NAME

audiocs – Crystal Semiconductor 4231 audio Interface

AVAILABILITY

The AUDIOCS Multimedia codec is available on SPARCstation 5 systems.

This hardware may or may not be available on future systems from Sun Microsystems Computer Corporation.

Audio Interfaces

SPARCstation 5 systems have the Multimedia Codec integrated onto the CPU board of the machine. In the "onboard" Codec, there are microphone, line in, headphone, and line out ports located on the system back panel. In addition, the headphone and microphone ports do not have the input detection circuitry to determine whether or not there is currently headphones or a microphone plugged in. There is *no* interface on the SPARCstation 5 for the speakerbox to connect to.

The new Sun Microphone II is recommended for normal desktop audio recording. Other audio sources may be recorded by connecting their line output to the line input (audio sources may also be connected from their headphone output if the volume is adjusted properly).

Applications that open **/dev/audio** may use the **AUDIO_GETDEV** ioctl to determine which audio device is being used. The audiocs driver will return the string **"SUNW,CS4231"** in the **name** field of the **audio_device** structure. The **version** field will contain **"a"** and the **config** field will contain the following value: **"onboard1"** on a **/dev/audio** stream associated with the onboard Multimedia Codec.

The **AUDIO_SETINFO ioctl** controls device configuration parameters. When an application modifies the **record.buffer_size** field using the **AUDIO_SETINFO** ioctl, the driver will constrain it to be non-zero and up to a maximum of **8180** bytes.

Audio Data Formats for the Multimedia 4231 Codec

The **audiocs** device supports the audio formats listed in the following table. When the device is open for simultaneous play and record, the input and output data formats must match.

Supported Audio Data Formats

Sample Rate	Encoding	Precision	Channels
8000 Hz	μ-law or A-law	8	1
9600 Hz	μ-law or A-law	8	1
11025 Hz	μ-law or A-law	8	1
16000 Hz	μ-law or A-law	8	1
18900 Hz	μ-law or A-law	8	1
22050 Hz	μ-law or A-law	8	1
32000 Hz	μ-law or A-law	8	1
37800 Hz	μ-law or A-law	8	1
44100 Hz	μ-law or A-law	8	1
48000 Hz	μ-law or A-law	8	1
8000 Hz	linear	16	1 or 2
9600 Hz	linear	16	1 or 2
11025 Hz	linear	16	1 or 2
16000 Hz	linear	16	1 or 2
18900 Hz	linear	16	1 or 2

22050 Hz	linear	16	1 or 2
32000 Hz	linear	16	1 or 2
37800 Hz	linear	16	1 or 2
44100 Hz	linear	16	1 or 2
48000 Hz	linear	16	1 or 2

Audio Ports

The **record.avail_ports** and **play.avail_ports** fields of the **audio_info** structure report the available input and output ports. The **audiocs** device supports three input ports, selected by setting the **record.port** field to either **AUDIO_MICROPHONE**, **AUDIO_INTERNAL_CD_IN**, or **AUDIO_LINE_IN**. If you select the **AUDIO_INTERNAL_CD_IN** this will select input from the internal CD drive installed on an SPARCstation 5 platform. This will allow you to gather data off of the CD without using a line out of the headphone jack to the line in of the audio input. The **play.port** field may be set to any combination of **AUDIO_SPEAKER**, **AUDIO_HEADPHONE**, and **AUDIO_LINE_OUT** by OR'ing the desired port names together.

Sample Granularity

Since the **audiocs** device manipulates buffers of audio data, at any given time the reported input and output sample counts will vary from the actual sample count by no more than the size of the buffers it is transferring. Programs should, in general, not rely on absolute accuracy of the **play.samples** and **record.samples** fields of the **audio_info** structure.

Audio Status Change Notification

As described in **audio**(7I), it is possible to request asynchronous notification of changes in the state of an audio device.

ERRORS

audiocs errors are defined in the **audio**(7I), man pages.

FILES

The physical device names are very system dependent and are rarely used by programmers. For example:

/devices/iommu@f,e0000000/sbus@f,e0001000/SUNW,CS4231@2,c00000:sound,audio

The programmer should instead use the generic device names listed below:

/dev/audio	symbolic link to the system's primary audio device, not necessarily a **audiocs** based audio device
/dev/audioctl	control device for the above audio device
/dev/sound/0*	represents the first audio device on the system and is not necessarily based on **audiocs**
/dev/sound/0	first audio device in the system
/dev/sound/0ctl	audio control for above device
/usr/demo/SOUND	audio demonstration programs and other files

SEE ALSO

ioctl(2), **audio**(7I), **streamio**(7I)

Crystal Semiconductor, Inc., data sheet for the CS4231 16-Bit, 48 kHz, Multimedia Audio Codec Publication number DS111PP2.

NOTES: The **AUDIO_INTERNAL_CD_IN** is another new functionality addition. Because of this, **audiotool** will now have a new button appear in the record popup box that will allow the user of **audiotool** to switch to the internal CD on the SPARCstation 5 (if present).