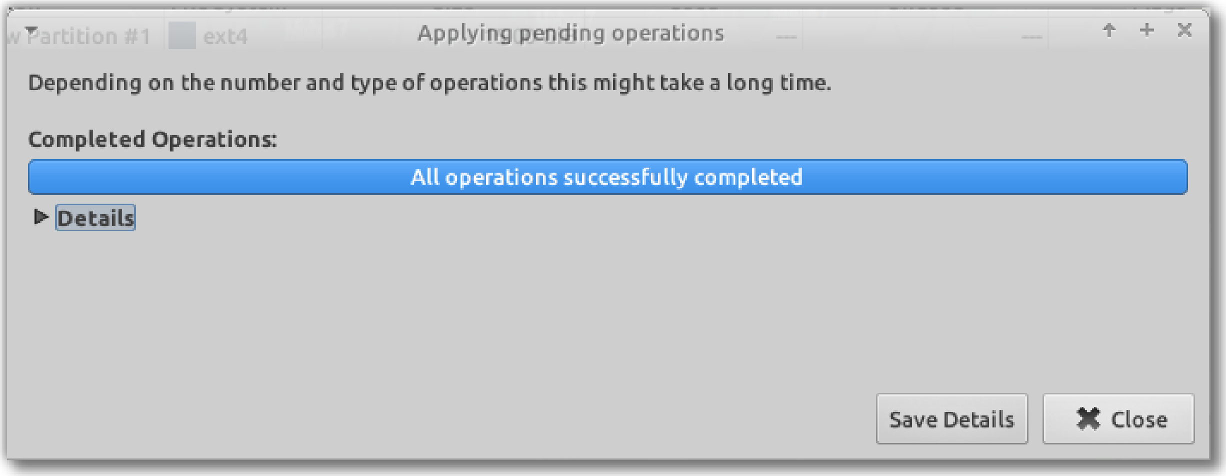


Partition	File System	Size	Used	Unused	Flags
New Partition #1	🟦 ext4	15.00 GiB	---	---	
New Partition #2	🟥 linux-swap	1.00 GiB	---	---	

Create Primary Partition #1 (ext4, 15.00 GiB) on /dev/sda

Create Primary Partition #2 (linux-swap, 1.00 GiB) on /dev/sda

2 operations pending



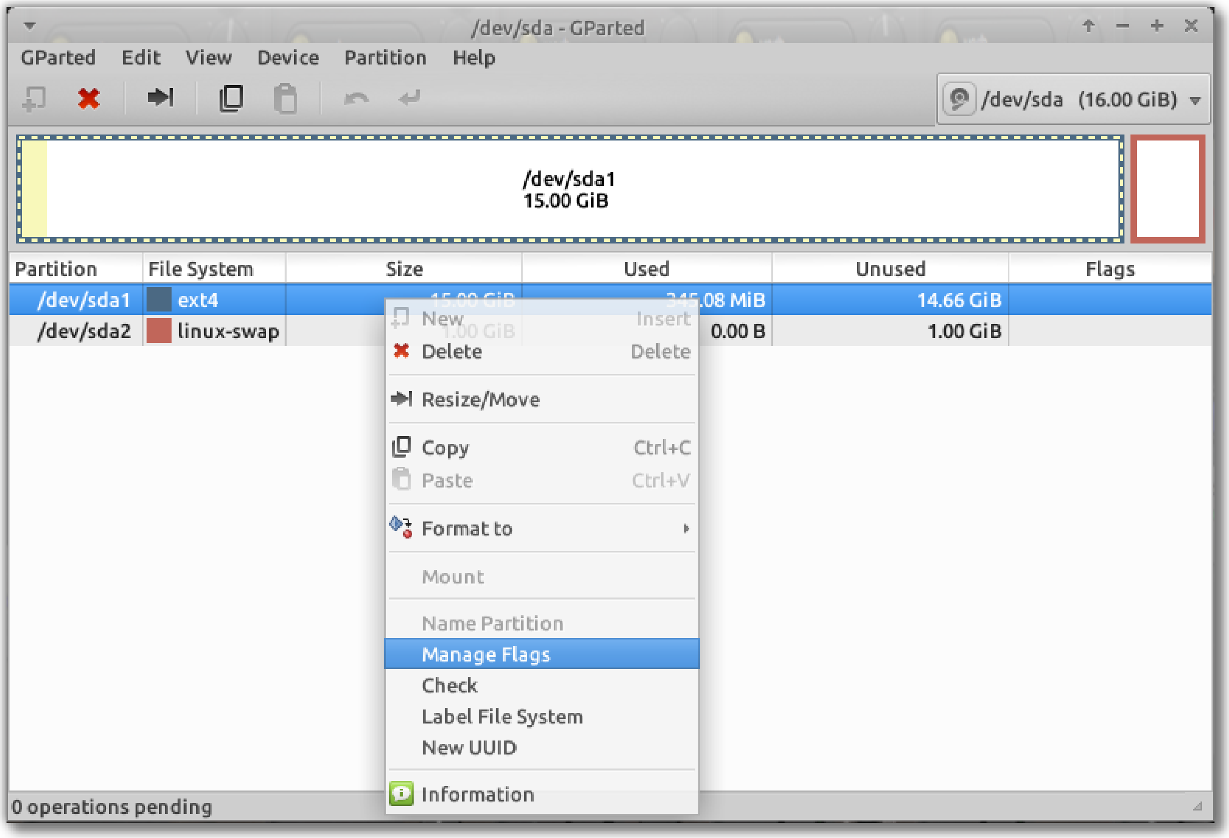
Applying pending operations

Depending on the number and type of operations this might take a long time.

Completed Operations:

All operations successfully completed

Before closing Gparted we want to right-click on the (sda1) ext4 partition and add a ‘boot’ flag.



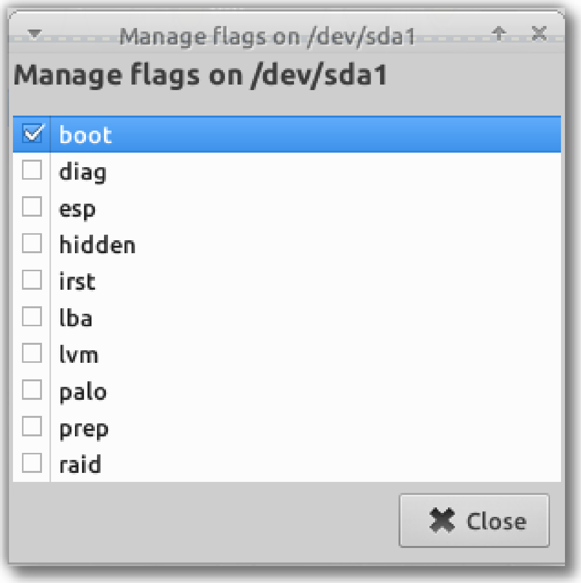
/dev/sda - GParted

/dev/sda (16.00 GiB)

/dev/sda1
15.00 GiB

Partition	File System	Size	Used	Unused	Flags
/dev/sda1	ext4	15.00 GiB	345.08 MiB	14.66 GiB	
/dev/sda2	linux-swap	1.00 GiB	0.00 B	1.00 GiB	

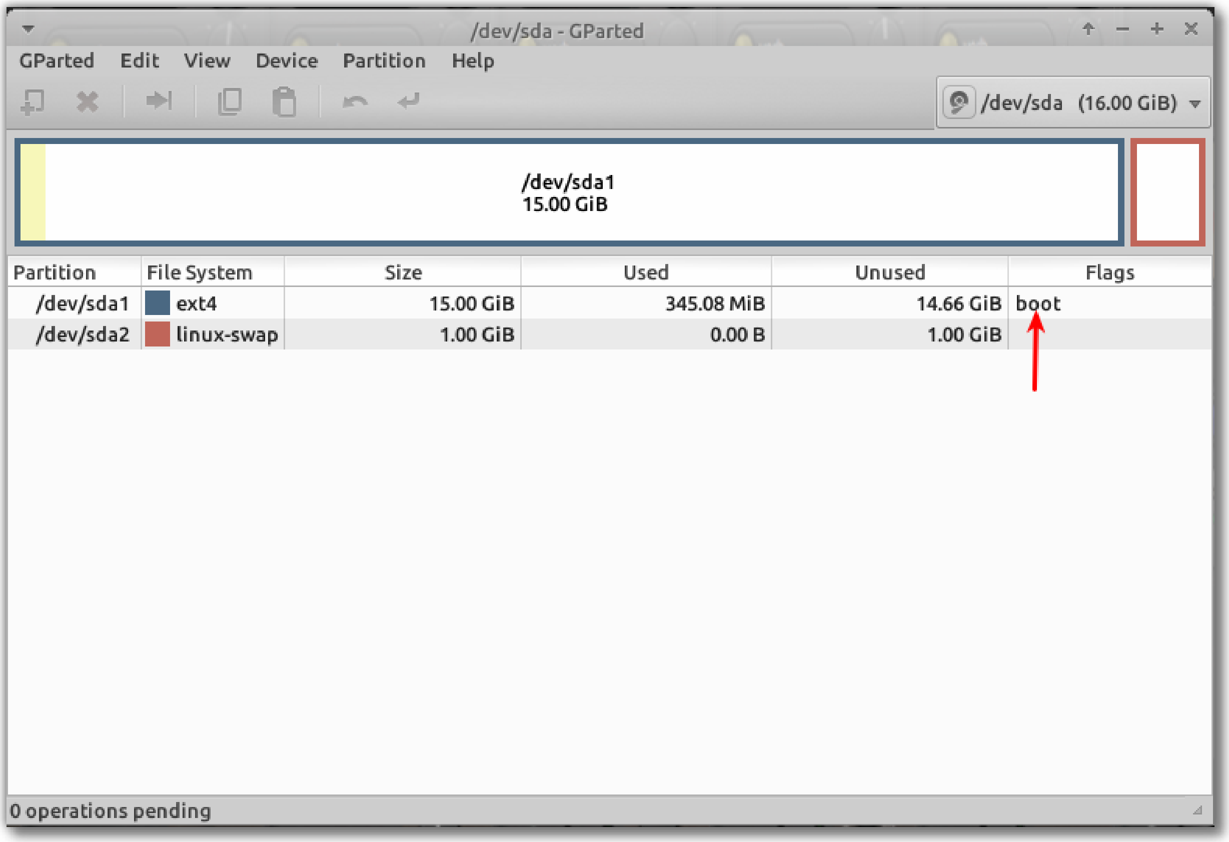
0 operations pending



Manage flags on /dev/sda1

- ☑ boot
- □ diag
- □ esp
- □ hidden
- □ irst
- □ lba
- □ lvm
- □ palo
- □ prep
- □ raid

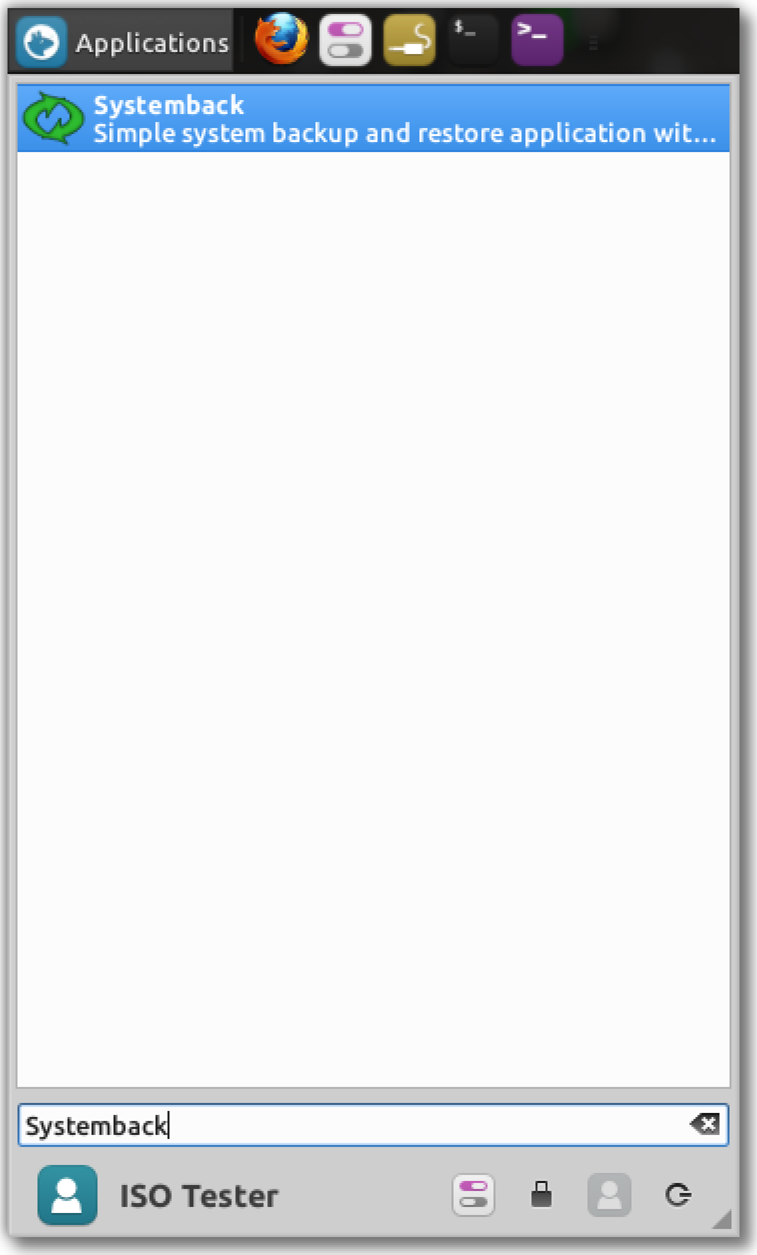
If everything has completed successfully we can verify our new partitions in Gparted and close it.

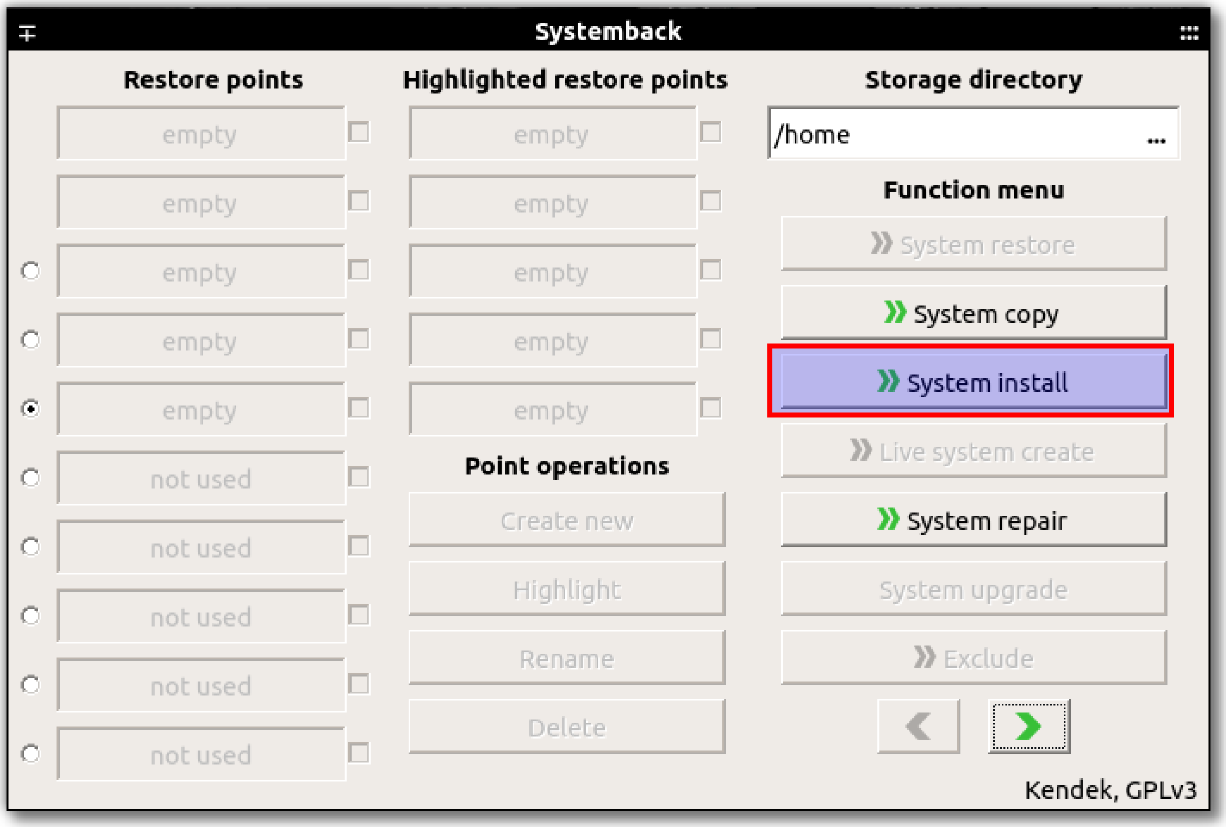


Partition	File System	Size	Used	Unused	Flags
/dev/sda1	🟦 ext4	15.00 GiB	345.08 MiB	14.66 GiB	boot
/dev/sda2	🟥 linux-swap	1.00 GiB	0.00 B	1.00 GiB	

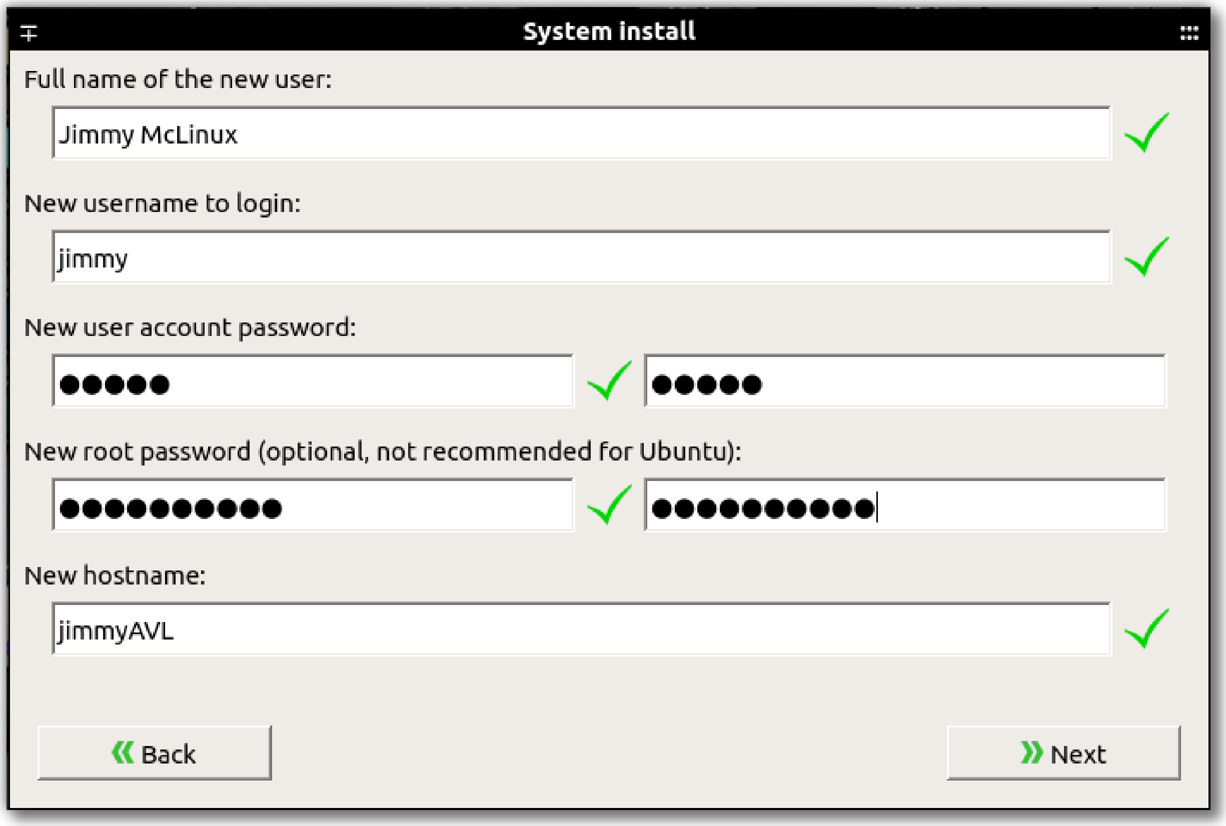
0 operations pending

Now that the hard drive has been partitioned we are ready to use Systemback to install AV Linux from the Live session to the Hard Drive. Launch Systemback from the Whisker menu and click on the ‘System Install’ button.




Systemback
Restore points
Highlighted restore points
Storage directory
empty
empty
empty
empty
empty
not used
not used
not used
not used
not used
/home
...
Function menu
System restore
System copy
System install
Live system create
System repair
System upgrade
Exclude
Point operations
Create new
Highlight
Rename
Delete
Kendek, GPLv3

Enter your name, Username and a separate and distinct password for your User and the root User, you can also create a hostname, this is the name the computer will display on a network and at the terminal prompt.



Full name of the new user:

Jimmy McLinux ✓

New username to login:

jimmy ✓

New user account password:

●●●●● ✓ ●●●●●

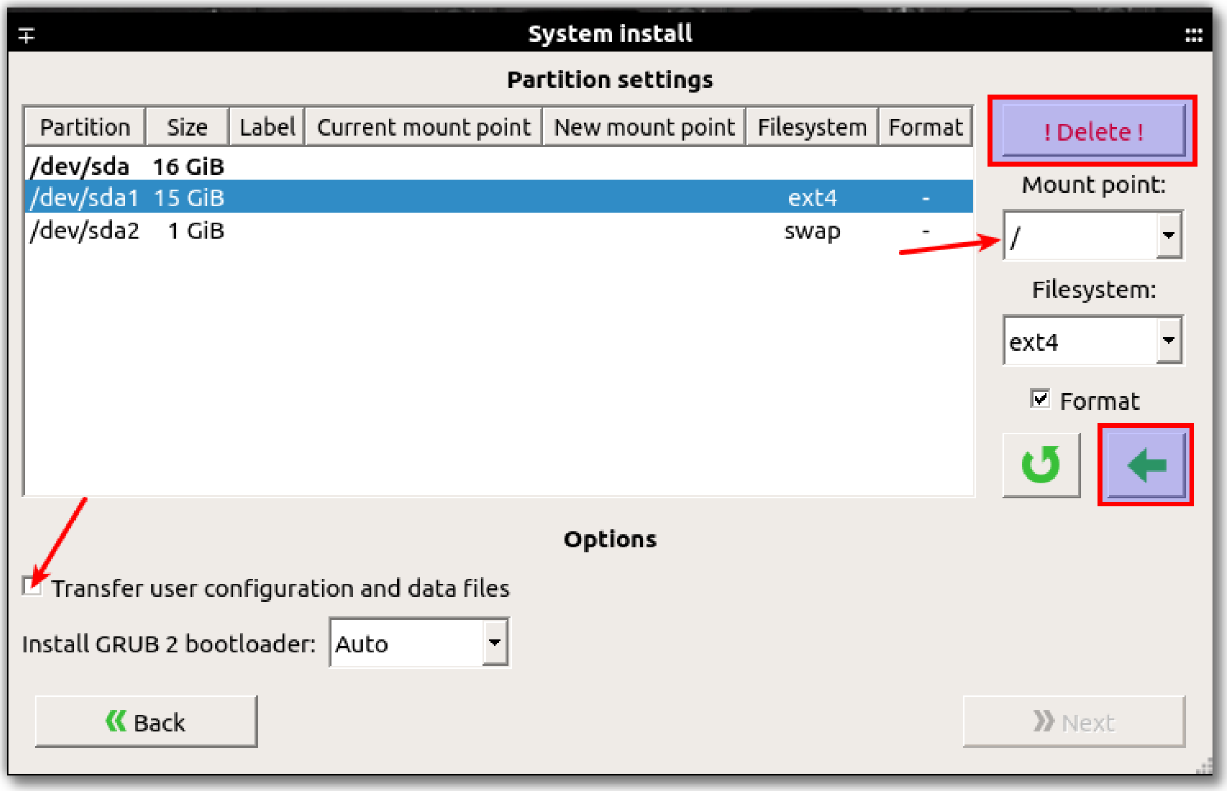
New root password (optional, not recommended for Ubuntu):

●●●●●●●●●●● ✓ ●●●●●●●●●●●

New hostname:

jimmyAVL ✓

In the ‘Partition Settings’ window we set up the partitions and mount points for install. In the example below we set the mount point for the ext4 (sda1) partition as ‘/’ and check ‘Format’ to clear the partition, once you have set the mount point click the green arrow button to apply the settings. It is also suggested to uncheck ‘Transfer User configuration and data files’ to allow some system defaults to be incorporated in the install.



System install

Partition settings

Partition	Size	Label	Current mount point	New mount point	Filesystem	Format
/dev/sda	**16 GiB**					
/dev/sda1	15 GiB				ext4	-
/dev/sda2	1 GiB				swap	-

Mount point: /

Filesystem: ext4

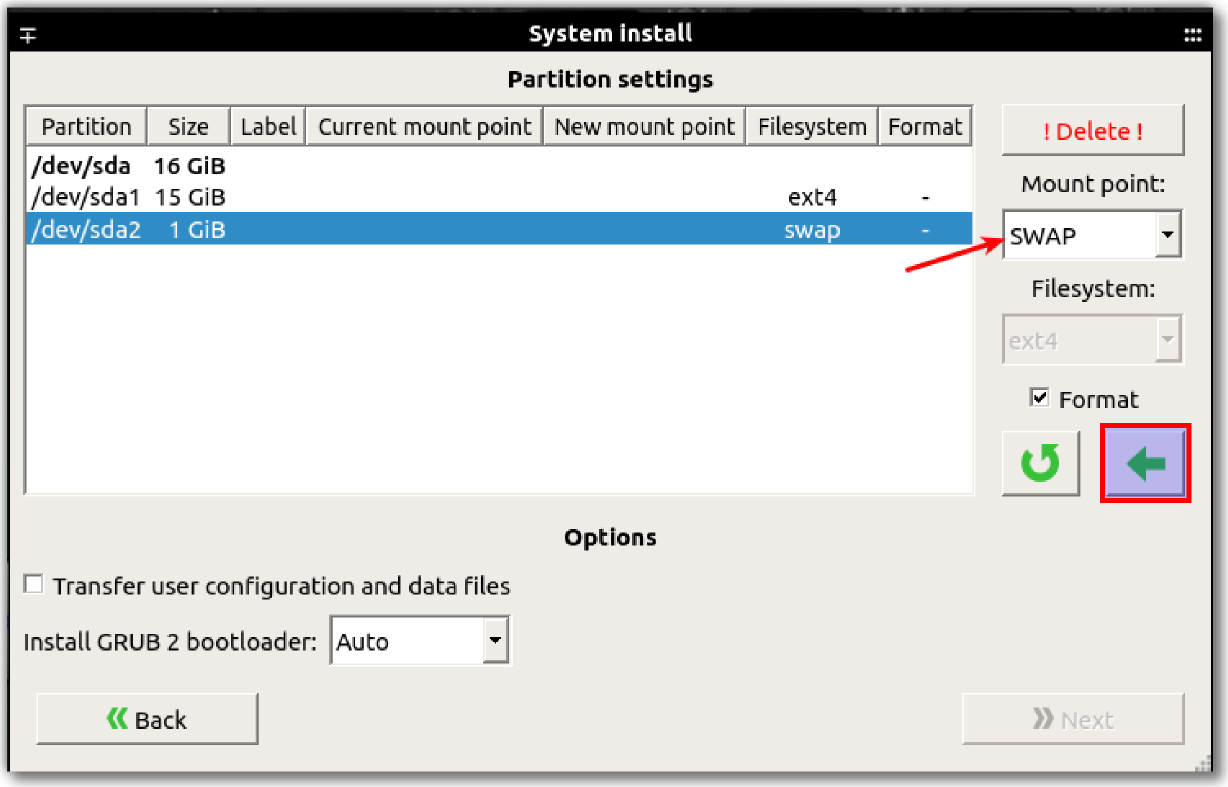
☑ Format

Options

☐ Transfer user configuration and data files

Install GRUB 2 bootloader: Auto

Set the mount point for the linux-swap (sda2) partition to ‘SWAP’ and apply the change with the green arrow button. Once the partition settings are done the ‘Next’ button will become active and you can start the install. The ‘Install GRUB 2 bootloader:’ dropdown box should say ‘Auto’ and not be greyed out.



System install

Partition settings

Partition	Size	Label	Current mount point	New mount point	Filesystem	Format
/dev/sda	**16 GiB**					
/dev/sda1	15 GiB				ext4	-
/dev/sda2	1 GiB				swap	-

Mount point: SWAP

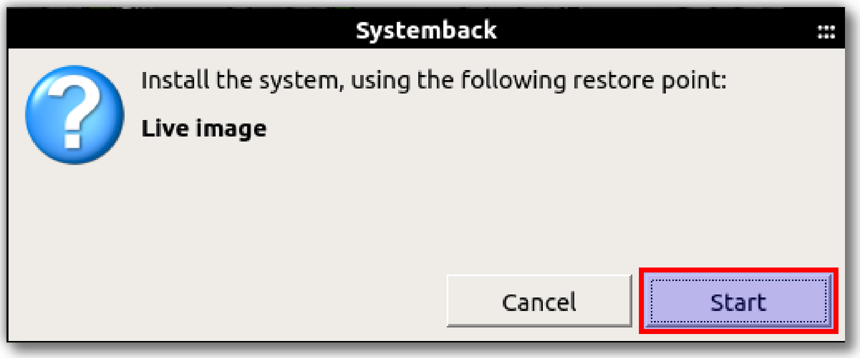
Filesystem: ext4

☑ Format

Options

□ Transfer user configuration and data files

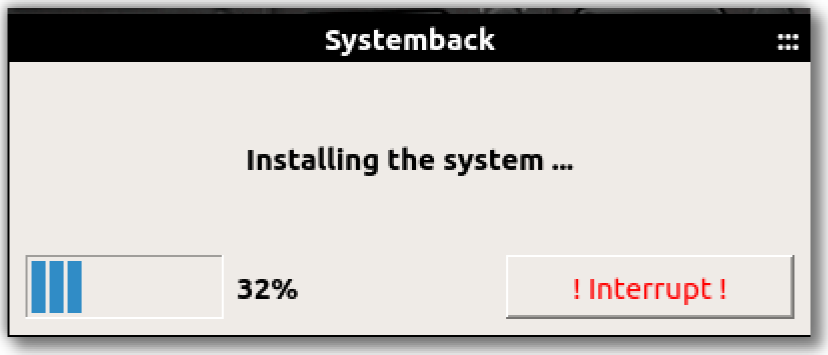
Install GRUB 2 bootloader: Auto



Install the system, using the following restore point:

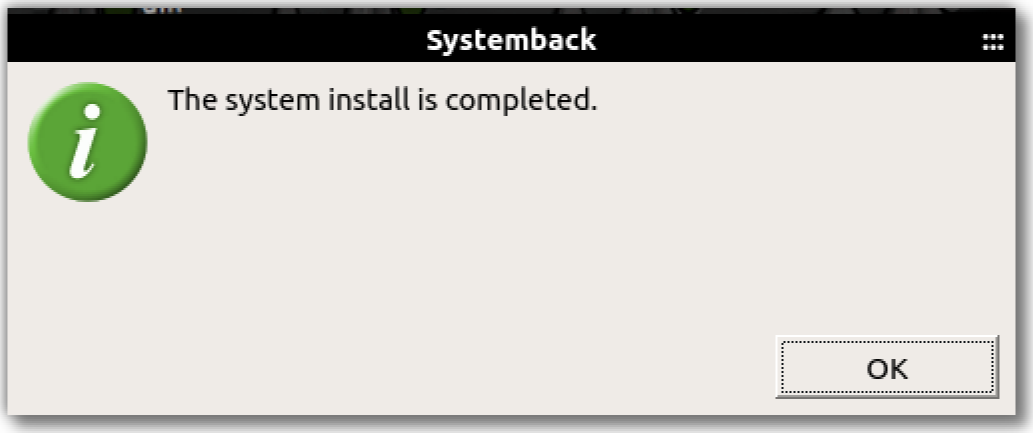
Live image

Installation from USB key should take 20 minutes or less and will also look after installing the GRUB 2 bootloader.



Installing the system ...

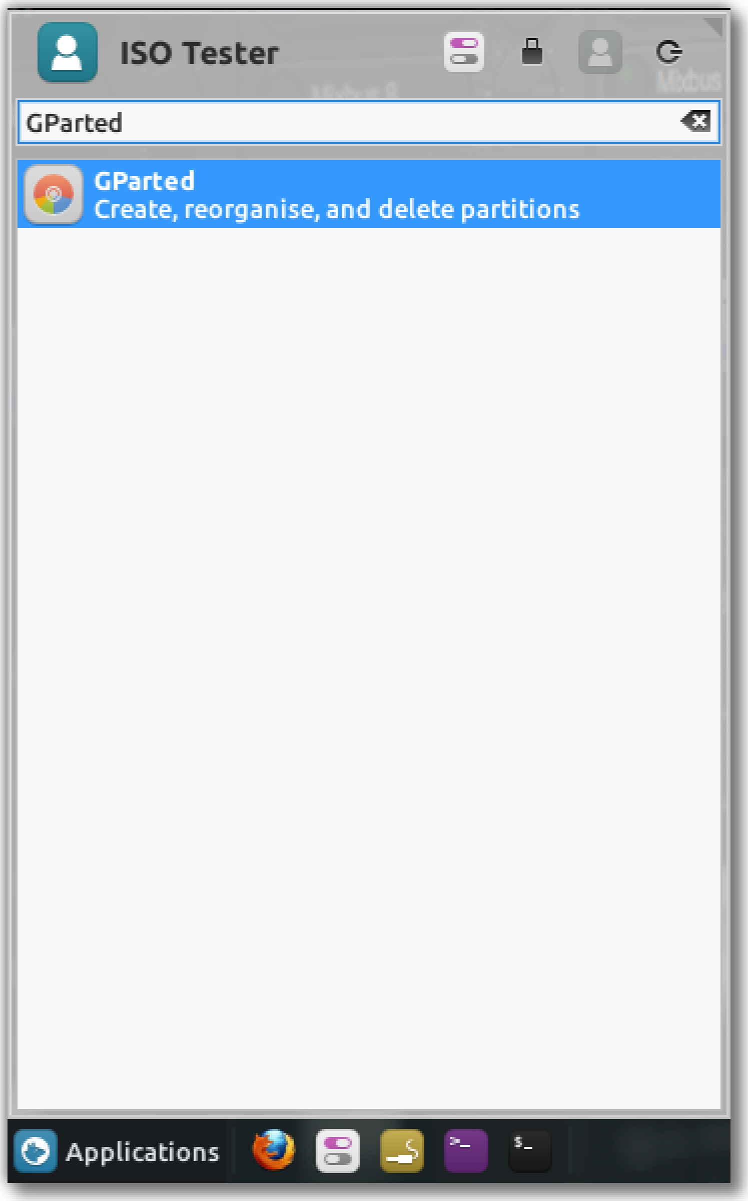
Once the system install has completed you can close Systemback and boot into your new system whenever you are ready!



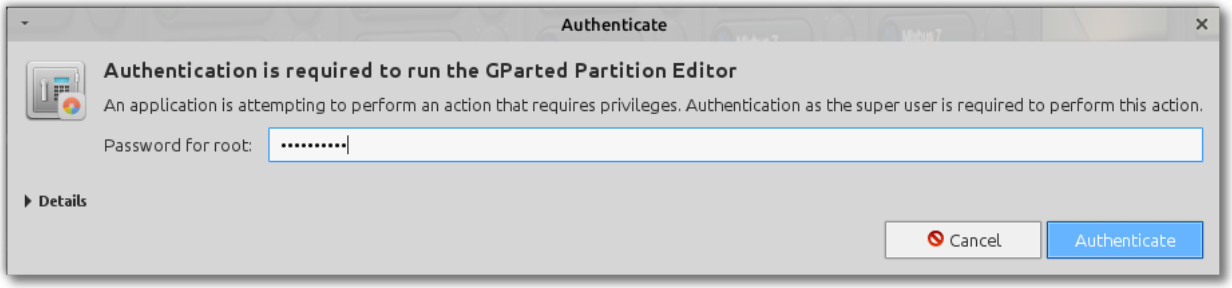
The system install is completed.

Installing on UEFI computers :

Once logged into to a Live USB session launch Gparted to set up a partition table and create disk partitions to install to. For simplicity and clarity we are assuming AV Linux is the only OS to be installed on the computer and we will use three primary partitions, a 128mb FAT32 EFI boot partition at (sda1), an ext4 (sda2) root partition to install AV Linux to and last a 'linux-swap' (sda3) partition.



Gparted requires Root privileges so enter the 64bit LiveISO Root password; **`avl64admin`**



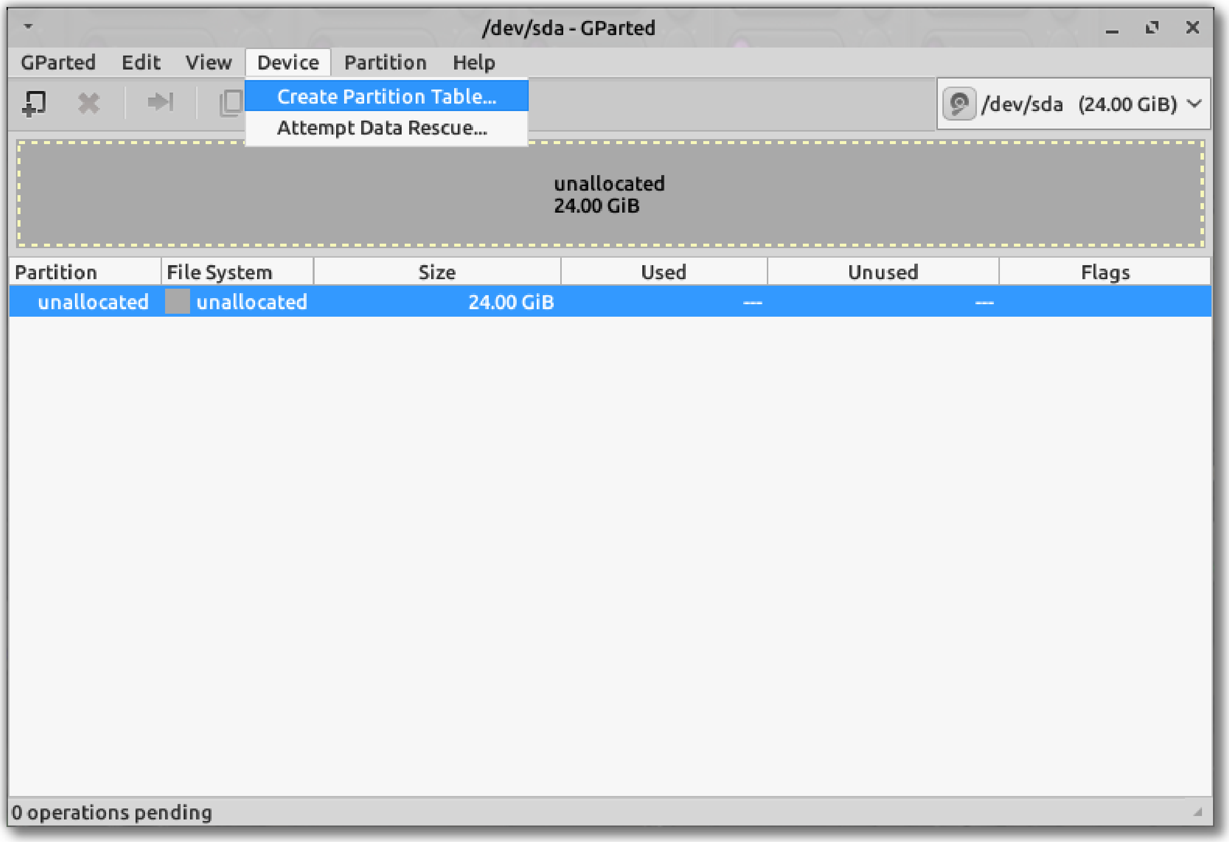
Authenticate

Authentication is required to run the GParted Partition Editor

An application is attempting to perform an action that requires privileges. Authentication as the super user is required to perform this action.

Password for root: ••••••••••

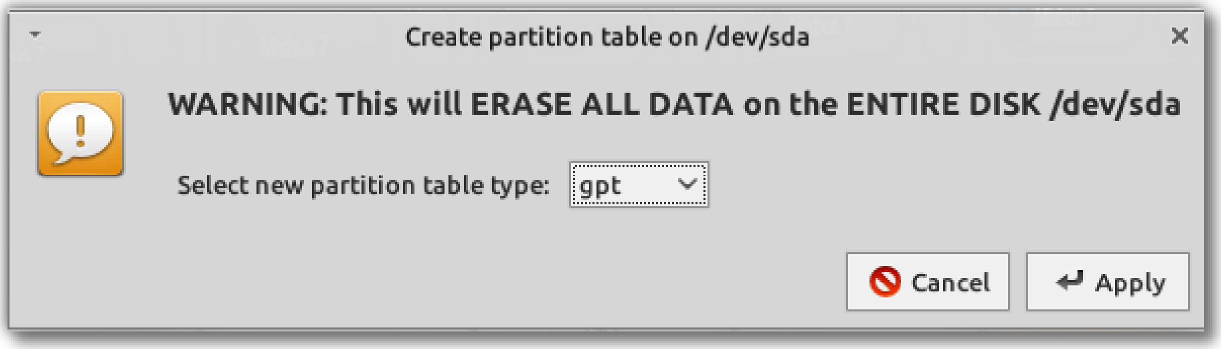
We can use a GPT partition table for UEFI boot, create one from the ‘Devices’ menu. *If you have existing data on the Hard Drive creating a partition table will erase the disk!*



/dev/sda - GParted

Partition	File System	Size	Used	Unused	Flags
unallocated	unallocated	24.00 GiB	---	---	

0 operations pending

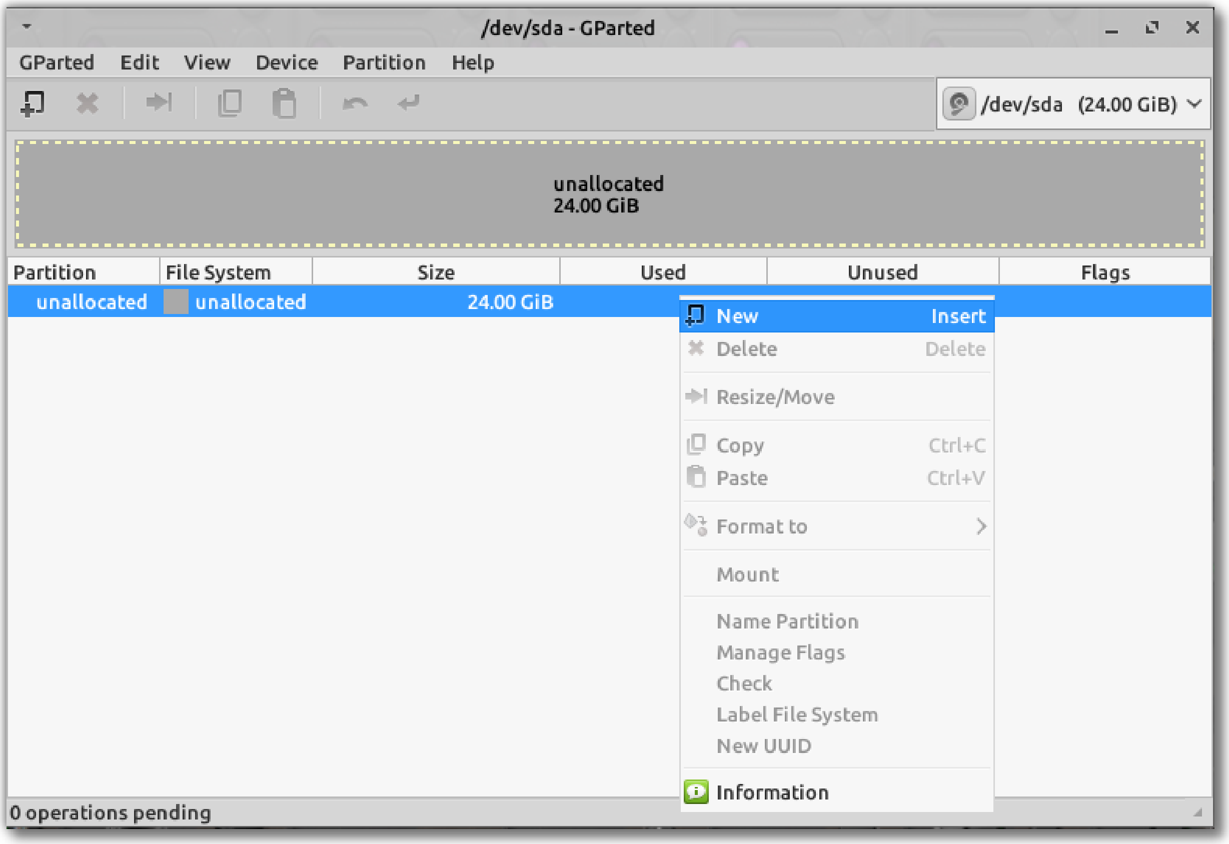


Create partition table on /dev/sda

WARNING: This will ERASE ALL DATA on the ENTIRE DISK /dev/sda

Select new partition table type: gpt

Once the partition table has been written we can create partitions on the disk to install to, we need a 128mb FAT32 EFI partition at (sda1), a single ext4 (sda2) partition for the operating system and one linux-swap (sda3) partition. Right-click on the unallocated disk space to create the new partitions.

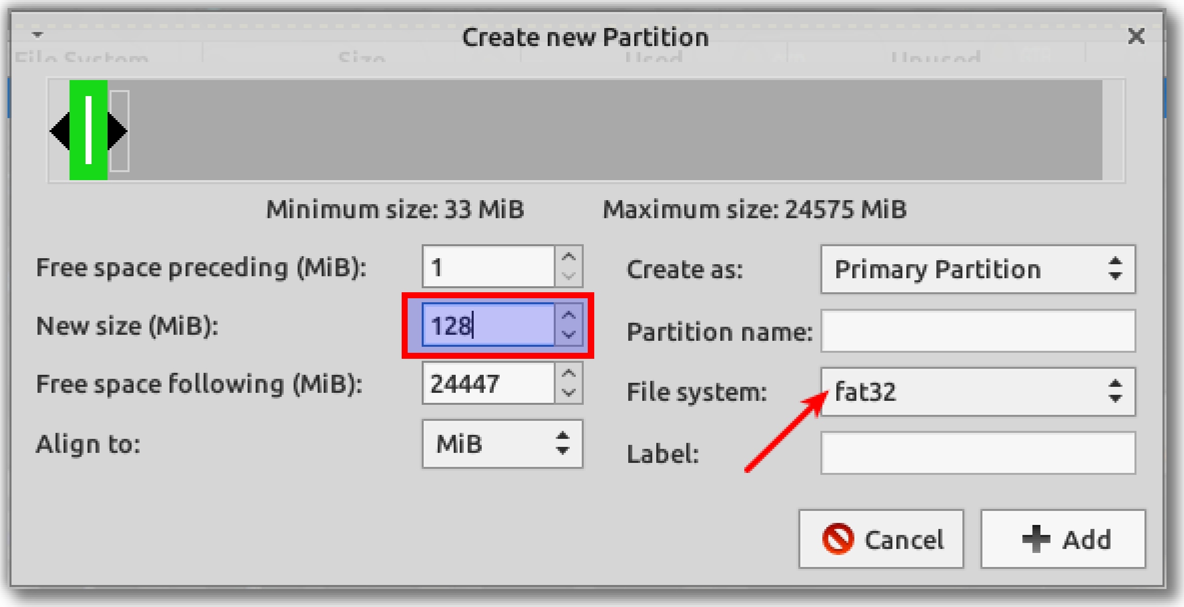


/dev/sda - GParted

Partition	File System	Size	Used	Unused	Flags
unallocated	unallocated	24.00 GiB			

0 operations pending

First create a 128mb primary partition and format it to FAT32, this will be the boot partition that contains the EFI boot files.



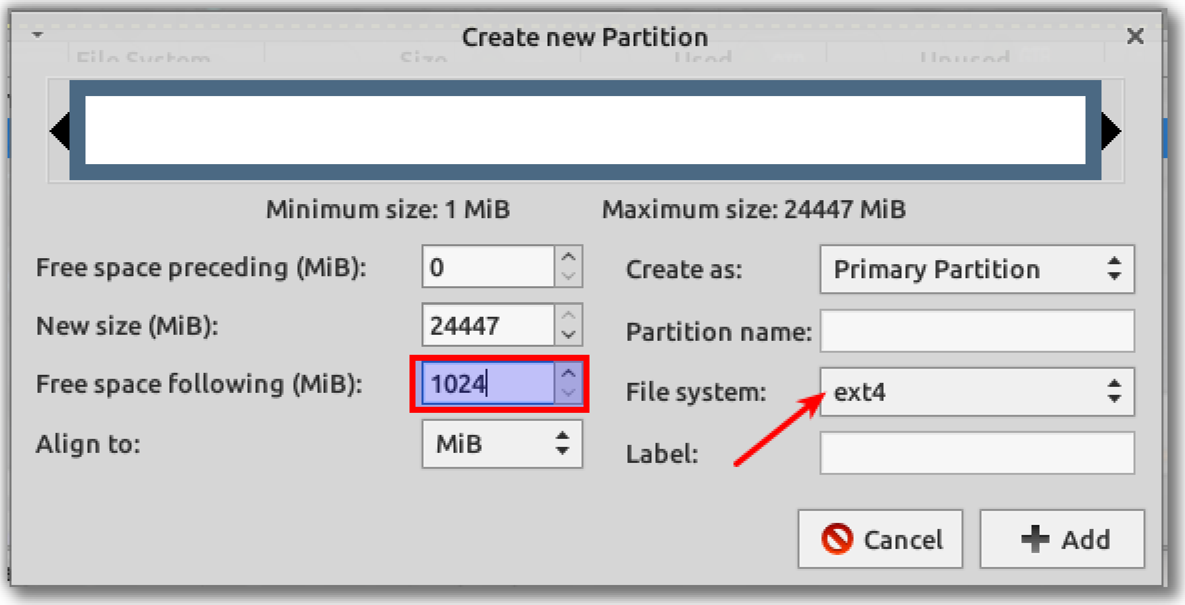
Create new Partition

Minimum size: 33 MiB
Maximum size: 24575 MiB

Free space preceding (MiB): 1
New size (MiB): 128
Free space following (MiB): 24447
Align to: MiB

Create as: Primary Partition
Partition name:
File system: fat32
Label:

Next create a primary partition and format it to ext4, create 1024mb of free space to follow to make room for a swap partition.



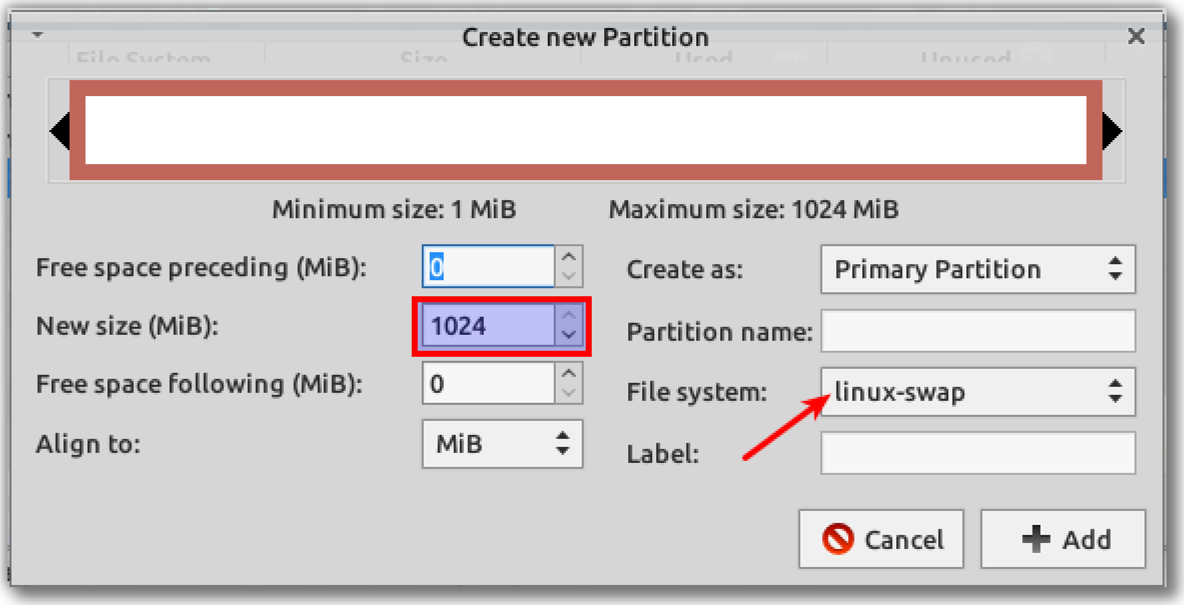
Create new Partition

Minimum size: 1 MiB
Maximum size: 24447 MiB

Free space preceding (MiB): 0
New size (MiB): 24447
Free space following (MiB): 1024
Align to: MiB

Create as: Primary Partition
Partition name:
File system: ext4
Label:

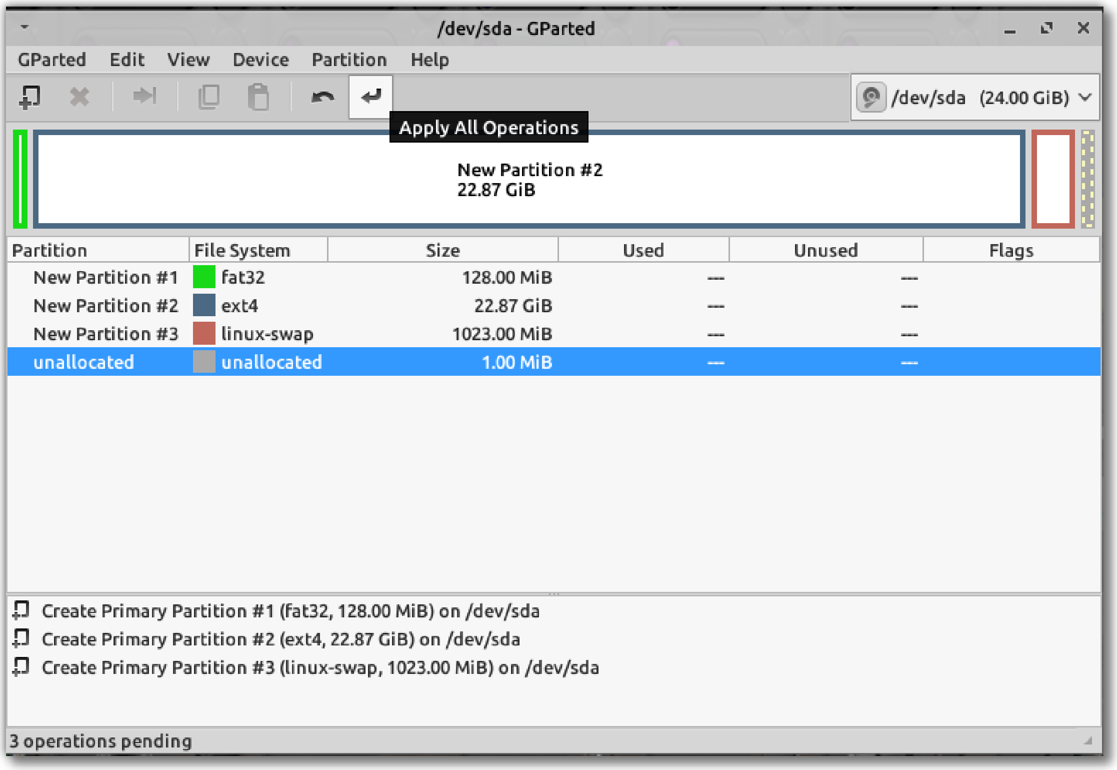
Lastly in the 1024mb of remaining unallocated space create a primary linux-swap partition.



Minimum size: 1 MiB Maximum size: 1024 MiB

Free space preceding (MiB):	0	Create as:	Primary Partition
New size (MiB):	1024	Partition name:	
Free space following (MiB):	0	File system:	linux-swap
Align to:	MiB	Label:	

Hit the Apply button to write the changes to disk.

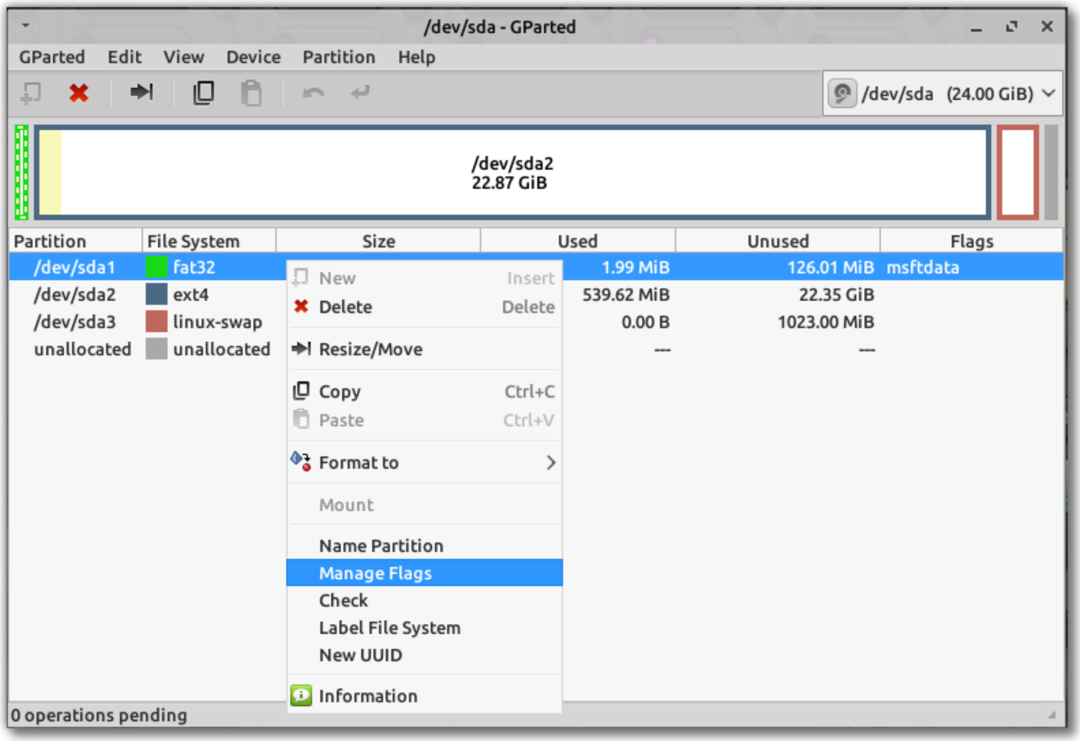


Partition	File System	Size	Used	Unused	Flags
New Partition #1	🟩 fat32	128.00 MiB	—	—	
New Partition #2	■ ext4	22.87 GiB	—	—	
New Partition #3	🟥 linux-swap	1023.00 MiB	—	—	
unallocated	■ unallocated	1.00 MiB	—	—	

Create Primary Partition #1 (fat32, 128.00 MiB) on /dev/sda
Create Primary Partition #2 (ext4, 22.87 GiB) on /dev/sda
Create Primary Partition #3 (linux-swap, 1023.00 MiB) on /dev/sda

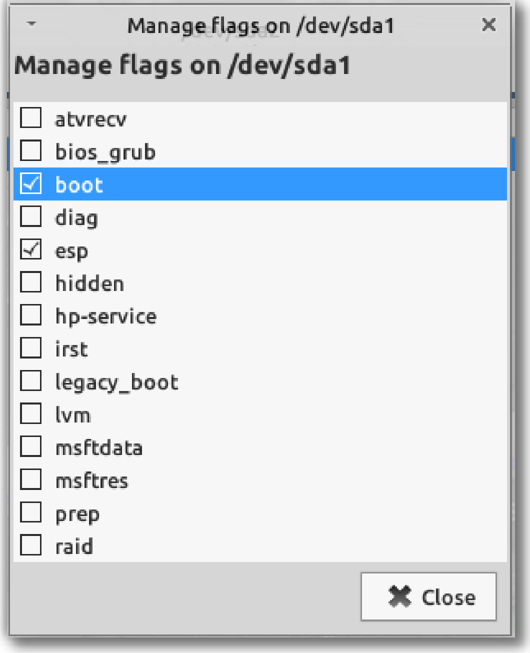
3 operations pending

Once the partitions have been successfully created and written to disk right-click on the (sda1) FAT32 partition select ‘Manage Flags’ from the menu and check off ‘boot’ this will automatically select ‘esp’.



Partition	File System	Size	Used	Unused	Flags
/dev/sda1	🟩 fat32		1.99 MiB	126.01 MiB	msftdata
/dev/sda2	▨ ext4		539.62 MiB	22.35 GiB	
/dev/sda3	🟥 linux-swap		0.00 B	1023.00 MiB	
unallocated	▨ unallocated		---	---	

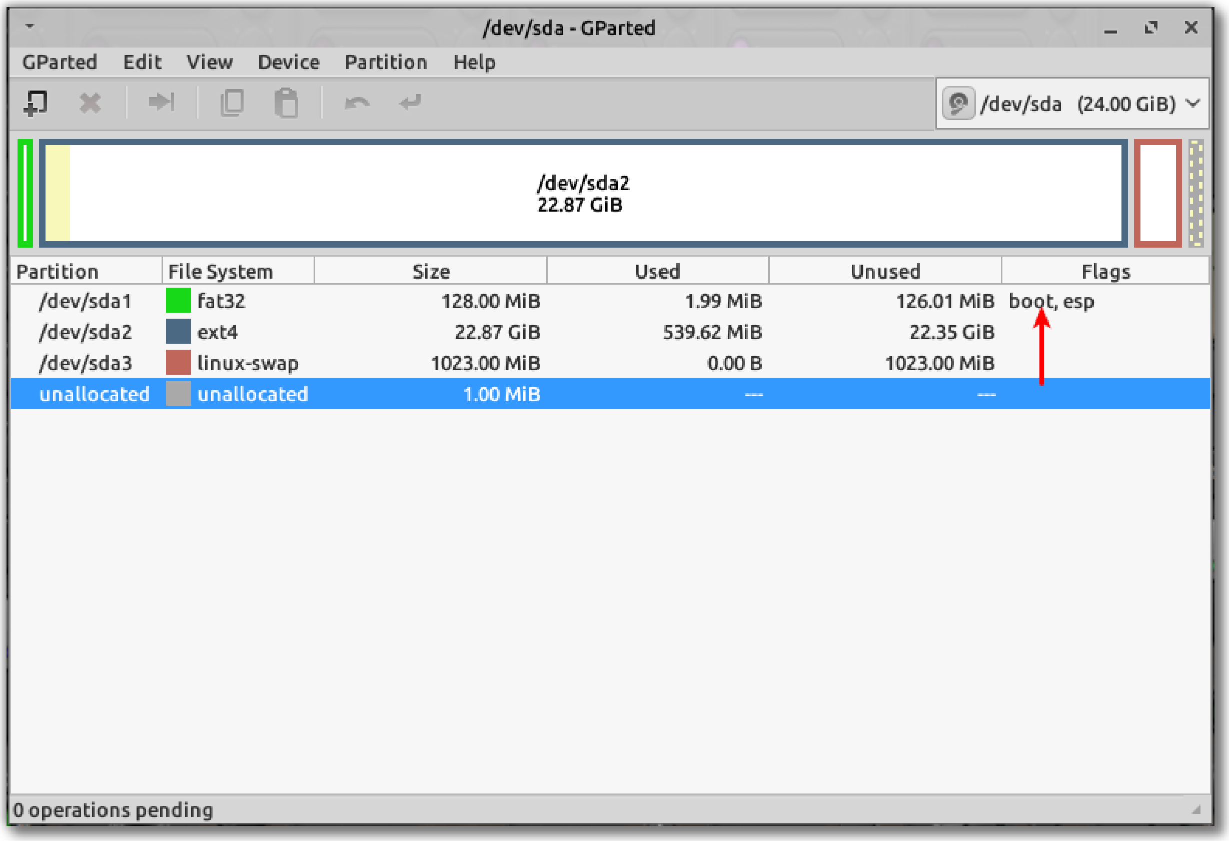
0 operations pending



Manage flags on /dev/sda1

- ☐ atvrecv
- ☐ bios_grub
- ☑ boot
- ☐ diag
- ☑ esp
- ☐ hidden
- ☐ hp-service
- ☐ irst
- ☐ legacy_boot
- ☐ lvm
- ☐ msftdata
- ☐ msftres
- ☐ prep
- ☐ raid

Now all partitions will be visible in the main Gparted window, once you have verified that they are created correctly you can close Gparted and move on to installation with Systemback.

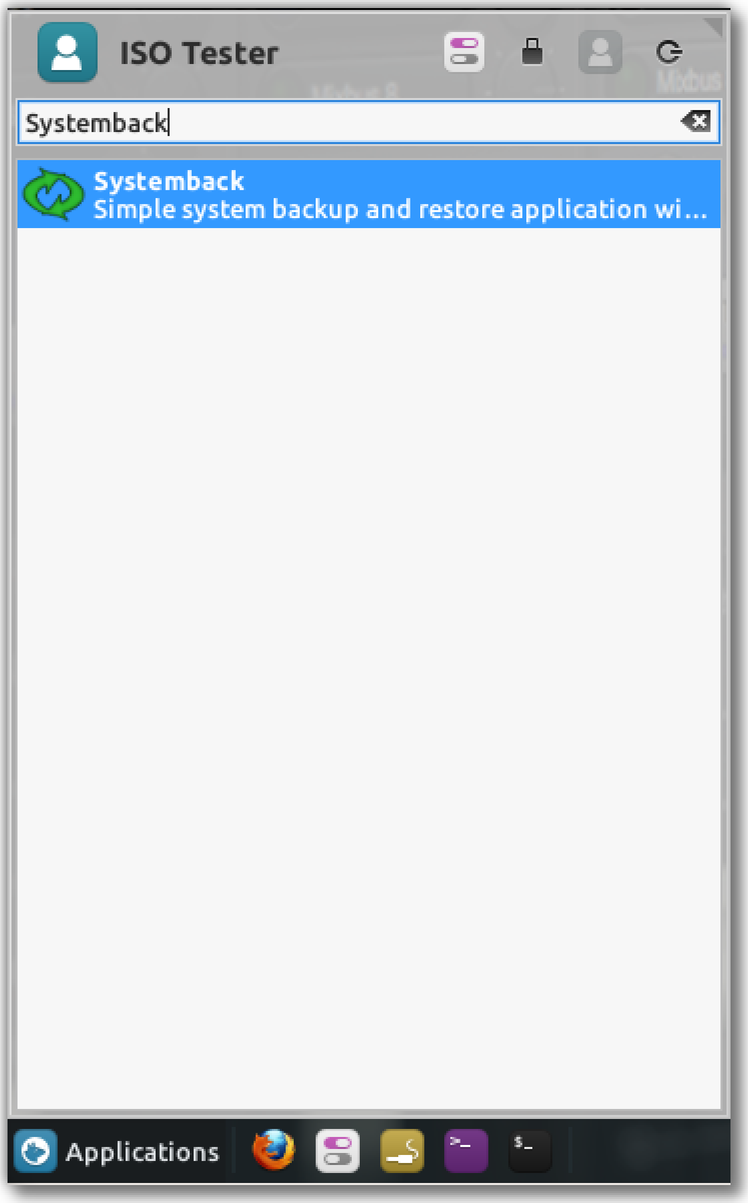


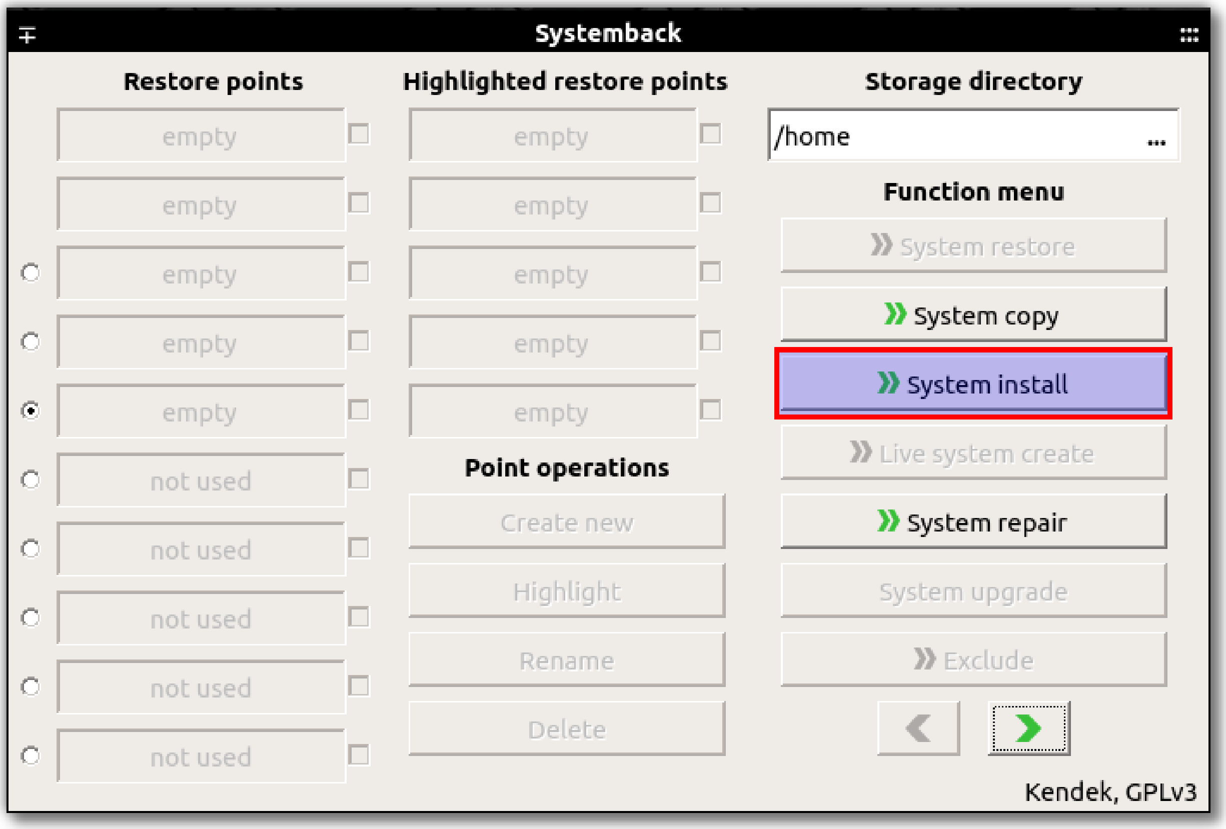
/dev/sda (24.00 GiB)

Partition	File System	Size	Used	Unused	Flags
/dev/sda1	🟩 fat32	128.00 MiB	1.99 MiB	126.01 MiB	boot, esp
/dev/sda2	🟦 ext4	22.87 GiB	539.62 MiB	22.35 GiB	
/dev/sda3	🟥 linux-swap	1023.00 MiB	0.00 B	1023.00 MiB	
unallocated	⬜ unallocated	1.00 MiB	---	---	

0 operations pending

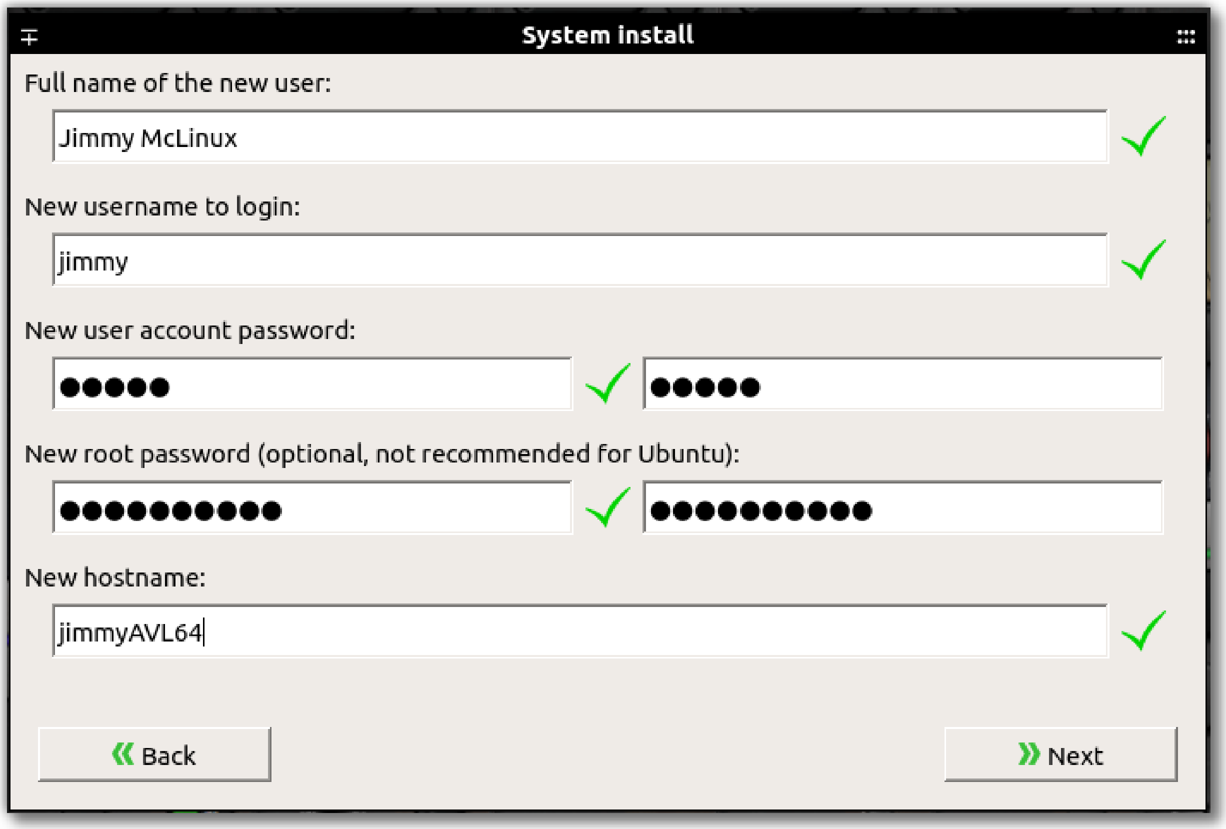
Now that the hard drive has been partitioned we are ready to use Systemback to install AV Linux from the Live session to the Hard Drive. Launch Systemback from the Whisker menu and click on the 'System Install' button.





Storage directory: /home

Enter your name, Username and a separate and distinct password for your User and the root User, you can also create a hostname, this is the name the computer will display on a network and at the terminal prompt.



Full name of the new user:

Jimmy McLinux ✓

New username to login:

jimmy ✓

New user account password:

●●●●● ✓ ●●●●●

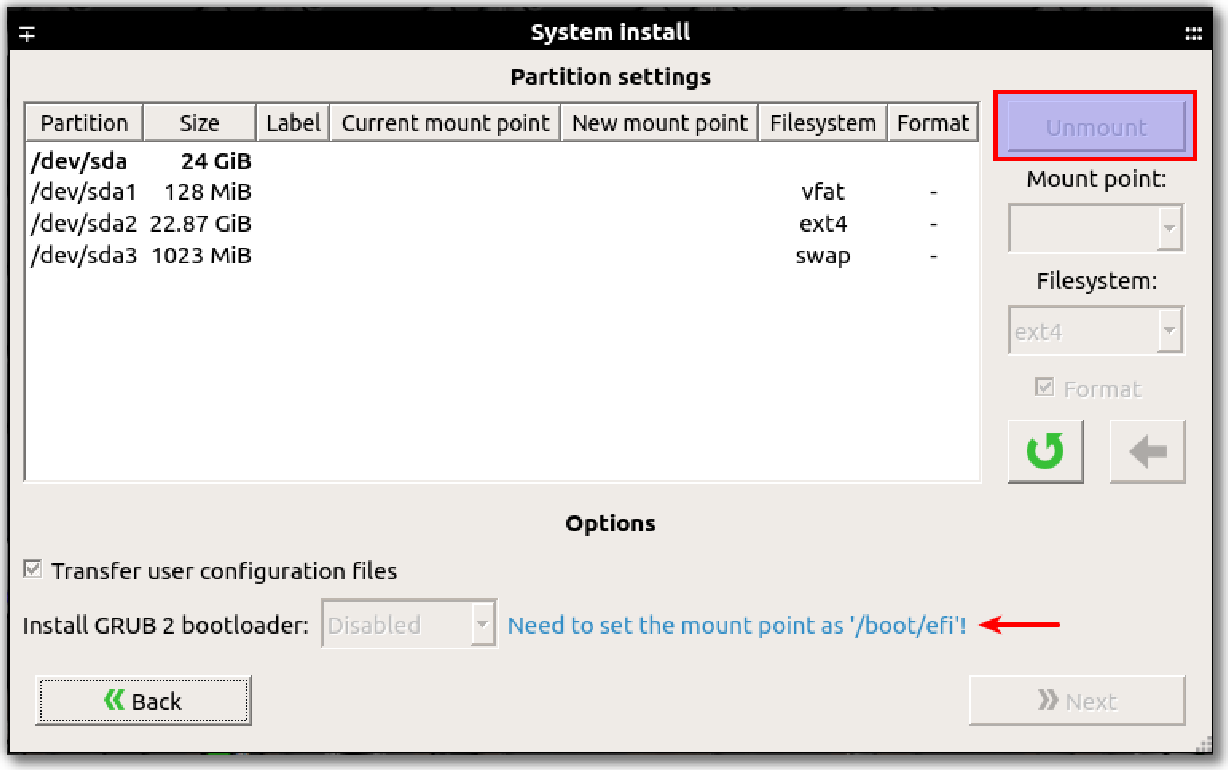
New root password (optional, not recommended for Ubuntu):

●●●●●●●●●●● ✓ ●●●●●●●●●●●

New hostname:

jimmyAVL64 ✓

In the 'Partition Settings' window we set up the partitions and mount points for install. Before we get to that in an UEFI install it should be noted that the 'Install GRUB 2 bootloader' dropdown is greyed out but beside it Systemback hints that we need to set a mount point as '/boot/efi'. This is pertaining to the first FAT32 (sda1) partition.



System install

Partition settings

Partition	Size	Label	Current mount point	New mount point	Filesystem	Format
/dev/sda	**24 GiB**					
/dev/sda1	128 MiB				vfat	-
/dev/sda2	22.87 GiB				ext4	-
/dev/sda3	1023 MiB				swap	-

Mount point:

Filesystem: ext4

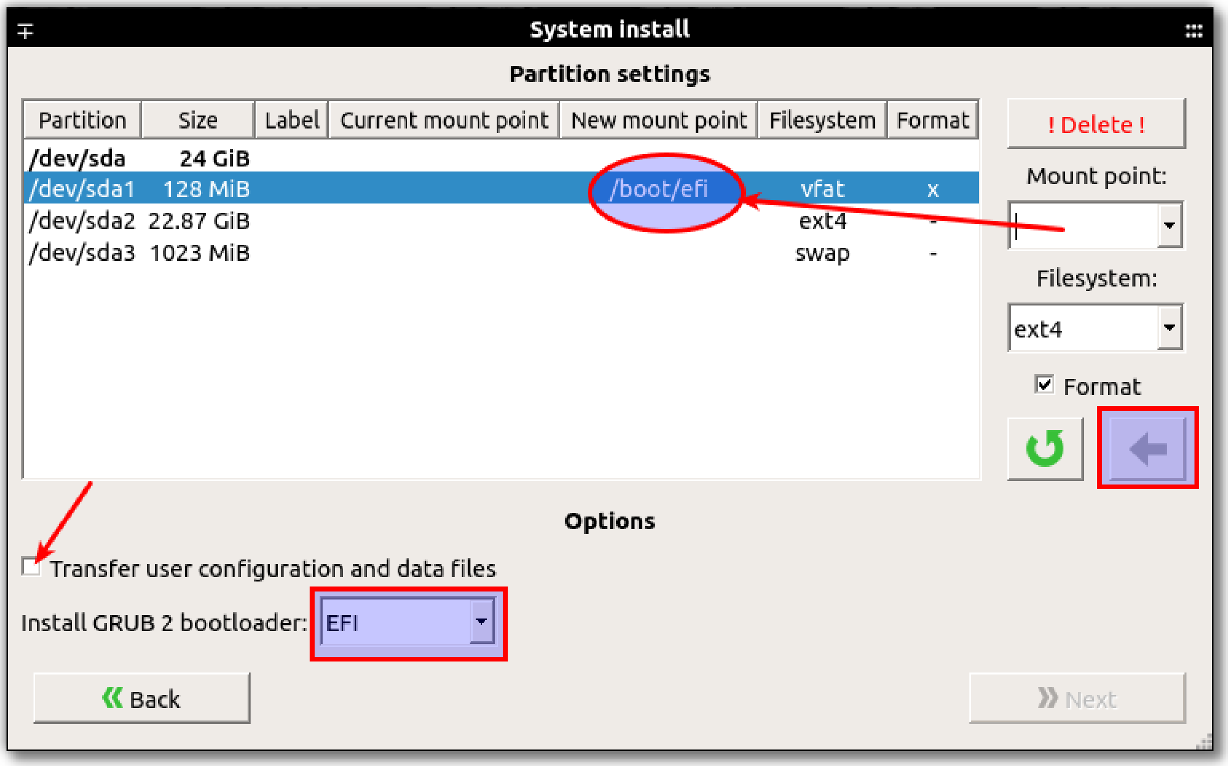
☑ Format

Options

☑ Transfer user configuration files

Install GRUB 2 bootloader: Disabled Need to set the mount point as '/boot/efi'!

In the example below we select and set the mount point for the intended EFI FAT32 (sda1) partition as '/boot/efi' and check 'Format' to clear the partition, once you have set the mount point click the green arrow button to apply the settings. You will notice that once you have applied the settings the GRUB 2 bootloader dropdown will change from greyed out to 'EFI'. It is also suggested to uncheck 'Transfer User configuration and data files' to allow some system defaults to incorporated in the install.



Partition	Size	Label	Current mount point	New mount point	Filesystem	Format
/dev/sda	**24 GiB**					
/dev/sda1	128 MiB			/boot/efi	vfat	x
/dev/sda2	22.87 GiB				ext4	-
/dev/sda3	1023 MiB				swap	-

Mount point:

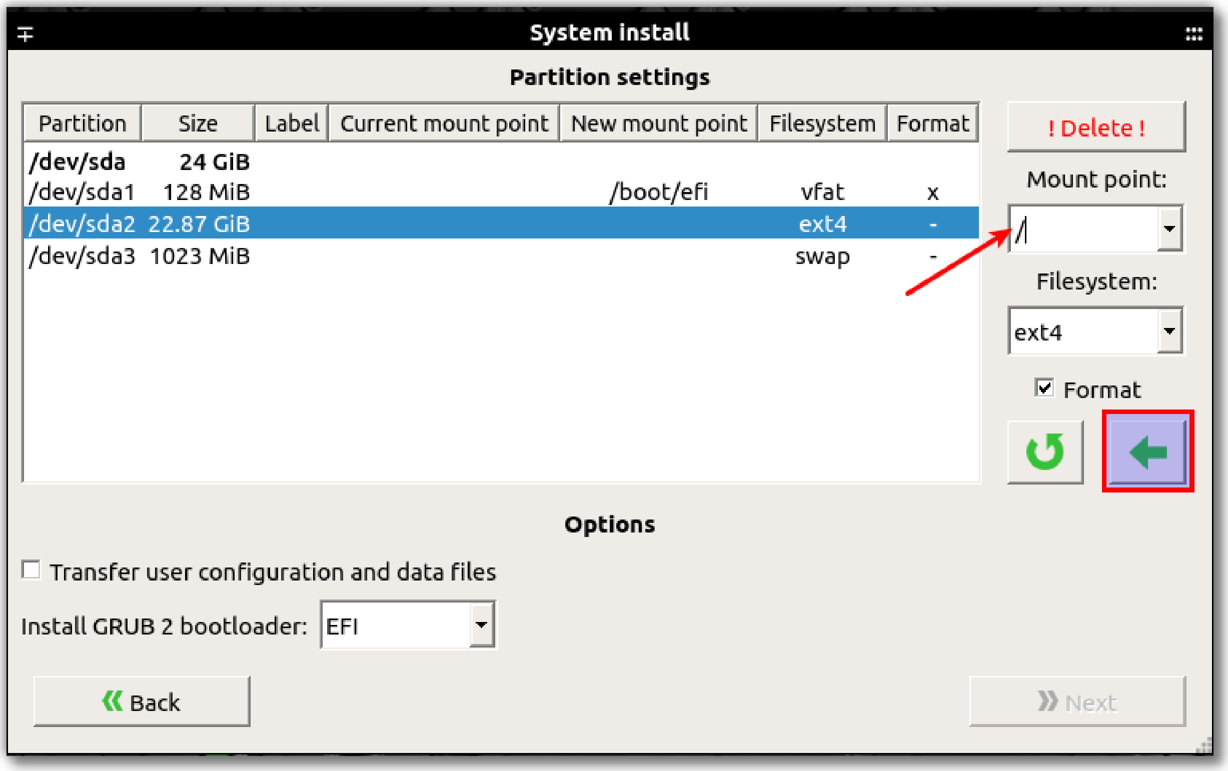
Filesystem: ext4

☑ Format

☐ Transfer user configuration and data files

Install GRUB 2 bootloader: EFI

Next set the mount point of the ext4 (sda2) partition to '/' and apply it with the green arrow.



Partition settings

Partition	Size	Label	Current mount point	New mount point	Filesystem	Format
/dev/sda	**24 GiB**					
/dev/sda1	128 MiB			/boot/efi	vfat	x
/dev/sda2	22.87 GiB				ext4	-
/dev/sda3	1023 MiB				swap	-

Mount point: /

Filesystem: ext4

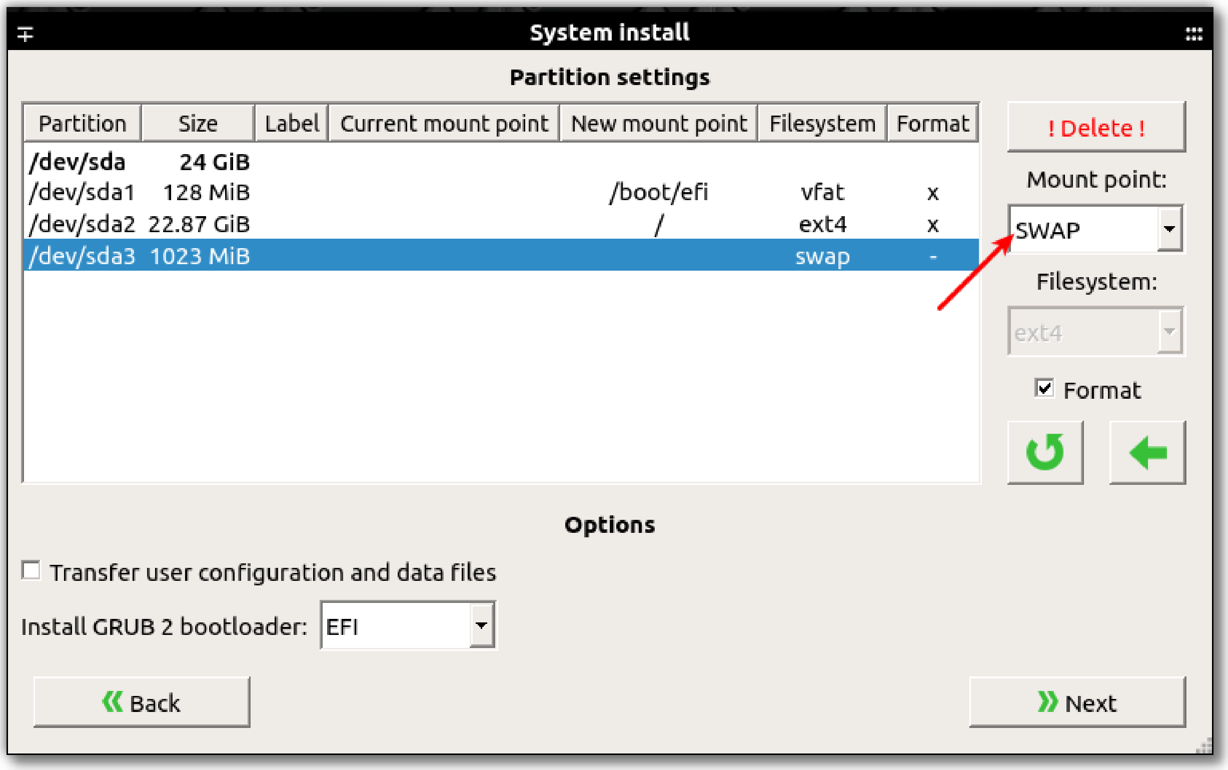
☑ Format

Options

□ Transfer user configuration and data files

Install GRUB 2 bootloader: EFI

Lastly set the mount point of the linux-swap (sda3) partition to 'SWAP' and apply it with the green arrow. Now that all partitions are set up and you can proceed with the install.



System install

Partition settings

Partition	Size	Label	Current mount point	New mount point	Filesystem	Format
/dev/sda	**24 GiB**					
/dev/sda1	128 MiB			/boot/efi	vfat	x
/dev/sda2	22.87 GiB			/	ext4	x
/dev/sda3	1023 MiB				swap	-

! Delete !

Mount point: SWAP

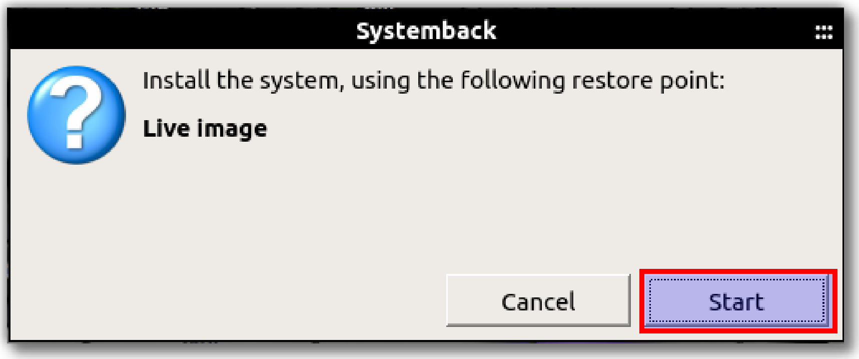
Filesystem: ext4

☑ Format

Options

□ Transfer user configuration and data files

Install GRUB 2 bootloader: EFI

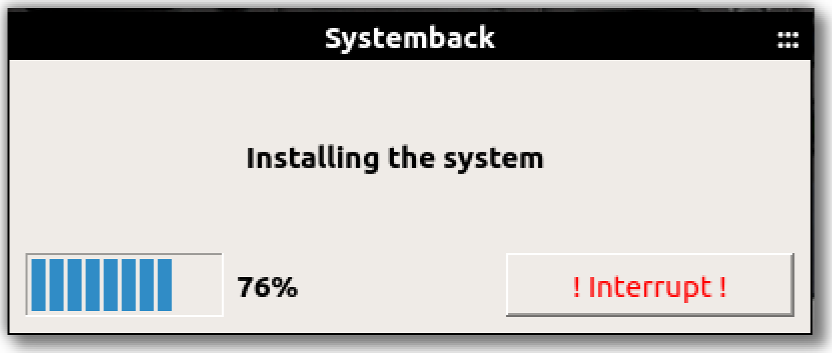


Systemback

Install the system, using the following restore point:

Live image

Installation from USB key should take 20 minutes or less and will also look after installing the GRUB 2 bootloader to the ‘EFI’ folder.

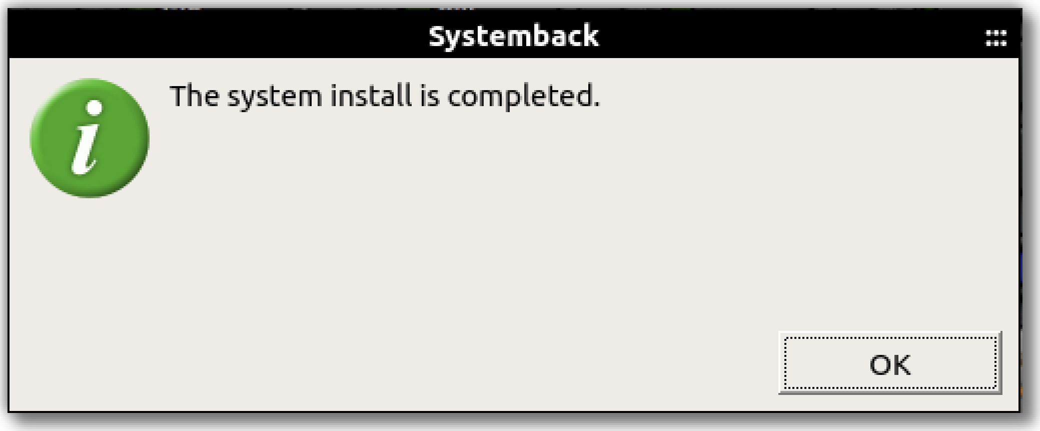


Systemback

Installing the system

76%

Once the system install has completed you can close Systemback and boot into your new system whenever you are ready!



Systemback

The system install is completed.

***Last Resort Manual GRUB-efi install in case the above doesn’t work.**

Reboot AVLinux Live from USB, this step is important because running from the Live USB will allow us to make changes to the partitions we created previously.

Mount the ext4 sda2 partition:

```
mount /dev/sda2 /mnt
```

Mount the FAT32 sda1 partition:

```
mount /dev/sda1 /mnt/boot
```

Now run this command:

```
for i in /dev /dev/pts /proc /sys /run; do sudo mount -B $i /mnt$i; done
```

Now change root on the /mnt directory:

```
chroot /mnt
```

Mount sda1:

```
mount /dev/sda1 /boot/efi
```

Install/Reinstall grub-efi:

```
apt-get install --reinstall grub-efi
```

Install grub to the partitioned drive:

```
grub-install /dev/sda
```

Make grub generate the changes in it’s config

```
update-grub
```

Verify the install:

```
efibootmgr --verbose | grep debian
```

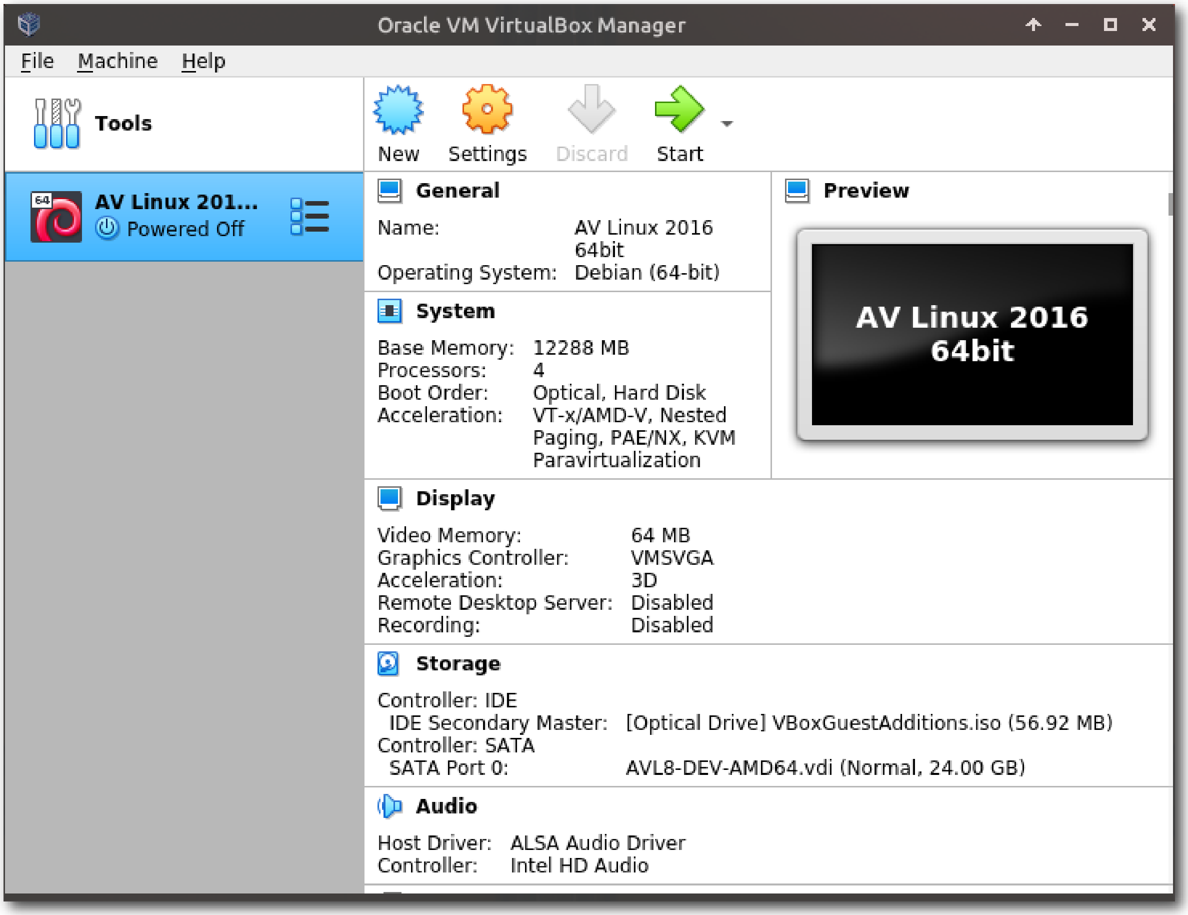
References:

https://help.ubuntu.com/community/Grub2/Installing#via_ChRoot
https://wiki.debian.org/GrubEFIReinstall

POST-INSTALL VIRTUALBOX GUEST ADDITIONS REMOVAL :

AV Linux is built in Virtualbox ‘Virtual Machines’ and utilizes ‘Guest Additions’ for full functionality with the Host machine. The Guest Additions modules are left in AV Linux because they don’t do any harm and are actually useful to people who may try AV Linux out in Virtualbox. When AV Linux boots on a computer that isn’t a Virtualbox host the modules are not initialized and will display a notification on when logging in to the Desktop and will aslo display a red warning in the kernel boot progress text. These notifications and warnings are harmless and will not impact performance at all.

It is important to note that the Virtualbox Guest Additions are now automatically removed when Live booting or installing AV Linux on computer hardware systems, installations in Virtualbox Virtual Machines will retain the Guest Additions for convenience.



General

Name: AV Linux 2016 64bit
Operating System: Debian (64-bit)

System

Base Memory: 12288 MB
Processors: 4
Boot Order: Optical, Hard Disk
Acceleration: VT-x/AMD-V, Nested Paging, PAE/NX, KVM Paravirtualization

Display

Video Memory: 64 MB
Graphics Controller: VMSVGA
Acceleration: 3D
Remote Desktop Server: Disabled
Recording: Disabled

Storage

Controller: IDE
IDE Secondary Master: [Optical Drive] VBoxGuestAdditions.iso (56.92 MB)
Controller: SATA
SATA Port 0: AVL8-DEV-AMD64.vdi (Normal, 24.00 GB)

Audio

Host Driver: ALSA Audio Driver
Controller: Intel HD Audio

IMPORTANT POST-INSTALL STEPS :

Changing the Default Language :

AV Linux is created and developed in my native Canadian English language so unsurprisingly the default Language is Canadian English:

```
LANGUAGE=en_CA:en
LANG=en_CA.UTF-8
```

It is important to note that changing AV Linux to a different language than the default is a combination of changing the default language and using the 'AV Linux Assistant' to install new Locales. If you do change the default Language please note that many of the convenience features in AV Linux (AV Linux Assistant, Quick Update Utility, Custom Scripts etc.) will remain in English because they are unique to AV Linux and not translated into any other languages.

In order to change to another language you need to know the two letter country code for your country, some common examples are 'FR' for French, 'ES' for Spanish, 'DE' for German and 'JP' for Japanese. If you don't know your country code you can find it here. Once you know the two letter code then you can change it in a Root Terminal with this command (using Spanish as an example):

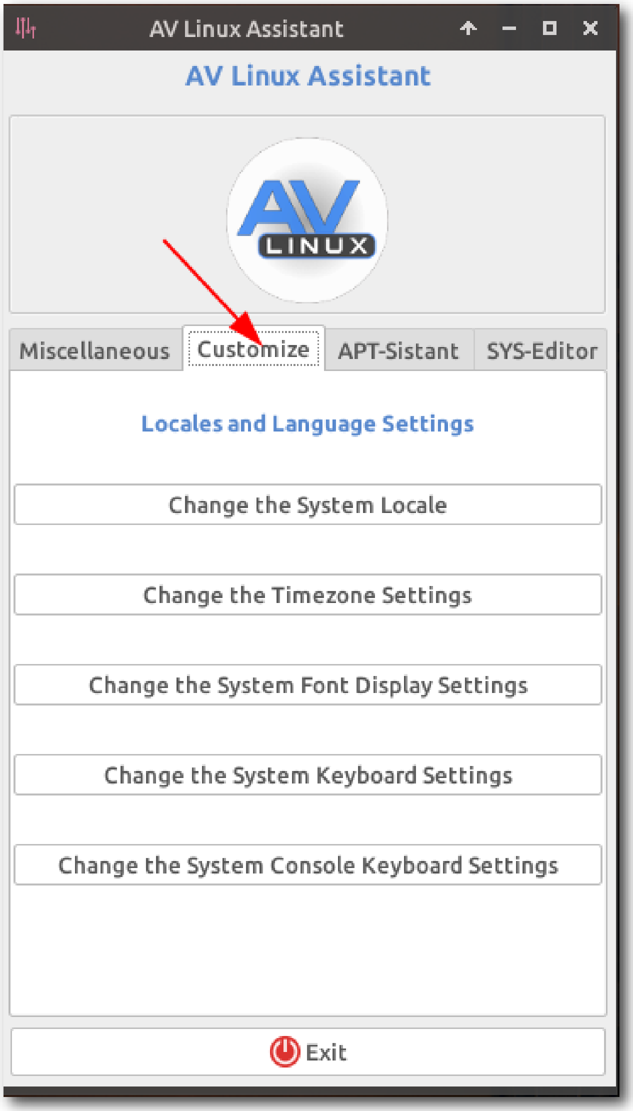
```
export LANG=es_ES.UTF-8
```

For further information on changing the default System language please read this page from the Debian Wiki:

https://wiki.debian.org/ChangeLanguage

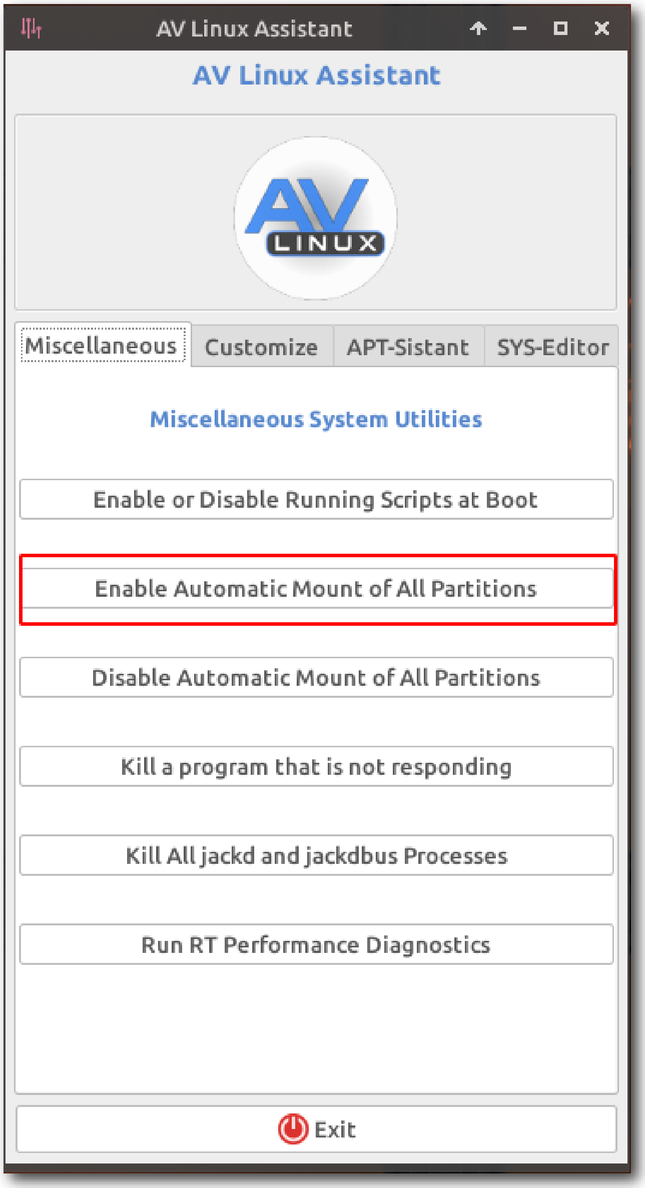
Post-Install Setup of Locales using the AV Linux Assistant :

The Systemback installer used to install the Live system to HDD simply copies the running Live session as-is. If you require a different locale, language and keyboard layout once AV Linux is installed you can use the ‘Customize’ Tab of the 'AV Linux Assistant' to assist you with adding your locale and changing the system keyboard settings.


AV Linux Assistant
AV Linux Assistant
AV
LINUX
Miscellaneous
Customize
APT-Sistant
SYS-Editor
Locales and Language Settings
Change the System Locale
Change the Timezone Settings
Change the System Font Display Settings
Change the System Keyboard Settings
Change the System Console Keyboard Settings
Exit

Enabling Automatic Mount of External Partitions :

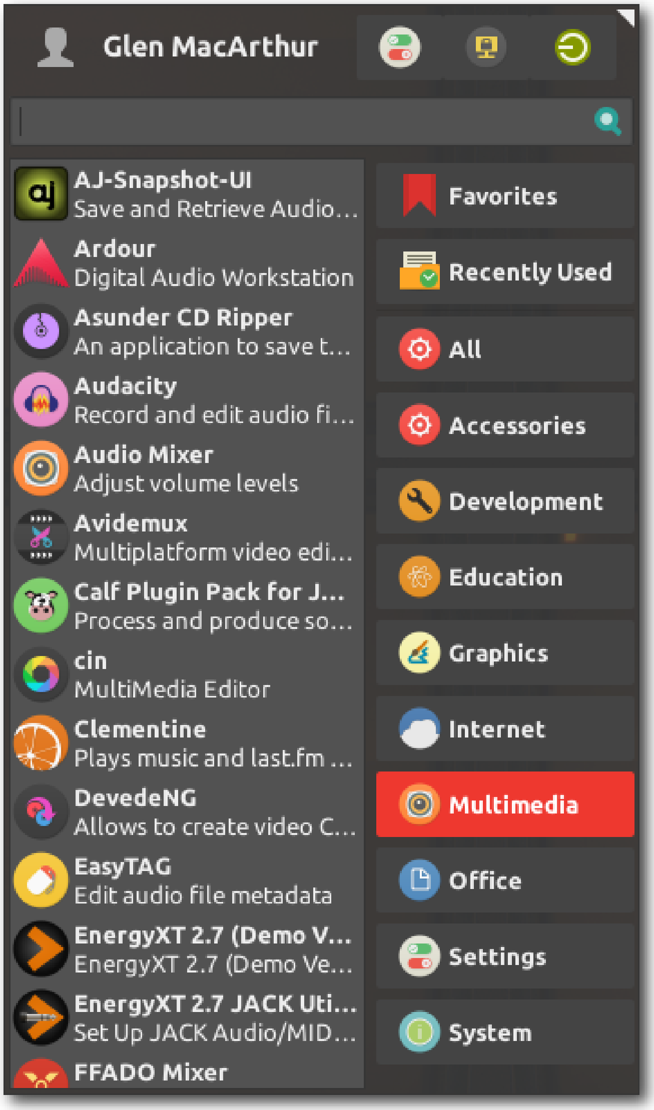
Previous versions of AV Linux would mount any external drives and partitions on the system automatically at boot, not everyone liked this feature and some had security concerns about all their system data being instantly available to a Live system so this feature is disabled in AV Linux 2020 and can be re-enabled after installing in the Miscellaneous tab of the ‘AV Linux Assistant’. The system must be rebooted for the setting to take effect.


AV Linux Assistant
AV Linux Assistant
AV LINUX
Miscellaneous
Customize
APT-Sistant
SYS-Editor
Miscellaneous System Utilities
Enable or Disable Running Scripts at Boot
Enable Automatic Mount of All Partitions
Disable Automatic Mount of All Partitions
Kill a program that is not responding
Kill All jackd and jackdbus Processes
Run RT Performance Diagnostics
Exit

WHISKER MENU :

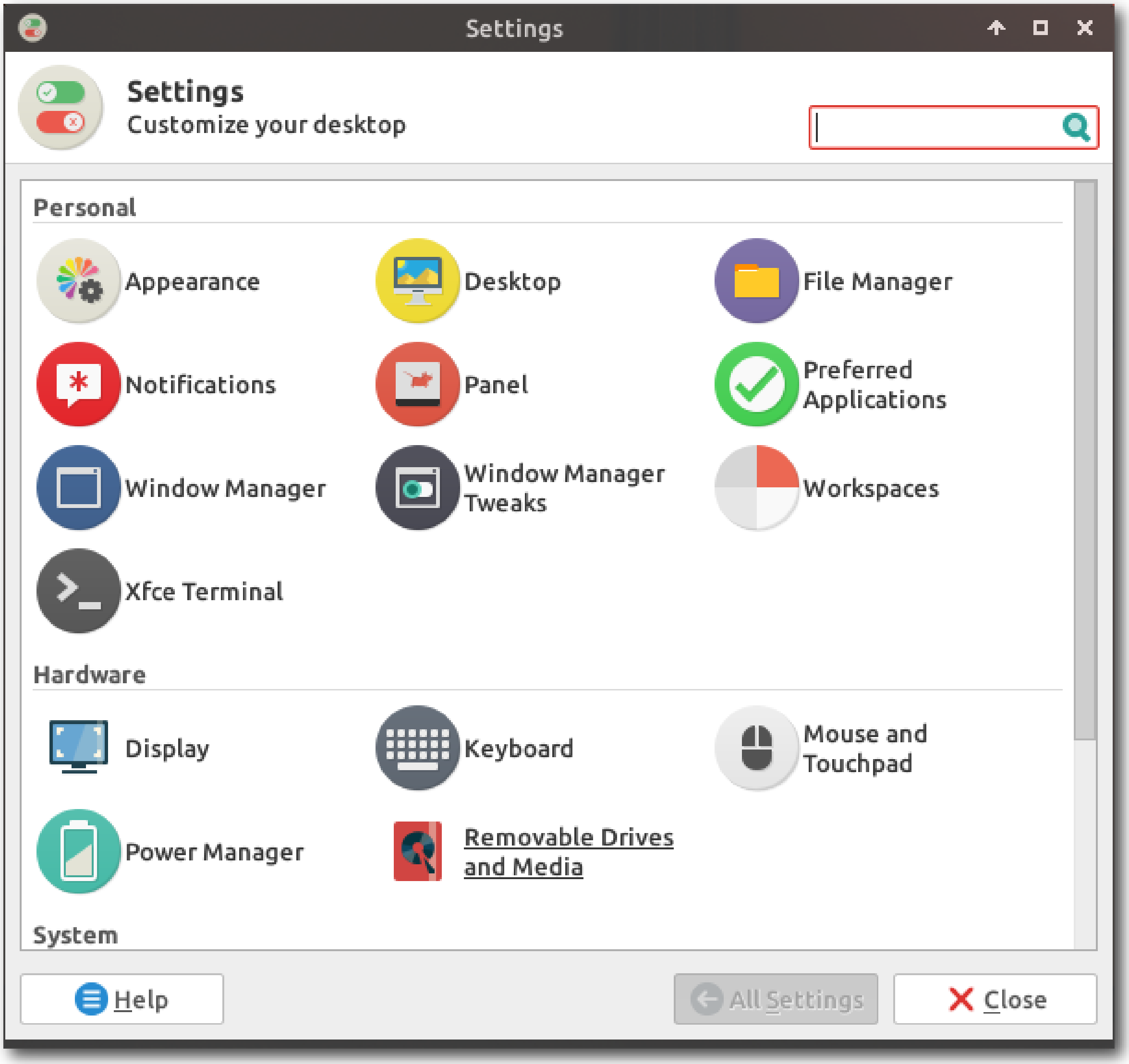
Customized Menu :

AV Linux 2020 uses the XFCE4 'Whisker Menu' which allows you to browse Applications as you would in a regular Menu as well as providing a Search bar that you can type the name of the Application into.

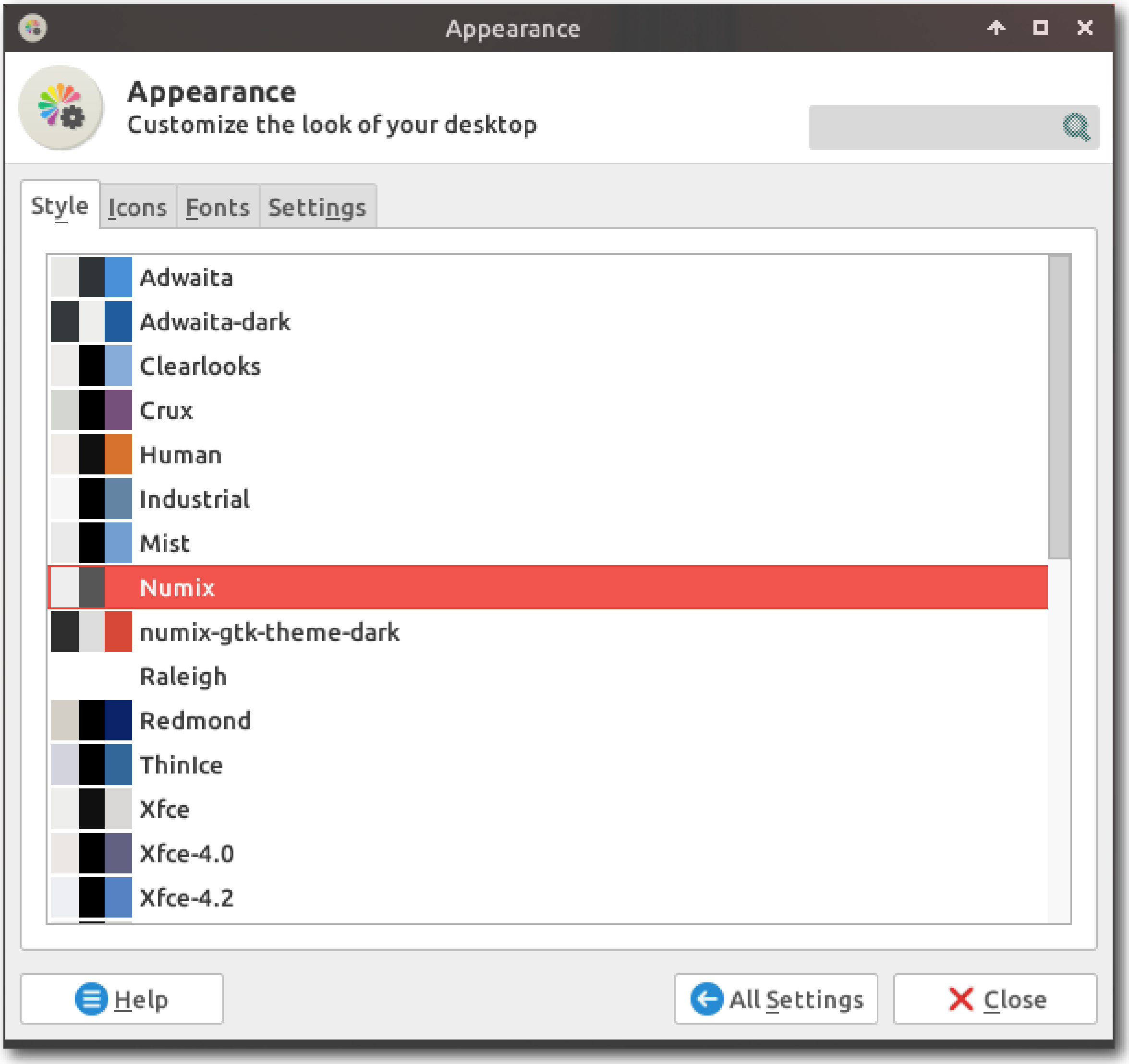


XFCE4 SETTINGS :

The settings for XFCE4 are accessed by using the 'Settings Manager'. Find it by either typing 'Settings' in the Whisker Menu search bar or navigate to 'Settings' → 'Settings Manager'.



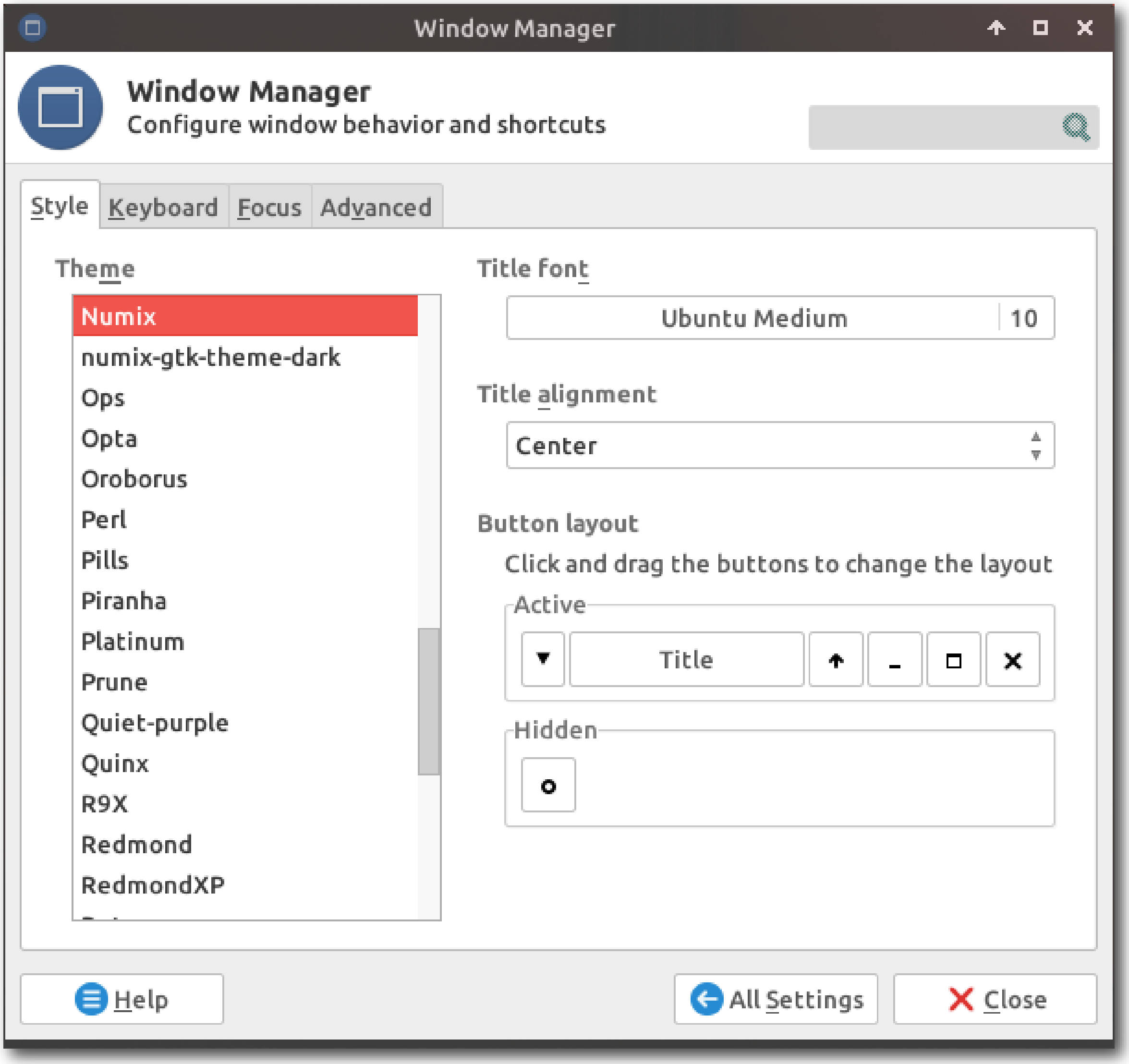
You can change how the system looks with the 'Appearance' settings. This will allow you to set the GTK theme, system icons, system fonts and some menu related items. AV Linux comes pre-loaded with a large amount of themes and colors to choose from.



Appearance
Customize the look of your desktop

- Adwaita
- Adwaita-dark
- Clearlooks
- Crux
- Human
- Industrial
- Mist
- Numix
- numix-gtk-theme-dark
- Raleigh
- Redmond
- ThinIce
- Xfce
- Xfce-4.0
- Xfce-4.2

The Window Manager themes are not set in the 'Appearance' dialog, they have a separate 'Window Manager' applet in the Settings Manager.



Window Manager

Configure window behavior and shortcuts

Theme: Numix

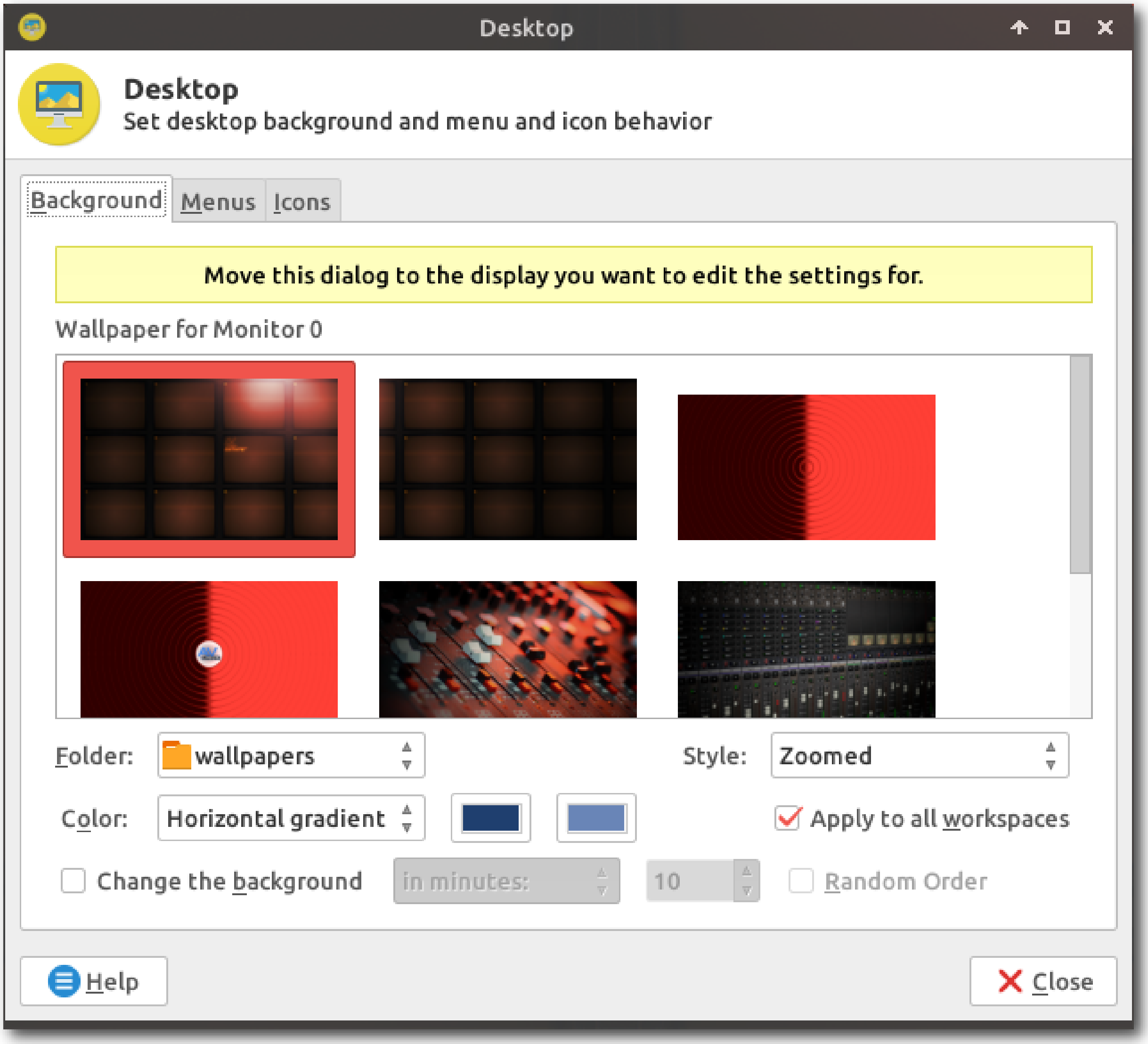
Title font: Ubuntu Medium 10

Title alignment: Center

Button layout

Click and drag the buttons to change the layout

Change your Desktop wallpaper and other settings with the 'Desktop' applet in the Settings Manager or right-click on the Desktop and select 'Desktop Settings' from the Menu. Most common image file formats will also give you the ability to 'Set As Wallpaper' when you right-click on them.



Desktop

Desktop

Set desktop background and menu and icon behavior

Move this dialog to the display you want to edit the settings for.

Wallpaper for Monitor 0

Folder: wallpapers

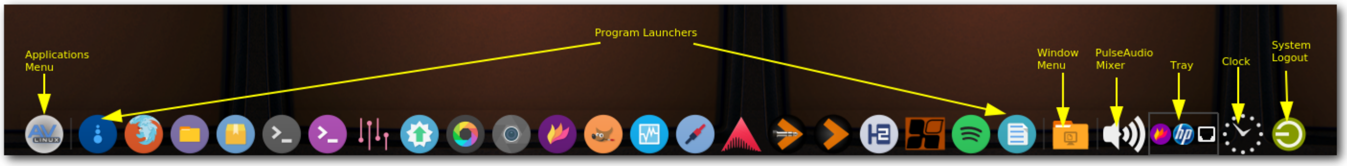
Style: Zoomed

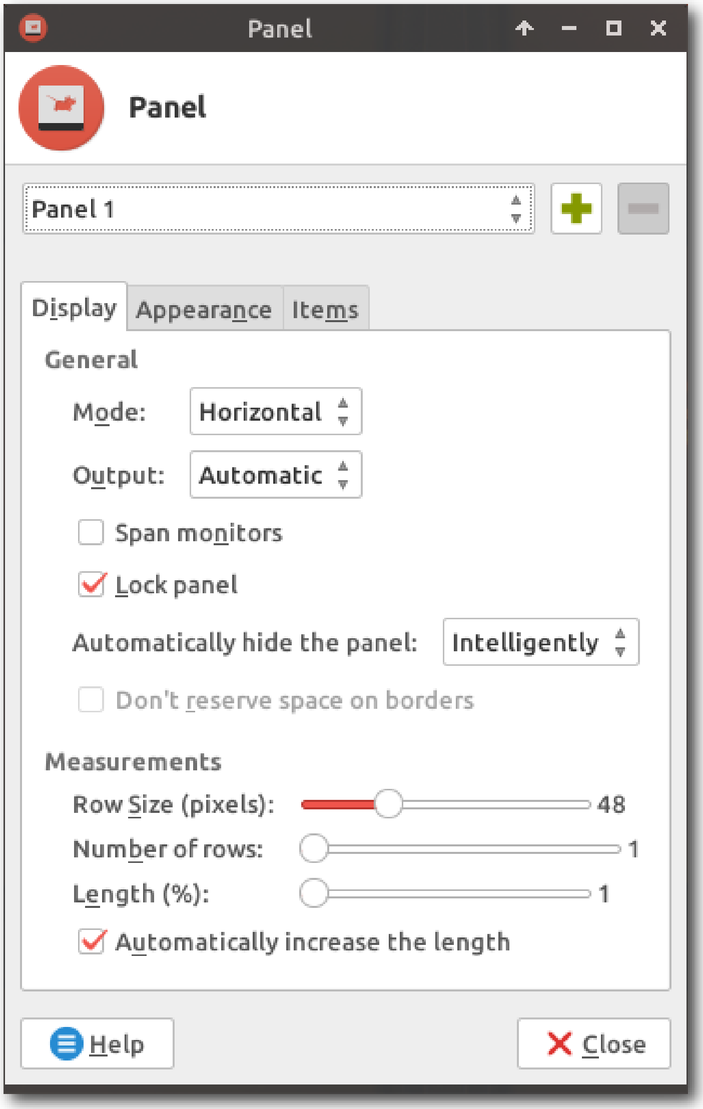
Color: Horizontal gradient

☑ Apply to all workspaces

☐ Change the background in minutes: 10 ☐ Random Order

The XFCE4 Panel at the bottom of the Desktop screen combines access to the menu with program launchers, a window menu, PulseAudio sound mixer, notification tray, system clock and session logout buttons. By default the menu is set up to look like a “Dock” but right-clicking on any item on the Panel and selecting ‘Panel’ → ‘Panel Preferences’ will open a window to configure the Panel however you want.





Panel 1

General

Mode: Horizontal

Output: Automatic

☐ Span monitors

☑ Lock panel

Automatically hide the panel: Intelligently

☐ Don't reserve space on borders

Measurements

Row Size (pixels): 48

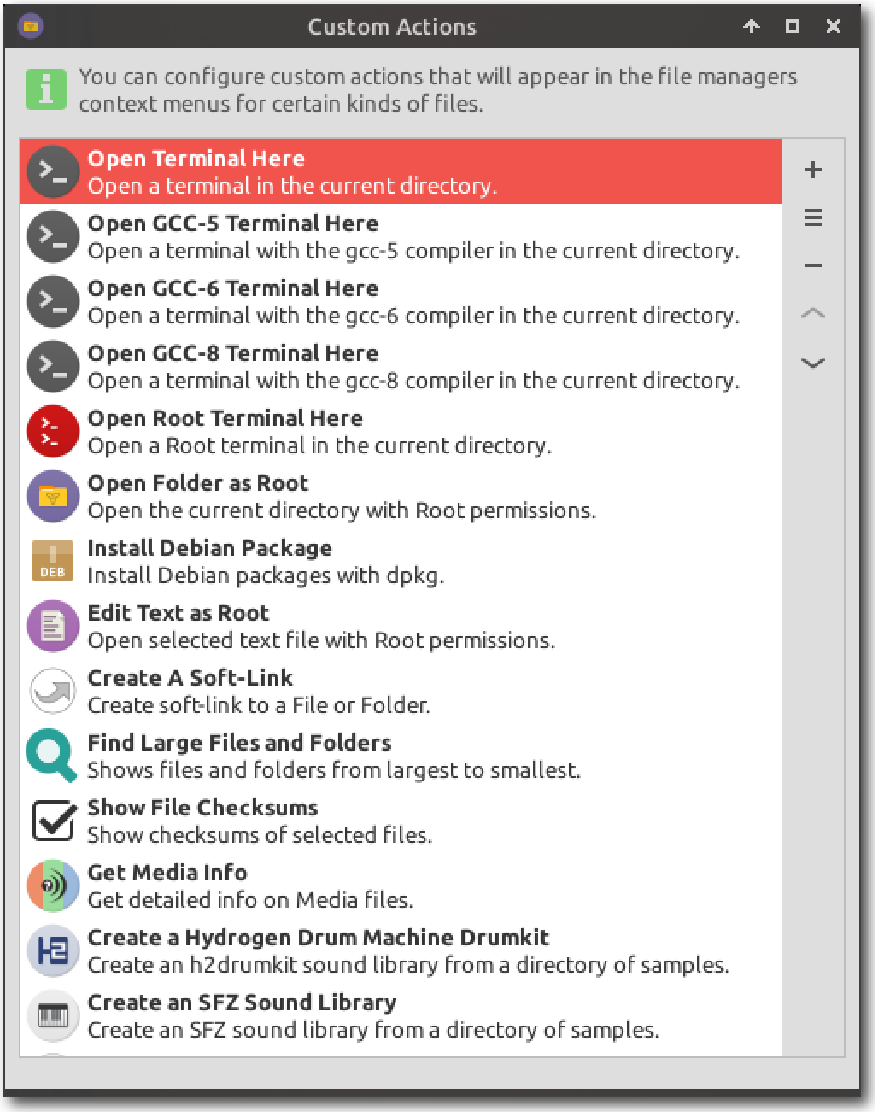
Number of rows: 1

Length (%): 1

☑ Automatically increase the length

THUNAR FILE MANAGER :

The Thunar File Manager included in AV Linux has been customized and extended with Custom Actions to do MUCH more than simply manage files. As you navigate the System you will see there are numerous options when you right-click on the Desktop and in folders , more different options appear when you right-click on certain file types. Custom Actions enable many tasks including system administration, media playing, media conversions, networking and much more! A summary of the Custom Actions is shown below, most options are self-explanatory. Some will be explained further on following pages.



Custom Actions

You can configure custom actions that will appear in the file managers context menus for certain kinds of files.

Open Terminal Here
Open a terminal in the current directory.

Open GCC-5 Terminal Here
Open a terminal with the gcc-5 compiler in the current directory.

Open GCC-6 Terminal Here
Open a terminal with the gcc-6 compiler in the current directory.

Open GCC-8 Terminal Here
Open a terminal with the gcc-8 compiler in the current directory.

Open Root Terminal Here
Open a Root terminal in the current directory.

Open Folder as Root
Open the current directory with Root permissions.

Install Debian Package
Install Debian packages with dpkg.

Edit Text as Root
Open selected text file with Root permissions.

Create A Soft-Link
Create soft-link to a File or Folder.

Find Large Files and Folders
Shows files and folders from largest to smallest.

Show File Checksums
Show checksums of selected files.

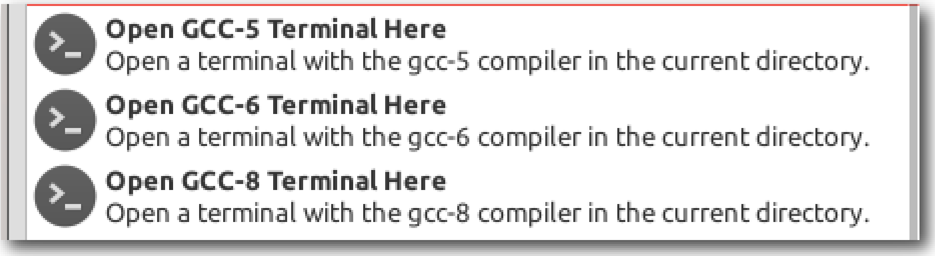
Get Media Info
Get detailed info on Media files.

Create a Hydrogen Drum Machine Drumkit
Create an h2drumkit sound library from a directory of samples.

Create an SFZ Sound Library
Create an SFZ sound library from a directory of samples.

Choice of Compilers :

A unique Custom Action feature of interest to developers and those who like to compile their own programs is the ability to choose which 'gcc' version to compile software source code with. This not a common requirement for end-users but may be handy for developers who need to compile older programs or compile with a gcc version which provides greater compatibility with other outside systems. Don't forget AV Linux is OOTB developer-friendly containing most common build systems, source code tools and development libraries.



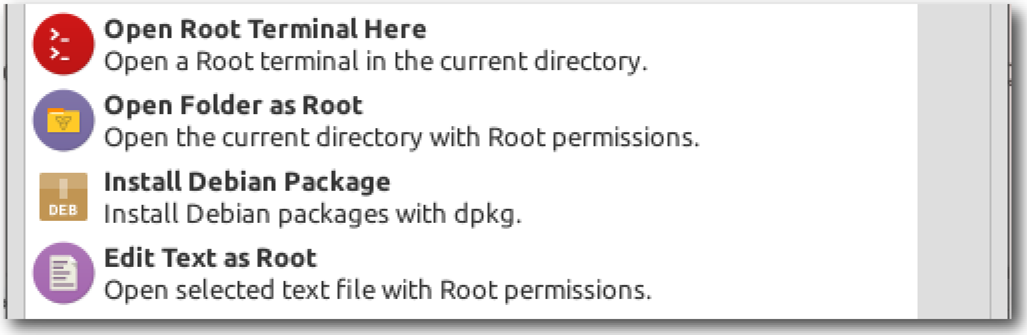
Open GCC-5 Terminal Here
Open a terminal with the gcc-5 compiler in the current directory.

Open GCC-6 Terminal Here
Open a terminal with the gcc-6 compiler in the current directory.

Open GCC-8 Terminal Here
Open a terminal with the gcc-8 compiler in the current directory.

Root Custom Actions (USE CAUTION!) :

For those who need to administrate their system and make changes outside of their home folder in the file system some handy Root Custom Actions are provided. These allow to open a Root Terminal within the folder you're viewing, open the current folder with Root privileges, Install a Debian package from Thunar (simple install, does not resolve external dependencies) and to Edit configuration text files as Root.



Open Root Terminal Here
Open a Root terminal in the current directory.

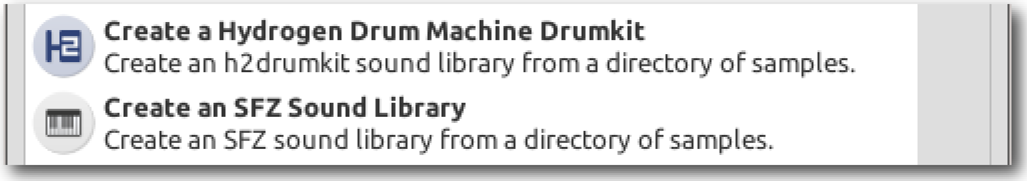
Open Folder as Root
Open the current directory with Root permissions.

Install Debian Package
Install Debian packages with dpkg.

Edit Text as Root
Open selected text file with Root permissions.

Create SFZ Sound Libraries and Hydrogen Drumkits :

From within Thunar you can launch interactive scripts to create SFZ and Hydrogen sound libraries. It is essential that you have your sound samples organized and properly formatted for the target application in a folder first.

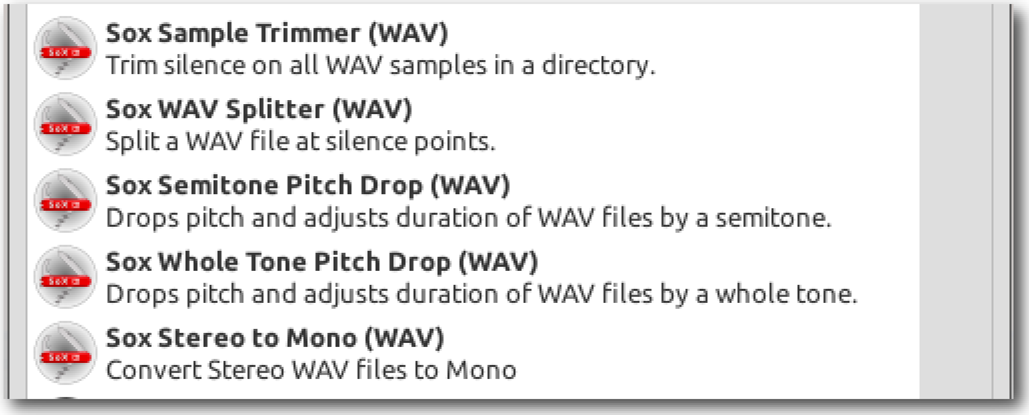


Create a Hydrogen Drum Machine Drumkit
Create an h2drumkit sound library from a directory of samples.

Create an SFZ Sound Library
Create an SFZ sound library from a directory of samples.

Split, Trim, Transpose and Convert WAV Samples with SoX Utilities :

This is a brand new feature in AV Linux 2020 and will probably require further future polishing but it currently allows for quick n' dirty manipulation of WAV files to prepare them for use in Sound libraries all from the comfort of Thunar! The SoX scripts themselves can be found in usr/local/bin and can be modified there for those who are savvy with SoX command line.



Sox Sample Trimmer (WAV)
Trim silence on all WAV samples in a directory.

Sox WAV Splitter (WAV)
Split a WAV file at silence points.

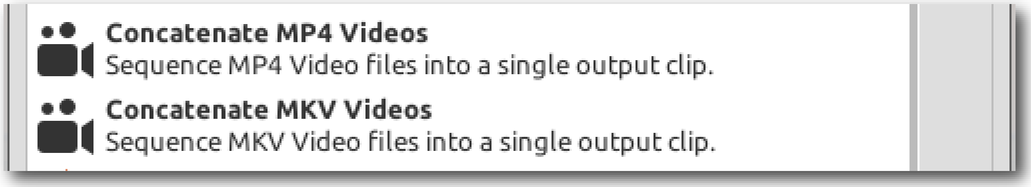
Sox Semitone Pitch Drop (WAV)
Drops pitch and adjusts duration of WAV files by a semitone.

Sox Whole Tone Pitch Drop (WAV)
Drops pitch and adjusts duration of WAV files by a whole tone.

Sox Stereo to Mono (WAV)
Convert Stereo WAV files to Mono

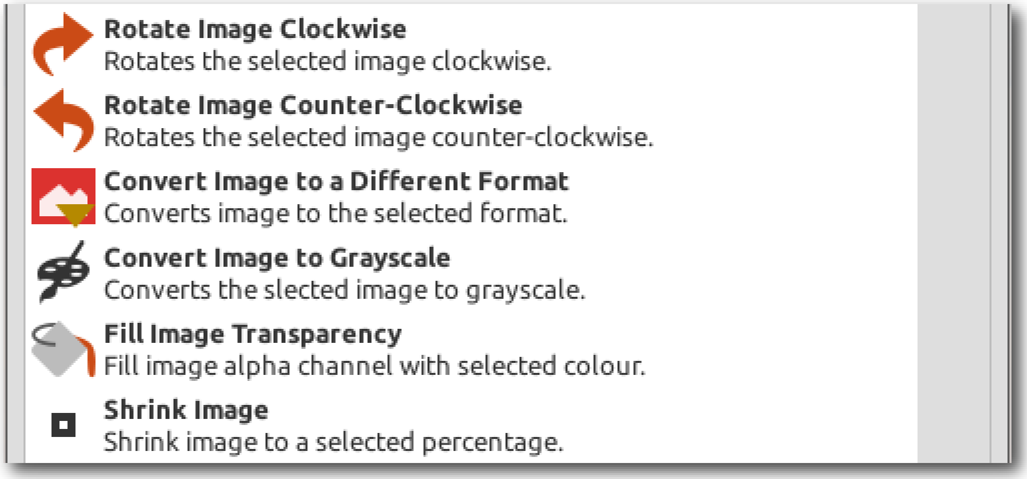
Concatenate MP4 and MKV Video files :

You can join MP4 and MKV Video files together, for example you have finished clips you want to combine without having to reopen them in a Video Editor and re-encode them with the resulting quality loss. If the clips are the same resolution, have been encoded with the same encoder and settings and if they are the same Audio sample rate you can use these Concatenate Custom Actions to join them without re-encoding.


Concatenate MP4 Videos
Sequence MP4 Video files into a single output clip.
Concatenate MKV Videos
Sequence MKV Video files into a single output clip.

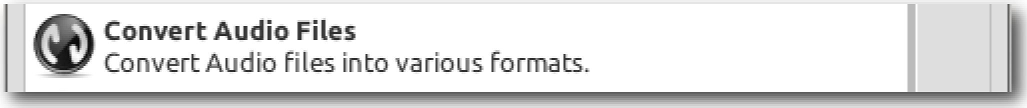
Manipulate, Convert and Work with Image files :

There are some newly added Custom Actions to quicky and easily work with pictures and image files.


Rotate Image Clockwise
Rotates the selected image clockwise.
Rotate Image Counter-Clockwise
Rotates the selected image counter-clockwise.
Convert Image to a Different Format
Converts image to the selected format.
Convert Image to Grayscale
Converts the slected image to grayscale.
Fill Image Transparency
Fill image alpha channel with selected colour.
Shrink Image
Shrink image to a selected percentage.

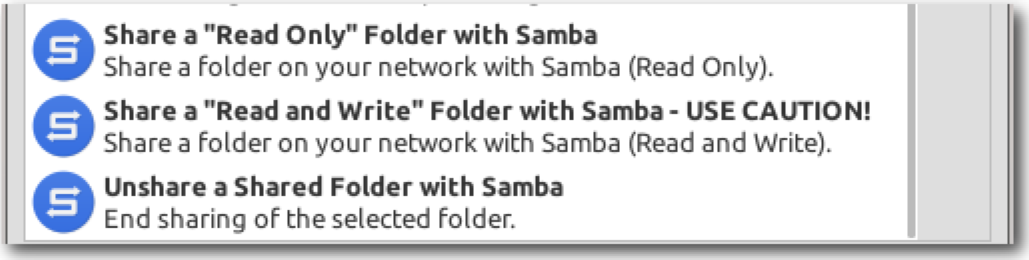
Convert Audio Files With PACPL :

You can quickly and easily convert Audio files from one format to another with the integrated PACPL Custom Action. When you right click on an Audio file in a folder you will will see the option to “Convert Audio Files” as one of the menu options. Pretty much all common options for conversion are supported.


Convert Audio Files
Convert Audio files into various formats.

One-Click Samba Sharing on Your Network :

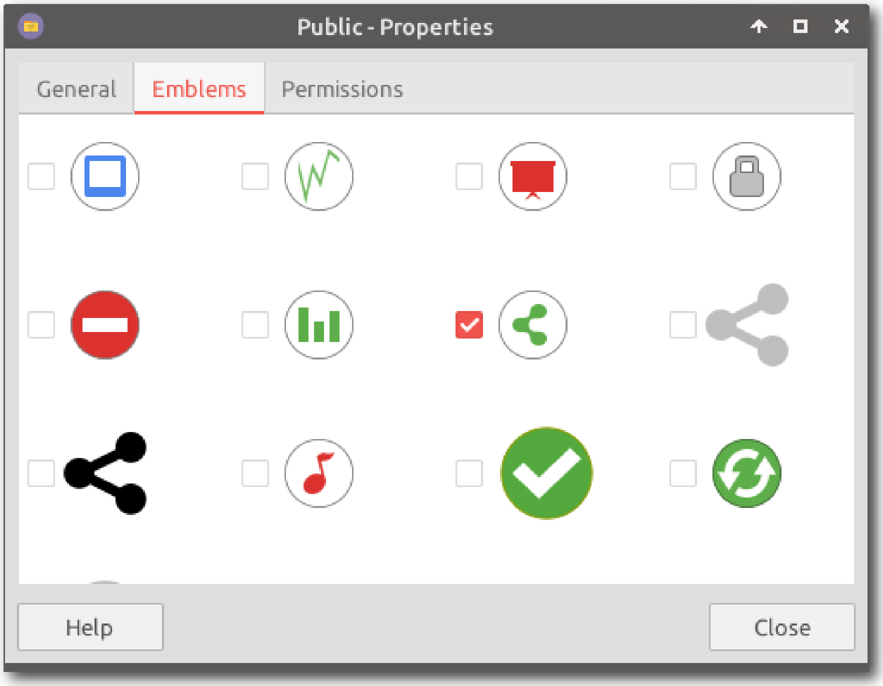
Right-clicking on a folder in Thunar will allow you to 'one-click' share it on your network. If you do share a folder on your network you may want to right-click on it and select a sharing or network ‘Emblem’ to display on the folder to visually remind you it is shared.



Share a "Read Only" Folder with Samba
Share a folder on your network with Samba (Read Only).

Share a "Read and Write" Folder with Samba - USE CAUTION!
Share a folder on your network with Samba (Read and Write).

Unshare a Shared Folder with Samba
End sharing of the selected folder.



***PLEASE NOTE!!** - “Read and Write” will expose any folders you enable for sharing on your Network with permissions for ALL Users on your Network, if you are concerned about the security of your network, or are not sure which files you are making available DO NOT enable Samba sharing! It is also not recommended to share the root directory of a drive and all its contents on a Network.

DEBIAN SYSTEM ADMINISTRATION BASICS :

Simple Commands for SysAdmin Tasks :

As a Linux User I used to wonder why XFCE4 and other light Desktop Environments didn't have any fancy graphical tools for common tasks like adding or removing Users and password changes. After learning how simple the actual Terminal commands were I could see that trying to put these tasks into a GUI could potentially make them more confusing and time consuming than they really need to be. In this section I've tried to demonstrate the most commonly used SysAdmin commands.

To add a new User to your system and create a new folder for them in the System '/home'folder you need to know what the new User's name will be and run this command in a Root Terminal:

```
adduser <USERNAME>
```

Obviously you replace '<USERNAME>' with the actual User name, when you execute this command you will be prompted for some more information and when finished the new Users folder will be created in the system '/home' folder.

To add a system User to a 'Group' on the system (ie the 'lpadmin' Group to allow printing) then use this command in a Root Terminal:

```
adduser <USERNAME> <GROUP>
```

To add a Group to the System use this command in a Root Terminal:

```
addgroup <GROUPNAME>
```

To remove a User from the System you use this command in a Root Terminal:

```
deluser <USERNAME>
```

To remove the User and their User folder from the systems '/home' add this:

```
deluser <USERNAME> --remove-home
```

To remove a User from a Group use this command:

```
deluser <USERNAME> <GROUP>
```

To change your 'Root' Password use this command in a Root Terminal:

```
passwd
```

To change a User's Password use this command in a Root Terminal:

```
passwd <USERNAME>
```

CHANGING USER AND GROUP ID's :

How to change 'UID' and 'GID' for System Users :

By default the primary User on a Linux system is assigned a numerical User and Group ID (a.k.a. 'UID' and 'GID') of '1000', additional Users are assigned numbers in excess of 1000 (ie 1001, 1002, etc). File and folder ownership permissions are assigned to the User and Group that created them. A scenario where this may come into play is if you are a secondary User and the primary User has been removed from the system now making you the new primary User/System Administrator, the files of the primary User will all have UID's and GID's of '1000' so since you are a secondary User with a UID/GID of '1001' you will not have ownership permissions of any files associated with User or Group '1000'. To fix this you'll need to change your UID/GID.

AV Linux 2020 has scripts to ease the changing of User and Group ID's for situations where it is necessary, it is highly recommended to not use these scripts unless you know exactly what you are doing.

In order to be used these scripts must be run as Root outside of the 'X' graphical environment in the the basic system Console this ensure that no files to be changed are being used by the graphical Desktop Environment. There are 2 ways to login to the bare Console:

1. Boot the system and select 'Advanced Options' from the initial GRUB Boot menu, then select 'Recovery Mode' in the Kernel Boot choices. When the computer completes it's boot in recovery mode you will arrive at a login prompt to the Console, in some cases you may need to hit the 'Enter' key on your computer keyboard to initiate the login prompt. Once prompted enter your Username as 'root' and then enter your Root password. You are now logged in to the Console as Root and can proceed to run the scripts

2. If you are using your computer you can use the Ctrl+Alt+F3 key to get out of X, you will then be presented with a bare Console login prompt and can enter the Username 'root' and your Root password at the Console prompt.

Using the UID/GID Scripts :

It is very important to note that you use these scripts for the regular Username you log into the system with. *As an example we are changing the UID/GID for a User named 'tester' from '1001' to '1000'.* Once logged in to the Console as Root enter this command to change your UID:

```
ChangeUID.sh
```

This will launch an interactive script which will indicate the syntax required.

ChangeUID.sh [username] [oldUID] [newUID]

To demonstrate our example from above complete the command and fill in the required information like the example below, then hit 'Enter':

```
ChangeUID.sh tester 1001 1000
```

Depending on the size of your Hard Drives and number of files on your system it could take the scripts several seconds to a few minutes to find and change the file ownerships. It is normal to see some warnings and terminal output about files located in '/proc'.

We are not done yet, so far only the User ID's have been changed, we now need to to also change the Group ID's. *You must change both User ID's and Group ID's.* Group ID's are done with a different script, as before we will use the example of the 'tester' Group being changed from '1001' to '1000'.

```
ChangeGID.sh
```

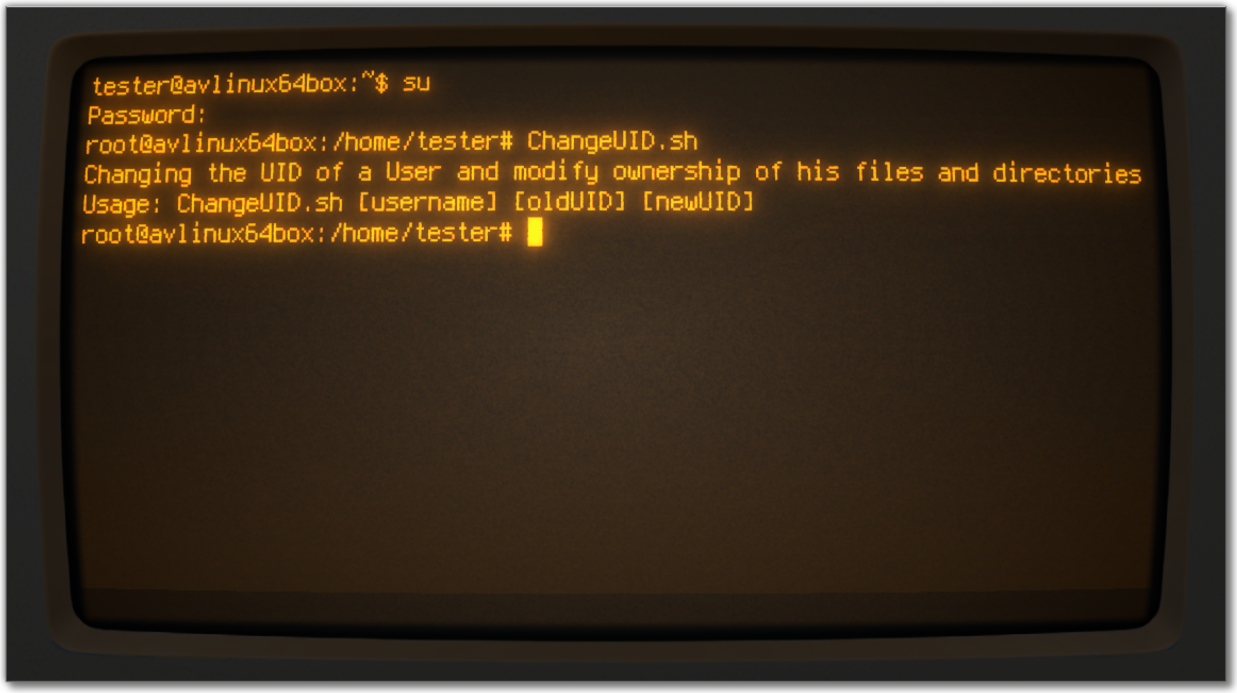
This will launch an interactive script which will indicate the syntax required.

```
ChangeGID.sh [username] [oldGID] [newGID]
```

To demonstrate our example from above complete the command and fill in the required information like the example below then hit 'Enter':

```
ChangeGID.sh tester 1001 1000
```

As before, depending on the size of your Hard Drives and number of files on your system it could take the scripts several seconds to a few minutes to find and change the file Group ownerships. It is normal to see some warnings and terminal output about files located in '/proc'.

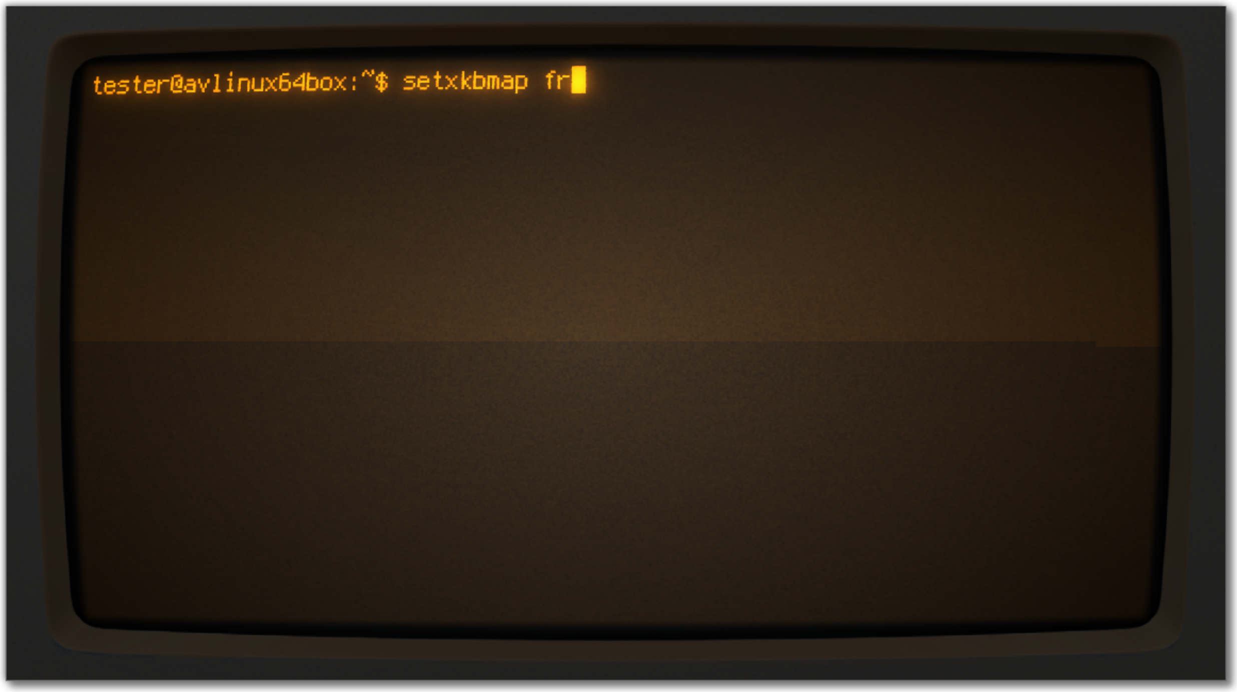


```
tester@avlinux64box:~$ su
Password:
root@avlinux64box:/home/tester# ChangeUID.sh
Changing the UID of a User and modify ownership of his files and directories
Usage: ChangeUID.sh [username] [oldUID] [newUID]
root@avlinux64box:/home/tester# 
```

CHANGING KEYBOARD SETTINGS :

Changing the Keyboard Layout for Other Languages :

To set the keyboard for a different language during a LiveISO session open a Terminal and use the 'setxkbmap' command with the accompanying 2 letter code for your language. The screenshot below shows the command for French (setxkbmap fr).



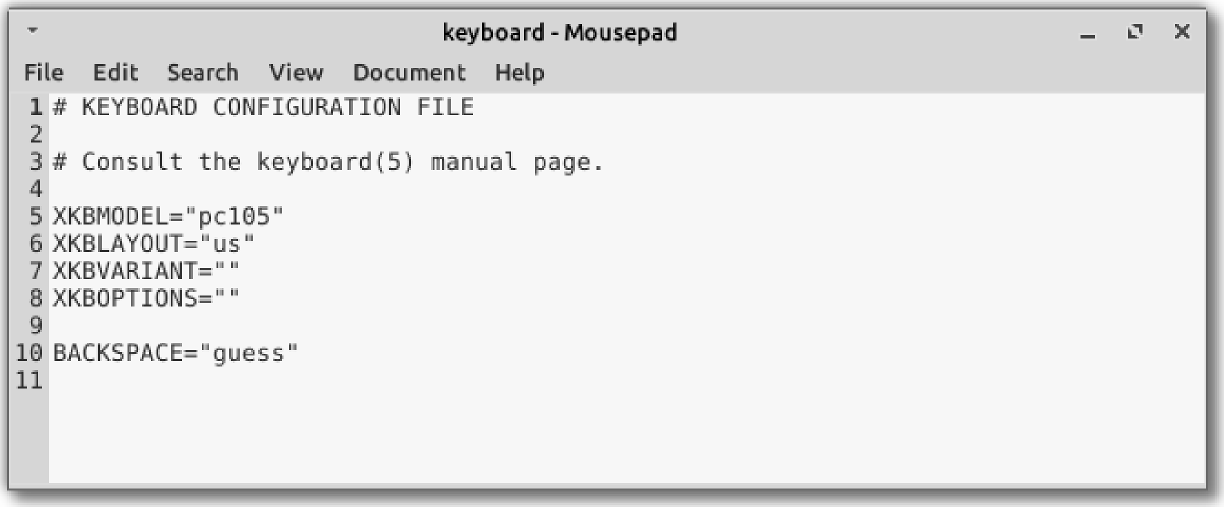
```
tester@avlinux64box:~$ setxkbmap fr
```

To permanently change the keyboard setting in an AV Linux install click the ‘Change Keyboard Settings’ button found in the ‘SYS-Editor’ tab of the AV Linux Assistant. You can also change the System keyboard manually by opening a Root Terminal from the Accessories menu and editing the configuration file in /etc/default/keyboard with this command:

```
mousepad /etc/default/keyboard
```

Change the Model and Country codes within the quotes to the correct ones for your Country and save the changes.

```
XKBMODEL="pc104"
XKBLAYOUT="us"
XKBVARIANT=""
XKBOPTIONS=""
```



```
# KEYBOARD CONFIGURATION FILE

# Consult the keyboard(5) manual page.

XKBMODEL="pc105"
XKBLAYOUT="us"
XKBVARIANT=""
XKBOPTIONS=""

BACKSPACE="guess"

```

SliM LOGIN MANAGER :

Setting SliM For Autologin :

AV Linux features 'SliM' as its default login manager. SliM has a very light system footprint and is still quite configurable by editing its configuration file in /etc/slim.conf. The example below will cover the most popular configuration request...autologin.

You can open the SliM configuration file for editing from the 'SYS-Editor' tab of the AV Linux Assistant.

To enable autologin two separate variables must be changed in slim.conf. Scroll down the file to find the following line:

```
# default_user
```

To set yourself as the default User remove the '#' comment from the beginning of the line and then add your Username, USERNAME is used here as an example:

```
default_user  USERNAME
```

If we leave the file like this then on next login it will automatically enter your Username but still require your password, to have autologin work fully you need to edit the autologin line:

```
# auto_login  no
```

Once again remove the '#' comment and change the 'no' to a 'yes' like this:

```
auto_login  yes
```

When you have completed editing the slim.conf file click 'Save' in the Mousepad Text Editor and autologin should be active on your next login.

***PLEASE NOTE!** - SliM does NOT support remote login, if you require remote login it is recommended to install 'lightDM' from the Debian repositories and configure it as the default login manager.

Setting SliM Default Session Using Other Desktop Environments :

Open a Root Terminal from the 'Accessories' Menu and enter:

```
mousepad /etc/slim.conf
```

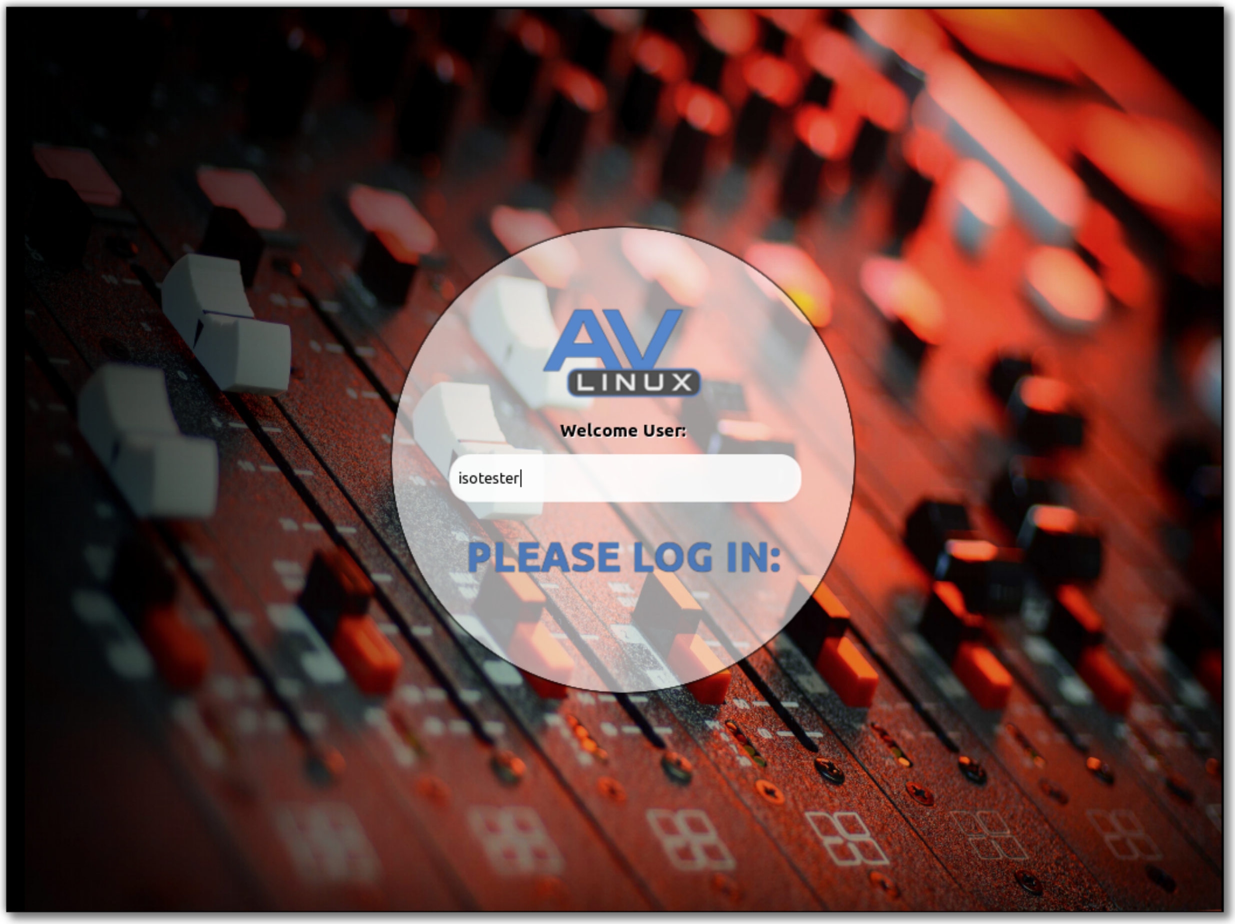
Scroll down the file to find the following line:

```
login_cmd        exec /bin/bash -login /etc/X11/Xsession %session
```

Change '%session' to the start command of your desired other default Desktop Environment.

Command Examples For Some Other Common Light Desktops:

default,startxfce4,openbox,ion3,icewm,wmaker,blackbox,awesome



Welcome User:

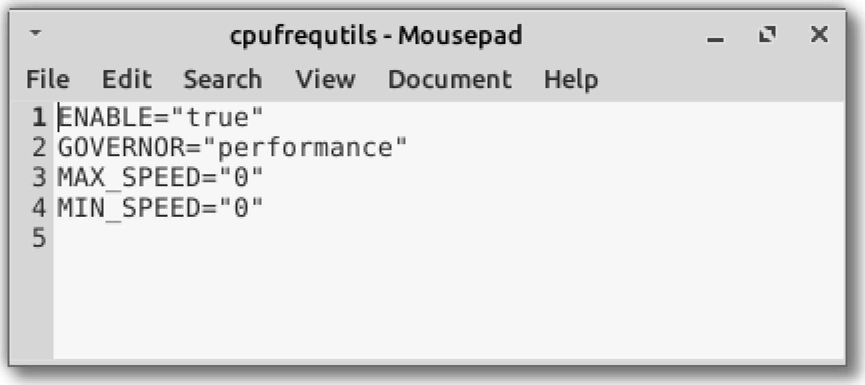
isotester

PLEASE LOG IN:

PERFORMANCE SETTINGS :

CPU Governor Settings :

Governing the CPU in AV Linux is set by the 'cpufrequtils' configuration file found in /etc/default. For Audio work it is NOT recommended to change this setting. This configuration file can be opened directly for editing in the ‘SYS-Editor’ tab of the ‘AV Linux Assistant’.

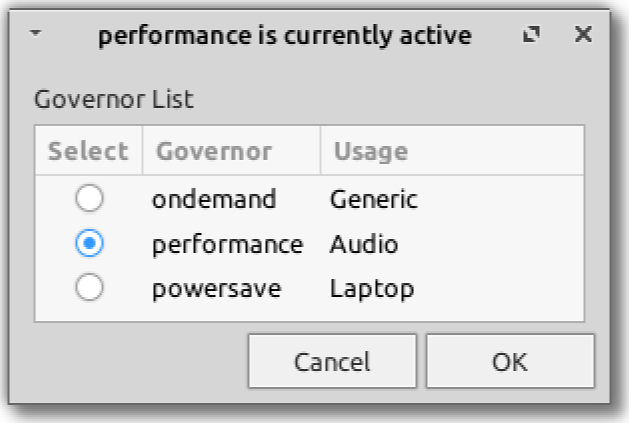


```
ENABLE="true"
GOVERNOR="performance"
MAX_SPEED="0"
MIN_SPEED="0"

```

NEW! Change CPU Governor Settings Dynamically :

For those who want to conserve battery life in a laptop or want the flexibilty to change the CPU Governor on-the-fly AV Linux 2020 now has the Korakios ‘Set CPU Governor’ Utility in the ‘Settings’ Menu.

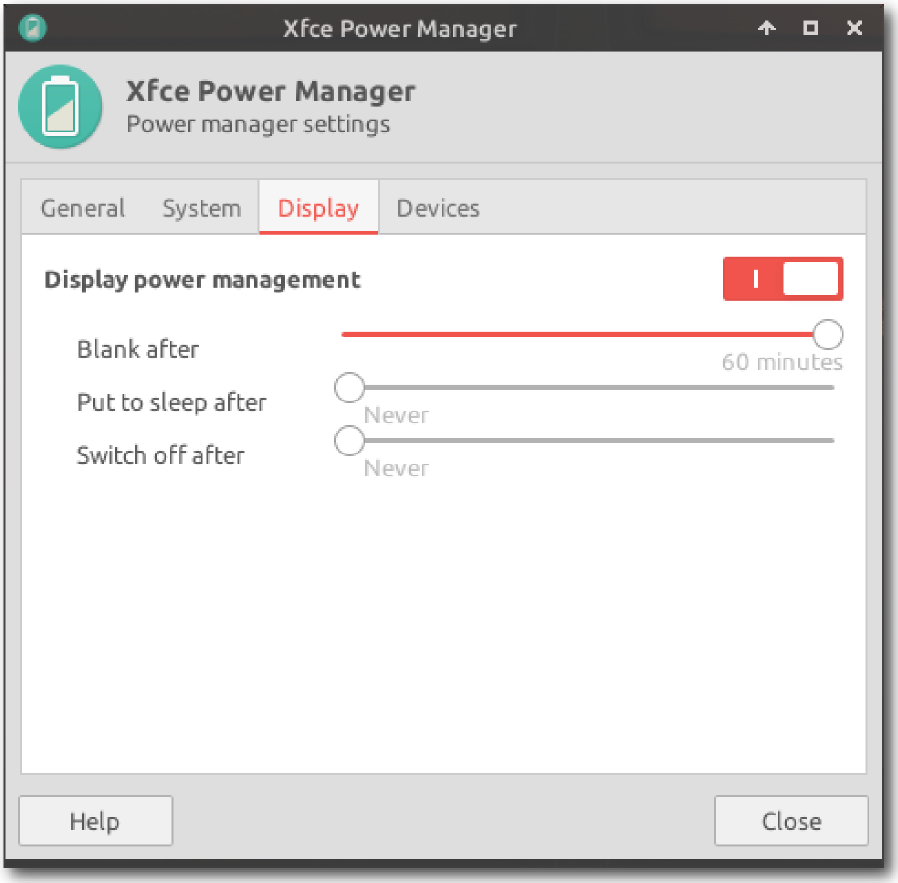

performance is currently active

Governor List

Select	Governor	Usage
○	ondemand	Generic
●	performance	Audio
○	powersave	Laptop

Power Management :

To change settings related to System power consumption use the XFCE4 Power Manager found in the 'Settings' Menu.



Xfce Power Manager

Xfce Power Manager
Power manager settings

Display power management

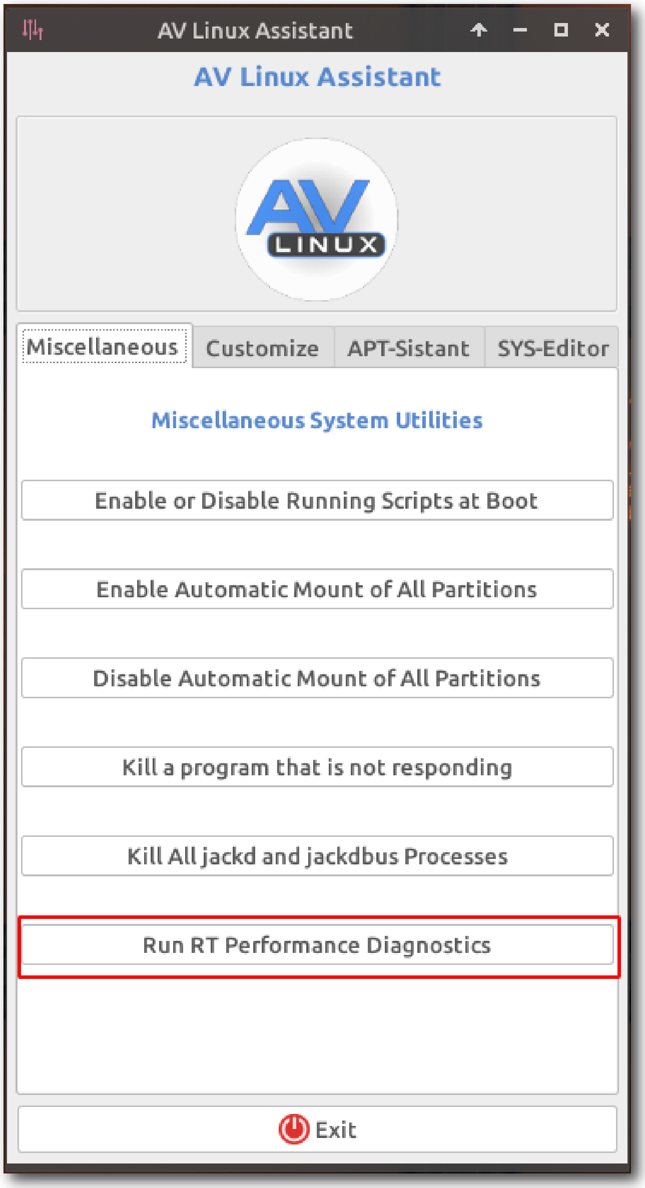
Blank after 60 minutes

Put to sleep after Never

Switch off after Never

System Check for Additional Performance Parameters :

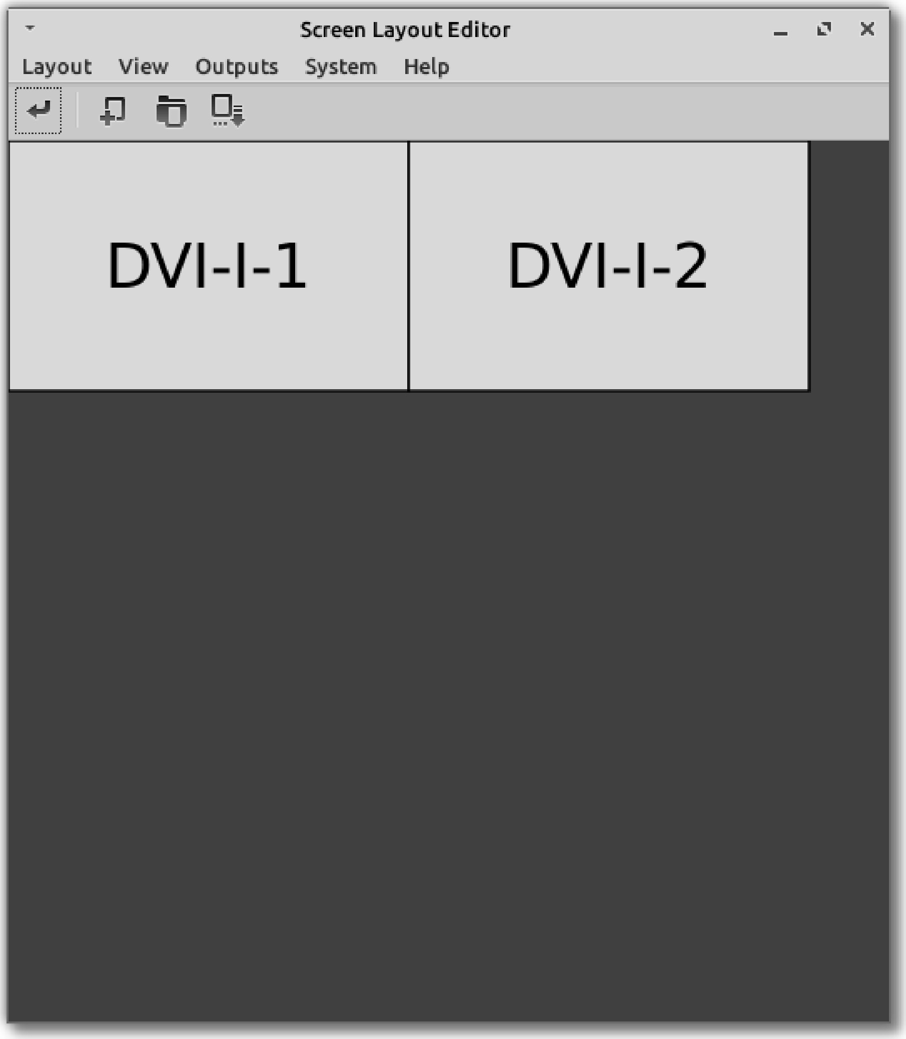
AV Linux 2020 has Raboof's 'Realtime Quick Config Scan' in the 'AV Linux Assistant' as a useful graphical way to check and verify important Linux-centric performance configurations on the system, by default AV Linux is pre-configured to pass all of the various configuration parameters.


AV Linux Assistant
AV Linux Assistant
AV LINUX
Miscellaneous
Customize
APT-Sistant
SYS-Editor
Miscellaneous System Utilities
Enable or Disable Running Scripts at Boot
Enable Automatic Mount of All Partitions
Disable Automatic Mount of All Partitions
Kill a program that is not responding
Kill All jackd and jackdbus Processes
Run RT Performance Diagnostics
Exit

MONITOR AND DISPLAY SETTINGS :

AV Linux uses an application called 'Arandr' to handle setting the monitor screen resolution and also for setting up Dual-head displays. Arandr can be found in the 'Settings' menu. To change and select the monitor resolution right-click on the rectangle within the Arandr window that represents the Video output and display you are using. If you are using more than one output and display there will be more than one rectangle present within the Arandr window.

***PLEASE NOTE! -** To use Dual-head for certain nVidia and AMD Video cards it may be necessary to have Proprietary Video Drivers installed which is not possible with the AV Linux RT Kernel.



Making a Persistent Dual-Head Setup :

If you have a permanent setup with Dual-head monitors you may want to have the Arandr configuration settings automatically start it up for you when you boot up your computer. This is possible but requires some extra steps and placing a '.desktop' launcher in /home/<YOURUSERNAME>/.config/autostart. Here's how to do it:

- Start Arandr configure the displays as desired.
- Save and name your configuration from the 'Save As' menu (ie dualhead.sh).
- 'dualhead.sh' will be saved in /home/<YOURUSERNAME>/.screenlayout by default.
- Find your created 'dualhead.sh' in the '.screenlayout' folder and right-click on it.
- Go to 'Properties' -->'Permissions' and make sure 'Allow executing file as program' is checked.
- In your home folder right-click and 'Create Document' → 'Empty File' and name it 'dualhead.desktop'.
- Right-click on the 'dualhead.desktop' file you created and 'Open with Mousepad'.
- From the example below copy and paste the Launcher text into the 'dualhead.desktop' file.
- Change the yellow highlighted '<YOURUSERNAME>' to your actual User name.
- Save your changes in Mousepad
- Copy the 'dualhead .desktop' file to /home/<YOURUSERNAME>/.config/autostart.
- On reboot your ArandR configuration should be automatically loaded.

Example 'dualhead.desktop' Launcher File :

```
[Desktop Entry]
Encoding=UTF-8
Version=1.0
Type=Application
Categories=System
Terminal=false
Icon=
Name=Dualhead
Exec=/home/<YOURUSERNAME>/.screenlayout/dualhead.sh
Comment=Autostart Dual Monitors
```

PROPRIETARY VIDEO DRIVERS IN AV LINUX :

***PLEASE NOTE!** - PROPRIETARY VIDEO DRIVERS ARE NOT COMPATIBLE WITH 'RT' KERNELS!!

Install the optional AV Linux 'lowlatency' kernel (Installed by default in AV Linux 2020.5.10) :

Proprietary Video drivers are not installable with 'RT' Kernels which AV Linux optionally uses for the best performance. If you are not experiencing any problems relating to Video drivers on your system then it is recommended to just use the default Xorg AMD and Nouveau video drivers. If you feel it is absolutely necessary to install 3rd party Video drivers then the first step for compatibility is to install the optional AV Linux 'lowlatency' kernel. To do this go to Menu→'System'→'Synaptic Package Manager' and in Synaptic's 'Quick filter' search bar enter one at a time:

"linux-image-5.4.28avl2-lowlatency"
"linux-headers-5.4.28avl2-lowlatency"

Select these packages to install with Synaptic and install them.

The SGFXI Script:

The installation of proprietary 3D nVidia and AMD video card drivers is handled by a 3rd party script in AV Linux called **SGFXI**. *Proprietary drivers are not supported and are to be installed at the risk and discretion of the User, potentially very new Video cards or very old legacy Video Cards may not be supported by SGFXI!* AV Linux provides this method as a courtesy to help facilitate the installation of proprietary 3D drivers since some Users may want this option and Debian Linux has no tools to handle this operation other than for the stock Debian Kernel which AV Linux does not use.

Running SGFXI :

SGFXI cannot be run in a regular Desktop session it has to run in the bare system console. In order to run SGFXI this way you need to shut down the graphical XFCE4 Desktop Environment by hitting the Ctrl, Alt, F2 keys simultaneously. Your system will then go to the basic system console where you will be prompted to login. Since SGFXI requires running with Root privileges you need to login as 'root' and then enter your root password. If a login prompt doesn't immediately appear in the console you may need to hit the 'Enter' key to display the login prompt. Once you have successfully logged in as 'root' then at the console command prompt run SGFXI by typing:

```
sgfxi
```

When SGFXI launches carefully read and follow the screen prompts.

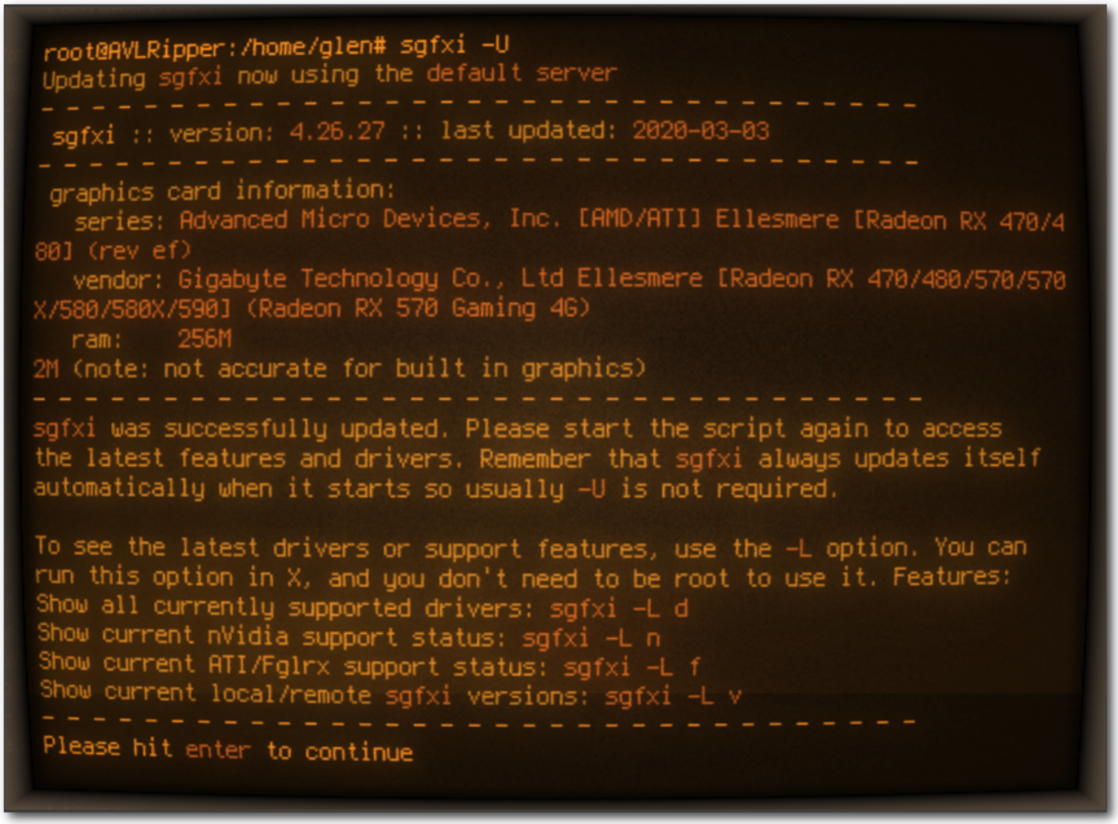
***PLEASE NOTE! -** In the case of nVidia Video cards since SGFXI needs to blacklist the Xorg 'Nouveau' driver module it is sometimes necessary to run SGFXI twice in a row to completely install the nVidia proprietary Video drivers. In this case SGFXI will most likely run the first time and obtain the drivers and when you are prompted to log back in the computer will fail to use the new driver and leave you at the bare console unable to login. The reason for this is that SGFXI cannot both install the drivers and blacklist modules from the Xorg Video drivers at the same time. Although this is somewhat cumbersome usually logging in as 'root' and running SGFXI again will allow the driver installation to complete.

SGFXI is quite flexible and can be run with many optional commands which can be accessed in a terminal by typing 'sgfxi -h':

Return the system to Xorg Video Drivers :

In the event that driver installation does not complete properly or you wish to go back to the Xorg drivers then follow the steps above to log in to the bare system console as root and run:

`sgfxi -! 32`



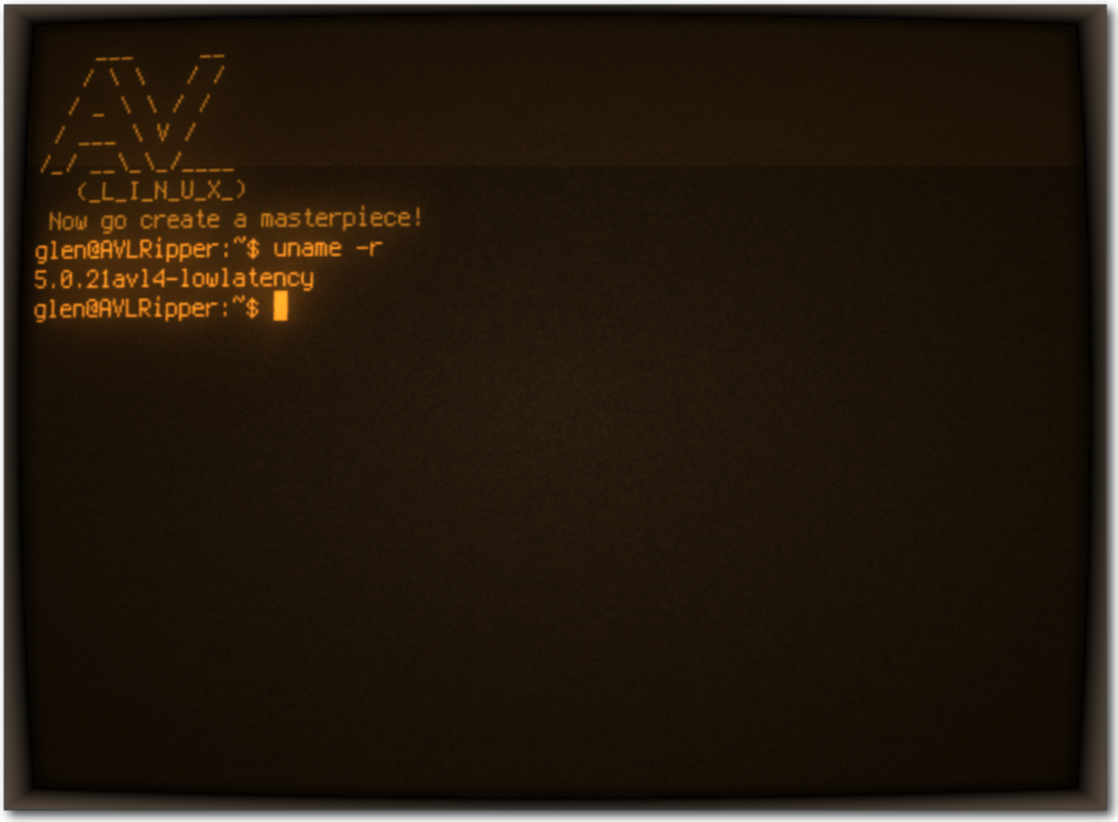
```
root@AVLRipper:/home/glen# sgfxi -U
Updating sgfxi now using the default server
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 sgfxi :: version: 4.26.27 :: last updated: 2020-03-03
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 graphics card information:
   series: Advanced Micro Devices, Inc. [AMD/ATI] Ellesmere [Radeon RX 470/4
80] (rev ef)
   vendor: Gigabyte Technology Co., Ltd Ellesmere [Radeon RX 470/480/570/570
X/580/580X/590] (Radeon RX 570 Gaming 4G)
   ram:    256M
2M (note: not accurate for built in graphics)
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
sgfxi was successfully updated. Please start the script again to access
the latest features and drivers. Remember that sgfxi always updates itself
automatically when it starts so usually -U is not required.

To see the latest drivers or support features, use the -L option. You can
run this option in X, and you don't need to be root to use it. Features:
Show all currently supported drivers: sgfxi -L d
Show current nVidia support status: sgfxi -L n
Show current ATI/Fglrx support status: sgfxi -L f
Show current local/remote sgfxi versions: sgfxi -L v
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
Please hit enter to continue
```

KERNEL NOTES :

Default 'lowlatency' Kernel :

AV Linux offers a range of choices for post-install Kernels, by default it now features a 'lowlatency' Kernel which (if necessary) will support the installation of 3rd party proprietary Video card drivers. AV Linux 2020 also features optionally installable 'RT' (Realtime Preempt) Kernels. 'RT" Kernels can offer lower latency performance advantages on some systems with certain hardware but *they do NOT support the installation of 3rd party proprietary Video card drivers.* Updated AV Linux Kernels can be installed from the AV Linux Kernel Repository which is enabled by default in the AV Linux 2020 Software Sources. If for some reason you require features that are not in the AV Linux kernel it is possible to install the 'Liquorix' kernels or the stock Debian kernels using Synaptic Package Manager. It is strongly recommended to only change or update your Kernel if absolutely necessary.



```
    ___     __
   / \ \   / /
  / _ \ \ / /
 / ___ \ V /
/_/ __\_\_/____
   (_L_I_N_U_X_)
 Now go create a masterpiece!
glen@AVLRipper:~$ uname -r
5.0.21avl4-lowlatency
glen@AVLRipper:~$
```

Cheatcodes Enabled By Default in AV Linux :

threadirqs - force-threaded irq handlers (realtime preemption)
Threaded irq's have long been a major part of the RT_PREEMPT patchset, and can offer significant benefits for low latency audio uses. Use this parameter unless you have a really good reason not to.

transparent_hugepage=never - turn off hugepages (a new memory management feature)
Transparent hugepages should be useful in memory intensive applications, such as virtual machines, databases, and possibly video editing. If ultra-low latency is desired, it seems to be best to disable them. Use this parameter if you want to squeeze the lowest latency possible out of your audio chain.

noresume - stops system from resuming from hibernation
This option is enabled on the LiveISO image to suppress the "**`running /scripts/local-block...done`**" message from displaying and delaying login. *If you have problems with hibernation you may want to remove this option after installing AV Linux.*

To Be Enabled Optionally :

noautogroup - disable auto cgroup scheduling
The famous "200 line patch that does wonders", aka SCHED_AUTOGROUP, is useful when cpu-intensive tasks, such as make, are being done in a terminal, while the desktop is in use. Use this parameter to disable it if you think it is causing problems.

mitigations=off - disable Kernel Page Table Isolation patches (aka the Meltdown mitigation)

This option is only recommended if you use your computer solely for Audio and Video work and do not have it connected to the Internet. This will disable protection from the 'Meltdown' security threat.

Example grub kernel command line:
threadirqs transparent_hugepage=never noresume quiet

Making GRUB-2 Add the Boot Flags Automatically :

1. In a Root Terminal:

```
mousepad /etc/default/grub
```

2. Add the desired boot flags to the GRUB_CMDLINE_LINUX_DEFAULT line, like this:

```
GRUB_CMDLINE_LINUX_DEFAULT="threadirqs transparent_hugepage=never"
```

3. Then run in a Root Terminal:

```
update-grub
```

4. Reboot

AUDIO & MIDI IN AV LINUX :

Recommended Reading!

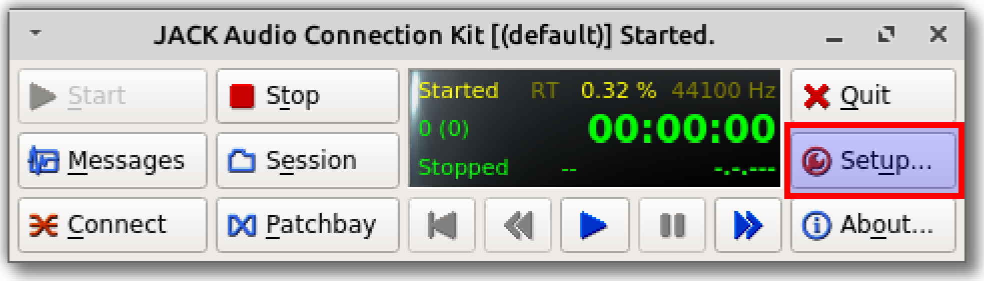
PulseAudio with JACK :

It cannot be overstated that AV Linux differs *significantly* from your usual Linux Desktop in its handling of Audio routing and subsystems. AV Linux relies on the low-latency Jack Audio Connection Kit (a.k.a JACK) for its powerful interconnectivity. JACK is a low-latency sound server which runs on top of ALSA (Advanced Linux Sound Architecture). ALSA is the basic 'driver' level of Audio hardware support and is both integrated in the Kernel itself as well as being a core component of the Operating System. By default many distributions and Desktop Environments install the 'PulseAudio' Audio server, in recent years PulseAudio can be made to peacefully coexist with JACK and AV Linux makes this easier by pre-configuring JACK and PulseAudio to work together with a custom 'pajackconnect' script .

Setting things up with Qjackctl :

The most initially confusing thing for many people getting started with Linux Audio is how to get the applications they want to use to 'see' (or perhaps hear) their Audio device. Reading this section will hopefully facilitate getting everything to 'just work'. The biggest step required of the User is to *identify* and *select* the Audio device they want to use, after that most of the complexity is looked after for you.

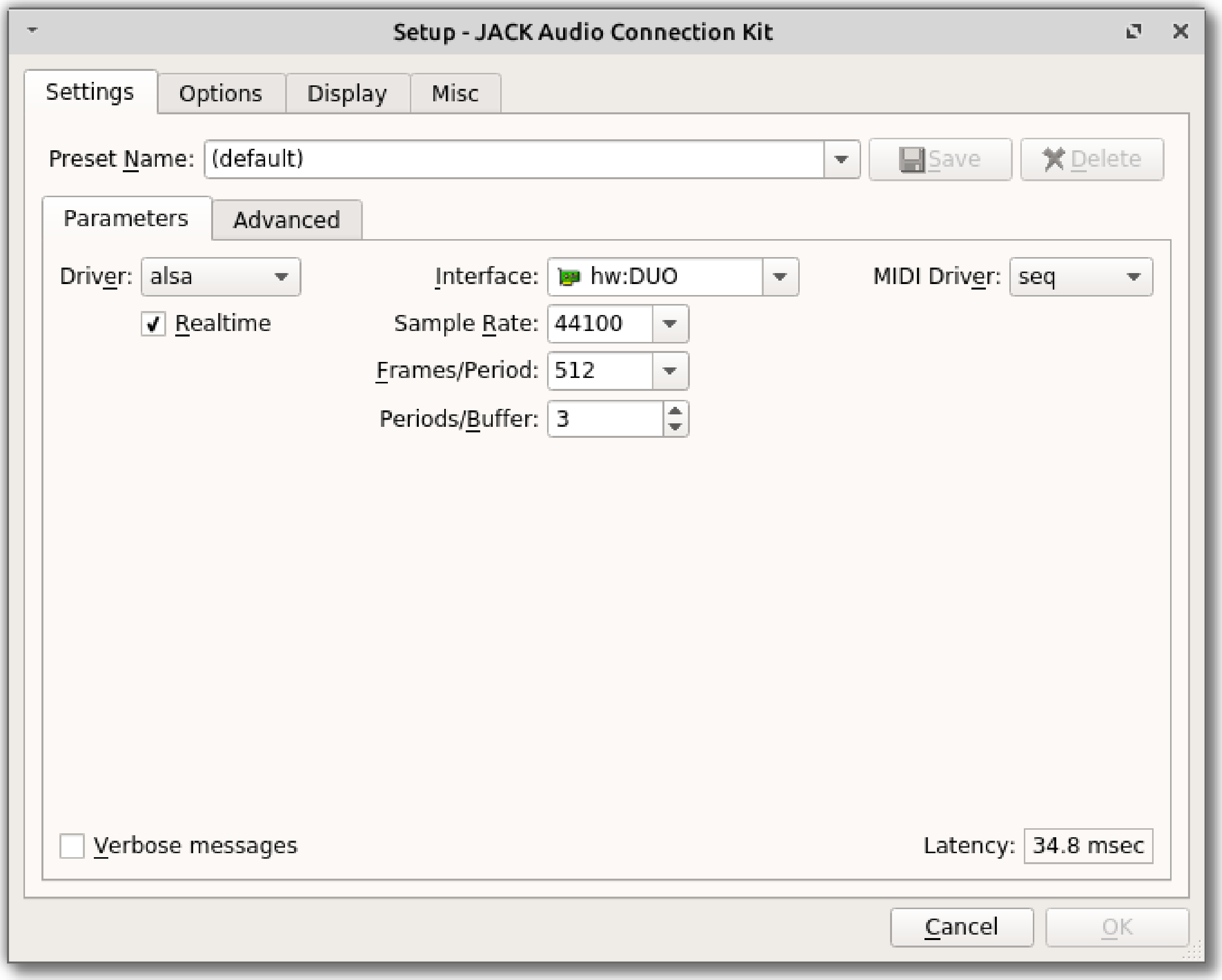
The easiest way to setup the JACK Audio server is to use the JACK Control app (a.k.a. Qjackctl). It can easily be launched from the XFCE4 Panel or Whisker Menu. To setup your Audio device click the 'Setup' button.



JACK Audio Connection Kit [(default)] Started.

```
Started   RT   0.32 %   44100 Hz
0 (0)              00:00:00
Stopped   --          -.-.---
```

The 'Setup' Window has multiple tabs which we will go over one at a time, the 'Settings' tab is where we initially select and set up the device we want to use with JACK in the 'Parameters' tab. To the left is the 'Driver' select dropdown box. Internal, PCI, and USB 1.1 and 2.0 Audio devices require the 'alsa' driver and FireWire devices require you to select the ‘alsa’ or 'firewire' driver (depending on the firewire driver being used). It is essential that the 'Realtime' checkbox is selected. Next we need to select our desired Audio device from the 'Interface' dropdown box.



Preset Name: (default)

Driver: alsa

☑ Realtime

Interface: hw:DUO

Sample Rate: 44100

Frames/Period: 512

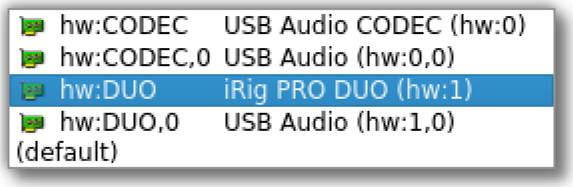
Periods/Buffer: 3

MIDI Driver: seq

□ Verbose messages

Latency: 34.8 msec

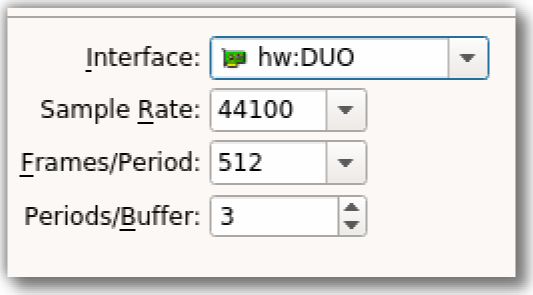
In the 'Interface' dropdown box we will see a list of available Audio devices on the system, generally speaking whatever appears in the dropdown box should be supported to use with JACK, below is an example with multiple ALSA devices on a system to illustrate what to look for.



hw:CODEC	USB Audio CODEC (hw:0)
hw:CODEC,0	USB Audio (hw:0,0)
hw:DUO	iRig PRO DUO (hw:1)
hw:DUO,0	USB Audio (hw:1,0)
(default)	

In the example picture above we can see that the system has a 'USB Audio CODEC' device at 'hw:0' and an iRig DUO USB Audio device at 'hw:1'

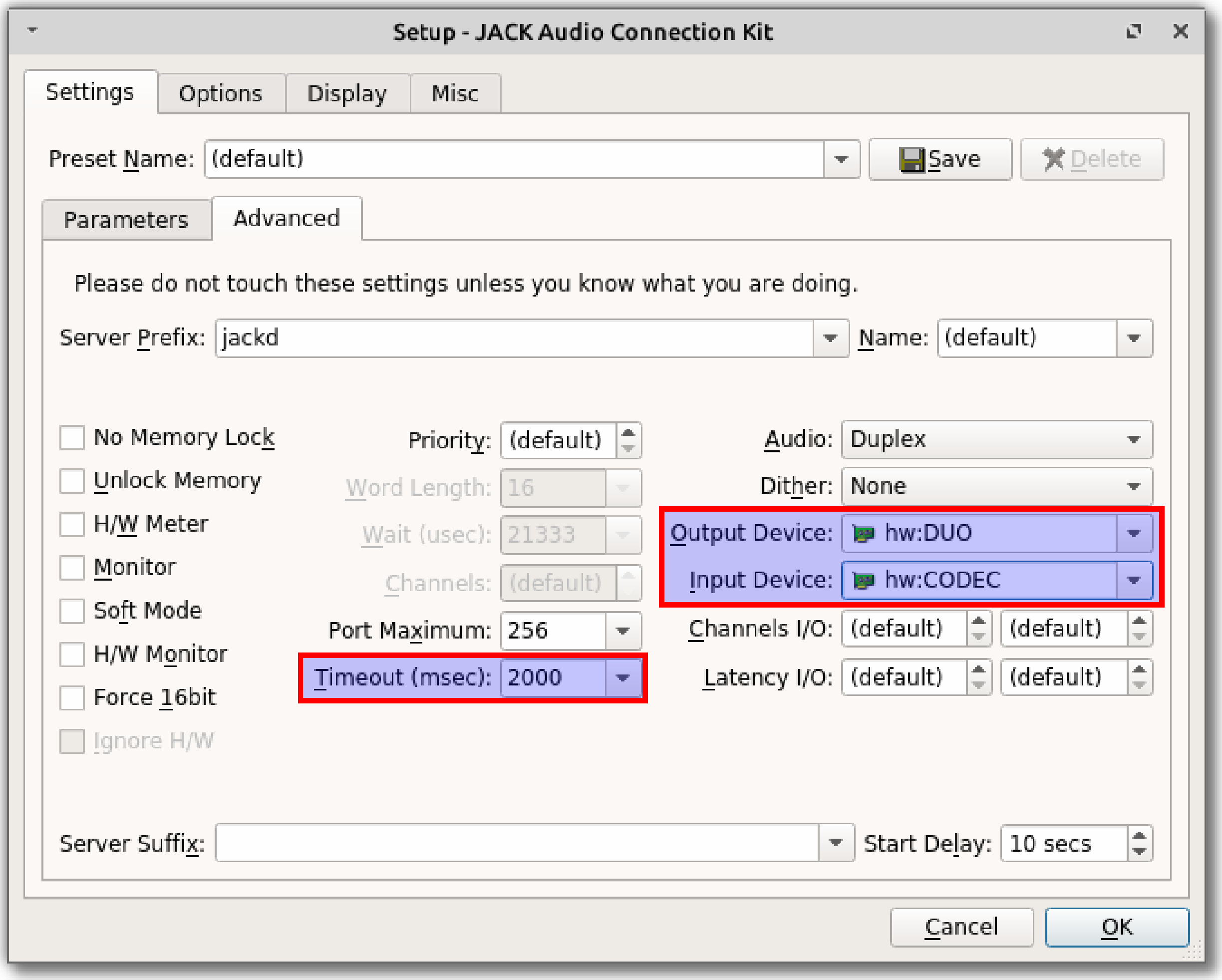
Underneath the 'Interface' dropdown box we can set the 'Sample Rate' , 'Frames/Period' and 'Periods/Buffer'. By default AV Linux is pre-configured for a Sample Rate of 44100, 1024 Frames/Period and 3 Periods/Buffer. Potentially these default settings will work OOTB for most Users but may need to be changed depending on the performance of your hardware. The the most influencial number is 'Frames/Period'. If you are experiencing Audio dropouts or 'Xruns' you may need to increase from '1024', conversely if you want to have lower 'latency' you can decrease from '1024' until Xruns reappear. The 'Periods/Buffer' figure is dependent on the Audio device type, USB and Internal Audio devices generally perform best at a setting of '3' Buffers and PCI(e) Audio devices require a setting of '2'. Once you are happy with your settings you can start JACK by hitting the 'Start' button on Qjackctl.



Interface: hw:DUO
Sample Rate: 44100
Frames/Period: 512
Periods/Buffer: 3

*PLEASE NOTE! - 'Latency' is the delay incurred by your Audio/MIDI signals going into your Audio/MIDI device Inputs and following the signal path of both the hardware and software Applications being used and coming back out of the Audio/MIDI device's Outputs.

The 'Advanced' tab of the Setup window contains extra settings for experienced Users and in most cases these settings do not need to be changed. The ability to choose separate Output and Input devices may be of interest to people who want to use multiple Audio devices, a common scenario is using USB microphones to record and another System Audio device to play back. Another important JACK setting is the 'Timeout' value for running MIDI Plugins and editing a setting of 2000ms is recommended and set by default.



Setup - JACK Audio Connection Kit

Preset Name: (default)

Please do not touch these settings unless you know what you are doing.

Server Prefix: jackd
Name: (default)

□ No Memory Lock
□ Unlock Memory
□ H/W Meter
□ Monitor
□ Soft Mode
□ H/W Monitor
□ Force 16bit
□ Ignore H/W

Priority: (default)
Word Length: 16
Wait (usec): 21333
Channels: (default)
Port Maximum: 256
Timeout (msec): 2000

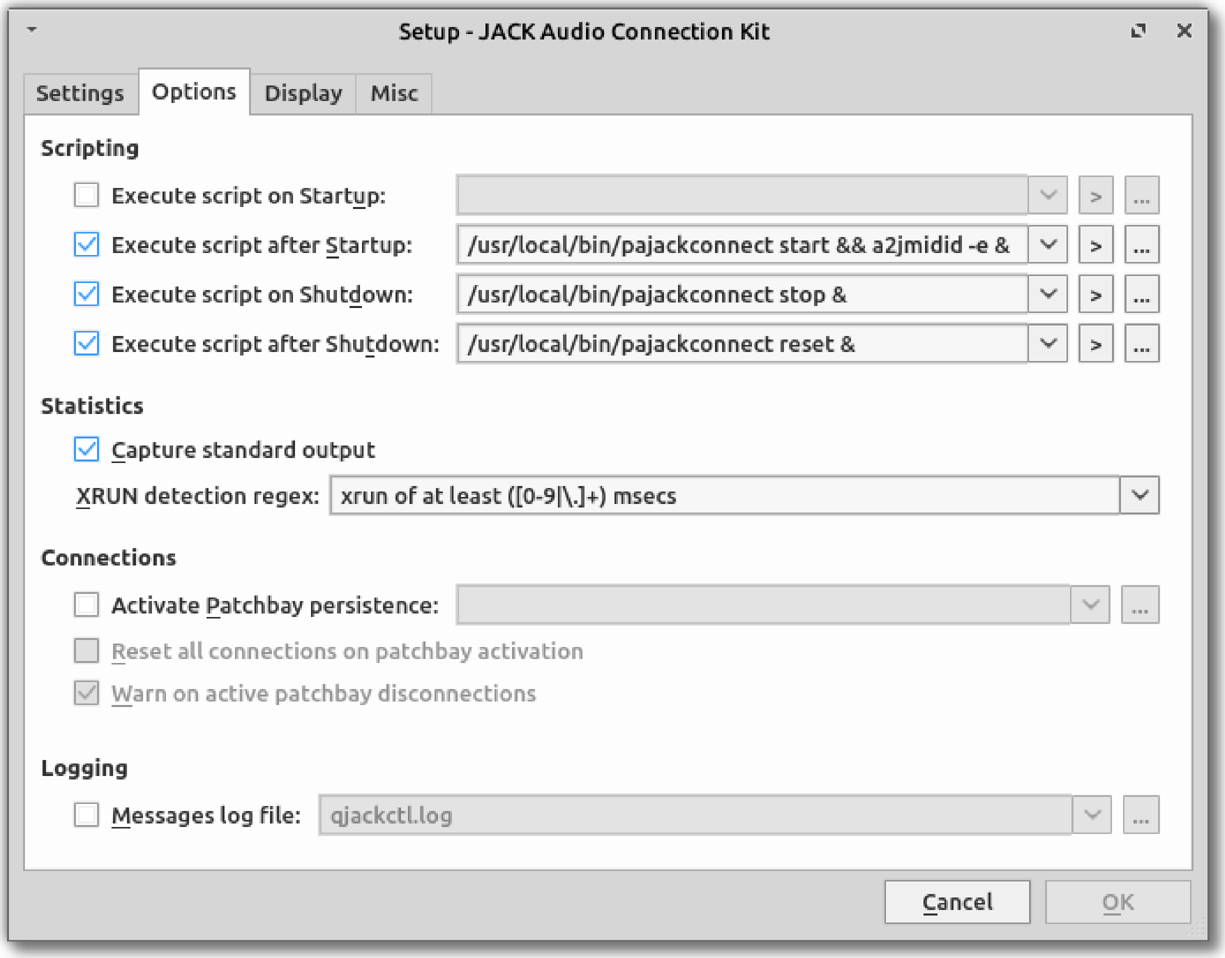
Audio: Duplex
Dither: None
Output Device: hw:DUO
Input Device: hw:CODEC
Channels I/O: (default) (default)
Latency I/O: (default) (default)

Server Suffix:
Start Delay: 10 secs

JACK's L'il Helpers: pajackconnect and a2jmidid :

The next 'Options' tab is where we can have Qjackctl execute any optional scripts when it is started, by default AV Linux provides a '*pajackconnect'* script as one of two very important helper applications when Qjackctl starts JACK. One helper application is '*a2jmidid*'' (ALSA to JACK MIDI Daemon). In Linux there are 2 methods of handling MIDI I/O, one is at the ALSA driver level and the other is with JACK. This can be a problem if you are using an application with JACK and trying to connect a MIDI device with ALSA, the two methods cannot be used at the same time so the solution is to bridge any ALSA MIDI devices so they appear available as JACK MIDI and this is exactly what 'a2jmidid' is for, now any ALSA MIDI devices seamlessly appear to be selected as 'a2j' in Applications using JACK.

The second helper application is a script known as '*pajackconnect*' and it's purpose is to integrate PulseAudio as a *source* and *sink* server and client routed through JACK. The ensures that applications using PulseAudio will route their Audio to the selected running Audio device you've selected in Qjackctl.



Scripting

☐ Execute script on Startup:

☑ Execute script after Startup: /usr/local/bin/pajackconnect start && a2jmidid -e &

☑ Execute script on Shutdown: /usr/local/bin/pajackconnect stop &

☑ Execute script after Shutdown: /usr/local/bin/pajackconnect reset &

Statistics

☑ Capture standard output

XRUN detection regex: xrun of at least ([0-9|\.]+) msecs

Connections

☐ Activate Patchbay persistence:

☐ Reset all connections on patchbay activation

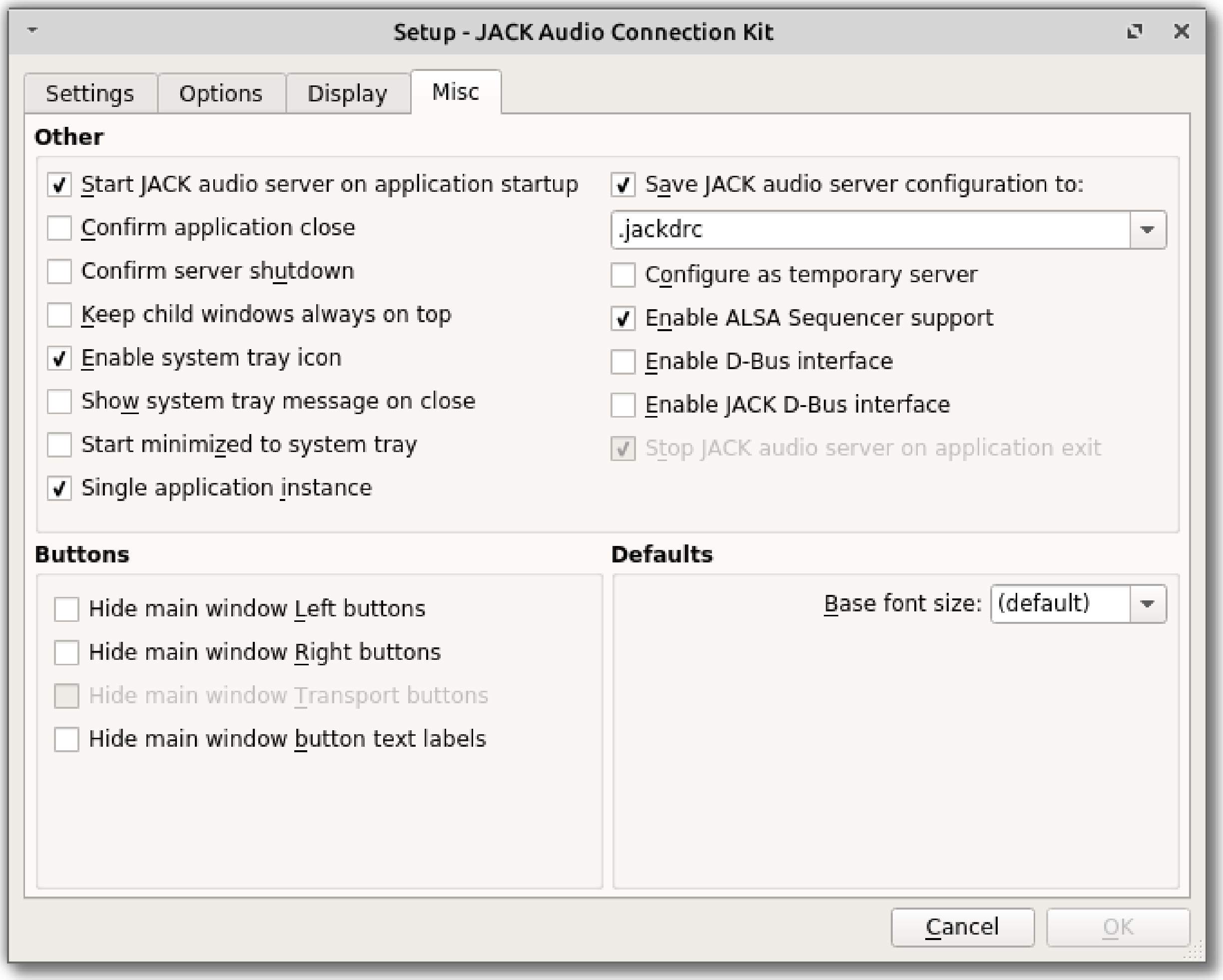
☑ Warn on active patchbay disconnections

Logging

☐ Messages log file: qjackctl.log

JACK Autostart and Other Settings :

The 'Misc' tab of the Qjackctl 'Setup' window gives some other convenient options for getting JACK integrated smoothly. The '*Start JACK Audio server on application startup'* checkbox means as soon as you launch Qjackctl it will start JACK without you needing to hit the 'Start' button. You can also have Qjackctl run in the system tray on the XFCE4 panel when you close the GUI. If you have a setup where you are using one Audio device and it doesn't change you can have Qjackctl automatically start when you log in to your computer, for this to work you need to select the option to '*Start JACK Audio server on application startup'*. To have Qjackctl automatically start you need to add it to the XFCE4 'Session and Startup' list. Go to the Whisker Menu and type '*Session*' into the search bar and the top choice should be 'Session and Startup', go to the 'Application Autostart' tab and click the 'Add' button and create an entry for Qjackctl like the one shown on the next page.



Other

☑ Start JACK audio server on application startup
□ Confirm application close
□ Confirm server shutdown
□ Keep child windows always on top
☑ Enable system tray icon
□ Show system tray message on close
□ Start minimized to system tray
☑ Single application instance

☑ Save JACK audio server configuration to: .jackdrc
□ Configure as temporary server
☑ Enable ALSA Sequencer support
□ Enable D-Bus interface
□ Enable JACK D-Bus interface
☑ Stop JACK audio server on application exit

Buttons

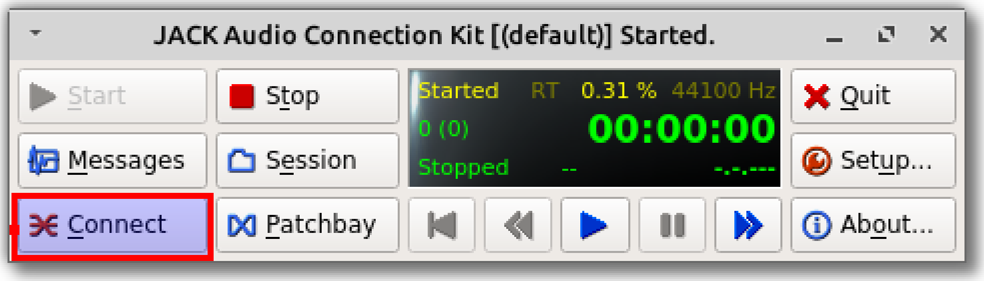
□ Hide main window Left buttons
□ Hide main window Right buttons
□ Hide main window Transport buttons
□ Hide main window button text labels

Defaults

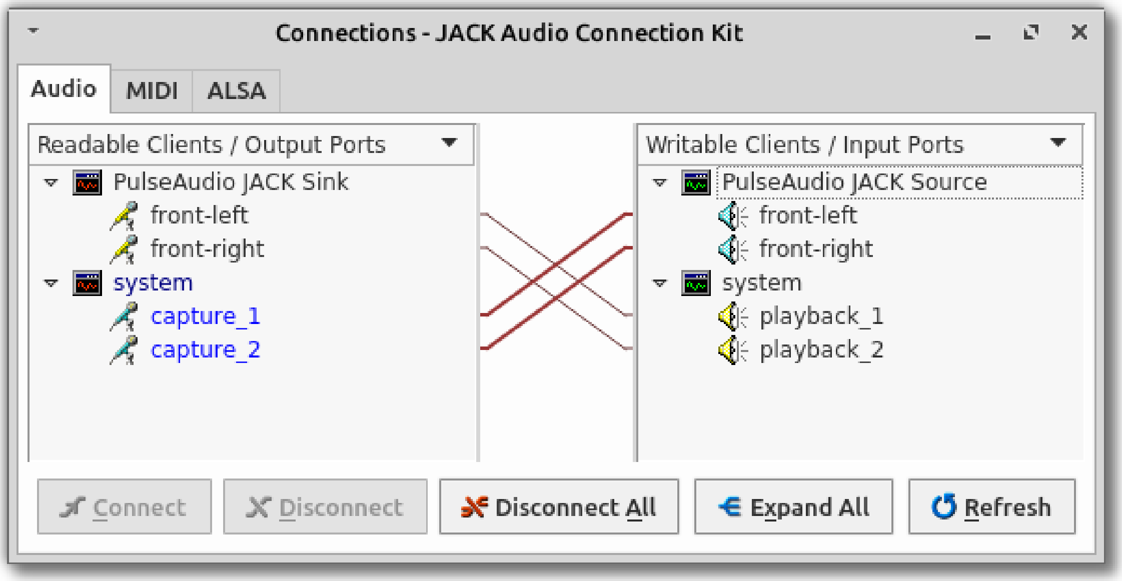
Base font size: (default)

Getting Connected :

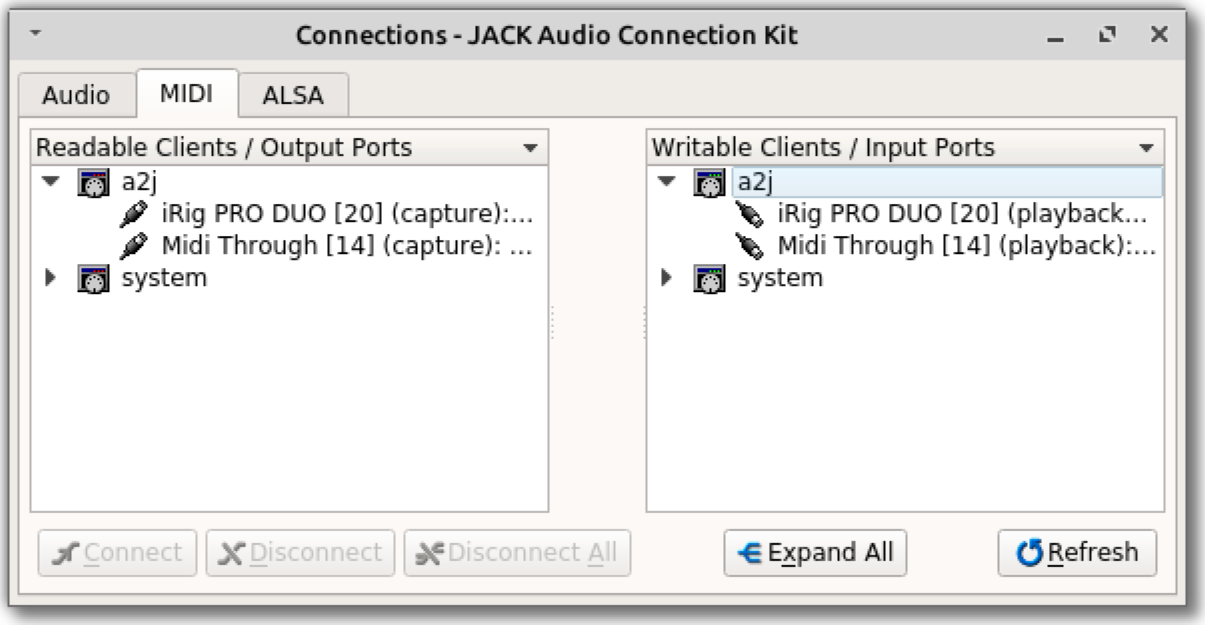
If you are using a monolithic DAW like Ardour or Mixbus with JACK you will find that most of the connectivity you need is managed within the program itself so making manual connections is not necessary, in these cases you simply start JACK and then launch your program. However if you want to use and connect individual JACK-aware programs you may want to use the connection features of Qjackctl. To access the connections window click the 'Connect' button.



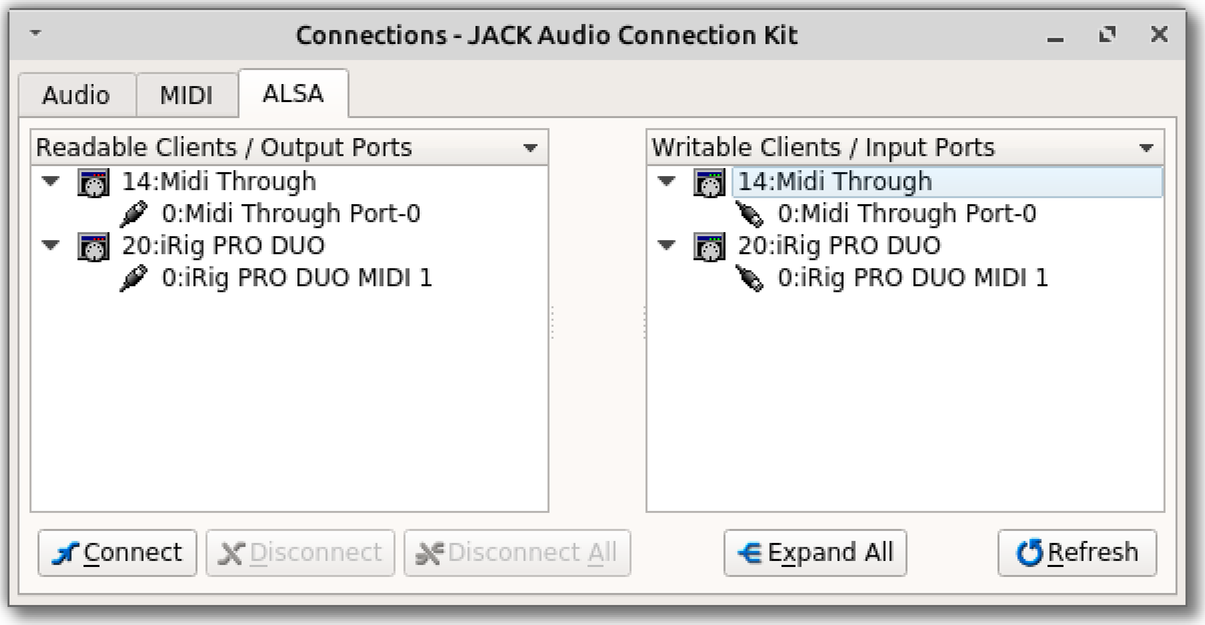
There are three tabs in the 'Connections' window which pertain to three specific connection points. 'Audio' is for both hardware and software Audio (not MIDI) connections. When you are using the default AV Linux settings it is normal and expected for the 'PulseAudio JACK Sink' and 'PulseAudio JACK Source' clients to appear because PulseAudio is still active on the system. If you have a JACK-aware application running it should appear in the 'Readable or Writable Clients' panes and in most cases you will want to connect it to the 'system' playback or 'system' capture ports *not* the PulseAudio ports.



The center 'MIDI' tab is for 'JACK MIDI' connections, because JACK MIDI is being bridged by 'a2jmidid' its ports appear under the 'a2j' Client. You can see the iRig PRO DUO is visible in this tab ready to be connected to JACK-aware MIDI applications.

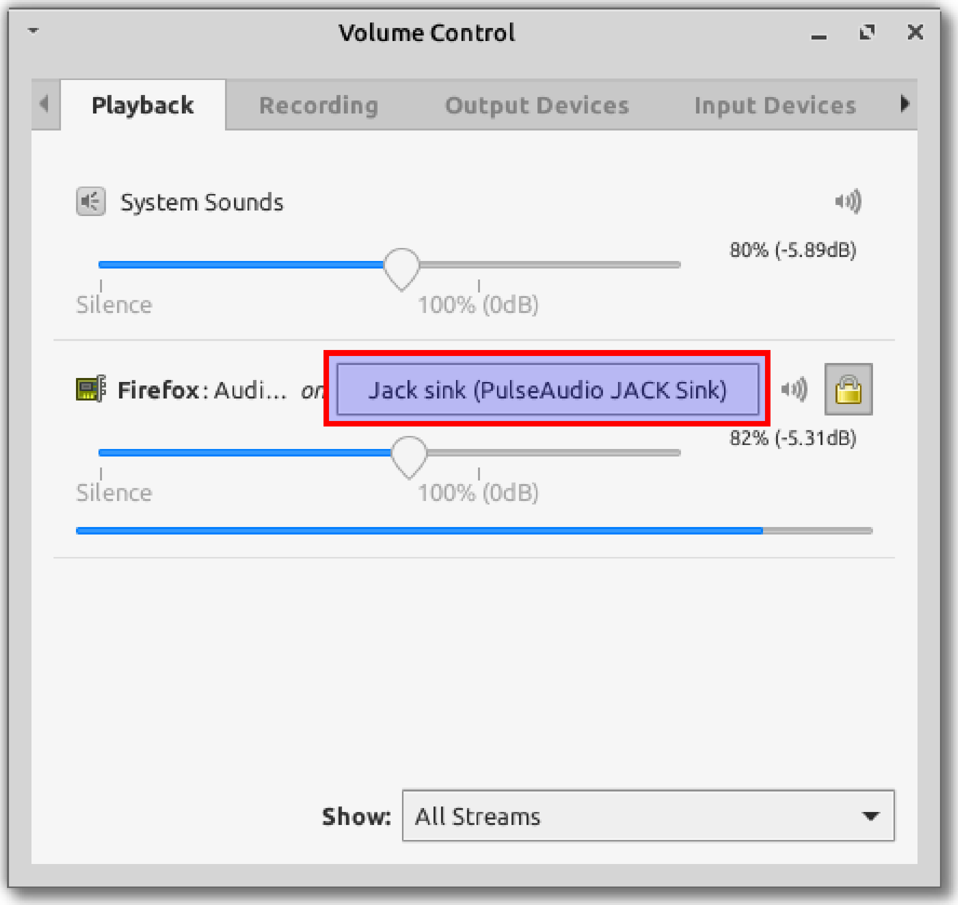

Connections - JACK Audio Connection Kit
Audio
MIDI
ALSA
Readable Clients / Output Ports
a2j
iRig PRO DUO [20] (capture):...
Midi Through [14] (capture): ...
system
Writable Clients / Input Ports
a2j
iRig PRO DUO [20] (playback...
Midi Through [14] (playback):...
system
Connect
Disconnect
Disconnect All
Expand All
Refresh

The 'ALSA' tab is for ALSA MIDI hardware and software to be connected, as you can see since the iRig PRO DUO is supported by ALSA it also appears in the ALSA tab.

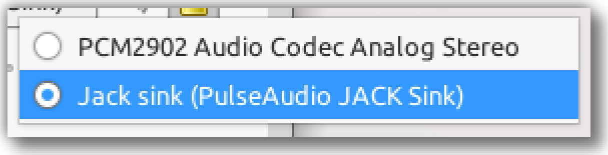


Potential Audio Routing Problems with Mozilla Firefox :

Recently Mozilla's Firefox Web Browser changed it's Audio routing from directly connecting to ALSA to utilizing PulseAudio. It has been noted that if PulseAudio and JACK are working together utilizing the 'PulseAudio JACK Source/Sink' Firefox may try to access the default system Audio device directly rather than connecting through the already running PulseAudio JACK Sink. This results in no Browser sound and Audio and Video streams that will not play back. To fix this Firefox needs to be directed to use the JACK Sink by using the PulseAudio Volume Control launched either from Menu→ Multimedia-→PulseAudio Volume Comtrol or clicking the PulseAudio applet on the XFCE4 Panel
Look for 'Firefox' in the 'Playback' Tab and click on the highlighted Audio device button.



Make sure you have the 'PulseAudio JACK Sink' selected for Playback rather than the system Audio device.

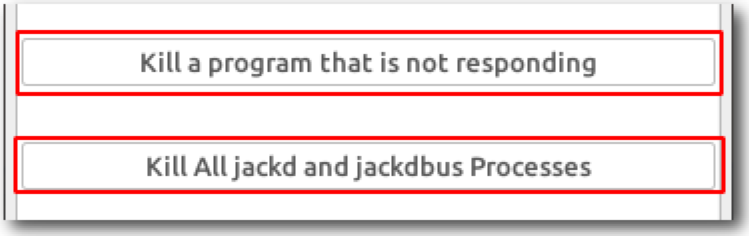

○ PCM2902 Audio Codec Analog Stereo
● Jack sink (PulseAudio JACK Sink)

jackd and jackdbus :

There are 2 different ways the system can run JACK behind the scenes, the simplest is by running the 'jackd' executable with 'Qjackctl' and this is what AV Linux uses by default, however there is a second way of running JACK and this is with the Desktop interprocess communication mechanism known as 'D-bus'. Running JACK with D-bus is a selectable option in Qjackctl (Setup → Misc. tab). If you start JACK with Qjackctl before doing Audio and MIDI work you will probably not encounter the D-bus JACK executable known as 'jackdbus'.

Occasionally other JACK-aware programs that are launched before Qjackctl may inadvertently start jackdbus and when you later try to launch JACK with Qjackctl you will see JACK is already running and displaying as 'Active' in the Qjackctl GUI and you may even notice that the sample rate may set to a different value than intended. Only one instance of JACK can run at a time so you may not be able to launch other JACK-aware programs or you may find that your Audio setup seems to have a mind of it's own if jackdbus is running undetected in the background.

The 'AV Linux Assistant' has utilities to help shutdown hung or misbehaving programs and also to kill any instances of jackd and jackdbus running in the background and reset the system to start JACK cleanly.


Kill a program that is not responding
Kill All jackd and jackdbus Processes

You can also manually kill all JACK processes by running this command in a regular Terminal:

```
killall -9 jackd jackdbus
```

FireWire Audio Drivers: ALSA or FFado?? :

We are in a period of dual support for FireWire Audio devices, with the older FFado method and the newer ALSA FireWire drivers which are present in the Linux kernel as modules. An issue is you have to use one or the other and it seems for most Users that FFado still provides the best latency (256fpp or less). By default AV Linux will load the ALSA modules for FireWire so to select your FireWire Audio device in Qjackctl you need to use the 'alsa' JACK driver not 'firewire'. It is now necessary to tell the system not to load the ALSA 'snd_dice' module before running FFado and JACK will work. To do this during a session open a Root Terminal and use this command to remove the ALSA FireWire module:

```
rmmod snd_dice
```

It is important to note this is a 'per-use' command and will not be persistent on a reboot in order to make it persistent on every boot some further configuration is needed.

Disabling ALSA FireWire Modules from loading at Boot :

If you want to permanently disable snd_dice you can blacklist the module so it will not load at boot like this:

- Create a text file in /etc/modprobe.d/ called 'snd_dice.conf' containing only the text 'blacklist snd_dice'.
- Run '**`depmod -ae`**' as root.
- Recreate your initrd with '**`update-initramfs -u`**'

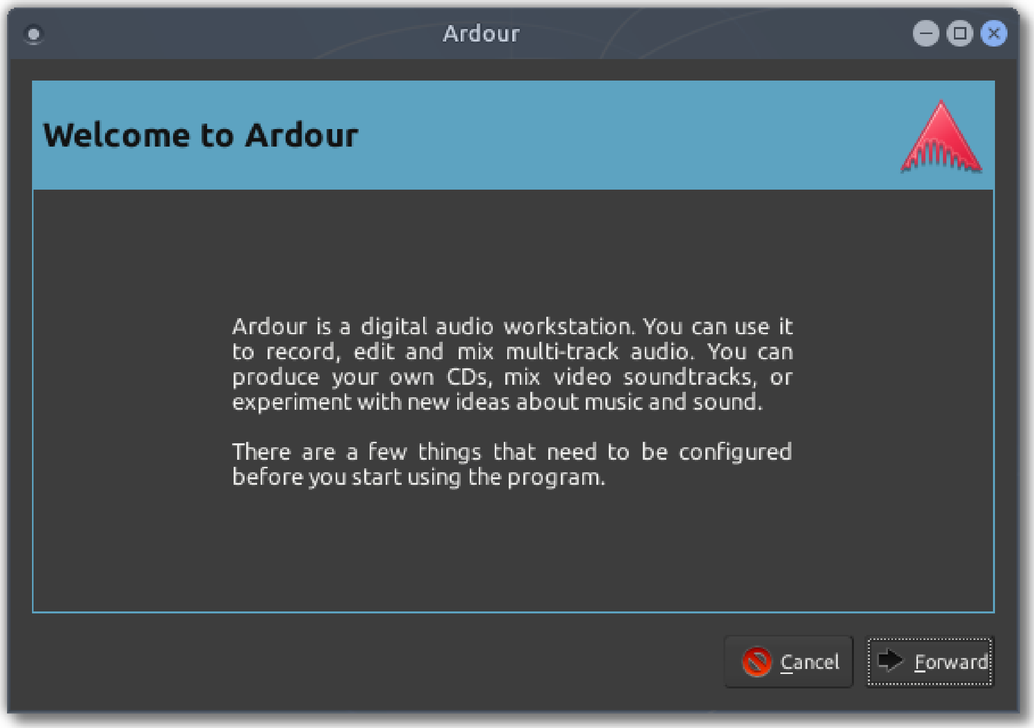
With the 'snd_dice' ALSA modules disabled you can now use the older FFado drivers, to do this select the 'firewire' driver in Qjackctl as detailed earlier in this section.

INITIAL SET UP OF ARDOUR/MIXBUS :

Choosing An Audio Backend :

For many people new to Audio Recording with Linux it can be a bit confusing and daunting to initially set up the full-featured DAWs Ardour and Mixbus. Both powerful programs share the same core so we will use Ardour as an example. Recently Ardour and Mixbus have gained the ability to be used with either JACK, ALSA and most recently PulseAudio 'backends'. **If you don't wish to use Ardour or Mixbus with JACK then choose one of the other Audio backends and ignore the JACK specific instructions in this section. As stated in the previous chapter AV Linux is centered around using the JACK Audio server, because JACK has interconnectivity with other external JACK-aware programs it is recommended to prefer the JACK backend for using Ardour/Mixbus and to have JACK up and running before Ardour and Mixbus are launched.**

When you initially launch Ardour or Mixbus either in a Live Session or a fresh HDD install you will be greeted by an initial welcome screen and walked through a few setup dialogs, in most cases except for what is detailed here you can accept the default setup choices as offered.

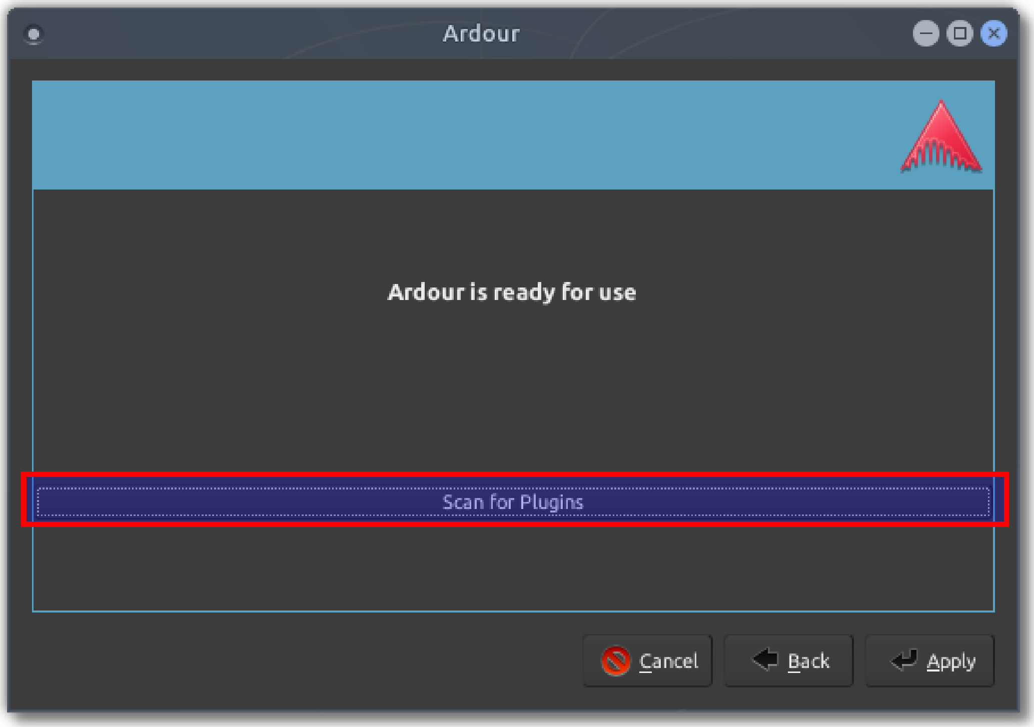


Ardour is a digital audio workstation. You can use it to record, edit and mix multi-track audio. You can produce your own CDs, mix video soundtracks, or experiment with new ideas about music and sound.

There are a few things that need to be configured before you start using the program.

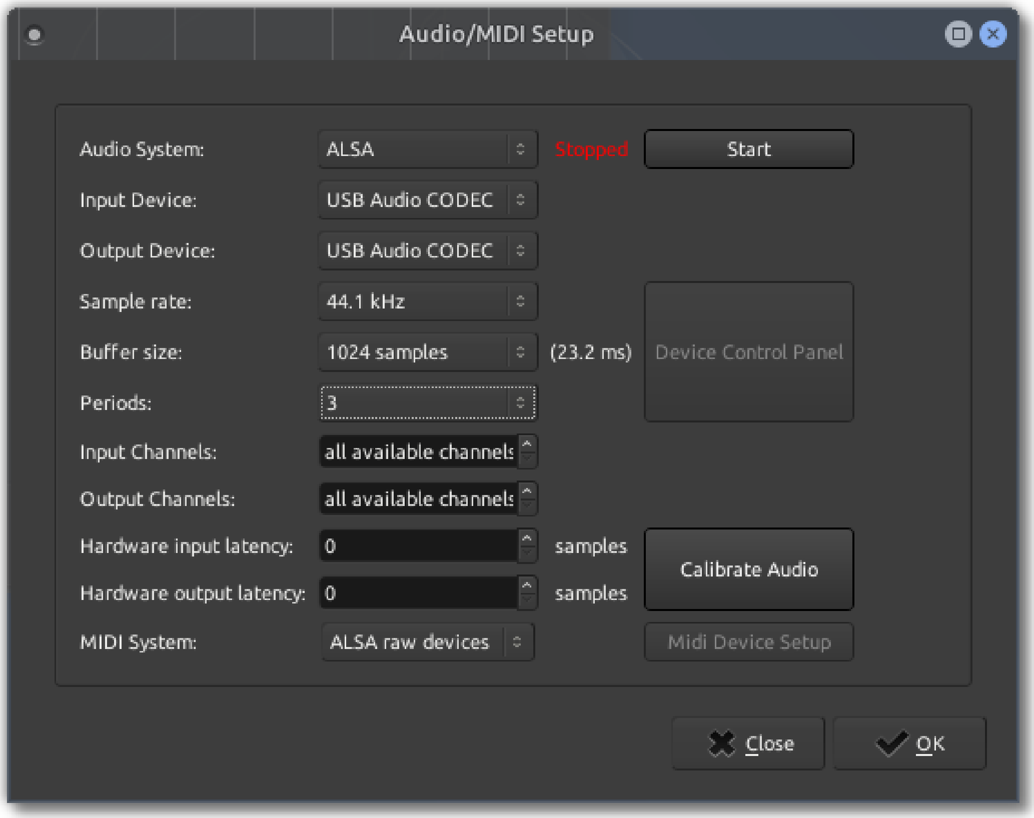
A very important part of the initial setup process is to have Ardour scan for Audio plugins, the scan doesn't take very long and doing this now will ensure that the hundreds of pre-installed Audio Plugins included in AV Linux will all be present and ready to use in your Ardour sessions. Ardour will auto-detect LADSPA and LV2 Audio plugins, LinuxVST plugins specifically will be found during the scan. It is important to note that any LinuxVST plugins you may have added yourself that aren't located in the standard paths of /usr/local/lib/vst or /usr/lib/vst will require you to to point Ardour/Mixbus to their folders by adding a custom path after launching the program, custom paths are set in 'Edit' → 'Preferences' → 'Plugins'.

***PLEASE NOTE!** - Mixbus now requires Plugins to be scanned from 'Edit' → 'Preferences' → 'Plugins' and does not offer a Scan option at first run.



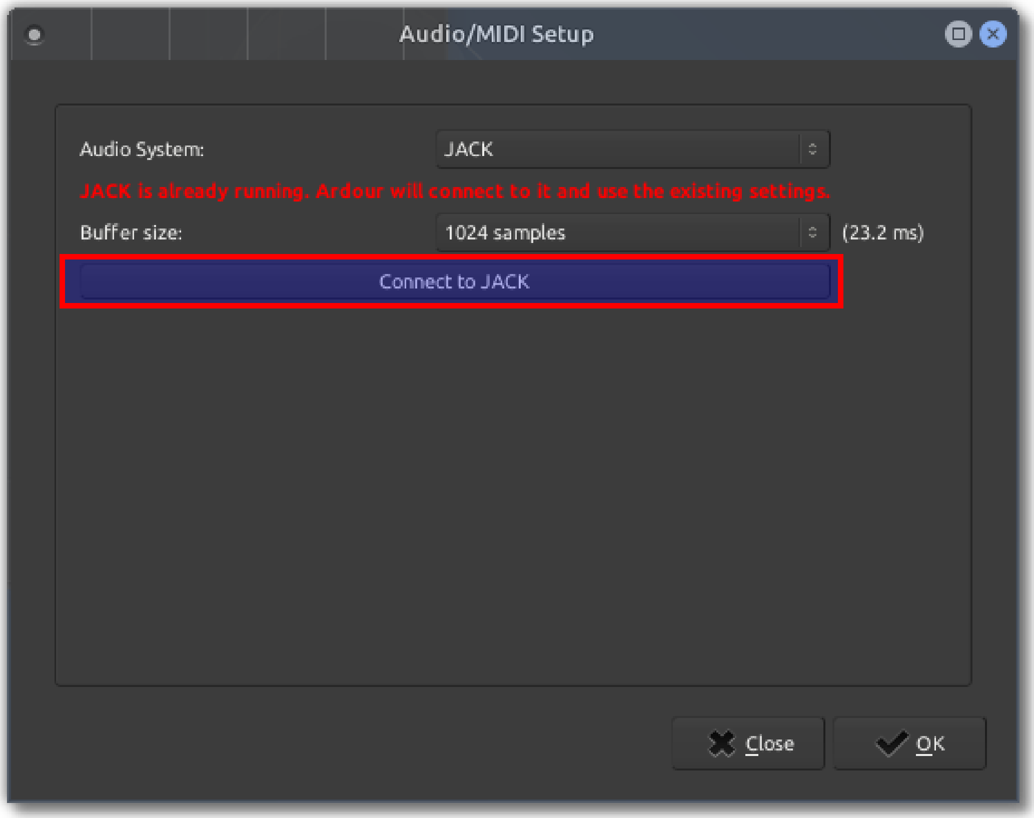
Ardour is ready for use

When you set up your initial Ardour/Mixbus session you will be presented with an 'Audio/MIDI Setup' dialog, this is where you will choose whichever Audio backend you will use. As stated JACK is the *preferred* recommendation, ALSA can be selected but has the following caveat: No Audio/MIDI from any other external programs or applications can be routed in or out of Ardour/Mixbus. In the ALSA setup example below we are using the same USB Audio device for both Input and Output which is a suggested practice. It is possible to select a different Input than the Output, people using USB Microphones may want to use the mic with an Input and the System Audio device as an Output. Take note that since this is a USB Audio device we set the 'Periods' dropdown selection to '3', for internal or PCI(e) Audio devices it is recommended to use a setting of '2'. If required it is also possible (but not usually necessary) to accurately calibrate Audio/MIDI latency using a cable looped from your Audio/MIDI outputs to the inputs to calculate the actual latencies. Once you have your settings selected click the 'Start' button to your upper-right.


Audio/MIDI Setup

Audio System: ALSA Stopped
Input Device: USB Audio CODEC
Output Device: USB Audio CODEC
Sample rate: 44.1 kHz
Buffer size: 1024 samples (23.2 ms)
Periods: 3
Input Channels: all available channels
Output Channels: all available channels
Hardware input latency: 0 samples
Hardware output latency: 0 samples
MIDI System: ALSA raw devices

If you already have JACK up and running before setting up your intial Ardour/Mixbus session when you select the 'JACK' backend it will detect that JACK is already running and simply clicking the 'Connect to JACK' button will connect you to whatever settings and Audio device you've chosen in Qjackctl.



Audio System: JACK

JACK is already running. Ardour will connect to it and use the existing settings.

Buffer size: 1024 samples (23.2 ms)

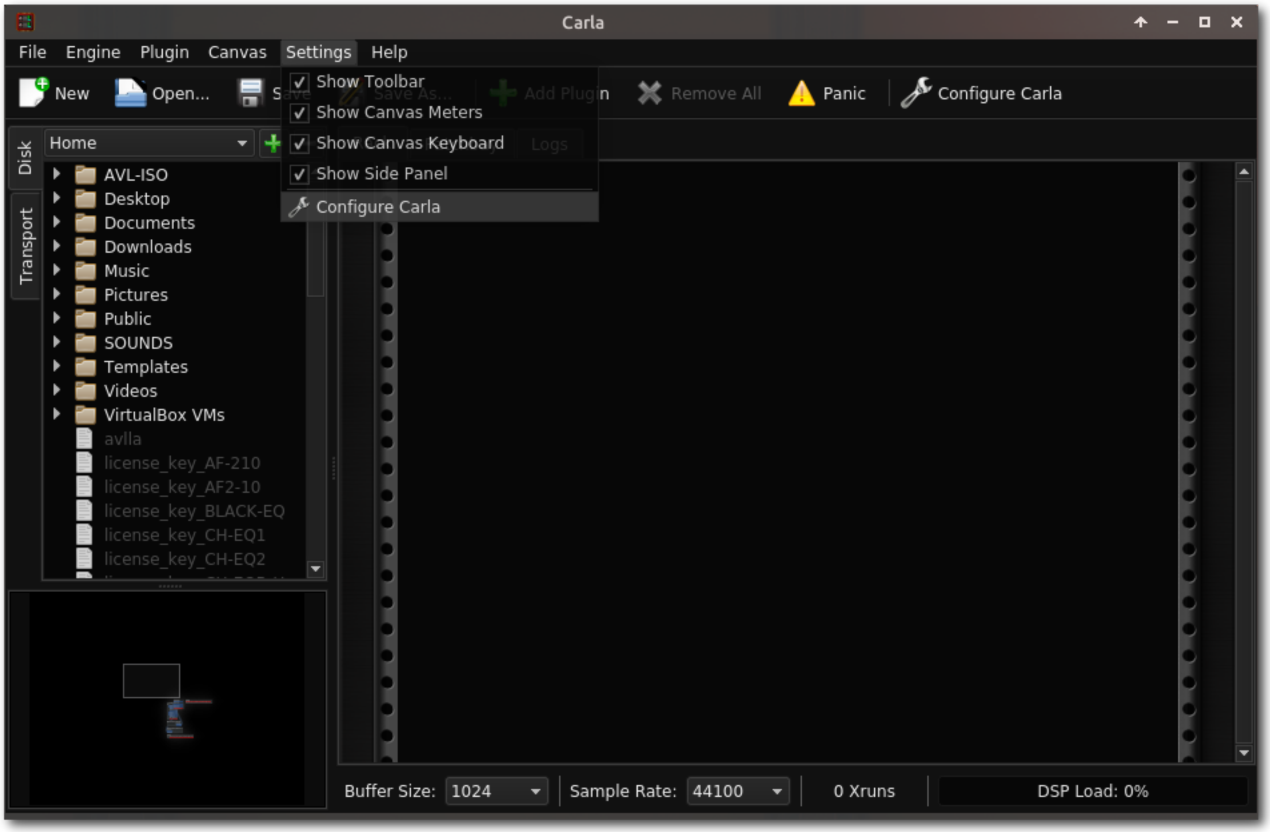
Further Info: The Ardour Reference Manual

CARLA PLUGIN HOST SETUP :

Carla... She's Quite a Gal! :

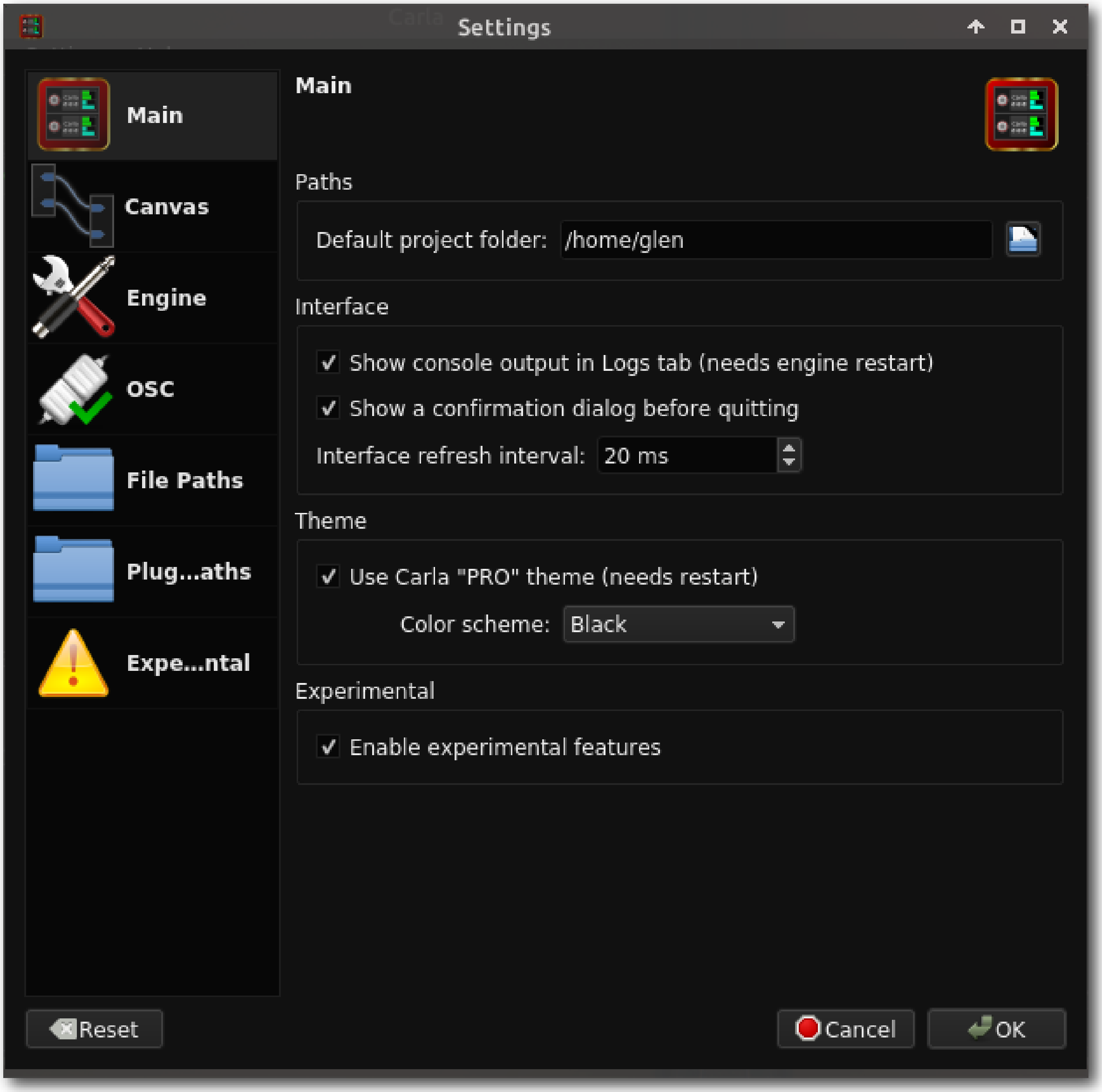
AV Linux includes 'Carla' which is a very useful host for all common Linux Audio plugin formats and comes with the optional extensions required to host Windows VST Audio plugins with Wine. Carla can be used to host plugins 'Standalone' or or also can be used as an LV2 or LinuxVST Plugin within Ardour or Mixbus to facilitate loading plugin formats that are not natively supported (ie DSSI). In addition Carla can also host Soundfont2, GIG and SFZ Sound Library formats. In order to get the best performance out of Carla it is advised to do an initial setup and scan for all Plugins available in various formats on the system. When this scan is performed with Carla running 'Standalone' it will then also ensure all Plugins scanned are available to Carla running as a Plugin when Ardour or Mixbus are used.

If you have downloaded any outside plugins or Soundfont2, SFZ, or GIG Sound Libraries to your system you may first want to tell Carla where they are by adding the 'PATH' to Carla's scan. To do this, make sure you have JACK running and launch Carla from the Whisker Menu and select 'Settings'→'Configure Carla'.



Buffer Size: 1024
Sample Rate: 44100
0 Xruns
DSP Load: 0%

The 'Settings' window will open, select either the ‘File Paths’ or 'Plugin Paths' Icon and from the Dropdown box select whichever type of Plugin or Sound Library you want to create a path for and if it isn't already listed use the '+Add' button to add your custom path for scanning. It is advised to restart Carla for the new paths to be taken into account.



Main

Paths

Default project folder: /home/glen

Interface

☑ Show console output in Logs tab (needs engine restart)

☑ Show a confirmation dialog before quitting

Interface refresh interval: 20 ms

Theme

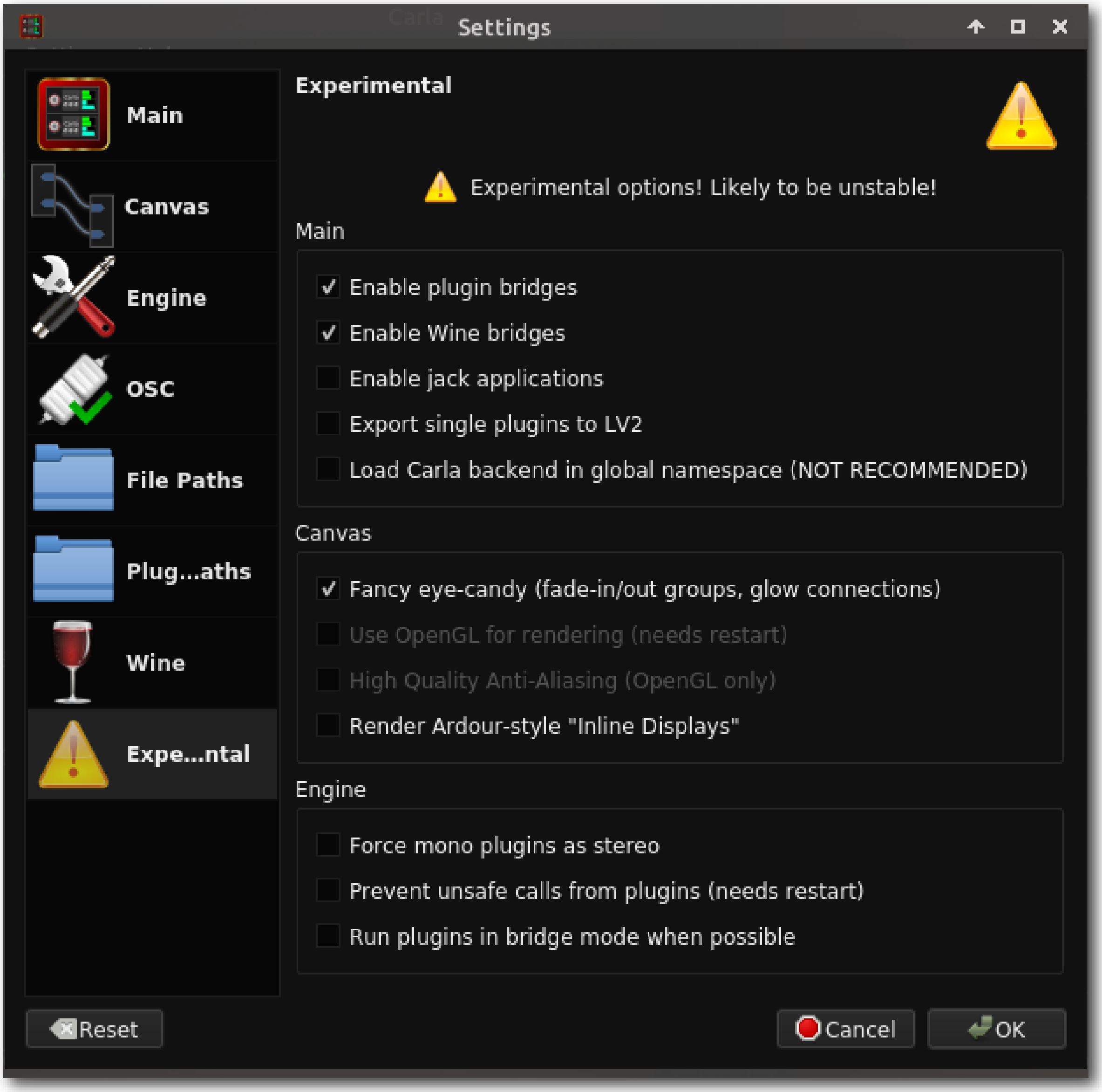
☑ Use Carla "PRO" theme (needs restart)

Color scheme: Black

Experimental

☑ Enable experimental features

***PLEASE NOTE! –** For Windows VST Plugins and other Plugin Bridges to work with Carla it is now necessary to enable that feature in the new ‘Experimental’ tab found in ‘Settings’→’Configure Carla’.



Experimental

⚠ Experimental options! Likely to be unstable!

Main

- ☑ Enable plugin bridges
- ☑ Enable Wine bridges
- ☐ Enable jack applications
- ☐ Export single plugins to LV2
- ☐ Load Carla backend in global namespace (NOT RECOMMENDED)

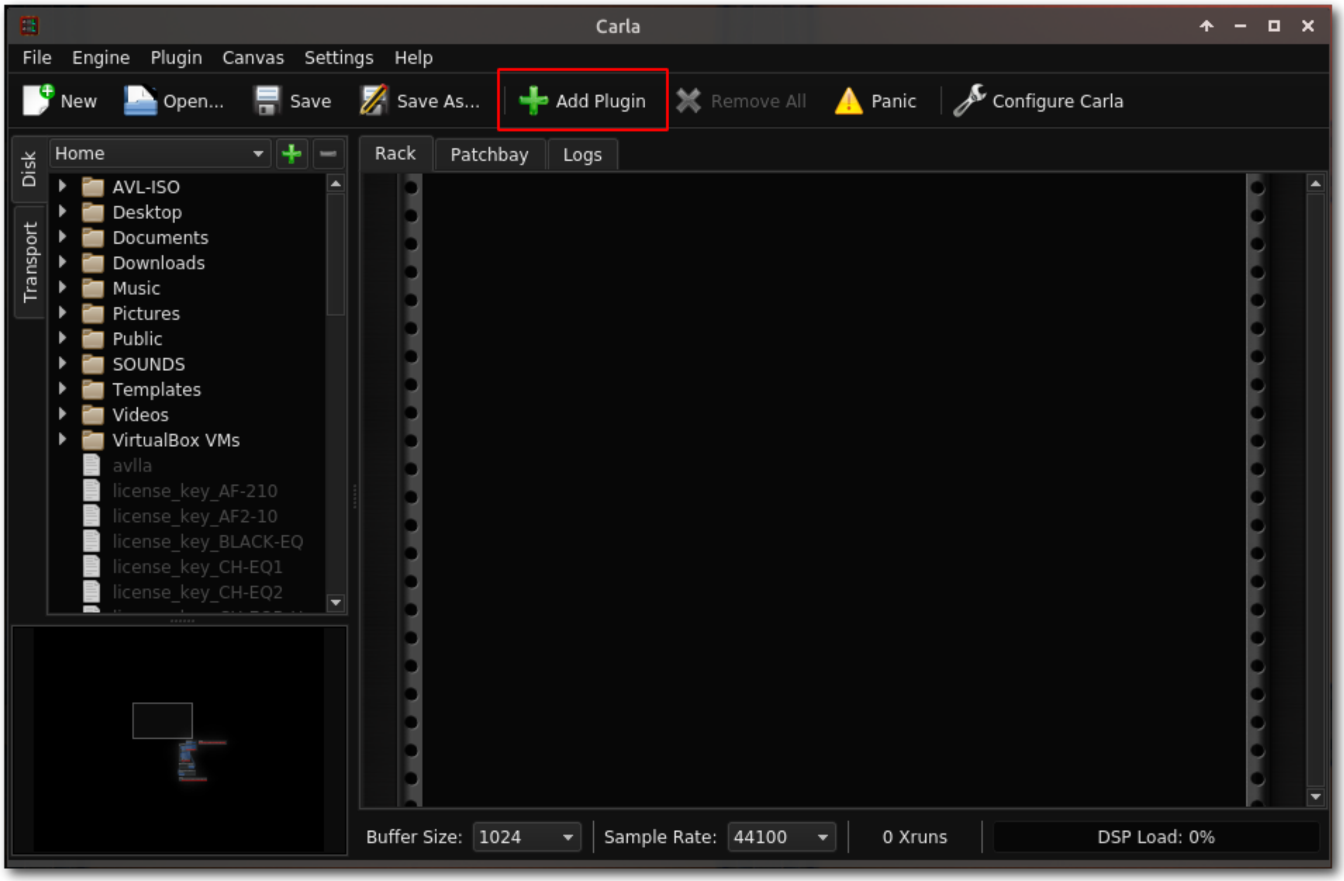
Canvas

- ☑ Fancy eye-candy (fade-in/out groups, glow connections)
- ☐ Use OpenGL for rendering (needs restart)
- ☐ High Quality Anti-Aliasing (OpenGL only)
- ☐ Render Ardour-style "Inline Displays"

Engine

- ☐ Force mono plugins as stereo
- ☐ Prevent unsafe calls from plugins (needs restart)
- ☐ Run plugins in bridge mode when possible

To access the scanning setup dialog click '+Add Plugin'.



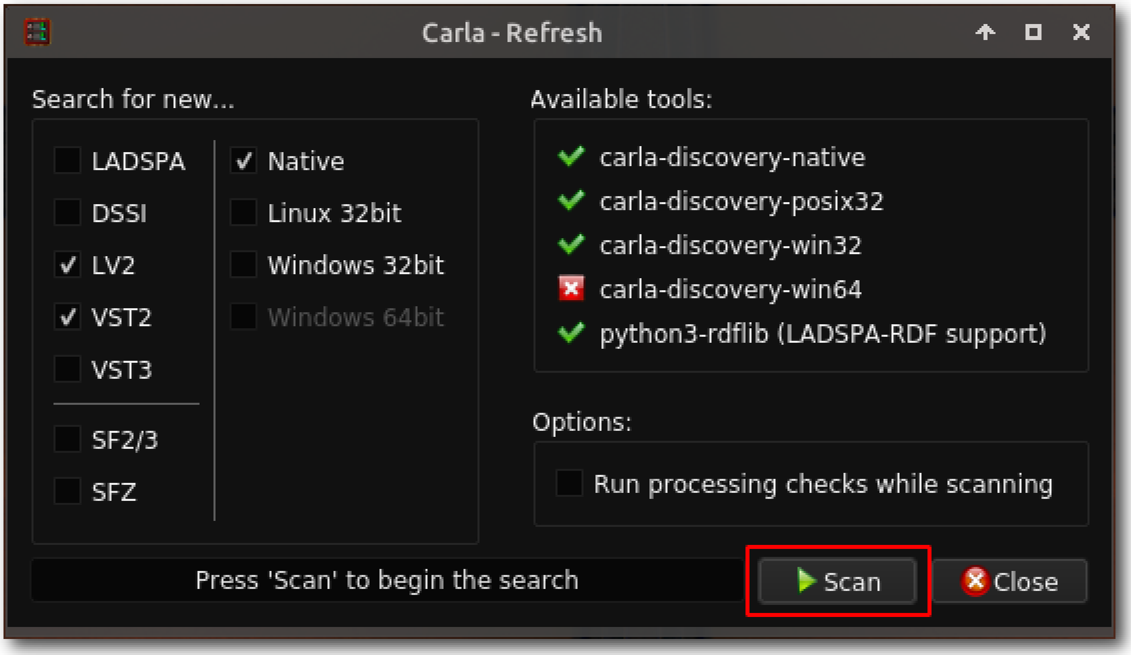
Buffer Size: 1024

Sample Rate: 44100

0 Xruns

DSP Load: 0%

At this point Carla will display what Plugins are already scanned and and available, to perform the actual scanning operations for new Plugins that aren't available yet. Click the 'Refresh' button and Carla’s Scan Window will open. Check off as many or as few Plugin types as you would like Carla to scan for and then select the 'Scan' Button to perform the actual scan. After scanning when you click the '+Add Plugin' on Carla's main window button you should be able to search and select your desired plugin by entering its name in the search field at the top of the 'Add New' window.



Search for new...

☐ LADSPA
☐ DSSI
☑ LV2
☑ VST2
☐ VST3
☐ SF2/3
☐ SFZ

☑ Native
☐ Linux 32bit
☐ Windows 32bit
☐ Windows 64bit

Available tools:

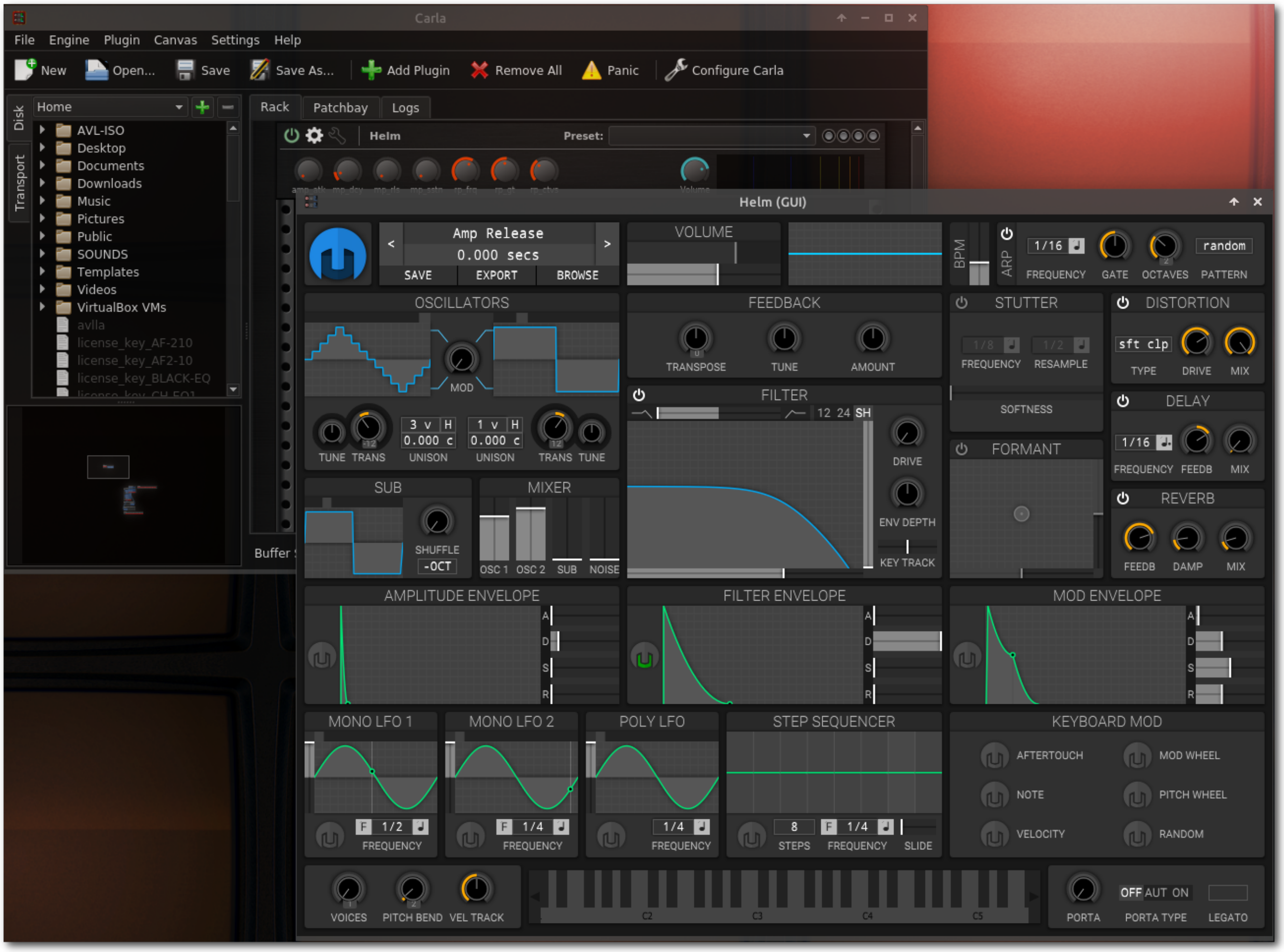
✓ carla-discovery-native
✓ carla-discovery-posix32
✓ carla-discovery-win32
☒ carla-discovery-win64
✓ python3-rdflib (LADSPA-RDF support)

Options:

☐ Run processing checks while scanning

Press 'Scan' to begin the search

Once you have Carla set up and have the Plugins you need to use included in the list you will notice that when a Plugin is selected it appears in 'Carla Rack'. From here you can simply tweak the Plugin parameters visually in the presented Rack UI or for most LV2, LinuxVST and DSSI plugins you can click on the 'gear' Icon in the Rack slot and the plugin will show its own GUI to handle settings. In the example below the ‘Helm’ Synthesizer Plugin is loaded in Carla Rack and it’s GUI is enabled. Note that LADSPA plugins and GIG, SFZ and SF2 Sound Libraries don't have GUI's and can have their settings modified by selecting the 'wrench' icon which will open a new parameters window.

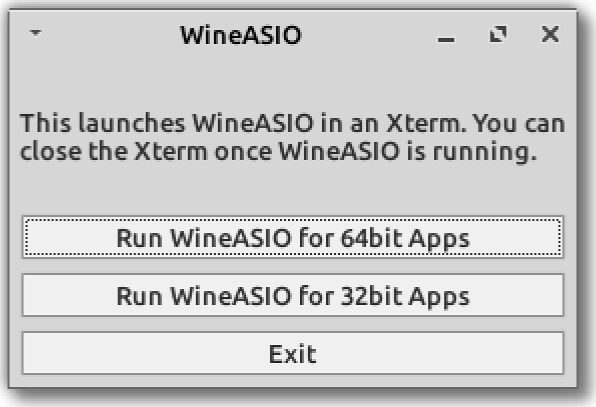


Any plugins that are loaded into Carla running as a Standalone host will not automatically connect to the system Audio outputs, this differs from Carla running as a Plugin within Ardour or Mixbus in which case the connections are handled automatically within the DAW. When Carla is used by itself it provides its own Patchbay to make connections. Carla can save both your Rack and Patchbay settings to a file to be retrieved later which makes preserving complicated setups easy.

RUNNING WINDOWS AUDIO SOFTWARE :

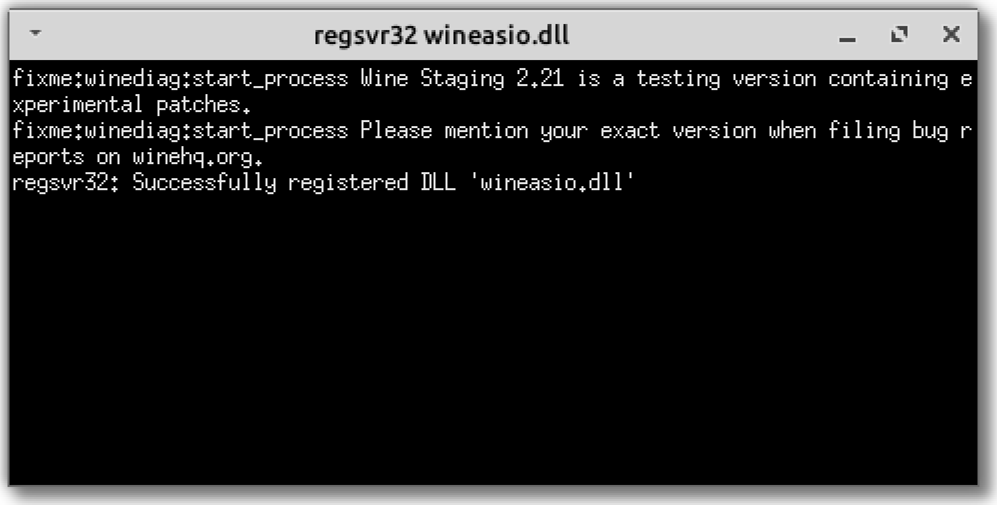
Exposing Windows ASIO Audio drivers to JACK with WineASIO :

It is possible to run some popular Windows Audio software in AV Linux and have it run with Windows native ASIO Audio drivers. This is accomplished using a utility called WineASIO which runs in the Microsoft Windows emulating Linux software known as 'Wine'. AV Linux 2020 comes with 'Wine-staging' installed and a WineASIO launching utility that can be found in the 'Multimedia'→'Audio Tools' menu. To use WineASIO you must first have the JACK Audio server running as detailed in the 'Audio & Midi in AV Linux' section. WineASIO can be used with both 32bit and 64bit Windows software applications.



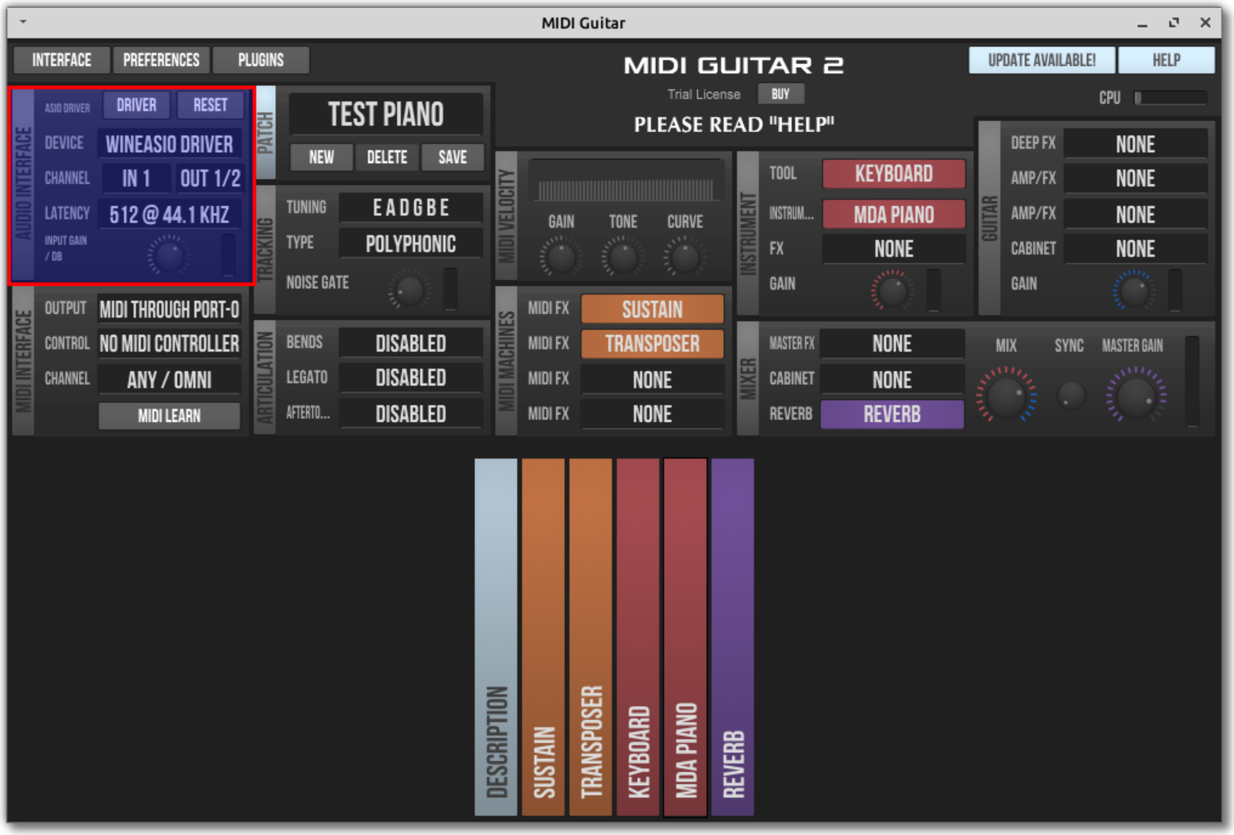
This launches WineASIO in an Xterm. You can close the Xterm once WineASIO is running.

Once you select the appropriate button pertaining to the Windows Audio application you want to run a Terminal window will open confirming that the WineASIO '.dll' has successfully launched.



```
fixme:winediag:start_process Wine Staging 2.21 is a testing version containing e
xperimental patches.
fixme:winediag:start_process Please mention your exact version when filing bug r
eports on winehq.org.
regsvr32: Successfully registered DLL 'wineasio.dll'
```

When WineASIO is up and running you can launch your Windows program and select the WineASIO driver in the Audio setup dialog of the application. As an example we will use the standalone version of the Windows software ‘Jam Origin MIDI Guitar 2’. As you can see in the highlighted section the WineASIO driver has been selected which will route the Audio output through JACK.



DEVICE WINEASIO DRIVER
CHANNEL IN 1 OUT 1/2
LATENCY 512 @ 44.1 KHZ

TEST PIANO

TUNING EADGBE
TYPE POLYPHONIC
NOISE GATE

TOOL KEYBOARD
INSTRUM... MDA PIANO
FX NONE
GAIN

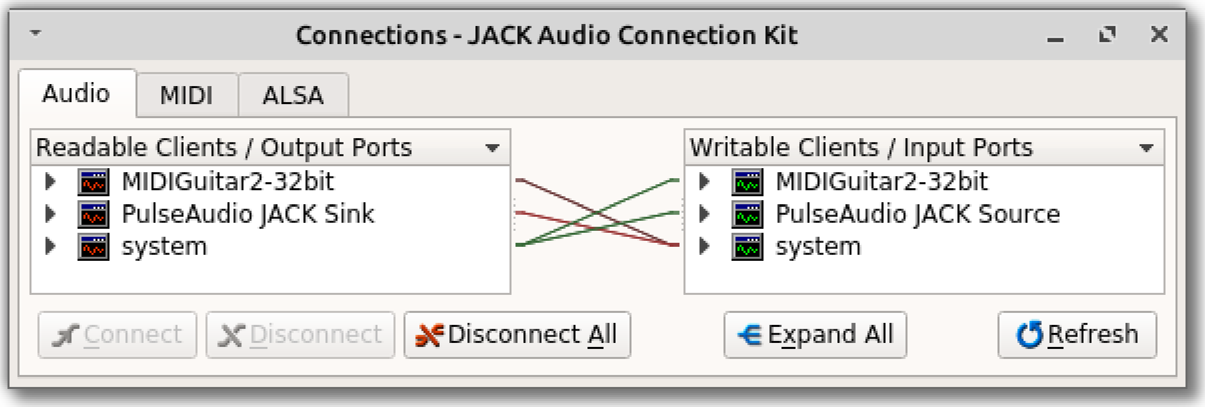
DEEP FX NONE
AMP/FX NONE
AMP/FX NONE
CABINET NONE
GAIN

OUTPUT MIDI THROUGH PORT-0
CONTROL NO MIDI CONTROLLER
CHANNEL ANY / OMNI

BENDS DISABLED
LEGATO DISABLED
AFTERTO... DISABLED

MIDI FX SUSTAIN
MIDI FX TRANSPOSER
MIDI FX NONE
MIDI FX NONE

MASTER FX NONE
CABINET NONE
REVERB REVERB



Readable Clients / Output Ports
- MIDIGuitar2-32bit
- PulseAudio JACK Sink
- system

Writable Clients / Input Ports
- MIDIGuitar2-32bit
- PulseAudio JACK Source
- system

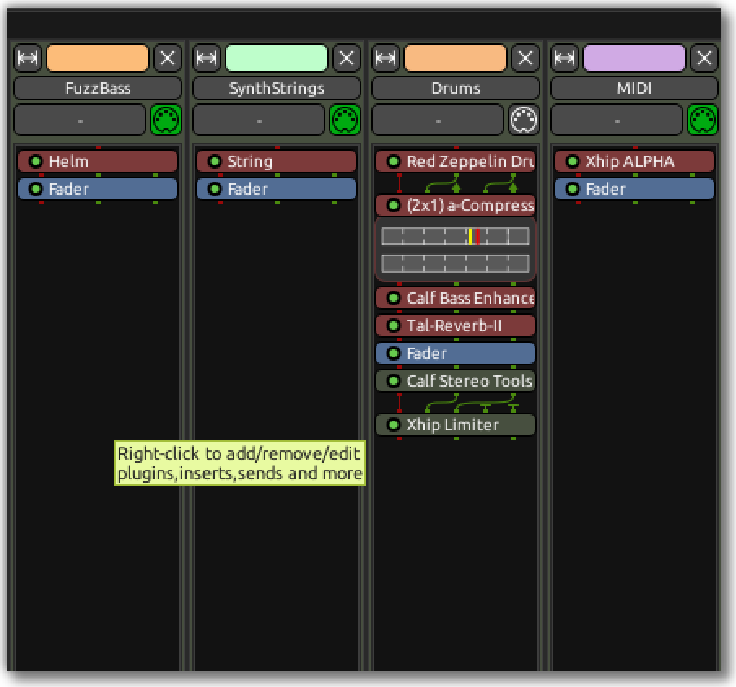
Running Windows VST Plugins in Ardour/Mixbus :

Steinberg's 'Virtual Studio Technology' or 'VST' Audio plugin format is a cross-platform industry standard and there are a wealth of good quality commercial and free VST plugins available. VST's for Windows are by far the most common and a large number of them will run on Linux with the aid of 'wine' Windows emulating software and various bridging applications. As you would expect running Audio plugins that are not native to Linux presents challenges and *it can not be overstated that there are no guarantees of functionality and stability, it is always preferable to run Audio plugins that were intended for the Linux platform.*

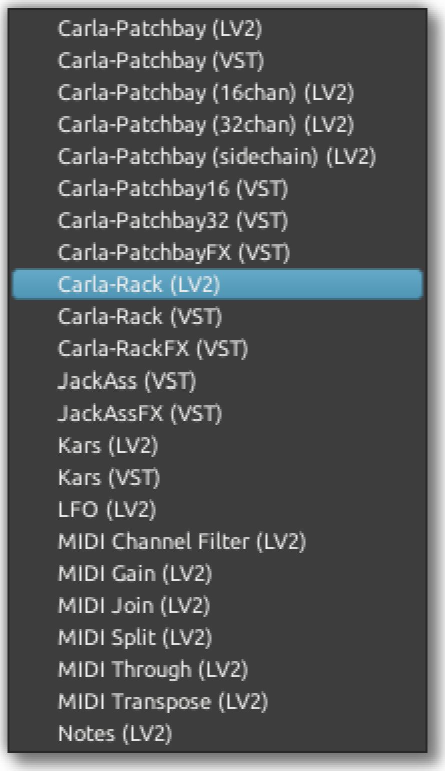
AV Linux comes with a small set of 'oldie-but-goodie' free 32bit Windows VST Audio plugins placed in the '/usr/local/lib/vst' folder of the filesystem. With 'wine-staging' pre-installed these plugins can be hosted and used in Ardour and Mixbus in two distinct ways.

The first method of hosting Windows VST's in Ardour and Mixbus on both 32 and 64bit AV Linux is using 'Carla-Rack' as a plugin host within Ardour and Mixbus. Carla is a standalone application but also exists as an LV2 and VST plugin that can be loaded into a channel strip and used as a bridge to allow hosting various plugins that may not be natively supported by the host, as an example in Ardour and Mixbus 'Carla-Rack' can be used to host Windows VST plugins that aren't natively supported. Before using Carla-Rack as a plugin it is important to have run Carla standalone and perform a Plugin Scan as detailed in 'Carla Plugin Host Setup'.

To use Carla-Rack in Ardour and Mixbus right click on a Mixer window channel strip and load the Carla-Rack LV2 or VST Plugin.



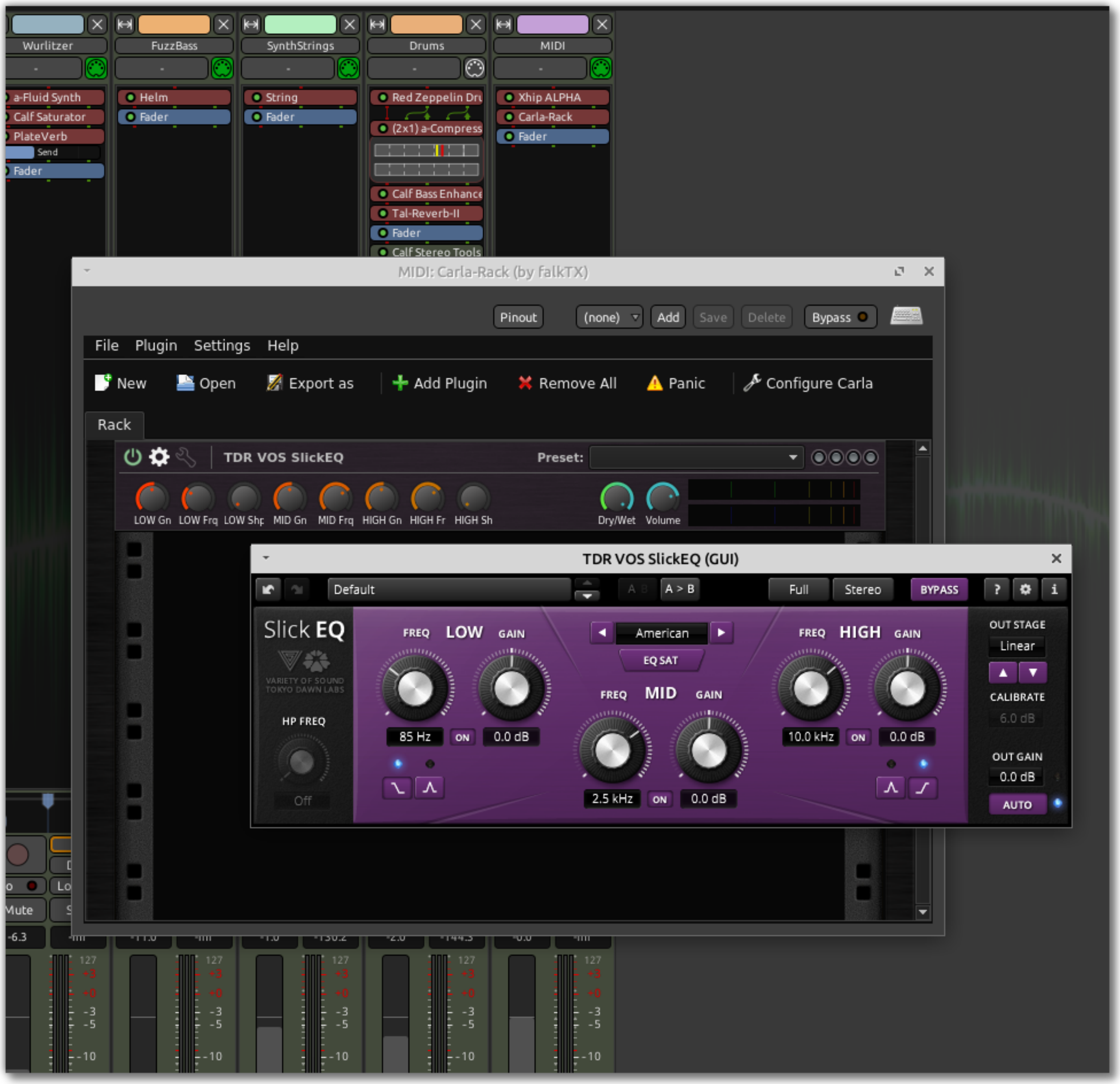
Then find Carla-Rack in the plugin list under the 'falkTX' category, both the LV2 and VST versions are supported by Ardour and Mixbus



Carla-Patchbay (LV2)
Carla-Patchbay (VST)
Carla-Patchbay (16chan) (LV2)
Carla-Patchbay (32chan) (LV2)
Carla-Patchbay (sidechain) (LV2)
Carla-Patchbay16 (VST)
Carla-Patchbay32 (VST)
Carla-PatchbayFX (VST)
Carla-Rack (LV2)
Carla-Rack (VST)
Carla-RackFX (VST)
JackAss (VST)
JackAssFX (VST)
Kars (LV2)
Kars (VST)
LFO (LV2)
MIDI Channel Filter (LV2)
MIDI Gain (LV2)
MIDI Join (LV2)
MIDI Split (LV2)
MIDI Through (LV2)
MIDI Transpose (LV2)
Notes (LV2)

Once Carla-Rack is added to the channel strip you open the Rack GUI by double-clicking on it, you can add Windows VST's by pressing the '+Add Plugin' button on the Carla-Rack GUI and then select the plugin you want from the list within Carla. Besides Windows VST's any format supported by Carla including Sound Libraries like GIG, SF2 and SFZ and Audio Plugin formats like DSSI can now be loaded into Carla-Rack within that channel strip. The Rack will host both 32bit and 64bit plugins in the 64bit version of AV Linux. The image below shows Carla-Rack hosting the 'Tokyo Dawn Labs Slick EQ' Windows VST in Ardour.

*Slick EQ is not available in AV Linux and must be downloaded separately.


Wurlitzer
FuzzBass
SynthStrings
Drums
MIDI
a-Fluid Synth
Calf Saturator
PlateVerb
Send
Fader
Helm
Fader
String
Fader
Red Zeppelin Dru
(2x1) a-Compress
Calf Bass Enhance
Tal-Reverb-II
Fader
Calf Stereo Tools
Xhip ALPHA
Carla-Rack
Fader
MIDI: Carla-Rack (by falkTX)
Pinout
(none)
Add
Save
Delete
Bypass
File
Plugin
Settings
Help
New
Open
Export as
Add Plugin
Remove All
Panic
Configure Carla
Rack
TDR VOS SlickEQ
Preset:
LOW Gn
LOW Frq
LOW Shp
MID Gn
MID Frq
HIGH Gn
HIGH Fr
HIGH Sh
Dry/Wet
Volume
TDR VOS SlickEQ (GUI)
Default
A > B
Full
Stereo
BYPASS
Slick EQ
VARIETY OF SOUND
TOKYO DAWN LABS
HP FREQ
Off
FREQ
LOW
GAIN
85 Hz
ON
0.0 dB
American
EQ SAT
FREQ
MID
GAIN
2.5 kHz
ON
0.0 dB
FREQ
HIGH
GAIN
10.0 kHz
ON
0.0 dB
OUT STAGE
Linear
CALIBRATE
6.0 dB
OUT GAIN
0.0 dB
AUTO
Mute
-6.3

Hosting Windows VST’s with ‘LinVST’ :

A second (and better) method of hosting Windows VST plugins is the use of the ‘LinVST’ bridge, LinVST works a bit differently by wrapping the Windows ‘.dll’ filetype and making it appear to the plugin host as a native Linux VST ‘.so’ file. The included Windows VST plugins in AV Linux already have been converted, follow the instructions below for any new Windows VST’s you may add.

In AV Linux Windows VST's are placed in /usr/local/lib/vst and /usr/lib/vst is for native for Linux VST's only... The rationale for this is that most DAWs will look along both of those paths automatically for VST plugins of any kind and we want VST's to be available system-wide for all Users not buried in the .wine folder in the Users home folder. One of the files pre-installed by LinVST is a dummy file called 'linvst.so' which is used as a test reference to convert all your Windows VST '.dll' files to Linux-friendly '.so' files. It is the '.so' files which LinVST will make appear in the usual list of plugins in Ardour/Mixbus.

LinVST comes with a little graphical utility to find the linuxvst.so file and then find all your .dll files and do the conversion, linuxvst.so is installed to /usr/share/linvst. Once you are certain that linuxvst.so is in the correct spot then you will need to run the conversion utility in a terminal, if you have kept everything in /usr/local/lib/vst then you will want to be in a Root Terminal because that folder is outside the User’s home folder in the filesystem, if you have everything together in a different VST folder in '.wine' or elsewhere in your home folder then you can use a regular terminal, then run this command in the terminal

```
linvstconvert
```

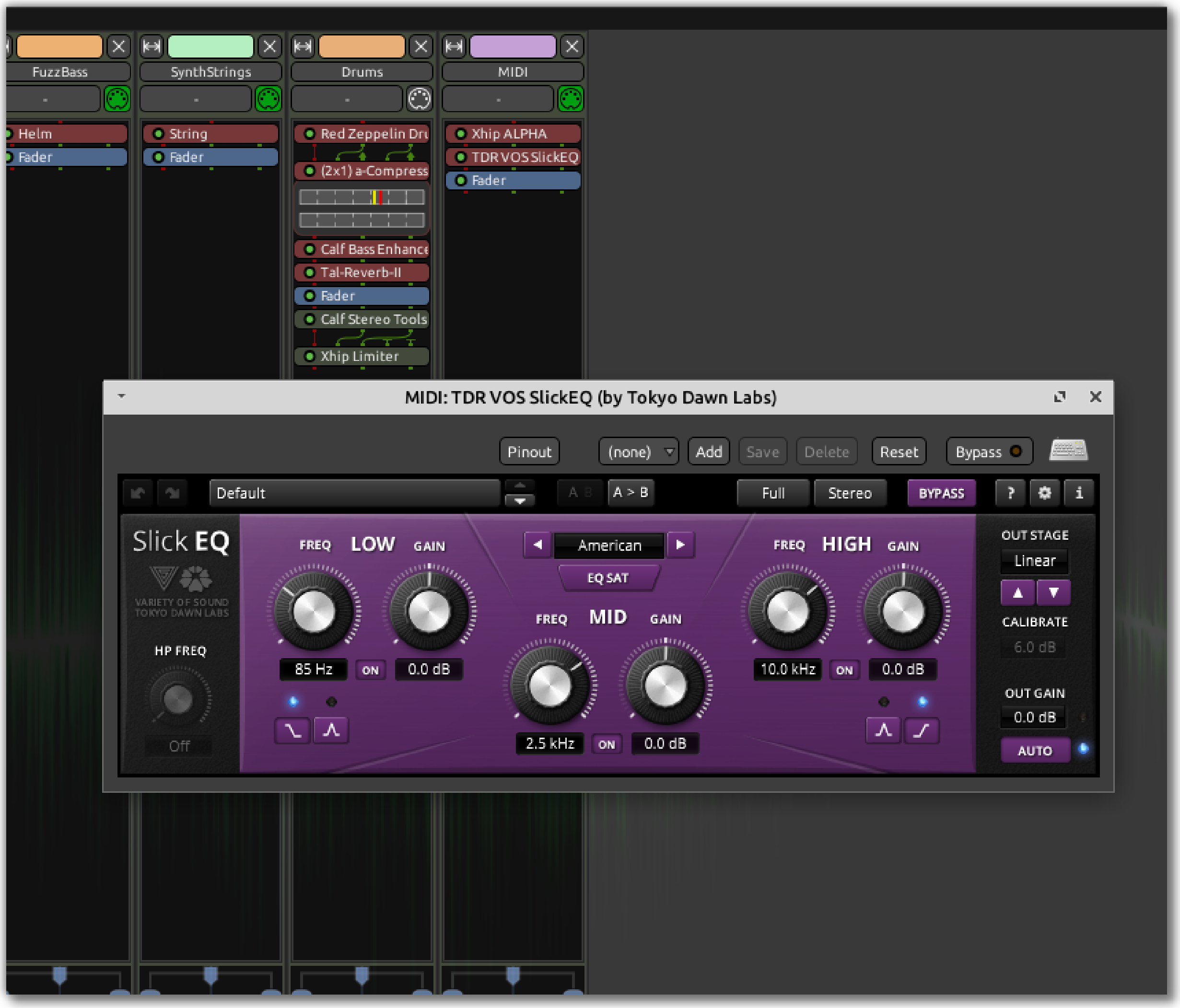
If your Windows VSTs have associated subfolders you may want to use this conversion command instead:

```
linvstconverttree
```

This will open a little dialog that prompts you to find 'linvst.so' (find it in /usr/share/linvst) and then find where your Windows VST .dlls are, once that is done hit 'Start' and it will convert the dlls to so's.

Now open Ardour/Mixbus and go to Edit--->Preferences--->Plugins--->VST and make sure the path to your Windows VST folder is there (this is why I use /usr/local/lib/vst because Mixbus looks there automatically). If your particular path isn't there you'll need to add it manually so Ardour/Mixbus knows where to scan..

Once that is done run a plugin scan and if all goes well those converted '.so' files should be picked up and appear as selectable in the Ardour/Mixbus plugin list. The image below shows the ‘Slick EQ’ Windows VST Plugin running with LinVST in Ardour.



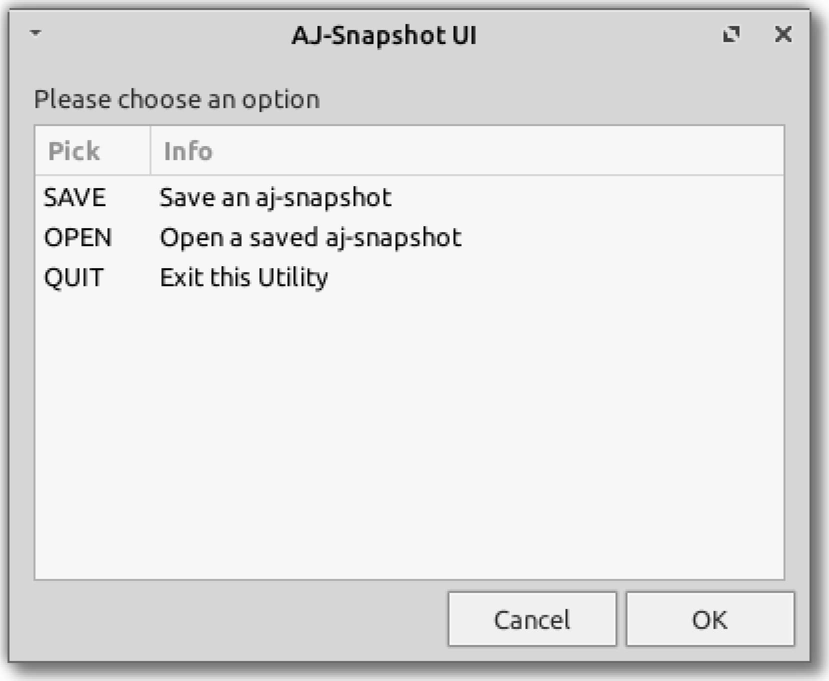
PLEASE NOTE The first time Wine runs on your computer it needs to configure itself and set up it's directories in a hidden '.wine' directory in your User home folder. Wine does not run it's setup until the first time it is called to run a Windows program by the host system. If the first time Wine is initiated is during a plugin scan within a DAW it is possible the initial Wine configuration setup will occur as you are running the LinVST plugin scanner which ensure the renamed '.so' files of the Windows VST Plugins show up in your Linux DAW. On some systems this may cause the scan to time out, fail and not completely finish. Once Wine has set up it's initial config you should be able to run the plugin scan again in your DAW and it should be able to successfully complete.

SAVING AND RESTORING JACK CONNECTIONS :

AJ-Snapshot for JACK-Aware External Application Connections :

If you are using several JACK-Aware applications and connecting them together those unique individual JACK connections will be lost when you you shut down the individual applications. This is a much different scenario than when you are working within a DAW like Ardour, or a single host like Carla, in that case the DAW remembers the connections when you save your session. What if you want to use external JACK programs in various combinations with a complicated routing? You certainly don't want to have to remember and manually re-connect every time you use those uniquely arranged programs.

A very simple and effective tool to save and restore ALSA and JACK Routing is a little CLI utility called aj-snapshot. In AV Linux I have added a very simple UI to make using aj-snapshot a little easier. With JACK running and your applications connected simply launch 'AJ-Snapshot-UI' from the Whisker Menu, it can be found in Multimedia → Audio Tools → AJ-Snapshot-UI. Select the option to 'Save an aj-snapshot' and it will prompt you t enter the name of the snapshot and present a File Manager to save it where you want. Later, with JACK running and the applications you wish to re-connect launched and running simply open your saved Snapshot and the routing and connections will be restored.



AJ-Snapshot UI

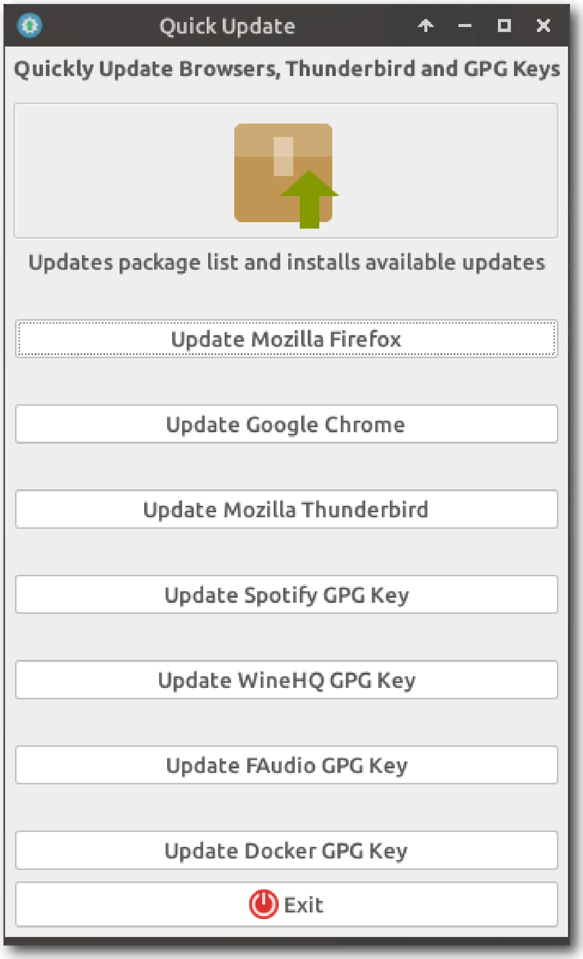
Please choose an option

Pick	Info
SAVE	Save an aj-snapshot
OPEN	Open a saved aj-snapshot
QUIT	Exit this Utility

QUICK UPDATE BROWSERS AND GPG KEYS :

Quick Update of Browsers and GPG Keys :

AV Linux 2020 features a new utility to selectively update the Web Browsers and Thunderbird on the system. The rationale behind this is if during heavy production you want to avoid blanket upgrades of the system for the sake of stability but want the security of the latest Web Browser and Thunderbird Email client you can use the '*Quick Updater*' utility to upgrade only those applications leaving the rest of the system untouched. An added new feature is to update the GPG keys of 3rd party Repositories in AV Linux applying to GPG Keys that are known to be updated regularly, when the old keys expire you will see error messages when using Synaptic Package Manager, with Quick Update you can update the expired keys with one click.



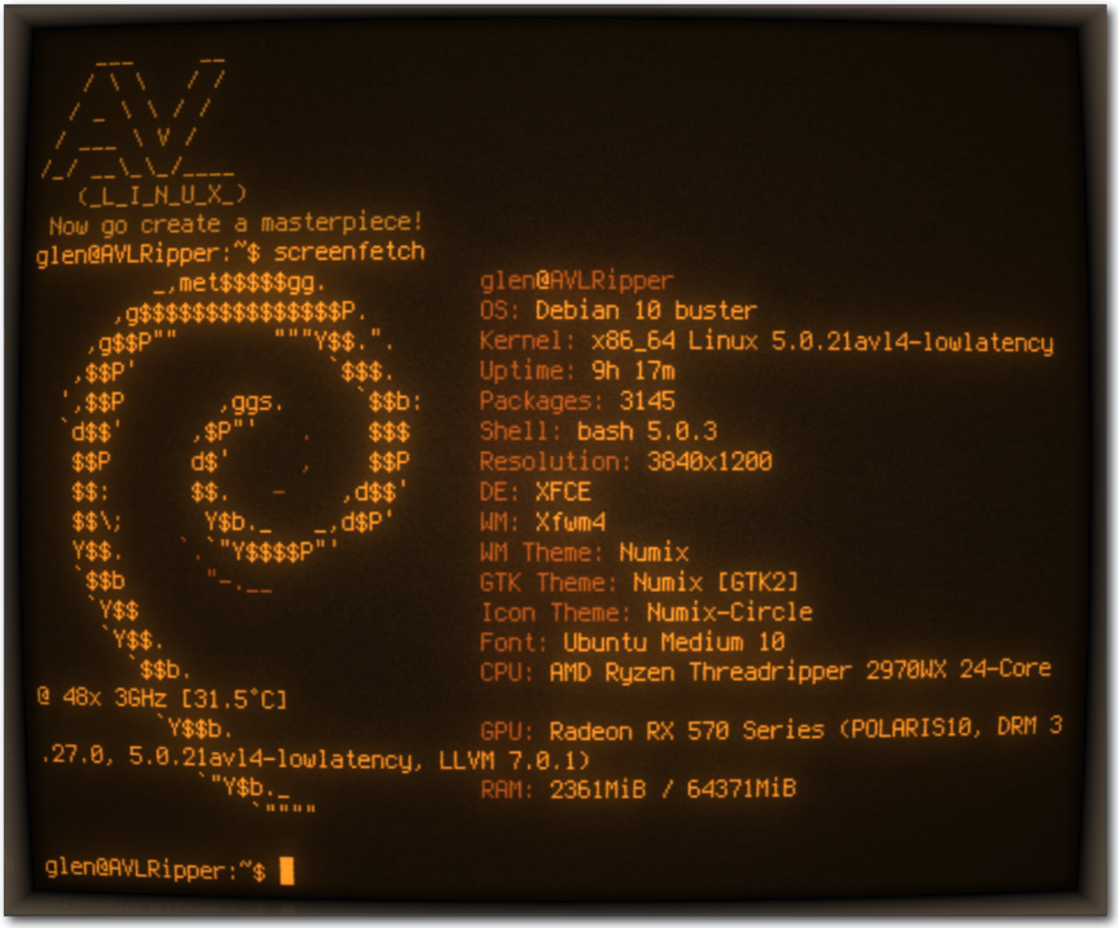
Quickly Update Browsers, Thunderbird and GPG Keys

Updates package list and installs available updates

DEBIAN STABLE DISTRIBUTION :

Background on the Debian Distribution Model :

Debian/GNU Linux 10 ‘Buster’ is the actual 'Distribution' that AV Linux 2020 is based on. Debian employs a multi-branch system to process the entry and inclusion of software which includes three separate branches commonly known as 'Unstable' or 'Sid' where software applications enter the Debian system, 'Testing' where software is refined and bugfixed and 'Stable' releases which are quite static in nature and provide Users with a solid well-tested foundation as a finished Operating System.



```
    ___        __
   / \ \      / /
  / _ \ \    / /
 / ___ \ \ V /
/_/   __\_\_/____
   (_L_I_N_U_X_)
 Now go create a masterpiece!
glen@AVLRipper:~$ screenfetch
          _,met$$$$$gg.           glen@AVLRipper
       ,g$$$$$$$$$$$$$$$P.        OS: Debian 10 buster
     ,g$$P""       """Y$$.".      Kernel: x86_64 Linux 5.0.21avl4-lowlatency
    ,$$P'              `$$$.      Uptime: 9h 17m
   ',$$P       ,ggs.     `$$b:    Packages: 3145
   `d$$'     ,$P"'   .    $$$     Shell: bash 5.0.3
    $$P      d$'     ,    $$P     Resolution: 3840x1200
    $$:      $$.   -    ,d$$'     DE: XFCE
    $$\;      Y$b._   _,d$P'      WM: Xfwm4
    Y$$.    `.`"Y$$$$P"'          WM Theme: Numix
    `$$b      "-.__               GTK Theme: Numix [GTK2]
     `Y$$                         Icon Theme: Numix-Circle
      `Y$$.                       Font: Ubuntu Medium 10
        `$$b.                     CPU: AMD Ryzen Threadripper 2970WX 24-Core
@ 48x 3GHz [31.5°C]
          `Y$$b.                  GPU: Radeon RX 570 Series (POLARIS10, DRM 3
.27.0, 5.0.21avl4-lowlatency, LLVM 7.0.1)
             `"Y$b._              RAM: 2361MiB / 64371MiB
                 `""""

glen@AVLRipper:~$ █
```

SOFTWARE UPDATES :

Recommended Reading!

Balancing Updates and Risk :

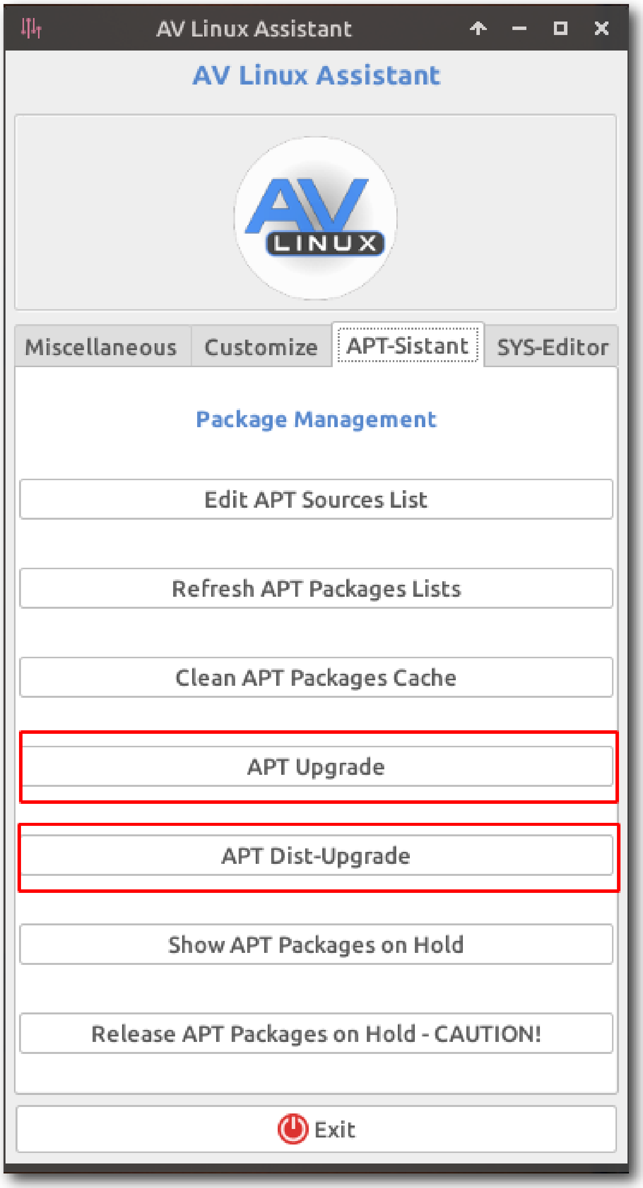
Updating a system can at times be unpredictable, AV Linux is intended to provide a dedicated Audio/Video workstation OS and since it has a specific, intended use *stability* is a required trait especially when doing prolonged production work. How do we keep fresh software on the system and retain stability? There are no guarantees and there is no surefire definitive answer to this question so below are two suggested ways to update your system. How to proceed will be up to the individual User and depend on the amount of experience using Debian Linux, the comfort level with risk and whether AV Linux is being used casually or for serious production.

Manual APT Tools in 'APT-Sistant' :

For most Users, especially those new to using Linux it is *highly recommended* to install and remove software in AV Linux with the 'Synaptic Package Manager' (description in following pages) this is by far the safest and most User-friendly graphical method. For experienced Linux Users or those well-versed with using Debian Linux there are some manual 'APT-Sistant' tools in the AV Linux Assistant to work with Debian 'APT' commands. These tools allow you to hand edit the 'sources.list' file to determine which Repositories are enabled, clean the packages cache, see and release 'held' Packages and most importantly to perform software upgrades in 2 different ways:

"APT Upgrade" is a way to only upgrade individual packages on your system that don't require the removal, installation or upgrade of their related dependencies, this is a 'safer' option because it will not remove or install new software to complete an upgrade and therefore causes less deep system changes, the downside is that some packages may not upgrade if they require new or upgraded dependencies.

"APT Dist-Upgrade" is a more intensive upgrade and will add, remove or upgrade dependencies to fulfill the upgrade requirements and because of that it will cause deeper system changes, it is generally safe to use APT Dist-Upgrade with Debian's 'Stable' Distribution but if you are in doubt and want to play it safe 'APT Upgrade may be a better option.


AV Linux Assistant
AV Linux Assistant
AV LINUX
Miscellaneous
Customize
APT-Sistant
SYS-Editor
Package Management
Edit APT Sources List
Refresh APT Packages Lists
Clean APT Packages Cache
APT Upgrade
APT Dist-Upgrade
Show APT Packages on Hold
Release APT Packages on Hold - CAUTION!
Exit

SOFTWARE MANAGEMENT :

Installing Downloaded or Outside Packages :

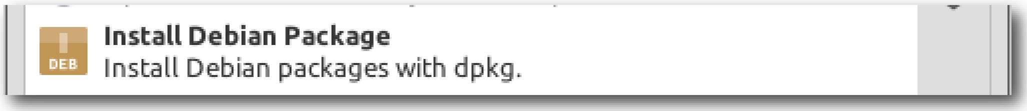
If you have a software 'Deb' package you have downloaded outside of the Repository system it can be installed by double-clicking on it which will automatically launch the 'Gdebi Package Installer'. Gdebi has the benefit of also installing related dependencies for packages if required. *Be aware that you should only install outside packages from sources you trust.* Only one Package Management Tool can run at the same time so Gdebi will not work if you have Synaptic running. Gdebi will also not force the downgrade of an installed Package so if you want to roll back to an older version of an installed package you will need to manually install it in a Root Terminal using the 'dpkg' command line (examples shown below). A new feature in AV Linux 2020 is an alternate quick install option for individual Debian Packages by right-clicking on the package in Thunar and using the "Install Debian Package" Custom Action. Please note the Custom Action just does simple single package installations and will not install any extra required dependencies it will however allow downgrading of a Package to an older version.

Packages can also be manually installed with these Debian 'dpkg' commands in a Root Terminal:

```
dpkg -i <PACKAGENAME>
```

If you have a folder of multiple Deb packages to install you can install them all at once by opening a Root Terminal within the folder and running dpkg with a 'wildcard' like this:

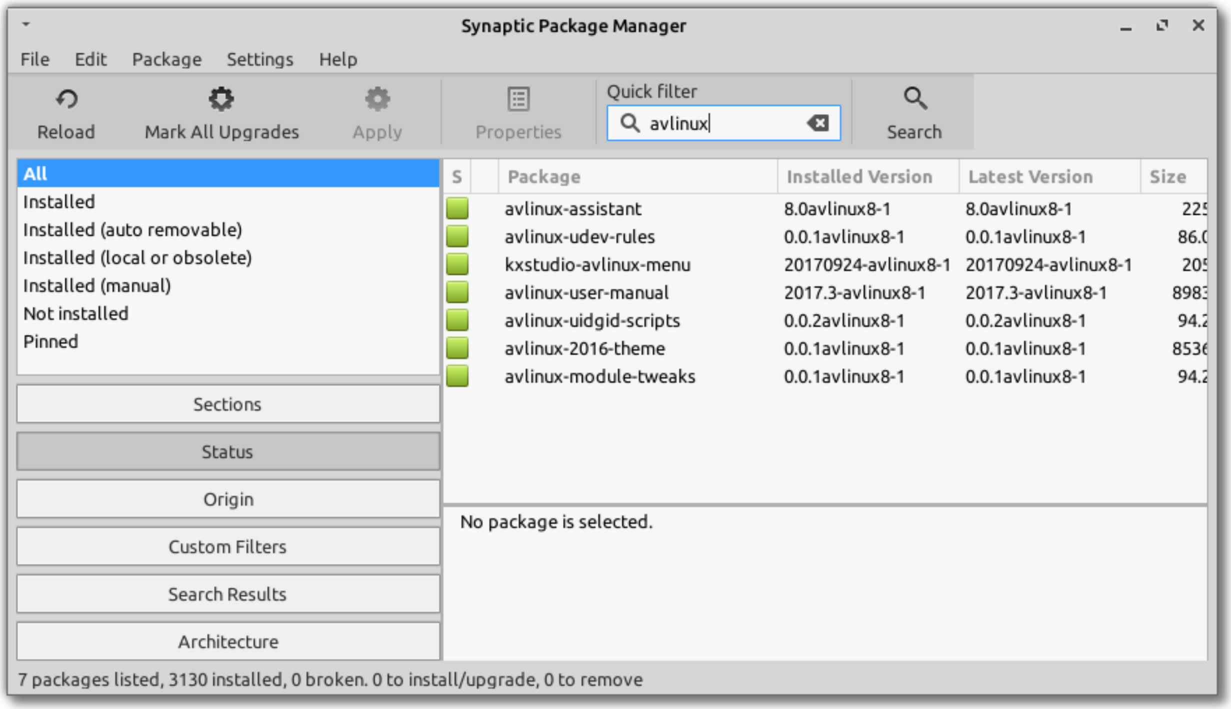
```
dpkg -i *.deb
```



Synaptic Package Manager :

**Recommended method for most Users.*

The most familiar Graphical Package management tool to Debian Linux Users is the Synaptic Package Manager. It has a well laid out and comprehensive interface to view what packages are on the system, the originating repositories they came from, and much more. It can be used for '[pinning'](pinning) individual Packages to prevent them from being upgraded and has many other in-depth capabilities beyond the scope of this manual. In AV Linux it is recommended to use Synaptic to search for Packages, to install, remove, upgrade and autoremove individual packages *but not necessarily for blanket upgrades especially if you are using the 'Safe Upgrade' Method. When Safe Upgrade is used any 'held back' Packages will still be visible as 'Installed (upgradeable)' in Synaptic.* This is because Synaptic uses its own upgrade logic called 'Smart Upgrade' which is quite similar to 'Dist Upgrade' and will forcibly remove and add dependencies if requires for Package updates if you use the 'Mark All Upgrades' functionality.



S	Package	Installed Version	Latest Version	Size
🟩	avlinux-assistant	8.0avlinux8-1	8.0avlinux8-1	225
🟩	avlinux-udev-rules	0.0.1avlinux8-1	0.0.1avlinux8-1	86.0
🟩	kxstudio-avlinux-menu	20170924-avlinux8-1	20170924-avlinux8-1	205
🟩	avlinux-user-manual	2017.3-avlinux8-1	2017.3-avlinux8-1	8983
🟩	avlinux-uidgid-scripts	0.0.2avlinux8-1	0.0.2avlinux8-1	94.2
🟩	avlinux-2016-theme	0.0.1avlinux8-1	0.0.1avlinux8-1	8536
🟩	avlinux-module-tweaks	0.0.1avlinux8-1	0.0.1avlinux8-1	94.2

No package is selected.

7 packages listed, 3130 installed, 0 broken. 0 to install/upgrade, 0 to remove

Cleaning Up After Package Operations ;

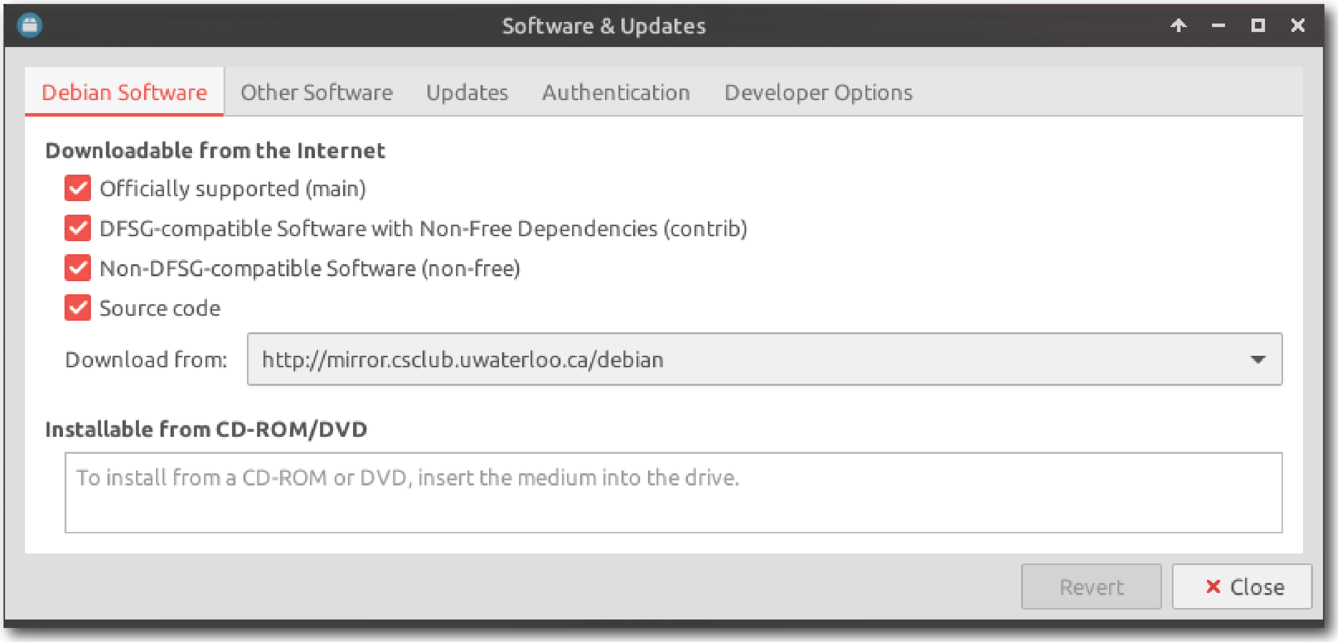
When you refresh the Repository Package lists and upgrade, remove and install packages there are some residual cached downloaded Package and Package-list files that collect on your system. These leftover cached files can take up quite a bit of HDD space on your system over time. AV Linux comes with a program called 'Bleachbit' which can be used to clean these caches and many other system areas. In addition the AV Linux Assistant has a quick and easy button to clean the residual Packages and related files. Just select the ' Clean APT Packages Cache' button in the ‘APT-Sistant’ tab of the AV Linux Assistant to delete these cached files.

MANAGING SOFTWARE REPOSITORIES :

Controlling What Software Is Available :

In Linux, software is made available from online collections of software formatted as ‘Packages’ called 'Repositories'. This system provides both applications and the required support dependencies to integrate and make them run properly on the system. Reputable Repositories usually provide a secure GPG key file that ensures the software is safe to download and install. AV Linux contains the official Debian Stable Repositories along with various other optional 'Repos' described in the next section.

Enabling and disabling Repositories is another effective strategy to control the stability of your system. If you are a 'bleeding-edge' person you can leave them as-is, if you are in heavy production or happy with your current setup and don't want to be distracted by constant updates then you can simply disable selected Repositories as you wish. The selection of Repositories is handled by Menu → Settings --> 'Software & Updates’.



Downloadable from the Internet

☑ Officially supported (main)

☑ DFSG-compatible Software with Non-Free Dependencies (contrib)

☑ Non-DFSG-compatible Software (non-free)

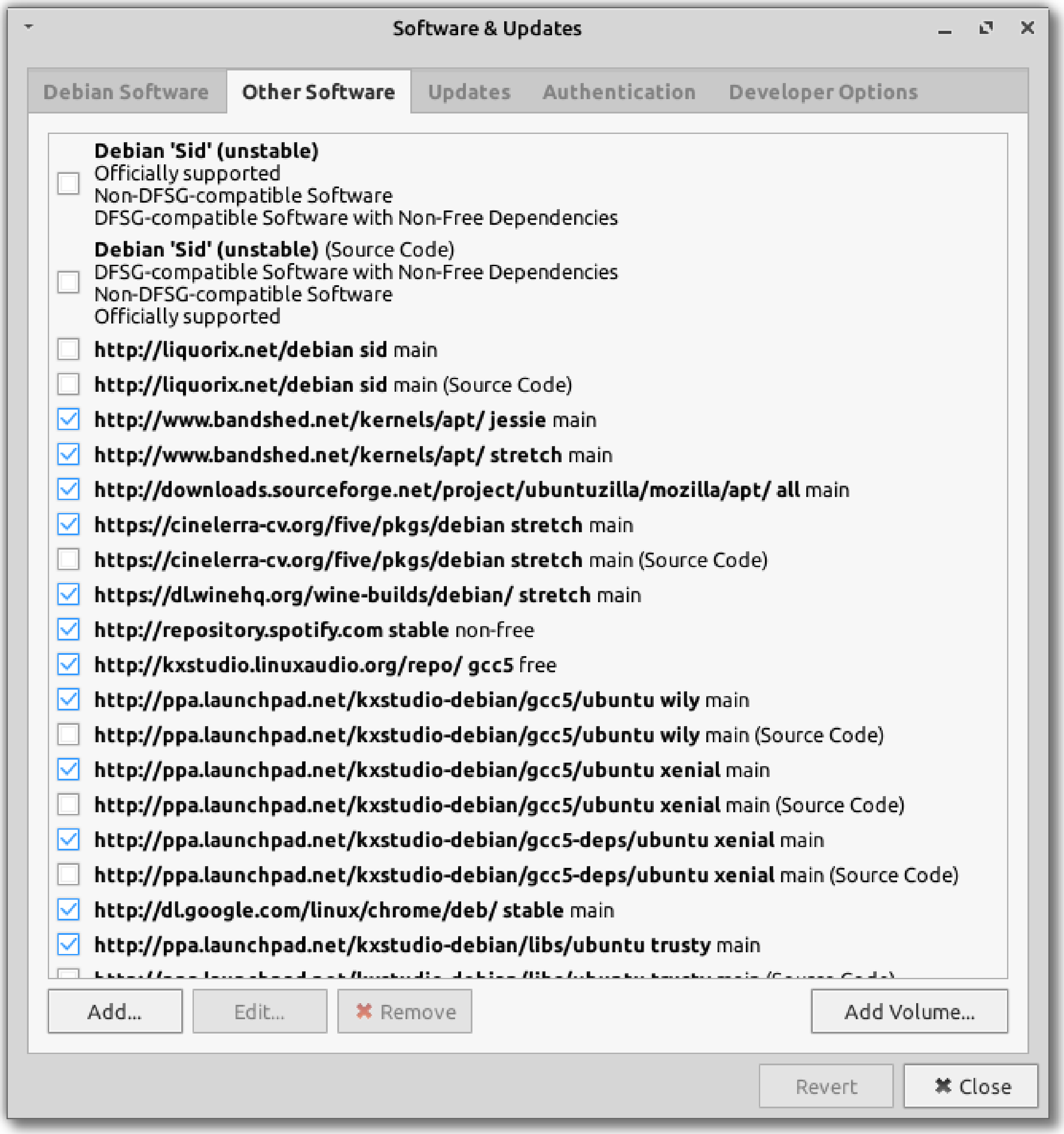
☑ Source code

Download from: http://mirror.csclub.uwaterloo.ca/debian

Installable from CD-ROM/DVD

To install from a CD-ROM or DVD, insert the medium into the drive.

The 'Software & Updates' utility has multiple tabs, the first tab allows you to select the actual Debian Repositories you want, and the second tab is where you select other external Repositories.



☐ **Debian 'Sid' (unstable)**
Officially supported
Non-DFSG-compatible Software
DFSG-compatible Software with Non-Free Dependencies

☐ **Debian 'Sid' (unstable)** (Source Code)
DFSG-compatible Software with Non-Free Dependencies
Non-DFSG-compatible Software
Officially supported

☐ **http://liquorix.net/debian sid** main

☐ **http://liquorix.net/debian sid** main (Source Code)

☑ **http://www.bandshed.net/kernels/apt/ jessie** main

☑ **http://www.bandshed.net/kernels/apt/ stretch** main

☑ **http://downloads.sourceforge.net/project/ubuntuzilla/mozilla/apt/ all** main

☑ **https://cinelerra-cv.org/five/pkgs/debian stretch** main

☐ **https://cinelerra-cv.org/five/pkgs/debian stretch** main (Source Code)

☑ **https://dl.winehq.org/wine-builds/debian/ stretch** main

☑ **http://repository.spotify.com stable** non-free

☑ **http://kxstudio.linuxaudio.org/repo/ gcc5** free

☑ **http://ppa.launchpad.net/kxstudio-debian/gcc5/ubuntu wily** main

☐ **http://ppa.launchpad.net/kxstudio-debian/gcc5/ubuntu wily** main (Source Code)

☑ **http://ppa.launchpad.net/kxstudio-debian/gcc5/ubuntu xenial** main

☐ **http://ppa.launchpad.net/kxstudio-debian/gcc5/ubuntu xenial** main (Source Code)

☑ **http://ppa.launchpad.net/kxstudio-debian/gcc5-deps/ubuntu xenial** main

☐ **http://ppa.launchpad.net/kxstudio-debian/gcc5-deps/ubuntu xenial** main (Source Code)

☑ **http://dl.google.com/linux/chrome/deb/ stable** main

☑ **http://ppa.launchpad.net/kxstudio-debian/libs/ubuntu trusty** main

☐ **http://ppa.launchpad.net/kxstudio-debian/libs/ubuntu trusty** main (Source Code)

EXTERNAL REPOSITORIES IN AV LINUX :

Additional Choices from 3rd Party Repositories :

Like all Debian-based projects AV Linux allows access to thousands of Packages through the official Debian Repositories by default but since AV Linux is a very focused project with an explicit purpose it relies on some extra software provided by 3rd party providers. **All external Repositories and Software come from trusted and reputable sources which are listed and provided below.** It is important to note that occasionally repositories may change or move and no longer be accessible and that for security peace of mind it is common practice for Repository maintainers to update their 'GPG' keys which may make Repositories unavailable to Package Management Tools until the keys are updated. AV Linux tries to mitigate this inconvenience by making common GPG key updates a one-click process in the 'Quick Update' utility but it should be noted the more Repositories on a system the more potential for problems. *I can only provide what is working at the time of creating the AV Linux ISO and cannot guarantee the permanence or future operation of 3rd party Repositories.*.

Provided External Repositories Enabled by Default and Their Purpose :

AV Linux Kernel Repository – The custom AV Linux RT Kernels are configured and compiled by Trulan Martin and are hosted in their own Repository. It should be noted that the outsourcing of these kernels is paid for out of pocket, donations to AV Linux help support kernel updates and development.

The github page can be found here: https://github.com/musical-chairs/linux

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Liquorix Kernel Repository – For User of Debian Linux the Liquorix project has long provided customized tweaked low latency (*note not RT Preempt) Kernels, if the AV Linux kernel doesn't suit your purposes you may want to try installing the Liquorix kernel.

The Liquorix project is here: https://liquorix.net/

KX Studio Repositories – falkTX the brilliant mind behind the KXStudio Distribution and applications has several 3rd party Repositories with Linux Audio software that are compatible with Debian and Ubuntu-based Distributions. AV Linux primarily uses these as a source of 'Carla' Plugin host and numerous Audio plugins for DAW hosts.

KXStudio Website: https://kx.studio/

Cinelerra-GG Repository – AV Linux features the incredible 'GG' fork of the powerful Video Editor Cinelerra. This fork has taken Cinelerra to new heights of usablity and functionality!

Cinelerra-GG Website: https://www.cinelerra-gg.org/

Ubuntuzilla Mozilla Builds of Firefox Repository – AV Linux has been using Debian Linux since 2007 and over that time period that availability of updated versions of Mozilla's Firefox Web Browser in the official Debian repositores has not been consistent, especially if AV Linux is in a temporary phase of being based on "Old Stable" between releases. For this reason the Ubuntuzilla Repository has been relied upon to provide independent 'Mozilla builds' of Firefox.

Ubuntuzilla Project: https://sourceforge.net/projects/ubuntuzilla/files/mozilla/apt/pool/main/f/firefox-mozilla-build/

WineHQ Repository - The 'Wine-Staging' Windows compatibility layer is used in AV Linux to host Windows Audio software applications and Audio plugins. Wine-staging is a special heavily developed version of Wine and is not available in the official Debian Repositories so WineHQ is used to provide these unique Wine builds.

WineHQ Repository information: https://wiki.winehq.org/Debian

---

FAudio WineHQ Supplemental Repository – FAudio is an external dependency for versions of Wine-Staging newer than 5.0, since FAudio is not contained in the Debian 10 (Buster) official Repositories nor packaged by the WineHQ maintainers currently we need to rely on an external Repository for FAudio only. *This is not really a desirable long term solution so it is possible that this Repository may be changed or become upsolete before the next AV Linux ISO release.*

FAudio Repository Info: https://forum.winehq.org/viewtopic.php?f=8&t=32192

Spotify for Linux Repository – The immensely popular music streaming service 'Spotify' makes a Deskop native Linux app and has a Repository for subscribers and Users of Spotify.

Spotify for Linux: https://www.spotify.com/ca-en/download/linux/

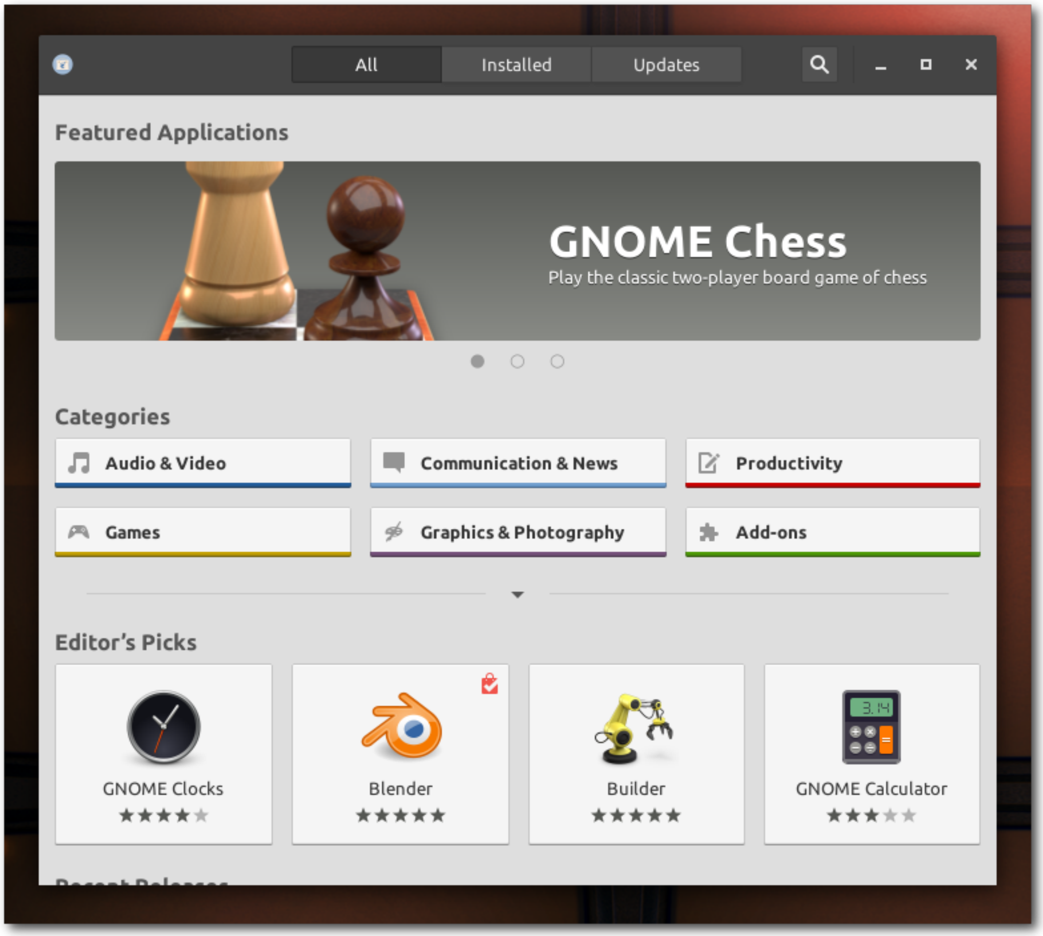
Docker Debian Community Edition – AV Linux 2020 is the first version to provide 'Docker' which is a 'container' based platform for running and distributing external software on various Operating Systems (Win, Mac, Linux). This is the Community maintained Repository of the Docker engine for Users of Debian Linux.

Docker for Debian: https://docs.docker.com/install/linux/docker-ce/debian/
Post Install Docker Info: https://docs.docker.com/install/linux/linux-postinstall/

EXTERNAL SOFTWARE PLATFORMS IN AV LINUX

Extending Choices of Applications Even Further!

AV Linux 2020 offers two popular but very different Platforms to extend the choice of Software available for installation.. 'Flatpak' and 'Docker'. Flatpak is a way of distributing software applications in a Distro-agnostic format from one central Flatpak Repository (called Flathub). Users of all kinds of Linux (not just Debian or Ubuntu) can download and install the most recent versions of their favourite programs. The Flatpak format contains all of the support libraries to run the application so you don't have to worry about solving dependencies with your Package Manager, just install the Flatpak and it's self contained format will run from it's own folder. A secondary benefit of this is that it allows to run new software on older systems which may not be capable of running and installing the latest versions from their own Repositories, it also provides program choices that may not otherwise be available . Flatpak has it's own graphical Software Manager that serves as frontend for the Flathub Repository.



***ADDENDUM - Using Flatpak from the Command Line :**

The Graphical Software Manager for Flatpak is a work in progress and to be honest at the time of this writing seems to be infuriatingly prone to stablility problems and hiccups. The fact that the software frontend isn't fully baked yet shouldn't discourage Users from enjoying the convenience of Flatpak so if you are not afraid to roll up your sleeves and dive into a Root Terminal it is really quite easy to download some 'Flatties' from the commandline…

Obviously in order to issue a Terminal Command you will want to know the name of the Application you want to install so we can cheat by going to the Flathub webpage here. Once you've determined what you want to install then Flatpak's command line will ingeniously search for an Application and then install it with one command.. Let's suppose I want to use Flatpak to install the fairly new 'Olive' Video Editor, I open a Root Terminal and issue this command:

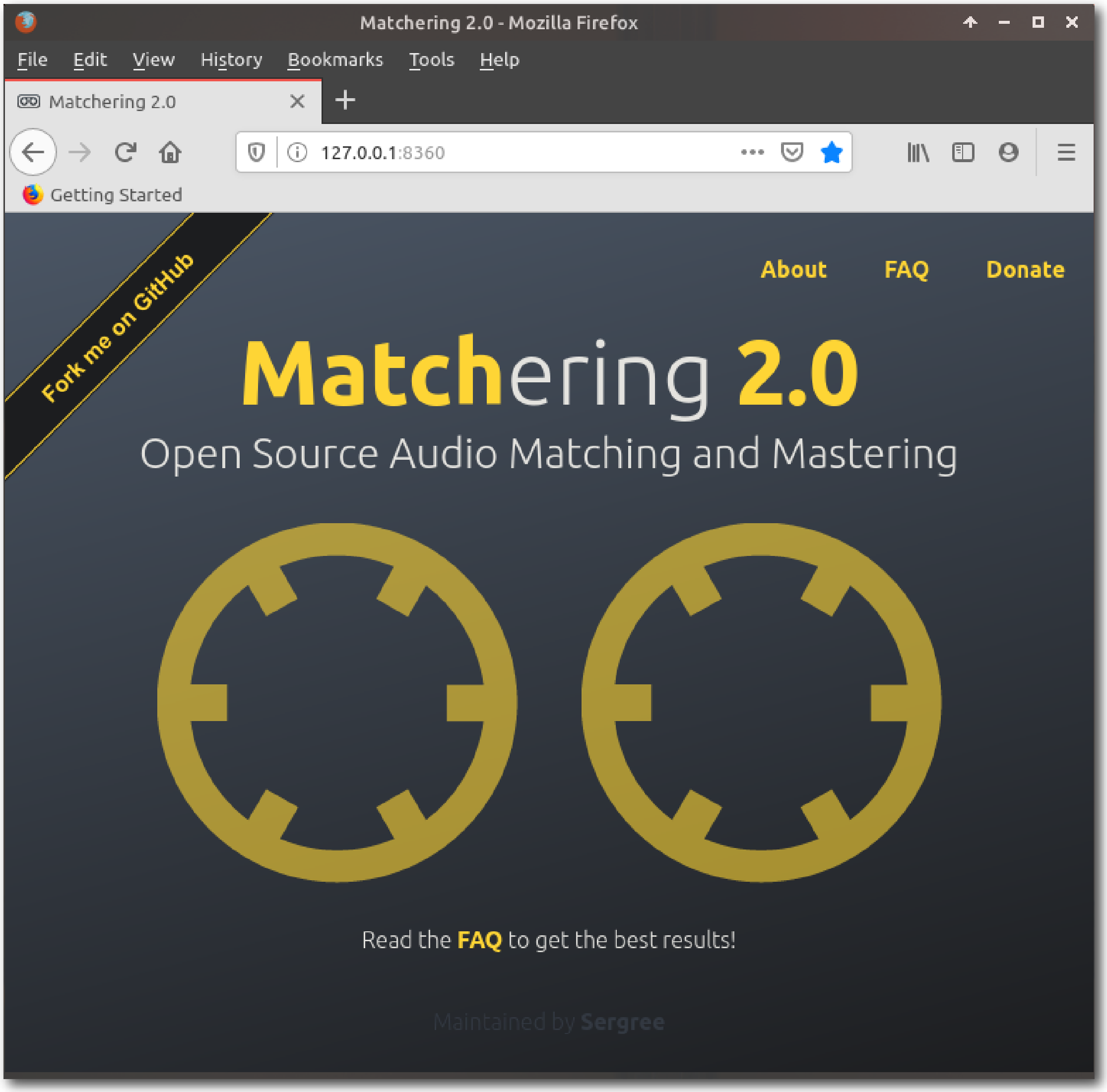
```
flatpak install olive
```

Once you've entered that command Flatpak will search the 'flathub' remote for Applications with the name 'olive' and ask you a series of interactive questions in the Terminal and with your permission will install Olive and the Launcher for Olive should appear in the 'Multimedia' Menu. If it doesn't appear right away it should appear on the next Login or Boot.

This is quite a basic example, for more detailed information and more in-depth command possibilities please refere to the flatpak documentation on this webpage:

https://docs.flatpak.org/en/latest/using-flatpak.html

Docker is much different that Flatpak and its system places programs in ‘containers’ which you download on to your system and run with the Docker engine (pre-installed in AV Linux 2020). Docker containers are cross-platform and run on Windows, Mac and Linux. Docker containers can contain anything from simple programs to very complicated software environments. Docker also has a Repository system that creators of Docker containers can upload their containers to called Docker Hub. The picture below is a container running ‘Matchering 2.0’ an application to learn and apply Equalization traits from one Audio file and apply it to another.



Matchering 2.0

Open Source Audio Matching and Mastering

Read the **FAQ** to get the best results!

Maintained by **Sergree**

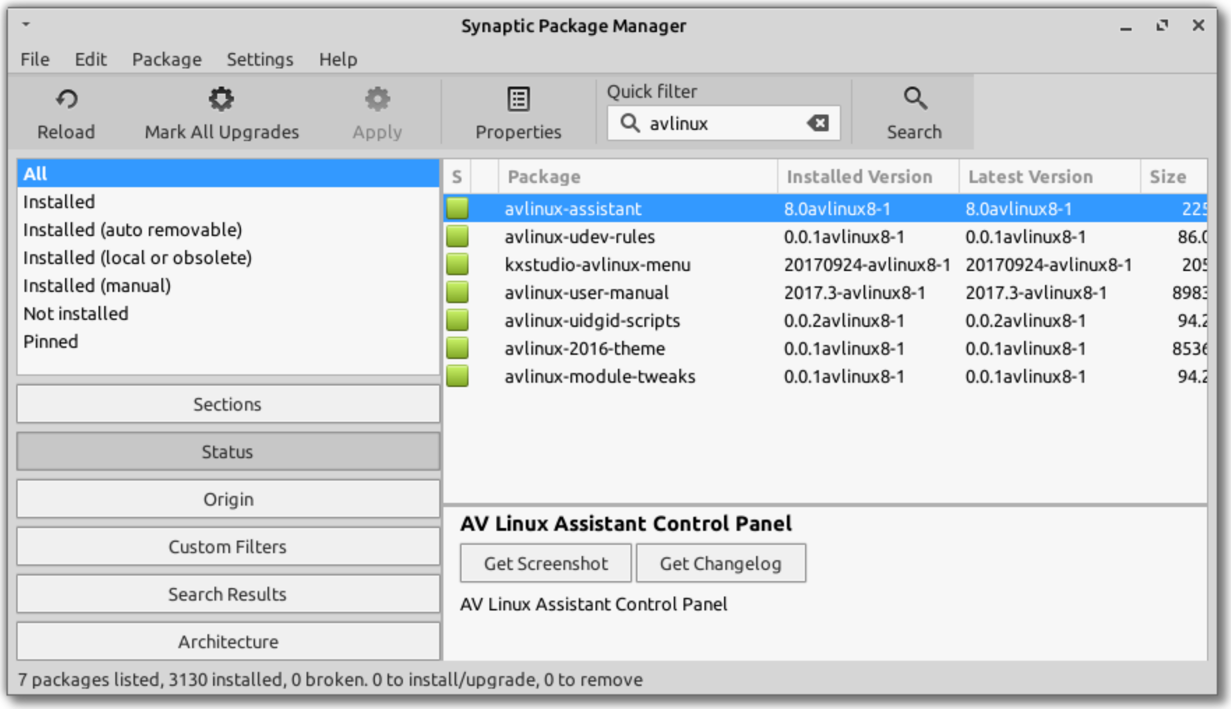
For more information on using Docker please refer to the Debian Docker Community information here:

https://docs.docker.com/engine/install/linux-postinstall/

PINNING AND HOLDING PACKAGES :

Preventing Unwanted Upgrades :

It is possible to prevent unwanted upgrades of Software Packages on your System by using 'Pinning' within the Synaptic Package Manager or marking Packages to 'hold' using the 'APT' Command Line Interface. It is important to consider that pinning a Package will also prevent its dependencies from upgrading. 'Pinning' is only recognized by the Synaptic Package Manager so if you are using 'Aptitude' or the 'APT' Command Line they will not be aware of the Packages you have pinned, if you are going to specifically use Pinning as a Package locking method it is recommended to only use Synaptic as your method of Package Management. To pin a Package in Synaptic find the the Package you want pinned and highlight it.



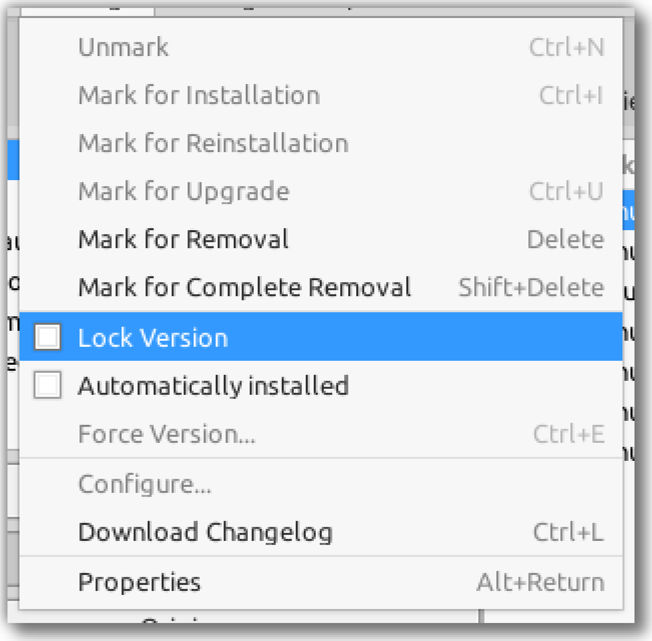
S	Package	Installed Version	Latest Version	Size
🟩	avlinux-assistant	8.0avlinux8-1	8.0avlinux8-1	225
🟩	avlinux-udev-rules	0.0.1avlinux8-1	0.0.1avlinux8-1	86.0
🟩	kxstudio-avlinux-menu	20170924-avlinux8-1	20170924-avlinux8-1	205
🟩	avlinux-user-manual	2017.3-avlinux8-1	2017.3-avlinux8-1	8983
🟩	avlinux-uidgid-scripts	0.0.2avlinux8-1	0.0.2avlinux8-1	94.2
🟩	avlinux-2016-theme	0.0.1avlinux8-1	0.0.1avlinux8-1	8536
🟩	avlinux-module-tweaks	0.0.1avlinux8-1	0.0.1avlinux8-1	94.2

AV Linux Assistant Control Panel

AV Linux Assistant Control Panel

7 packages listed, 3130 installed, 0 broken. 0 to install/upgrade, 0 to remove

Navigate to the 'Package' menu in Synaptic and check off 'Lock Version'. The Package you have pinned will now appear with its status as 'Pinned' in the left-hand pane of the Synaptic window when the 'Status' button is selected. To unpin simply uncheck 'Lock Version'.



Using 'apt-mark' to Hold and Release Packages :

To use 'APT' Commands to place a Package on hold open a Root Terminal and use the following commands, note that <PACKAGENAME> requires the actual name of the Package but not the version number:

```
apt-mark hold <PACKAGENAME>
```

To remove the hold on a Package use this command:

```
apt-mark unhold <PACKAGENAME>
```

To see what packages are held on your system:

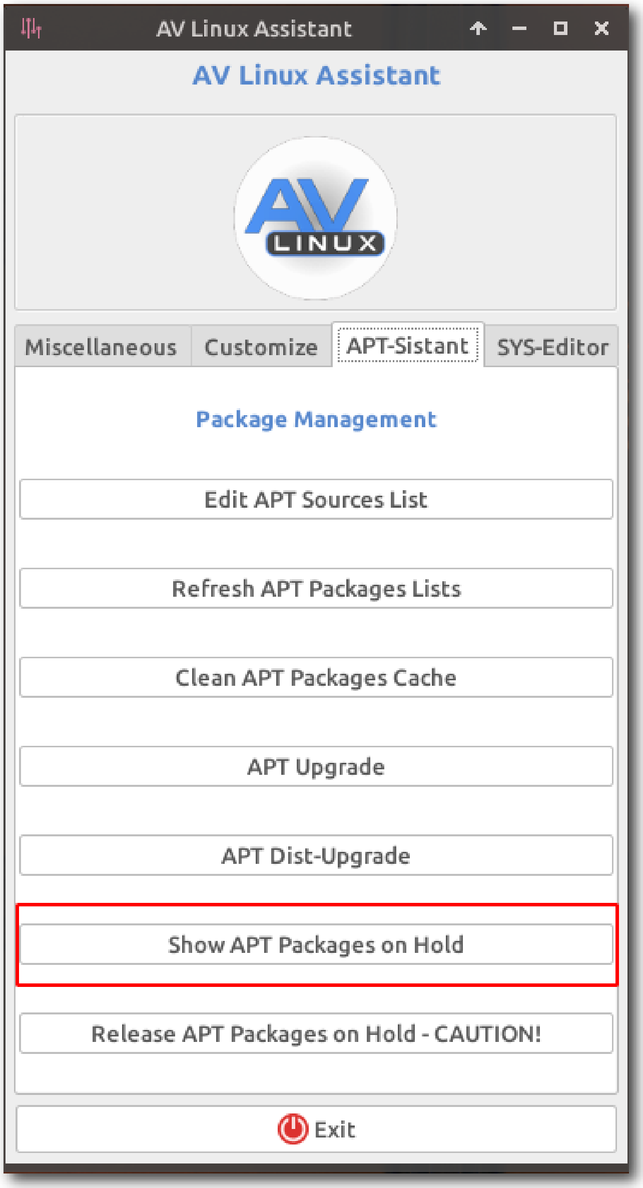
```
apt-mark showhold
```

To discover more useful functions of 'apt-mark' use this command:

```
apt-mark --help
```

Held Packages in AV Linux 2020 :

AV Linux 2020 has some specific held packages in order to maintain compatibility with Systemback. This enables the AV ISO's to be created and also helps keep backup functionality intact. It is possible that these held packages may complicate future updates however it is not advised to to release the hold on these packages unless you are certain you do not want to use Systemback. To see which packages are held in AV Linux use the 'Show APT Packages on Hold' button in 'APT-sistant' tab in the AV Linux Assistant.

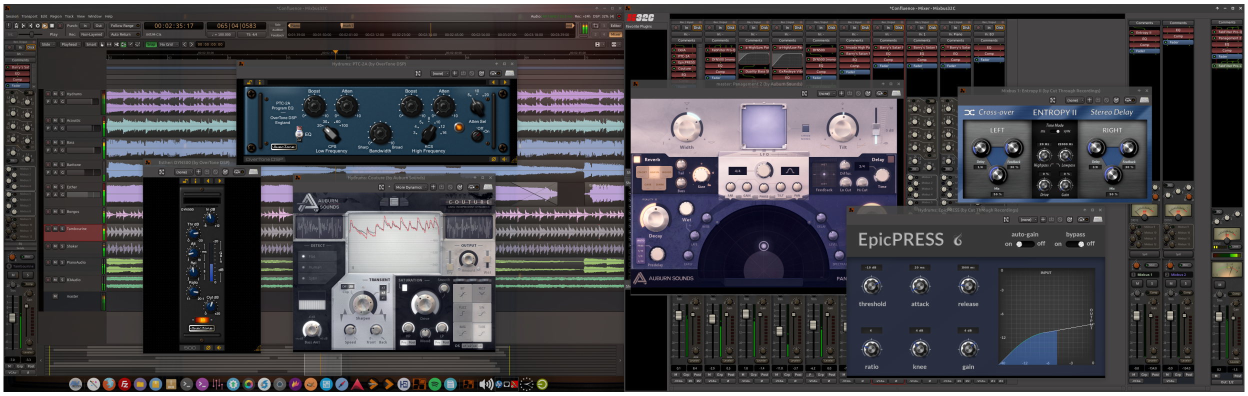


COMMERCIAL SOFTWARE DEMOS IN AV LINUX :

An Introduction to Some New Options :

AV Linux is somewhat unique compared to its contemporaries in that it offers the choice of trying Commercial software demos right in the base Operating System. Over the years good relationships with Vendors have been formed and have provided the opportunity to showcase both Open-Source excellence and innovative Commercial Audio choices. Currently AV Linux provides the Demo version of Harrison Mixbus 32C which brings the authentic sound of the famous Harrison hardware consoles into a powerful DAW based on Ardour. Harrison Mixbus 32C also comes with all of Harrison's Audio Plugin Demos for you to evaluate as well.

Additionally (and new to AV Linux 2020) are additional versatile Audio plugin choices with Demos provided by Applied Computer Music Technologies, Auburn Sounds, Cut Through Recordings and OvertoneDSP.



Purchasing and Registering the Demos :

All of the Commercial Demos are limited in some way and are not fully functional until they are purchased and registered. The limitation methods vary from not all options being available, dropouts in sound, generated noises at certain intervals etc. Each Vendor has their own method of handling purchasing and registration as well. Harrison, Applied Music Technologies and OvertoneDSP all provide a license text file upon purchase that can be copied and pasted in the Users home folder. Once this text file is present the software will find it the next time it is launched and will appear as registered and be fully functional. With this method there is no need to remove the demos and replace them you can leave them installed as they are and merely add the text key.

Auburn Sounds and Cut Through Recordings employ a different system where the User is given a special private download URL in an email once purchase and payment are completed and the User then downloads replacement Plugins which are fully functional. For this method it is necessary for the User to manually remove the installed demos using either Synaptic Package Manager or 'dpkg' command (shown below) and then install the replacement plugins as instructed by the individual Vendor.

To remove Auburn Sounds or Cut Through Recordings Demo versions from your system you can either search for ‘auburnsounds-demo-plugins’ or ‘ctrecordings-demo-plugins’ in Synaptic, then remove them or alternately open a Root Terminal and issue this command:

```
dpkg -r auburnsounds-demo-plugins
```

```
dpkg -r ctrecordings-demo-plugins
```

Detailed information on installing the replacement Plugins can be found at the Vendors respective websites linked at the beginning of this section. In most cases it is suggested to create a ‘.vst’ folder in the User’s home folder for Linux VST2 Plugins and a ‘.lv2’ folder for LV2 Plugins and copy your Registered versions there.

**NOTE – Both Ardour and Harrison Mixbus (the default DAW Applications included in AV Linux) do not automatically search for Plugins in the User’s home so these folders must be added to the Plugin search paths manually in Ardour and Mixbus. Plugin search paths can be edited in the ‘Edit’-→’Preferences’-→’Plugins’-→’VST’ menus of both Ardour and Mixbus.*

Hey Wait! Not For Me! :

With the knowledge that not everyone necessarily wants to have or purchase Commercial Software and that some may prefer for ideological reasons to use only Open-Source applications you can of course choose remove the Commercial Demos from AV Linux.

Removing Harrison Mixbus 32C (and the Harrison Audio Plugins) requires running a script because it is a bundled application that installs to the ‘/opt’ folder of the Filesystem, it is not installed or removed with the usual Package Management utilities so to remove it you need to run this command in a Root Terminal:

```
/opt/ Mixbus32C-6.0.652.uninstall.sh
```

The Audio Plugin Demos are Debian Packages and can be removed by searching ‘auburnsounds-demo-plugins’ ‘ctrecordings-demo-plugins’ ‘acm-demo-plugins’ and ‘overtonedsp-demo-plugins’ in Synaptic Package Manager and removing them. Or they can all be removed at once with the following dpkg command in a Root Terminal.

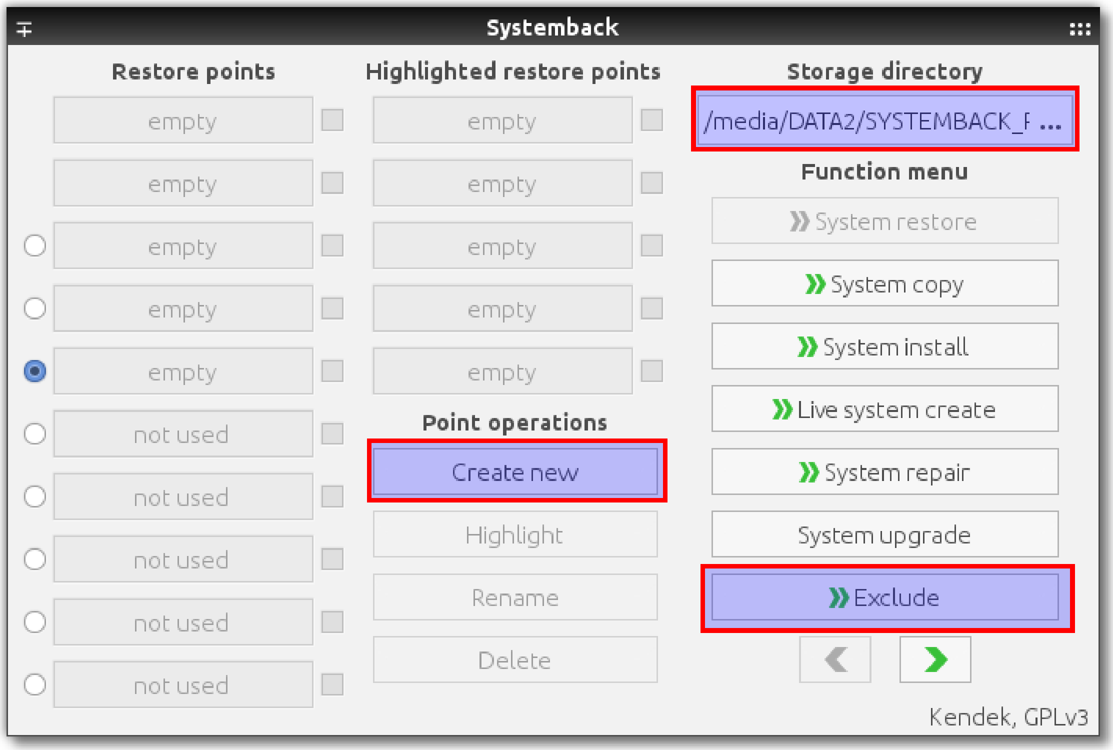
```
dpkg -r auburnsounds-demo-plugins ctrecordings-demo-plugins acm-demo-plugins
overtonedsp-demo-plugins
```

SYSTEMBACK RESTORE :

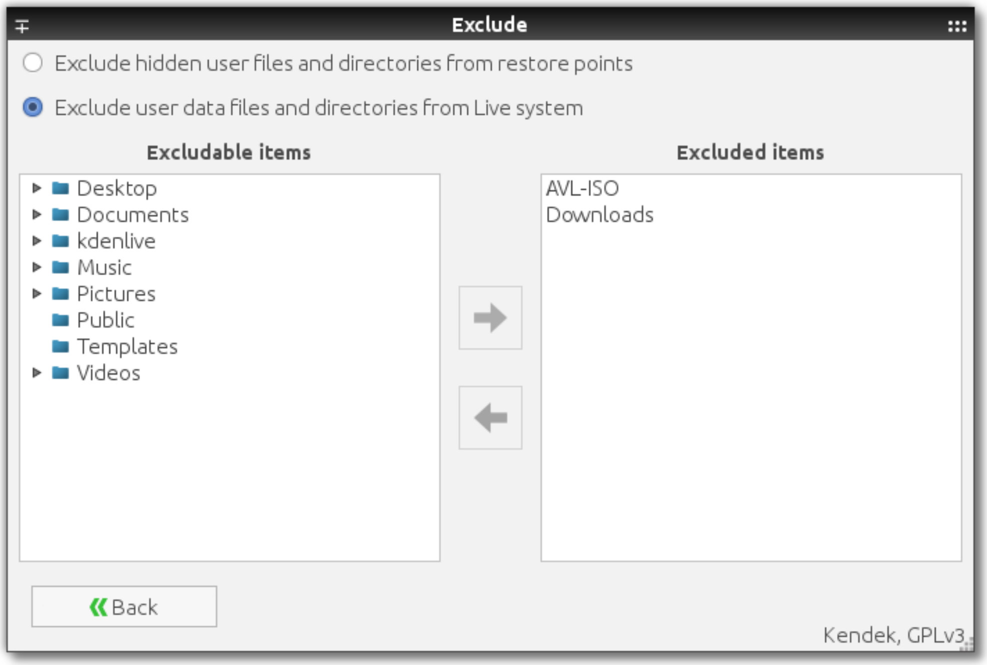
Comprehensive Backup and Restore :

AV Linux 2020 makes great use of Systemback for ISO creation, its Installer and probably its most useful daily function: System Restore. Systemback serves an extremely important need by helping mitigate some of the risk involved with potential bad upgrades. By making regular restore points if there is some sort of system breakage incurred by faulty upgrades you can simply roll the system back to your last working restore point much like Windows computers have had as standard issue for many years. Systemback is quite easy to use and simply requires adequate writable HDD space to store its Restore data. By default Systemback will store them in the system '/home' folder, most mounted removable drives and partitions in '/media' can also be used if your User has write permissions.

To get started launch Systemback from the Whisker Menu and enter your Root Password. The Restore window is shown below, here you can define where the Restore data goes in the 'Storage directory' field in the upper-right corner. I personally suggest not using the default of '/home' and selecting a drive or partition that AV Linux is not installed on just to keep the restore point in a safe and separate location. To set files and data that don't want to be part of the backup use the 'Exclude' feature.



Storage directory
/media/DATA2/SYSTEMBACK_F ...



○ Exclude hidden user files and directories from restore points

● Exclude user data files and directories from Live system

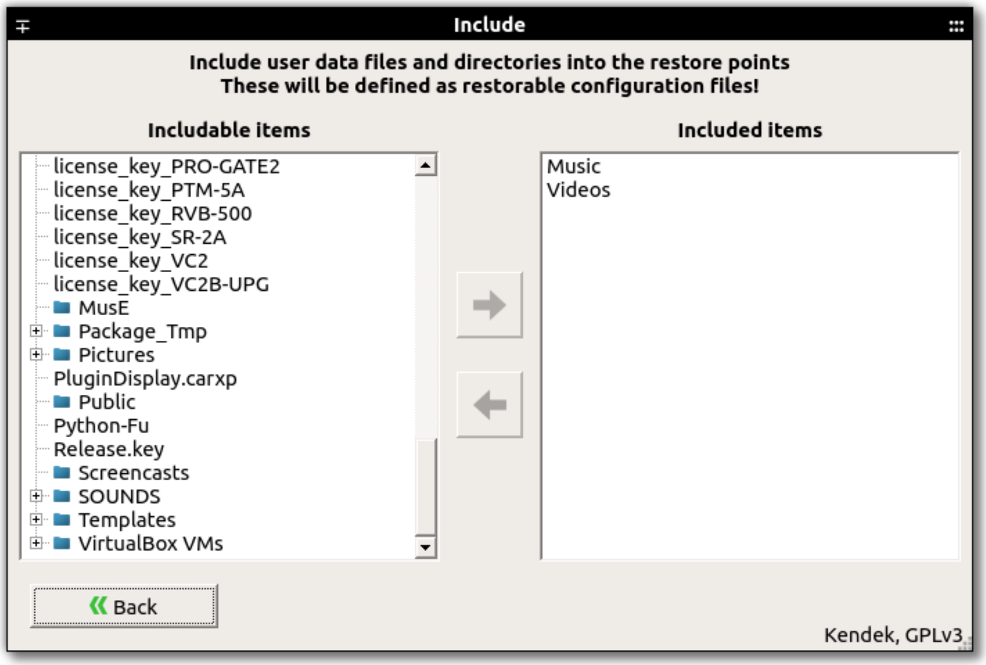
Excludable items

- Desktop
- Documents
- kdenlive
- Music
- Pictures
- Public
- Templates
- Videos

Excluded items

- AVL-ISO
- Downloads

***PLEASE NOTE!** - It is important to note that excluded items will be excluded from both Restore points and any Live ISO's you create. You must also specifically define what data you want to include in your backups in the 'Include' window. Once you have completed your settings click the 'Create New' button and Systemback will take as long as it requires based on the amount of data you are backing up.



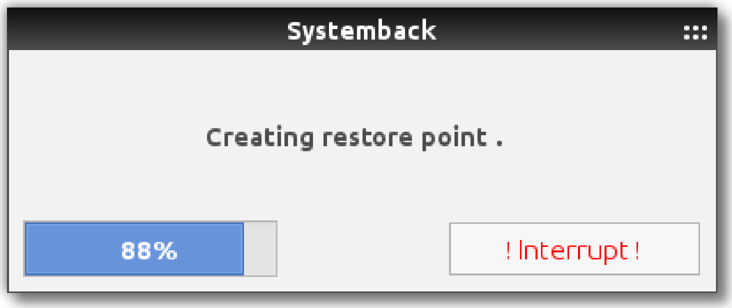
Include user data files and directories into the restore points
These will be defined as restorable configuration files!

Includable items

- license_key_PRO-GATE2
- license_key_PTM-5A
- license_key_RVB-500
- license_key_SR-2A
- license_key_VC2
- license_key_VC2B-UPG
- MusE
- Package_Tmp
- Pictures
- PluginDisplay.carxp
- Public
- Python-Fu
- Release.key
- Screencasts
- SOUNDS
- Templates
- VirtualBox VMs

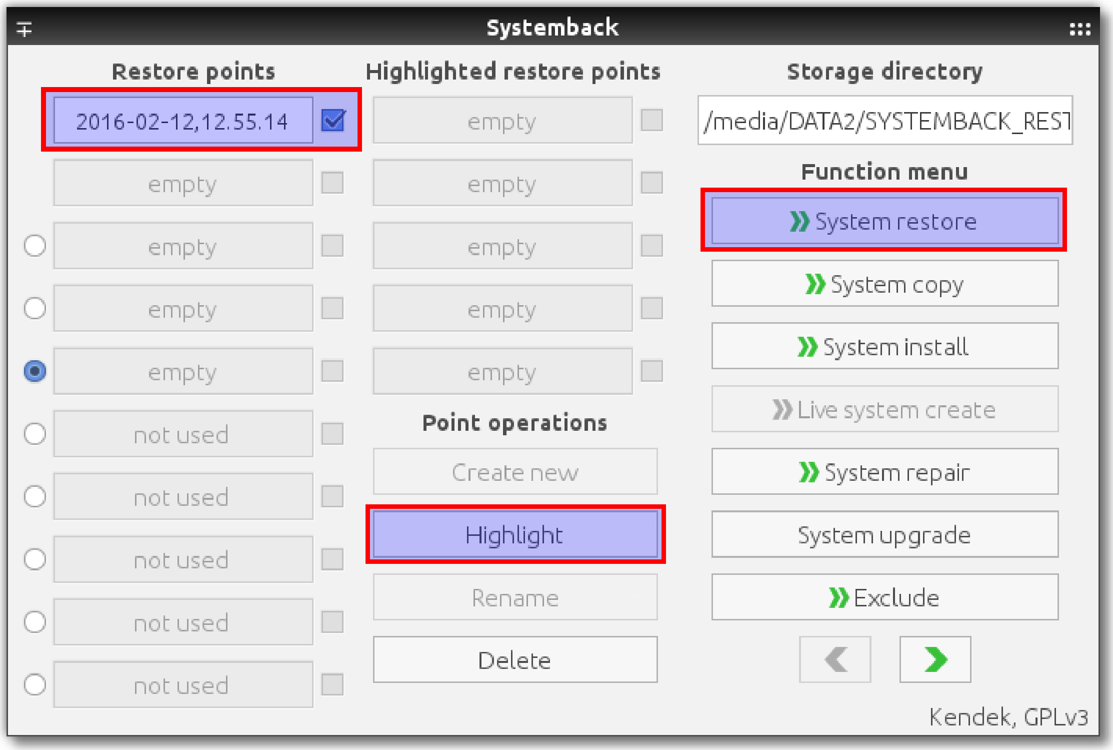
Included items

- Music
- Videos



Creating restore point .

When creation of the Restore point is complete it will appear under the 'Restore points' column in the Systemback GUI. If you have created a point of some special significance (ie before an update to a complete new Desktop Environment) you can prioritize it by using the 'Highlight' button and then it will appear in the 'Highlighted restore points' column. If you need to Restore your system select the 'System restore' button and select your Restore options in the Restore window.



Restore points		Highlighted restore points	
2016-02-12,12.55.14	☑	empty	□
empty	□	empty	□
○ empty	□	empty	□
○ empty	□	empty	□
● empty	□	empty	□
○ not used	□		
○ not used	□		
○ not used	□		
○ not used	□		
○ not used	□		

Storage directory: /media/DATA2/SYSTEMBACK_REST

DEBIAN REFERENCE :

Many people who are new to Linux are reluctant to use the terminal and sometimes consider it to be either a primitive means of using the computer or too complicated. After some time to adjust to using it most Linux Users come to appreciate the facility and speed afforded by using the CLI. The following section can be utilized by experienced Linux Users and demonstrate some fundamentals to new Linux Users. The apt and dpkg articles are modified from an excellent article by Matthew Danish.

Common APT usage :

apt-get install <package> Downloads <package> and all of its dependencies, and installs or upgrades them. This will also take a package off of *hold* if it was put on. See below for more info on *hold.*

apt-get remove [--purge] <package> Removes <package> and any packages that depend on it. --purge specifies that packages should be *purged*, see dpkg -P for more information.

apt-get update Updates packages listings from Debian mirrors, should be run at least once a day if you install anything that day, and every time after /etc/apt/sources.list is changed.

apt-get upgrade [-u] Upgrades all packages installed to newest versions available. Will not install new or remove old packages. If a package changes dependencies and requires installation of a new package, it will not be upgraded, it will be put on *hold* instead. apt-get upgrade will not upgrade packages put on *hold* (that is the meaning of *hold*). See below for how to manually put packages on *hold*. I suggest the `-u' option as well, because then you can see what packages are going to be upgraded.

apt-get dist-upgrade [-u] Similar to apt-get upgrade, except that *dist-upgrade* will install or remove packages to satisfy dependencies.

apt-cache search <pattern> Searches packages and descriptions for <pattern>.

apt-cache show <package> Shows the full description of <package>.

apt-cache showpkg <package> Shows a lot more detail about <package>, and its relationships to other packages.

Common Dpkg Usage :

dpkg -i <package.deb> Installs a Debian package file; one that you downloaded manually, for example.

dpkg -c <package.deb> Lists the contents of <package.deb>, a .deb file.

dpkg -I <package.deb> Extracts package information from <package.deb>, a .deb file.
dpkg -r <package> Removes an installed package named <package>

dpkg -P <package> Purges an installed package named <package>. The difference between *remove* and *purge* is that while *remove* only deletes data and executables, *purge* also deletes all configuration files in addition.

dpkg -L <package> Gives a listing of all the files installed by <package>. See also dpkg -c for checking the contents of a .deb file.

dpkg -s <package> Shows information on the installed package <package>. See also apt-cache show for viewing package information in the Debian archive and dpkg -I for viewing package information extracted from a .deb file.

dpkg-reconfigure <package> Reconfigures an installed package, if it uses *debconf* (*debconf* provides that consistent configuration interface for package installation). You can reconfigure *debconf* itself if you want to change the front-end or priority of questions asked. For example, to reconfigure *debconf* with the dialog front-end, you simply run:

dpkg-reconfigure --frontend=dialog debconf

echo ``<package> hold" | dpkg --set-selections Put <package> on *hold* (command line method)

dpkg --get-selections ``<package>" Get the current status of <package> (command line method)

dpkg -S <file> Searches for <file> in package database, telling you which packages have that file in them.

Building Debian Packages from Source :

apt-get source [-b] <package> Download the source Debian package for <package> and extract it. You must have deb-src lines in your /etc/apt/sources.list for this to work. If you supply the `-b' option and you are currently root, then the package will be automatically built if possible.

apt-get build-dep <package> Download and install the packages necessary to build the source Debian package <package>. This feature is only present in apt version 0.5 and up. Currently this means that woody and above contain this functionality. If you have an older version of apt then the easiest way to find out the build dependencies is to look in the debian/control file in the source package directory. A common usage of this command is in conjunction with apt-get source -b. For example (as root):

apt-get build-dep <package>
apt-get source -b <package>

Will download the source package, all of its build dependencies, and attempt to compile the source package.

dpkg-source -x <package.dsc> If you have downloaded the source package for a program manually, which includes several files such as a .orig.tar.gz (or .tar.gz if it is Debian native), a .dsc, and a .diff.gz (if it is not Debian native), then you can unpack the source package using this command on the .dsc file.

dpkg-buildpackage Builds a Debian package from a Debian source tree. You must be in the main directory of the source tree for this to work. Sample usage:

dpkg-buildpackage -rfakeroot -uc -b

Where `-rfakeroot' instructs it to use the fakeroot program to simulate root privileges (for ownership purposes), `-uc' stands for ``Don't cryptographically sign the changelog'', and `-b' stands for ``Build the binary package only''

debuild A handy wrapper script around dpkg-buildpackage that will automatically take care of using fakeroot or not, as well as running lintian and gpg for you.

Fixing dependencies :

dpkg --configure --pending If dpkg quits with an error while apt-get install, upgrade, or dist-upgrading try running this to configure the packages that were already unpacked. Then try apt-get install, upgrade, or dist-upgrade -f, and then try apt-get install, upgrade, or dist-upgrade again. Repeat as needed. This usually resolves most dependency problems (also, if it mentions a specific package for some reason, you might want to try installing or removing that package)

apt-get install -f
apt-get upgrade -f
apt-get dist-upgrade -f

Attempt to fix dependencies while doing one of the above. Note that apt-get install -f does not require a <package> argument.

More info on Debian/GNU Linux: https://wiki.debian.org/

HANDY TERMINAL COMMANDS :

SYMLINK TO A FILE OR FOLDER ELSEWHERE ON SYSTEM (AS ROOT) :

```
ln -s /path/file/exists /path/link/placed
```

REBUILD FONT CACHE (AS ROOT) :

```
fc-cache -f -v
```

FONT ANTIALIASING AND HINTING SETUP:

```
dpkg-reconfigure fontconfig-config
```

DVD RIPPING WITH MPLAYER :
*Creates a file called "dump.vob" in your home folder assuming movie is title 1.

```
mplayer dvd://1 -dumpstream -dumpfile dump.vob
```

VIRTUALBOX MODULE SETUP (AS ROOT) :
*Make sure linux-headers are installed and linked

```
/etc/init.d/vboxdrv setup
```

PRINT A 'selections.txt' FILE TO DESIGNATE HELD PACKAGES (AS ROOT)

```
dpkg --get-selections \* > selections.txt
```

*Then edit selections.txt as Root

SAVE THE 'selections.txt' FILE TO DPKG (AS ROOT)

```
dpkg --set-selections < selections.txt
```

BUILD DEBIAN PACKAGE WITH GIT-BUILDPACKAGE:

```
git-buildpackage --git-upstream-branch=origin/upstream
```

BUILD DEBIAN PACKAGE WITH DPKG:

```
dpkg-buildpackage -rfakeroot -uc -b
```

LINKING KERNEL HEADERS FOR MODULE BUILDING:

```
ln -s /usr/src/linux-headers-$(uname -r) /lib/modules/$(uname -r)/build
```

SET A DIFFERENT C COMPILER THAN DEFAULT
*Replace X.X with desired gcc version

```
export CC=/usr/bin/gcc-X.X
```

APPLY A PATCH TO SOURCE CODE OR KERNEL

```
patch -p1 < PATCHFILENAME
```

CHECK SOUND DEVICES INSTALLED ON SYSTEM

```
cat /proc/asound/cards
```

CHECK AUDIO PLAYBACK DEVICES ON SYSTEM

```
aplay -l
```

THANKS AND ACKNOWLEDGEMENTS :

The Debian/GNU Linux Distribution

Krisztian Kende – Systemback

Franco Conidi – Systemback NVMe support

Trulan Martin – RT Kernels

Anahata, Autostatic, linuxaudio.org – Torrents and Mirrors

Korakios – CPU governing utility and UEFI boot tweaks

Tony Brijeski – Yad/Zenity Scripts

RockHopper – H2 and SFZ Thunar Custom Actions, Shuriken Beat Slicer

Yann Buchau – Thunar Image Custom Actions

XFCE4 Team

Filipe Coelho – KX Studio Repositories, Carla

Paul Davis, Robin Gareus, Ben Loftis – Ardour/Mixbus

osxmidi – LinVST, SFZero

aciddose – Xhip synth and plugins

User Manual Proofreaders

Numix Icon Team – Themes/Icons

Ubuntu fonts

Harrison Consoles – Default Wallpapers

Special Thanks:

All financial supporters of AV Linux, your kind generosity and encouragement is very much appreciated !