ALSA Sucks?

Trouble Shooting for Your Healthy Music Life

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You Got Problems?

- Can't play DVD with my onboard sound chip!
- Sound doesn't work any more after updating my kernel!
- I get noisy playback!
- I can't run Unreal Tournament!
- My USB device doesn't work with JACK!
- No documentation at all!!

...

- ... ALSA sucks!!!?

Different Problems, Different Solutions

- Installation Problems

- Configuration Problems

- Errors during Operation

- Performance Problems

- Communication Problems

Installation Problems

- **The easiest way**
  - Use the package included in distros

- **Compiling ALSA drivers manually**
  - Prepare the correct kernel source tree
  - 2.6 kernels - included in the kernel tree
    - ▸ Easier to compile together with the kernel
    - ▸ Possible to build from alsa-driver tarball
  - 2.2/2.4 kernels
    - ▸ Build from alsa-driver tarball only

- **ALSA-library, utils and tools**
  - Should be OK on every system
    - ▸ For CVS build, use the newer GNU auto-tools

Configuration Problems

- Automatic configurators
  - alsaconf script (in alsa-utils package)
    - For a single card only
  - Distro's configurator (e.g. YaST2)

- 2.6 kernels - it's easy!
  - Only a single line to /etc/modprobe.conf
    ```
    alias snd-card-0 snd-intel8x0
    ```
  - For auto-loading of OSS emulation, another line
    ```
    alias sound-slot-0 snd-intel8x0
    ```

- 2.2/2.4 kernels
  - More alias lines for auto-loading of OSS emulations
    ```
    alias sound-service-0-0 snd-mixer-oss
    alias sound-service-0-1 snd-seq-oss
    ....
    ```

Configuration Problems (contd)

- **Sound of silence?**
  - Mixer is muted as default on ALSA
  - Don't panic, just adjust certain basic volumes
  - alsaconf does good job in most cases

- **Device files**
  - Some distros don't have device files for ALSA
    - Scripts in kernel tree and alsa-driver tree
  - Devfs - Keep as it is
  - Device file permission can be changed dynamically
    - PAM, resmgr, udev...

- **Hotplug & udev**
  - Make sure hotplug starts after alsasound init script
  - udev - Don't touch it yet with ALSA!

Errors in Operation

- Know the difference of "Doesn't Work"

- Non-fatal problems
  - Total silence
  - Playback/record noises
  - Repeated sounds
  - Operation is blocked
  - OSS mmap mode

- Fatal problems
  - I/O blocked process (D state in ps)
  - Kernel Oops
  - Hard lock-up

Troubleshooting

- **Silent playback (looks as if working)**
  - Check the physical connections (right jack?)
  - Check mixer configuration (unmuted, volume up?)
  - Tweak unusual switches
    - "External Amplifier" for laptops
    - "Headphone" or "Surround" instead of Master
    - Can be tuned with ac97_quirk module option?

- **Noisy playback/recording**
  - VIA chip - dxs_support module option
  - Mixer misconfiguration
    - Onboard - "IEC958 Input Monitor"
    - SB Live - "Digital/Analog"
  - A bug in OSS emulation
    - Check whether it happens with ALSA native apps

Troubleshooting (contd)

- **Repeated sounds**
  - IRQ problem
    - ▸ Turning off APCI (pci=noacpi or acpi=off)
  - PnP-OS in BIOS
    - ▸ Set OFF (mostly for old machines)

- **Operation is blocked/invalid**
  - Check other process using the sound device
    - ▸ Sound daemons (aRts, esound)
      ```
      fuser /dev/snd/*
      ```

- **OSS mmap mode**
  - Tweak proc file
  - Run via alsa-oss wrapper

Fatal Errors

- **Gather the debug information**
  - Compile ALSA with debug option
  - See kernel messages via dmesg command
  - Enable magic SysRq in kernel

- **I/O blocked process (D state in ps)**
  - Deadlock in kernel
  - Kernel stack trace (Alt+SysRq+T/P) will help for debugging

- **Kernel Oops**
  - Run ksymoops

- **Hard lock-up**
  - Stacktrace on console?

Performance Problems

- Buffer underruns/overruns (xrun)
  - Enable xrun logging
    ```
    echo 1 > /proc/asound/card0/pcm0p/xrun_debug
    ```
  - Enable xrun stack-tracing
    ```
    echo 2 > /proc/asound/card0/pcm0p/xrun_debug
    ```

- USB 1.1 devices
  - Choose the right sample rate
    - Divisible by 1000 (e.g. 48000)
  - Anyway too narrow bandwidth for multi-channel...

- Use tuned kernel (e.g. preemption)
  - Mandatory for RT processes (e.g. JACK)
  - Check the latency via latencytest program

Surround Output

- Surround output from 2-channel samples
  - Not supported on all hardwares
  - Some supports mixer switch ("Duplicate Front")
  - Use a dedicated PCM in ~/.asoundrc
    - Data copy via route or plug plugin

- Check mixer volumes
  - Master volume doesn't affect Surround volumes
    - Higher level mixer would be needed

- Use pre-defined PCM names
  - surround40, surround51, ...
    ```
    % aplay -Dsurround51 some-6ch-wav-file.wav
    ```

- Speaker-test utility by James Courtier-Dutton

S/PDIF Output

- IEC958 = S/PDIF

- Check whether it's really supported
  - Check AC97 proc file for onboard chips
  - Check /usr/share/alsa/cards/*.conf for your driver
  - "IEC958 xxx" mixer elements?

- Use pre-defined PCM names
  - iec958, spdif

- Video players
  - Xine and MPlayer support AC3-output via ALSA S/PDIF

OSS Compatibility Problems

- Kernel module and user-space library

- Performance problems on OSS apps
  - Periodic noises, too high CPU
    - ► Can be a bug of OSS emulation layer
    - ► Try equivalent ALSA native apps
  - Error returned?
    - ► Check ioctl calls via strace
    - ► Check PCM setting (hw_params proc file)

- Mixer
  - Not all mixer elements are mapped

- Read Documentation

Bug Reporting

- ALSA devel ML or ALSA Bug Tracking System

- Give information!
  - Hardware information
  - Driver and kernel version
  - Exact symptom description

- Proc files are helpful
  - AC97 status and AC97 register dump
    - e.g. /proc/asound/card0/codec97#0/*
  - PCM status
    - e.g. /proc/asound/card0/pcm0p/sub0/*
  - Chip-specific register dump (if any)

Bug Reporting (contd)

- **USB descriptors**
  - Output of lsusb -v
  - /proc/asound/card?/stream* files

- **Onboard chip is often hard to debug**
  - Give pressure to hardware vendor, too!

- **Don't be afraid**
  - We're lazy but would like to help you :)
  - Send "ping" occasionally

Resources

- **Web Pages**
  - ALSA project homepage
    `http://www.alsa-project.org`
  - ALSA bug tracking system
    `https://bugtrack.alsa-project.org/alsa-bug/`
  - ALSA Wiki & FAQ
    `http://alsa.opensrc.org`

- **Documents in Kernel**
  `linux/Documentaiton/sound/alsa`
  `alsa-kernel/Documentation`
  - ALSA-Configuration.txt
  - OSS-Emulation.txt
  - Procfile.txt
  - ALSA-driver writing guide and API reference

Resources (contd)

- **Test tools**
  - Test and example programs in alsa-lib
    - ‣ Build separately in test directory
  - Latency-test utility (for 2.6 kernels)
    ```
    http://www.alsa-project.org/~iwai
    ```
  - Surround test utility (will be in ALSA tree)
    ```
    http://www.superbug.demon.co.uk/speaker-test/
    ```