

## Alsa soundscapes, not just for musicians

# Free Sound Dimensions

There are many good reasons to install the Advanced Linux Sound Architecture, Alsa, by default on modern distributions. They include a variety of Alsa-based audio applications ranging from simple CD players to professional studio programs.

BY WOLFGANG BONGERTZ

It seems quite logical for Linux distributions to opt for a GPL-licensed software rather than a commercial OSS. The first, and most obvious, advantage is that the user does not need to spend money just to install a sound card, assuming that it has Alsa support. This is true of many cards, including some quite exotic models that you won't find down at your local hardware dealers. To find out if Alsa supports your card, check out the database at [1].

If your card is not listed, it doesn't automatically mean that you will be

unable to use it with Alsa, but it might take a while to check what standards your card supports and to tweak out the best settings.

In many cases you might actually save money by buying a new sound card, rather than opting for a seemingly inevitable OSS, as a surcharge may be payable if you want to enable the card on Linux. Yours truly first purchased an OSS license for a sound card with the Aureal Vortex chipset, only to discover that I was expected to pay an additional fee for enabling even the basic chipset func-

tions. If you are not forced to use a specific sound card, because your Windows based music program requires the specific functionality of the card, a cheap card and Alsa are probably your best options.

It is often possible to use OSS-based applications, by installing the compatibility library, *ALSA-oss*, which is also available from the Alsa homepage [1].

The recommended approach is to install the Alsa packages supplied with your distro first. You can avoid downloads and complicated modifi-

cations of your configuration in this way.

Once you have the drivers and audio programs working to your satisfaction, there is no real reason to update. As not all Alsa tools and applications are installed by default, you may need to add one or two programs.

The current SuSE 9.0 and Mandrake 9.2 distributions have Alsa version 0.96 – which was released in the fall of 2003 – including a number of tools. 0.x versions of Alsa are not under active development. Currently, the Alsa homepage [1] has a stable version 1.02 for kernel ver-

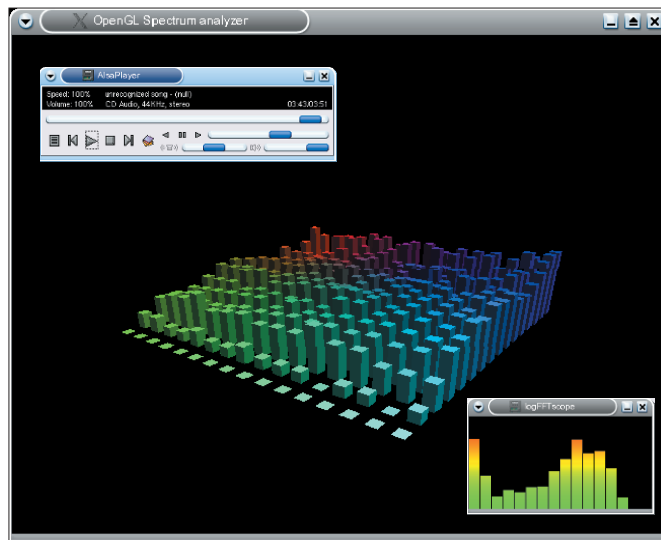


Figure 1: The Alsaplayer is versatile, and handles everything from MP3 files to audio CDs as audio streams. It can also visualize signals. The spectral waterfall (center of image) may be more appealing, but the spectrum analyzer (bottom right) provides more information.

## Box 1: Updating to Alsa from OSS

The first thing to do is to make sure that OSS (if it is still installed) does not take command of your sound card and is not automatically loaded when you boot your machine. *su* to root in the command line and halt the OSS driver as follows:

```
soundoff
```

Then call *soundconf* to open the OSS configuration menu. Select the *Disable automatic startup at boot time* option below *Automatic Boot Setup*. You should see a message to the effect that the OSS driver has been removed successfully. Don't forget to *save and exit*, when quitting the configuration menu, to

prevent the OSS driver from launching automatically in future.

Older OSS versions may use an entry in */etc/init.d/boot.local* to start the OSS driver. In this case, remove the line with the */usr/bin/local/soundon* entry.

You can now use your distribution's installation manager to install Alsa if you have not already done so. After installing Alsa, you should have a script called *alsasound* in your */etc/init.d* directory. Again working with super user privileges, type

```
/etc/init.d/alsasound restart
```

in the command line to launch, or re-launch, the driver.

Suse and Mandrake installation tools can autodetect internal sound cards. If required, you can finish off the configuration with YaST on Suse 9.0 (see Figure 2), and with *draksound* on Mandrake. The installation procedure should also automatically start the sound daemon.

If you installed the latest Alsa version from the source code (see Box 2: Installing Alsa from the Sources), avoid installing a sound card via YaST or *draksound* as this would overwrite the new drivers.

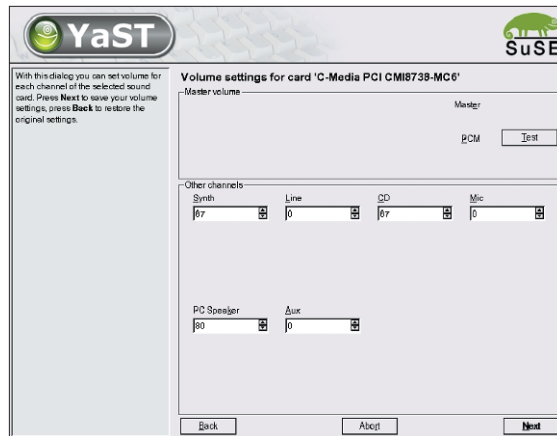
sions 2.2, 2.4, and 2.6. Beta version 1.03 is just around the corner.

The following sections assume that you have a working Alsa driver installation. Users moving from OSS should check out the notes in the boxes. Box 2 provides instructions on installing Alsa from the sources.

## Jack Connects

The Jack Audio Connection Kit (Jack) [3] allows multiple applications to work with the Alsa audio drivers at the same time. Jack is included with most current distributions, and will automatically be installed if you set up an application such as *alsaplayer*.

Jack is an audio server that connects various audio applications to the hardware and makes sure that applications can exchange data. See Figure 3. For example, a MIDI sequencer simply records control data which are fed to a sound generator on the sound card, or an external instrument, which in turn takes care of producing the required sounds. If you want to add an echo, Alsa



**Figure 2: Suse Linux uses YaST to for Alsa sound configuration. Users can set the volume at the same time.**

will transport your midi data to the chip that generates the sound, and Jack will take the sound produced by the chip to the echo processor, and hand it back to the sound card. It can even take a detour via a software based audio mixer, if required.

Of course, this assumes that the applications are “jackified”. Figure 4 shows a software synthesizer that does not have

a Jack interface. In this case, Jack controls the synthesizer indirectly, as the MIDI sequencer which controlling the synthesizer is running as a Jack client – synchronously with the multi-track recorder client.

Thanks to the efforts of a continually growing community of audio developers, most of whom work with Alsa applications, there is a large selection of “jackified” software available, and the collection continues to grow. Box 3: Applications,

lists a number of programs that rely on Jack functionality.

## LADSPA versus VST

LADSPA (Linux Audio Developers Simple Plugin Architecture) is the Open Source equivalent of Steinberg’s VST standard for audio plug-ins in Cubase or Nuendo. Synthesizers, sequencers, audio workstations, and a multitude of pro-

## Box 2: Installing Alsa from the Sources

Before you start, make sure that the kernel source code is installed to fulfill all of the Alsa drivers’ dependencies. Then you need to type

```
modinfo soundcore
```

If the response tells you that this module is available, you can assume that you will not need to re-compile the kernel. The database of supported cards on the Alsa homepage [1] typically has detailed guidelines on individual cards, and links to distribution specific tutorials.

Packages that you downloaded from the homepage need to be unpacked in separate directories. They include both the drivers, and a collection of libraries, tools, and modules for special cards like the Aureal Vortex, Turtle Beach Multisound Pinnacle/Fuji, Sek’D/Marian Prodif Plus, or Advantage.

After unpacking the archive files in */opt*, for example, you should have a few subdirectories called *alsa-driver*, *alsa-lib*, *alsa-firmware*, *alsa-oss*, *alsa-utils*, and *alsa-tools* plus the version number suffix for the version you are installing.

### Step by Step

The following example is for a Terratec 128iPCI card, which uses a *es1938* driver module. This driver is referred to by its module

name during configuration and when added to the kernel. You may need to refer to the installation guide on the Alsa homepage [1] to find out the module name for your sound card.

In a command line window, change to the driver directory

```
cd /opt/alsa-driver-xx
```

and then type the following

```
./configure --with-sequencer=
yes with--isapnp=no;
make; make install
```

to build the software in a single operation. *configure* options always start with *--with* and are located in the *INSTALL* file. In this case, we simply enabled sequencer support, and removed ISA PnP sound card support, which we will not need. If you prefer, you can tell *configure* to configure the driver module for your card by stipulating *--with-cards=es1938*. Alsa versions prior to 0.94 need to run a script to be able to assign privileges for *snddevices*.

Before you turn to the lib package, first type

```
chmod a+r+w /dev/mixer
/dev/dsp /dev/sequencer /dev/midi
```

Then working in the */opt/alsa-lib-xx* directory, follow the normal steps to complete the

install: */configure; make; make install*. Follow the same approach for the utilities and OSS compatibility packages in */alsa-utils-xx*, and */alsa-oss-xx*. Change to the directory, *configure*, *compile*, and *install* all in a single quick action.

Time to add the modules to the kernel. The Alsa hardware database at [1] tells you the right module(s) for your sound card(s). This is *snd-es-1938* for the Terratec 128i PCI in our case:

```
modprobe /dev/snd-es1938;
modprobe /dev/snd-mixer;
modprobe /dev/snd-seq-oss
```

After completing the install, you may find that the volume controllers for the sound card are muted. You can use the *alsamixer* from the utilities package to set the volume. Assuming that the install worked out OK, you should also be able to use other mixers such as *gamix* or *kmix*.

You can use the user-specific *.asoundrc* file to update plug-ins for converting PCM formats or routing to distribution specific variants for Alsa. Alsa will work perfectly well without *.asoundrc*, but it does give you more control over your own soundcard(s). Check out the tutorial [2] for more info on generating an *.asoundrc*.

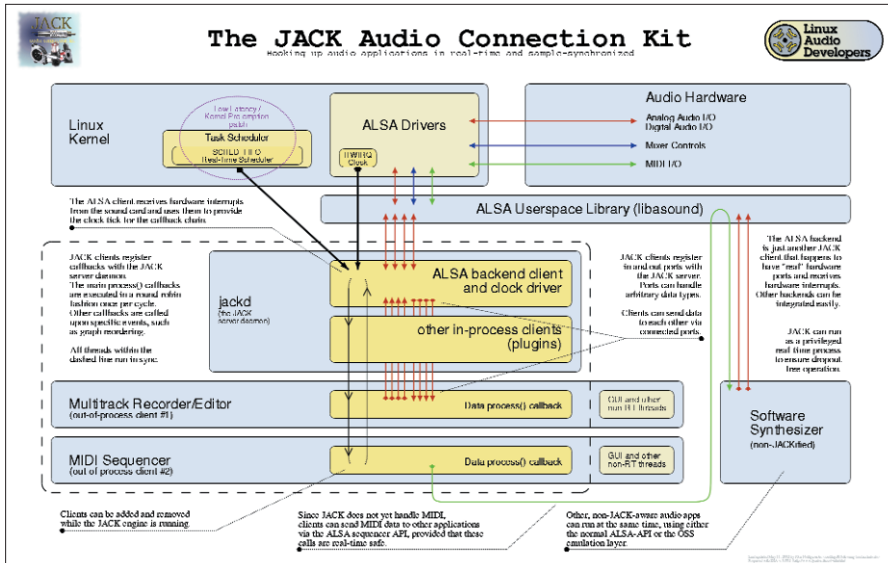


Figure 3: This diagram by Jörn Nettingsmeier shows how Jack works. The *jackd* daemon hovers like a spider in its web, and provides stable routing of the audio streams in the background.

grams for musicians and sound engineers all work with LADSPA plug-ins. In fact, there are any number of quite impressive plug-ins available from various sources.

The Agnula project distributions, which are tailored to meet the needs of musicians and studio owners, all rely heavily on a combination of Trio Alsa, Jack, and LADSPA.

### Agnula and EU Sponsorship

The European Commission invested 1.7 million Euro over a period of two years in the Agnula project [4], giving the project the task of developing a customized, Debian and Red Hat-based Linux distribution for audio applications. The

self-installing and configuring versions, DeMuDi and ReHMuDi, were due to be completed on 31.3.2004. The Agnula homepage had a downloadable ISO CD image of both distributions ready by the deadline. Unfortunately, neither of the CDs was bootable, and both lacked a simple installation routine. The packages these distros contain are older than those provided by generic distributions in most cases.

This said, the approach is interesting. The Agnula distributions provide a collection of apps for musicians and sound engineers, and this gives DeMuDi and ReHMuDi a fighting chance against commercial applications for Mac and Windows in this professional market. ■

### Box 3: Applications

Free and commercial applications for Alsa and Jack can easily hold their sway with more established audio applications. Check out the list of applications and short descriptions later on in this article. For a more detailed list, check out the Applications section [5] on the Alsa homepage.

Most popular distributions include the **Alsaplayer**, and an audio media player that handles and plays almost everything, from audio CDs, through various PCM formats, to MP3 as audio streams. The program also has visual gimmicks such as a waterfall spectral display or level indicators. See Figure 1 for an example.

**Jazz++** is a free MIDI sequencer with all the features that you need to produce stunning

professional results. **Jazz++** also runs on Windows. [6]

**amSynth** is targeted at fans of classical analog synthesizers. Just like in the good old days of MiniMoogs, you can twiddle knobs to modify the sound. [7]

**Ardour** is a multi-track recording program for professional applications. [8]

**Simsam** is a simple MIDI sample player, which can be controlled via a MIDI keyboard. DJs in particular might be interested in this app. [9]

The Audio/MIDI sequencer, **MusE** [10], the **BEAST** [11], **AlsaModularSynth** [12], and **FluidSynth** [13] synthesizers, and the MIDI sequencer and note editor, **Rosegarden** [14], are all worthy of note.

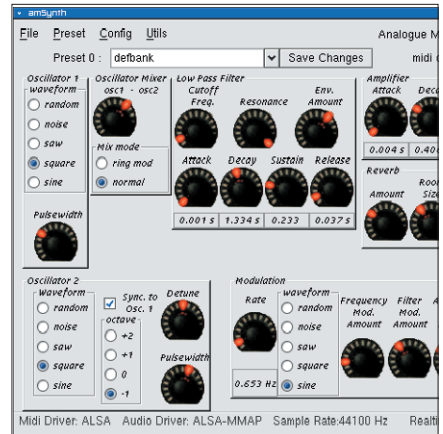


Figure 4: amSynth brings back the classical sound of analog synthesizers. You need to twiddle buttons to control it, just like on a true analog synthesizer.

### INFO

- [1] The Alsa project: <http://alsa-project.org>
- [2] Tutorial .asoundrc: <http://alsa-project.org/alsa-doc/doc-php/asoundrc.php3>
- [3] Jack homepage: <http://jackit.sourceforge.net/>
- [4] Introduction to Alsa, Jack, and LADSPA: [http://www.agnula.org/documentation/dp\\_tutorials/alsa\\_jack\\_ladspa/](http://www.agnula.org/documentation/dp_tutorials/alsa_jack_ladspa/)
- [5] Alsa applications: <http://alsa-project.org/applications.php3>
- [6] Jazz++ MIDI sequencer: <http://www.jazzware.com/cgi-bin/Zope.cgi/jazzware>
- [7] Amsynth synthesizer: <http://amsynthe.sourceforge.net/amSynth/>
- [8] Ardour homepage: <http://ardour.org/>
- [9] Simsam MIDI Sample Player: <http://simsam.sourceforge.net>
- [10] MusE "Professional Music Maker" Linux Magazine, Issue 37, December 2003, p20
- [11] The BEAST: <http://beast.gtk.org/>
- [12] AlsaModularSynth: <http://alsamodular.sourceforge.net/>
- [13] FluidSynth: <http://www.fluidsynth.org/>
- [14] Rosegarden "On a Bed of Roses" Linux Magazine, Issue 37, December 2003, p25

### THE AUTHOR

After studying communications engineering at the technical university in Brunswick, Germany, Wolfgang Bongertz went into journalism, writing for special-interest publications for musicians and studio staff. He has worked with Linux for several years now, specializing in exchanging data with Mac and Windows machines, and applications for musicians.