

Soundcard drivers for Linux

DRIVING TEST

A common argument against the use of Linux was, and still is, the lack of driver support for the vast range of different hardware components. For this reason, numerous projects have been developed that have eliminated, and/or aim to eliminate, exactly this problem.

When considering soundcards, there are essentially three possibilities for convincing the hardware to work together with Linux: these are the OSS/Lite drivers contained in the kernel sources, the ALSA project and the commercially distributed OSS driver from 4Front. In order to prevent misunderstandings right from the start, it should be mentioned that this article is based on the current versions of ALSA (version 0.5.12a) and OSS (version 3.9.6b). The information on the kernel drivers is based on the version 2.4.16 of the kernel. In order to keep this article from becoming excessively long, we have limited the focus to an explicit discussion about each of the supported soundcards. Much more information can be found on the appropriate Web pages.

ALSA

The ALSA project was created by Jaroslav Kysela at the beginning of 1998. This development has been supported by the SuSE company since December 1999. Nowadays, all the recent distributions aid the installation of sound cards with their own configuration programs. As a general rule, the distributions revert to the ALSA drivers, as these run under the GPL or LGPL and are compatible with numerous different soundcards.

Installation

As mentioned above, ALSA drivers are used in most common distributions as the standard soundcard driver. It is obviously impossible to deal with all the distributions here, and as such we have chosen SuSE Linux 7.3 as an illustrative example to describe how ALSA is set up. Other than this YaST2-based solution, there is also the possibility of using the *alsaconf* – the ALSA internal configuration program.

You generally have to have root rights in order to set up hardware. This can be done as follows:

- Log in as a normal user.
- Release the output of the X server (in the terminal): *xhost + localhost*.

- “Acquisition” of root rights in a terminal: *su -* (then enter the root password at the subsequent prompt).
- Return the display: *export DISPLAY=0:0* (if they use another shell other than *bash*, *setenv DISPLAY 0:0* can also get you where you want to go.)

All programs started from this terminal window, from now on, are executed from root and displayed on the normal user’s screen. Now to install the soundcard:

- Start from YaST2 by entering *yast2* in the root terminal.
- Click the soundcard configuration in the Hardware submenu (Figure 1).
- The soundcard should now be recognised automatically (Figure 2).
- All you have to do now is repeatedly press Continue.

And that is basically all there is to it. The only other thing that should be done now is a check of whether the soundcard was set up correctly: To do this, the command:

```
cat /proc/asound/sndstat
```

should be entered in the root terminal, whereupon Linux tells us which sound channels were set up. In order not to give an individual soundcard the priority, ALSA’s many other settings and functions should not be changed at this stage. For SBLive cards for example, it is possible to install and use the



Figure 1: YaST2 hardware configuration

Operating systems should not only be measured by their stability, but also by their level of hardware support. Unfortunately few hardware manufacturers make their own drivers available for Linux. There are ways around this though, as Hagen Hoepfner explains

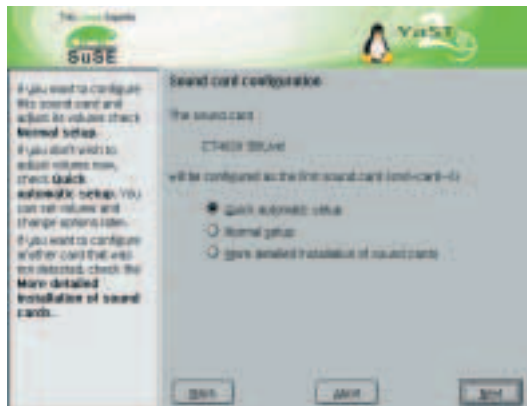


Figure 2: YaST2 soundcard configuration

SoundFont files that are included in the Windows driver CD. Go ahead and start the YaST2 soundcard configuration program again. You will be surprised how much fine-tuning is possible.

OSS/Lite

Let's turn our attention now to Linux drivers that are a little more mature in their years – drivers such as the cute little penguin Tux. Those of you who have compiled your own kernel will know that it's also possible to set up soundcards in this way. Although we don't want to compile our own kernel now, a short look at kernel drivers is nevertheless quite interesting. Simply enter the command:

```
ls/lib/modules/2.4.16-4GB/kernel/drivers/sound/
```

in the root terminal, which is still open after the ALSA installation (2.4.16-4GB is the current kernel number and should be changed if necessary). The indicated files are kernel modules that support the use of soundcards. Simply switch the previously configured ALSA driver off and use a kernel module:

- Switch off the ALSA driver (first you must quit all programs that use the soundcard):
`/etc/init.d/alsasound stop`
- Load the suitable kernel module (in the example of SBLive): `modprobe emu10k1`

Was that all? Well no, the SuSE distribution 7.3 used in the test installed only one driver without a problem. The loaded driver was the ALSA driver, which we mentioned in the previous section. By the way, this driver is based on the OSS/Lite driver developed by Creative Labs, which goes by the same name. In order to shorten the discussion here, it must be mentioned that Linus Torvalds recently made an announcement, which was discussed on *Pro Linux*. This announcement essentially states that ALSA drivers will completely replace the old OSS/Lite drivers and will thus flow directly into the kernel.

Open Sound System (OSS)

Why should Linux users be forced to deal with commercial software, when there Free alternatives? This question must be answered individually, as there are many individual questions that play a role:

- Will a soundcard be supported?
- Which functions of the soundcard are supported?
- Which software is to be used?

ALSA can be configured in such a way that OSS drivers are emulated, and as such the last question is made irrelevant for the normal user. Tests with special audio software (such as SLAB, ecasound) however show that the original OSS drivers are superior to the emulated variants. Probably the most decisive advantage is the fact that OSS makes one (e.g. with SB 128) or several (e.g. with SB Live) output channels (Figure 3) available, in addition to the standard audio channel `/dev/dsp0`. It is thus possible to bind the KDE Sound Daemon (ARTS) to `/dev/dsp1`, for example. It is therefore possible for programs (such as RealPlayer), whose output does not run through Arts, to be heard without a problem through `/dev/dsp0`. If that is still not enough for you, you can gain a further eight virtual channels by purchasing a license for *Virtual Mixer*.

License model

As was already suggested, 4Fronts OSS is a commercial product, not subject to the GPL. The price is based on a standard license, which must be purchased in all cases and costs \$20 for Linux. Additional special licenses are necessary for the use of newer PCI cards, special functions for older ISA soundcards and professional soundcards (refer to Table 1). It is recommended that you download and install the free demo version of OSS before you purchase it. If you are happy with the test version, you can then simply order a license file. The license file is a text file, which contains a license key that unlocks the appropriate drivers (refer to the section



Figure 3: Multiple output channels

Table 1: OSS licenses

PCI soundcards

Avance Logic PCI (AVANCE)
Aureal Vortex (VORTEX)
C-Media CMI873x (CMEDIA)
Conexant Riptide (RIPTIDE)
Cirrus Logic CS428x/CS46xx (CRYSTAL)
ESS Maestro (MAESTRO)
ESS Solo-1 (SOLO)
Forte Media (FMEDIA)
Intel8xx/SiS7012 (INTELPCI)
NeoMagic NM2200 (NEOMAGIC)
Sound Blaster SBPCI128/ Ensoniq AudioPCI (APCI)
Sound Blaster Live!/Audigy (SBLIVE)
S3 SonicVibes (S3VIBES)
Trident 4DWave/SiS7018 (TRIDENT)

VIA97/Geode (VIA97)
Yamaha DS-XG (YMH)

ISA soundcards

All ISA BUS Soundcards (ISA)
SB-AWE64 Wave Table (AWE)
Dream SAM9704 (DREAM)
Ensoniq-VIVO Wave Table (VIVO)

Professional soundcards

Virtual Mixer (MIX)
Input Multiplexer (IMUX)
Envy24/MIDIMan (ENVY24)
LynxONE (LYNXONE)
RME Digi32/Digi96 (DIGI32)
Sonorus Studi/o (STUDIO)

on installation). The licenses can be ordered either directly through the 4Front Web site or from SuSE.

Installation

As previously mentioned, it's a good idea to first download and install the demo version of OSS from the Web server before you go ahead and buy the appropriate license(s). The installation, for which root rights are again necessary, is executed as follows:

- Create a source directory: `mkdir ~/oss`.
- Download the drivers into the source directory.
- Change to the source directory: `cd ~/oss`.
- Unpack the archive, e.g.: `tar xvzf osslinux396b-2x.tar.gz`.
- Start the installation: `./oss-install`.

After accepting the license conditions, the installation program tries to install the drivers that are necessary for the current kernel version. If no pre-compiled drivers are found, it will try to compile them. To do this, the kernel sources must be installed. Note: the version of these kernel sources must precisely match that of the installed kernel. There are some cases (some distributions) where the two do not match. An example of this is my Mandrake distribution, which has a current kernel of the version number `linux-2.4.17-10mdk` and kernel sources of the version number `linux-2.4.17-15mdk`. As we don't want to have to compile a kernel, we can use a little trick. We can simply edit the file `/usr/src/linux/include/linux/version.h` and enter the version number of the current kernel there. And hey presto – the OSS installation routine is content.

If you have bought a license from OSS, the appropriate license.dat file is simply copied into the OSS directory, which was created in the first installation, and then activated in the `oss-install`

program through the appropriate menu point.

By the way, you can display the existing (or set) sound channels in a similar way to ALSA through `cat/dev/sndstat`.

Result

In order to put this summary into perspective, we need to realise that on the one hand it is only a matter of time before OSS/Lite drivers disappear from the scene, while on the other ALSA continues to grow in importance. Both of these drivers are perfectly satisfactory for normal desktop use. However, if you need to use special software, there is no way around using OSS at present. The developers of the ALSA drivers are aiming at OSS compatibility, and as such only time will tell whether the emulation can completely replace the commercial drivers. The bottom line is that nothing stands in your way if you want to install a soundcard under Linux – as long as you use one of the many supported cards.

The author

Hagen Hoepfner is a member of the technical staff at the Institute for Technical and Operational Information Systems. In his spare time he is an ardent father and plays the guitar in the rock band "Gute Frage" ("Good Question") (<http://www.gutefrage.de>).

Info

The ALSA soundcard matrix: <http://www.alsa-project.org/~goemon/>
Soundcards supported by OSS: <http://www.opensound.com/osshw.html>
The kernel sound module: <http://www.linux.uni-bayreuth.de/howtos/html/DE-Sound-HOWTO-3.html>
Homepage of the ALSA project: <http://www.alsa-project.org>
ALSA and SuSE: <http://www.alsa-project.org/announce/profi.php3>
Installation of ALSA, independent of distribution: <http://www.alsa-project.org/~valenty/Alsa-sound-mini-HOWTO.html>
Pro Linux discussion – OSS/Lite versus ALSA: <http://www.pro-linux.de/news/2002/3990.html>
4Front's homepage: <http://www.opensound.com>
Information about OSS licences: <http://www.opensound.com/license.html>
OSS download page: <http://www.opensound.com/download.cgi>