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\* USB devices

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USB Audio/MIDI driver (SND\_USB\_AUDIO) [N/m/?] (NEW) m

Native Instruments USB audio devices (SND\_USB\_CAIAQ) [N/m/?] (NEW) n

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\* System on Chip audio support

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ALSA for SoC audio support (SND\_SOC) [N/m/?] (NEW) m

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\* STMicroelectronics SoCs support

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STMicroelectronics SoCs support (SND\_STM) [N/m/?] (NEW) m

Name of BPA2 partition to allocate buffers from (SND\_STM\_BPA2\_PARTITION\_NAME) [audio] (NEW)

STx7100 and STx7109 support (SND\_STM\_STX710X) [N/m/?] (NEW) m

STx7105 support (SND\_STM\_STX7105) [M/n/?] (NEW) m

STx7111 support (SND\_STM\_STX7111) [N/m/?] (NEW) m

STx7141 support (SND\_STM\_STX7141) [N/m/?] (NEW) m

STx7200 support (SND\_STM\_STX7200) [N/m/?] (NEW) m

Dummy converter driver (SND\_STM\_CONV\_DUMMY) [N/m/?] (NEW) m

Generic GPIO-controlled converter driver (SND\_STM\_CONV\_GPIO) [N/m/?] (NEW) m

Generic I2C-controlled converter driver (SND\_STM\_CONV\_I2C) [N/m/?] (NEW) m

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\* Open Sound System

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Open Sound System (DEPRECATED) (SOUND\_PRIME) [N/m/?] (NEW) n

????

```
make ARCH=sh CROSS_COMPILE=sh4-linux- vmlinux
```

```
make ARCH=sh CROSS_COMPILE=sh4-linux- modules
```

```
make ARCH=sh CROSS_COMPILE=sh4-linux- modules_install INSTALL_MOD_PATH=./modules_install
```

make the vmlinux.ub

```
sh4-linux-objcopy -O binary vmlinux vmlinux.bin
```

```
gzip --best --force vmlinux.bin
```

```
mkimage -A sh -O linux -T kernel -C gzip -a 0x80800000 -e 0x80801000 -n "Linux 2.6" -d vmlinux.bin.gz vmlinux.ub
```

???? ALSA-Lib ? ALSA-Utills ??

????: <http://www.alsa-project.org/main/index.php/Download>

alsa-lib

```
CC=sh4-linux-gcc \
./configure --host=sh4-linux
```

make

```
make install DESTDIR=/home/alang/STLinux_Cross-Compile/build_opt/alsa-lib
```

alsa-utils

```
CC=sh4-linux-gcc \
./configure --host=sh4-linux
```

make

```
make install DESTDIR=/home/alang/STLinux_Cross-Compile/build_opt/alsa-utils
```

?? ALSA ????

???????????

```
/lib/modules/2.6.23.17_stm23_A18B-PDK7105-32BITS-A18B/kernel/sound
```

????

```
modprobe soundcore
modprobe snd-usb-audio
modprobe snd-pcm-oss
modprobe snd_seq_midi
modprobe snd_seq_oss
```

TIP:

```
????????????? depmod -a
```

?????????????

```
root@localhost:/dev/snd# lsmod | grep snd
```

```
soundcore      6468  1 snd
snd            49972  7
snd_usb_audio,snd_pcm,snd_timer,snd_usb_lib,snd_rawmidi,snd_seq_device,snd_hwdep
snd_hwdep      7492  1 snd_usb_audio
snd_seq_device  6860  1 snd_rawmidi
snd_rawmidi    22496  1 snd_usb_lib
snd_timer      21060  1 snd_pcm
snd_pcm        78373  1 snd_usb_audio
snd_page_alloc  6376  1 snd_pcm
```

```
snd_usb_lib      15712 1 snd_usb_audio
snd_usb_audio    80128 0
```

?? /etc/modprobe.conf (???)

# ALSA portion

```
alias char-major-116 snd
alias snd-card-0 snd-usb-audio
options snd-usb-audio nrpacks=1
```

# OSS/Free portion

```
alias char-major-14 soundcore
alias sound-slot-0 snd-card-0
```

# card #1

```
alias sound-service-0-0 snd-mixer-oss
alias sound-service-0-1 snd-seq-oss
alias sound-service-0-3 snd-pcm-oss
alias sound-service-0-12 snd-pcm-oss
```

TIPs:

?? modprobe.conf ?????? APP ?? aplay -l???????????????????

?? alsa.conf

??? alsa-lib ???<alsa-lib>/usr/share/alsa/alsa.conf ??? /usr/share/alsa/alsa.conf

?????????? alsa.conf?

```
pcm.!default {
```

```
    type hw
    card 0
```

```
}
```

```
pcm.hw {
```

```
    type hw
    card 0
    device 0
    subdevice 0
```

```
}
```

```
ctl.!default {
```

```
    type hw
    card 0
```

```
}
```

```
ctl.hw {
```

```
    type hw
    card 0
```

```
}
```

????

???? audio

vi /etc/group

????

audio\*:1000:

?????? dev\_snd\_all.tar.gz

mkdir /dev/snd

chmod 0755 /dev/snd

tar xzf dev\_snd\_all.tar.gz -C /dev/snd

????

root@localhost:/dev/snd# ls -l /dev/snd

```
crw-rw---- 1 root  audio  116,  5 Jan  1  2000 controlC0
crw-rw-rw- 1 root  audio  116, 32 Feb 24 16:56 controlC1
crw-rw---- 1 root  audio  116,  4 Jan  1  2000 pcmC0D0c
crw-rw---- 1 root  audio  116,  3 Jan  1  2000 pcmC0D0p
crw-rw-rw- 1 root  audio  116, 25 Feb 24 16:56 pcmC0D1c
crw-rw-rw- 1 root  audio  116, 17 Feb 24 16:56 pcmC0D1p
crw-rw-rw- 1 root  audio  116, 26 Feb 24 16:56 pcmC0D2c
crw-rw-rw- 1 root  audio  116, 18 Feb 24 16:56 pcmC0D2p
crw-rw---- 1 root  audio  116,  1 Feb 24 16:56 seq
crw-rw---- 1 root  audio  116,  2 Jan  1  2000 timer
```

## Q&A

?? alsamixer????? Error opening terminal: vt102.

Ans??? STLinux ?????? /opt/STM/STLinux-2.3/devkit/sh4/target/usr/share/terminfo/v/vt102 ?????? usr/  
share/terminfo/v/vt102

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- <http://alsa.opensrc.org/AlsaBuild2.6>
- <http://alsa.opensrc.org/TroubleShooting>
- <http://snowwolf725.blogspot.tw/>